STATE OF CALIFORNIA—RESOURCES AGENCY   EDMUND G. BROWN JR., Governor

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
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Richard L. Jachowski
Chief, Office of the Scientific Authority
United States Department of Interior
Fish and Wildlife Service
Washington, D. C.   20240

Dear Mr. Jachowski:

Pursuant to your letter of April 22, 1981, enclosed you will find the
information required to determine if the export of California's bobcats
from the United States is not detrimental to the survival of the species.

In providing this information that you requested on the status of bobcats
in California and our regulations pertaining to this species, we do so
with the understanding that this does concede that the Office of the
Scientific Authority, U. S. Fish and Wildlife Service, has any authority
to restrain in any way export of bobcats from California. We feel strongly
that authority to manage resident wildlife resides with the State.

We are continuing to monitor the harvest of bobcats, evaluate recently
gathered data, and are proceeding with a management plan to assure that
the harvest of bobcats continues to provide a renewable resource of
benefit to the people of California. References made in the attached
document to changes in regulations should demonstrate our current level
of knowledge and ability to manage bobcats at ecologically sound levels
in this State. We will continue to share with the O.S.A. and all in-
terested parties the factual information gathered and to defend our
management of bobcats in California.

Sincerely,

Director

Enclosure

State of California
THE RESOURCES AGENCY
Department of Fish and Game

INFORMATION REQUESTED BY THE O.S.A., U.S.F.&W.S. FOR APPROVAL OF THE
INTERNATIONAL EXPORT OF BOBCATS FROM CALIFORNIA DURING THE 1981-82 SEASON

1. BIOLOGICAL INFORMATION:

a. Estimate of Size of Statewide Population:

By using information on the quantity of various habitat types and on
the estimated densities of bobcats in various habitat types, an estimate
may be made of the statewide population of bobcats. An estimate of the
total acreage of each county in California and that portion assumed to
be bobcat has been documented (Table 4, Gould 1978a). Likewise, an
estimation was made (Table 1, Gould 1978b) of the average density of
bobcats per habitat type throughout California. Densities were estimated
by comparing capture rates in a specific habitat type, where the density
had been determined through capture-mark-recapture and radio-telemetry
techniques, with other habitat types where just the capture rate was known.

Recent refinements of known densities of studied populations (Lembeck
1978, Zezulak and Schwab 1979, 1980, Gould 1980a, and Zezulak 1981) has
resulted in slight changes in the estimated density of bobcats in some
habitat types (Table 1). Increases were made in the estimated density
of bobcats in pine-fir-chaparral, woodland-chaparral, coastal forest,
and hardwood habitat types; reductions were made in the estimated
densitites of bobcats in grassland, inland sagebrush, juniper-pinyon,
and pine-fir-sagebrush habitat types. This has resulted in an increase
in the estimated bobcat population in California to approximately 74,700
(Tables 2 and 3). This does not change drastically, from the 1978 to
the 1981 estimate, the ranking of those counties estimated to have the
higher bobcat populations. However, woodland-chaparral, hardwood, pine-
fir-chaparral, and coastal forest habitats appear to approach chaparral
habitat in being able to sustain high bobcat densities and populations.

In most instances, the estimated density for a habitat type is 50 to 75
percent of probable and measured density to insure a conservative estimate
of the bobcat population in California. The estimated densities for each
habitat type also do not consider the annual production of young which
probably inflates densities to more than twice that of the pre-breeding
season adult population densities.

As an additional check on the estimated population densities, these
densities were compared to the average harvest densities by county
(Gould 1981a). The estimated percent of harvest of the total population
could be calculated and the results compared with population structure
data (Gould 1981b) to determine what inconsistencies existed between the
two sets of data. Some inconsistencies were noted; future population
modeling should be able to resolve the inconsistencies and help produce
a more accurate estimate of population size.

Table 1. Habitat types available for use by bobcats, their area and estimated bobcat population density, 1981.

Habitat Type	1981 Estimated Area – mi^2	Estimated Bobcat Density – #/mi^2
1. Redwood	2,697	0.1
2. Coastal Forest	4,303	0.75
3. Pine-Fir-Chaparral	20,404	0.75
4. Pine-Fir-Sagebrush	2,319	0.1
5. Lodgepole	3,398	0.05
6. Pinyon-Juniper	5,107	0.1
7. Hardwood	1,935	1.0
8. Woodland-Chaparral	4,346	1.5
9. Woodland-Sagebrush	82	0.25
10. Woodland-Grassland	9,441	1.0
11. Chaparral	13,677	2.0
12. Coastal Sagebrush	2,683	0.25
13. Inland Sagebrush	6,580	0.1
14. Low Desert	13,595	0.1
15. High Desert	23,722	0.2
16. Grassland	14,075	0.1
17. Agriculture	16,478	0.05
18. Other suitable minor habitats Riparian, Minor Conifers, Valley Mesquite, Saltbrush-Buckwheat	1,876	0.05
19. Non-suitable habitats	10,086	0.0

Table 2. Distribution of bobcat habitat by counties and estimated bobcat populations (in parenthesis), 1981

Habitat Type County	Redwood	Coastal Forest	Pine-Fir-Chaparral	Pine-Fir-Sagebrush	Lodgepole	Pinyon-Juniper	Hardwood	Woodland-Chaparral	Woodland-Sagebrush	Woodland-Grassland	Chaparral	Coastal Sagebrush	Inland Sagebrush	Low Desert	High Desert	Grassland	Agriculture	Other suitable minor habitats
1. Alameda			226 (170)		375 (19)	46 (5)	19 (29)			135 (135)	13 (26)		59 (6)			190 (19)	90 (5)	5
2. Alpine			188 (141)		51 (3)		35 (35)	54 (81)		147 (147)	46 (92)					38 (4)	16 (1)	5
3. Amador			483 (362)					263 (395)		145 (145)	37 (74)					170 (17)	422 (21)	73 (4)
4. Butte			369 (277)	2 -	23 (1)			39 (59)		365 (365)	85 (170)		5 (1)			101 (10)	575 (29)	8 -
5. Calaveras			46 (35)				128 (128)			203 (203)	104 (208)					57 (6)	122 (6)	2 -
6. Colusa										150 (150)	42 (84)					187 (19)	10 (1)	
7. Contra Costa							17 (17)			61 (122)						10 (1)	21 (1)	1 -
8. Del Norte	339 (34)	568 (425)			166 (8)		104 (104)	264 (396)		82 (82)	52 (104)					819 (82)	1826 (91)	388 (19)
9. El Dorado			965 (724)		533 (27)		45 (45)	102 (153)		407 (407)	333 (666)					99 (10)	599 (30)	7 -
10. Fresno			768 (576)				76 (76)			211 (211)	138 (276)					269 (27)	19 (1)	6 -
11. Glenn			164 (123)				117 (117)			206 (206)		62 (16)				752 (38)		25 (1)
12. Humboldt	1286 (129)	1339 (1004)	148 (111)										775 (93)	1672 (167)	6052 (1210)	113 (11)		9 -
13. Imperial					140 (7)	802 (80)				371 (371)	250 (500)			1531 (153)		1690 (169)	1041 (52)	758 (33)
14. Inyo			12 (9)			522 (52)		720 (1080)		11 (11)					622 (124)	591 (59)	696 (35)	4 -
15. Kern			293 (220)							147 (147)	382 (764)					59 (6)	45 (2)	5 -
16. Kings							183 (183)									177 (18)	109 (5)	2 -
17. Lake			325 (244)		32 (2)	621 (62)		46 (69)	17 (4)	28 (28)	1128 (2256)	276 (69)	2111 (211)			201 (10)	201 (10)	56 (3)
18. Lassen			626 (470)	709 (2)		219 (22)	2 (2)	345 (518)		168 (168)	26 (52)		36 (4)		625 (125)	272 (27)	599 (30)	19 (1)
19. Los Angeles			153 (115)		157 (8)		11 (11)			47 (47)	48 (96)					258 (26)		5 -
20. Madera		4 (3)	443 (332)				31 (31)			301 (301)	224 (448)					207 (21)	10 (1)	27 (1)
21. Marin					100 (5)			55 (83)				6 (2)				271 (27)	8	49 (2)
22. Mariposa			427 (320)				208 (208)	155 (233)		373 (373)	255 (510)					465 (47)	56 (3)	50 (3)
23. Mendocino	1042 (104)	530 (398)	313 (235)					64 (96)		94 (94)						963 (96)	629 (31)	210 (11)
24. Merced				991 (99)	62 (3)	562 (56)					7 (14)		1813 (181)			54 (5)	1 -	
25. Modoc			16 (12)	184 (18)	445 (22)	576 (58)							1129 (113)		245 (49)	65 (7)	64 (3)	61 (3)
26. Mono		122 (92)	25 (19)					70 (105)		738 (738)	1038 (2076)	191 (48)				643 (64)	425 (21)	5 -
27. Monterey		14 (11)					73 (73)	117 (176)		248 (248)	205 (410)					56 (6)	38 (2)	
28. Napa					65 (3)			8 (12)		128 (128)			33 (3)			13 (1)	117 (12)	6 -
29. Nevada			594 (446)					135 (203)	10 (3)	113 (113)	74 (148)	152 (38)				40 (4)	123 (6)	
30. Orange			1 (1)		47 (2)					2 (2)	11 (22)		3 -			27 (3)	203 (10)	
31. Placer			797 (598)		18 (1)		45 (45)			3 (3)	160 (320)		100 (10)			42 (4)	31 (2)	19 (1)
32. Plumas			2107 (1580)		5 -	158 (16)	2 (2)			22 (22)	945 (1890)	316 (73)		4678 (468)		191 (19)	448 (22)	43 (2)
33. Riverside			93 (70)				2 (2)			335 (335)	314 (628)	55 (14)	316 (73)			542 (54)	536 (27)	6 -
34. Sacramento			13 (10)			20 (2)										15 (2)	93 (5)	12 (1)
35. San Benito			327 (245)	39 (4)		611 (61)				508 (1016)		94 (24)	30 (3)	1561 (156)	16178 (3236)	258 (26)	142 (7)	8 -
36. San Bernardino			86 (65)			55 (6)		24 (36)		134 (134)	1753 (3506)	569 (142)	8 (1)	1009 (101)		181 (18)	91 (5)	
37. San Diego								3 (5)		17 (17)	2 (4)	10 (3)				1171 (117)	1019 (51)	13 (1)
38. San Francisco			27 (20)					613 (920)	23 (6)	261 (261)	532 (1064)	54 (14)				60 (6)	389 (19)	37 (2)
39. San Joaquin						39 (4)	98 (98)			5 (5)		45 (11)				27 (1)	27 (1)	
40. San Luis Obispo		116 (87)				80 (8)	14 (14)		25 (6)	251 (251)	1138 (2276)	454 (114)	25 (3)			455 (46)	179 (9)	5 -
41. San Mateo			38 (29)				50 (50)			177 (177)	122 (244)					173 (17)	150 (8)	
42. Santa Barbara							34 (34)	441 (662)	7 (2)		14 (28)	40 (10)				21 (2)	46 (2)	1 -
43. Santa Clara	11 (1)															94 (9)	83 (4)	3 -
44. Santa Cruz	19 (2)	253 (190)	2011 (1508)	153 (15)	31 (2)	50 (5)	138 (138)	44 (66)		598 (598)	530 (1060)		29 (3)			18 (2)	29 (1)	
45. Shasta			838 (629)					39 (59)		2 (2)						608 (61)	333 (17)	2 -
46. Sierra			2787 (2090)		281 (14)	236 (24)	118 (118)			228 (228)	867 (1734)		305 (31)			138 (14)	375 (19)	5 -
47. Siskiyou		426 (320)					118 (118)			71 (71)	31 (22)					255 (26)	147 (7)	17 (1)
48. Solano							80 (80)	11 (17)		308 (308)	130 (260)					385 (39)	612 (31)	12 (1)
49. Sonoma		447 (335)						320 (480)		53 (53)	67 (134)		3 (1)				560 (28)	6 -
50. Stanislaus								5 (8)		1092 (1092)	336 (672)					488 (49)	154 (8)	45 (2)
51. Sutter			806 (605)				27 (27)			118 (118)	152 (304)					19 (2)	12 (1)	4 -
52. Tehama			2088 (1566)		83 (4)		189 (189)			404 (404)	578 (1156)		81 (8)			676 (68)	1010 (51)	34 (2)
53. Trinity		484 (363)	527 (395)	202 (20)	316 (16)	218 (22)	105 (105)	199 (299)		282 (282)	200 (400)					81 (8)	7 -	2 -
54. Tulare			1021 (766)		468 (23)			81 (122)			660 (1320)	356 (89)	38 (4)			94 (9)	194 (10)	4 -
55. Tuolumne			55 (41)	39 (4)		292 (29)		43 (65)								9 (1)	728 (36)	18 (1)
56. Ventura							1 (1)			117 (117)	73 (158)					88 (9)	116 (6)	4 -
57. Yolo			198 (149)					47 (71)		135 (135)								
58. Yuba																		
Est. No. Bobcats Per Habitat Type	(270)	(3229)	(15308)	(231)	(170)	(512)	(1935)	(6528)	(21)	(9441)	(27314)	(674)	(660)	(1359)	(4744)	(1412)	(826)	(89)

Table 3. Amount of habitat and estimated bobcat population, by county, 1981.

	Suitable bobcat habitat (mi^2)	Unsuitable bobcat habitat (mi^2)	Estimated size of bobcat pop.		Suitable bobcat habitat (mi^2)	Unsuitable bobcat habitat (mi^2)	Estimated size of bobcat pop.
Alameda	447	288	214	Orange	499	284	228
Alpine	716	14	201	Placer	1,349	83	952
Amador	575	38	504	Plumas	2,490	81	1,963
Butte	1,593	73	1,018	Riverside	6,729	448	2,585
Calaveras	1,007	21	884	Sacramento	794	191	72
Colusa	1,121	31	609	San Benito	1,380	16	1,050
Contra Costa	503	231	259	San Bernardino	19,517	612	4,755
Del Norte	995	8	600	San Diego	3,995	263	4,022
El Dorado	1,665	60	1,420	San Francisco	0	45	0
Fresno	5,221	765	2,066	San Joaquin	1,272	137	119
Glenn	1,294	24	726	San Luis Obispo	3,217	110	2,505
Humboldt	3,452	122	1,611	San Mateo	267	187	124
Imperial	3,921	364	353	Santa Barbara	2,700	45	2,792
Inyo	9,597	494	1,563	Santa Clara	1,108	196	1,143
Kern	7,798	372	2,759	Santa Cruz	401	38	236
Kings	1,302	93	105	Shasta	3,740	108	3,405
Lake	1,146	110	1,346	Sierra	955	3	696
Lassen	4,387	162	839	Siskiyou	6,191	121	4,637
Los Angeles	3,059	1,012	2,734	Solano	620	205	126
Madera	2,026	123	1,146	Sonoma	1,395	185	1,034
Marin	352	138	199	Stanislaus	1,452	53	739
Mariposa	1,413	43	1,185	Sutter	571	36	36
Mendocino	3,452	59	2,115	Tehama	2,948	27	2,455
Merced	1,800	183	320	Trinity	3,149	43	2,547
Modoc	3,703	390	369	Tulare	4,350	496	2,546
Mono	2,725	319	282	Tuolumne	2,142	133	1,601
Monterey	3,243	80	3,061	Ventura	1,775	81	1,571
Napa	709	81	855	Yolo	952	80	314
Nevada	950	30	757	Yuba	588	51	370
				TOTAL	146,718	10,086	74,723

b. Research:

Past research on bobcats in California has included two cursory evaluations
of bobcat distribution in areas believed to have a high or a low density
of bobcats (Grippi 1976, Gould 1977a), and four intensive field studies
using radio-telemetry and capture-mark-recapture techniques (Lembeck 1978,
Zezulak and Schwab 1979, 1980, Gould 1980a, Zezulak 1981). These field
studies have investigated density, home range, age and sex structure,
reproduction and mortality of three of California's four subspecies and
of both harvested and unharvested populations.

The commercial and sport harvest of bobcats has been monitored annually
on a county by county basis (Gould 1977a, 1977b, Belluomini 1978, Gould
1978a, 1978b, 1979a, 1979b, 1980a, 1980b, and 1981a). Additionally,
the condition of bobcat populations, determined by gathering information
on the age and sex structures of local and statewide populations has been
gathered and analyzed (Gould 1979b, 1980a, 1980b, 1980c, 1981b, Zezulak
1981). Summaries of the cited reports are included in Appendix 1 and
copies of reports not yet received by the O.S.A. (Gould 1981a, 1981b)
are attached in Appendix 2.

Briefly, these studies have disclosed that bobcats are very widely
distributed throughout a vast variety of habitat types in 57 of
California's 58 counties. Their density varies with habitat type
from as high as almost 4 per square mile occurring in chaparral
habitat to as low as 0.13 per square mile in inland sagebrush and
juniper-pinyon habitats. The commercial take of bobcats has increased
as the price of pelts has increased but the total harvest, including
sport take, and the harvest per commercial trapper has generally re-
mained stable. Harvest patterns appear to be consistent in the last
five years with the same counties usually sustaining the highest take
of bobcats. Age and structures appear to differ in accordance to the
estimated bobcat density. Only a slight difference in population
structure is noted in counties with high bobcat densitites and high
harvests. Areas of low bobcat density and relatively high harvest are
noticeable through analysis of age and sex structure data. Shortened
seasons in these latter areas have been effective in reducing harvest.

Current research involves the monitoring of harvest on geographical
and method of take bases and on the analysis of the sex and age structure.
Current regulations (Appendix 3) require hunters and trappers to provide
the Department with the biological information necessary for age and
sex structure analysis. The best examples of the current type of eval-
uation of harvest monitoring and sex and age structure analysis are
contained in Appendix 2 (Gould 1981a, 1981b).

c. Population Modeling:

No computer modeling of bobcat populations is employed presently in
California. Future research in California will lead to a more refined
modeling method than the presently used evaluation techniques (Gould

1981a, 1981b). Future modeling should make evident the meanings of the yearly changes in population parameters, integrate density and abundance data with harvest data to allow the effective annual prediction of trends in bobcat populations, and integrate population structure and harvest data to provide a check on bobcat density and abundance estimates.

d. Population Trends:

Except for scent post data gathered by the USFWS Animal Damage Control office while assessing coyote trends, only information on harvest exists in California for long-term trends in bobcat populations. In the last ten years, there has been a shift in the area where most bobcats are harvested from northeastern to south coastal California (Gould 1981a) (Tables 4 and 5). Northeastern bobcats are larger and their pelts are more valuable than those bobcats taken elsewhere in California. They are also less densely distributed (Zezulak 1981). The increase in harvest of bobcats in the northeastern section of California has not kept pace with the increase elsewhere in the state indicating a higher percent of the population is being taken. This is substantiated by characteristics of the sex and age structure and average life expectancy of those populations (Gould 1981b). As a result, management decisions to reduce the harvest of bobcats in northeastern California were implemented and successful during the 1980-81 season.

Although the amount of bobcat habitat in California remains fairly constant, its composition varies with land use practices. In general, habitat conversions appear to be mutually compensating in regards to the overall abundance of bobcats. Also, fluctuations in prey density are not as pronounced in the mild climate of the better quality bobcat habitat in California as elsewhere in the United States.

2. MANAGEMENT PROGRAM:

a. Harvest Level Objective:

It is estimated that about 13,000 bobcats will be taken during the 1981-82 season (Table 6). This estimate is based on the rate of take in recent seasons, the length of the 1981-82 season, and the predicted commercial demand of bobcat fur. The 1981-82 season will be a week longer throughout most of California than it was last season. However, the increase in the number of new license buyers has not continued and the average pelt price for California bobcats has remained relatively stable.

The level of harvest that we do not wish to exceed is approximately 14,500 bobcats. This figure is calculated from the estimated statewide population (74,723 bobcats) using the known mortality rates (35.6% for adults and 22.9% for young, from life tables of age structure obtained during the 1979-80 season), a sex ratio of 1.33 males per female (Table 7), and a reproductive potential where 80% of the females breed with a litter size of 2.5 young (Lembeck 1978, Gould 1980a, Zezulak 1981):

Table 4. Ten counties reporting highest trapper take of bobcat, 1971-81.

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	Tuolomne	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

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

Table 5. Ten counties with the highest hunter take of bobcat reported in hunter survey and hunting tag returns, 1971-80.

Rank	1971	1972	1973	1974	1975
1	Tehama	San Luis Obispo	San Diego	Mendocino	San Diego
2	Tulare	Fresno	Shasta	Fresno	Mendocino
3	San Diego	San Bernardino	Kern	Kern	Riverside
4	San Bernardino	Mendocino	Fresno	Glenn	Santa Barbara
5	Humboldt	Kern	Tehama	Tehama	San Luis Obispo
6	Kern	Inyo	Humboldt	San Diego	Kern
7	Santa Barbara	San Diego	Mendocino	Madera	Tulare
8	Fresno	Lake	Madera	Lake	Madera
9	Siskiyou	Santa Barbara	Tulare	Yuba	Lake
10	Trinity	Madera	El Dorado	San Benito	Monterey

Rank	1976	1977	1978	1979 [1]	1980 [1] [2]
1	Tulare	Los Angeles	Tulare	San Bernardino	Kern
2	Fresno	Orange	Fresno	Tuolumne	Monterey
3	Monterey	Santa Barbara	Mendocino	Los Angeles	Tuolumne
4	Humboldt	Kern	Humboldt	Nevada	El Dorado
5	San Diego	Humboldt	Kern	Ventura	San Bernardino
6	Kern	San Diego	San Diego	Inyo	Imperial
7	Butte	Contra Costa	San Bernardino	Mariposa	Ventura
8	Madera	San Bernardino	Monterey	San Diego	San Luis Obispo
9	Mendocino	Mendocino	San Luis Obispo	Calaveras	San Diego
10	Riverside	San Luis Obispo	Lassen-Shasta	Mendocino	Siskiyou

1/ For 1979 and 1980, hunter take only includes sport hunting take.
2/ Bobcat hunting tag returns only used for 1980 (1980-81 season).

Table 6. Estimated annual take of bobcats by hunting and trapping in California.

		1976-77	1977-78	1978-79	1979-80	1980-81	1981-82[2]	1981-82[3]
I.	Take by licensed trappers	5,400	5,146	8,326	7,809	9,595	10,000	10,800
	A. Trapper take	5,000	4,650	6,825	6,686	8,702	9,000	9,800
	B. Commercial hunter take	400	500	1,500	1,123	893	1,000	1,000
II.	Take by all hunters	10,500	15,300	5,811	7,708	3,737	4,000	4,700
	A. Take by houndsmen	31%	34%	35%	45%	55%	55%	55%
	B. Take by predator callers	22%	43%	40%	35%	15%	15%	15%
	C. Incidental take to hunting other species or farming-ranching	48%	23%	25%	20%	30%	30%	30%
III.	Animal damage control take	347	208	56	32	24	20	20
IV.	Total take (IA + II + III)	15,847	20,150	12,700	14,450	12,463	13,020	14,520

1/ Licensed trapper data for season indicated, hunter take for calendar year of first year listed, animal damage control take for fiscal year noted.
2/ Projected estimate based on previous data.
3/ Possible highest estimate of take.

```
74,723 adults                           74,723 adults
x .356 average adult mortality rate     x 4.29 % females
 26,601 adults dying                    32,070 adult females
+14,688 young dying                     x   80 % breeding
 41,289 bobcats dying annually          25,656 breeding females
x  .35 allowable harvest rate           x  2.5 litter size
 14,451 harvestable bobcats             64,140 young produced annually
                                        x .229 mortality rate of young
                                        14,688 young dying
```

Figures used to calculate the allowable harvest limit are generally
conservative. The total population estimate is derived by using
densities known to be below measured densities and both the portion
of breeding females and litter size are below the potential for bobcats.
As the harvest exerts more pressure on the population, females comprise
a greater portion of the population allowing for a higher percent of the
population to be breeders. Finally, the mortality rates are from harvested
populations and because of the harvest are probably higher than the mortality
rates of the unharvest populations in the state.

It is estimated that the maximum sustainable yield could occur where
mortality rates for both adults and young were 45% (Gould 1981a) and where
50% of the mortality was due to harvest. In such a case, the harvest
could be as high as 31,000 bobcats:

```
 73,723 adults                          74,723 adults
+64,140 young produced annually         x 42.9 % females
137,863 total bobcats                   32,070 adult females
x   .45 mortality rate                  x   80 % breeding
 62,038 bobcats dying annually          25,656 breeding females
x   .50 maximum harvest rate            x  2.5 litter size
 31,019 maximum sustainable harvest     64,140 young produced annually
```

b. Maintenance of Harvest Level Objectives:

Ideally, harvest limits should be set by county or by some area smaller
than the whole state. This has not been done due to inability to handle
all the information available. Presently, checks on potential overharvest
are coming from evaluations of age and sex structure date (Tables 7 and 8).
This short evaluation is available prior to establishment of season lengths
for the following season and is followed by a more refined analysis (Gould
1981a, 1981b).

Despite the continued increase in commercial take due to the continued
high value of bobcat furs, it has been evident that season length has
controlled the take of bobcats. During the 1978-79 season, no export
tags were available after the first week in February, effectively closing
the season three weeks early, and the export tag quota was reached and
the season closed a month early in the 1979-80 season. In both cases,
the number of bobcats which would have been taken had the season continued
to its pre-planned conclusion, was reduced.

Table 7. Observed sex ratios of bobcats harvested in California, 1975-81.

		1975-76 & 1976-77	1977-78	1978-79	1979-80	1980-81
1.	Alameda				1.80 (28)[1]/	2.00 (3)
2.	Alpine				4.50 (11)	2.33 (10)
3.	Amador				1.00 (14)	.00 (4)
4.	Butte				1.00 (60)	1.13 (51)
5.	Calaveras				.90 (19)	1.88 (23)
6.	Colusa				1.00 (24)	3.75 (19)
7.	Contra Costa				1.00 (2)	1.00 (2)
8.	Del Norte				1.14 (120)	1.28 (91)
9.	El Dorado				1.10 (38)	1.07 (31)
10.	Fresno				1.73 (246)	1.41 (301)
11.	Glenn				1.36 (26)	2.42 (41)
12.	Humboldt			1.21 (75)	1.58 (351)	1.52 (434)
13.	Imperial				2.00 (6)	1.14 (15)
14.	Inyo				1.51 (211)	1.28 (258)
15.	Kern			1.21 (106)	2.01 (328)	1.33 (331)
16.	Kings				2.19 (51)	1.44 (44)
17.	Lake	1.00 (14)		2.00 (15)	1.53 (147)	1.34 (166)
18.	Lassen			1.00 (20)	1.43 (255)	1.89 (81)
19.	Los Angeles			1.00 (18)	1.22 (124)	1.70 (162)
20.	Madera				1.27 (43)	1.12 (121)
21.	Marin				1.20 (11)	1.27 (26)
22.	Mariposa			1.67 (8)	2.05 (134)	.94 (180)
23.	Mendocino			1.00 (10)	1.10 (321)	1.24 (340)
24.	Merced				1.50 (10)	1.00 (4)
25.	Modoc	.70 (17)	2.40 (17)	1.10 (42)	1.04 (193)	1.90 (116)
26.	Mono				1.94 (94)	2.04 (76)
27.	Monterey			1.25 (27)	1.31 (298)	1.21 (702)
28.	Napa			1.25 (9)	2.36 (37)	1.33 (21)
29.	Nevada				3.00 (8)	
30.	Orange				.60 (8)	.50 (6)
31.	Placer				.75 (14)	1.00 (6)
32.	Plumas			.25 (5)	1.00 (86)	.78 (32)
33.	Riverside				.81 (67)	.89 (70)
34.	Sacramento				- (1)	
35.	San Benito				1.48 (196)	1.35 (305)
36.	San Bernardino			1.23 (127)	1.24 (370)	1.38 (698)
37.	San Diego		.94 (60)	1.26 (113)	1.03 (264)	.88 (284)
38.	San Francisco					
39.	San Joaquin				1.00 (2)	1.50 (15)
40.	San Luis Obispo				1.35 (273)	1.48 (513)
41.	San Mateo				1.18 (61)	1.26 (106)
42.	Santa Barbara			1.25 (90)	.98 (472)	1.26 (668)
43.	Santa Clara			1.67 (8)	1.00 (6)	1.14 (15)
44.	Santa Cruz			2.00 (21)	2.63 (29)	1.00 (64)
45.	Shasta			.25 (8)	1.30 (216)	1.18 (198)
46.	Sierra				.60 (8)	.43 (10)
47.	Siskiyou			1.00 (6)	1.28 (356)	1.36 (253)
48.	Solano					1.09 (23)
49.	Sonoma				1.90 (58)	1.00 (44)
50.	Stanislaus				1.10 (21)	1.77 (86)
51.	Sutter					
52.	Tehama				1.19 (127)	1.54 (178)
53.	Trinity				1.16 (54)	.72 (91)
54.	Tulare				1.86 (371)	1.73 (431)
55.	Tuolumne				1.53 (43)	1.82 (172)
56.	Ventura				1.92 (254)	1.36 (276)
57.	Yolo					
58.	Yuba				1.63 (21)	1.00 (4)

[1]/ Parenthetical values represent sample size.

Table 8. Observed age structure and reproductive potential data of bobcats harvested in California, 1980-81.

County	(A) Minimum % in 0-1 age class[1]	(B) Females in 1-2 age class & older	Ratio of (A) to (B)[2]
Alameda	0 (3)	33.3 (3)	.00
Alpine	20.0 (10)	20.0 (10)	1.00
Amador	25.0 (4)	75.0 (4)	.33
Butte	26.8 (41)	29.3 (41)	.91
Calaveras	13.6 (22)	27.3 (22)	.50
Colusa	11.1 (27)	23.5 (17)	.47
Contra Costa	0 (2)	50.0 (2)	.00
Del Norte	12.9 (85)	36.9 (84)	.35
El Dorado	2.9 (35)	55.2 (29)	.05
Eastern Fresno	17.9 (134)	28.4 (134)	.63
Western Fresno	16.9 (130)	33.8 (130)	.50
Glenn	18.8 (32)	15.6 (32)	1.21
Humboldt	14.2 (429)	34.8 (368)	.41
Imperial	33.3 (3)	50.0 (2)	.67
Inyo	15.5 (238)	33.6 (238)	.46
Kern	14.6 (425)	31.8 (409)	.46
Kings	10.0 (40)	35.0 (40)	.29
Lake	15.2 (158)	34.4 (154)	.44
Lassen	13.2 (53)	38.6 (44)	.34
Los Angeles	11.4 (114)	28.9 (114)	.39
Madera	17.9 (117)	38.5 (117)	.46
Marin	30.8 (26)	23.1 (26)	1.33
Mariposa	17.1 (170)	40.5 (168)	.42
Mendocino	14.6 (267)	35.9 (251)	.41
Merced	25.0 (8)	25.0 (8)	1.00
Modoc	28.0 (118)	20.3 (118)	1.38
Mono	17.2 (64)	24.5 (53)	.70
Monterey	17.9 (446)	36.5 (427)	.49
Napa	15.8 (19)	40.0 (20)	.40
Orange & Western Riverside	15.4 (26)	42.3 (26)	.36
Riverside			
Placer	50.0 (6)	0 (2)	–
Plumas	25.7 (35)	40.6 (32)	.63
Eastern Riverside	10.5 (19)	63.2 (19)	.17
West Central Riverside	12.6 (191)	36.8 (190)	.34
Riverside & Southwest San Bernardino			
San Benito	19.0 (232)	33.2 (232)	.57
Eastern San Bernardino	29.7 (417)	28.9 (374)	1.03
San Diego	10.2 (284)	48.6 (255)	.21
San Joaquin	6.7 (15)	33.3 (15)	.20
San Luis Obispo	22.4 (402)	32.4 (364)	.69
San Mateo	10.2 (157)	33.1 (157)	.31
Santa Barbara	20.2 (608)	32.4 (583)	.62
Santa Clara	0 (7)	57.2 (7)	.00
Santa Cruz	15.9 (63)	44.4 (63)	.36
Shasta	19.5 (200)	33.8 (195)	.58
Sierra	20.0 (10)	70.0 (10)	.29
Eastern Siskiyou	28.6 (70)	30.3 (66)	.94
Western Siskiyou	21.6 (185)	32.4 (185)	.67
Solano	21.7 (23)	34.8 (23)	.62
Sonoma	14.3 (63)	32.9 (79)	.43
Stanislaus	11.3 (80)	33.8 (80)	.33
Tehama	20.8 (173)	30.4 (158)	.68
Trinity	12.8 (86)	40.5 (79)	.32
Tulare	25.1 (386)	26.5 (377)	.95
Tuolumne	20.6 (160)	29.8 (161)	.69
Ventura	17.4 (92)	32.6 (92)	.53
Yolo	100.0 (1)	0 (1)	–
Yuba	0 (4)	100.0 (2)	.00

1/ Determined by the number of individuals still having canine teeth with open apical root foramen.
2/ (A) ÷ (B); number of young per breeding age female caught.
3/ Parenthetical value represents sample size.

It appears that the rate of commercial harvest has stabilized in the last two years at about 177.5 bobcats per day (Table 9). This has occurred despite the increase in the number of successful bobcat trappers (Table 10) Also, a shortened local season has reduced the take in an area where the harvest pressure had been high (Table 9).

The current allowable harvest limit probably will not be reached because of the continued trend in the reduction of sport take and the leveling off or slight reduction in the number of licensed trappers and bobcat fur value (Tables 10 and 11). Given the current commercial harvest rate, a season increased by one week throughout most of the state, and an increase of 30% in the sport take, the conservative allowable harvest would not be exceeded (Table 6). Also, the Fish and Game Commission may act at any time to close the season if presented with facts that over-harvesting is occurring.

Table 9. Bobcat Season Lengths and Harvest Rates.

Year	Season	Season Length (Days)	Rate of Commercial Harvest (bobcats/day)	Reported Commercial Take Lassen & Modoc Counties
1976-77	11-16 - 2/28	105	51.4	NA[1]
1977-78	11-16 - 2/28	105	49.0	NA
1978-79	11/16 - 2/28	105 (82)[2]	101.5	552
1979-80	11/16 - 1/31	77 (44)[3]	177.5	468
1980-81	12/1 - 12/21[4]	21[5]		209
	12/1 - 1/15	46	177.7	
	12/1 - 1/31	62		

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[1] Comparable data not available.
[2] All bobcat export tags were sold by the end of the first week in February which effectively closed the season over three weeks early.
[3] Season closed on December 29 as quota of export tags to be sold was reached.
[4] State divided into three zones.
[5] Average season length of 54 days.

Table 10. Average bobcat harvest per successful bobcat trapper per season
in California, 1970-71 to 1978-79[1/].

Season	No. of licensed trappers	No. of trappers harvesting bobcats	Harvest per successful trapper
1970-71	631	No Data Available	
1971-72	539	59	9.97
1972-73	682	95	7.22
1973-74	878	172	7.23
1974-75	1,172	227	6.14
1975-76	931	283	7.78
1976-77	1,692	446	8.11
1977-78	1,889	550	8.08
1978-79	2,378	766	9.04
1979-80	3,221	920	7.76
1980-81[2/]	3,201	1,007	8.04

1/ Data only available on the number of successful bobcat trappers and not on
   the number of trappers trying to catch bobcats.
2/ Preliminary data.

* * *

Table 11. Bobcat pelt prices.

Season	Average Price	Highest Price[1/]
1970-71	$10.86	Not recorded
1971-72	$18.83	$30.00
1972-73	$29.33	$61.00
1973-74	$45.00	$110.00
1974-75	$50.50	$110.00
1975-76	$133.50	$300.00
1976-77	$76.00	$225.00
1977-78[2/]	$105.80	$285.00
1978-79[2/]	$120.00	$426.00
1979-80[2/]	$114.20	$313.00
1980-81[3/]	$129.90	$325.00

1/ Highest single price reported as average price of top quality pelt is not
   available.
2/ Data taken only from California Trapper's Association fur sales which tend
   to be higher than average paid throughout season by all fur dealers.
3/ Data from information supplied by 23 fur dealers in completing their
   annual "Licensed Fur Dealer Report." Average price is for 5,934
   bobcats sold.
4/ Highest price paid at California Trappers Association fur sales.

Table 12. Take of bobcat, by county, during 1980-81.

County	Licensed Trapper Take[1]	Commercial Hunter Take	Sport Hunter Take[2]	Animal Damage Control Take[3]	Total Take
Alameda	1	2	21		24
Alpine	10				10
Amador	3	1	22		26
Butte	47	4			51
Calaveras	18	5			23
Colusa	24	5			29
Contra Costa	2				2
Del Norte	80	21			101
El Dorado	31	5	179		215
Fresno	279	24	68		371
Glenn	40	1	68		109
Humboldt	289	162	58	5	514
Imperial	15	1	135		151
Inyo	259		46		305
Kern	328	15	513		856
Kings	44				44
Lake	163	7		1	171
Lassen	87	4	65		156
Los Angeles	158	4	65		227
Madera	119	2	21	2	144
Marin	3	23			26
Mariposa	154	26	12	2	194
Mendocino	356	51	64		471
Merced	5	4			9
Modoc	108	10			118
Mono	75	1			76
Monterey	657	94	296		1,047
Napa	21		23	1	45
Nevada				1	1
Orange	6		23		29
Placer		6	40		46
Plumas	24	12	12		48
Riverside	65	12	57		134
Sacramento					
San Benito	283	22	12		317
San Bernardino	704	20	141		865
San Diego	306	20	95		421
San Francisco					
San Joaquin	15				15
San Luis Obispo	507	13	102	6	628
San Mateo	106				106
Santa Barbara	664	30	62	2	758
Santa Clara	10	5	41		56
Santa Cruz	64			1	65
Shasta	201	12	12		225
Sierra	6	4			10
Siskiyou	253	27	88		368
Solano	23			1	24
Sonoma	95	1	22	2	120
Stanislaus	58	28	41		127
Sutter					
Tehama	180	6			186
Trinity	94	13	12		119
Tulare	369	70	23		462
Tuolumne	151	25	250		426
Ventura	272	4	132		408
Yolo			23		23
Yuba	2	2			4
Unknown	868	89			957
TOTAL	8,702	893	2,844	24	12,463

1/ Take during 1980-81 season by licensed trappers, but excluding take by licensed trappers who hunted.
2/ Estimated take from Hunter Survey for 1980 and from returns of Bobcat Hunting Tag Reports for 1980-81 season, but corrected for take by hunters with trapping licenses who did not use traps.
3/ Provided by California office of Animal Damage Control Section, U. S. Fish and Wildlife Service for Fiscal Year 1980 (1980-81).

c. 1981-82 Trapping Regulations:

Changes in the regulations (Appendix 3) pertaining to the take of bobcats include:

(i) - Increasing the length of the open season by one week except in the northeastern part of the state.

(ii)- Allowing season length to control the take by eliminating the wording which allowed the Director to close the season when 6,000 export tags had been sold.

3. 1980-81 SEASON HARVEST INFORMATION:

During the 1980-81 season, an estimated 12,463 bobcats were taken in 55 of California's 58 counties (Table 12). Approximately 77% (9,595) were reported taken and tagged by licensed trappers and commercial hunters. To date, licensed fur dealers have reported buying 61.8% (5,934) of the bobcats reported taken by licensed trappers and commercial hunters.

b. Bobcat Trappers:

The number of licensed trappers (commercial fur harvesters) remained stable from the 1979-80 to 1980-81 season (Table 10). There was an 11% increase in the number of successful commercial fur harvesters and their average take was up 36% over the last two seasons.

c. Bobcat Fur Value:

The value of bobcat fur was at the higher end of the average pelt price realized over the last six seasons (Table 11). The range in price brought by a bobcat pelt at California Trappers Association's fur sales during the 1980-81 season varied from $21.50 to $325.00.

4. CALIFORNIA DEPARTMENT OF FISH AND GAME BOBCAT TECHNICAL DATA CONTACT:

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