

SOUTHWESTERN WILLOW FLYCATCHER 2004 SURVEY AND NEST MONITORING REPORT

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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. Information was gathered in a standardized, systematic, interagency approach to provide a basis for management recommendations. Results of the 2004 survey and nest monitoring effort are summarized in this report.

Surveys, Detections, and Distribution. The Arizona Game and Fish Department and other cooperators spent 2736 hours surveying 178 sites covering approximately 175 linear km of riparian habitat. Surveyors detected 940 resident flycatchers at 40 sites. They located 522 flycatcher territories; in which 430 pairs were documented at 37 sites. Flycatchers were documented along 12 drainages. The major concentrations in low elevations (<1115 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), Alamo Lake (Brown's Crossing), and Topock Marsh (Lower Colorado River). Two high-elevation (>2400 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 490 flycatcher nesting attempts at 32 sites throughout Arizona. Of these, 431 nests contained eggs and were monitored. Nest fate (success or failure) was determined for 389 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, Littlefield, and RM 277-274 R Grand Canyon). Of the 389 nests with known outcomes, 182 (47%) were successful; this includes fledges in 11 territories with no nest found. One hundred sixty-nine nests were depredated, nine were deserted, four were infertile, seven failed directly due to brown-headed cowbird parasitism, and 17 failed due to unknown causes.

In nest monitoring study areas, we calculated Mayfield nest success for 378 nests. Mayfield nest success was 43.35%. Four hundred nine flycatchers fledged from 171 successful nests, of which Mayfield nest success could be calculated. Average seasonal productivity was 1.31 for the 104 females (150 nests) that we intensively monitored during the breeding season. At monitored sites, 25 flycatcher nests were parasitized by brown-headed cowbirds. Cowbirds were documented at 28 of 32 sites where flycatcher nests were observed. Cowbird trapping was conducted at four sites, two of which (Alpine Horse Pasture and Topock) had known breeding flycatchers.

Color Banding and Adult Movement. At the Winkelman Study Area we banded 55 new flycatchers. We detected 20 between-year movements at the Winkelman Study Area by resighting flycatchers. Sixteen movements (averaging 14.7 km) were within the San Pedro River drainage. Three movements (averaging 36.6 km) were between drainages within the Winkelman Study Area and one movement (98.1 km) was between study areas (Roosevelt Lake to the San

Pedro River). We also had one within-season movement of 7.74 km on the San Pedro River drainage.

Nesting Habitat Characterization. Tamarisk was the predominant nesting substrate (298 nests). Nests were also found in willow (133 nests), cottonwood (24 nests), mesquite (5 nests), Arizona ash (1 nest), and common buttonbush (1 nest). Mean nest height was 4.73 m ($s = \pm 1.59$; $n = 81$) at the Winkelman Study Area and 3.58 m ($s = \pm 1.24$; $n = 64$) 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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SOUTHWESTERN WILLOW FLYCATCHER 2004 SURVEY AND NEST MONITORING REPORT

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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 (Fig. 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 (Unitt 1987; Wilbur 1987).

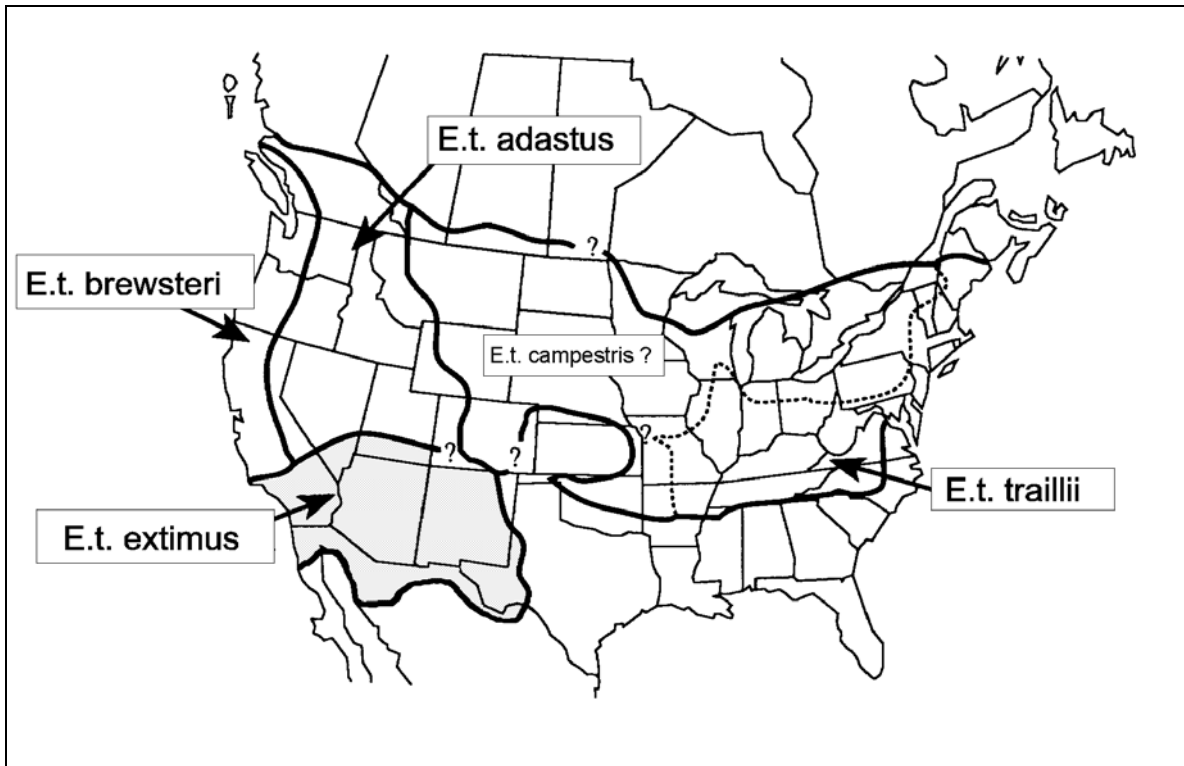


Figure 1. Distribution of willow flycatcher subspecies. Adapted from Browning (1993) and Unitt (1987).

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 (AGFD), as the coordinating agency, to initiate statewide flycatcher surveys in 1993 (Muiznieks and others 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 identified as 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 and currently is in the process of being redesignated (USFWS 2004). The flycatcher is also included in the AGFD list, *Wildlife of Special Concern in Arizona* (1996). As a result of the Biological Opinion regarding modifications to Roosevelt Dam (USFWS 1996), AGFD was contracted by U.S. Bureau of Reclamation to locate and monitor nests at three breeding areas (Tonto Creek and Salt River study areas [Roosevelt Lake], and Winkelman Study Area). This intensive nest monitoring effort began in 1997 and has continued through 2004 in order to collect detailed local population estimates and nest productivity data.

This document serves as the AGFD summary report on 2004 activities. It also contains a summary of related work by cooperators, which fall into one of two categories: 1) the effort to systematically search riparian habitat to record the presence and number of flycatchers in Arizona (surveys); or, 2) the intensive effort at a few select breeding areas to estimate nest success and productivity, and to record vegetation characteristics at some or all of the nests (monitoring).

Specifically, the 2004 AGFD objectives were as follows:

1. Coordinate survey and monitoring efforts with agency and private cooperators.
2. Survey habitat at Alamo Lake. Survey sites along the Little Colorado and San Francisco rivers in the Greer/Alpine area. Survey suitable and potentially suitable habitat within 40 km of occupied habitat at Roosevelt Lake. Survey suitable and potentially suitable habitat (where landowner permission was obtained) on the San Pedro River from Bingham Cienega to the confluence with the Gila River and on the Gila River from Dripping Springs Wash to the Florence-Kelvin Highway Bridge (Winkelman Study Area).
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), U.S. Bureau of Reclamation (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 2004 survey and monitoring data. Prior Arizona survey and monitoring data can be found in McCarthy and others (1998), Paradzick and others (1999, 2000, 2001), Sferra and others (1995, 1997), Spencer and others (1996), and Smith and others (2002, 2003, 2004). Our work complements that of CPRS (see Newell and others 2004), 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 and others (2005), Finch and Stoleson (2000), McLeod and others (2005), Owen and Sogge (2002), Paxton and others (1996), Sedgwick (2000), Sogge and others (1997b, 2003), SWCA, Inc. Environmental Consultants (1997), and Whitfield and Enos (1996). Information on the 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. AGFD compiled this information and worked to coordinate surveys with agencies and organizations to limit overlap of areas. AGFD 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 and others 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 25 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. 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 or the last 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, AGFD 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 AGFD 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 Nongame and Endangered Wildlife Program Willow Flycatcher Database and made available for electronic transfer to the Willow Flycatcher Information Management System. Flycatchers and other species of concern detected during surveys were recorded in the AGFD Heritage Data Management System.

AGFD SURVEY TECHNIQUES

All AGFD surveys were conducted according to established survey protocol (Sogge and others 1997a), except at sites with accessibility constraints (for example: Bermuda Flats). Additionally, when flycatchers were detected, repeat visits were conducted until pair status was confirmed. For resident adult flycatchers at AGFD sites, we assumed that pairs were monogamous, unless evidence from color-banded individuals indicated that polygyny was occurring. Polygyny was determined if a color-banded male was concurrently attending nests of two or more females.

AGFD NEST MONITORING TECHNIQUES

Nest monitoring methods used by AGFD followed the Southwestern Willow Flycatcher Nest Monitoring Protocol (Rourke and others 1999), a modification of the Breeding Biology Research and Monitoring Database (BBIRD) field protocol (Martin and others 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 mirror pole or miniature video camera. After hatching, the nestling number was also confirmed using these same techniques. 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 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 a set number of marked females to be monitored each year. To obtain a statistically valid sample, we needed to monitor 35 females in the Winkelman Study Area, 35 at Salt River Study Area, and 15 at Tonto Creek Study Area. 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 to meet our sample size. We selected females in an effort to optimize the number of years monitored and the age distribution. Additionally, we selected females only if we were able to monitor all nesting attempts in compliance with established protocol (Rourke and others 1999). This method of monitoring known females 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 and others 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.

AGFD NEST MONITORING STUDY AREAS

Three study areas were surveyed and monitored by AGFD during 2004: 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 recent years, both study areas have expanded as flycatchers were found in habitat that developed as lake levels receded.

Salt River Study Area. Vegetation varied from monotypic tamarisk (*Tamarix* spp.) to nearly monotypic Goodding willow (*Salix gooddingii*). Canopy height varied from 5 m to 10 m. The Salt River is perennial.

Tonto Creek Study Area. Vegetation varied from a tamarisk-dominated understory with patchy Fremont cottonwood (*Populus fremontii*) and/or Goodding willow overstory to stands of monotypic tamarisk. Canopy height varied from 5 m to 9 m. Portions of the Tonto Creek Study Area had standing water through most of the breeding season.

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 mid-May. Due to decreased releases from San Carlos Reservoir, the water flow at the Gila River study sites varied this season from flowing to only portions having standing water.

COOPERATOR NEST MONITORING

SWCA Environmental Consultants (SWCA) monitored nests at Topock Marsh and RM 277-274 R GC along the Colorado River, and Littlefield on the Virgin River. EcoPlan Associates monitored nests at the Big Sandy River Downstream US 93 study site. The nests at Alamo Lake – Brown's Crossing were monitored by USBR. Comparisons between AGFD and cooperator nest monitoring results were sometimes difficult because not all cooperators used the AGFD nest monitoring protocol (Rourke and others 1999) or the same method of analysis for nest success calculations; therefore, AGFD results may differ the cooperators' results.

COLOR BANDING

AGFD personnel color banded flycatchers at the Winkelman Study Area, while CPRS personnel conducted banding at Roosevelt Lake. At Roosevelt Lake, AGFD coordinated closely with CPRS to resight previously banded birds, and to locate unbanded birds for future banding. For more information regarding the banding methods used and results of the CPRS project, see Newell and others (2004). Additionally, SWCA conducted banding on the Colorado River. For

more information regarding the banding methods used and results of the SWCA project, see McLeod and others (2005).

ADULT MOVEMENT

With banding efforts at the Winkelman Study Area, we have continued to document flycatcher movements between patches. Movement may occur between or within study areas or years. Using GIS, we measured movements from the flycatcher's last known territory to the territory it occupied in 2004.

COWBIRD TRAPPING

Cowbird trapping was coordinated and conducted by cooperators. Traps were placed at four sites within two flycatcher breeding areas: 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 respective agency: 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 and others (1997a): 1) high-elevation Geyer willow (*Salix geyeriana*); 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 (such as patch composition, average canopy height, and distance to water) were visually estimated and recorded on forms in the field for every survey. AGFD personnel also measured habitat variables at nest sites; descriptive statistics were calculated where applicable.

RESULTS

SURVEYS, DETECTIONS, AND DISTRIBUTION

One hundred seventy-eight sites were surveyed covering approximately 175 linear km of riparian habitat (Table 1; Appendixes B, C). Sites ranged from 30 m to 2539 m in elevation and 0.87 km to 5.72 km in length. Forty-six of the 178 sites were not surveyed according to protocol. This was most likely due to time or funding limitations, habitat was determined unsuitable for flycatchers, or because of accessibility constraints. Thirteen sites were not surveyed previously. New survey sites were located along Tonto Creek (2 sites); and Colorado (6 sites), Verde (2 sites), Gila (1 site), Salt (1 site), and San Pedro (1 site) rivers.

Nine hundred forty resident flycatchers were documented within 522 territories at 40 sites (Table 1; Appendixes B, C). AGFD personnel and statewide cooperators recorded 430 known pairs. 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 (for example: inundation of habitat or access to private property at a site) precluded the documentation of pairs.

Resident flycatchers were documented along 12 drainages (Appendixes B, C). The greatest concentrations of flycatchers were found at the Winkelman Study Area with 37% of the birds statewide, and at Roosevelt Lake with 40% (Salt River 27% and Tonto Creek 13%; Fig. 2; Table 2). Resident flycatchers were detected for the first time at two sites that were surveyed at least once in previous years: Pinal Creek and Waddell Dam. Flycatchers were documented at the Three Links site on the San Pedro River and Bermuda Flats in the Tonto Creek Study Area, which were surveyed for the first time in 2004. Six sites, which were surveyed according to protocol, had one flycatcher in 2003 and no birds in 2004 (Adobe Lake, Bill Williams, GRN004, GRS012, Lower Santa Maria, and Mittry Lake). Davenport and Tonto Creek also were occupied in 2003 but not in 2004 (3 and 11 flycatchers, respectively). Cowbirds were documented at 140 survey sites including all but four flycatcher breeding sites (Malpais Hill, San Pedro/Aravaipa Confluence, PZ Ranch West, and Aravaipa Inflow North; Table 1; Appendix C).

Table 1. Willow flycatcher survey effort, detection, and nesting attempt totals in Arizona, 2004.	
Survey hours	2736
Sites surveyed	178
Linear km of habitat covered	175
Sites with resident willow flycatchers	40
Sites with documented pairs	37
Sites with documented breeding	32
Resident willow flycatchers	940
Territories	522
Pairs	430
Nesting attempts	490
Sites with cowbirds detected	140
Breeding sites with cowbirds detected	28

Migrant flycatchers were detected at 60 sites (Appendix C), 22 of which also had resident birds. Thirty-two flycatchers of unknown status were documented. These occurred on the Colorado (15), Gila (8), Big Sandy (3), Verde (2), and Salt (1) rivers (Appendix C).

Topock Marsh (Lower Colorado River) was the lowest elevation (140 m) where nesting was documented. Alpine Horse Pasture (San Francisco River) was the highest elevation (2414 m) where nesting was documented. No resident flycatchers were detected between 992 m and 2410 m.

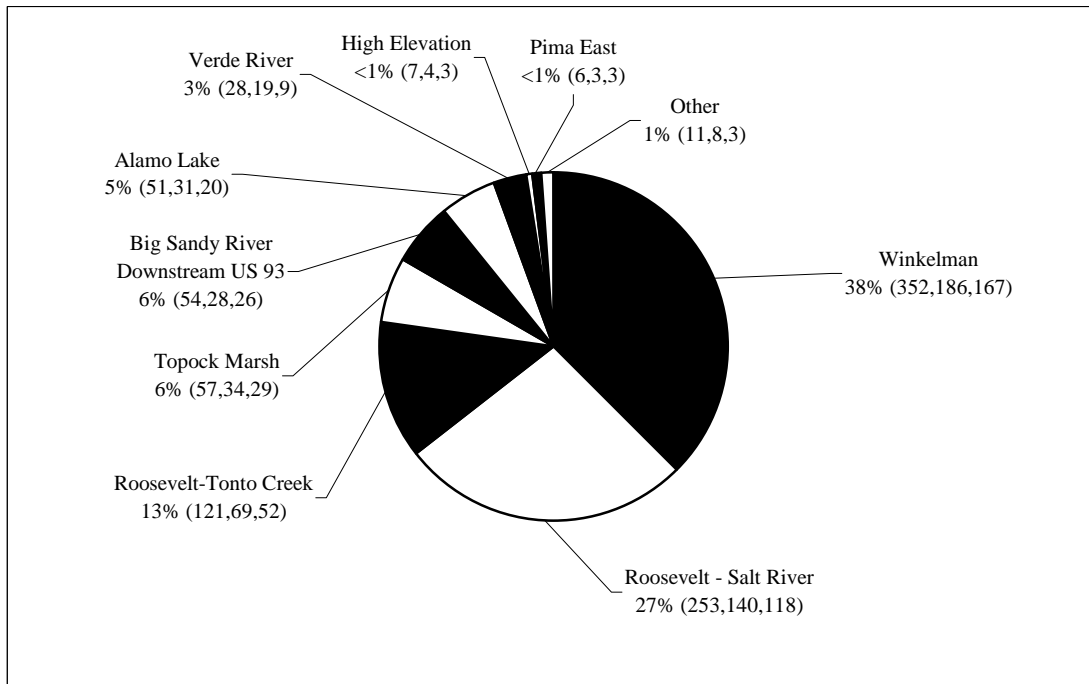


Figure 2. Southwestern willow flycatcher distribution in Arizona, 2004. The figure depicts survey location and percent of known willow flycatchers (number of resident willow flycatchers, number of territories, number of pairs). Percentages are based on total number of willow flycatchers detected in 2004 (see Table 2 for sites within each survey location).

Table 2. Sites with resident willow flycatchers grouped by survey locations in Arizona (see Fig. 2).^a

Winkelman Study Area	Roosevelt Lake		Alamo Lake	Verde River	High Elevation	Other Sites
	Salt River	Tonto Creek				
<ul style="list-style-type: none"> ▶ GRN018 ▶ GRS018 ▶ GRS007 ▶ Kearny ▶ CB Crossing Southeast ▶ Dudleyville Crossing ▶ Malpais Hill ▶ 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 ▶ Bingham Cienega ▶ Three Links 	<ul style="list-style-type: none"> ▶ Salt River Inflow ▶ Lake Shore ▶ School House Point South ▶ School House Point North 	<ul style="list-style-type: none"> ▶ Bar-X Road ▶ Bermuda Flats ▶ Orange Peel 	<ul style="list-style-type: none"> ▶ Lower Big Sandy River ▶ Alamo Lake-Brown's Crossing 	<ul style="list-style-type: none"> ▶ Camp Verde ▶ Horseshoe North 	<ul style="list-style-type: none"> ▶ River Reservoir ▶ Alpine Horse Pasture 	<ul style="list-style-type: none"> ▶ Mile 259.5 R GC ▶ Miles 277.0 to 274.0 R GC ▶ Monkey's Head ▶ Littlefield ▶ Pinal Creek ▶ Waddell Dam

^a Topock Marsh, Pima East, and Big Sandy River Downstream US 93 are not included in the table because they are individual sites.

NEST MONITORING

Statewide Effort

We documented 490 nesting attempts statewide at 32 sites (Appendix C). Of these, 431 nests were monitored and contained eggs. One hundred eighty-two (42%) of the 431 monitored nests fledged young, 207 (48%) failed, and 42 (10%) had unknown outcomes (Table 3). Excluding unknown outcomes, 47% of nests fledged and 53% failed. Depredation was the major cause of nest failure (82%; Table 4). Cooper's hawks and common kingsnakes have been documented as the most common predators of flycatcher nests at Roosevelt Lake and the Winkelman Study Area (Tudor and others in review). The earliest documented occurrence of egg laying in 2004 was on 17 May at San Manuel Crossing (Winkelman Study Area). The first hatching date and the first fledging date occurred at San Manuel Crossing on 31 May and 16 June, respectively. The last documented fledging occurred after 19 August at Wheatfields (Winkelman Study Area).

Table 3. Willow flycatcher nest monitoring results in Arizona, 2004.							
Site		Pairs ^a	Nests	Successful nests ^b	Failed nests	Unknown outcome ^c	Parasitized nests ^d
Roosevelt Lake	Tonto Creek	41	53	13	31	9	3
	Salt River	80	101	41	56	4	2
	Total	121	154	54	87	13	5
Winkelman Study Area		143	198	86	84	28	5
Alamo Lake - Brown's Crossing		10	10	5	5	0	1
Big Sandy River Downstream US 93		23	27	17	9	1	1
Topock Marsh ^e		27	39	18	21	0	13
Littlefield		1	2	1	1	0	0
RM 277.0 - 274.0 R Grand Canyon		1	1	1	0	0	0
All sites		326	431	182	207	42	25

^a Number of pairs contributing to the number of monitored nests.

^b Includes 11 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-five nests (6%) 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 Roosevelt Lake (5), Winkelman Study Area (5), Alamo Lake (1), Big Sandy River Downstream US 93 (1), and Topock Marsh (13). Eleven of the 25 (44%) nests parasitized were depredated (Table 5). The fate of three (12%) parasitized nests

was unknown: at the Gila River, a cowbird nestling was last observed at six days old; one nest at Topock Marsh had one addled flycatcher egg, one dead flycatcher nestling, and the fate of the cowbird nestling was unknown; and at Tonto Creek, a cowbird egg was removed from a nest, but the fate of the flycatcher egg is unknown.

Site		Depredated ^a	Deserted	Parasitized ^b	Infertile clutches ^c	Other
Roosevelt Lake	Tonto Creek	27	1	0	0	2
	Salt River	44	1	1	2	8
	Total	71	2	1	2	10
Winkelman Study Area		70	4	2	2	6
Alamo Lake - Brown's Crossing		2	3	0	0	0
Big Sandy River Downstream US 93		9	0	0	0	0
Topock Marsh ^d		16	0	4	0	1
Littlefield		1	0	0	0	0
RM 277.0 - 274.0 R Grand Canyon		0	0	0	0	0
All sites		169	9	7	4	17

^a Includes parasitized nests that were later depredated at Salt River, Topock Marsh, and Big Sandy River Downstream US 93.

^b Includes only those nests that failed directly due to cowbird parasitism (nests subsequently abandoned with eggs or fledged only cowbird young).

^c Includes one nest with infertile flycatcher and cowbird eggs at Salt River.

^d Cowbird trapping occurred in the area during the breeding season.

Outcome	Number of nests
Depredated	11
Nest abandoned	3
Flycatcher and cowbird eggs never hatched	1
Fledged only cowbird	2
Fledged flycatcher and cowbird	1
Fledged only flycatcher	3
Failure of nest due to unknown cause	1
Fate of nest unknown	3
Total parasitized nests	25

AGFD Study Areas

Nest Success. We were able to calculate Mayfield (1961, 1975) estimates of nest success for 378 nests statewide (Table 6). Mayfield nest success for all nests combined was 43.35%. Mayfield nest success for Roosevelt and Winkelman study areas was 31.94% and 49.57%, respectively.

Table 6. Willow flycatcher nest success and productivity of monitored nests at study areas in Arizona, 2004.					
Site		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	17.40 (487)	19	0.48 (40)	2.38 (8)
	Salt River	38.64 (1530)	98	1.04 (94)	2.45 (40)
	Total	31.94 (2017)	117	0.87 (134)	2.44 (48)
Winkelman Study Area		49.57 (3294)	209	1.20 (174)	2.52 (83)
Big Sandy River Downstream US 93		66.74 (411)	37	1.76 (21)	2.47 (15)
Alamo Lake - Brown's Crossing		57.59 (151)	13	1.63 (8)	2.60 (5)
Topock ^b		38.23 (582)	28	0.74 (38)	1.56 (18)
Littlefield		42.90 (33)	2	0.10 (2)	0.13 (1)
RM 277.0 - 274.0 R Grand Canyon		100.00 (26)	3	0.14 (1)	0.20 (1)
All sites		43.35 (6514)	409	1.09 (378)	2.42 (171)

^a n = number of nests.

^b Cowbird trapping occurred in the area during the breeding season.

Nest Productivity. Four hundred nine young fledged from 171 nests, where Mayfield estimates were calculated (Table 6); some nests of unknown outcome had enough observations to include in the analysis. This total does not include 18 additional fledglings in 11 territories, which could not be associated with a nest, at Lower Big Sandy River (2), Big Sandy River Downstream US 93 (5), Winkelman Study Area (4), and Tonto Creek Study Area (7). Seventy-six 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 2.66.

Female Productivity. One hundred four females were followed through all nesting attempts (n = 150) to determine female productivity at AGFD study areas. Average seasonal fecundity and average seasonal productivity were 1.69 and 1.31, respectively (Table 7). Thirty-seven females failed to successfully fledge any young (24 at Roosevelt Lake and 13 at Winkelman). Sixty percent had only one nesting attempt (Table 8). Of the total renests (41) documented, five were a

third nesting attempt (Table 8). Seven nests were initiated after a successful nest (double brood attempt), of which four (57%) were successful (one at the Tonto Creek Study Area and three at the Winkelman Study Area).

Site		No. of females	Nests	Average seasonal fecundity ^a	Average seasonal productivity ^b
Roosevelt Lake	Tonto Creek	15	21	0.60	0.29
	Salt River	36	46	1.64	1.49
	Total	51	67	1.33	1.13
Winkelman Study Area		53	83	2.04	1.48
All Sites		104	150	1.69	1.31

^a Mean fledges per female.

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

Site		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	15	66.7 (10)	26.7 (4)	6.7 (1)
	Salt River	36	75.0 (27)	22.2 (8)	2.8 (1)
	Total	51	72.5 (37)	23.5 (12)	3.9 (2)
Winkelman Study Area		53	49.1 (26)	45.3 (24)	5.7 (3)
All Sites		104	60.6 (63)	34.6 (36)	4.8 (5)

^a n = number of nests

COLOR BANDING

In 2004, we captured 68 flycatchers including 55 new-banded birds and 13 banded recaptures, of which nine were from previous years and four were banded in 2004. We placed color bands on 54 of the 68 flycatchers to aid in our nest monitoring efforts at the Winkelman Study Area (Appendix D). One flycatcher was not color banded due to a previous leg injury; it received a Federal Bird Band on the opposite leg (Appendix D).

ADULT MOVEMENT

With the banding effort by AGFD at the Winkelman Study Area, we documented movements of flycatchers between patches, with 16 along San Pedro River. In 2004, we documented 21 movements (Table 9). The most common type of movement (20) was within study area, between years. Of these, 19 moved from the site where they were last detected (2000-2003) to a different site within the same study area in 2004. The average distance moved was 18.2 km with a range

of 0.55 – 57.67 km. Three of these movements were between drainages within the Winkelman Study Area, from the Gila to the San Pedro River. We documented one adult flycatcher that moved 7.74 km between patches along the San Pedro River within the 2004 breeding season. In addition, one flycatcher traveled 98.08 km from the Roosevelt Study Area in 2003 to the San Pedro River in 2004. No movements were detected from San Pedro River to the Gila River or from Winkelman Study Area to Roosevelt Lake. Roosevelt Lake and statewide movement data can be found in the CPRS survivorship and movement report (Newell and others 2004).

Table 9. Willow flycatcher movements detected at the Winkelman Study Area in 2004.								
Last Detected in		Site Detected in 2004	Distance Moved (km)	Federal Bird Band Number	Color Band ^a		Age ^b 2004	Sex ^c
Site	Year				Left Leg	Right Leg		
Between study area between year movement								
School House North	2003	Wheatfields South	98.08	2290-24313	DD	YKY	ASY	M
Within study area between year movement								
Wheatfields	2003	Aravaipa Inflow North	3.81	2240-84088	DD	RZ	ASY	M
	2003	Wheatfields South	0.55	1590-97562	GG	ZZ	A7Y	M
	2003	Wheatfields South	0.61	2240-84054	DWD	DD	ASY	F
Aravaipa Inflow South	2003	San Manuel Crossing	26.88	2240-84063	GRG	DD	ASY	U
San Pedro / Aravaipa Confluence	2003	Aravaipa Inflow South	2.19	2240-84049	OD	DD	ASY	U
	2003	Aravaipa Inflow South	2.34	2240-84093	DD	YZ	ASY	M
Aravaipa Inflow North	2003	Cooks Lake	0.98	1740-51792	RO	XX	ATY	M
	2003	San Manuel Crossing	30.5	2240-84081	KZK	DD	ASY	F
	2003	San Manuel Crossing	31.13	2240-84085	YGY	DD	ASY	F
	2003	San Manuel Crossing	31.15	2240-84075	DD	DYD	ASY	F
	2003	Wheatfields South	5.28	2240-84078	GWG	DD	ASY	F
PZ Ranch West	2003	San Pedro / Aravaipa Confluence	5.49	1590-97556	ZZ	GW	A7Y	M
	2003	Aravaipa Inflow South	6.73	2240-84034	DD	DZ	ATY	M
Malpais Hill	2002	San Manuel Crossing	35.83	2240-84027	DD	OD	ATY	U
Dudleyville Crossing	2001	Aravaipa Inflow North	7.77	2240-84011	WK	DD	A4Y	U
CB Crossing SE	2000	San Manuel Crossing	43.95	1710-20381	DR	DD	A5Y	M
Kearny	2000	San Manuel Crossing	57.67	1590-97257	PPXX	KK	A8Y	M
	2002	PZ Ranch West	24.76	1590-97588	ZZ	YD	A7Y	F
	2003	Aravaipa Inflow North	27.39	2240-84060	DD	YRY	ASY	F
Within study area movement during 2004								
Dudleyville Crossing	2004	Aravaipa Inflow North	7.74	2240-84011	WK	DD	A4Y	U

^a D = Blue, G = Green, K = Black, O = Orange, R = Red, W = White, X = Silver, Y = Yellow, Z = Gold, P = Hot Pink (Plastic)

^b ASY = 3rd year or older, ATY = 4th year or older, A4Y = 5th year or older, A5Y = 6th year or older, A7Y = 8th year or older, A8Y = 9th year or older.

^c F = female, M = male, and U = unknown.

HABITAT CHARACTERISTICS

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

Eighteen sites within a mid-elevation band (992–2410 m) were surveyed, but resident flycatchers were not detected (see Appendix C). Riparian vegetation at these intermediate elevations was often in narrow bands along high-gradient streams prone to frequent scouring by floods, and was often dominated by an overstory of Arizona sycamore (*Platanus wrightii*).

Most nesting sites (26 of 32) were characterized as mixed native/exotic associations. However, the amount of tamarisk varied within and between sites. Three nesting sites (GRS007, GRN018, and Topock Marsh) were composed of dense monotypic stands of tamarisk, forming a nearly continuous closed canopy. Alpine Horse Pasture was the only breeding site classified as native broadleaf.

Nesting substrate was documented for 462 of the 490 nests (Table 10). Tamarisk and Goodding willow were the primary nesting substrates in Arizona. At the Winkelman Study Area (Cook’s Lake Cienega), five nests were documented in mesquite, one nest in common buttonbush, and one nest in Arizona ash (Table 10. This was the first breeding season in Arizona with a record of Arizona ash as nesting substrate. Mean nest height at Winkelman and Roosevelt Lake study areas was 4.73 m ($s = \pm 1.59$; $n = 81$) and 3.58 m ($s = \pm 1.24$; $n = 64$), respectively (Appendix D).

Table 10. Tree species used for willow flycatcher nesting in Arizona, 2004.	
Substrate	No. of nests
Common buttonbush (<i>Cephalanthus occidentalis</i>)	1
Arizona ash (<i>Fraxinus velutina</i>)	1
Fremont cottonwood (<i>Populus fremontii</i>)	24
Mesquite (<i>Prosopis</i> spp.)	5
Coyote willow (<i>Salix exigua</i>)	3
Geyer willow (<i>Salix geyeriana</i>)	1
Goodding willow (<i>Salix gooddingii</i>)	129
Tamarisk (<i>Tamarix</i> spp.)	298
Total	462

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 and conservation efforts. During the 2004 survey, 77% of flycatchers were concentrated within two areas of the state (Roosevelt Lake and Winkelman Study Area). The 2004 breeding season had a statewide increase of abundance of 27.3% from 2003 and 21.4% from 2002 (522 territories in 2004, 410 in 2003, and 430 in 2002; Smith and others 2004). However, the total number of resident flycatchers in Arizona may be underestimated because there were 32 unknown status birds (2 in 2003), some birds may have not been detected at surveyed sites, and not all previously occupied areas were surveyed in 2004. For example, Ft. Thomas - Geronimo had 22 territories in 2003 (Smith and others 2004), but was not surveyed in 2004.

The number of territories at the Winkelman Study Area increased from 165 territories in 2003 to 186 in 2004. The increase in flycatcher territories at Wheatfields South (2 to 9 territories), Aravaipa Inflow South (5 to 13 territories), and San Manuel Crossing (35 to 59 territories) can be attributed to the continuing regeneration of habitat due to perennial water flow. The apparent decrease of territories from 2003 to 2004 at Malpais Hill (11 to 2 territories) is not representative because the entire area was not surveyed in 2004 due to lack of landowner permission. An increase from one to two territories occurred in the area surveyed both years. There was a notable decline in flycatcher occupation along the Gila River sites within the Winkelman Study Area. From 2002 to 2003 there was a 44% decline in resident flycatchers and a 47% decline from 2003 to 2004. In the past two years, the Gila River has dropped from 46 to 14 territories (a 69.5% decline). Three sites on the Gila River that had lone males in 2003 had no flycatchers in 2004 and one site declined 60% from ten to four territories. This decrease may be attributed to the lack of suitable habitat as a result of diminished flows in the Gila River since 2002 (discussed in Habitat section). Additionally in 2004, approximately two-thirds of Kearny, the most productive site remaining on the Gila River at the Winkelman Study Area, burned in early July. Approximately two-thirds of the site burned. Only the area inundated with water daily (due to a Biological Opinion, USFWS 1998) survived the fire; this area had the main concentration of birds. After the fire, one female flycatcher banded at Kearny in 2000 was found dead, and one nest tree with three flycatcher nestlings was burned. Only one of three other nestlings of fledge age was known to have fledged after the fire. Another nest, although not burned, contained three flycatcher eggs that never hatched post fire.

Flycatcher abundance at Roosevelt Lake increased by 56% since 2003 (134 to 209 territories) primarily due to School House Point North (52 to 84 territories), Bar-X Road (2 to 10 territories), and Bermuda Flats (new site with 40 territories). The territories at Bermuda Flats could be underestimated because of the late discovery (7 June) of birds at the site and logistical constraints of surveying the inundated habitat. Recruitment of flycatchers at both School House Point North and Bermuda Flats may be attributed to new vegetation. Sites with older habitat

continued to decline from 2003 to 2004, including the upstream portion of School House Point North (28 to 24 residents), Salt River Inflow (82 to 62 residents), and Tonto Creek Inflow (11 to 0 residents). This year is the first time since the discovery of flycatchers at Tonto Creek Inflow in 1993 (Sferra and others 1997) that flycatchers have not occupied the site.

Big Sandy River Downstream US 93 and Topock Marsh had the greatest relative increase in flycatchers documented in Arizona. Big Sandy River Downstream US 93 had an 87% increase in flycatchers since 2003 (15 to 28 territories), which was attributed to the increase in survey effort and new suitable habitat (Patrick Dockens, pers. com). The number of territories at Topock Marsh tripled from 2003 to 2004 (11 and 34, respectively; McLeod and others 2005).

Several sites had notable detections in 2004. Flycatchers were first documented at Pinal Creek and along the Aqua Fria River at the Waddell Dam site. This year was also the first time since 2001 that resident flycatchers were documented along the Virgin River. Three flycatchers were detected in the Lower Grand Canyon in 2004 for the first time since 2001 (McLeod and others 2005). The receding water in Lake Mead may have contributed to the absence of birds in 2002 and 2003; however, the regeneration of vegetation in exposed areas is possibly the catalyst for their return to the Lower Grand Canyon (McLeod and others 2005). In contrast, the habitat structure at Bill Williams has deteriorated as water levels have receded. This is the first year since 1998 that flycatchers have not nested at Monkey's Head along the Bill Williams Delta (McLeod and others 2005). Residents at Monkey's Head has also decreased from nine in 2003 to two in 2004.

NEST MONITORING

In 1995, AGFD 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. During 2004 overall productivity and nest success in Arizona decreased from the high levels of 2003.

Nest success at the Winkelman Study Area decreased from a high of 67% in 2003 to 50% this season, yet was higher than in 2002 (33%; Figure 3). However, the nest success at Winkelman for 2004 was equal to the 1997-2004 average (50%). The Salt River Study Area declined from 63% in 2003 to 39% in 2004, but remains above the nest success documented in 2002 (16%). Tonto Creek Study Area had the second to lowest success rate (17%) on record since 1997 (Figure 3). Both the Salt River and Tonto Creek study areas were below their eight-year averages (49% at both sites). Similarly, the nest success at Alamo Lake (58% compared to 64%) and Topock (38% compared to 87%) fell below the levels recorded in 2003.

Breeding flycatchers have occurred at Monkey's Head on the Bill Williams River from 1999-2003. The absence of nesting in 2004 is indicative of the decreasing water levels and dying vegetation on the Bill Williams River (McLeod and others 2005). Big Sandy River Downstream US 93 exceeded the nest success levels of 2003 (67% compared to 53%). The increase may be attributed to more experience field personnel (Dockens and others 2004). This is the first year

breeding has been documented at Littlefield since surveys began in 1997. In addition, flycatcher nests have not been recorded at the Lower Grand Canyon since 2001 (McLeod and others 2005). McLeod and others (2005) hypothesize the year-to-year variability in the demography and breeding status of the southwestern willow flycatchers is more apparent in small riparian areas, such as the Grand Canyon and Littlefield, because of their size and increased susceptibility to ecological change.

Similar to nest success results, seasonal fecundity was lower this year than last year. The Salt River Study Area decreased from 2.39 to 1.64, Tonto Creek Study Area decreased from 1.85 to 0.60, and Winkelman Study Area decreased from 2.53 to 2.04. In 2004, 34.6% of AGFD monitored females attempted to renest, whereas only 21.6% renested in 2003.

Nest parasitism at Roosevelt Lake, Winkelman Study Area, and Big Sandy River Downstream US 93 remained within historic levels of 2-4%; whereas, Alamo Lake (10%) and Topock (33%) increased from 2003 (0% and 12.5%, respectively). The rate of cowbird parasitism can be site dependent. Thus, cowbird trapping may be beneficial on some study sites, whereas other sites may not necessitate trapping (USFWS 2002). In 2004, cowbird trapping occurred at Topock Marsh, Alpine Horse Pasture, Greer Townsite, and Greer River Reservoir, and it was the first year since 1996 that traps were removed from Winkelman Study Area. Similar to when traps were removed from the Salt River Study Area in 2001, the nest parasitism rate at the Winkelman Study Area remained within historical levels in 2004.

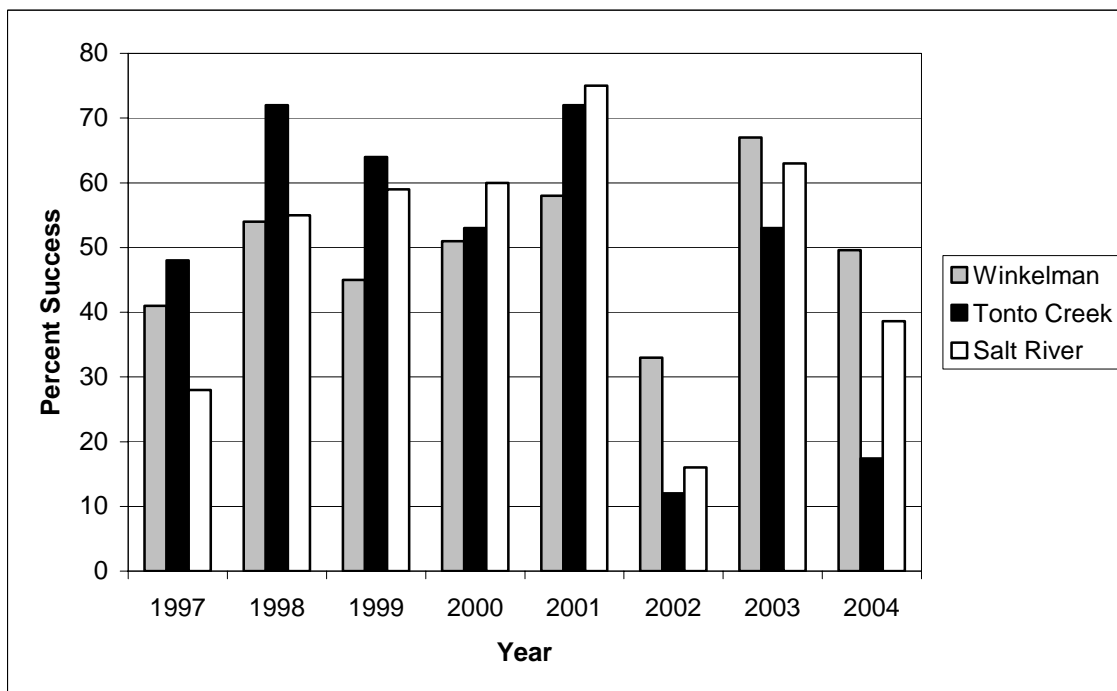


Figure 3. Mayfield nest success at Winkelman, Tonto Creek, and Salt River study areas, 1997-2004.

BANDING AND ADULT MOVEMENT

This was our fourth year of banding at the Winkelman Study Area. We continued to focus on banding females, allowing us to monitor specific individuals for productivity. Of the 68 flycatchers captured, 54 were color-banded. Of these, 24 were sexed in the hand as females. Fifty-one percent of known nesting females at the Winkelman Study Area were banded.

Of the 21 movements detected, 91% (19) were within study area movements. These movements support CPRS findings that the Winkelman Study Area is a single population due to the close proximity of patches and the frequent movement of flycatchers within the area (Eben Paxton, pers. com). Of the 19 within study area movements, three flycatchers moved between years from the Gila River to the San Pedro River. One movement was along the San Pedro River during 2004. Another movement was between study areas and years, from Roosevelt Lake to the Winkelman Study Area. No flycatchers have been documented moving from San Pedro River to the Gila River or from San Pedro River to Roosevelt Lake in the past two years.

HABITAT

The flycatcher occupies a wide variety of riparian habitats across its range (McCarthy and others 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 of occupied habitats suggests that flycatchers may rely on structure of vegetation as much as, or more than, particular 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 and Sogge 2002).

With the low precipitation levels of the last several years, many of the state's reservoirs have receded exposing previously inundated lakebeds. Vegetation suitable for flycatchers has rapidly colonized these areas. This year continued to highlight the importance of this new habitat. In 2004, 48% (248 of 520) of flycatcher territories in Arizona were in exposed lakebed habitats. Flycatchers at Roosevelt Lake have continued to colonize farther into the lakebed each year since 1999, illustrated by the increasing number of flycatchers at School House Point North and the movement of birds into Bermuda Flats. As a response to changing habitat characteristics, the general trend for flycatchers has been to move from older habitats, such as the Tonto Creek Inflow site, to younger and more suitable habitat exemplified at Bermuda Flats. As additional areas are colonized by new riparian vegetation, these sites may become suitable for flycatchers in future years.

In contrast, the low precipitation levels (NOAA 2005) and inconsistent flows in some areas have resulted in the slow decline in vegetation and a decreasing number of flycatchers. For example, the controlled releases from the San Carlos Reservoir resulted in significantly less water in the Gila River at the Winkelman Study Area since 2002 (USGS 2005). In 2003 and 2004, the areas surveyed along the Gila River only had a few areas with standing water during the summer.

These past three years of diminished and inconsistent flows have resulted in declining suitable habitat, as well as, significant reduction of flycatchers occupying the Gila River sites.

As in previous years, the two largest known concentrations of flycatchers in Arizona were located at Winkelman Study Area and Roosevelt Lake. The importance of monitoring and managing these areas was demonstrated this year, as all occupied habitat is susceptible to catastrophic events such as flood and fires. In 2004, two-thirds of the Kearny site on the Gila River burned. Fortunately, the fire spared most of the area inhabited by flycatchers. This demonstrates the susceptibility of flycatcher habitat to catastrophic events, and the need to conserve areas and drainages with extant flycatcher populations currently unprotected.

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 1950 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 1500 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
 - d. were previously unsuitable habitat but have developed into potentially suitable habitat
2. Priority areas for more intensive or continued survey effort include:
 - a. Alamo Lake/Lower Big Sandy River/Lower Santa Maria River
 - b. Gila River from the New Mexico border to the Kelvin Bridge
 - c. Gila River from the confluence with the Salt River to Gillespie Dam
 - d. Havasu Creek drainage
 - e. Little Colorado River and tributaries with suitable habitat

- f. Lower Colorado River between river mile 260 and Yuma
 - g. Lower Grand Canyon area of the Colorado River between miles 246 and 272
 - h. Salt River and Tonto Creek upstream from Roosevelt Lake
 - 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
 - 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 AGFD 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, 2004.

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 _____ _____ _____ _____ _____ Total hrs _____	Date _____ Start _____ Stop _____ Total hrs _____							
2 _____ _____ _____ _____ _____ Total hrs _____	Date _____ Start _____ Stop _____ Total hrs _____							
3 _____ _____ _____ _____ _____ Total hrs _____	Date _____ Start _____ Stop _____ Total hrs _____							
4 _____ _____ _____ _____ _____ Total hrs _____	Date _____ Start _____ Stop _____ Total hrs _____							
5 _____ _____ _____ _____ _____ Total hrs _____	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, 2004.

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.

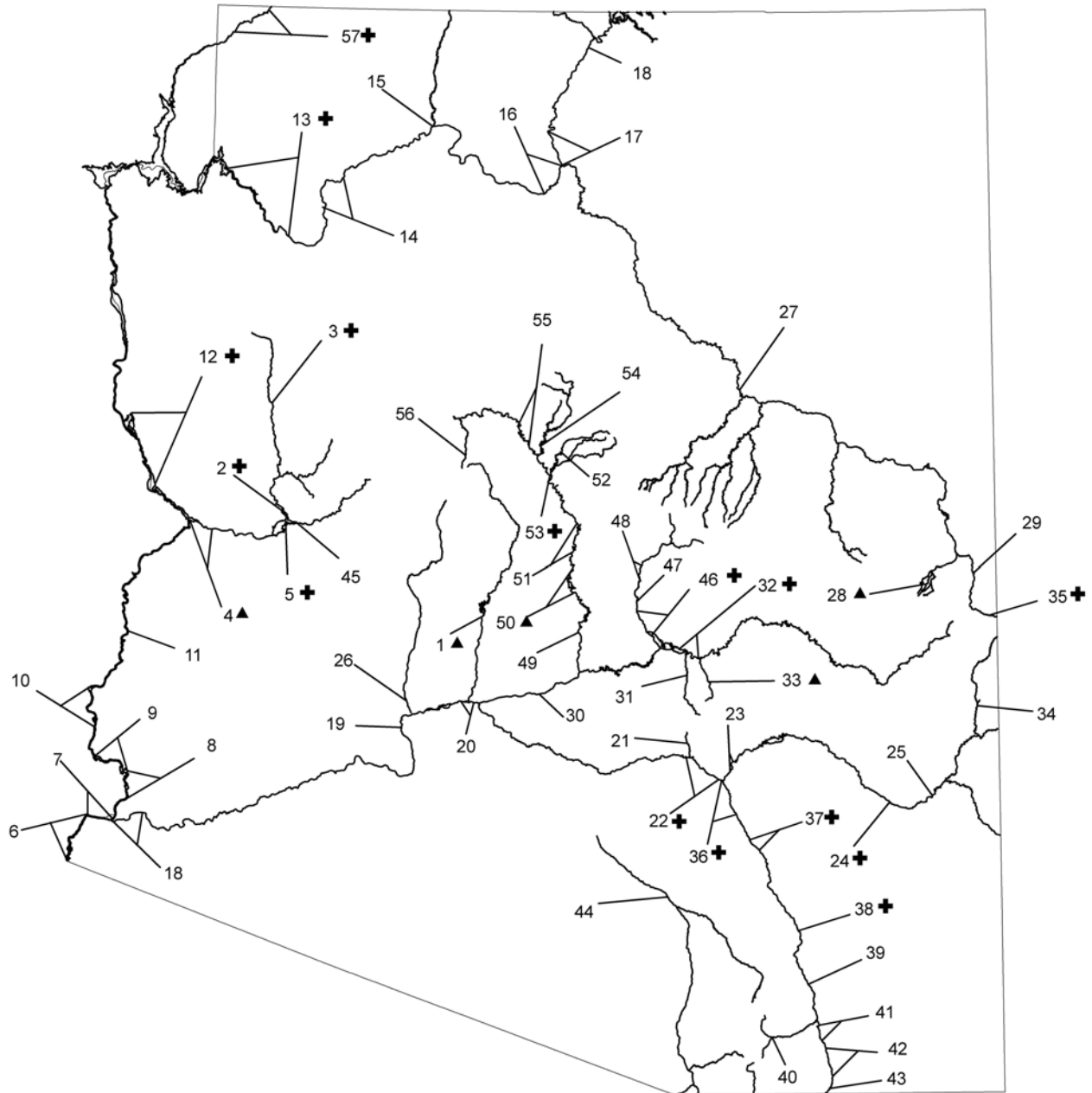
Remember to attach a copy of a USGS quad/topographical map (REQUIRED) of the survey area, outlining the survey site and location of WIFL detections. Also include a sketch or aerial photograph showing details of site location, patch shape, survey route in relation to patch, and location of any willow 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. Map of sites in Arizona and sites along adjoining water bodies surveyed for willow flycatchers, 2004. (see Appendix C for site names);
+ = Resident willow flycatchers detected and breeding documented, ▲ = Resident willow flycatchers detected (no breeding documented).



Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Aqua Fria River										
Waddell Dam Maricopa, 439, 5.25	1	6/2/2004 6/14/2004 6/25/2004	3 1 1	1	1	0	0	0	2	Y
Morgan City Maricopa, 445, 2.75	1	6/2/2004 6/25/2004	0 0	0	0	0	0	0	0	Y
Big Sandy River										
Lower Big Sandy River ^e Mohave, 357, 23.9	2	5/24/2004 6/15/2004 6/16/2004 7/12/2004	1 9 12 8	14	7	7	5	2	0	Y
Big Sandy River Downstream US 93 Mohave, 555, 34.61	3	Monitored 5/04 to 8/04	N/A	54	28	26	28	1	1	Y
Bill Williams River										
Bill Williams River Delta - Marsh Edge La Paz, 143, 28.24	4	5/19/2004 5/25/2004 5/27/2004 6/9/2004 6/15/2004 6/21/2004 6/30/2004 7/7/2004 7/15/2004	1 0 1 2 1 0 0 0 0	0	0	0	0	0	2	Y
Monkey's Head La Paz, 143, 65.22	4	Monitored 5/04 to 8/04	N/A	2	2	0	0	0	1	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Gemini La Paz, 152, 12.48	4	5/24/2004	0	0	0	0	0	0	1	Y
		5/30/2004	1							
		6/5/2004	0							
		6/13/2004	0							
		6/22/2004	0							
		6/28/2004	0							
		7/12/2004	0							
		7/28/2004	0							
Cave Wash 1 La Paz, 152, 35.32	4	5/15/2004	0	0	0	0	0	0	1	Y
		5/16/2004	0							
		5/20/2004	0							
		5/21/2004	1							
		5/23/2004	1							
		5/29/2004	0							
		6/4/2004	0							
		6/8/2004	0							
		6/10/2004	0							
		6/12/2004	0							
		6/17/2004	0							
		6/20/2004	0							
		6/22/2004	0							
		6/27/2004	0							
		6/29/2004	0							
		7/3/2004	0							
7/6/2004	0									
7/9/2004	0									
7/28/2004	0									
Cave Wash 2 La Paz, 152, 13.13	4	5/16/2004	0	0	0	0	0	0	2	Y
		5/21/2004	2							
		6/4/2004	0							
		6/10/2004	2							
		6/17/2004	1							
		6/20/2004	0							
		6/27/2004	0							
		7/3/2004	0							
		7/9/2004	0							
		7/28/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Buckskin La Paz, 174, 19.37	4	5/28/2004	1	0	0	0	0	0	1	Y
		5/30/2004	0							
		6/2/2004	0							
		6/6/2004	0							
		6/14/2004	0							
		6/19/2004	0							
		6/25/2004	0							
		7/8/2004	0							
		7/12/2004	0							
7/28/2004	0									
Alamo Lake - Brown's Crossing Mohave, 347, 20.75	5	6/15/2004	32	37	24	13	10	0	0	Y
		6/16/2004	37							
		7/12/2004	13							
Colorado River										
Hunter's Hole Yuma, 24, 15.33	6	5/18/2004	5	0	0	0	0	0	37	Y
		5/30/2004	37							
		6/9/2004	4							
		6/14/2004	0							
		6/22/2004	0							
		6/27/2004	0							
		7/1/2004	0							
		7/9/2004	0							
		7/14/2004	0							
		7/23/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Gadsden Pond Yuma, 26, 16.27	6	5/18/2004	4	0	0	0	0	0	22	Y
		5/28/2004	22							
		6/9/2004	3							
		6/13/2004	0							
		6/14/2004	0							
		6/16/2004	0							
		6/22/2004	0							
		6/27/2004	0							
		7/9/2004	0							
		7/14/2004	0							
7/23/2004	0									
Gadsden Bend Yuma, 30, 9.89	6	5/18/2004	8	0	0	0	0	1	8	Y
		5/28/2004	8							
		6/9/2004	1							
		6/13/2004	2							
		6/14/2004	1							
		6/22/2004	0							
		6/27/2004	0							
		7/1/2004	0							
		7/9/2004	0							
		7/14/2004	0							
7/23/2004	1									
Fort Yuma 1 & 2 Yuma, 38, 15	7	5/20/2004	2	0	0	0	0	0	2	Y
		6/8/2004	0							
		6/24/2004	0							
		7/8/2004	0							
		7/15/2004	0							
Yuma Territorial Prison Yuma, 38, 18.75	7	5/19/2004	4	0	0	0	0	0	4	Y
		5/21/2004	0							
		6/9/2004	0							
		6/10/2004	0							
		6/24/2004	0							
		6/25/2004	0							
		7/6/2004	0							
		7/15/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
2 East to Gila River Yuma, 38, 101.32	7	5/17/2004	0	0	0	0	0	0	29	Y
		5/19/2004	2							
		5/20/2004	3							
		5/21/2004	29							
		5/31/2004	11							
		6/8/2004	2							
		6/9/2004	1							
		6/10/2004	19							
		6/12/2004	2							
		6/13/2004	1							
		6/15/2004	0							
		6/21/2004	0							
		6/24/2004	0							
		6/25/2004	0							
		6/26/2004	0							
		6/28/2004	0							
		7/6/2004	0							
7/8/2004	0									
7/10/2004	0									
7/14/2004	0									
7/15/2004	0									
7/17/2004	0									
7/23/2004	0									

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 2 Yuma, 40, 10.66	7	5/18/2004	5	0	0	0	0	0	14	Y
		5/19/2004	0							
		5/29/2004	14							
		5/30/2004	9							
		6/8/2004	1							
		6/13/2004	0							
		6/20/2004	0							
		6/26/2004	0							
		7/1/2004	0							
		7/8/2004	0							
		7/12/2004	0							
		7/21/2004	0							
		6/8/2004	5							
		6/13/2004	0							
		6/17/2004	0							
		6/17/2004	0							
		6/24/2004	0							
6/30/2004	0									
7/8/2004	0									
7/12/2004	0									
7/21/2004	0									
Castle Dome Yuma, 61, 6.77	8	5/21/2004	0	0	0	0	0	0	2	Y
		6/10/2004	2							
		6/24/2004	0							
		7/1/2004	0							
		7/7/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 Yuma, 49, 37.09	8	5/19/2004	2	0	0	0	0	0	15	Y
		5/26/2004	2							
		5/30/2004	15							
		6/2/2004	2							
		6/8/2004	0							
		6/9/2004	0							
		6/13/2004	1							
		6/16/2004	0							
		6/17/2004	0							
		6/22/2004	0							
		6/23/2004	0							
		7/7/2004	0							
		7/8/2004	0							
		7/12/2004	0							
		7/20/2004	0							
7/21/2004	0									
7/24/2004	0									
7/27/2004	0									
8/3/2004	0									
Cottonwood Nursery Yuma, 62, 7.12	8	5/18/2004	3	0	0	0	0	0	4	Y
		5/29/2004	3							
		6/3/2004	4							
		6/10/2004	0							
		6/17/2004	0							
		6/24/2004	0							
		6/29/2004	0							
		7/10/2004	0							
		7/15/2004	0							
		7/24/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Martinez Lake Yuma, 62, 58.03	8	5/17/2004	7	0	0	0	0	0	36	Y
		5/18/2004	2							
		5/29/2004	2							
		5/29/2004	36							
		6/3/2004	27							
		6/10/2004	16							
		6/11/2004	3							
		6/12/2004	3							
		6/19/2004	0							
		6/24/2004	1							
		6/28/2004	0							
		6/29/2004	0							
		7/7/2004	0							
		7/10/2004	0							
		7/10/2004	0							
7/11/2004	0									
7/20/2004	0									
7/20/2004	0									
7/20/2004	0									
Firebreak Yuma, 61, 0.75	8	5/27/2004	11	0	0	0	0	11	0	U
Clear Lake La Paz, 61, 8.89	9	5/19/2004	1	0	0	0	0	0	3	Y
		5/20/2004	0							
		5/28/2004	3							
		6/2/2004	0							
		6/11/2004	1							
		6/15/2004	0							
		6/23/2004	0							
		6/28/2004	0							
		7/8/2004	0							
		7/11/2004	0							
7/24/2004	0									
Picacho West La Paz, 61, 1.77	9	5/20/2004	2	0	0	0	0	0	2	N
		5/28/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Nortons Landing La Paz, 61, 7.51	9	6/16/2004	0	0	0	0	0	0	0	Y
		6/25/2004	0							
		6/29/2004	0							
		7/8/2004	0							
		7/24/2004	0							
Adobe Lake La Paz, 61, 3.19	9	5/20/2004	0	0	0	0	0	0	5	Y
		5/30/2004	3							
		6/2/2004	5							
		6/11/2004	0							
		6/15/2004	0							
		6/23/2004	0							
		6/29/2004	0							
		7/8/2004	0							
		7/15/2004	0							
7/24/2004	0									
Hoge La Paz, 61, 13.79	9	5/20/2004	2	0	0	0	0	0	16	Y
		5/30/2004	9							
		6/2/2004	16							
		6/11/2004	1							
		6/15/2004	0							
		6/23/2004	0							
		6/29/2004	0							
		7/8/2004	0							
		7/15/2004	0							
7/24/2004	0									

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 La Paz, 65, 46.69	10	5/15/2004	0	0	0	0	0	0	13	Y
		5/16/2004	0							
		5/25/2004	13							
		5/26/2004	1							
		6/1/2004	6							
		6/1/2004	0							
		6/11/2004	0							
		6/12/2004	0							
		6/13/2004	0							
		6/14/2004	1							
		6/15/2004	0							
		6/25/2004	0							
		6/27/2004	0							
		7/1/2004	0							
		7/7/2004	0							
7/12/2004	0									
7/13/2004	0									
7/21/2004	0									
SW of Landing Strip – Cibola La Paz, 64, 35.63	10	5/15/2004	0	0	0	0	0	0	5	Y
		5/16/2004	0							
		5/25/2004	5							
		5/26/2004	1							
		6/1/2004	5							
		6/11/2004	1							
		6/12/2004	0							
		6/14/2004	1							
		6/25/2004	0							
		6/27/2004	0							
		7/1/2004	0							
		7/7/2004	0							
		7/12/2004	0							
		7/20/2004	0							
		7/21/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 La Paz, 66, 17.5	10	5/15/2004	0	0	0	0	0	0	14	Y
		5/26/2004	8							
		6/1/2004	14							
		6/11/2004	2							
		6/14/2004	0							
		6/25/2004	0							
		7/1/2004	0							
		7/7/2004	0							
		7/12/2004	0							
		7/20/2004	0							
Cibola Restoration La Paz, 70, 22.8	10	5/19/2004	8	0	0	0	0	0	12	Y
		5/26/2004	6							
		6/2/2004	4							
		6/9/2004	12							
		6/15/2004	0							
		6/23/2004	0							
		7/7/2004	0							
		7/24/2004	0							
		7/27/2004	0							
		8/4/2004	2							
Ehrenberg La Paz, 79, 14.37	11	5/15/2004	2	0	0	0	0	0	2	Y
		5/25/2004	2							
		6/2/2004	1							
		6/13/2004	0							
		6/16/2004	0							
		6/26/2004	0							
		7/6/2004	0							
		7/11/2004	0							
		7/15/2004	0							
		7/20/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Neptune – North Lake Havasu Mohave, 136, 9.45	12	5/26/2004 6/11/2004 6/15/2004 6/27/2004 7/13/2004 7/17/2004 7/23/2004 7/26/2004	1 0 0 0 0 0 0 0	0	0	0	0	0	1	Y
Blankenship Mohave, 137, 12.03	12	5/27/2004 6/1/2004 6/9/2004 6/15/2004 6/28/2004 7/13/2004 7/22/2004 7/27/2004	1 2 0 0 0 0 0 0	0	0	0	0	0	2	Y
Pulpit Rock Mohave, 183, 3.46	12	5/14/2004 6/1/2004 6/9/2004 6/15/2004 6/28/2004 7/13/2004 7/22/2004 7/27/2004	0 0 0 0 0 0 0 0	0	0	0	0	0	0	N
Topock Marsh Mohave, 140, 209.4	12	Monitored 5/04 to 8/04	N/A	57	34	29	43	5	5	Y
Miles 277.0 to 274.0 R GC Mohave, 366, 80.85	13	Monitored 5/04 to 8/04	N/A	2	1	1	1	0	0	Y

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Sitename 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 Mohave, 366, 30.7	13	5/18/2004	0	0	0	0	0	0	0	Y
		5/25/2004	0							
		5/29/2004	0							
		6/2/2004	0							
		6/5/2004	0							
		6/10/2004	0							
		6/15/2004	0							
		6/18/2004	0							
		6/23/2004	0							
		6/30/2004	0							
		7/4/2004	0							
		7/15/2004	0							
7/20/2004	0									
7/22/2004	0									
Miles 272.0 to 268.0 R GC Mohave, 366, 3.31	13	5/24/2004	0	0	0	0	0	0	0	Y
		5/28/2004	0							
Miles 268.0 to 264.0 R GC Mohave, 366, 2.01	13	5/28/2004	0	0	0	0	0	0	0	N
		6/4/2004	0							
Miles 263.5 to 262.5 L GC Mohave, 353, 1	13	6/4/2004	0	0	0	0	0	0	0	U
Miles 262.5 to 259.5 L GC Mohave, 384, 4.39	13	5/24/2004	0	0	0	0	0	0	0	Y
		5/28/2004	0							
Miles 261.2 to 260.5 R GC Mohave, 353, 14.7	13	5/24/2004	0	0	0	0	0	0	0	Y
		5/28/2004	0							
		6/4/2004	0							
		6/9/2004	0							
		6/19/2004	0							
		6/24/2004	0							
		7/3/2004	0							
		7/7/2004	0							
7/17/2004	0									

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 Mohave, 384, 11.39	13	5/23/2004	0	0	0	0	0	0	0	Y
		5/27/2004	0							
		6/3/2004	0							
		6/9/2004	0							
		6/19/2004	0							
		6/24/2004	0							
		7/3/2004	0							
		7/7/2004	0							
		7/19/2004	0							
		7/20/2004	0							
Mile 259.5 R Waterfall Rapid GC Mohave, 352, 40.44	13	5/23/2004	0	1	1	0	0	0	0	Y
		5/27/2004	0							
		5/28/2004	1							
		5/29/2004	0							
		6/3/2004	0							
		6/8/2004	1							
		6/19/2004	0							
		6/24/2004	1							
		6/24/2004	1							
		7/3/2004	0							
		7/7/2004	0							
		7/17/2004	0							
		7/20/2004	0							
7/21/2004	0									
Miles 257.5 to 257.0 R GC Mohave, 353, 18.8	13	5/22/2004	0	0	0	0	0	0	0	N
		5/23/2004	0							
		5/27/2004	0							
		6/3/2004	0							
		6/9/2004	0							
		6/16/2004	0							
		6/21/2004	0							
		7/1/2004	0							
		7/5/2004	0							
		7/19/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 252.2 L GC Mohave, 384, 17.8	13	5/22/2004	0	0	0	0	0	0	0	Y
		5/26/2004	0							
		6/3/2004	0							
		6/9/2004	0							
		6/16/2004	0							
		6/21/2004	0							
		7/1/2004	0							
		7/5/2004	0							
		7/16/2004	0							
7/19/2004	0									
Mile 251 R GC Mohave, 372, 2.78	13	6/20/2004	0	0	0	0	0	0	0	N
		7/1/2004	0							
		7/5/2004	0							
Mile 249.5 R GC Mohave, 372, 4.15	13	5/27/2004	0	0	0	0	0	0	0	N
		6/2/2004	0							
		6/7/2004	0							
		6/16/2004	0							
		6/21/2004	0							
		7/1/2004	0							
		7/5/2004	0							
		7/18/2004	0							
		7/21/2004	0							
Mile 249.5 L GC Mohave, 373, 3.16	13	5/27/2004	0	0	0	0	0	0	0	N
		6/2/2004	0							
		6/7/2004	0							
		6/16/2004	0							
		6/21/2004	0							
		7/1/2004	0							
		7/5/2004	0							
		7/18/2004	0							
		7/21/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 249.0 L Lost Creek GC Mohave, 366, 2.23	13	5/22/2004	0	0	0	0	0	0	0	N
		5/26/2004	0							
		6/2/2004	0							
		6/7/2004	0							
		6/16/2004	0							
		6/21/2004	0							
		7/1/2004	0							
		7/5/2004	0							
		7/18/2004	0							
		7/21/2004	0							
Mile 248.3 R Surprise Canyon GC Mohave, 366, 19.08	13	5/20/2004	0	0	0	0	0	0	0	Y
		5/27/2004	0							
		6/2/2004	0							
		6/3/2004	0							
		6/7/2004	0							
		6/17/2004	0							
		6/22/2004	0							
		6/24/2004	0							
		7/1/2004	0							
		7/2/2004	0							
		7/6/2004	0							
		7/16/2004	0							
		7/19/2004	0							
7/22/2004	0									
RM 247 L GC Mohave, 365, 1.01	13	6/20/2004	0	0	0	0	0	0	0	N
		7/2/2004	0							
		7/6/2004	0							

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Sitename 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 Mohave, 372, 24.58	13	5/19/2004	0	0	0	0	0	0	0	Y
		5/22/2004	0							
		5/26/2004	0							
		6/2/2004	0							
		6/7/2004	0							
		6/17/2004	0							
		6/22/2004	0							
		6/23/2004	0							
		6/30/2004	0							
		7/2/2004	0							
		7/6/2004	0							
Mile 243.0 L GC Mohave, 384, 17.76	13	5/19/2004	0	0	0	0	0	0	0	Y
		5/22/2004	0							
		5/26/2004	0							
		6/2/2004	0							
		6/7/2004	0							
		6/17/2004	0							
		6/22/2004	0							
		6/23/2004	0							
		6/30/2004	0							
		7/2/2004	0							
		7/6/2004	0							
Separation Canyon R GC Mohave, 327, 9.8	13	5/22/2004	0	0	0	0	0	0	0	N
		5/26/2004	0							
		6/2/2004	0							
		6/7/2004	0							
		6/17/2004	0							
		6/22/2004	0							
		7/2/2004	0							
		7/6/2004	0							
		7/18/2004	0							
		7/21/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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 204.5 R Spring Canyon GC Mohave, 457, 0.75	14	6/17/2004	0	0	0	0	0	0	0	N
Miles 199.0 to 196.0 R Parashant Camp GC Mohave, 488, 0.75	14	6/17/2004	0	0	0	0	0	0	0	N
Miles 196.0 to 195.1 L GC ^f Coconino, 470	14	6/16/2004	0	0	0	0	0	0	0	N
Miles 196.0 to 191.0 R GC ^f Mohave, 488, 4.1	14	6/16/2004	0	0	0	0	0	0	0	N
Mile 195.0 L GC ^f Coconino, 472	14	6/16/2004	0	0	0	0	0	0	0	N
Miles 194.9 to 191.2 L GC ^f Coconino, 472	14	6/16/2004	0	0	0	0	0	0	0	N
Miles 143.5 to 143.0 R GC Mohave, 573, 0.33	15	6/13/2004	0	0	0	0	0	0	0	N
Miles 71.3 to 71.0 L Cardenas GC Coconino, 853, 0.5	15	6/8/2004	0	0	0	0	0	0	0	N
Mile 65.3 L Lava Chuar GC Coconino, 853, 0.5	15	6/8/2004	0	0	0	0	0	0	0	N
Miles 51.5 to 50.5 L GC Coconino, 853, 1.75	16	6/6/2004 6/7/2004	1 0	0	0	0	0	0	1	N

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Sitename 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 46.9 to 46.6 R GC Coconino, 853, 0.75	16	6/6/2004	0	0	0	0	0	0	0	N
Mile 5.2 R GC Coconino, 969, 0.25	17	6/3/2004	0	0	0	0	0	0	0	N
Gila River										
North Gila Valley Site 1 Yuma, 41, 4.95	18	5/17/2004 5/27/2004 6/8/2004	0 8 2	0	0	0	0	8	2	Y
Yuma Lake Yuma, 45.72, 2.83	18	5/19/2004 6/9/2004 6/23/2004 6/30/2004 7/7/2004	0 0 0 0 0	0	0	0	0	0	0	Y
Fortuna Wash Yuma, 41, 19.75	18	5/17/2004 5/27/2004 6/8/2004 6/14/2004 6/17/2004 6/20/2004 6/22/2004 6/28/2004 6/30/2004 7/6/2004 7/11/2004 7/21/2004	1 1 4 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	4	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Fortuna North Yuma, 43, 10.64	18	5/17/2004	0	0	0	0	0	0	5	Y
		5/27/2004	5							
		6/8/2004	2							
		6/14/2004	0							
		6/20/2004	0							
		6/24/2004	0							
		6/30/2004	0							
		7/6/2004	0							
		7/12/2004	0							
7/21/2004	0									
Arlington South Maricopa, 244, 11.5	19	5/26/2004	0	0	0	0	0	0	0	Y
		6/17/2004	0							
		6/30/2004	0							
		7/11/2004	0							
		7/21/2004	0							
Goodyear KR Maricopa, 274, 13.25	20	5/27/2004	0	0	0	0	0	0	0	Y
		6/21/2004	0							
		7/2/2004	0							
		7/4/2004	0							
		7/8/2004	0							
		7/16/2004	0							
N.E. Goodyear Butte Maricopa, 277, 9.24	20	5/20/2004	0	0	0	0	0	0	0	N
		6/17/2004	0							
		6/24/2004	0							
		7/1/2004	0							
		7/8/2004	0							
Mineral Creek at Lake Flat Pinal, 668, 17.09	21	5/26/2004	0	0	0	0	0	0	0	U
		6/21/2004	0							
		7/1/2004	0							
		7/9/2004	0							
		7/16/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
GRSN022 Pinal, 527, 2.5	22	5/28/2004 6/18/2004 7/2/2004 7/9/2004 7/16/2004	0 0 0 0 0	0	0	0	0	0	0	N
GRN020 Pinal, 549, 5.05	22	5/19/2004 6/14/2004 6/30/2004	0 0 0	0	0	0	0	0	0	Y
GRN018 Pinal, 561, 31.56	22	Monitored 5/04 to 8/04	N/A	6	3	3	3	0	3	Y
GRS018 Pinal, 543, 7.38	22	Monitored 5/04 to 8/04	N/A	4	2	2	1	0	0	Y
GRS016 Pinal, 549, 8.09	22	5/27/2004 5/28/2004 6/9/2004 6/24/2004	0 2 0 0	0	0	0	0	0	2	Y
Kearny Pinal, 555, 2.88	22	Monitored 5/04 to 8/04	N/A	10	5	5	8	0	2	Y
GRS012 Pinal, 555, 3.63	22	5/29/2004 6/6/2004 6/29/2004	0 0 0	0	0	0	0	0	0	Y
GRS011 Pinal, 561, 3.73	22	5/20/2004 6/15/2004 6/24/2004	0 0 0	0	0	0	0	0	0	Y
GRN010 Pinal, 573, 4.8	22	5/22/2004 6/14/2004 6/30/2004	0 0 0	0	0	0	0	0	0	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
GRS010 Pinal, 561, 2.73	22	5/20/2004 6/15/2004 6/24/2004	0 0 0	0	0	0	0	0	0	Y
GRN009 Pinal, 579, 7.51	22	5/21/2004 6/14/2004 6/30/2004	0 0 0	0	0	0	0	0	0	Y
GRN008 Pinal, 579, 6.44	22	5/21/2004 6/14/2004 6/30/2004	0 0 0	0	0	0	0	0	0	Y
GRS007 Pinal, 573, 13.91	22	Monitored 5/04 to 8/04	N/A	6	4	2	2	0	3	Y
GRN004 Pinal, 585, 4.75	22	5/26/2004 6/3/2004 7/6/2004	0 1 0	0	0	0	0	0	1	Y
Dripping Springs Campground Pinal, 610, 2.75	23	5/20/2004 6/15/2004 6/29/2004	0 0 0	0	0	0	0	0	0	Y
Dripping Springs Wash Gila, 621, 0.87	23	5/20/2004 6/2/2004 6/29/2004	0 0 0	0	0	0	0	0	0	Y
Pima East Graham, 856, 21.34	24	Monitored 5/04 to 8/04	N/A	6	3	3	4	0	0	Y
Bonita Creek Graham, 975, 14.33	25	5/19/2004 6/9/2004 6/23/2004 7/8/2004 7/15/2004	0 0 0 0 0	0	0	0	0	0	0	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Pinto Creek Gila, 732, 14.75	31	5/25/2004 6/16/2004 7/13/2004	0 0 0	0	0	0	0	0	0	N
Lake Shore Gila, 640, 18.83	32	Monitored 5/04 to 8/04	N/A	26	15	11	14	0	3	Y
School House Point South Gila, 640, 11.27	32	Monitored 5/04 to 8/04	N/A	9	5	4	5	0	1	Y
School House Point North Gila, 640, 220.5	32	Monitored 5/04 to 8/04	N/A	156	83	74	69	0	10	N
Salt River Inflow Gila, 640, 127.75	32	Monitored 5/04 to 8/04	N/A	60	34	29	32	1	1	Y
Cottonwood Acres II Gila, 652, 25.83	32	5/26/2004 6/2/2004 7/7/2004	0 0 0	0	0	0	0	0	0	Y
Cottonwood Acres I Gila, 652, 15.17	32	5/20/2004 6/21/2004 6/28/2004	0 0 0	0	0	0	0	0	0	Y
Meddler Point Gila, 640, 3.19	32	5/30/2004 6/6/2004 6/25/2004	0 0 0	0	0	0	0	0	0	Y
Eads Wash Gila, 661, 3.3	32	5/30/2004 6/6/2004 6/25/2004	0 0 0	0	0	0	0	0	0	Y
Roosevelt Diversion Dam Gila, 664, 4.42	32	5/26/2004 6/2/2004 6/23/2004	0 0 0	0	0	0	0	0	0	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Salt River at State Route 288 Bridge Gila, 668, 5.36	32	5/26/2004 6/2/2004 6/23/2004	0 0 0	0	0	0	0	0	0	Y
Pinal Creek Gila, 853, 20.47	33	5/20/2004 6/8/2004 6/23/2004 7/1/2004 7/14/2004	0 0 2 2 2	2	1	1	0	0	0	N
San Francisco River										
Clifton Peak Greenlee, 1058, 15.75	34	5/21/2004 6/9/2004 6/24/2004 7/2/2004 7/15/2004	0 0 0 0 0	0	0	0	0	0	0	Y
Alpine Horse Pasture Apache, 2414, 3.63	35	5/26/2004 6/16/2004 7/14/2004	0 1 2	2	1	1	1	0	0	Y
San Pedro River										
CB Crossing Southeast Pinal, 594, 3.3	36	Monitored 5/04 to 8/04	N/A	3	2	1	0	0	0	Y
Indian Hills Pinal, 604, 6.79	36	5/25/2004 6/4/2004 6/27/2004	0 0 0	0	0	0	0	0	0	Y
Dudleyville Crossing Pinal, 604, 48.81	36	Monitored 5/04 to 8/04	N/A	16	9	7	6	0	1	Y
Malpais Hill Pinal, 634, 4.25	36	Monitored 5/04 to 8/04	N/A	3	2	2	2	0	0	N

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
PZ Ranch Pinal, 634, 6.5	36	5/25/2004 6/21/2004 7/2/2004	0 0 0	0	0	0	0	0	0	N
PZ Ranch West Pinal, 634, 6.5	36	Monitored 5/04 to 8/04	N/A	4	2	2	1	0	0	N
Cook's Lake Cienega/Seep Pinal, 643, 20.62	36	Monitored 5/04 to 8/04	N/A	24	12	12	8	0	1	Y
Aravaipa Inflow North Pinal, 661, 15.11	36	Monitored 5/04 to 8/04	N/A	44	23	21	31	0	1	N
San Pedro/Aravaipa Confluence Pinal, 658, 13.66	36	Monitored 5/04 to 8/04	N/A	15	9	6	9	0	1	N
Aravaipa Inflow South Pinal, 658, 21.60	36	Monitored 5/04 to 8/04	N/A	24	13	11	15	0	0	Y
Wheatfields Pinal, 671, 7.33	36	Monitored 5/04 to 8/04	N/A	34	18	16	23	0	2	Y
Wheatfields South Pinal, 621, 11.43	36	Monitored 5/04 to 8/04	N/A	18	9	9	14	0	0	Y
Cabbage Wash Pinal, 681, 11.09	36	5/17/2004 6/15/2004 7/2/2004	0 0 0	0	0	0	0	0	0	N
San Manuel Crossing Pinal, 780, 17.27	37	Monitored 5/04 to 8/04	N/A	114	59	55	84	0	3	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Catalina Wash Pinal, 774, 5.03	37	Monitored 5/04 to 8/04	N/A	12	6	6	8	0	1	Y
Bingham Cienega Pima, 609, 2.41	37	Monitored 5/04 to 8/04	N/A	3	2	1	1	0	0	Y
Three Links Cochise, 991, 29	38	5/21/2004 5/21/2004 6/10/2004 6/10/2004 6/30/2004 6/30/2004	8 5 12 7 3 9	12	6	6	5	0	4	Y
Apache Powder Rd. Cochise, 1097, 16	39	5/20/2004 6/11/2004 6/23/2004 7/2/2004 7/16/2004	0 0 0 1 0	0	0	0	0	0	1	Y
Babocomari Cochise, 1402, 6.5	40	6/11/2004 6/18/2004 7/7/2004	0 0 0	0	0	0	0	0	0	Y
SPRNCA – 9 Cochise, 1158, 17	41	5/26/2004 6/8/2004 6/28/2004	0 0 0	0	0	0	0	0	0	Y
Charleston Bridge North Cochise, 1188, 21.5	42	5/26/2004 5/27/2004 6/2/2004 6/10/2004 6/15/2004 6/24/2004 6/25/2004	2 0 0 0 0 0 0	0	0	0	0	0	2	Y
Escapula Wash South Cochise, 1219, 8.7	42	5/28/2004 6/4/2004 6/24/2004	0 0 0	0	0	0	0	0	0	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
State Route 90 Bridge Cochise, 1237, 27.79	43	5/25/2004	0	0	0	0	0	0	0	Y
		6/3/2004	0							
		6/14/2004	0							
		6/16/2004	0							
		6/30/2004	0							
		7/1/2004	0							
SPRNCA - Carr to Hunter Cochise, 1250, 5.93	43	5/25/2004	0	0	0	0	0	0	0	Y
		6/16/2004	0							
		7/1/2004	0							
Hereford Bridge Cochise, 1265, 16.16	43	6/1/2004	0	0	0	0	0	0	0	Y
		6/19/2004	0							
		7/6/2004	0							
SPRNCA – Palominas Cochise, 1280, 17.46	44	5/24/2004	0	0	0	0	0	0	0	Y
		6/7/2004	0							
		6/29/2004	0							
Santa Cruz River										
Ina Bridge Pima, 658, 14.75	44	5/28/2004	0	0	0	0	0	0	0	Y
		6/12/2004	0							
		6/25/2004	0							
		7/3/2004	0							
		7/12/2004	0							
Santa Maria River										
Lower Santa Maria River Mohave, 354, 11	45	5/25/2004	2	0	0	0	0	0	2	Y
		6/15/2004	0							
		7/14/2004	0							
Tonto Creek										
Bermuda Flats Gila, 610	46	Monitored 6/04 to 8/04	N/A	67	40	26	20	0	0	Y

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Orange Peel Gila, 610, 35.33	46	Monitored 5/04 to 8/04	N/A	16	8	8	16	0	0	Y
Tonto Creek Inflow Gila, 640, 23.86	46	5/15/2004 5/20/2004 5/24/2004 6/4/2004 6/8/2004 6/9/2004 6/16/2004 6/23/2004 6/25/2004 6/29/2004	0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	Y
A-Cross Road South Gila, 677, 9.33	46	5/21/2004 6/3/2004 7/3/2004	0 0 0	0	0	0	0	0	0	Y
A-Cross Road North Gila, 677, 11.03	46	5/18/2004 6/2/2004 6/30/2004	0 0 0	0	0	0	0	0	0	Y
Bar-X Road Gila, 694, 22.42	46	Monitored 5/04 to 8/04	N/A	18	10	8	9	0	0	Y
Haufer Wash Gila, 671, 1	47	5/28/2004 6/16/2004	0 0	0	0	0	0	0	0	Y
Del Shay Gila, 823, 0.45	48	5/26/2004 7/12/2004	0 0	0	0	0	0	0	0	N
Gisela South Gila, 853, 2.3	48	5/28/2004 6/16/2004	0 0	0	0	0	0	0	0	Y

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Sitename 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
Red Creek ^f Yavapai, 640	51	5/25/2004	0	0	0	0	0	0	0	Y
Pete's Cabin Mesa L ^f Yavapai, 707	51	5/25/2004	2	0	0	0	0	2	0	Y
Pete's Cabin Mesa R ^f Yavapai, 713	51	5/25/2004	0	0	0	0	0	0	0	Y
Squaw Butte R ^f Yavapai, 732	51	5/25/2004	0	0	0	0	0	0	0	Y
Mile 34.75 L ^f Gila, 756	51	5/25/2004	0	0	0	0	0	0	0	Y
East Verde - Verde Confluence L ^f Gila, 719	51	5/25/2004	0	0	0	0	0	0	0	Y
East Verde - Verde Confluence R ^f Yavapai, 719	51	5/25/2004	0	0	0	0	0	0	0	Y
Stage Stop - Dry Beaver Creek Yavapai, 1103, 2.5	52	5/24/2004 6/22/2004	0 0	0	0	0	0	0	0	Y

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Sitename 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
Camp Verde ^e Yavapai, 942, 24.75	53	5/17/2004	1	4	2	2	1	0	1	Y
		5/29/2004	1							
		6/2/2004	1							
		6/13/2004	2							
		6/26/2004	2							
		7/10/2004	2							
		7/29/2004	0							
Sheepshead Canyon Yavapai, 1052, 2.92	54	5/26/2004	0	0	0	0	0	0	0	Y
		6/17/2004	0							
		7/1/2004	0							
Mingus Ave - Rocking Chair Road Yavapai, 994, 10.67	55	5/17/2004	0	0	0	0	0	0	0	N
		6/16/2004	0							
		6/22/2004	0							
		6/29/2004	0							
		7/6/2004	0							
Tapco Yavapai, 1036, 1.75	55	6/17/2004	0	0	0	0	0	0	0	Y
		6/21/2004	0							
		7/2/2004	0							
Verde @ Powerline Yavapai, 1061, 1.75	55	5/27/2004	0	0	0	0	0	0	0	Y
		6/21/2004	0							
		7/2/2004	0							
Granite Creek Yavapai, 1585, 31.50	56	5/19/2004	1	0	0	0	0	0	1	Y
		6/15/2004	0							
		6/22/2004	0							
		6/29/2004	0							
		7/8/2004	0							

Appendix C. Arizona willow flycatcher survey results by site, 2004 (map numbers correspond to Appendix B).										
Sitename 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
Virgin River										
Littlefield ^e Mohave, 579, 33.3	57	Monitored 5/04 to 7/04	N/A	3	2	1	2	0	0	Y
Black Rock Gulch Mohave, 719, 5	57	6/10/2004 7/13/2004	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 Discrepancies between number of WIFL found on individual surveys and number of WIFL in the site summary can be attributed to not all resident WIFL being seen on one day.

^f We were unable to determine survey hours.

Appendix D. Willow flycatcher banding effort at the Winkelman Study Area, 2004						
Site Banded	Date Banded	Federal Bird band number	Color band left leg ^a	Color band right leg ^a	Age 2004 ^b	Sex ^c
Dudleyville Crossing	05/14/04	2360-07125	DX	KR	AHY	M
Aravaipa Inflow North	05/17/04	2360-07127	DX	KW	AHY	M
	06/06/04	2360-07185	DX	ZZ	AHY	M
	06/27/04	2360-07109	WD	DX	AHY	F
	06/27/04	2360-07110	KY	DX	AHY	M
San Pedro/Aravaipa Confluence	06/22/04	2360-07101	DX	ZW	AHY	F
	06/22/04	2360-07102 ^d		DX	AHY	M
	06/29/04	2360-07112	OW	DX	AHY	M
Aravaipa Inflow South	05/21/04	2360-07142	DX	OK	AHY	M
	05/24/04	2360-07149	DX	OW	AHY	U
	06/01/04	2360-07156	DX	RD	AHY	F
	06/07/04	2360-07188	DX	ZR	AHY	M
	06/22/04	2360-07104	OD	DX	AHY	F
	07/04/04	2360-07113	WO	DX	AHY	M
Wheatfields	05/12/04	2360-07117	DX	DV	AHY	U
	05/12/04	2360-07111	DX	DR	AHY	M
	05/21/04	2360-07143	DX	OO	AHY	M
	05/22/04	2360-07145	DX	RR	AHY	F
	06/01/04	2360-07157	DX	RK	AHY	F
	06/02/04	2360-07162	DX	RV	AHY	F
	06/06/04	2360-07182	DX	ZO	AHY	F
	06/06/04	2360-07177	DX	WD	AHY	M
Wheatfields South	06/10/04	2360-07195	DX	YW	AHY	F
	05/23/04	2360-07148	DX	OR	AHY	M
	06/02/04	2360-07165	DX	RW	AHY	F
	06/18/04	2360-07199	DX	WV	AHY	M
	06/23/04	2360-07105	WK	DX	AHY	F
San Manuel Crossing	06/23/04	2360-07108	YR	DX	AHY	F
	05/11/04	2360-07107	DX	DO	AHY	M
	05/11/04	2360-07103	DX	DD	AHY	M
	05/13/04	2360-07123	DX	KO	AHY	U
	05/13/04	2360-07118	DX	DZ	AHY	M
	05/13/04	2360-07120	DX	KK	AHY	F
	05/18/04	2360-07134	DX	KY	AHY	U
	05/18/04	2360-07129	DX	DW	AHY	M
	05/20/04	2360-07141	DX	OD	AHY	U
	05/25/04	2360-07150	DX	OY	AHY	U
05/28/04	2360-07155	DX	OZ	AHY	U	

Appendix D. Willow flycatcher banding effort at the Winkelman Study Area, 2004						
Site Banded	Date Banded	Federal Bird band number	Color band left leg ^a	Color band right leg ^a	Age 2004 ^b	Sex ^c
San Manuel Crossing	06/03/04	2360-07167	DX	VR	AHY	F
	06/03/04	2360-07166	DX	RZ	AHY	M
	06/05/04	2360-07172	DX	YK	AHY	F
	06/05/04	2360-07168	DX	VV	AHY	F
	06/05/04	2360-07176	DX	YO	AHY	F
	06/05/04	2360-07170	DX	WR	AHY	F
	06/05/04	2360-07173	DX	ZD	AHY	M
	06/09/04	2360-07189	DX	WK	AHY	F
	06/09/04	2360-07192	DX	YV	AHY	M
	06/12/04	2360-07197	DX	VW	AHY	F
	06/13/04	2360-07198	DX	WZ	AHY	F
	06/19/04	2360-07200	DX	RO	AHY	F
	06/19/04	2360-07106	DX	VY	AHY	M
	07/06/04	2360-07124	YD	DX	AHY	F
	07/06/04	2360-07114	VY	DX	AHY	F
	07/06/04	2360-07116	OO	DX	AHY	M
	07/06/04	2360-07122	KW	DX	AHY	M

^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

^c Sex: F = female, M = male, U = unknown

^d New capture with a previous leg injury; only a Federal Bird Band was placed on non-injured leg.

Appendix E. Habitat measurements recorded at willow flycatcher nests located in AGFD study areas in Arizona, 2004.				
	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	18	19	19	19
Mean \pm s	4.67 \pm 1.36	7.73 \pm 1.76	8.51 \pm 3.08	102.73 \pm 126.08
Median	4.70	7.90	8.10	25.70
Minimum	2.47	3.77	1.60	0.00
Maximum	6.54	10.14	13.25	320.00
Salt River Study Area				
Number of nests ^a	46	48	48	48
Mean \pm s	3.08 \pm 0.90	5.89 \pm 2.61	5.56 \pm 4.10	165.38 \pm 190.43
Median	2.96	5.11	3.80	37.95
Minimum	1.80	2.82	1.50	0.00
Maximum	5.58	14.40	18.90	518.0
Roosevelt Lake Total				
Number of nests ^a	64	67	67	67
Mean \pm s	3.58 \pm 1.24	6.49 \pm 2.52	6.44 \pm 4.03	147.62 \pm 175.98
Median	3.28	6.23	5.30	25.70
Minimum	1.80	2.82	1.50	0.00
Maximum	6.54	14.40	18.90	518.00
Winkelman Study Area				
Number of nests ^a	81	81	81	79
Mean \pm s	4.73 \pm 1.59	7.89 \pm 2.70	8.31 \pm 5.99	32.46 \pm 64.80
Median	4.50	7.90	6.50	14.90
Minimum	2.15	3.20	1.00	0.10
Maximum	9.30	14.69	33.00	406.00

^a Number of nests used in calculation