

**NEOTROPICAL MIGRATORY BIRD
MONITORING STUDY
AT
MARINE CORPS BASE CAMP PENDLETON, CALIFORNIA
THIRD ANNUAL PROGRESS REPORT
1997**

Prepared for

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Introduction

This report is the third annual progress update summarizing the activities of two MAPS stations at Marine Corps Base Camp Pendleton. MAPS, or “Monitoring Avian Productivity and Survival”, 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. 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.

Methods

Each banding station was operated once during every 10-day period between April 1 and August 31, 1997, for a total of 15 days per station. Ten mistnets were erected at each site in fixed locations (Figures 1 and 2). Nets were opened at dawn and run for several hours, depending on the weather. Nets were checked every 15-30 minutes by observers working circuits. All birds except hummingbirds 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 were not processed, but were identified to species, age, and sex when possible, and released immediately at the capture site. Typically, four field personnel operated the De Luz station, and two the Case Springs station, working on consecutive days.

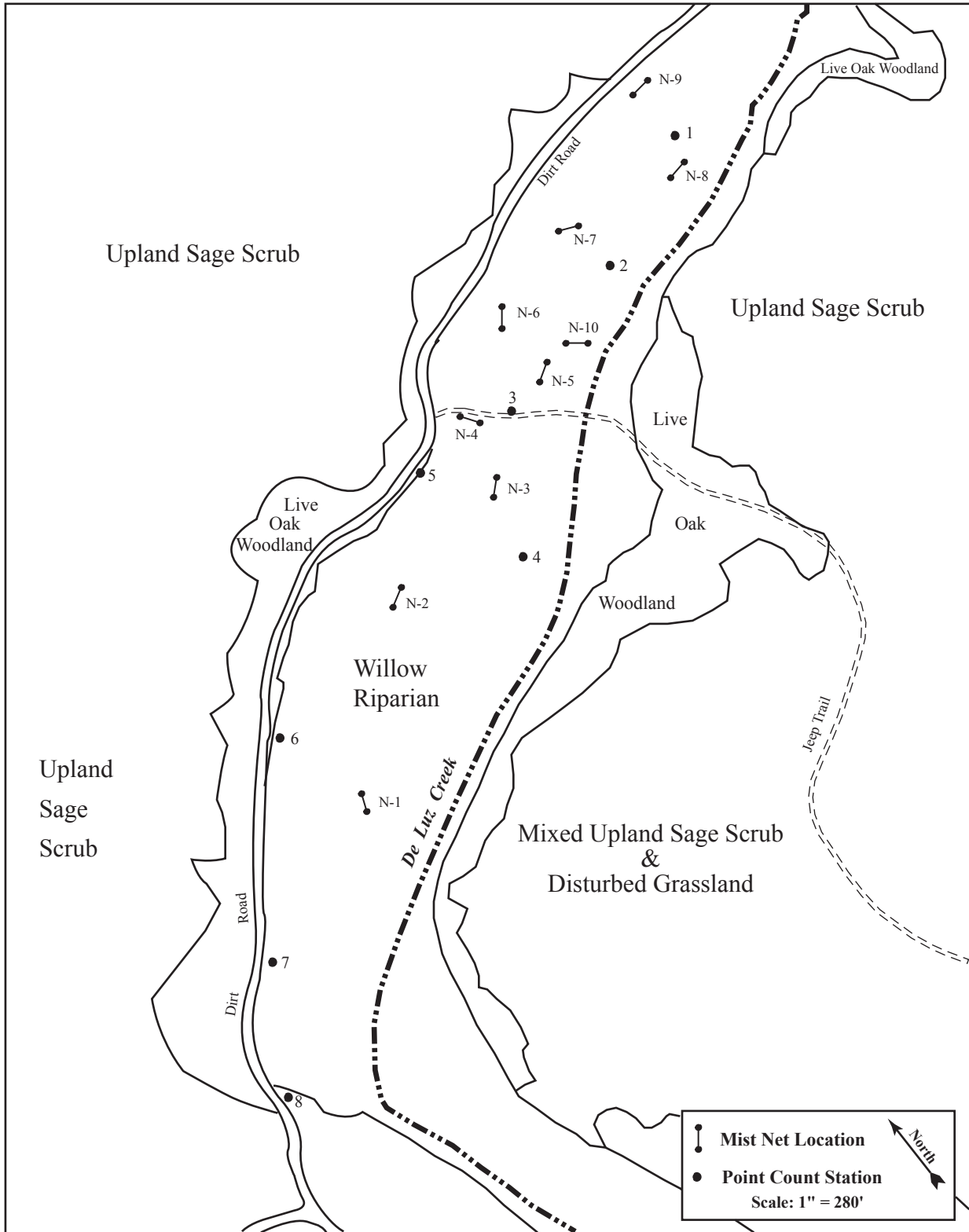


Figure 1. De Luz Creek MAPS Station, Marine Corps Base Camp Pendleton.

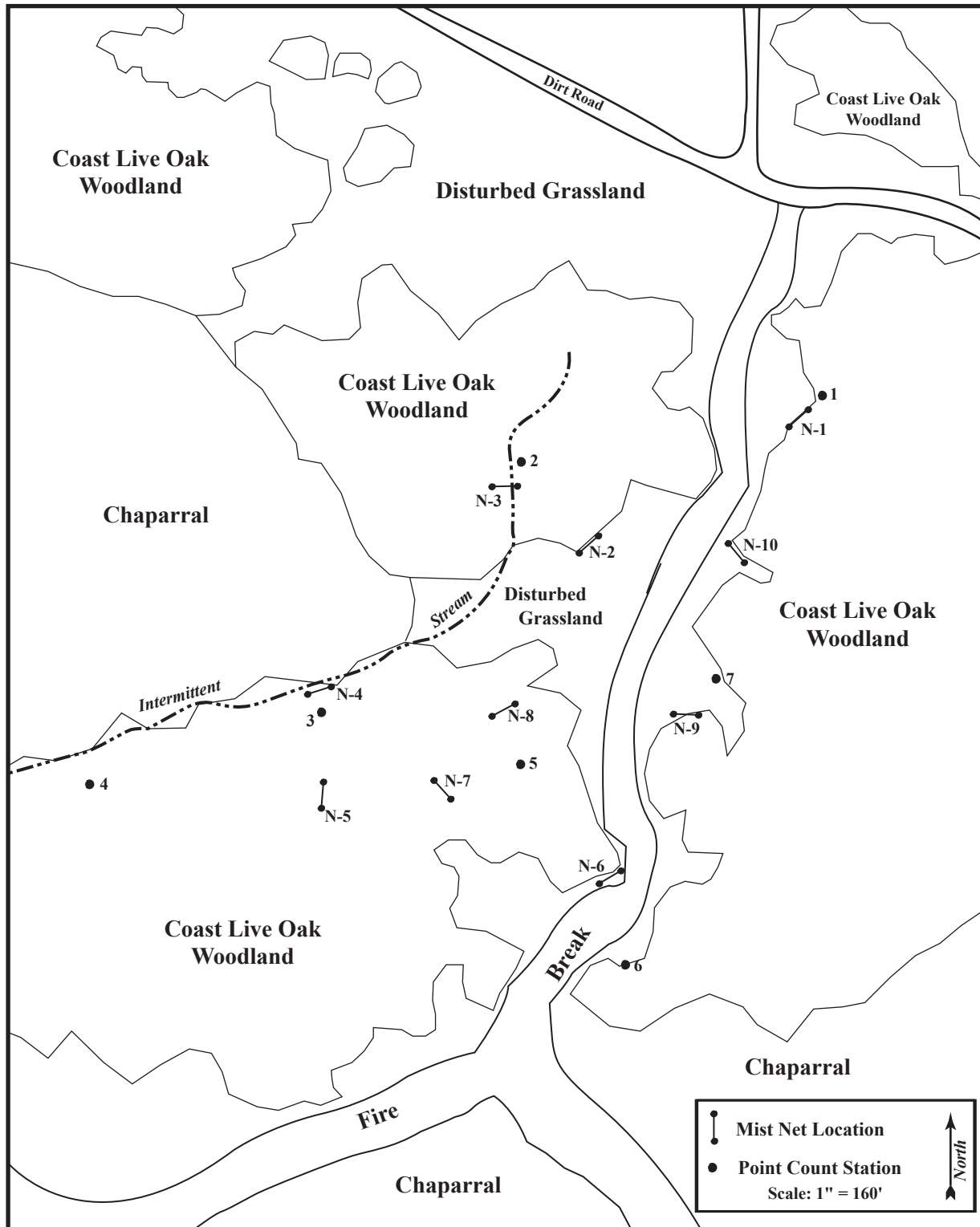


Figure 2. Case Springs MAPS Station, Marine Corps Base Camp Pendleton.

Results

De Luz Creek

Overview of 1997 Captures

Four hundred and four individuals of 37 species were caught during 763 net-hours (Table 1; see attached list of A.O.U. codes for common and taxonomic species names). As in previous years, the most abundant species at the station included common yellowthroats, song sparrows, yellow-breasted chats, spotted towhees, black-headed grosbeaks, and wrentits (Figure 3), although the relative abundance of these species differed between years (Table 2). Overall, the number of individuals caught in 1997 was 4 percent lower than the number (422) captured in 1996; however, captures per net hour were comparable (0.63 versus 0.61 in 1997 and 1996, respectively). Although the number of species caught in 1997 was comparable to that in 1996 (38), species composition of the captures differed between the two years. Twenty-four percent (9/38) of the species captured in 1996 were absent from captures in 1997, and 22 percent (8/37) of the 1997 captures, including four new records for the station (American kestrel, mourning dove, Allen's hummingbird, and northern mockingbird) were of species not captured in 1996 (Table 2).

The sex ratio of birds of known sex (N=238) deviated from the roughly 1:1 ratio observed in previous years, with 57 percent female and 43 percent male (Table 1). Age composition, however, was comparable to previous years, with 76 percent of the known-aged birds (N=373, Table 1) second-year birds or older, and 24 percent hatching-year birds.

Three hundred and twenty-seven of the birds caught (81 percent), including 10 hummingbirds, one California quail, two mourning doves, and one American kestrel, were new captures. Of these, 97 percent (289/298; hummingbirds, quail, doves and kestrel excluded), were banded; the remainder escaped prior to banding or were not banded for other reasons (Table 2). The majority of birds were captured only once during the season, but some individuals of the most abundant species were captured 2-3 times, and one individual of each of two species (common yellowthroat and song sparrow) was captured four times (Table 3).

Overall capture rates by net ranged from 37 to 98 captures per 100 net-hours (Table 5), for an overall average capture rate of 63 per 100 net-hours (Table 4), comparable to the capture rate in 1996. Captures were less equitably distributed across nets than in 1996 (Figure 4), although the pattern among nets remained the same, with net 4 exhibiting the lowest capture rate (37 per 100 net-hours), and nets 2 and 3 the highest (98 and 92 per 100 net-hours, respectively).

Capture rates peaked at 93 captures per 100-net hours in late April (Table 5), two weeks earlier than the 1996 peak in mid-May. Captures per 100-net hours ranged from 51 to 78 between May and mid-June, and declined thereafter to an average of roughly 40 for the remainder of the season.

Table 2. Number of Birds Captured, Banded, and Recaptured: De Luz Creek, 1995 - 1997

Species	Code	Total Captures			New Individuals Banded			Banded 1995, Recaptured 1997	Banded 1996, Recaptured 1997	Other ^a Banded, Recaptured 1997	Total Recaptured 1997
		1995	1996	1997	1995	1996	1997				
CAQU	-	2	0	1	0	0	0	0	0	0	0
MOD0	3160	0	0	2	0	0	0	0	0	0	0
AMKE	3600	0	0	1	0	0	0	0	0	0	0
DOWO	3940	2	2	2	2	2	2	0	0	0	0
NUWO	3970	4	4	2	4	2	1	0	0	0	0
BCHU	4290	3	2	5	0	0	0	0	0	0	0
COHU	4300	2	2	1	0	0	0	0	0	0	0
ANHU	4310	5	5	16	0	0	0	0	0	0	0
ALHU	4340	0	0	1	0	0	0	0	0	0	0
UNHU	4409	11	1	2	0	0	0	0	0	0	0
ATFL	4540	13	9	11	10	7	9	0	1	0	1
WEWP	4620	0	1	0	0	1	0	0	0	0	0
PSFL	4641	14	9	7	14	9	6	0	0	0	0
WIFL	4660	1	1	0	1	1	0	0	0	0	0
HOOR	5050	2	0	0	2	0	0	0	0	0	0
BUOR	5080	5	1	7	5	1	5	1	0	0	1
PUFI	5170	0	1	0	0	1	0	0	0	0	0
HOFI	5190	1	23	8	1	22	8	0	0	0	0
LEGO	5300	15	14	14	15	13	14	0	0	0	0
LASP	5520	1	1	0	1	1	0	0	0	0	0
GCSP	5570	3	2	0	3	2	0	0	0	0	0
DEJU	5677	0	1	0	0	0	0	0	0	0	0
RCSP	5800	1	4	1	1	4	1	0	0	0	0
SOSP	5810	70	69	74	51	43	45	5	5	0	10
LISP	5830	1	1	0	1	1	0	0	0	0	0
SPTO	5880	38	27	25	33	17	10	5	4	0	9
CALT	5911	20	25	10	17	19	8	0	1	0	1
BHGR	5960	33	40	36	26	33	23	5	2	0	7
BLGR	5970	0	1	2	0	1	2	0	0	0	0
LAZB	5990	12	1	0	12	1	0	0	0	0	0
WETA	6070	1	0	1	1	0	1	0	0	0	0
PHAI	6200	2	0	0	2	0	0	0	0	0	0
WAVI	6270	0	3	0	0	3	0	0	0	0	0
HUVI	6320	2	0	2	2	0	1	0	1	0	1
LBVI	6334	10	5	8	9	5	3	0	1	1	2
NAWA	6450	1	0	0	1	0	0	0	0	0	0
OCWA	6460	13	4	6	12	3	5	1	0	0	1
YWAR	6520	3	7	3	3	6	3	0	0	0	0
YRWA	6560	2	0	0	2	0	0	0	0	0	0
COYE	6810	74	70	74	62	42	42	7	7	0	14
YBCH	6830	55	51	43	39	30	27	6	2	0	8
WIWA	6850	2	2	2	2	2	2	0	0	0	0
NOMO	7030	0	0	1	0	0	1	0	0	0	0
CATH	7100	2	5	7	0	4	6	0	1	0	1
BEWR	7190	22	11	19	16	4	11	4	1	0	5
HOWR	7210	3	8	8	2	8	5	0	1	0	1
OATI	7330	7	5	1	6	1	1	0	0	0	0
WREN	7420	49	45	50	33	26	21	9	5	0	14
BUSH	7430	10	14	20	9	13	18	2	0	0	2
SWTH	7580	22	8	6	22	8	6	0	0	0	0
HETH	7590	1	0	2	1	0	2	0	0	0	0
Total		540	485	481	423	336	289	45	32	1	78

^a Banded bird recovered at MAPS station but not banded by this project

Figure 3. Number of Individuals Caught per Species: De Luz Creek, 1997

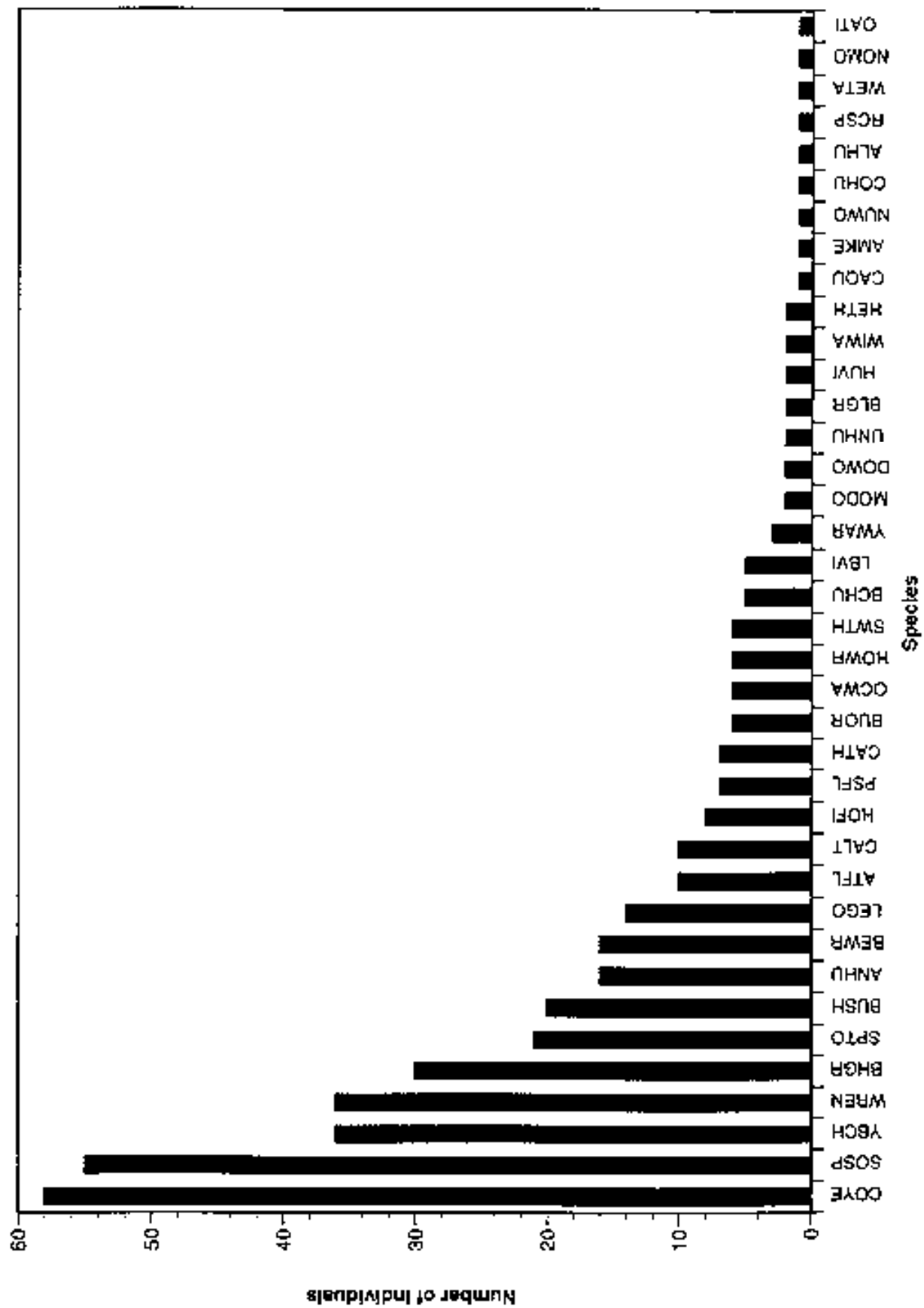


Table 3. Capture Frequency of Individuals: De Luz Creek, 1997

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	1	1
MODO	3160	0	0	0	0	0	2	2
AMKE	3600	0	0	0	0	0	1	1
DOWO	3940	2	0	0	0	2	0	2
NUWO	3970	0	1	0	0	2	0	2
BCHU	4290	0	0	0	0	0	5	5
COHU	4300	0	0	0	0	0	1	1
ANHU	4310	0	0	0	0	0	16	16
ALHU	4340	0	0	0	0	0	1	1
UNHU	4409	0	0	0	0	0	2	2
ATFL	4540	9	1	0	0	11	0	11
PSFL	4641	6	0	0	0	6	1	7
BUOR	5080	5	1	0	0	7	0	7
HOFI	5190	8	0	0	0	8	0	8
LEGO	5300	14	0	0	0	14	0	14
RCSP	5800	1	0	0	0	1	0	1
SOSP	5810	43	6	5	1	74	0	74
SPTO	5880	15	4	0	0	23	2	25
CALT	5911	9	0	0	0	9	1	10
BHGR	5960	25	4	1	0	36	0	36
BLGR	5970	2	0	0	0	2	0	2
WETA	6070	1	0	0	0	1	0	1
HUVI	6320	2	0	0	0	2	0	2
LBVI	6334	3	1	1	0	8	0	8
OCWA	6460	6	0	0	0	6	0	6
YWAR	6520	3	0	0	0	3	0	3
COYE	6810	45	7	3	1	72	2	74
YBCH	6830	29	5	1	0	42	1	43
WIWA	6850	2	0	0	0	2	0	2
NOMO	7030	1	0	0	0	1	0	1
CATH	7100	7	0	0	0	7	0	7
BEWR	7190	13	3	0	0	19	0	19
HOWR	7210	4	2	0	0	8	0	8
OATI	7330	1	0	0	0	1	0	1
WREN	7420	23	10	2	0	49	1	50
BUSH	7430	20	0	0	0	20	0	20
SWTH	7580	6	0	0	0	6	0	6
HETH	7590	2	0	0	0	2	0	2
Total		307	45	13	2	444	37	481

Table 4. Number of Captures by Date: De Luz Creek, 1997

Species	Code	Date														Total Captures 1997	Captures per 100 Net-hours ^a	
		4/4/97	4/14/97	4/23/97	5/4/97	5/14/97	5/24/97	6/3/97	6/13/97	6/23/97	7/2/97	7/13/97	7/23/97	8/2/97	8/13/97			8/21/97
CAQU	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.13
MODO	3160	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2	0.26
AMKE	3600	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.13
DOWO	3940	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0.26
NUWO	3970	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	0.26
BCHU	4290	0	0	0	0	0	0	0	3	0	0	0	0	1	0	1	5	0.66
COHU	4300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
ANHU	4310	1	4	1	0	1	2	2	1	2	0	0	0	0	2	0	16	2.10
ALHU	4340	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.13
UNHU ^b	4409	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	0.26
ATFL	4540	0	0	1	2	1	2	0	0	0	1	0	1	3	0	0	11	1.44
PSFL	4641	1	0	0	1	0	0	1	0	1	0	0	1	2	0	0	7	0.92
BUOR	5080	0	0	0	0	0	0	2	3	0	2	0	0	0	0	0	7	0.92
HOFI	5190	0	0	0	0	2	0	0	0	1	0	2	0	0	3	0	8	1.05
LEGO	5300	3	0	4	0	1	1	0	1	2	0	0	0	0	2	0	14	1.83
RCSP	5800	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
SOSP	5810	3	10	6	6	4	7	9	5	4	3	1	4	4	4	4	74	9.70
SPTO	5880	0	2	7	5	2	2	1	0	1	1	2	0	0	0	2	25	3.28
CALT	5911	1	1	3	2	0	0	0	0	0	0	1	0	0	1	1	10	1.31
BHGR	5960	0	3	4	5	2	1	4	0	1	2	11	1	1	1	0	36	4.72
BLGR	5970	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0.26
WETA	6070	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.13
HUVI	6320	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2	0.26
BEVI	6334	0	0	1	2	0	0	1	0	1	0	0	1	2	0	0	8	1.05
OCWA	6460	2	1	1	0	0	0	0	0	0	0	0	0	1	0	1	6	0.79
YWAR	6520	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	3	0.39
COYE	6810	9	7	3	5	5	14	10	4	6	2	2	2	1	2	2	74	9.70
YBCH	6830	0	4	4	2	2	1	3	7	4	5	5	1	2	2	1	43	5.64
WIWA	6850	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0.26
NOMO	7030	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.13
CATH	7100	0	0	0	0	1	1	0	0	0	1	2	0	0	1	1	7	0.92
BEWR	7190	3	0	4	0	1	1	1	3	2	0	0	0	0	0	4	19	2.49
HOWR	7210	0	0	0	1	2	1	1	2	1	0	0	0	0	0	0	8	1.05
OATI	7330	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
WREN	7420	3	8	5	3	3	2	2	0	4	8	6	3	2	1	0	50	6.55
BUSH	7430	4	0	2	2	0	0	0	0	7	1	0	2	1	0	1	20	2.62
SWTH	7580	0	0	1	1	3	1	0	0	0	0	0	0	0	0	0	6	0.79
HETH	7590	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.26
Total		32	42	50	45	31	37	37	29	38	27	35	17	20	22	19	481	63.03
Species		12	11	18	18	15	13	12	9	15	10	12	9	13	11	11	37	4.85

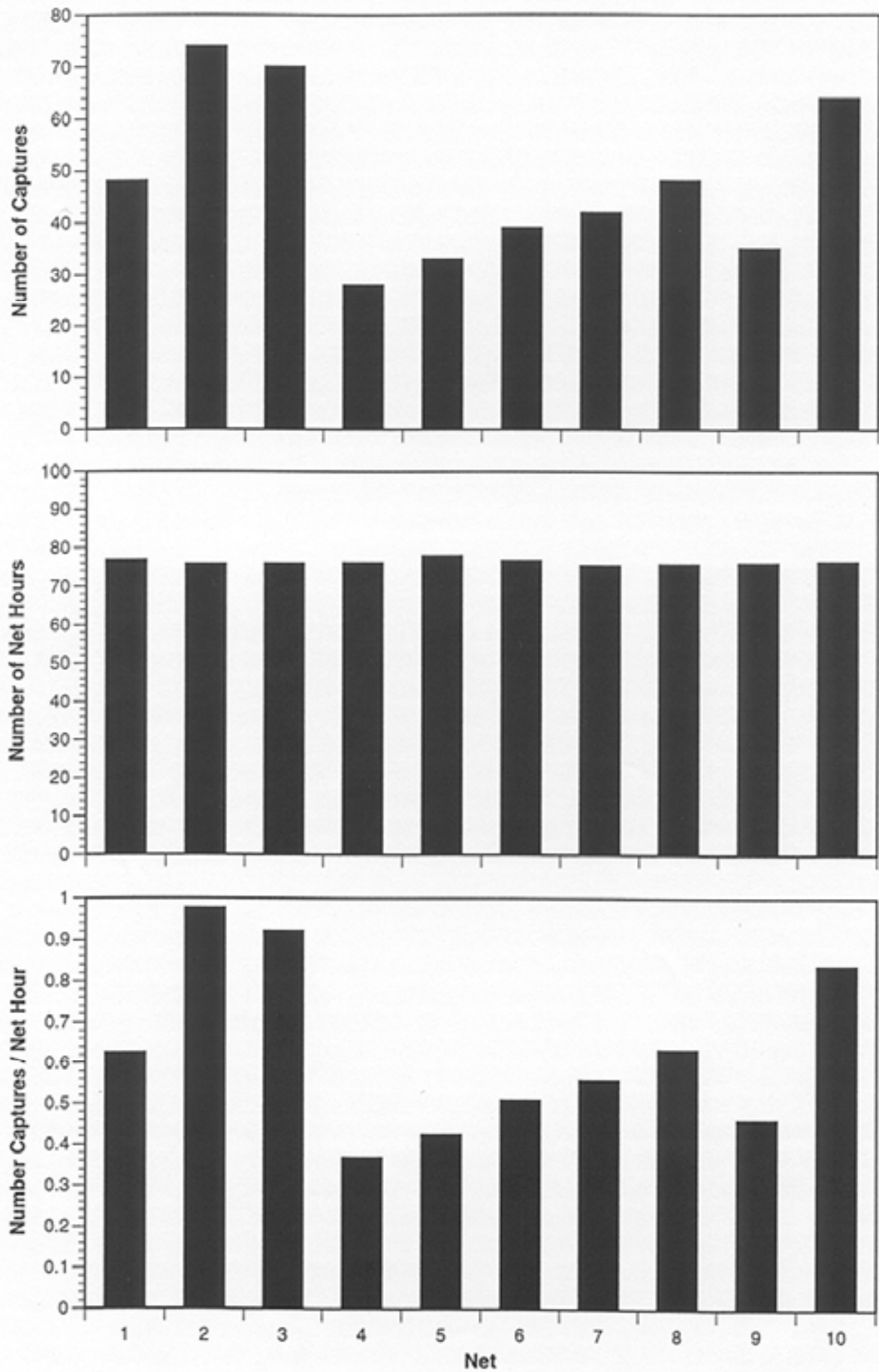
^a 763:05 total net-hours

^b Not included in species total

Table 5. Capture Rates by Net and Date: De Luz Creek, 1997

Date		Net										Date Totals
		1	2	3	4	5	6	7	8	9	10	
4/4/97	Net Hours	4:40	4:50	4:50	4:45	4:45	5:00	5:00	4:45	4:45	4:50	48:10
	Captures	5	3	4	1	5	3	0	3	2	6	32
	Captures/Net Hour	1.07	0.62	0.83	0.21	1.05	0.60	0.00	0.63	0.42	1.24	0.66
4/14/97	Net Hours	5:30	5:20	5:10	5:05	5:30	5:20	5:15	5:15	5:15	5:30	53:10
	Captures	6	6	5	4	3	3	2	2	1	10	42
	Captures/Net Hour	1.09	1.13	0.97	0.79	0.55	0.56	0.38	0.38	0.19	1.82	0.79
4/23/97	Net Hours	5:25	5:25	5:20	5:20	5:25	5:20	5:15	5:25	5:25	5:30	53:50
	Captures	5	10	6	4	3	3	6	3	6	4	50
	Captures/Net Hour	0.92	1.85	1.13	0.75	0.55	0.56	1.14	0.55	1.11	0.73	0.93
5/4/97	Net Hours	5:45	5:40	6:05	6:00	6:00	5:45	5:30	5:40	5:45	5:45	57:55
	Captures	4	5	6	1	3	4	3	8	0	11	45
	Captures/Net Hour	0.70	0.88	0.99	0.17	0.50	0.70	0.55	1.41	0.00	1.91	0.78
5/14/97	Net Hours	5:15	5:15	5:10	4:45	5:35	5:20	5:05	5:10	5:10	5:15	52:00
	Captures	3	5	6	2	1	1	1	4	2	6	31
	Captures/Net Hour	0.57	0.95	1.16	0.42	0.18	0.19	0.20	0.77	0.39	1.14	0.60
5/24/97	Net Hours	5:20	5:20	5:20	5:20	5:10	5:10	5:05	5:10	5:00	5:15	52:10
	Captures	3	2	7	5	3	0	3	3	5	6	37
	Captures/Net Hour	0.56	0.38	1.31	0.94	0.58	0.00	0.59	0.58	1.00	1.14	0.71
6/3/97	Net Hours	4:45	4:30	4:35	4:35	5:25	5:10	4:40	4:45	4:40	4:40	47:45
	Captures	4	12	0	0	7	1	1	3	3	6	37
	Captures/Net Hour	0.84	2.67	0.00	0.00	1.29	0.19	0.21	0.63	0.64	1.29	0.77
6/13/97	Net Hours	4:00	3:55	3:50	4:00	3:50	3:55	3:40	3:50	4:00	3:45	38:45
	Captures	2	6	4	2	1	5	1	2	2	4	29
	Captures/Net Hour	0.50	1.53	1.04	0.50	0.26	1.28	0.27	0.52	0.50	1.07	0.75
6/23/97	Net Hours	5:25	5:20	5:20	5:15	5:35	5:25	5:30	5:25	5:25	5:30	54:10
	Captures	2	7	7	1	1	2	9	4	3	2	38
	Captures/Net Hour	0.37	1.31	1.31	0.19	0.18	0.37	1.64	0.74	0.55	0.36	0.70
7/2/97	Net Hours	5:20	5:20	5:20	5:20	5:30	5:15	5:20	5:15	5:15	5:30	53:25
	Captures	3	5	4	2	2	5	2	0	2	2	27
	Captures/Net Hour	0.56	0.94	0.75	0.38	0.36	0.95	0.38	0.00	0.38	0.36	0.51
7/13/97	Net Hours	5:45	5:45	5:45	6:00	5:45	5:45	5:50	5:50	5:50	5:45	58:00
	Captures	2	4	9	1	2	3	5	5	4	0	35
	Captures/Net Hour	0.35	0.70	1.57	0.17	0.35	0.52	0.86	0.86	0.69	0.00	0.60
7/23/97	Net Hours	5:30	5:35	5:35	5:40	5:35	5:20	5:25	5:35	5:35	5:25	55:15
	Captures	1	2	5	2	0	1	3	1	0	2	17
	Captures/Net Hour	0.18	0.36	0.90	0.35	0.00	0.19	0.55	0.18	0.00	0.37	0.31
8/2/97	Net Hours	4:40	4:30	4:25	4:35	4:50	4:45	4:35	4:20	4:30	4:45	45:55
	Captures	2	3	2	2	0	3	2	4	1	1	20
	Captures/Net Hour	0.43	0.67	0.45	0.44	0.00	0.63	0.44	0.92	0.22	0.21	0.44
8/13/97	Net Hours	4:55	4:45	5:05	5:00	4:50	4:45	5:05	5:05	5:00	4:45	49:15
	Captures	4	1	4	0	2	1	4	3	2	1	22
	Captures/Net Hour	0.81	0.21	0.79	0.00	0.41	0.21	0.79	0.59	0.40	0.21	0.45
8/21/97	Net Hours	4:30	4:20	4:10	4:30	4:10	4:20	4:10	4:20	4:30	4:20	43:20
	Captures	2	3	1	1	0	4	0	3	2	3	19
	Captures/Net Hour	0.44	0.69	0.24	0.22	0.00	0.92	0.00	0.69	0.44	0.69	0.44
Net Totals	Net Hours	76:45	75:50	76:00	76:10	77:55	76:35	75:25	75:50	76:05	76:30	763:05
	Captures	48	74	70	28	33	39	42	48	35	64	481
	Captures/Net Hour	0.63	0.98	0.92	0.37	0.42	0.51	0.56	0.63	0.46	0.84	0.63

Figure 4. Captures, Net Hours, and Capture Rate by Net: De Luz Creek, 1997



Survival and Return Rates of Birds Banded in 1995 and 1996

Seventy-seven of the birds caught in 1997 (19 percent) were recaptured individuals originally banded in previous years (Table 2), providing two years of survival data for the 1995 banded cohort, and one year for the 1996 cohort. An important discovery made this year was that first-year return rates based on only a single year of recapture data underestimate actual survival by at least 33 percent (Table 6). This was revealed by the return in 1997 of birds banded in 1995 but not recaptured in 1996, although they obviously were alive in that year. The adjusted first-year return rate for the 1995 cohort (28 percent, Table 6B), based on two years of recapture data, is considerably higher than the non-adjusted rate of 21 percent calculated in 1996 (Table 6A). In addition, the number of species represented by recaptures increased by one with the recapture of a Bullock's oriole banded in 1995 but not seen again until 1997. It is likely that return rates will continue to require adjustment over time as birds are recaptured for the first time years after the original year of banding, but such adjustments are expected to become increasingly minor as the cohort ages.

The species most affected with regard to adjusted return rates included spotted towhee, black-headed grosbeak, orange-crowned warbler, Bewick's wren, wren-tit, and bushtit, whose recalculated return rates were on average twice as high as the non-adjusted rates calculated in 1996 (Table 6A and B). Overall, the effect of the adjustment on return rates was to reduce the variability among species (non-adjusted: $(\bar{X} = 21.7 \pm 10.0, N = 13 \text{ species})$; adjusted: $(\bar{X} = 28.2 \pm 8.5, N = 14 \text{ species})$), suggesting that species are less dissimilar with regard to annual survival than was indicated by the non-adjusted data.

Return rates for adults and birds of unknown age were more affected by the addition of the second year of recapture data to the analysis than were those for birds banded in their hatching year (Table 6B); however, the bias in annual survival favoring adults remained. Similarly, the difference between sexes calculated from the 1996 data remained evident in the adjusted analysis, with male returns on average twice those of females (Table 7B).

Forty-nine percent of the birds surviving in 1996 returned for a second year in 1997 (Table 6C), representing 13.9 percent of the original 1995 cohort. Second-year survival was higher for adults (51 percent, 41/81) than for birds banded as hatching-year individuals (29 percent, 2/7), although small sample sizes for the latter age-class indicate the need for caution in interpreting these results.

One year of recapture data for the 1996 banded cohort yields a non-adjusted return rate of 13 percent (Table 8), suggesting that annual survival between 1996 and 1997 was considerably lower than between 1995 and 1996. Although first-year return rates for all age-classes were lower for the 1996 cohort than for the comparable non-adjusted 1995 cohort, hatching-year birds appeared to have been most strongly affected (Table 8A). Returns of Hutton's vireo, least Bell's vireo, and California thrasher expand the suite of species for which survival data are being generated at this station, although the small numbers of individuals of each species banded complicates analysis and interpretation of species trends.

Table 6. Recapture Rate by Age at Banding of Birds Banded in 1995: De Luz Creek

A. Non-Adjusted One-Year Survival^a

Species	After Hatching Year			Hatching Year			Unknown Age			Total		
	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
NUWO	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
ATFL ^b	10	2	20.0%	0	0	-	0	0	-	10	2	20.0%
BUOR ^{b,c}	4	-	-	1	-	-	0	-	-	5	-	-
SOSP	34	9	26.5%	16	3	18.8%	1	0	0.0%	51	12	23.5%
SPTO	25	6	24.0%	8	0	0.0%	0	0	-	33	6	18.2%
CALT	11	3	27.3%	6	1	16.7%	0	0	-	17	4	23.5%
BHGR ^b	23	4	17.4%	3	0	0.0%	0	0	-	26	4	15.4%
OCWA ^b	11	1	9.1%	1	0	0.0%	0	0	-	12	1	8.3%
COYE	38	13	34.2%	23	0	0.0%	1	0	0.0%	62	13	21.0%
YBCH ^b	36	10	27.8%	2	0	0.0%	1	0	0.0%	39	10	25.6%
BEWR	13	1	7.7%	2	1	50.0%	1	1	100.0%	16	3	18.8%
OATI	5	2	40.0%	1	1	100.0%	0	0	-	6	3	50.0%
WREN	24	6	25.0%	1	0	0.0%	8	1	12.5%	33	7	21.2%
BUSH	6	1	16.7%	1	0	0.0%	2	0	0.0%	9	1	11.1%
Total	244	59	24.6%^d	65	6	9.4%^d	14	2	14.3%	323	67	21.1%^d

B. Adjusted One-Year Survival^e

NUWO	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
ATFL ^b	10	2	20.0%	0	0	-	0	0	-	10	2	20.0%
BUOR ^b	4	1	25.0%	1	0	0.0%	0	0	-	5	1	20.0%
SOSP	34	10	29.4%	16	3	18.8%	1	0	0.0%	51	13	25.5%
SPTO	25	9	36.0%	8	0	0.0%	0	0	-	33	9	27.3%
CALT	11	3	27.3%	6	1	16.7%	0	0	-	17	4	23.5%
BHGR ^b	23	7	30.4%	3	0	0.0%	0	0	-	26	7	26.9%
OCWA ^b	11	2	18.2%	1	0	0.0%	0	0	-	12	2	16.7%
COYE	38	16	42.1%	23	1	4.3%	1	0	0.0%	62	17	27.4%
YBCH ^b	36	11	30.6%	2	0	0.0%	1	0	0.0%	39	11	28.2%
BEWR	13	3	23.1%	2	1	50.0%	1	1	100.0%	16	5	31.3%
OATI	5	2	40.0%	1	1	100.0%	0	0	-	6	3	50.0%
WREN	24	12	50.0%	1	0	0.0%	8	1	12.5%	33	13	39.4%
BUSH	6	2	33.3%	1	0	0.0%	2	1	50.0%	9	3	33.3%
Total	244	81	33.2%	65	7	10.8%	14	3	21.4%	323	91	28.2%

C. Non-Adjusted Two-Year Survival^f

NUWO	4	0	0.0%	0	0	-	0	0	-	4	0	0.0%
ATFL ^b	10	0	0.0%	0	0	-	0	0	-	10	0	0.0%
BUOR ^b	4	1	25.0%	1	0	0.0%	0	0	-	5	1	20.0%
SOSP	34	5	14.7%	16	0	0.0%	1	0	0.0%	51	5	9.8%
SPTO	25	5	20.0%	8	0	0.0%	0	0	-	33	5	15.2%
CALT	11	0	0.0%	6	0	0.0%	0	0	-	17	0	0.0%
BHGR ^b	23	5	21.7%	3	0	0.0%	0	0	-	26	5	19.2%
OCWA ^b	11	1	9.1%	1	0	0.0%	0	0	-	12	1	8.3%
COYE	38	6	15.8%	23	1	4.3%	1	0	0.0%	62	7	11.3%
YBCH ^b	36	6	16.7%	2	0	0.0%	1	0	0.0%	39	6	15.4%
BEWR	13	2	15.4%	2	1	50.0%	1	1	100.0%	16	4	25.0%
OATI	5	0	0.0%	1	0	0.0%	0	0	-	6	0	0.0%
WREN	24	9	37.5%	1	0	0.0%	8	0	0.0%	33	9	27.3%
BUSH	6	1	16.7%	1	0	0.0%	2	1	50.0%	9	2	22.2%
Total	244	41	16.8%	65	2	3.1%	14	2	14.3%	323	45	13.9%

^a Survival from 1995 to 1996 based only on 1996 recapture data; includes only species with at least one eventual recapture (up to 1997).

^b Migratory species

^c No recaptures in 1996; included in table for purpose of comparability to subsequent table

^d Percent recapture excluding BUOR (not recaptured in 1996)

^e Survival from 1995 to 1996 based on 1996 and 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

^f Survival from 1995 to 1997 based only on 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

Table 7. Recapture Rate by Sex of Birds Banded as Adults in 1995: De Luz Creek

A. Non-Adjusted One-Year Survival^a

Species	Female			Male			Unknown			Total		
	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
NUWO	2	0	0.0%	2	1	50.0%	0	0	-	4	1	25.0%
ATFL ^b	2	0	0.0%	3	2	66.7%	5	0	0.0%	10	2	20.0%
BUOR ^{b,c}	1	-	-	3	-	-	0	-	-	4	-	-
SOSP	14	2	14.3%	18	7	38.9%	2	0	0.0%	34	9	26.5%
SPTO	9	2	22.2%	16	4	25.0%	0	0	-	25	6	24.0%
CALT	6	2	33.3%	5	1	20.0%	0	0	-	11	3	27.3%
BHGR ^d	15	2	13.3%	8	2	25.0%	0	0	-	23	4	17.4%
OCWA ^d	3	1	33.3%	4	0	0.0%	4	0	0.0%	11	1	9.1%
COYE	17	5	29.4%	21	8	38.1%	0	0	-	38	13	34.2%
YBCH ^d	15	0	0.0%	21	10	47.6%	0	0	-	36	10	27.8%
BEWR	7	1	14.3%	4	0	0.0%	2	0	0.0%	13	1	7.7%
OATI	2	1	50.0%	3	1	33.3%	0	0	-	5	2	40.0%
WREN	0	0	-	0	0	-	24	6	25.0%	24	6	25.0%
BUSH	4	0	0.0%	2	1	50.0%	0	0	-	6	1	16.7%
Total	97	16	16.7%^e	110	37	34.5%^e	37	6	16.2%	244	59	24.6%^d

B. Adjusted One-Year Survival^a

NUWO	2	0	0.0%	2	1	50.0%	0	0	-	4	1	25.0%
ATFL ^b	2	0	0.0%	3	2	66.7%	5	0	0.0%	10	2	20.0%
BUOR ^b	1	0	0.0%	3	1	33.3%	0	0	-	4	1	25.0%
SOSP	14	2	14.3%	18	8	44.4%	2	0	0.0%	34	10	29.4%
SPTO	9	3	33.3%	16	6	37.5%	0	0	-	25	9	36.0%
CALT	6	2	33.3%	5	1	20.0%	0	0	-	11	3	27.3%
BHGR ^d	15	3	20.0%	8	4	50.0%	0	0	-	23	7	30.4%
OCWA ^d	3	1	33.3%	4	1	25.0%	4	0	0.0%	11	2	18.2%
COYE	17	6	35.3%	21	10	47.6%	0	0	-	38	16	42.1%
YBCH ^d	15	0	0.0%	21	11	52.4%	0	0	-	36	11	30.6%
BEWR	7	2	28.6%	4	1	25.0%	2	0	0.0%	13	3	23.1%
OATI	2	1	50.0%	3	1	33.3%	0	0	-	5	2	40.0%
WREN	0	0	-	0	0	-	24	12	50.0%	24	12	50.0%
BUSH	4	1	25.0%	2	1	50.0%	0	0	-	6	2	33.3%
Total	97	21	21.6%	110	48	43.6%	37	12	32.4%	244	81	33.2%

C. Non-Adjusted Two-Year Survival^a

NUWO	2	0	0.0%	2	0	0.0%	0	0	-	4	0	0.0%
ATFL ^b	2	0	0.0%	3	0	0.0%	5	0	0.0%	10	0	0.0%
BUOR ^b	1	0	0.0%	3	1	33.3%	0	0	-	4	1	25.0%
SOSP	14	1	7.1%	18	4	22.2%	2	0	0.0%	34	5	14.7%
SPTO	9	2	22.2%	16	3	18.8%	0	0	-	25	5	20.0%
CALT	6	0	0.0%	5	0	0.0%	0	0	-	11	0	0.0%
BHGR ^d	15	2	13.3%	8	3	37.5%	0	0	-	23	5	21.7%
OCWA ^d	3	0	0.0%	4	1	25.0%	4	0	0.0%	11	1	9.1%
COYE	17	2	11.8%	21	4	19.0%	0	0	-	38	6	15.8%
YBCH ^d	15	0	0.0%	21	6	28.6%	0	0	-	36	6	16.7%
BEWR	7	1	14.3%	4	1	25.0%	2	0	0.0%	13	2	15.4%
OATI	2	0	0.0%	3	0	0.0%	0	0	-	5	0	0.0%
WREN	0	0	-	0	0	-	24	9	37.5%	24	9	37.5%
BUSH	4	1	25.0%	2	0	0.0%	0	0	-	6	1	16.7%
Total	97	9	9.3%	110	23	20.9%	37	9	24.3%	244	41	16.8%

^a Survival from 1995 to 1996 based only on 1996 recapture data; includes only species with at least one eventual recapture (up to 1997).

^b Migratory species

^c No recaptures in 1996; included in table for purpose of comparability to subsequent table

^d Female recapture excluding BUOR (not recaptured in 1996)

^e Survival from 1995 to 1996 based on 1996 and 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

^f Survival from 1995 to 1997 based only on 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

Table 8. Recapture Rate by Age at Banding of Birds Banded in 1996: De Luz Creek

Non-Adjusted One-Year Survival^a

Species	Code	AHY			HY			Unknown			Total		
		Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
ATFL ^b	4540	7	1	14.3%	0	0	-	0	0	-	7	1	14.3%
SOSP	5810	19	5	26.3%	22	0	0.0%	2	0	0.0%	43	5	11.6%
SPTO	5880	14	4	28.6%	2	0	0.0%	1	0	0.0%	17	4	23.5%
CALT	5911	16	1	6.3%	3	0	0.0%	0	0	-	19	1	5.3%
BHGR ^b	5960	27	2	7.4%	4	0	0.0%	2	0	0.0%	33	2	6.1%
HUVI	6320	1	1	100.0%	0	0	-	0	0	-	1	1	100.0%
LBVI ^b	6334	5	1	20.0%	0	0	-	0	0	-	5	1	20.0%
COYE	6810	29	6	20.7%	11	1	9.1%	2	0	0.0%	42	7	16.7%
YBCH ^b	6830	28	2	7.1%	2	0	0.0%	0	0	-	30	2	6.7%
CATH	7100	3	1	33.3%	0	0	-	1	0	0.0%	4	1	25.0%
BEWR	7190	2	1	50.0%	2	0	0.0%	0	0	-	4	1	25.0%
HOWR	7210	8	1	12.5%	0	0	-	0	0	-	8	1	12.5%
WREN	7420	17	4	23.5%	1	0	0.0%	8	1	12.5%	26	5	19.2%
Total		176	30	17.0%	47	1	2.1%	16	1	6.3%	239	32	13.4%

^a Survival from 1996 to 1997 based only on 1996 recapture data

^b Migratory species

Table 9. Recapture Rate by Sex of Birds Banded as Adults in 1996: De Luz Creek

Non-Adjusted One-Year Survival^a

Species	Code	Female			Male			Unknown			Total		
		Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
ATFL ^b	4540	2	1	50.0%	1	0	0.0%	4	0	0.0%	7	1	14.3%
SOSP	5810	8	2	25.0%	7	2	28.6%	4	1	25.0%	19	5	26.3%
SPTO	5880	7	2	28.6%	7	2	28.6%	0	0	-	14	4	28.6%
CALT	5911	5	0	0.0%	4	1	25.0%	7	0	0.0%	16	1	6.3%
BHGR ^b	5960	12	1	8.3%	15	1	6.7%	0	0	-	27	2	7.4%
HUVI	6320	0	0	-	0	0	-	1	1	100.0%	1	1	100.0%
LBVI ^b	6334	0	0	-	1	1	100.0%	4	0	0.0%	5	1	20.0%
COYE	6810	13	2	15.4%	16	4	25.0%	0	0	-	29	6	20.7%
YBCH ^b	6830	19	1	5.3%	8	1	12.5%	1	0	0.0%	28	2	7.1%
CATH	7100	1	1	100.0%	0	0	-	2	0	0.0%	3	1	33.3%
BEWR	7190	0	0	-	0	0	-	2	1	50.0%	2	1	50.0%
HOWR	7210	1	0	0.0%	2	1	50.0%	5	0	0.0%	8	1	12.5%
WREN	7420	0	0	-	0	0	-	17	4	23.5%	17	4	23.5%
Total		68	10	14.7%	61	13	21.3%	47	7	14.9%	176	30	17.0%

^a Survival from 1996 to 1997 based only on 1996 recapture data

^b Migratory species

Case Springs

Overview of 1997 Captures

One hundred and sixty-eight individuals of 33 species were caught during 761 net-hours at the Case Springs station (Table 10). Unlike at De Luz, the number of captures increased by 28 percent relative to 1996, and captures per net-hour increased by 33 percent (Table 11). The most abundant species at the site included oak titmouse (formerly plain titmouse), California towhee, Pacific-slope flycatcher, Acorn woodpecker, and black-headed grosbeak, with oak titmouse replacing lesser goldfinch as the most abundant species at the station (Figure 5). Species recorded for the first time included white-crowned sparrow, black-chinned sparrow, violet-green swallow, Hutton's vireo, and common yellowthroat.

The sex ratio of birds of known sex (N=98) was exactly 1:1, as in 1996 (Table 10). Age ratio was also comparable, with 74 percent of the known-aged birds (N=138, Table 10) second-year birds or older, and 26 percent hatching year birds.

One hundred and fifty-five of the birds caught (92 percent), including 20 hummingbirds, were new captures. Of these, 99 percent (133/135) of the non-hummingbirds were banded; the remaining two escaped prior to banding. As in 1996, recapture of banded birds occurred less often than at De Luz, with only 11 percent of banded birds captured more than once during the season (Table 11). The most commonly recaptured species: oak titmouse, California towhee, white-breasted nuthatch, and acorn woodpecker, were also among the most abundant species breeding at the site.

Overall capture rates by net ranged from seven to 51 captures per 100 net-hours, with an average of 24 (Table 14). As in previous years, capture rates were highly variable among nets (Figure 6). Captures per 100 net-hours increased to a peak of 37 in late May, and varied little around a mean of 26 for the remainder of the season (Tables 13 and 14).

Survival and Return Rates of Birds Banded in 1995 and 1996

Thirteen of the 168 birds caught in 1997 (eight percent) were recaptured birds originally banded in 1995 or 1996 (Table 11). As at De Luz Creek, the 1997 returns included birds banded in 1995 but not recaptured in 1996, although their effect on calculated survival rates was not as great (Table 15). The adjusted first-year survival rate of 12.5 percent calculated for the 1995 cohort was 15 percent greater than the non-adjusted rate of 10.9 percent, and was produced by the first-time recapture of a single California towhee in 1997.

Not only did inclusion of an additional recapture in the analysis change the calculated return rates, inclusion of information on sex of birds for which sex was unknown at the time of banding influenced sex-based survival estimates (Table 16 A1), decreasing the skew between males and females. While these estimates continue to suffer from small sample sizes and are

difficult to interpret with regard to broad-scale trends, they point out that duration of the monitoring effort is a strong determinant of the reliability of the survival estimates generated in a particular year. Based upon our experience with two Camp Pendleton stations, two years is insufficient time to capture the breadth of species-, age-, habitat-, and environment-specific variables influencing bird behavior and survival, and data based upon such a short period are almost certainly incorrectly estimating important life-history parameters.

Although even corrected and adjusted return rates for the Case Springs birds reflect lower overall first-year survival than at the De Luz station (Table 15 B2), second-year survival was higher among adults at Case Springs (63 percent) than at De Luz (49 percent; Table 15 C2), and female survival was nearly three times as high as male survival. Moreover, first-year survival of the 1996 cohort (38 percent) was considerably higher than the non-adjusted first-year survival of the 1995 Case Springs cohort (17.1 percent), as well as the 1996 De Luz cohort (13 percent), reflecting an opposite trend in annual survival to that detected at De Luz.

Table 10. Age and Sex of individuals Captured: Case Springs, 1997

Species	Code	Female					Female Total	Male					Male Total	Unknown Sex			Unknown Total	Species Total
		Age*						Age*						Age*				
		A	H	O	S	U		A	H	O	S	U		A	H	U		
NUWO	3970	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
ACWO	4070	2	0	0	0	0	2	3	0	0	0	6	9	0	0	0	0	11
RSFL	4130	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
ANHU	4310	5	0	0	0	2	7	1	2	0	0	0	3	0	0	3	3	13
ALHU	4340	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
UNHU	4409	1	0	0	0	0	1	0	0	0	0	0	0	0	0	5	5	6
ATFL	4540	2	0	0	0	0	2	0	0	0	0	0	0	3	2	0	5	7
WEWP	4620	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
PSFL	4641	2	0	0	0	0	2	0	0	0	0	0	0	5	5	0	10	12
LEGO	5300	3	0	1	2	0	6	0	0	2	0	0	2	0	0	0	0	8
LASP	5520	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	2
WCSP	5540	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
GCSP	5570	0	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	3
CHSP	5600	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
BCSP	5650	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
ORJU	5671	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
SPTO	5880	1	0	1	0	0	2	1	0	1	0	0	2	0	3	0	3	7
CALT	5911	2	1	0	0	0	3	5	0	0	0	0	5	2	2	1	5	13
BHGR	5960	2	0	1	0	0	3	0	0	5	3	0	8	0	0	0	0	11
LAZB	5990	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
WETA	6070	0	0	2	0	0	2	0	1	0	0	0	1	0	0	0	0	3
VGSW	6150	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
PHAI	6200	2	0	0	0	0	2	0	0	2	0	0	2	0	0	0	0	4
HUVI	6320	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
OCWA	6460	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	2
COYE	6810	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
WIWA	6850	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
BEWR	7190	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	2
HOWR	7210	2	0	0	0	0	2	4	0	0	0	0	4	1	0	2	3	9
WBNU	7270	2	1	0	0	0	3	3	0	0	0	0	3	0	2	1	3	9
OATI	7330	2	0	0	0	0	2	0	0	0	0	0	0	3	6	7	16	18
WREN	7420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
BUSH	7430	0	0	0	0	1	1	1	0	0	0	0	1	0	3	0	3	5
WEBL	7670	0	1	1	0	0	2	0	2	0	0	0	2	0	3	0	3	7
Total		34	3	6	3	3	49	23	5	12	3	6	49	21	28	21	70	168

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

Table 11. Number of Birds Captured, Banded, and Recaptured: Case Springs, 1995 - 1997

Species	Code	Total Captures			New Individuals Banded			Banded 1995, Recaptured 1997	Banded 1996, Recaptured 1997	Total Recaptured 1997
		1995	1996	1997	1995	1996	1997			
RSHA	3390	0	1	0	0	0	0	0	0	0
NUWO	3970	1	1	1	1	1	1	0	0	0
ACWO	4070	15	5	13	11	4	9	0	2	2
RSFL	4130	2	1	1	1	1	1	0	0	0
BCHU	4290	0	1	0	0	0	0	0	0	0
COHU	4300	2	3	0	0	0	0	0	0	0
ANHU	4310	15	16	13	0	0	0	0	0	0
ALHU	4340	4	0	1	0	0	0	0	0	0
UNHU	4409	2	2	6	0	0	0	0	0	0
ATFL	4540	5	2	7	4	1	6	1	0	1
WEWP	4620	2	0	1	2	0	1	0	0	0
PSFL	4641	9	7	12	9	7	12	0	0	0
HAFL	4680	2	0	0	2	0	0	0	0	0
WESJ	4810	3	3	0	3	3	0	0	0	0
EUST	4930	0	1	0	0	1	0	0	0	0
LEGO	5300	25	24	8	24	24	8	0	0	0
LASP	5520	7	1	2	6	1	2	0	0	0
WCSP	5540	0	0	2	0	0	2	0	0	0
GCSP	5570	0	2	3	0	2	2	0	0	0
CHSP	5600	14	2	1	14	2	1	0	0	0
BCSP	5650	0	0	1	0	0	1	0	0	0
DEJU	5677	6	0	2	6	0	2	0	0	0
RCSP	5800	3	1	0	3	1	0	0	0	0
SOSP	5810	0	2	0	0	1	0	0	0	0
SPTO	5880	5	6	7	4	3	7	0	0	0
CALT	5911	21	10	15	16	7	8	2	3	5
BHGR	5960	12	3	11	11	3	10	0	1	1
LAZB	5990	9	2	1	9	2	1	0	0	0
WETA	6070	1	3	3	1	3	3	0	0	0
VGSW	6150	0	0	1	0	0	1	0	0	0
PHAI	6200	0	1	4	0	1	4	0	0	0
WAVI	6270	1	1	0	1	1	0	0	0	0
HUVI	6320	0	0	1	0	0	1	0	0	0
OCWA	6460	3	1	2	3	1	2	0	0	0
YWAR	6520	3	0	0	3	0	0	0	0	0
BTYW	6650	1	0	0	1	0	0	0	0	0
TOWA	6680	3	0	0	3	0	0	0	0	0
HEWA	6690	2	2	0	2	1	0	0	0	0
COYE	6810	0	0	1	0	0	1	0	0	0
WIWA	6850	3	0	1	3	0	1	0	0	0
BEWR	7190	1	1	2	1	1	2	0	0	0
HOWR	7210	11	9	10	9	7	7	1	0	1
WBNU	7270	12	5	13	9	3	8	1	0	1
OATI	7330	24	10	24	16	7	16	0	2	2
WREN	7420	0	1	1	0	1	1	0	0	0
BUSH	7430	2	2	5	2	2	5	0	0	0
SWTH	7580	16	0	0	16	0	0	0	0	0
HETH	7590	1	0	0	1	0	0	0	0	0
WEBL	7670	4	4	7	4	4	7	0	0	0
Total		252	136	183	201	96	133	5	8	13

Figure 5. Number of Individuals Caught per Species: Case Springs, 1997

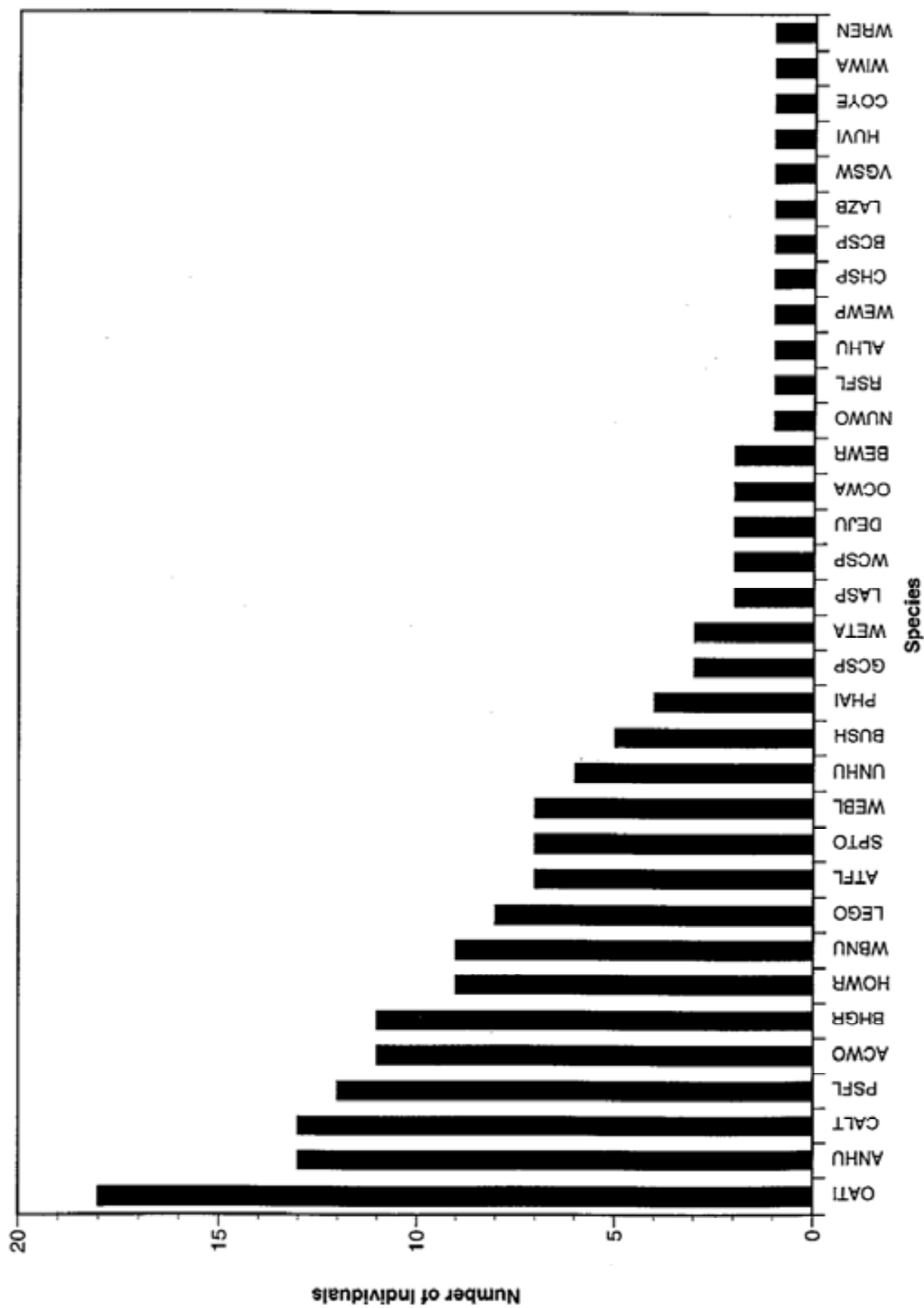


Table 12. Capture Frequency of Individuals: Case Springs, 1997

Species	Code	# Individuals / Capture Incidence (Banded Birds Only)			# Captures		
		1 Capture	2 Captures	3 Captures	Banded Birds	Unbanded Birds	All Birds
NUWO	3970	1	0	0	1	0	1
ACWO	4070	9	2	0	13	0	13
RSFL	4130	1	0	0	1	0	1
ALHU	4340	0	0	0	0	1	1
ANHU	4310	0	0	0	0	13	13
UNHU	4409	0	0	0	0	6	6
ATFL	4540	7	0	0	7	0	7
WEWP	4620	1	0	0	1	0	1
PSFL	4641	12	0	0	12	0	12
LEGO	5300	8	0	0	8	0	8
LASP	5520	2	0	0	2	0	2
WCSP	5540	2	0	0	2	1	3
GCSP	5570	2	0	0	2	0	2
CHSP	5600	1	0	0	1	0	1
BCSP	5650	1	0	0	1	0	1
ORJU	5671	2	0	0	2	0	2
SPTO	5880	7	0	0	7	0	7
CALT	5911	11	2	0	15	0	15
BHGR	5960	11	0	0	11	0	11
LAZB	5990	1	0	0	1	0	1
WETA	6070	3	0	0	3	0	3
VGSW	6150	1	0	0	1	0	1
PHAI	6200	4	0	0	4	0	4
HUVI	6320	1	0	0	1	0	1
OCWA	6460	2	0	0	2	0	2
COYE	6810	1	0	0	1	0	1
WIWA	6850	1	0	0	1	0	1
BEWR	7190	2	0	0	2	0	2
HOWR	7210	7	1	0	9	1	10
WBNU	7270	5	4	0	13	0	13
OATI	7330	13	4	1	24	0	24
WREN	7420	1	0	0	1	0	1
BUSH	7430	5	0	0	5	0	5
WEBL	7670	7	0	0	7	0	7
Total		132	13	1	161	22	183

Table 13. Number of Captures by Date: Case Springs, 1997

Species	Code	Date														Total Captures 1997	Captures per 100 Net-hours ^a	
		4/6/97	4/15/97	4/25/97	5/5/97	5/15/97	5/25/97	6/4/97	6/16/97	6/24/97	7/3/97	7/14/97	7/24/97	8/1/97	8/14/97			8/22/97
NUWO	3970	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.13
ACWO	4070	0	1	1	2	1	1	0	0	0	1	2	1	0	1	2	13	1.71
RSFL	4130	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
ANHU	4310	0	1	1	0	3	3	3	0	0	1	0	0	0	1	0	13	1.71
ALHU	4340	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.13
UNHU ^b	4409	0	0	0	0	0	1	1	0	3	0	0	0	0	1	0	6	0.79
ATFL	4540	0	0	0	2	0	1	1	1	0	1	1	0	0	0	0	7	0.92
WEWP	4620	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.13
PSFL	4641	0	0	0	0	0	0	1	0	0	0	2	3	1	5	0	12	1.58
LEGO	5300	0	0	0	0	1	1	0	1	2	0	1	0	0	0	2	8	1.05
LASP	5520	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0.26
WCSP	5540	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.26
GCSP	5570	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.39
CHSP	5600	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.13
BCSP	5650	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.13
ORJU	5671	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.26
SPTO	5880	0	0	0	1	0	1	0	2	1	0	0	0	1	1	0	7	0.92
CALT	5911	0	1	0	1	0	2	0	2	0	2	3	2	0	2	0	15	1.97
BHGR	5960	0	0	0	1	0	0	4	2	1	0	1	2	0	0	0	11	1.44
LAZB	5990	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.13
WETA	6070	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3	0.39
VGSW	6150	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.13
PHAI	6200	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	4	0.53
HUVI	6320	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.13
OCWA	6460	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0.26
COYE	6810	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.13
WIWA	6850	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.13
BEWR	7190	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0.26
HOWR	7210	0	2	0	1	5	1	0	0	1	0	0	0	0	0	0	10	1.31
WBNU	7270	0	0	0	2	1	3	1	1	2	1	1	0	0	1	0	13	1.71
OATI	7330	0	0	2	1	1	4	1	1	2	3	2	2	3	2	0	24	3.15
WREN	7420	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.13
BUSH	7430	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3	5	0.66
WEBL	7670	0	0	0	0	0	1	0	0	0	2	0	4	0	0	0	7	0.92
Total		3	11	5	12	13	20	15	14	14	13	15	15	8	17	8	183	24.03
Species		1	8	4	9	7	11	9	11	8	9	10	7	6	10	4	33	4.33

^a 761:25 total net-hours

^b Not included in species total

Table 14. Capture Rates by Net and Date: Case Springs, 1997

Date		Net										Date Totals
		1	2	3	4	5	6	7	8	9	10	
4/6/97	Net Hours	4:30	4:35	4:35	4:35	4:35	4:30	4:35	4:35	4:30	4:25	45:25
	Captures	2	0	0	1	0	0	0	0	0	0	3
	Captures/Net Hour	0.44	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.07
4/15/97	Net Hours	4:25	4:55	4:55	4:50	4:50	4:50	4:45	4:50	4:50	4:55	48:05
	Captures	2	0	0	2	0	3	1	2	1	0	11
	Captures/Net Hour	0.45	0.00	0.00	0.41	0.00	0.62	0.21	0.41	0.21	0.00	0.23
4/25/97	Net Hours	4:50	4:35	4:45	4:55	5:10	5:20	5:20	5:20	5:05	5:00	50:20
	Captures	1	0	2	0	0	0	0	1	1	0	5
	Captures/Net Hour	0.21	0.00	0.42	0.00	0.00	0.00	0.00	0.19	0.20	0.00	0.10
5/5/97	Net Hours	5:25	5:35	5:35	5:30	5:30	5:30	5:30	5:45	5:40	5:20	55:20
	Captures	2	1	1	1	1	1	1	4	0	0	12
	Captures/Net Hour	0.37	0.18	0.18	0.18	0.18	0.18	0.18	0.70	0.00	0.00	0.22
5/15/97	Net Hours	5:10	5:25	5:25	5:30	5:35	0:00	5:30	5:30	5:35	5:35	49:15
	Captures	2	0	2	2	4	0	2	0	0	1	13
	Captures/Net Hour	0.39	0.00	0.37	0.36	0.72	0	0.36	0.00	0.00	0.18	0.26
5/25/97	Net Hours	6:10	5:50	6:00	6:00	6:00	0:00	6:00	6:00	5:50	5:50	53:40
	Captures	5	1	2	0	1	0	2	6	2	1	20
	Captures/Net Hour	0.81	0.17	0.33	0.00	0.17	0	0.33	1.00	0.34	0.17	0.37
6/4/97	Net Hours	5:40	5:20	5:40	5:40	5:40	5:30	5:40	5:45	5:40	5:40	56:15
	Captures	5	0	4	2	0	0	1	0	3	0	15
	Captures/Net Hour	0.88	0.00	0.71	0.35	0.00	0.00	0.18	0.00	0.53	0.00	0.27
6/16/97	Net Hours	5:35	5:30	5:35	5:35	5:35	5:35	5:35	5:35	5:35	5:40	55:50
	Captures	4	0	0	1	2	2	2	2	0	1	14
	Captures/Net Hour	0.72	0.00	0.00	0.18	0.36	0.36	0.36	0.36	0.00	0.18	0.25
6/24/97	Net Hours	5:55	6:00	6:00	6:05	6:05	5:50	6:00	6:05	5:55	5:55	59:50
	Captures	0	0	2	3	2	0	0	5	0	2	14
	Captures/Net Hour	0.00	0.00	0.33	0.49	0.33	0.00	0.00	0.82	0.00	0.34	0.23
7/3/97	Net Hours	5:10	5:05	5:05	5:05	5:05	5:10	5:05	5:00	5:05	5:05	50:55
	Captures	0	1	0	0	0	6	1	3	0	2	13
	Captures/Net Hour	0.00	0.20	0.00	0.00	0.00	1.16	0.20	0.60	0.00	0.39	0.26
7/14/97	Net Hours	4:20	4:20	4:10	4:10	4:10	4:15	4:10	4:15	4:20	4:20	42:30
	Captures	1	0	1	0	0	6	2	3	2	0	15
	Captures/Net Hour	0.23	0.00	0.24	0.00	0.00	1.41	0.48	0.71	0.46	0.00	0.35
7/24/97	Net Hours	4:55	4:55	4:55	4:55	4:55	4:55	4:55	4:55	4:55	4:55	49:10
	Captures	5	0	0	1	2	1	2	2	0	2	15
	Captures/Net Hour	1.02	0.00	0.00	0.20	0.41	0.20	0.41	0.41	0.00	0.41	0.31
8/1/97	Net Hours	5:10	5:10	5:10	5:15	5:15	5:15	5:10	5:15	5:15	5:15	52:10
	Captures	2	0	1	1	0	1	2	0	0	1	8
	Captures/Net Hour	0.39	0.00	0.19	0.19	0.00	0.19	0.39	0.00	0.00	0.19	0.15
8/14/97	Net Hours	5:00	5:05	5:05	5:05	4:55	5:10	4:55	4:55	4:40	4:40	49:30
	Captures	4	2	2	1	1	0	5	1	1	0	17
	Captures/Net Hour	0.80	0.39	0.39	0.20	0.20	0.00	1.02	0.20	0.21	0.00	0.34
8/22/97	Net Hours	4:15	4:15	4:20	4:20	4:20	4:10	4:20	4:45	4:10	4:15	43:10
	Captures	4	0	0	0	0	0	0	3	0	1	8
	Captures/Net Hour	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.24	0.19
Net Totals	Net Hours	76:30	76:35	77:15	77:30	77:40	66:00	77:30	78:30	77:05	76:50	761:25
	Captures	39	5	17	15	13	20	21	32	10	11	183
	Captures/Net Hour	0.51	0.07	0.22	0.19	0.17	0.30	0.27	0.41	0.13	0.14	0.24

Figure 6. Captures, Net Hours, and Capture Rate by Net: Case Springs, 1997

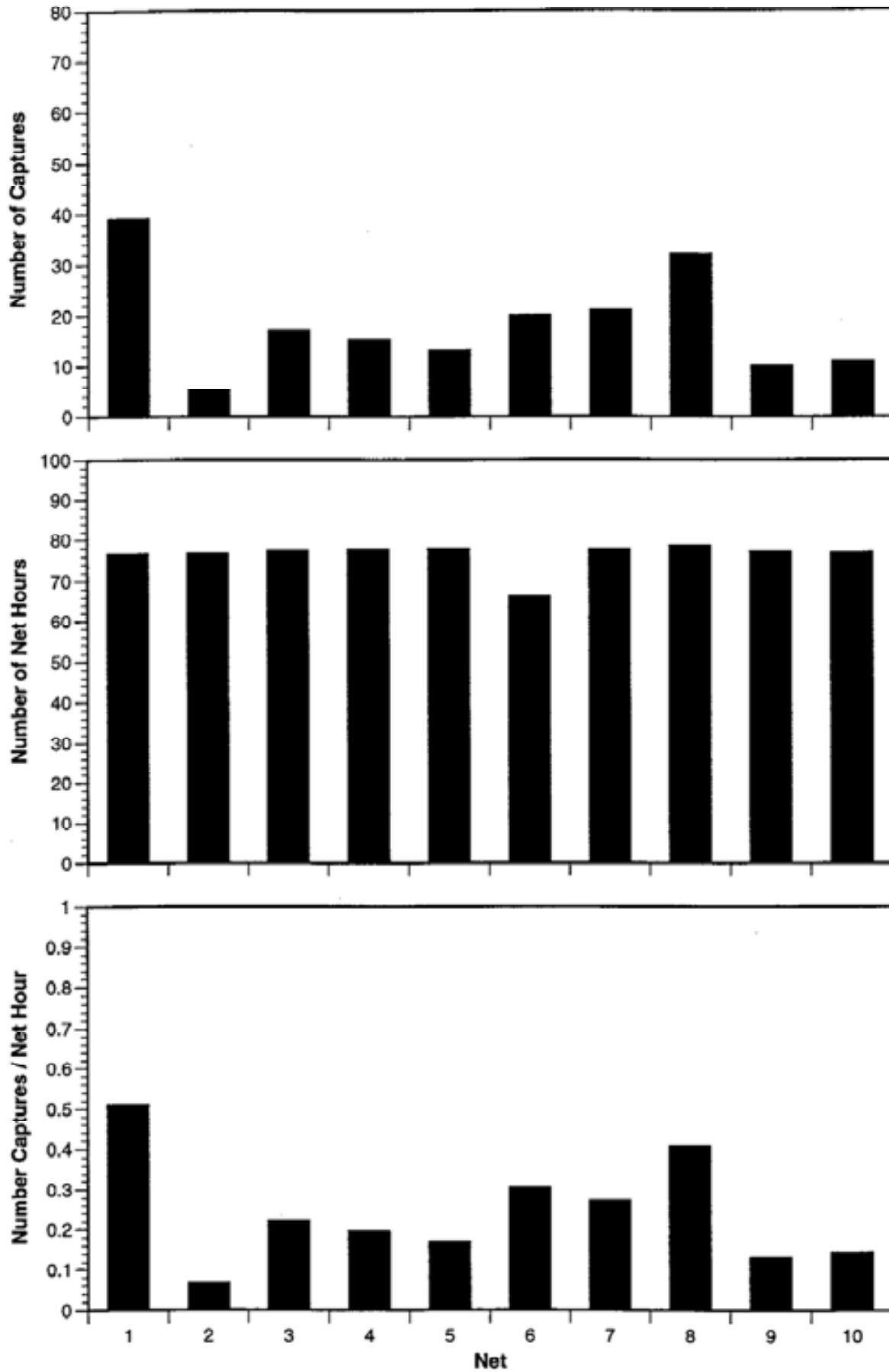


Table 15. Recapture Rate by Age at Banding of Birds Banded in 1995: Case Springs

A. Non-Adjusted One-Year Survival^a

Species	After Hatch Year			Hatch Year			Unknown Age			Total		
	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
ACWO	7	1	14.3%	1	0	0.0%	3	0	0.0%	11	1	9.1%
ATFL ^b	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	9	1	11.1%	7	0	0.0%	0	0	-	16	1	6.3%
HOWR	8	2	25.0%	0	0	-	0	0	-	8	2	25.0%
WBNU	6	1	16.7%	2	0	0.0%	1	0	0.0%	9	1	11.1%
OATI	7	1	14.3%	4	0	0.0%	5	0	0.0%	16	1	6.3%
Total	41	7	17.1%	14	0	0.0%	9	0	0.0%	64	7	10.9%

B. Adjusted One-Year Survival^c

ACWO	7	1	14.3%	1	0	0.0%	3	0	0.0%	11	1	9.1%
ATFL ^b	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	9	2	22.2%	7	0	0.0%	0	0	-	16	2	12.5%
HOWR	8	2	25.0%	0	0	-	0	0	-	8	2	25.0%
WBNU	6	1	16.7%	2	0	0.0%	1	0	0.0%	9	1	11.1%
OATI	7	1	14.3%	4	0	0.0%	5	0	0.0%	16	1	6.3%
Total	41	8	19.5%	14	0	0.0%	9	0	0.0%	64	8	12.5%

C. Non-Adjusted Two-Year Survival^d

ACWO	7	0	0.0%	1	0	0.0%	3	0	0.0%	11	0	0.0%
ATFL ^b	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	9	2	22.2%	7	0	0.0%	0	0	-	16	2	12.5%
HOWR	8	1	12.5%	0	0	-	0	0	-	8	1	12.5%
WBNU	6	1	16.7%	2	0	0.0%	1	0	0.0%	9	1	11.1%
OATI	7	0	0.0%	4	0	0.0%	5	0	0.0%	16	0	0.0%
Total	41	5	12.2%	14	0	0.0%	9	0	0.0%	64	5	7.8%

^a Survival from 1995 to 1996 based only on 1996 recapture data; includes only species with at least one eventual recapture (up to 1997).

^b Migratory species

^c Survival from 1995 to 1996 based on 1996 and 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

^d Survival from 1995 to 1997 based only on 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

Table 16: Recapture Rate by Sex of Birds Banded as Adults in 1995: Case Springs

A1. Non-Adjusted One-Year Survival by Uncorrected Sex^{a,b}

Species	Female			Male			Unknown			Total		
	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
ACWO	1	0	0.0%	4	0	0.0%	2	1	50.0%	7	1	14.3%
ATFL ^c	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	3	1	33.3%	5	0	0.0%	1	0	0.0%	9	1	11.1%
HOWR	2	0	0.0%	6	2	33.3%	0	0	-	8	2	25.0%
WBNU	4	0	0.0%	1	0	0.0%	1	1	100.0%	6	1	16.7%
OATI	3	1	33.3%	2	0	0.0%	2	0	0.0%	7	1	14.3%
Total	17	3	17.6%	18	2	11.1%	6	2	33.3%	41	7	17.1%

A2. Non-Adjusted One-Year Survival by Corrected Sex^{a,d}

ACWO	1	0	0.0%	5	1	20.0%	1	0	0.0%	7	1	14.3%
ATFL ^c	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	3	1	33.3%	5	0	0.0%	1	0	0.0%	9	1	11.1%
HOWR	2	0	0.0%	6	2	33.3%	0	0	-	8	2	25.0%
WBNU	5	1	20.0%	1	0	0.0%	0	0	-	6	1	16.7%
OATI	3	1	33.3%	2	0	0.0%	2	0	0.0%	7	1	14.3%
Total	18	4	22.2%	19	3	15.8%	4	0	0.0%	41	7	17.1%

B1. Adjusted One-Year Survival by Uncorrected Sex^{b,e}

ACWO	1	0	0.0%	4	0	0.0%	2	1	50.0%	7	1	14.3%
ATFL ^c	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	3	2	66.7%	5	0	0.0%	1	0	0.0%	9	2	22.2%
HOWR	2	0	0.0%	6	2	33.3%	0	0	-	8	2	25.0%
WBNU	4	0	0.0%	1	0	0.0%	1	1	100.0%	6	1	16.7%
OATI	3	1	33.3%	2	0	0.0%	2	0	0.0%	7	1	14.3%
Total	17	4	23.5%	18	2	11.1%	6	2	33.3%	41	8	19.5%

B2. Adjusted One-Year Survival by Corrected Sex^{d,e}

ACWO	1	0	0.0%	5	1	20.0%	1	0	0.0%	7	1	14.3%
ATFL ^c	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	3	2	66.7%	5	0	0.0%	1	0	0.0%	9	2	22.2%
HOWR	2	0	0.0%	6	2	33.3%	0	0	-	8	2	25.0%
WBNU	5	1	20.0%	1	0	0.0%	0	0	-	6	1	16.7%
OATI	3	1	33.3%	2	0	0.0%	2	0	0.0%	7	1	14.3%
Total	18	5	27.8%	19	3	15.8%	4	0	0.0%	41	8	19.5%

C1. Non-Adjusted Two-Year Survival by Uncorrected Sex^{b,f}

ACWO	1	0	0.0%	4	0	0.0%	2	0	0.0%	7	0	0.0%
ATFL ^c	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	3	2	66.7%	5	0	0.0%	1	0	0.0%	9	2	22.2%
HOWR	2	0	0.0%	6	1	16.7%	0	0	-	8	1	12.5%
WBNU	4	0	0.0%	1	0	0.0%	1	1	100.0%	6	1	16.7%
OATI	3	0	0.0%	2	0	0.0%	2	0	0.0%	7	0	0.0%
Total	17	3	17.6%	18	1	5.6%	6	1	16.7%	41	5	12.2%

C2. Non-Adjusted Two-Year Survival by Corrected Sex^{d,f}

ACWO	1	0	0.0%	5	0	0.0%	1	0	0.0%	7	0	0.0%
ATFL ^c	4	1	25.0%	0	0	-	0	0	-	4	1	25.0%
CALT	3	2	66.7%	5	0	0.0%	1	0	0.0%	9	2	22.2%
HOWR	2	0	0.0%	6	1	16.7%	0	0	-	8	1	12.5%
WBNU	5	1	20.0%	1	0	0.0%	0	0	-	6	1	16.7%
OATI	3	0	0.0%	2	0	0.0%	2	0	0.0%	7	0	0.0%
Total	18	4	22.2%	19	1	5.3%	4	0	0.0%	41	5	12.2%

^a Survival from 1995 to 1996 based only on 1996 recapture data; includes only species with at least one eventual recapture (up to 1997).^b Sex based on original capture classification; not corrected using recapture information^c Migratory species^d Sex classification corrected using recapture information^e Survival from 1995 to 1996 based on 1996 and 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).^f Survival from 1995 to 1997 based only on 1997 recapture data; includes only species with at least one eventual recapture (up to 1997).

Table 17. Recapture Rate by Age at Banding of Birds Banded in 1996: Case Springs

Non-Adjusted One-Year Survival^a

Species	AHY			HY			Unknown			Total		
	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
ACWO	4	2	50.0%	0	0	-	0	0	-	4	2	50.0%
CALT	3	2	66.7%	4	1	25.0%	0	0	-	7	3	42.9%
BHGR ^b	3	1	33.3%	0	0	-	0	0	-	3	1	33.3%
OATI	3	1	33.3%	4	1	25.0%	0	0	-	7	2	28.6%
Total	13	6	46.2%	8	2	25.0%	0	0	-	21	8	38.1%

^a Survival from 1996 to 1997 based only on 1996 recapture data

^b Migratory species

Table 18. Recapture Rate by Sex of Birds Banded as Adults in 1996: Case Springs

Non-Adjusted One-Year Survival^a

Species	Female			Male			Unknown			Total		
	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured	Banded	Recaptured	% Recaptured
ACWO	1	0	0.0%	3	2	66.7%	0	0	-	4	2	50.0%
CALT	1	0	0.0%	2	2	100.0%	0	0	-	3	2	66.7%
BHGR ^b	0	0	-	3	1	33.3%	0	0	-	3	1	33.3%
OATI	1	0	0.0%	0	0	-	2	1	50.0%	3	1	33.3%
Total	3	0	0.0%	8	5	62.5%	2	1	50.0%	13	6	46.2%

^a Survival from 1996 to 1997 based only on 1996 recapture data

^b Migratory 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
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
ATFL	Ash-throated flycatcher	<i>Myiarchus cinerascens</i>	454.0
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
VGSW	Violet-green swallow	<i>Tachycineta thalassina</i>	615.0
PHAI	Phainopepla	<i>Phainopepla nitens</i>	620.0
WAVI	Warbling vireo	<i>Vireo gilvus</i>	627.0
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
YRWA	Yellow-rumped warbler	<i>Dendroica coronata</i>	655.6
BTYW	Black-throated gray warbler	<i>Dendroica nigrescens</i>	665.0
TOWA	Townsend's warbler	<i>Dendroica townsendi</i>	668.0

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

Code	Common Name	Scientific Name	AOU #
HEWA	Hermit warbler	<i>Dendroica occidentalis</i>	669.0
COYE	Common yellowthroat	<i>Geothlypis trichas</i>	681.0
YBCH	Yellow-breasted chat	<i>Icteria virens</i>	683.0
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
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