



Neotropical Migratory Bird Monitoring Study at Marine Corps Base Camp Pendleton, California

2001 Annual Report

Prepared for:

**U.S. Marine Corps Base Camp Pendleton
Assistant Chief of Staff, Environmental Security**

**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
WESTERN ECOLOGICAL RESEARCH CENTER**

Neotropical Migratory Bird Monitoring Study at Marine Corps Base Camp Pendleton, California

By Barbara E. Kus and Bryan L. Sharp

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Sacramento, California
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U.S. DEPARTMENT OF THE INTERIOR
GALE A. NORTON, SECRETARY

U.S. GEOLOGICAL SURVEY
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Introduction

This report is the seventh annual progress update summarizing the activities of two MAPS stations at Marine Corps Base Camp Pendleton. MAPS, or “Monitoring Avian Productivity and Survivorship”, is an international program designed to monitor through capture and banding basic demographic parameters of migratory species, many of which are imperiled regionally and even globally. Age- and sex-specific data on annual survival, reproduction, and recruitment can be gathered and compared across stations to identify population trends for species of interest, and can be used to identify factors responsible for trends; in particular, negative trends. In turn, information obtained from long-term monitoring of bird populations can be used to guide management activities intended to maintain or re-establish viable populations throughout the species’ ranges.

Two MAPS stations were established at Camp Pendleton in 1995 and operated annually thereafter: one in riparian habitat along De Luz Creek, and the other in an oak woodland near Case Springs in a mountainous region of the Base. A third station was established in 1998 in riparian habitat along the Santa Margarita River west of Ysidora Basin, at the site of the former settling ponds. These stations were established as part of a long-term study of the status of Neotropical migratory birds at Camp Pendleton, and are being operated in a manner consistent with other banding stations participating in an effort to monitor birds world-wide. Operation of the Case Springs station was ceased after the 1999 season due to low capture rates, so the following progress report deals exclusively with results from the De Luz and Santa Margarita stations.

Methods

Following the protocol established in past years, the De Luz and Santa Margarita banding stations were operated once during every 10-day period between April 1 and August 31, 2001, for a total of 15 days per station. Ten mistnets were erected at each site in fixed locations (Figures 1-2). Nets were opened at dawn and run until late morning, typically between 1100 and noon. Nets were not operated during inclement weather (rain, extreme heat or cold), and any netting time missed as a result was compensated for by netting on the next available day, starting at the time the netting ended on the previous day. Nets were checked every 15-30 minutes by observers working circuits. All birds except hummingbirds, game birds (California quail, doves) and raptors were removed from nets, held in mesh bags labeled with the net number and time of capture, and taken to a central processing location where they were banded with USGS numbered aluminum bands. Data recorded for each individual caught included age, sex, breeding condition, weight, wing chord, fat deposition, feather wear, and molt status. After processing, birds were released in the vicinity of the net in which they had been captured. Hummingbirds, game birds and raptors were not banded, but were identified to species, age, and sex when possible, and released immediately at the capture site. Typically, three field personnel operated the De Luz station, and five to six the Santa Margarita station, working on consecutive days. Fieldwork was conducted by Peter Beck, Laurie Clarke, Peter Famolaro, Kim Ferree, David Kisner, Barbara Kus, Melissa Mersy, Bonnie Peterson, Jay Rourke, Erik Sgariglia, Bryan Sharp, Lara Tikkanen, and Mike Wellik.

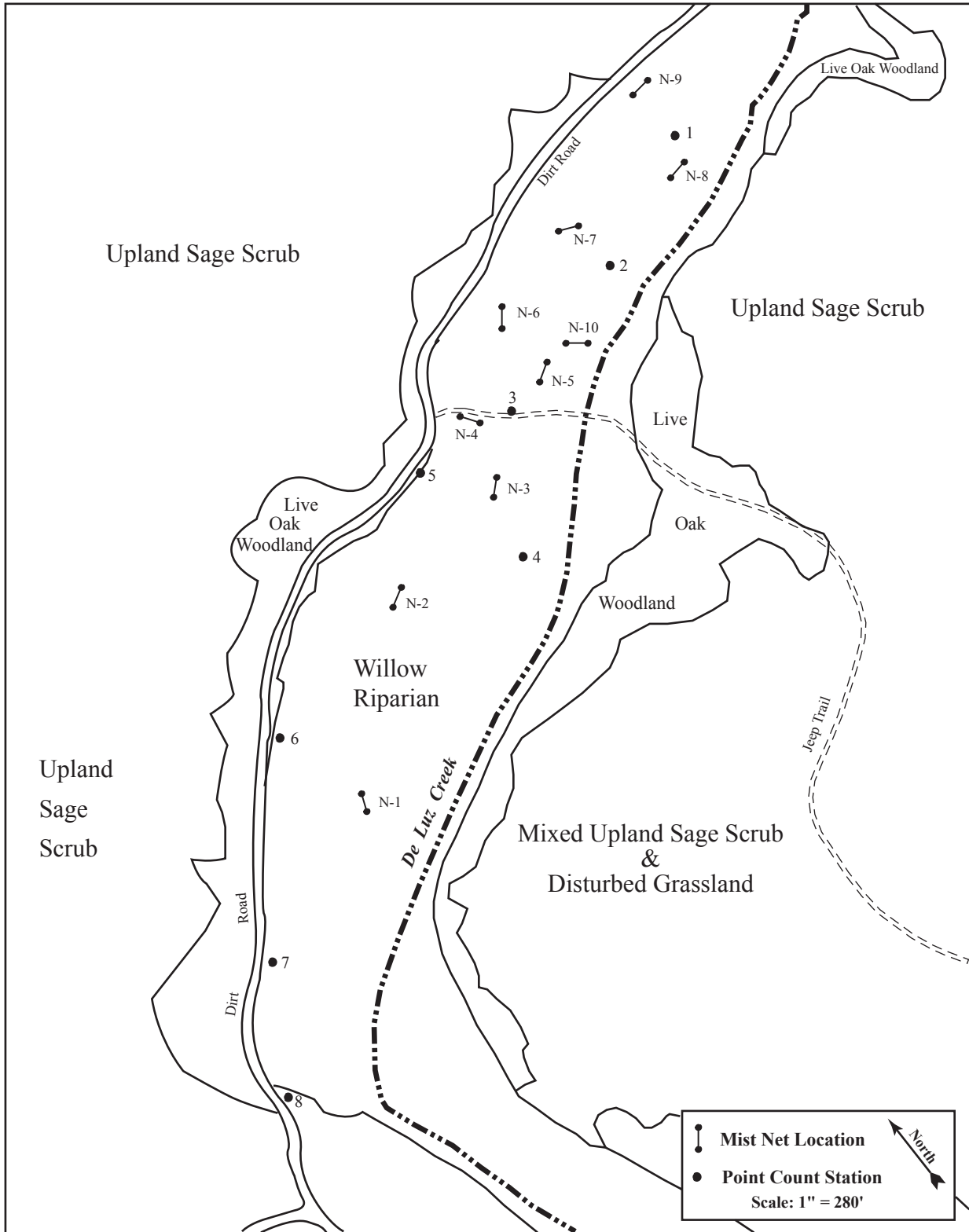


Figure 1. De Luz Creek MAPS Station, Marine Corps Base Camp Pendleton.

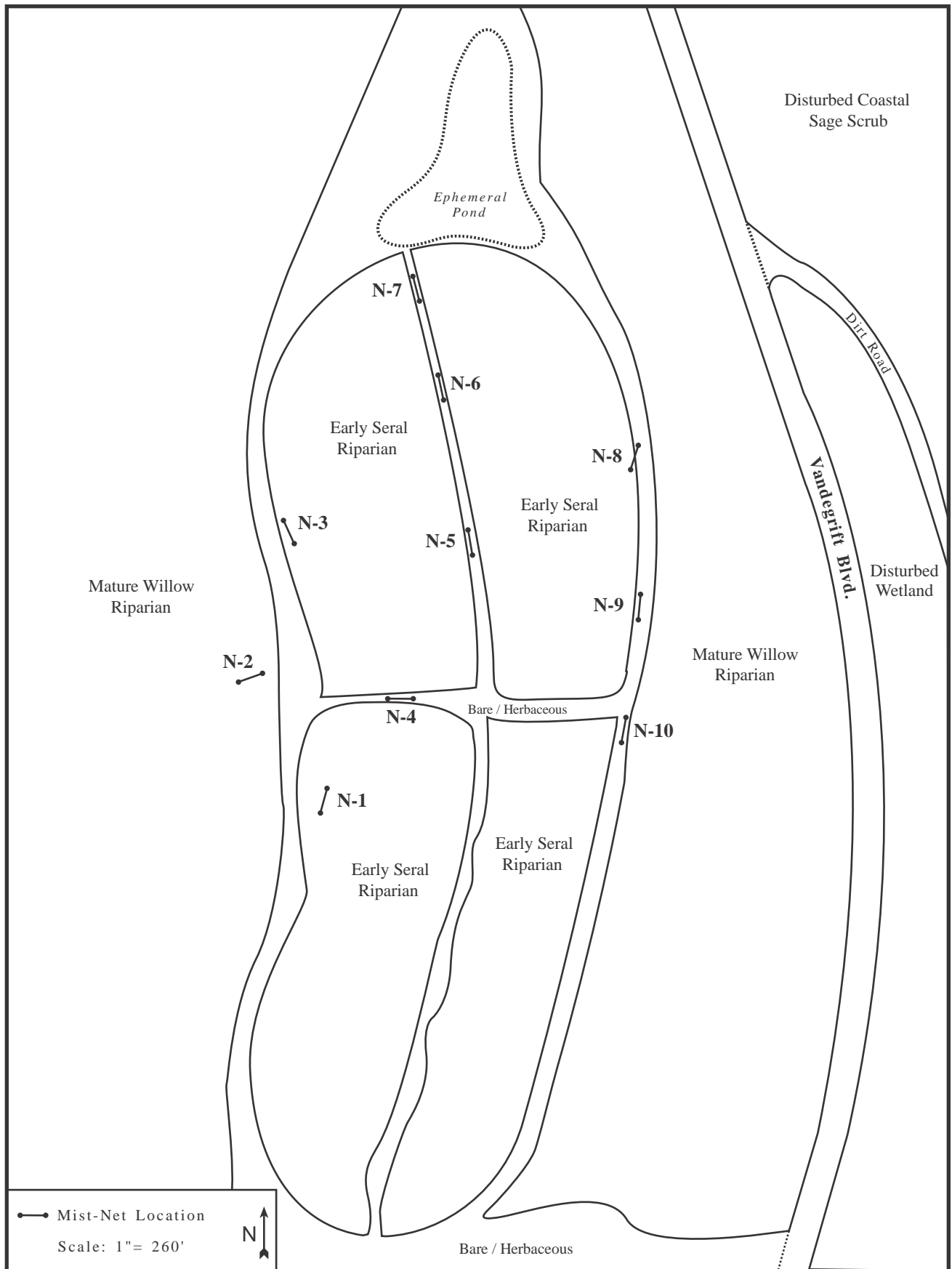


Figure 2. Santa Margarita River MAPS station, Marine Corps Base Camp Pendleton.

Results

De Luz Creek

Overview of 2001 Captures

Three hundred and fifty individuals of 32 species were caught during 763 net-hours (Table 1; see attached list of A.O.U. codes for common and taxonomic species names). Overall, the number of individuals caught in 2001 was well below the mean number (417) caught per year between 1995-2000. Captures per net hour were also lower than the 1995-00 mean (0.64), at 0.54. Overall, 2001 had the lowest total captures, individuals captured, and capture rates for all years of the study.

As in previous years, the most abundant species at the station was the common yellowthroat, which made up 24 percent of the individuals captured (Figure 3). Song sparrows had consistently been the second most abundant species, but wrentits were the second most abundant species in 2001, followed by song sparrows. Rounding out the ten most abundant species were yellow-breasted chats, orange-crowned warblers, lesser goldfinches, Bewick's wrens, spotted towhees, house wrens, and bushtits; together, these ten species comprised 76 percent of all individuals captured. Among locally breeding migrant species that appeared to decline at the station between 1995 and 1998, Pacific-slope flycatcher captures remained considerably higher than their low in 1998, yellow-breasted chats continued a decline that temporarily abated in 1999, and black-headed grosbeaks declined again after rebounding in 2000 from their low recorded in 1999 (Table 2). Capture trends among resident species were mixed, with captures of two species (lesser goldfinch and song sparrow) lower than both the previous year and their 1995-2000 average, while those of two species (common yellowthroat and wrentit) reached all-time highs.

The sex ratio of birds of known sex (N=176) was essentially 1:1, at 49 percent female and 51 percent male (Table 1). Age composition changed relative to prior years, with the proportion of juvenile birds in the population increasing to an all-time high of 38 percent (Table 1), well above the mean of 22 percent for 1995-2000. This increase is influenced greatly by the large number of juvenile common yellowthroats and wrentits captured in 2001.

Two hundred and seventy-three of the birds caught (78 percent), including 15 hummingbirds and three California quail, were new captures. Of these, 99 percent (255/258; hummingbirds and quail excluded) were banded; the remainder escaped prior to banding (2) or were not banded for other reasons (2, Table 3). The majority of birds were captured only once during the season, but some individuals of the most abundant species were captured 2-4 times (Table 3). Overall capture rates by net ranged from 35 to 72 captures per 100 net-hours, for an overall average capture rate of 54 per 100 net-hours (Table 4). Nets differed in their capture rates relative to previous years; compared to their 1995-2000 mean capture rates, captures at net 6 were equal to the mean, and all other nets had lower capture rates than the mean (Figure 4).

Capture rates reached 72 per 100-net hours in late April (Table 4), coinciding with peak

Table 1. Sex and Age of Individuals Captured: De Luz Creek, 2001

Species	Code	Female					Female Total	Male					Male Total	Unknown Sex					Unknown Total	Species Total
		Age ^a						Age ^a						Age ^a						
		A	H	O	S	U		A	H	O	S	U		A	H	O	S	U		
CAQU	0.0	0	0	0	0	0	0	1	1	0	0	0	2	0	1	0	0	0	1	3
NUWO	397.0	0	0	0	0	0	0	1	1	1	0	0	3	0	1	0	0	0	1	4
BCHU	429.0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
COHU	4300	0	0	0	0	0	0	1	1	0	0	0	2	0	0	0	0	0	0	2
ANHU	431.0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	2
UNHU	440.9	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	6	8	9
ATFL	454.0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	4	0	0	9	9
PSFL	464.1	3	0	0	0	0	3	0	0	0	0	0	0	5	1	0	0	0	6	9
HOOR	5050	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	2
PUFI	517.0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
LEGO	530.0	3	1	1	1	0	6	2	0	5	1	0	8	0	0	0	0	0	0	14
RCSP	5800	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
SOSP	581.0	6	0	0	0	0	6	12	0	0	0	0	12	2	10	0	0	2	14	32
LISP	5830	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
SPTO	588.0	2	0	1	0	0	3	4	0	2	1	0	7	0	3	0	0	0	3	13
CALT	591.1	5	0	0	0	0	5	2	0	0	0	0	2	0	2	0	0	0	2	9
BHGR	596.0	0	0	4	0	0	4	0	1	1	1	0	3	0	1	0	0	0	1	8
LAZB	599.0	2	0	1	0	0	3	0	0	1	0	0	1	0	0	0	0	0	0	4
WAVI	627.0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	2
LBVI	633.4	1	0	0	0	0	1	0	0	0	0	0	0	4	2	0	0	0	6	7
OCWA	646.0	7	0	1	0	0	8	2	0	1	0	0	3	0	4	0	0	0	4	15
YWAR	652.0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	2
AUWA	6560	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
COYE	681.0	12	2	7	0	0	21	5	10	10	3	0	28	0	36	0	0	0	36	85
YBCH	683.0	6	1	0	0	0	7	9	0	0	0	0	9	0	4	0	0	0	4	20
CATH	710.0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
BEWR	719.0	3	0	0	0	0	3	0	0	0	0	0	0	3	8	0	0	0	11	14
HOWR	721.0	3	0	1	0	0	4	0	0	0	0	0	0	4	5	0	0	0	9	13
OATI	733.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
WREN	742.0	0	0	0	0	0	0	0	0	0	0	0	0	22	24	0	0	1	47	47
BUSH	743.0	3	0	0	0	0	3	6	0	0	0	0	6	0	3	0	0	0	3	12
SWTH	758.0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
HETH	759.0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	3
Total		65	4	17	1	0	87	47	14	21	7	0	89	49	110	5	1	9	174	350

^a Age Key
A = After Hatching Year
H = Hatching Year
O = Older than Second Year
S = Second Year
U = Unknown Age

Figure 3. Number of Individuals Caught per Species: De Luz Creek, 2001

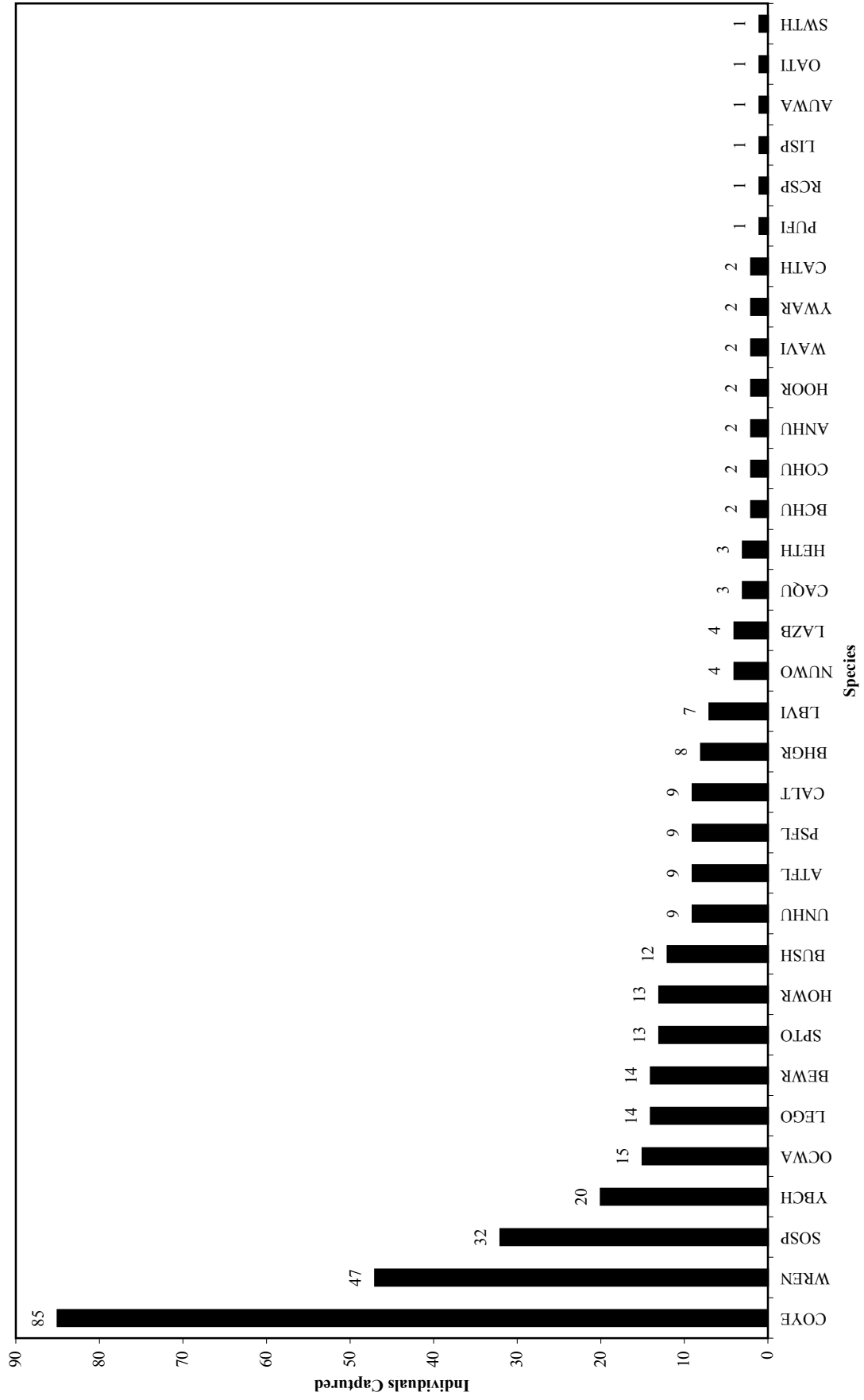


Table 2. Number of Birds Captured, Banded, and Recaptured: De Luz Creek, 1995 - 2001

Species	Code	Total Captures ^a								New Individuals Banded								Recaptured Individuals, 2001										
		Year							Total	Year							Total	Originally Banded						Total				
		1995	1996	1997	1998	1999	2000	2001		1995	1996	1997	1998	1999	2000	2001		1995	1996	1997	1998	1999	2000					
CAQU	0.0	2	0	1	2	1	1	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MODO	316.0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COGD	320.0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COHA	333.0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMKE	360.0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOWO	394.0	2	2	2	1	0	1	0	8	2	2	2	1	0	1	0	8	0	0	0	0	0	0	0	0	0	0	0
NUWO	397.0	4	4	2	12	2	4	4	32	4	2	1	6	1	2	0	16	0	1	0	0	0	0	0	0	0	1	1
RSFL	413.0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
BCHU	429.0	3	2	5	7	9	11	2	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COHU	430.0	2	2	1	2	1	0	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANHU	431.0	5	5	16	15	5	9	2	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ALHU	434.0	0	0	1	1	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNHU	440.9	11	1	2	8	9	12	9	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATFL	454.0	13	9	11	15	8	7	10	73	10	7	9	9	6	5	7	53	0	1	0	1	0	0	0	0	0	2	2
WEWP	462.0	0	1	0	0	1	0	0	2	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
PSFL	464.1	14	9	7	2	8	11	9	60	14	9	6	0	8	10	7	54	0	0	0	0	1	1	2	2	2	2	2
WIFL	466.0	1	1	0	2	1	1	0	6	1	1	0	2	1	1	0	6	0	0	0	0	0	0	0	0	0	0	0
HAFL	468.0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
WESJ	481.0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
HOOR	505.0	2	0	0	3	3	0	2	10	2	0	0	3	3	0	2	10	0	0	0	0	0	0	0	0	0	0	0
BUOR	508.0	5	1	7	3	3	0	0	19	5	1	5	3	3	0	0	17	0	0	0	0	0	0	0	0	0	0	0
PUFI	517.0	0	1	0	0	0	2	1	4	0	1	0	0	0	2	1	4	0	0	0	0	0	0	0	0	0	0	0
HOFI	519.0	1	23	8	8	8	9	0	57	1	22	8	8	6	9	0	54	0	0	0	0	0	0	0	0	0	0	0
LEGO	530.0	15	14	14	26	45	20	14	148	15	13	14	25	41	17	10	135	0	0	0	1	0	3	4	4	4	4	4
LASP	552.0	1	1	0	0	0	0	0	2	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
WCSP	554.0	0	0	0	0	0	5	0	5	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0
GCSP	557.0	3	2	0	1	1	0	0	7	3	2	0	0	1	0	0	6	0	0	0	0	0	0	0	0	0	0	0
DEJU	567.7	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RCSP	580.0	1	4	1	0	3	0	1	10	1	4	1	0	3	0	1	10	0	0	0	0	0	0	0	0	0	0	0
SOSP	581.0	70	69	74	75	79	54	38	459	51	43	45	52	31	25	22	269	1	0	2	2	3	2	10	10	10	10	10
LISP	583.0	1	1	0	0	1	0	1	4	1	1	0	0	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0
SPTO	588.0	38	27	25	24	21	20	13	168	33	17	10	14	17	15	10	116	0	0	0	1	1	1	3	3	3	3	3
CALT	591.1	20	25	10	23	16	9	10	113	17	19	8	16	13	6	4	83	0	0	0	1	1	2	4	4	4	4	4
BHGR	596.0	33	40	36	21	8	17	8	163	26	33	23	8	5	13	6	114	0	1	0	0	0	1	2	2	2	2	2
BLGR	597.0	0	1	2	1	0	0	0	4	0	1	2	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
LAZB	599.0	12	1	0	2	2	4	7	28	12	1	0	1	2	4	6	26	0	0	0	0	0	0	0	0	0	0	0
WETA	607.0	1	0	1	0	0	0	0	2	1	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
CLSW	612.0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
VGSW	615.0	0	0	0	0	1	2	0	3	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0
NRWS	617.0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
PHAI	620.0	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
WAVI	627.0	0	3	0	1	2	1	1	8	0	3	0	1	2	1	1	8	0	0	0	0	0	0	0	0	0	0	0
HUVI	632.0	2	0	2	0	1	0	3	8	2	0	1	0	1	0	3	7	0	0	0	0	0	0	0	0	0	0	0
LBVI	633.4	10	5	8	13	8	7	8	59	9	5	3	5	5	4	5	36	0	0	0	0	1	1	2	2	2	2	2
NAWA	645.0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
OCWA	646.0	13	4	6	9	19	8	16	75	12	3	5	8	16	5	14	63	0	0	0	0	1	0	1	1	1	1	1
YWAR	652.0	3	7	3	6	7	10	2	38	3	6	3	5	7	10	2	36	0	0	0	0	0	0	0	0	0	0	0
AUWA	656.0	2	0	0	0	0	0	1	3	2	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0
TOWA	668.0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
MGWA	680.0	0	0	0	0	1	1	0	2	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0
COYE	681.0	74	70	74	96	71	67	107	559	62	42	42	64	40	37	66	353	2	1	1	1	4	6	15	15	15	15	15
YBCH	683.0	55	51	43	28	35	28	25	265	39	30	27	18	17	16	15	162	0	0	0	0	0	5	5	5	5	5	5
WIWA	685.0	2	2	2	2	5	6	1	20	2	2	2	2	5	6	0	19	0	0	0	0	0	0	0	0	0	0	0
NOMO	703.0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
CATH	710.0	2	5	7	3	0	2	2	21	0	4	6	3	0	1	2	16	0	0	0	0	0	0	0	0	0	0	0
BEWR	719.0	22	11	19	32	17	17	18	136	16	4	11	22	4	6	10	73	0	0	0	1	1	1	3	3	3	3	3
HOWR	721.0	3	8	8	18	36	9	13	95	2	8	5	13	20	4	11	63	0	0	0	0	0	0	0	0	0	0	0
OATI	733.0	7	5	1	3	6	1	2	25	6	1	1	2	2	1	2	15	0	0	0	0	0	0	0	0	0	0	0
WREN	742.0	49	45	50	22	28	39	59	292	33	26	21	9	17	27	32	165	1	1	0	0	3	9	14	14	14	14	14
BUSH	743.0	10	14	20	8	23	28	13	116	9	13	18	4	16	23	10	93	0	0	0	0	0	1	1	1	1	1	1
SWTH	758.0	22	8	6	4	8	4	1	53	22	8	6	4	8	4	1	53	0	0	0	0	0	0	0	0	0	0	0
HETH	759.0	1	0	2	2	3	1	3	12	1	0	2	2	2	1	3	11	0	0	0	0	0	0	0	0	0	0	0
Total		540	485	481	502	511	432	411	3362	423	336	289	312	310	265	2190	4	5	3	7	16	33	68	68	68	68	68	68

^a Includes multiple

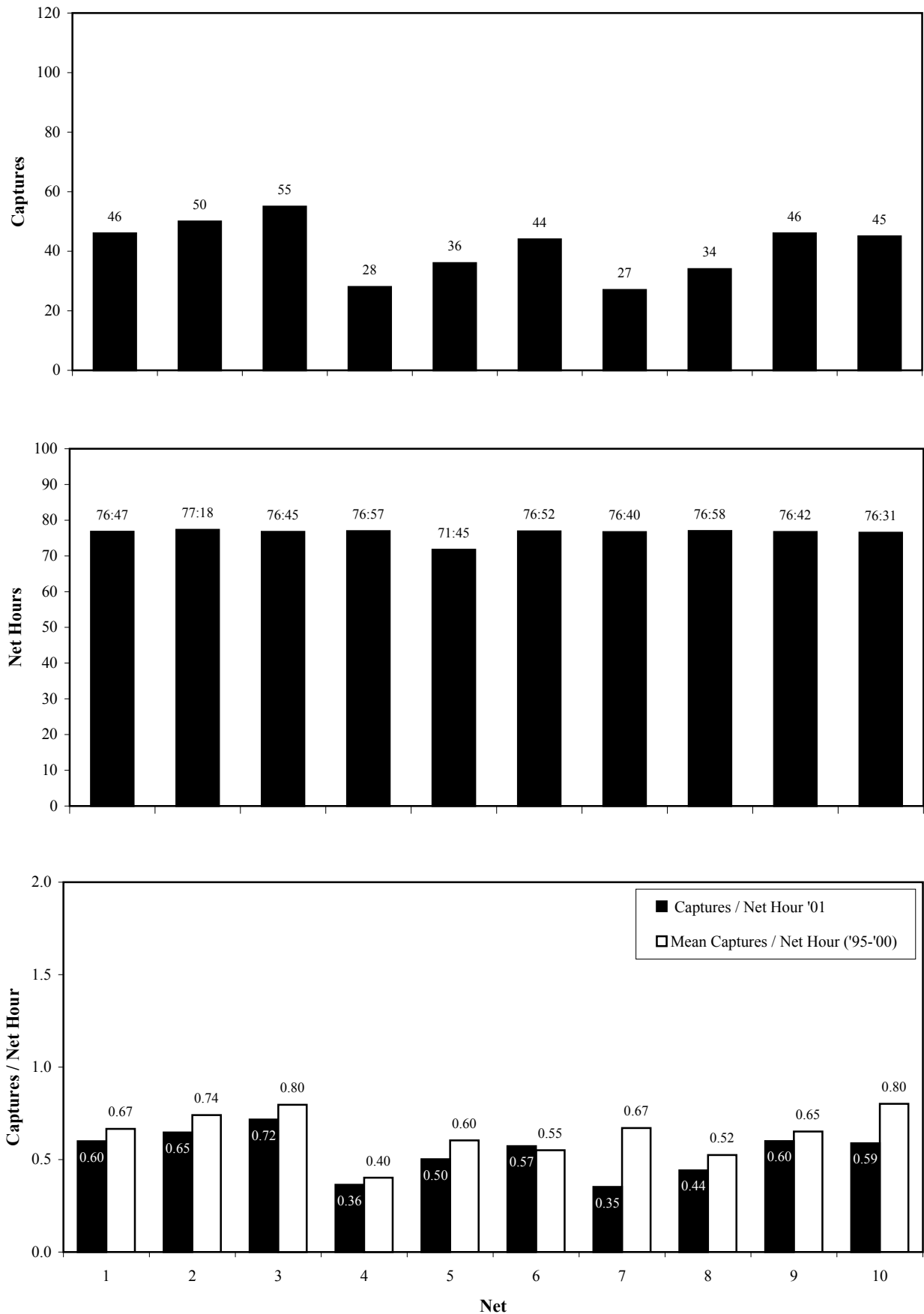
Table 3. Capture Frequency of Individuals: De Luz Creek, 2001

Species	Code	# Individuals / Capture Incidence (Banded Birds Only)				# Captures		
		1 Capture	2 Captures	3 Captures	4 Captures	Banded Birds	Unbanded Birds	All Birds
CAQU	0	0	0	0	0	0	3	3
NUWO	3970	4	0	0	0	4	0	4
BCHU	4290	0	0	0	0	0	2	2
COHU	4300	0	0	0	0	0	2	2
ANHU	4310	0	0	0	0	0	2	2
UNHU	4409	0	0	0	0	0	9	9
ATFL	4540	9	0	0	0	9	0	9
PSFL	4641	9	0	0	0	9	0	9
HOOR	5050	2	0	0	0	2	0	2
PUFI	5170	1	0	0	0	1	0	1
LEGO	5300	14	0	0	0	14	0	14
RCSP	5800	1	0	0	0	1	0	1
SOSP	5810	27	5	0	0	32	0	32
LISP	5830	1	0	0	0	1	0	1
SPTO	5880	13	0	0	0	13	0	13
CALT	5911	8	1	0	0	9	0	9
BHGR	5960	8	0	0	0	8	0	8
LAZB	5990	5	1	0	0	6	0	6
WAVI	6270	1	0	0	0	1	0	1
HUVI	6320	3	0	0	0	3	0	3
LBVI	6334	6	1	0	0	7	0	7
OCWA	6460	14	1	0	0	15	0	15
YWAR	6520	2	0	0	0	2	0	2
AUWA	6560	1	0	0	0	1	0	1
COYE	6810	66	13	0	3	82	2	84
YBCH	6830	17	1	2	0	20	0	20
WIWA	6850	0	0	0	0	0	1	1
CATH	7100	2	0	0	0	2	0	2
BEWR	7190	10	4	0	0	14	0	14
HOWR	7210	9	2	0	0	11	0	11
OATI	7330	2	0	0	0	2	0	2
WREN	7420	41	1	4	1	47	0	47
BUSH	7430	10	1	0	0	11	1	12
SWTH	7580	1	0	0	0	1	0	1
HETH	7590	3	0	0	0	3	0	3
Total		290	31	6	4	331	22	353

Table 4. Capture Rate by Net and Date: De Luz Creek, 2001

MAPS Period	Date		Net										Date Total
			1	2	3	4	5	6	7	8	9	10	
-3	4/3	Net Hours	4:55	5:00	5:00	5:14	5:08	5:10	5:08	5:08	5:08	5:04	50:55
		Captures	2	0	0	4	3	3	0	3	4	4	23
		Captures/Net Hour	0.41	0.00	0.00	0.76	0.58	0.58	0.00	0.58	0.78	0.79	0.45
-2	4/12	Net Hours	5:14	5:04	4:51	5:23	5:00	5:00	5:15	4:56	5:05	5:02	50:50
		Captures	6	1	3	1	3	4	0	4	6	2	30
		Captures/Net Hour	1.15	0.20	0.62	0.19	0.60	0.80	0.00	0.81	1.18	0.40	0.59
-1	4/24	Net Hours	5:05	5:25	5:25	5:25	5:40	5:32	5:04	4:57	5:00	5:01	52:34
		Captures	4	1	3	1	6	4	5	4	7	3	38
		Captures/Net Hour	0.79	0.18	0.55	0.18	1.06	0.72	0.99	0.81	1.40	0.60	0.72
1	5/3	Net Hours	5:00	5:10	4:55	4:59	5:05	4:55	5:10	5:15	4:57	4:55	50:21
		Captures	1	4	3	0	2	1	3	3	2	1	20
		Captures/Net Hour	0.20	0.77	0.61	0.00	0.39	0.20	0.58	0.57	0.40	0.20	0.40
2	5/11	Net Hours	5:15	5:12	5:13	4:55	4:55	5:00	5:00	5:15	5:25	5:00	51:10
		Captures	8	2	2	4	2	1	3	1	2	1	26
		Captures/Net Hour	1.52	0.38	0.38	0.81	0.41	0.20	0.60	0.19	0.37	0.20	0.51
3	5/22	Net Hours	5:17	5:16	5:16	5:14	5:14	5:11	4:53	5:15	5:04	5:10	51:50
		Captures	2	3	8	1	3	1	3	2	2	6	31
		Captures/Net Hour	0.38	0.57	1.52	0.19	0.57	0.19	0.61	0.38	0.39	1.16	0.60
4	5/31	Net Hours	5:04	5:07	5:07	5:05	4:42	4:55	5:05	5:07	5:00	4:40	49:52
		Captures	3	6	3	0	1	1	1	5	3	5	28
		Captures/Net Hour	0.59	1.17	0.59	0.00	0.21	0.20	0.20	0.98	0.60	1.07	0.56
5	6/15	Net Hours	4:32	4:56	4:56	4:58	4:55	4:55	4:43	4:53	5:03	4:55	48:46
		Captures	0	5	5	2	1	3	2	7	3	2	30
		Captures/Net Hour	0.00	1.01	1.01	0.40	0.20	0.61	0.42	1.43	0.59	0.41	0.62
6	6/20	Net Hours	5:11	5:10	4:53	5:05	5:10	5:08	5:12	5:09	5:11	5:10	51:19
		Captures	1	4	2	1	2	4	3	1	4	4	26
		Captures/Net Hour	0.19	0.77	0.41	0.20	0.39	0.78	0.58	0.19	0.77	0.77	0.51
7	7/2	Net Hours	5:21	5:18	5:16	5:01	5:10	5:23	5:20	5:15	5:14	5:22	52:40
		Captures	5	5	2	2	0	10	1	1	2	3	31
		Captures/Net Hour	0.93	0.94	0.38	0.40	0.00	1.86	0.19	0.19	0.38	0.56	0.59
8	7/10	Net Hours	5:15	5:05	4:55	4:50	5:10	5:00	5:00	4:51	4:50	4:56	49:52
		Captures	4	4	11	2	3	5	2	1	4	2	38
		Captures/Net Hour	0.76	0.79	2.24	0.41	0.58	1.00	0.40	0.21	0.83	0.41	0.76
9	7/20	Net Hours	5:20	5:19	5:23	5:18	5:18	4:57	5:21	5:21	5:20	5:15	52:52
		Captures	3	7	4	1	5	0	1	1	5	3	30
		Captures/Net Hour	0.56	1.32	0.74	0.19	0.94	0.00	0.19	0.19	0.94	0.57	0.57
10	7/30	Net Hours	5:08	5:10	5:12	5:25	5:18	5:30	5:30	5:33	5:20	5:18	53:24
		Captures	4	6	7	3	3	5	1	0	0	2	30
		Captures/Net Hour	0.78	1.16	1.35	0.55	0.57	0.91	0.18	0.00	0.00	0.38	0.56
11	8/9	Net Hours	5:05	5:01	5:18	5:00	0:00	5:18	5:00	4:55	5:00	5:20	45:57
		Captures	0	1	1	3	0	1	1	1	0	4	12
		Captures/Net Hour	0.00	0.20	0.19	0.60	0.00	0.19	0.20	0.20	0.00	0.75	0.26
12	8/23	Net Hours	5:05	5:05	5:05	5:05	5:00	4:58	4:59	5:08	5:05	5:23	50:53
		Captures	3	1	1	3	2	1	1	0	2	3	17
		Captures/Net Hour	0.59	0.20	0.20	0.59	0.40	0.20	0.20	0.00	0.39	0.56	0.33
Net Total		Net Hours	76:47	77:18	76:45	76:57	71:45	76:52	76:40	76:58	76:42	76:31	763:15
		Captures	46	50	55	28	36	44	27	34	46	45	411
		Captures/Net Hour	0.60	0.65	0.72	0.36	0.50	0.57	0.35	0.44	0.60	0.59	0.54

Figure 4. Captures, Net Hours, and Capture Rate by Net: De Luz Creek, 2001



movement of migrants through the site (Table 5) and peaked at 76 captures per 100-net hours in mid-July, coinciding with an increase in the number of hatch-year birds captured. Otherwise, captures in 2001 were relatively consistent on a period-to-period basis as compared to previous years, without a significant decline in number of captures until August.

Population Trends, Productivity, Survivorship, and Recruitment: 1995 - 2001

Sixty-eight of the birds caught in 2001 (19 percent) were recaptured individuals originally banded in previous years (Table 2), providing six years of survival data for the 1995 banded cohort, five years for the 1996 cohort, four years for the 1997 cohort, three years for the 1998 cohort, two years for the 1999 cohort, and one year for the 2000 cohort. As discussed in previous reports, estimated survival rates are a function of the number of years of recapture data from which they are calculated, and require adjustment as additional years of data are collected (Fourth Annual Progress Report, 1998, Table 6). This derives from the failure of birds to return to the banding site, and/or be recaptured, during every year that they are alive.

Population Size

The majority of species (65 percent) captured at De Luz Creek average fewer than six individuals per year, and many are not caught at all in some years; such low average capture rates make these species poor indicators of long term population trends within the community. Although seventeen species average greater than six captures per year, six of these species are disproportionately represented by transient individuals, or have age classes that are difficult to distinguish, making them poor indicators of breeding population size, productivity, and survivorship. We therefore confined our examination of population trends to the remaining 12 species with adequate numbers of known-age individuals. We considered residents and migrants separately, since these two groups experience different conditions affecting survival and productivity. Seven resident (Figure 5a) and five migrant (Figure 5b) species were selected for preliminary analysis of population trends.

The two most abundant resident species breeding at the site are common yellowthroats and song sparrows (COYE and SOSA, Figure 5a), while the two most abundant breeding migrant species are black-headed grosbeaks and yellow-breasted chats (BHGR and YBCH, Figure 5b). The number of adult (AHY) captures, an index of local population size, was similar across years for common yellowthroats and song sparrows, except for 1996 and 2001 when captures of these two species moved in opposite directions, with the number of song sparrows in 2001 the lowest in the seven years of the study. From 1995 to 1999, black-headed grosbeak and yellow-breasted chat captures appeared to track one another, although chat captures were consistently higher. In 2000, while chats continued to decline from their 1996 peak, grosbeaks rebounded from their 1999 low, but the overall trends for these two species remained similar and both species showed declines in 2001. Because of their higher capture rates and apparent similarity in population trends (within resident and migrant subgroups) these four species were selected for further detailed analysis.

Table 5. Number of Captures by Date: De Luz Creek, 2001

Species	Code	MAPS Period															Total	Captures per 100 Net Hours ^a
		-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12		
		Date																
		4/3	4/12	4/24	5/3	5/11	5/22	5/31	6/15	6/20	7/2	7/10	7/20	7/30	8/9	8/23		
CAQU	0.0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	0.39
NUWO	397.0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	4	0.52
BCHU	429.0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0.26
COHU	430.0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0.26
ANHU	431.0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2	0.26
UNHU ^b	440.9	0	0	0	0	3	1	0	3	0	1	1	0	0	0	0	9	1.18
ATFL	454.0	0	0	1	1	2	0	0	1	0	1	0	2	2	0	0	10	1.31
PSFL	464.1	0	2	0	2	0	1	0	3	0	0	1	0	0	0	0	9	1.18
HOOR	505.0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0.26
PUFI	517.0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
LEGO	530.0	1	0	3	2	3	2	1	0	0	1	0	0	0	0	1	14	1.83
RCSP	580.0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.13
SOSP	581.0	2	4	4	3	4	0	3	3	2	1	5	1	1	1	4	38	4.98
LISP	583.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
SPTO	588.0	0	3	1	0	0	1	1	1	1	0	0	3	1	1	0	13	1.70
CALT	591.1	0	1	2	0	1	0	0	2	1	1	0	0	0	1	1	10	1.31
BHGR	596.0	0	0	1	1	0	1	2	1	0	0	0	1	0	0	1	8	1.05
LAZB	599.0	0	0	4	1	0	0	0	0	2	0	0	0	0	0	0	7	0.92
WAVI	627.0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
HUVI	632.0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0.39
LBVI	633.4	0	0	1	0	0	1	2	0	0	0	0	0	2	0	2	8	1.05
OCWA	646.0	0	1	3	0	2	6	2	0	1	0	0	0	0	1	0	16	2.10
YWAR	652.0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	0.26
AUWA	656.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
COYE	681.0	8	5	6	3	3	6	5	9	9	11	14	6	13	6	3	107	14.02
YBCH	683.0	0	0	3	3	1	3	2	0	4	2	6	1	0	0	0	25	3.28
WIWA	685.0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
CATH	710.0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0.26
BEWR	719.0	1	3	0	1	2	0	1	3	1	1	2	1	1	0	1	18	2.36
HOWR	721.0	0	1	1	1	0	0	0	2	0	1	2	3	2	0	0	13	1.70
OATI	733.0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	0.26
WREN	742.0	6	3	3	0	2	5	4	2	3	8	6	7	6	2	2	59	7.73
BUSH	743.0	1	4	2	2	1	0	3	0	0	0	0	0	0	0	0	13	1.70
SWTH	758.0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.13
HETH	759.0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.39
Total		23	30	38	20	26	31	28	30	26	31	38	30	31	12	17	411	53.85
Species		9	13	17	11	12	12	13	10	10	12	8	13	10	6	10	34	4.45

^a 763:15 total net-hours

^b Not included in species total

Figure 5a. De Luz Creek Population Trends, 1995-2001: Adult Captures, Resident Species

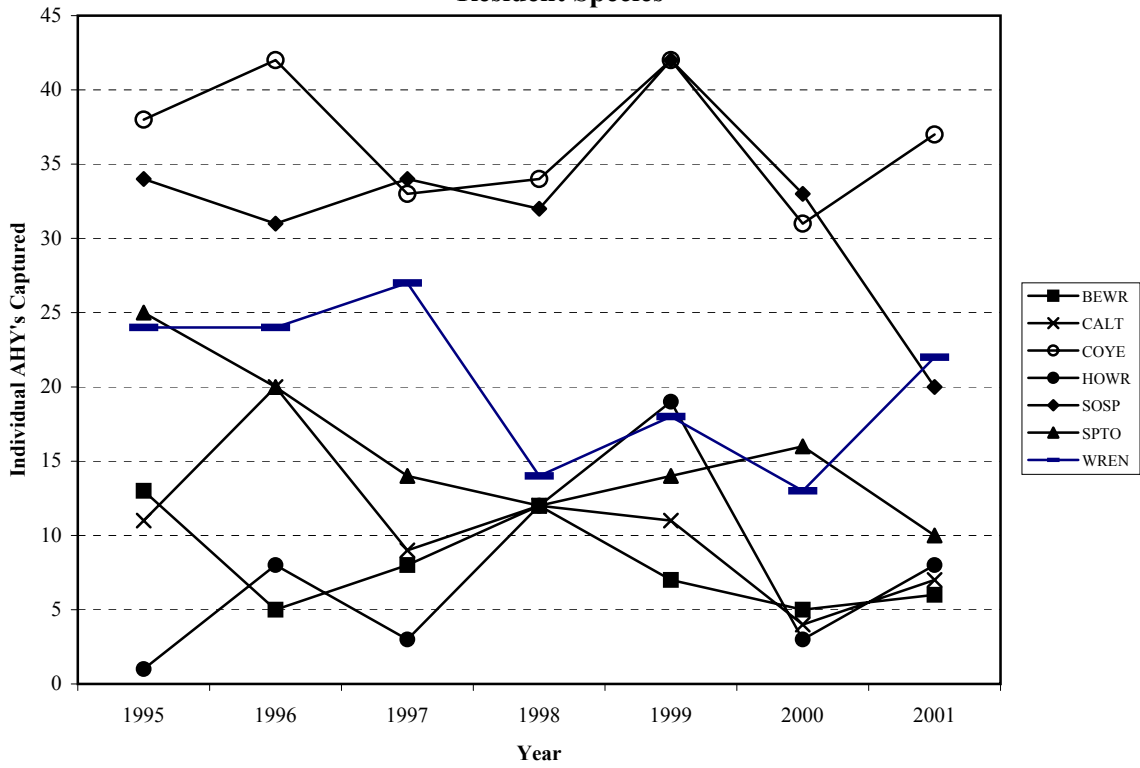
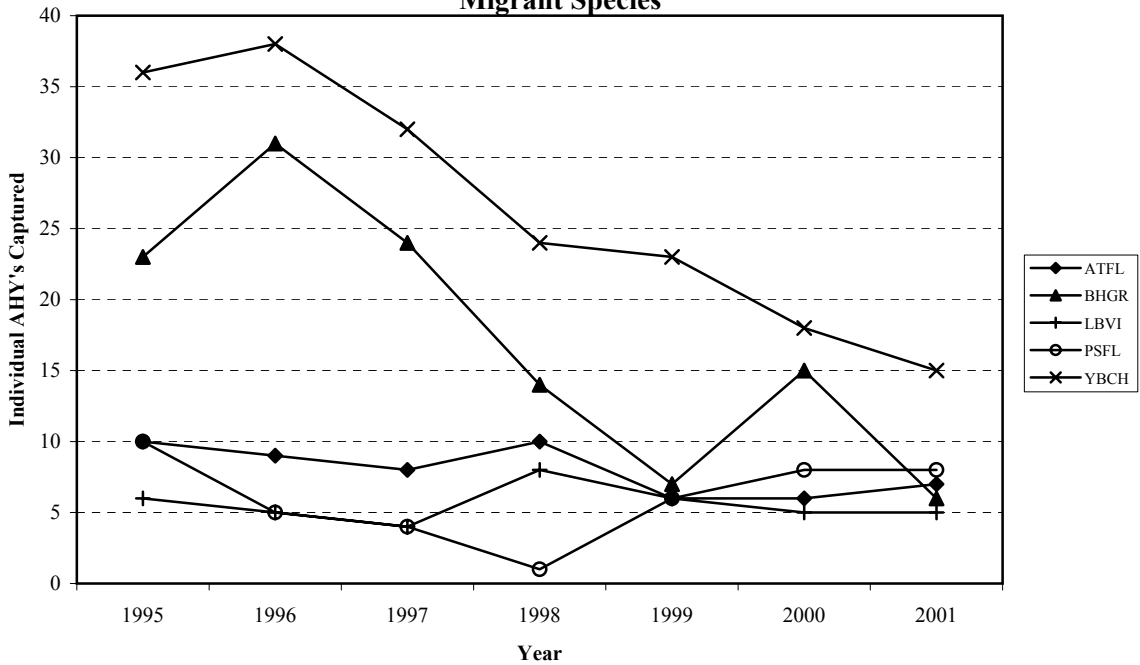


Figure 5b. De Luz Creek Population Trends, 1995-2001: Adult Captures, Migrant Species



Survival and Population Size

Among all four species, most captures of adults each year were new captures (Figures 6a-d). Recaptures were lower and generally less variable between years. Ideally, survivorship should be broken down by species and cohort (year of initial banding), but limited recaptures for the most common species require that all cohorts be pooled for analysis. Between-year survivorship estimates are useful in examining whether species respond differently to variable annual environmental conditions, while cumulative survivorship estimates (survivorship since time of initial banding) are used to compare species' longevity and mortality rates. Survivorship of adults between years (individuals recaptured in year X+1 / individuals captured in year X) generally ranged between 0.20 and 0.50 (Figure 7a). Mean survivorship across years was highest for common yellowthroats (0.39) and lowest for yellow-breasted chats (0.28). Differences in mean survivorship between species (Two-way ANOVA, data arcsine transformed: $F = 3.82$, $p = 0.03$) and years ($F = 3.58$, $p = 0.03$) were both significant at the $\alpha = 0.03$ level. When chats were dropped from the analysis, survivorship did not differ between species ($F = 2.46$, $p = 0.13$), but still differed between years at the $\alpha = 0.06$ level ($F = 3.20$, $p = 0.06$). The years in which mean survivorship of these four species differed most from the combined 6-year mean for all four species of 0.34 were in 1998-1999 (0.46) and 2000-2001 (0.26).

Cumulative survivorship declined for all four species (Figure 7b) from a mean across species of 0.25 after one year to 0.02 after six years. Survival significantly declined across years since time of first capture (Two-way ANOVA, data arcsine transformed: $F = 40.09$, $p << 0.001$) and differed significantly among species ($F = 9.04$, $p = 0.001$). Cumulative survivorship was greatest for yellowthroats, and lowest for chats (Figure 7b). All four focal species showed positive relationships between adult survivorship and changes in population size (Figure 8a-b), although none of these relationships were significant (COYE: $R^2 = 0.30$, $p = 0.26$; SOSPO: $R^2 = 0.37$, $p = 0.20$; BHGR: $R^2 = 0.41$, $p = 0.17$; YBCH: $R^2 = 0.53$, $p = 0.10$).

Productivity, Recruitment, and Population Size

The number of juvenile (hatching-year, HY) individuals captured was indexed to adults at the site (number HY captures / number AHY captures) to control for fluctuations in adult population size when calculating annual productivity. Productivity for common yellowthroats and song sparrows ranged between 0.17 (SOSP, 1999) and 1.30 (COYE, 2001) HY's per adult (Figure 9a), and appeared to follow similar trends, except in 1996 when sparrow productivity (0.71) was nearly three times as high as that for yellowthroats (0.26). Productivity of both song sparrows and common yellowthroats increased substantially in 2001, with the increase much greater in common yellowthroats as productivity reached an all-time high of 1.30. HY/AHY productivity of black-headed grosbeaks and yellow-breasted chats followed similar yearly trends (Figure 9b), except in 2000 when chat productivity increased while grosbeak productivity declined. Productivity of these migrant species was generally lower than, and trends dissimilar to, those of the two resident species, except for in 2001, when all four species showed marked increases. Apparent productivity of grosbeaks (0.07 – 0.33) has generally been higher than that for chats (0.00 – 0.33), but this measure of chat productivity may be an underestimate. Although chat captures have declined over the course of this study, they still remain relatively high, and chats are the most commonly captured migrant species at this site. It is possible that hatching-year chats may not be adequately sampled, and the extremely low average captures of hatching-

Figure 6a. Composition of Adult Common Yellowthroat Captures at De Luz Creek, 1995 - 2001



Figure 6b. Composition of Adult Song Sparrow Captures at De Luz Creek, 1995 - 2001

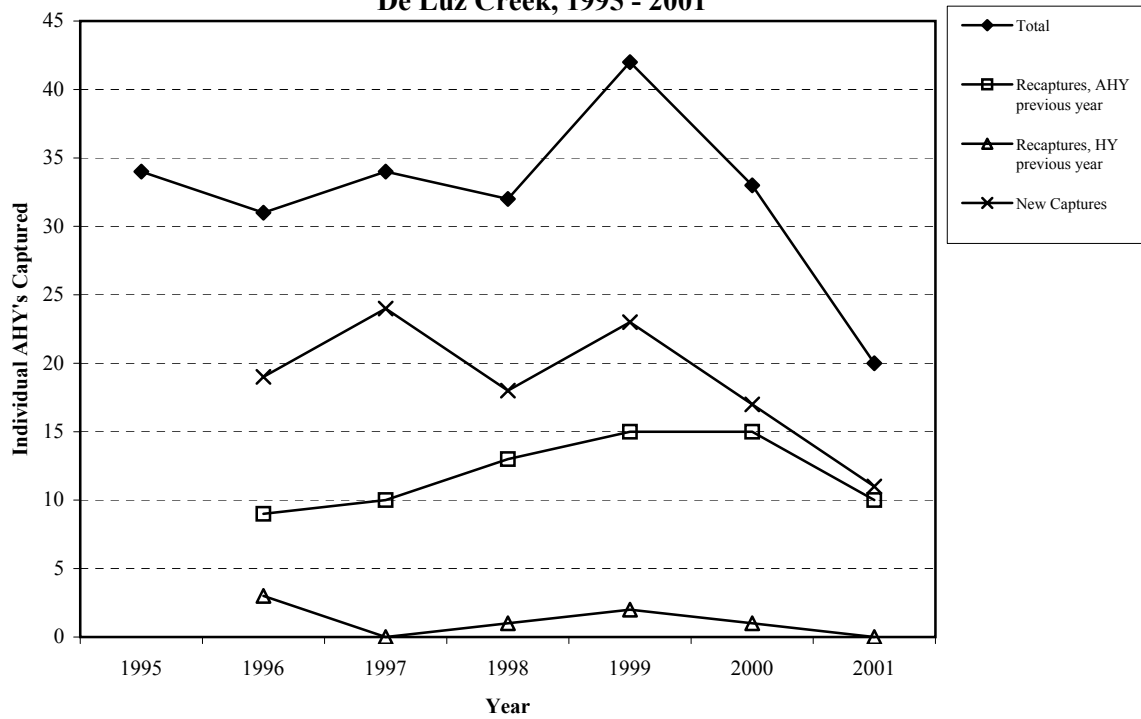


Figure 6c. Composition of Adult Black-Headed Grosbeak Captures at De Luz Creek, 1995 - 2001

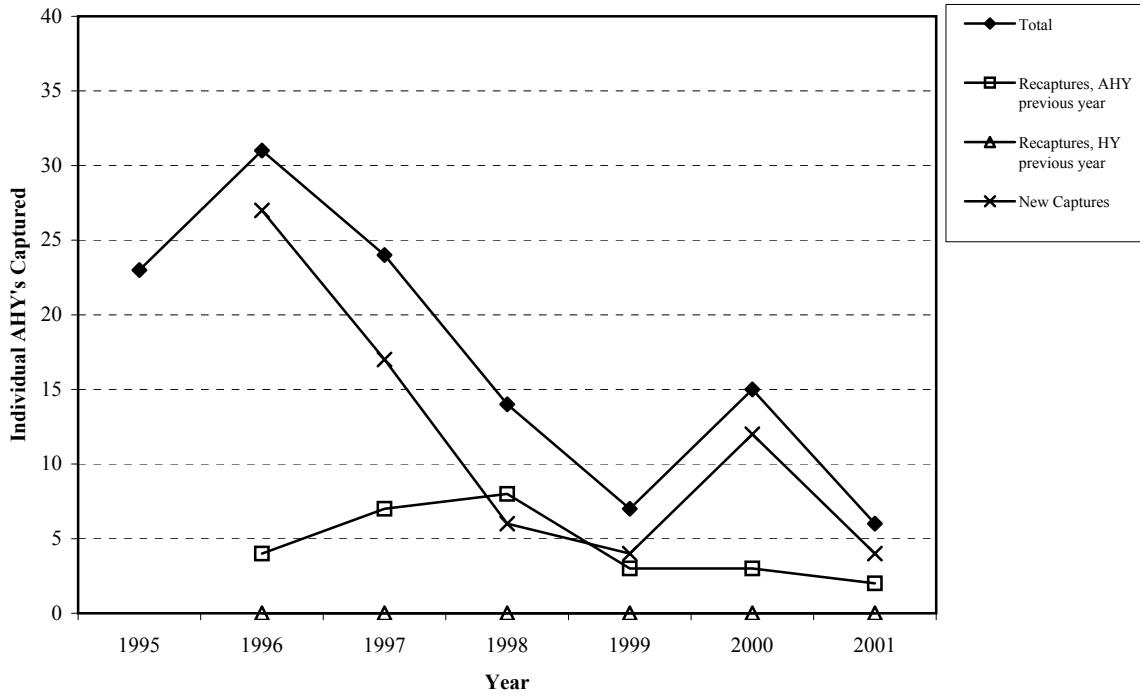
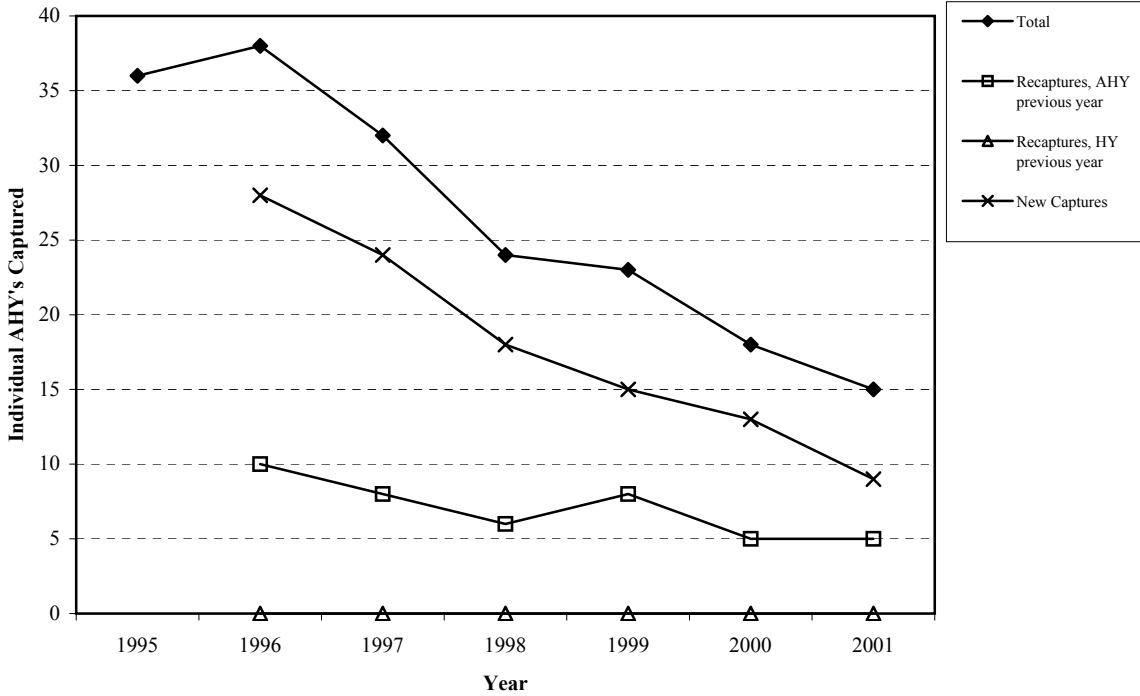
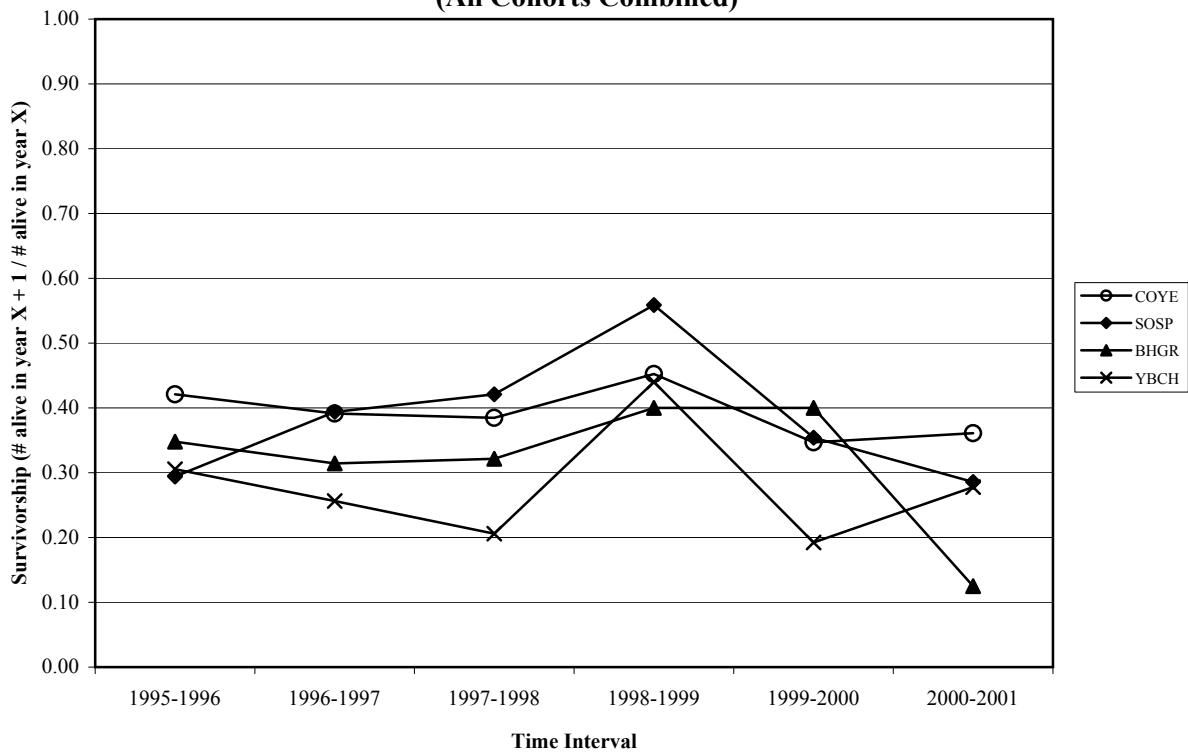


Figure 6d. Composition of Adult Yellow-Breasted Chat Captures at De Luz Creek, 1995 - 2001



**Figure 7a. Adult Survivorship between Years at De Luz Creek, 1995 -2001
(All Cohorts Combined)**



**Figure 7b. Adult Survivorship from Time of First Capture at De Luz Creek,
1995-2001 (All Cohorts Combined)**

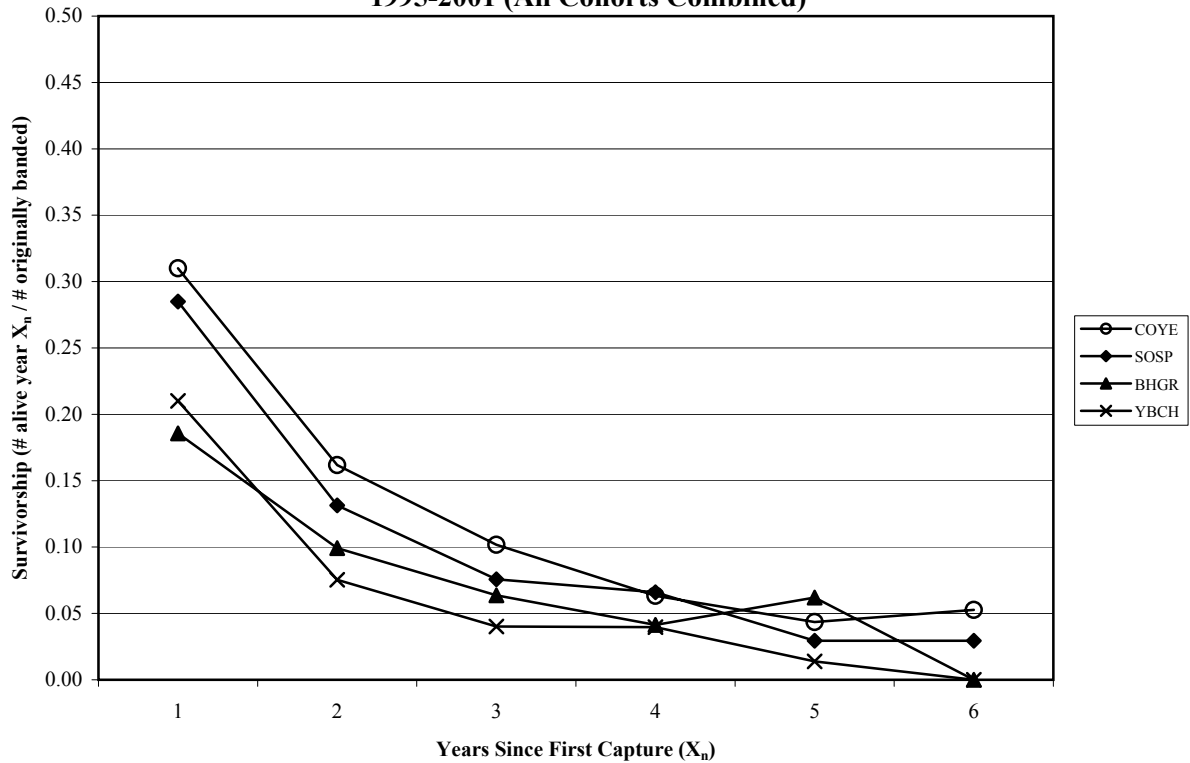


Figure 8a. Relationship between Survivorship and Changes in Adult Population Size, Resident Species, De Luz Creek 1995 -2001

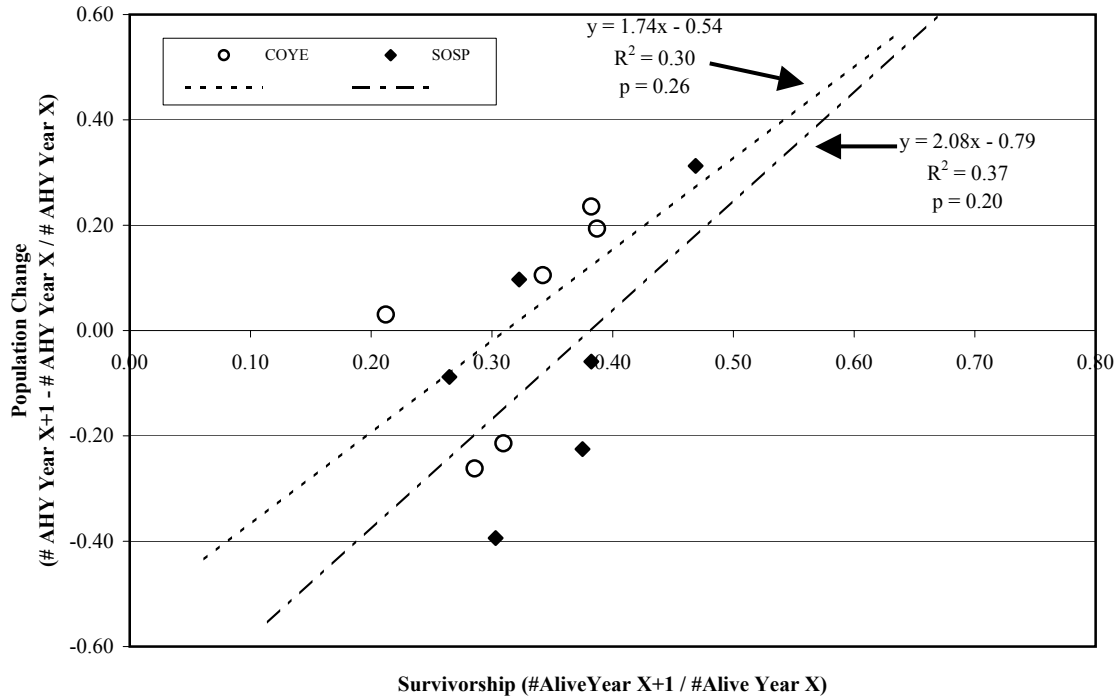
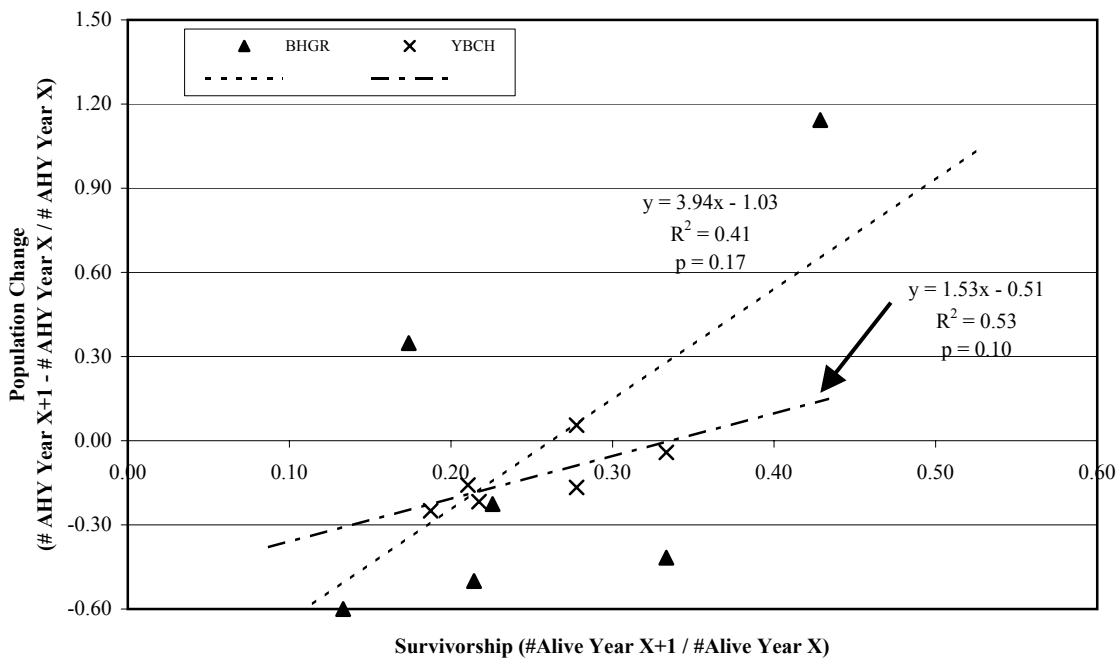
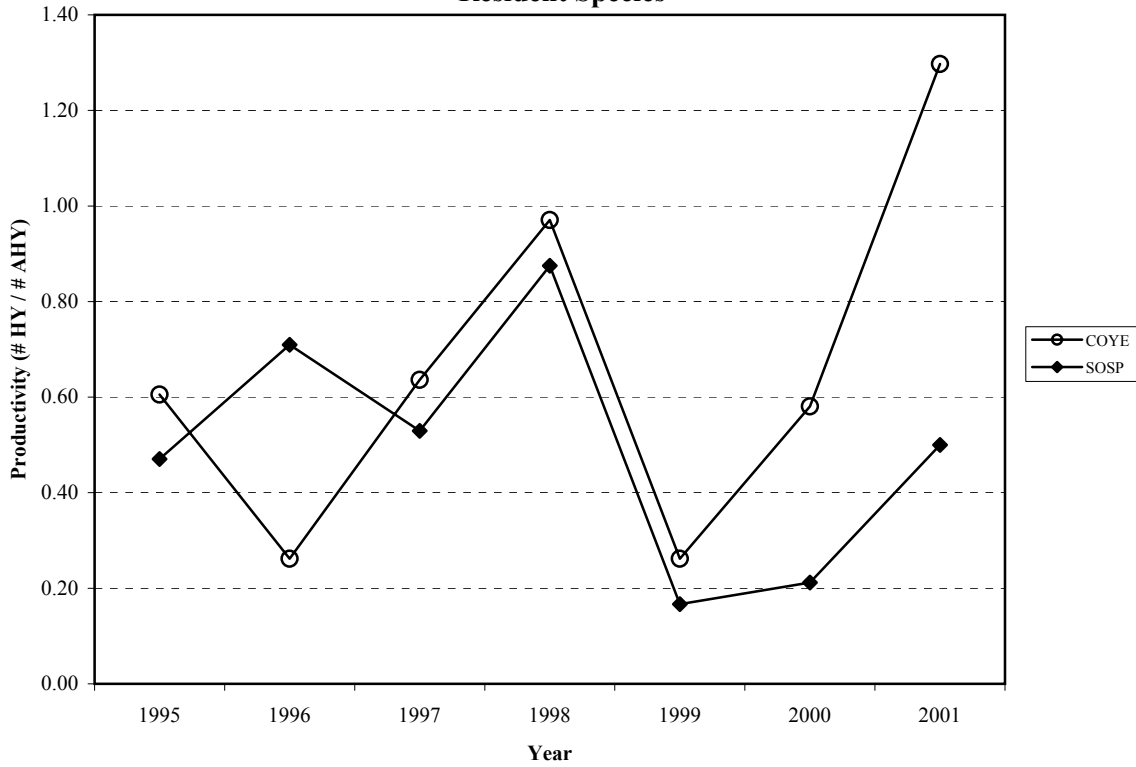


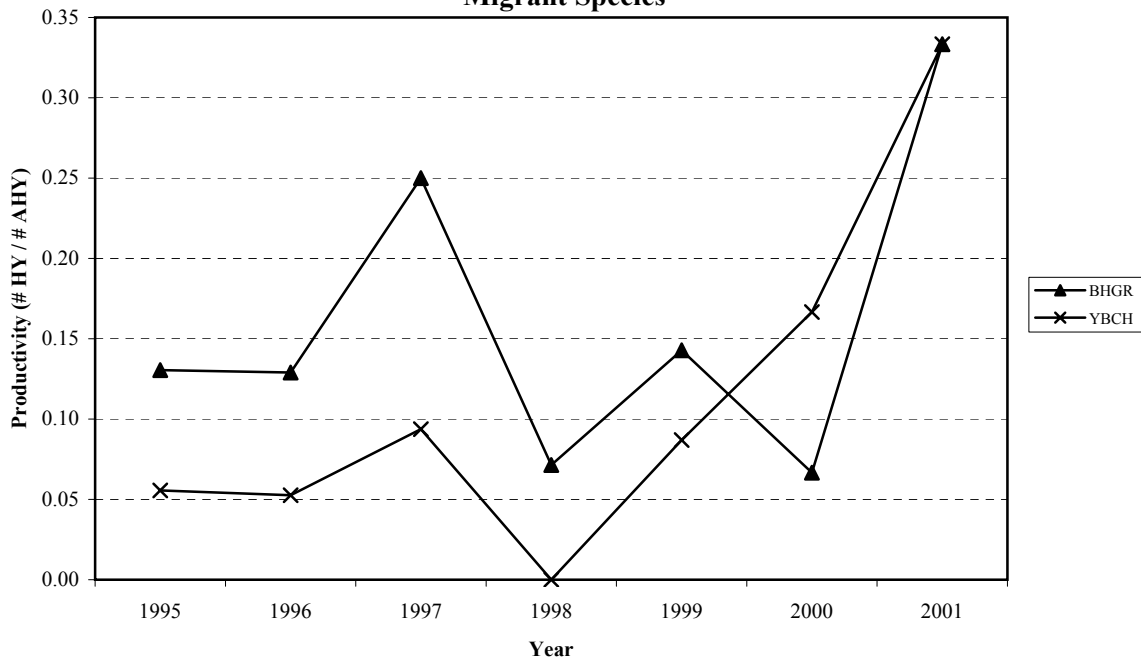
Figure 8b. Relationship between Survivorship and Changes in Adult Population Size, Migrant Species, De Luz Creek 1995 -2001



**Figure 9a. Annual Productivity, 1995-2001: De Luz Creek,
Resident Species**



**Figure 9b. Annual Productivity, 1995-2001: De Luz Creek,
Migrant Species**



year chats (2.4 per year) may be a poor indicator of actual chat productivity at the site. However, chat productivity has increased steadily over the last few years; thus, overall chat captures at the site may increase in the near future.

Local recruitment (recapture of birds initially banded as hatching-years) has been extremely low since 1995 for common yellowthroats and song sparrows (Figure 6a-b) and non-existent for black-headed grosbeaks and yellow-breasted chats (Figure 6c-d). There is no relationship between local recruitment and population change (Figure 10) in common yellowthroats or song sparrows. However, productivity is significantly and strongly positively correlated with population change in the subsequent year for both common yellowthroats and song sparrows (Figure 11a; COYE: $y = 0.71x - 0.38$, $R^2 = 0.81$, $p = 0.01$; SOSp: $y = 0.85x - 0.48$, $R^2 = 0.92$, $p = 0.003$). In contrast, black-headed grosbeaks and yellow-breasted chats exhibited no relationship between productivity and population change (Figure 11b). These results indicate (at least among resident species) that although population fluctuations are a function of yearly productivity and subsequent recruitment of juvenile birds, most locally banded juveniles move away from their natal site and out of our sampling area. This local reciprocal recruitment of juveniles could be confirmed by re-sighting or recapture of banded birds outside, but adjacent to, the banding station.

Summary: 1995-2001

Adult populations of the two most common resident species fluctuated on a yearly basis, except for the appearance of a downward trend in song sparrow adults over the past two years. The two most common migrant species have steadily declined in number of adults over the years with the exception of increases in black-headed grosbeak numbers relative to the prior year in 1996 and 2000. Adult survivorship does not appear to be driving population fluctuations to a great extent. Mean annual adult survivorship differed significantly between species and years, and survivorship of all four species declined as a function of time since banding, a typical pattern of mortality for these passerine species. Productivity was also highly variable between years, with residents and migrants again exhibiting different trends, with the exception of 2001, when all four species showed considerable increases in productivity. Recruitment, although not from within the banding site, appears to be the strongest determinant of breeding population size among residents.

Santa Margarita River

Overview of 2001 Captures

Six hundred and sixty-two individuals of 39 species were caught during 771 net-hours (Table 6). Overall captures totaled 808, for an average capture rate of 1.05 captures per net-hour, considerably lower than the 1998-2000 average capture rate (1.33) but almost two times higher than the capture rate at De Luz in 2001. Species richness was nearly equal to its peak in 1999 (40 species). As opposed to the De Luz site, the Santa Margarita station in 2001 rebounded from all-time lows in 2000 of total captures, individuals captured, and capture rates.

Figure 10. Relationship between Recruitment and Changes in Population Size, Resident Species, De Luz Creek 1995 -2001

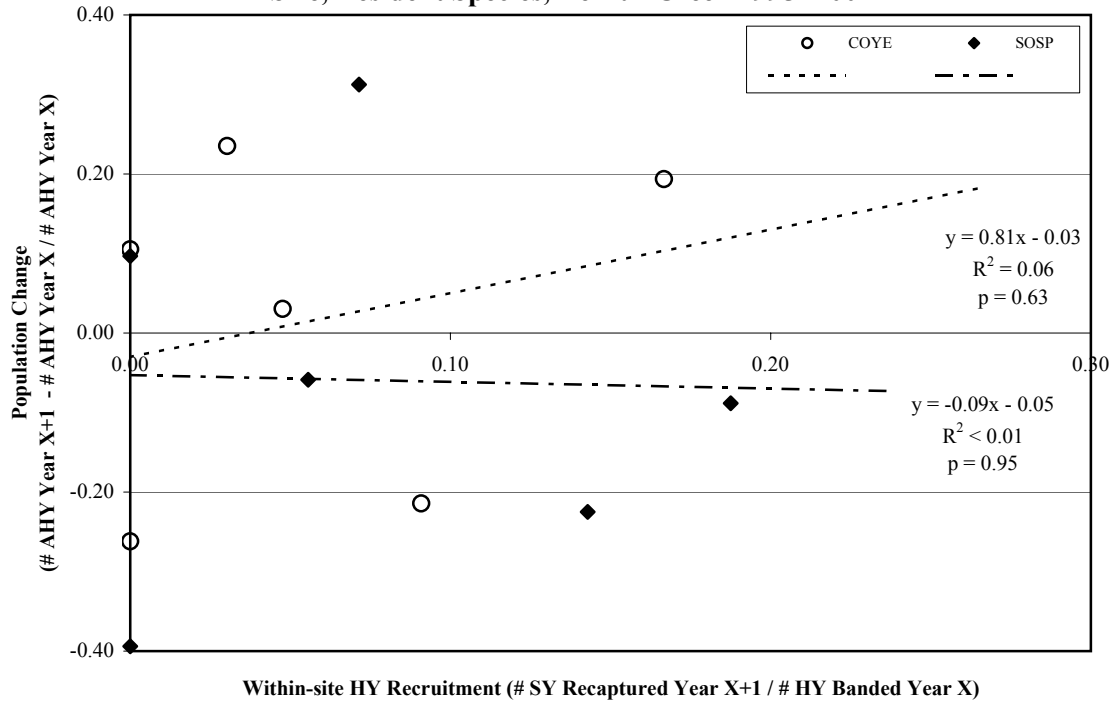


Figure 11a. Relationship between Productivity and Changes in Adult Population Size, Resident Species, De Luz Creek 1995 -2001

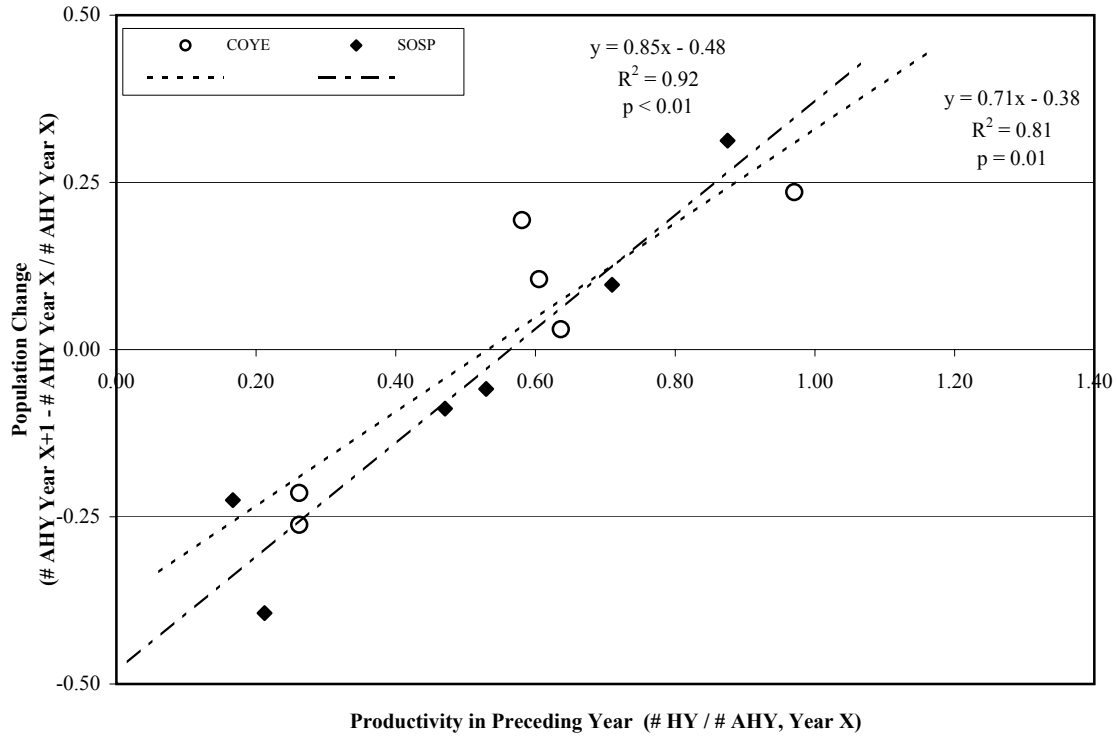


Figure 11b. Relationship between Productivity and Changes in Adult Population Size, Migrant Species, De Luz Creek 1995 -2001

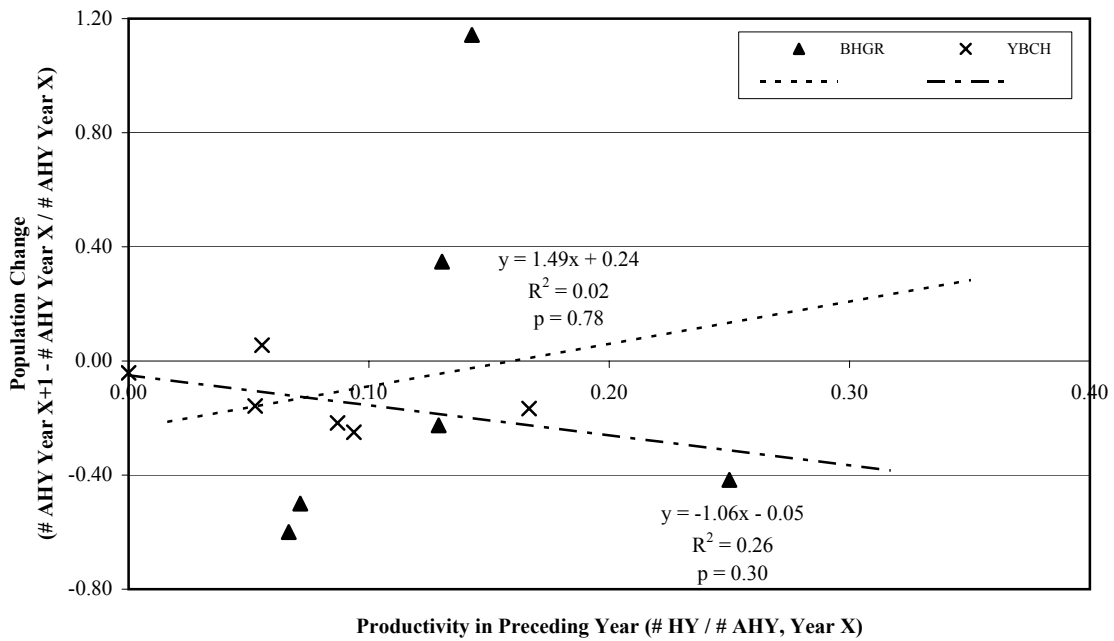


Table 6. Sex and Age of Individuals Captured: Santa Margarita River, 2001

Species	Code	Female					Female Total	Male					Male Total	Unknown Sex					Unknown Total	Species Total					
		Age ^a						Age ^a						Age ^a											
		A	H	O	S	U		A	H	O	S	U		A	H	O	S	U							
DOWO	394.0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
NUWO	397.0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
BCHU	429.0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
COHU	430.0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
ANHU	431.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
UNHU	440.9	2	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	4	0	0	0	5	7
ATFL	454.0	1	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	4
WIFL	466.0	2	0	0	0	0	2	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	5	7
HOFI	519.0	0	0	0	0	0	0	2	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	1	3
AMGO	529.0	7	0	2	0	0	9	2	1	4	1	0	8	0	0	0	0	0	0	0	0	0	0	0	17
LEGO	530.0	1	0	0	0	0	1	2	0	2	1	0	5	0	0	0	0	0	0	0	0	0	0	0	6
WCSP	554.0	1	0	0	0	0	1	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0	9	10
BRSP	562.0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
SOSP	581.0	20	0	0	0	0	20	16	0	0	0	0	16	8	45	0	0	0	7	0	0	0	0	60	96
LISP	583.0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2
SPTO	588.0	2	0	0	0	0	4	5	0	2	0	0	7	1	0	0	0	0	1	0	0	0	0	2	13
CALT	591.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
BHGR	596.0	2	0	1	0	0	3	0	0	2	3	0	5	0	0	0	0	0	0	0	0	0	0	0	8
TRES	614.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
WAVI	627.0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	9	9
CAVI	629.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
HUVI	632.0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
LBVI	633.4	6	0	0	0	0	6	0	0	0	0	0	0	11	5	0	0	0	0	0	0	0	0	16	22
OCWA	646.0	11	1	4	0	0	16	13	1	1	1	0	16	3	13	0	0	2	0	0	0	0	0	18	50
YWAR	652.0	4	0	2	0	0	6	10	0	2	1	0	13	2	7	0	0	0	0	0	0	0	0	9	28
AUWA	656.0	0	0	3	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	4
BTYW	665.0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
TOWA	668.0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
HEWA	669.0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
MGWA	680.0	2	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
COYE	681.0	28	5	11	5	0	49	22	12	19	5	2	60	1	108	0	0	3	0	0	0	0	0	112	221
YBCH	683.0	7	0	0	0	0	7	8	0	1	1	0	10	0	4	0	0	0	0	0	0	0	0	4	21
WIWA	685.0	5	0	0	0	0	5	10	2	3	0	0	13	5	0	0	0	0	0	0	0	0	0	5	25
BEWR	719.0	1	0	0	0	0	1	0	0	0	0	0	0	3	11	0	0	0	0	0	0	0	0	14	15
HOWR	721.0	5	0	0	0	0	5	1	0	0	0	0	1	7	5	0	0	2	0	0	0	0	0	14	20
WREN	742.0	0	0	0	0	0	0	0	0	0	0	0	0	11	7	0	0	2	0	0	0	0	0	20	20
BUSH	743.0	11	2	0	0	0	13	4	0	0	0	0	4	1	8	0	0	3	0	0	0	0	0	12	29
RCKI	749.0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SWTH	758.0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	4
HETH	759.0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total		125	8	24	7	0	164	97	17	37	13	2	166	87	220	0	0	25	332	662					

Once again, the two most abundant species at the Santa Margarita station were common yellowthroats and song sparrows. Yellowthroats outnumbered song sparrows for the second consecutive year at more than twice the number of song sparrows captured (Figure 12). Together these two species comprised 48 percent of all individuals captured, comparable to the 1998-2000 average (54 percent). While captures of individual common yellowthroats reached an all-time high in 2001 (221), the number of song sparrow individuals has decreased to less than a third of their 1998 high (1998 = 328, 1999 = 238, 2000 = 109, 2001 = 96). Common yellowthroats and song sparrows were followed in abundance by orange-crowned warblers, bushtits, yellow warblers, Wilson's warblers, least Bell's vireos, yellow-breasted chats, wrentits, American goldfinches, Bewick's wrens, and spotted towhees. The latter ten species comprised 39 percent of all individuals captured, and 87 percent of all individuals captured belonged to one of the twelve most abundant species. Once again, relatively high captures of sensitive species (southwestern willow flycatcher, least Bell's vireo, yellow warbler, yellow-breasted chat) confirmed that this site supports breeding populations of several species of conservation concern. Seven new species were captured at the site in 2001 (Table 7) including Costa's hummingbird, Brewer's sparrow, Lincoln's sparrow, California towhee, Cassin's vireo, hermit warbler, and MacGillivray's warbler.

The sex ratio of birds of known sex (N=330), similar to De Luz, was almost exactly 1:1, at 164 female individuals and 166 males (Table 6). The proportion of hatching-year birds in the population in 2001 (39 percent) was comparable to the 1998-2000 average (37 percent), and to the percentage at De Luz (38 percent) in 2001, which was an all-time high for De Luz. As in 1998-2000, this high productivity was mainly attributable to high captures of hatching-year common yellowthroats (125 individuals) and song sparrows (45 individuals), although orange-crowned warblers (15 individuals), Bewick's wrens (11 individuals), bushtits (ten individuals), yellow warblers (seven individuals), and wrentits (seven individuals) contributed substantially to the total. These seven species together accounted for 90 percent of all hatching-year individuals captured. Single-species comparisons between the Santa Margarita and De Luz populations indicate that song sparrow productivity was 2.0 times higher at the former site (1.02 young/adult versus 0.50 young/adult, respectively), while common yellowthroat productivity was nearly equal between sites (1.37 young/adult versus 1.30 young/adult).

Six hundred and seventy of the birds caught (95 percent) were banded. Birds not banded included ten hummingbirds, and 23 additional birds that escaped prior to banding (20) or were not banded for other reasons (three, Table 8). The majority of birds (84 percent) were captured only once during the season, but some individuals of the most abundant species were captured 2-4 times, and two common yellowthroats and one Bewick's wren were captured five times (Table 8). Overall capture rates by net ranged from 77 to 203 captures per 100 net-hours, for an overall average capture rate of 105 per 100 net-hours (Table 9). Capture rates at all nets were lower than, but proportional to, the 1998-2000 averages, except for net 2, which had a higher than average capture rate (Figure 13). Capture rates peaked at 187 captures per 100-net hours in late April (Table 9), and declined steadily for the rest of the season after that peak. Peak capture rates coincided with the peak movement of migrants through the site, as did species richness (Table 10).

Figure 12. Number of Individuals Caught per Species: Santa Margarita River, 2001

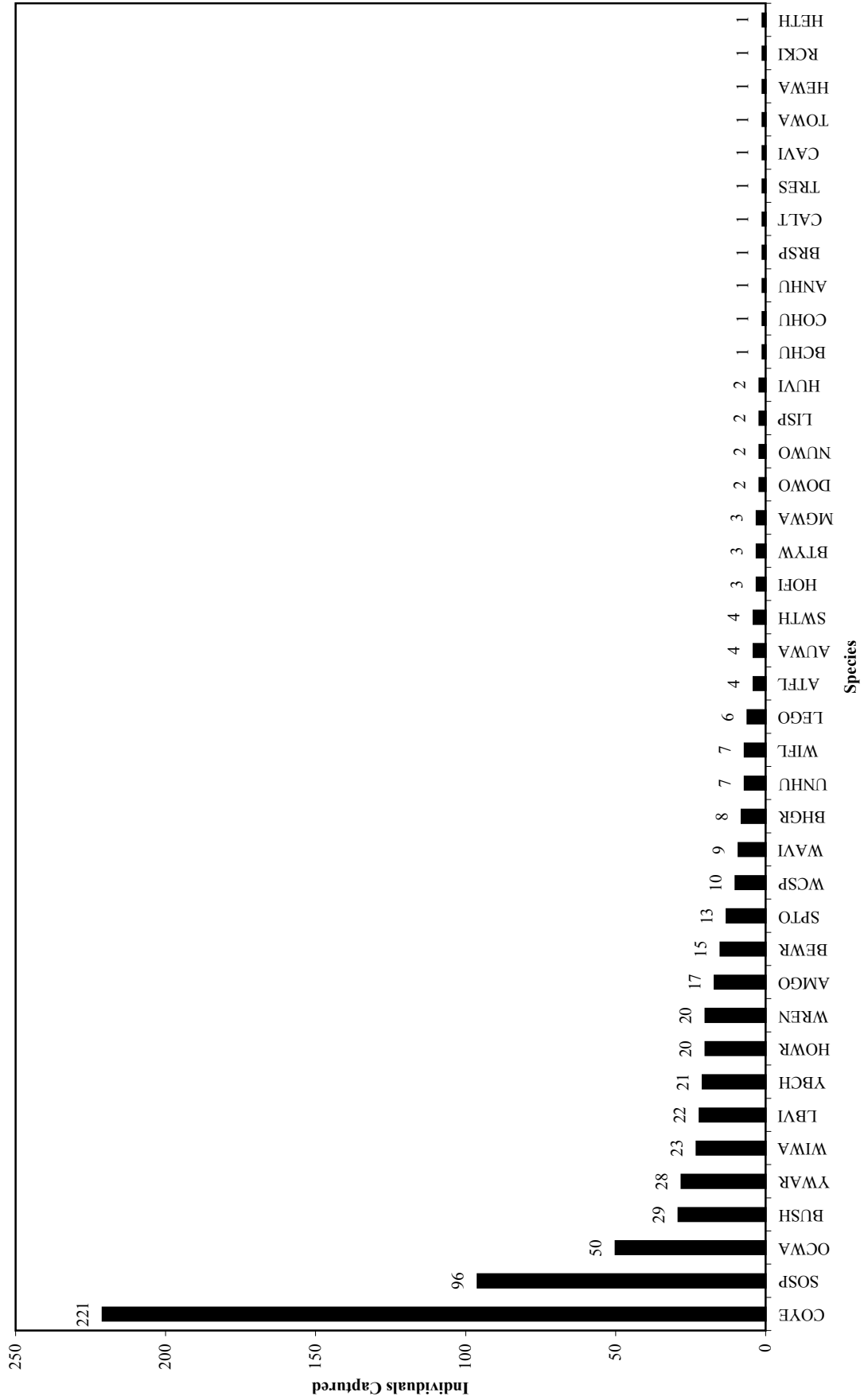


Table 7. Number of Birds Captured, Banded, and Recaptured: Santa Margarita River, 1998 - 2001

Species	Code	Total Captures ^a					New Individuals Banded					Recaptured Individuals, 2001				
		Year				Total	Year				Total	Originally Banded			Total	
		1998	1999	2000	2001		1998	1999	2000	2001		1998	1999	2000		
CAQU	0.0	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0
MODO	316.0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
COGD	320.0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
SSHA	332.0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
DOWO	394.0	3	4	3	2	12	2	2	2	2	8	0	0	0	0	0
NUWO	397.0	0	1	1	2	4	0	1	1	2	4	0	0	0	0	0
BCHU	429.0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
COHU	430.0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
ANHU	431.0	3	4	1	1	9	0	0	0	0	0	0	0	0	0	0
RUHU	433.0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
ALHU	434.0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0
UNHU	440.9	1	5	0	7	13	0	0	0	0	0	0	0	0	0	0
BLPH	458.0	2	1	0	0	3	2	1	0	0	3	0	0	0	0	0
PSFL	464.1	3	15	2	0	20	2	15	2	0	19	0	0	0	0	0
HOOR	505.0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
HOFI	519.0	2	10	8	3	23	2	10	8	3	23	0	0	0	0	0
AMGO	529.0	19	31	14	17	81	17	28	12	17	74	0	0	0	0	0
LEGO	530.0	11	26	8	6	51	10	23	8	6	47	0	0	0	0	0
WCSP	554.0	0	5	0	5	10	0	4	0	5	9	0	0	0	0	0
BRSP	562.0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
LISP	583.0	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0
CALT	591.1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
BLGR	597.0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
LAZB	599.0	0	0	3	0	3	0	0	3	0	3	0	0	0	0	0
TRES	614.0	0	1	0	1	2	0	1	0	1	2	0	0	0	0	0
WAVI	627.0	3	19	2	9	33	3	19	2	9	33	0	0	0	0	0
CAVI	629.1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
NAWA	645.0	0	4	0	0	4	0	4	0	0	4	0	0	0	0	0
AUWA	656.0	0	1	0	4	5	0	1	0	4	5	0	0	0	0	0
BTYW	665.0	0	1	1	3	5	0	1	1	3	5	0	0	0	0	0
TOWA	668.0	1	4	1	1	7	1	4	1	1	7	0	0	0	0	0
HEWA	669.0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
MGWA	680.0	0	0	0	3	3	0	0	0	3	3	0	0	0	0	0
HOWA	684.0	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0
WIWA	685.0	9	26	18	25	78	8	26	17	25	76	0	0	0	0	0
HOWR	721.0	9	19	2	22	52	7	13	2	16	38	0	0	0	0	0
RCKI	749.0	0	2	0	1	3	0	2	0	1	3	0	0	0	0	0
SWTH	758.0	12	25	4	4	45	12	25	4	3	44	0	0	0	0	0
HETH	759.0	0	1	0	1	2	0	1	0	1	2	0	0	0	0	0
ATFL	454.0	0	5	2	4	11	0	4	2	3	9	0	0	1	1	1
BHGR	596.0	4	6	2	9	21	2	6	2	7	17	0	0	1	1	1
HUVI	632.0	5	1	1	2	9	4	0	1	1	6	0	0	1	1	1
WIFL	466.0	11	11	4	8	34	6	7	3	5	21	1	0	1	2	2
WREN	742.0	11	18	18	25	72	8	16	15	17	56	0	0	2	2	2
BUSH	743.0	22	62	30	31	145	19	54	20	25	118	0	0	2	2	2
SPTO	588.0	18	13	19	17	67	13	11	12	10	46	0	0	3	3	3
BEWR	719.0	24	20	14	21	79	14	14	4	12	44	2	1	0	3	3
LBVI	633.4	43	33	33	32	141	33	14	19	19	85	4	1	0	5	5
YBCH	683.0	24	27	25	27	103	16	19	15	17	67	0	4	1	5	5
YWAR	652.0	35	55	28	31	149	30	37	13	22	102	3	2	1	6	6
OCWA	646.0	29	115	68	61	273	26	98	46	38	208	1	6	5	12	12
SOSP	581.0	400	314	149	126	989	316	177	69	70	632	16	2	15	33	33
COYE	681.0	230	260	240	289	1019	196	160	140	180	676	12	15	33	60	60
Total		936	1154	705	808	3603	750	800	424	534	2508	39	31	66	136	136

^a Includes multiple captures of some individuals (i.e., these numbers do not reflect total individuals)

Table 8. Capture Frequency of Individuals: Santa Margarita River, 2001

Species	Code	# Individuals / Capture Incidence (Banded Birds Only)					# Captures		
		1 Capture	2 Captures	3 Captures	4 Captures	5 Captures	Banded Birds	Unbanded Birds	All Birds
DOWO	394.0	2	0	0	0	0	2	0	2
NUWO	397.0	2	0	0	0	0	2	0	2
BCHU	429.0	0	0	0	0	0	0	1	1
COHU	430.0	0	0	0	0	0	0	1	1
ANHU	431.0	0	0	0	0	0	0	1	1
UNHU	440.9	0	0	0	0	0	0	7	7
ATFL	454.0	4	0	0	0	0	4	0	4
WIFL	466.0	6	1	0	0	0	7	0	7
HOFI	519.0	3	0	0	0	0	3	0	3
AMGO	529.0	17	0	0	0	0	17	0	17
LEGO	530.0	6	0	0	0	0	6	0	6
WCSP	554.0	5	0	0	0	0	5	0	5
BRSP	562.0	1	0	0	0	0	1	0	1
SOSP	581.0	75	12	7	0	0	94	4	98
LISP	583.0	2	0	0	0	0	2	0	2
SPTO	588.0	12	0	1	0	0	13	2	15
CALT	591.1	1	0	0	0	0	1	0	1
BHGR	596.0	7	1	0	0	0	8	0	8
TRES	614.0	1	0	0	0	0	1	0	1
WAVI	627.0	9	0	0	0	0	9	0	9
CAVI	629.1	1	0	0	0	0	1	0	1
HUVI	632.0	2	0	0	0	0	2	0	2
LBVI	633.4	18	4	1	1	0	24	0	24
OCWA	646.0	40	9	0	0	0	49	3	52
YWAR	652.0	25	3	0	0	0	28	0	28
AUWA	656.0	4	0	0	0	0	4	0	4
BTYW	665.0	3	0	0	0	0	3	0	3
TOWA	668.0	1	0	0	0	0	1	0	1
HEWA	669.0	1	0	0	0	0	1	0	1
MGWA	680.0	3	0	0	0	0	3	0	3
COYE	681.0	173	26	10	4	2	215	8	223
YBCH	683.0	17	4	0	0	0	21	0	21
WIWA	685.0	25	0	0	0	0	25	0	25
BEWR	719.0	12	2	0	0	1	15	0	15
HOWR	721.0	14	3	0	0	0	17	2	19
WREN	742.0	15	5	0	0	0	20	1	21
BUSH	743.0	25	2	0	0	0	27	2	29
RCKI	749.0	1	0	0	0	0	1	0	1
SWTH	758.0	3	0	0	0	0	3	1	4
HETH	759.0	1	0	0	0	0	1	0	1
Total		537	72	19	5	3	636	33	669

Table 9. Capture Rate by Net and Date: Santa Margarita River, 2001

MAPS Period	Date		Net										Date Total
			1	2	3	4	5	6	7	8	9	10	
-3	4/5	Net Hours	5:08	5:18	5:30	5:19	5:08	5:13	5:20	5:19	5:16	5:20	52:51
		Captures	10	12	5	2	1	5	6	2	4	2	49
		Captures/Net Hour	1.95	2.26	0.91	0.38	0.19	0.96	1.13	0.38	0.76	0.38	0.93
-2	4/13	Net Hours	4:58	4:56	5:00	5:10	4:50	4:59	5:08	4:52	4:55	5:00	49:48
		Captures	5	5	4	2	4	8	1	4	2	5	40
		Captures/Net Hour	1.01	1.01	0.80	0.39	0.83	1.61	0.19	0.82	0.41	1.00	0.80
-1	4/26	Net Hours	4:55	5:00	4:50	4:55	5:10	5:08	5:08	5:19	5:20	5:35	51:20
		Captures	10	20	10	8	10	6	9	4	13	6	96
		Captures/Net Hour	2.03	4.00	2.07	1.63	1.94	1.17	1.75	0.75	2.44	1.07	1.87
1	5/4	Net Hours	5:12	5:20	5:05	4:50	5:13	5:05	4:57	5:01	5:06	5:05	50:54
		Captures	5	10	4	6	6	6	8	10	6	10	71
		Captures/Net Hour	0.96	1.88	0.79	1.24	1.15	1.18	1.62	1.99	1.18	1.97	1.39
2	5/15	Net Hours	5:00	5:10	5:05	5:02	5:05	5:00	5:00	5:21	5:10	5:30	51:23
		Captures	4	17	5	9	5	2	4	7	12	8	73
		Captures/Net Hour	0.80	3.29	0.98	1.79	0.98	0.40	0.80	1.31	2.32	1.45	1.42
3	5/24	Net Hours	5:32	5:15	5:36	5:03	5:22	5:19	5:12	4:39	4:05	4:45	50:48
		Captures	4	19	6	5	5	4	5	7	6	4	65
		Captures/Net Hour	0.72	3.62	1.07	0.99	0.93	0.75	0.96	1.51	1.47	0.84	1.28
4	6/1	Net Hours	4:59	5:07	5:18	5:10	5:05	5:05	5:05	5:02	4:50	5:07	50:48
		Captures	2	14	10	5	2	3	7	8	3	14	68
		Captures/Net Hour	0.40	2.74	1.89	0.97	0.39	0.59	1.38	1.59	0.62	2.74	1.34
5	6/13	Net Hours	5:14	5:15	5:20	5:05	5:06	5:12	5:13	5:25	5:30	5:17	52:37
		Captures	2	19	2	8	4	4	1	20	5	8	73
		Captures/Net Hour	0.38	3.62	0.38	1.57	0.78	0.77	0.19	3.69	0.91	1.51	1.39
6	6/21	Net Hours	5:03	5:05	4:55	5:05	4:56	4:53	5:00	5:05	5:03	5:07	50:12
		Captures	7	7	3	2	0	3	5	4	11	10	52
		Captures/Net Hour	1.39	1.38	0.61	0.39	0.00	0.61	1.00	0.79	2.18	1.95	1.04
7	7/3	Net Hours	5:35	5:26	5:34	5:10	5:25	5:33	5:34	5:25	5:27	5:25	54:34
		Captures	1	19	10	3	6	11	4	11	5	3	73
		Captures/Net Hour	0.18	3.50	1.80	0.58	1.11	1.98	0.72	2.03	0.92	0.55	1.34
8	7/11	Net Hours	5:08	4:56	5:07	5:09	5:10	5:10	5:10	5:10	5:07	5:07	51:14
		Captures	3	7	2	3	7	1	4	7	4	3	41
		Captures/Net Hour	0.58	1.42	0.39	0.58	1.35	0.19	0.77	1.35	0.78	0.59	0.80
9	7/23	Net Hours	5:00	5:00	5:01	4:54	4:54	5:05	5:05	5:09	5:08	5:10	50:26
		Captures	1	2	2	2	3	2	3	3	5	3	26
		Captures/Net Hour	0.20	0.40	0.40	0.41	0.61	0.39	0.59	0.58	0.97	0.58	0.52
10	7/31	Net Hours	5:05	5:04	5:03	5:04	4:53	4:57	5:03	5:11	5:03	5:06	50:29
		Captures	4	1	4	2	4		6	1	1	1	24
		Captures/Net Hour	0.79	0.20	0.79	0.39	0.82	0.00	1.19	0.19	0.20	0.20	0.48
11	8/10	Net Hours	5:25	5:15	5:06	5:07	5:10	5:10	5:10	5:20	5:20	5:20	52:23
		Captures	2	3	3	5	4	6		4	5	1	33
		Captures/Net Hour	0.37	0.57	0.59	0.98	0.77	1.16	0.00	0.75	0.94	0.19	0.63
12	8/22	Net Hours	5:15	5:20	5:25	5:13	5:07	5:10	5:10	5:10	5:10	5:03	52:03
		Captures	0	2	5	1	1	1	3	3	4	4	24
		Captures/Net Hour	0.00	0.38	0.92	0.19	0.20	0.19	0.58	0.58	0.77	0.79	0.46
Net Total		Net Hours	77:29	77:27	77:55	76:16	76:34	76:59	77:15	77:28	76:30	77:57	771:50
		Captures	60	157	75	63	62	62	66	95	86	82	808
		Captures/Net Hour	0.77	2.03	0.96	0.83	0.81	0.81	0.85	1.23	1.12	1.05	1.05

Figure 13. Captures, Net Hours, and Capture Rate by Net: Santa Margarita River, 2001

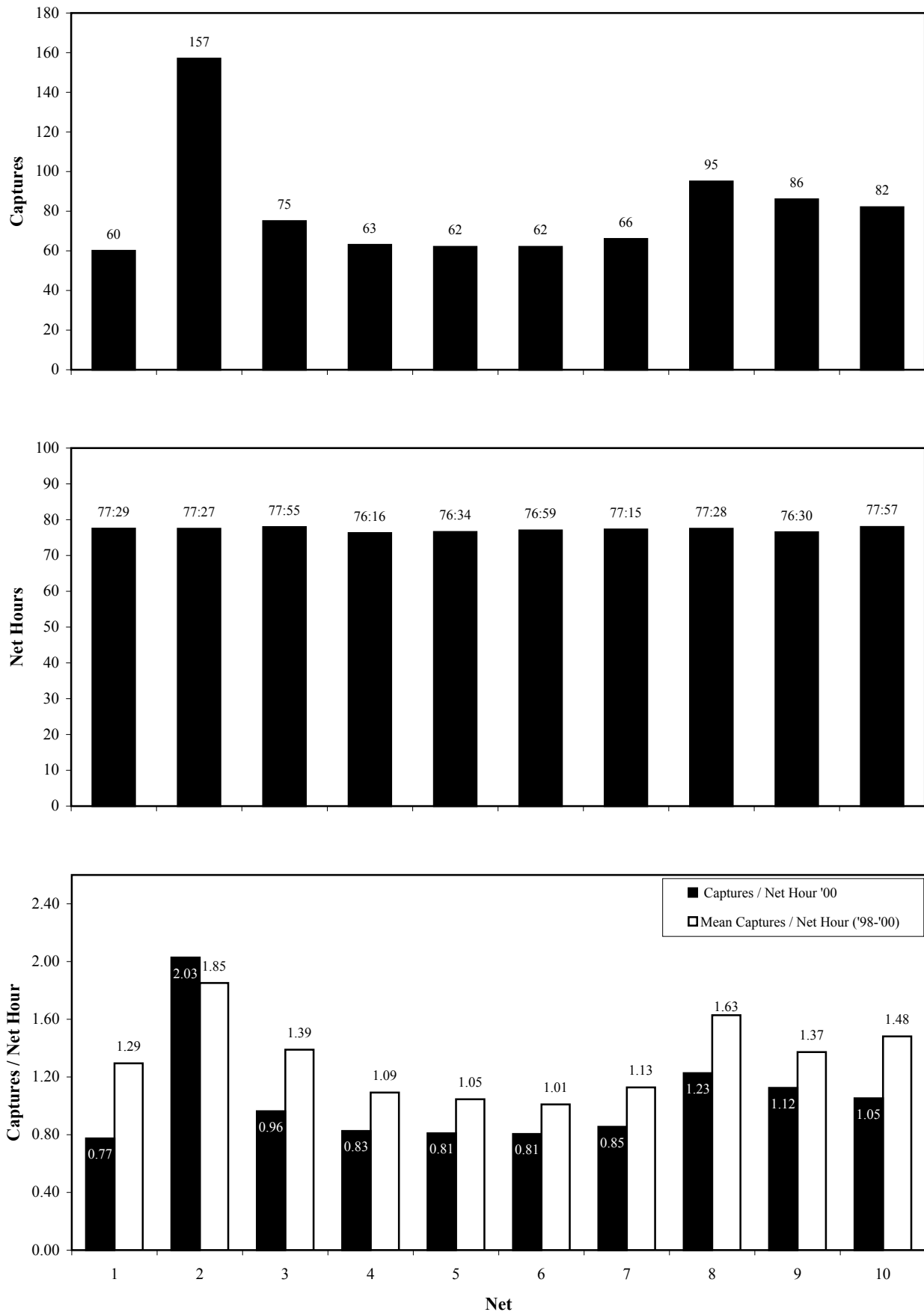


Table 10. Number of Captures by Date: Santa Margarita River, 2001

Species	Code	MAPS Period														Total	Captures per 100 Net Hours ^a	
		-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11			12
		Date																
		4/5	4/13	4/26	5/4	5/15	5/24	6/1	6/13	6/21	7/3	7/11	7/23	7/31	8/10	8/22		
DOWO	394.0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	0.26
NUWO	397.0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0.26
BCHU	429.0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.13
COHU	430.0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.13
ANHU	431.0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.13
UNHU ^b	440.9	0	0	0	0	1	1	0	2	2	0	1	0	0	0	0	7	0.91
ATFL	454.0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	4	0.52
WIFL	466.0	0	0	0	1	0	2	2	1	0	0	1	0	0	0	1	8	1.04
HOFI	519.0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3	0.39
AMGO	529.0	0	1	5	0	3	0	2	2	1	0	0	3	0	0	0	17	2.20
LEGO	530.0	0	0	1	1	0	0	1	1	0	0	0	1	0	1	0	6	0.78
WCSP	554.0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0.65
BRSP	562.0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
SOSP	581.0	15	8	8	12	11	9	10	10	3	11	7	5	3	8	6	126	16.32
LISP	583.0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.26
SPTO	588.0	4	0	3	1	2	3	2	2	0	0	0	0	0	0	0	17	2.20
CALT	591.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.13
BHGR	596.0	0	0	3	0	2	2	2	0	0	0	0	0	0	0	0	9	1.17
TRES	614.0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.13
WAVI	627.0	0	0	0	7	2	0	0	0	0	0	0	0	0	0	0	9	1.17
CAVI	629.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
HUVI	632.0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0.26
LBVI	633.4	1	0	2	5	6	2	1	1	3	5	2	1	1	0	2	32	4.15
OCWA	646.0	5	9	13	8	5	8	2	4	0	0	1	1	0	2	3	61	7.90
YWAR	652.0	0	1	10	5	4	2	1	4	1	2	1	0	0	0	0	31	4.02
AUWA	656.0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.52
BTYW	665.0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0.39
TOWA	668.0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
HEWA	669.0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
MGWA	680.0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3	0.39
COYE	681.0	12	14	16	15	22	26	34	27	30	32	18	11	15	14	3	289	37.44
YBCH	683.0	0	0	2	3	5	4	3	0	1	2	4	0	1	1	1	27	3.50
WIWA	685.0	0	0	17	6	0	0	0	0	0	0	1	0	0	0	1	25	3.24
BEWR	719.0	0	0	0	0	0	2	2	1	4	4	2	2	0	3	1	21	2.72
HOWR	721.0	0	1	2	0	1	2	2	3	1	5	1	1	1	0	2	22	2.85
WREN	742.0	1	0	0	0	2	2	2	4	2	3	2	0	3	2	2	25	3.24
BUSH	743.0	2	1	1	0	4	0	0	8	4	8	0	0	0	2	1	31	4.02
RCKI	749.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
SWTH	758.0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	4	0.52
HETH	759.0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
Total		49	40	96	71	73	65	68	73	52	73	41	26	24	33	24	808	104.69
Species		11	10	22	17	16	12	16	15	10	10	11	9	6	8	12	39	5.05

^a 771:50 total net-hours

^b Not included in species total

Recapture of Banded Birds

One hundred and thirty-six (20 percent) of all individuals caught were recaptures of birds originally banded in 1998, 1999, or 2000 (Table 7), which is comparable to 2000 (22 percent). Song sparrows, common yellowthroats, orange-crowned warblers, yellow warblers, least Bell's vireos, and yellow-breasted chats comprised eighty-nine percent of all recaptures. At this time, data are not sufficient for detailed analyses of year-to-year and cumulative survivorship of individuals within a species such as that performed for the De Luz site. Such analyses will be included in subsequent reports. The high capture numbers for several sensitive species at Santa Margarita will be useful for understanding determinants of population demographics for these species, and when compared to the De Luz site, may indicate how habitat characteristics at each site affect demographic characteristics.

Population Size

We confined our examination of population trends at the Santa Margarita site to the 13 species with adequate numbers of known-age individuals. We considered residents and migrants separately, since these two groups experience different conditions affecting survival and productivity. Seven resident (Figure 14a) and six migrant (Figure 14b) species were initially selected for preliminary analysis of population trends.

The two most abundant resident species breeding at the site are common yellowthroats and song sparrows (COYE and SOSA, Figure 14a), while the two most abundant breeding migrant species are orange-crowned warblers and yellow-breasted chats (OCWA and YBCH, Figure 14b). The number of adult (AHY) captures, an index of local population size, was similar across years for common yellowthroats and song sparrows, except for 2001 when captures of these two species moved in opposite directions, with the number of song sparrows exhibiting a large drop in numbers whereas yellowthroats increased slightly over their 2000 total. The orange-crowned warbler population increased dramatically from 1998 to 1999, and dropped considerably after the 1999 peak, although the species remained the most abundant migrant at the site. The adult population of yellow-breasted chats has remained relatively consistent over the four years of the study. Because of their higher capture rates, these four species were selected for further detailed analysis. Yellow-breasted chats were selected even though their numbers are not as high as yellow warblers in order to compare trends for one migrant species between the De Luz and Santa Margarita sites. The analyses for the Santa Margarita site include only a description of trends in adult populations and of annual productivity of the four species as there are not sufficient data to perform statistically sound regression analyses. Such analyses will be performed with the gathering of additional data in future years.

Population Trends and Productivity

As at the De Luz site, most captures of adults each year were new captures (Figures 15a-d). Recaptures were lower and generally less variable between years. Local recruitment (recapture of birds initially banded as hatching-years) has been extremely low since 1998 for

Figure 14a. Santa Margarita River Population Trends, 1998-2001: Adult Captures, Resident Species

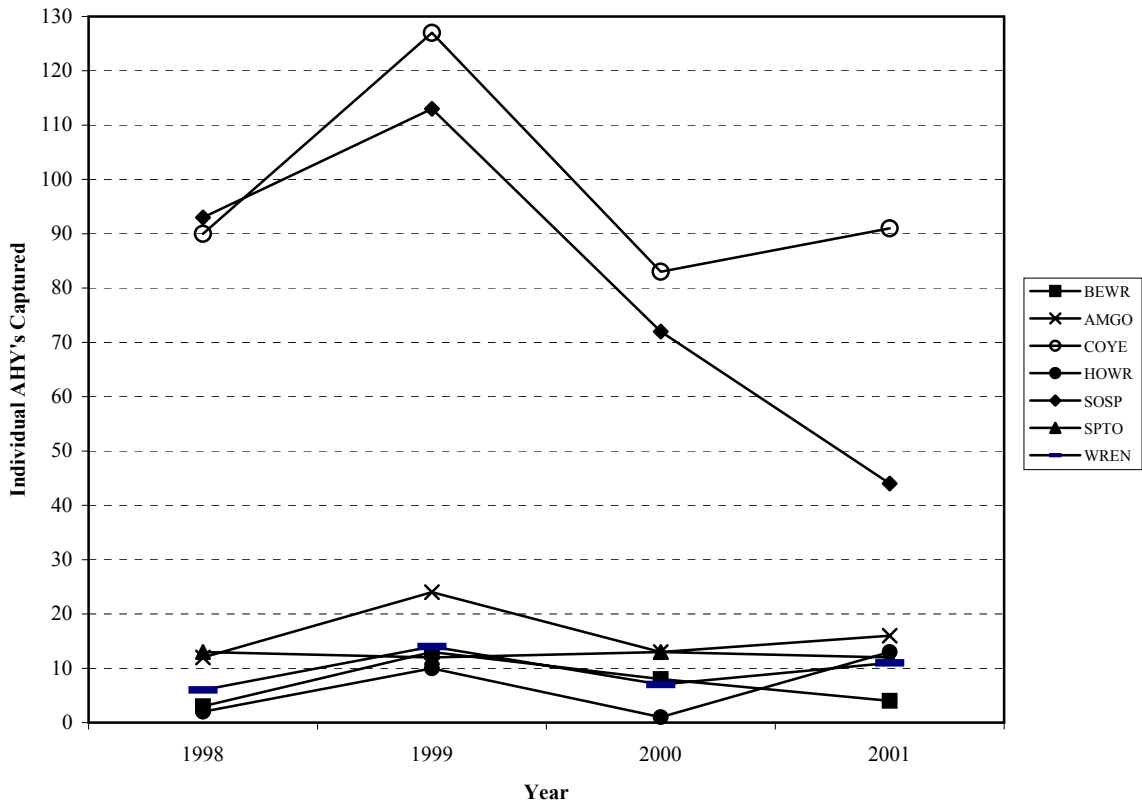


Figure 14b. Santa Margarita River Population Trends, 1998-2001: Adult Captures, Migrant Species

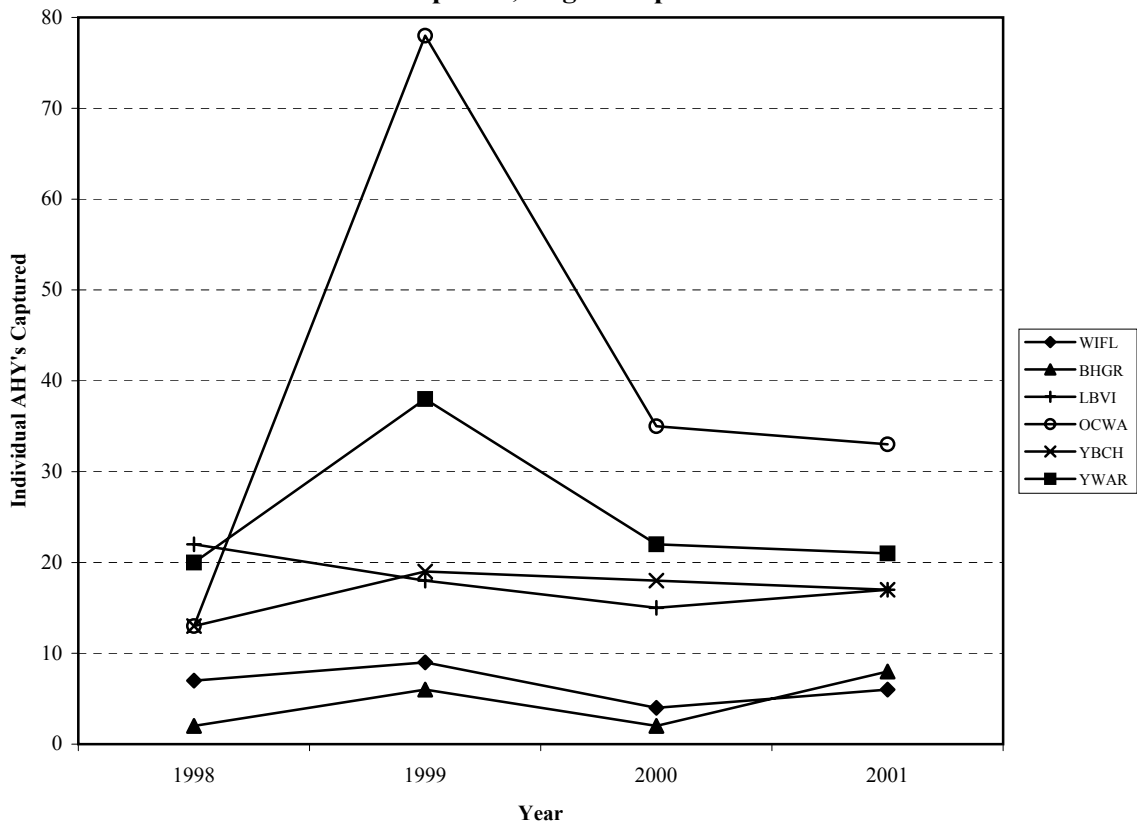


Figure 15a. Composition of Adult Common Yellowthroat Captures at Santa Margarita River, 1998 - 2001

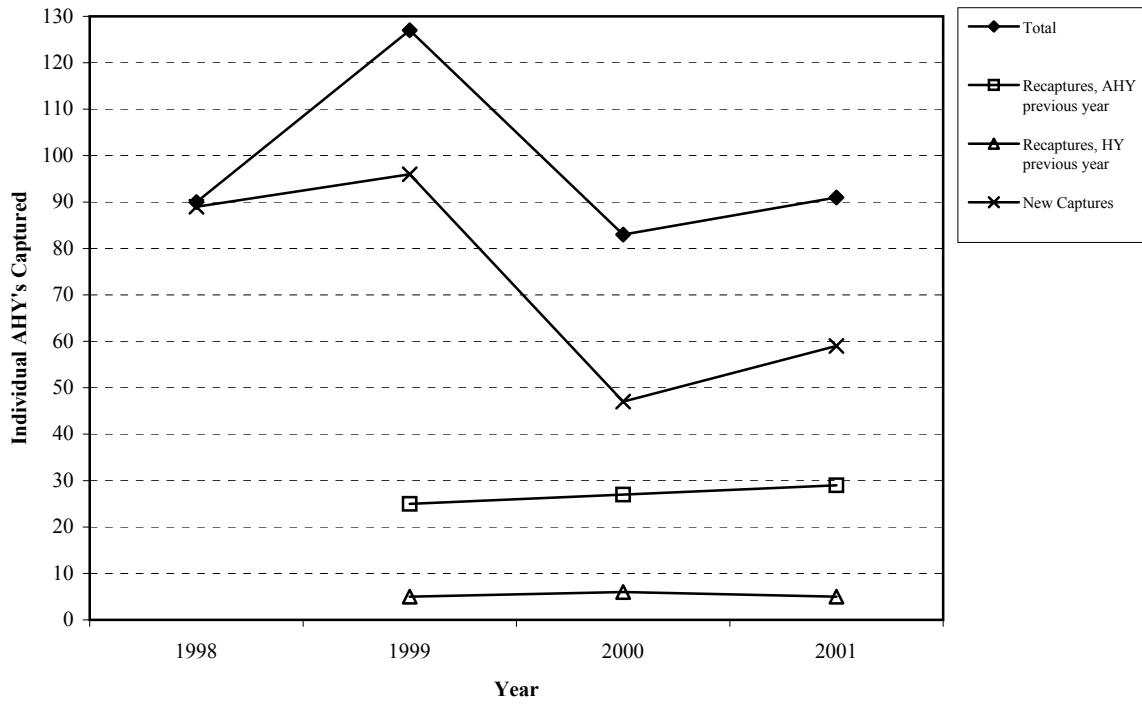


Figure 15b. Composition of Adult Song Sparrow Captures at Santa Margarita River, 1998 - 2001

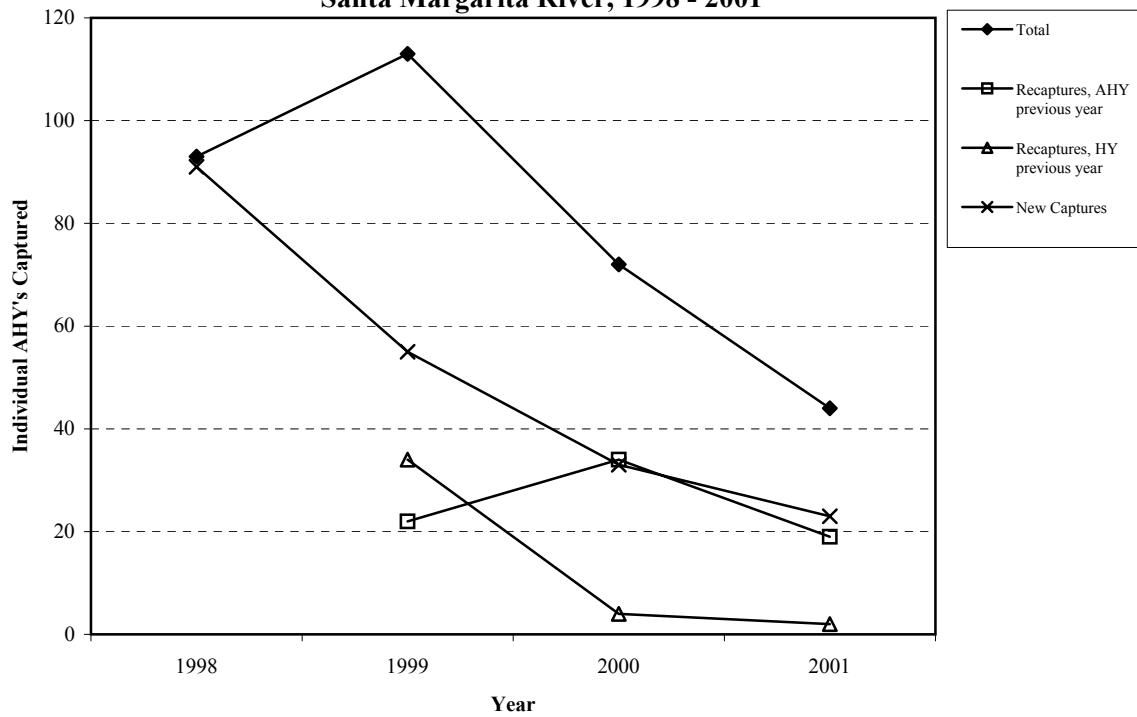


Figure 15c. Composition of Adult Orange-crowned Warbler Captures at Santa Margarita River, 1998 - 2001

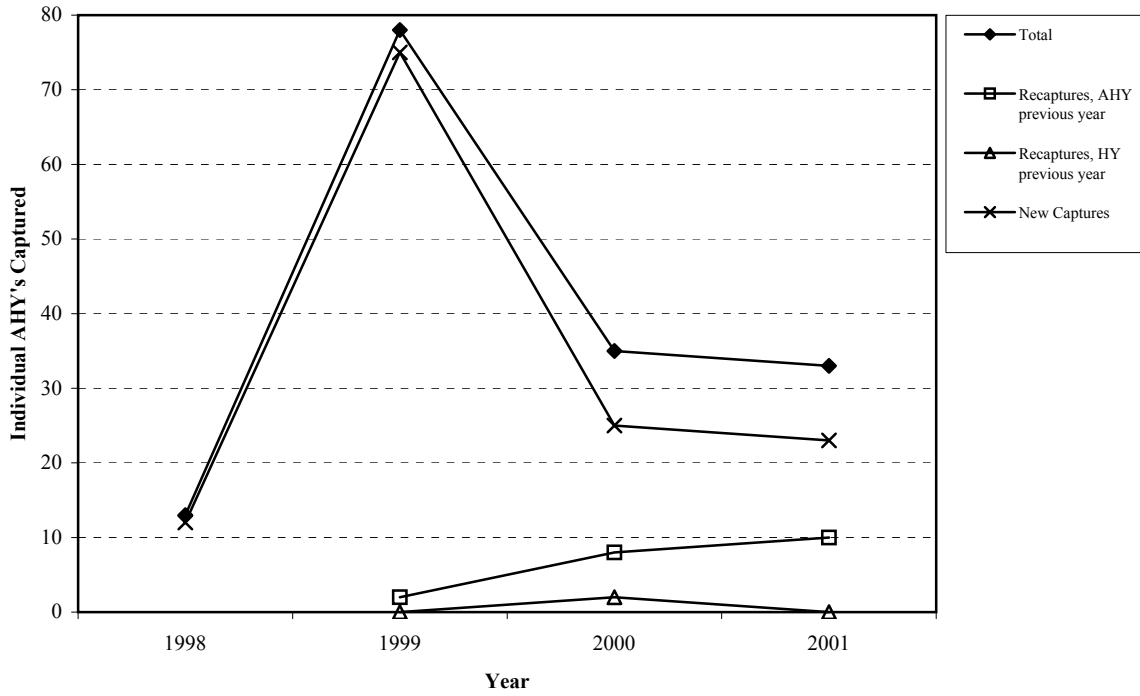
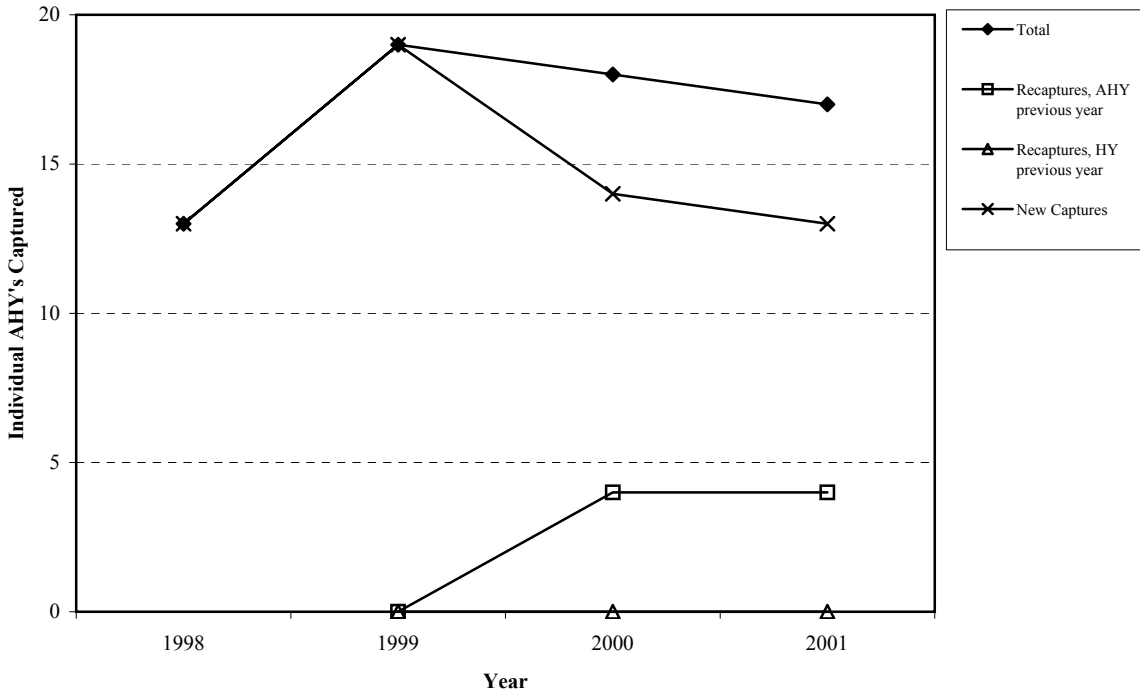


Figure 15d. Composition of Adult Yellow-Breasted Chat Captures at Santa Margarita River, 1998 - 2001



common yellowthroats and song sparrows (Figure 15a-b), with the exception of 1999 recruitment of song sparrows. Only two orange-crowned warblers initially banded as hatching-year birds have been recaptured over the course of the study, and no hatching-year yellow-breasted chats have been recaptured (Figure 15c-d). These trends are similar to those exhibited by the four species analyzed at the De Luz site (Figure 6a-d).

Productivity of common yellowthroats and song sparrows ranged between 0.46 (SOSP, 2000) and 2.24 (SOSP, 1998) HY's per adult (Figure 16a), and appeared to follow similar trends, except in 2000 when yellowthroat productivity (1.10) was more than twice that of 1999 while sparrow productivity (0.46) was nearly half that of 1999. Productivity of orange-crowned warblers fluctuated annually, but was consistently higher than that of yellow-breasted chats (Figure 16b). Chat productivity has been relatively low over the course of the study, although it reached an all-time high of 0.24 in 2001.

Summary: 1998-2001

Adult populations of the two most common resident species fluctuated on a yearly basis, except for the appearance of a downward trend in song sparrow adults over the past two years, similar to that seen at De Luz. Orange-crowned warblers have declined from a large peak in 1999, but persist in substantial numbers. The adult yellow-breasted chat population has shown little fluctuation over the course of the study. Productivity was highly variable between years, with residents and migrants exhibiting different trends.

Figure 16a. Annual Productivity, 1998-2001: Santa Margarita River, Resident Species

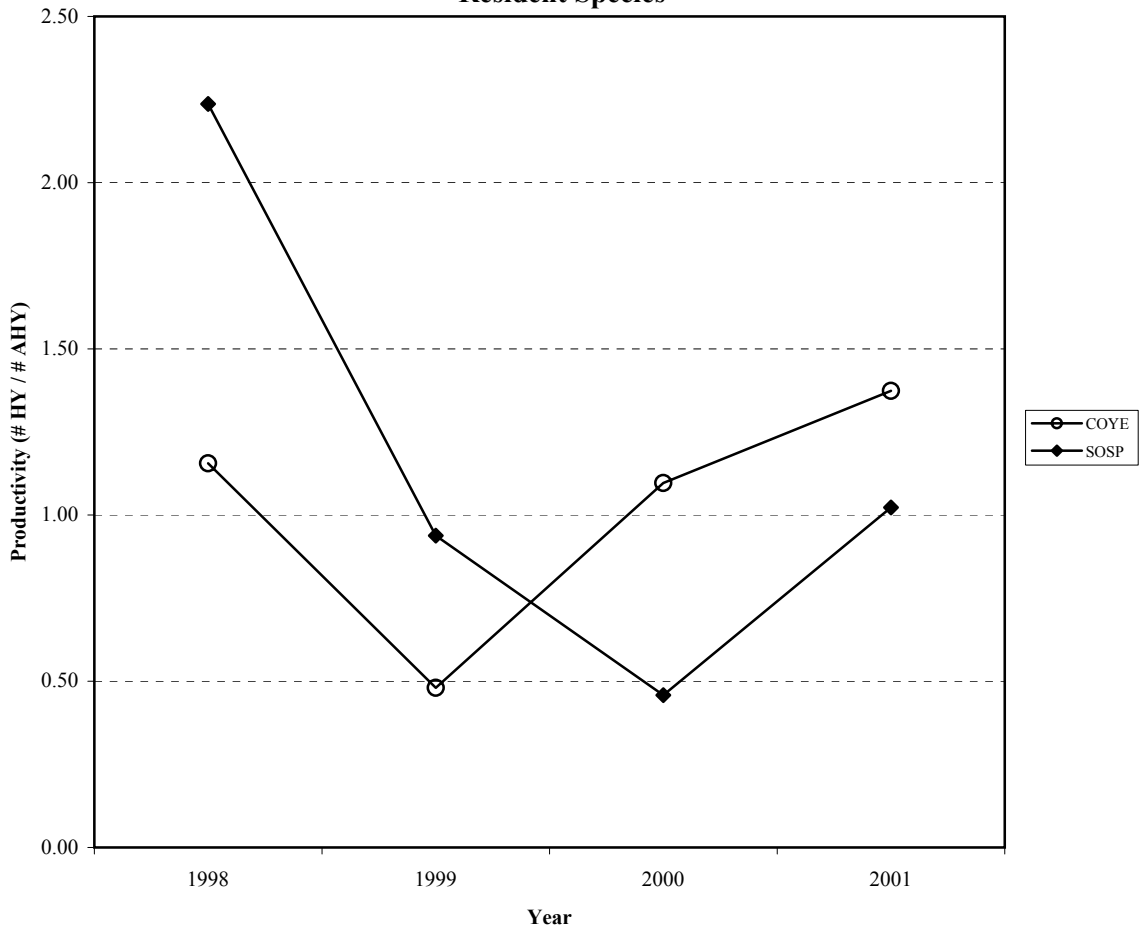
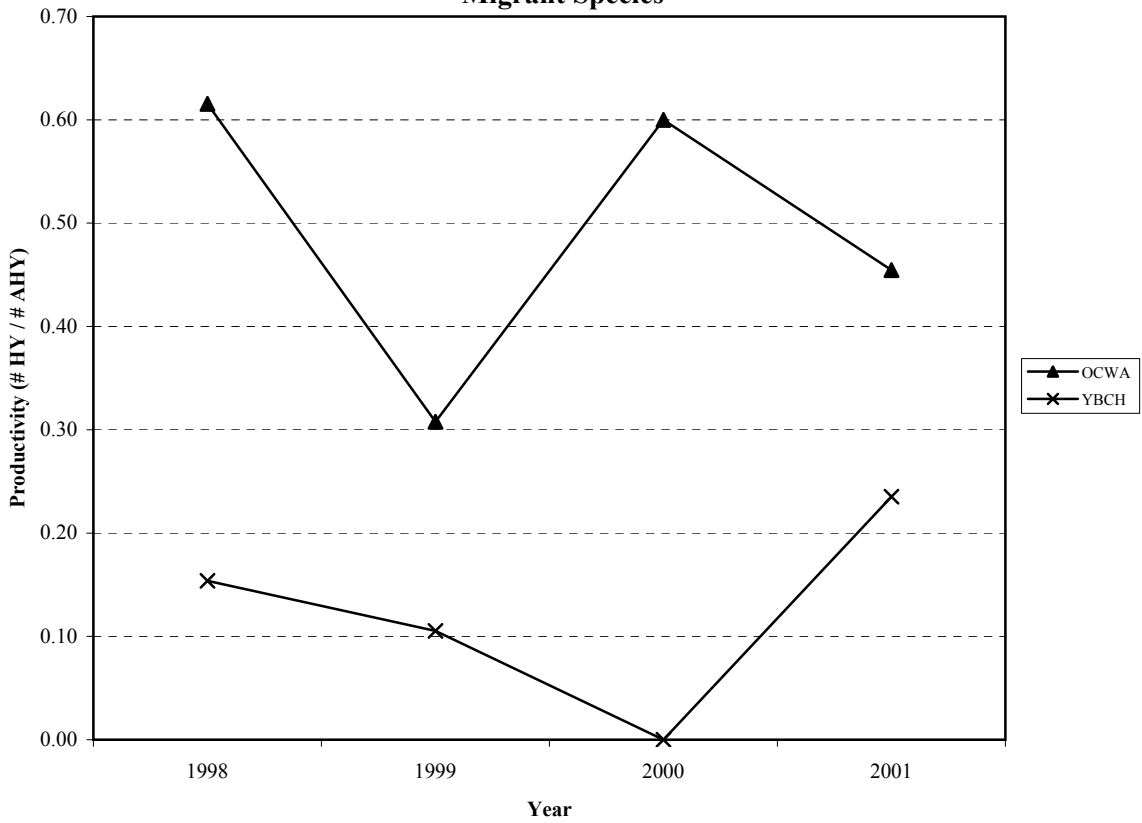


Figure 16b. Annual Productivity, 1998-2001: Santa Margarita River, Migrant Species



**Alpha Codes, Common Names, and Scientific Names
of Species Caught at MAPS Stations, Camp Pendleton**

Code	Common Name	Scientific Name	AOU #
MODO	Mourning dove	<i>Zenaida macroura</i>	316.0
COGD	Common ground-dove	<i>Columbina passerina</i>	320.0
SSHA	Sharp-shinned hawk	<i>Accipiter striatus</i>	332.0
COHA	Cooper's hawk	<i>Accipiter cooperii</i>	333.0
RSHA	Red-shouldered hawk	<i>Buteo lineatus</i>	339.0
AMKE	American kestrel	<i>Falco sparverius</i>	360.0
CAQU	California quail	<i>Callipepla californica</i>	0.0
DOWO	Downy woodpecker	<i>Dendrocopos pubescens</i>	394.0
NUWO	Nuttall's woodpecker	<i>Dendrocopos nuttallii</i>	397.0
ACWO	Acorn woodpecker	<i>Melanerpes formicivorus</i>	407.0
RSFL	Red-shafted Flicker	<i>Colaptes auratus cafer</i>	413.0
BCHU	Black-chinned hummingbird	<i>Archilochus alexandri</i>	429.0
COHU	Costa's hummingbird	<i>Archilochus costae</i>	430.0
ANHU	Anna's hummingbird	<i>Archilochus anna</i>	431.0
ALHU	Allen's hummingbird	<i>Selasphorus sasin</i>	434.0
UNHU	Unidentified hummingbird species	<i>Trochilidae spp.</i>	440.9
ATFL	Ash-throated flycatcher	<i>Myiarchus cinerascens</i>	454.0
BLPH	Black phoebe	<i>Sayornis nigricans</i>	458.0
WEWP	Western wood-pewee	<i>Contopus sordidulus</i>	462.0
PSFL	Pacific-slope flycatcher	<i>Empidonax difficilis</i>	464.1
WIFL	Willow flycatcher	<i>Empidonax traillii</i>	466.0
HAFL	Hammond's flycatcher	<i>Empidonax hammondii</i>	468.0
WESJ	Western scrub-jay	<i>Aphelocoma californica</i>	481.0
EUST	European starling	<i>Sturnus vulgaris</i>	493.0
HOOR	Hooded oriole	<i>Icterus cucullatus</i>	505.0
BUOR	Bullock's oriole	<i>Icterus bullockii</i>	508.0
PUFI	Purple finch	<i>Carpodacus purpureus</i>	517.0
HOFI	House finch	<i>Carpodacus mexicanus</i>	519.0
AMGO	American goldfinch	<i>Carduelis tristis</i>	529.0
LEGO	Lesser goldfinch	<i>Carduelis psaltria</i>	530.0
LASP	Lark sparrow	<i>Chondestes grammacus</i>	552.0
WCSP	White-crowned sparrow	<i>Zonotrichia leucophrys</i>	554.0
GCSP	Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>	557.0
CHSP	Chipping sparrow	<i>Spizella passerina</i>	560.0
BCSP	Black-chinned sparrow	<i>Spizella atrogularis</i>	565.0
DEJU	Dark-eyed junco	<i>Junco hyemalis</i>	567.1
RCSP	Rufous-crowned sparrow	<i>Aimophila ruficeps</i>	580.0
SOSP	Song sparrow	<i>Melospiza melodia</i>	581.0
LISP	Lincoln's sparrow	<i>Melospiza lincolnii</i>	583.0
SPTO	Spotted towhee	<i>Pipilo maculatus</i>	588.0
CALT	California towhee	<i>Pipilo crissalis</i>	591.1
BHGR	Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	596.0
BLGR	Blue grosbeak	<i>Guiraca caerulea</i>	597.0
LAZB	Lazuli bunting	<i>Passerina amoena</i>	599.0
WETA	Western tanager	<i>Piranga ludoviciana</i>	607.0
TRES	Tree swallow	<i>Tachycineta bicolor</i>	614.0
VGSW	Violet-green swallow	<i>Tachycineta thalassina</i>	615.0
NRWS	Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	617.0

**Alpha Codes, Common Names, and Scientific Names
of Species Caught at MAPS Stations, Camp Pendleton
(continued)**

Code	Common Name	Scientific Name	AOU #
PHAI	Phainopepla	<i>Phainopepla nitens</i>	620.0
WAVI	Warbling vireo	<i>Vireo gilvus</i>	627.0
CAVI	Cassin's vireo	<i>Vireo cassinii</i>	629.1
HUVI	Hutton's vireo	<i>Vireo huttoni</i>	632.0
LBVI	Least Bell's vireo	<i>Vireo bellii pusillus</i>	633.4
NAWA	Nashville warbler	<i>Vermivora ruficapilla</i>	645.0
OCWA	Orange-crowned warbler	<i>Vermivora celata</i>	646.0
YWAR	Yellow warbler	<i>Dendroica petechia</i>	652.0
AUWA	Audubon's warbler	<i>Dendroica coronata</i>	656.0
BTYW	Black-throated gray warbler	<i>Dendroica nigrescens</i>	665.0
TOWA	Townsend's warbler	<i>Dendroica townsendi</i>	668.0
HEWA	Hermit warbler	<i>Dendroica occidentalis</i>	669.0
MGWA	MacGillivray's warbler	<i>Oporornis tolmiei</i>	680.0
COYE	Common yellowthroat	<i>Geothlypis trichas</i>	681.0
YBCH	Yellow-breasted chat	<i>Icteria virens</i>	683.0
HOWA	Hooded warbler	<i>Wilsonia citrina</i>	684.0
WIWA	Wilson's warbler	<i>Wilsonia pusilla</i>	685.0
NOMO	Northern mockingbird	<i>Mimus polyglottos</i>	703.0
CATH	California thrasher	<i>Toxostoma redivivum</i>	710.0
BEWR	Bewick's wren	<i>Thyromanes bewickii</i>	719.0
HOWR	House wren	<i>Troglodytes aedon</i>	721.0
WBNU	White-breasted nuthatch	<i>Sitta carolinensis</i>	727.0
OATI	Oak titmouse	<i>Baeolophus inornatus</i>	733.0
WREN	Wrentit	<i>Chamaea fasciata</i>	742.0
BUSH	Bushtit	<i>Psaltriparus minimus</i>	743.0
RCKI	Ruby-crowned kinglet	<i>Regulus calendula</i>	749.0
SWTH	Swainson's thrush	<i>Catharus ustulata</i>	758.0
HETH	Hermit thrush	<i>Catharus guttatus</i>	759.0
WEBL	Western bluebird	<i>Sialia mexicana</i>	767.0