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California Department of Fish and Game
JOB FINAL REPORT

Project Number: W-65-R-4 **Subproject Title:** Nongame Wildlife Investigations

Job Number: IV-10 **Job Title:** Bobcat Monitoring and Management

Period Covered: July 1, 1986 - June 30, 1987

SUMMARY:

Harvest Assessment, 1985-86

An estimated 9,824 bobcats were taken during the 1985 hunting year and the 1985-86 trapping season. Trappers took 6,927 bobcats and hunters, 2,861. The total take was a decrease of about 700 from the 1984-85 year and was lower than any total take since 1976-77 except for the 1983-84 season. The greatest take continued to occur in counties along California's south coast although most of the current year's decrease in take occurred in southern California. Data on the bobcat harvest were gathered through the process of tagging bobcat furs for export, the annual trapping report and hunter survey, and from the U.S. Fish and Wildlife Service depredation control records. This information is provided in an attached supplement to the 1985-86 Job Progress Report.

Harvest Assessment, 1986-87

An estimated 9,786 bobcats were taken during the 1986 hunting year and the 1986-87 trapping season. Approximately 8,003 bobcats were taken by trappers and 1,739 by hunters. The total take was a slight decrease of about 40 from the 1985-86 year and was lower than any total take since 1976-77 except for the 1983-84 season. The greatest take continued to occur in counties along California's south coast. Data on the bobcat harvest were gathered through the process of tagging bobcat furs for export, the annual trapping report and hunter survey, and from the U.S. Fish and Wildlife Service depredation control records.

Age and Sex Structure

Lower jaws from 7,167 and 6,540 harvested and tagged bobcats were collected from commercial trappers during the 1984-85 and 1985-86 seasons respectively. These provided data on the age and sex structure of bobcat populations throughout California. Data also were analyzed on the basis of 37 geographical areas, each area representing a local population. The type of data gathered in the 1983-84 season sample were similar to that obtained in the five previous seasons. This information is presented in an attached supplement to the 1985-86 Job Progress Report.

Going into the 1984-85 season previous data indicated that the condition of most bobcat populations 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 trend continued through the 1984-85 and 1985-86 seasons. Parameters measured to determine the condition of both statewide and local bobcat populations (sex

ratios, age structure, average life expectancy, proportions of young-of-the-year and breeding aged females, and in the ration of young to breeding aged females) have begun to cycle around relatively healthy levels.

As a result of this information, it is recommended that the statewide age and sex structure monitoring be discontinued and only reinstated only 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 are still not as good as elsewhere.

BACKGROUND:

Bobcat harvest increased in California from the 1960's through the late 1970's. This increase reflected high fur prices and an abundant population of bobcats. The sale of bobcat fur has brought the highest dollar income to trappers of any species of fur harvested and sold in California since the 1975-76 season. In order 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. Reports on these studies have been made through other jobs. A statewide harvest monitoring system has been used where the age and sex structures of the harvested population were sampled to determine the effect of the harvest on the various bobcat populations, and to identify the amount of harvest. Only the monitoring of the quantity of harvest is being conducted now since the age and sex structure of the harvested bobcat poulation and harvest demand has been stable over the last four seasons.

Public interest in the bobcat, on both the domestic and international fronts, has increased greatly over the last 18 years. Prior to 1971, the bobcat in California was a nonprotected mammal and there were no restrictions on its take. In 1971, this species was given Nongame status by the California Legislature. Subsequently, in 1974 a six month season was imposed on the take of bobcats. This season was further restricted to the standard 3 1/2 month furbearer season in 1976. During the 1978-79 season, the export tag quota was reached by the end of January, effectively shortening the season by one month. During 1979-80 the season was reduced to 2 1/2 months, but was closed on December 29, 1979, one month earlier than proposed because the quota of export tags had been reached once again.

For the 1980-81 season the state was divided into three harvest zones, each with a different length season depending upon the status of the local bobcat populations. These regulations, setting different season lengths for various regions, were a result of previous work (see W-54-R-12, Job IV-7). The season length was increased by one week, except in the northeastern California region, for the 1981-82 season in order to have the bobcat season coincide with the season on the gray fox. The northeastern California season was set back two weeks and its length was increased by a week for the 1982-83 season.

The season limit for bobcat sport hunters was set at two for the 1980-81 season and increased to five for the 1984-85 season. Prior to the 1982-83 season, the sport hunting season length and timing coincided with the

commercial take season. In 1982-83, the sport hunting season was extended for two weeks at the end of the commercial seasons in Del Norte, Humboldt, Kern, Lake, Mendocino, Trinity, and San Diego Counties. For the 1985-86 season, the sport hunting season was extended on a statewide basis to open a week before the commercial season and to last until February 15.

The Defenders of Wildlife petitioned the Secretary of the Interior in early 1977 to place the bobcat on the endangered species list. Subjective evaluation of data from Animal Damage Control take, along with increased fur prices and commercial demand and take of bobcats, led this group to take this action. The Secretary later found that the petitioned action was not warranted.

In 1973, the United States became a party to the treaty on International Trade in Endangered Species of Wild Fauna and Flora. The treaty restricted trade in endangered species and established procedures to monitor the trade of other species that might be faced with endangerment in the future. The bobcat was one of the species deemed by the parties to the treaty as a candidate for future endangerment. The Endangered Species Scientific Authority (E.S.S.A.) was established as the scientific authority to monitor the species status in the United States, and the U.S. Fish and Wildlife Service was given the authority over trade as provided by the treaty. The E.S.S.A. evaluated data to justify harvest and export of bobcat furs for three years.

In November, 1979, Defenders of Wildlife brought suit against the E.S.S.A. The suit was heard in December and the court's decision reversed the E.S.S.A.'s findings for five states and parts of two others, but not for California. After the suit, the E.S.S.A. was dissolved and the responsibility was given to the U.S. Fish and Wildlife Service, whose Office of the Scientific Authority (O.S.A.) now has the responsibility for scientific monitoring. However, an appeal by Defenders of Wildlife of the court's ruling to the Court of Appeals, District Court for the District of Columbia, resulted in a court order that prohibited bobcat pelts taken after July 1, 1982 from being exported. This ban was imposed until O.S.A. could satisfy the court that export findings were based on reliable population estimates and that each state would enforce a predetermined take limit. Guidelines from O.S.A. to the states to obtain this information were not accepted by the court. During 1982 there was legislative redefinition of the Endangered Species Act which effectively voided the court's ban on export. On December 1, 1982 the export ban was lifted and the major European market was reopened.

Since late 1982 there has been little activity to ban the harvest of bobcats. However, this has been a period of intense management and monitoring of bobcat populations and harvest. It is the results of this management and monitoring that are discussed in this report.

OBJECTIVES:

1. Develop a bobcat population model or models for all local populations.

2. Determine the annual bobcat harvest on a regional basis.

3. Use information generated by the first two objectives to develop a statewide management plan and to manage local populations by manipulating season lengths and chronology, take methods, and harvest limits.

PROCEDURES:

The commercial take is determined through assessment of mandatory annual reports of licensed trappers and an export tagging program for all bobcat furs. Commercial fur takers report their take at the end of each license year (fiscal year) giving the quantity of take of each species by county. Anyone possessing or wishing to sell or to transport a bobcat fur must have it tagged. As part of the tagging process, the taker must supply information on the place, date and method of take.

Sport take is determined through the Department's annual hunter survey questionnaire. This survey queries a 2 to 4% sample of California's licensed hunters about their hunting effort and success for various species. Information on total take, distribution of hunting effort, and percent successful hunters is gathered on bobcat hunting from this survey. Additional information on sport hunting is gathered through the sale of hunting tags and their return. Sport hunters are required to report their kill and provide information on their take.

All depredation take must be reported to the Department. This information is reported directly by the person doing the taking or from the public agencies doing the depredation control work.

FINDINGS:

Age and Sex Structure

The assessment of the age and sex structure of harvested bobcats in California for the 1984-85 and 1985-86 season is in the attached supplement to last year's Job Progess Report and cited below:

> Gould, G.I., Jr. 1988. The Age and Sex Structure of Harvested Bobcats in California, 1984-85 and 1985-86. Calif. Dept. of Fish and Game, Nongame Wildl. Invest., Supplement #2 to Job Progress Report, Project W-65-R-3 (554), Job IV-10. 11 pp.

Harvest Assessment

The assessment of the bobcat harvest for the 1985-86 season is in the attached supplement to last year's Job Progress Report and cited below:

> Gould, G.I., Jr. 1988. The Harvest of Bobcats in California, 1985-86. Calif. Dept. of Fish and Game, Nongame Wildl. Invest., Supplement #1 to Job Progress Report, Project W-65-R-3 (554), Job IV-10. 10 pp.

For the 1986-87 season the total estimated take of bobcats was 9,786 individuals (Table 1). This was about 40 (0.4%) less than were taken during 1985-86, and from 1,100 more to 4,640 less than were taken during the seven years prior to 1985-86. Trappers continue to take the majority (82%) of bobcats and the total hunter take, of 1,739 was lower by over 1,100 bobcats than in 1985-86. The hunter take also was lower, only 41% of the average take since the 1980-81 season. The total take of bobcats ranged from none in four counties to 1,008 in San Bernardino County (Table 2). The harvest in each of

the ten counties having the highest total take was at least 370 (compared to 371 last year). This year 22 of 58 counties reported a take of more than 100 bobcats; last year more than 100 bobcats were taken from 25 counties.

Table 1. Estimated Annual Take of Bobcats by Hunting and Trapping in California, 1976-77 to 1986-87.

Season	Total Commercial Take (IA+IB)	Commercial Trapper Take (IA)	Commercial Hunter Take (IB)	Total Hunter Take (II)	Animal Damage Control Take (III)	Total Annual Take (IA+II+III)
1976-77	5400	5000	400	10500	347	15847
1977-78	5150	4650	500	15300	208	20158
1978-79	8325	6825	1500	5811	56	12692
1979-80	7809	6686	1123	7708	32	14426
1980-81	9595	8702	893	3737	24	12463
1981-82	9337	8162	1175	3037	34	11233
1982-83	8513	7427	1086	2951	48	10426
1983-84	7362	6576	786	2077	43	8696
1984-85	8897	7495	1402	2993	48	10536
1985-86	8099	6927	1172	2861	36	9824
1986-87	9123	8003	1120	1739	44	9786

In what has become the norm, the vast majority of bobcats are harvested from counties in southern California. For the sixth time in the last ten years, San Bernardino County had the highest commercial take (Table 3). Five of the six counties in the South Coastal area and three of five counties in the South Sierra area comprised eight of the top ten. As usual, the only representative from northern California in the top ten in commercial take was Humboldt County.

The 1986-87 harvest was basically equal to that of 1985-86 (Table 1). However, the take varied from previous years in the different geographic areas of California (Table 4). Substantial percentage increases in harvest occurred in the North Sierra, Northeast, Northwest, and South Coast areas. Some noticeable percentage decreases in harvest were noted in the Central Coast and East Sierra areas.

The market for bobcat fur has become relatively stable in both political and economic terms. There was no national or international regulatory action pending which might have influenced the demand for bobcat furs. However, the average value for a raw bobcat fur shows a substantial increase of 55.1% from 1985-86 to 1986-87 (Table 5).

Indications from the trends in average take per trapper over the last 11 seasons are that it was easier to catch a bobcat in 1986-87 than it was in 1975-76 (Table 6). The continued maintenance of a high take of bobcats per trapper indicates that the bobcat resource was abundant during the 1986-87 season.

Table 2. Take of Bobcats by County during the 1986-87 Season.

County	Licenced Trapper Take	Commercial Hunter Take	Sport Hunter Take	Animal Damage Control Take	Total County Take
Alameda			15		15
Alpine	15				15
Amador	2				2
Butte	57	6	2		65
Calaveras	28		5		33
Colusa	78				78
Contra Costa	3				3
Del Norte	7				7
El Dorado	10	9	16	2	37
Fresno	319	26	25		370
Glenn	83	1	19		103
Humboldt	177	242	7	8	434
Imperial	13				13
Inyo	234				234
Kern	735	104	39	1	879
Kings	47				47
Lake	110	11	7		128
Lassen	101	38	2		141
Los Angeles	311	4	16		331
Madera	92	1	4	1	98
Marin	3	25		1	29
Mariposa	135	12		10	157
Mendocino	91	79	2	3	175
Merced	1				1
Modoc	204	33	5		242
Mono	92	2			94
Monterey	485	86	15		586
Napa	41		15	1	57
Orange	47				47
Placer	1				1
Plumas	57	3	17		77
Riverside	137	6	49		192
Sacramento				1	1
San Benito	178	9	36		223
San Bernardino	889	9	110		1008
San Diego	418	18	10		446
San Luis Obispo	463	28	67	1	559
San Mateo		8		1	9
Santa Barbara	580	24	15	4	623
Santa Clara	45		5		50
Shasta	173	48	30		251
Sierra		2	3		5
Siskiyou	287	39	30	5	361
Solano			5		5
Sonoma	65	5	2	3	75
Stanislaus	49	1			50
Sutter			5		5
Tehama	55	1	4		60
Trinity	14	81	2		97
Tulare	446	153	20		619
Tuolumne	35	1		2	38
Ventura	587	5	5		597
Yolo	3				3
Yuba			10		10
Total	8003	1120	619	44	9786

No bobcats reported taken in Nevada, San Francisco, San Joaquin and Santa Cruz Counties.

Table 3. Ten Counties Reporting Highest Commercial Take of Bobcats 1971-87.

Rank	1971-72	1972-73	1973-74	1974-75	1975-76
1	Modoc	Merced	San Diego	San Diego	Humboldt
2	Shasta	Modoc	Modoc	Modoc	San Diego
3	Merced	Shasta	Tehama	Lassen	Modoc
4	Lassen	Siskiyou	Tuolumne	Humboldt	Shasta
5	Siskiyou	Humboldt	Siskiyou	Inyo	Inyo
6	Riverside	Sierra	Humboldt	Siskiyou	Siskiyou
7	San Bernardin	Tehama	Mendocino	Colusa	Riverside
8	San Diego	San Bernardino	Shasta	Riverside	San Bernardino
9	Humboldt	Butte	Lake	Fresno	Solano
10	Plumas	San Diego	Solano	Lake	Lake

Rank	1976-77	1977-78	1978-79	1979-80	1980-81
1	Humboldt	San Bernardino	Humboldt	Santa Barbara	San Bernardino
2	San Bernardino	Humboldt	San Bernardino	Humboldt	Monterey
3	Santa Barbara	Tulare	Shasta	Tulare	Santa Barbara
4	Shasta	Santa Barbara	Kern	Kern	San Luis Obispo
5	San Benito	Kern	Siskiyou	San Bernardino	Humboldt
6	Mendocino	Inyo	Santa Barbara	Siskiyou	Tulare
7	Tulare	Mendocino	Inyo	San Diego	Mendocino
8	Fresno	Modoc	Modoc	Mendocino	Kern
9	San Diego	Shasta	Mendocino	Monterey	San Diego
10	Inyo	Monterey	Tehama	San Luis Obispo	San Benito

Rank	1981-82	1982-83	1983-84	1984-85	1985-86
1	San Bernardino	San Bernardino	San Bernardino	Kern	Kern
2	Kern	Monterey	Kern	Tulare	San Bernardino
3	Monterey	Kern	Santa Barbara	Monterey	Tulare
4	Santa Barbara	Santa Barbara	San Luis Obispo	San Bernardino	Monterey
5	Tulare	San Luis Obispo	Los Angeles	Santa Barbara	Santa Barbara
6	Humboldt	Tulare	Monterey	San Luis Obispo	San Diego
7	San Diego	Humboldt	Tulare	Los Angeles	Ventura
8	Ventura	Los Angeles	San Diego	Humboldt	Humboldt
9	Fresno	San Diego	Ventura	Siskiyou	Los Angeles
10	San Luis Obispo	Ventura	Humboldt	San Diego	Inyo

Rank	1986-87
1	San Bernardino
2	Kern
3	Santa Barbara
4	Tulare
5	Ventura
6	Monterey
7	San Luis Obispo
8	San Diego
9	Humboldt
10	Fresno

Table 4. Geographical Differences in the Amount of Commercial Take of Bobcats in California, 1981-82 to 1986-87.

Geographical Area	1981-82 Take	Change < to>	1982-83 Take	Change < to>	1983-84 Take	Change < to>	1984-85 Take	Change < to>	1985-86 Take	Change < to>	1986-87 Take
Northeast	397	31	522	-37	328	54	506	-23	390	32	514
Northwest	1501	-24	1141	-13	997	41	1404	-31	967	26	1216
North Coast	559	-4	538	-38	332	8	358	3	367	16	425
Central Coast	118	6	125	-77	29	266	106	23	130	-18	107
North Sierra	46	41	65	-46	35	43	50	-14	43	53	66
Central Sierra	374	-29	267	-16	224	1	226	12	253	-8	232
East Sierra	332	-22	260	16	301	11	333	22	406	-16	343
South Coast	2429	5	2546	-9	2318	8	2511	-7	2344	23	2881
South Sierra	1971	-28	1428	10	1569	33	2086	-16	1745	10	1923
Southern California	1332	7	1419	-13	1230	7	1317	10	1454	-3	1416

Table 5. Bobcat Pelt Prices

Season	Average Price	Highest Price
1970-71	$ 10.86	not recorded
1971-72	$ 18.83	$ 30.00
1972-73	$ 29.33	$ 6.00
1973-74	$ 45.00	$ 110.00
1974-75	$ 50.00	$ 110.00
1975-76	$ 133.50	$ 300.00
1976-77	$ 76.00	$ 225.00
1977-78	$ 105.00	$ 185.00
1978-79	$ 120.00	$ 426.00
1979-80	$ 114.20	$ 313.00
1980-81	$ 129.90	$ 325.00
1981-82	$ 114.53	$ 325.00
1982-83	$ 105.85	$ 342.11
1983-84	$ 102.33	$ 380.00
1984-85	$ 121.96	$ 368.00
1985-86	$ 107.86	Not Available
1986-87	$ 167.33	Not Available

As usual the commercial take of bobcats was mostly by trapping (Table 7). However, at 83.4% this was the second lowest take by trap, 3% less than the average over the last six seasons (Table 8). This no doubt was influenced by the high take where the method of take was not known in Inyo, Kern, San Bernardino, and Santa Barbara Counties. In all instances the trends in these counties has shown a higher trapping take in the past than occurred this season. If indeed this were the case, the percentage of bobcats harvested by trap would be very close to the average since the 1980-81 season.

Table 6. Average Bobcat Harvest per Successful Trapper per Season in California.*

County	Season											
	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87
Butte	3.8	5.6	2.9	3.1	3.4	2.5						
Fresno		9.1	10.5	10.6	9.2	10.2	9.1	8.5	11.9	10.0	12.1	17.6
Humboldt	9.2	8.8	6.6	6.0	6.1	5.3	5.7	4.8	7.6	9.3	18.0	12.5
Inyo	10.6	8.3	10.9	10.5	7.3	8.5	5.0	5.3	7.8	5.6	14.2	9.7
Kern	5.3		14.6	26.9	10.6	11.0	10.8	12.2	16.5	18.4	14.7	13.0
Lake	4.5	5.3	5.7	10.0	6.4	4.7	5.9	4.6	5.9			7.2
Lassen		5.4	3.5	6.0	4.3	3.8	5.9	6.5	3.6	4.8	4.4	4.4
Los Angeles	6.8	6.6	8.6	7.6	14.8	14.1	8.1	8.8	13.5	15.8	14.9	15.6
Mendocino	4.4	6.7	5.9	8.0	5.9	6.1	4.5	5.4	6.1	5.9	5.1	6.5
Modoc		5.0	5.3	5.6	4.2	3.2	4.6	5.5	7.7	7.2	6.3	6.2
Monterey		8.1	9.1	9.2	11.3	16.3	14.2	11.7	14.7	18.0	17.8	21.4
Plumas	9.8	2.9	3.4	4.5	4.3		5.5	4.5				
Riverside				7.8	9.9	5.8	7.8	9.0	7.4	10.3	10.1	9.8
San Benito		10.9	8.7	9.0	9.8	13.0	9.0	9.8		8.3		14.2
San Bernardino		16.9	17.4	19.3	17.5	14.7	9.2	10.0	12.0	11.6	14.6	14.6
San Diego		11.1		12.1	11.5	6.0	9.4	9.8	10.6	11.8	10.8	11.6
San Luis Obispo				9.1	9.0	13.9	8.5	10.6	14.4	11.1	10.8	14.7
Santa Barbara			19.4	16.9	16.8	15.2	13.6	12.2	16.6	17.4	16.3	16.1
Shasta	5.4	5.1	4.3	4.0	3.6	2.9	3.1	3.3	4.1	4.4	4.8	4.7
Siskiyou	6.2	4.3	5.1	6.7	4.4	3.8	5.7	5.1	5.2	0.2	5.6	5.9
Tehama	3.6	4.7	4.8	5.3	3.7	5.1	4.1	3.8	3.7	6.3	3.8	3.9
Trinity	2.5	3.7	4.0	5.4	4.0	3.3	3.3	4.4	2.5	3.5		8.5
Tulare		13.1	7.7	11.7	12.2	9.2	9.3	11.2	10.5	13.4	14.5	12.3
Ventura				7.1	10.0	9.4	10.4	11.2	10.4	13.5	12.6	18.4
Statewide	7.78	8.11	8.08	9.04	7.76	8.04	8.78	9.08	11.86	12.01	12.71	14.75
# Trappers harvesting bobcats	283	446	550	766	920	1,007	909	821	488	398	547	584
# Trappers licenced	931	1,692	1,889	2,378	3,221	3,201	3,686	3,901	1,607	1,650	1,417	1,347

* County data from counties and years where more than ten trappers per county reported.

The take by dogs, of 10.6% of the total take, also might be fractionally higher if some of the bobcats taken with unknown methods in Kern County were taken through the use of dogs. This would raise this year's average for this method to slightly higher than average. About 0.1% of the bobcat furs were salvaged and of the remaining, 0.8% were taken through the use of a predator call and 0.7% were taken by hunting where the specific method was not given. The same areas appear to support more dog hunting year after year with Humboldt County as the prime example. Predator calling only occurs erratically as a commercial hunting method.

The harvest of bobcats by hunters was approximately 1,739 (Table 1). Of these, 918 were taken and reported by licensed hunters (Table 9), 619 were taken by hunters with hunting licenses only, 299 by hunters with both hunting and trapping licenses, and 821 by hunters with only a trapping license. The estimate of 918 bobcats taken by licensed hunters was derived from the Department's annual "Game Take Hunter Survey". A sample of 3% of California's 456,681 licensed hunters produced a response of 8,850 questionnaires. This

Table 7. Method of Commercial Take of Bobcats, 1986-87.

County	% Taken by Trap	% Taken by Dogs	% Taken by Calling	% Tasken by Misc. Hunt.	% Salvaged Road Kill	% Method Unknown	Sample Size
Alpine	100						15
Amador	100						2
Butte	90	9	2				63
Calaveras	100						28
Colusa	100						78
Contra Costa	100						3
Del Norte	100						7
El Dorado	53		47				19
Fresno	92	8			0		345
Glenn	99	1					84
Humboldt	42	58	0				419
Imperial	100						13
Inyo	39					61	234
Kern	73	10	2	1	0	14	839
Kings	100						47
Lake	91	9					121
Lassen	73	24	3	1			139
Los Angeles	98		1	0		1	315
Madera	99	1					93
Marin	11			89			28
Mariposa	92	8					147
Mendocino	54	46					170
Merced	100						1
Modoc	86	7	0	6			237
Mono	98			2			94
Monterey	85	15					571
Napa	100						41
Orange	100						47
Placer	100						1
Plumas	95	5					60
Riverside	96		2	2			143
San Benito	95	5					187
San Bernardino	92			1		7	898
San Diego	95		2	2	0		436
San Luis Obispo	94	5		0			491
San Mateo		100					8
Santa Barbara	91	4	0	0	1	4	604
Santa Clara	100						45
Shasta	78	18	4		0		221
Sierra		100					2
Siskiyou	88	8	4				326
Sonoma	93	7					70
Stanislaus	98			2			50
Tehama	98	2					56
Trinity	15	85					95
Tulare	74	25		0	0		599
Tuolumne	97			3			36
Ventura	94		1			5	592
Yolo	100						3
Total	83.4	10.6	0.8	0.8	0.1	4.2	9123

Table 8. Method of Commercial Take of Bobcats, 1980-87.

Season	Method of Take (Percent of Total Statewide Take)					
	Trap	Dogs	Calling	Misc. Hunt.	Road Kill	Unknown
1980-81	90.6	6.6	0.7	1.4	0.3	0.5
1981-82	86.2	9.5	1.3	1.8	0.3	0.9
1982-83	86.7	10.4	0.9	1.4	0.2	0.4
1983-84	89.0	9.3	0.4	1.1	0.2	<0.1
1984-85	82.8	13.5	0.7	1.7	0.3	1.0
1985-86	85.1	13.2	0.6	0.7	0.1	0.3
1986-87	83.4	10.6	0.8	0.8	0.1	4.2

Table 9. Statistical Parameters of the Hunter Take of Bobcats during 1986, Poisson Distribution.*

Frequency Distribution:	Bobcats Taken Per Hunter	No. of Hunters	Total Bobcats Taken
	0	30	0
	1	4	
	2	1	2
	3	1	3
	4	1	4
	5	1	5
		$\Sigma f = 38$	$\Sigma yf = 18$

Average take per hunter $\bar{x} = \dfrac{\text{total bobcats taken}}{\text{total respondents}} = \dfrac{18}{8850} = 0.0020338$

State-wide bag x = $(\bar{x})$ (tot. no. license buyers) = (0.0020338)(456681) = 918

Assuming that bobcat take follows a Poisson distribution, confidence limits can be assigned by knowing $\bar{x}$ and n (total no. of respondents)

$$\sigma_{(\bar{x})} = \sqrt{\frac{\bar{x}}{n}} = \sqrt{\frac{0.0020338}{8850}} = 0.0004794$$

Confidence interval of $\bar{x} = \bar{x} \pm t\sigma$

Confidence Levels	Mean ± standard deviation $\bar{x} \pm t\sigma$	Confidence Intervals $\bar{x} \pm t\sigma$	Confidence Intervals for Total Take **
@ 80% =	0.0020338 ± (1.35) (0.0004793)	0.0020338 ± 0.0006472	633 to 1224
@ 90% =	0.0020338 ± (1.65) (0.0004793)	0.0020338 ± 0.0007910	568 to 1290
@ 95% =	0.0020338 ± (1.96) (0.0004793)	0.0020338 ± 0.0009396	500 to 1358
@ 99% =	0.0020338 ± (2.576) (0.0004793)	0.0020338 ± 0.0012349	365 to 1493

* After Shimamoto (1976)
** Calculated by multiplying confidence intervals for x by the total number of license buyers.

sampling provides an 80% confidence level for the estimated take of bobcats of between 633 and 1,224 individuals. These same hunters spent an estimated 15,402 days hunting bobcats for an average take of 0.057 bobcats per day (Table 10). This is the lowest hunter take per unit of effort in the last eight seasons and is exactly the opposite trend noted above in the highest take of bobcats ever per successful trapper.

Table 10. Licenced Sport Hunter Take of Bobcats, 1978-86.

Year	Est. Licensed Hunter Take	No. Licensed Hunters Hunting Bobcats	Percent Successful	Days Hunted	Bobcats Take/Day
1978	5733	7566	45	57603	0.100
1979	7462	5960	47	65340	0.114
1980	3373	4843	59	32951	0.102
1981	2585	4551	45	30192	0.086
1982	2574	4408	41	32984	0.078
1893	1794	3082	43	23184	0.077
1984	2232	3456	33	35670	0.063
1985	2211	2597	40	22785	0.097
1986	884	1938	21	15402	0.057

Additional information on the extent and distribution of the sport hunting take of bobcats is gathered through the sport hunting tag program. Obtaining these tags and returning them to the Department upon taking bobcat are legal requirements of bobcat hunters and the system should provide considerable information. However, it doesn't (Table 11). Given a sport hunting public of about 1,350 (estimated from the annual hunter survey and subtracting all trappers who reported taking bobcats), only about 60% of the sport hunters bought the required tags in 1986. Additionally, sport hunters sent in tags for less than one-quarter of the bobcats that they reported taking in the annual hunter survey. Although these figures are quite low, they represent a significant increase in compliance over the previous six years.

Table 11. Sport Hunting Tag Program Compliance, 1980-87.

	Season						
	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
No. of Sport Hunting Tag Buyers	262	427	384	495	547	720	820
Estimated No. of Bobcat Hunters*	3836	3642	3408	2594	3058	2050	1354
Percent of Hunters Buying Tags	6.8	11.7	11.3	19.1	17.9	35.1	60.6
Take Reported by Sport Hunting Tag Return	70	113	87	107	156	149	147
Estimated Sport Hunting Take**	2794	1862	1865	1291	1591	1689	619
Percent of Take Reported	2.5	6.1	4.7	8.3	9.8	8.8	23.7

* Estimated number of bobcat hunters calculated by subtracting number of licensed trappers taking bobcats from the number of hunters estimated by annual Hunter Survey.

** Estimated sport hunting take calculated by subtracting estimated take by persons both licensed to hunt and trap from the reported licensed hunter take.

ANALYSIS:

There appears to be nothing exceptional or abnormal in either the age and sex structure of bobcats taken during the 1984-85 and 1985-86 seasons or in the harvest of bobcats during the 1985-86 or 1986-87 seasons. In-depth discussions of data from pevious years and their shortcomings have appeared in previous Job Progress Reports and no new insights have been acquired over the last year.

It should be noted that the commercial demand for bobcats appears to have leveled off, resulting in a relatively stable harvest, especially since the 1982-83 season. Since that time the bobcat population dynamics parameters have shown a similar degree of stability. These same parameters are at a considerably better level than they were during the previous years when bobcat harvest was considerably higher.

Given the season length in effect since the 1982-83 season, the harvest has remained below the 14,400 statewide harvest limit. With this situation, the fact that age and sex structure trends continue to show a healthy bobcat population in the state, and that the current age and sex structure monitoring program is very costly and time consuming, we recommend that the statewide age and sex structure program be discontinued. Harvest monitoring should continue and if the statewide harvest reaches 14,000 bobcats the age and sex structure monitoring should be reinstituted.

However, the condition of bobcats in northeastern California should continue to be examined every year. The age and sex structures have not increased to levels similar to elsewhere, but the population appears to continue to support a stable but slightly cyclic harvest (Table 12). If the harvest in this local area increases to more than 425 for more than two successive seasons, additional management action should be instigated to determine the effects on that population.

Table 12. Recent Commercial Harvest of Bobcats in Northeastern California.

Season	County				Total Northeastern California
	Eastern Siskiyou	Modoc	Lassen	Plumas	
1978-79	81	306	246	47	680
1979-80	88	216	302	95	701
1980-81	82	126	96	39	343
1981-82	49	143	147	58	397
1982-83	74	238	177	35	524
1983-84	45	182	84	17	328
1984-85	54	231	188	33	506
1985-86	78	181	108	23	390
1986-87	78	237	139	60	514

The disparity between the information provided by the annual hunter survey and the sport hunting tag program continues. In their argument to increase the limit for sport hunting tags to five and to get the Department to sell sport hunting tags on a request by mail basis, sport hunters said that these actions would increase compliance. Results from the analysis of the 1986-87 harvest do demonstrate a substantial change in compliance in buying tags and in reporting harvested bobcats (Table 11). Despite this increase in compliance, more than 75% of the bobcats estimated taken by sport hunting are not reported and for every two bobcat hunters with bobcat hunting tags there is one hunting illegally without tags.

RECOMMENDATION:

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

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