SOUTHWESTERN WILLOW FLYCATCHER
2005 SURVEY AND NEST MONITORING REPORT

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Cover picture by Alexander Smith.

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EXECUTIVE SUMMARY

Purpose. The southwestern willow flycatcher (flycatcher) was federally listed as endangered in 1995. Probable factors contributing to population declines are: loss, alteration, and fragmentation of native riparian breeding habitat; loss of wintering habitat; nest predation; and brood parasitism by brown-headed cowbirds. Prompted by concern for population declines, statewide surveys for the flycatcher were initiated in 1993. In 1996, Arizona Game and Fish entered into a cooperative agreement with U.S. Bureau of Reclamation to begin a 10-year project to fulfill mandates of the 1996 Biological Opinion related to the modification to Roosevelt Lake Dam. One of the main objectives was to look at the effects of inundation at Roosevelt Lake on flycatcher dispersal. Results of the 2005 survey and nest monitoring effort are summarized in this report.

Surveys, Detections, and Distribution. The Arizona Game and Fish Department and other cooperators spent 2,710 hours surveying 184 sites covering approximately 186 linear km of riparian habitat. Surveyors detected 883 resident flycatchers at 47 sites. They located 483 flycatcher territories, in which 409 pairs were documented at 42 sites. Flycatchers were documented along 15 drainages. The major concentrations in low elevations (<1,115 m) occurred at the Winkelman Study Area (near the confluence of the Gila and San Pedro rivers), Roosevelt Lake (Salt River and Tonto Creek Study Areas), Big Sandy River Downstream US 93 (on the Big Sandy River near the US 93 bridge), and the Gila-Safford area (Gila River). Two high-elevation (>2,400 m) sites with flycatchers were documented: one site on the Little Colorado River (Greer River Reservoir) and one on the San Francisco River (Alpine Horse Pasture).

Nesting Attempts and Nest Success. Statewide surveyors documented 526 flycatcher nesting attempts at 36 sites throughout Arizona. Of these, 434 nests contained eggs and were monitored. Nest fate (success or failure) was determined for 414 nests within Arizona Game and Fish Department Study Areas (Roosevelt Lake and Winkelman) and other cooperators' nest monitoring study sites (Alamo Lake, Big Sandy River Downstream US 93, Topock Marsh, Monkey's Head, Horseshoe and Ister Flat). Of the 414 nests with known outcomes, 230 (56%) were successful (this includes fledglings in six territories where the nest was not found). One hundred forty-one nests were depredated, 18 were deserted, 8 were infertile, 4 failed directly due to brown-headed cowbird parasitism, and 10 failed due to other undetermined causes.

In nest monitoring study areas, we calculated Mayfield nest success for 424 nests. Mayfield nest success was 54.6%, calculated for 224 successful nests that fledged 555 flycatchers. Average seasonal productivity was 1.61 fledglings for the 128 females (178 nests) that we intensively monitored during the breeding season. At monitored sites, 32 flycatcher nests were parasitized by brown-headed cowbirds. Cowbirds were documented during surveys and nest monitoring at 31 of 36 sites where flycatcher nests were observed. Cowbird trapping was conducted at four sites, one of which (Topock Marsh) had known breeding flycatchers.

Color Banding and Adult Movement. At the Winkelman Study Area we banded 37 new adult flycatchers and documented 17 movements of adults by resighting banded individuals. Twelve between-year movements occurred within the Winkelman Study Area, 10 of which were within the San Pedro or Gila Rivers (average distance 10.5 km) and 2 of which were between the San Pedro and Gila rivers (average distance 24.0 km). One flycatcher moved 150.4 km between years

and study areas (Roosevelt Lake to the San Pedro River). We also had four within-season movements averaging 8.6 km within the Winkelman Study Area.

Nesting Habitat Characterization. Nesting substrate was documented for 512 of the 526 nesting attempts. Tamarisk was the predominant nesting substrate (335 nests). Nests were also found in Gooding willow (123 nests), cottonwood (37 nests), mesquite (8 nests), common buttonbush (2 nests), coyote willow (2 nests) snags (2 nests; 1 cottonwood and 1 willow), hackberry (1 nest), graythorn (1 nest), and an undetermined willow species (1 nest). Mean nest height was 5.29 m ($s = \pm 1.87$; $n = 76$) at the Winkelman Study Area and 3.45 m ($s = \pm 1.01$; $n = 70$) at Roosevelt Lake.

Management/Recommendations. The highest conservation priority for the southwestern willow flycatcher is protection of occupied habitat through partnerships with land management agencies and private landowners. Extensive surveys have been performed since 1993 to identify occupied habitat, yet there is little or no survey data for some riparian areas where potentially suitable habitat exists. These areas should be identified, documented, and surveys implemented and coordinated through state, federal, Native American, and private partnerships.

Knowledge of habitat relationships and their influence on reproductive success must be a primary component of recovery, conservation, and management strategies. Only through detailed demographic studies, surveys, nest monitoring, vegetation sampling, and habitat measurements can these relationships be described. Sharing of data will be needed to identify similarities and differences between local population characteristics. Conservation and recovery of the flycatcher is dependent on the cooperation and support of federal and state agencies, as well as that of private landowners, Native American nations, and non-governmental organizations. Recovery goals should include the protection, restoration, and maintenance of riparian ecosystem integrity.

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INTRODUCTION

The willow flycatcher (*Empidonax traillii)* is a widely distributed summer resident of much of the United States and southern Canada (Brown 1988). The four (or five) subspecies of willow flycatcher recognized in North America (Figure 1) are distinguished from each other by breeding range and subtle differences in color and morphology (Aldrich 1953, Browning 1993, Hubbard 1987, Phillips 1948, Unitt 1987). The current breeding range of the southwestern willow flycatcher (*E.t. extimus*; flycatcher) includes Arizona, southern California, New Mexico, southern Nevada, southern Utah, and southwestern Colorado. There are few historical breeding records for extreme northwestern Mexico and southwestern Texas (Unitt 1987, Wilbur 1987).

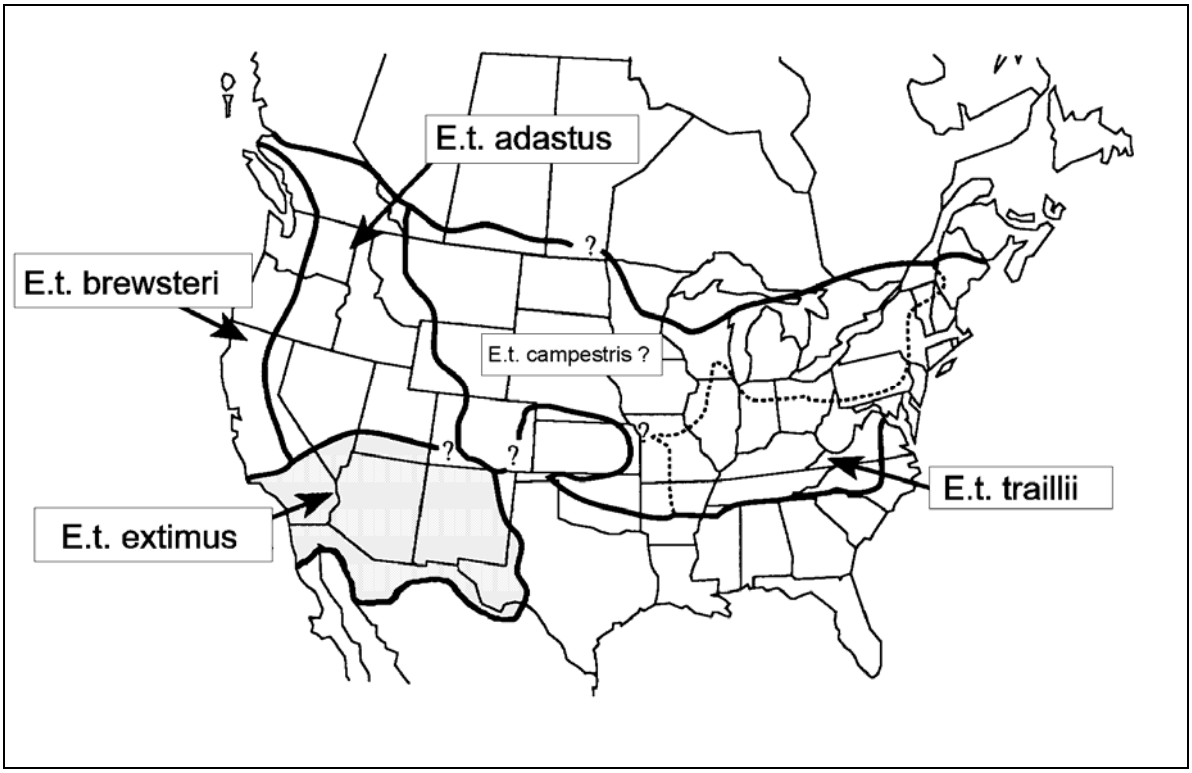

Figure 1. Distribution of willow flycatcher subspecies. Question marks (?) on the map represent areas where the actual location of the subspecies boundary is unknown. Adapted from Browning (1993) and Unitt (1987).

The flycatcher is a riparian obligate breeder, restricted to dense, mesic habitats. Concern over declining populations and degradation of native riparian habitat prompted Arizona Partners in Flight, an interagency program dedicated to conserving land birds, and the Arizona Game and Fish Department (AZGFD), as the coordinating agency, to initiate statewide flycatcher surveys in 1993 (Muiznieks et al. 1994). At that time, the primary objective was to survey suitable and/or historical riparian and wetland habitat, using standardized methods, to determine status of the flycatcher in Arizona. As a result of that survey effort, collection of habitat and nest productivity information was determined to be important. In 1994, statewide surveys continued, but few breeding sites were documented and most of these were comprised of five or fewer territories.

In 1995, the flycatcher was federally listed as endangered (events leading to listing and designation of critical habitat are described in U.S. Fish and Wildlife Service Federal Register filings [1991, 1992, 1993, 1995, and 1997]). On 11 May 2001, as a result of a court ruling, critical habitat was set aside for the flycatcher. The final rule redesignating critical habitat was published on 19 October 2005 and went into effect 18 November 2005 (USFWS 2005). The flycatcher is also included in the AZGFD list, *Wildlife of Special Concern in Arizona* (1996).

Modifications to Roosevelt Dam in the 1990s increased the storage capacity of the reservoir. As a result of the Biological Opinion regarding modifications to Roosevelt Dam (USFWS 1996), AZGFD entered into a cooperative agreement with the U.S. Bureau of Reclamation (USBR) to locate and monitor nests at three breeding areas [Tonto Creek and Salt River Study Areas (collectively referred to as Roosevelt Lake), and Winkelman Study Area (includes the San Pedro and Gila rivers)]. This intensive nest monitoring effort began in 1997 and has continued through 2005 in order to collect detailed local population estimates and nest productivity data. One of the objectives of the Biological Opinion is to assess dispersal from occupied habitat that becomes inundated. Roosevelt Lake increased to near capacity in 2005 due to increased winter rainfall and runoff, which was the first opportunity for AZGFD and cooperating agencies to investigate the effects of habitat inundation on flycatcher dispersal.

This document serves as the AZGFD summary report on 2005 activities. It also contains a summary of related work by cooperators, including: 1) surveys; the systematic search of riparian habitat to record the presence and abundance of flycatchers in Arizona, and 2) monitoring; the estimation of nest success and productivity, and documentation of vegetation characteristics at some of the nests.

Specifically, the 2005 AZGFD objectives were as follows:

1. Coordinate survey and monitoring efforts with agency and private cooperators.
2. Survey suitable and potentially suitable habitat within 40 km of occupied habitat at Roosevelt Lake. Survey suitable and potentially suitable habitat on the San Pedro River from Bingham Cienega north to the confluence with the Gila River and on the Gila River from Dripping Springs Wash west to the Florence-Kelvin Highway Bridge (Winkelman Study Area), where landowner permission was obtained.

3. Monitor nests to determine nest success and productivity at three breeding areas: the Winkelman Study Area, and Tonto Creek and Salt River Study Areas (Roosevelt Lake).
4. Band flycatchers at the Winkelman Study Area to determine female fecundity.
5. Record and report color-band information to U.S. Geological Survey Southwest Biological Science Center, Colorado Plateau Research Station at Northern Arizona University (CPRS), USBR, and U.S. Fish and Wildlife Service (USFWS).
6. Document the presence or absence of brown-headed cowbirds (*Molothrus ater*) at survey sites and determine impacts of cowbird parasitism.
7. Characterize vegetation composition and structure at nest sites.
8. Compile statewide data into an annual report.
9. Incorporate survey, monitoring, and geographical data into a comprehensive statewide database.
10. Develop management recommendations for the flycatcher.

As noted above, this report includes only the 2005 survey and monitoring data. Prior Arizona survey and monitoring data can be found in: McCarthey et al. (1998), Munzer et al. (2005), Paradzick et al. (1999, 2000, 2001), Sferra et al. (1995, 1997), Spencer et al. (1996), and Smith et al. (2002, 2003, 2004). Our work complements that of CPRS (see Causey et al. 2006), and other ongoing research projects. More in-depth discussions on willow flycatcher natural history, demography, and associated threats can be found in Cardinal and Paxton (2005), Durst et al. (2005), Finch and Stoleson (2000), McLeod et al. (2005), Owen et al. (2005), Paxton et al. (1996), Sedgwick (2000), Sogge et al. (1997b, 2003), SWCA, Inc. Environmental Consultants (1997), USFWS (2002 and 2005), and Whitfield and Enos (1996). Information on conservation measures and recovery efforts of the southwestern willow flycatcher can be found in the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002).

METHODS

STATEWIDE SURVEYS

Prior to the breeding season, cooperators were asked to identify their intended survey sites. AZGFD compiled this information and worked to coordinate surveys with agencies and organizations to limit overlap. AZGFD, along with CPRS and USFWS, conducted a flycatcher training workshop in May, which all new surveyors were required to attend to receive a federal permit.

Surveys were to be performed according to established protocol (Sogge et al. 1997a). Survey sites were identified by agency and private cooperators in the field on 7.5-minute topographical maps or with Global Positioning System (GPS) units. At a minimum, one tape-playback survey was to be performed at each site in each of the following three periods: 15 May to 31 May, 1 June to 21 June, and 22 June to 10 July. For areas requiring USFWS project clearance, a minimum of five surveys were to be performed. Surveys had to be performed at least five days apart and when birds are most active (from one hour prior to sunrise to 10:00 AM).

Flycatchers were considered territorial (or resident within a site) if they were detected between 15 June and 20 July, regardless of whether a possible or known mate was observed. However, some birds that were detected only during the first few days of the "resident window" were considered migrants based on field observations (that is, they were not seen on repeated visits to area). Additionally, birds were considered territorial if observations of nesting activity or nests were found outside these dates. Flycatchers documented prior to 15 June, but not detected in subsequent visits during the end of the second survey period or anytime during the third survey period, were considered migrants. Birds initially detected after 25 July were also considered migrants. An "unknown" designation was given to birds if follow-up surveys were not completed according to protocol or if not enough information was available to determine resident or migrant status. When time permitted, AZGFD and cooperators with nest monitoring permits performed intensive nest searches when flycatcher pairs were documented.

Flycatcher survey data were recorded on a standardized form (Appendix A) and returned to AZGFD and USFWS. To keep site designations and reporting consistent in future years, all sites were geographically defined using a set of start and stop Universal Transverse Mercator (UTM) coordinates. This information was then compiled and entered into the Willow Flycatcher Database and made available for electronic transferal to the Willow Flycatcher Information Management System. Flycatchers and other species of concern detected during surveys were recorded in the AZGFD Heritage Data Management System.

AZGFD Survey Techniques

All AZGFD surveys were conducted according to established survey protocol (Sogge et al. 1997a). Due to high lake levels and inundation of habitat, some sites at Roosevelt Lake were difficult to assess. Surveys at the lake were completed from boat and kayak where land access was not available. Additionally, new or not recently surveyed habitat on the Salt River and Tonto Creek was surveyed if deemed potentially suitable for flycatchers. When flycatchers were detected, repeat visits were conducted until pair status was confirmed. For resident adult flycatchers at AZGFD sites, we assumed that pairs were monogamous, unless evidence from color-banded individuals indicated polygyny. Polygyny was determined if a color-banded male was concurrently attending nests of two or more females.

AZGFD Nest Monitoring Techniques

Nest monitoring methods used by AZGFD followed the Southwestern Willow Flycatcher Nest Monitoring Protocol (Rourke et al. 1999), a modification of the Breeding Biology Research and Monitoring Database (BBIRD) field protocol (Martin et al. 1997). Nest searches were conducted from mid-May through August. Nests were located by watching adults return to a nest or by systematically searching suspected nest areas. Nests were monitored every two to four days after incubation was confirmed. During incubation, nest contents were observed directly using a compass mirror, mirror pole, or miniature video camera. After hatching, the nestling number was also confirmed using these same techniques, with the exception of very tall nests where nestling number was confirmed visually with binoculars. Once nestlings were confirmed, nests were

observed from a distance to reduce the risk of nest predation and the possibility of premature fledging. If no adult or nestling activity was observed at a previously active nest, the nest was checked directly to identify nest contents and a search of the general area was conducted to locate possible fledglings.

We considered a nest successful if any of four conditions was documented: 1) one or more young were visually confirmed fledging from the nest or located near the nest; 2) adults were seen feeding fledglings; 3) parents behaved as if dependent young were nearby (defensive behavior and/or adults agitated) when the nest was empty; or 4) nestlings were observed in the nest within two days of the estimated fledge date (12 days). This assumption is based on observations of southwestern willow flycatchers fledging at ten days of age. Assuming fledging when we were unable to confirm fledglings might cause nest success calculations to be overestimated; however, excluding these nests may cause underestimation.

We considered a nest to have failed if any of six outcomes was documented: 1) the nest was found empty or destroyed more than two days prior to the estimated fledge date (depredated); 2) the nest fledged no flycatcher young but contained cowbird eggs or young (parasitized); 3) the nest was deserted with eggs remaining (deserted); 4) the nest was abandoned prior to egg laying (abandoned); 5) the nest was destroyed due to weather (weather); or 6) the entire clutch was incubated unsuccessfully for more than 20 days (infertile).

The method for selecting nest monitoring areas within the Roosevelt Lake and Winkelman Study Areas was changed in 2001. From 1995 to 2000, we monitored all flycatcher nests at a select number of sites within each study area; these sites were designated as nest monitoring sites in the Roosevelt Lake Biological Opinion (USFWS 1996). In 2001, we began a five-year study to more closely examine female productivity, enabling detection of year-to-year differences and comparisons of productivity between sites. To accomplish this, we needed to monitor a set of marked females each year. Females were selected from all study sites and not just the nest monitoring sites used from 1995-2000. All nests were monitored until we were able to identify enough nesting females. Additionally, we selected females only if we were able to monitor all nesting attempts in compliance with established protocol (Rourke et al. 1999). This method of monitoring known females has allowed us to calculate individual female seasonal fecundity, a better indicator of population nest success and productivity than nest-based measurements (Pease and Grzybowski 1995, Thompson et al. 2001). Although we concentrated efforts on selected females, additional nests were monitored as time permitted. These changes in monitoring techniques must be accounted for when making comparisons with years prior to 2001. For example, the number of fledglings per study area cannot be compared directly without taking into account the number of nests monitored in that area.

AZGFD NEST MONITORING STUDY AREAS

Three study areas were surveyed and monitored by AZGFD during 2005: the Salt River and Tonto Creek Study Areas at Roosevelt Lake and the Winkelman Study Area.

Roosevelt Lake

The Salt River and Tonto Creek Study Areas are approximately 640 m elevation and within the Tonto National Forest. Riparian habitat is surrounded by Arizona Upland as described by Brown (1994). We surveyed suitable habitat within 40 km of the Salt River and Tonto Creek Study Areas. In 2005, due to increased winter rains (Figure 2, Appendix B) and subsequent rise in lake levels (Figure 3, Appendix C), both study areas expanded away from the lake. Flycatchers were found in areas not previously documented with residents (Figure 4 and Figure 5).

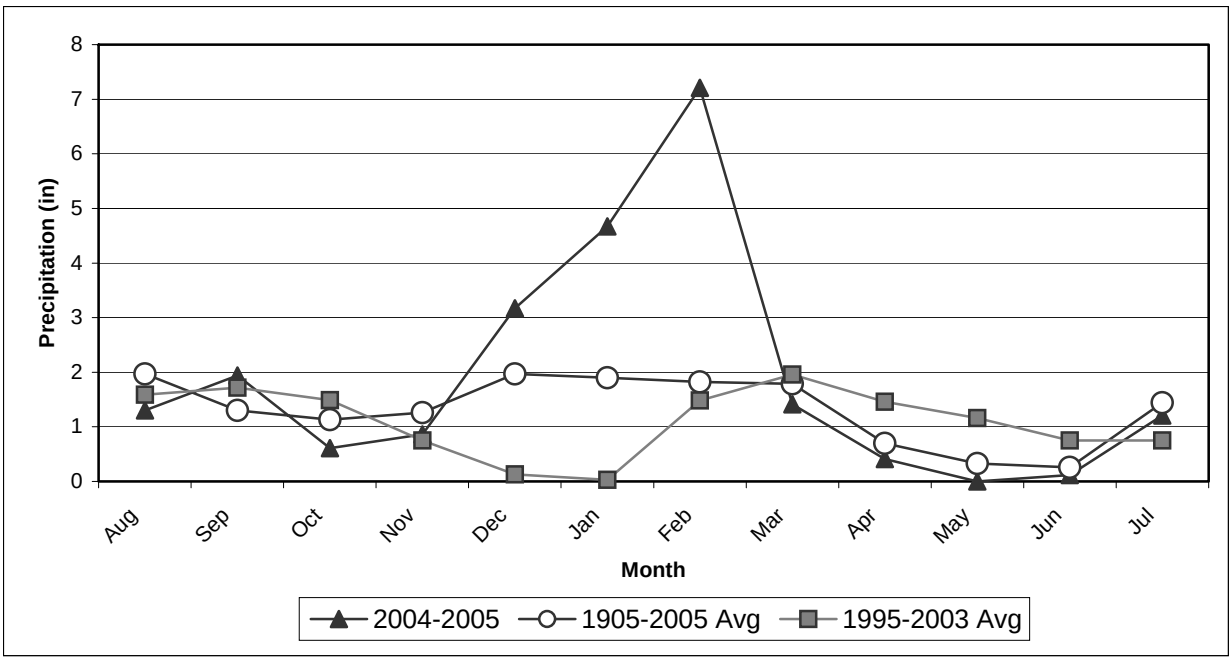

Figure 2. Average monthly precipitation recorded by Roosevelt 1 WNW weather station. Graph depicts August 2004-July 2005, historic averages (1905-2005), and recent averages (1995-2003). (WRCC, 2006). For exact precipitation averages by month for Roosevelt Lake refer to Appendix B.

Salt River Study Area. Prior to 2005, vegetation varied from monotypic tamarisk (*Tamarix* spp.) to nearly monotypic Goodding willow (*Salix gooddingii*). Canopy height varied from 5 m to 10 m. In 2005, with the inundation of riparian vegetation (Figure 4), breeding habitat at most sites shifted to primarily monotypic tamarisk as much of the native species were completely submerged. The exception to this was at the Shangri-la patch (Salt River Inflow) where there was

only partial inundation of native vegetation. Following inundation new canopy height ranged from 3 m to 12 m. The Salt River is perennial.

Tonto Creek Study Area. Prior to 2005, vegetation varied from a tamarisk-dominated understory with patchy Fremont cottonwood (*Populus fremontii)* and/or Goodding willow overstory to stands of monotypic tamarisk or willow. Canopy height varied from 5 m to 9 m. In 2005, much of the former Tonto Creek Inflow was inundated (Figure 5), as well as areas upstream that previously only had saturated soil during the breeding season. Vegetation composition changed slightly; varying from monotypic willow (that had previously represented some of the overstory) to mostly dominated by tamarisk (that were not completely inundated). Following inundation new canopy height varied from 4 m to 8 m. The Tonto Creek has intermittent flows.

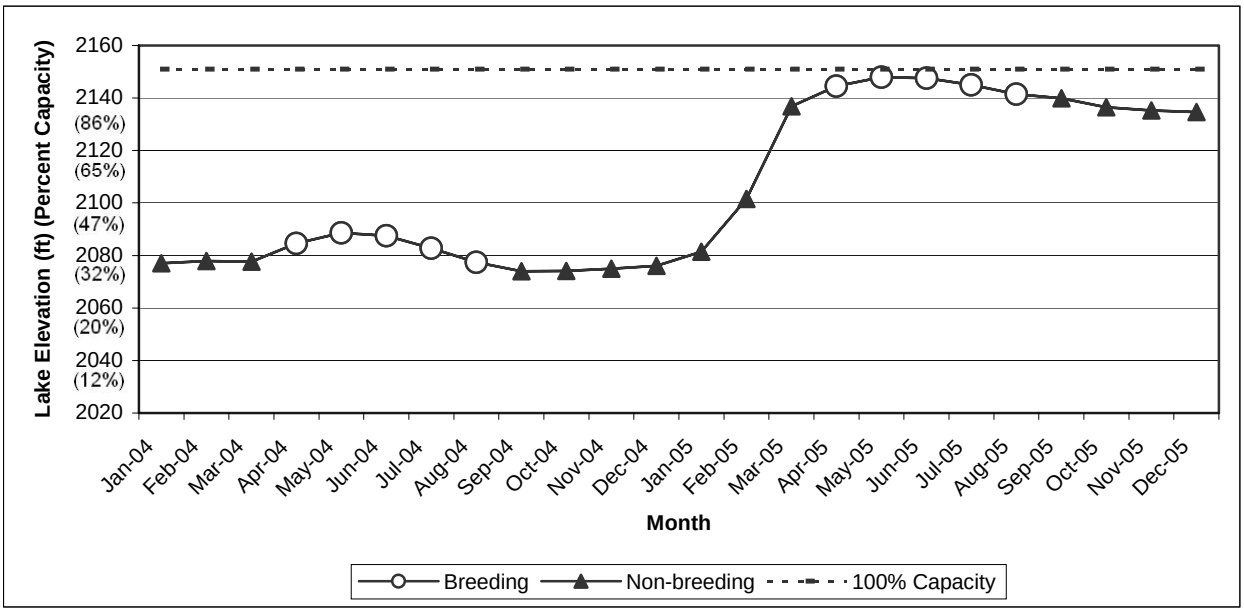

Figure 3. Lake elevations in feet with percent capacity for Roosevelt Lake January 2004 – December 2005. Each point represents the elevation of the lake on the first day of each month. Triangles correspond to the non-breeding season and circles correspond to the breeding season. The dashed line depicts 100% capacity. For exact elevations and capacities of Roosevelt Lake refer to Appendix C.

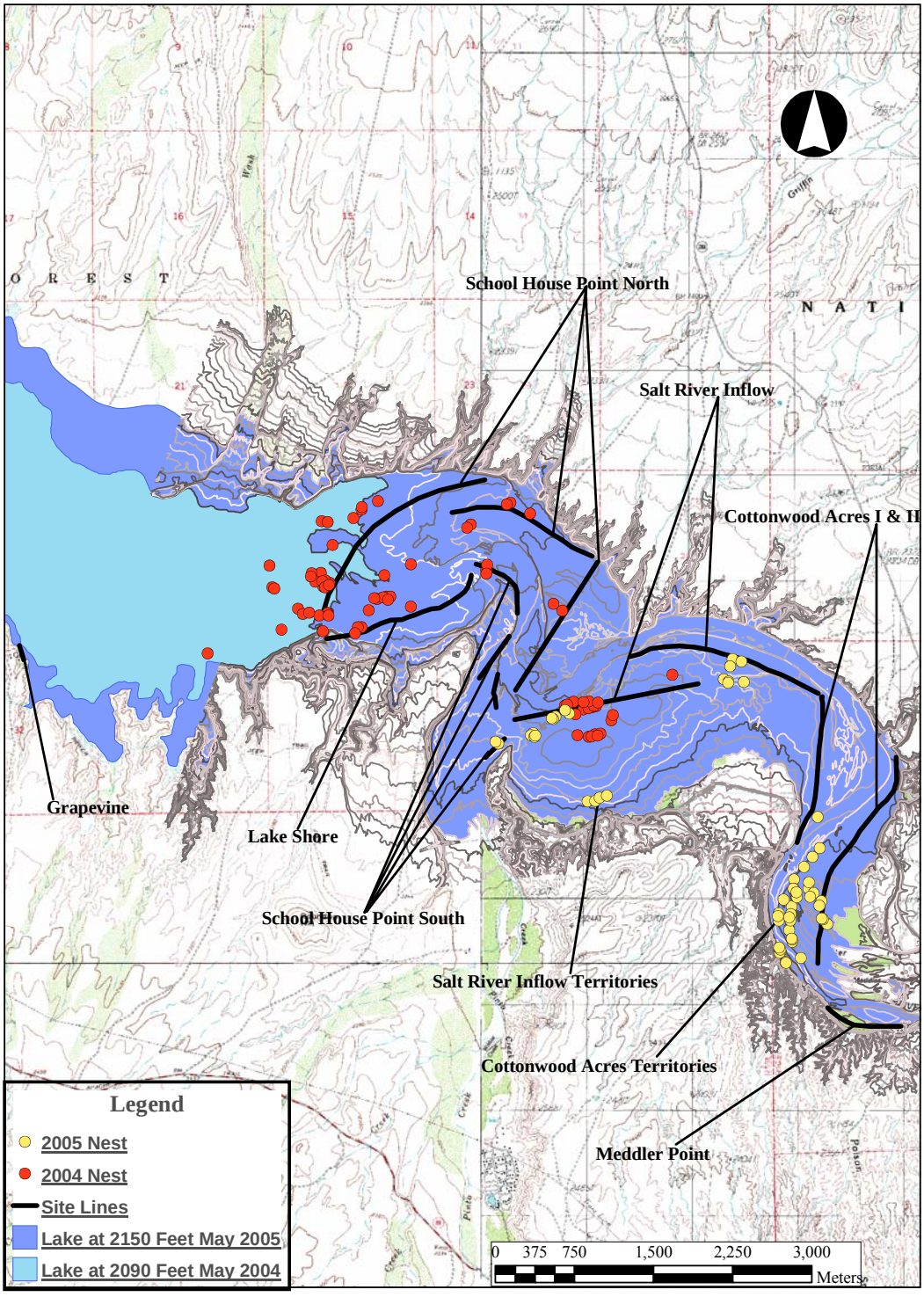

Figure 4. Map of the Salt River Study Area at Roosevelt Lake depicting approximate lake levels and nesting locations during the 2004 and 2005 breeding seasons.

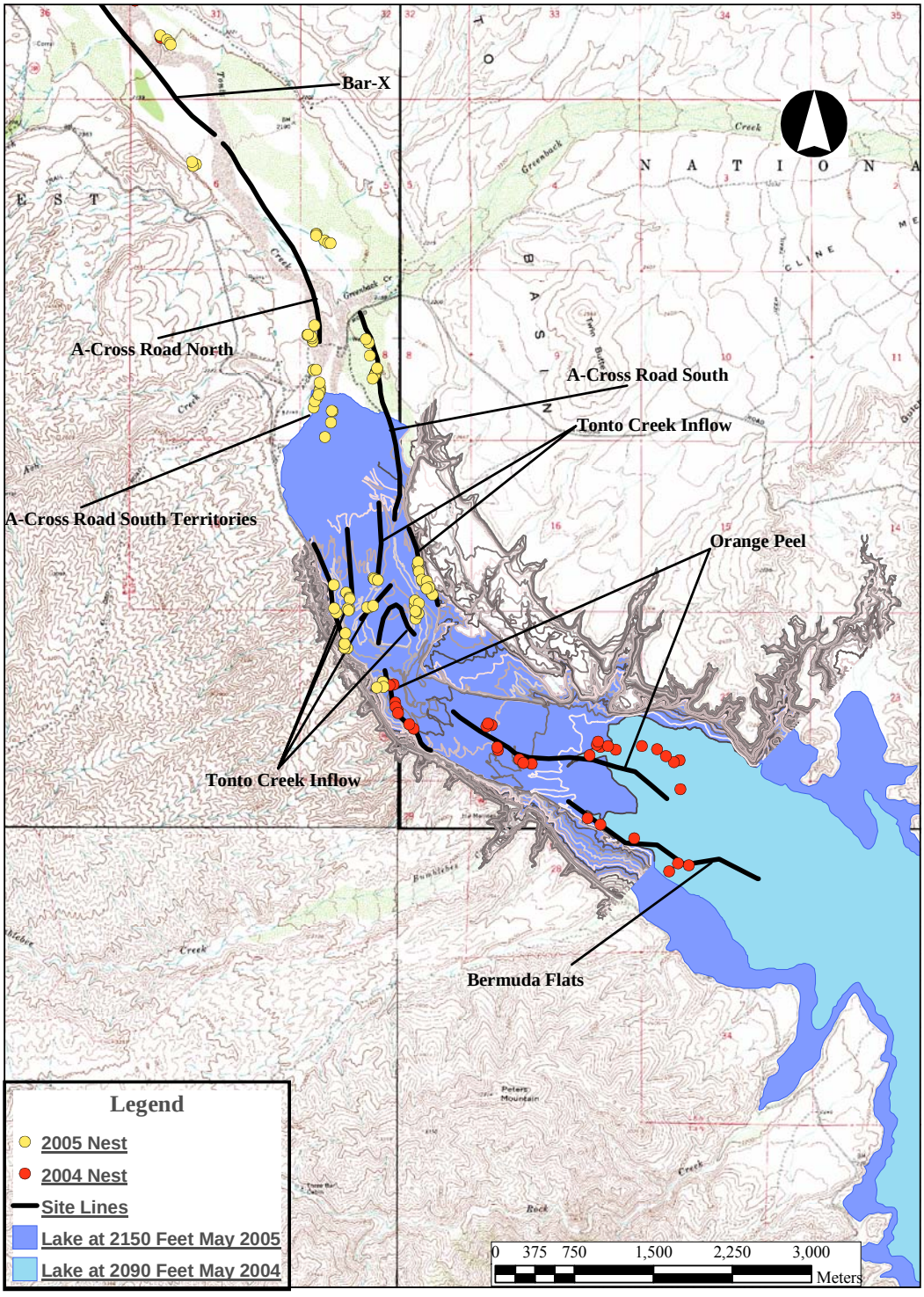

Figure 5. Map of Tonto Creek Study Area at Roosevelt Lake depicting approximate lake levels and nesting locations during the 2004 and 2005 breeding seasons.

Winkelman Study Area

We surveyed and conducted nest monitoring along 86 km of suitable habitat (where landowner access was granted) on the San Pedro River from Bingham Cienega downstream to the confluence with the Gila River, and on the Gila River from Dripping Springs Wash (upstream of Winkelman) to the Florence-Kelvin Highway Bridge. Elevation ranged from 549 m at the Florence-Kelvin Highway Bridge to 853 m at Bingham Cienega. Riparian forests along this reach varied from monotypic tamarisk to stands of native Goodding willow and Fremont cottonwood. Average canopy height varied from 5 m to 10 m. Riparian habitat was surrounded by Arizona Upland as described by Brown (1994). Flows on the San Pedro River varied throughout the season; portions north of Aravaipa Creek inflow to the confluence of the San Pedro and Gila rivers dried out by mid-June. Due to increased, constant flow releases from San Carlos Reservoir in 2005, compared to 2003 and 2004 (Figure 6, Appendix D), the Gila River maintained a higher water flow throughout the breeding season.

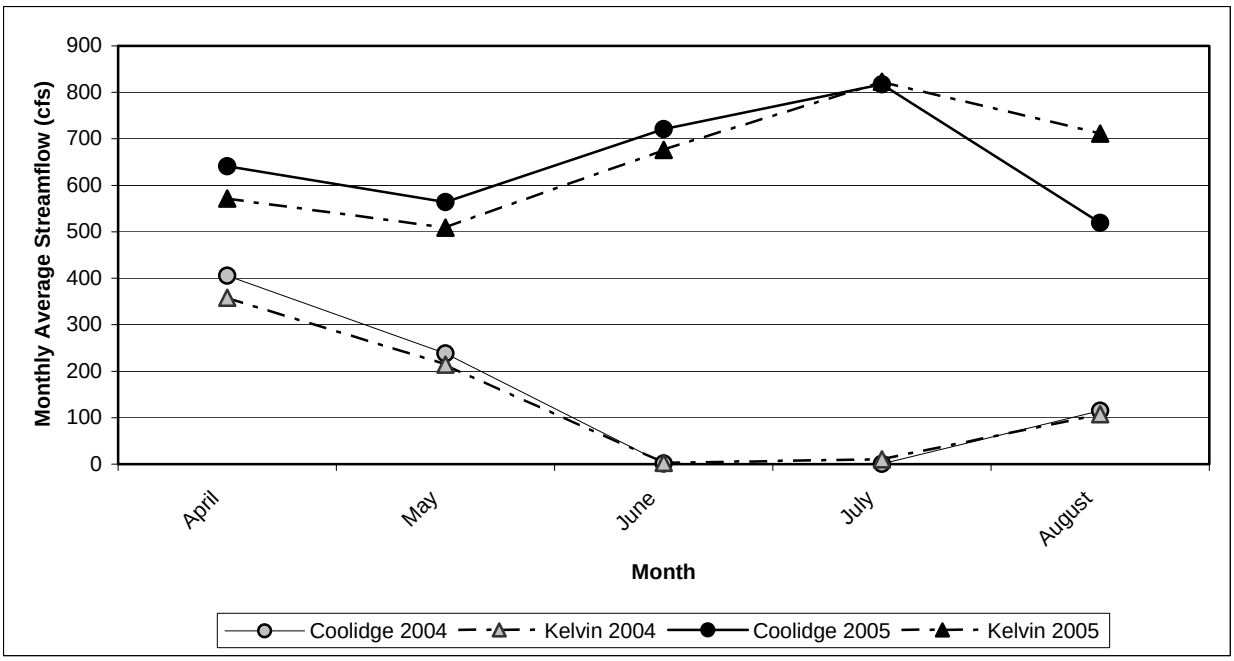

Figure 6. Gila River stream flows for Coolidge Dam and Kelvin Bridge during the breeding season (April – August) for 2004 and 2005 (USGS, 2006). For exact Gila River flows at Coolidge Dam and Kelvin Bridge refer to Appendix D.

COOPERATOR NEST MONITORING

SWCA Environmental Consultants (SWCA) monitored nests at Topock Marsh along the Colorado River and Monkey's Head study site on the Bill Williams River. EcoPlan Associates monitored nests at the Big Sandy River Downstream US 93 study site and Horseshoe Reservoir on the Verde River. The nests at Alamo Lake – Brown's Crossing were monitored by USBR. Comparisons between AZGFD and cooperator nest monitoring results were sometimes difficult

because not all cooperators use the AZGFD nest monitoring protocol (Rourke et al. 1999) or the same method of analysis for nest success calculations; therefore, AZGFD and cooperators' results may not be directly comparable.

COLOR BANDING

AZGFD personnel color banded flycatchers at the Winkelman Study Area, while CPRS personnel banded at Roosevelt Lake. At Roosevelt Lake, AZGFD coordinated closely with CPRS to resight previously banded birds, and to locate unbanded birds for banding. For more information regarding the banding methods used and results of the CPRS project, see Causey et al. (2006). Additionally, SWCA conducted banding on the Colorado River. For more information regarding the banding methods used and results of the SWCA project, see Koronkiewicz et al. (2006).

ADULT MOVEMENT

Banding efforts at the Winkelman Study Area have allowed us to document flycatcher movements between patches. Movements may occur between or within study areas and between or within years. Using a Geographical Information System (GIS), we measured the distance of movements from the flycatcher's last known territory to the territory it occupied in 2005.

COWBIRD TRAPPING

Cowbird trapping was coordinated and conducted by cooperators. No cowbird trapping occurred at either Winkelman or Roosevelt Study areas for a second year in a row. Traps were placed at four sites within two areas occupied by resident flycatchers: Greer/Alpine area (Alpine Horse Pasture, Greer Townsite, and Greer River Reservoir), and Topock Marsh on the Colorado River. Information regarding trapping can be obtained by contacting the Apache-Sitgreaves National Forest (Greer/Alpine area) and SWCA (Topock Marsh).

HABITAT CHARACTERISTICS

Vegetation at occupied flycatcher sites was classified into four general types according to Sogge et al. (1997a): 1) high-elevation willow (*Salix spp.*); 2) low-elevation native broadleaf dominated (commonly willow and/or cottonwood); 3) low-elevation mixed native broadleaf and exotic tamarisk; and 4) low-elevation monotypic tamarisk. General habitat characteristics (e.g., patch composition, average canopy height, and distance to water) were visually estimated and recorded on forms in the field for every site surveyed. AZGFD personnel also measured habitat variables at nest sites; descriptive statistics were calculated where applicable.

RESULTS

SURVEYS, DETECTIONS, AND DISTRIBUTION

One hundred eighty-four sites were surveyed covering approximately 186 linear km of riparian habitat throughout Arizona (Table 1; Appendixes E, F). Sites ranged from 19 m to 2539 m in elevation and 0.04 km to 9.3 km in length. Twenty-seven of the 184 sites were not surveyed according to protocol. This was most likely due to time or funding limitations, because habitat was determined unsuitable for flycatchers, or because of accessibility constraints. Seventeen new sites were surveyed in 2005. These new survey sites were located along Tonto Creek (1 site), and the Gila (4 sites), Verde (4 sites), Colorado (3 sites), Little Colorado (2 sites), Salt (2 sites), and Santa Cruz (1 site) rivers.

Eight hundred eighty-three resident flycatchers were documented within 483 territories at 47 sites (Table 1; Appendixes E, F). AZGFD personnel and statewide cooperators recorded 409 pairs at 42 sites. The male to female ratio was not 1:1 at all sites since polygynous and unpaired birds were detected at some sites. In some instances, insufficient survey effort and other factors (e.g., inundation of habitat or access to private property) precluded the documentation of pairs.

Resident flycatchers were documented along 15 drainages (Appendixes E, F). The greatest concentrations of flycatchers were found at the Winkelman Study Area with 39%, and at Roosevelt Lake with 32% (Salt River 14% and Tonto Creek 18%; Figure 7; Table 2). Resident flycatchers were detected for the first time at seven sites that were surveyed at least once in previous years: Dripping Springs Campground, Porter Wash Cove, Watson Wash, and Teague (all on the Gila River); Hereford Bridge (San Pedro River), Cottonwood Acres II (Salt River), and A-Cross Road North (Tonto Creek). Flycatchers were documented at the Grapevine site on the Salt River, which was surveyed for the first time in 2005. Eight sites, which were surveyed according to protocol, had between one and three flycatcher territories in 2004, but no birds in 2005 (Mile 259.5 R Waterfall Rapid GC, Miles 277.0 to 274.0 R GC, Waddell Dam, Bingham Cienega, Littlefield, Camp Verde, Malpais Hill [where access was permitted], and Pima East). Lake Shore, Bermuda Flats, and School House Point North (Roosevelt Lake) were also occupied in 2004 but not in 2005, due to site inundation (15, 40, and 83 flycatchers, respectively). Cowbirds were documented at 140 survey sites, including all but five flycatcher breeding sites (CB Crossing, Aravaipa Inflow North, Cook's Lake Seep/Cienega, Orange Peel Campground, and School House South Three; Table 1; Appendix F).

Migrant flycatchers were detected at 56 sites (Appendix F), 27 of which also had resident birds. Six flycatchers of unknown status were documented at Three Links (2), Mile 277-274 R GC (1), Cave Wash 1 (1), Adobe Lake (1), and Cibola Restoration (1); (Appendix F).

Topock Marsh (Lower Colorado River) was the lowest elevation (140 m) where nesting was documented. Hereford Bridge (San Pedro River) was the highest elevation (1265 m) where nesting was documented. Nesting had been previously documented in the White Mountains above 2,400 m, but reduced survey and nest monitoring effort in 2005 may have been

insufficient to document nesting. No resident flycatchers were detected between 1,265 m and 2,414 m.

Table 1. Willow flycatcher survey effort, detection, and nesting attempt totals in Arizona, 2005.	
Survey hours	2710
Sites surveyed	184
Linear km of habitat covered	186
Sites with resident willow flycatchers	47
Sites with documented pairs	42
Sites with documented breeding	36
Resident willow flycatchers	883
Territories	483
Pairs	409
Nesting attempts	526
Sites with cowbirds detected	140
Breeding sites with cowbirds detected	31

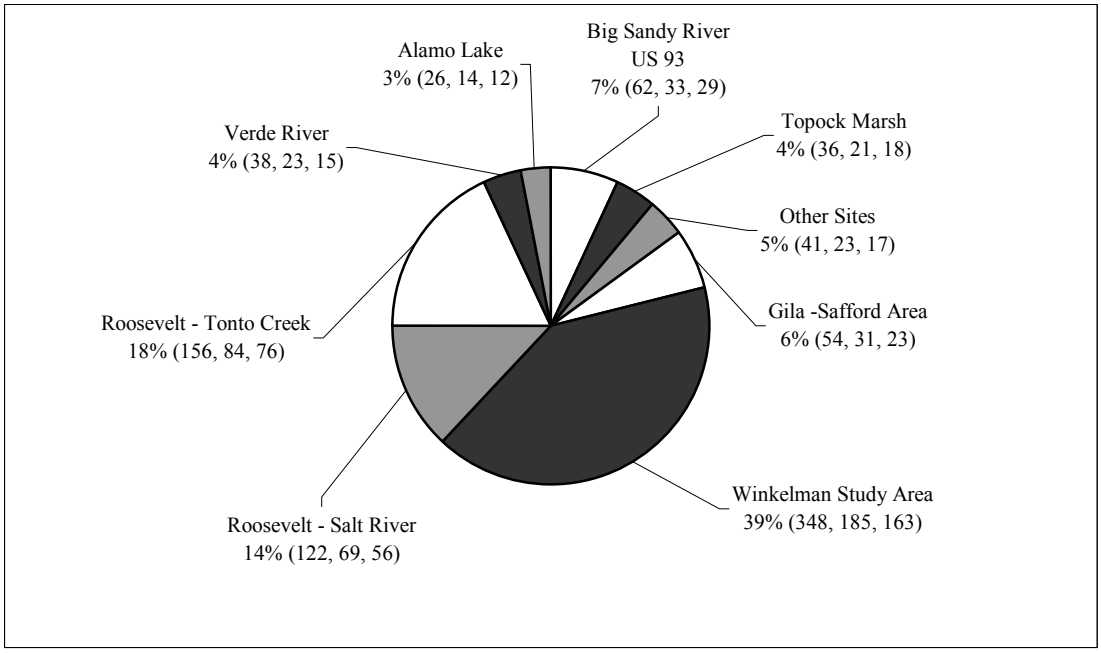

Figure 7. Southwestern willow flycatcher distribution in Arizona, 2005. The figure depicts survey location and percent of known willow flycatchers (number of resident willow flycatchers, number of territories, number of pairs). Percentages are based on total number of willow flycatchers detected in 2005 (see Table 2 for sites within each survey location). Number of residents, territories and pairs may not be equal due to polygynous males and non-territorial floaters.

Table 2. Sites with resident willow flycatchers grouped by survey locations in Arizona, 2005. (see Figure 2).[a]

Winkelman Study Area[b]	Roosevelt Lake		Alamo Lake	Verde River	Gila-Safford Area	Other Sites
	Salt River	Tonto Creek				
► GRN018 ► GRS018 ► GRS016 ► GRS010 ► GRS007 ► Dripping Springs Wash ► Dripping Springs Campground ► Kearny ► CB Crossing Southeast ► Dudleyville Crossing ► Cook's Lake Cienega/Seep ► PZ Ranch West ► Aravaipa Inflow North ► San Pedro / Aravaipa Confluence ► Aravaipa Inflow South ► Wheatfields ► Wheatfields South ► San Manuel Crossing ► Catalina Wash	► Cottonwood Acres I ► Cottonwood Acres II ► School House Point South ► Grapevine ► Salt River Inflow	► Bar-X Road ► A-Cross Road North ► A-Cross Road South ► Tonto Creek Inflow ► Orange Peel Campground	► Lower Big Sandy River ► Alamo Lake – Brown's Crossing	► Horseshoe North ► Ister Flat	► Teague ► Fort Thomas - Geronimo ► Porter Wash Ponds ► Watson Wash	► Monkey's Head ► Pinal Creek ► Waterwheel Cove ► Whitlow Dam ► Alpine Horse Pasture ► Greer River Reservoir ► Three Links ► Hereford Bridge

[a] Topock Marsh and Big Sandy River Downstream US 93 are not included in the table because they are individual sites.
[b] GRN# and GRS# are abbreviations for the Gila River North and Gila River South sites.

NEST MONITORING

Statewide Effort

We documented 526 nesting attempts statewide at 36 sites (Appendix F). Of these, 434 nests were monitored and contained eggs. Two hundred and thirty (53%) of the 434 monitored nests fledged young, 181 (42%) failed, and 23 (5%) had unknown outcomes (Table 3). Of nests with known outcomes, 55% fledged at least one young and 45% failed. Depredation was the predominant cause of nest failure (77%; Table 4). Cooper's hawks (*Accipiter cooperii*) and common kingsnakes (*Lampropeltis getulus*) have been documented as the most common predators of flycatcher nests at Roosevelt Lake and the Winkelman Study Area (Tudor et al., in prep). The earliest documented occurrence of egg laying in 2005 was on 20 May at Kearny Sewage Ponds (Winkelman Study Area). The first hatching date and the first fledging date occurred at Cottonwood Acres I on 2 June and 17 June, respectively. The last documented fledging occurred on 25 August at GRS016 (Winkelman Study Area).

Table 3. Willow flycatcher nest monitoring results in Arizona, 2005.

Study Area		Pairs[a]	Nests[b]	Successful nests[b]	Failed nests	Unknown outcome[c]	Parasitized nests[d]
Roosevelt Lake	Tonto Creek	63	80	34	43	3	3
	Salt River	48	58	26	29	3	0
	Total	111	138	60	72	6	3
Winkelman		136	194	124	54	16	0
Alamo Lake - Brown's Crossing		9	9	6	3	0	0
Big Sandy River Downstream US 93		23	34	18	15	1	10
Topock Marsh[e]		17	34	8	26	0	16
Monkey's Head		2	2	2	0	0	0
Horseshoe North		14	22	12	10	0	0
Ister Flat		1	1	0	1	0	0
All sites		313	434	230	181	23	29

[a] Number of pairs contributing to the number of monitored nests.
[b] ncludes 6 territories with fledges but no nest found.
[c] Nests monitored only for a portion of nesting cycle. Nest fate was unknown.
[d] Includes all parasitized nests, those that both fledged willow flycatcher young or failed.
[e] Cowbird trapping occurred in the area during the breeding season.

Parasitism. Twenty-nine nests (7%) were parasitized at nest monitoring areas (Tables 3, 5). Cowbirds may have caused, or contributed to, abandonment at other nests but direct evidence was not found. Nest parasitism was recorded at Topock Marsh (47%: 16 of 34 nests), Big Sandy River Downstream US 93 (29%: 10 of 34 nests), and Roosevelt Lake (2%: 3 of 138 nests). Seventeen of the 29 (59%) nests parasitized were depredated (Table 5).

Table 4. Causes of nest failure for willow flycatchers at monitoring areas in Arizona, 2005.

Study Area		Depredated[a]	Deserted	Parasitized[b]	Infertile clutches	Other
Roosevelt Lake	Tonto Creek	34	5	1	2	1
	Salt River	23	1	0	3	2
	Total	57	6	1	5	3
Winkelman		47	2	0	3	2
Alamo Lake - Brown's Crossing		2	0	0	0	1
Big Sandy, South US 93 Bridge		6	6	2	0	1
Topock Marsh[c]		20	4	1	0	1
Horseshoe North		8	0	0	0	2
Ister Flat		1	0	0	0	0
All sites		141	18	4	8	10

[a] Includes parasitized nests that were later depredated at Topock Marsh.
[b] Includes only those nests that failed directly due to cowbird parasitism (nests subsequently abandoned with eggs or fledged only cowbird young).
[c] Cowbird trapping occurred in the area during the breeding season.

Table 5. Fate of parasitized willow flycatcher nests at monitoring areas in Arizona, 2005.

Outcome	Number of nests
Depredated	17
Nest abandoned	2
Nest deserted	1
Fledged only cowbird	1
Fledged flycatcher and cowbird	5
Fledged only flycatcher	3
Total parasitized nests	29

Intensive Nest Monitoring Areas

Nest Success. We were able to calculate Mayfield (1961, 1975) estimates of nest success for 424 nests statewide (Table 6). Mayfield nest success for all nests combined was 54.6%. Mayfield nest successes for Roosevelt Lake and Winkelman Study Areas were 46.0% and 68.5%, respectively.

Table 6. Willow flycatcher nest success and productivity of monitored nests at study areas in Arizona, 2005.

Study Area		Mayfield nest success (No. of observation days)	Number of young fledged	Mean number of young fledged per nest (n)[a]	Mean number young fledged per successful nest (n)[a]
Roosevelt Lake	Tonto Creek	46.29 (1557)	82	1.03 (80)	2.41 (34)
	Salt River	45.59 (1030)	60	1.05 (57)	2.40 (25)
	Total	46.01 (2587)	142	1.04 (137)	2.41 (59)
Winkelman Study Area		68.52 (3882)	310	1.68 (185)	2.61 (119)
Big Sandy River Downstream US 93		55.21 (702)	32	.94 (34)	1.78 (18)
Monkey's Head, Bill Williams		100.00(56)	6	3.00 (2)	3.00 (2)
Alamo Lake Brown's Crossing		62.16 (175)	16	1.78 (9)	2.67 (6)
Topock Marsh[b]		15.00 (390)	18	.53 (34)	2.25 (8)
Horseshoe Reservoir		51.99 (468)	31	1.35 (23)	2.58 (12)
All sites		54.56 (8260)	555	1.31 (424)	2.48 (224)

[a] n = number of nests.
[b] Cowbird trapping occurred in the area during the breeding season.

Nest Productivity. Five hundred fifty-five young fledged from 224 nests where Mayfield estimates were calculated (Table 6); some nests of unknown outcome had enough observations to be included in the analysis. This total does not include 12 additional fledglings in six territories that could not be associated with a nest; Gila River (8), San Pedro River (2), and Salt River Inflow (2). Eighty-one percent of young that fledged were confirmed after leaving the nest; the rest were presumed fledged based on activities at the nest or confirmed fledging of siblings. Mean clutch size (includes only complete clutches) was 2.82 eggs.

Female Productivity. One hundred twenty-eight females were followed through all nesting attempts (n = 178) to determine female productivity at AZGFD Study Areas. Average seasonal fecundity (mean fledges per female) and average seasonal productivity (mean fledges per nesting attempt per female) were 2.11 and 1.61, respectively (Table 7). Thirty-seven females failed to successfully fledge any young (20 at Roosevelt Lake and 17 at Winkelman). Sixty-one percent had only one observed nesting attempt (Table 8). Twenty-five nests were initiated after a successful nest (double brood attempt), of which fourteen (56%) were successful (1 at the Salt River Study Area and 13 at the Winkelman Study Area: 6 on the Gila River and 7 on the San Pedro River).

Table 7. Female productivity at AZGFD Study Areas, 2005.

Study Area		No. of females	Nests	Average seasonal fecundity[a]	Average seasonal productivity[b]
Roosevelt Lake	Tonto Creek	32	42	1.56	1.33
	Salt River	23	29	1.57	1.30
	Total	55	71	1.56	1.32
Winkelman		73	107	2.52	1.82
All Sites		128	178	2.11	1.61

[a] Mean fledges per female.
[b] Mean fledges per nesting attempt per female [Average of (# Fledges /# Nests for each female)].

Table 8. Renesting attempts at AZGFD Study Areas, 2005.

Study Area		No. of females	Percent of females with 1 nest (n)[a]	Percent of females with 2 nests (n)[a]	Percent of females with 3 nests (n)[a]
Roosevelt Lake	Tonto Creek	32	68.8 (22)	31.3 (10)	0.0 (0)
	Salt River	23	73.9 (17)	26.1 (6)	0.0 (0)
	Total	55	70.9 (39)	29.1 (16)	0.0 (0)
Winkelman		73	53.4 (39)	46.6 (34)	0.0 (0)
All Sites		128	60.9 (78)	39.1 (50)	0.0 (0)

[a] n = number of nests.

COLOR BANDING

In 2005, we captured 44 adult flycatchers, 37 of which we color banded to aid in our nest monitoring efforts at the Winkelman Study Area (Appendix G). Seven of the flycatchers were banded recaptures, including six from previous years and one from 2005.

ADULT MOVEMENT

With the banding effort by AZGFD at the Winkelman Study Area, we documented movements of flycatchers both within and between study areas and within and between years. In 2005, we documented 17 total movements. The greatest distance a flycatcher moved was 150.4 km from the Roosevelt Study Area in 2004 to the San Pedro River in 2005 (Table 9). The most common type of movement detected was between years, within study area. Twelve individuals moved from the site where they were last detected (2003-2004) to a different site within the same study area in 2005. The average distance moved between years, within a study area, was 12.8 km (range: 0.6 – 29.4 km). Two of the twelve movements were between drainages within the Winkelman Study Area, from the Gila River to the San Pedro River, while the remaining ten movements were within the same drainage they formerly occupied. We documented four adult

flycatchers that moved between patches within the 2005 breeding season. The average distance moved within 2005 was 8.6 km (range: 1.2 km – 24.8 km). Two adults were caught early in the season and moved to other sites post-banding. The third was resighted at the same site it occupied for the past three years during the first survey period, but was then found downstream during the second and third survey periods. The fourth moved from the Gila River to the San Pedro River after its young had fledged. No movements were detected from the San Pedro to the Gila River, or from the Winkelman Study Area to Roosevelt Lake. Roosevelt Lake and statewide movement data can be found in the CPRS survivorship and movement report (Causey et al. 2006).

Table 9. Willow flycatcher movements detected at the Winkelman Study Area in 2005.

Last Detected in		Site Dectected in 2005	Distance Moved (km)	Federal Bird Band Number	Color Band[a]		Age[b] 2005	Sex[c]
Site	Year				Left Leg	Right Leg		
Between Study Area between year movement								
Bar X Road, Roosevelt Lake	2004	San Manuel Crossing	150.4	2290-24228	YDY	GG	ASY	F
Within Study Area between year movement								
San Manuel Crossing	2004	Aravaipa Inflow South	26.2	2360-07176	DX	YO	ASY	F
Aravaipa Inflow North	2004	Wheatfields	4.1	1710-20216	ZZ	WW	A7Y	F
	2004	Wheatfields South	5.3	2240-84069	KYK	DD	A4Y	F
	2004	San Manuel Crossing	29.4	2240-84019	KK	DD	ATY	M
Wheatfields	2004	Aravaipa Inflow South	0.6	2360-07142	DX	OK	ASY	M
PZ Ranch West	2003	Wheatfields South	8.1	2240-84086	DD	GYG	A4Y	F
Malpais Hill	2003	Wheatfields South	10.7	2240-84030	VW	DD	A4Y	F
Dudleyville Crossing	2004	Wheatfields	11.8	2240-84058	WKW	DD	A4Y	F
Kearny	2004	GRS007	8.4	2240-84053	YVY	DD	A4Y	F
GRS007	2004	Wheatfields South	24.7	1740-91891	YY	DD	A8Y	M
	2003	Aravaipa Inflow South	23.2	1740-91888	DD	YG	A7Y	M
GRN018	2003	GRS016	0.8	2290-24295	GG	YDY	ATY	F
Within Study Area movement during 2005								
Aravaipa Inflow South	2005	Wheatfields South	1.2	2360-07139	DO	DX	AHY	F
Malpais Hill	2005	Dudleyville Crossing	3.5	2240-84029	OO	DD	A4Y	M
Kearny	2005	GRS016	4.8	2360-07135	DX	WW	AHY	U
GRS007	2005	Wheatfields South	24.8	1740-91891	YY	DD	A8Y	M

[a] D = Blue, G = Green, K = Black, O = Orange, V = Violet, W = White, X = Silver, Y = Yellow, Z = Gold
[b] AHY = 2nd year or older, ASY = 3rd year or older, ATY = 4th year or older, A4Y = 5th year or older, A7Y = 8th year or older, A8Y = 9th year or older
[c] F = Female, M = Male, U = Unknown

HABITAT CHARACTERISTICS

Although vegetation composition varied, most sites where flycatchers were documented shared landscape characteristics. Occupied sites were commonly in broad floodplains with dense riparian habitat where water, or saturated soil, was present sometime during the breeding season.

Eighteen sites within a mid-elevation band (1,265–2,414 m) were surveyed, but resident flycatchers were not detected (see Appendix F). Riparian vegetation at these intermediate elevations was often in narrow bands along high-gradient streams prone to frequent scouring by floods and dominated by an overstory of Arizona sycamore (*Platanus wrightii*).

Most nesting sites (29 of 36) were characterized as mixed native/exotic associations, however, the amount of tamarisk varied within and between sites. Seven nesting sites (GRS007, GRS016, GRS018, GRN018, School House Point South, Cottonwood Acres I and Topock Marsh) were composed of dense monotypic stands of tamarisk, forming a nearly continuous closed canopy.

Nesting substrate was documented for 512 of the 526 nests (Table 10). Tamarisk and Goodding willow were the primary nesting substrates in Arizona. At the Winkelman Study Area (San Manuel Crossing), we documented the first record of a nest in graythorn (*Ziziphus obtusifolia*) (Table 10). Mean nest height at Winkelman and Roosevelt Lake Study Areas was 3.45 m ($s = \pm$ 1.01; $n = 69$) and 5.29 m ($s = \pm$ 1.87; $n = 76$), respectively (Appendix H).

Table 10. Tree species used for willow flycatcher nesting in Arizona, 2005.

Substrate	No. of nests
Hackberry *(Celtis reticulata)*	1
Common buttonbush (*Cephalanthus occidentalis)*	2
Fremont cottonwood *(Populus fremontii)*	37
Mesquite *(Prosopis* spp.*)*	8
Coyote willow *(Salix exigua)*	2
Goodding willow *(Salix gooddingii)*	123
Willow *(Salix* spp.*)*	1
Tamarisk *(Tamarix* spp.*)*	335
Graythorn *(Ziziphus obtusifolia)*	1
Snag *(Populus fremontii and Salix* spp.*)*	2
Total	512

DISCUSSION

SURVEYS

Annual statewide surveys provide critical information concerning the distribution and abundance of flycatchers in Arizona. These data allow agency resource managers and private organizations to make science-based decisions regarding present and future research, management and conservation efforts. During the 2005 survey, 71% of flycatchers were concentrated within two areas of the state (Winkelman Study Area and Roosevelt Lake). The 2005 breeding season had a statewide decrease in abundance of 8.0% from 2004, but a 17.1% increase from 2003 (483 territories in 2005, 522 in 2004, and 410 in 2003; Smith et al. 2004, Munzer et al. 2005). The largest change in flycatcher numbers between 2004 and 2005 occurred at the Roosevelt Lake Study Area. This change is attributed to the dramatic rise in lake levels caused by increased winter rainfall and run-off (Figure 2, Appendix B). In May 2004, Roosevelt Lake was at 38% capacity (2088.62 ft) and in May of 2005 the lake had risen to 96% capacity (2,147.99 ft) (Figure 3, Appendix C). Sites that had been previously occupied by resident flycatchers were inundated during 2005, causing flycatchers to move further upstream on both the Salt River and Tonto Creek to where habitat was available.

The number of flycatcher territories at Roosevelt Lake decreased 26.8% from 209 territories in 2004 to 153 territories in 2005. This decline can likely be attributed to changes in available habitat (see Habitat section). Three sites were completely inundated in 2005, and therefore supported no flycatchers: Bermuda Flats (39 territories in 2004), Lake Shore (15 territories in 2004) and School House Point North (83 territories in 2004). Eight additional sites were partially inundated: School House Point South, Grapevine, Salt River Inflow, Cottonwood Acres I, and Cottonwood Acres II on the Salt River and Orange Peel, Tonto Creek Inflow, and A-Cross Road South on Tonto Creek. Many flycatchers moved upstream on the Salt River in 2005 because breeding habitat was not available in areas occupied in previous years when lake levels were lower (Figure 4). On Tonto Creek, flycatchers moved away from the lake but did not move any further upstream past previously occupied habitat; they moved to areas that had either never been occupied in the past nine years or to areas unoccupied recently (Figure 5). One flycatcher was discovered at a new site, Grapevine, on the Salt River just downstream of the Salt River Inflow site, which had not been previously surveyed. Two sites that have been previously surveyed had resident flycatchers for the first time in 2005: Cottonwood Acres II (surveyed since 1994), and A-Cross Road North (surveyed since 1998) (6 and 10 territories, respectively). Three additional sites where flycatchers historically occurred were not occupied in 2004 but had flycatchers again in 2005: Cottonwood Acres I, A-Cross Road South and Tonto Creek Inflow (36, 20 and 36 territories, respectively).

The number of flycatcher territories at the Winkelman Study Area increased 2.8% from 180 territories in 2004 to 185 in 2005. The increase in flycatcher territories at Wheatfields South (9 to 14), Aravaipa Inflow South (13 to 16), and Dudleyville Crossing (9 to 15) can likely be attributed to the continuing regeneration of habitat due to perennial water flow. Additionally, on the Gila River from 2004 to 2005 there was a 100% increase in resident flycatchers (14 to 28

territories). Two sites increased dramatically: Gila River North 18 increased from two to six territories and Gila River South 18 increased from three to ten territories. Flycatchers were documented for the first time at Dripping Springs Campground on the Gila River. These increases can likely be attributed to increased water releases from Coolidge Dam into the Gila River throughout the 2005 breeding season (Figure 6, Appendix D; see Habitat section).

In 2005, the Gila-Safford Area had the greatest increase, relative to 2004, in flycatcher abundance documented in Arizona. Teague (22 territories), Fort Thomas-Geronimo (5 territories), Porter Wash Ponds (2 territories) and Watson Wash (2 territories) compose this area and accounted for 6% of the 2005 flycatcher population for the state. Teague had not been surveyed since 1999 and Porter Wash Ponds and Watson Wash had not been surveyed since 1997, all of which had previously no flycatcher detections. It is difficult to speculate about this increase in flycatchers because of the lack of recent survey effort, however, it is possible that this increase at the Teague site was due to the increase in survey effort (Magill, EcoPlan, pers. com.) and that possibly a greater area was surveyed here than in past years. Fort Thomas – Geronimo actually decreased in total numbers since it was last surveyed in 2003 when 22 territories were detected.

Also, in 2005 nine previously unoccupied sites had residents; five occurred on the Gila River (28 territories), two on the Salt River (42 territories), one on Tonto Creek (10 territories) and one on the Colorado River (2 territories). Of the 16 new survey sites in 2005 only one, Grapevine on the Salt River, had a flycatcher detected.

NEST MONITORING

In 1995, AZGFD and other cooperating agencies began monitoring nests to record and evaluate factors affecting nest success and document habitat attributes influencing productivity. Since 1995, we have recorded differences in annual estimates of nest success and productivity. Overall productivity and nest success in Arizona was greater in 2005 than 2004.

Mayfield nest success at the Winkelman Study Area increased from 50% in 2004 to 69% in 2005. This is the highest documented nest success at the Winkelman Study Area, exceeding the previous high of 67% in 2003 (Figure 8). This increase in nest success could potentially be attributed to the increased winter and spring rains along the San Pedro and Gila rivers as well as the continuous flows on the Gila River throughout the breeding season. Nest success at the Salt River Study Area showed slight variation from 39% in 2004 to 46% in 2005 (Figure 8). Nest success at the Tonto Creek Study Area increased markedly from 17% in 2004 to 46% in 2005 (Figure 8). At the Tonto Creek Study Area, nest success has been fluctuating greatly since the documented low of approximately 12% in 2002 (Figure 8). Nest success at both the Salt River and Tonto Creek Study Areas were just below their nine-year averages (48% at each site). At cooperators' sites, nest success at Alamo Lake increased slightly from 58% in 2004 to 62% in 2005, but fell at both Big Sandy River Downstream US 93 (67% to 55%) and Topock Marsh (38% to 15%).

The average seasonal fecundity (fledges per female) for AZGFD Study Areas combined increased in 2005 from 1.69 fledges to 2.11 fledges. However, the Salt River Study Area decreased for a second year from 1.64 fledges to 1.57 fledges. The Tonto Creek Study Area increased dramatically from 0.60 fledges to 1.56 fledges and the Winkelman Study Area increased from 2.04 fledges to 2.52 fledges. In 2005, 39% of AZGFD monitored females attempted to renest, whereas only 35% renested in 2004 and 22% renested in 2003.

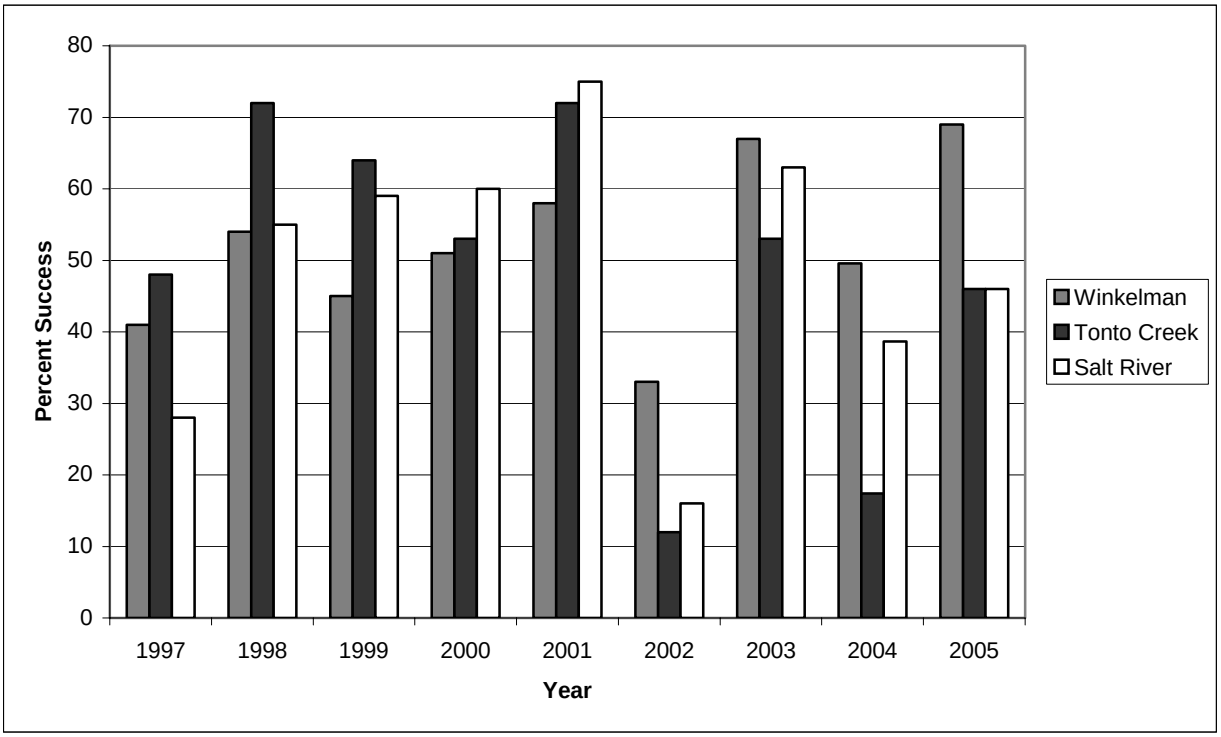

Figure 8. Mayfield nest success at Winkelman, Tonto Creek, and Salt River Study Areas, 1997-2005.

2005 was the first year that we were able to look at the effects of inundation on nest site selection and nesting success at Roosevelt Lake. One hundred and thirty-eight nests were detected and monitored at Roosevelt Lake in 2005. Of these nests 65% were in areas that were partially inundated (Table 11). Since we did not document water height at the time of nest selection, this percentage is based on the high water elevation that occurred in May (2,147 ft). Using GIS, we were able to plot the water levels and look at nest locations relative to water elevation. We found that on the Salt River flycatchers chose inundated areas more often than non-inundated areas for nest site location (55 nests in inundated habitat versus 3 nests in non-inundated habitat). However, on Tonto Creek nest site selection was more similar between inundated and non-inundated habitats (34 nests in inundated habitat and 46 in non-inundated habitat).

Calculating simple nest success at Roosevelt Lake for those nests that were in inundated habitat versus those that were in non-inundated habitat (at the high water level), we found that 43% (38 of 89 nests) in inundated habitat were successful and 54% (22 of 49 nests) in non-inundated

habitat were successful (Table 11). At Tonto Creek there was little difference in simple nest success between nests in inundated habitat (41%) and nests in non-inundated habitat (44%). Whereas on the Salt River there was a greater difference in simple nest success between nests in inundated habitat (44%) and nests in non-inundated habitat (67%), this number, however, is based on just three nests and therefore may not be a true representation of nest success in non-inundated habitat.

Table 11. Nest site selection and simple nest success for nests in inundated habitat versus nests in non-inundated habitat at Roosevelt Lake, 2005.

	Total Nests	Successful Nests	n	Failed Nests	n	Unknown Outcome	n
Inundated Habitat 64.5% of total nests at Roosevelt Lake were in partially inundated habitat in 2005							
Salt River Inflow	55	44%	24	51%	28	5%	3
Tonto Creek Inflow	34	41%	14	59%	20	0%	0
Total Inundated	89	43%	38	54%	48	3%	3
Non-inundated Habitat 35.5% of total nests at Roosevelt Lake were in non-inundated habitat in 2005							
Salt River Inflow	3	67%	2	33%	1	0%	0
Tonto Creek Inflow	46	44%	20	50%	23	6%	3
Total Non-Inundated	49	54%	22	49%	24	6%	3

The rate of cowbird parasitism on flycatchers is frequently site dependent. Thus, cowbird trapping may be beneficial on some study sites, whereas other sites may not necessitate trapping (USFWS 2002). For example, in 2005, for a second year there was no cowbird trapping at the Winkelman Study Area and no documented cases of parasitism at the Winkelman Study Area. Also for a second year in a row there was no cowbird trapping at Roosevelt Lake and nest parasitism was 2.2% which remained within historic levels of 2-4%, despite the inundated vegetation creating thin and patchy habitat. At some cooperators' sites nest parasitism increased. At both the Big Sandy River Downstream US 93 and Topock Marsh, parasitism was up from 2004 (4% to 29% and 33% to 59%, respectively). In 2005, cowbird trapping occurred at Topock Marsh, Alpine Horse Pasture, Greer Townsite, and Greer River Reservoir.

BANDING AND ADULT MOVEMENT

This was our fifth year of banding at the Winkelman Study Area. We continued to focus on banding females, allowing us to document individual productivity. Of the 44 flycatchers captured, 37 were color-banded in 2005 by AZGFD, the other 7 were recaptured individuals. Of the new captured individuals, 16 were sexed in the hand as females. Forty-four percent of known nesting females at the Winkelman Study Area were banded.

At the Winkelman Study Area, 94% (16 of 17) of the movements detected were within study area movements. Of the 16 within study area movements, 2 flycatchers moved between years

between drainages. Both moved from the Gila River to the San Pedro River. Ten flycatchers moved between years within drainage along both the San Pedro and Gila rivers. Four within season movements occurred at the Winkelman Study Area during 2005. The final movement documented was between study areas and years, from Roosevelt Lake to the Winkelman Study Area. No flycatchers have been documented moving from the San Pedro River to Roosevelt Lake since 2001. Between 2001 and 2005, six flycatchers have been documented moving from Roosevelt Lake to the Winkelman Study Area.

HABITAT

The flycatcher occupies a wide variety of riparian habitats across its range (McCarthey et al. 1998, Skaggs 1996, Whitfield and Enos 1996). The majority of occupied sites are mixed native/exotic vegetation with tamarisk being an important component. The importance of riparian vegetation for this species has continuously been at the forefront of recovery discussions (USFWS, 2002). The variety in species composition of occupied habitats suggests that flycatchers may rely on the structure of vegetation as much as, or more than, specific species of vegetation. A recent study conducted by CPRS suggested that, on a physiological level, native and exotic habitats do not greatly differ in quality for flycatchers (Owen et al. 2005).

With the high precipitation level in the winter and spring of 2005 (NOAA 2006), many of the lakes and reservoirs filled to near capacity, inundating previously occupied habitat. Roosevelt Lake is an excellent example of this; it filled to 96% capacity by May of 2005, compared to 38% in May 2004 (Figure 3; Skarupa, SRP, pers. com.). This caused a dramatic change in available habitat for the flycatchers. Two major sites on the Salt River, School House Point North (156 flycatchers at 83 territories in 2004) and Lake Shore (26 flycatchers at 15 territories in 2004), were completely inundated and supported no resident flycatchers in 2005 (Figure 4). Likewise, on Tonto Creek, Bermuda Flats (67 flycatchers at 40 territories in 2004) was completely inundated and supported no flycatchers in 2005 (Figure 5). In addition to these sites where habitat was completely lost to inundation, there were also sites that were partially flooded, reducing the amount of available habitat and in areas changing the habitat landscape. Due to these changes, flycatchers dispersed into areas upstream or to previously unoccupied areas on both Tonto Creek and the Salt River. On the Salt River flycatchers occupied Cottonwood Acres II and on Tonto Creek they occupied A-Cross Road North, both for the first time in 2005. Flycatchers were also found recolonizing areas that they had gradually shifted away from over past years as lake levels generally decreased year to year prior to 2005. This occurred on Tonto Creek at both the Tonto Creek Inflow site (the site had steadily declined from a high of 28 territories in 1998 to 0 in 2004 and then increased to 36 territories in 2005) and A-Cross Road South (3 territories in 2001, none in 2002-2004 and then 20 territories in 2005) and on the Salt River at the Cottonwood Acres I site (2 territories in 1999 and 2000 and none until 36 territories in 2005).

In addition to the change in location of occupied habitat, the structure of habitat available to the flycatchers at Roosevelt Lake changed. Because of inundation, the habitat in some areas was much thinner with less overstory and less foliage density than previous years. This increased

exposure may have made the nests more susceptible to sun and weather, as well as predation. With data from only one post-inundation breeding season on vegetation structure and nest success, it is difficult to draw conclusions on the effects of changes in habitat structure on nest success.

In comparing the location of territories in 2004 versus the location of territories in 2005, and taking into account the elevation of the lake in May 2005, we estimate that 73% of the territories from 2004 would have been inundated in 2005. At the Salt River Study Area 75% of the 2004 territories would have been inundated at 2005 lake levels and at the Tonto Creek Study Area 70% of 2004 territories would have been inundated. Just 9% of the 2004 territories at the Roosevelt Lake Study area would not have been inundated in 2005. The remaining 18% were undetermined as it was difficult to estimate some of the nest locations in comparison to lake levels and taking into account the possibility for partially inundated nesting territories.

While the vegetation structure did not change at the Winkelman Study Area, constant flows returned to the Gila River through the breeding season in 2005. In 2003 and 2004 the early season flows on the Gila River were much lower than in 2005 (USGS 2006) and the river dried completely by mid-season. Additionally, the number of flycatchers had declined by nearly half each year from 2002 to 2004. The average flow at the Kelvin Bridge gauge station during the breeding season (April through August) in 2004 was 139.8 cubic feet per second, compared to 657.2 cubic feet per second in 2005 (USGS 2006). The number of flycatcher territories doubled (14 to 28 territories) from 2004 to 2005 on the Gila River. It can be speculated that return in constant flows to the Gila River influenced the number of returning flycatchers. Although no drastic habitat change occurred between 2004 and 2005, the return of continuous flow in the Gila River may have provided flycatchers a more attractive habitat.

A fire burned the riparian area and surrounding grasslands at the north end of the San Pedro River Preserve property (Dudleyville Crossing site) in 2005 from 17 July to 19 July. Before the fire, the San Pedro River Preserve supported 7 territories and 2 early season migrants. Because it was already late in the breeding season when the fire occurred, four non-breeding males occupying territories at the north end of the preserve had already left the area. Three territories were affected by the fire: one territory was occupied by a lone male that was not seen again, a second territory had a possible nest that was never confirmed active, and a third territory should have had fledges that were not located post-fire. In past years of our study, fire has dramatically changed the occupied habitat along the San Pedro River. For example, in June 1996, a fire burned 75% of the PZ Ranch site. At the time of the fire there were approximately 28 flycatchers at 15-16 territories, 10 of which were in the area that burned (Spencer et al. 1996). In the years post-fire, a significant decrease in flycatchers has been documented at the site (9 flycatchers in 1997, 2 in 1998, 1 in 1999 and no flycatchers 2000 to present). This decline can be attributed to lack of regeneration of suitable habitat in the area of the fire. Future surveys at the San Pedro River Preserve will determine the extent to which flycatchers return to this area and, therefore, the long-term effects this fire has had on the site.

At the Kearny Sewage Pond, on the Gila River, where there was a fire in 2004, we documented three resident territories and two migrants at the site in 2005. This is compared to five resident territories and two migrants prior to the fire and nine resident territories and two migrants in 2003. Flycatchers at the site, however, had been declining steadily since 1998 (25 territories), and therefore it is difficult to conclude that this year's decrease in territories can be attributed entirely to the fire. The flycatchers that occupied the site in 2005 all remained very close to the center area of the site that was not effected by the fire. This area continues to have standing water or well-saturated soil throughout the breeding season due to the mandates of the Kearny Biological Opinion (USFWS 1998). The area burned in 2004 has started to regenerate with tamarisk (sprouting from the roots of burned and partially burned trees) and tree tobacco (*Nicotiana glauca)*. The tamarisk has grown to approximately 2-3 m in height but is still thin compared to typical flycatcher habitat. This site, like Dudleyville, will need continued surveys to document the return of flycatchers to these burned areas.

As in previous years, the two largest known concentrations of flycatchers in Arizona were located at the Winkelman Study Area and Roosevelt Lake. The importance of monitoring and managing these areas was demonstrated this year as occupied habitat is susceptible to catastrophic events, such as flooding and fires. During the winter and early spring of 2005, the increased precipitation (NOAA 2006) led to our first opportunity to see the early effects of habitat inundation on the Roosevelt Lake population. Flycatchers were able to locate habitat for breeding by moving upstream on both the Salt and Tonto arms of the lake. Future years will allow us to determine if flycatchers continue to return to Roosevelt Lake or seek other breeding areas, as well as other long-term effects of inundation on the population. Both the fire at the San Pedro River Preserve and the inundation of Roosevelt Lake demonstrate the susceptibility of flycatcher habitat to catastrophic events, and the need to conserve areas and drainages with extant flycatcher populations.

Knowledge of habitat relationships and their influence on reproductive success must be a primary component of recovery, conservation, and management strategies for the flycatcher. Only through detailed demographic research, nest monitoring, surveys, vegetation sampling, and habitat measurements can these parameters be described. This information will affect management decisions on both the local and range-wide level. Conservation and recovery success of the flycatcher are not only dependent on federal and state agency direction, but also must include cooperation and support of non-governmental organizations, private landowners, and Native American nations.

RECOMMENDATIONS

SURVEYS

1. Conduct statewide surveys in support of the Southwestern Willow Flycatcher Recovery Plan downlisting and delisting criteria (USFWS 2002). Specifically, downlisting can occur if: 1) the total known population of flycatchers increases to a minimum of 1,950 territories over an appropriate geographic distribution (as specified in Criteria set A) and this level is maintained for a five-year period, or 2) the total known population increases to a minimum of

1,500 territories over an appropriate geographic distribution (as specified in Criteria set B). This level is maintained for a three-year period, given assurances of habitat protection through conservation management agreements (USFWS 2002). Therefore, conduct surveys in areas that:
   a. have not been surveyed but appear to have suitable habitat;
   b. contain previously occupied habitat;
   c. are adjacent to occupied habitat; and,
   d. were previously unsuitable habitat but have developed into potentially suitable habitat.
2. Priority areas for more intensive or continued survey effort include:
   a. Salt River and Tonto Creek upstream from Roosevelt Lake, as suitable habitat and land owner permission allows;
   b. Alamo Lake/Lower Big Sandy River/Lower Santa Maria River;
   c. Gila River from the New Mexico border to the Kelvin Bridge and Kelvin Bridge to Ashurst-Hayden Dam were suitable habitat is found;
   d. Gila River from the confluence with the Salt River to Gillespie Dam;
   e. Havasu Creek drainage;
   f. Little Colorado River and tributaries with suitable habitat;
   g. Lower Colorado River between river mile 260 and Yuma;
   h. Lower Grand Canyon area of the Colorado River between river miles 246 and 272;
   i. San Francisco River from the New Mexico border to Clifton;
   j. San Pedro River from Cascabel to its confluence with the Gila River;
   k. Santa Cruz River from Rio Rico to Tubac;
   l. Verde River from Cottonwood to the confluence with the Salt River; and
   m. White River and tributaries with suitable habitat.
3. Conduct multiple years of surveys to adequately assess population trends.
4. Encourage federal, state, Native American, and private partners to maintain or increase funding for statewide surveys and develop partnerships with private landowners to survey suitable habitat.
5. Continue training workshops to improve surveyor knowledge of survey techniques, and also to standardize data reporting, protocol adherence, and interagency communication.

NEST MONITORING

1. Continue to monitor nests within small and large populations of flycatchers to evaluate reproductive success, productivity, cowbird parasitism, predation, and impacts of human and other disturbances.

MANAGEMENT

1. Protect areas with extant flycatcher populations through conservation management agreements to support Recovery Plan downlisting and delisting criteria (USFWS 2002). Such agreements include Conservation Easements, Safe Harbor Agreements (SHA), and the

Landowner Incentive Program (LIP). Focus on areas and drainages in the state that are lacking protected southwestern willow flycatcher areas.

2. Monitor and protect areas where regeneration of riparian vegetation is occurring.
3. Create and enforce exclosures on flycatcher breeding areas where feasible to eliminate or minimize impacts of land uses (for example: grazing, water diversion and inundation, and OHV use) on flycatcher breeding habitat.
4. Initiate cowbird trapping at breeding areas with evidence of high rates of flycatcher nest parasitism. Investigate trapping options at corrals, feedlots, and roost sites near flycatcher breeding sites impacted by parasitism.
5. Work with the Arizona Bird Conservation Initiative (a multi-agency association dedicated to the conservation of all birds in Arizona) to encourage and create private/public partnerships for fencing and habitat restoration through federal, state, and non-government programs (for example USFWS Partners for Wildlife, the AZGFD Stewardship Program, and the Federal Landowner Incentive Program).
6. Continue and increase communication with federal and state agencies, Native American tribes, and private organizations conducting flycatcher surveys, monitoring, and research to develop region-wide conservation strategies.

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Appendix A. Survey and detection form for Arizona willow flycatcher surveys, 2005.

Willow Flycatcher Survey and Detection Form (revised April, 2004)

Site Name_____ State_____ County _____
USGS Quad Name _____ Elevation _____ feet / meters (circle one)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ☐ *Yes* ☐ *No*

Site Coordinates: Start: N_____ E_____ UTM Datum _____(NAD27 preferred)
Stop: N_____ E_____ UTM Zone _____

***** Fill in additional site information on back of this page *****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found ? Y or N	Cowbirds Detected? Y or N	Presence of Livestock, Recent sign, If Yes, Describe Y or N	Comments about this survey (e.g., bird behavior, evidence of pairs or breeding, number of nests, nest contents or number of fledges seen; potential threats)
1_____	Date							
	Start							
	Stop							
	Total hrs ____							
2_____	Date							
	Start							
	Stop							
	Total hrs ____							
3_____	Date							
	Start							
	Stop							
	Total hrs ____							
4_____	Date							
	Start							
	Stop							
	Total hrs ____							
5_____	Date							
	Start							
	Stop							
	Total hrs ____							
Overall Site Summary (Total **resident** WIFLs only) Total survey hrs_____		Adults	Pairs	Territories	Nests	Were any WIFLs color-banded? Yes No If yes, report color combination(s) in the comments section on back of form		

Reporting Individual _____ Date Report Completed _____
US Fish and Wildlife Service Permit #_____ AZ Game and Fish Department (or other state) Permit # _____

Submit original form by August 1st. Retain a copy for your records.

Appendix A (continued). Survey and detection form for Arizona willow flycatcher surveys, 2005.

Fill in the following information completely. Submit original form by August 1st. Retain a copy for your records.

Reporting Individual _____ Phone # _____
Affiliation _____ E-mail _____
Site Name _____ Date Report Completed _____

Did you verify that this site name is consistent with that used in previous years? Yes / No (circle one)
If name is different, what name(s) was used in the past? _____
If site was surveyed last year, did you survey the same general area this year? Yes / No If no, summarize in comments below.
Did you survey the same general area during each visit to this site this year? Yes / No If no, summarize in comments below.

Management Authority for Survey Area (circle one): Federal Municipal/County State Tribal Private
Name of Management Entity or Owner (e.g., Tonto National Forest) _____

Length of area surveyed: _____ (specify units, e.g., miles = mi, kilometers = km, meters = m)

Vegetation Characteristics: Overall, are the species in tree/shrub layer at this site comprised predominantly of (check one):

☐ Native broadleaf plants (entirely or almost entirely, includes high-elevation willow)

☐ Mixed native and exotic plants (mostly native)

☐ Mixed native and exotic plants (mostly exotic)

☐ Exotic/introduced plants (entirely or almost entirely)

Identify the 2-3 predominant tree/shrub species: _____

Average height of canopy (Do not put a range): _____ (specify units)

Was surface water or saturated soil present at or adjacent to site? Yes / No (circle one)
Distance from the site to surface water or saturated soil: _____ (specify units)

Did hydrological conditions change significantly among visits (did the site flood or dry out)? Yes / No (circle one)
If yes, describe in comments section below.

Remember to attach a copy of a USGS quad/topographical map (REQUIRED) of the survey area, outlining the survey site and location of WIFL detections. Also include a sketch or aerial photograph showing details of site location, patch shape, survey route in relation to patch, and location of any willow flycatchers or willow flycatcher nests detected. Such sketches or photographs are welcomed, but DO NOT substitute for the required USGS quad map. Please include photos of the interior of the patch, exterior of the patch, and overall site and describe any unique habitat features.

Comments (attach additional sheets if necessary)

_____
_____
_____
_____
_____
_____
_____

WIFL Detection Locations:

Date Detected	N UTM	E UTM	Date Detected	N UTM	E UTM

Appendix B. Roosevelt Lake area precipitation averages for 2004, 2005, historic average (1905-2005) and recent average (1995-2003).

Month	**2004**	**2005**	**1905-2005**	**1995-2003**
January	1.05	4.67	1.9	0.03
February	0.62	7.21	1.82	1.48
March	2.59	1.41	1.79	1.96
April	1.22	0.41	0.7	1.46
May	0	0	0.33	1.16
June	0	0.12	0.26	0.75
July	0.4	1.21	1.44	0.75
August	1.3	2.68	1.97	1.59
September	1.94	0.04	1.3	1.72
October	0.61	0.54	1.13	1.49
November	0.86	N/A	1.26	0.75
December	3.17	N/A	1.97	0.13
Annual Sum	13.76	18.29[a]	15.87	13.27

[a] This sum does not include November and December as those data were not yet available.
(Western Regional Climate Center, 2006)

Appendix C. Roosevelt Lake elevation in feet and percent capacity for 2004 and 2005.

	Elevation (ft)	% Capacity	Elevation (ft)	% Capacity
Month	**2004**	**2004**	**2005**	**2005**
January	2077.01	30%	2081.40	33%
February	2077.87	30%	2101.55	48%
March	2077.66	30%	2136.87	83%
April	2084.56	35%	2144.48	92%
May	2088.62	38%	2147.99	96%
June	2087.50	37%	2147.55	96%
July	2082.71	33%	2145.04	92%
August	2077.44	30%	2141.46	88%
September	2073.95	28%	2139.95	86%
October	2074.15	28%	2136.54	82%
November	2074.58	28%	2135.26	81%
December	2076.01	29%	2134.65	80%
Annual Average	2079.34	31%	2132.73	80%
Breeding Season Average	2084.17	35%	2145.30	93%

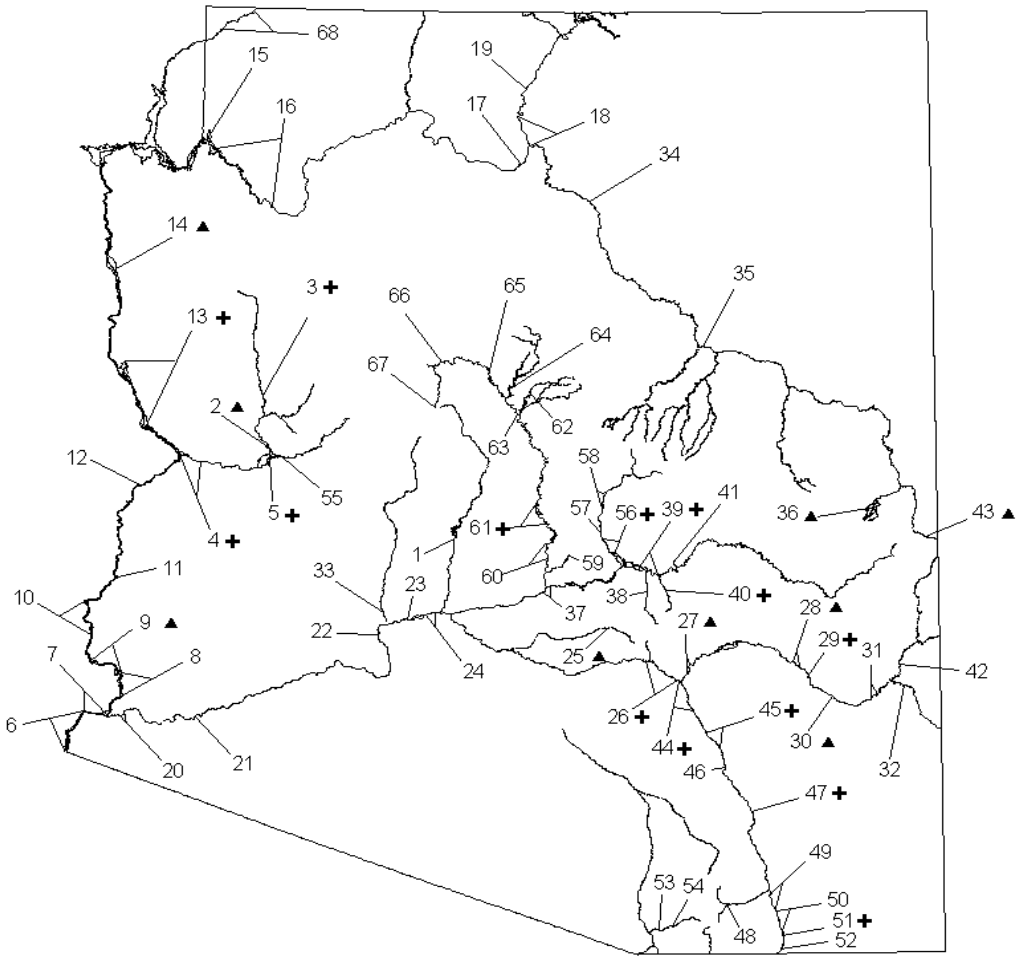
(SRP, 2005)

Appendix D. Gila River Stream flows in cubic feet per second at the Coolidge Dam and Kelvin Bridge for 2004 and 2005.

	Coolidge (cfs)	Kelvin (cfs)	Coolidge (cfs)	Kelvin (cfs)
Month	**2004**	**2004**	**2005**	**2005**
January	N/A	99	107	310
February	152	135	69	679
March	285	309	380	383
April	406	359	641	577
May	238	222	564	505
June	1.4	3.8	721	669
July	1.0	10	817	818
August	115	104	519	717
September	79	90	471	529
October	38	35	226	232
November	20	1.8	1.3	16
December	125	120	300	265
Annual average	133	124	401	475
Breeding Season average	152	140	653	657

(USGS, 2006)

Appendix E. Map of sites in Arizona and sites along adjoining water bodies surveyed for willow flycatchers, 2005. (see Appendix F for site names);
✚ = Resident willow flycatchers detected and breeding documented, ▲ = Resident willow flycatchers detected (no breeding documented).



Drainage	Map Number	Drainage	Map Number	Drainage	Map Number
Agua Fria	1	Hassayampa River	33	Santa Cruz River	53-54
Big Sandy River	2-3	Little Colorado River	34-36	Santa Maria River	55
Bill Williams River	4-5	Salt River	37-41	Tonto Creek	56-58
Colorado River	6-19	San Francisco River	42-43	Verde River	59-66
Gila River	20-32	San Pedro River	44-52	Virgin River	67

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Agua Fria River										
Waddell Dam Agua Fria River Maricopa, 439, 2.60	1	5/18/2005 6/14/2005 7/4/2005	0 0 0	0	0	0	0	0	0	Y
Morgan City Agua Fria River Maricopa, 445, 7.74	1	5/18/2005 6/14/2005 7/4/2005	0 0 0	0	0	0	0	0	0	Y
Big Sandy River										
Lower Big Sandy River[e] Big Sandy River Mohave, 357, 9.00	2 ▲	5/23/2005 7/6/2005	7 8	8	5	3	0	0	0	N
Big Sandy River Downstream US 93 Big Sandy River Mohave, 555, 12.81	3 +	Monitored 5/05 to 8/05	N/A	62	33	29	44	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Bill Williams River										
Bill Williams River Delta - Marsh Edge Bill Williams River La Paz, 163, 20.33	4	5/20/2005 5/25/2005 6/1/2005 6/7/2005 6/14/2005 6/22/2005 6/28/2005 7/11/2005 7/17/2005 7/21/2005	0 0 0 1 0 0 0 0 0 0	0	0	0	0	0	1	Y
Monkey's Head Bill Williams River La Paz, 143, 30.60	4 +	Monitored 5/05 to 8/05	N/A	4	2	2	2	0	0	Y
Gemini Bill Williams River La Paz, 152, 6.05	4	5/18/2005 5/22/2005 5/28/2005 6/4/2005 6/14/2005 6/23/2005 6/30/2005 7/11/2005 7/20/2005 7/25/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Cave Wash 1 Bill Williams River La Paz, 152, 16.74	4	5/17/2005 5/21/2005 5/25/2005 5/30/2005 6/15/2005 6/23/2005 6/29/2005 7/13/2005 7/19/2005 7/23/2005	0 0 0 0 0 1 0 0 0 0	0	0	0	0	1	0	Y
Cave Wash 2 Bill Williams River La Paz, 152, 2.85	4	5/25/2005 6/15/2005 7/23/2005	0 0 0	0	0	0	0	0	0	Y
Buckskin Bill Williams River La Paz, 174, 10.31	4	5/17/2005 5/21/2005 5/25/2005 5/30/2005 6/15/2005 6/23/2005 6/29/2005 7/13/2005 7/19/2005 7/23/2005	1 0 0 0 0 0 0 0 0 0	0	0	0	0	0	1	Y
Alamo Lake - Brown's Crossing Bill Williams River Mohave, 347, 15.50	5 +	Monitored 5/05 to 8/05	N/A	18	9	9	9	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Colorado River										
Hunter's Hole Colorado River Yuma, 31, 26.33	6	5/18/2005 5/21/2005 6/3/2005 6/8/2005 6/12/2005 6/17/2005 6/29/2005 7/4/2005 7/12/2005 7/18/2005	6 2 1 2 0 1 0 0 0 0	0	0	0	0	0	6	Y
Gadsden Pond Colorado River Yuma, 46, 22.96	6	5/17/2005 5/21/2005 6/3/2005 6/8/2005 6/12/2005 6/17/2005 6/29/2005 7/4/2005 7/12/2005 7/18/2005	7 7 1 2 2 0 0 0 0 0	0	0	0	0	0	7	Y
Gadsden Bend Colorado River Yuma, 30, 16.85	6	5/17/2005 5/21/2005 6/3/2005 6/8/2005 6/12/2005 6/29/2005 7/4/2005 7/12/2005 7/18/2005	6 2 2 1 1 0 0 0 0	0	0	0	0	0	6	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
County 11th St. to County 10th St. Colorado River Yuma, 31, 1.54	6	5/25/2005 6/8/2005 6/22/2005 6/29/2005 7/6/2005	1 0 0 0 0	0	0	0	0	0	1	Y
County 10th St. to County 9th St. Colorado River Yuma, 31, 2.25	6	5/25/2005 6/8/2005 6/22/2005 6/29/2005 7/6/2005	0 0 0 0 0	0	0	0	0	0	0	Y
County 9th St. to Morelos Dam Colorado River Yuma, 38, 1.55	6	5/25/2005 6/8/2005 6/22/2005 6/29/2005 7/6/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Lower Yuma Division #2 Colorado River Yuma, 37, 2.25	6	5/25/2005 6/8/2005 6/22/2005 6/29/2005 7/6/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Fort Yuma 1 & 2 Colorado River Yuma, 38, 20.04	7	5/16/2005 6/16/2005 6/27/2005 6/28/2005 7/10/2005 7/18/2005	1 0 0 0 0 0	0	0	0	0	0	1	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Yuma Territorial Prison Colorado River Yuma, 38, 16.07	7	5/15/2005 5/17/2005 6/15/2005 6/17/2005 6/26/2005 6/28/2005 7/9/2005 7/11/2005 7/17/2005 7/19/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
2 East to Gila River Colorado River Yuma, 38, 99.07	7	5/15/2005 5/16/2005 5/17/2005 5/24/2005 6/2/2005 6/7/2005 6/14/2005 6/15/2005 6/16/2005 6/17/2005 6/19/2005 6/26/2005 6/27/2005 6/28/2005 7/1/2005 7/6/2005 7/9/2005 7/10/2005 7/11/2005 7/15/2005 7/17/2005 7/18/2005 7/19/2005 7/20/2005	4 0 4 3 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	4	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Gila/Colorado Confluence 1 Colorado River Yuma, 40, 35.82	7	5/18/2005 5/22/2005 5/23/2005 5/24/2005 5/31/2005 6/1/2005 6/9/2005 6/14/2005 6/16/2005 6/22/2005 6/23/2005 6/24/2005 6/28/2005 6/30/2005 7/3/2005 7/4/2005 7/7/2005 7/15/2005 7/19/2005 7/21/2005	9 0 0 0 4 0 5 1 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	9	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Mittry Lake Colorado River Yuma, 49, 25.32	8	5/17/2005 5/20/2005 5/22/2005 5/27/2005 6/2/2005 6/7/2005 6/8/2005 6/14/2005 6/21/2005 6/28/2005 6/29/2005 7/5/2005 7/12/2005 7/20/2005 7/26/2005	5 0 0 0 0 2 0 0 0 0 0 0 0 0 0	0	0	0	0	0	5	Y
Martinez Lake Colorado River Yuma, 62, 59.74	8	5/14/2005 5/19/2005 5/20/2005 5/26/2005 6/4/2005 6/5/2005 6/9/2005 6/18/2005 6/19/2005 6/23/2005 7/2/2005 7/7/2005 7/16/2005 7/21/2005	2 1 3 7 2 0 2 0 0 0 0 0 0 0	0	0	0	0	0	7	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Triangle Colorado River Yuma, 19, 5.21	9	5/14/2005 5/19/2005 5/26/2005 6/4/2005 6/7/2005 6/18/2005 6/23/2005 7/2/2005 7/7/2005 7/16/2005	1 2 0 0 0 0 0 0 0 0	0	0	0	0	0	2	Y
Clear Lake Colorado River La Paz, 61, 7.78	9	5/18/2005 5/24/2005 6/4/2005 6/9/2005 6/17/2005 6/22/2005 7/2/2005 7/8/2005 7/14/2005 7/21/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
Nortons Landing Colorado River La Paz, 61, 22.51	9	5/13/2005 5/20/2005 5/25/2005 6/6/2005 6/15/2005 6/30/2005 7/5/2005 7/12/2005 7/17/2005	0 1 4 0 0 0 0 0 0	0	0	0	0	0	4	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Adobe Lake Colorado River La Paz, 61, 8.75	9 ▲	5/17/2005 5/25/2005 6/1/2005 6/7/2005 6/15/2005 6/20/2005 6/30/2005 7/5/2005 7/12/2005 7/17/2005	16 7 3 9 1 1 0 0 0 0	0	0	0	0	1	15	Y
Hoge Colorado River La Paz, 61, 35.91	9	5/18/2005 5/25/2005 6/1/2005 6/7/2005 6/15/2005 6/20/2005 6/30/2005 7/5/2005 7/12/2005 7/17/2005	7 10 5 8 0 0 0 0 0 0	0	0	0	0	0	10	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Cibola Lake Colorado River La Paz, 65, 54.89	10	5/21/2005 5/23/2005 5/25/2005 6/1/2005 6/4/2005 6/5/2005 6/8/2005 6/15/2005 6/16/2005 6/18/2005 6/19/2005 6/22/2005 6/29/2005 7/2/2005 7/5/2005 7/13/2005 7/16/2005 7/17/2005 7/20/2005	0 2 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	2	Y
SW of Landing Strip - Cibola Colorado River La Paz, 64, 25.62	10	5/22/2005 5/25/2005 6/1/2005 6/5/2005 6/15/2005 6/16/2005 6/19/2005 6/29/2005 7/2/2005 7/4/2005 7/13/2005 7/17/2005	0 6 0 6 0 0 0 0 0 0 0 0	0	0	0	0	0	6	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Arnet Ditch/Tieback Levee Colorado River La Paz, 66, 24.25	10	5/22/2005 5/25/2005 6/1/2005 6/5/2005 6/16/2005 6/19/2005 6/29/2005 7/4/2005 7/13/2005 7/17/2005	0 7 0 1 0 0 0 0 0 0	0	0	0	0	0	7	Y
Cibola Restoration Colorado River La Paz, 70, 21.72	10	5/18/2005 5/26/2005 6/2/2005 6/9/2005 6/17/2005 6/25/2005 6/30/2005 7/12/2005 7/21/2005 7/27/2005	2 0 6 4 1 0 0 0 0 0	0	0	0	0	1	5	Y
Ehrenberg Colorado River La Paz, 79, 18.25	11	5/17/2005 5/20/2005 5/23/2005 6/3/2005 6/7/2005 6/12/2005 6/16/2005 6/21/2005 6/30/2005 7/3/2005 7/9/2005 7/14/2005 7/18/2005	3 1 0 1 1 1 0 0 0 0 0 0 0	0	0	0	0	0	3	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Ahakhav Preserve Colorado River La Paz, 104, 26.75	12	5/19/2005 5/20/2005 5/26/2005 6/10/2005 7/14/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Neptune - North Lake Havasu Colorado River Mohave, 136, 16.31	13	5/19/2005 5/26/2005 6/1/2005 6/7/2005 6/16/2005 6/26/2005 6/30/2005 7/12/2005 7/17/2005 7/21/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N
Blankenship Colorado River Mohave, 136, 28.99	13	5/14/2005 5/24/2005 6/1/2005 6/8/2005 6/22/2005 7/7/2005 7/12/2005 7/15/2005 7/19/2005 7/26/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Pulpit Rock Colorado River Mohave, 183, 3.30	13	5/14/2005 5/24/2005 6/1/2005 6/8/2005 6/22/2005 7/7/2005 7/12/2005 7/15/2005 7/19/2005 7/26/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
Topock Marsh Colorado River Mohave, 140, 173.49	13 +	Monitored 5/05 to 8/05	N/A	36	21	18	38	2	3	Y
Waterwheel Cove Colorado River Mohave, 195, 22.20	14 ▲	5/16/2005 5/17/2005 6/14/2005 7/7/2005	1 2 0 2	2	2	0	0	0	0	Y
Raven's Nest Beach - Lake Mead Colorado River Mohave, 345, 5.50	15	5/11/2005 5/25/2005 6/8/2005 6/23/2005 7/8/2005 7/20/2005	0 0 0 0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Snake Beach - Lake Mead Colorado River Mohave, 345, 3.50	15	5/10/2005 5/24/2005 6/7/2005 7/7/2005 7/19/2005	0 0 0 0 0	0	0	0	0	0	0	N
Miles 277.0 to 274.0 R GC Colorado River Mohave, 366, 86.98	16	5/11/2005 5/12/2005 5/18/2005 5/25/2005 5/26/2005 6/1/2005 6/5/2005 6/8/2005 6/9/2005 6/15/2005 6/16/2005 6/20/2005 6/21/2005 6/22/2005 6/30/2005 7/5/2005 7/7/2005 7/8/2005 7/16/2005 7/19/2005 7/20/2005	0 0 0 0 0 1 1 1 0 1 0 1 1 0 0 0 0 0 0 0 0	0	0	0	0	1	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Miles 277.0 to 273.5 L GC Colorado River Mohave, 366, 42.21	16	5/10/2005 5/18/2005 5/24/2005 5/25/2005 6/1/2005 6/5/2005 6/7/2005 6/15/2005 6/20/2005 6/21/2005 6/30/2005 7/5/2005 7/6/2005 7/19/2005	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
Miles 261.2 to 260.5 R GC [e] Colorado River Mohave, 353, 1.53	16	5/20/2005	0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Mile 260.0 L Quartermaster GC Colorado River Mohave, 384, 21.44	16	5/19/2005 5/24/2005 6/4/2005 6/8/2005 6/19/2005 6/23/2005 6/24/2005 6/29/2005 7/4/2005 7/15/2005 7/19/2005	0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N
Mile 259.5 R Waterfall Rapid GC Colorado River Mohave, 352, 34.98	16	5/12/2005 5/19/2005 5/24/2005 5/26/2005 6/4/2005 6/8/2005 6/15/2005 6/19/2005 6/23/2005 6/29/2005 7/4/2005 7/15/2005 7/19/2005	0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Miles 257.5 to 257.0 R GC Colorado River Mohave, 353, 13.44	16	5/20/2005 6/6/2005 6/8/2005 6/19/2005 6/23/2005 6/29/2005 7/4/2005 7/14/2005 7/18/2005	0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
Mile 252.2 L GC Colorado River Mohave, 384, 25.26	16	5/21/2005 5/26/2005 6/3/2005 6/6/2005 6/18/2005 6/22/2005 7/3/2005 7/7/2005 7/14/2005 7/18/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N
Mile 249.5 R GC Colorado River Mohave, 372, 21.12	16	5/21/2005 5/26/2005 6/3/2005 6/6/2005 6/18/2005 6/22/2005 7/3/2005 7/7/2005 7/14/2005 7/18/2005	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Mile 249.5 L GC Colorado River Mohave, 373, 12.39	16	5/21/2005 5/23/2005 5/26/2005 6/3/2005 6/6/2005 6/18/2005 6/22/2005 7/2/2005 7/3/2005 7/7/2005 7/14/2005 7/18/2005	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
Mile 248.3 R Surprise Canyon GC Colorado River Mohave, 366, 18.92	16	5/11/2005 5/23/2005 5/25/2005 6/2/2005 6/7/2005 6/14/2005 6/18/2005 6/21/2005 6/23/2005 7/2/2005 7/7/2005 7/13/2005 7/14/2005 7/17/2005	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Mile 246.0 L GC Colorado River Mohave, 372, 34.32	16	5/11/2005 5/23/2005 5/25/2005 6/2/2005 6/7/2005 6/14/2005 6/17/2005 6/21/2005 6/22/2005 7/2/2005 7/6/2005 7/13/2005 7/14/2005 7/17/2005	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N
Mile 243.0 L GC Colorado River Mohave, 384, 15.09	16	5/22/2005 6/2/2005 6/7/2005 6/17/2005 6/21/2005 6/23/2005 7/1/2005 7/6/2005 7/13/2005 7/14/2005 7/17/2005	0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Separation Canyon R GC Colorado River Mohave, 427, 10.61	16	5/22/2005 6/2/2005 6/7/2005 6/17/2005 6/21/2005 7/1/2005 7/6/2005 7/13/2005 7/17/2005	0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	N
Miles 71.3 to 71.0 L Cardenas GC [e] Colorado River Coconino, 853, 5.82	17	6/10/2005 6/24/2005 7/9/2005 7/17/2005	0 0 0 0	0	0	0	0	0	0	N
Miles 56.5 to 56.0 R Kwagunt Marsh GC [e] Colorado River Coconino, 853, 2.21	18	6/9/2005 6/22/2005 7/8/2005 7/16/2005	0 0 0 0	0	0	0	0	0	0	N
Mile 53.3 R GC - Nankoweap Main Camp [e] Colorado River Coconino, 850, 2.07	18	6/9/2005 6/22/2005 7/8/2005 7/16/2005	0 0 0 0	0	0	0	0	0	0	N
Miles 51.5 to 50.5 L GC [e] Colorado River Coconino, 853, 6.76	18	6/9/2005 6/22/2005 7/8/2005 7/15/2005	0 0 0 0	0	0	0	0	0	0	N

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Mile 50.0 L GC [e] Colorado River Coconino, 853, 3.41	18	6/9/2005 6/22/2005 7/8/2005 7/15/2005	0 0 0 0	0	0	0	0	0	0	N
Miles 29.0 to 28.0 L GC [e] Colorado River Coconino, 887, 1.29	19	6/7/2005 6/17/2005 7/7/2005 7/14/2005	0 0 0 0	0	0	0	0	0	0	N
Gila River										
Fortuna Wash [e] Gila River Yuma, 61, 12.81	20	6/5/2005 6/15/2005 6/20/2005 6/28/2005 7/3/2005 7/14/2005 7/17/2005	0 0 0 0 0 0 0	0	0	0	0	0	0	Y
Fortuna North Gila River Yuma, 43, 11.77	20	5/19/2005 5/22/2005 5/31/2005 6/9/2005 6/16/2005 6/22/2005 7/1/2005 7/4/2005 7/15/2005 7/19/2005	0 0 2 1 0 0 0 0 0 0	0	0	0	0	0	2	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Tacna Marsh - Quigley Wildlife Area Gila River Yuma, 78, 3.10	21	5/26/2005 6/20/2005 7/7/2005	1 0 0	0	0	0	0	0	1	Y
Arlington South Gila River Maricopa, 244, 13.30	22	5/27/2005 6/6/2005 6/30/2005 7/7/2005 7/14/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Buckeye Gila River Maricopa, 256, 3.74	23	5/27/2005 6/9/2005 6/23/2005	0 0 0	0	0	0	0	0	0	Y
Goodyear KR - West Gila River Maricopa, 271, 1.48	24	5/31/2005 6/9/2005 7/2/2005 7/8/2005 7/15/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Goodyear KR Gila River Maricopa, 274, 6.45	24	5/31/2005 6/9/2005 7/2/2005 7/8/2005 7/15/2005	0 0 0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Estrella GC Gila River Maricopa, 275, 4.09	24	5/31/2005 6/9/2005 7/2/2005 7/8/2005 7/15/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Whitlow Dam [j] Gila River Pinal, 634, 11.06	25 ▲	5/25/2005 6/3/2005 6/12/2005 6/19/2005 7/2/2005 7/6/2005	0 1 1 1 0 0	1	1	0	0	0	0	Y
GRSN022 [e] Gila River Pinal, 541, 0.60	26	7/8/2005 7/17/2005	0 0	0	0	0	0	0	0	N
GRN020 Gila River Pinal, 549, 6.20	26	5/22/2005 6/15/2005 6/30/2005 7/8/2005 7/17/2005	0 1 0 0 0	0	0	0	0	0	1	Y
GRS020 [e] Gila River Pinal, 543, 0.20	26	7/8/2005 7/17/2005	0 0	0	0	0	0	0	0	N
GRN018 Gila River Pinal, 561, 50.59	26 +	Monitored 5/05 to 8/05	N/A	12	6	6	6[h]	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
GRS018 Gila River Pinal, 543, 18.70	26 +	Monitored 5/05 to 8/05	N/A	18	9	9	12[h]	0	0	Y
GRS016 Gila River Pinal, 549, 16.48	26 +	Monitored 5/05 to 8/05	N/A	2	1	1	1	0	0	Y
Kearny Gila River Pinal, 555, 3.11	26 +	Monitored 5/05 to 8/05	N/A	6	3	3	6	0	2	Y
GRS012 Gila River Pinal, 555, 6.77	26	5/19/2005 6/3/2005 7/2/2005	0 0 0	0	0	0	0	0	0	Y
GRS011 Gila River Pinal, 561, 2.64	26	5/20/2005 6/11/2005 6/23/2005	0 0 0	0	0	0	0	0	0	Y
GRN010 Gila River Pinal, 573, 4.84	26	5/26/2005 6/8/2005 6/27/2005	0 0 0	0	0	0	0	0	0	Y
GRS010 Gila River Pinal, 561, 2.47	26 +	5/20/2005 6/11/2005 6/23/2005 7/8/2005	0 0 0 2	2	1	1	1	0	0	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
GRN009 Gila River Pinal, 579, 3.27	26	5/26/2005 6/8/2005 6/27/2005	0 0 0	0	0	0	0	0	0	N
GRN008 Gila River Pinal, 579, 3.70	26	5/26/2005 6/8/2005 6/27/2005	0 0 0	0	0	0	0	0	0	Y
GRS007 Gila River Pinal, 573, 16.59	26 +	Monitored 5/05 to 8/05	N/A	11	6	5	8	0	1	Y
GRN004 Gila River Pinal, 585, 2.28	26	5/31/2005 6/17/2005 7/8/2005	0 0 0	0	0	0	0	0	0	Y
Dripping Springs Campground[e] Gila River Pinal, 610, 3.00	27 ▲	6/27/2005	1	1	1	0	0	0	0	Y
Dripping Springs Wash Gila River Pinal, 621, 0.95	27 ▲	5/15/2005 6/21/2005 6/27/2005	0 1 2	2	1	1	0	0	0	Y
Fort Thomas - Geronimo Gila River Graham, 810, 5.00	28 ▲	5/25/2005 6/16/2005 6/25/2005	7 8 8	8	5	3	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Porter Wash Ponds Gila River Graham, 823, 3.77	28 ▲	5/26/2005 6/20/2005 6/30/2005	2 2 3	3	2	1	0	0	0	Y
Teague Gila River Graham, 824, 36.08	29 +	Monitored 5/05 to 8/05	N/A	40	22	18	10	0	0	Y
Watson Wash Gila River Graham, 869, 2.25	30 ▲	5/24/2005 6/20/2005 6/30/2005	0 3 2	3	2	1	0	0	0	Y
Earven Flat Gila River Graham, 952, 5.00	31	5/18/2005 5/20/2005 6/2/2005 6/20/2005 7/8/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Spring Canyon Gila River Graham, 950, 1.75	31	5/20/2005 6/20/2005 7/8/2005	0 0 0	0	0	0	0	0	0	Y
Bonita Creek Gila River Graham, 975, 14.71	31	5/14/2005 6/15/2005 6/28/2005 7/8/2005 7/15/2005	0 0 0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Gutherie Gila River Greenlee, 1029, 3.00	32	5/16/2005 6/1/2005 6/23/2005	0 0 0	0	0	0	0	0	0	Y
Hassayampa River										
Johnson Road Hassayampa River Maricopa, 300, 10.09	33	5/16/2005 6/14/2005 6/27/2005 7/5/2005 7/12/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Little Colorado River										
Tanners Crossing Little Colorado River Coconino, 1262, 17.50	34	5/27/2005 6/10/2005 6/23/2005 6/30/2005 7/6/2005	1 0 0 0 0	0	0	0	0	0	1	Y
I-40 Cottonwood Bridges Little Colorado River Navajo, 1484, 11.99	35	5/25/2005 6/15/2005 6/22/2005 6/28/2005 7/7/2005	0 0 0 0 0	0	0	0	0	0	0	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
River Reservoir [f, e] Little Colorado River Apache, 2499	36 ▲	6/16/2005 7/9/2005 7/21/2005	3 3 3	3	2	1	0	0	0	Y
Greer Townsite [f, e] Little Colorado River Apache, 2539	36	6/16/2005 7/9/2005 7/21/2005	0 0 0	0	0	0	0	0	0	Y
Salt River										
Granite Reef Salt River Maricopa, 403, 12.16	37	5/19/2005 5/21/2005 6/6/2005 7/5/2005	0 0 0 0	0	0	0	0	0	0	Y
Coon Creek Salt River Gila, 610, 8.16	37	5/23/2005 6/1/2005 7/4/2005	0 0 0	0	0	0	0	0	0	Y
Pinto Creek Salt River Gila, 732, 40.26	38	5/24/2005 5/25/2005 5/27/2005 6/8/2005 6/13/2005 7/6/2005 7/12/2005	0 0 0 0 0 0 0	0	0	0	0	0	0	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Grapevine [e] Salt River Gila, 640, 4.08	39 ▲	6/21/2005 7/12/2005	1 0	1	1	0	0	0	0	Y
Pinto Creek near School House [e] Salt River Gila, 640, 3.25	39	6/20/05	0	0	0	0	0	0	0	N
School House Point South Salt River Gila, 640, 4.75	39 +	Monitored 5/05 to 8/05	N/A	4	2	2	2	0	1	N
School House Point North Salt River Gila, 640, 6.00	39	5/16/2005 6/8/2005 7/6/2005	0 1 0	0	0	0	0	0	1	N
Salt River Inflow [i] Salt River Gila, 640, 108.99	39 +	Monitored 5/05 to 8/05	N/A	36	22	17	22	0	3	Y
Cottonwood Acres II Salt River Gila, 652, 37.24	39 +	Monitored 5/05 to 8/05	N/A	7	6	1	1	0	1	Y
Cottonwood Acres I Salt River Gila, 652, 45.40	39 +	Monitored 5/05 to 8/05	N/A	71	36	35	44[h]	0	2	Y
Meddler Point Salt River Gila, 640, 5.38	39	5/19/2005 6/4/2005 7/8/2005	0 0 0	0	0	0	0	0	0	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Eads Wash Salt River Gila, 661, 3.50	39	5/19/2005 6/4/2005 7/8/2005	0 0 0	0	0	0	0	0	0	N
Roosevelt Diversion Dam Salt River Gila, 664, 3.92	39	5/19/2005 6/4/2005 7/8/2005	0 0 0	0	0	0	0	0	0	N
Salt River at State Route 288 Bridge [f] Salt River Gila, 668	39	5/15/2005 5/19/2005 6/4/2005 7/8/2005	0 0 0 0	0	0	0	0	0	1	U
Pinal Creek Salt River Gila, 853, 54.84	40 +	5/18/2005 6/16/2005 6/30/2005 7/7/2005 7/14/2005	3 14 14 14 14	14	7	7	8[h]	0	0	Y
Cherry Creek South Salt River Gila, 793, 8.60	41	5/30/2005 5/31/2005 6/14/2005 6/27/2005	0 0 0 0	0	0	0	0	0	0	Y
Cherry Creek North Salt River Gila, 793, 6.46	41	5/31/2005 6/14/2005 6/27/2005	0 0 0	0	0	0	0	0	0	N

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
San Francisco River										
Clifton Peak San Francisco River Greenlee, 1058, 34.00	42	5/19/2005 6/17/2005 6/29/2005 7/8/2005 7/15/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Alpine Horse Pasture[e] San Francisco River Apache, 2414	43 ▲	7/9/2005 7/21/2005	1 1	1	1	0	0	0	0	Y
San Pedro River										
CB Crossing Southeast San Pedro River Pinal, 594, 4.07	44 +	Monitored 5/05 to 8/05	N/A	2	1	1	2	0	1	N
Indian Hills San Pedro River Pinal, 604, 22.68	44	5/16/2005 6/7/2005 7/5/2005	0 0 0	0	0	0	0	0	0	Y
Dudleyville Crossing San Pedro River Pinal, 604, 61.32	44 +	Monitored 5/05 to 8/05	N/A	24	15	9	9	0	4	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Malpais Hill San Pedro River Pinal, 634, 2.56	44	5/16/2005 5/22/2005 5/25/2005 6/11/2005 6/28/2005	1 0 0 0 0	0	0	0	0	0	1	Y
PZ Ranch San Pedro River Pinal, 634, 3.88	44	5/18/2005 6/6/2005 6/28/2005	0 0 0	0	0	0	0	0	0	N
PZ Ranch West San Pedro River Pinal, 634, 3.13	44 +	Monitored 5/05 to 8/05	N/A	2	1	1	2	0	0	Y
Cook's Lake Cienega/Seep [g] San Pedro River Pinal, 643, 22.41	44 +	5/18/2005 5/19/2005 6/1/2005 6/2/2005 6/28/2005 7/1/2005	9 5 17 5 10 5	17	11	6	8	0	1	N
Aravaipa Inflow North San Pedro River Pinal, 661, 18.19	44 +	Monitored 5/05 to 8/05	N/A	32	18	14	24	0	1	N
San Pedro/Aravaipa Confluence San Pedro River Pinal, 658, 14.53	44 +	Monitored 5/05 to 8/05	N/A	19	10	9	11[h]	0	1	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Aravaipa Inflow South San Pedro River Pinal, 658, 21.61	44 +	Monitored 5/05 to 8/05	N/A	32	16	16	19	0	2	Y
Wheatfields San Pedro River Pinal, 671, 10.23	44 +	Monitored 5/05 to 8/05	N/A	24	12	12	18	0	1	Y
Wheatfields South San Pedro River Pinal, 671, 15.41	44 +	Monitored 5/05 to 8/05	N/A	28	14	14	16	0	0	Y
Capgage Wash San Pedro River Pinal, 681, 2.64	44	5/18/2005 6/1/2005 7/7/2005	0 0 0	0	0	0	0	0	0	N
San Manuel Crossing San Pedro River Pinal, 780, 53.14	45 +	Monitored 5/05 to 8/05	N/A	107	55	52	67	0	1	Y
Catalina Wash San Pedro River Pinal, 774, 12.30	45 +	5/16/2005 5/18/2005 6/1/2005 6/27/2005	0 4 7 6	7	4	3	1	0	1	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Bingham Cienega San Pedro River Pima, 854, 2.25	46	5/16/2005 6/1/2005 6/27/2005	0 1 0	0	0	0	0	0	1	N
Three Links San Pedro River Cochise, 991, 32.25	47 +	5/25/2005 6/21/2005 7/12/2005	7 12 11	14	7	6	8	2	1	Y
Babocomari San Pedro River Cochise, 1403, 8.91	48	5/27/2005 6/16/2005 7/12/2005	0 0 0	0	0	0	0	0	0	Y
SPRNCA - 9 San Pedro River Cochise, 1158, 8.95	49	5/23/2005 6/6/2005 6/28/2005	0 0 0	0	0	0	0	0	0	Y
Charleston Bridge North San Pedro River Cochise, 1188, 17.56	49	5/23/2005 5/24/2005 6/6/2005 6/7/2005 6/28/2005 7/1/2005	0 0 0 0 0 0	0	0	0	0	0	0	Y
Escapula Wash North San Pedro River Cochise, 1219, 3.55	49	5/24/2005 6/7/2005 7/1/2005	0 0 0	0	0	0	0	0	0	Y

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Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Escapula Wash South San Pedro River Cochise, 1219, 6.89	49	5/24/2005 6/7/2005 7/1/2005	0 0 0	0	0	0	0	0	0	Y
State Route 90 Bridge San Pedro River Cochise, 1237, 18.44	50	5/25/2005 6/21/2005 6/30/2005	0 0 0	0	0	0	0	0	0	Y
SPRNCA - Carr to Hunter San Pedro River Cochise, 1250, 5.50	50	5/25/2005 6/21/2005 6/30/2005	0 0 0	0	0	0	0	0	0	Y
Hereford Bridge [f] San Pedro River Cochise, 1265	51 +	5/26/2005 6/20/2005 7/7/2005 7/10/2005 7/19/2005 7/25/2005	0 0 2 2 2 2	2	1	1	1	0	0	Y
SPRNCA - Palominas San Pedro River Cochise, 1280, 22.08	52	5/31/2005 6/17/2005 7/8/2005	0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Santa Cruz River										
Cuates Buttes [e] Santa Cruz River Santa Cruz, 1085, 4.61	53	6/11/2005 7/10/2005	0 0	0	0	0	0	0	0	Y
Patagonia Lake-Sonoita Creek Santa Cruz River Santa Cruz, 1157, 12.96	54	5/22/2005 6/10/2005 7/9/2005	0 0 0	0	0	0	0	0	0	Y
Santa Maria River										
Lower Santa Maria River [e] Santa Maria River Mohave, 354, 10.00	55	5/23/2005 7/6/2005	0 0	0	0	0	0	0	0	Y
Tonto Creek										
Orange Peel Tonto Creek Gila, 610, 1.42	56 +	Monitored 5/05 to 8/05	N/A	9	5	4	4	0	0	N
Tonto Creek Inflow [i] Tonto Creek Gila, 640, 22.49	56 +	Monitored 5/05 to 8/05	N/A	65	37	32	38	0	3	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
A-Cross Road South Tonto Creek Gila, 677, 20.66	56 +	Monitored 5/05 to 8/05	N/A	40	20	20	27	0	1	Y
A-Cross Road North [i] Tonto Creek Gila, 677, 20.66	56 +	Monitored 5/05 to 8/05	N/A	21	10	10	13	0	1	Y
Bar-X Road [i] Tonto Creek Gila, 694, 27.16	56 +	Monitored 5/05 to 8/05	N/A	21	12	10	14	0	1	Y
Punkin Center Tonto Creek Gila, 732, 10.36	57	5/17/2005 6/15/2005 6/28/2005 7/6/2005 7/13/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Del Shay Tonto Creek Gila, 823, 4.90	58	5/17/2005 6/8/2005 7/11/2005	0 0 0	0	0	0	0	0	0	N
Rye Creek Tonto Creek Gila, 854, 11.33	58	5/17/2005 6/8/2005 7/11/2005	0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Gisela South Tonto Creek Gila, 853, 15.34	58	5/17/2005 6/15/2005 6/28/2005 7/6/2005 7/13/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Tonto Creek - Gisela Tonto Creek Gila, 915, 10.66	58	5/16/2005 6/7/2005 6/29/2005	0 0 0	0	0	0	0	0	0	Y
Verde River										
Rock Creek - Beeline Maricopa, 634, 4.00	59	5/18/2005 6/6/2005 7/5/2005	0 0 0	0	0	0	0	0	0	Y
Needle Rock Verde River Maricopa, 457, 3.36	60	5/23/2005 6/16/2005 7/13/2005	0 0 0	0	0	0	0	0	0	Y
Bartlett Dam Verde River Maricopa, 137, 10.07	60	5/23/2005 6/16/2005 7/13/2005	0 0 0	0	0	0	0	0	0	Y
Bartlett North Verde River Maricopa, 166, 11.77	61	5/19/2005 6/15/2005 7/13/2005	0 0 0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Davenport [e] Verde River Maricopa, 576, 2.91	61	5/18/2005 6/14/2005	0 0	0	0	0	0	0	0	N
Horseshoe North Verde River Yavapai, 604, 10.00	61 +	Monitored 5/05 to 8/05	N/A	34	20	14	22	0	1	Y
Ister Flat Verde River Yavapai, 610, 4.00	61 +	Monitored 5/05 to 8/05	N/A	4	3	1	1	0	0	Y
Stage Stop - Dry Beaver Creek [e] Yavapai, 1103, 3.25	62	5/27/2005 6/19/2005	0 0	0	0	0	0	0	0	Y
Camp Verde [e] Verde River Yavapai, 942, 14.48	63	5/27/2005 6/26/2005 7/10/2005	0 0 0	0	0	0	0	0	0	Y
Sheepshead Canyon [e] Verde River Yavapai, 1052, 2.50	64	5/25/2005 6/20/2005	0 0	0	0	0	0	0	0	Y
Verde @ Powerline [e] Verde River Yavapai, 1061, 1.00	65	5/31/2005	0	0	0	0	0	0	0	Y

Appendix F. Arizona willow flycatcher survey results by site, 2005 (map numbers and symbols correspond to Appendix E).

Site name Drainage County, Elevation (m), Survey Hours	Map Number	Individual Surveys		Site Summary						
		Survey Date	WIFL[a]	Resident Adult WIFL	Territories	Pairs	Nests	Unknown Status WIFL[b]	Migrant WIFL[c]	BHCO Present[d]
Near Muldoon Canyon [e, f] Verde River Yavapai, 1280	66	6/13/2005	0	0	0	0	0	1	0	U
Granite Creek Verde River Yavapai, 1585, 13.00	67	5/25/2005 6/16/2005 7/1/2005 7/8/2005 7/15/2005	0 0 0 0 0	0	0	0	0	0	0	Y
Virgin River										
Littlefield [e] Virgin River Mohave, 579, 4.07	68	6/1/2005 7/14/2005	0 0	0	0	0	0	0	0	N
Black Rock Gulch [e] Virgin River Mohave, 719, 5.41	68	5/31/2005 7/13/2005	0 0	0	0	0	0	0	0	Y

[a] WIFL = adult willow flycatcher (*Empidonax trailii extimus*).
[b] Estimated number of willow flycatchers that could not be classified as resident or migrant due to brief appearance at the site during the breeding season or lack of survey data.
[c] Maximum number of migrant willow flycatchers detected during any single survey event.
[d] BHCO = brown-headed cowbirds (*Molothrus ater*).
[e] Survey did not meet 3-survey period USFWS protocol guidelines due to habitat determined to be unsuitable, habitat rendered unsuitable due to fire or other natural event, time, or accessibility constraints.
[f] We were unable to determine survey hours.
[g] Discrepancies between number of WIFL found on individual surveys and number of WIFL in the site summary occur because not all resident WIFL were seen on the same day.
[h] Total nest number includes one or two instances where fledglings were found and confirmed to a territory but no actual nest was found before fledglings were discovered.
[i] Number of residents, territories and pairs may not be equal due to polygynous males and non-territorial floaters.
[j] Site is located within the Gila River watershed on Queen Creek.

Appendix G. Willow flycatcher banding effort at the Winkelman Study Area, 2005.

Site Banded	Date Banded	Federal Bird band number	Color band left leg[a]	Color band right leg[a]	Age 2005[b]	Sex[c]
Gila River South Site 07	06/12/05	2360-07161	RW	DX	AHY	F
	06/12/05	2360-07169	WZ	DX	AHY	M
Kearny	05/14/05	2360-07135	DX	WW	AHY	U
	05/27/05	2360-07159	YV	DX	ASY	M
Gila River South Site 16	06/08/05	2360-07131	YY	DX	AHY	F
	06/08/05	2360-07147	KR	DX	AHY	M
	06/08/05	2360-07144	WW	DX	AHY	M
Dudleyville Crossing	06/07/05	2360-07179	DZ	DX	AHY	F
	06/13/05	2360-07178	RR	XD	AHY	F
	06/13/05	2360-07194	VW	DX	AHY	F
Cook's Lake Cienega	05/21/05	2360-07151	WR	DX	AHY	M
	05/21/05	2360-07153	DV	DX	AHY	F
Aravaipa Inflow North	06/22/05	2360-07205	ZZ	DX	AHY	F
	06/27/05	2360-07208	KD	DX	AHY	M
	07/03/05	2360-07210	ZD	DX	AHY	F
San Pedro/Aravaipa Confluence	05/23/05	2360-07164	DW	DX	AHY	U
Aravaipa Inflow South	05/15/05	2360-07137	DD	DX	AHY	M
	05/20/05	2360-07139	DO	DX	AHY	F
	05/20/05	2360-07140	KO	DX	AHY	M
	05/20/05	2360-07146	ZW	DX	AHY	F
	06/07/05	2360-07121	WV	DX	AHY	F
	06/11/05	2360-07154	WY	DX	AHY	F
	06/14/05	2360-07202	VD	DX	AHY	M
Wheatfields	05/22/05	2360-07158	YK	DX	AHY	M
Wheatfields South	05/15/05	2360-07136	DX	WY	AHY	U
	05/22/05	2360-07160	VV	DX	AHY	M
	06/21/05	2360-07204	RR	DX	AHY	F
	06/23/05	2360-07206	RD	DX	AHY	F
San Manuel Crossing	05/12/05	2360-07126	DX	VD	AHY	M
	05/12/05	2360-07128	DX	WO	AHY	M
	05/12/05	2360-07132	DX	YY	AHY	M
	05/29/05	2360-07171	DX	ZK	AHY	F
	06/06/05	2360-07174	DR	DX	AHY	F
	06/15/05	2360-07201	OK	DX	AHY	F
	06/19/05	2360-07203	RK	DX	AHY	M
	06/24/05	2360-07207	OR	DX	AHY	M
	06/24/05	2360-07209	YW	DX	AHY	F

[a] Color band color codes: D = Blue, K = Black, O = Orange, R = Red, V = Violet, W = White, X = Silver, Y = Yellow, and Z = Gold
[b] Age: AHY = 2 years or older, ASY = 3 years or older
[c] Sex: F = Female, M = Male, U = Unknown

Appendix H. Habitat measurements recorded at willow flycatcher nests located in AZGFD Study Areas in Arizona, 2005.

	Nest height (m)	Nest substrate height (m)	Diameter of nest substrate main stem (cm)	Distance from nest to water (m)
Tonto Creek Study Area				
Number of nests[a]	37	37	34	37
Mean ± s	3.67 ± 1.1	7.80 ± 3.64	8.29 ± 5.47	45.48 ± 85.04
Median	3.50	6.84	6.30	10.40
Minimum	1.88	3.05	2.60	0.00
Maximum	6.56	16.34	23.2	305.00
Salt River Study Area				
Number of nests[a]	33	33	32	33
Mean ± s	3.2 ± .86	5.47 ± 1.88	8.68 ± 9.65	18.33 ± 51.53
Median	2.97	4.82	4.85	0.00
Minimum	1.89	3.23	1.80	0.00
Maximum	4.85	12	47	204.00
Roosevelt Lake Total				
Number of nests[a]	70	70	66	70
Mean ± s	3.45 ± 1.01	6.69 ± 3.14	8.48 ± 7.73	32.68 ± 72.05
Median	3.29	5.66	5.30	5.30
Minimum	1.88	3.05	1.80	0.00
Maximum	6.56	16.34	47	305.00
Winkelman Study Area				
Number of nests[a]	76	76	75	76
Mean ± s	5.29 ± 1.87	8.64 ± 2.98	10.91 ± 5.72	55.73 ± 108.37
Median	5.21	8.28	10.2	16.95
Minimum	1.10	3.20	1.70	0.00
Maximum	13.06	20	29.3	471.13

[a] Number of nests used in calculation.