Survivorship and Movements of Southwestern Willow Flycatchers in Arizona - 2000

Courtesy of Mary Whitfield

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INTRODUCTION

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a small, endangered bird that breeds only in riparian habitats scattered throughout portions of the Southwestern states (Unitt 1987). The flycatcher has suffered serious declines as riparian habitats have been lost or modified (USFWS 1993), and was listed as a federal endangered species (USFWS 1995).

Two of the largest southwestern willow flycatcher breeding sites in Arizona are found at the Salt River and Tonto Creek inflows to Roosevelt Lake (Figure 1). Flycatchers were first noted here in 1993 (Muiznieks et al. 1994), where they breed in patches of dense riparian habitat at an elevation of approximately 640 m. These sites include a mosaic of patches, some of which are dominated by tamarisk (*Tamarix ramosissima*), others by native willow (primarily *Salix goodingii*), and some with a mixture of both tamarisk and willow. The Salt River Inflow and Tonto Creek sites face the prospect of inundation and potential destruction of habitat when increased lake levels, made possible by recent modifications to Roosevelt Dam, occur. The lake level has been below the elevation of the breeding patches since 1996, but may be raised to a level above the breeding patches some time in the future, dependent on water use, precipitation, and runoff.

The U.S. Bureau of Reclamation (Reclamation) consulted with the Fish and Wildlife Service under Section 7 of the Endangered Species Act (ESA) regarding potential impacts to the southwestern willow flycatcher resulting from operation of the modified Roosevelt Dam and reservoir. The resulting Biological Opinion requires that Reclamation fund a comprehensive southwestern willow flycatcher research program that includes collection of demographic data (such as birth/death rates, lifetime reproductive success, immigration/emigration, site fidelity, movement between sites, age-specific reproductive success, and longevity). Such a study requires color banding flycatchers so that individuals can be identified and their movements, survivorship, and reproductive efforts can be tracked.

Figure 1. Location of the Roosevelt Lake and San Pedro River study areas.

A major reason to study movements at Roosevelt Lake was to determine where resident flycatchers moved when their breeding habitat was inundated. At that time, little was known about site fidelity, dispersal, or movement behavior of willow flycatchers. Therefore, there was no way to predict how individual flycatchers would respond when habitat inundation occurred. The lower San Pedro River (Figure 1) was selected as an area where the same site fidelity, movement, and dispersal behavior could be studied among populations that would not experience inundation.

The Roosevelt Lake Biological Opinion, then, was the driving force behind the research presented in this report. Reclamation has funded this USGS-based research program at Roosevelt Lake and the lower San Pedro River since 1996. A detailed history of the willow flycatcher banding in Arizona is presented in Netter et al. (1998).

PROJECT OBJECTIVES

The major goal of this project is to color band and resight southwestern willow flycatchers at several study areas at Roosevelt Lake and the lower San Pedro/ Gila rivers complex. Monitoring these color banded birds is the only effective way to determine between-year survivorship and mortality of adults and young, immigration and emigration, site fidelity, and movement between sites. Furthermore, the presence of banded birds at a site contributes to on-going flycatcher studies by the Arizona Game and Fish Department (AGFD) by providing more accurate assessment of the number of breeding birds, and the ability to document breeding activities (e.g., pairing, nesting attempts, reproductive success) of individuals within and between years.

Specific objectives of the USGS-based demography study are:

(1) collect data on between-year survivorship and mortality of adults and young, immigration, emigration, site fidelity, and movement between sites;

(2) assist the Arizona Game and Fish Department in better determining the number of breeding willow flycatchers at their monitoring sites; and

(3) genetically determine the sex of all southwestern willow flycatchers that cannot be sexed in the field.

To date, five years of data collection (1996-2000) have been funded and conducted. Results of 1996 through 1999 were reported by Paxton and Sogge (1996), Paxton et al. (1997), Netter et al. (1998), and English et al. (1999). This report summarizes results of the fifth year of field work.

STUDY AREAS

This study was conducted at selected southwestern willow flycatcher breeding sites at Roosevelt Lake and the lower San Pedro River area (including some portions of the Gila River near the San Pedro confluence; Figure 1). Most sites studied in 2000 were also studied in previous years (1996-1999); however, several smaller sites where banding had not occurred from 1996-1999 were added in 2000 due to detections of banded flycatchers (Table 1). These "secondary" sites were visited by banders on only one or two occasions, and were not extensively monitored by AGFD.

This list includes sites across a broad geographic range, an important consideration in the demographic analysis. In addition, these sites encompass a variety of lowland flycatcher breeding habitats, which may allow us to evaluate the effects of habitat on movements and survival. These sites contain the majority of known breeding willow flycatchers in Arizona (Paradzick et al. 2000).

BACKGROUND ON ROOSEVELT LAKE/ SAN PEDRO RIVER BANDING PROJECT

In 1996, the USGS Colorado Plateau Field Station (CPFS) joined with AGFD to conduct a long term and large scale demographic study of willow flycatchers in Arizona. AGFD continued its ongoing surveying and monitoring of new and known flycatcher breeding sites, while CPFS joined the efforts by color banding the flycatchers at most of the AGFD monitored sites, as well as several other sites. Since 1996, over 450 adult and 200 nestling willow flycatchers have been captured and banded at Roosevelt Lake and

Table 1: Locations where territorial and breeding flycatchers were banded, recaptured or resighted at Roosevelt Lake and the lower San Pedro River, Arizona from 1996 through 2000. Includes drainage, site name, and years flycatchers have been banded or resighted at a particular site.

Drainage	Site	1996	1997	1998	1999	2000
Roosevelt Lake						
	Salt River Inflow, Old Salt	X	X	X	X	X
	Salt River Inflow, Campaign Bay				X	X
	School House Point South				•	•
	School House Point North					•
	Lake Shore					•
	Tonto Creek Inflow	X	X	X	X	X
	Orange Peel					•
	A+ Cross Road					•
Lower San Pedro/ Gila River Confluence	Wheatfields			•	•	•
	Aravaipa Creek Inflow			•	·	·
	Aravaipa Creek Inflow North				•	•
	Aravaipa Creek Inflow South					·
	Cooks Lake Cienega	X	X	•	·	·
	Cooks Lake Seep	X	X	X	X	X
	PZ Ranch	X	X	X	X	X
	Malpais Hills					•
	Dudleyville Crossing		X	X	X	X
	Indian Hills		X	X	X	X
	CB Crossing		•	X	X	X
	Gila River North 04			•	•	
	Gila River South 07			•	•	•
	Gila River North 10		•	•	•	•
	Gila River South 12			•	•	•
	Kearny Sewage Ponds		•	X	X	X
	Gila River North 18			•	•	•
	Gila River South 18					•
	Gila River North 20			•	•	

X=priority banding site for CPFS; > 50% of all detected birds were banded. •= non-priority sites where banded flycatchers were detected; banding occurred when time permitted.

the San Pedro/Gila areas. A listing of all flycatchers banded in Arizona (which includes birds outside of the Roosevelt Lake and San Pedro/Gila areas) is presented in Appendix 1. An additional population genetics component of this study took place during 1996 and 1997 (see Sogge et al. 1998; Busch et al. 2000). The work conducted from 1996-1999 provides the foundation for this year's site fidelity, movement, and survivorship data.

METHODS

Banding and resighting efforts were closely coordinated with AGFD crews working at Roosevelt Lake and the lower San Pedro River in Arizona. We use AGFD territory number designations to reference where flycatchers were captured or resighted at each site.

BANDING

In 2000, we netted and/or resighted flycatchers at 25 sites at Roosevelt Lake and the lower San Pedro River (Table 1). The CPFS crew usually banded at primary sites once every week to allow for maximum coverage of as many sites as possible and to minimize potential disturbance to flycatchers. Banders assisted AGFD by surveying and resighting at all sites as well.

All adult willow flycatchers were captured using mist nets (see Ralph et al. 1993). The mist nets were typically set up in a known breeding territory and recordings of willow flycatcher vocalizations (both songs and calls) were broadcast from a compact disk player to attract territorial flycatchers.

Prior to 1998, all flycatchers were banded with a uniquely numbered USFWS aluminum band and a unique combination of two plastic color bands, with the bottom color band a common color shared by all flycatchers from that drainage (drainages with larger breeding populations have more than one assigned base color); (Table 2). However, as birds were resighted in subsequent years, it became apparent that celluloid bands can cause injuries to the legs of some flycatchers. A technique was needed to develop non-plastic color bands. Therefore in 1998, we created color bands by (1) anodizing aluminum bands and (2) adhering automobile detailing tape to an aluminum band and sealing the entire band with epoxy (making sure that no epoxy could come in contact with flycatchers' legs). Thus from 1998 to 2000 each captured adult was banded with a unique combination of a numbered USFWS anodized colored band on one leg, and an aluminum color band (either striped or solid) on the other leg. The USFWS anodized color band represented a shared color for each drainage (base color). We attempted to recapture most adults that had been previously banded with plastic bands; all plastic bands on recaptured adults were removed and replaced with a unique metal band. Both of these techniques allowed each individual to be identified if seen again in the field without need for recapture (see resight section below).

In addition to banding, each adult was measured for wing chord, tail length, culmen length, bill width, weight, and fat level in a standardized method (Pyle 1997). When possible, the gender of adult flycatchers was determined by the presence of a cloacal protuberance (male) or brood patch (female). Nestlings were banded only when they could be taken from nests that were safely accessible, and only when 7-10 days of age. Unfortunately, most nests were not accessible without risk of damaging the nest or nest plant, and accessible nests often failed (e.g., from predation) before the young could be banded. Thus, only a small proportion of nestlings are typically banded at each site in any year. Nestlings banded after 1998 received a single colored-anodized USFWS numbered band (color common to drainage) on one leg.

Table 2: Base band colors for all new captured willow flycatchers in Arizona. Includes site, anodized USFWS band, and plastic color band combinations. Prior to 1998, plastic color bands were used in conjunction with a silver USFWS Band.

Site	Metal (1998-2000)	Plastic (prior to 1998)				
Roosevelt Lake	Violet, Black	Red	Red/White	White/Red	Blue/Pink	Pink/Blue
San Pedro River	Gold	Black	White	White/Black	Black/White	
Gila River	Blue	Light Blue				
Gila River Survey Site	Silver					

RESIGHTING:

Resighting consists of using binoculars to determine the identity of a color banded flycatcher by observing, from a distance, the unique color band combination on its legs, and thus allows researchers to detect and monitor individual flycatchers without the need to recapture them. Typically, territories and nests were the focal areas for resighting in order to determine which individuals belonged to specific territories and were attending specific nests. This information could then be used to document movement, individual productivity, and gender-based behavioral patterns. Furthermore, resighting is the most reliable method for establishing the particular territory a flycatcher belongs to, as techniques used to capture adults (such as tape playbacks of flycatcher vocalizations) can lure in adults from neighboring territories.

Banders typically spent the early part of each morning banding, and then redirected their efforts to resighting as daylight increased and birds became more difficult to catch. All banders and AGFD field crews recorded their observations of color banded flycatchers. For every resighted flycatcher, we recorded the color band combination, site, specific location at the site (using a designated territory number or aerial map), the level of confidence in the resight, and any behavioral observations (see Appendix 2). Because resighting is difficult, and misidentification of color combinations is a possibility, all resight data in this report is based on at least two or more resights of each color banded individual in the same area.

GENETICS:

A genetic sample was taken from all adult flycatchers for which gender could not be determined at the time of capture. DNA was obtained from a small drop of blood taken (non-lethally) from flycatchers by clipping off the tip of one toenail, just past the quick, when flycatchers were handled for banding. This technique works well for obtaining small amounts of blood from willow flycatchers and other small passerines, with no discernable negative effects (Super and van Riper 1995, Paxton and Sogge 1996). The drop of blood was stored in a small vial with 1xSSC-EDTA buffer. Samples were placed on ice in the field, then frozen in the lab until the DNA was extracted. Gender was determined using the protocol developed by Griffiths et al. (1996). Gender determination makes it possible to look for gender-based differences in factors such as dispersal, site fidelity, survivorship, etc.

RESULTS

SUMMARY OF 2000 BANDING:

In 2000, the CPFS banding crew banded 125 new adult flycatchers from Roosevelt Lake and the lower San Pedro River and 71 nestlings (from 35 nests) at Roosevelt Lake. Overall, 70% of the total number of adult flycatchers detected at priority study sites were banded by the end of the breeding season (Table 3).

The CPFS and AGFD crews spent considerable time resighting and detected a total of 114 adult and five nestling flycatchers banded in previous years. Of the returning banded adults, 76 returned to the site where they were detected the previous year, 31 moved from their 1999 site, and six went undetected in 1999.

Table 3: Summary of southwestern willow flycatchers banded and resighted during the 2000 breeding season at Roosevelt Lake and the lower San Pedro River in Arizona. Includes drainage, site name, number of new captures, total numbers of banded adults and nestlings, and percent of all adults banded. Intensive banding efforts were only conducted at the monitored sites (in bold letters).

Drainage	Site	# New Captures	Total # Banded Adults	# Nestlings Banded (# nests)	% of All Adults Banded
Roosevelt Lake	**Old Salt**	8	14	6 (4)	56%
	Shangri-la	21	42	52 (25)	67%
	Mudflats	3	11	7 (4)	67%
	School House South	5	7	0	N/A
	School House North	4	4	0	N/A
	Lake Shore	15	20	0	N/A
	Tonto Creek Inflow	8	23	3 (1)	68%
	Orange Peel	5	7	3 (1)	N/A
	A+ Cross Road	1	2	0	N/A
Lower San Pedro River Gila River Confluence	Wheatfields	4	6	0	N/A
	Aravaipa Creek Inflow	3	10	0	N/A
	Aravaipa South	0	1	0	N/A
	Aravaipa North	10	11	0	N/A
	Cooks Lake Seep	0	2	0	100%
	Cooks Lake	0	4	0	N/A
	PZ Ranch[2]	0	0	0	---
	Malapais Hills	0	1	0	N/A
	Dudleyville Crossing	5	14	0	70%
	Indian Hills	5	13	0	81%
	CB Crossing	11	13	0	72%
	Gila River South 07	5	8	0	N/A
	Gila River North 10	0	2	0	N/A
	Gila River South 12	0	3	0	N/A
	Kearny Sewage Ponds	12	29	0	78%
	Gila River North 18	0	1	0	N/A
	Gila River South 18	0	1	0	N/A
Totals		125	244[1]	71 (35)	70%

[1]This count does not include five flycatchers that were doubled counted in the site totals due to being confirmed in territories at two different sites each.
[2]No flycatchers were detected at PZ Ranch in 2000

SITE BY SITE BANDING RESULTS

Roosevelt Lake

Roosevelt Lake is formed by Roosevelt Dam at the confluences of the Salt River and Tonto Creek in central Arizona, approximately 87 km northeast of Phoenix. Willow flycatchers are found at 640 m elevation at the inflows of the Salt River and Tonto Creek, breeding in the mature riparian vegetation found in the flood basins near the average lake level shoreline. The breeding sites are anywhere from several meters to 350 m from the water, depending on annual fluctuating lake levels and creek/river flows.

In 1995, high water levels inundated portions of the historical breeding habitat. Since 1995, the average surface elevation of Roosevelt Lake has continued to drop due to lower than average precipitation in Arizona. This has allowed new habitat to form on the once inundated flood plain. In 1998 willow flycatchers were first detected occupying some of this new habitat, and in both 1999 and 2000 additional patches of new habitat were occupied by breeding flycatchers.

Salt River Inflow

From 1996 through 1998, all activity at the Salt River Inflow was focused on a single location (now called Old Salt). During 1999, breeding willow flycatchers were found at a new location along the Salt River Inflow, named Campaign Bay (Campaign Bay consists of two sites, Mudflats and Shangri-la). Banded flycatchers were also resighted at another site, School House Point South. Although flycatchers were known to be present at School House Point South in previous years, 1999 was the first detection of banded birds which moved into the site. In 2000, two new locations were discovered with banded flycatchers – School House Point North and Lakeshore.

The Salt River Inflow - Old Salt location consists of a large monotypic stand of dense tamarisk that stretches for 2 km along the Salt River. The stand's core is mature tamarisk forming a canopy averaging 10 - 12 m high, with little or no understory vegetation. Edges of the mature tamarisk core consist of younger tamarisk in various stages of growth.

The Salt River Inflow - Campaign Bay location has a small area of young tamarisk with a canopy height of approximately 6 m. There is also an adjacent area with both mature willow (10 m tall) and tamarisk (8 m tall) interspersed with 5 m tall mesquite (*Prosopis spp.)*. In these areas there is very little understory vegetation.

The Salt River survey sites: School House Point South, School House North and Lakeshore are all located downstream of both the Old Salt site and Campaign Bay. School House South consists of a dense stand of mature tamarisk (average height of 10 m), with very little understory vegetation. School House Point North lies across the river and upstream from the School House South location and also consists of dense, mature tamarisk. Lakeshore lies closest to Roosevelt Lake on the south side of the river. This site is nearly complete native willow and cottonwood, with very little understory (average height of approximately 12 m).

In 2000, AGFD detected 151 willow flycatchers from 86 territories along the Salt River Inflow at Old Salt, Campaign Bay, School House North and South, and Lakeshore combined (69 pairs, 17 unpaired males and nine cases of polygyny; AGFD, unpublished data). Mate replacement was also noted where a new male or female moved into a previously occupied territory for a second nesting attempt. The CPFS banding crew captured 56 new flycatchers, recaptured 11 and with AGFD resighted the 29 other returning flycatchers (Table 4).

Table 4: Willow flycatchers banded and resighted at the Salt River Inflow in 2000. Table includes AGFD site, date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory captured or resighted at in 2000, whether or not it was a confirmed occupant of the territory, and status (new, recapture or resight).

AGFD Site	Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	Age 2000	Sex	2000 Territory	Confirmed Resident of Territory	Status
Old Salt	7/24/97	1590-97263	PD/R	X	A4Y	F	78	Yes	Resight
Old Salt	6/7/98	1590-97518	V	GR	ATY	M	57	Yes	Resight
Old Salt	6/19/98	1590-97531	V	WW	ATY	F	24	Yes	Resight
Old Salt	5/13/99	1710-20285	V	YR	ASY	M	17/24[1]	Yes/Yes	Recapture
Old Salt	7/16/98	1710-20473	KW	Z	ATY	M	89	Yes	Resight
Old Salt	6/16/00	1710-20611	GV	K	AHY	F	15	Yes	New
Old Salt	6/2/00	1710-20680	YW	K	AHY	M	26	Yes	New
Old Salt	6/2/00	1710-20681	K	RW	AHY	U	72/8[1]	Yes/Yes	New
Old Salt	6/2/00	1710-20682	WK	K	AHY	U	78	Yes	New
Old Salt	6/16/00	1710-20693	K	WK	AHY	M	91/16[1]	Yes/Yes	New
Old Salt	6/16/00	1710-20694	GG	K	AHY	F	40	Yes	New
Old Salt	7/6/96	1740-91532	RK	X	A5Y	M	55	Yes	Resight
Old Salt	7/12/00	1740-91591	DWD	K	AHY	M	16	No	New
Old Salt	6/18/00	1740-91969	DW	K	AHY	F	72	Yes	New
Mudflats	6/28/99	1590-97507	V	YKY	SY	U	35	No	Recapture
Mudflats	6/7/98	1590-97516	V	KK	ATY	M	1	Yes	Resight
Mudflats	7/1/98	1590-97524	YW	V	ATY	F	68	Yes	Resight
Mudflats	6/22/99	1590-97543	V	WG	ASY	U	92	Yes	Resight
Mudflats	6/23/99	1710-20256	V	KW	ASY	U	31	No	Resight
Mudflats	6/23/99	1710-20258	V	OY	ASY	F	58	Yes	Resight
Mudflats	6/23/99	1710-20281	V	GG	ASY	M	68	Yes	Recapture
Mudflats	5/17/00	1710-20601	K	GR	AHY	U	19	Yes	New
Mudflats	6/1/00	1710-20679	RW	K	AHY	U	19	No	New
Mudflats	6/19/00	1710-20697	YK	K	AHY	M	94	Yes	Resight
Mudflats	6/16/00	1740-91967	K	GK	AHY	F	92	Yes	New
Shangri-la	6/28/97	1590-97318	X	W/PD	A4Y	F	10	No	Resight
Shangri-la	6/5/97	1590-97325	KW/O	X	A4Y	F	69	Yes	Resight
Shangri-la	6/7/98	1590-97537	V	RR	ATY	U	34	Yes	Resight
Shangri-la	6/30/98	1590-97540	V	RY	ATY	F	23	Yes	Resight
Shangri-la	6/22/99	1590-97544	V	RD	ASY	U	9	Yes	Recapture
Shangri-la	6/22/99	1710-20273	V	KR	ASY	F	29	Yes	Resight
Shangri-la	6/22/99	1710-20275	V	OO	ASY	U	4	Yes	Resight
Shangri-la	6/23/99	1710-20280	V	KD	ASY	U	6/65[1]	Yes/Yes	Resight
Shangri-la	6/23/99	1710-20282	V	YO	ASY	F	37	Yes	Resight
Shangri-la	7/14/99	1710-20302	V	DR	ASY	U	3	Yes	Resight
Shangri-la	7/24/99	1710-20305	V	DO	ASY	U	25	Yes	Recapture
Shangri-la	7/26/99	1710-20308	WO	V	ASY	F	14	Yes	Resight
Shangri-la	6/27/99	1710-20335	V	KG	ASY	F	56	Yes	Resight
Shangri-la	6/27/99	1710-20337	WD	V	ASY	F	27	Yes	Resight

Table 4: Continued, Willow flycatchers banded and resighted at the Salt River Inflow in 2000.

AGFD Site	Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	Age 2000	Sex	2000 Territory	Confirmed Resident of Territory	Status
Shangri-la	6/27/99	1710-20338	YD	V	ASY	M	65/13[1]	Yes/Yes	Recapture
Shangri-la	6/22/99	1710-20340	V	OW	ASY	F	6	Yes	Resight
Shangri-la	6/22/99	1710-20341	V	VV	ASY	F	12	Yes	Resight
Shangri-la	6/27/99	1710-20347	V	YD	ASY	U	29/51[1]	Yes/Yes	Resight
Shangri-la	6/27/99	1710-20348	V	OD	ASY	U	2	No	Resight
Shangri-la	6/6/00	1710-20593	K	WD	AHY	M	14	Yes	New
Shangri-la	6/15/00	1710-20594	K	KG	AHY	F	13	Yes	New
Shangri-la	5/17/00	1710-20595	K	DK	AHY	U	23	Yes	New
Shangri-la	5/20/00	1710-20597	K	YV	AHY	U	11	Yes	New
Shangri-la	5/9/00	1710-20599	K	KY	AHY	M	5/10[1]	Yes/Yes	New
Shangri-la	5/9/00	1710-20600	K	GY	AHY	M	30	Yes	New
Shangri-la	5/22/00	1710-20603	K	VG	AHY	U	56/4[1]	Yes/Yes	New
Shangri-la	6/15/00	1710-20609	WR	K	AHY	U	12	Yes	New
Shangri-la	6/6/00	1710-20686	K	KW	AHY	U	84	Yes	New
Shangri-la	6/6/00	1710-20687	KR	K	AHY	F	84	Yes	New
Shangri-la	6/15/00	1710-20691	RR	K	AHY	M	18	Yes	New
Shangri-la	6/15/00	1710-20692	K	GV	AHY	F	18	Yes	New
Shangri-la	5/11/00	1710-46321	K	GW	AHY	M	77	Yes	New
Shangri-la	5/11/00	1710-46322	KY	K	AHY	M	67/4[2]	Yes/No	New
Shangri-la	5/12/00	1710-46323	GY	K	AHY	M	88	Yes	New
Shangri-la	5/12/00	1710-46324	YG	K	AHY	M	80/84[2]	Yes/Yes	New
Shangri-la	7/12/00	1740-91590	WDW	K	AHY	M	52	Yes	New
Shangri-la	6/15/00	1740-91600	K	DW	AHY	M	47	Yes	New
Shangri-la	6/27/96	1740-91728	X	RG	A5Y	M	69	Yes	Recapture
Shangri-la	6/19/96	1740-91739	X	WY	A5Y	M	27/87[1]	Yes/Yes	Resight
Shangri-la	6/15/00	1740-91966	K	KD	AHY	M	36	Yes	New
Shangri-la	6/17/00	1740-91968	WD	K	AHY	F	30	Yes	New
Shangri-la	7/1/00	1740-91975	K	OY	AHY	M	45	No	New
Shangri-la	7/23/97	2070-92905	WK/R	X	A4Y	M	37	Yes	Resight
School House S.	5/14/97	1590-97304	G/RW	X	A4Y	M	3	Yes	Resight
School House S.	7/14/97	1590-97373	VG	X	A4Y	F	3	Yes	Recapture
School House S.	6/19/00	1710-20598	VY	K	AHY	U	4	Yes	New
School House S.	6/19/00	1710-20613	K	KK	AHY	U	7	No	New
School House S.	6/19/00	1710-20614	K	RR	AHY	F	7	No	New
School House S.	6/19/00	1710-20615	K	GG	AHY	U	6	Yes	New
School House S.	6/19/00	1710-20616	K	YY	AHY	F	6	No	New
School House N.	6/19/00	1740-91970	K	WW	AHY	M	4	Yes	New
School House N.	6/19/00	1740-91972	YD	K	AHY	U	3	Yes	New
School House N.	6/19/00	1740-91973	WW	K	AHY	M	5	Yes	New
School House N.	6/19/00	1740-91974	GK	K	AHY	F	5	Yes	New
Lake Shore	6/6/99	1710-20263	GW	V	ASY	U	8	Yes	Resight
Lake Shore	7/24/99	1710-20306	V	KGK	SY	U	16	Yes	Recapture
Lake Shore	6/18/99	1710-20339	V	OG	ASY	U	1	Yes	Recapture
Lake Shore	6/18/99	1710-20345	V	YG	ASY	F	5	Yes	Resight
Lake Shore	7/7/99	1710-20578	V	DD	SY	U	6	Yes	Recapture
Lake Shore	6/30/00	1710-20604	K	OY	AHY	U	19	No	New
Lake Shore	6/30/00	1710-20605	KGK	K	AHY	U	3	No	New

Table 4: Continued, Willow flycatchers banded and resighted at the Salt River Inflow in 2000.

AGFD Site	Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	Age 2000	Sex	2000 Territory	Confirmed Resident of Territory	Status
Lake Shore	6/13/00	1710-20688	RK	K	AHY	U	50	Yes	New
Lake Shore	6/30/00	1710-20689	GO	K	AHY	F	50	No	New
Lake Shore	6/30/00	1710-20690	K	VW	AHY	F	19	No	New
Lake Shore	6/19/00	1710-20697	YK	K	AHY	M	9	Yes	New
Lake Shore	6/19/00	1710-20698	YY	K	AHY	F	18	Yes	New
Lake Shore	6/19/00	1710-20699	K	WR	AHY	M	18	Yes	New
Lake Shore	6/13/00	1710-46325	WG	K	AHY	F	2	Yes	New
Lake Shore	6/13/00	1710-46326	K	KR	AHY	U	2	Yes	New
Lake Shore	6/13/00	1710-46327	K	DY	AHY	M	7	Yes	New
Lake Shore	6/13/00	1710-46328	GW	K	AHY	U	8	No	New
Lake Shore	6/13/00	1710-46329	WY	K	AHY	F	26	Yes	New
Lake Shore	6/13/00	1710-46330	YD	K	AHY	F	4	Yes	New
Lake Shore	7/16/00	2210-57031	K	OW	AHY	U	5	No	New

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), V=USFWS anodized violet band, Z=USFWS anodized gold band and K= USFWS anodized black. All metal solid-color bands are denoted by double letters, plastic bands by single letter: D = dark blue, G = green, K = black, O = orange, R = red, W = white, Y = yellow, V = violet, and P = pink.
Age: AHY, SY, ASY, ATY, A4Y, A5Y = adult.
Sex: F = female, M = male, U = unknown.
[1]Polygyny per AGFD, unpublished data.
[2]Within season within site movement

Tonto Creek Inflow

The Tonto Creek Inflow breeding site is comprised of mature tamarisk (10-12 m tall) with mature Goodding's willow (*Salix gooddingii*) (15-20 m tall) and Fremont cottonwood (*Populus fremontii*) interspersed at varying densities. A perennial seep runs on the west side of the site, 10-500 m from the flycatcher territories, and there are several small perennial pools throughout the site. In 2000, Tonto Creek had surface flow for about two-thirds of the breeding season, and Roosevelt Lake shoreline was more than 3 km from the breeding site.

Over the past five seasons breeding flycatchers were detected only at one historical breeding site, Tonto Creek Inflow. In 2000, breeding flycatchers were discovered at two additional survey sites along Tonto Creek. A+ Cross Road, 2.5 km north of the Tonto Creek Inflow site, had a single breeding pair of flycatchers. This site consists of very young, thin tamarisk, mixed with mature cottonwoods and an understory of short mesquite. The other site, Orange Peel, has two distinct patches. One patch lies to the west of Tonto Creek and is similar to Campaign Bay with young willow interspersed with young tamarisk and mesquite and little understory structure. The other lies to the East and more southern end of Tonto Creek, and is similar to the habitat structure of the Tonto site with more mature, dense tamarisk.

In 2000, AGFD detected 45 willow flycatchers from 26 territories (22 pairs, three additional territories with unpaired males and four cases of polygyny; AGFD, unpublished data). The CPFS banding crew captured 14 new flycatchers, recaptured two, and along with AGFD resighted the remaining 16 adults banded in previous years (Table 5).

Table 5: Willow flycatchers banded, recaptured, and resighted at Tonto Creek Inflow, Arizona in 2000, including AGFD site, date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory captured or resighted at in 2000, whether or not it was a confirmed resident of the territory, and status (new, recapture, resight).

AGFD Site	Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	2000 Territory	Confirmed Resident of Territory	Status
A+ Cross Road	6/28/99	1590-97511	KR	V	SY	F	33	Yes	Recapture
A+ Cross Road	7/3/00	1710-20628	K	GO	AHY	M	33	No	New
Tonto Creek	5/13/97	1590-97202	KR	X	A4Y	M	87/8[1]	Yes/Yes	Resight
Tonto Creek	5/31/97	1590-97313	P/RW	X	A4Y	M	25	Yes	Resight
Tonto Creek	5/13/98	1590-97513	YK	V	ATY	M	6	Yes	Resight
Tonto Creek	6/17/98	1590-97522	WY	V	ATY	F	8	Yes	Resight
Tonto Creek	6/8/98	1590-97525	RW	V	ATY	U	11	Yes	Resight
Tonto Creek	6/6/99	1710-20277	WG	V	ASY	U	95	Yes	Resight
Tonto Creek	6/14/99	1710-20283	WR	V	ASY	F	14	Yes	Resight
Tonto Creek	6/26/99	1710-20334	YV	V	ASY	F	37	Yes	Resight
Tonto Creek	7/23/99	1710-20557	V	DK	ASY	F	5	Yes	Resight
Tonto Creek	7/29/99	1710-20567	YO	V	ASY	M	22	Yes	Resight
Tonto Creek	5/18/00	1710-20596	YV	K	AHY	U	14	No	New
Tonto Creek	5/18/00	1710-20602	GR	K	AHY	U	18	Yes	New
Tonto Creek	5/18/00	1710-20671	K	WY	AHY	M	36/38[1]/42[2]	Yes/Yes/Yes	New
Tonto Creek	5/31/00	1710-20678	K	YW	AHY	F	87	Yes	New
Tonto Creek	6/18/00	1710-20696	K	RG	AHY	F	66	Yes	New
Tonto Creek	5/10/00	1710-46319	K	YG	AHY	M	95/37[1]	Yes/Yes	New
Tonto Creek	5/10/00	1710-46320	K	WG	AHY	M	14	Yes	New
Tonto Creek	6/2/96	1740-91506	RW	X	A5Y	M	73	Yes	Resight
Tonto Creek	6/12/96	1740-91523	X	R/R	A5Y	U	91	Yes	Resight
Tonto Creek	7/13/00	1740-91592	K	WV	AHY	F	18	Yes	New
Tonto Creek	6/3/96	1740-91706	KY	X	A5Y	M	10	Yes	Resight
Tonto Creek	6/15/96	1740-91721	X	PD/R	A5Y	U	83/82/5[1]	Yes/Yes/Yes	Resight
Tonto Creek	7/13/96	1740-91744	PD/RW	X	A5Y	M	1	Yes	Resight
Orange Peel	6/28/99	1590-97507	V	YKY	SY	U	85	Yes	Resight
Orange Peel	7/28/99	1710-20561	DO	V	SY	F	89	Yes	Recapture
Orange Peel	6/18/00	1710-20612	VG	K	AHY	F	31	Yes	New
Orange Peel	7/2/00	1710-20626	RO	K	AHY	U	85	Yes	New
Orange Peel	7/2/00	1710-20627	OO	K	AHY	U	86	Yes	New
Orange Peel	6/18/00	1710-20695	KW	K	AHY	M	31/66	Yes/Yes	New
Orange Peel	7/12/00	2210-57071	RG	K	AHY	U	89	No	New

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), V=USFWS anodized violet band, Z=USFWS anodized gold band and K= USFWS anodized black band. All metal solid-color bands are denoted by double letters, plastic bands by single letter: D = dark blue, G = green, K = black, O = orange, R = red, W = white, Y = yellow, V = violet, and P = pink.
Age: AHY, SY, ASY, ATY, A4Y , A5Y = adult.
Sex: F = female, M = male, U = unknown.
[1]Polygyny per AGFD, unpublished data.
[2]Within season within site movement

San Pedro River/Gila River Confluence

The largest concentration of flycatcher sites in Arizona is located about 70 km southeast of Phoenix and occurs within a 40 km stretch of the lower San Pedro and Gila Rivers, in close proximity to their confluence. The lower San Pedro River supports seven known breeding sites within a 17 km stretch, while the nearby Gila River supports 9-11 known sites in a 22 km stretch (AGFD unpublished data). Sites ranged from approximately 0.2 to 7 km apart. With the exception of Kearny sewage ponds, all of the sites within this stretch of the Gila River had six or fewer territories in 1997 and 1998 (English, et al. 1999). In 2000, four sites along the San Pedro/Gila rivers had eight or more territories. Because we have observed flycatchers moving among all of these sites, we treat all of the sites in this lower San Pedro River/Gila River confluence area as a single drainage for the purpose of this report. Both rivers are perennial, and the riparian vegetation is a mixture of exotic tamarisk, mature cottonwoods, and willow, in varying proportions. This is a low elevation (555 to 643 m) desert area. Some sites where banding occurred in 2000 were not intensively monitored by AGFD, and banding was a low priority (Table 1).

In 2000, we banded 55 adult flycatchers. Sixty adult flycatchers banded in previous years were detected in 2000 (out of 108 banded flycatchers present in 1999); 42 returned to the same site they were detected at in 1999, and 16 traveled to new sites (this summary does not include the two birds banded before 1999, not detected in 1999, then resighted again in 2000.

PZ Ranch

PZ Ranch is located 15 km south of the San Pedro/Gila River confluence, and is 350 m from the San Pedro River. It consists of a mature Fremont cottonwood gallery forest (about 17 m tall), with tamarisk understory on the edge.

In June 1996, a fire burned approximately 75% of the entire patch and two-thirds of the historical flycatcher breeding area. The CPFS banding crew entered the burn area immediately after the fire to band eight adults before they dispersed (Paxton et. al 1996). In subsequent years, a substantial effort was put forth to see if any flycatchers returned to the burned area, but none were found. Following the fire, the number of territories in the unburned portion of this site has decreased annually from five in 1997, to two in 1998, and only one in 1999.
In 2000, AGFD detected no willow flycatchers at PZ Ranch (AGFD, unpublished data).

Cooks Lake Seep

Cooks Lake Seep is in the San Pedro River flood basin, 16 km south of the San Pedro/Gila River confluence. It is a perennial seep for at least several hundred meters. The vegetation is comprised of mixed native/exotic species with Goodding's willow overstory (15-17 m high) adjacent to the seep, and tall tamarisk (10-12 m) interspersed throughout the site in varying densities.

In 2000, AGFD detected two willow flycatchers from one territory (both unpaired, territorial birds; AGFD unpublished data). The CPFS banding crew, along with AGFD, resighted the two returning flycatchers, both of which left the site early on in the season (Table 6). The second flycatcher arrived and defended the same territory after the previous bird had left the site. One bird moved to Cooks Lake Cienega and the other bird moved to Malpais Hills within this 2000 breeding season.

Table 6: Willow flycatchers resighted at Cooks Lake Seep, Arizona in 2000. Table includes date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory resighted at in 2000, whether or not it was a confirmed resident of the territory, and status (new, recapture, or resight).

Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	2000 Territory	Confirmed Resident of Territory	Status
05/15/99	1590-97578	KV	Z	ASY	U	3	Yes[1]	Resight
06/17/96	1740-91620	X	KY	A5Y	M	3	Yes[2]	Resight

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), and Z=USFWS anodized gold band. All metal solid-color bands are denoted by double letters, plastic bands by a single letter: K = black, Y = yellow, V=violet
Age: ASY, A5Y = adult.
Sex: F = female, M = male, U=unknown.
[1]Bird left site by 5/11/00.
[2]Bird left site by 6/2/00.

Dudleyville Crossing

The Dudleyville Crossing site is located about 9 km south of the San Pedro/Gila River confluence, and is within 200 m of the San Pedro River. The vegetation consists of tamarisk (10-12 m tall), with a broadleaf overstory of willow and Fremont cottonwood (14 to 17 m tall).

In 2000, AGFD detected 20 willow flycatchers from eleven territories (ten pairs, including one case of polygyny, and one unpaired, territorial bird; AGFD, unpublished data). The CPFS banding crew captured five new willow flycatchers, recaptured two and along with AGFD resighted the other seven returning adults (Table 7). Of the nine returning flycatchers, six were present at Dudleyville in 1999, while two birds moved from CB Crossing and one bird moved from Kearny Sewage Ponds.

Table 7: Willow flycatchers banded, recaptured, and resighted at Dudleyville Crossing, Arizona in 2000. Table includes date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory captured or resighted at in 2000, whether or not it was a confirmed resident of the territory, and status (new, resight, recapture).

Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	2000 Territory	Confirmed Resident of Territory	Status
05/29/97	1590-97209	GK	X	A4Y	M	8	Yes	Resight
07/14/98	1590-97561	Z	WK	ATY	M	9	Yes	Resight
06/13/99	1590-97584	OO	Z	ASY	M	16	No	Resight
05/13/98	1590-97587	Z	WR	ATY	U	13/6[1]	Yes/Yes	Resight
06/06/98	1590-97593	Z	RD	ATY	F	13	Yes	Resight
06/10/99	1710-20201	Z	YR	ASY	M	2	Yes	Recapture
07/03/00	1710-20235	RD	Z	AHY	U	17	No	New
05/19/00	1710-20420	GK	D	AHY	M	5	Yes	New
06/06/00	1710-20445	D	YD	AHY	U	5	Yes	New
06/06/00	1710-20450	D	WY	AHY	U	20	Yes	New
06/27/99	1710-20481	YD	Z	ASY	F	16	Yes	Resight
06/23/99	1710-20491	Z	KD	ASY	U	20	Yes	Resight
06/23/98	1740-91866	D	KK	ATY	M	3	Yes	Recapture
06/17/00	1740-91883	YG	D	AHY	U	3	Yes	New

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), and Z=USFWS anodized gold band. All metal solid-color bands are denoted by double letters, plastic bands by a single letter: D = dark blue, G = green, K = black, O = orange, R = red, W = white, Y = yellow. D= USFWS aluminum band
Age: AHY, ASY, ATY, A4Y = adult.
Sex: F = female, M = male, U=unknown.
[1]Polygyny per AGFD unpublished data.

Indian Hills

Indian Hills, located approximately 3 km south of the San Pedro/Gila River confluence, consists of tamarisk (10-12 m tall) with mature cottonwoods (14-17 m tall) interspersed in varying densities throughout the site. It is located between the San Pedro River and agricultural fields, and receives periodic irrigation runoff.

In 2000, AGFD detected 16 willow flycatchers from eight territories (eight pairs; AGFD unpublished data). The CPFS banding crew captured five new willow flycatchers and, along with AGFD, resighted the remaining eight returning flycatchers (Table 8). Of the eight flycatchers that returned, seven were detected at Indian Hills in 1999, while one bird moved from Kearny Sewage Ponds.

Table 8: Willow flycatchers banded, recaptured, and resighted at Indian Hills, Arizona in 2000. Table includes date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory captured or resighted at in 2000, whether or not it was a confirmed resident of the territory, and status (new, recapture, resight).

Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	2000 Territory	Confirmed Resident of Territory	Status
05/29/97	1590-97206	WR/K	X	A4Y	M	17	Yes	Resight
05/29/97	1590-97208	WU/K	X	A4Y	F	10	Yes	Resight
05/30/97	1590-97210	WR	X	A4Y	M	13	Yes	Resight
05/30/97	1590-97212	O/WK	X	A4Y	F	6	Yes	Resight
05/22/98	1590-97564	Z	YW	ATY	M	50	Yes	Resight
07/02/99	1710-20218	Z	YV	ASY	U	10	Yes	Resight
05/03/00	1710-20372	D	DK	AHY	U	14	Yes	New
05/18/00	1710-20376	DY	D	AHY	U	31	Yes	New
06/07/00	1710-20388	D	VY	AHY	M	3	No	New
06/07/00	1710-20389	WR	D	AHY	F	3	Yes	New
06/07/00	1710-20390	GR	D	AHY	U	17	Yes	New
05/15/99	1710-20451	KK	Z	ASY	U	6	Yes	Resight
06/04/98	1740-91854	D	WG	ATY	F	14	Yes	Resight

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), D=USFWS anodized blue band, and Z=USFWS anodized gold band. All metal solid-color bands are denoted by double letters, plastic bands by a single letter: D = dark blue, G = green, K = black, O = orange, P = pink, R = red, V = violet, W = white, Y = yellow, U=purple
Age: AHY, ASY, ATY , A4Y= adult.
Sex: F = female, M = male, U =unknown.

CB Crossing

CB Crossing is located approximately 2 km south of the San Pedro/Gila River confluence. This site is between the San Pedro River and agricultural fields, and receives periodic irrigation runoff. It is dominated by tamarisk (10-12 m tall), and has some cottonwood overstory (14-17 m tall).

In 2000, AGFD detected 18 willow flycatchers from 11 territories (seven pairs, two cases of polygyny, and six unpaired territorial flycatchers; AGFD, unpublished data). The CPFS banding crew captured 11 new willow flycatchers, and along with AGFD resighted two banded flycatchers (Table 9). One bird was banded at CB Crossing in 1998 but not detected in 1999, and the other moved from Aravaipa in 2000. All six unpaired territorial birds remained only a brief time; some birds defended the same territory as a previous flycatcher who had already left the site.

Table 9: Willow flycatchers banded, and resighted at CB Crossing, Arizona in 2000. Table includes date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory captured or resighted at in 2000, whether or not it was a confirmed resident of the territory, and status (new or resight).

Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	2000 Territory	Confirmed Resident of Territory	Status
06/21/98	1590-97558	WK	Z	ATY	U	12	Yes	Resight
06/30/00	1710-20234	WV	Z	AHY	U	10	No	New
05/19/00	1710-20377	DK	D	AHY	U	25/22[1]	Yes/Yes	New
06/02/00	1710-20381	DR	D	AHY	U	1	Yes	New
06/16/00	1710-20391	YW	D	AHY	M	6/4[2]	No/Yes	New
06/14/00	1710-20440	GY	D	AHY	U	15	No	New
06/14/00	1710-20441	D	YW	AHY	U	10	No	New
06/02/00	1710-20442	KD	D	AHY	U	12/3[2]	Yes/Yes	New
06/02/00	1710-20443	KV	D	AHY	U	15	No	New
06/02/00	1710-20444	D	WK	AHY	U	2	Yes	New
06/02/00	1710-20452	RG	Z	AHY	U	4	No	New
06/30/00	1710-20454	OK	Z	AHY	F	3	Yes	New
06/09/99	1710-20476	WD	Z	ASY	F	14	Yes	Resight

Color bands are read top/bottom where D=USFWS anodized blue band, and Z=USFWS anodized gold band. All metal solid-color bands are denoted by double letters, plastic bands by a single letter: D = dark blue, G = green, K = black, V = violet, W = white, Y = yellow, R=red, O=orange, V=violet.
Age: AHY, ASY, ATY = adult.
Sex: F = female, M = male, U = unknown.
[1]polygyny per AGFD unpublished data.
[2]Within season within site movement

Kearny

The Kearny sewage ponds breeding site is located on the Gila River, near the waste water treatment plant for the city of Kearny, approximately 6 km northwest (downstream) of the San Pedro/Gila River confluence. Seepage or overflow from the treated effluent ponds periodically inundates portions of the occupied habitat. The site is comprised primarily of tall (10-12 m) mature tamarisk, with areas of Freemont cottonwood overstory (12-14 m tall) and occasional patches of mesquite (9-11m tall) interspersed throughout the site.

In 2000, AGFD detected 37 willow flycatchers from 20 territories (20 pairs, including five cases of polygyny; AGFD, unpublished data). The CPFS banding crew captured 12 new adult willow flycatchers, recaptured one, and with AGFD resighted the 16 returning flycatchers (Table 10). Of the 17 returning flycatchers, 14 were present at Kearny in 1999 and two were detected at Indian Hills in 1999 and one at Cooks Lake Seep. Two unpaired returning flycatchers (D:KY; Z:GW) left the site early in the season and were not detected elsewhere.

Table 10: Willow flycatchers banded, recaptured, and resighted at Kearny sewage ponds, Arizona in 2000. Table includes date originally banded, USFWS band number, color band combination, age in 2000, sex if known, territory captured or resighted at in 2000, whether or not it was a confirmed resident of the territory, and status (new, recapture or resight).

Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	2000 Territory	Confirmed Resident of Territory	Status
07/11/97	1590-97257	P/X	K	A4Y	M	22/23[1]	Yes/Yes	Resight
07/11/97	1590-97258	WY	X	A4Y	M	27	Yes	Resight
06/21/98	1590-97556	Z	GW	ATY	M	23	No	Resight
06/19/99	1710-20216	Z	WW	ASY	F	84	Yes	Resight
05/17/00	1710-20237	GR	Z	AHY	M	84/9[2]	No/Yes	New
05/17/00	1710-20238	Z	VK	AHY	M	20	Yes	New
05/10/00	1710-20373	YR	D	AHY	U	10	Yes	New
05/17/00	1710-20374	YD	D	AHY	U	28/64[1]	Yes/Yes	New
05/17/00	1710-20375	YV	D	AHY	U	25	Yes	New
06/01/00	1710-20378	D	GK	AHY	U	11	Yes	New
06/01/00	1710-20379	RD	D	AHY	U	48	Yes	New
06/01/00	1710-20380	D	KV	AHY	U	48/84[1]	Yes/Yes	New
06/05/00	1710-20386	D	KR	AHY	F	8	Yes	New
06/05/00	1710-20387	RG	D	AHY	F	20	Yes	New
06/25/99	1710-20417	GG	D	ASY	F	23	Yes	Resight
06/15/00	1710-20453	Z	OY	AHY	U	10	Yes	New
06/07/99	1710-20487	WW	Z	ASY	U	7/6[1]	Yes/Yes	Resight
05/01/98	1740-91852	D	RD	ATY	M	19	Yes	Resight
06/04/98	1740-91855	D	RK	ATY	M	26	Yes	Resight
06/07/98	1740-91857	D	RG	TY	U	25	Yes	Resight
06/20/98	1740-91865	D	KY	ATY	M	64	Yes	Resight
06/18/99	1740-91868	D	WW	ASY	F	7	Yes	Resight
06/20/99	1740-91869	D	RR	ASY	F	27	Yes	Resight
06/20/99	1740-91870	RY	D	ASY	F	26	Yes	Resight
06/21/99	1740-91872	D	DY	ASY	U	8	Yes	Recapture
07/01/99	1740-91876	D	YR	ASY	F	28	Yes	Resight
06/20/98	1740-91878	D	RW	ATY	M	15/51[1]	Yes/Yes	Resight
06/20/98	1740-91879	D	DW	ATY	F	16	Yes	Resight
06/05/00	1740-91882	RK	D	AHY	F	6	Yes	New

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), D=USFWS anodized blue band, and Z=USFWS anodized gold band. All metal solid-color bands are denoted by double letters, plastic by single: D = dark blue, G = green, K = black, O = Orange, P = pink, R = red, V = violet, W = white, Y = yellow.
Age: AHY, ASY, TY, ATY, A4Y = adult. **Sex**: F = female, M = Male, U = unknown.
[1]polygyny per AGFD unpublished data. [2]Within season within site movement

Additional Survey Sites with Banded Birds

Banded willow flycatchers were found at 11 additional AGFD survey sites along the San Pedro and Gila Rivers (Table 11). These sites were not primary banding sites and were monitored by AGFD only as time permitted. The CPFS banding crew captured 22 new flycatchers, recaptured four, and along with the AGFD crew resighted 21 returning flycatchers. In 2000, four birds at Gila River South 07, 10 birds at Aravaipa North, and four birds at the Wheatfields were banded with only a single silver service band and are not listed in Table 11.

Table 11: Willow flycatchers resighted in 2000 at Arizona Game and Fish Department survey sites (as opposed to monitoring sites; refer to Page 3 and Table 1). Table includes AGFD site, date banded, band number, color band combination, age in 2000, sex if known, confirmed resident of the territory and status (new, resight, and recapture).

AGFD site	Date Banded	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex	Confirmed Resident of Territory	Status
Wheatfields	06/04/98	1590-97551	Z	GG	ATY	F	Yes	Resight
Wheatfields	07/14/98	1590-97562	GG	Z	ATY	U	Yes	Recapture
Aravaipa Inflow	06/28/97	1590-97353		X	4Y	U	Yes	Recapture
Aravaipa Inflow	05/17/99	1590-97580	KD	Z	ASY	U	Yes	Resight
Aravaipa Inflow	05/17/99	1590-97581	VG	Z	ASY	M	Yes	Recapture
Aravaipa Inflow	05/13/98	1590-97588	Z	YD	ATY	U	Yes	Resight
Aravaipa Inflow	06/25/99	1710-20228	RR	Z	ASY	F	Yes	Resight
Aravaipa Inflow	06/06/00	1710-20419	WD	D	AHY	F	Yes	New
Aravaipa Inflow	06/06/00	1710-20446	KR	D	AHY	U	No	New
Aravaipa Inflow	06/06/00	1710-20447	KY	D	AHY	M	Yes	New
Aravaipa Inflow	06/09/99	1710-20476	WD	Z	ASY	F	Yes	Resight
Aravaipa Inflow	06/28/99	1710-20484	Z	YK	ASY	U	Yes	Resight
Aravaipa North	06/28/98	1740-91684	X	GV	ATY	M	Yes	Recapture
Aravaipa South	07/02/99	1710-20217	Z	WD	ASY	F	Yes	Resight
Cooks Lake Cienega	05/18/99	1710-20439	DW	D	ASY	U	Yes	Resight
Cooks Lake Cienega	06/09/99	1710-20475	WR	Z	ASY	U	Yes	Resight
Cooks Lake Cienega	06/17/96	1740-91620	X	KY	A5Y	M	Yes	Resight
Cooks Lake Cienega	06/22/98	1740-91859	D	KD	TY	U	Yes	Resight
Malpais Hills	05/15/99	1590-97578	KV	Z	ASY	U	Yes	Resight
Gila River South 07	07/03/00	1710-20236	VW	Z	AHY	F	No	New
Gila River South 07	06/06/96	1740-91518	KW/KW	X	ASY	F	Yes	Resight
Gila River South 07	05/18/99	1740-91867	D	RY	ASY	M	Yes	Resight
Gila River South 07	06/23/98	1740-91891	YY	D	ATY	U	Yes	Resight
Gila River North 10	06/28/99	1710-20485	Z	GY	ASY	U	Yes	Resight
Gila River North 10	05/18/99	1740-91888	D	YG	ASY	U	Yes	Resight
Gila River South 12	05/18/99	1710-20415	KG	D	ASY	U	Yes	Resight
Gila River South 12	05/18/99	1710-20424	WG	D	ASY	F	Yes	Resight
Gila River South 12	06/20/98	1740-91856	D	GG	ATY	U	Yes	Resight
Gila River North 18	07/04/96	1740-91531	X	L/KW	A5Y	F	Yes	Resight
Gila River South 18	06/25/99	1710-20227	YY	Z	ASY	M	Yes	Resight

Color bands are read top/bottom where X=USFWS aluminum band (non-colored), D=USFWS anodized blue band, and Z=USFWS anodized gold band. All metal solid-color bands are denoted by double letters, plastic by single: D = dark blue, G = green, K = black, L = light blue, O = Orange, P = pink, R = red, V = violet, W = white, Y = yellow, and KW = black over white split.
Age: AHY, ASY, TY, ATY, 4Y, A4Y, A5Y = adult.
Sex: F = female, M = Male, U = unknown.

ADULT SURVIVORSHIP

Survivorship is defined as the number of individuals known to survive from one year to the next. Survivorship calculations are based on resights and recaptures of banded individuals. In 2000, 86 of 152 adult flycatchers banded in 1999 at Roosevelt Lake and the lower San Pedro primary sites returned to the same or different breeding site. Thus, 1999-2000 survivorship (Table 12) was 57%. Adult survivorship was slightly different between the San Pedro sites (66%) and the Roosevelt Lake sites (50%).

Table 12: Willow flycatcher survivorship in Arizona from 1999 to 2000. Data are listed by drainage and site. The table includes the total number of banded flycatchers present in 1999, the number that returned (to any site) in 2000, and overall percent survivorship.

Drainage	Site	# Banded 1999	# Returned 2000	% Survivorship
Roosevelt Lake	Old Salt	15	5	33%
	Shangri-la	33	17	52%
	Mudflats	9	6	67%
	Tonto	31	16	52%
	Overall at Roosevelt	**88**	**44**	**50%**
San Pedro/Gila River Confluence	Cooks Lake Seep	6	4	67%
	PZ Ranch	1	0	0
	Dudleyville	10	6	60%
	Indian Hills	14	12	86%
	CB Crossing	9	3	33%
	Kearny	24	17	71%
	Overall at San Pedro	**64**	**42**	**66%**
Overall Totals		**152**	**86**	**57%**

ADULT SITE FIDELITY

Site fidelity is defined as an adult flycatcher returning to the same breeding site that it used the previous year. It is calculated by dividing the number of banded birds returning to the site in 2000 by the total number of banded birds at the site in 1999. Flycatchers banded prior to 1999 and detected in 2000, but not 1999, were excluded from this calculation because their 1999 whereabouts were unknown. We detected 61 (of 152 possible) flycatchers that returned to the same breeding site that they occupied in 1999 (40% site fidelity; Table 13).

Table 13: Willow flycatcher site fidelity in Arizona, organized by drainage and site. Table includes the total number of banded flycatchers present in 1999, those returning to the same site in 2000, and total percent site fidelity of all returning birds.

Drainage	Site	# Banded 1999	# Returned 2000	Site Fidelity (%)
Roosevelt Lake	Old Salt	15	3	20%
	Shangri-la	33	12	36%
	Mudflats	9	4	44%
	Tonto	31	13	42%
	Overall at Roosevelt	**88**	**32**	**36%**
San Pedro/Gila River Confluence	Cooks Lake Seep	6	2	33%
	PZ Ranch	1	0	0%
	Dudleyville	10	6	60%
	Indian Hills	14	7	50%
	CB Crossing	9	0	0%
	Kearny	24	14	58%
	Overall at San Pedro	**64**	**29**	**45%**
Overall Totals		**152**	**61**	**40%**

ADULT MOVEMENT WITHIN SITE

Movement within-site is defined as a territorial flycatcher relocating from one nesting or territorial area to a new nesting or territorial area *within* a breeding site. Movement within-site can occur *between* or *within* a breeding season, as was observed in 1997, 1998 and 1999. Because flycatcher territories vary in size and precise territorial boundaries were not mapped, flycatchers are considered to have moved only if they were resighted or recaptured >50 m from a previous resight/capture site or nest location.

Between-Year Movement Within-Sites

Between-year movement within-sites represents flycatchers returning to different locations within their previous year's breeding site. Of the 61 flycatchers that returned to their previous year's breeding site, 38 (62%) settled in approximately the same area and 23 (38%) moved >50 m (Table 14).

Table 14: Between-year within-site movement of flycatchers returning to the same breeding site in Arizona, 2000. Table includes drainage, site, total number of site faithful birds, percent of birds settled on new territories, and average and range of distance moved (in meters).

Drainage	Site	# Birds Returning to Breeding Site	% Birds moved >50 m	Average Distance Moved (m)	Range of Distances Moved (m)
Roosevelt Lake	Salt River Inflow	3	33%	279	279
	Shangri-la	13	31%	141	58-24
	Mudflats	3	66%	89	77-101
	Tonto Creek Inflow	13	54%	264	60-555
San Pedro/Gila River Confluence	Cooks Lake Seep	2	50%	90	90
	CB Crossing	0	--	--	--
	Indian Hills	7	29%	253	115-391
	Kearny	14	21%	76	51-112
	Dudleyville	6	50%	117	96-135
Overall Totals		**61**	**38%**	**172**	**51-555**

Same-Year Movement Within-Sites

Same-year movement within-sites occurs when a flycatcher that defended a territory or nest area moves within the same breeding season to a different territory or nest area within the breeding site. Four flycatchers were detected moving within-site during the 2000 breeding season. At Campaign Bay, two lone males moved and successfully paired up in their new territories. Another lone male, at Tonto Creek Inflow, moved 420 m and paired up with two females. One incidence of within-site movement was also noted at Kearny sewage ponds; the male banded early in the season at one territory moved 208 m, where he paired and nested. Five other males were pulled into adjacent territories during banding due to playback vocalizations and were not considered within-site movement.

Mate replacement occurs when one flycatcher from a pair abandons its territory after a nesting attempt fails, and is replaced with a new mate. In 2000, AGFD and USGS documented four cases of mate replacement at Roosevelt Lake breeding sites. Three cases occurred at Shangri-la and one at Tonto. All three Shangri-la replacements were males that paired with neighboring females for that female's second nesting attempt.

ADULT MOVEMENT BETWEEN-SITES

Between-site movement is defined as a flycatcher that moved from one breeding site to another breeding site, and may occur between and within years. In 2000, we detected five 1999 nestlings (pg. 24 Table: 17) and 31 adult flycatchers that moved to new sites from 1999 to 2000 (16% of the banded flycatchers present in 1999). Three moved from their 1998 site but were not detected in 1999. One of the 34 adult flycatchers moved between drainages. All natal and juvenile movements are presented in a separate section below (see page 24). Five adult flycatchers moved between-sites *within* the 2000 breeding season.

Between-Year Movement Between-Sites

Year to year movement between-sites may occur within and between drainages, the latter being less common. In 2000, USGS and AGFD detected 33 within-drainage movements and one between-drainage movement.

Roosevelt Lake

Fourteen flycatchers moved to different sites between seasons at Roosevelt Lake. Three flycatchers moved from the Tonto Creek Inflow to the Salt River Inflow, and two moved from Salt River to Tonto Creek. The remaining nine flycatchers moved between the Salt River Sites. There was also one between year movement between drainage; a Kearny sewage pond (Gila River) flycatcher moved 69 km to Shangri-la (at Roosevelt Lake).

Lower San Pedro River

The San Pedro and Gila River sites are close together along a riparian corridor that has relatively contiguous riparian vegetation. Flycatcher movements are commonly observed between all sites. Overall, 17 banded flycatchers were detected at different sites along the San Pedro/Gila River area in 2000 (Table 15).

Table 15: Adult southwestern willow flycatchers at Roosevelt Lake and the lower San Pedro River/Gila River confluence that exhibited between-year, between-site movement from 1999 to 2000. Table includes sites where flycatchers were detected in 1999 and 2000, distance moved, USFWS band number, color band combination, age in 2000, and sex. Nestling movement is detailed in Table 17.

Site Detected in 1999 (unless noted 1998)	Site Detected in 2000	Distance moved (km)	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	2000 Age	Sex
Old Salt	Shangri-la	1.9	1590-97318	X	W/PD	A4Y	F
	Shangri-la	1.2	1710-20302	V	DR	ASY	U
Old Salt (1998)	Shangri-la	2.1	1590-97537	V	RR	ATY	U
Mudflats	Shangri-la	1.1	1710-20280	V	KD	ASY	U
	Shangri-la	1.1	1710-20282	V	YO	ASY	F
Shangri-la	Mudflats	1.1	1590-97543	V	WG	ASY	U
	Lakeshore	1.7	1710-20339	V	OG	ASY	U
	Lakeshore	1.7	1710-20345	V	YG	ASY	U
	Tonto Creek	28.8	1710-20557	V	DK	ASY	F
	Tonto Creek	28.8	1710-20567	YO	V	ASY	M
School House South	Shangri-la	1.5	1590-97540	V	RY	ATY	F
	Shangri-la	0.9	1740-91728	X	RG	A5Y	M
Tonto Creek	Lakeshore	26.5	1710-20263	GW	V	ASY	U
	Salt River Inflow	30	1740-91532	RK	X	A5Y	M
	Shangri-la	28.8	2070-92905	WK/R	X	A4Y	M
Tonto (1998)	Mudflats	28.8	1590-97524	YW	V	ATY	F
Aravaipa	Cooks Cienega	2.5	1710-20475	WR	Z	ASY	U
	GN10	20	1710-20485	Z	GY	ASY	U
Cooks Lake seep	Wheatfields	4.5	1590-97551	Z	GG	ATY	F
	Kearny	22	1710-20216	Z	WW	ASY	F
Indian Hills	Aravaipa South	12	1710-20217	Z	WD	ASY	F
	GS18	17	1710-20227	YY	Z	ASY	M
	Aravaipa	15	1710-20228	RR	Z	ASY	F
	Kearny	14.5	1710-20487	WW	Z	ASY	U
	Kearny	14.5	1740-91857	D	RG	ATY	U
CB Crossing	Dudleyville	6	1710-20491	Z	KD	ASY	U
	Aravaipa North	12	1740-91684	X	GV	ATY	M
	Dudleyville	6	1740-91866	D	KK	ATY	M
GS07	Cooks Cienega	22	1710-20439	DW	D	ASY	U
GS07 (1998)	GS12	4	1740-91856	D	GG	ATY	U
GS12	GN10	1.5	1740-91888	D	YG	ASY	U
Kearny	Shangri-la	69	1590-97325	KW/O	X	A4Y	F
	Dudleyville	22	1590-97561	Z	WK	ATY	M
	Indian Hills	14.5	1740-91854	D	WG	ATY	F

Same-Year Movement Between-Sites

Same-year movement between sites occurred on five occasions in 2000, two incidences at Roosevelt and three at San Pedro. A lone male at Lakeshore moved mid- season to Mudflats where he paired (a movement of 1.7 km). A second year female at Mudflats disappeared after her nest was predated, and was detected at the Orange Peel survey site four weeks later incubating eggs. Along the San Pedro/ Gila River sites, there were three flycatchers banded/ resighted early in the breeding season that moved to different sites to breed. Two unpaired males seen early in the season at Cooks Lake Seep moved to Cooks Lake Cienega (0.4 km) and Malpais Hills (4 km) to breed. One female whose nest failed at Aravaipa moved 13 km to CB Crossing to nest again.

NESTLING CAPTURE AND BANDING

Nestlings were banded only when they could be taken from nests that were safely accessible and only when 7-10 days of age. Nestlings banded in 2000 received a colored-anodized USFWS numbered band (each color common to the particular drainage; see Table 2) on one leg. We banded a total of 71 nestlings (from 35 nests) at Roosevelt Lake – most from Campaign Bay (Table 16).

Table 16: Willow flycatcher nestlings banded in 2000. Table includes site banded, date banded, USFWS band number, the leg the service band was applied to, and the AGFD territory and nest number.

Site	Date Banded	USFWS Band Number	Service Band Left Leg	Service Band Right Leg	2000 Territory and Nest
Mud Flats	6/24/00	1710-20323		V	1A
Mud Flats	7/27/00	2210-57006		K	1B
Mud Flats	6/29/00	1710-20620		K	68A
Mud Flats	6/29/00	1710-20621		K	68A
Mud Flats	7/6/00	1740-51851		K	58A
Mud Flats	7/6/00	1740-51852		K	58A
Old Salt	7/9/00	1740-51863	K		55A
Old Salt	7/17/00	2210-57064		K	72A
Old Salt	7/17/00	2210-57065		K	72A
Old Salt	7/17/00	2210-57066	K		26A
Old Salt	7/17/00	2210-57067	K		26A
Old Salt	7/19/00	2210-57076	K		17A
Old Salt	7/19/00	2210-57077	K		17A
Shangri-la	6/24/00	1710-20324		V	3A
Shangri-la	6/24/00	1710-20325		V	3A
Shangri-la	6/24/00	1710-20326	V		123A
Shangri-la	6/24/00	1710-20327	V		123A
Shangri-la	6/24/00	1710-20328		V	115A
Shangri-la	6/16/00	1710-20610		K	65A
Shangri-la	6/21/00	1710-20617	K		56A
Shangri-la	6/21/00	1710-20618	K		56A
Shangri-la	6/21/00	1710-20619	K		56A
Shangri-la	6/29/00	1710-20622	K		107B
Shangri-la	6/29/00	1710-20623	K		107B
Shangri-la	6/29/00	1710-20624		K	51A

Table 16: Continued, Willow flycatcher nestlings banded in 2000.

Site	Date Banded	USFWS Band Number	Service Band Left Leg	Service Band Right Leg	2000 Nest
Shangri-la	6/29/00	1710-20625		K	51A
Shangri-la	7/9/00	1740-51858		K	87A
Shangri-la	7/9/00	1740-51859		K	87A
Shangri-la	7/9/00	1740-51861		K	27B
Shangri-la	7/9/00	1740-51862		K	27B
Shangri-la	7/3/00	1740-51876		K	9B
Shangri-la	7/3/00	1740-51877		K	9B
Shangri-la	7/18/00	1740-51878		K	4B
Shangri-la	7/18/00	1740-51879		K	4B
Shangri-la	7/18/00	2210-57068		K	4B
Shangri-la	7/19/00	1740-91596		K	2A
Shangri-la	7/21/00	1740-91597		K	29B
Shangri-la	7/21/00	1740-91598		K	29B
Shangri-la	7/21/00	1740-91599		K	29B
Shangri-la	7/21/00	2210-57001	K		23B
Shangri-la	7/21/00	2210-57002	K		23B
Shangri-la	7/21/00	2210-57003		K	23B
Shangri-la	7/17/00	2210-57061	K		14C
Shangri-la	7/17/00	2210-57062	K		14C
Shangri-la	7/17/00	2210-57063	K		14C
Shangri-la	7/11/00	2210-57069		K	84A
Shangri-la	7/11/00	2210-57070		K	84A
Shangri-la	7/15/00	2210-57074		K	121A
Shangri-la	7/15/00	2210-57075		K	121A
Shangri-la	7/27/00	2210-57007		K	80B
Shangri-la	7/29/00	2210-57008	K		65B
Shangri-la	7/30/00	2210-57009		K	88C
Shangri-la	7/30/00	2210-57010		K	88C
Shangri-la	7/30/00	2210-57011		K	123B
Shangri-la	7/30/00	2210-57012		K	123B
Shangri-la	7/30/00	2210-57013		K	123B
Shangri-la	7/31/00	2210-57014	K		3B
Shangri-la	7/31/00	2210-57015	K		3B
Shangri-la	7/1/00	1710-20700		K	6A
Shangri-la	7/1/00	1740-51850		K	6A
Shangri-la	7/6/00	1740-51853	K		77A
Shangri-la	7/6/00	1740-51854	K		77A
Shangri-la	7/6/00	1740-51855		K	100A
Shangri-la	7/6/00	1740-51856		K	100A
Shangri-la	7/6/00	1740-51857		K	100A
Orange Peel	7/14/00	1740-91593	K		31A
Orange Peel	7/14/00	1740-91594	K		31A
Orange Peel	7/14/00	1740-91595	K		31A
Tonto Creek Inflow	7/15/00	2210-57060		K	25B
Tonto Creek Inflow	7/15/00	2210-57072		K	25B
Tonto Creek Inflow	7/15/00	2210-57073		K	25B

FIRST YEAR SURVIVORSHIP AND MOVEMENTS

In 1999, 62 nestlings were banded at five sites – most (40) at the Salt River Inflow-Campaign Bay location. In 2000, five of the 62 nestlings banded in 1999 were resighted or recaptured (Table 17). Thus, 1999 – 2000 first year survivorship (the percentage of banded nestlings subsequently resighted) was 8%. One additional Kearny nestling was resighted at Gila River South 07 but never recaptured, so individual identity and year banded is unknown.

We had one foreign recapture of a banded nestling. A nestling banded at Shangri-la in 1999 was recaptured on 29 January 2000 at a wintering site near Bolson, Costa Rica by USGS personnel (Tom Koronkiewicz, unpublished data). This nestling returned to breed at Roosevelt Lake- Orange Peel in 2000.

Over the course of this study (1996-2000), we have resighted 11 of 118 banded nestlings during their following year. None of these "second year" flycatchers returned to their natal sites. All three banded nestlings first resighted after their second year were also found at new locations (though their second year locations were not known). Collectively, this evidence suggests a tendency for second year birds to disperse and settle outside of their natal site. However, this movement between sites may not be as pronounced if the definition of site is reported by drainage and not by AGFD definitions. For those flycatchers banded as nestlings and first detected in 2000 (Table 17), the average distance moved was 7.0 km (range =0.7km - 28.8km).

Table 17: Willow flycatcher nestlings banded in previous years that were first detected in 2000. Includes natal banding location, site detected in 2000, the distance moved from natal site, USFWS band number, color band combination, date natal banding, and sex.

Natal Banding Site	Site Detected in 2000	Distance Moved (km)	USFWS Band Number	Color Band Left Leg	Color Band Right Leg	Natal Date Banded	Sex
Shangri-la	Mudflats	0.7	1590-97507	V	YKY	6/28/99	U
	Lakeshore	1.7	1710-20306	V	KGK	7/24/99	U
	Lakeshore	1.7	1710-20578	V	DD	7/7/99	U
	Orange Peel	28.8	1710-20561	DO	V	7/28/99	U
Tonto Creek Inflow	A Cross Road	2.5	1590-97511	KR	V	6/28/99	U

Color bands are read top/bottom where X = USFWS aluminum band (non-colored), D = USFWS anodized blue band, and V = USFWS anodized violet band,. All metal solid-color bands are denoted by double letters, plastic bands by a single letter: D = dark blue, G = green, K = black, R = red, O = orange, and Y = yellow.
Sex: F = female, M = Male, U = unknown.

DISCUSSION

2000 BANDING AND RESIGHTING EFFORTS

The 2000 field season was the most successful to date, with 125 new adults and 71 nestling flycatchers banded. One hundred and fourteen banded adults returned from previous years, and five flycatchers banded as nestlings in previous years were located at breeding sites. Overall, 70% of all adult flycatchers detected at primary banding and monitoring sites were banded by the end of the 2000 season.

From 1996 to 2000, we have banded 488 adult and 183 nestling southwestern willow flycatchers at Roosevelt Lake and the lower San Pedro River. For four consecutive years, we have banded 68% or more of all flycatchers detected at AGFD monitoring sites (Paxton and Sogge 1996, Paxton et al. 1997, Netter et al. 1998, English et al. 1999). Maintaining high overall percentages of banded birds is important because it increases the proportion of banded birds returning in subsequent years, which in turn increases our ability to detect site fidelity and movement, and provides a more accurate calculation of survivorship.

Resighting was a major component of banders' work with the result that the number of returning banded adult and nestling flycatchers detected at Roosevelt Lake and the lower San Pedro River continued to increase annually (35 in 1997, 71 in 1998, 81 in 1999, 119 in 2000). Resighting is central to this project in order to detect returning flycatchers, confirm territory status, and detect movements among breeding populations. In 2000, the high level and skill of resighting efforts by the USGS and AGFD staff produced resights that provided outstanding demographic data (including more between-site movement detections than in previous years), as well as verification of uncommon behaviors such as polygyny and mate replacement. The assistance and cooperation of the AGFD willow flycatcher crew was crucial to this resighting success.

SURVIVORSHIP

Survivorship is defined as the number of individuals that survive from one year to the next, and accurate calculations depend on year to year detection of birds. Estimated 1999-2000 survivorship rate, based on 86 of 152 returning banded adults, was 57%.

One problem with calculating survivorship is that it assumes that all living flycatchers are detected. This year we detected five flycatchers at our monitoring sites that were detected in 1998, but were not detected in 1999. Recalculating last year's survivorship by including these individuals increases the 1998-1999 survivorship rate from 50% (as reported in English et al. 1999) to 54%. This results in corrected estimates that are higher than those presented earlier, underscoring the fact that survivorship estimates are just that - *estimates*. However, given that most known sites in central Arizona receive strong survey coverage, a banded flycatcher that moves to another site has a high probability of being detected. This, coupled with our large number of study sites, high percentage of banded birds within a given year, and the long-term nature of our study, provides for more accurate survivorship estimates than would be possible with a shorter, smaller scale study.

The complementary calculation of survivorship is mortality, hence we have a mortality rate of 43% between 1999- 2000. This is similar to the mortality rate of 1998-1999 (after adjustments) and 1997-1998 which were 46% and 39% respectively. 1996-1997 showed the lowest mortality rate of 36%. No mechanism for these differing mortality rates are known, though possible factors include mortality during migration and/or the wintering period.

This year we detected 5 of the 62 nestlings (8%) banded in 1999. In 1999, 21% of the nestlings banded in 1998 returned. In 1998 and 1997, 5% and 8% respectively of the nestling banded the previous year returned (Paxton et al. 1997; Netter et al. 1998). When values were recalculated based on 1999 detections of a 1996 nestling and a 1997 nestling not previously detected, survivorship rates rose to 17% (1996-1997) and 14% (1997-1998). If this pattern continues, the survival rate for 1999-2000 may increase due to birds detected in years to come. Since 1996, 15 of 118 nestlings have been resighted from one to four years after banding, for a combined first-year survivorship rate of 13%.

The demographic patterns of wild bird populations often vary from year to year, sometimes to a very large degree. Thus, it is no surprise to find relatively substantial differences (up to 11%) among survivorship and mortality rates for different years. The different patterns that we observe reinforce the variability of demographic traits and the need for long-term data. The value of long-term and large-scale data is further illustrated by the dramatic upward adjustments of first-year survivorship estimates - adjustments that would not have been possible without at least three years of sampling and multiple study sites (since all juveniles dispersed, the number subsequently seen would have been lower if fewer breeding sites were monitored).

SITE FIDELITY

Site fidelity is the tendency of flycatchers to return to the same breeding site between years. 1996-1997, 1997-1998, and 1998-1999 site fidelity rates were 26% and 38% and 40%, respectively (English et al. 1999). Our 1999-2000 rate of 40% is similar to the 1998-1999 and 1997-1998 rates (Figure 2). The higher fidelity rates for 1997 through 1999 may be partially attributed to an increase in resighting effort at survey sites, whereby a higher percentage of returning flycatchers were more likely to be detected.

From 1997 to 2000, the overall site fidelity at Roosevelt Lake (35%, 41%, 40%, and 36%, respectively) has been similar. San Pedro, between 1998 and 2000, has similar overall site fidelity to Roosevelt Lake (36%, 40% and 45%). However, in 1997, overall site fidelity at San Pedro was only 17%. Due to the large area of habitat burned from a fire in 1996, a large percentage of birds banded in 1996 at PZ Ranch had very poor site fidelity in 1997. Site fidelity varied among individual sites, and between years at the same site (Figure 2). The highest fidelity has been at the Tonto Creek Inflow and Kearny sites, and more recently at Campaign Bay. PZ Ranch, which in 1996 suffered a burn that destroyed 75% of available habitat, has had poor site fidelity, while CB Crossing has had 0% site fidelity for the last three consecutive years.

Calculating site fidelity as the number of flycatchers returning to a site divided by the total number of banded birds present at that site the year before is convenient for comparisons among sites and to other studies, but it does not differentiate between fidelity based on mortality versus choice. Because this study encompasses multiple drainages and represents most known occupied willow flycatcher sites in these drainages, movements are readily detected. Thus it is instructive to look at an alternate calculation of site fidelity – the percentage of birds known to *survive*, thus having the choice between site fidelity or movement. In this comparison, 70% of known surviving 1999 adults returned to the same breeding site in 2000. This compares with 66%, 74%, and 78% of known surviving adults in 1997, 1998, and 1999 respectively (English et al. 1999; Netter et al. 1998). Thus, each year approximately two-thirds of known returning adults are site faithful to their previous year's breeding site.

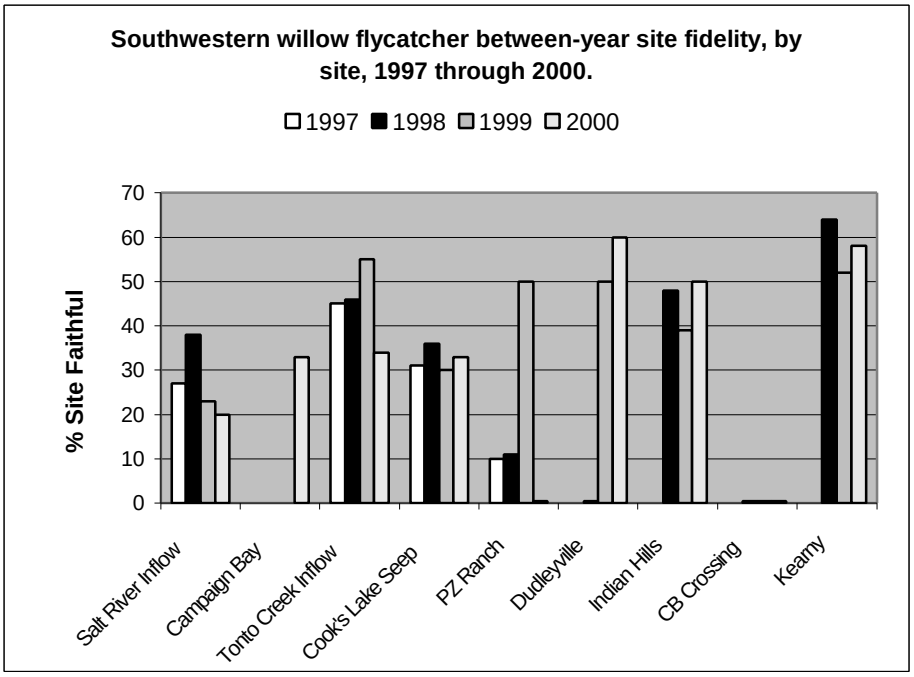

Figure 2: Site fidelity of willow flycatchers at nine Arizona sites from 1997 to 2000. Banding was not conducted at all sites in all years.

ADULT MOVEMENT WITHIN-SITE

Of the banded flycatchers that returned in 2000 to their 1999 breeding site, 67% returned to or near (within 50 m) the same territory as in 1999, while 38% settled more than 50 m away. This is similar to patterns observed in previous years where returning to or near the same territory was more common than settlement elsewhere in the patch (1997 = 77% vs 23%; 1998 = 55% vs 45%; 1999 = 52% vs 48%). Also as in past years, some birds settled far from their former year's territory. For all years, range of distance moved depended on breeding patch size; movements were greater at larger sites.

Of the four willow flycatchers at primary monitoring sites that moved within their breeding patch during the 2000 season, all were unpaired males prior to their movement (15 to 420m), and all secured a mate post-movement. This suggests that local movements by males are related to lack of a mate.

ADULT MOVEMENT BETWEEN-SITES

As in previous years, we detected a substantial amount of movement between sites, illustrating the dynamic nature of the willow flycatcher population as a whole. Most movements were 25 km or less, but we did detect one flycatcher from Kearny sewage ponds (in 1999) that moved over 69 km to Shangri-la. Overall, 16% of banded 1999 flycatchers were found in new breeding sites in 2000, similar to patterns seen for 1996-1997 (14%), 1997-1998 (13%), and 1998-1999 (17%) (Paxton et al. 1997, Netter et al. 1998, English et al. 1999).

Although these numbers represent a low overall percentage of the banded flycatchers, this level of movement has significant implications to genetic structure, site tenacity, and response to habitat

modification and/or destruction. This level of population movement and resultant genetic mixing helps explain the patterns of high genetic diversity within, and low population structuring (e.g., low reproductive isolation) among willow flycatcher populations in the Southwest (Busch et al. 2000).

If we base our calculation on only the number of *birds known to survive*, which therefore had the choice between site fidelity and movement, 29% of individuals moved to new sites between 1999 and 2000 (similar to the 34%, 26%, and 29% in 1997, 1998, and 1999, respectively).

We documented five cases of within-season movements between breeding sites (three males and two females). Prior to moving 0.4 km, 1.7 km, and 4 km between sites to breed, all three males were unpaired. One female was a second year bird who moved sites after her nest failed, a movement of 29 km. Another female, at Aravaipa, moved 13 km to CB Crossing after her nest failed. These types of movements provide a reminder that flycatchers may view sites, corridors, and habitat patchiness and isolation differently than we typically do.

Detection of continuous movement of flycatchers throughout the breeding season, both within and between different sites, underscores that surveys throughout the breeding season are essential for accurate population estimates of breeding willow flycatchers. In fact, accurate population estimates in large, densely populated breeding sites may require intense color-banding and tracking of individual birds. Additionally, our data indicate that areas within suitable habitat that are unoccupied early in the breeding season may become occupied later as flycatchers resettle territories. Certain sites, such as Kearny or Campaign Bay, will fill up with birds before other breeding sites, such as CB Crossing. We also find that within a site, the birds settle first into the high density areas and later settle into the less dense outlying territories. Furthermore, the presence of a flycatcher at a territory throughout the breeding season does not mean that it is the same individual, as reshuffling and replacement of individuals does occur. Although a flycatcher territory may be occupied in consecutive years and have nearly identical territory boundaries in both years, it may not be occupied by the same flycatcher.

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Literature Cited

Busch, J.D., M. P. Miller, E. P. Paxton, M. K. Sogge, and P. Keim. 2000. Genetic Variation in the Endangered Southwestern Willow Flycatcher. Auk 117: 586-595.

English, H.C., E.H. Paxton and M.K. Sogge. 1999. Surviorship and movements of Southwestern Willow Flycatchers in Arizona – 1999. U.S. Geological Survey report to the U.S. Bureau of Reclamation, Phoenix, AZ.

Griffiths, R., S. Daan, and C. Dijkstra. 1996. Sex identification in birds using two CHD genes. Proc. R. Soc. Lond. B 263:1251-1256.

Muiznieks, B.D., T.E. Corman, S.J. Sferra, M.K. Sogge and T.J. Tibbitts. 1994. Arizona Partners in Flight 1993 southwestern willow flycatcher survey. Arizona Game and Fish Department Nongame and Endangered Wildlife Program Technical Report 52.

Netter, M.R., E.H. Paxton and M.K. Sogge. 1998. Banding and movements of the Southwestern Willow Flycatcher at Roosevelt Lake and San Pedro River/Gila River confluence, Arizona – 1998. U.S.G.S. Colorado Plateau Field Station Report to the U.S. Bureau of Reclamation, Phoenix, AZ.

Paradzick, C.E, R.F. Davidson, J.W. Rourke, M.W. Sumner, and T.D. McCarthey. 2000. Southwestern Willow Flycatcher 1999 Survey and Nest Monitoring Report. Nongame and Endangered Wildlife Program Technical Report 151, Arizona Game and Fish Department, Phoenix, AZ. 93 pp.

Paxton, E., and M. K. Sogge. 1996. Banding and population genetics of southwestern willow flycatchers in Arizona - 1996 summary report. USGS Colorado Plateau Research Station / Northern Arizona University report. 25 pp.

Paxton, E., M. K. Sogge, and J. Owen. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. Colorado Plateau Research Station Research Report.

Paxton, E., S. Langridge, and M.K. Sogge. 1997. Banding and population genetics of southwestern willow flycatchers in Arizona - 1997 Summary Report. USGS Colorado Plateau Research Station / Northern Arizona University report. 63 pp.

Pyle, P. 1997. Identification guide to North American Birds. Part 1. Slate Creek Press, Bolinas, CA. 730 pp.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. USFS General Technical Report PSW-GTR-144. Albany, CA; Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 41 pp.

Sogge, M.K., J. Busch, E. Paxton, M. Miller and Dr. P. Keim. 1998. Population genetic analysis of the southwestern willow flycatcher: 1996-1997. Report to Arizona Game and Fish Department Heritage fund. Heritage fund project I96049.

Super, P.E. and C. van Riper III. 1995. A comparison of avian hematozoan epizootiology in two California coastal scrub communities. Journal of Wildlife Diseases 31: 447-461.

Unitt, P. 1987. *Empidonax traillii extimus*: an endangered subspecies. Western Birds 18:137-162.

U.S. Fish and Wildlife Service. 1993. Proposal to list the southwestern willow flycatcher as an endangered species and to designate critical habitat. Federal Register 58:39495-39522 (July 23, 1993).

U.S. Fish and Wildlife Service. 1995. Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher. Federal Register 60:10694 (February 27, 1995).

APPENDIX 1: WILLOW FLYCATCHERS BANDED BY CPFS 1994 THROUGH 2000

The following table lists all willow flycatchers banded by the Colorado Plateau Field Station in Arizona from 1994 to 2000. The table is sorted by flycatcher band number, and includes color combination, site banded at, age when banded (either adult or nestling), sex, date banded, and the years it was detected (including the year it was banded). A numerical footnote in a "Years Detected" column indicates that the flycatcher moved that year to a different site than it occupied the prior year, with the number indicating the new location (see end of table for site numbers).

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1520-93443	O/X:R	Tuzigoot Bridge	AHY	M	22-Jul-94	X	X	X [1]	X			
1520-93444	X:PD/Y	Alpine Horse Pasture	AHY	M	24-Jul-94	X		X	X	X	X	
1520-93445	X:R	Alpine Horse Pasture	AHY	F*	24-Jul-94	X						
1590-97201	P/KW:X	Cooks Lake Seep	AHY	M	30-Apr-97				X	X		
1590-97202	KR:X	Tonto Creek Inflow	AHY	M	13-May-97				X	X	X	X
1590-97203	UW/R:X	Tonto Creek Inflow	AHY	M*	15-May-97				X			
1590-97204	X:DP/K	Cooks Lake Seep	AHY	M*	22-May-97				X			
1590-97205	UW/K:X	Cooks Lake Seep	AHY	M	23-May-97				X	X		
1590-97206	WR/K:X	Indian Hills	AHY	M	29-May-97				X	X	X	X
1590-97207	VY:X	Indian Hills	AHY	M*	29-May-97				X	X	X	
1590-97208	WU/K:X	Indian Hills	AHY	F	29-May-97				X	X	X	X
1590-97209	GK:X	Indian Hills	AHY	M	29-May-97				X	X [14]	X [07]	X
1590-97210	WR:X	Indian Hills	AHY	M	30-May-97				X	X	X	X
1590-97211	Y/WK:X	Indian Hills	AHY	F	30-May-97				X	X [07]	X	
1590-97212	O/WK:X	Indian Hills	AHY	F	30-May-97				X	X	X	X
1590-97213	X:Y/WR	Salt River Inflow	AHY	F	31-May-97				X			
1590-97214	X:D/WR	Salt River Inflow	AHY	M	01-Jun-97				X			
1590-97215	X:P/WR	Salt River Inflow	AHY	M	01-Jun-97				X			
1590-97216	L/WR:X	Tonto Creek Inflow	AHY	M	02-Jun-97				X	X		
1590-97217	Y/WR:X	Salt River Inflow	AHY	U	03-Jun-97				X			
1590-97218	X:O/WR	Salt River Inflow	AHY	M	03-Jun-97				X	X		
1590-97219	X:DP/WR	Salt River Inflow	AHY	F*	03-Jun-97				X	X		
1590-97220	P/O:X	Camp Verde	AHY	M	08-Jun-97				X	X	X	X
1590-97221	DP/O:X	Camp Verde	AHY	F	08-Jun-97				X	X	X	X
1590-97222	WK/O:X	Camp Verde	AHY	F	08-Jun-97				X	X	X	X
1590-97223	WR/O:X	Camp Verde	AHY	F*	08-Jun-97				X	X		
1590-97224	X:P/D	Greer Town	AHY	M*	14-Jun-97				X	X	X	
1590-97225	X:D/D	Greer Town	AHY	F	14-Jun-97				X	X [34]	X	
1590-97232	X:WK/D	Greer Town	AHY	M	17-Jun-97				X	X	X	X
1590-97233	O:X	Camp Verde	N	U	23-Jun-97				X			
1590-97234	O:X	Camp Verde	N	U	23-Jun-97				X			
1590-97235	O:X	Camp Verde	N	U	23-Jun-97				X			
1590-97236	R:X	Salt River Inflow	N	U	23-Jun-97				X			
1590-97237	R:X	Salt River Inflow	N	U	23-Jun-97				X			
1590-97238	RG:X	Kearny Sewage Ponds	AHY	F	24-Jun-97				X	X	X [11]	
1590-97239	DP/L:X	Kearny Sewage Ponds	AHY	M	24-Jun-97				X			
1590-97240	YG:X	Cooks Lake Cienega	N	M	24-Jun-97				X	X [8]	X [13]	
1590-97241	K:X	Cooks Lake Cienega	N	U	24-Jun-97				X			
1590-97242	P/WK:X	Indian Hills	AHY	M	25-Jun-97				X	X [7]		
1590-97243	:X	Indian Hills	AHY	F	25-Jun-97				X		X [13]	
1590-97244	X:R/WK	Indian Hills	AHY	F*	25-Jun-97				X			
1590-97245	PD/WK:X	Indian Hills	AHY	F	25-Jun-97				X			
1590-97246	X:R/K	Cooks Lake Cienega	AHY	F*	26-Jun-97				X			
1590-97247	X:K/K	Cooks Lake Cienega	AHY	M	26-Jun-97				X			
1590-97248	X:D/K	Cooks Lake Seep	AHY	F	26-Jun-97				X			
1590-97249	P/WR:X	Tonto Creek Inflow	AHY	M*	29-Jun-97				X			
1590-97250	X:R	Salt River Inflow	N	U	30-Jun-97				X			
1590-97251	X:R	Salt River Inflow	N	U	30-Jun-97				X			
1590-97252	X:R	Salt River Inflow	N	U	30-Jun-97				X			
1590-97253	X:PD/R	Salt River Inflow	AHY	F	30-Jun-97				X	X		

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1590-97254	RW/R:X	Salt River Inflow	AHY	M	01-Jul-97				X			
1590-97255	X:K	Kearny Sewage Ponds	N	U	02-Jul-97				X			
1590-97256	K:R/X	Kearny Sewage Ponds	AHY	M	11-Jul-97				X			
1590-97257	P/X:K	Kearny Sewage Ponds	AHY	M	11-Jul-97				X	X	X	X
1590-97258	WY:X	Kearny Sewage Ponds	AHY	M	11-Jul-97				X	X	X	X
1590-97259	K:G/X	Indian Hills	AHY	F	12-Jul-97				X	X	X	
1590-97260	X:Y/D	Greer Town	AHY	F	20-Jul-97				X	X [33]		
1590-97261	X:O/D	Greer Town	AHY	F	20-Jul-97				X	X		
1590-97262	X:RW/D	Greer Town	AHY	M	20-Jul-97				X	X		
1590-97263	PD/R:X	Salt River Inflow	AHY	F	24-Jul-97				X	X	X	X
1590-97264	X:WU/R	Salt River Inflow	AHY	M	24-Jul-97				X			
1590-97265	K:X	Indian Hills	N	U	26-Jul-97				X			
1590-97266	L:X	Kearny Sewage Ponds	N	U	28-Jul-97				X			
1590-97267	X:L/K	Cooks Lake Seep	AHY	M	29-Jul-97				X			
1590-97268	X:R	Salt River Inflow	N	U	07-Aug-97				X			
1590-97269	X:R	Salt River Inflow	N	U	07-Aug-97				X			
1590-97286	:X	Gila River South 07	AHY	U	04-Jun-00							X
1590-97287	:X	Wheat Fields	AHY	M*	05-Jun-00							X
1590-97288	:X	Wheat Fields	AHY	U	05-Jun-00							X
1590-97289	:X	Wheat Fields	AHY	U	05-Jun-00							X
1590-97290	:X	Wheat Fields	AHY	U	05-Jun-00							X
1590-97291	:X	Gila River	AHY	U	10-Jun-00							X
1590-97292	:X	Gila River	AHY	U	10-Jun-00							X
1590-97293	:X	Gila River	AHY	U	10-Jun-00							X
1590-97294	:X	Gila River	AHY	F*	10-Jun-00							X
1590-97296	:X	Gila River	AHY	F*	10-Jun-00							X
1590-97297	:X	Gila River	AHY	U	10-Jun-00							X
1590-97301	Due to an injury this USFWS band and color band combination were removed, the new band number is 1590-97574											
1590-97302	R/L:X	Kearny Sewage Ponds	AHY	M	08-May-97				X			
1590-97303	:X	Kearny Sewage Ponds	AHY	M	08-May-97				X	X		
1590-97304	G/RW:X	Salt River Inflow	AHY	M	14-May-97				X	X	X [18]	X
1590-97306	PD/W:X	Kearny Sewage Ponds	AHY	F*	22-May-97				X	X		
1590-97307	G/L:X	Kearny Sewage Ponds	AHY	M	22-May-97				X	X	X	
1590-97308	YK:X	PZ Ranch	AHY	F	29-May-97				X	X [4]		
1590-97309	X:L/W	PZ Ranch	AHY	F	29-May-97				X			
1590-97310	Y/W:X	PZ Ranch	AHY	U	29-May-97				X	X [8]	X	
1590-97311	W/RW:X	Tonto Creek Inflow	AHY	M	31-May-97				X	X	X	
1590-97312	O/RW:X	Tonto Creek Inflow	AHY	M	31-May-97				X			
1590-97313	P/RW:X	Tonto Creek Inflow	AHY	M	31-May-97				X	X	X	X
1590-97314	KW/RW:X	Tonto Creek Inflow	AHY	F	01-Jun-97				X	X		
1590-97315	X:W/RW	Salt River Inflow	AHY	M	02-Jun-97				X			
1590-97316	D/RW:X	Salt River Inflow	AHY	M	02-Jun-97				X	X		
1590-97317	X:G/RW	Salt River Inflow	AHY	F	02-Jun-97				X			
1590-97318	X:W/PD	Salt River Inflow	AHY	F	02-Jun-97				X	X	X	X [22]
1590-97319	X:O/PD	Salt River Inflow	AHY	M	02-Jun-97				X	X	X	
1590-97320	X:Y/PD	Tonto Creek Inflow	AHY	M	03-Jun-97				X	X		
1590-97321	X:L/RW	Tonto Creek Inflow	AHY	U	03-Jun-97				X			
1590-97322	X:Y/O	Camp Verde	AHY	F	05-Jun-97				X			
1590-97323	X:P/O	Camp Verde	AHY	M	05-Jun-97				X			
1590-97324	X:O/O	Camp Verde	AHY	F	05-Jun-97				X	X		
1590-97325	KW/O:X	Camp Verde	AHY	F	05-Jun-97				X	X [5]	X	X [22]
1590-97326	X:D/O	Camp Verde	AHY	M	05-Jun-97				X			
1590-97327	X:DP/O	Camp Verde	AHY	F	05-Jun-97				X	X		
1590-97342	PD:KW/X	Topock Marsh	AHY	M	17-Jun-97				X			
1590-97343	PD:RW/X	Topock Marsh	AHY	M	18-Jun-97				X			
1590-97344	PD:UW/X	Topock Marsh	AHY	F	18-Jun-97				X			
1590-97345	DW:X	Indian Hills	AHY	M*	25-Jun-97				X	X		
1590-97346	W:K/X	Indian Hills	AHY	F*	25-Jun-97				X	X		
1590-97347	W:G/X	CB Crossing	AHY	M	27-Jun-97				X			
1590-97348	W:O/X	CB Crossing	AHY	M	27-Jun-97				X			
1590-97349	W:D/X	CB Crossing	AHY	F*	27-Jun-97				X	X [4]		

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1590-97350	W:Y/X	CB Crossing	AHY	M	27-Jun-97				X			
1590-97351	X:K/RW	Salt River Inflow	AHY	M	28-Jun-97				X	X		
1590-97352	W/PD:X	Salt River Inflow	AHY	F	28-Jun-97				X			
1590-97353	:X	Cooks Lake Cienega	N	U	28-Jun-97				X		X [13]	X
1590-97354	WK:X	Cooks Lake Cienega	N	U	28-Jun-97				X			
1590-97355	W:P/X	Gila River North 10	AHY	M	29-Jun-97				X			
1590-97356	W:X	Gila River North 10	N	U	29-Jun-97				X			
1590-97357	W:X	Gila River North 10	N	U	29-Jun-97				X			
1590-97358	W:X	Gila River North 10	N	U	29-Jun-97				X			
1590-97359	UW/RW:X	Tonto Creek Inflow	AHY	F	01-Jul-97				X			
1590-97360	DP/RW:X	Tonto Creek Inflow	AHY	M	01-Jul-97				X	X	X	
1590-97365	UW/O:X	Camp Verde	AHY	F	06-Jul-97				X	X		
1590-97366	X:PD/O	Camp Verde	AHY	M	06-Jul-97				X			
1590-97367	X:RY	Camp Verde	AHY	M	06-Jul-97				X	X		X
1590-97368	X:O	Camp Verde	N	U	08-Jul-97				X			
1590-97369	Y:X	Alpine Horse Pasture	N	U	09-Jul-97				X			
1590-97370	Y:X	Alpine Horse Pasture	N	U	09-Jul-97				X			
1590-97371	Y:X	Alpine Horse Pasture	N	U	09-Jul-97				X			
1590-97372	W:L/X	Dudleyville Crossing	AHY	F	11-Jul-97				X	X [12]		
1590-97373	VG:X	Salt River Inflow	AHY	F	14-Jul-97				X	X	X [18]	X
1590-97374	X:PD/RW	Salt River Inflow	AHY	M	14-Jul-97				X			
1590-97375	WU/RW:X	Salt River Inflow	AHY	F	14-Jul-97				X			
1590-97376	X:D	Greer River Reservoir	N	U	14-Jul-97				X			
1590-97377	X:D	Greer River Reservoir	N	U	14-Jul-97				X			
1590-97378	X:D	Greer River Reservoir	N	U	15-Jul-97				X			
1590-97379	X:D	Greer River Reservoir	N	U	15-Jul-97				X			
1590-97380	X:D	Greer River Reservoir	N	U	15-Jul-97				X			
1590-97381	X:P/KW	CB Crossing	AHY	F*	22-Jul-97				X	X [16]	X	
1590-97382	X:K	CB Crossing	N	U	22-Jul-97				X			
1590-97383	X:K	CB Crossing	N	U	22-Jul-97				X			
1590-97401	X:R/W	PZ Ranch	AHY	M	15-May-97				X			
1590-97402	P/W:X	PZ Ranch	AHY	F	15-May-97				X			
1590-97501	V:GW	Salt River Inflow	AHY	F*	18-Jun-98					X		
1590-97502	:V	Tonto Creek Inflow	N	U	21-Jul-98					X		
1590-97503	GY:V	Tonto Creek Inflow	N	U	21-Jul-98					X	X [22]	X [31]
1590-97506	V:	Salt River Inflow	N	U	28-Jun-99						X	
1590-97507	V:YKY	Shangri-la	N	U	28-Jun-99						X	X [23]
1590-97508	V:	Salt River Inflow	N	U	28-Jun-99						X	
1590-97509	:V	Tonto Creek Inflow	N	U	28-Jun-99						X	
1590-97511	KR:V	Tonto Creek Inflow	N	F*	28-Jun-99						X	X [27]
1590-97512	:V	Tonto Creek Inflow	N	U	28-Jun-99						X	
1590-97513	YK:V	Tonto Creek Inflow	AHY	U	13-May-98					X	X	X
1590-97514	V:YK	Salt River Inflow	AHY	M*	24-May-98					X	X [18]	
1590-97515	V:RG	Salt River Inflow	AHY	M	03-Jun-98					X		
1590-97516	V:KK	Salt River Inflow	AHY	M*	07-Jun-98					X	X [23]	X
1590-97517	V:KY	Salt River Inflow	AHY	F*	07-Jun-98					X	X [22]	
1590-97518	V:GR	Salt River Inflow	AHY	M	07-Jun-98					X		X
1590-97519	KY:V	Tonto Creek Inflow	AHY	M*	08-Jun-98					X		
1590-97520	KK:V	Tonto Creek Inflow	AHY	M*	16-Jun-98					X		
1590-97521	GR:V	Tonto Creek Inflow	AHY	F*	17-Jun-98					X		
1590-97522	WY:V	Tonto Creek Inflow	AHY	F*	17-Jun-98					X	X	X
1590-97523	YG:V	Tonto Creek Inflow	AHY	M	17-Jun-98					X		
1590-97524	YW:V	Tonto Creek Inflow	AHY	F*	01-Jul-98					X	X	X [23]
1590-97525	RW:V	Tonto Creek Inflow	AHY	U	08-Jun-98					X		X
1590-97526	DK:V	Tonto Creek Inflow	AHY	U	08-Jun-98					X		
1590-97527	WW:V	Tonto Creek Inflow	AHY	F*	09-Jun-98					X		
1590-97528	DW:V	Tonto Creek Inflow	AHY	F*	17-Jun-98					X		
1590-97529	V:RW	Salt River Inflow	AHY	M	18-Jun-98					X		
1590-97530	V:DW	Salt River Inflow	AHY	M*	18-Jun-98					X	X	
1590-97531	V:WW	Salt River Inflow	AHY	F*	19-Jun-98					X		X
1590-97537	V:RR	Salt River Inflow	AHY	U	07-Jun-98					X		X [22]

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1590-97538	V:YY	Salt River Inflow	AHY	M	07-Jun-98					X		
1590-97539	YR:V	Salt River Inflow	AHY	F*	19-Jun-98					X		
1590-97540	V:RY	Salt River Inflow	AHY	F*	30-Jun-98					X	X [18]	X [22]
1590-97541	:V	Tonto Creek Inflow	N	U	27-Jul-98					X		
1590-97542	:V	Tonto Creek Inflow	N	U	27-Jul-98					X		
1590-97543	V:WG	Shangri-la	AHY	U	22-Jun-99						X	X [23]
1590-97544	V:RD	Shangri-la	AHY	U	22-Jun-99						X	X
1590-97545	V:	Salt River Inflow	N	U	04-Jul-99						X	
1590-97546	V:	Salt River Inflow	N	U	04-Jul-99						X	
1590-97547	V:	Salt River Inflow	N	U	04-Jul-99						X	
1590-97548	:V	Salt River Inflow	N	U	10-Aug-99						X	
1590-97549	VK:V	Tonto Creek Inflow	AHY	U	14-May-99						X	
1590-97550	RD:V	Tonto Creek Inflow	AHY	U	14-May-99						X	
1590-97551	Z:GG	PZ Ranch	AHY	F*	04-Jun-98					X	X [8]	X [19]
1590-97552	Z:RK	Indian Hills	AHY	F*	05-Jun-98					X		
1590-97553	Z:KW	Indian Hills	AHY	M*	05-Jun-98					X		
1590-97554	Z:GK	Indian Hills	AHY	F*	05-Jun-98					X		
1590-97555	RK:Z	Indian Hills	AHY	F*	05-Jun-98					X		
1590-97556	Z:GW	CB Crossing	AHY	M*	21-Jun-98					X	X [5]	X
1590-97557	Z:VG	CB Crossing	AHY	F*	21-Jun-98					X		
1590-97558	WK:Z	CB Crossing	AHY	U	21-Jun-98					X		X
1590-97559	KR:Z	CB Crossing	AHY	M	21-Jun-98					X		
1590-97561	Z:WK	CB Crossing	AHY	U	14-Jul-98					X	X [5]	X [7]
1590-97562	GG:Z	CB Crossing	AHY	U	14-Jul-98					X	X [19]	X
1590-97563	Z:RG	Cooks Lake Seep	AHY	M	20-May-98					X	X [12]	
1590-97564	Z:YW	Indian Hills	AHY	M	22-May-98					X	X	X
1590-97565	Due to an injury this USFWS band and color band combination were removed, the new band number is 1710-20215											
1590-97566	:Z	Dudleyville	N	U	07-Aug-98					X		
1590-97567	:Z	Dudleyville	N	U	07-Aug-98					X		
1590-97574	:Z	PZ Ranch	AHY	U	07-May-97				X	X	X	
1590-97575	Z:RW	Kearny Sewage Ponds	AHY	U	04-Jun-98					X		
1590-97576	RW:Z	Indian Hills	AHY	F*	05-Jun-98					X		
1590-97577	Z:DW	Cooks Lake Seep	AHY	U	05-Jun-98					X		
1590-97578	KV:Z	Cooks Lake Seep	AHY	U	15-May-99						X	X
1590-97579	WY:Z	Aravaipa	AHY	U	17-May-99						X	
1590-97580	KD:Z	Aravaipa	AHY	U	17-May-99						X	X
1590-97581	VG:Z	Aravaipa	AHY	U	17-May-99						X	X
1590-97582	YW:Z	CB Crossing	AHY	F	10-Jun-99						X	
1590-97583	DK:Z	CB Crossing	AHY	M	10-Jun-99						X	
1590-97584	OO:Z	Dudleyville	AHY	M	13-Jun-99						X	X
1590-97585	YG:Z	Dudleyville	AHY	F	13-Jun-99						X	
1590-97587	Z:WR	Dudleyville	AHY	M	13-May-98					X	X	X
1590-97588	Z:YD	Dudleyville	AHY	U	13-May-98					X	X [13]	X
1590-97589	Z:DY	Dudleyville	AHY	F*	06-Jun-98					X		
1590-97590	Z:RY	Dudleyville	AHY	M	06-Jun-98					X	X	
1590-97591	Z:RR	Dudleyville	AHY	F	06-Jun-98					X		
1590-97592	Z:YY	Dudleyville	AHY	M*	06-Jun-98					X		
1590-97593	Z:RD	Dudleyville	AHY	F*	06-Jun-98					X	X	X
1590-97594	Z:DR	Kearny Sewage Ponds	AHY	F*	20-Jun-98					X		
1590-97596	Z:	Kearny Sewage Ponds	N	U	20-Jun-98					X		
1590-97597	Z:	Kearny Sewage Ponds	N	U	20-Jun-98					X		
1590-97598	Z:	Kearny Sewage Ponds	N	U	20-Jun-98					X		
1710-20201	Z:YR	Dudleyville	AHY	M	10-Jun-99						X	X
1710-20215	Z:	Cooks Lake Seep	AHY	M*	22-Jun-98					X	X [9]	
1710-20216	Z:WW	Cooks Lake Seep	AHY	F	19-Jun-99						X	X [5]
1710-20217	Z:WD	Indian Hills	AHY	F	02-Jul-99						X	X [29]
1710-20218	Z:YV	Indian Hills	AHY	U	02-Jul-99						X	X
1710-20227	YY:Z	Indian Hills	AHY	M	25-Jun-99						X	X [30]
1710-20228	RR:Z	Indian Hills	AHY	F	25-Jun-99						X	X [13]
1710-20234	WV:Z	CB Crossing	AHY	U	30-Jun-00							X
1710-20235	RD:Z	Dudleyville	AHY	U	03-Jul-00							X

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1710-20236	VW:Z	Gila River South 07	AHY	F*	03-Jul-00							X
1710-20237	GR:Z	Kearny Sewage Ponds	AHY	M*	17-May-00							X
1710-20238	Z:VK	Kearny Sewage Ponds	AHY	M*	17-May-00							X
1710-20251	V:WK	Salt River Inflow	AHY	U	15-Jun-99						X	
1710-20252	V:WY	Salt River Inflow	AHY	U	15-Jun-99						X	
1710-20253	V:KO	Salt River Inflow	AHY	U	15-Jun-99						X	
1710-20254	V:GO	Salt River Inflow	AHY	U	15-Jun-99						X	
1710-20255	V:OK	Mud Flats	AHY	U	23-Jul-99						X	
1710-20256	V:KW	Mud Flats	AHY	U	23-Jun-99						X	X
1710-20257	V:GK	Mud Flats	AHY	M	23-Jun-99						X	
1710-20258	V:OY	Mud Flats	AHY	F	23-Jun-99						X	X
1710-20261	VG:V	Tonto Creek Inflow	AHY	U	05-Jun-99						X	
1710-20262	V:GY	Tonto Creek Inflow	AHY	M	05-Jun-99						X	
1710-20263	GW:V	Tonto Creek Inflow	AHY	U	06-Jun-99						X	X [24]
1710-20273	V:KR	Shangri-la	AHY	F	22-Jun-99						X	X
1710-20274	V:GV	Shangri-la	AHY	U	22-Jun-99						X	
1710-20275	V:OO	Shangri-la	AHY	U	22-Jun-99						X	X
1710-20276	GG:V	Tonto Creek Inflow	AHY	M	04-Jun-99						X	
1710-20277	WG:V	Tonto Creek Inflow	AHY	U	06-Jun-99						X	X
1710-20278	GK:V	Tonto Creek Inflow	AHY	U	14-Jun-99						X	
1710-20279	V:VG	Shangri-La	AHY	U	18-Jun-99						X	
1710-20280	V:KD	Mud Flats	AHY	U	23-Jun-99						X	X [22]
1710-20281	V:GG	Mud Flats	AHY	M	23-Jun-99						X	X
1710-20282	V:YO	Mud Flats	AHY	F	23-Jun-99						X	X [22]
1710-20283	WR:V	Tonto Creek Inflow	AHY	F	14-Jun-99						X	X
1710-20284	RY:V	Tonto Creek Inflow	AHY	M	14-May-99						X	
1710-20285	V:YR	Salt River Inflow	AHY	M	13-May-99						X	X
1710-20287	V:	Salt River Inflow	N	U	30-Jun-99						X	
1710-20288	V:	Salt River Inflow	N	U	30-Jun-99						X	
1710-20289	V:	Salt River Inflow	N	U	30-Jun-99						X	
1710-20290	V:	Salt River Inflow	N	U	30-Jun-99						X	
1710-20291	V:	Salt River Inflow	N	U	30-Jun-99						X	
1710-20293	V:VK	Mudflats	AHY	F	23-Jun-99						X	
1710-20294	GO:V	Tonto Creek Inflow	AHY	F	29-Jun-99						X	
1710-20295	:V	Salt River Inflow	N	U	09-Jul-99						X	
1710-20296	OW:V	Tonto Creek Inflow	AHY	U	29-Jun-99						X	
1710-20297	:V	Salt River Inflow	N	U	09-Jul-99						X	
1710-20298	:V	Tonto Creek Inflow	N	U	19-Jul-99						X	
1710-20299	:V	Tonto Creek Inflow	N	U	19-Jul-99						X	
1710-20300	V:	Salt River Inflow	N	U	19-Jul-99						X	
1710-20301	V:VY	Salt River Inflow	AHY	F	14-Jul-99						X	
1710-20302	V:DR	Salt River Inflow	AHY	U	14-Jul-99						X	X [22]
1710-20303	V:WD	Salt River Inflow	AHY	F	14-Jul-99						X	
1710-20304	:V	Salt River Inflow	N	U	14-Jun-99						X	
1710-20305	V:DO	Shangri-la	AHY	U	24-Jul-99						X	X
1710-20306	V:KGK	Shangri-la	N	U	24-Jul-99						X	X [24]
1710-20307	KO:V	Salt River Inflow	AHY	M	25-Jul-99						X	
1710-20308	WO:V	Shangri-la	AHY	F	26-Jul-99						X	X
1710-20309	RK:V	Shangri-la	AHY	F	27-Jul-99						X	
1710-20310	OK:V	Shangri-la	AHY	F	27-Jul-99						X	
1710-20323	:V	Mud Flats	N	U	24-Jun-00							X
1710-20324	:V	Shangri-la	N	U	24-Jun-00							X
1710-20325	:V	Shangri-la	N	U	24-Jun-00							X
1710-20326	V:	Shangri-la	N	U	24-Jun-00							X
1710-20327	V:	Shangri-la	N	U	24-Jun-00							X
1710-20328	:V	Shangri-la	N	U	24-Jun-00							X
1710-20331	V:YW	Salt River Inflow	AHY	F*	02-Jul-98					X		
1710-20332	RG:V	Tonto Creek Inflow	AHY	F*	23-Jul-98					X	X	
1710-20333	OY:V	Tonto Creek Inflow	AHY	F	26-Jun-99						X	
1710-20334	YV:V	Tonto Creek Inflow	AHY	F	26-Jun-99						X	
1710-20335	V:KG	Shangri-la	AHY	F	27-Jun-99						X	X

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1710-20336	V:OR	Shangri-la	AHY	M	27-Jun-99						X	
1710-20337	WD:V	Shangri-la	AHY	F	27-Jun-99						X	X
1710-20338	YD:V	Shangri-la	AHY	M	27-Jun-99						X	X
1710-20339	V:OG	Shangri-la	AHY	U	18-Jun-99						X	X [24]
1710-20340	V:OW	Shangri-la	AHY	F	22-Jun-99						X	X
1710-20341	V:VV	Shangri-la	AHY	F	22-Jun-99						X	X
1710-20342	V:DY	Shangri-la	AHY	U	22-Jun-99						X	
1710-20343	V:WR	Shangri-la	AHY	F	22-Jun-99						X	
1710-20344	V:WO	Shangri-la	AHY	U	27-Jun-99						X	
1710-20345	V:YG	Shangri-la	AHY	F	27-Jun-99						X	X [24]
1710-20346	V:RO	Shangri-la	AHY	F	27-Jun-99						X	
1710-20347	V:YD	Shangri-la	AHY	U	27-Jun-99						X	X
1710-20348	V:OD	Shangri-la	AHY	U	27-Jun-99						X	
1710-20362	:X	Aravaipa North	AHY	F*	03-Jun-00							X
1710-20363	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20364	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20365	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20372	D:DK	Indian Hills	AHY	U	03-May-00							X
1710-20373	YR:D	Kearny Sewage Ponds	AHY	U	10-May-00							X
1710-20374	YD:D	Kearny Sewage Ponds	AHY	U	17-May-00							X
1710-20375	YV:D	Kearny Sewage Ponds	AHY	U	17-May-00							X
1710-20376	DY:D	Indian Hills	AHY	U	18-May-00							X
1710-20377	DK:D	CB Crossing	AHY	U	19-May-00							X
1710-20378	D:GK	Kearny Sewage Ponds	AHY	U	01-Jun-00							X
1710-20379	RD:D	Kearny Sewage Ponds	AHY	U	01-Jun-00							X
1710-20380	D:KV	Kearny Sewage Ponds	AHY	U	01-Jun-00							X
1710-20381	DR:D	CB Crossing	AHY	U	02-Jun-00							X
1710-20382	:D	Kearny Sewage Ponds	N	U	07-Jul-99						X	
1710-20383	:D	Kearny Sewage Ponds	N	U	07-Jul-99						X	
1710-20384	:D	Kearny Sewage Ponds	N	U	07-Jul-99						X	
1710-20385	:D	Kearny Sewage Ponds	N	U	09-Jul-99						X	
1710-20386	D:KR	Kearny Sewage Ponds	AHY	F	05-Jun-00							X
1710-20387	RG:D	Kearny Sewage Ponds	AHY	F	05-Jun-00							X
1710-20388	D:VY	Indian Hills	AHY	M	07-Jun-00							X
1710-20389	WR:D	Indian Hills	AHY	F	07-Jun-00							X
1710-20390	GR:D	Indian Hills	AHY	U	07-Jun-00							X
1710-20391	YW:D	CB Crossing	AHY	M	16-Jun-00							X
1710-20401	D:WD	Kearny Sewage Ponds	AHY	M*	22-Jun-98					X	X	
1710-20402	D:KW	Kearny Sewage Ponds	AHY	F*	22-Jun-98					X		
1710-20415	KG:D	Gila River South 12	AHY	U	18-May-99						X	X
1710-20416	D:VK	Kearny Sewage Ponds	AHY	M	12-Jun-99						X	
1710-20417	GG:D	Kearny Sewage Ponds	AHY	F	25-Jun-99						X	X
1710-20418	D:DD	Kearny Sewage Ponds	AHY	F	01-Jul-99						X	
1710-20419	WD:D	Aravaipa	AHY	F	06-Jun-00							X
1710-20420	GK:D	Dudleyville	AHY	M	19-May-00							X
1710-20424	WG:D	Gila River South 12	AHY	F	18-May-99						X	X
1710-20438	VY:D	Gila River South 07	AHY	M	18-May-99						X	
1710-20439	DW:D	Gila River South 07	AHY	U	18-May-99						X	X [9]
1710-20440	GY:D	CB Crossing	AHY	U	14-Jun-00							X
1710-20441	D:YW	CB Crossing	AHY	U	14-Jun-00							X
1710-20442	KD:D	CB Crossing	AHY	U	02-Jun-00							X
1710-20443	KV:D	CB Crossing	AHY	U	02-Jun-00							X
1710-20444	D:WK	CB Crossing	AHY	U	02-Jun-00							X
1710-20445	D:YD	Dudleyville	AHY	U	06-Jun-00							X
1710-20446	KR:D	Aravaipa	AHY	U	06-Jun-00							X
1710-20447	KY:D	Aravaipa	AHY	M	06-Jun-00							X
1710-20450	D:WY	Dudleyville	AHY	U	06-Jun-00							X
1710-20451	KK:Z	Indian Hills	AHY	U	15-May-99						X	X
1710-20452	RG:Z	CB Crossing	AHY	U	02-Jun-00							X
1710-20453	Z:OY	Kearny Sewage Ponds	AHY	U	15-Jun-00							X
1710-20454	OK:Z	CB Crossing	AHY	F	30-Jun-00							X

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1710-20467	:Z	Kearny Sewage Ponds	N	U	15-Jul-98					X		
1710-20468	:Z	Kearny Sewage Ponds	N	U	15-Jul-98					X		
1710-20469	:Z	Kearny Sewage Ponds	N	U	15-Jul-98					X		
1710-20470	Z:KG	Aravaipa	AHY	F*	16-Jul-98					X		
1710-20471	Z:KR	Aravaipa	AHY	F*	16-Jul-98					X		
1710-20472	GV:Z	Aravaipa	AHY	M*	16-Jul-98					X		
1710-20473	KW:Z	Aravaipa	AHY	M*	16-Jul-98					X	X [2]	X
1710-20474	GK:Z	Aravaipa	AHY	F*	16-Jul-98					X		
1710-20475	WR:Z	Aravaipa	AHY	U	09-Jun-99						X	X [9]
1710-20476	WD:Z	Aravaipa	AHY	F	09-Jun-99						X	X
1710-20477	VY:Z	Aravaipa	AHY	U	09-Jun-99						X	
1710-20478	Z:GR	Aravaipa	AHY	F	09-Jun-99						X	
1710-20479	Z:KK	Aravaipa	AHY	F	09-Jun-99						X	
1710-20480	YV:Z	Aravaipa	AHY	U	25-Jun-99						X	
1710-20481	YD:Z	Dudleyville	AHY	F	27-Jun-99						X	X
1710-20482	DR:Z	Aravaipa	AHY	U	28-Jun-99						X	
1710-20483	YR:Z	Aravaipa	AHY	F	28-Jun-99						X	
1710-20484	Z:YK	Aravaipa	AHY	U	28-Jun-99						X	X
1710-20485	Z:GY	Aravaipa	AHY	U	28-Jun-99						X	X [20]
1710-20487	WW:Z	Indian Hills	AHY	U	07-Jun-99						X	X [5]
1710-20488	DW:Z	CB Crossing	AHY	U	07-Jun-99						X	
1710-20489	GW:Z	CB Crossing	AHY	U	07-Jun-99						X	
1710-20490	Z:VY	CB Crossing	AHY	M	23-Jun-99						X	
1710-20491	Z:KD	CB Crossing	AHY	U	23-Jun-99						X	X [7]
1710-20492	:Z	Aravaipa	N	U	18-Jul-99						X	
1710-20493	:Z	Aravaipa	N	U	18-Jul-99						X	
1710-20494	:Z	CB Crossing	N	U	19-Jul-99						X	
1710-20495	:Z	Aravaipa	N	U	21-Jul-99						X	
1710-20496	:Z	Aravaipa	N	U	21-Jul-99						X	
1710-20542	:X	Aravaipa North	AHY	F*	03-Jun-00							X
1710-20543	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20544	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20545	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20546	:X	Aravaipa North	AHY	F*	03-Jun-00							X
1710-20547	:X	Aravaipa North	AHY	U	03-Jun-00							X
1710-20548	:X	Gila River South 07	AHY	U	04-Jun-00							X
1710-20549	:X	Gila River South 07	AHY	M*	04-Jun-00							X
1710-20553	V:	Salt River Inflow	N	U	19-Jul-99						X	
1710-20554	V:	Salt River Inflow	N	U	19-Jul-99						X	
1710-20555	:V	Tonto Creek Inflow	N	U	20-Jul-99						X	
1710-20556	:V	Tonto Creek Inflow	N	U	20-Jul-99						X	
1710-20557	V:DK	Shangri-la	AHY	F	23-Jul-99						X	X [3]
1710-20558	V:	Salt River Inflow	N	U	24-Jul-99						X	
1710-20559	V:	Salt River Inflow	N	U	24-Jul-99						X	
1710-20560	V:KV	Shangri-la	AHY	F	25-Jul-99						X	
1710-20561	DO:V	Shangri-la	N	F*	28-Jul-99						X	X [26]
1710-20562	V:	Salt River Inflow	N	U	28-Jul-99						X	
1710-20563	V:	Salt River Inflow	N	U	28-Jul-99						X	
1710-20564	OR:V	Salt River Inflow	AHY	F	28-Jul-99						X	
1710-20565	YY:V	Salt River Inflow	AHY	M	28-Jul-99						X	
1710-20566	KV:V	Shangri-la	AHY	F	29-Jul-99						X	
1710-20567	YO:V	Shangri-la	AHY	M	29-Jul-99						X	X [3]
1710-20568	KD:V	Shangri-la	AHY	U	29-Jul-99						X	
1710-20569	:V	Salt River Inflow	N	U	29-Jul-99						X	
1710-20570	:V	Salt River Inflow	N	U	29-Jul-99						X	
1710-20571	:V	Salt River Inflow	N	U	29-Jul-99						X	
1710-20572	V:	Salt River Inflow	N	U	10-Aug-99						X	
1710-20573	:V	Tonto Creek Inflow	N	U	07-Jul-99						X	
1710-20574	:V	Tonto Creek Inflow	N	U	07-Jul-99						X	
1710-20575	:V	Tonto Creek Inflow	N	U	07-Jul-99						X	
1710-20576	V:	Salt River Inflow	N	U	07-Jul-99						X	

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1710-20577	V:	Salt River Inflow	N	U	07-Jul-99						X	
1710-20578	V:DD	Shangri-la	N	U	07-Jul-99						X	X [24]
1710-20579	:V	Salt River Inflow	N	U	10-Aug-99						X	
1710-20580	V:	Salt River Inflow	N	U	10-Aug-99						X	
1710-20581	V:	Salt River Inflow	N	U	10-Aug-99						X	
1710-20582	V:	Salt River Inflow	N	U	10-Aug-99						X	
1710-20588	:V	Salt River Inflow	N	U	10-Aug-99						X	
1710-20589	:V	Salt River Inflow	N	U	10-Aug-99						X	
1710-20590	:V	Salt River Inflow	N	U	10-Aug-99						X	
1710-20591	V:	Salt River Inflow	N	U	10-Aug-99						X	
1710-20592	:V	Salt River Inflow	N	U	10-Aug-99						X	
1710-20593	K:WD	Shangri-la	AHY	M*	06-Jun-00							X
1710-20594	K:KG	Shangri-la	AHY	F*	15-Jun-00							X
1710-20595	K:DK	Shangri-la	AHY	U	17-May-00							X
1710-20596	YV:K	Tonto Creek Inflow	AHY	U	18-May-00							X
1710-20597	K:YV	Shangri-la	AHY	U	20-May-00							X
1710-20598	VY:K	School House South	AHY	U	19-Jun-00							X
1710-20599	K:KY	Shangri-la	AHY	M*	09-May-00							X
1710-20600	K:GY	Shangri-la	AHY	M*	09-May-00							X
1710-20601	K:GR	Mud Flats	AHY	U	17-May-00							X
1710-20602	GR:K	Tonto Creek Inflow	AHY	U	18-May-00							X
1710-20603	K:VG	Shangri-la	AHY	U	22-May-00							X
1710-20604	K:OY	Lake Shore	AHY	U	30-Jun-00							X
1710-20605	KGK:K	Lake Shore	AHY	U	30-Jun-00							X
1710-20609	WR:K	Shangri-la	AHY	U	15-Jun-00							X
1710-20610	:K	Shangri-la	N	U	16-Jun-00							X
1710-20611	GV:K	Salt River Inflow	AHY	F*	16-Jun-00							X
1710-20612	VG:K	Orange Peel	AHY	F*	18-Jun-00							X
1710-20613	K:KK	School House South	AHY	U	19-Jun-00							X
1710-20614	K:RR	School House South	AHY	F*	19-Jun-00							X
1710-20615	K:GG	School House South	AHY	U	19-Jun-00							X
1710-20616	K:YY	School House South	AHY	F*	19-Jun-00							X
1710-20617	K:	Shangri-la	N	U	21-Jun-00							X
1710-20618	K:	Shangri-la	N	U	21-Jun-00							X
1710-20619	K:	Shangri-la	N	U	21-Jun-00							X
1710-20620	:K	Mud Flats	N	U	29-Jun-00							X
1710-20621	:K	Mud Flats	N	U	29-Jun-00							X
1710-20622	K:	Shangri-la	N	U	29-Jun-00							X
1710-20623	K:	Shangri-la	N	U	29-Jun-00							X
1710-20624	:K	Shangri-la	N	U	29-Jun-00							X
1710-20625	:K	Shangri-la	N	U	29-Jun-00							X
1710-20626	RO:K	Orange Peel	AHY	U	02-Jul-00							X
1710-20627	OO:K	Orange Peel	AHY	U	02-Jul-00							X
1710-20628	K:GO	A+ Cross Road	AHY	M*	03-Jul-00							X
1710-20630	VV:X	Greer Town	AHY	M*	15-Jul-98					X	X	X
1710-20631	:X	Alpine Horse Pasture	N	U	14-Jul-98					X		
1710-20632	:X	Alpine Horse Pasture	N	U	14-Jul-98					X		
1710-20633	WO:X	Alpine Horse Pasture	N	U	14-Jul-98					X		X
1710-20637	VV:X	Planet Ranch	AHY	M	3-Jul-98					X		
1710-20638	WK:X	Grand Canyon RM 267	AHY	U	01-Jul-98					X		
1710-20639	X:	Alamo Lake	AHY	M*	23-Jun-98					X		
1710-20640	:X	Alamo Lake	AHY	M*	23-Jun-98					X		
1710-20641	:XNX	Gila River	AHY	F*	20-Jun-00							X
1710-20642	:XNX	Gila River	AHY	F*	20-Jun-00							X
1710-20643	:XNX	Gila River	AHY	U	20-Jun-00							X
1710-20645	:XNX	Gila River	AHY	U	29-Jun-00							X
1710-20646	XNX:	Gila River South 07	AHY	F	24-Jun-99						X	
1710-20647	XNX:	Gila River South 07	AHY	F	24-Jun-99						X	
1710-20648	XNX:	Gila River South 07	AHY	F	24-Jun-99						X	
1710-20649	:XNX	Gila River South 07	AHY	U	24-Jun-99						X	
1710-20650	:XNX	Gila River South 07	AHY	F	03-Jul-99						X	

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1710-20651	XNX:	Gila River South 07	AHY	F	03-Jul-99						X	
1710-20656	:XNX	Gila River	AHY	U	09-Jun-00							X
1710-20657	:XNX	Gila River	AHY	U	09-Jun-00							X
1710-20658	:XNX	Gila River	AHY	F*	09-Jun-00							X
1710-20659	:XNX	Gila River	AHY	M*	29-Jun-00							X
1710-20660	:XNX	Gila River	AHY	F*	29-Jun-00							X
1710-20661	:XNX	Gila River	AHY	F*	29-Jun-00							X
1710-20671	K:WY	Tonto Creek Inflow	AHY	M*	18-May-00							X
1710-20678	K:YW	Tonto Creek Inflow	AHY	F*	31-May-00							X
1710-20679	RW:K	Mud Flats	AHY	U	01-Jun-00							X
1710-20680	YW:K	Salt River Inflow	AHY	M*	02-Jun-00							X
1710-20681	K:RW	Salt River Inflow	AHY	U	02-Jun-00							X
1710-20682	WK:K	Salt River Inflow	AHY	U	02-Jun-00							X
1710-20686	K:KW	Shangri-la	AHY	U	06-Jun-00							X
1710-20687	KR:K	Shangri-la	AHY	F*	06-Jun-00							X
1710-20688	RK:K	Lake Shore	AHY	U	13-Jun-00							X
1710-20689	GO:K	Lake Shore	AHY	F*	30-Jun-00							X
1710-20690	K:VW	Lake Shore	AHY	F*	30-Jun-00							X
1710-20691	RR:K	Shangri-la	AHY	M*	15-Jun-00							X
1710-20692	K:GV	Shangri-la	AHY	F*	15-Jun-00							X
1710-20693	K:WK	Salt River Inflow	AHY	M*	16-Jun-00							X
1710-20694	GG:K	Salt River Inflow	AHY	F*	16-Jun-00							X
1710-20695	KW:K	Orange Peel	AHY	M*	18-Jun-00							X
1710-20696	K:RG	Orange Peel	AHY	F*	18-Jun-00							X
1710-20697	YK:K	Lake Shore	AHY	M*	19-Jun-00							X
1710-20698	YY:K	Lake Shore	AHY	F*	19-Jun-00							X
1710-20699	K:WR	Lake Shore	AHY	M*	19-Jun-00							X
1710-20700	:K	Shangri-la	N	U	01-Jul-00							X
1710-46318	XDX:	Shangri-la	AHY	U	14-Jul-99						X	
1710-46319	K:YG	Tonto Creek Inflow	AHY	M*	10-May-00							X
1710-46320	K:WG	Tonto Creek Inflow	AHY	M*	10-May-00							X
1710-46321	K:GW	Shangri-la	AHY	M*	11-May-00							X
1710-46322	KY:K	Shangri-la	AHY	M*	11-May-00							X
1710-46323	GY:K	Shangri-la	AHY	M*	12-May-00							X
1710-46324	YG:K	Shangri-la	AHY	M*	12-May-00							X
1710-46325	WG:K	Lake Shore	AHY	F*	13-Jun-00							X
1710-46326	K:KR	Lake Shore	AHY	U	13-Jun-00							X
1710-46327	K:DY	Lake Shore	AHY	M*	13-Jun-00							X
1710-46328	GW:K	Lake Shore	AHY	U	13-Jun-00							X
1710-46329	WY:K	Lake Shore	AHY	F*	13-Jun-00							X
1710-46330	YD:K	Lake Shore	AHY	F*	13-Jun-00							X
1710-46365	R:WK	Gila River	AHY	U	28-Jun-00							X
1710-46366	R:KD	Gila River	AHY	U	28-Jun-00							X
1710-46367	YD:R	Gila River	AHY	M*	28-Jun-00							X
1710-46368	KY:R	Gila River	AHY	U	28-Jun-00							X
1710-46369	YV:R	Gila River	AHY	F*	28-Jun-00							X
1710-46370	GK:R	Gila River	AHY	F*	28-Jun-00							X
1710-46371	DR:R	Gila River	AHY	U	20-Jun-00							X
1710-46372	YK:R	Gila River	AHY	U	21-Jun-00							X
1710-46373	DY:R	Gila River	AHY	U	21-Jun-00							X
1710-46374	R:WD	Gila River	AHY	F*	21-Jun-00							X
1710-46375	R:KR	Gila River	AHY	U	21-Jun-00							X
1710-46376	R:RG	Gila River	AHY	U	21-Jun-00							X
1710-46377	R:WW	Gila River	AHY	F*	21-Jun-00							X
1710-46378	RD:R	Gila River	AHY	F*	21-Jun-00							X
1710-46379	YY:R	Gila River	AHY	U	20-Jun-00							X
1710-46380	R:KW	Gila River	AHY	U	20-Jun-00							X
1710-46381	R:YW	Gila River	AHY	F*	21-Jun-00							X
1710-46382	R:YY	Gila River	AHY	U	21-Jun-00							X
1710-46383	RR:R	Gila River	AHY	F*	21-Jun-00							X
1710-46384	R:DK	Alpine Horse Pasture	AHY	F	13-Jun-99						X	

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1710-46385	:R	Camp Verde	AHY	F*	25-Jun-00							X
1710-46386	VW:R	Camp Verde	AHY	U	25-Jun-00							X
1710-46390	R:VG	Camp Verde	AHY	M	01-Jul-99						X	
1710-46391	R:VY	Gila River	AHY	U	20-Jun-00							X
1710-46392	R:YK	Gila River	AHY	U	20-Jun-00							X
1710-46394	R:DY	Gila River	AHY	F*	20-Jun-00							X
1710-46395	R:DW	Gila River	AHY	U	20-Jun-00							X
1710-46396	R:YV	Greer River Reservoir	AHY	U	12-Jun-99						X	
1710-46397	VY:R	Gila River	AHY	U	21-Jun-00							X
1710-46398	R:WR	Gila River	AHY	F*	20-Jun-00							X
1710-46399	:R	Alpine Horse Pasture	N	U	16-Jul-99						X	
1710-46400	R:WY	Gila River	AHY	U	20-Jun-00							X
1740-51801	:X	Gila River	AHY	U	10-Jun-00							X
1740-51850	:K	Shangri-la	N	U	01-Jul-00							X
1740-51851	:K	Mud Flats	N	U	06-Jul-00							X
1740-51852	:K	Mud Flats	N	U	06-Jul-00							X
1740-51853	K:	Shangri-la	N	U	06-Jul-00							X
1740-51854	K:	Shangri-la	N	U	06-Jul-00							X
1740-51855	:K	Shangri-la	N	U	06-Jul-00							X
1740-51856	:K	Shangri-la	N	U	06-Jul-00							X
1740-51857	:K	Shangri-la	N	U	06-Jul-00							X
1740-51858	:K	Shangri-la	N	U	09-Jul-00							X
1740-51859	:K	Shangri-la	N	U	09-Jul-00							X
1740-51861	:K	Shangri-la	N	U	09-Jul-00							X
1740-51862	:K	Shangri-la	N	U	09-Jul-00							X
1740-51863	K:	Salt River Inflow	N	U	09-Jul-00							X
1740-51876	:K	Shangri-la	N	U	03-Jul-00							X
1740-51877	:K	Shangri-la	N	U	03-Jul-00							X
1740-51878	:K	Shangri-la	N	U	18-Jul-00							X
1740-51879	:K	Shangri-la	N	U	18-Jul-00							X
1740-91501	:X	Camp Verde	AHY	U	28-May-96			X	X			
1740-91502	G/O:X	Camp Verde	AHY	M	28-May-96			X	X			
1740-91503	L/O:X	Camp Verde	AHY	M*	28-May-96			X				
1740-91504	K/O:X	Camp Verde	AHY	F	28-May-96			X	X			
1740-91505	D/O:X	Camp Verde	AHY	M*	28-May-96			X	X			
1740-91506	RW:X	Tonto Creek Inflow	AHY	M	02-Jun-96			X		X	X	X
1740-91507	K/WR:X	Tonto Creek Inflow	AHY	F*	02-Jun-96			X	X			
1740-91508	KK:X	Cooks Lake Seep	AHY	M	03-Jun-96			X	X	X		
1740-91509	D/K:X	Cooks Lake Seep	AHY	F	03-Jun-96			X				
1740-91510	R/W:X	Cooks Lake Cienega	AHY	M	04-Jun-96			X				
1740-91511	K/W:X	Cooks Lake Cienega	AHY	F	04-Jun-96			X				
1740-91512	G/W:X	Cooks Lake Cienega	AHY	M	04-Jun-96			X	X [4]	X [13]		
1740-91513	:X	PZ Ranch	AHY	F	05-Jun-96			X			X [5]	
1740-91514	W/KW:X	PZ Ranch	AHY	M	05-Jun-96			X	X			
1740-91515	O/KW:X	PZ Ranch	AHY	F	05-Jun-96			X				
1740-91516	RW/KW:X	PZ Ranch	AHY	M	06-Jun-96			X				
1740-91517	DP/KW:X	PZ Ranch	AHY	F	06-Jun-96			X				
1740-91518	KW/KW:X	PZ Ranch	AHY	F	07-Jun-96			X	X	X [5]	X [11]	X
1740-91519	DP/W:X	PZ Ranch	AHY	M	07-Jun-96			X				
1740-91520	D/W:X	PZ Ranch	AHY	F	07-Jun-96			X				
1740-91521	Y/W:X	PZ Ranch	AHY	M	07-Jun-96			X				
1740-91522	W/W:X	PZ Ranch	AHY	M	07-Jun-96			X				
1740-91523	X:R/R	Tonto Creek Inflow	AHY	U	12-Jun-96			X	X	X	X	X
1740-91524	RW/RW:X	Tonto Creek Inflow	AHY	M	14-Jun-96			X				
1740-91525	Y/O:X	Tavasci Marsh	AHY	M	28-Jun-96			X				
1740-91526	W/O:X	Camp Verde	AHY	M	29-Jun-96			X				
1740-91527	O/O:X	Tavasci Marsh	AHY	F	30-Jun-96			X				
1740-91528	RW/O:X	Camp Verde	AHY	F	01-Jul-96			X	X	X		
1740-91529	X:R/KW	PZ Ranch	AHY	F	03-Jul-96			X				
1740-91530	X:G/KW	PZ Ranch	AHY	M	04-Jul-96			X				
1740-91531	X:L/KW	PZ Ranch	AHY	F	04-Jul-96			X	X [10]	X [15]	X	X

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1740-91532	RK:X	Camp Verde	N	U	06-Jul-96			X			X [3]	X [2]
1740-91533	R/G:X	Grand Canyon RM 50	AHY	M	12-Jul-96			X	X			
1740-91534	O/Y:X	Alpine Horse Pasture	AHY	U	26-Jul-96			X				
1740-91535	Y:X	Alpine Horse Pasture	N	U	26-Jul-96			X				
1740-91536	O:X	Camp Verde	N	U	08-Aug-96			X				
1740-91537	O:X	Camp Verde	N	U	08-Aug-96			X				
1740-91538	O:X	Camp Verde	N	U	08-Aug-96			X				
1740-91539	R:X	Tonto Creek Inflow	N	U	09-Aug-96			X				
1740-91540	R:X	Tonto Creek Inflow	N	U	09-Aug-96			X	X [2]			
1740-91541	R:X	Tonto Creek Inflow	N	U	09-Aug-96			X				
1740-91590	WDW:K	Shangri-la	AHY	M	12-Jul-00							X
1740-91591	DWD:K	Salt River Inflow	AHY	M	12-Jul-00							X
1740-91592	K:WV	Tonto Creek Inflow	AHY	F	13-Jul-00							X
1740-91593	K:	Tonto Creek Inflow	N	U	14-Jul-00							X
1740-91594	K:	Tonto Creek Inflow	N	U	14-Jul-00							X
1740-91595	K:	Tonto Creek Inflow	N	U	14-Jul-00							X
1740-91596	:K	Shangri-la	N	U	19-Jul-00							X
1740-91597	:K	Shangri-la	N	U	21-Jul-00							X
1740-91598	:K	Shangri-la	N	U	21-Jul-00							X
1740-91599	:K	Shangri-la	N	U	21-Jul-00							X
1740-91600	K:DW	Shangri-la	AHY	M	15-Jun-00							X
1740-91601	R/K:X	Cooks Lake Seep	AHY	F	01-Jun-96			X				
1740-91602	G/K:X	Cooks Lake Seep	AHY	F	01-Jun-96			X				
1740-91603	L/K:X	Cooks Lake Seep	AHY	F*	02-Jun-96			X				
1740-91604	Y/K:X	Cooks Lake Cienega	AHY	F	04-Jun-96			X				
1740-91605	W/K:X	Cooks Lake Cienega	AHY	M	04-Jun-96			X				
1740-91606	O/K:X	Cooks Lake Cienega	AHY	F*	04-Jun-96			X				
1740-91607	WR/K:X	PZ Ranch	AHY	M	05-Jun-96			X	X [5]			
1740-91608	DP/K:X	PZ Ranch	AHY	F	05-Jun-96			X				
1740-91609	KW/K:X	PZ Ranch	AHY	F	05-Jun-96			X				
1740-91610	R/KW:X	PZ Ranch	AHY	M	06-Jun-96			X	X [8]			
1740-91611	G/WK:X	PZ Ranch	AHY	M	06-Jun-96			X	X [8]			
1740-91612	L/KW:X	PZ Ranch	AHY	F	06-Jun-96			X				
1740-91613	K/WK:X	PZ Ranch	AHY	M	07-Jun-96			X	X [4]	X		
1740-91614	L/W:X	Cooks Lake Seep	AHY	M	13-Jun-96			X	X			
1740-91615	O/W:X	Cooks Lake Seep	AHY	F	13-Jun-96			X	X	X [11]	X	
1740-91616	X:Y/K	Cooks Lake Seep	AHY	M*	15-Jun-96			X	X			
1740-91617	X:W/K	Cooks Lake Seep	AHY	M	15-Jun-96			X	X [5]	X		
1740-91618	X:O/K	Cooks Lake Seep	AHY	F*	17-Jun-96			X				
1740-91619	X:RW/K	Cooks Lake Seep	AHY	F	17-Jun-96			X				
1740-91620	X:KY	Cooks Lake Seep	AHY	M	17-Jun-96			X		X [10]	X [8]	X
1740-91622	X:R/Y	Sanchez Road Gila	AHY	U	25-Jun-96			X				
1740-91623	X:G/Y	Sanchez Road Gila	AHY	F	25-Jun-96			X				
1740-91624	X:Y/Y	Sanchez Road Gila	AHY	F*	25-Jun-96			X				
1740-91625	X:L/Y	Sanchez Road Gila	AHY	F	26-Jun-96			X				
1740-91626	X:K/Y	Sanchez Road Gila	AHY	M	26-Jun-96			X				
1740-91627	X:O/Y	Sanchez Road Gila	AHY	F	26-Jun-96			X				
1740-91628	O/D:X	Greer River reservoir	AHY	F*	01-Jul-96			X				
1740-91629	L/D:X	Greer River reservoir	AHY	F*	01-Jul-96			X				
1740-91630	G/Y:X	Alpine Horse Pasture	AHY	F	02-Jul-96			X				
1740-91631	Y:X	Alpine Horse Pasture	N	U	11-Jul-96			X				
1740-91632	KW:X	Alpine Horse Pasture	N	U	11-Jul-96			X		X [17]		
1740-91633	Y:X	Alpine Horse Pasture	N	U	11-Jul-96			X				
1740-91634	X:Y/KW	Cooks Lake Seep	AHY	M	12-Jul-96			X	X [6]			
1740-91635	W:X	Cooks Lake Seep	N	U	12-Jul-96			X				
1740-91636	X:O/KW	Cooks Lake Seep	AHY	F	13-Jul-96			X	X	X	X	
1740-91637	D/WK:X	Cooks Lake Seep	AHY	U	16-Jul-96			X	X [7]			
1740-91684	X:GV	Camp Verde	AHY	M*	28-Jun-98					X	X [10]	X [21]
1740-91685	X:RK	Camp Verde	AHY	M*	28-Jun-98					X	X	X
1740-91695	:X	Alpine Horse Pasture	N	U	19-Jul-98					X		
1740-91696	:X	Alpine Horse Pasture	N	U	19-Jul-98					X		

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1740-91697	:X	Alpine Horse Pasture	N	U	19-Jul-98					X		
1740-91698	YV:X	Alpine Horse Pasture	AHY	M*	21-Jul-98					X		
1740-91699	WD:X	Greer River Reservoir	AHY	F*	20-Jul-98					X		
1740-91701	R/R:X	Tonto Creek Inflow	AHY	M	01-Jun-96			X				
1740-91702	X:G/R	Tonto Creek Inflow	AHY	M*	01-Jun-96			X	X			
1740-91703	L/R:X	Tonto Creek Inflow	AHY	F	01-Jun-96			X				
1740-91704	K/R:X	Tonto Creek Inflow	AHY	F*	01-Jun-96			X	X			
1740-91705	X:D/R	Tonto Creek Inflow	AHY	F	02-Jun-96			X				
1740-91706	KY:X	Tonto Creek Inflow	AHY	M	03-Jun-96			X	X	X	X	X
1740-91707	W/R:X	Salt River Inflow	AHY	M	04-Jun-96			X				
1740-91708	X:R/DP	Salt River Inflow	AHY	M	04-Jun-96			X				
1740-91709	X:G/R	Salt River Inflow	AHY	F	04-Jun-96			X	X			
1740-91710	X:L/R	Salt River Inflow	AHY	F	04-Jun-96			X		X [3]		
1740-91711	X:K/R	Salt River Inflow	AHY	F	05-Jun-96			X				
1740-91712	X:Y/R	Salt River Inflow	AHY	F	05-Jun-96			X	X [3]			
1740-91713	X:W/R	Salt River Inflow	AHY	M	05-Jun-96			X	X [3]	X		
1740-91714	PD/R:X	Tonto Creek Inflow	AHY	M	11-Jun-96			X		X	X	
1740-91715	KW/R:X	Tonto Creek Inflow	AHY	M	11-Jun-96			X				
1740-91716	D/R:X	Tonto Creek Inflow	AHY	M	12-Jun-96			X				
1740-91717	G/WR:X	Tonto Creek Inflow	AHY	M	12-Jun-96			X	X	X [11]		
1740-91718	O/RW:X	Tonto Creek Inflow	AHY	M	13-Jun-96			X				
1740-91719	L/RW:X	Tonto Creek Inflow	AHY	F	14-Jun-96			X				
1740-91720	X:O/R	Salt River Inflow	AHY	F*	15-Jun-96			X	X			
1740-91721	X:PD/R	Salt River Inflow	AHY	U	15-Jun-96			X		X [3]	X	X
1740-91722	X:L/RW	Salt River Inflow	AHY	U	16-Jun-96			X				
1740-91723	X:K/WR	Salt River Inflow	AHY	F	16-Jun-96			X	X			
1740-91724	X:D/RW	Salt River Inflow	AHY	M	17-Jun-96			X				
1740-91725	X:Y/RW	Salt River Inflow	AHY	M	18-Jun-96			X	X			
1740-91726	X:O/RW	Salt River Inflow	AHY	F	18-Jun-96			X				
1740-91727	X:KW/R	Salt River Inflow	AHY	M	19-Jun-96			X				
1740-91728	X:RG	Salt River Inflow	AHY	M*	27-Jun-96			X	X	X	X [18]	X [22]
1740-91729	X:Y/DP	Salt River Inflow	AHY	U	28-Jun-96			X	X [3]			
1740-91730	X:W/DP	Salt River Inflow	AHY	F	29-Jun-96			X				
1740-91731	X:O/DP	Salt River Inflow	AHY	F*	29-Jun-96			X				
1740-91732	X:RW/DP	Salt River Inflow	AHY	M	29-Jun-96			X				
1740-91733	X:KW/DP	Salt River Inflow	AHY	U	29-Jun-96			X				
1740-91734	X:K/DP	Salt River Inflow	AHY	M	29-Jun-96			X				
1740-91735	RW/D:X	Greer River Reservoir	AHY	M	02-Jul-96			X	X			
1740-91736	KW/D:X	Greer River Reservoir	AHY		02-Jul-96							
1740-91737	X:R/D	Greer River Reservoir	AHY	M	03-Jul-96			X				
1740-91738	X:G/D	Greer River Reservoir	AHY	M	03-Jul-96			X		X		
1740-91739	X:WY	Salt River Inflow	AHY	M	19-Jun-96			X	X	X	X [22]	X
1740-91740	X:KW/RW	Salt River Inflow	AHY	F*	19-Jun-96			X				
1740-91741	D/WR:X	Tonto Creek Inflow	AHY	F	12-Jul-96			X	X			
1740-91742	Y/RW:X	Tonto Creek Inflow	AHY	M	12-Jul-96			X	X			
1740-91743	R:X	Tonto Creek Inflow	N	U	13-Jul-96			X				
1740-91744	PD/RW:X	Tonto Creek Inflow	AHY	M*	13-Jul-96			X	X	X	X	X
1740-91745	R/DP:X	Salt River Inflow	AHY	M	14-Jul-96			X				
1740-91760	X:G/PD	Salt River Inflow	AHY	F	15-Jul-96			X	X			
1740-91851	D:WR	Kearny Sewage Ponds	AHY	U	01-May-98					X	X [20]	
1740-91852	D:RD	Kearny Sewage Ponds	AHY	M*	01-May-98					X	X	X
1740-91853	D:GW	Kearny Sewage Ponds	AHY	M*	21-May-98					X		
1740-91854	D:WG	Kearny Sewage Ponds	AHY	F*	04-Jun-98					X	X	X [4]
1740-91855	D:RK	Kearny Sewage Ponds	AHY	M*	04-Jun-98					X	X	X
1740-91856	D:GG	Gila River South 07	AHY	U	20-Jun-98					X		X [12]
1740-91857	D:RG	Kearny Sewage Ponds	N	U	22-Jun-98					X	X [4]	X [5]
1740-91858	D:	Kearny Sewage Ponds	N	U	22-Jun-98					X		
1740-91859	D:KD	Kearny Sewage Ponds	N	U	22-Jun-98					X	X [9]	X
1740-91860	D:GV	Kearny Sewage Ponds	N	U	22-Jun-98					X	X [21]	
1740-91861	:D	Kearny Sewage Ponds	N	U	22-Jun-98					X		
1740-91862	:D	Kearny Sewage Ponds	N	U	22-Jun-98					X		

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
1740-91863	:D	Kearny Sewage Ponds	N	U	22-Jun-98					X		
1740-91864	:D	Kearny Sewage Ponds	N	U	22-Jun-98					X		
1740-91865	D:KY	Kearny Sewage Ponds	AHY	M	20-Jun-98					X	X	X
1740-91866	D:KK	Gila River South 12	AHY	M	25-Jun-98					X	X [10]	X [7]
1740-91867	D:RY	Gila River South 07	AHY	M	18-May-99						X	X
1740-91868	D:WW	Kearny Sewage Ponds	AHY	F	18-Jun-99						X	X
1740-91869	D:RR	Kearny Sewage Ponds	AHY	F	20-Jun-99						X	X
1740-91870	RY:D	Kearny Sewage Ponds	AHY	F	20-Jun-99						X	X
1740-91871	RW:D	Kearny Sewage Ponds	AHY	F	21-Jun-99						X	
1740-91872	D:DY	Kearny Sewage Ponds	AHY	U	21-Jun-99						X	X
1740-91873	:D	Kearny Sewage Ponds	N	U	22-Jun-99						X	
1740-91874	:D	Kearny Sewage Ponds	N	U	22-Jun-99						X	
1740-91875	:D	Kearny Sewage Ponds	N	U	22-Jun-99						X	
1740-91876	D:YR	Kearny Sewage Ponds	AHY	F	01-Jul-99						X	X
1740-91877	:D	Gila River South 12	N	U	13-Jul-98					X		
1740-91878	D:RW	Kearny Sewage Ponds	AHY	M*	20-Jun-98					X	X	X
1740-91879	D:DW	Kearny Sewage Ponds	AHY	F*	20-Jun-98					X	X	X
1740-91880	:D	Gila River South 12	N	U	13-Jul-98					X		
1740-91881	:D	Gila River South 12	N	U	13-Jul-98					X		
1740-91882	RK:D	Kearny Sewage Ponds	AHY	F	05-Jun-00							X
1740-91883	YG:D	Dudleyville	AHY	U	17-Jun-00							X
1740-91888	D:YG	Gila River South 12	AHY	U	18-May-99						X	X [20]
1740-91889	D:YY	Kearny Sewage Ponds	AHY	F*	20-Jun-98					X		
1740-91890	RR:D	Kearny Sewage Ponds	AHY	F*	20-Jun-98					X	X	
1740-91891	YY:D	Gila River South 12	AHY	U	23-Jun-98					X	X [11]	X
1740-91892	WW:D	Kearny Sewage Ponds	N	U	12-Jul-98					X	X [16]	
1740-91902	X:K	Cooks Lake Cienega	AHY	F*	30-May-97				X			
1740-91903	WR/KW:X	Cooks Lake Cienega	AHY	M	30-May-97				X			
1740-91966	K:KD	Shangri-la	AHY	M	15-Jun-00							X
1740-91967	K:GK	Mud Flats	AHY	F	16-Jun-00							X
1740-91968	WD:K	Shangri-la	AHY	F	17-Jun-00							X
1740-91969	DW:K	Salt River Inflow	AHY	F	18-Jun-00							X
1740-91970	K:WW	School House North	AHY	M	19-Jun-00							X
1740-91972	YD:K	School House North	AHY	U	19-Jun-00							X
1740-91973	WW:K	School House North	AHY	M	19-Jun-00							X
1740-91974	GK:K	School House North	AHY	F	19-Jun-00							X
1740-91975	K:OY	Shangri-la	AHY	M	01-Jul-00							X
1870-58350	Y/R:X	Tonto Creek Inflow	AHY	M	12-Jul-95		X	X				
1870-58351	DP/D:X	Greer River Reservoir	AHY	M*	18-Jul-95		X	X				
1870-58352	Y/D:X	Greer River Reservoir	AHY	F*	18-Jul-95		X					
1870-58353	G/D:X	Greer River Reservoir	AHY	M*	18-Jul-95		X	X	X	X	X [17]	
1870-58355	R/D:X	Greer River Reservoir	AHY	F	19-Jul-95		X	X				
1870-58359	W/D:X	Greer River Reservoir	AHY	F*	19-Jul-95		X	X				
1870-58360	D/D:X	Greer River Reservoir	AHY	F*	20-Jul-95		X	X	X			
1870-58362	X	Greer River Reservoir	N	U	26-Jul-95		X					
1870-58363	K/D:X	Greer River Reservoir	AHY	F	26-Jul-95		X	X	X			
1870-58364	Y/Y:X	Alpine Horse Pasture	AHY	F	27-Jul-95		X	X	X	X	X	
1870-58365	Y/R:X	Alpine Horse Pasture	AHY	F*	28-Jul-95		X	X				
2070-92902	W/Y:X	Alpine Horse Pasture	AHY	F	18-Jun-97				X			
2070-92903	OR:X	Alpine Horse Pasture	AHY	F*	18-Jun-97				X	X		X
2070-92904	X:WU/R	Salt River Inflow	AHY	F	01-Jul-97				X			
2070-92905	WK/R:X	Salt River Inflow	AHY	M	23-Jul-97				X	X [3]	X	X [22]
2070-92906	X:W	Kearny Sewage Ponds	N	U	01-Aug-97				X			
2070-92907	X:W	Kearny Sewage Ponds	N	U	01-Aug-97				X			
2070-92908	X:W/W	Indian Hills	AHY	M*	02-Aug-97				X	X [12]		
2070-92951	X:GK	Indian Hills	AHY	M*	12-Jul-97				X	X		
2070-92952	K/X:K	Indian Hills	AHY	F	12-Jul-97				X			
2070-92953	G/X:K	Indian Hills	AHY	F*	13-Jul-97				X	X [7]	X	
2070-92954	R/X:R	Salt River Inflow	AHY	M*	14-Jul-97				X			
2210-57001	K:	Shangri-la	N	U	21-Jul-00							X
2210-57002	K:	Shangri-la	N	U	21-Jul-00							X

USFWS Band Number	Color Band Combo	Site Banded	Age When Banded	Sex	Date Banded	Years Detected						
						94	95	96	97	98	99	00
2210-57003	:K	Shangri-la	N	U	21-Jul-00							X
2210-57006	:K	Mud Flats	N	U	27-Jul-00							X
2210-57007	:K	Shangri-la	N	U	27-Jul-00							X
2210-57008	K:	Shangri-la	N	U	29-Jul-00							X
2210-57009	:K	Shangri-la	N	U	30-Jul-00							X
2210-57010	:K	Shangri-la	N	U	30-Jul-00							X
2210-57011	:K	Shangri-la	N	U	30-Jul-00							X
2210-57012	:K	Shangri-la	N	U	30-Jul-00							X
2210-57013	:K	Shangri-la	N	U	30-Jul-00							X
2210-57014	K:	Shangri-la	N	U	31-Jul-00							X
2210-57015	K:	Shangri-la	N	U	31-Jul-00							X
2210-57031	K:OW	Lake Shore	AHY	U	16-Jul-00							X
2210-57060	:K	Tonto Creek Inflow	N	U	15-Jul-00							X
2210-57061	K:	Shangri-la	N	U	17-Jul-00							X
2210-57062	K:	Shangri-la	N	U	17-Jul-00							X
2210-57063	K:	Shangri-la	N	U	17-Jul-00							X
2210-57064	:K	Salt River Inflow	N	U	17-Jul-00							X
2210-57065	:K	Salt River Inflow	N	U	17-Jul-00							X
2210-57066	K:	Salt River Inflow	N	U	17-Jul-00							X
2210-57067	K:	Salt River Inflow	N	U	17-Jul-00							X
2210-57068	:K	Shangri-la	N	U	18-Jul-00							X
2210-57069	:K	Shangri-la	N	U	11-Jul-00							X
2210-57070	:K	Shangri-la	N	U	11-Jul-00							X
2210-57071	RG:K	Orange Peel	AHY	U	12-Jul-00							X
2210-57072	:K	Tonto Creek Inflow	N	U	15-Jul-00							X
2210-57073	:K	Tonto Creek Inflow	N	U	15-Jul-00							X
2210-57074	:K	Shangri-la	N	U	15-Jul-00							X
2210-57075	:K	Shangri-la	N	U	15-Jul-00							X
2210-57076	K:	Salt River Inflow	N	U	19-Jul-00							X
2210-57077	K:	Salt River Inflow	N	U	19-Jul-00							X

Color bands are read top/bottom where X = USFWS aluminum band (non-colored), D = USFWS anodized blue band, V = USFWS anodized violet band, Z = USFWS anodized gold band, and XNX = anodized bronze band. All metal solid-color bands are denoted by double letters, plastic bands by a single letter: D = dark blue, G = green, K = black, L = light blue, O = orange, P = pink, R = red, W = white, Y = yellow, DK = dark blue over black split, DR = dark blue over red split, DW = dark blue over white split, DY = yellow over dark blue split, GK = green over black split, GW = green over white split, KW = black over white split, PD = pink over dark blue split, RG = red over green split, RW = red over white split, WK = white over black split, WU = white over purple split, YK = yellow over black split, YR = yellow over red split, and YW = yellow over white split.

Age: AHY, SY, ASY, TY, ATY, 4Y, A4Y = adult, N = Nestling.

Sex: F = female, M = Male, U = unknown

Site Codes are: **01**=CAVE, **02**=SALT, **03**=TONT, **04**=INHI, **05**=KRNY, **06**=PZRA, **07**=DUVI, **08**=COSE, **09**=COLA**, 10**=CBCR, **11**=GS07, **12**=GS12, **13**=ARVI, **14**=GNO4, **15**=GN18, **16**=GN20, **17**=GRTO, **18**=SCHS, **19**=WEAT, **20**=GN10, **21**=ARVN, **22**=SHAN, **23**=MUDF, **24**=LAKE, **25**=SCHN, **26**=ORNG, **27**=ACRO, **28**=MALP, **29**=ARVS, **30**=GS18, **31**=Gila River, **32**=GREE, **33**=ZUNI, **34**=ALPI

APPENDIX 2: RESIGHT PROTOCOL

OBJECTIVES:

Over the last five years, the USGS/BRD Colorado Plateau Field Station has color banded willow flycatcher adults and nestlings in the states of Arizona, Colorado, California, Nevada, Utah, and New Mexico. In addition, other researchers have on-going color banding projects in other states, with the result that a large number of willow flycatchers have been color banded, and incidental resighting by other researchers in the field is possible. The reporting of any such sightings is very important. Each flycatcher is banded with (1) a numbered USFWS aluminum band, and adults are uniquely marked with two color bands on either the opposite leg as the aluminum band or with a color band on each leg (one being over the aluminum band) or (2) a color-anodized USFWS aluminum band on one leg and a metal color band (either striped or solid) on the other leg. Nestlings were banded with (1) one color band on one leg and the aluminum band on the other or (2) a color-anodized aluminum band; the color is specific to the drainage and is not unique to each nestling. Other researchers have different banding schemes, but the resight protocol is the same. Our objective in color banding individual flycatchers is to gain information on adult and young survivorship (and mortality rate), immigration, emigration, and site fidelity, and to aid in determining the number of breeding pairs at a particular site.

Resighting is the process of verifying the exact color band combination on each individual bird. Resighting color banded birds is critical in reaching the above objectives and requires persistence and accuracy. Resighting is very difficult, and determining the color combination on a flycatcher may take several attempts before a good resight is achieved. The majority of the habitat where flycatchers are seen consist of dense vegetation with low light conditions, making resighting that much more difficult. If you are not able to see both legs or the entire band combination, record your complete observation accurately and conservatively. Having inaccurate data gives misleading results and is worse than having no data at all. Any detection of a color banded flycatcher (or a flycatcher just banded with an aluminum band) is important to CPFS, and should be reported as soon as possible even if no resight of the color combination is made.

IN THE FIELD - RESIGHTING:

Once you have visually detected a willow flycatcher, you need to first look carefully at both legs for the presence of color bands. If the flycatcher is color banded then you need to determine the following:

1) Which leg are the color bands on?
2) Which leg is the aluminum USFWS (non-colored) or color-anodized aluminum USFWS band on?
3) How many color bands are on each leg (1 if color band is metal, 1 or 2 bands if color band is plastic)?
4) What is the color combination (how does it read from top to bottom, from the thigh to the foot)?
5) Is the bird exhibiting any behaviors of interest (e.g. singing, territorial, breeding behavior, etc.)?
6) How confident are you on the resight? Anything below 98-100% confidence is not confirmed.

Orientation of the bird's legs (i.e. what bands are on which legs) is sometimes difficult to assess, but essential in getting the correct color band combination. As a precautionary measure, before you leave the area, resight the bird again to insure that your first resight was correct. If there is more than one person in the area, both individuals should try to resight the bird without conferring on the potential band combination. If you are unable to confirm your resight, then your best option would be to have a partner go in and try to resight the same bird. If this is not a feasible option, you should return and try to resight the bird again at a later date/time. Resighting should be a passive activity, and flycatchers should not be chased through the vegetation to obtain a good resight. We have found that quietly sitting/standing in a central area of flycatcher activity is the most effective way to resight. We are interested in any report of banded willow flycatchers, not just complete color combinations. State and Federal permitting agencies should be contacted to ensure that resighting is allowed under a researcher's permit.

REPORTING RESIGHT INFORMATION:

1) Write down the entire color band combination, noting which leg they were on, orientation (top/bottom), and if you can determine if bands are plastic or metal.
2) Write down any behaviors that you observe (e.g., singing, breeding behavior, etc.).
3) Record location (be as accurate as possible).
4) Make sure you indicate your level of confidence.
5) Contact Colorado Plateau Field Station as soon as possible, or if unable to do so, contact the USFWS or your state wildlife department. **Colorado Plateau Field Station**, Northern Arizona University, PO Box 5614, Flagstaff, AZ 86011. (520) 556-7311 ext 232, FAX (520) 556-7500, e-mail: mark_k_sogge@usgs.gov