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Survivorship and Movements of Southwestern Willow Flycatchers at Roosevelt Lake, Arizona - 2001

Photo by Suzanne Langridge, USGS

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EXECUTIVE SUMMARY

The 2001 USGS field season focused exclusively on Roosevelt Lake for the first time. This allowed us to track most banded willow flycatchers that were detected, observe high levels of movement, and address questions of management concern that we did not investigate in previous years. Overall, we captured and banded 83 new adult flycatchers, monitored 196 banded adults, and banded 107 nestlings from 43 nests. This year, perhaps due to the intensive resighting at all occupied patches, we recorded 65% adult survivorship, the highest level ever recorded at Roosevelt Lake. We also detected high levels of movement from patch to patch, with 27 (32%) of the returning birds moving to different locations.

In 2001, 21 of the 71 nestlings banded in 2000 returned and were detected, resulting in a juvenile survivorship of 30%. This is the highest juvenile survivorship rate yet reported in Arizona. Four nestlings banded in 1999 were also detected, raising survivorship estimates from past years.

This year we verified and adopted a technique that uses molt patterns to identify adult flycatchers that are in their second calendar year of life (second year adults). Of the 83 newly captured adults, 21 (25%) were determined to be second year birds. Including returning banded nestlings, nearly 40% of the newly detected and banded adults at Roosevelt Lake were second year birds. Overall, nearly 30% of all banded adult flycatchers at Roosevelt Lake in 2001 were of known age. From this information we were able to show that second year birds tend to settle into younger habitat and arrive later than older adult flycatchers.

Finally, we began a pilot project to run passive nets within breeding areas to detect the presence of non-breeding flycatchers (floaters). Of 22 birds captured passively, eight (36%) were not detected again and may have been floaters. An additional eight adults captured via target netting may also have been floaters. This documentation of a non-breeding (and thus not counted) floater population of flycatchers at Roosevelt Lake has important management and conservation implications.

Survivorship and Movements of Southwestern Willow Flycatchers at Roosevelt Lake, Arizona – 2001

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 (Marshall 2000, Unitt 1987). The flycatcher has suffered serious declines as riparian habitats have been lost or modified (Marshall and Stoleson 2000, USFWS 1993), and was listed as a federal endangered species in 1995 (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 (Fig. 1). Flycatchers were first noted here in 1993 (Muiznieks et al. 1994), where they breed in patches of dense riparian habitat. 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 historic 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 (USFWS 1996).

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.

A major reason to study movements at Roosevelt Lake (and beyond) 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 was then selected as an area where the same site fidelity, movement, and dispersal behavior could be studied among populations that would not experience inundation. In 2001, work was ended at the San Pedro River so that USGS could focus its efforts on the rapidly growing population at Roosevelt Lake.

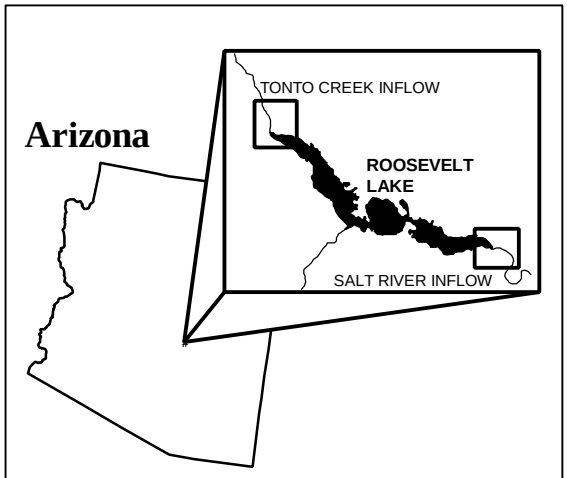

Figure 1. Location of Roosevelt Lake, Gila County, Arizona, and the Salt River and Tonto Creek Inflow sites.

The Roosevelt Lake Biological Opinion 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 from 1996 to 2000, and exclusively at Roosevelt Lake in 2001.

STUDY AREA AND BANDING HISTORY

STUDY AREA

Roosevelt Lake is formed by Roosevelt Dam at the confluences of the Salt River and Tonto Creek in central Arizona, approximately 90 km northeast of Phoenix. Willow flycatchers are found at roughly 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 patches are several meters to 500 m from the water, depending on annual fluctuating lake levels and creek/river flows. Roosevelt Lake's primary purpose is to hold and retain water for downstream use; therefore the water levels fluctuate significantly with winter runoff spikes and rapid summer time down draws. 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 1999 willow flycatchers were first detected occupying some of this new habitat, and in years since additional patches of new habitat have become occupied by breeding flycatchers.

The Tonto Creek and Salt River Inflows consist of a matrix of riparian habitat, with areas of occupied patches interspersed with varying aged vegetation (Fig. 2). In past years, most of these patches were considered as separate sites (see Luff et al. 2000, Paradzick et al. 2001). However, based on the high degree of observed movement among these patches both between and within years, we now consider the complex of patches at each inflow area as one site. The following sections give a brief history of the patches at the Salt River Inflow and the Tonto Creek Inflow:

Salt River Inflow: From 1996 through 1998, all activity at the Salt River Inflow was focused on a single location (now called Old Salt). Beginning in 1999, flycatchers were detected at additional sites at lower elevations in the lakebed. These new, young patches form a mosaic of different patch sizes, ages, and habitat composition. Many of these patches had significant numbers of flycatchers present when discovered, and presumably were occupied by flycatchers prior to discovery. There were nine distinct habitat patches occupied by breeding willow flycatchers in 2001 (in order from farthest upstream to farthest downstream):

Old Salt - The original patch within which Willow Flycatchers were known to breed, discovered in 1993 (Muiznieks et al. 1994). Old Salt consists of a mature monotypic stand of tamarisk.

Mudflats - Flycatchers were first detected here in 1999. This patch (and all the other patches below) was under water in 1995 and has developed since that time. It is composed mostly of young tamarisk, with a small native component.

Shangri-la - Flycatchers were first detected here in 1999. This site is composed of dense willow, cottonwood (*Populus fremontii*), and tamarisk.

School House South 1 - Flycatchers were first detected here in 1999. A dense patch of primarily mature tamarisk trees.

School House South 3 - Flycatchers were first detected here in 2000. A young patch of mixed riparian habitat.

School House North 1 - Flycatchers were first detected here in 1999. A dense habitat of mature tamarisk riparian habitat.

Schoo Hhouse North 2- Flycatchers were first detected here in 2000. The patch is a large, dense patch of young tamarisk.

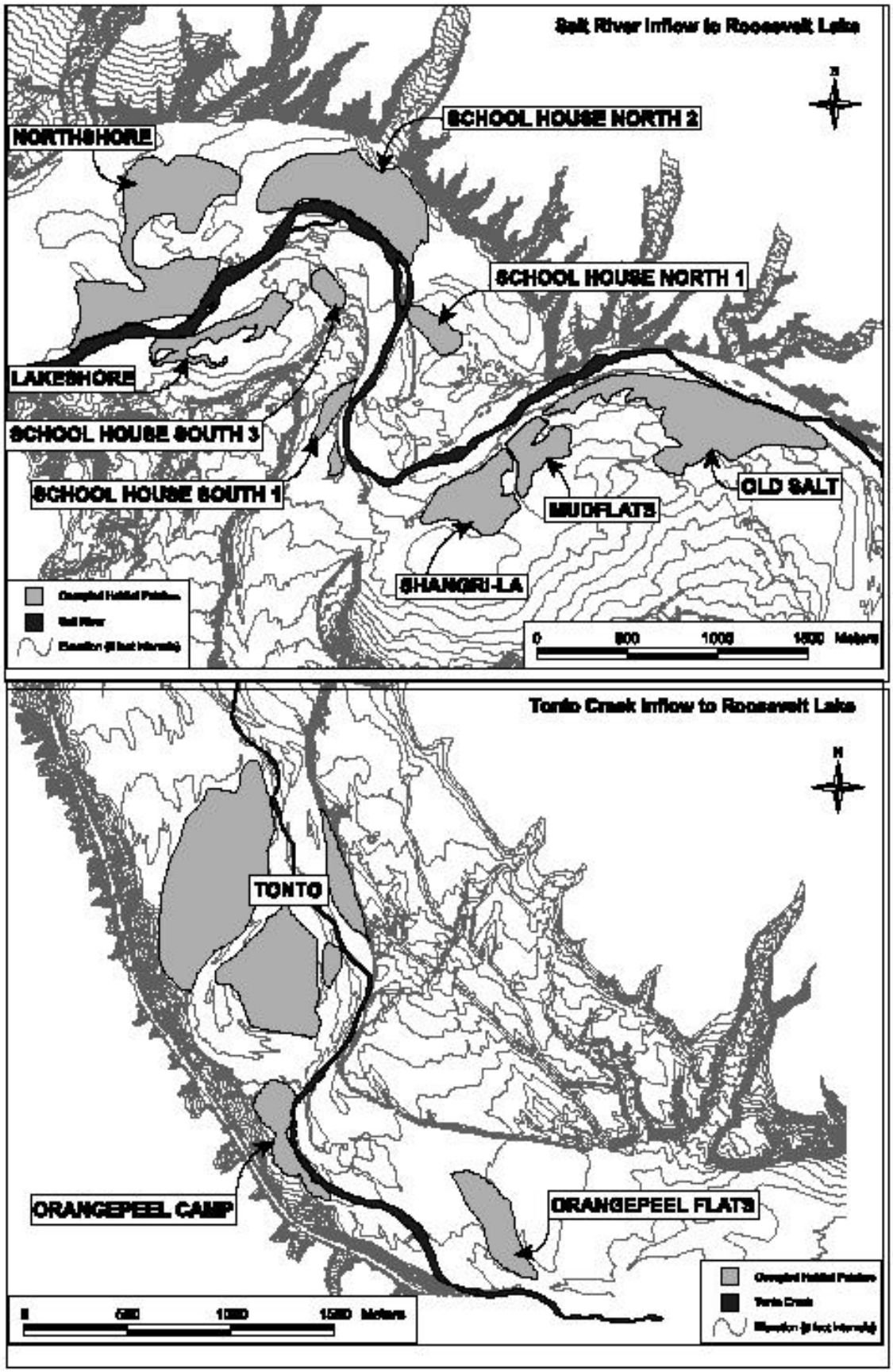

Figure 2: Location and name of the willow flycatcher's occupied habitat patches at Roosevelt Lake

Lake Shore - Flycatchers were first detected here in 2000. This patch is a nearly monotypic stand of young willow trees.

North Shore - 2001 was the first year of confirmed breeding at this patch, although flycatchers were heard singing from there in 2000. A large area composed of clumps of willow and tamarisk habitat.

Tonto Creek Inflow: Up until 2000, all flycatcher breeding activity was at the Tonto habitat patch. As with the Salt River Inflow site, habitat in the dry lakebed began to be occupied by flycatchers in 2000. There were four distinct habitat patches occupied by breeding willow flycatchers in 2001 (in order from farthest upstream to farthest downstream):

A-cross Road - **(not shown in Fig. 2)** Unlike the new habitat patches of the Salt River Inflow which are downstream of the historic Old Salt patch, this small, isolated patch is 2.5 km upstream of the historic Tonto patch. Flycatchers were first detected here in 2000. This patch consists of very young, thin tamarisk, mixed with mature cottonwoods and an under story of short mesquite (*Prosopis spp.*).

Tonto - Tonto is the longest occupied patch of the Tonto Creek Inflow site, having been discovered in 1994 **(**Muiznieks et al. 1994). The Tonto patch is comprised of mature tamarisk stands with mature willow and cottonwood overstory in most locations.

Orange Peel Campground - Birds were first confirmed breeding here in 2000, although there was singing from the patch in 1999. This site consists of young willow interspersed with young tamarisk and mesquite and little under story structure.

Orange Peel Flats - Birds were first detected here in 2000. This patch is composed of primarily dense tamarisk.

BACKGROUND ON THE BANDING PROJECT AT ROOSEVELT LAKE

In 1996, the USGS Colorado Plateau Field Station (CPFS) and the Arizona Game and Fish Department (AGFD) began 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. From 1996 to 2000, 684 adults and 318 nestling willow flycatchers were captured and banded across Arizona. A listing of all flycatchers banded at Roosevelt Lake since 1996 is presented in Appendix 1. An additional population genetics component of this study took place during 1996 and 1997 (Busch et al. 2000, Paxton 2000, Sogge et al. 1998). The work conducted from 1996-2000 provides the foundation for this year's site and patch fidelity, movement, and survivorship data.

PROJECT OBJECTIVES

The major goal of this project is to color band and resight southwestern willow flycatchers at all locations within the Roosevelt Lake area. 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 and patch 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 a 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 and patch fidelity, and movement between sites;

(2) assist AGFD in banding female flycatchers for their seasonal fecundity study;

(3) determine, along with AGFD, the number of flycatchers present at Roosevelt Lake; and

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

To date, 6 years of data collection (1996-2001) 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), English et al. (1999), and Luff et al. (2000). This report summarizes results of the sixth year of fieldwork.

METHODS

BANDING ADULTS

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 (per Sogge et al. *in press*).

Prior to 1998, all flycatchers were banded with a uniquely numbered federal aluminum bird band and a unique combination of two plastic color bands. However, as birds were resighted in subsequent years, it became apparent that plastic bands could 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 2001 each captured adult was banded with a unique combination of a numbered federal anodized colored bird band on one leg, and an aluminum color band (either striped or solid) on the other leg. 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 combination. Both of these techniques allowed each individual to be identified if seen again in the field without need for recapture (see Resighting 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). Those flycatchers whose gender could not be determined in the field had a DNA sample taken for gender determination via genetic methods (see Genetics section below).

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. This 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. 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, patch, specific location at the patch (using a designated territory number or aerial map), the level of confidence in the resight, and any behavioral observations. Because resighting is difficult, and misidentification of color combinations is a possibility, all resight data in this report are based on at least two or more resights of each color banded individual in the same area.

NEST MONITORING AND BANDING NESTLINGS

In 2001, we focused our nest monitoring and nestling banding efforts mainly on four patches (Mudflats, Shangri-la, Lakeshore, and Orange Peel Campground). USGS nest monitoring efforts were conducted in those territories which AGFD was not monitoring, and was conducted only to track nestlings to banding age. Nests were visited approximately three to four times during nest activity to determine nestling age and continuation of the nesting effort.

Nestlings were banded at 7-10 days of age and only when they could be taken from nests that were safely accessible. 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 in any year. Nestlings were banded with a single colored-anodized federal numbered bird band, and a drop of blood was taken for genetic gender determination.

PASSIVE NETTING

Passive netting is the process of placing one or more mist nets in an area and waiting for birds to fly into them (without the use of tape-playback, decoys, etc). In 2001, USGS began a passive netting pilot project to evaluate the effectiveness of this technique for detecting non-breeding flycatchers (floaters) that may be present at the sites, but are not detected with conventional survey techniques (i.e. territorial response to tape-playback). Our interest in exploring the number of floaters present at the breeding sites was the result of occasionally capturing flycatchers that could not be assigned to a nearby territory, and were never seen again in that year. We used passive netting at one patch (Lake Shore) every two weeks for approximately 8 morning hours, with 5-6 12 meter nets employed per attempt. Our goals were to catch 1) individuals that might be using areas outside their noted territory, 2) flycatchers (banded and unbanded) not previously detected in the patch, and 3) flycatchers that were not responsive when using the target netting method described above. Nets were checked for birds every 20 to 30 minutes; any flycatchers caught were processed as per the methods stated in the Banding section.

GENETICS

A genetic sample was taken from all newly captured flycatchers while being handled for banding. DNA was obtained from a small drop of blood taken (non-lethally) from willow flycatchers by clipping off the tip of one toenail, just past the quick (vascularized tissue). This technique works well for obtaining small amounts of blood from flycatchers and other small passerines, with no discernable negative effects (Super and van Riper 1995, Bush et al. 2000). 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, and survivorship.

DETERMINING AGE BY MOLT PATTERNS

Pyle (1998) proposed that second year willow flycatchers can exhibit patterns of retained flight feathers (primaries and secondaries) that are not observed on older adults. While handling flycatchers during banding, the banders inspected each wing for retained feathers, which were noted by their wear and lighter color (especially on the wing spines) when compared with adjacent flight feathers. We began to evaluate this as a possible technique for aging flycatchers in 1998, when the idea was first proposed. After several years of evaluating returning adults and banded, second year returning nestlings, we are confident that retained feathers indicate a second year southwestern willow flycatcher. Not all second year birds exhibited this pattern, but most did. Thus, all flycatchers with retained feathers are now being aged as second year adults (SY), and those without the retained feathers are considered second year or older (AHY).

RESULTS

SUMMARY OF 2001 BANDING AND RESIGHTING EFFORTS

In 2001, the CPFS banding crew banded 83 new adult flycatchers and 107 nestlings from 43 nests at 13 patches within the Roosevelt Lake area. Overall, 80% of the total number of adult flycatchers detected at the study patches were banded by the end of the breeding season (Table 1).

The CPFS crew spent considerable time resighting banded birds and detected a total of 91 adult flycatchers banded in previous years. In addition, 22 returning nestlings were recaptured to determine identity. Not included in the count of total number banded adults (Table 1) are five returning banded nestlings that were unsuccessfully targeted for capture, however their one base color band indicated that they were banded as nestlings at Roosevelt Lake. Of the returning banded adults, 57 returned to the patch where they were detected the previous year, 29 moved from their 2000 patch or site, and five went undetected in 2000, but were detected in 2001.

The numbers of flycatchers reported herein for each patch may differ slightly from those reported by AGFD. The differences between numbers are due to different approaches in determining the exact number of individual flycatchers. Our estimates are based on the number of banded and unbanded birds confirmed to a territory, taking into account birds that move from patch to patch, are polygamous, and are captured but are never detected again. Our estimates are best interpreted as the minimum number of individual adults detected in 2001.

Table 1: Summary of southwestern willow flycatchers banded during the 2001 breeding season at Roosevelt Lake in Arizona. Includes patch name, number of new captures, total numbers of banded adults, total numbers of adult birds banded or unbanded, total numbers of nestlings banded and percent of all adult birds banded.

Patch	# New Adult Captures	Total # Banded Adults	Total # Adult Birds Detected	# Nestlings Banded (# nests)	% of All Adults Banded
Old Salt	7	18	21	0	86%
Mudflats	4	11	14	3 (2)	79%
Shangri-la	20	57	78	66 (25)	73%
School House South 1	0	3	5	0	60%
School House South 3	2	7	9	1 (1)	78%
School House North 1	2	16	18	0	89%
School House North 2	0	1	4	3 (1)	25%
Lake Shore	19	39	44	24 (10)	89%
North Shore	7	9	11	0	82%
A+ Cross Road	6	6	6	0	100%
Tonto Creek Inflow	2	15	20	0	75%
Orange Peel Campground	9	12	13	7 (3)	92%
Orange Peel Flats	5	6	6	3 (1)	100%
Totals	**83**	**196***	**245***	**107 (43)**	**80%**

* This count does not include two flycatchers that were double counted in the patch totals due to being confirmed in territories at two different patches each and one flycatcher that was triple counted in the patch totals due to being confirmed in territories at three different patches.

SITE BY SITE BANDING RESULTS AT ROOSEVELT LAKE

Salt River Inflow

In 2001, the CPFS and AGFD crews detected 200 willow flycatchers from 113 territories along the Salt River Inflow (105 pairs, including 15 polygamous males; eight unpaired males; and 13 presumed floaters). Mate replacement was also noted. The CPFS banding crew captured 60 new flycatchers, recaptured 32, and with help from AGFD resighted the 68 other returning flycatchers (Table 2).

Table 2: Willow flycatchers banded and resighted at the Salt River Inflow in 2001. Table includes patch name, date originally banded, federal bird band number, color band combination, age in 2001, sex if known, territory captured or resighted in 2001, whether or not it was a confirmed occupant of the territory, and status (new, recapture, resight or moved).

Patch Name	Date Banded	Federal Bird Band Number	Color Band Left Leg	Color Band Right Leg	Age 2001	Sex	2001 Territory	Confirmed Resident of Territory	Status
Old Salt	6/15/2001	1490-89801	V	WV	AHY	F*	16	Yes	New
	6/15/2001	1490-89901	YO	Z	AHY	F*	23	Yes	New
	6/19/1998	1590-97531	V	WW	A4Y	F	1	Yes	Resight
	5/30/2001	1710-20204	Z	OD	AHY	F*	22	No	New
	5/13/1999	1710-20285	V	YR	ATY	M	22	Yes	Recapture
	7/19/1999	1710-20298	YKY	V	TY	M	48/29[1]	Yes/Yes	Recapture
	6/17/2001	1710-20457	YDY	Z	AHY	M*	29	No	New
	5/22/2001	1710-20459	Z	OW	AHY	U	48	Yes	New
	7/16/1998	1710-20473	KW	Z	A4Y	M*	21	Yes	Resight
	5/17/2001	1710-20498	Z	WV	AHY	U	2	Yes	New
	5/17/2001	1710-20499	WO	Z	AHY	U	21	Yes	New
	5/17/2000	1710-20601	K	GR	ASY	M	2	Yes	Recapture
	6/2/2000	1710-20682	WK	K	ASY	M	32/1[2]	Yes/No	Resight
	7/9/2000	1740-51858	OK	K	SY	F	70	Yes	Recapture
	6/11/1996	1740-91714	PD/R	X	A6Y	U	32	Yes	Resight
	6/15/2000	1740-91966	K	KD	ASY	M	23/62[1]	Yes/Yes	Resight
	6/18/2000	1740-91969	DW	K	ASY	F	22	Yes	Resight
	6/19/2000	1740-91973	WW	K	ASY	M	1	Yes	Resight
Mudflats	6/15/2001	1490-89929	OY	Z	SY	U	19	Yes	New
	6/7/1998	1590-97516	V	KK	A4Y	M	47/53/97[1]	No/Yes/Yes	Recapture
	7/1/1998	1590-97524	YW	V	A4Y	F	6	Yes	Resight
	5/31/2001	1710-20205	WVW	Z	AHY	U	91	Yes	Moved
	6/3/2001	1710-20220	VV	Z	AHY	F*	47	Yes	New
	5/22/2001	1710-20240	KG	Z	AHY	U	97	Yes	New
	6/23/1999	1710-20256	V	KW	ATY	F	83	Yes	Recapture
	7/11/2001	1710-20268	GV	V	SY	F*	40	Yes	New
	6/23/1999	1710-20281	V	GG	ATY	M	40/6[1]	Yes	Recapture
	6/1/2001	1710-20461	KRK	Z	AHY	U	91	Yes	Moved
	6/29/2000	1710-20625	OW	K	SY	U	83	Yes	Recapture
Shangri-la	7/1/2001	1490-89803	V	WDW	AHY	F*	65	Yes	New
	5/30/2001	1490-89909	YK	Z	AHY	U	34	No	New
	6/1/2001	1490-89910	VK	Z	AHY	U	82	No	New
	6/27/2001	1490-89913	Z	KGK	SY	M*	78	Yes	New
	6/29/2001	1490-89921	OG	Z	SY	U	36	Yes	New
	7/11/2001	1490-89944	OW	Z	SY	F*	61	Yes	New
	6/2/1997	1590-97318	X	W/PD	A5Y	F	62	Yes	Resight
	6/7/1998	1590-97537	V	RR	A4Y	U	77	Yes	Resight
	6/30/1998	1590-97540	V	RY	A4Y	F	50	Yes	Resight

Table 2: Continued. Banded willow flycatchers detected at the Salt River Inflow site, 2001.

		Federal	Color Band				Confirmed	

Patch Name	Date Banded	Bird Band Number	Left Leg	Right Leg	Age 2001	Sex	2001 Territory	Resident of Territory	Status
Shangri-la	6/22/1999	1590-97543	V	WG	ATY	U	27	Yes	Resight
	6/22/1999	1590-97544	V	RD	ATY	M	7	Yes	Resight
	5/22/2001	1710-20203	Z	RO	AHY	U	30	Yes	New
	5/31/2001	1710-20205	WVW	Z	AHY	U	59	Yes	Moved
	6/5/2001	1710-20207	RY	Z	AHY	U	90	Yes	New
	6/13/2001	1710-20210	Z	RDR	AHY	F*	54	Yes	New
	5/17/2001	1710-20219	DO	Z	AHY	U	41/61[1]	Yes/Yes	New
	6/3/2001	1710-20241	KY	Z	AHY	F*	69	Yes	New
	6/5/2001	1710-20243	OD	Z	AHY	F*	9	Yes	New
	6/3/2001	1710-20264	OO	V	AHY	F*	56	Yes	New
	6/22/1999	1710-20273	V	KR	ATY	F	3	Yes	Resight
	6/22/1999	1710-20274	V	GV	ATY	M	65	Yes	Resight
	6/23/1999	1710-20280	V	KD	ATY	M	43	Yes	Resight
	6/23/1999	1710-20282	V	YO	ATY	F	0	Yes	Resight
	7/14/1999	1710-20302	V	DR	4Y	M	18	Yes	Resight
	7/26/1999	1710-20308	WO	V	ATY	F	7	Yes	Resight
	6/27/1999	1710-20338	YD	V	ATY	M	62/5[1]	Yes/Yes	Resight
	6/22/1999	1710-20340	V	OW	ATY	F	43	Yes	Resight
	6/27/1999	1710-20347	V	YD	ATY	M	45/3[1]	Yes/Yes	Resight
	5/30/2001	1710-20456	WRW	Z	AHY	F*	52	Yes	New
	6/1/2001	1710-20461	KRK	Z	AHY	U	59	Yes	New
	5/4/2001	1710-20497	Z	YW	AHY	U	99	Yes	New
	5/8/2001	1710-20500	WG	Z	AHY	F*	45	Yes	New
	5/17/2000	1710-20595	K	DK	ASY	M	50/81[1]	Yes/Yes	Resight
	5/20/2000	1710-20597	K	YV	ASY	M	42	Yes	Resight
	5/9/2000	1710-20599	K	KY	ASY	M*	49/52/77[1]	Yes/Yes/Yes	Resight
	5/9/2000	1710-20600	K	GY	ASY	M	98	Yes	Resight
	5/22/2000	1710-20603	K	VG	ASY	U	13/56[1]	Yes/Yes	Recapture
	6/30/2000	1710-20605	KGK	K	ASY	M	28	Yes	Resight
	6/15/2000	1710-20609	WR	K	ASY	M	31	Yes	Resight
	6/16/2000	1710-20611	GV	K	ASY	F	42	Yes	Resight
	7/15/1998	1710-20630	VV	X	A4Y	M*	30	Yes	Resight
	6/6/2000	1710-20687	KR	K	ASY	F	16	Yes	Resight
	5/12/2000	1710-46323	GY	K	ASY	M*	11	Yes	Resight
	5/12/2000	1710-46324	YG	K	ASY	M*	63	Yes	Resight
	6/13/2000	1710-46327	K	DY	TY	M	92	Yes	Resight
	7/3/2001	1740-51889	VWV	K	SY	U	78	No	New
	7/25/2001	1740-51900	K	RDR	AHY	U	20	Yes	New
	7/12/2000	1740-91591	DWD	K	TY	M	12/16[2]	Yes/No	Resight
	7/19/2000	1740-91596	OD	K	SY	M	17	No	Recapture
	6/30/1998	1740-91632	KW	X	6Y	M	4	Yes	Resight
	6/27/1996	1740-91728	X	RG	A6Y	M	4	Yes	Resight
	6/22/1998	1740-91857	D	RG	4Y	F	41	Yes	Resight
	6/17/2000	1740-91968	WD	K	ASY	F	63	Yes	Resight
	6/19/2000	1740-91972[D]	YD	K	TY	F	9	Yes	Resight
	7/23/1997	2070-92905	WK/R	X	A5Y	M	0/20/37[1]	Yes/Yes/Yes	Resight
	7/29/2001	2210-57041	K	WDW	AHY	F*	13	No	New
	7/19/2000	2210-57076	K	OO	SY	F	90/36[2]	No/Yes	Recapture
School House South 1	5/14/1997	1590-97304	G/RW	X	A5Y	M	38	No	Resight
	7/29/1999	1710-20567	YO	V	ATY	M	1/37	No/Yes	Resight
	6/15/2000	1710-20692	K	GV	ASY	F*	1	Yes	Resight

Table 2: Continued. Banded willow flycatchers detected at the Salt River Inflow site, 2001.

		Federal	Color Band				Confirmed	

Patch Name	Date Banded	Bird Band Number	Left Leg	Right Leg	Age 2001	Sex	2001 Territory	Resident of Territory	Status
School House South 3	6/16/2001	1710-20223	Z	WG	AHY	U	0	No	New
	5/5/2001	1710-20239	Z	GO	AHY	U	36	Yes	New
	6/14/1999	1710-20283	WR	V	ATY	F	16	Yes	Resight
	6/19/2000	1710-20613	K	KK	ASY	M	16	Yes	Resight
	6/19/2000	1710-20614	K	RR	ASY	F	50	Yes	Resight
	6/30/2000	1710-20689	GO	K	ASY	F	17	Yes	Resight
	5/11/2000	1710-46321	K	GW	ASY	M*	17	Yes	Resight
School House North 1	6/16/2000	1590-97373	VG	X	A5Y	F	90	Yes	Resight
	6/14/2001	1710-20211	RKR	Z	SY	F*	77	Yes	New
	6/14/2001	1710-20242	YG	Z	AHY	F*	0	Yes	New
	7/24/2000	1710-20325	DYD	V	SY	F	76	Yes	Recapture
	7/9/1999	1710-20385	YRY	D	TY	M	76	Yes	Recapture
	7/29/1999	1710-20567	YO	V	ATY	M	0/90	Yes/Yes	Moved
	6/6/2000	1710-20686	K	KW	ASY	M	77	Yes	Resight
	6/13/2000	1710-20688	RK	K	ASY	U	81	Yes	Resight
	6/15/2000	1710-20691	RR	K	ASY	M	79	Yes	Resight
	7/6/2000	1740-51857	RY	K	SY	F	1	Yes	Recapture
	7/6/1996	1740-91532	RK	X	6Y	M	78	Yes	Resight
	6/16/2000	1740-91967	K	GK	ASY	F	80	Yes	Resight
	5/31/2001	1740-91970	K	RD	ASY	U	0/90[1]	Yes/Yes	Recapture
	6/19/2000	1740-91974	GK	K	ASY	F	78	Yes	Resight
	7/1/2000	1740-91975	K	OY	ASY	M*	80	No	Recapture
	7/11/2000	2210-57069	VK	K	SY	M	76	No	Recapture
Schl. Hse. N. 2	7/11/2000	2210-57070	RD	K	SY	F	27	Yes	Recapture
Lake Shore	7/2/2001	1490-89805	V	DWD	SY	U	34	No	New
	6/18/2001	1490-89806	V	VW	AHY	F*	13	Yes	New
	6/28/2001	1490-89816	WK	V	SY	F*	49	No	New
	6/18/2001	1490-89903	Z	DWD	AHY	F*	77	Yes	New
	5/5/2001	1490-89906	Z	VW	AHY	U	48	Yes	New
	6/28/2001	1490-89914	VWV	Z	AHY	U	84	No	New
	7/10/2001	1490-89943	RDR	Z	AHY	F*	80	Yes	New
	7/12/2001	1490-89945	YRY	Z	AHY	F*	41	Yes	New
	6/28/1999	1590-97511	KR	V	TY	F	14	Yes	Resight
	6/9/1998	1590-97527	WW	V	A4Y	F	34	Yes	Recapture
	5/31/2001	1710-20205	WVW	Z	AHY	U	49	No	New
	6/12/2001	1710-20209	Z	WRW	AHY	U	11	No	New
	6/14/2001	1710-20222	Z	DYD	AHY	U	80	No	New
	6/6/1999	1710-20263	GW	V	ATY	F	83	Yes	Resight
	6/22/1999	1710-20275	V	OO	ATY	M	0/15[1]	Yes/Yes	Resight
	6/30/1999	1710-20288	V	RYR	TY	M	21	Yes	Recapture
	7/24/2001	1710-20317	OD	V	SY	U	49	No	New
	7/18/2001	1710-20321	V	KRK	SY	F*	48	No	New
	7/30/2001	1710-20322	V	RDR	SY	M*	N/A	No	New
	6/18/1999	1710-20339	V	OG	4Y	M	14	Yes	Resight
	5/5/2001	1710-20458	Z	OG	AHY	U	35	Yes	New
	6/2/2001	1710-20462	DY	Z	AHY	U	41/83[1]	Yes/Yes	New
	6/2/2001	1710-20463	Z	KV	SY	U	49/80[2]	No/Yes	New
	6/12/2001	1710-20464	Z	KY	SY	U	27	Yes	New
	6/13/2000	1710-20578	V	DD	TY	M	33	Yes	Recapture
	6/30/2000	1710-20604	K	KV	ASY	M	34/65/77[1]	Yes/Yes/Yes	Recapture
	6/21/2000	1710-20618	K	VK	SY	U	84	Yes	Recapture

Table 2: Continued. Banded willow flycatchers detected at the Salt River Inflow site, 2001.

		Federal	Color Band				Confirmed	

Patch Name	Date Banded	Bird Band Number	Left Leg	Right Leg	Age 2001	Sex	2001 Territory	Resident of Territory	Status
Lake Shore	7/2/2000	1710-20626	RO	K	ASY	U	49	Yes	Recapture
	6/19/2000	1710-20698	YY	K	ASY	F	84	Yes	Recapture
	6/19/2000	1710-20699	K	WR	ASY	M	22	Yes	Resight
	6/13/2000	1710-46325	WG	K	ASY	F	33	Yes	Resight
	6/13/2000	1710-46330[D]	YD	K	TY	F	15	Yes	Resight
	6/21/2000	2210-57002	K	OK	SY	M	27	No	Recapture
	6/27/2000	2210-57007	WO	K	SY	F	49	Yes	Recapture
	6/29/2000	2210-57008	K	YR	SY	F	48	Yes	Recapture
	6/31/00	2210-57014	K	WVW	SY	F	65	Yes	Recapture
	7/17/2000	2210-57062	K	OD	SY	F	27	Yes	Recapture
	7/15/2000	2210-57075	OG	K	SY	F	22	Yes	Recapture
	6/18/2001	2210-57078	RWR	K	AHY	M*	13	No	New
North Shore	7/14/2001	1490-89802	V	WRW	AHY	F*	55	No	New
	7/26/2001	1490-89817	KG	V	SY	U	55	No	New
	7/14/2001	1490-89964	Z	DRD	SY	F*	51/55[2]	No/No	New
	6/30/2001	1710-20265	KW	V	SY	F*	52	Yes	New
	6/30/2001	1710-20266	DR	V	SY	U	52	No	New
	7/2/2001	1710-20267	DY	V	SY	U	51	Yes	New
	7/14/2001	1710-20320	V	RK	SY	M*	58	No	New
	7/6/2000	1740-51853	K	VWV	SY	M	59	No	Recapture
	7/9/2000	1740-51863	K	YO	SY	F	54	No	Recapture

Color band color codes: **X**=silver, **V**=violet, **Z**=gold, **K**=black, **D**=blue, **G**=green, **O**=orange, **R**=red, **W**=white, **Y**=yellow, and **P**=pink

Age: **SY**=2 years, **AHY**=2 years or older, **TY**=3 years, **ASY**=3 years or older, **4Y**=4 years, **ATY**=4 years or older, **A4Y**=5 years or older, **6Y**=6 years, **A5Y**=6 years or older, **A6Y**=7 years or older

Sex: **F**=female, **M**=male, **U**=unknown.

[1] Polygamous male

[2] Same-season, within-site movement

* Birds sexed in the field

[D] Band combination YD:K is a duplicate color combination from 2000; it is assumed that the individual banded at Lake Shore in 2000 returned to Lake Shore in 2001, while the other individual moved from School House North 1 (2000) to Shangri-la (2001).

Tonto Creek Inflow

In 2001, CPFS and AGFD detected 45 willow flycatchers from 26 territories along the Tonto Creek Inflow (24 pairs, including 3 polygamous males; 2 unpaired males; and 2 presumed floaters). The CPFS banding crew captured 22 new flycatchers, recaptured 5, and along with AGFD resighted the remaining 12 adults banded in previous years (Table 3, next page).

Table 3: Willow flycatchers banded, recaptured, and resighted at Tonto Creek Inflow, Arizona in 2001, including patch name, date originally banded, federal bird band number, color band combination, age in 2001, sex if known,

territory captured or resighted in 2001, whether or not it was a confirmed resident or the territory, and status (new, recapture, resight).

Patch Name	Date Banded	Federal Bird Band Number	Color Band Left Leg	Color Band Right Leg	Age 2001	Sex	2001 Territory	Confirmed Resident of Territory	Status
A+ Cross Road	6/16/2001	1490-89902	KO	Z	AHY	F*	47	Yes	New
	6/12/2001	1490-89911	GO	Z	AHY	F*	41	Yes	New
	6/12/2001	1490-89912	Z	YDY	AHY	U	47	Yes	New
	5/21/2001	1710-20202	Z	VWV	AHY	U	41/83[1]	Yes/Yes	New
	6/12/2001	1710-20221	GY	Z	AHY	U	47	No	New
	6/12/2001	1710-20316	WV	V	AHY	U	83	Yes	New
Tonto Creek	5/11/1999	1590-97202	KR	X	A5Y	M	8	Yes	Resight
	5/31/1997	1590-97313	P/RW	X	A5Y	M	7	Yes	Resight
	6/6/2001	1710-20208	Z	WY	AHY	F*	3	Yes	New
	6/6/1999	1710-20277	WG	V	ATY	F	2	Yes	Resight
	6/26/1999	1710-20334	YV	V	ATY	F	0	Yes	Resight
	5/31/2001	1710-20460	Z	WDW	AHY	U	7	Yes	New
	7/29/1999	1710-20570	DWD	V	TY	M	0	Yes	Recapture
	5/18/2000	1710-20671	K	WY	ASY	M	1	Yes	Resight
	5/31/2000	1710-20678	K	YW	ASY	F	8	Yes	Resight
	6/16/2000	1710-20694	GG	K	ASY	F*	40	Yes	Recapture
	6/10/2000	1710-46319	K	YG	ASY	M*	2	Yes	Resight
	5/10/2000	1710-46320	K	WG	TY	M*	9	Yes	Recapture
	5/13/1998	1740-91706	KY	X	A6Y	M	5/39[1]	Yes/Yes	Resight
	6/15/1996	1740-91721	X	WV	A6Y	M	40	Yes	Recapture
	7/12/2000	2210-57071	RG	K	ASY	M	3	Yes	Resight
Orange Peel Campground	5/9/2001	1490-89907	Z	WO	AHY	U	52	Yes	New
	6/18/2001	1490-89930	Z	KO	AHY	U	48	No	New
	6/26/2001	1490-89934	Z	KYK	SY	U	30	Yes	New
	6/26/2001	1490-89935	Z	WKW	AHY	U	30	Yes	New
	6/26/2001	1490-89936	RYR	Z	AHY	U	44	Yes	New
	6/6/2001	1710-20244	Z	RWR	AHY	M*	54	No	New
	6/26/2001	1710-20271	V	VWV	AHY	F*	44	Yes	New
	6/2/2001	1710-20329	RR	V	AHY	F*	48	Yes	New
	6/2/2001	1710-20330	VY	V	AHY	U	51	Yes	New
	6/29/2000	1710-20622	K	DO	SY	F	53	Yes	Recapture
	6/2/2000	1710-20681	K	RW	ASY	F	51	Yes	Resight
	6/18/2000	1710-20696	K	RG	ASY	F*	52	Yes	Resight
Orange Peel Flats	6/30/2001	1490-89804	RYR	V	AHY	F*	27	Yes	New
	5/20/2001	1490-89908	Z	YO	AHY	U	15/55[1]	Yes	New
	6/30/2001	1490-89968	Z	DK	AHY	M*	27	Yes	New
	6/14/2001	1710-20465	DYD	Z	AHY	U	41	No	New
	6/14/2001	1710-20466	Z	YKY	AHY	U	55	Yes	New
	7/28/1999	1710-20561	DO	V	TY	F	15	Yes	Resight

Color band color codes: **X**=silver, **V**=violet, **Z**=gold, **K**=black, **D**=blue, **G**=green, **O**=orange, **R**=red, **W**=white, **Y**=yellow, and **P**=pink

Age: **SY**=2 years, **AHY**=2 years or older, **TY**=3 years, **ASY**=3 years or older, **ATY**=4 years or older, **A5Y**=6 years or older, **A6Y**=7 years or older

Sex: **F**=female, **M**=male, **U**=unknown.

[1] Polygamous male

* Birds sexed in the field

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 2001, 84 of 130 banded adult flycatchers that were detected at Roosevelt Lake patches in 2000 returned to the same or different breeding location. Thus, overall 2000-2001 survivorship was 65% (Table 4).

Table 4: Willow flycatcher survivorship at Roosevelt Lake in Arizona from 2000 to 2001. Data are listed by site and patch name. The table includes the total number of banded flycatchers present in 2000, the number that returned (to any patch) in 2001, and overall percent survivorship.

Site	Patch	# Banded 2000	# detected in 2001	% Survivorship
Salt River Inflow	Old Salt	14	11	79%
	Mudflats	11	7	64%
	Shangri-la	42	31	74%
	School House South	7	4	57%
	School House North	4	4	100%
	Lake Shore	20	12	60%
	Salt River Inflow Totals:	**98**	**69**	**70%**
Tonto Creek Inflow	Orange Peel	7	4	57%
	Tonto Creek	23	10	43%
	A+ Cross Road	2	1	50%
	Tonto Creek Totals:	**32**	**15**	**47%**
Overall Totals		**130**	**84**	**65%**

ADULT PATCH FIDELITY

Patch fidelity is defined as an adult flycatcher returning to the same breeding patch that it used the previous year. It is calculated by dividing the number of banded birds returning to the patch in 2001 by the total number of banded birds at the patch in 2000. For the purpose of comparison with past CPFS reports, in which patches were considered separate sites, we have calculated patch fidelity (as well as site fidelity). Also calculated is the percent *of those flycatchers that returned in 2001* which showed patch fidelity. We detected 57 (of 130 possible) flycatchers that returned to the same breeding patch that they occupied in 2000 (44% patch fidelity; Table 5).

Table 5: Willow flycatcher patch fidelity at Roosevelt Lake in Arizona, organized by site and patch. Table includes the total number of banded flycatchers present in 2000, those returning to the same patch in 2001, the percentage of flycatchers exhibiting patch fidelity of all flycatchers present in 2000, and the percent exhibiting patch fidelity of those that returned in 2001.

Site	Patch	# Banded 2000	# Returned 2001	Patch Fidelity (%)	% of returning
Salt River Inflow	Old Salt	14	5	36%	45%
	Mudflats	11	4	36%	57%
	Shangri-la	42	24	57%	80%
	School House South	7	3	43%	75%
	School House North	4	2	50%	50%
	Lake Shore	20	8	40%	67%
Salt River Inflow Site Fidelity:		**98**	**46**	**47%**	**67%**
Tonto Creek Inflow	Orange Peel	7	2	29%	50%
	Tonto Creek	23	9	39%	90%
	A+ Cross Road	2	0	0%	0%
Tonto Creek Inflow Site Fidelity:		**32**	**11**	**34%**	**73%**
Overall Totals:		**130**	**57**	**44%**	**68%**

ADULT MOVEMENT

Between-year, Within-patch Movement: 2000-2001

Within-patch movement is defined as a territorial flycatcher relocating from one nesting or territorial area to a new nesting or territorial area *within* a breeding patch. 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 area or nest location.

Between-year movement within-patches represents flycatchers returning to different locations within their previous year's breeding patch. Of the 57 flycatchers that returned to their previous year's breeding patch, 40 (70%) settled in approximately the same area and 17 (30%) moved >50 m (Table 6). The average distance moved by a flycatcher within a patch, between 2000 and 2001, was 230 m (range = 51 to 707 m). The two birds that were not detected last year but returned to the same patch they used in 1999 were not included in this analysis of movement.

Table 6: Between-year, within-patch movement of flycatchers returning to the same breeding site in Arizona, 2001. Table includes site, patch, total number of patch faithful birds, percent of birds settled on new territories, and average and range of distance moved (in meters) of those flycatchers that moved greater than 50 m.

Site	Patch	# Birds Returning to Breeding Patch	# (%) Birds moved > 50 m	Average Distance Moved (m)	Range of Distances Moved (m)
Salt River Inflow	Salt River Inflow	5	3 (60%)	111	72 to 152
	Mudflats	4	1 (25%)	125	125
	Shangri-la	24	6 (25%)	135	51 to 278
	School House South 1	1	0%	N/A	N/A
	School House South 3	2	1 (50%)	54	54
	School House North 1	2	0%	N/A	N/A
	Lake Shore	8	3 (38%)	298	207 to 430
Tonto Creek Inflow	Orange Peel Flats	1	0%	N/A	N/A
	Orange Peel Campground	1	0%	N/A	N/A
	Tonto Creek Inflow	9	3 (33%)	655	594 to 707
	A+ Cross Road	0	N/A	N/A	N/A
Overall Totals		**57**	**17 (30%)**	**230**	**51 to 707**

Between-year, Between-patch Movement: 2000-2001

Between-patch movement is defined as a flycatcher that moved from one breeding patch to another breeding patch, and may occur between and within years. Year to year movement between-patches may occur within and between drainages, the latter being less common.

In 2001, we detected 20 within-drainage movements and 11 between-drainage movements by adult flycatchers (Table 7, Fig. 3). Nineteen moved between-patches, within-site at Roosevelt Lake, six flycatchers moved between the Tonto Creek and Salt River Inflows, and three birds moved to Roosevelt from other sites, as follows: a Kearny Sewage Pond (Gila River) flycatcher moved 69 km and two Greer Township (White Mountains) flycatchers moved 144 km, all to the Shangri-la patch (Salt River Inflow).

Table 7: Adult southwestern willow flycatchers at Roosevelt Lake that exhibited between-year, between-patch movement from 2000 to 2001. Table includes patches where flycatchers were detected in 2000 and 2001, distance moved, federal bird band number, color band combination, age in 2001, and sex.

Patch Detected in 2000 (unless previous years noted)	Patch Detected in 2001	Distance Moved (km)	Federal Bird Band Number	2001 Age	Sex
Old Salt	Shangri-la	1.4	1710-20611	ASY	F
		1.4	1740-91591	TY	M
	School House North 1	2	1740-91532	6Y	M
	Orange Peel Campground	28.7	1710-20681	ASY	F
	Tonto Creek	28.4	1710-20694	ASY	F*
Mudflats	Old Salt	1.2	1710-20601	ASY	M
	Shangri-la	0.4	1590-97543	ATY	M
	School House North 1	1	1740-91967	ASY	F
Shangri-la	Old Salt	2	1740-91966	ASY	M
	School House South 1	1.2	1710-20692	ASY	F*
	School House South 3	1.5	1710-46321	ASY	M*
	School House North 1	1.1	1710-20686	ASY	M
		1.2	1710-20691	ASY	M
		1.1	1740-91975	ASY	M*
	Lake Shore	1.9	1710-20275	ATY	M
School House South 1	School House North 1	1.1	1590-97373	A5Y	F
School House North 1	Old Salt	2	1740-91973	ASY	M
Lake Shore	Shangri-la	1.7	1710-20605	ASY	M
		1.9	1710-46327	TY	M
	School House South 3	1	1710-20689	ASY	F
	School House North 1	1.6	1710-20688	ASY	U
Orange Peel Flats	Lake Shore	24.5	1710-20626	ASY	U
	Tonto Creek	1.7	2210-57071	ASY	M
Tonto Creek	School House South 1	27.2	1710-20567	ATY	M
	School House South 3	26.3	1710-20283	ATY	F
Tonto Creek (1998)	Lake Shore	25.9[t]	1590-97527	A4Y	F
Tonto Creek (1999)	Old Salt	29.2[t]	1740-91714	A6Y	M
A+ Cross Road	Lake Shore	27.3	1590-97511	ATY	F
Kearny Sewage Ponds	Shangri-la	69	1740-91857	4Y	U
Greer Township	Shangri-la	144	1710-20630	A4Y	M
Greer Township (1998)	Shangri-la	144[t]	1740-91632	6Y	M

* Birds sexed in the field

[t] Birds not detected in 2000, distances are from last known location

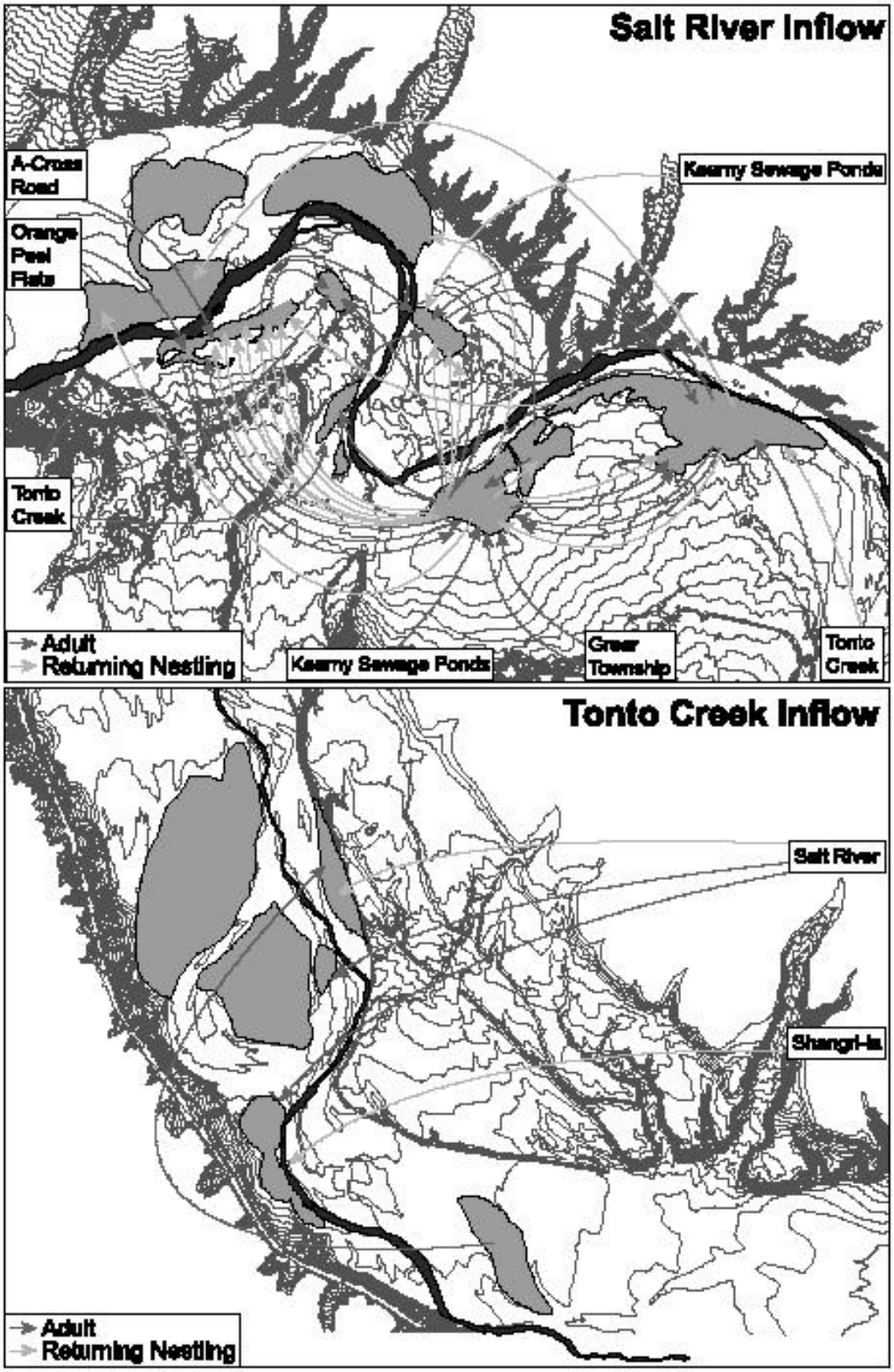

Figure 3: Between-year, between-patch movement by adult (red) and juvenile (yellow) flycatchers at Roosevelt Lake

Same-year, Within-patch Movement: 2001

Same-year movement within-patches 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 patch. Eleven flycatchers were detected moving within-patch during the 2001 breeding season. Three individuals, near the end of the breeding season, moved to different locations and were detected exhibiting no territorial behavior at all. One of these birds moved at least 630 meters. Five flycatchers that were banded early in the season, as well as three that were territorial in one area initially, moved distances ranging from 21 to 259 m to another area where breeding was attempted after their 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 2001, USGS documented one case of mate replacement at Mudflats and another at School House North 1. In both cases, previously unknown birds moved into the territory and paired with one of the birds already present. The replaced adult was not seen again.

Same-year, Between-patch Movement: 2001

Same-year movement between-patches occurred on 13 occasions in 2001 (Table 8, Fig. 4). Most of the flycatchers moved between patches along the Salt River Inflow. However, one bird moved from A+ Cross Road to Old Salt, a distance of 30 km. One male flycatcher was detected early in the season at Tonto then moved to School House South 1, where it nested with two females; it then moved again across the river to School House North 1, where it was detected singing at the end of the season. A female flycatcher disappeared after banding at Lake Shore and was detected at Shangri-la (2 km away) where she paired with a newly banded male. As a pair, both birds then moved to Mudflats where they nested. Another female flycatcher nested at Orange Peel Flats and later paired and nested at the Wheatfields area on the San Pedro River, approximately 117 km (AGFD, unp. data). Both nesting attempts failed due to predation.

Table 8: Adult willow flycatchers at Roosevelt Lake that exhibited same-year, between-patch movement in 2001. Table includes patches where flycatchers were first and later detected, distance moved, federal bird band number, color band combination, age in 2001 and sex.

Patch First Detected	Patch Later Detected	Distance Moved (km)	Federal Bird Band Number	Color Band		Age	Sex
				Left Leg	Right Leg		
Old Salt	School House South 3	2.6	1590-97531	V	WW	A4Y	F
Shangri-la	Mudflats	0.6	1490-89914	WVW	Z	AHY	U
		0.6	1710-20461	KRK	Z	AHY	U
School House South 1	School House North 1	0.8	1710-20567	YO	V	ATY	M
School House South 3	Shangri-la	1.4	1590-97543	V	WG	ATY	U
School House North 1	Lake Shore	1.5	1740-91970	K	RD	ASY	M
		1.4	1740-91975	K	OY	ASY	M
Lake Shore	Shangri-la	2	1490-89914	WVW	Z	AHY	U
		1.7	2210-57078	RWR	K	AHY	M*
	North Shore	0.4	1490-89903	Z	DWD	AHY	F*
Orange Peel Flats	San Pedro River[1]	117	1710-20466	Z	YKY	AHY	U
Tonto Creek	School House South 1	2.7	1710-20567	YO	V	ATY	M
A+ Cross Road	Old Salt	30.3	1490-89912	Z	YDY	AHY	U

* Birds sexed in the field

[1] Wheatfields site on the Lower San Pedro River

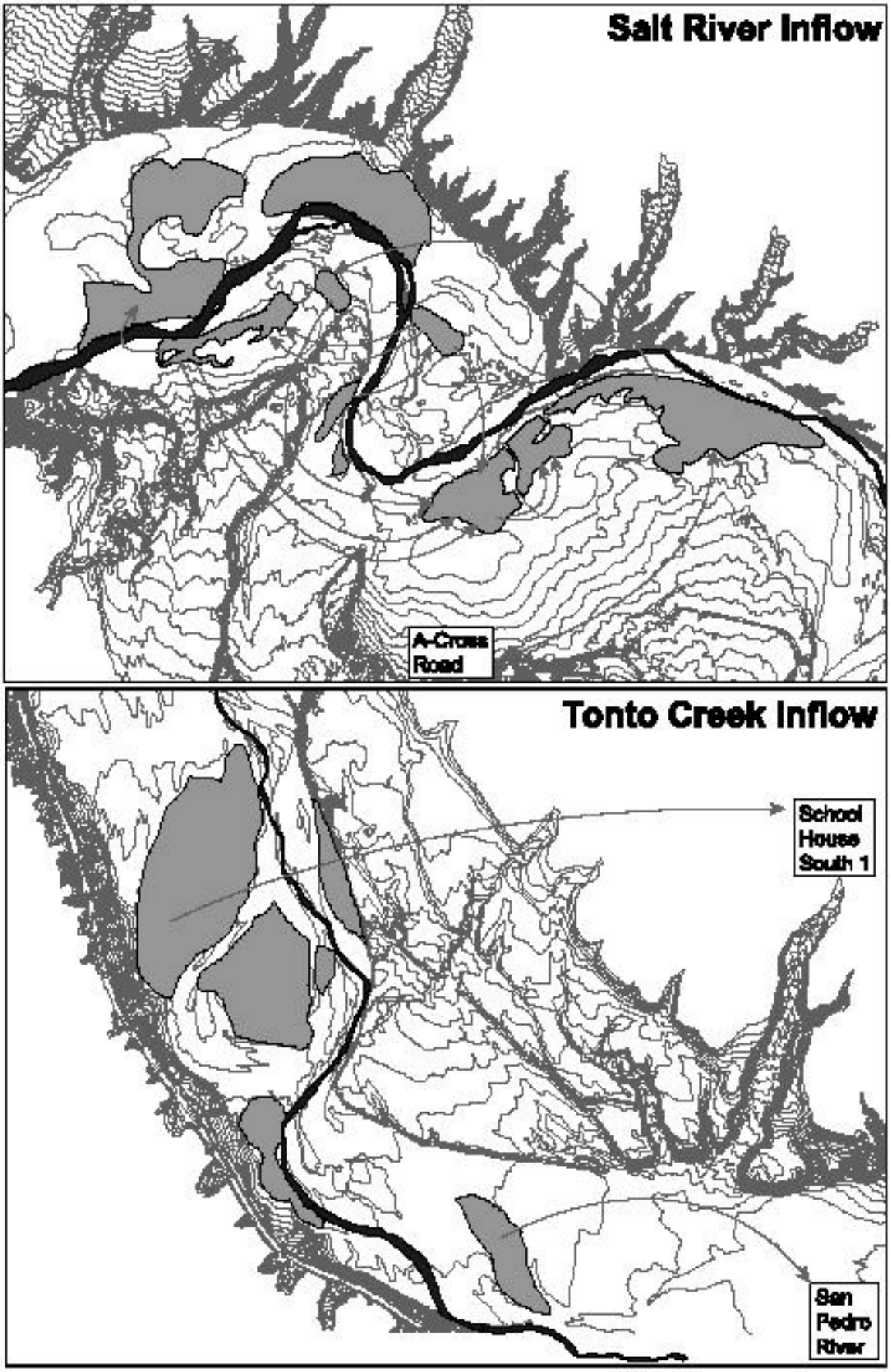

Figure 4: Same-year, between-patch movement by adult willow flycatchers at Roosevelt Lake, 2001.

NESTLING BANDING, SURVIVORSHIP AND MOVEMENT

Nestling Banding: 2001

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 2001 received a colored-anodized federal bird band on one leg. We banded a total of 107 nestlings (from 43 nests) at Roosevelt Lake - most from Shangri-la, Mudflats and Lake Shore (Table 9).

Table 9: Willow flycatcher nestlings banded in 2001 at Roosevelt Lake. Table includes patch banded, date banded, federal bird band number, the leg the service band was applied to, and the territory and nest number.

Patch	2000 Territory and Nest	Date Banded	Bird Band Number	Color Band	
				Left Leg	Right Leg
Mudflats	47A	7/27/2001	2210-57094	K	
			2210-57095	K	
	83A	6/30/2001	1740-51865		K
Shangri-la	3A	7/1/2001	2210-57033	K	
			2210-57034		K
	4A	6/19/2001	1490-89931		Z
			1490-89932	Z	
			1490-89933		Z
	9A	6/27/2001	2210-57092		K
			2210-57093		K
	11A	6/25/2001	1710-20229	Z	
			1710-20230	Z	
			1710-20231		Z
			1710-20232		Z
	12A	6/18/2001	1710-20250		Z
			1490-89959	Z	
			1490-89962		Z
			1490-89966		Z
	13A	6/16/2001	1710-20245		Z
	17A	7/12/2001	2210-57051	K	
			2210-57052		K
			2210-57053	K	
			2210-57054		K
	30A	6/20/2001	1490-89949		Z
			1490-89950	Z	
			1490-89951	Z	
	39A	7/25/2001	1740-51896	K	
			1740-51897	K	
	41A	7/1/2001	2210-57032		K
			2210-57035		K
			2210-57037		K
	42A	6/25/2001	1490-89940		Z
			1490-89941	Z	
			1490-89942		Z
	43A	6/20/2001	1490-89953		Z
			1490-89954		Z
	45A	6/16/2001	1710-20246		Z
			1710-20247		Z

Table 9: Continued. Nestlings banded at Roosevelt Lake in 2001

Patch	2000 Territory and Nest	Date Banded	Bird Band Number	Color Band	
				Left Leg	Right Leg
Shangri-la	45B	7/25/2001	2210-57055	K	
			2210-57056	K	
			2210-57057	K	
	50A	6/25/2001	1710-20224		Z
			1710-20225		Z
			1710-20226	Z	
	52B	7/27/2001	2210-57058	K	
			2210-57059		K
	54A	7/2/2001	1740-51883		K
			1740-51884	K	
			1740-51885		K
	56A	6/25/2001	1710-20233		Z
			1490-89939	Z	
	62A	6/18/2001	1490-89969	Z	
			1490-89970	Z	
			1490-89971	Z	
	63A	6/28/2001	2210-57044		K
			2210-57045		K
			2210-57046		K
	69A	7/10/2001	2210-57038	K	
			2210-57039		K
			2210-57040	K	
	81A	6/30/2001	1740-51866		K
			1740-51867		K
			1740-51868		K
	92A	6/29/2001	1740-51881		K
			1740-51882		K
	99A	6/20/2001	1490-89955		Z
			1490-89956		Z
			1490-89957		Z
	98B	7/27/2001	1740-51840		K
School House South 3	17A	6/27/2001	2210-57096		K
School House North 2	18A	6/26/2001	1740-51841		K
			1740-51842	K	
			1740-51843		K
Lake Shore	0A	7/17/2001	1740-51875		K
			1740-91976		K
			1710-20606		K
	14A	6/16/2001	1710-20248	Z	
			1710-20249		Z
	21A	7/2/2001	1740-51886		K
			1740-51887	K	
			1740-51888		K
	27A	7/10/2001	2210-57048		K
			2210-57049	K	
	34A	6/29/2001	2210-57099	K	
			1740-51880	K	

Table 9: Continued. Nestlings banded at Roosevelt Lake in 2001

	2000 Territory	Date	Bird Band	Color Band

Patch	and Nest	Banded	Number	Left Leg	Right Leg
Lake Shore	49B	7/17/2001	1740-51872		K
			1740-51873		K
			1740-51874		K
	77A	7/4/2001	2210-57047		K
	80A	7/17/2001	1740-51869		K
			1740-51870		K
			1740-51871		K
	83A	6/29/2001	2210-57097		K
			2210-57098		K
	84A	6/26/2001	2210-57079	K	
			2210-57080	K	
			2210-57081	K	
Orange Peel Flats	15A	7/10/2001	1740-51890		K
			1740-51891	K	
			1740-51892		K
Orange Peel Campground	30A	7/27/2001	1740-51899	K	
	51A	7/2/2001	1740-51837	Z	
			1740-51838	Z	
			1740-51839	Z	
	52A	7/10/2001	1740-51893		K
			1740-51894	K	
			1740-51895	K	
Color band color codes: Z=gold and **K**=black					

First Year Survivorship and Movements:

In 2000, we banded 71 nestlings at five patches at Roosevelt Lake; 21 of these nestlings were resighted or recaptured in 2001 (Table 10). Thus, 2000-2001 first year survivorship (based on the percentage of banded nestlings subsequently resighted) was 30%. Three of the 21 nestlings were resighted and not recaptured, but are known to be year 2000 nestlings because of their black anodized federal bird band. We also resighted two violet color-banded individuals that were not recaptured; violet was used from 1998 through 2000 nestlings, so individual identity and banding year of these birds are unknown. Four returning flycatchers banded as nestlings in 1999 were recaptured in 2001 (Table 10); three from Roosevelt Lake and one from Kearny Sewage Ponds along the San Pedro River. For those flycatchers banded as nestlings and first detected in 2001 (Table 10), the average distance moved was 8.4 km (range = 0.3 km – 67 km).

Table 10: Willow flycatcher nestlings banded in previous years that were first detected in 2001. Includes natal banding location, patch detected in 2001, the distance moved from natal site, federal bird band number, color band combination, date of natal banding, and sex.

Natal Banding Patch	Patch Detected in 2001	Distance Moved (km)	Federal Bird Band Number	Color Band		Natal Date Banded	Sex
				Left Leg	Right Leg		
Old Salt	Shangri-la	1.9	2210-57076	K	OO	7/19/2000	F
	North Shore	3.4	1740-51863	K	YO	7/9/2000	F
	Lake Shore	3.5*	1710-20288	V	RYR	6/30/1999	M
	Tonto Creek Inflow	28.8*	1710-20570	DWD	V	7/29/1999	M
Shangri-la	Old Salt	1.3	1740-51858	OK	K	7/9/2000	F
	Mudflats	0.4	1710-20625	OW	K	6/29/2000	M
	Shangri-la	0.3	1740-91596	OD	K	7/19/2000	M
	School House North 1	1.1	1710-20325	DYD	V	6/24/2000	F
		0.9	1740-51857	RY	K	7/6/2000	F
		1.1	2210-57069	VK	K	7/11/2000	M
	School House North 2	1.9	2210-57070	RD	K	7/11/2000	F
	North Shore	2.6	1740-51853	K	VWV	7/6/2000	M
	Lake Shore	1.7	1710-20618	K	VK	6/21/2000	U
		1.9	2210-57002	K	OK	7/21/2000	M
		1.8	2210-57007	WO	K	7/27/2000	F
		1.9	2210-57008	K	YR	7/29/2000	F
		2.2	2210-57014	K	WVW	7/31/2000	F
		1.9	2210-57062	K	OD	7/17/2000	F
		2	2210-57075	OG	K	7/15/2000	F
	Orange Peel Camp	27.4	1710-20622	K	DO	6/29/2000	F
Tonto	Old Salt	28.8*	1710-20298	YKY	V	6/19/1999	M
San Pedro River	School House North 1	67*	1710-20385	YRY	D	7/9/1999	M

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

* Bird not detected in 2000, therefore distance moved is approximated by using 1999 natal site

PASSIVE NETTING

This season we evaluated the effectiveness of using passive nets to detect (via capture) non-breeding flycatchers at the Lake Shore patch. Although we were able to devote only limited time to the effort, it was a successful trial run. Overall, 22 individual flycatchers were captured: nine unbanded adults, three returning, previously banded nestlings, and 10 previously banded adults (Table 11).

We noted four categories of encounters while passive netting at Lake Shore. Of the 22 captures, four were recaptured in their resident territory and six in areas outside of their resident territory (typically directly adjacent or very close to their territory). Eight flycatchers were either newly banded (seven) or recaptured (one) then not detected again, or not detected exhibiting territorial behavior. Four flycatchers were captured passively and newly banded then later detected in an adjacent territory or the territory in which they were captured.

Table 11: Southwestern willow flycatchers caught in passive nets at Lake Shore in 2001. Table includes federal bird band number, color band combination, capture date (some birds caught more than once), status (recaptured or newly banded), and type of capture.

Federal Bird Band Number	Color Band		Capture Date	Status	Type of Capture
	Left Leg	Right Leg			
1490-89805	V	DWD	7/2/2001	New	ND
1490-89816	WK	V	6/28/2001	New	ND
1490-89906	Z	VW	7/17/2001	Recapture	LD
1490-89914	VWV	Z	6/28/2001	New	ND
1490-89943	RDR	Z	7/24/2001	Recapture	OT
1490-89945	YRY	Z	7/12/2001	New	LD
1590-97527	WW	V	5/29/2001	Recapture	RT
1710-20222	Z	DYD	7/30/2001	Recapture	ND
1710-20275	V	OO	5/20/2001	Recapture	OT
1710-20288	V	RYR	7/24/2001	Recapture	OT
1710-20317	OD	V	7/24/2001	New	ND
1710-20321	V	KRK	7/17/2001	New	ND
1710-20322	V	RDR	7/30/2001	New	ND
1710-20462	DY	Z	7/12/2001	Recapture	LD
1710-20463	Z	KV	6/2/2001	New	OT
1710-20464	Z	KY	7/12/2001	Recapture	RT
1710-20604	K	KV	7/29/2001	Recapture	OT
1710-20618	K	VK	6/28/2001	New	RT
1710-20698	YY	K	6/28/2001	Recapture	RT
1710-20699	K	WR	5/22/2001	Recapture	OT
2210-57002	K	OK	7/18/2001	Recapture	ND
2210-57014	K	WVW	7/2/2001	Recapture	LD

RT= bird was recaptured in its resident territory

OT= bird was recaptured outside of its resident territory

ND= bird was newly banded or recaptured, but not detected again or not detected exhibiting territorial behavior

LD= bird was newly banded in a territory then detected later as a resident of that territory or an adjacent territory

AGE STRUCTURE AND SETTLEMENT PATTERNS

Based on retained feathers and returning banded birds, we were able to definitively age 56 of the 196 willow flycatcher adults at Roosevelt Lake in 2001 (29%; Tables 2 and 3). This provided the first opportunity to evaluate the age structure on the breeding grounds. Of these 56, 39 flycatchers were in their second year, 12 were in their third year, 3 were in their fourth year, and 2 were in their sixth year (Fig. 5A). Because the majority of unbanded flycatchers captured cannot be aged, we can only assign a minimum age: two calendar years of age or older (AHY). If a banded AHY adult was to return the following year, its minimum age would be three calendar years of age or older (ASY). Examination of the relative age structure of those adults for whom an exact age is unknown showed a similar pattern, possibly indicating that most new captured flycatchers are second year adults (Fig. 5B).

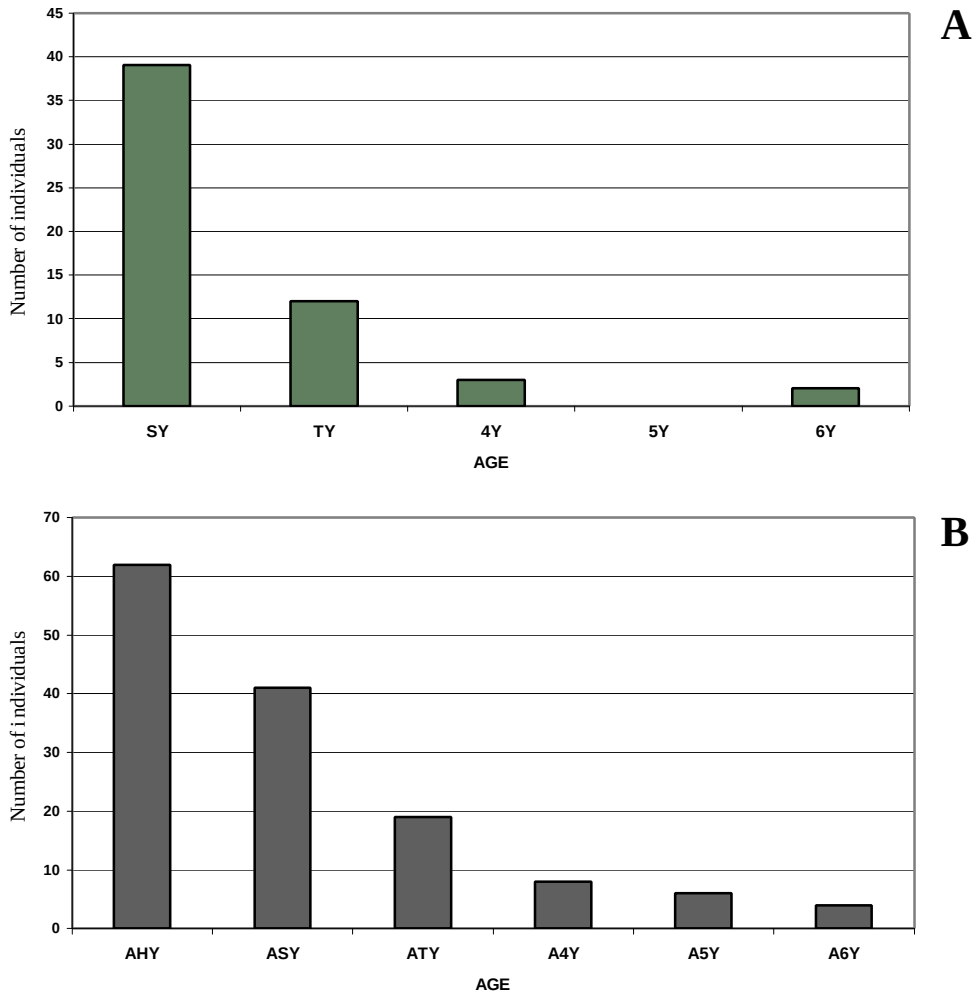

Figure 5: Age structure of adult willow flycatchers at Roosevelt Lake in 2001: Based on (A) age of adults and (B) minimum age of adults. Age groups are as follows: **SY**=2 calendar years of age, **TY**=3 calendar years of age, **4Y**=4 calendar years of age, **5Y**=5 calendar years of age, **6Y**=6 calendar years of age, **AHY**=2 calendar years of age or older, **ASY**=3 calendar years of age or older, **ATY**=4 calendar years of age or older, **A4Y**=5 calendar years of age or older, **A5Y**=6 calendar years of age or older, **A6Y**=7 calendar years of age or older.

We examined settlement patterns of willow flycatchers by age. The second year birds were generally detected later in the breeding season (Fig. 6), and there was a significant difference in the capture time (approximating arrival time) of the two age groups (Independent Samples t-test, $t=-7.193$, $P<0.001$). Of the 40 second year birds detected in 2001 (including the three returning nestlings not recaptured), 70% were detected in the new habitat patches at the Salt River Inflow site (School House North 1 and 2, Lake Shore, and North Shore); these sites combined account for only 33% of the banded population of flycatchers. More years of study will be needed to determine if this patterns holds.

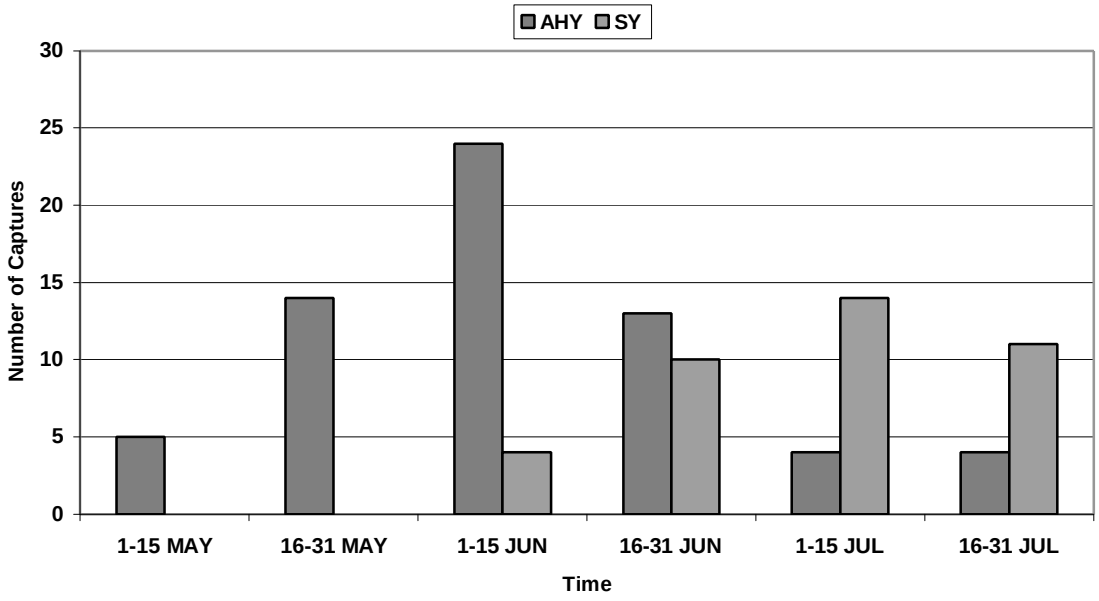

Figure 6: Capture dates (an analog of arrival time) of second year (SY) and after hatch year (AHY) newly banded adult flycatchers, 2001.

DISCUSSION

2001 BANDING AND RESIGHTING EFFORTS

In 2001, the USGS banding project focused exclusively on Roosevelt Lake, and no work was conducted at the Lower San Pedro River sites as in previous years. The purpose for this was two-fold. First, by focusing on one area, we hoped to be able to increase the likelihood of detecting secretive or remote birds, increase the number of adults banded, and increase the number of nestlings banded. These goals were realized successfully. Second, the willow flycatcher population at Roosevelt Lake has been increasing in numbers rapidly since 1999, after several years of relative stability (Fig. 7). Because of the rapidly growing population and colonization of new patches, the complexity of working at Roosevelt Lake has increased as well, requiring increased work effort and focus.

Overall, 83 new adults and 107 nestling willow flycatchers were banded in 2001, and 113 adults banded in previous years returned. This resulted in 80% of all adult flycatchers detected at Roosevelt Lake being banded by the end of the 2001 season. Furthermore, 27 flycatchers banded as nestlings in previous years were located for the first time at Roosevelt.

From 1996 to 2001, we banded 329 adult and 247 nestling southwestern willow flycatchers at Roosevelt Lake; as a result 68% or more of all flycatchers detected at Roosevelt Lake within a given year were banded (Paxton and Sogge 1996, Paxton et al. 1997, Netter et al. 1998, English et al. 1999, Luff et al. 2000). 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, provides a more accurate calculation of survivorship, and provides AGFD with banded females for their seasonal fecundity study. This large number of banded flycatchers will be important when the habitat is inundated, as we will have a better chance of detecting some of the Roosevelt Lake flycatchers that move to other sites.

ADULT 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 2000-2001 survivorship rate, based on 84 of 130 returning banded adults, was 65%.

One problem with calculating survivorship is that it assumes that all living flycatchers are detected. This year we detected four flycatchers at our monitoring sites that were detected in 1999, but were not detected in 2000. In addition, one bird detected in 1998, but not in 1999 or 2000, was detected in 2001. Recalculating survivorship for those years by including these individuals increases the 1998-1999 survivorship rate from 56% (as reported in Luff et al. 2000) to 58%, and the 1999-2000 survivorship rate from 50% (Luff et al. 2000) to 53%. This results in corrected estimates that are higher than those presented earlier, underscoring the fact that survivorship estimates are just that – *estimates*. In the past, the chances of a banded flycatcher

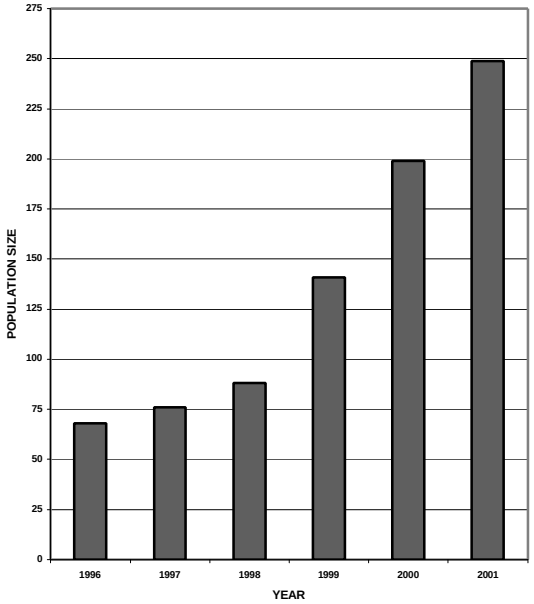

Figure 7: Population size at Roosevelt Lake from 1996 to 2001

that moved to another site being detected via resighting or recapture was high. With this year's focus on just Roosevelt Lake and reduced AGFD resighting at the San Pedro River, the probability of detecting a banded flycatcher that moved out of the Roosevelt Lake area is lower than in previous years.

The complementary calculation of survivorship is mortality; hence we have a mortality rate of 35% between 2000-2001. This is the lowest mortality yet seen at Roosevelt Lake, where we noted 48% mortality in 1997, 47% in 1998, 42% in 1999, and 47% in 2000. No mechanism for these differing mortality rates are known, though possible factors include increased resight effort (especially in remote areas at Roosevelt Lake), mortality during migration and/or the wintering period.

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 13%) 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 upward adjustments of previous year survivorship estimates - adjustments that would not have been possible without multiple years of sampling and multiple study sites.

ADULT SITE FIDELITY, PATCH FIDELITY AND MOVEMENT

Flycatchers that survive the winter and return to the breeding grounds have a choice between returning to the approximate area where they bred the year before, or to move to a new breeding location. Based on banding results from 1997 to 2000, we know that a high number of flycatchers move to different breeding patches and sites from one year to the next. In the past, we have presented site fidelity (returning to the same site) and movement among sites based on definitions of most habitat patches being separate sites. However, the degree of movement observed indicates that a site, to the flycatcher, is best defined on a reach by reach basis. Therefore, in 2001 and beyond we are considering all patches within the Salt River Inflow as one site, and all patches within the Tonto Creek Inflow as one site. This difference changes the numbers for birds moving between sites, and site fidelity. For the highest resolution, we have presented the return patterns by patch, which can be compared with past "site"-level (now patch-level) data.

Site and Patch Fidelity

Site and patch fidelity is the tendency of flycatchers to return to the same breeding site and/or patch between years. Over the last four years, 1996-2000, patch fidelity rates ranged from 35% to 41% (Luff et al. 2000). Our 2000-2001 patch fidelity rate of 44% is similar, though higher, to these previous years. With the more restrictive definition of site adopted in 2001, the site fidelity for Roosevelt Lake is 60% in 2001. Because the Salt River and Tonto Creek Inflows were single patches until 1999, the 1996-1997 and 1997-1998 patch and site fidelities are the same. However, the site fidelities for 1998-1999 and 1999-2000 would increase from the reported patch fidelities by 9% and 8%, respectively.

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 all known occupied willow flycatcher areas at Roosevelt Lake, 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, 68% and 75% of known surviving 2000 adults returned in 2001 to the same breeding patch and site, respectively.

Adult Movement

Between-year movement gives us an indication of the dynamic nature of habitat use by the willow flycatcher. As in past years, in 2001 we observed a high degree of movement at Roosevelt Lake, although higher. In 2001, we detected nine adult flycatchers that moved between the Tonto and Salt sites, as compared to 3 in 1997, 1 in 1998, 0 in 1999, and 6 in 2000. Between-patch, same-site movement has also increased with 5 in 1999, 10 in 2000, and 20 in 2001. Even among those adults that returned to the same breeding patch, 30% moved to an area that was > 50 m from their previous year's breeding area.

Same-year movement was also observed within- and between-sites in 2001. Eleven adults moved to different locations within the same patch, 10 moved between-patches but within the same site, and three flycatchers moved between sites within the 2001 season. One of the most interesting movements was by a female at the Orange Peel Flats patch at the Tonto Creek Inflow site. Her initial nesting attempt failed due to predation, following which she moved to a site on the San Pedro River (Wheatfields; 117 km away), built a nest, and attempted to breed (AGFD unpub. data). Her second nesting attempt also failed, but it is the first observed case of actual breeding attempts at two distant locations within the same breeding season.

These levels of movement have 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). These types of movements also 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. We also find that within a site, the birds settle first into the historically high population density areas and later settle into less populated outlying areas. 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.

NESTLING BANDING, SURVIVORSHIP AND MOVEMENT

This year we recorded the highest number of banded nestlings that returned from previous years. Twenty-one of the 71 nestlings banded in 2000 returned to Roosevelt Lake this year, resulting in a survivorship rate of 30%. This is far higher than the rates of previous years, and probably reflects the effort to band a much higher number of nestlings, and resighting in all the habitat patches. Over the past years, we have observed that many banded nestlings are not detected for two or more years after being banded. In 2001, four nestlings banded in 1999 were detected for the first time, and another two (resighted but not recaptured) that were banded in 1998 or 1999 were detected. Thus we expect to detect more 2000 nestlings next year, and possibly beyond, which will increase the 2000-2001 nestling survivorship rate. Furthermore, the large number of nestlings banded this year (107), should improve our future estimates of juvenile survivorship, an essential demographic parameter (Stoleson et al. 2000).

As in past years, nestling dispersal is high. This year we observed only the second returning nestling to settle in the same patch from which it fledged. In the past, many nestlings have moved to different sites and even different drainages, indicating a high propensity to disperse. As noted in the age structure and

settlement patterns section (below), second year flycatchers tended to settle into newer habitat. Compared with the relatively high site fidelity of adults, young birds may be the main colonizers of new habitat.

PASSIVE NETTING AND DETECTION OF NON-BREEDING FLYCATCHERS

This was the first year that we used passive nets to catch non-territorial floater flycatchers. The efforts were a success. In 2001, we captured 22 different individual flycatchers of which eight (36%) were not detected again and are assumed to be floaters. In addition, eight other new adults captured via target netting were never detected after banding and may have been floaters as well. This is a relatively high percentage of the new birds banded and may indicate a substantial population of "undetected" flycatchers at the Roosevelt site. Caveats to this conclusion, however, are that Lake Shore may have an unusually high number of floaters compared to other patches or these birds may be breeders that were not detected by USGS or AGFD. However, our intensive resighting efforts make us confident that few of these birds were breeders at Lake Shore. Given the success of the pilot project this year, and the important management and conservation implications of these findings, we anticipate expanding the efforts for next year.

AGE STRUCTURE AND SETTLEMENT PATTERNS AT ROOSEVELT LAKE

With the high number of returning nestlings, and the adoption of the retained flight feathers method (Pyle 1998) to determine age, 29% of the 2001 breeding population were of known age (Fig. 5A). The age structure is also similar to those birds of minimum age (Fig. 5B), suggesting that most birds captured as adults of unknown age are actually second year birds. With the high number of nestlings banded and the large second year cohort in 2001, we expect a significantly higher percentage of birds being of known age in 2002 and beyond.

We have observed for years that flycatchers first arrive and/or are detected at the breeding sites over the length of the breeding season. Older males arrive first, females follow by several weeks, and then a second pulse of arrivals follows several weeks after initial nesting attempts are begun. From late May through June, new territorial flycatchers, possibly new arrivals, are detected almost daily, increasing the breeding density at the sites. Finally, successful breeders vacate their territories and often new pairs subsequently occupy it. In 2001, 40% of the new adults (including returning nestlings) were second year birds. Examining the time of capture (an analog of arrival time) by age (Fig. 6), there is a significant difference between the average capture time of the second year and older. Thus, the later arriving birds appear to be younger, some of whom may be floaters until a territory becomes available.

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APPENDIX 1: WILLOW FLYCATCHERS BANDED BY USGS AT ROOSEVELT LAKE 1996 THROUGH 2001

The following table lists all willow flycatchers banded by Colorado Plateau Field Station staff at Roosevelt Lake from 1996 to 2001. The table is sorted by flycatcher band number, and includes color combination, site and patch banded at, age when banded (either adult or nestling), sex, date banded, and the year(s) it was detected (including the year it was banded). A numerical footnote in a "Year(s) Detected" column indicates that the flycatcher moved that year to a different site/patch than it occupied the prior year, with the number indicating the new location (see end of table for site numbers).

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1490-89801	V:WV	Salt River	Salt River Inflow	AHY	F*	15-Jun-01						X
1490-89802	V:WRW	Salt River	North Shore	AHY	F*	14-Jul-01						X
1490-89803	V:WDW	Salt River	Shangri-la	AHY	F*	01-Jul-01						X
1490-89804	RYR:V	Tonto Creek	Orange Peel Flats	AHY	F*	30-Jun-01						X
1490-89805	V:DWD	Salt River	Lake Shore	SY	U	02-Jul-01						X
1490-89806	V:VW	Salt River	Lake Shore	AHY	F*	18-Jun-01						X
1490-89816	WK:V	Salt River	Lake Shore	SY	F*	28-Jun-01						X
1490-89817	KG:V	Salt River	North Shore	SY	U	26-Jul-01						X
1490-89901	YO:Z	Salt River	Salt River Inflow	AHY	F*	15-Jun-01						X
1490-89902	KO:Z	Tonto Creek	A+ Cross Road	AHY	F*	16-Jun-01						X
1490-89903	Z:DWD	Salt River	Lake Shore	AHY	F*	18-Jun-01						X
1490-89906	Z:VW	Salt River	Lake Shore	AHY	U	05-May-01						X
1490-89907	Z:WO	Tonto Creek	Orange Peel Camp	AHY	U	09-May-01						X
1490-89908	Z:YO	Tonto Creek	Orange Peel Flats	AHY	U	20-May-01						X
1490-89909	YK:Z	Salt River	Shangri-la	AHY	U	30-May-01						X
1490-89910	VK:Z	Salt River	Shangri-la	AHY	U	01-Jun-01						X
1490-89911	GO:Z	Tonto Creek	A+ Cross Road	AHY	F*	12-Jun-01						X
1490-89912	Z:YDY	Tonto Creek	A+ Cross Road	AHY	U	12-Jun-01						X
1490-89913	Z:KGK	Salt River	Shangri-la	SY	M*	27-Jun-01						X
1490-89914	VWV:Z	Salt River	Lake Shore	AHY	U	28-Jun-01						X
1490-89921	OG:Z	Salt River	Shangri-la	SY	U	29-Jun-01						X
1490-89929	OY:Z	Salt River	Mud Flats	SY	U	15-Jun-01						X
1490-89930	Z:KO	Tonto Creek	Orange Peel Camp	AHY	U	18-Jun-01						X
1490-89931	:Z	Salt River	Shangri-la	N	U	19-Jun-01						X
1490-89932	Z:	Salt River	Shangri-la	N	U	19-Jun-01						X
1490-89933	:Z	Salt River	Shangri-la	N	U	19-Jun-01						X
1490-89934	Z:KYK	Tonto Creek	Orange Peel Camp	SY	U	26-Jun-01						X
1490-89935	Z:WKW	Tonto Creek	Orange Peel Camp	AHY	U	26-Jun-01						X
1490-89936	RYR:Z	Tonto Creek	Orange Peel Camp	AHY	U	26-Jun-01						X
1490-89939	Z:	Salt River	Shangri-la	N	U	25-Jun-01						X
1490-89940	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1490-89941	Z:	Salt River	Shangri-la	N	U	25-Jun-01						X
1490-89942	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1490-89943	RDR:Z	Salt River	Lake Shore	AHY	F*	10-Jul-01						X
1490-89944	OW:Z	Salt River	Shangri-la	SY	F*	11-Jul-01						X
1490-89945	YRY:Z	Salt River	Lake Shore	AHY	F*	12-Jul-01						X
1490-89949	:Z	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89950	Z:	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89951	Z:	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89953	:Z	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89954	:Z	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89955	:Z	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89956	:Z	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89957	:Z	Salt River	Shangri-la	N	U	20-Jun-01						X
1490-89959	Z:	Salt River	Shangri-la	N	U	18-Jun-01						X
1490-89962	:Z	Salt River	Shangri-la	N	U	18-Jun-01						X
1490-89964	Z:DRD	Salt River	North Shore	SY	F*	14-Jul-01						X

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year (s) Detected					
							96	97	98	99	00	01
1490-89966	:Z	Salt River	Shangri-la	N	U	18-Jun-01						X
1490-89968	Z:DK	Tonto Creek	Orange Peel Flats	AHY	M*	30-Jun-01						X
1490-89969	Z:	Salt River	Shangri-la	N	U	18-Jun-01						X
1490-89970	Z:	Salt River	Shangri-la	N	U	18-Jun-01						X
1490-89971	Z:	Salt River	Shangri-la	N	U	18-Jun-01						X
1590-97202	KR:X	Tonto Creek	Tonto Creek Inflow	AHY	M	13-May-97		X	X	X	X	X
1590-97203	UW/R:X	Tonto Creek	Tonto Creek Inflow	AHY	M	15-May-97		X				
1590-97213	X:Y/WR	Salt River	Salt River Inflow	AHY	F	31-May-97		X				
1590-97214	X:D/WR	Salt River	Salt River Inflow	AHY	M	1-Jun-97		X				
1590-97215	X:P/WR	Salt River	Salt River Inflow	AHY	M	1-Jun-97		X				
1590-97216	L/WR:X	Tonto Creek	Tonto Creek Inflow	AHY	M	2-Jun-97		X	X			
1590-97217	Y/WR:X	Salt River	Salt River Inflow	AHY	M	3-Jun-97		X				
1590-97218	X:O/WR	Salt River	Salt River Inflow	AHY	M	3-Jun-97		X	X			
1590-97219	X:DP/WR	Salt River	Salt River Inflow	AHY	F	3-Jun-97		X	X			
1590-97236	R:X	Salt River	Salt River Inflow	N	F	23-Jun-97		X				
1590-97237	R:X	Salt River	Salt River Inflow	N	M	23-Jun-97		X				
1590-97249	P/WR:X	Tonto Creek	Tonto Creek Inflow	AHY	M	29-Jun-97		X				
1590-97250	X:R	Salt River	Salt River Inflow	N	F	30-Jun-97		X				
1590-97251	X:R	Salt River	Salt River Inflow	N	F	30-Jun-97		X				
1590-97252	X:R	Salt River	Salt River Inflow	N	M	30-Jun-97		X				
1590-97253	X:PD/R	Salt River	Salt River Inflow	AHY	F	30-Jun-97		X	X			
1590-97254	RW/R:X	Salt River	Salt River Inflow	AHY	M	1-Jul-97		X				
1590-97263	PD/R:X	Salt River	Salt River Inflow	AHY	F	24-Jul-97		X	X	X	X	
1590-97264	X:WU/R	Salt River	Salt River Inflow	AHY	M	24-Jul-97		X				
1590-97268	X:R	Salt River	Salt River Inflow	N	F	7-Aug-97		X				
1590-97269	X:R	Salt River	Salt River Inflow	N	U	7-Aug-97		X				
1590-97304	G/RW:X	Salt River	Salt River Inflow	AHY	M	14-May-97		X	X	X [5]	X	X
1590-97311	W/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	31-May-97		X	X	X		
1590-97312	O/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	31-May-97		X				
1590-97313	P/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	31-May-97		X	X	X	X	X
1590-97314	KW/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	F	1-Jun-97		X	X			
1590-97315	X:W/RW	Salt River	Salt River Inflow	AHY	M	2-Jun-97		X				
1590-97316	D/RW:X	Salt River	Salt River Inflow	AHY	M	2-Jun-97		X	X			
1590-97317	X:G/RW	Salt River	Salt River Inflow	AHY	F	2-Jun-97		X				
1590-97318	X:W/PD	Salt River	Salt River Inflow	AHY	F	2-Jun-97		X	X	X	X [3]	X
1590-97319	X:O/PD	Salt River	Salt River Inflow	AHY	M	2-Jun-97		X	X	X		
1590-97320	X:Y/PD	Tonto Creek	Tonto Creek Inflow	AHY	M	3-Jun-97		X	X			
1590-97321	X:L/RW	Tonto Creek	Tonto Creek Inflow	AHY	M	3-Jun-97		X				
1590-97325	KW/O:X	Verde River	Camp Verde	AHY	F	5-Jun-97		X	X [14]	X	X [3]	
1590-97351	X:K/RW	Salt River	Salt River Inflow	AHY	M	28-Jun-97		X	X			
1590-97352	W/PD:X	Salt River	Salt River Inflow	AHY	F	28-Jun-97		X				
1590-97359	UW/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	F	1-Jul-97		X				
1590-97360	DP/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	1-Jul-97		X	X	X		
1590-97373	VG:X	Salt River	Salt River Inflow	AHY	F	14-Jul-97		X	X	X [6]	X	X [7]
1590-97374	X:PD/RW	Salt River	Salt River Inflow	AHY	M	14-Jul-97		X				
1590-97375	WU/RW:X	Salt River	Salt River Inflow	AHY	F	14-Jul-97		X				
1590-97501	V:GW	Salt River	Salt River Inflow	AHY	F	18-Jun-98			X			
1590-97502	:V	Tonto Creek	Tonto Creek Inflow	N	F	21-Jul-98			X			
1590-97503	GY:V	Tonto Creek	Tonto Creek Inflow	N	M	21-Jul-98			X	X [3]	X [18]	
1590-97506	V:	Salt River	Salt River Inflow	N	F	28-Jun-99				X		
1590-97507	V:YKY	Salt River	Shangri-la	N	F	28-Jun-99				X	X [4]	
1590-97508	V:	Salt River	Salt River Inflow	N	F	28-Jun-99				X		
1590-97509	:V	Tonto Creek	Tonto Creek Inflow	N	F	28-Jun-99				X		
1590-97511	KR:V	Tonto Creek	Tonto Creek Inflow	N	F	28-Jun-99				X	X [13]	X [9]
1590-97512	:V	Tonto Creek	Tonto Creek Inflow	N	U	28-Jun-99				X		
1590-97513	YK:V	Tonto Creek	Tonto Creek Inflow	AHY	M	13-May-98			X	X	X	
1590-97514	V:YK	Salt River	Salt River Inflow	AHY	M	24-May-98			X	X [6]		
1590-97515	V:RG	Salt River	Salt River Inflow	AHY	M	3-Jun-98			X			
1590-97516	V:KK	Salt River	Salt River Inflow	AHY	M	7-Jun-98			X	X [4]	X	X
1590-97517	V:KY	Salt River	Salt River Inflow	AHY	F	7-Jun-98			X	X [3]		
1590-97518	V:GR	Salt River	Salt River Inflow	AHY	M	7-Jun-98			X		X	

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1590-97519	KY:V	Tonto Creek	Tonto Creek Inflow	AHY	M*	8-Jun-98			X			
1590-97520	KK:V	Tonto Creek	Tonto Creek Inflow	AHY	M	16-Jun-98			X			
1590-97521	GR:V	Tonto Creek	Tonto Creek Inflow	AHY	F	17-Jun-98			X			
1590-97522	WY:V	Tonto Creek	Tonto Creek Inflow	AHY	F	17-Jun-98			X	X	X	
1590-97523	YG:V	Tonto Creek	Tonto Creek Inflow	AHY	M	17-Jun-98			X			
1590-97524	YW:V	Tonto Creek	Tonto Creek Inflow	AHY	F	1-Jul-98			X	X	X [4]	X
1590-97525	RW:V	Tonto Creek	Tonto Creek Inflow	AHY	U	8-Jun-98			X		X	
1590-97526	DK:V	Tonto Creek	Tonto Creek Inflow	AHY	U	8-Jun-98			X			
1590-97527	WW:V	Tonto Creek	Tonto Creek Inflow	AHY	F	9-Jun-98			X			X [9]
1590-97528	DW:V	Tonto Creek	Tonto Creek Inflow	AHY	F	17-Jun-98			X			
1590-97529	V:RW	Salt River	Salt River Inflow	AHY	M	18-Jun-98			X			
1590-97530	V:DW	Salt River	Salt River Inflow	SY	M	18-Jun-98			X	X		
1590-97531	V:WW	Salt River	Salt River Inflow	AHY	F	19-Jun-98			X		X	X
1590-97537	V:RR	Salt River	Salt River Inflow	AHY	U	7-Jun-98			X		X [3]	X
1590-97538	V:YY	Salt River	Salt River Inflow	AHY	M	7-Jun-98			X			
1590-97539	YR:V	Salt River	Salt River Inflow	AHY	F	19-Jun-98			X			
1590-97540	V:RY	Salt River	Salt River Inflow	AHY	F	30-Jun-98			X	X [5]	X [3]	X
1590-97541	:V	Tonto Creek	Tonto Creek Inflow	N	M	27-Jul-98			X			
1590-97542	:V	Tonto Creek	Tonto Creek Inflow	N	F	27-Jul-98			X			
1590-97543	V:WG	Salt River	Shangri-la	AHY	U	22-Jun-99				X	X [4]	X [3]
1590-97544	V:RD	Salt River	Shangri-la	AHY	M	22-Jun-99				X	X	X
1590-97545	V:	Salt River	Salt River Inflow	N	F	4-Jul-99				X		
1590-97546	V:	Salt River	Salt River Inflow	N	M	4-Jul-99				X		
1590-97547	V:	Salt River	Salt River Inflow	N	F	4-Jul-99				X		
1590-97548	:V	Salt River	Salt River Inflow	N	M	10-Aug-99				X		
1590-97549	VK:V	Tonto Creek	Tonto Creek Inflow	AHY	M	14-May-99				X		
1590-97550	RD:V	Tonto Creek	Tonto Creek Inflow	AHY	M	14-May-99				X		
1710-20202	Z:VWV	Tonto Creek	A+ Cross Road	AHY	U	21-May-01						X
1710-20203	Z:RO	Salt River	Shangri-la	AHY	U	22-May-01						X
1710-20204	Z:OD	Salt River	Salt River Inflow	AHY	F*	30-May-01						X
1710-20205	WVW:Z	Salt River	Lake Shore	AHY	U	31-May-01						X
1710-20207	RY:Z	Salt River	Shangri-la	AHY	U	05-Jun-01						X
1710-20208	Z:WY	Tonto Creek	Tonto Creek Inflow	AHY	F*	06-Jun-01						X
1710-20209	Z:WRW	Salt River	Lake Shore	AHY	U	02-Jun-01						X
1710-20210	Z:RDR	Salt River	Shangri-la	AHY	F*	13-Jun-01						X
1710-20211	RKR:Z	Salt River	School House North 1	SY	F*	14-Jun-01						X
1710-20219	DO:Z	Salt River	Shangri-la	AHY	U	17-May-01						X
1710-20220	VV:Z	Salt River	Mud Flats	AHY	F*	03-Jun-01						X
1710-20221	GY:Z	Tonto Creek	A+ Cross Road	AHY	U	12-Jun-01						X
1710-20222	Z:DYD	Salt River	Lake Shore	AHY	U	14-Jun-01						X
1710-20223	Z:WG	Salt River	School House South 3	AHY	U	16-Jun-01						X
1710-20224	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20225	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20226	Z:	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20229	Z:	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20230	Z:	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20231	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20232	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20233	:Z	Salt River	Shangri-la	N	U	25-Jun-01						X
1710-20239	Z:GO	Salt River	School House South 3	AHY	U	05-May-01						X
1710-20240	KG:Z	Salt River	Mud Flats	AHY	U	22-May-01						X
1710-20241	KY:Z	Salt River	Shangri-la	AHY	F*	03-Jun-01						X
1710-20242	YG:Z	Salt River	School House North 1	AHY	F*	04-Jun-01						X
1710-20243	OD:Z	Salt River	Shangri-la	AHY	F*	05-Jun-01						X
1710-20244	Z:RWR	Tonto Creek	Orange Peel Camp	AHY	M*	06-Jun-01						X
1710-20245	:Z	Salt River	Shangri-la	N	U	16-Jun-01						X
1710-20246	:Z	Salt River	Shangri-la	N	U	16-Jun-01						X
1710-20247	:Z	Salt River	Shangri-la	N	U	16-Jun-01						X
1710-20248	Z:	Salt River	Lake Shore	N	U	16-Jun-01						X
1710-20249	:Z	Salt River	Lake Shore	N	U	16-Jun-01						X
1710-20250	:Z	Salt River	Shangri-la	N	U	18-Jun-01						X

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1710-20251	V:WK	Salt River	Salt River Inflow	AHY	M	15-Jun-99				X		
1710-20252	V:WY	Salt River	Salt River Inflow	SY	F	15-Jun-99				X		
1710-20253	V:KO	Salt River	Salt River Inflow	SY	M	15-Jun-99				X		
1710-20254	V:GO	Salt River	Salt River Inflow	AHY	M	15-Jun-99				X		
1710-20255	V:OK	Salt River	Mud Flats	AHY	M	23-Jul-99				X		
1710-20256	V:KW	Salt River	Mud Flats	AHY	F	23-Jun-99				X	X	X
1710-20257	V:GK	Salt River	Mud Flats	SY	M	23-Jun-99				X		
1710-20258	V:OY	Salt River	Mud Flats	SY	F	23-Jun-99				X	X	
1710-20261	VG:V	Tonto Creek	Tonto Creek Inflow	AHY	M	5-Jun-99				X		
1710-20262	V:GY	Tonto Creek	Tonto Creek Inflow	AHY	M	5-Jun-99				X		
1710-20263	GW:V	Tonto Creek	Tonto Creek Inflow	AHY	F	6-Jun-99				X	X [9]	X
1710-20264	OO:V	Salt River	Shangri-la	AHY	F*	03-Jun-01						X
1710-20265	KW:V	Salt River	North Shore	SY	F*	30-Jun-01						X
1710-20266	DR:V	Salt River	North Shore	SY	U	30-Jun-01						X
1710-20267	DY:V	Salt River	North Shore	SY	U	02-Jul-01						X
1710-20268	GV:V	Salt River	Mud Flats	SY	F*	11-Jul-01						X
1710-20271	V:VWV	Tonto Creek	Orange Peel Camp	AHY	F*	26-Jun-01						X
1710-20273	V:KR	Salt River	Shangri-la	AHY	F	22-Jun-99				X	X	X
1710-20274	V:GV	Salt River	Shangri-la	AHY	M	22-Jun-99				X		X
1710-20275	V:OO	Salt River	Shangri-la	AHY	M	22-Jun-99				X	X	X [9]
1710-20276	GG:V	Tonto Creek	Tonto Creek Inflow	AHY	M*	4-Jun-99				X		
1710-20277	WG:V	Tonto Creek	Tonto Creek Inflow	AHY	F	6-Jun-99				X	X	X
1710-20278	GK:V	Tonto Creek	Tonto Creek Inflow	AHY	F	14-Jun-99				X		
1710-20279	V:VG	Salt River	Shangri-La	AHY	M	18-Jun-99				X		
1710-20280	V:KD	Salt River	Mud Flats	AHY	M	23-Jun-99				X	X [3]	X
1710-20281	V:GG	Salt River	Mud Flats	AHY	M	23-Jun-99				X	X	X
1710-20282	V:YO	Salt River	Mud Flats	AHY	F	23-Jun-99				X	X [3]	X
1710-20283	WR:V	Tonto Creek	Tonto Creek Inflow	AHY	F	14-Jun-99				X	X	X [6]
1710-20284	RY:V	Tonto Creek	Tonto Creek Inflow	AHY	M	14-May-99				X		
1710-20285	V:YR	Salt River	Salt River Inflow	AHY	M	13-May-99				X	X	X
1710-20287	V:	Salt River	Salt River Inflow	N	F	30-Jun-99				X		
1710-20288	V:RYR	Salt River	Salt River Inflow	N	M	30-Jun-99				X		X [9]
1710-20289	V:	Salt River	Salt River Inflow	N	F	30-Jun-99				X		
1710-20290	V:	Salt River	Salt River Inflow	N	F	30-Jun-99				X		
1710-20291	V:	Salt River	Salt River Inflow	N	M	30-Jun-99				X		
1710-20293	V:VK	Salt River	Mudflats	AHY	F	23-Jun-99				X		
1710-20294	GO:V	Tonto Creek	Tonto Creek Inflow	AHY	F	29-Jun-99				X		
1710-20295	:V	Salt River	Salt River Inflow	N	F	9-Jul-99				X		
1710-20296	OW:V	Tonto Creek	Tonto Creek Inflow	AHY	M	29-Jun-99				X		
1710-20297	:V	Salt River	Salt River Inflow	N	F	9-Jul-99				X		
1710-20298	YKY:V	Tonto Creek	Tonto Creek Inflow	N	M	19-Jul-99				X		X [1]
1710-20299	:V	Tonto Creek	Tonto Creek Inflow	N	F	19-Jul-99				X		
1710-20300	V:	Salt River	Salt River Inflow	N	M	19-Jul-99				X		
1710-20301	V:VY	Salt River	Salt River Inflow	SY	F	14-Jul-99				X		
1710-20302	V:DR	Salt River	Salt River Inflow	SY	M	14-Jul-99				X	X [3]	X
1710-20303	V:WD	Salt River	Salt River Inflow	SY	F	14-Jul-99				X		
1710-20304	:V	Salt River	Salt River Inflow	N	U	14-Jun-99				X		
1710-20305	V:DO	Salt River	Shangri-la	AHY	M	24-Jul-99				X	X	
1710-20306	V:KGK	Salt River	Shangri-la	N	M	24-Jul-99				X	X [7]	
1710-20307	KO:V	Salt River	Salt River Inflow	AHY	M	25-Jul-99				X		
1710-20308	WO:V	Salt River	Shangri-la	AHY	F	26-Jul-99				X	X	X
1710-20309	RK:V	Salt River	Shangri-la	AHY	F	27-Jul-99				X		
1710-20310	OK:V	Salt River	Shangri-la	AHY	F	27-Jul-99				X		
1710-20316	WV:V	Tonto Creek	A+ Cross Road	AHY	U	12-Jun-01						X
1710-20317	OD:V	Salt River	Lake Shore	SY	U	24-Jul-01						X
1710-20320	V:RK	Salt River	North Shore	SY	M*	14-Jul-01						X
1710-20321	V:KRK	Salt River	Lake Shore	SY	F*	18-Jul-01						X
1710-20322	V:RDR	Salt River	Lake Shore	SY	M*	30-Jul-01						X
1710-20323	:V	Salt River	Mud Flats	N	F	24-Jun-00					X	
1710-20324	:V	Salt River	Shangri-la	N	M	24-Jun-00					X	
1710-20325	DYD:V	Salt River	Shangri-la	N	F	24-Jun-00					X	X [7]

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1710-20326	V:	Salt River	Shangri-la	N	F	24-Jun-00					X	
1710-20327	V:	Salt River	Shangri-la	N	F	24-Jun-00					X	
1710-20328	:V	Salt River	Shangri-la	N	F	24-Jun-00					X	
1710-20329	RR:V	Tonto Creek	Orange Peel Camp	AHY	F*	02-Jun-01						X
1710-20330	VY:V	Tonto Creek	Orange Peel Camp	AHY	U	02-Jun-01						X
1710-20331	V:YW	Salt River	Salt River Inflow	AHY	F	2-Jul-98			X			
1710-20332	RG:V	Tonto Creek	Tonto Creek Inflow	AHY	F	23-Jul-98			X	X		
1710-20333	OY:V	Tonto Creek	Tonto Creek Inflow	AHY	F	26-Jun-99				X		
1710-20334	YV:V	Tonto Creek	Tonto Creek Inflow	AHY	F	26-Jun-99				X		X
1710-20335	V:KG	Salt River	Shangri-la	AHY	F	27-Jun-99				X	X	
1710-20336	V:OR	Salt River	Shangri-la	AHY	M*	27-Jun-99				X		
1710-20337	WD:V	Salt River	Shangri-la	AHY	F	27-Jun-99				X	X	
1710-20338	YD:V	Salt River	Shangri-la	AHY	M	27-Jun-99				X	X	X
1710-20339	V:OG	Salt River	Shangri-la	SY	M	18-Jun-99				X	X [9]	X
1710-20340	V:OW	Salt River	Shangri-la	AHY	F	22-Jun-99				X	X	X
1710-20341	V:VV	Salt River	Shangri-la	AHY	F	22-Jun-99				X	X	
1710-20342	V:DY	Salt River	Shangri-la	AHY	M	22-Jun-99				X		
1710-20343	V:WR	Salt River	Shangri-la	AHY	F	22-Jun-99				X		
1710-20344	V:WO	Salt River	Shangri-la	AHY	M	27-Jun-99				X		
1710-20345	V:YG	Salt River	Shangri-la	AHY	F	27-Jun-99				X	X [24]	
1710-20346	V:RO	Salt River	Shangri-la	SY	F	27-Jun-99				X		
1710-20347	V:YD	Salt River	Shangri-la	AHY	M	27-Jun-99				X	X	X
1710-20348	V:OD	Salt River	Shangri-la	SY	M	27-Jun-99				X		
1710-20385	YRY:D	San Pedro River	Kearny Sewage Ponds	N	M	9-Jul-99				X		X [7]
1710-20456	WRW:Z	Salt River	Shangri-la	AHY	F*	30-May-01						X
1710-20457	YDY:Z	Salt River	Salt River Inflow	AHY	M*	17-Jun-01						X
1710-20458	Z:OG	Salt River	Lake Shore	AHY	U	05-May-01						X
1710-20459	Z:OW	Salt River	Salt River Inflow	AHY	U	22-May-01						X
1710-20460	Z:WDW	Tonto Creek	Tonto Creek Inflow	AHY	U	31-May-01						X
1710-20461	KRK:Z	Salt River	Shangri-la	AHY	U	01-Jun-01						X
1710-20462	DY:Z	Salt River	Lake Shore	AHY	U	02-Jun-01						X
1710-20463	Z:KV	Salt River	Lake Shore	SY	U	02-Jun-01						X
1710-20464	Z:KY	Salt River	Lake Shore	SY	U	12-Jun-01						X
1710-20465	DYD:Z	Tonto Creek	Orange Peel Flats	AHY	U	14-Jun-01						X
1710-20466	Z:YKY	Tonto Creek	Orange Peel Flats	AHY	U	14-Jun-01						X
1710-20473	KW:Z	San Pedro River	Aravaipa	AHY	M*	16-Jul-98			X	X [1]	X	X
1710-20497	Z:YW	Salt River	Shangri-la	AHY	U	04-May-01						X
1710-20498	Z:WV	Salt River	Salt River Inflow	AHY	U	17-May-01						X
1710-20499	WO:Z	Salt River	Salt River Inflow	AHY	U	17-May-01						X
1710-20500	WG:Z	Salt River	Shangri-la	AHY	F*	18-May-01						X
1710-20553	V:	Salt River	Salt River Inflow	N	F	19-Jul-99				X		
1710-20554	V:	Salt River	Salt River Inflow	N	F	19-Jul-99				X		
1710-20555	:V	Tonto Creek	Tonto Creek Inflow	N	F	20-Jul-99				X		
1710-20556	:V	Tonto Creek	Tonto Creek Inflow	N	M	20-Jul-99				X		
1710-20557	V:DK	Salt River	Shangri-la	AHY	F	23-Jul-99				X	X [2]	
1710-20558	V:	Salt River	Salt River Inflow	N	F	24-Jul-99				X		
1710-20559	V:	Salt River	Salt River Inflow	N	M	24-Jul-99				X		
1710-20560	V:KV	Salt River	Shangri-la	AHY	F	25-Jul-99				X		
1710-20561	DO:V	Salt River	Shangri-la	N	F	28-Jul-99				X	X [12]	X
1710-20562	V:	Salt River	Salt River Inflow	N	F	28-Jul-99				X		
1710-20563	V:	Salt River	Salt River Inflow	N	F	28-Jul-99				X		
1710-20564	OR:V	Salt River	Salt River Inflow	SY	F	28-Jul-99				X		
1710-20565	YY:V	Salt River	Salt River Inflow	AHY	M*	28-Jul-99				X		
1710-20566	KV:V	Salt River	Shangri-la	AHY	F	29-Jul-99				X		
1710-20567	YO:V	Salt River	Shangri-la	AHY	M	29-Jul-99				X	X [2]	X [5]
1710-20568	KD:V	Salt River	Shangri-la	AHY	M	29-Jul-99				X		
1710-20569	:V	Salt River	Salt River Inflow	N	M	29-Jul-99				X		
1710-20570	DWD:V	Salt River	Salt River Inflow	N	M	29-Jul-99				X		X [2]
1710-20571	:V	Salt River	Salt River Inflow	N	M	29-Jul-99				X		
1710-20572	V:	Salt River	Salt River Inflow	N	F	10-Aug-99				X		
1710-20573	:V	Tonto Creek	Tonto Creek Inflow	N	F	7-Jul-99				X		

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1710-20574	:V	Tonto Creek	Tonto Creek Inflow	N	F	7-Jul-99				X		
1710-20575	:V	Tonto Creek	Tonto Creek Inflow	N	F	7-Jul-99				X		
1710-20576	V:	Salt River	Salt River Inflow	N	M	7-Jul-99				X		
1710-20577	V:	Salt River	Salt River Inflow	N	M	7-Jul-99				X		
1710-20578	V:DD	Salt River	Shangri-la	N	M	7-Jul-99				X	X [9]	X
1710-20579	:V	Salt River	Salt River Inflow	N	F	10-Aug-99				X		
1710-20580	V:	Salt River	Salt River Inflow	N	M	10-Aug-99				X		
1710-20581	V:	Salt River	Salt River Inflow	N	M	10-Aug-99				X		
1710-20582	V:	Salt River	Salt River Inflow	N	M	10-Aug-99				X		
1710-20588	:V	Salt River	Salt River Inflow	N	M	10-Aug-99				X		
1710-20589	:V	Salt River	Salt River Inflow	N	F	10-Aug-99				X		
1710-20590	:V	Salt River	Salt River Inflow	N	F	10-Aug-99				X		
1710-20591	V:	Salt River	Salt River Inflow	N	F	10-Aug-99				X		
1710-20592	:V	Salt River	Salt River Inflow	N	M	10-Aug-99				X		
1710-20593	K:WD	Salt River	Shangri-la	AHY	M	6-Jun-00					X	
1710-20594	K:KG	Salt River	Shangri-la	AHY	F	15-Jun-00					X	
1710-20595	K:DK	Salt River	Shangri-la	AHY	M	17-May-00					X	X
1710-20596	YV:K	Tonto Creek	Tonto Creek Inflow	AHY	M	18-May-00					X	
1710-20597	K:YV	Salt River	Shangri-la	AHY	M	20-May-00					X	X
1710-20598	VY:K	Salt River	School House South	AHY	M	19-Jun-00					X	
1710-20599	K:KY	Salt River	Shangri-la	AHY	M*	9-May-00					X	X
1710-20600	K:GY	Salt River	Shangri-la	AHY	M	9-May-00					X	X
1710-20601	K:GR	Salt River	Mud Flats	AHY	M	17-May-00					X	X [1]
1710-20602	GR:K	Tonto Creek	Tonto Creek Inflow	AHY	M	18-May-00					X	
1710-20603	K:VG	Salt River	Shangri-la	AHY	F	22-May-00					X	X
1710-20604	K:KV	Salt River	Lake Shore	AHY	M	30-Jun-00					X	X
1710-20605	KGK:K	Salt River	Lake Shore	AHY	M	30-Jun-00					X	X [3]
1710-20606	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1710-20609	WR:K	Salt River	Shangri-la	AHY	M	15-Jun-00					X	X
1710-20610	:K	Salt River	Shangri-la	N	M	16-Jun-00					X	
1710-20611	GV:K	Salt River	Salt River Inflow	AHY	F	16-Jun-00					X	X [3]
1710-20612	VG:K	Tonto Creek	Orange Peel	AHY	F*	18-Jun-00					X	
1710-20613	K:KK	Salt River	School House South 3	AHY	M	19-Jun-00					X	X
1710-20614	K:RR	Salt River	School House South 3	AHY	F	19-Jun-00					X	X
1710-20615	K:GG	Salt River	School House South 3	AHY	M	19-Jun-00					X	
1710-20616	K:YY	Salt River	School House South 3	AHY	F	19-Jun-00					X	
1710-20617	K:	Salt River	Shangri-la	N	U	21-Jun-00					X	
1710-20618	K:VK	Salt River	Shangri-la	N	U	21-Jun-00					X	X [9]
1710-20619	K:	Salt River	Shangri-la	N	U	21-Jun-00					X	
1710-20620	:K	Salt River	Mud Flats	N	M	29-Jun-00					X	
1710-20621	:K	Salt River	Mud Flats	N	F	29-Jun-00					X	
1710-20622	K:DO	Salt River	Shangri-la	N	F	29-Jun-00					X	X [11]
1710-20623	K:	Salt River	Shangri-la	N	M	29-Jun-00					X	
1710-20624	:K	Salt River	Shangri-la	N	F	29-Jun-00					X	
1710-20625	OW:K	Salt River	Shangri-la	N	M	29-Jun-00					X	X [4]
1710-20626	RO:K	Tonto Creek	Orange Peel Flats	AHY	U	2-Jul-00					X	X [9]
1710-20627	OO:K	Tonto Creek	Orange Peel Camp	AHY	U	2-Jul-00					X	
1710-20628	K:GO	Tonto Creek	A+ Cross Road	AHY	M	3-Jul-00					X	
1710-20630	VV:X	White Mountains	Greer Town	AHY	M*	15-Jul-98			X	X	X	X [3]
1710-20639	X:	Tonto Creek	Alamo Lake	AHY	M	23-Jun-98			X			
1710-20640	:X	Tonto Creek	Alamo Lake	AHY	F	23-Jun-98			X			
1710-20671	K:WY	Tonto Creek	Tonto Creek Inflow	AHY	M	18-May-00					X	X
1710-20678	K:YW	Tonto Creek	Tonto Creek Inflow	AHY	F	31-May-00					X	X
1710-20679	RW:K	Salt River	Mud Flats	SY	M	1-Jun-00					X	
1710-20680	YW:K	Salt River	Salt River Inflow	AHY	M*	2-Jun-00					X	
1710-20681	K:RW	Salt River	Salt River Inflow	AHY	F	2-Jun-00					X	X [11]
1710-20682	WK:K	Salt River	Salt River Inflow	AHY	M	2-Jun-00					X	X
1710-20686	K:KW	Salt River	Shangri-la	AHY	M	6-Jun-00					X	X [7]
1710-20687	KR:K	Salt River	Shangri-la	AHY	F	6-Jun-00					X	X
1710-20688	RK:K	Salt River	Lake Shore	AHY	U	13-Jun-00					X	X [7]
1710-20689	GO:K	Salt River	Lake Shore	AHY	F	30-Jun-00					X	X [6]

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1710-20690	K:VW	Salt River	Lake Shore	AHY	F	30-Jun-00					X	
1710-20691	RR:K	Salt River	Shangri-la	AHY	M	15-Jun-00					X	X [7]
1710-20692	K:GV	Salt River	Shangri-la	AHY	F*	15-Jun-00					X	X [5]
1710-20693	K:WK	Salt River	Salt River Inflow	AHY	M	16-Jun-00					X	
1710-20694	GG:K	Salt River	Salt River Inflow	AHY	F*	16-Jun-00					X	X [2]
1710-20695	KW:K	Tonto Creek	Orange Peel Camp	AHY	M*	18-Jun-00					X	
1710-20696	K:RG	Tonto Creek	Orange Peel Camp	AHY	F*	18-Jun-00					X	X
1710-20697	YK:K	Salt River	Lake Shore	AHY	M	19-Jun-00					X	
1710-20698	YY:K	Salt River	Lake Shore	AHY	F	19-Jun-00					X	X
1710-20699	K:WR	Salt River	Lake Shore	AHY	M	19-Jun-00					X	X
1710-20700	:K	Salt River	Shangri-la	N	F	1-Jul-00					X	
1710-46318	XDX:	Salt River	Shangri-la	AHY	U	14-Jul-99				X		
1710-46319	K:YG	Tonto Creek	Tonto Creek Inflow	AHY	M*	10-May-00					X	X
1710-46320	K:WG	Tonto Creek	Tonto Creek Inflow	SY	M*	10-May-00					X	X
1710-46321	K:GW	Salt River	Shangri-la	AHY	M*	11-May-00					X	X [6]
1710-46322	KY:K	Salt River	Shangri-la	AHY	M*	11-May-00					X	
1710-46323	GY:K	Salt River	Shangri-la	AHY	M*	12-May-00					X	X
1710-46324	YG:K	Salt River	Shangri-la	AHY	M*	12-May-00					X	X
1710-46325	WG:K	Salt River	Lake Shore	AHY	F	13-Jun-00					X	X
1710-46326	K:KR	Salt River	Lake Shore	AHY	M	13-Jun-00					X	
1710-46327	K:DY	Salt River	Lake Shore	SY	M	13-Jun-00					X	X [3]
1710-46328	GW:K	Salt River	Lake Shore	AHY	M	13-Jun-00					X	
1710-46329	WY:K	Salt River	Lake Shore	AHY	F	13-Jun-00					X	
1710-46330	YD:K	Salt River	Lake Shore	SY	F	13-Jun-00					X	X
1740-51837	Z:	Tonto Creek	Orange Peel Camp	N	U	02-Jul-01						X
1740-51838	Z:	Tonto Creek	Orange Peel Camp	N	U	02-Jul-01						X
1740-51839	Z:	Tonto Creek	Orange Peel Camp	N	U	02-Jul-01						X
1740-51840	:K	Salt River	Shangri-la	N	U	25-Jul-01						X
1740-51841	:K	Salt River	North Shore	N	U	26-Jul-01						X
1740-51842	K:	Salt River	North Shore	N	U	26-Jul-01						X
1740-51843	:K	Salt River	North Shore	N	U	26-Jul-01						X
1740-51850	:K	Salt River	Shangri-la	N	F	1-Jul-00					X	
1740-51851	:K	Salt River	Mud Flats	N	M	6-Jul-00					X	
1740-51852	:K	Salt River	Mud Flats	N	F	6-Jul-00					X	
1740-51853	K:VWV	Salt River	Shangri-la	N	M	6-Jul-00					X	X [10]
1740-51854	K:	Salt River	Shangri-la	N	F	6-Jul-00					X	
1740-51855	:K	Salt River	Shangri-la	N	F	6-Jul-00					X	
1740-51856	:K	Salt River	Shangri-la	N	M	6-Jul-00					X	
1740-51857	RY:K	Salt River	Shangri-la	N	F	6-Jul-00					X	X [7]
1740-51858	OK:K	Salt River	Shangri-la	N	F	9-Jul-00					X	X [1]
1740-51859	:K	Salt River	Shangri-la	N	M	9-Jul-00					X	
1740-51861	:K	Salt River	Shangri-la	N	F	9-Jul-00					X	
1740-51862	:K	Salt River	Shangri-la	N	F	9-Jul-00					X	
1740-51863	K:YO	Salt River	Salt River Inflow	N	F	9-Jul-00					X	X [10]
1740-51865	:K	Salt River	Mud Flats	N	U	30-Jun-01						X
1740-51866	:K	Salt River	Shangri-la	N	U	30-Jun-01						X
1740-51867	:K	Salt River	Shangri-la	N	U	30-Jun-01						X
1740-51868	:K	Salt River	Shangri-la	N	U	30-Jun-01						X
1740-51869	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51870	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51871	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51872	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51873	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51874	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51875	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1740-51876	:K	Salt River	Shangri-la	N	F	3-Jul-00					X	
1740-51877	:K	Salt River	Shangri-la	N	F	3-Jul-00					X	
1740-51878	:K	Salt River	Shangri-la	N	M	18-Jul-00					X	
1740-51879	:K	Salt River	Shangri-la	N	F	18-Jul-00					X	
1740-51880	K:	Salt River	Lake Shore	N	U	29-Jun-01						X
1740-51881	:K	Salt River	Shangri-la	N	U	29-Jun-01						X

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1740-51882	:K	Salt River	Shangri-la	N	U	29-Jun-01						X
1740-51883	:K	Salt River	Shangri-la	N	U	02-Jul-01						X
1740-51884	K:	Salt River	Shangri-la	N	U	02-Jul-01						X
1740-51885	:K	Salt River	Shangri-la	N	U	02-Jul-01						X
1740-51886	:K	Salt River	Lake Shore	N	U	02-Jul-01						X
1740-51887	K:	Salt River	Lake Shore	N	U	02-Jul-01						X
1740-51888	:K	Salt River	Lake Shore	N	U	02-Jul-01						X
1740-51889	VWV:K	Salt River	Shangri-la	SY	U	03-Jul-01						X
1740-51890	:K	Tonto Creek	Orange Peel Flats	N	U	10-Jul-01						X
1740-51891	K:	Tonto Creek	Orange Peel Flats	N	U	10-Jul-01						X
1740-51892	:K	Tonto Creek	Orange Peel Flats	N	U	10-Jul-01						X
1740-51893	:K	Tonto Creek	Orange Peel Camp	N	U	10-Jul-01						X
1740-51894	K:	Tonto Creek	Orange Peel Camp	N	U	10-Jul-01						X
1740-51895	K:	Tonto Creek	Orange Peel Camp	N	U	10-Jul-01						X
1740-51896	K:	Salt River	Shangri-la	N	U	25-Jul-01						X
1740-51897	K:	Salt River	Shangri-la	N	U	25-Jul-01						X
1740-51899	K:	Tonto Creek	Orange Peel Camp	N	U	27-Jul-01						X
1740-51900	K:RDR	Salt River	Shangri-la	AHY	U	25-Jul-01						X
1740-91506	RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	2-Jun-96	X		X	X	X	
1740-91507	K/WR:X	Tonto Creek	Tonto Creek Inflow	AHY	F	2-Jun-96	X	X				
1740-91523	X:R/R	Tonto Creek	Tonto Creek Inflow	AHY	U	12-Jun-96	X	X	X	X	X	
1740-91524	RW/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	14-Jun-96	X					
1740-91532	RK:X	Verde River	Camp Verde	N	M	6-Jul-96	X			X [2]	X [1]	X [7]
1740-91539	R:X	Tonto Creek	Tonto Creek Inflow	N	F	9-Aug-96	X					
1740-91540	R:X	Tonto Creek	Tonto Creek Inflow	N	M	9-Aug-96	X	X [1]				
1740-91541	R:X	Tonto Creek	Tonto Creek Inflow	N	M	9-Aug-96	X					
1740-91590	WDW:K	Salt River	Shangri-la	AHY	M	12-Jul-00					X	
1740-91591	DWD:K	Salt River	Salt River Inflow	SY	M	12-Jul-00					X	X [3]
1740-91592	K:WV	Tonto Creek	Tonto Creek Inflow	AHY	F	13-Jul-00					X	
1740-91593	K:	Tonto Creek	Tonto Creek Inflow	N	M	14-Jul-00					X	
1740-91594	K:	Tonto Creek	Tonto Creek Inflow	N	M	14-Jul-00					X	
1740-91595	K:	Tonto Creek	Tonto Creek Inflow	N	M	14-Jul-00					X	
1740-91596	OD:K	Salt River	Shangri-la	N	M	19-Jul-00					X	X
1740-91597	:K	Salt River	Shangri-la	N	M	21-Jul-00					X	
1740-91598	:K	Salt River	Shangri-la	N	F	21-Jul-00					X	
1740-91599	:K	Salt River	Shangri-la	N	M	21-Jul-00					X	
1740-91600	K:DW	Salt River	Shangri-la	AHY	M	15-Jun-00					X	
1740-91632	KW:X	White Mountains	Alpine Horse Pasture	N	M	11-Jul-96	X		X [17]			X [3]
1740-91701	R/R:X	Tonto Creek	Tonto Creek Inflow	AHY	M	1-Jun-96	X					
1740-91702	X:G/R	Tonto Creek	Tonto Creek Inflow	AHY	M	1-Jun-96	X	X				
1740-91703	L/R:X	Tonto Creek	Tonto Creek Inflow	AHY	F	1-Jun-96	X					
1740-91704	K/R:X	Tonto Creek	Tonto Creek Inflow	AHY	F	1-Jun-96	X	X				
1740-91705	X:D/R	Tonto Creek	Tonto Creek Inflow	AHY	F	2-Jun-96	X					
1740-91706	KY:X	Tonto Creek	Tonto Creek Inflow	AHY	M	3-Jun-96	X	X	X	X	X	X
1740-91707	W/R:X	Salt River	Salt River Inflow	AHY	M	4-Jun-96	X					
1740-91708	X:R/DP	Salt River	Salt River Inflow	AHY	M	4-Jun-96	X					
1740-91709	X:G/R	Salt River	Salt River Inflow	AHY	F	4-Jun-96	X	X				
1740-91710	X:L/R	Salt River	Salt River Inflow	AHY	F	4-Jun-96	X		X [2]			
1740-91711	X:K/R	Salt River	Salt River Inflow	AHY	F	5-Jun-96	X					
1740-91712	X:Y/R	Salt River	Salt River Inflow	AHY	F	5-Jun-96	X	X [2]				
1740-91713	X:W/R	Salt River	Salt River Inflow	AHY	M	5-Jun-96	X	X [2]	X			
1740-91714	PD/R:X	Tonto Creek	Tonto Creek Inflow	AHY	M	11-Jun-96	X		X	X		X[2]
1740-91715	KW/R:X	Tonto Creek	Tonto Creek Inflow	AHY	M	11-Jun-96	X					
1740-91716	D/R:X	Tonto Creek	Tonto Creek Inflow	AHY	M	12-Jun-96	X					
1740-91717	G/WR:X	Tonto Creek	Tonto Creek Inflow	AHY	M	12-Jun-96	X	X	X [16]			
1740-91718	O/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	13-Jun-96	X					
1740-91719	L/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	F	14-Jun-96	X					
1740-91720	X:O/R	Salt River	Salt River Inflow	AHY	F	15-Jun-96	X	X				
1740-91721	X:WV	Salt River	Salt River Inflow	AHY	M	15-Jun-96	X		X [2]	X	X	X
1740-91722	X:L/RW	Salt River	Salt River Inflow	AHY	M	16-Jun-96	X					
1740-91723	X:K/WR	Salt River	Salt River Inflow	AHY	F	16-Jun-96	X	X				

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
1740-91724	X:D/RW	Salt River	Salt River Inflow	AHY	M	17-Jun-96	X					
1740-91725	X:Y/RW	Salt River	Salt River Inflow	AHY	M	18-Jun-96	X	X				
1740-91726	X:O/RW	Salt River	Salt River Inflow	AHY	F	18-Jun-96	X					
1740-91727	X:KW/R	Salt River	Salt River Inflow	AHY	M	19-Jun-96	X					
1740-91728	X:RG	Salt River	Salt River Inflow	AHY	M	27-Jun-96	X	X	X	X [5]	X [3]	X
1740-91729	X:Y/DP	Salt River	Salt River Inflow	AHY	M	28-Jun-96	X	X [2]				
1740-91730	X:W/DP	Salt River	Salt River Inflow	AHY	F	29-Jun-96	X					
1740-91731	X:O/DP	Salt River	Salt River Inflow	AHY	F	29-Jun-96	X					
1740-91732	X:RW/DP	Salt River	Salt River Inflow	AHY	M	29-Jun-96	X					
1740-91733	X:KW/DP	Salt River	Salt River Inflow	AHY	M	29-Jun-96	X					
1740-91734	X:K/DP	Salt River	Salt River Inflow	AHY	M	29-Jun-96	X					
1740-91739	X:WY	Salt River	Salt River Inflow	AHY	M	19-Jun-96	X	X	X	X [3]	X	
1740-91740	X:KW/RW	Salt River	Salt River Inflow	AHY	F	19-Jun-96	X					
1740-91741	D/WR:X	Tonto Creek	Tonto Creek Inflow	AHY	F	12-Jul-96	X	X				
1740-91742	Y/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	12-Jul-96	X	X				
1740-91743	R:X	Tonto Creek	Tonto Creek Inflow	N	F	13-Jul-96	X					
1740-91744	PD/RW:X	Tonto Creek	Tonto Creek Inflow	AHY	M	13-Jul-96	X	X	X	X	X	
1740-91745	R/DP:X	Salt River	Salt River Inflow	AHY	M	14-Jul-96	X					
1740-91760	X:G/PD	Salt River	Salt River Inflow	AHY	F	15-Jul-96	X	X				
1740-91857	D:RG	San Pedro River	Kearny Sewage Ponds	N	F	22-Jun-98			X	X [15]	X [14]	X [3]
1740-91966	K:KD	Salt River	Shangri-la	AHY	M	15-Jun-00					X	X [1]
1740-91967	K:GK	Salt River	Mud Flats	AHY	F	16-Jun-00					X	X [7]
1740-91968	WD:K	Salt River	Shangri-la	AHY	F	17-Jun-00					X	X
1740-91969	DW:K	Salt River	Salt River Inflow	AHY	F	18-Jun-00					X	X
1740-91970	K:RD	Salt River	School House North	AHY	M	19-Jun-00					X	X
1740-91972	YD:K	Salt River	School House North	AHY	F	19-Jun-00					X	X [3]
1740-91973	WW:K	Salt River	School House North	AHY	M	19-Jun-00					X	X [1]
1740-91974	GK:K	Salt River	School House North	AHY	F	19-Jun-00					X	X
1740-91975	K:OY	Salt River	Shangri-la	AHY	M*	1-Jul-00					X	
1740-91976	:K	Salt River	Lake Shore	N	U	17-Jul-01						X
1870-58350	Y/R:X	Tonto Creek	Tonto Creek Inflow	AHY	M	12-Jul-95	X					
2070-92904	X:WU/R	Salt River	Salt River Inflow	AHY	F	1-Jul-97		X				
2070-92905	WK/R:X	Salt River	Salt River Inflow	AHY	M	23-Jul-97		X	X [2]	X	X [3]	X
2070-92954	R/X:R	Salt River	Salt River Inflow	AHY	M	14-Jul-97		X				
2210-57001	K:	Salt River	Shangri-la	N	F	21-Jul-00					X	
2210-57002	K:OK	Salt River	Shangri-la	N	M	21-Jul-00					X	X [9]
2210-57003	:K	Salt River	Shangri-la	N	F	21-Jul-00					X	
2210-57006	:K	Salt River	Mud Flats	N	M	27-Jul-00					X	
2210-57007	WO:K	Salt River	Shangri-la	N	F	27-Jul-00					X	X [9]
2210-57008	K:YR	Salt River	Shangri-la	N	F	29-Jul-00					X	X [9]
2210-57009	:K	Salt River	Shangri-la	N	F	30-Jul-00					X	
2210-57010	:K	Salt River	Shangri-la	N	F	30-Jul-00					X	
2210-57011	:K	Salt River	Shangri-la	N	F	30-Jul-00					X	
2210-57012	:K	Salt River	Shangri-la	N	M	30-Jul-00					X	
2210-57013	:K	Salt River	Shangri-la	N	M	30-Jul-00					X	
2210-57014	K:WVW	Salt River	Shangri-la	N	F	31-Jul-00					X	X [9]
2210-57015	K:	Salt River	Shangri-la	N	M	31-Jul-00					X	
2210-57031	K:OW	Salt River	Lake Shore	SY	M	16-Jul-00					X	
2210-57032	:K	Salt River	Shangri-la	N	U	01-Jul-01						X
2210-57033	K:	Salt River	Shangri-la	N	U	01-Jul-01						X
2210-57034	:K	Salt River	Shangri-la	N	U	01-Jul-01						X
2210-57035	:K	Salt River	Shangri-la	N	U	01-Jul-01						X
2210-57037	:K	Salt River	Shangri-la	N	U	01-Jul-01						X
2210-57038	K:	Salt River	Shangri-la	N	U	10-Jul-01						X
2210-57039	:K	Salt River	Shangri-la	N	U	10-Jul-01						X
2210-57040	K:	Salt River	Shangri-la	N	U	10-Jul-01						X
2210-57041	K:WDW	Salt River	Shangri-la	AHY	F*	29-Jul-01						X
2210-57044	:K	Salt River	Shangri-la	N	U	28-Jun-01						X
2210-57045	:K	Salt River	Shangri-la	N	U	28-Jun-01						X
2210-57046	:K	Salt River	Shangri-la	N	U	28-Jun-01						X
2210-57047	:K	Salt River	Lake Shore	N	U	04-Jul-01						X

Federal Bird Band Number	Color Band Combo	Site	Patch Banded	Age When Banded	Sex	Date Banded	Year(s) Detected					
							96	97	98	99	00	01
2210-57048	:K	Salt River	Lake Shore	N	U	10-Jul-01						X
2210-57049	K:	Salt River	Lake Shore	N	U	10-Jul-01						X
2210-57051	K:	Salt River	Shangri-la	N	U	12-Jul-01						X
2210-57052	:K	Salt River	Shangri-la	N	U	12-Jul-01						X
2210-57053	K:	Salt River	Shangri-la	N	U	12-Jul-01						X
2210-57054	:K	Salt River	Shangri-la	N	U	12-Jul-01						X
2210-57055	K:	Salt River	Shangri-la	N	U	25-Jul-01						X
2210-57056	K:	Salt River	Shangri-la	N	U	25-Jul-01						X
2210-57057	K:	Salt River	Shangri-la	N	U	25-Jul-01						X
2210-57058	K:	Salt River	Shangri-la	N	U	27-Jul-01						X
2210-57059	:K	Salt River	Shangri-la	N	U	27-Jul-01						X
2210-57060	:K	Tonto Creek	Tonto Creek Inflow	N	F	15-Jul-00					X	
2210-57061	K:	Salt River	Shangri-la	N	F	17-Jul-00					X	
2210-57062	K:OD	Salt River	Shangri-la	N	F	17-Jul-00					X	X [9]
2210-57063	K:	Salt River	Shangri-la	N	F	17-Jul-00					X	
2210-57064	:K	Salt River	Salt River Inflow	N	F	17-Jul-00					X	
2210-57065	:K	Salt River	Salt River Inflow	N	M	17-Jul-00					X	
2210-57066	K:	Salt River	Salt River Inflow	N	M	17-Jul-00					X	
2210-57067	K:	Salt River	Salt River Inflow	N	F	17-Jul-00					X	
2210-57068	:K	Salt River	Shangri-la	N	F	18-Jul-00					X	
2210-57069	VK:K	Salt River	Shangri-la	N	M	11-Jul-00					X	X [7]
2210-57070	RD:K	Salt River	Shangri-la	N	F	11-Jul-00					X	X [8]
2210-57071	RG:K	Tonto Creek	Orange Peel Flats	AHY	M	12-Jul-00					X	X [2]
2210-57072	:K	Tonto Creek	Tonto Creek Inflow	N	F	15-Jul-00					X	
2210-57073	:K	Tonto Creek	Tonto Creek Inflow	N	M	15-Jul-00					X	
2210-57074	:K	Salt River	Shangri-la	N	F	15-Jul-00					X	
2210-57075	OG:K	Salt River	Shangri-la	N	F	15-Jul-00					X	X [9]
2210-57076	K:OO	Salt River	Salt River Inflow	N	F	19-Jul-00					X	X [3]
2210-57077	K:	Salt River	Salt River Inflow	N	M	19-Jul-00					X	
2210-57078	RWR:K	Salt River	Lake Shore	AHY	M*	18-Jun-01						X
2210-57079	K:	Salt River	Lake Shore	N	U	26-Jun-01						X
2210-57080	K:	Salt River	Lake Shore	N	U	26-Jun-01						X
2210-57081	K:	Salt River	Lake Shore	N	U	26-Jun-01						X
2210-57092	:K	Salt River	Shangri-la	N	U	27-Jun-01						X
2210-57093	:K	Salt River	Shangri-la	N	U	27-Jun-01						X
2210-57094	K:	Salt River	Mud Flats	N	U	27-Jun-01						X
2210-57095	K:	Salt River	Mud Flats	N	U	27-Jun-01						X
2210-57096	:K	Salt River	School House South 3	N	U	27-Jun-01						X
2210-57097	:K	Salt River	Lake Shore	N	U	29-Jun-01						X
2210-57098	:K	Salt River	Lake Shore	N	U	29-Jun-01						X
2210-57099	K:	Salt River	Lake Shore	N	U	29-Jun-01						X

Site codes (for movement): **1**=Old Salt, **2**=Tonto, **3**=Shangri-la, **4**=Mudflats, **5**=School House South 1, **6**=School House South 3, **7**=School House North 1, **8**=School House North 2, **9**=Lake Shore, **10**=North Shore, **11**=Orange Peel Campground, **12**=Orange Peel Flats, **13**=A-Cross Road, **14**=Kearny Sewage Ponds (San Pedro River), **15**=Indian Hills (San Pedro River), **16**=Gila River South (Gila River), **17**=Greer Township (White Mtns.), **18**=Gila River