

JOB PROGRESS REPORT

State: California

Project Number: W-54-R-14 Project Title: Nongame Wildlife Investigations

Job Number: IV-6 Job Title: Bobcat Harvest Assessment

Period Covered: July 1, 1981 - June 30, 1982 Job Type: Survey and Inventory

SUMMARY:

An estimated total of 11,233 bobcats were taken during the 1981 hunting year and the 1981-82 trapping season. Approximately 8,162 bobcats were taken by trappers and 3,037 were taken by hunters. The total take was a decrease of about 1,200 from the 1980-81 year, even though the reported commercial take only decreased by 260 bobcats. The total estimated take was the lowest in the last five years, generally because of the continued reduction in sport hunting. As has occurred in recent years, the greatest take continues to come from 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.

Regulations which divide the state into three zones with different season lengths continue in force.

BACKGROUND:

Bobcat harvest has increased in California over the last decade. This reflects an abundant population of bobcats and high fur prices. The sale of bobcat fur now brings the highest dollar income to trappers of any species of fur harvested and sold in California. 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 performed 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 state-wide harvest monitoring system has been established where the age and sex structures of the harvested population are sampled (see Job IV-7) to determine the effect of the harvest on the various bobcat populations, and to identify the amount of harvest. This latter project is the subject of this job report.

OBJECTIVE:

Determine the annual bobcat harvest on a regional basis, for the purpose of managing populations through the manipulation of season lengths and chronology, take methods, and take limits.

PROCEDURES:

The commercial take is determined through assessment of mandatory, annual reports of licensed trappers and through a mandatory 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 and provide other biological information.

Sport take is determined through the Department's annual hunter survey questionnaire. This survey queried a 3 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.

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

RESULTS:

Attached is the report cited below prepared to justify the export of harvested bobcats from California:

California Department of Fish and Game. 1981. Information requested by the O.S.A., U.S.F.W.S. for approval of the international export of bobcats from California during the 1982-83 season. State of California, Resources Agency, California Department of Fish and Game, Sacramento. Multilith report, August, 1982. 18 pp.

The total estimated take of bobcats during 1981-82 was 11,233 individuals (Table 1). This was about 1,200 less (-10%) than were taken in during 1980-81, and 4,600, 8,900, 1,500 and 3,700 less than were taken in 1976-1977, 1977-78, 1978-79 and 1979-80, respectively. However, trappers took the majority (73%) of the bobcats and accounted for the third highest reported commercial take ever, the second highest in the last six seasons. Hunter take continues to decrease, down 18.7% from last season and the lowest in the last six years. The total take of bobcats ranged from none in San Francisco and Sutter counties to 904 in San Bernardino County (Table 2). The harvest in each of the ten counties having the highest total take was at least 348. Thirty of California's 58 counties had a reported take of less than 100 bobcats.

Over the last 11 years, the distributional pattern of the commercial take of bobcats has shown a shift from northeastern California counties to south coastal and southern California counties (Table 3). This pattern continued through the 1981-82 season with seven of the top ten counties being from these areas, and eight of the top ten counties this year were in the top ten in 1980-81. Once again the highest commercial take came from San Bernardino County, with Humboldt County, a perennial (11 of last 11 seasons) top ten county being the only northern California county. Tulare County, in the top ten five of the last six seasons, and Fresno County, both from the west slope of the Sierra Nevada, were the only two other non-south coastal or southern California counties in the top ten in commercial take.

Only Humboldt, San Bernardino and San Diego counties were important before the drastic increases in the take of bobcat occurred about six seasons ago and have remained important counties in the commercial take (Table 3). Kern, Monterey, Santa Barbara, Tulare and San Luis Obispo counties were relatively unimportant when bobcat harvest levels were low, but have been able to supply the demand over the last five seasons.

The 2.6% decrease in commercial take from last year did not occur because of a general state-wide trend (Table 4). The trend in most geographical areas was a 7 to 17% reduction in take. However, there also was an increase of 15% in northeastern California, of 29% in the north coast area, and of 38% in the southern Sierra Nevada.

Table 1. Estimated annual take of bobcats by hunting and trapping in California.

	<u>S E A S O N</u> ^{1/}					
	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>	<u>1981-82</u>
I. Take by licensed trappers	5,400	5,146	8,326	7,809	9,595	9,337
A. Trapper take	5,000	4,650	6,825	6,686	8,702	8,162
B. Commercial hunter take	400	500	1,500	1,123	893	1,175
II. Take by all hunters	10,500	15,300	5,811	7,708	3,737	3,037
III. Animal damage control take	347	208	56	32	24	34
IV. Total take (IA + II + III)	<u>15,847</u>	<u>20,150</u>	<u>12,700</u>	<u>14,450</u>	<u>12,463</u>	<u>11,233</u>

^{1/} Licensed trapper data for season indicated, hunter take for calendar year of first year listed, animal damage control take for fiscal year noted.

Table 2. Take of bobcats, by county, during 1981-82.

	<u>Licensed^{1/}</u> <u>Trapper Take</u>	<u>Commercial</u> <u>Hunter Take</u>	<u>Sport^{2/}</u> <u>Hunter Take</u>	<u>Animal Damage^{3/}</u> <u>Control Take</u>	<u>Total County</u> <u>Take</u>
1. Alameda	9	4	9	0	22
2. Alpine	9	0	12	0	21
3. Amador	6	0	29	0	35
4. Butte	28	3	10	0	41
5. Calaveras	11	5	37	0	53
6. Colusa	76	4	8	1	89
7. Contra Costa	0	0	17	0	17
8. Del Norte	51	2	0	0	53
9. El Dorado	32	4	25	0	61
10. Fresno	240	68	8	0	316
11. Glenn	88	3	14	1	106
12. Humboldt	291	143	64	4	502
13. Imperial	92	0	66	0	158
14. Inyo	257	4	25	0	286
15. Kern	659	132	118	1	910
16. Kings	70	0	0	0	70
17. Lake	144	10	37	0	191
18. Lassen	102	45	9	0	156
19. Los Angeles	157	4	0	0	161
20. Madera	173	3	61	2	239
21. Marin	2	20	0	0	22
22. Mariposa	134	38	9	1	182
23. Mendocino	209	44	9	3	265
24. Merced	5	2	0	1	8
25. Modoc	126	17	9	0	152
26. Mono	61	1	0	0	62
27. Monterey	609	156	94	2	861
28. Napa	29	4	50	0	83
29. Nevada	0	0	17	0	17
30. Orange	42	0	13	0	55
31. Placer	4	2	0	0	6
32. Plumas	46	12	0	0	58
33. Riverside	154	8	131	0	293
34. Sacramento	0	0	0	1	1
35. San Benito	186	34	0	0	220
36. San Bernardino	811	64	27	2	904
37. San Diego	336	13	316	0	665
38. San Francisco	0	0	0	0	0
39. San Joaquin	4	0	0	0	4
40. San Luis Obispo	282	24	87	1	394
41. San Mateo	74	0	49	0	123
42. Santa Barbara	705	6	108	1	820
43. Santa Clara	10	4	8	0	22
44. Santa Cruz	0	0	24	0	24
45. Shasta	210	68	12	1	291
46. Sierra	4	4	48	0	56
47. Siskiyou	246	50	51	1	348

Table 2. Take of bobcats, by county, during 1981-82.

	<u>Licensed 1/ Trapper Take</u>	<u>Commercial Hunter Take</u>	<u>Sport 2/ Hunter Take</u>	<u>Animal Damage 3/ Control Take</u>	<u>Total County Take</u>
48. Solano	2	1	0	3	6
49. Sonoma	172	2	59	5	238
50. Stanislaus	4	2	27	0	33
51. Sutter	0	0	0	0	0
52. Tehama	153	17	0	0	170
53. Trinity	44	22	7	1	74
54. Tulare	574	52	12	2	640
55. Tuolumne	70	74	18	0	162
56. Ventura	344	0	128	0	472
57. Yolo	2	0	0	0	2
58. Yuba	1	0	0	0	1
59. Unknown	12				12
TOTAL	<u>8,162</u>	<u>1,175</u>	<u>1,862</u>	<u>34</u>	<u>11,233</u>

1/ Take during 1981-82 season by licensed trappers, but excluding take by licensed trappers who hunted.

2/ Estimated take from Hunter Survey for 1981 and from returns of Bobcat Hunting Tag Reports for 1981-82 season, but corrected for take by commercial hunters.

3/ Provided by the California office of Animal Damage Control Section, U.S. Fish and Wildlife Service for Fiscal Year 1981-1982.

Table J. Ten counties reporting highest commercial take of bobcat, 1971-82.

<u>Rank</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>
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 Bernardino	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
<u>Rank</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>
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
<u>Rank</u>	<u>1981-82</u>				
1	San Bernardino				
2	Kern				
3	Monterey				
4	Santa Barbara				
5	Tulare				
6	Humboldt				
7	San Diego				
8	Ventura				
9	Fresno				
10	San Luis Obispo				

Table 4. Geographical differences in the commercial take of bobcats in California during the 1980-81 and 1981-82 seasons.

<u>Geographical Area</u>	<u>1980-81 Take</u>	<u>1981-82 Take</u>	<u>Percent Change</u>
Northeast	346	397	+ 15
Northwest	1,787	1,501	- 16
North Coast	434	559	+ 29
Central Coast	321	118	- 63
North Sierra	75	46	- 39
Central Sierra	449	374	- 17
East Sierra	367	332	- 10
South Coast	3,060	2,695	- 12
South Sierra	1,424	1,971	+ 38
Southern California	1,425	1,332	- 7

Despite an uncertain market for bobcat pelts due to federal (court ordered) restrictions on the export of bobcat pelts from the United States, bobcat prices only decreased by 12% and relatively high values were maintained (Table 5). Even though the average price paid per raw bobcat pelt was \$114.53, it was still the fourth highest average price recorded. Some degree of stability may be occurring in the market as the highest price paid per pelt at a California Trappers Association fur sale has remained the same over the last three years.

The peak of the average take per licensed trapper reporting, both on a state-wide and on a county basis, was the 1978-79 season (Table 6). Since then, the average take per trapper has decreased in 18 of the 22 counties where there are normally more than ten trappers reporting per county. The take rate has reached the lowest rate in the last seven seasons during 1981-82 in five of the counties and in the last two seasons, in 13 counties. It appears that the trapping pressure in some counties (i.e., Monterey, San Bernardino and Santa Barbara counties) has increased beyond the point allowing the maximum harvest for the local population. At this point, where the average take per trapper begins to decrease-and has happened in at least 16 of the 22 counties sampled-harvest pressure may be decreasing population size. However, this may be a function of people trapping in more different counties as the number of bobcat trappers increases, since the state-wide take per trapper has stayed fairly constant over the last seven seasons. If trapper pressure causes trappers to spend less time in an area (county) and to trap in more counties than they would at lower trapper densities, trapping pressure may affect trapper populations as much as bobcat populations. Also, harvest rate figures when viewed by themselves on a local basis may be giving a false representation of what may be occurring.

Over 86% of the commercially taken bobcats for which take data were gathered, were taken by trapping, 0.3% were salvaged road kills, and no method of take was reported for 0.9% of the bobcats (Table 7). The remaining 12.6% of the commercially harvested bobcats were taken by hunting; 9.5% were taken through the use of dogs, 1.3% through the use of a predator call, and 1.8% were taken by hunting where the specific method was not given. These results show an increase in the portion of the commercial take by hunters from 8.7% last year to a figure closer to the portion taken by trappers in 1979-80 of 14.4%. However, the number of bobcats taken with the use of dogs remains over seven times that of the take utilizing a predator call. The commercial take of bobcats using dogs is not particularly a south coastal or southern California phenomenon. Over the last two years significant numbers of bobcats were taken commercially using dogs in Humboldt, Mendocino, Marin, Tuolumne, Mariposa, Monterey and Tulare counties. The commercial take of bobcats using a predator call remains scattered with counties having desert or Great Basin habitat usually reporting some take by this method.

The season for bobcat was one week longer, except in northeastern California, in 1981-82 than in 1980-81, because of a week earlier season opening. In 1980-81, more bobcats were taken during the first week than in any succeeding week in all three different season zones. This was not the case in 1981-82 where the initial week showed the biggest take only in the northeastern portion of the state (Tables 8, 9 and 10). This is an area with a three week season which started one week after the remainder of the state where the second week of the season was the week with the largest percentage of bobcats taken. The minor sub-peak in take which occurred in the two zones with the longer seasons in 1980-81 did not occur in 1981-82 when the take steadily and regularly declined from the second week on.

Table 5. Bobcat pelt prices.

<u>Season</u>	<u>Average Price</u>	<u>Highest Price</u> ^{1/}
1970-71	\$ 10.86 ^{2/}	Not recorded
1971-72	\$ 18.83 ^{2/}	\$ 30.00
1972-73	\$ 29.33 ^{2/}	\$ 61.00
1973-74	\$ 45.00 ^{2/}	\$110.00
1974-75	\$ 50.00 ^{2/}	\$110.00
1975-76	\$133.50 ^{2/}	\$300.00
1976-77	\$ 76.00 ^{2/}	\$225.00
1977-78	\$105.80 ^{3/}	\$185.00 ^{3/}
1978-79	\$120.00 ^{3/}	\$426.00 ^{3/}
1979-80	\$114.20 ^{3/}	\$313.00 ^{3/}
1980-81	\$129.90 ^{4/}	\$325.00 ^{3/}
1981-82	\$114.53 ^{4/}	\$325.00 ^{3/}

1/ Highest single price reported as average price of top quality pelt is not available.

2/ Average price estimated from trappers' reports and sample of fur dealers.

3/ Data taken only from California Trappers' Association fur sales which tend to be higher than average paid throughout season by all fur dealers.

4/ Data taken from annual reports of licensed fur dealers.

Table 6. Average bobcat harvest per successful trapper per season in California.

<u>C O U N T Y</u>	<u>S E A S O N</u>						
	<u>75-76</u>	<u>76-77</u>	<u>77-78</u>	<u>78-79</u>	<u>79-80</u>	<u>80-81</u>	<u>81-82</u>
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
Humboldt	9.2	8.8	6.6	6.0	6.1	5.3	5.7
Inyo	10.6	8.3	10.9	10.5	7.3	8.5	5.0
Kern			14.6	26.9	10.6	11.0	10.8
Lake	5.3	5.3	5.7	10.0	6.4	4.7	5.9
Lassen	4.5	5.4	3.5	6.0	4.3	3.8	5.9
Los Angeles		6.6	8.6	7.6	14.8	14.1	8.1
Mendocino	6.8	6.7	5.9	8.0	5.9	6.1	4.5
Modoc	4.4	5.0	5.3	5.6	4.2	3.2	4.6
Monterey		8.1	9.1	9.2	11.3	16.3	14.2
Plumas		2.9	3.4	4.5	4.3		5.5
Riverside	9.8			7.8	9.9	5.8	7.8
San Benito		10.9	8.7	9.0	9.8	13.0	9.0
San Bernardino		16.9	17.4	19.3	17.5	14.7	9.2
San Diego		11.1		12.1	11.5	6.0	9.4
Santa Barbara			19.4	16.9	16.8	15.2	13.6
Shasta	5.4	5.1	4.3	4.0	3.6	2.9	3.1
Siskiyou	6.2	4.3	5.1	6.7	4.4	3.8	5.7
Tehama	3.6	4.7	4.8	5.3	3.7	5.1	4.1
Trinity	2.5	3.9	4.0	5.4	4.0	3.3	3.3
Tulare		13.1	7.7	11.7	12.2	9.2	9.3
<u>State-wide</u>	7.78	8.11	8.08	9.04	7.76	8.04	8.78
<u>No. of trappers harvesting bob- cats</u>	283	446	550	766	920	1,007	909
<u>No. of licensed trappers</u>	931	1,692	1,889	2,378	3,221	3,201	3,686

1/ County data from counties and years where more than 10 trappers per county reported.

Table 7. Method of commercial take of bobcats, 1981-82.

	% Taken by Trap	% Taken by Dogs	% Taken by Calling	% Taken by Misc. Hunting	% Salvaged From Road Kill	% Where Method Un- known
1. Alameda	38 (5)		31 (4)			31 (4)
2. Alpine	100 (9)					
3. Amador	100 (6)					
4. Butte	90 (28)	10 (3)				
5. Calaveras	69 (11)	31 (5)				
6. Colusa	95 (76)	3 (2)				
7. Contra Costa						
8. Del Norte	96 (51)	4 (2)				
9. El Dorado	89 (32)	11 (4)				
10. Fresno	78 (240)	20 (63)				
11. Glenn	97 (88)	3 (3)				
12. Humboldt	67 (291)	32 (137)	-(2) ^{1/}	1 (4)		
13. Imperial	100 (92)					
14. Inyo	95 (248)		1 (2)	1 (2)		3 (9)
15. Kern	83 (656)	13 (103)	2 (13)	2 (16)	- (3)	
16. Kings	100 (70)					
17. Lake	83 (128)	6 (10)				10 (16)
18. Lassen	65 (95)		8 (12)	22 (33)		5 (7)
19. Los Angeles	97 (156)			2 (4)	1 (1)	
20. Madera	98 (173)		1 (1)	1 (2)		
21. Marin	9 (2)	91 (20)				
22. Mariposa	78 (134)	22 (37)		1 (1)		
23. Mendocino	82 (208)	17 (43)		- (1)	- (1)	
24. Merced	71 (5)	14 (1)	14 (1)			
25. Modoc	78 (112)	1 (1)		11 (16)	1 (2)	8 (12)
26. Mono	95 (59)			2 (1)	3 (2)	
27. Monterey	80 (609)	19 (143)	1 (4)	1 (9)		
28. Napa	85 (28)		12 (4)		3 (1)	
29. Nevada						
30. Orange	100 (42)					
31. Placer	67 (4)	33 (2)				
32. Plumas	79 (46)	21 (12)				
33. Riverside	95 (154)		5 (8)			
34. Sacramento						
35. San Benito	85 (186)	15 (33)	- (1)			
36. San Bernardino	93 (811)	- (1)	3 (29)	4 (34)		
37. San Diego	96 (334)			4 (13)	1 (2)	
38. San Francisco						
39. San Joaquin	100 (4)					
40. San Luis Obispo	92 (282)	- (1)	4 (12)	4 (11)		
41. San Mateo	100 (74)					
42. Santa Barbara	98 (700)	- (3)	- (2)	- (1)	1 (5)	
43. Santa Clara	64 (9)		29 (4)		7 (1)	
44. Santa Cruz						
45. Shasta	74 (205)	24 (67)		- (1)	2 (5)	
46. Sierra	38 (3)	38 (3)	13 (1)		13 (1)	
47. Siskiyou	82 (244)	14 (42)	2 (7)	- (1)	1 (2)	
48. Solano	67 (2)		33 (1)			
49. Sonoma	83 (144)			1 (2)		16 (28)

Table 7. Method of commercial take of bobcats, 1981-82 - continued.

	% Taken by Trap	% Taken by Dogs	% Taken by Calling	% Taken by Misc. Hunting	% Salvaged From Road Kill	% Where Method Un- known
50. Stanislaus	67 (4)			33 (2)		
51. Sutter						
52. Tehama	90 (153)	7 (12)	3 (5)			
53. Trinity	67 (44)	30 (20)		3 (2)		
54. Tulare	92 (574)	8 (48)	- (2)	- (2)		
55. Tuolumne	49 (70)	47 (67)	5 (7)			
56. Ventura	100 (343)				- (1)	
57. Yolo	100 (2)					
58. Yuba	100 (1)					
Unknown						(12)
State-wide	86.2 (8047)	9.5 (888)	1.3 (122)	1.8 (165)	0.3 (27)	0.9 (88)

1/ - value indicates
less than 0.5%.

Table 8. Weekly proportion of commercial bobcat harvest in northeastern California, 1981-82 season.

Given in percent of total county take. Season: December 1 - December 21.

<u>County</u>	<u>Weeks:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>Sample Size</u>
Lassen			34	40	26					147
Modoc			42	27	31					119
Plumas		4	29	40	20	2	5			55
Siskiyou		6	25	21	20	9	7	6	6	266
Regional Total		$\bar{3}$	$\bar{31}$	$\bar{29}$	$\bar{24}$	$\bar{5}$	$\bar{4}$	$\bar{2}$	$\bar{2}$	$\bar{587}$

Table 9. Weekly proportion of commercial bobcat harvest in south coastal California, 1981-82 season.

Given in percent of total county take. Season: November 24 - January 31.

<u>County</u>	<u>Weeks:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Sample Size</u>
Monterey		10	14	10	10	10	11	11	8	7	9	661
San Benito		6	19	14	10	13	12	7	6	7	6	166
San Diego		10	14	10	13	13	7	4	10	13	6	336
San Luis Obispo		9	17	17	14	9	6	7	7	5	9	240
Santa Barbara		16	19	14	8	8	8	8	6	6	7	709
Ventura		13	17	10	12	9	8	3	5	7	15	318
Regional Total		$\bar{12}$	$\bar{17}$	$\bar{12}$	$\bar{10}$	$\bar{10}$	$\bar{10}$	$\bar{7}$	$\bar{7}$	$\bar{7}$	$\bar{8}$	$\bar{2340}$

Table 10. Weekly proportion of commercial bobcat harvest in that part of California having a season from November 24, 1981 to January 15, 1982.

Given in percent of total county take.

County	Weeks:	1	2	3	4	5	6	7	8	9&10	Sample Size
Del Norte		2			4	14	6	70	4		51
Humboldt		11	19	18	9	11	10	15	6	1	325
Mendocino		18	22	18	13	7	11	8	3		252
Shasta		6	23	21	18	9	5	11	7		267
Tehama		11	23	13	10	12	14	9	8		156
Trinity		22	4	4	30	17	9	7	7		46
Sub-region		12	20	17	13	10	9	14	5	>1	1097
Colusa		28	24	25	4	3	5	7	3	1	79
Glenn		14	19	17	17	7	5	14	7		72
Lake		14	22	9	14	14	7	13	6		145
Marin		23	18	23	4	14	4	4	9		22
Napa		25	19	25	9	13	3	6			32
Solano		33	33								
Sonoma		10	28	18	5	9	9	10	10		57
Yolo					100						2
Sub-region		18	22	16	11	10	6	11	6		412
Butte		19	27	12	15	12	4	12			26
Nevada											0
Placer			60					20	20		5
Sierra		13	13	13	13		13	37			8
Sutter											0
Yuba				100							1
Sub-region		15	28	12	12	7	5	18	3		40
Amador					33		50			17	6
Calaveras		25	19		12		19	25			16
El Dorado		8	6	22	14	22	8	8	11		36
Mariposa		17	27	14	12	5	8	9	8	>1	171
Sacramento											0
Tuolumne		9	10	12	5	7	10	21	24	>1	135
Sub-region		13	18	13	10	7	27	14	14	>1	364

Table 10. Weekly proportion of commercial bobcat harvest in that part of California having a season from November 24, 1981 to January 15, 1982.

Given in percent of total county take. Continued

County	Weeks:	1	2	3	4	5	6	7	8	9&10	Sample Size
Alameda			56		11			22	11		9
Contra Costa											0
Merced			14			29	57				7
San Joaquin			50		50						4
San Mateo	27	25	13	3	11	7		7	7		74
Santa Clara	50	14	14		7	14					14
Santa Cruz											0
Stanislaus	17		17			50			17		6
Sub-region	25	25	11	4	12	10	6	6			114
Alpine	44	22		22			11				9
Inyo	23	20	17	16	10	5	5	3			260
Mono	25	25	10	11	8	15	7				61
Sub-region	24	21	15	15	10	7	5	2			330
Fresno	16	17	20	18	5	8	5	8	3		276
Kern	10	17	16	16	14	8	10	6	2		697
Kings		14	34	11	4	19	10	7			70
Madera	16	13	21	23	13	8	4	4			176
Tulare	14	22	14	13	10	12	9	6			512
Sub-region	13	18	17	16	11	10	8	6	1		1731
Imperial	22	26	5	10	11	11	8	7			88
Los Angeles	18	29	14	9	7	11	7	3	2		152
Orange	17	43	36				5				42
Riverside	18	30	7	9	8	9	6	13			163
San Bernardino	22	19	14	13	12	10	7	3			787
Sub-region	21	23	13	11	10	9	7	7	>1		1232
Total Region	16	20	16	15	10	9	9	6	>1		5320

The harvest of bobcats by hunters was approximately 3,037 (Table 2). Of these, 2,585 were taken and reported by licensed hunters (Table 11). Of these, 723 were estimated taken by licensed hunters who also were licensed commercial fur takers (licensed trappers). An additional 452 bobcats were estimated taken by hunters who only had a trapping license. The estimate of 2,585 bobcats taken by licensed hunters was derived from the Department's annual "Game Take Hunter Survey". The response of a usable 2.7% sample of more than 500,000 licensed hunters in California gave an 80% confidence level of bobcat take between 2,168 and 3,002 animals. Also, it was estimated that 5,180 persons hunted bobcats and that 40% of these were successful. These same hunters spent an estimated 30,192 days hunting for an average take of 0.086 bobcats per day. This is considerably (14 to 25%) below the take per unit effort for hunters in recent years (Table 12).

ANALYSIS:

The downward trend in the total take of bobcats continued through the 1981-82 season and was the lowest in the last six years. This reduction was made despite the third highest recorded commercial take (12,250 taken in 1927-28, 9,595 taken in 1980-81). Regulations limiting the sport take to two bobcats per hunter resulted in less than 1% of the sport hunters taking more than two bobcats per hunter. This compares to 5% in 1980, 14% in 1979, 13% in 1977 and 15% in 1976. Therefore, it appears that a seasonal bag limit has worked to reduce the hunter take of bobcats. However, the reduction in the take of bobcats per day hunted may indicate a reduction in the availability of bobcats, a change in the efficiency of methods used by hunters, or both.

The reduction of 2.6% in commercial take may signify the opposite. The reduction is minor, but the market conditions for sale of bobcat pelts were really unsettled throughout the season. As a result of a court decision regarding the federal government's interpretation of the CITES, the U. S. Fish and Wildlife Service could not allow the export of bobcat pelts from the United States. Since Europe is one of the major markets, it was expected that prices would fall considerably. They decreased 12%, but the take remained high, perhaps in response to rumors throughout the season that the export ban would be rescinded.

The effect of harvest must be understood to assure that the bobcat resource is not being over-utilized. There are indications that some populations are reaching their harvest limits (see W-54-R-13, Job IV-7). This may be true of bobcat populations in south coastal California counties which have sustained a large increase in commercial take over the last decade. This year, five of the six counties in this area reported a lower commercial take than last year, suggesting that the harvest limit given normal trapper effort and a normal population density may have been reached. However, this doesn't consider the vagaries of the commercial market this year.

The unsettled market is believed to have limited the commercial take. Seasons in the two zones with longer season lengths were extended by one week. It was predicted last year that the take could increase by 10 to 25%, depending upon the area. The total take did not increase, probably due to market conditions, and only the north-eastern California area, the area without a lengthened season, showed an increase in take. The uncertainty in the fur market for bobcat also could have been the major reason why the opening week of the season was not the most productive as it was in 1980-81.

If market conditions stabilize and export of bobcat pelts from the United States is allowed, it is possible that commercial take will increase as was predicted last year.

Table 11. Statistical parameters of the hunter take of bobcat during 1981. Poisson distribution.^{1/}

Frequency distribution:	No. of Bobcats Taken	No. of Hunters	Total Bobcats Taken
	0	68	0
	1	41	41
	2	13	26
	3	1	3
		$\sum f=123$	$\sum yf=70$

$$\bar{x} = \frac{\text{total bobcats taken}}{\text{total respondents}} = \frac{70}{14,621} = 0.0047876$$

State-wide bobcat bag $\bar{x} = (\bar{x})$ (total no. license buyers) = (.0047876) (540,000) = 2585.

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

$$\sigma (\bar{x}) = \sqrt{\frac{\bar{x}}{n}} = \sqrt{\frac{0.0047876}{14,621}} = 0.0005722$$

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

Level of Confidence	$\bar{x} + t\sigma$	Confidence Intervals for (\bar{x})	Confidence Interval for State-wide bag ^{2/}
80%	0.0047876 \pm (1.35) (0.0005722)	0.0047876 \pm 0.0007725	2168 - 3002
90%	0.0047876 \pm (1.65) (0.0005722)	0.0047876 \pm 0.0009441	2075 - 3095
95%	0.0047876 \pm (1.96) (0.0005722)	0.0047876 \pm 0.0011215	1980 - 3191
99%	0.0047876 \pm (2.576) (0.0005722)	0.0047876 \pm 0.001474	1789 - 3381

^{1/} After Shimamoto (1976)

^{2/} Calculated by multiplying confidence interval for \bar{x} by the total number of license buyers (540,000).

Table 12. Licensed sport hunter take of bobcat, 1978-1981.

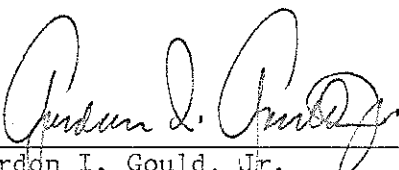
	<u>Estimated License Hunter Take</u>	<u>No. Licensed Hunters Hunting Bobcats</u>	<u>Percent Successful</u>	<u>Days Hunted</u>	<u>Bobcats Taken/Day</u>
1978	5,733	7,566	45	57,603	0.100
1979	7,462	5,960	47	65,340	0.114
1980	3,373	4,843	50	32,951	0.102
1981	2,585	5,180	40	30,192	0.086

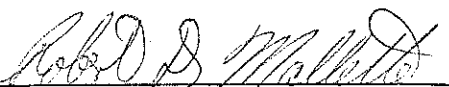
In calculating weekly harvest rates, it was noted that for 92 bobcats tagging officers noted dates of take which were outside the legal season in the area (in 19 different counties) where the bobcats were reported taken. While this only represents less than 1% of the commercial take, reported dates of take ranged from 20 October to 25 February, without any explanation of why the tagging was allowed. This was in direct conflict with general Department cooperation where data on take were received for all but 12 of the 9,337 bobcats taken commercially.

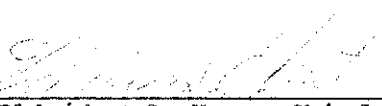
An extended sport hunting season of two weeks is planned for the 1982-83 season for seven counties where the condition of local bobcat populations are best. This should increase the sport hunting take as these counties were responsible for about 30% of the sport hunting take last year. For the second year in a row, the hunters did not support the sport hunting tag program. Only 427 hunters bought the special tags and they reported taking 113 bobcats. This is considerably below the calculated take by sport hunters through the use of the annual hunter survey and commercial tagging program. It had been hoped that the poor support of the program last year was a function of the Department initiating this new program. But the lack of correlation between hunter survey data and bobcat hunting tag data still doesn't allow us to precisely calculate the sport hunting take.

RECOMMENDATIONS:

1. Continue to monitor the take of bobcat by geographical area in order to use information in determination of management procedures needed to maintain bobcat populations.
2. Evaluate the methods used to obtain the harvest of bobcats by hunters and correct for any inherent biases.
3. Develop and improve methods to evaluate harvest data and to correlate with other population dynamics information.
4. Incorporate density estimates of bobcats obtained through field research and their evaluation through comparison of crude mortality rate and trends in average life expectancy and other parameters of population dynamics into the "Bobcat Management Plan", Job IV.9.

Prepared by: 
 Gordon I. Gould, Jr.
 Associate Wildlife Manager-Biologist

Approved by: 
 Robert D. Mallette
 Nongame Wildlife Coordinator

Approved by: 
 Eldridge G. Hunt, Chief
 Wildlife Management Branch

Date: 9-23-82