

**NEOTROPICAL MIGRATORY BIRD  
MONITORING STUDY  
AT  
MARINE CORPS BASE CAMP PENDLETON, CALIFORNIA  
SECOND ANNUAL PROGRESS REPORT  
1996**

*Prepared for*

U.S. Marine Corps  
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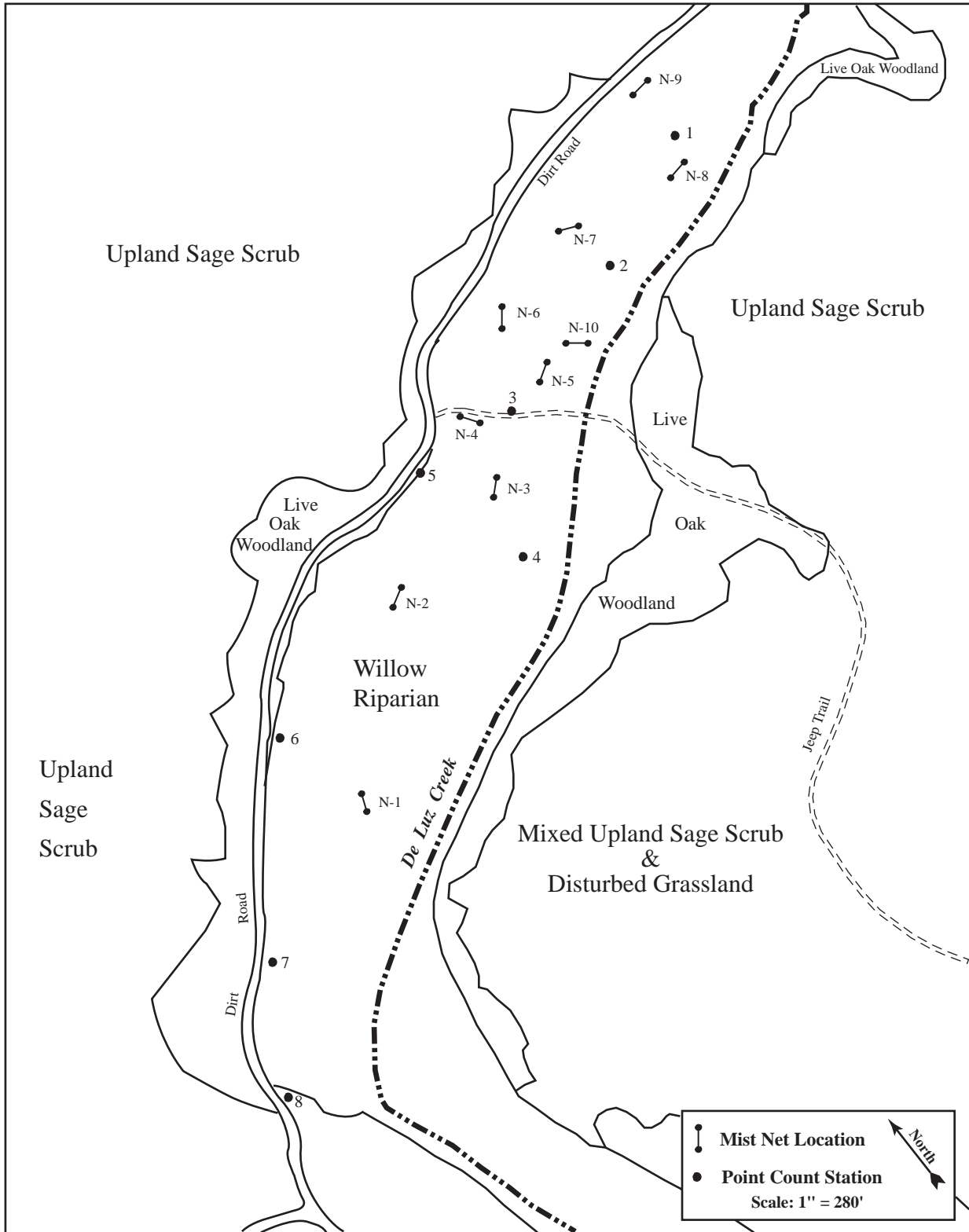
## ***Introduction***

This report is the second 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 in 1995 and 1996; 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, 1996, 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 National Biological Service 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.**

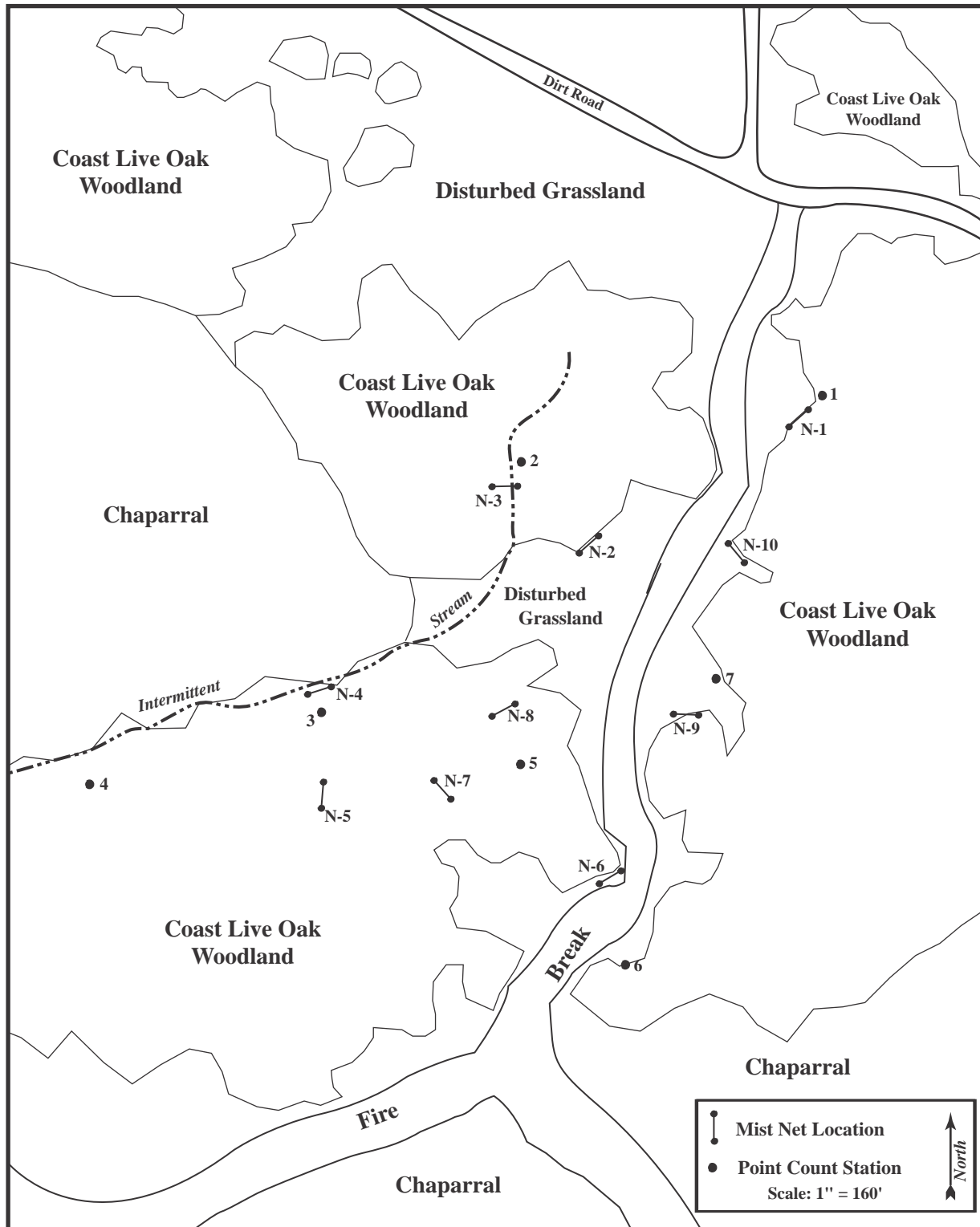


Figure 2. Case Springs MAPS Station, Marine Corps Base Camp Pendleton.

## **Results**

### De Luz Creek

#### *Overview of 1996 Captures*

Four hundred and twenty-two individuals of 38 species were caught during 789 net-hours (Table 1; see attached list of A.O.U. codes for common and taxonomic species names). As in 1995, the most abundant species at the station included common yellowthroats, song sparrows, yellow-breasted chats, spotted towhees, black-headed grosbeaks, wrentits, and California towhees (Figure 3), although the relative abundance of these species differed between the two years (Table 2). Overall, the number of individuals caught in 1996 was seven percent lower than the number (454) captured in 1995, despite the fact that the total number of net-hours was seven percent greater in 1996. Fewer species were caught in 1996 as well, and seven of the 41 species (California quail, hooded oriole, western tanager, phainopepla, Nashville warbler, yellow-rumped warbler, and hermit thrush) captured in 1995 were not represented in the 1996 captures (Table 2). In contrast, five of the 38 species caught in 1996, including western wood peewee, purple finch, Oregon junco, blue grosbeak, and warbling vireo, were first-time records for the station.

The sex ratio of birds of known sex (N=265) was roughly 1:1, with 49 percent female and 51 percent male (Table 1). Eighty-two percent of the known-aged birds (N=393, Table 1) were second-year birds or older, and 18 percent were hatching year birds. Both the age- and sex-composition of the 1996 population were comparable to those in 1995.

Three hundred and fifty-five of the birds caught (84 percent), including 10 hummingbirds, were new captures. Of these, 97 percent of the non-hummingbirds (336/345) were banded; the remainder escaped prior to banding (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 wrentit was captured four times (Table 3).

Overall capture rates by net ranged from 26 to 86 captures per 100 net-hours (Table 5), for an overall average capture rate of 61 per 100 net-hours (Table 4). With the exception of net 4, capture rates were comparable among nets, and equitability appeared higher than in 1995 (Figure 4). Net 4, located along a dirt road crossing De Luz Creek, experienced the lowest capture rates in both years (55 and 26 captures per 100 net-hours in 1995 and 1996, respectively), and capture rate dropped by 50 percent in 1996 relative to the previous year. Clearing of vegetation near the net, increased vehicle and foot-traffic by Marines along the dirt road, and daily vehicle trips by personnel operating a cowbird trap near the net (Griffith Wildlife Biology) probably all contributed to the reduced capture rate.

Unlike in 1995, when April was the period of highest captures, capture rates in 1996 increased steadily through the season until they peaked in mid-May at 94 captures per 100 net-hours (Table 5). Capture rates declined for the remainder of the season, and fluctuated between 43 and 76 captures per 100 net-hours, with periodic pulses produced at least in part by the emergence of fledged young.

**Table 1**  
**Age and Sex of Individuals Captured: De Luz, 1996**

Species	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	L	U							
DOWO	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	
NUWO	0	0	0	0	0	0	2	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	3
BCHU	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
COHU	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	2
ANHU	2	0	0	0	0	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3	5
HUMM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
ATFL	2	0	0	0	0	2	3	0	0	0	0	3	4	0	0	0	0	0	0	0	0	4	9
WEWP	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
PSFL	1	0	0	0	0	1	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	8	9
WIFL	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
BUOR	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
PUFI	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
HOFI	4	0	0	0	1	5	2	2	0	0	0	4	0	9	0	4	0	0	0	0	0	13	22
LEGO	2	0	0	5	0	7	3	0	0	3	0	6	0	0	0	0	0	0	0	0	0	0	13
LASP	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
GCSP	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	2
ORJU	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
RCSP	1	0	0	0	0	1	2	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	4
SOSP	12	0	0	0	0	12	15	0	0	0	0	15	4	20	2	2	0	0	0	0	0	28	55
LISP	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
SPTO	8	1	1	0	1	11	9	0	2	0	0	11	0	1	0	0	0	0	0	0	0	1	23
CALT	8	3	0	0	0	11	5	0	0	0	0	5	7	0	0	0	0	0	0	0	0	7	23
BHGR	14	1	0	0	2	17	12	0	2	3	0	17	0	3	0	0	0	0	0	0	0	3	37
BLGR	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
LAZB	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
WAVI	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	3	3
LBVI	0	0	0	0	0	0	1	0	0	0	0	1	4	0	0	0	0	0	0	0	0	4	5
OCWA	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	4
YWAR	4	0	0	0	0	4	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	6
COYE	19	0	0	0	0	19	24	0	1	0	0	25	0	10	1	2	0	0	0	0	0	13	57
YBCH	20	0	0	0	0	20	18	0	0	1	0	19	1	2	0	0	0	0	0	0	0	3	42
WIWA	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
CATH	1	0	0	0	0	1	1	0	0	0	0	1	2	0	0	1	0	0	0	0	0	3	5
BEWR	3	0	0	0	0	3	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	4	7
HOWR	1	0	0	0	0	1	2	0	0	0	0	2	5	0	0	0	0	0	0	0	0	5	8
PLTI	2	0	0	0	0	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	4
WREN	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	10	0	0	0	0	0	36	36
COBU	3	1	0	0	1	5	6	0	0	0	0	6	0	3	0	0	0	0	0	0	0	3	14
SWTH	0	0	0	0	0	0	1	0	0	0	0	1	7	0	0	0	0	0	0	0	0	7	8
Sex Total	114	6	1	5	5	131	117	3	5	8	1	134	73	57	4	23	0	0	0	0	0	157	422

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

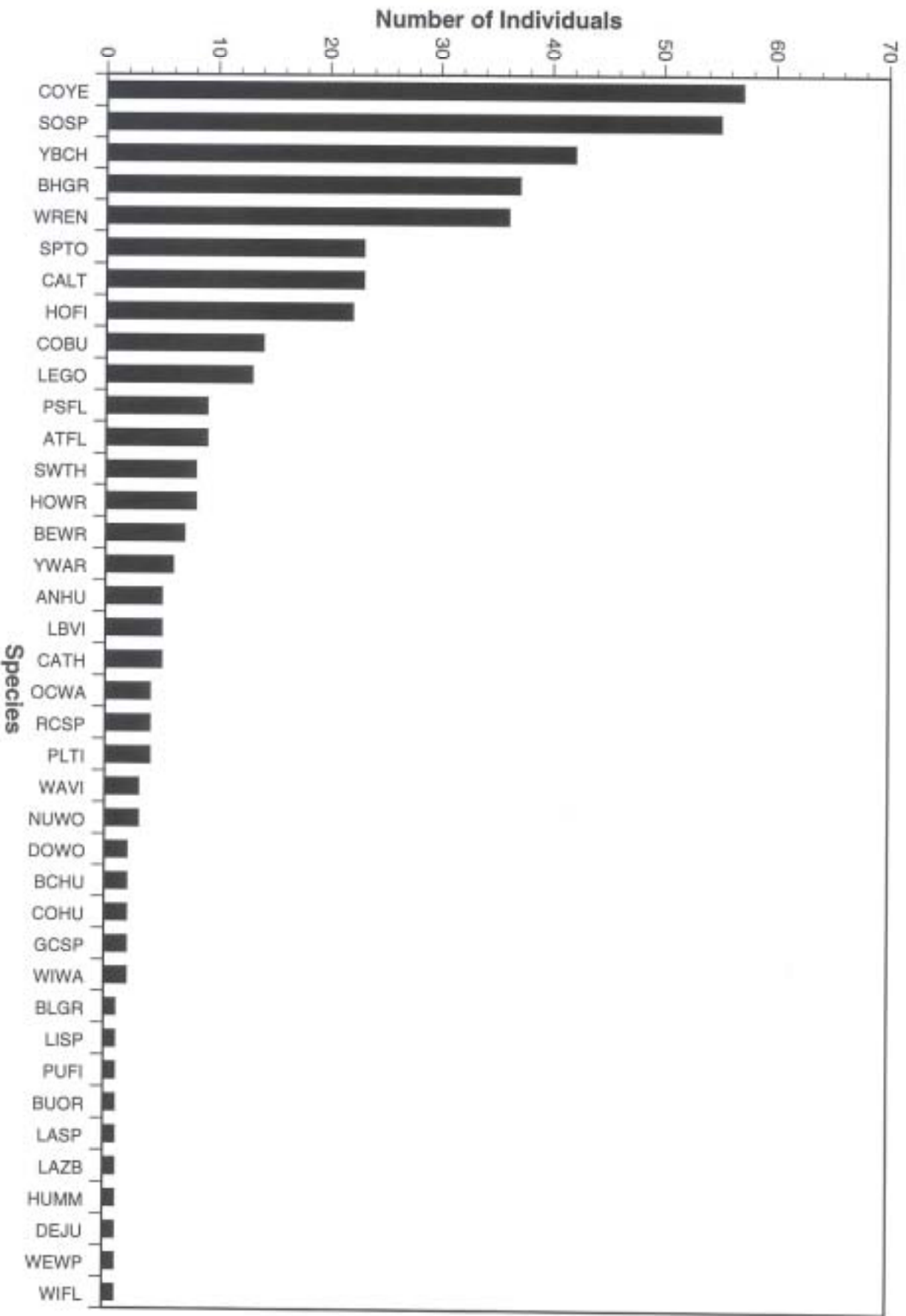


Figure 3  
 Number of Individuals Caught by Species: De Luz

**Table 2**  
**Change in Capture Frequency between 1995 and 1996: De Luz**

Species	Captures		Net Change	Individuals Banded		Banded 1995, Recaptured 1996	Percent Recapture
	1995	1996 <sup>a</sup>		1995	1996		
CAQU	2	0	-2	0	0	0	NA
DOWO	2	2	0	2	2	0	0%
NUWO	4	4	0	4	2	1	25%
BCHU	3	2	-1	0	0	0	NA
COHU	2	2	0	0	0	0	NA
ANHU	5	5	0	0	0	0	NA
HUMM	11	1	-10	0	0	0	NA
ATFL	13	9	-4	10	7	2	20%
WEWP	0	1	1	0	1	0	NA
PSFL	14	9	-5	14	9	0	0%
WIFL	1	1	0	1	1	0	0%
HOOR	2	0	-2	2	0	0	0%
BUOR	5	1	-4	5	1	0	0%
PUFI	0	1	1	0	1	0	NA
HOFI	1	23	22	1	22	0	0%
LEGO	15	14	-1	15	13	0	0%
LASP	1	1	0	1	1	0	0%
GCSP	3	2	-1	3	2	0	0%
ORJU	0	1	1	0	0	0	NA
RCSP	1	4	3	1	4	0	0%
SOSP	70	69	-1	51	43	12	24%
LISP	1	1	0	1	1	0	0%
SPTO	38	27	-11	33	17	6	18%
CALT	20	25	5	17	19	4	24%
BHGR	33	40	7	26	33	4	15%
BLGR	0	1	1	0	1	0	NA
LAZB	12	1	-11	12	1	0	0%
WETA	1	0	-1	1	0	0	0%
PHAI	2	0	-2	2	0	0	0%
WAVI	0	3	3	0	3	0	NA
HUVI	2	0	-2	2	0	0	0%
LBVI	10	5	-5	9	5	0	0%
NAWA	1	0	-1	1	0	0	0%
OCWA	13	4	-9	12	3	1	8%
YWAR	3	7	4	3	6	0	0%
YRWA	2	0	-2	2	0	0	0%
COYE	74	70	-4	62	42	13	21%
YBCH	55	51	-4	39	30	10	26%
WIWA	2	2	0	2	2	0	0.0%
CATH	2	5	3	0	4	0	NA
BEWR	22	11	-11	16	4	3	19%
HOWR	3	8	5	2	8	0	0%
PLTI	7	5	-2	6	1	3	50%
WREN	49	45	-4	33	26	7	21%
COBU	10	14	4	9	13	1	11%
SWTH	22	8	-14	22	8	0	0%
HETH	1	0	-1	1	0	0	0%
<b>Total</b>	<b>540</b>	<b>485</b>	<b>-55</b>	<b>423</b>	<b>336</b>	<b>67</b>	<b>16%</b>

<sup>a</sup>Includes recaptures of birds banded in 1995



**Table 3**  
**Capture Frequency of Individuals: De Luz,1996**

Species	# Individuals / Capture Incidence (All Banded Birds)				Captures:		
	1 Capture	2 Captures	3 Captures	4 Captures	Banded Birds	Unbanded Birds	All Birds
DOWO	2	0	0	0	2	0	2
NUWO	2	1	0	0	4	0	4
BCHU	0	0	0	0	0	2	2
COHU	0	0	0	0	0	2	2
ANHU	0	0	0	0	0	5	5
HUMM	0	0	0	0	0	1	1
ATFL	9	0	0	0	9	0	9
WEWP	1	0	0	0	1	0	1
PSFL	9	0	0	0	9	0	9
WIFL	1	0	0	0	1	0	1
BUOR	1	0	0	0	1	0	1
PUFI	1	0	0	0	1	0	1
HOFI	21	1	0	0	23	0	23
LEGO	12	1	0	0	14	0	14
LASP	1	0	0	0	1	0	1
GCSP	2	0	0	0	2	0	2
ORJU	0	0	0	0	0	1	1
RCSP	4	0	0	0	4	0	4
SOSP	44	8	3	0	69	0	69
LISP	1	0	0	0	1	0	1
SPTO	20	2	1	0	27	0	27
CALT	21	2	0	0	25	0	25
BHGR	34	3	0	0	40	0	40
BLGR	1	0	0	0	1	0	1
LAZB	1	0	0	0	1	0	1
WAVI	3	0	0	0	3	0	3
LBVI	5	0	0	0	5	0	5
OCWA	4	0	0	0	4	0	4
YWAR	5	1	0	0	7	0	7
COYE	43	11	1	0	68	2	70
YBCH	32	7	1	0	49	2	51
WIWA	2	0	0	0	2	0	2
CATH	4	0	0	0	4	1	5
BEWR	4	2	1	0	11	0	11
HOWR	8	0	0	0	8	0	8
PLTI	3	1	0	0	5	0	5
WREN	26	6	0	1	42	3	45
COBU	14	0	0	0	14	0	14
SWTH	8	0	0	0	8	0	8
<b>Total</b>	<b>349</b>	<b>46</b>	<b>7</b>	<b>1</b>	<b>466</b>	<b>19</b>	<b>485</b>

**Table 4**  
**Number of Captures by Date: De Luz, 1996**

Species	Date														Total Captures 1996	Captures per 100 Net-hours <sup>a</sup>
	4/2/96	4/12/96	4/21/96	5/1/96	5/11/96	5/21/96	5/31/96	6/11/96	6/21/96	7/1/96	7/11/96	7/20/96	7/31/96	8/9/96		
DOWO	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0.25
NUWO	0	0	0	1	1	0	0	0	1	0	0	1	0	0	4	0.51
BCHU	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0.25
COHU	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.25
ANHU	0	0	2	0	0	0	0	0	0	2	0	0	1	0	5	0.63
HUMM <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.13
ATFL	0	0	0	0	2	0	0	2	3	1	0	0	1	0	9	1.14
WEWP	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.13
PSFL	1	0	0	0	1	0	1	0	1	0	3	2	0	0	9	1.14
WIFL	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.13
BUOR	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.13
PUFI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.13
HOFI	0	0	0	0	0	0	0	0	0	4	3	0	2	14	23	2.91
LEGO	1	1	3	0	1	0	0	2	2	2	1	1	0	0	14	1.77
LASP	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.13
GCSP	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0.25
ORJU	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
RCSP	0	0	0	1	0	1	1	0	0	0	0	1	0	0	4	0.51
SOSP	3	1	5	4	6	8	7	8	8	6	1	3	3	1	69	8.74
LISP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.13
SPTO	6	0	1	3	6	2	1	1	1	0	2	0	0	2	27	3.42
CALT	2	1	0	2	1	1	3	1	1	1	2	4	2	3	25	3.17
BHGR	0	0	3	2	6	6	2	4	2	4	2	0	5	3	40	5.06
BLGR	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.13
LAZB	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.13
WAVI	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	0.38
LBVI	0	0	0	1	0	1	0	0	0	0	0	1	0	1	5	0.63
OCWA	0	0	1	0	1	0	0	0	0	0	0	0	0	1	4	0.51
YWAR	0	0	0	3	2	0	0	1	1	0	0	0	0	0	7	0.89
COYE	5	7	4	5	5	3	3	8	10	2	2	5	4	5	70	8.86
YBCH	0	0	2	5	1	8	5	6	6	5	2	4	1	4	51	6.46
WIWA	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0.25
CATH	0	0	2	0	0	0	0	1	1	0	0	0	0	0	5	0.63
BEWR	0	1	0	3	0	1	1	1	0	1	1	0	1	0	11	1.39
HOWR	0	1	1	2	0	1	1	0	0	2	0	0	0	0	8	1.01
PLTI	0	0	0	0	1	1	0	0	1	0	0	0	2	0	5	0.63
WREN	4	3	4	3	1	9	1	5	2	4	0	0	2	3	45	5.70
COBU	0	2	0	0	0	2	1	0	0	1	1	0	4	1	14	1.77
SWTH	0	0	1	1	3	2	1	0	0	0	0	0	0	0	8	1.01
<b>Captures</b>	<b>25</b>	<b>17</b>	<b>30</b>	<b>38</b>	<b>42</b>	<b>49</b>	<b>29</b>	<b>41</b>	<b>41</b>	<b>32</b>	<b>24</b>	<b>25</b>	<b>27</b>	<b>26</b>	<b>39</b>	<b>485</b>
<b>Species</b>	<b>10</b>	<b>8</b>	<b>13</b>	<b>16</b>	<b>18</b>	<b>16</b>	<b>14</b>	<b>13</b>	<b>15</b>	<b>13</b>	<b>14</b>	<b>10</b>	<b>11</b>	<b>11</b>	<b>15</b>	<b>38</b>

<sup>a</sup> 789:46 Total Net Hours

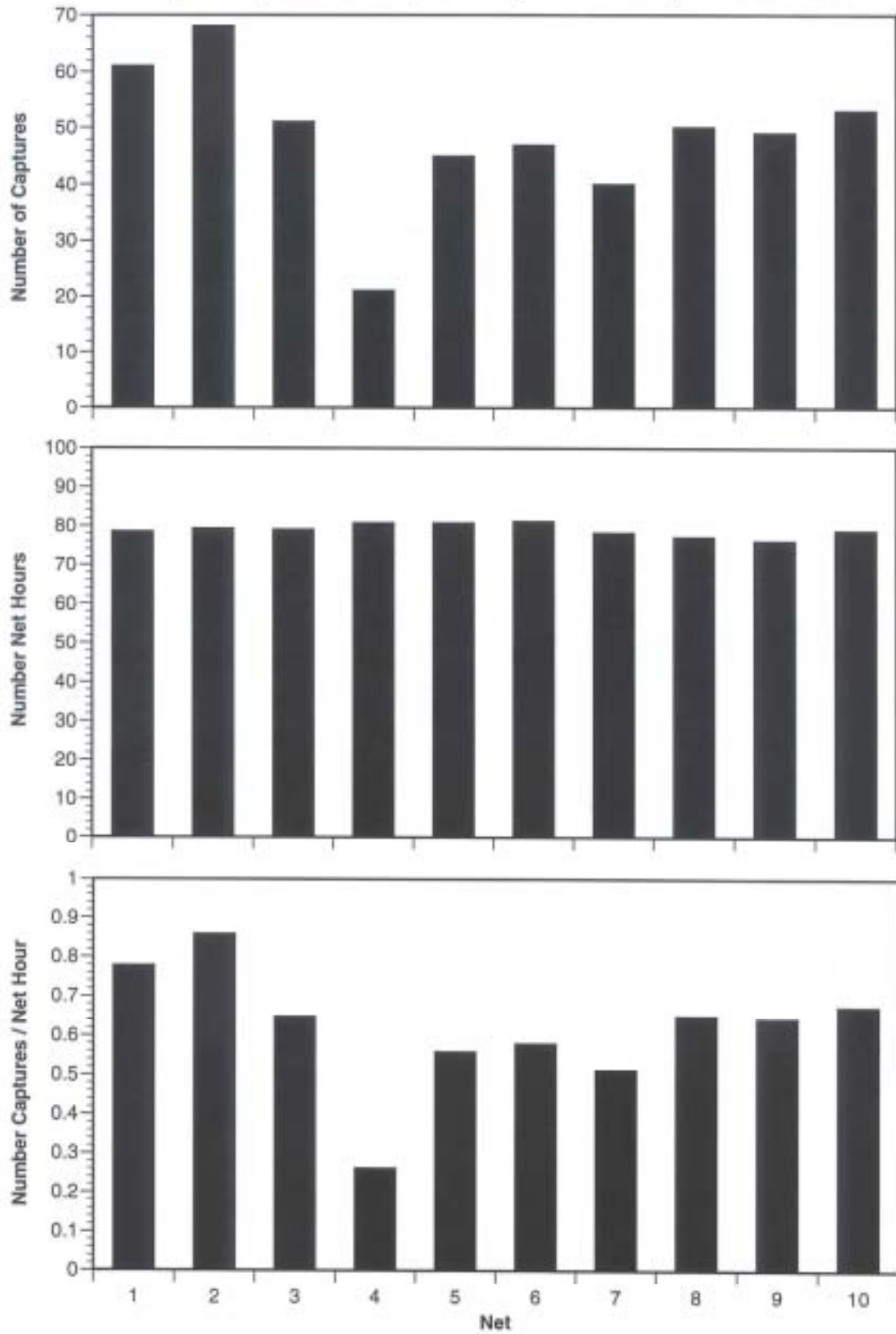
<sup>b</sup> Not included in species total

**Table 5**  
**Capture Rates by Net and Date: De Luz, 1996**

Date		Net										Date Total
		1	2	3	4	5	6	7	8	9	10	
4/2/96	Net Hours	6:24	6:44	6:22	6:14	5:57	6:14	6:01	5:50	5:53	6:10	61:49
	Captures	5	1	0	2	2	1	4	2	5	3	25
	Captures/Net Hour	0.78	0.15	0.00	0.32	0.34	0.16	0.66	0.34	0.85	0.49	0.40
4/12/96	Net Hours	5:36	5:33	5:32	5:42	5:34	5:32	5:34	5:45	5:39	5:30	55:57
	Captures	1	2	1	2	4	1	0	3	2	1	17
	Captures/Net Hour	0.18	0.36	0.18	0.35	0.72	0.18	0.00	0.52	0.35	0.18	0.30
4/21/96	Net Hours	4:55	4:53	4:45	4:40	4:50	4:55	5:05	4:50	4:50	5:10	48:53
	Captures	4	1	0	4	4	6	4	0	1	6	30
	Captures/Net Hour	0.81	0.20	0.00	0.86	0.83	1.22	0.79	0.00	0.21	1.16	0.61
5/1/96	Net Hours	4:35	4:35	4:35	4:45	4:30	4:35	4:00	4:15	3:45	3:50	43:25
	Captures	8	3	5	0	5	4	2	3	3	5	38
	Captures/Net Hour	1.75	0.65	1.09	0.00	1.11	0.87	0.50	0.71	0.80	1.30	0.88
5/11/96	Net Hours	4:10	4:35	4:35	5:00	5:05	4:35	3:55	4:30	4:15	4:10	44:50
	Captures	4	8	6	4	2	4	5	3	4	2	42
	Captures/Net Hour	0.96	1.75	1.31	0.80	0.39	0.87	1.28	0.67	0.94	0.48	0.94
5/21/96	Net Hours	5:30	5:50	5:40	5:50	5:45	5:50	5:35	5:30	5:35	5:45	56:50
	Captures	4	9	7	0	4	3	2	5	8	7	49
	Captures/Net Hour	0.73	1.54	1.24	0.00	0.70	0.51	0.36	0.91	1.43	1.22	0.86
5/31/96	Net Hours	5:10	5:25	5:30	5:18	5:55	5:55	6:00	5:20	5:30	5:45	55:48
	Captures	3	6	2	1	1	4	3	4	3	2	29
	Captures/Net Hour	0.58	1.11	0.36	0.19	0.17	0.68	0.50	0.75	0.55	0.35	0.52
6/11/96	Net Hours	5:46	5:42	5:54	6:01	5:40	5:40	5:50	5:50	5:30	5:50	57:43
	Captures	5	6	4	0	1	3	2	5	6	9	41
	Captures/Net Hour	0.87	1.05	0.68	0.00	0.18	0.53	0.34	0.86	1.09	1.54	0.71
6/21/96	Net Hours	6:25	6:25	6:10	6:10	6:35	6:20	6:10	6:00	6:00	6:10	62:25
	Captures	4	2	4	1	3	7	6	5	2	7	41
	Captures/Net Hour	0.62	0.31	0.65	0.16	0.46	1.11	0.97	0.83	0.33	1.14	0.66
7/1/96	Net Hours	4:55	4:57	5:08	4:54	4:50	5:00	4:39	4:24	4:22	4:45	47:54
	Captures	3	5	1	2	4	2	4	4	2	5	32
	Captures/Net Hour	0.61	1.01	0.19	0.41	0.83	0.40	0.86	0.91	0.46	1.05	0.67
7/11/96	Net Hours	5:15	5:17	5:11	5:24	5:20	5:20	5:25	5:20	5:20	5:30	53:22
	Captures	1	2	7	2	0	2	3	5	0	2	24
	Captures/Net Hour	0.19	0.38	1.35	0.37	0.00	0.38	0.55	0.94	0.00	0.36	0.45
7/20/96	Net Hours	5:50	5:50	6:00	5:50	5:40	5:55	5:50	5:35	5:30	5:40	57:40
	Captures	1	1	3	1	4	6	2	3	3	1	25
	Captures/Net Hour	0.17	0.17	0.50	0.17	0.71	1.01	0.34	0.54	0.55	0.18	0.43
7/31/96	Net Hours	4:13	3:43	3:52	4:56	5:03	5:05	4:15	4:05	4:05	4:20	43:37
	Captures	5	6	4	1	3	2	2	2	1	1	27
	Captures/Net Hour	1.19	1.61	1.03	0.20	0.59	0.39	0.47	0.49	0.24	0.23	0.62
8/9/96	Net Hours	4:40	4:43	4:40	4:50	4:50	5:05	4:45	4:45	4:45	4:55	47:58
	Captures	11	3	1	0	4	1	1	3	2	0	26
	Captures/Net Hour	2.36	0.64	0.21	0.00	0.83	0.20	0.21	0.63	0.42	0.00	0.54
8/19/96	Net Hours	5:05	5:05	5:05	5:10	5:10	5:10	5:10	5:10	5:10	5:20	51:35
	Captures	2	13	6	1	4	1	0	3	7	2	39
	Captures/Net Hour	0.39	2.56	1.18	0.19	0.77	0.19	0.00	0.58	1.35	0.38	0.76
Net Total	Net Hours	78:29	79:17	78:59	80:44	80:44	81:11	78:14	77:09	76:09	78:50	789:46
	Captures	61	68	51	21	45	47	40	50	49	53	485
	Captures/Net Hour	0.78	0.86	0.65	0.26	0.56	0.58	0.51	0.65	0.64	0.67	0.61

Figure 4

Captures, Net Hours, and Capture Rate by Net: De Luz



### *Survival and Return Rates of Birds Banded in 1995*

Sixty-seven of the birds caught in 1996 (16 percent) were recaptured individuals originally banded in 1995 (Table 2), representing an overall survival/return rate of 16 percent of the 1995 banded population. Thirteen species (34 percent of the 38 non-hummingbird species banded in 1995), including four migrants and nine residents, were represented among the recaptures. The likelihood that a species was represented among the recaptures was a function of the number of individuals of that species banded the previous year (Figure 5), which in turn was a function of abundance. A minimum of four banded individuals per species appeared to be required for representation among the recaptures; species with fewer than this, which made up nearly half of the species banded in 1995, never appeared among the 1996 recaptures. With the exception of Swainson's thrush, which occurs at the station as a transient, all species with more than 15 banded individuals were represented by recaptures.

Return/survival rates (hereafter called simply return rates) averaged 21.7 percent for the 13 species, and 22.8 percent for the 12 species that breed at the site (Table 6). Orange-crowned warblers, which exhibited the lowest return rate at 8.3 percent of those banded in 1995, breed at Camp Pendleton, but not at this MAPS site, and are thus captured in passage. The highest return rate observed (50 percent) was that of the plain titmouse; however, small sample sizes and low vulnerability to netting indicate the need for caution in interpreting these data. Bushtits, with a calculated return rate of 11.1 percent, move about in family groups and are erratic and patchy in their use of the area; consequently, their survival is probably under-estimated by this approach. Outside of these species, return rates were remarkably consistent relative to the mean.

As expected from other studies, return rates differed across age- and sex-classes. On average, 25 percent of the birds banded as adults were recaptured at the site, in contrast to just 10 percent of birds banded as hatching-year individuals (Table 6). Although hatching-year birds made up roughly 19 percent of the banded population in 1995, only four species (Bewick's wren, California towhee, plain titmouse, and song sparrow), all residents, were represented among the recaptures by returning first-year adults. Common yellowthroat, the most abundant bird at the station in 1996, is conspicuously absent from this list, suggesting high dispersal or poor survival of young during this period.

Of birds banded as adults in 1995, males, with an average return rate across species of 35 percent, were twice as likely to survive and return to the site as were females (Table 7). The disparity between male and female return rates was generally greatest in the migrants; however, song sparrows, a resident species, exhibited a strong sex difference more similar to that of migrants than of the other residents. Curiously, no female yellow-breasted chats returned in 1996 while nearly half of the banded males did so, despite the fact that the banded sample of females was sufficient to detect returns. Further monitoring of this neotropical migrant will be necessary to determine whether this is typical of this species and to identify the factors responsible for its occurrence.

Figure 5

Recapture as a Function of the Number of Individuals Banded:  
De Luz

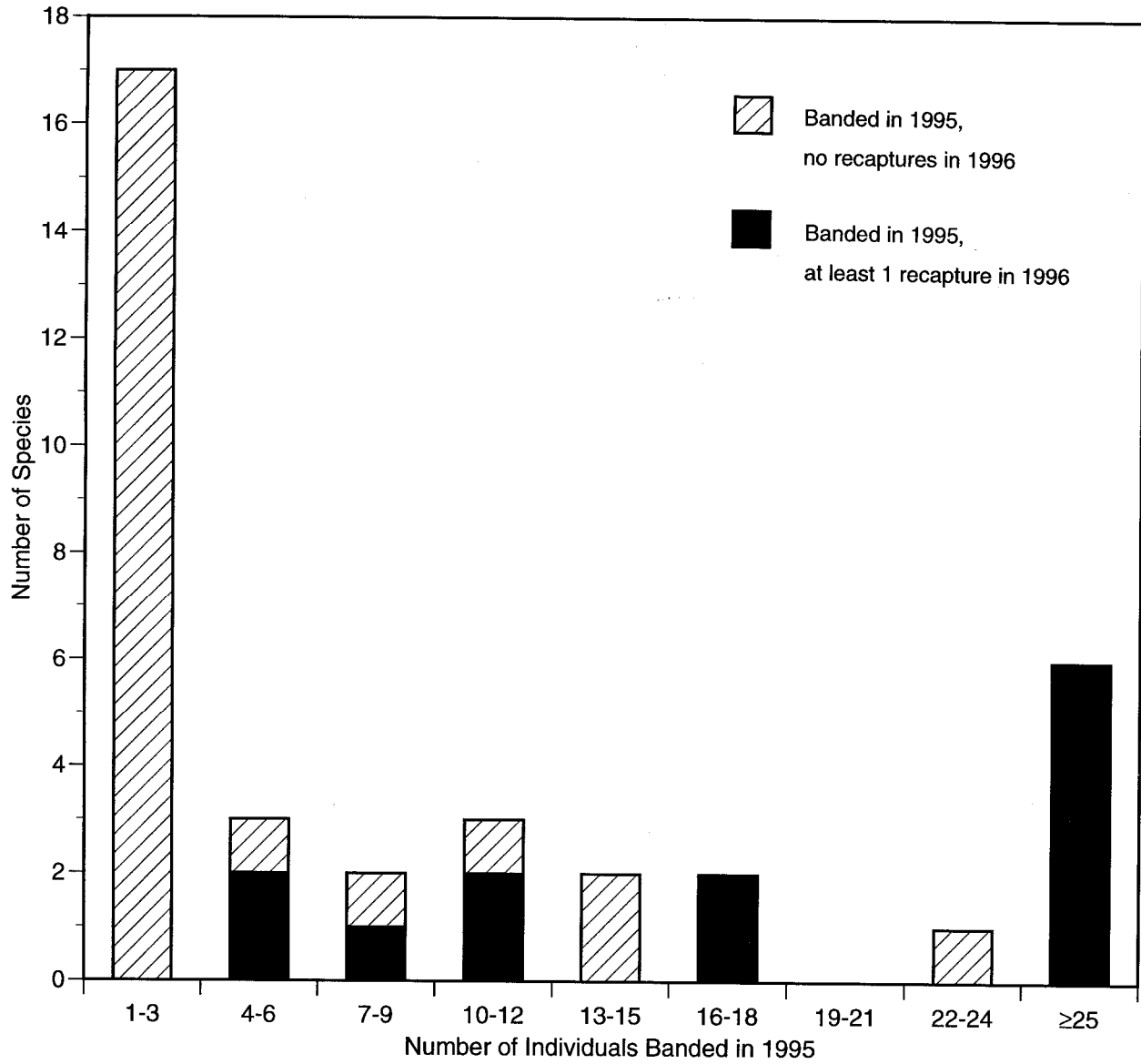


Table 6. Recapture Rate by Age of Birds Banded in 1995: De Luz Creek

Species	Age at Time of Banding <sup>b</sup>				Unknown Age, Sex							
	TOTAL	AHY	HY									
	# Banded	# Recaptured	%Recaptured	# Banded	# Recaptured	%Recaptured						
ATFL <sup>a</sup>	10	2	20.0	10.0	2.0	20.0	0	0	0	0	0	0
BEWR	16	3	18.8	13.0	1.0	7.7	2	1	1	1	50.0	100.0
BHGR <sup>a</sup>	26	4	15.4	23.0	4.0	17.4	3	0	0	0	0.0	-
CALT	17	4	23.5	11.0	3.0	27.3	6	1	1	0	16.7	-
COBU	9	1	11.1	6.0	1.0	16.7	1	0	0	0	0.0	0.0
COYE	62	13	21.0	38.0	13.0	34.2	23	0	0	1	0.0	0.0
NUWO	4	1	25.0	4.0	1.0	25.0	0	0	0	0	-	-
OCWA <sup>a</sup>	12	1	8.3	11.0	1.0	9.1	1	0	0	0	0.0	-
PLTI	6	3	50.0	5.0	2.0	40.0	1	1	1	0	100.0	-
SOSP	51	12	23.5	34.0	9.0	26.5	15	3	3	2	20.0	0.0
SPTO	33	6	18.2	25.0	6.0	24.0	8	0	0	0	0.0	-
WREN	33	7	21.2	24.0	6.0	25.0	1	0	0	8	0.0	12.5
YBCH <sup>a</sup>	39	10	25.6	36.0	10.0	27.8	2	0	0	1	0.0	0.0
<b>Total</b>	<b>318</b>	<b>67</b>	<b>21.1</b>	<b>240.0</b>	<b>59</b>	<b>24.6</b>	<b>63</b>	<b>6</b>	<b>6</b>	<b>15</b>	<b>9.5</b>	<b>13.3</b>

<sup>a</sup>migratory species  
<sup>b</sup>AHY = after hatching year; HY = hatching year

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

Species	Males			Sex			Unknown Sex		
	# Banded	# Recaptured	%Recaptured	# Banded	# Recaptured	%Recaptured	# Banded	# Recaptured	%Recaptured
ATFL <sup>a</sup>	3	2	66.7	2	0	0.0	5	0	0.0
BEWR	4	0	0.0	7	1	14.3	2	0	0.0
BHGR <sup>a</sup>	8	2	25.0	15	2	13.3	0	0	-
CALT	5	1	20.0	6	2	33.3	0	0	-
COBU	2	1	50.0	4	0	0.0	0	0	-
COYE	21	8	38.1	17	5	29.4	0	0	-
NUWO	2	1	50.0	2	0	0.0	0	0	-
OCWA <sup>a</sup>	4	0	0.0	3	1	33.3	4	0	0.0
PLTI	3	1	33.3	2	1	50.0	0	0	0
SOSP	18	7	38.9	14	2	14.3	2	0	0.0
SPTO	16	4	25.0	9	2	22.2	0	0	0
WREN	0	0	-	1	0	0.0	23	6	26.1
YBCH <sup>a</sup>	21	10	47.6	15	0	0.0	0	0	0
<b>Total</b>	<b>107</b>	<b>37</b>	<b>34.6</b>	<b>97</b>	<b>16</b>	<b>16.5</b>	<b>36</b>	<b>6</b>	<b>16.7</b>

<sup>a</sup>migratory species

## Case Springs

### *Overview of 1996 Captures*

One hundred and thirty-one individuals of 33 species were caught during 826 net-hours at the Case Springs station (Table 8). As at De Luz, species richness and abundance were lower in 1996 relative to the previous year, with 43 percent fewer individuals captured despite a 13 percent increase in net time (Table 9). The most abundant species at the site included lesser goldfinch, California towhee, plain titmouse, and house wren (Figure 4). Swainson's thrush, one of the most abundant species in 1995, was absent from the site in 1996, and chipping sparrows, also among the most commonly caught species in 1995, dropped by 86 percent (Table 9). Twenty-five percent of the 36 species caught in 1995, all migrants and primarily warblers, flycatchers and thrushes, were absent in 1996; in turn, 18 percent (6/33) of the 1996 captures, including black-chinned hummingbird, European starling, golden-crowned sparrow, phainopepla, wren-tit, and red-shouldered hawk, were new

The sex ratio of birds of known sex (N=86) was 1:1, with 50 percent female and 50 percent male (Table 8). Seventy-five percent of the known-aged birds (N=117, Table 8) were second-year birds or older, and 25 percent were hatching year birds. Both the age- and sex-composition of the 1996 population were comparable to those in 1995.

One hundred and twenty-four of the birds caught (95 percent), including 22 hummingbirds and one raptor, were new captures. Of these, 95 percent (96/101) of the non-hummingbirds and non-raptors were banded; the remaining five escaped prior to banding. As in 1995, recapture of banded birds occurred less often than at De Luz, with only five percent of banded birds captured more than once (Table 10). The most commonly recaptured species, California towhee, white-breasted nuthatch, and plain titmouse, were also among the most abundant species breeding at the site.

Overall capture rates ranged from zero to 37 captures per 100 net-hours, with an average capture rate (16 per 100 net-hours) less than half that in 1995 (Table 12). As in 1995, capture rates were highly variable among nets; however, the pattern with regard to relative performance remained the same (Figure 5). Capture rates were lowest in April, and did not exhibit the May peak observed in 1995, when many migrants passed through the site (Tables 11 and 12). Beyond this, no clear trend in capture rates with regard to time of season was discernible from the 1996 data.

### *Survival and Return Rates of Birds Banded in 1995*

Seven of the birds caught in 1996 (5 percent) were recaptured birds originally banded in 1995 (Table 9), representing an overall return rate of just 4 percent of the 1995 banded population. Six species: acorn woodpecker, California towhee, house wren, white-breasted nuthatch, plain titmouse, and ash-throated flycatcher, all residents except the latter, were included among the recaptures. As at De Luz, no species with fewer than four banded individuals were recaptured, amounting to 52 percent of the non-hummingbird species banded in



1995 (Figure 6).

Return rates averaged roughly 11 percent across species (Table 13), half that observed for the 13 returning De Luz species (Table 6). Birds banded as adults were more than twice as likely to be recaptured at Case Springs as were birds banded as hatching-year individuals (15 versus 7 percent, respectively; Table 13), but less likely to be recaptured at their original banding site than adults banded at De Luz Creek (25 percent, Table 6). It is likely that differences in sample size and species composition of the captures with regard to migratory status, as well as habitat effects on overwinter survival, are responsible for differences in overall return rates between the two stations.

Recapture rates differed between adult males and females (Table 14), with females exhibiting the higher rate, in contrast to De Luz, where male returns were twice as likely as female returns (Table 7). However, this may be an artifact of a small sample size coupled with the lack of banded males in two of the six Case Springs species. Additional data will be required to evaluate sex-related survival.

Three species (ash-throated flycatcher, California towhee, and plain titmouse) were among the recaptures at both MAPS sites. Of these, California towhees and plain titmice exhibited lower overall survival rates at the Case Springs site (Tables 6 and 13), while ash-throated flycatchers, a migrant, were comparable in return rates at the two sites.

**Table 8**  
**Age and Sex of Individuals Captured: Case Springs, 1996**

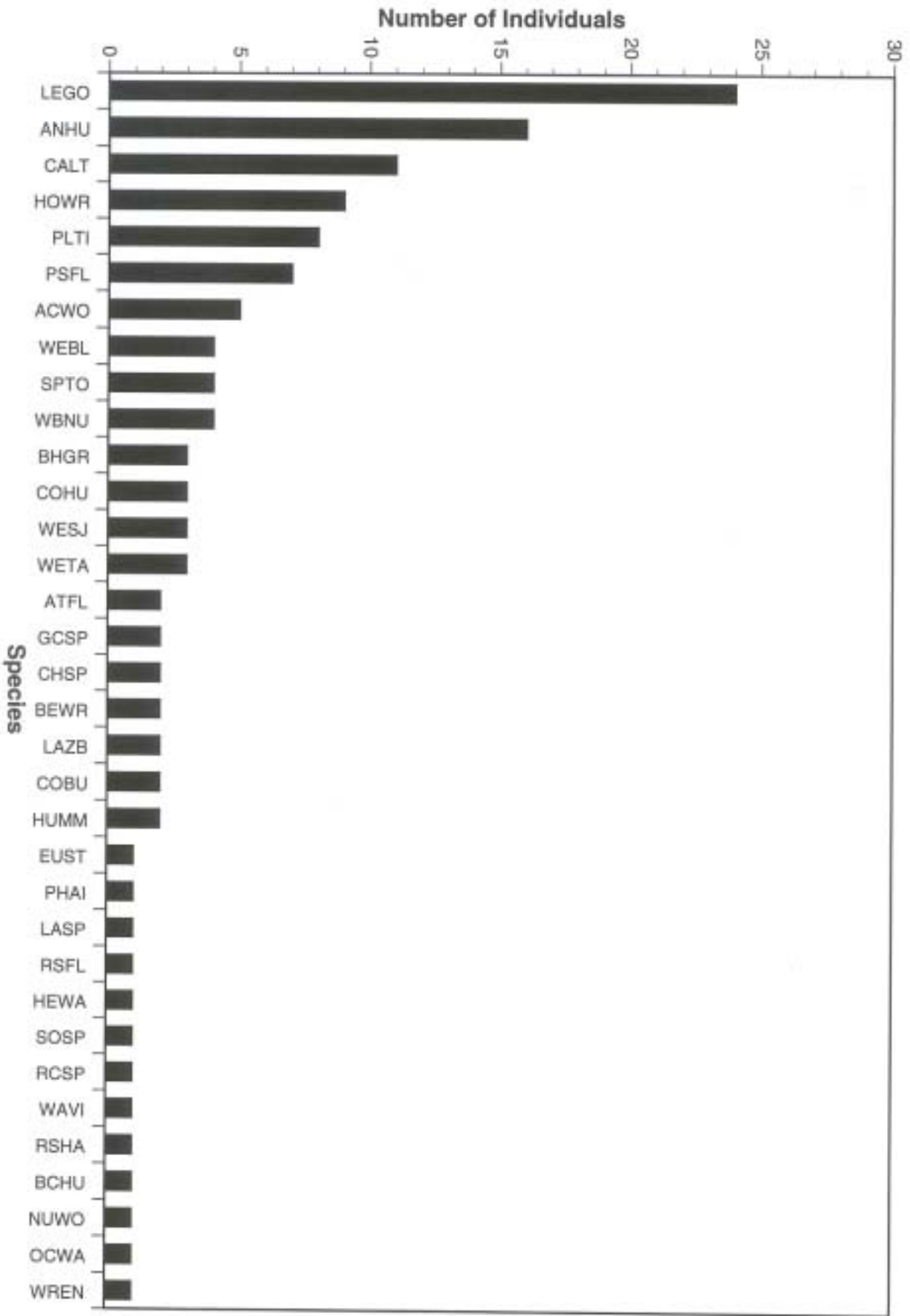
Species	Female					Female Total	Male					Male Total	Unknown Sex					Unknown Total	Species Total
	Age*						Age*						Age*						
	A	H	O	S	U		A	H	O	S	U		A	H	O	S	U		
RSHA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	
NUWO	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	
ACWO	1	0	0	0	0	1	4	0	0	0	0	4	0	0	0	0	0	5	
RSFL	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	
BCHU	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	
COHU	0	0	0	0	0	0	1	2	0	0	0	3	0	0	0	0	0	3	
ANHU	7	1	0	0	1	9	0	3	0	0	0	3	0	0	0	0	4	16	
HUMM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	2	
ATFL	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	
PSFL	1	0	0	0	0	1	1	0	0	0	0	1	3	2	0	0	0	7	
WESJ	1	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	3	
EUST	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	
LEGO	2	1	3	4	0	10	4	0	4	5	0	13	0	1	0	0	0	24	
LASP	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
GCSP	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	
CHSP	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	
RCSP	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
SOSP	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
SPTO	2	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	4	
CALT	2	1	0	0	0	3	2	0	0	0	0	2	0	3	0	0	3	11	
BHGR	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0	0	0	3	
LAZB	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	2	
WETA	0	0	0	1	0	1	0	0	0	2	0	2	0	0	0	0	0	3	
PHAI	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	
WAVI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
OCWA	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	
HEWA	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
BEWR	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	
HOWR	3	0	0	0	0	3	2	0	0	0	0	2	1	2	0	0	1	9	
WBNU	1	1	0	0	0	2	2	0	0	0	0	2	0	0	0	0	0	4	
PLTI	2	0	0	0	0	2	0	0	0	0	0	0	2	4	0	0	0	8	
WREN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
COBU	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	
WEBL	1	0	0	0	0	1	1	0	0	0	0	1	0	2	0	0	0	4	
<b>Sex Total</b>	<b>29</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>43</b>	<b>21</b>	<b>5</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>43</b>	<b>12</b>	<b>20</b>	<b>1</b>	<b>1</b>	<b>11</b>	<b>45</b>	<b>131</b>

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

**Table 9**  
**Change in Capture Frequency between 1995**  
**and 1996: Case Springs**

Species	Captures		Net Change	Individuals Banded		Banded 1995, Recaptured 1996	Percent Recapture
	1995	1996 <sup>a</sup>		1995	1996		
RSHA	0	1	1	0	0	0	NA
NUWO	1	1	0	1	1	0	0%
ACWO	15	5	-10	11	4	1	9%
RSFL	2	1	-1	1	1	0	0%
BCHU	0	1	1	0	0	0	NA
COHU	2	3	1	0	0	0	NA
ANHU	15	16	1	0	0	0	NA
ALHU	4	0	-4	0	0	0	NA
HUMM	2	2	0	0	0	0	NA
ATFL	5	2	-3	4	1	1	25%
WEWP	2	0	-2	2	0	0	0%
PSFL	9	7	-2	9	7	0	0%
HAFL	2	0	-2	2	0	0	0%
WESJ	3	3	0	3	3	0	0%
EUST	0	1	1	0	1	0	NA
LEGO	25	24	-1	24	24	0	0%
LASP	7	1	-6	6	1	0	0%
GCSP	0	2	2	0	2	0	NA
CHSP	14	2	-12	14	2	0	0%
DEJU	6	0	-6	6	0	0	0%
RCSP	3	1	-2	3	1	0	0%
SOSP	0	2	2	0	1	0	NA
SPTO	5	6	1	4	3	0	0%
CALT	21	10	-11	16	7	1	6%
BHGR	12	3	-9	11	3	0	0%
LAZB	9	2	-7	9	2	0	0%
WETA	1	3	2	1	3	0	0%
PHAI	0	1	1	0	1	0	NA
WAVI	1	1	0	1	1	0	0%
OCWA	3	1	-2	3	1	0	0%
YWAR	3	0	-3	3	0	0	0%
BTYW	1	0	-1	1	0	0	0%
TOWA	3	0	-3	3	0	0	0%
HEWA	2	2	0	2	1	0	0%
WIWA	3	0	-3	3	0	0	0%
BEWR	1	1	0	1	1	0	0%
HOWR	11	9	-2	8	7	2	25%
WBNU	12	5	-7	9	3	1	11%
PLTI	24	10	-14	16	7	1	6%
WREN	0	1	1	0	1	0	NA
COBU	2	2	0	2	2	0	0%
SWTH	16	0	-16	16	0	0	0%
HETH	1	0	-1	1	0	0	0%
WEBL	4	4	0	4	4	0	0%
<b>Total</b>	<b>252</b>	<b>136</b>	<b>-116</b>	<b>200</b>	<b>96</b>	<b>7</b>	<b>4%</b>

<sup>a</sup> Includes recaptures of birds banded in 1995



**Figure 6**  
**Number of Individuals Caught by Species: Case Springs**

**Table 10**  
**Capture Frequency of Individuals: Case Springs,1996**

Species	# Individuals / Capture Incidence (Banded Birds Only)		# Captures:		
	1 Capture	2 Captures	Banded Birds	Unbanded Birds	All Birds
	RSHA	0	0	0	1
NUWO	1	0	1	0	1
ACWO	5	0	5	0	5
RSFL	1	0	1	0	1
BCHU	0	0	0	1	1
COHU	0	0	0	3	3
ANHU	0	0	0	16	16
HUMM	0	0	0	2	2
ATFL	2	0	2	0	2
PSFL	7	0	7	0	7
WESJ	3	0	3	0	3
EUST	1	0	1	0	1
LEGO	24	0	24	0	24
LASP	1	0	1	0	1
GCSP	2	0	2	0	2
CHSP	2	0	2	0	2
RCSP	1	0	1	0	1
SOSP	1	0	1	1	2
SPTO	3	0	3	3	6
CALT	6	2	10	0	10
BHGR	3	0	3	0	3
LAZB	2	0	2	0	2
WETA	3	0	3	0	3
PHAI	1	0	1	0	1
WAVI	1	0	1	0	1
OCWA	1	0	1	0	1
HEWA	1	0	1	1	2
BEWR	1	0	1	0	1
HOWR	9	0	9	0	9
WBNU	3	1	5	0	5
PLTI	6	2	10	0	10
WREN	1	0	1	0	1
COBU	2	0	2	0	2
WEBL	4	0	4	0	4
<b>Total</b>	<b>98</b>	<b>5</b>	<b>108</b>	<b>28</b>	<b>136</b>

**Table 11**  
**Number of Captures by Date: Case Springs, 1996**

Species	Date															Total Captures 1996	Captures per 100 Net-hours <sup>a</sup>
	4/4/96	4/13/96	4/22/96	5/2/96	5/12/96	5/22/96	6/3/96	6/12/96	6/22/96	7/5/96	7/12/96	7/20/1992	8/1/96	8/10/96	8/20/96		
RSHA	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.12
NUWO	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.12
ACWO	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	5	0.60
RSFL	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.12
BCHU	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.12
COHU	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3	0.36
ANHU	0	1	3	0	1	0	1	3	4	1	1	0	1	0	0	16	1.94
HUMM <sup>b</sup>	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0.24
ATFL	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0.24
PSFL	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	7	0.85
WESJ	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	3	0.36
EUST	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.12
LEGO	0	0	1	1	2	1	5	2	0	7	4	0	0	1	0	24	2.90
LASP	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.12
GCSP	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0.24
CHSP	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0.24
RCSP	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.12
SOSP	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.12
SPTO	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	4	0.48
CALT	1	0	0	1	0	0	2	1	0	2	1	0	1	1	3	13	1.57
BHGR	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	3	0.36
LAZB	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0.24
WETA	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	0.36
PHAI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.12
WAVI	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.12
OCWA	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.12
HEWA	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.12
BEWR	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0.24
HOWR	0	0	0	2	1	0	3	0	2	0	0	0	0	0	1	9	1.09
WBNU	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3	5	0.60
PLTI	0	1	0	1	0	0	0	2	2	1	0	0	2	0	1	10	1.21
WREN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.12
COBU	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0.24
WEBL	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	4	0.48
<b>Captures</b>	<b>2</b>	<b>3</b>	<b>8</b>	<b>14</b>	<b>7</b>	<b>2</b>	<b>13</b>	<b>13</b>	<b>11</b>	<b>18</b>	<b>11</b>	<b>0</b>	<b>8</b>	<b>12</b>	<b>14</b>	<b>136</b>	<b>16.45</b>
<b>Species</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>11</b>	<b>6</b>	<b>2</b>	<b>6</b>	<b>9</b>	<b>6</b>	<b>11</b>	<b>6</b>	<b>0</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>33</b>	<b>3.99</b>

<sup>a</sup> 826:36 Total Net Hours

<sup>b</sup> Not included in species total

**Table 12**  
**Capture Rates by Net and Date: Case Springs, 1996**

Date		Net										Date Totals
		1	2	3	4	5	6	7	8	9	10	
4/4/96	Net Hours	5:20	5:14	5:11	5:10	5:10	4:50	5:05	5:00	5:10	5:25	51:35
	Captures	1	0	0	1	0	0	0	0	0	0	2
	Captures/Net Hour	0.19	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.04
4/13/96	Net Hours	5:55	6:05	6:06	5:55	5:55	6:02	5:57	6:05	6:00	6:05	60:05
	Captures	0	0	0	2	0	0	1	0	0	0	3
	Captures/Net Hour	0.00	0.00	0.00	0.34	0.00	0.00	0.17	0.00	0.00	0.00	0.05
4/22/96	Net Hours	7:20	7:10	7:10	6:55	6:55	7:05	7:00	7:00	7:05	7:15	70:55
	Captures	1	0	2	4	0	0	0	1	0	0	8
	Captures/Net Hour	0.14	0.00	0.28	0.58	0.00	0.00	0.00	0.14	0.00	0.00	0.11
5/2/96	Net Hours	6:10	6:15	6:05	6:05	6:05	6:05	6:15	6:25	6:10	6:15	61:50
	Captures	1	0	2	0	1	2	4	4	0	0	14
	Captures/Net Hour	0.16	0.00	0.33	0.00	0.16	0.33	0.64	0.62	0.00	0.00	0.23
5/12/96	Net Hours	0:00	5:50	6:05	6:00	5:55	4:00	6:00	5:50	6:10	6:15	52:05
	Captures	0	0	0	1	0	0	1	3	1	1	7
	Captures/Net Hour	0.00	0.00	0.00	0.17	0.00	0.00	0.17	0.51	0.16	0.16	0.13
5/22/96	Net Hours	6:50	7:05	7:00	6:20	7:00	7:10	7:10	7:10	7:30	7:10	70:25
	Captures	1	0	0	0	0	0	0	1	0	0	2
	Captures/Net Hour	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.03
6/3/96	Net Hours	5:40	5:43	5:36	5:35	5:34	5:40	5:36	5:37	5:41	5:41	56:23
	Captures	1	0	4	5	0	0	1	0	0	2	13
	Captures/Net Hour	0.18	0.00	0.71	0.90	0.00	0.00	0.18	0.00	0.00	0.35	0.23
6/12/96	Net Hours	5:45	5:49	5:45	5:44	5:48	5:45	5:50	5:45	5:50	5:40	57:41
	Captures	2	0	0	4	2	0	1	1	1	2	13
	Captures/Net Hour	0.35	0.00	0.00	0.70	0.34	0.00	0.17	0.17	0.17	0.35	0.23
6/22/96	Net Hours	5:40	6:30	6:05	6:05	6:05	6:40	6:05	6:05	6:25	6:00	61:40
	Captures	1	0	2	1	1	1	2	1	2	0	11
	Captures/Net Hour	0.18	0.00	0.33	0.16	0.16	0.15	0.33	0.16	0.31	0.00	0.18
7/5/96	Net Hours	5:25	4:55	5:29	5:28	5:27	4:40	5:25	5:15	5:20	5:20	52:44
	Captures	5	0	1	5	0	4	1	1	0	1	18
	Captures/Net Hour	0.92	0.00	0.18	0.91	0.00	0.86	0.18	0.19	0.00	0.19	0.34
7/12/96	Net Hours	5:25	5:45	5:45	5:45	5:50	5:50	5:50	5:50	5:50	5:50	57:40
	Captures	1	0	5	0	1	3	0	0	0	1	11
	Captures/Net Hour	0.18	0.00	0.87	0.00	0.17	0.51	0.00	0.00	0.00	0.17	0.19
7/20/96	Net Hours	4:20	0:00	4:25	4:10	4:20	0:00	4:30	4:40	4:45	3:20	34:30
	Captures	0	0	0	0	0	0	0	0	0	0	0
	Captures/Net Hour	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8/1/96	Net Hours	4:25	4:10	4:50	4:50	4:50	4:15	4:52	4:45	4:40	4:43	46:20
	Captures	3	0	0	2	0	0	3	0	0	0	8
	Captures/Net Hour	0.68	0.00	0.00	0.41	0.00	0.00	0.62	0.00	0.00	0.00	0.17
8/10/96	Net Hours	5:10	3:50	4:55	4:30	4:50	3:50	4:15	4:35	4:40	5:05	45:40
	Captures	5	0	0	1	0	1	1	0	1	3	12
	Captures/Net Hour	0.97	0.00	0.00	0.22	0.00	0.26	0.24	0.00	0.21	0.59	0.26
8/20/96	Net Hours	4:23	4:50	4:47	4:40	4:38	4:35	4:43	4:50	4:47	4:50	47:03
	Captures	7	0	0	2	0	1	1	1	1	1	14
	Captures/Net Hour	1.60	0.00	0.00	0.43	0.00	0.22	0.21	0.21	0.21	0.21	0.30
Net Totals	Net Hours	77:48	79:11	85:14	83:12	84:22	76:27	84:33	84:52	86:03	84:54	826:36
	Captures	29	0	16	28	5	12	16	13	6	11	136
	Captures/Net Hour	0.37	0.00	0.19	0.34	0.06	0.16	0.19	0.15	0.07	0.13	0.16

Table 13. Recapture Rate by Age of Birds Banded in 1995: Case Springs

Species	Age at Time of Banding <sup>b</sup>				Unknown Age, Sex	
	TOTAL	AHY	HY	# Banded	# Recaptured	%Recaptured
ACWO	11	7	1	1	0	0.0
ATFL <sup>a</sup>	4	4	1	0	0	-
CALT	16	9	1	7	0	-
HOWR	8	7	1	1	0	-
PLTI	16	7	1	4	0	0.0
WBNU	9	6	1	2	0	0.0
<b>Total</b>	<b>64</b>	<b>40</b>	<b>6</b>	<b>15</b>	<b>1</b>	<b>6.7</b>

<sup>a</sup>migratory species  
<sup>b</sup>AHY = after hatching year; HY = hatching year  
<sup>c</sup>males of unknown age  
<sup>d</sup>female of unknown age

Table 14. Recapture Rate by Sex of Birds Banded as Adults in 1995: Case Springs

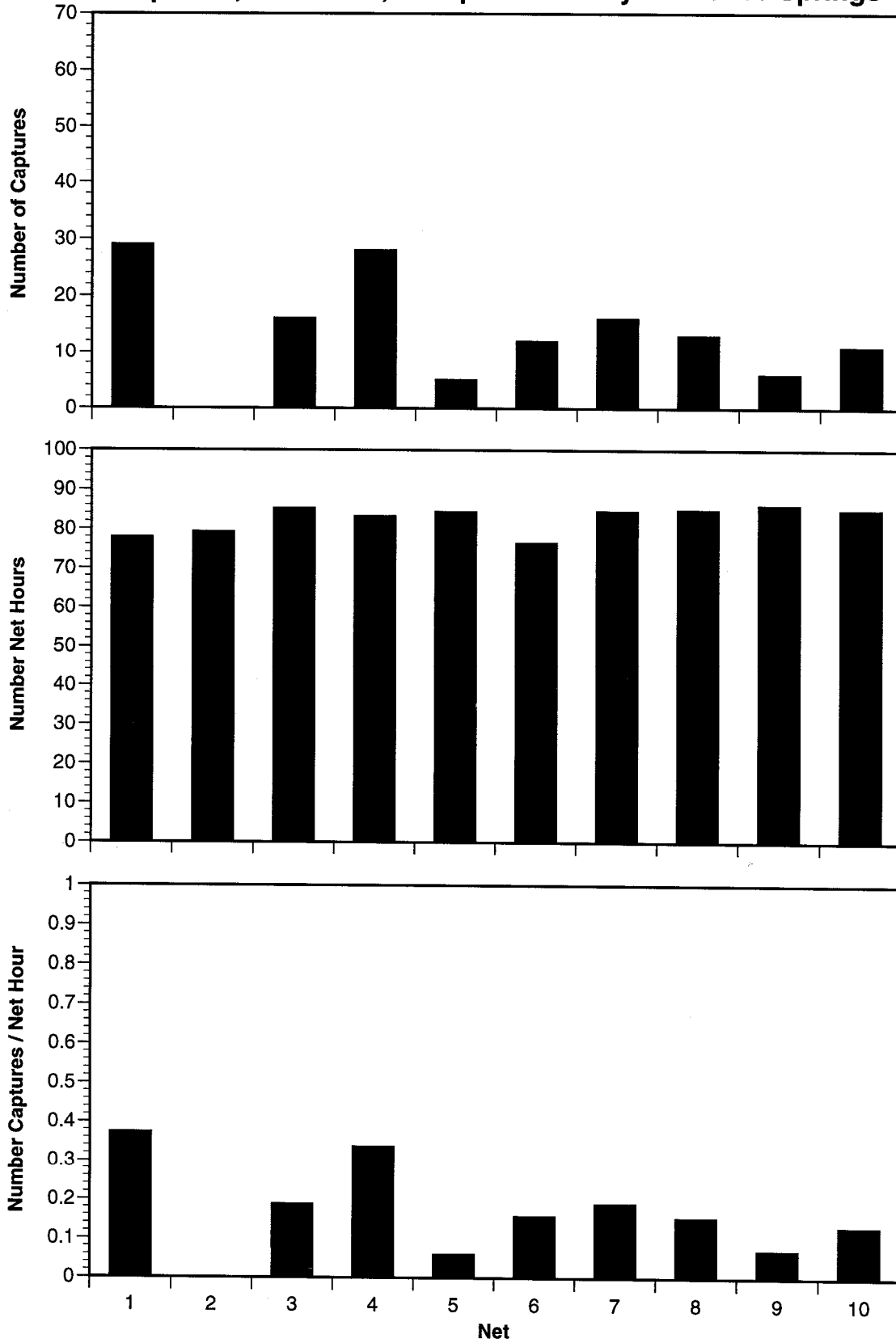
Species	Males		Sex		Unknown Sex	
	# Banded	# Recaptured	%Recaptured	# Banded	# Recaptured	%Recaptured
ACWO	4	1	25.0	1	0	0.0
ATFL <sup>a</sup>	0	0	-	4	1	25.0
CALT	5	0	0.0	3	1	33.3
HOWR	5	1	20.0	2	0	0.0
PLTI	2	0	0.0	3	1	33.3
WBNU	0	0	-	4	1	25.0
<b>Total</b>	<b>16</b>	<b>2</b>	<b>12.5</b>	<b>17</b>	<b>4</b>	<b>23.5</b>

<sup>a</sup>migratory species



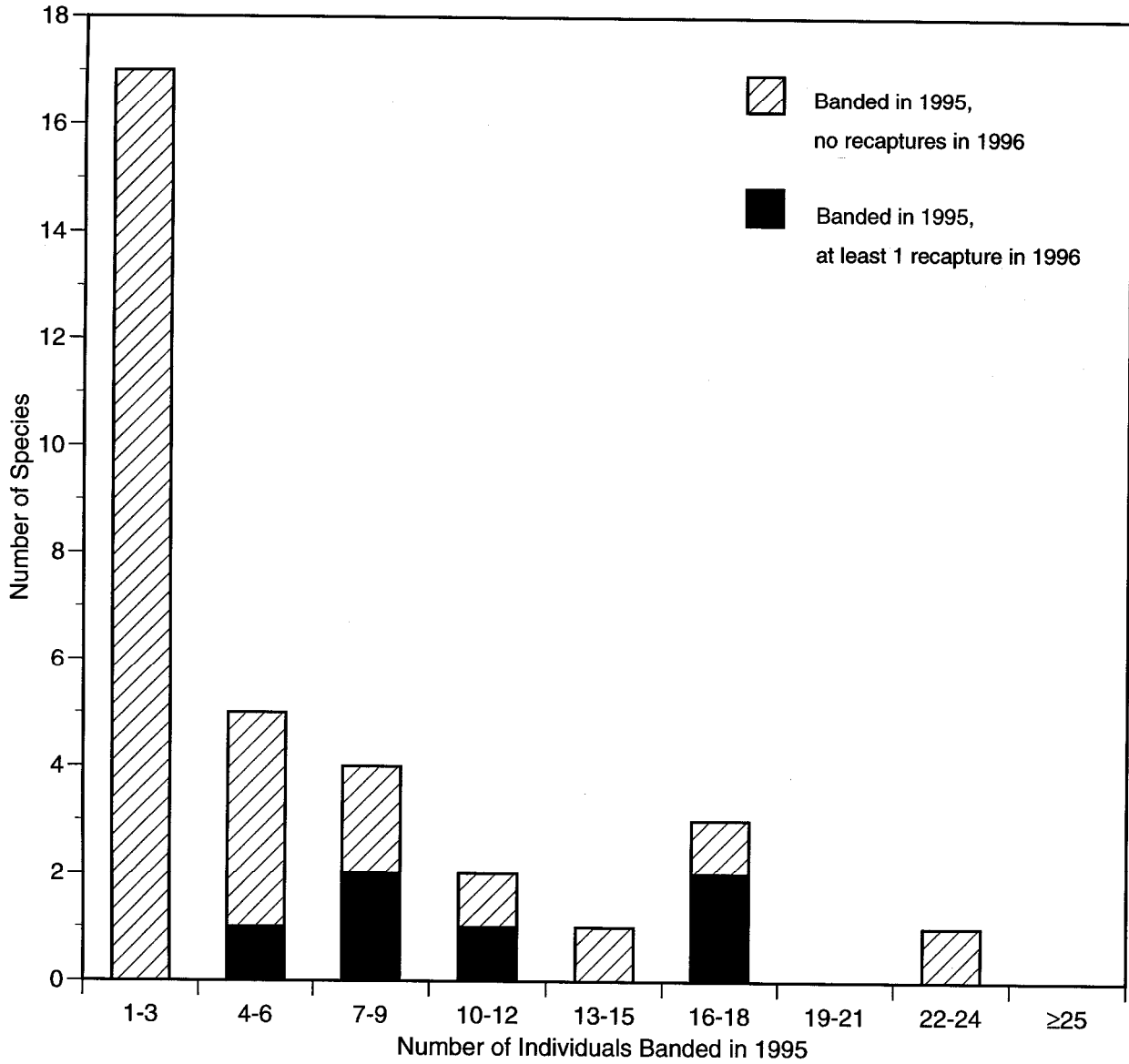
Figure 7

Captures, Net Hours, & Capture Rate by Net: Case Springs



**Figure 8**

**Recapture as a Function of the Number of Individuals Banded:  
Case Springs**



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

<b>Code</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>AOU #</b>
RSHA	Red-shouldered hawk	<i>Buteo lineatus</i>	339.0
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
NOFL	Northern flicker	<i>Colaptes auratus</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
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 lincolni</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
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
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

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

<b>Code</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>AOU #</b>
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
PLTI	Plain titmouse	<i>Parus 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