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THE RESOURCES AGENCY
Department of Fish and Game

THE AGE AND SEX STRUCTURE OF HARVESTED BOBCATS IN CALIFORNIA, 1984-85 AND 1985-86 [1/]

by
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ABSTRACT

This report covers the analyses of age and sex structure data from bobcat populations harvested in the 1984-85 and 1985-86 season, the last two seasons for which this data will be gathered under the current program for managing bobcats in California.

A sample of 7,167 of the 8,897 bobcats taken and tagged during the 1984-85 season provided data on the age and sex structure of bobcat populations in 49 counties in California. During the 1985-86 season a sample of 6,540 of the 8,099 bobcats commercially harvested and tagged provided data on tha age and sex structure of bobcat populations in 51 counties.

For both years data were analyzed on the basis of 39 geographical areas, each area representing a local population and with an adequate sample size. The type of data gathered was similar to that obtained in the five previous seasons. Information on the number of young which must survive per breeding age female and the average life expectancy were the major parameters utilized in evaluating the condition of regional bobcat populations.

Going into the 1984-85 season, population trends had begun to level off at a generally healthier level in 1982-83 and 1983-84 than in the four seasons previous to that. This leveling pattern continued through the 1984-85 and 1985-86 seasons. Cycling around a generally healthier population has been demonstrated in both statewide and most area data for sex ratios, age structure, average life expectancy, proportions of young-of-the-year and breeding aged females, and in the ratio of young to breeding aged females.

As a result of this information, it is recommended that the age and sex structure monitoring be discontinued and only reinstated if certain harvest levels are reached. Special recognition is given to reinstituting population structure monitoring of the local population in the northeastern portion of the state where population conditions still are not as good as elsewhere.

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RECOMMENDATIONS

1. Discontinue the monitoring of the age and sex structure of bobcat populations until such time as the maximum harvest limit is reached. Evaluate setting regional or local maximum harvest limits for the most potentially sensitive bobcat populations.

2. Discontinue the practice of changing existing regulations before the effects of previously established regulations are known or evaluated.

3. Continue to monitor the harvest of bobcats by geographical area in order to use that information to detrermine the management needed to maintain viable bobcat populations throughout California.

INTRODUCTION

The bobcat harvest has increased in California since the late 1960's. This reflects high fur prices and an abundant population of bobcats. Bobcat fur has been the most economically important of any species of furbearer in California since the 1975-76 season. This rise to importance has brought with it a concern, by both the public and by wildlife management agencies, for the resource's well-being. The history of this increase in political and management interest is documented in the Progress Report (Project W-65-R-3, Job IV-10).

To determine the magnitude of the bobcat harvest and the resultant effect on bobcat populations throughout the state, a number of studies were initiated. Field studies of local population dynamics have been completed on unharvested populations in Siskiyou, Riverside, and San Diego counties and on a harvested population in San Diego County. The annual commercial, sport and depredation harvest of bobcats has been carefully monitored to determine the quantity and the distribution of take. Reports on these studies have been presented in previous Job Progress Reports.

A statewide harvest monitoring system was initiated in 1978 to sample the age and sex structures of the harvested bobcat populations. This system has allowed the Department to investigate the possible effects of harvest on and the relative health of regional bobcat populations.

The first age and sex structure data were gathered at the height of the commercial and sport take of bobcats. Many populations showed low average life expectancies, high numbers of young, a small proportion of breeding aged females, and relatively fewer males than normal. Over the first four years the general condition of most regional populations changed from the conditions noted above to those of a more normal population not trying to have to produce young at a fast rate to replace those that are dying. Over the last four years, this condition has remained relatively stable, and is beginning to exhibit some annual variations.

The condition for all areas has not been uniform. The parameters of population dynamics for bobcats in northeastern California have shown that those bobcat populations are more stressed than elsewhere in the state. In contrast, in the south coast area of California, bobcat populations initially were in a better condition than in the remainder of the state.

The goal of the age and sex structure monitoring has been to make sure that the commercial and sport harvest of bobcats does not detrimentally affect bobcat populations. The specific objectives have been to determine age and sex structures of bobcat populations throughout California, develop a bobcat population model or models for all local populations, and use this information to develop a statewide management plan to manage local populations by manipulating season lengths and chronology, harvest methods, and take limits.

METHODS

The California Fish and Game Commission has enacted regulations requiring any person harvesting a bobcat to report that take to the Department. Additionally, anyone taking a bobcat for sport or commercial purposes must have the proper license and tags and have the pelts marked or tagged within two weeks of the end of the season. At such time, the hunter or trapper also must provide the Department with information on when, where and how each bobcat was taken, its sex, and the lower jaw containing the canine teeth which are used for aging each bobcat. In the aging process the lower canines are removed from the jaw. Those with closed apical foramen are processed by Matson's (Milltown, Montana) and the cementum layers are analyzed for annuli. Those teeth with open apical foramen are noted as young-of-the-year (Crowe 1974) and retained.

Age and sex structure are then analyzed by geographical area, usually by county. Sometimes samples from adjacent counties are grouped and sometimes a sample from one county is divided into two or three samples depending on the local diversity of habitat types. Data presently considered in analysis are:

1. Sex ratio
2. Relative height of age pyramid
3. Intrinsic rate of increase or decrease
4. Percent of young-of-the-year
5. Percent of breeding age females
6. Ratio of young-of-the-year to breeding age females, and the relationship of this ratio to known litter size
7. Average life expectancy
8. Relationship of the present year's data to past data and the amount of harvest

RESULTS

1984-85 Season

During the 1984-85 season 8,897 bobcats were taken and tagged. Of these 5,991 were sent for age analysis, 1,176 were processed and retained as young-of-the-year, 431 unuseable jaws were received, no jaws were provided for 172 bobcats, and 1,127 jaws were not forwarded by Department tagging agents. This sample represents bobcats taken in 49 counties and has resulted in 37 different areas used for analysis; current data may be compared with data from previous years.

Sex ratios continue to vary throughout the state, from as low of 0.91 males per female in Glenn County to 2.53 in Tuolumne County (Table 1). Likewise, sex ratios continue to vary for the same county from one year to the next. The ratio of males increased in 15 of 30 counties where there have been sufficient sample sizes for a comparison; in only four areas was there a substantial drop in the proportion of males.

The age structure was calculated for each sample area (Table 2). There were nine different areas where the percent of individuals in the first two age classes exceeded 50%. This is a considerably larger number of areas than in previous years and reflects a leveling off of the age structure.

Table 1. Observed sex ratios (males per female) of bobcats harvested in California, 1978-86.

COUNTY	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
Alameda		1.80 (28)*	2.00 (3)	3.50 (9)	1.33 (21)	.00 (3)	.50 (6)	.67 (5)
Alpine		4.50 (11)	2.33 (10)	8.00 (9)	.83 (11)	.71 (12)	1.00 (8)	.80 (18)
Amador		1.00 (14)	.00 (4)		2.00 (3)	- (1)	1.00 (2)	- (1)
Butte		1.00 (60)	1.13 (51)	1.07 (31)	1.20 (23)	.73 (26)	1.00 (18)	1.00 (6)
Calaveras		.90 (19)	1.88 (23)	.78 (16)	1.93 (28)	2.33 (10)	6.00 (7)	1.33 (7)
Colusa		1.00 (24)	3.75 (19)	1.42 (80)	1.51 (97)	1.67 (72)	1.85 (74)	2.04 (70)
Contra Costa		1.00 (2)	1.00 (2)					
Del Norte		1.14 (120)	1.28 (91)	2.40 (51)	1.06 (29)	1.56 (41)	1.71 (19)	1.27 (25)
El Dorado		1.10 (38)	1.07 (31)	.80 (36)	1.26 (44)	1.94 (47)	1.14 (15)	1.77 (36)
Fresno		1.73 (246)	1.41 (301)	1.44 (307)	1.65 (213)	1.84 (244)	1.65 (183)	1.48 (208)
Glenn		1.36 (26)	2.42 (41)	1.28 (91)	1.83 (90)	1.29 (39)	.91 (65)	1.30 (53)
Humboldt	1.21 (75)	1.58 (351)	1.52 (434)	1.44 (369)	1.23 (362)	1.42 (273)	1.38 (350)	1.16 (311)
Imperial		2.00 (6)	1.14 (15)	1.04 (92)	1.74 (37)	.60 (24)	1.00 (10)	
Inyo		1.51 (211)	1.28 (258)	1.58 (261)	1.31 (139)	1.27 (170)	1.98 (173)	1.49 (269)
Kern	1.21 (106)	2.01 (328)	1.33 (331)	1.63 (793)	1.35 (427)	1.63 (510)	2.00 (564)	1.54 (749)
Kings		2.19 (51)	1.44 (44)	1.12 (70)	1.67 (14)	1.57 (59)	1.48 (62)	1.67 (8)
Lake	2.00 (15)	1.53 (147)	1.34 (166)	1.32 (130)	1.21 (108)	1.75 (47)	1.35 (47)	1.48 (62)
Lassen	1.00 (20)	1.43 (255)	1.89 (81)	1.14 (148)	1.57 (164)	1.14 (63)	1.36 (165)	1.75 (88)
Los Angeles	1.00 (18)	1.22 (124)	1.70 (162)	1.22 (158)	1.34 (344)	1.43 (357)	1.56 (340)	1.18 (264)
Madera		1.27 (43)	1.12 (121)	1.37 (173)	1.89 (124)	1.35 (129)	1.48 (129)	1.54 (33)
Marin		1.20 (11)	1.27 (26)	.83 (22)	1.83 (16)	2.10 (31)	1.71 (19)	2.14 (22)
Mariposa	1.67 (8)	2.05 (134)	.94 (180)	.99 (171)	1.56 (75)	2.08 (74)	.96 (51)	
Mendocino	1.00 (10)	1.10 (321)	1.24 (340)	1.07 (251)	1.74 (124)	1.71 (104)	1.70 (116)	2.33 (40)
Merced		1.50 (10)	1.00 (4)	1.33 (7)	1.00 (4)	2.00 (3)	4.00 (5)	- (1)
Modoc	1.10 (42)	1.04 (196)	1.90 (116)	1.12 (121)	1.19 (204)	1.55 (120)	2.00 (195)	1.57 (175)
Mono		1.94 (94)	2.04 (76)	.94 (62)	1.02 (75)	1.22 (60)	1.04 (114)	2.29 (56)
Monterey	1.25 (27)	1.31 (298)	1.21 (702)	1.22 (762)	1.34 (594)	1.14 (436)	1.19 (610)	1.72 (356)
Napa	1.25 (9)	2.36 (37)	1.33 (21)	1.31 (30)	1.20 (38)	1.00 (14)	2.25 (13)	1.89 (52)
Nevada		3.00 (8)			.75 (7)		1.00 (2)	- (2)
Orange		.60 (8)	.50 (6)	1.47 (42)	.73 (11)	1.33 (7)	1.00 (24)	1.29 (39)
Placer		.75 (14)	1.00 (6)	1.00 (6)	1.50 (9)	- (3)	- (2)	- (5)
Plumas	.25 (5)	1.00 (86)	.78 (32)	2.00 (57)	2.40 (31)	.63 (13)	4.33 (16)	.67 (5)
Riverside		.81 (67)	.89 (70)	.99 (163)	.99 (167)	1.06 (122)	1.65 (146)	1.38 (174)
Sacto.		- (1)						
San Benito		1.48 (196)	1.35 (305)	1.54 (206)	1.79 (94)	1.69 (148)	1.66 (93)	1.26 (52)
San Berdo.	1.23 (127)	1.24 (370)	1.38 (698)	1.48 (814)	1.64 (601)	1.63 (510)	1.26 (493)	1.34 (703)
San Diego	1.26 (113)	1.03 (264)	.88 (284)	1.30 (352)	1.19 (320)	1.06 (122)	1.24 (235)	1.42 (428)
San Joaquin		1.00 (2)	1.50 (15)	3.00 (4)	3.00 (7)			- (1)
San Luis Obispo		1.35 (273)	1.48 (513)	1.52 (307)	1.28 (473)	1.28 (370)	1.37 (413)	1.38 (229)
San Mateo		1.18 (61)	1.26 (106)	1.96 (74)	.76 (34)	2.00 (6)	2.00 (6)	
Santa Barbara	1.25 (90)	.98 (472)	1.26 (668)	1.30 (692)	1.17 (578)	1.51 (540)	1.11 (497)	1.30 (437)
Santa Clara	1.67 (8)	1.00 (6)	1.14 (15)	1.33 (13)	2.17 (17)		1.56 (46)	1.46 (69)
Santa Cruz	2.00 (21)	2.63 (29)	1.00 (64)		160 (26)	1.00 (2)		
Shasta	.25 (8)	1.30 (216)	1.18 (198)	1.18 (279)	1.43 (241)	1.30 (101)	1.16 (203)	1.38 (183)
Sierra		.60 (8)	.43 (10)	1.33 (7)	1.50 (5)	- (2)	.43 (10)	2.00 (6)
Siskiyou	1.00 (6)	1.28 (356)	1.36 (253)	1.45 (291)	1.44 (254)	1.71 (57)	1.82 (254)	1.44 (127)
Solano			1.09 (23)		1.33 (7)	2.00 (3)		
Sonoma		1.90 (58)	1.00 (44)	1.59 (127)	.96 (76)	2.33 (20)	1.80 (14)	1.75 (55)
Stanis.		1.10 (21)	1.77 (86)	1.00 (6)	1.50 (9)	1.80 (14)	1.57 (180	1.44 (39)
Sutter								
Tehama		1.19 (127)	1.54 (178)	1.38 (164)	1.27 (156)	1.06 (99)	1.46 (145)	3.00 (16)
Trinity		1.16 (54)	.72 (91)	.75 (56)	1.73 (67)	1.23 (29)	1.05 (84)	1.70 (27)
Tulare		1.86 (371)	1.73 (431)	1.79 (555)	1.61 (313)	1.37 (341)	1.53 (548)	1.40 (473)
Tuolumne		1.53 (43)	1.82 (172)	1.15 (146)	2.70 (53)	1.75 (44)	2.53 (67)	1.55 (97)
Ventura		1.92 (254)	1.36 (276)	1.08 (341)	1.26 (289)	1.34 (274)	1.40 (271)	1.49 (358)
Yolo					1.33 (13)	.88 (15)	1.17 (13)	1.20 (11)
Yuba		1.63 (21)	1.00 (4)		1.86 (18)	.00 (1)	1.20 (11)	4.00 (20)

* Parenthetical values represent sample sizes.

Table 2. Age structure of a sample of bobcats harvested in California, 1984-85.

Area of Take	Percent of county sample in each age class									Sample size
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	
Butte, Nevada, Placer, eastern Tehama, Yuba	11	24	12	22	10	8	4	4	3	74
Del Norte	No Data									
El Dorado, Amador, Calaveras	18	25	18	18	14	4	0	0	0	28
Eastern Fresno	21	23	14	12	12	7	3	2	1	122
Western Fresno	5	25	23	10	11	8	5	6	1	80
Humboldt	9	17	23	20	11	8	5	2	1	346
Inyo	19	45	14	3	3	4	5	2	1	168
Kern	23	30	15	12	8	4	3	1	2	569
Kings	9	38	23	17	6	3	2	2	0	64
Lake, Colusa, southern Glenn	6	13	18	17	22	9	8	3	2	158
Lassen	22	23	16	11	15	5	2	1	1	166
Los Angeles	12	40	14	9	12	5	3	1	1	340
Madera	15	12	25	20	6	3	4	6	6	143
Marin, Sonoma	6	15	18	30	9	6	3	0	3	33
Mariposa, Merced	9	9	24	24	15	8	2	4	1	85
Mendocino	11	19	21	17	16	7	3	2	3	117
Modoc	30	25	17	10	5	4	4	4	1	198
Mono, Alpine	33	19	12	13	3	4	7	2	2	123
Monterey	15	28	18	10	13	9	2	2	2	610
Napa, Solano, Yolo	13	18	11	8	11	16	8	5	5	38
Plumas, Sierra	22	16	13	19	9	9	3	3	3	32
Western Riverside, Orange	9	31	16	9	20	7	4	0	0	45
San Benito	10	16	11	14	20	10	9	3	2	93
Eastern San Bernardino, eastern Riverside, Imperial	14	43	8	5	11	8	6	1	2	408
Southwestern San Bernardino, central Riverside	16	38	12	9	6	5	4	5	2	218
San Diego	19	23	13	6	9	10	6	4	3	298
San Luis Obispo	17	33	11	10	12	7	3	1	1	423
San Mateo	No Data									
Santa Barbara	18	36	10	8	11	7	3	3	1	536
Santa Cruz, western Santa Clara	0	39	26	4	0	4	0	4	9	23
Shasta	24	20	14	12	8	7	5	4	3	202
Eastern Siskiyou	35	6	29	6	18	0	6	0	0	17
Western Siskiyou	22	18	16	15	11	8	4	1	1	238
Stanislaus, San Joaquin, eastern Santa Clara	19	19	17	17	21	2	2	0	0	48
Western Tehama, northern Glenn	12	19	19	17	14	7	6	0	3	129
Trinity	16	17	14	16	16	10	4	3	3	81
Tulare	24	27	14	13	9	4	2	2	2	551
Tuolumne	11	13	24	17	21	1	5	4	4	85
Ventura	20	33	11	9	9	8	4	3	0	273

The trends in age structure of the various bobcat populations are supported by trends in average life expectancy (ALE) (Table 3). The ALE's in the 1982-83, 1983-84 and 1984-85 seasons are considerably higher than those in the 1978-80 and 1980-81 seasons.

Table 3. Frequency distribution of average life expectancy of bobcats harvested in California, 1978-79 to 1985-86.

SEASON	Percent samples in each average life expectancy class					
	<2.099	2.100-2.499	2.500-2.699	2.700-3.099	3.100-3.499	>3.500
1978-79	5	16	32	21	5	21
1979-80	5	13	13	38	18	13
1980-81	8	23	15	41	10	3
1981-82	3	11	8	34	26	18
1982-83	0	5	3	26	31	36
1983-84	0	3	0	22	28	47
1984-85	0	8	8	30	24	30
1985-86	0	5	3	27	38	27

ALE's were calculated for each sample population and can be compared to ALE's for the previous six seasons (Table 4). In 1984-85 ALE's were up in only seven of 35 areas from last year as compared with 23 increases for 36 areas which occurred from the 1982-83 season to the 1983-84 season. This year's ALE's are up in 13 of 37 areas from the 1982-83 season.

The ALE was below the standard of 2.500 years believed necessary to maintain a stable population (see previous discussion in Job Progress Reports for Job IV-7, W-54-R-12 and W-54-R-13) only in Modoc County and eastern Siskiyou County. The ALE of 2.38 years in eastern Siskiyou County was slightly higher than in 1983-84. However, the ALE of 2.399 in Modoc County was considerably lower than it was in 1983-84. There were no areas with critically low (<2.099 years) ALE's this past season (Table 3).

Of the 37 populations of bobcats analyzed this last season, there were 20 areas where the ALE was greater than 3.100 (Table 4). This is a decrease from 75% of all areas in 1983-84 and 67% in 1982-83 to 54% this year. Bobcats in four areas had ALE's of over 4.000 years.

Once again the percent of young, percent of breeding age females and the intrinsic rate of increase for most area populations were within the ranges seen in recent years (Table 5). Only in eastern Siskiyou County, Modoc County, and the Mono County and Alpine County area was the number of young produced per breeding age female more than the standard of one young. For the latter area this was indicative of natural population cycling because the number of young per breeding age female was very low during the previous years. This is not the case with the bobcats in eastern Siskiyou County where the number of young per breeding age female always has been recorded at more than one.

Table 4. Average life expectancy of bobcats harvested in California, 1978-79 to 1985-86.

Area of Take	Average Life Expectancy (in years)							
	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
Butte, Nevada, Placer eastern Tehama, Yuba	3.86*	2.824	2.788	3.094	3.313	4.306	3.432	4.548
Del Norte		3.139	3.457	3.458	3.534	3.037		2.500
El Dorado, Amador Calaveras		3.732	3.170	2.825	3.553	4.226	2.929	3.159
Eastern Fresno		3.284	3.312	2.985	3.107	3.338	3.197	3.601
Western Fresno		2.789	2.278	2.771	3.084	3.176	3.838	3.449
Humboldt	2.212	2.820	2.823	2.925	3.425	3.511	3.520	3.195
Inyo		2.594	2.307	3.286	3.334	3.388	2.530	3.113
Kern	2.566	2.621	2.887	3.237	3.368	3.096	2.672	2.838
Kings		3.248	2.477	2.502	2.93	3.229	2.469	3.38
Lake, Colusa southern Glenn	2.601	2.885	2.698	2.937	3.565	3.617	4.044	3.723
Lassen	1.312	2.211	2.069	2.454	2.878	2.897	2.892	3.057
Los Angeles	4.550	3.886	3.047	2.983	3.700	3.245	2.750	2.981
Madera		3.000	3.023	3.046	2.685	3.640	3.731	3.076
Marin, Sonoma		2.884	2.409	3.629	3.326	3.559	3.955	3.038
Mariposa, Merced		3.225	2.869	3.634	3.196	3.058	3.653	3.381
Mendocino	2.45	3.121	2.892	3.523	3.661	3.856	3.338	3.974
Modoc	2.538	1.973	2.219	2.445	2.705	2.933	2.399	2.437
Mono, Alpine		2.156	2.894	3.201	3.220	3.431	2.955	3.287
Monterey	2.884	2.562	2.445	2.933	3.381	3.138	3.026	3.407
Napa, Solano, Yolo	2.759	2.306	2.988	4.026	4.728	5.133	4.158	4.167
Plumas, Sierra	2.68	3.039	3.771	2.454	2.444	4.21	3.406	4.68
Western Riverside Orange		3.648	2.575	4.043	4.270	4.96	3.456	3.360
San Benito	2.60	2.715	2.777	3.278	3.904	3.595	4.005	2.962
Eastern San Bernardino eastern Riverside Imperial	2.272	2.485	1.986	2.850	3.777	3.323	2.990	3.002
Southwestern San Bernardino central Riverside	2.543	2.669	2.803	3.295	4.213	3.524	2.917	2.759
San Diego	2.924	2.998	2.830	3.392	4.075	3.942	3.527	3.495
San Luis Obispo		3.524	2.512	3.213	3.438	3.449	3.098	3.395
San Mateo		2.833	3.073	3.530	3.529			
Santa Barbara	4.324	3.231	2.622	3.535	3.918	3.535	2.907	3.129
Santa Cruz western Santa Clara	3.566	2.462	3.010		2.705		4.326	
Shasta		2.667	2.646	2.503	2.943	3.045	3.218	3.473
Eastern Siskiyou		1.884	1.790	1.650	2.363	2.192	2.38	2.425
Western Siskiyou		3.041	2.605	2.812	2.861	3.081	3.195	2.883
Stanislaus San Joaquin eastern Santa Clara		3.55	2.433	2.52	3.150		3.021	3.583
Westwern Tehama northern Glenn		2.787	2.392	2.790	2.900	3.656	3.353	3.875
Trinity		2.990	3.219	2.732	2.917	4.603	3.426	3.759
Tulare		3.078	2.496	2.309	2.876	2.960	2.678	3.113
Tuolumne	3.32	3.051	2.779	3.329	3.160	3.568	3.524	3.694
Ventura	2.849	3.148	2.874	3.498	3.641	3.376	2.782	3.088

* Average life expectancy given to two decimals indicates sample size of 20 or fewer bobcats. All other average life expectancies given are from samples greater than 20 bobcats.

Table 5. Age structure and reproductive potential of bobcats harvested in California, 1984-85.

Area of Take	% in 0-1 Age Class	% Females 1.5 years and older	# Young per Breeding age Female	Intrinsic Rate of Increase
Butte, Nevada, Placer, eastern Tehama, Yuba	10.8	40.5	0.27	5
Del Norte	No Data			
El Dorado, Amador, Sacramento, Calaveras	17.9	32.1	0.56	9
Eastern Fresno	21.3	23.1	0.92	15
Western Fresno	5.0	31.3	0.16	2
Humboldt	9.2	38.7	0.24	-4
Inyo	19.0	27.4	0.69	24
Kern	22.8	23.5	0.97	18
Kings	9.4	34.4	0.27	1
Lake, Colusa, southern Glenn	5.7	39.2	0.15	-8
Lassen	22.3	30.7	0.73	13
Los Angeles	12.4	34.1	0.36	13
Madera	14.7	32.8	0.45	0
Marin, Sonoma	6.1	36.4	0.17	-6
Mariposa, Merced	9.4	45.6	0.21	-10
Mendocino	11.1	31.6	0.35	-1
Modoc	30.3	25.1	1.21	19
Mono, Alpine	32.5	30.9	1.05	24
Monterey	14.6	37.9	0.39	9
Napa, Solano, Yolo	13.2	36.8	0.36	8
Plumas, Sierra	21.9	40.6	0.54	11
Western Riverside, Orange	8.9	33.3	0.27	9
San Benito	9.7	33.3	0.29	0
Eastern San Bernardino, eastern Riverside, Imperial	13.5	35.8	0.38	22
Southwestern San Bernardino, central Riverside	16.1	39.6	0.41	19
San Diego	19.1	34.9	0.55	16
San Luis Obispo	16.8	33.8	0.50	17
San Mateo	No Data			
Santa Barbara	18.1	33.3	0.54	20
Santa Cruz, western Santa Clara	0.0	43.5	0.00	13
Shasta	23.8	32.2	0.74	16
Eastern Siskiyou	35.3	18.8	1.88	7
Western Siskiyou	21.8	28.9	0.75	10
Stanislaus, San Joaquin, eastern Santa Clara	18.8	31.3	0.60	5
Western Tehama, northern Glenn	12.4	36.4	0.34	0
Trinity	16.0	39.5	0.41	5
Tulare	23.8	29.3	0.81	16
Tuolumne	10.6	22.4	0.47	-6
Ventura	20.1	32.0	0.63	19

1985-86 Season

During the 1985-86 season 8,099 bobcats were taken and tagged. Of these 5,650 were sent for age analysis, 890 were processed and retained as young-of-the-year, 277 unuseable jaws were received, no jaws were provided for 89 bobcats, and 1,193 jaws were not forwarded by Department tagging agents. This sample represents bobcats taken in 49 counties. This has resulted in 37 different areas used for analysis and current data may be compared with data from previous years.

As in previous years, sex ratios continue to vary throughout the state, from as low of 1.16 males per female in Humboldt County to 4.00 in Yuba County (Table 1). Likewise, sex ratios continue to vary for the same county from one year to the next. This year there was a slight increase in the proportion of males. The ratio of males increased in 17 of 33 counties where there have been sufficient sample sizes for a comparison; in five areas there was a substantial drop in the proportion of males.

The age structure was calculated for each sample area (Table 6). There was only one area, Modoc County, where the percent of individuals in the first two age groups exceeded 50%. This is considerably fewer areas with this high percent of younger individuals than in 1984-85, and is similar to the situation in the 1982-83 and 1983-84 seasons.

The trends in age structure of the various bobcat populations are reflected in the relatively stable trend in ALE's since the 1982-83 season (Table 3). ALE's were calculated for each sample population and can be compared to ALE's for the previous seven seasons (Table 4). In 1885-86 the ALE's were up in 20 of 36 areas from the previous year.

The ALE still remains below the standard of 2.5 years believed necessary to maintain a stable population only in Modoc County and eastern Siskiyou County. However, the ALE's in these two areas, of slightly more than 2.4 years, is very close to the standard. For the fourth successive year there were no areas with critically low (<2.099 years) ALE's.

Once again the percent of young, percent of breeding age females and the intrinsic rate of increase for most area populations were within the ranges seen in recent years (Table 7). Only in eastern Siskiyou County and the eastern San Bernardino County, eastern Riverside County and Imperial County areas was the number of young produced per breeding age female more than the standard of one young. For the latter area this was indiciative of natural population cycling bedause the number of young per breeding age female was very low during the previous years. This is not the case with the bobcats in eastern Siskiyou County where the number of young per breeding age female always has been recorded at more than one.

Table 6. Age structure of a sample of bobcats harvested in California, 1985-86.

Area of Take	Percent of county sample in each age class									Sample size
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	
Butte, Nevada, Placer, eastern Tehama, Yuba	10	5	24	5	14	14	7	10	10	42
Del Norte	8	20	48	16	4	4	0	0	0	25
El Dorado, Amador, Calaveras	25	14	16	14	14	2	7	2	5	44
Eastern Fresno	5	24	30	5	14	11	1	1	2	129
Western Fresno	8	20	30	13	3	10	9	4	1	79
Humboldt	16	19	23	14	10	6	4	4	2	311
Inyo	21	20	28	6	4	6	5	4	2	269
Kern	18	28	26	8	5	6	3	2	2	749
Kings	13	13	25	13	13	13	13	0	0	8
Lake, Colusa, southern Glenn	13	14	22	11	10	10	9	8	1	166
Lassen	18	23	23	10	9	3	3	6	2	88
Los Angeles	9	29	30	10	5	7	5	3	1	264
Madera	12	18	27	18	6	9	6	0	3	33
Marin, Sonoma	11	18	29	26	6	3	1	0	3	80
Mariposa, Merced	17	19	17	12	14	5	7	5	2	42
Mendocino	9	11	19	18	21	4	9	2	4	57
Modoc	29	22	20	11	7	5	2	2	1	175
Mono, Alpine	15	23	25	7	10	3	7	7	2	61
Monterey	11	18	32	8	8	10	3	3	3	356
Napa, Solano, Yolo	10	19	16	11	13	10	6	2	6	63
Plumas, Sierra	18	0	18	0	18	18	9	0	9	11
Western Riverside, Orange	8	15	35	13	8	11	6	4	1	107
San Benito	14	27	21	10	12	10	6	0	0	52
Eastern San Bernardino, eastern Riverside, Imperial	26	16	27	6	5	5	5	5	3	604
Southwestern San Bernardino, central Riverside	9	37	26	12	4	2	4	2	2	205
San Diego	10	21	27	12	6	8	3	5	2	428
San Luis Obispo	7	27	24	12	10	9	5	2	1	229
San Mateo	No Data									
Santa Barbara	11	26	30	5	9	5	5	4	2	437
Santa Cruz, western Santa Clara	No Data									
Shasta	19	18	16	13	12	6	6	4	4	183
Eastern Siskiyou	30	19	18	15	8	3	5	3	0	67
Western Siskiyou	15	22	23	13	12	7	8	0	0	60
Stanislaus, San Joaquin, eastern Santa Clara	9	18	21	16	11	13	6	1	1	109
Western Tehama, northern Glenn	3	13	31	16	9	9	9	3	3	32
Trinity	4	11	30	19	11	11	7	4	4	27
Tulare	11	28	24	9	9	9	5	2	1	473
Tuolumne	11	13	28	10	13	11	2	1	3	98
Ventura	11	30	24	8	9	5	5	2	2	359

Table 7. Age structure and reproductive potential of bobcats harvested in California, 1985-86.

Area of Take	% in 0-1 Age Class	% Females 1.5 years and older	# Young per Breeding age Female	Intrinsic Rate of Increase
Butte, Nevada, Placer, eastern Tehama, Yuba	9.5	20.5	0.46	-8
Del Norte	8.0	40.0	0.20	-18
El Dorado, Amador, Sacramento, Calaveras	5.0	31.8	0.79	10
Eastern Fresno	4.7	40.3	0.12	-2
Western Fresno	7.6	34.2	0.22	-4
Humboldt	15.8	36.3	0.44	4
Inyo	20.8	27.9	0.75	11
Kern	17.5	31.4	0.56	10
Kings	12.5	25.0	0.50	-5
Lake, Colusa, southern Glenn	12.7	30.7	0.41	-1
Lassen	18.2	27.3	0.67	9
Los Angeles	8.7	40.5	0.21	1
Madera	12.1	33.3	0.36	-4
Marin, Sonoma	11.3	29.9	0.38	-6
Mariposa, Merced	16.7	26.8	0.62	7
Mendocino	8.8	42.9	0.21	-7
Modoc	29.1	26.3	1.11	14
Mono, Alpine	14.8	24.6	0.60	7
Monterey	10.7	32.9	0.33	-2
Napa, Solano, Yolo	9.5	33.3	0.29	4
Plumas, Sierra	18.2	45.5	0.40	-1
Western Riverside, Orange	7.5	42.1	0.18	-10
San Benito	13.5	40.4	0.33	5
Eastern San Bernardino, eastern Riverside, Imperial	25.5	31.0	0.82	12
Southwestern San Bernardino, central Riverside	8.8	42.9	0.21	5
San Diego	10.3	35.7	0.29	1
San Luis Obispo	7.0	38.2	0.18	2
San Mateo	No Data			
Santa Barbara	11.4	37.1	0.31	4
Santa Cruz, western Santa Clara	No Data			
Shasta	19.1	33.3	0.57	10
Eastern Siskiyou	29.9	29.9	1.00	13
Western Siskiyou	15.0	25.0	0.60	1
Stanislaus, San Joaquin, eastern Santa Clara	9.2	38.5	0.24	-2
Western Tehama, northern Glenn	3.1	37.5	0.08	-13
Trinity	3.7	33.3	0.11	-15
Tulare	11.0	35.7	0.31	5
Tuolumne	11.2	33.0	0.34	-3
Ventura	11.1	34.4	0.32	7

DISCUSSION

There appears to be nothing abnormal in either the age or sex structure of bobcats taken during the 1984-85 or the 1985-86 harvest seasons. In-depth discussions of caveats of data interpretation have appeared in previous Job Progress Reports and no new insights have been acquired over the last year.

After seven years (eight, if partial data from 1978-79 are included) of data collection some rather obvious observations can be made from the data and should be mentioned here because of the cesation of the age and sex monitoring program and the shear quantity of data which has been gathered.

Sex structures fluctuate between counties and between years. The largest variations usually are in counties whose sample sizes are small and the harvest quantity is relatively small and varies from year to year. In counties with perennially large and sustained harvests, the sex ratio is relatively stable, shows a normal bias towards males, and the variations are probably due to changes in population structure dealing with the relative actions of weather on birth rates and natural mortality.

Some areas continuously show age structures with more than 40% to 45% of the population in the 0-1 and 1-2 age classes (ie. Eastern Siskiyou and Modoc Counties). This is indicative of a population having to produce a large number of young, which in turn is indicative of a heavier than normal loss of adults which create more 'vacant slots' than normal for young to fit into.

This condition also was noticed in the calculation of the ALE. All populations, except those in eastern Siskiyou and Modoc Counties, are maintaining ALE's of more than the 2.500 year standard. Ideally, the ALE should be above 3.100 years. In the last four seasons the parameters of population dynamics of California bobcats have shown a stability at a level indicating relatively good health. In at least three of the last four seasons 22 of the 37 areas for which we have annual data had ALE's higher than 3.100 years. Five have had an average ALE higher than 3.500 years and and ALE of greater than 4.000 years occurred 11.4% of the time and in 11 of the 39 different areas.

An ALE of 3.500 or more would indicate a relatively unharvested situation; but even the ALE of an unharvested population will fluctuate from year to year, often fairly dramatically, as birth rates and death rates are not consistent or constant. Also, the ALE in areas with relatively stable bobcat populations but supporting a harvest would be expected to show some annual variation for the same reasons. In all, the relative health of bobcat populations in California is at a point where continued monitoring of the age and sex structure is not needed at the current harvest levels.

It should be noted that there are areas in northeastern California where the population is not at a point where it can be judged healthy and relatively immune to the effects of harvest. This is evidenced by the biannual cycles in harvest quantity and population dynamics. This area, however, appears to be handling the current harvest pressure without a general loss in the size of the population. In addition to reinstituting the age and sex monitoring program if there is an increase in harvest above the statewide management level of 14,400, it is suggested that if the harvest in northeastern California exceedes 425 for two successive seasons that the population condition is monitored in this local area.