

**STATE OF CALIFORNIA  
DEPARTMENT OF FISH AND GAME  
WILDLIFE MANAGEMENT DIVISION  
NONGAME BIRD AND MAMMAL SECTION**

**BOBCAT HARVEST ASSESSMENT, 1989-90**

by

William E. Grenfell Jr.

May 1991

State of California  
THE RESOURCES AGENCY  
Department of Fish and Game

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**ABSTRACT**

An estimated 3,455 bobcats were taken during the 1989 hunting year and the 1989-90 trapping season. Trappers took 2,677 bobcats and hunters, 715. The total take was a decrease of 49% from the 1988-89 year and was the lowest reported take in the last 14 years. The bobcat take decreased in all regions of the state except in the East Sierra (Table 4). The bobcat take in that region increased by 62% (73 animals in 1988-89 compared to 118 animals in 1989-90). The average pelt price dropped to \$17.91, and is the lowest pelt value in the last 18 years. Also, the average take per successful trapper and the average take by sport hunter per hunting day were lower than in several previous years.

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 U.S. Department of Agriculture, Animal Damage Control records.

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## INTRODUCTION

Bobcat harvest increased in California from the 1960s through the late 1970s. 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 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 were 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 previously distributed. A statewide harvest monitoring system was used where the age and sex structures of the harvested population were sampled to determine the effect of the harvest on various bobcat populations, and to identify the amount of harvest. The age and sex structure of the various bobcat populations in California stabilized during the mid-1980s. Currently, only the monitoring of harvest quantity is being conducted since the demand and harvest have been relatively stable since 1982-83.

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 3½ 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 2½ 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 were a result of previous research and monitoring efforts (see W-54-R-12, IV-7). The 1981-82 season length was increased by one week in length, except in the northeastern California region, in order to have the bobcat season coincide with the season on gray fox. In 1982-83, the northeastern California season was set back two weeks, and its length was increased by a week.

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 1982-83, 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 Convention on International Trade in Endangered Species of Wild Fauna and Flora. This 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 body 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.

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. Determine the annual bobcat harvest on a regional basis.
2. Use this information along with previously gathered information on bobcat biology and population dynamics to develop a statewide management plan and to manage local populations by manipulating season lengths and chronology, take methods, and harvest limits.

## **METHODS**

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 trappers 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 trapper 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.

## RESULTS

For the 1989-90 season the total estimated take of bobcats was 3,455 individuals (Table 1). This was about 3,252 (51.5%) less than were taken during 1988-89, and the lowest estimated take in the 14 seasons since 1976-77. Trappers continue to take the majority (77%) of bobcats. The total hunter take of 715 was lower by 1,063 bobcats than in 1988-89. The hunter take also was the lowest in 14 seasons since the 1976-77 season (Table 1). The total take of bobcats ranged from none in five counties to 324 and 323 in Kern and San Bernardino Counties respectively (Table 2). The harvest in each of the ten counties having the highest total take was at least 150 (compared to 254 last year). This year only 12 of 58 counties reported a take of more than 100 bobcats; last year more than 100 bobcats were taken from 20 counties.

| Season  | Total<br>Commercial<br>Take<br>(IA+IB) | Commercial<br>Trapper<br>Take<br>(IA) | Commercial<br>Hunter<br>Take<br>(IB) | Total<br>Hunter<br>Take<br>(II) | Animal<br>Damage<br>Control<br>Take<br>(III) | Total<br>Annual<br>Take<br>(IA+II+III) |
|---------|--|---------------------------------------|--------------------------------------|---------------------------------|--|--|
| 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                                   | 870                                   | 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                                   |
| 1987-88 | 8994                                   | 8017                                  | 977                                  | 2773                            | 47   | 10837                                  |
| 1988-89 | 5586                                   | 4877                                  | 709                                  | 1778                            | 52   | 6707                                   |
| 1989-90 | 2980                                   | 2677                                  | 303                                  | 715                             | 63   | 3455                                   |

Table 2. Take of Bobcats by County during the 1989-90 Season.

| County          | Licensed Trapper Take | Commercial Hunter Take | Sport Hunter Take | Animal Damage Control Take | Total County Take |
|-----------------|-----------------------|------------------------|-------------------|----------------------------|-------------------|
| Alameda         |                       |                        | 2                 |                            | 2                 |
| Alpine          | 12                    |                        | 2                 |                            | 14                |
| Amador          | 11                    | 5                      | 6                 |                            | 22                |
| Butte           | 2                     |                        |                   |                            | 2                 |
| Calaveras       |                       | 4                      | 1                 | 1                          | 6                 |
| Colusa          | 11                    |                        | 2                 |                            | 13                |
| Del Norte       |                       |                        | 2                 |                            | 2                 |
| El Dorado       |                       | 7                      |                   |                            | 7                 |
| Fresno          | 226                   |                        | 22                |                            | 248               |
| Glenn           |                       |                        | 2                 |                            | 2                 |
| Humboldt        | 25                    | 101                    | 21                | 3                          | 150               |
| Imperial        | 8                     |                        | 2                 |                            | 10                |
| Inyo            | 76                    |                        | 5                 |                            | 81                |
| Kern            | 292                   | 14                     | 14                | 4                          | 324               |
| Lake            | 17                    |                        | 11                | 3                          | 31                |
| Lassen          | 78                    | 7                      | 7                 | 1                          | 93                |
| Los Angeles     | 187                   |                        | 5                 |                            | 192               |
| Madera          | 28                    |                        | 9                 |                            | 37                |
| Marin           |                       | 20                     |                   | 4                          | 24                |
| Mariposa        |                       |                        | 7                 | 5                          | 12                |
| Mendocino       | 3                     | 3                      | 19                | 6                          | 31                |
| Merced          |                       |                        | 7                 |                            | 7                 |
| Modoc           | 48                    | 14                     | 14                | 1                          | 77                |
| Mono            | 24                    | 6                      | 3                 |                            | 33                |
| Monterey        | 193                   | 1                      | 20                |                            | 214               |
| Napa            | 5                     |                        | 5                 | 2                          | 12                |
| Nevada          |                       | 4                      |                   | 5                          | 9                 |
| Orange          | 13                    |                        |                   |                            | 13                |
| Placer          | 1                     |                        | 11                |                            | 12                |
| Plumas          | 45                    | 2                      | 18                |                            | 65                |
| Riverside       | 33                    |                        | 5                 |                            | 38                |
| San Benito      | 49                    |                        | 18                |                            | 67                |
| San Bernardino  | 294                   |                        | 29                |                            | 323               |
| San Diego       | 168                   | 9                      | 7                 | 8                          | 192               |
| San Joaquin     |                       |                        | 2                 |                            | 2                 |
| San Luis Obispo | 105                   | 16                     | 7                 | 1                          | 129               |
| Santa Barbara   | 55                    | 7                      | 2                 | 1                          | 65                |
| Santa Clara     | 17                    |                        | 22                |                            | 39                |
| Shasta          | 79                    | 17                     | 41                |                            | 137               |
| Sierra          |                       |                        | 2                 |                            | 2                 |
| Siskiyou        | 129                   | 13                     | 17                | 6                          | 165               |
| Solano          |                       |                        | 4                 |                            | 4                 |
| Sonoma          | 27                    |                        | 5                 | 6                          | 38                |
| Stanislaus      | 9                     | 1                      | 6                 |                            | 16                |
| Tehama          | 4                     | 1                      | 6                 |                            | 11                |
| Trinity         | 21                    | 2                      | 2                 |                            | 25                |
| Tulare          | 99                    | 37                     | 14                |                            | 150               |
| Tuolumne        | 8                     |                        | 5                 | 6                          | 19                |
| Ventura         | 242                   | 12                     | 1                 |                            | 255               |
| Yolo            | 32                    |                        |                   |                            | 32                |
| Yuba            | 1                     |                        |                   |                            | 1                 |
| <b>Total</b>    | <b>2677</b>           | <b>303</b>             | <b>412</b>        | <b>63</b>                  | <b>3455</b>       |

No bobcats were reported taken in Contra Costa, Kings, Sacramento, San Mateo, Santa Cruz and Sutter counties.

The majority of bobcats was harvested from counties in southern California (Table 3). Three of six counties in the South Coast area, two of five counties in the Southern California area, three of five counties in the South Sierra area, and two counties in the Northwest area made up the top ten counties with the highest bobcat harvests (Table 3).

Table 3. Ten Counties Reporting Highest Commercial Take of Bobcats 1971-90.

| 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 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   | 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         | 1987-88         | 1988-89         | 1989-90         |                 |
| 1    | San Bernardino  | San Bernardino  | San Bernardino  | Kern            |                 |
| 2    | Kern            | Kern            | Kern            | San Bernardino  |                 |
| 3    | Santa Barbara   | Monterey        | San Diego       | Ventura         |                 |
| 4    | Tulare          | Tulare          | Santa Barbara   | Fresno          |                 |
| 5    | Ventura         | Santa Barbara   | Monterey        | Monterey        |                 |
| 6    | Monterey        | Siskiyou        | Los Angeles     | Los Angeles     |                 |
| 7    | San Luis Obispo | Humboldt        | Ventura         | San Diego       |                 |
| 8    | San Diego       | Ventura         | Fresno          | Siskiyou        |                 |
| 9    | Humboldt        | San Diego       | Tulare          | Tulare          |                 |
| 10   | Fresno          | San Luis Obispo | San Luis Obispo | Humboldt        |                 |

The 1989-90 take of bobcats was among the lowest in the previous six seasons in all but one of the geographic areas monitored (Table 4). The increase in the East Sierra was from a very low 73 bobcats last year (1988-89) compared to 118 in the 1989-90 season.

**Table 4. Geographical Differences in the Amount of Commercial Take of Bobcats in California, 1983-84 to 1989-90.**

| Area                   | 1984-85<br>Take | Change<br><to><br>(%) | 1985-86<br>Take | Change<br><to><br>(%) | 1986-87<br>Take | Change<br><to><br>(%) | 1987-88<br>Take | Change<br><to><br>(%) | 1988-89<br>Take | Change<br><to><br>(%) | 1989-90<br>Take |
|------------------------|-----------------|-----------------------|-----------------|-----------------------|-----------------|-----------------------|-----------------|-----------------------|-----------------|-----------------------|-----------------|
| Northeast              | 506             | -23                   | 390             | 32                    | 514             | 17                    | 601             | -53                   | 282             | -28                   | 230             |
| Northwest              | 1404            | -31                   | 967             | 26                    | 1216            | 11                    | 1355            | -49                   | 694             | -48                   | 362             |
| North Coast            | 358             | 3                     | 367             | 16                    | 425             | 14                    | 483             | -35                   | 312             | -64                   | 112             |
| Central Coast          | 106             | 23                    | 130             | -18                   | 107             | 12                    | 120             | -67                   | 40              | -32                   | 27              |
| North Sierra           | 50              | -14                   | 43              | 53                    | 66              | -64                   | 24              | -67                   | 8               | 0                     | 8               |
| Central<br>Sierra      | 226             | 12                    | 253             | - 8                   | 232             | 47                    | 342             | -63                   | 127             | -72                   | 35              |
| East Sierra            | 333             | 22                    | 406             | -16                   | 343             | -28                   | 248             | -71                   | 73              | 62                    | 11              |
| South Coast            | 2511            | - 7                   | 2344            | 23                    | 2881            | -13                   | 2510            | -30                   | 1753            | -51                   | 857             |
| South Sierra           | 2086            | -16                   | 1745            | 10                    | 1923            | - 6                   | 1809            | -43                   | 1026            | -32                   | 696             |
| Southern<br>California | 1317            | 10                    | 1454            | - 3                   | 1416            | 6                     | 1502            | -15                   | 1271            | -58                   | 535             |
| Total                  | 8897            |                       | 8099            |                       | 9123            |                       | 8994            |                       | 5586            |                       | 2980            |

The market for bobcat fur has become relatively stable in both political and economic terms. However, the average price of a bobcat pelt dropped by about 88% in the past two years. It dropped from an all time high of \$167.33 in 1986-87 to \$17.91 (Table 5). There was no national or international regulatory action pending which might have influenced the demand for bobcat furs. The market just appears to be saturated. At this time (April 1991) bobcat pelt prices are on the increase, and are expected to reach an average of \$30.00 to \$50.00 by the fall of 1991.

**Table 5. Bobcat Pelt Prices, 1970-71 to 1989-90.**

| 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 |
| 1987-88 | \$ 142.73     | Not Available |
| 1988-89 | \$ 102.31     | Not Available |
| 1989-90 | \$ 17.91      | Not Available |



Despite the reduction in the commercial take of bobcats, the average take per trapper remained higher than the 12 season average of 10.1 bobcats per successful trapper (Table 6). The continued maintenance of a high rate of bobcats per successful trapper, particularly with respect to low pelt prices, indicates that the bobcat resource was abundant during the 1989-90 season.

| County                              | Season |       |       |       |       |       |       |       |       |       |       |       |
|-------------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                     | 78-79  | 79-80 | 80-81 | 81-82 | 82-83 | 83-84 | 84-85 | 85-86 | 86-87 | 87-88 | 88-89 | 89-90 |
| Butte                               | 3.1    | 3.4   | 2.5   |       |       |       |       |       |       |       |       |       |
| Fresno                              | 10.6   | 9.2   | 10.2  | 9.1   | 8.5   | 11.9  | 10.0  | 12.1  | 17.6  | 15.3  | 16.1  | 17.4  |
| Glenn                               | 7.4    |       | 5.0   | 5.5   | 6.8   |       | 5.8   |       |       | 10.7  |       |       |
| Humboldt                            | 6.0    | 6.1   | 5.3   | 5.7   | 4.8   | 7.6   | 9.3   | 18.0  | 12.5  | 13.0  | 8.6   | 2.3   |
| Inyo                                | 10.5   | 7.3   | 8.5   | 5.0   | 5.3   | 7.8   | 5.6   | 14.2  | 9.7   | 6.2   |       |       |
| Kern                                | 26.9   | 10.6  | 11.0  | 10.8  | 12.2  | 16.5  | 18.4  | 14.7  | 13.0  | 14.2  | 9.1   | 11.7  |
| Lake                                | 10.0   | 6.4   | 4.7   | 5.9   | 4.6   | 5.9   |       |       | 7.2   | 7.9   |       |       |
| Lassen                              | 6.0    | 4.3   | 3.8   | 5.9   | 6.5   | 3.6   | 4.8   | 4.4   | 4.4   | 9.8   | 3.9   | 5.6   |
| Los Angeles                         | 7.6    | 14.8  | 14.1  | 8.1   | 8.8   | 13.5  | 15.8  | 14.9  | 15.6  | 11.1  | 12.0  | 14.4  |
| Madera                              |        |       |       | 8.9   |       | 11.3  | 12.7  |       |       | 7.3   |       |       |
| Mariposa                            | 6.9    | 11.8  | 5.7   | 10.1  | 6.3   |       | 9.6   | 7.2   | 10.1  | 19.9  |       |       |
| Mendocino                           | 8.0    | 5.9   | 6.1   | 4.5   | 5.4   | 6.1   | 5.9   | 5.1   | 6.5   | 6.2   | 5.4   |       |
| Modoc                               | 5.6    | 4.2   | 3.2   | 4.6   | 5.5   | 7.7   | 7.2   | 6.3   | 6.2   | 7.2   | 7.2   | 3.0   |
| Mono                                |        | 5.9   |       | 4.2   | 6.9   | 9.2   |       |       |       | 6.5   |       |       |
| Monterey                            | 9.2    | 11.3  | 16.3  | 14.2  | 11.7  | 14.7  | 18.0  | 17.8  | 21.4  | 24.8  | 14.0  | 16.1  |
| Plumas                              | 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   | 12.0  | 8.7   | 16.5  |
| San Benito                          | 9.0    | 9.8   | 13.0  | 9.0   | 9.8   |       | 8.3   |       | 14.2  |       |       |       |
| San Bernardino                      | 19.3   | 17.5  | 14.7  | 9.2   | 10.0  | 12.0  | 11.6  | 14.6  | 14.6  | 13.3  | 12.3  | 14.0  |
| San Diego                           | 12.1   | 11.5  | 6.0   | 9.4   | 9.8   | 10.6  | 11.8  | 10.8  | 11.6  | 14.0  | 16.9  | 16.8  |
| San Luis Obispo                     | 9.1    | 9.0   | 13.9  | 8.5   | 10.6  | 14.4  | 11.1  | 10.8  | 14.7  | 14.4  | 10.4  | 7.5   |
| Santa Barbara                       | 16.8   | 15.2  | 13.6  | 12.2  | 16.6  | 17.4  | 16.3  | 16.1  | 13.9  | 13.9  | 11.7  |       |
| Shasta                              | 4.0    | 3.6   | 2.9   | 3.1   | 3.3   | 4.1   | 4.4   | 4.8   | 4.7   | 4.9   | 6.3   | 4.9   |
| Siskiyou                            | 6.7    | 4.4   | 3.8   | 5.7   | 5.1   | 5.2   | 0.2   | 5.6   | 5.9   | 9.9   | 6.5   | 5.0   |
| Sonoma                              | 7.2    | 4.8   | 6.4   | 7.5   | 8.4   | 6.5   | 4.6   |       | 6.8   |       | 9.3   |       |
| Tehama                              | 5.3    | 3.7   | 5.1   | 4.1   | 3.8   | 3.7   | 6.3   | 3.8   | 3.9   | 5.8   |       |       |
| Trinity                             | 5.4    | 4.0   | 3.3   | 3.3   | 4.4   | 2.5   | 3.5   |       | 8.5   | 5.0   | 2.2   |       |
| Tulare                              | 11.7   | 12.2  | 9.2   | 9.3   | 11.2  | 10.5  | 13.4  | 14.5  | 12.3  | 17.1  | 8.5   | 6.2   |
| Tuolumne                            |        |       | 7.4   | 5.8   | 6.9   | 5.4   |       |       |       | 5.2   |       |       |
| Ventura                             | 7.1    | 10.0  | 9.4   | 10.4  | 11.2  | 10.4  | 13.5  | 12.6  | 18.4  | 16.6  | 9.9   | 16.1  |
| Statewide                           | 9.04   | 7.76  | 8.04  | 8.78  | 9.08  | 11.86 | 12.01 | 12.71 | 14.75 | 13.55 | 12.61 | 12.06 |
| # Trappers<br>harvesting<br>bobcats | 766    | 920   | 1,007 | 909   | 821   | 488   | 398   | 547   | 584   | 664   | 443   | 303   |
| # Trappers<br>licensed              | 2,378  | 3,221 | 3,201 | 3,686 | 3,901 | 1,607 | 1,650 | 1,417 | 1,347 | 1,460 | 1,244 | 834   |

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

As usual the commercial take of bobcats was primarily by trapping (90%) (Tables 7 and 8). Hunting with dogs remains the second most common way to take bobcats. This method was most commonly employed in Mendocino County. About 0.4% of the bobcat furs were salvaged and of the remaining, 0.7% were taken through the use of a predator call and 1.6% were taken by hunting where the specific method was not given. Predator calling only occurs occasionally as a commercial hunting method.

Table 7. Method of Commercial Take of Bobcats, 1989-90.

| County          | % Taken<br>by Trap | % Taken<br>by Dogs | % Taken<br>by<br>Calling | % Taken<br>Misc.<br>Hunting | %<br>Salvaged<br>Road Kill | %<br>Method<br>Unknown | Sample<br>Size |
|-----------------|--------------------|--------------------|--------------------------|-----------------------------|----------------------------|------------------------|----------------|
| Alpine          | 100                |                    |                          |                             |                            |                        | 12             |
| Amador          | 69                 | 31                 |                          |                             |                            |                        | 16             |
| Butte           | 100                |                    |                          |                             |                            |                        | 2              |
| Calaveras       |                    | 100                |                          |                             |                            |                        | 4              |
| Colusa          | 100                |                    |                          |                             |                            |                        | 11             |
| El Dorado       |                    | 100                |                          |                             |                            |                        | 7              |
| Fresno          | 100                |                    |                          |                             |                            |                        | 226            |
| Humboldt        | 20                 | 80                 |                          |                             |                            |                        | 126            |
| Imperial        | 100                |                    |                          |                             |                            |                        | 8              |
| Inyo            | 100                |                    |                          |                             |                            |                        | 76             |
| Kern            | 95                 | 4                  | 1                        |                             |                            |                        | 306            |
| Lake            | 100                |                    |                          |                             |                            |                        | 17             |
| Lassen          | 92                 | 7                  | 1                        |                             |                            |                        | 85             |
| Los Angeles     | 100                |                    |                          |                             |                            |                        | 187            |
| Madera          | 93                 | 100                |                          |                             |                            |                        | 28             |
| Marin           |                    |                    |                          | 100                         |                            |                        | 20             |
| Mendocino       | 50                 | 50                 |                          |                             |                            |                        | 6              |
| Modoc           | 78                 | 17                 | 2                        | 3                           |                            |                        | 62             |
| Mono            | 80                 |                    |                          | 20                          |                            |                        | 30             |
| Monterey        | 99                 | 1                  |                          |                             |                            |                        | 194            |
| Napa            | 100                |                    |                          |                             |                            |                        | 5              |
| Nevada          |                    | 100                |                          |                             |                            |                        | 4              |
| Orange          | 100                |                    |                          |                             |                            |                        | 13             |
| Placer          | 100                |                    |                          |                             |                            |                        | 1              |
| Plumas          | 100                |                    |                          |                             |                            |                        | 47             |
| Riverside       | 100                |                    |                          |                             |                            |                        | 33             |
| San Benito      | 100                |                    |                          |                             |                            |                        | 49             |
| San Bernardino  | 100                |                    |                          |                             |                            |                        | 294            |
| San Diego       | 95                 |                    | 3                        | 2                           |                            |                        | 177            |
| San Luis Obispo | 87                 |                    | 1                        | 12                          |                            |                        | 121            |
| Santa Barbara   | 89                 | 11                 |                          |                             |                            |                        | 62             |
| Santa Clara     | 100                |                    |                          |                             |                            |                        | 17             |
| Shasta          | 81                 | 18                 |                          |                             | 1                          |                        | 96             |
| Siskiyou        | 91                 | 4                  | 5                        |                             |                            |                        | 142            |
| Sonoma          | 100                |                    |                          |                             |                            |                        | 27             |
| Stanislaus      | 90                 |                    |                          | 10                          |                            |                        | 10             |
| Tehama          | 80                 | 20                 |                          |                             |                            |                        | 5              |
| Trinity         | 91                 | 9                  |                          |                             |                            |                        | 23             |
| Tulare          | 73                 | 27                 |                          |                             |                            |                        | 136            |
| Tuolumne        | 100                |                    |                          |                             |                            |                        | 8              |
| Ventura         | 95                 | 3                  | 1                        | 1                           |                            |                        | 254            |
| Yolo            | 100                |                    |                          |                             |                            |                        | 32             |
| Yuba            | 100                |                    |                          |                             |                            |                        | 1              |
| Total           | 89.9               | 7.8                | 0.7                      | 1.6                         | 0                          | 0                      | 2980           |

\* 0 = less than 0.5 percent.

**Table 8. Method of Commercial Take of Bobcats, 1980-90.**

| 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     |
| 1987-88 | 88.5   | 9.6  | 1.1     | 0.6         | 0.1       | 0.1     |
| 1988-89 | 85.5   | 11.8 | 0.9     | 0.4         | 0.1       | 1.4     |
| 1989-90 | 89.9   | 7.8  | 0.7     | 1.6         | -         | -       |

The harvest of bobcats by hunters was approximately 715 (Table 1). Of these, 549 were taken and reported by licensed hunters (Tables 9 and 10), 412 were taken by hunters with hunting licenses only, 137 by hunters with both hunting and trapping licenses, and 166 by hunters with only a trapping license. The estimate of 715 bobcats taken by licensed hunters was derived from the Department's annual "Game Take Hunter Survey." A sample of 3.1% of California's 384,096 licensed hunters produced 11,890 responses. This sampling provides an 80% confidence level for the estimated take of bobcats by licensed hunters of between 385 and 713 individuals (Table 9). These same hunters spent an estimated 11,154 days hunting bobcats for an average take of 0.049 bobcats per day (Table 10). This is the lowest hunter take per unit of effort in the last ten seasons.

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. Given a sport hunting public of about 950 (estimated from the annual hunter survey and subtracting all trappers who reported taking bobcats), about 94% of the sport hunters purchased the required tags in 1989. Additionally, sport hunters sent in tags for about 68% of the bobcats that they reported taking in the annual hunter survey.

## DISCUSSION

The total bobcat harvest, as in last year, decreased again in the 1989-90 season. This was due primarily to the very low bobcat pelt price average of \$17.91. There has always been a fairly strong correlation between pelt price and trapper effort. The reduction in bobcat take was coupled with a substantial reduction in pelt prices of both coyotes and gray foxes. These lower pelt prices are determined by the fur market, and makes it economically unrealistic for many trappers to trap if the pelt prices for all three species (coyote, bobcat and gray fox) are low. There was no national or international regulatory action enacted or pending which might have influenced the demand for bobcat furs. The market just appears to be saturated. It is expected to improve somewhat during the 1990-91 trapping season.

**Table 9.** Statistical Parameters of the Hunter Take of Bobcats during 1987, Poisson Distribution.\*

| Frequency Distribution: | Bobcats Taken Per Hunter | No. of Hunters | Total Bobcats Taken |
|-------------------------|--------------------------|----------------|---------------------|
|                         | 0                        | 21             | 0                   |
|                         | 1                        | 8              | 8                   |
|                         | 2                        | 3              | 6                   |
|                         | 3                        | 1              | 3                   |
|                         | 4                        | 0              | 0                   |
|                         |                          | -----          | -----               |
|                         |                          | Ef= 33         | Eyf= 17             |

$$\text{Average take per hunter } x = \frac{\text{total bobcats taken}}{\text{total respondents}} = \frac{17}{11890} = 0.001429$$

$$\text{Statewide bag} = (x)(\text{tot. no. license buyers}) = (0.001429)(384096) = 549$$

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

$$\sigma(x) = \frac{x}{n} = \frac{0.001429}{11890} = 0.0003162$$

Confidence interval of  $x = x \pm t\sigma$

| Confidence Levels | Mean $\pm$ std. deviation<br>$x \pm t \sigma$ | Confidence Intervals<br>$x \pm t\sigma$ | Confidence Intervals for Total Take ** |
|-------------------|---|---|--|
| @ 80% =           | $x \pm (1.35) \sigma$                         | 0.001429 $\pm$ 0.0004268                | 385 to 713                             |
| @ 90% =           | $x \pm (1.65) \sigma$                         | 0.001429 $\pm$ 0.0005217                | 349 to 749                             |
| @ 95% =           | $x \pm (1.96) \sigma$                         | 0.001429 $\pm$ 0.0006197                | 311 to 787                             |
| @ 99% =           | $x \pm (2.576) \sigma$                        | 0.001429 $\pm$ 0.0008145                | 236 to 862                             |

\* After Shimamoto (1976)

\*\* Calculated by multiplying confidence intervals for  $x$  by the total number of license buyers.

**Table 10.** Licensed Sport Hunter Take of Bobcats, 1978-89

| 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            |
| 1983 | 1794                      | 3082                                 | 43                 | 23184       | 0.077            |
| 1984 | 2232                      | 3456                                 | 33                 | 35670       | 0.063            |
| 1985 | 2205                      | 2597                                 | 40                 | 22785       | 0.097            |
| 1986 | 918                       | 1938                                 | 21                 | 15402       | 0.057            |
| 1987 | 2278                      | 2482                                 | 45                 | 20740       | 0.110            |
| 1988 | 1400                      | 2040                                 | 43                 | 18800       | 0.074            |
| 1989 | 549                       | 1221                                 | 36                 | 11154       | 0.049            |

Since the 1982-83 season, and with no change in season length, the harvest has remained below the 14,400 statewide harvest limit. Harvest monitoring should continue and if the statewide harvest reaches 14,000 bobcats the age and sex structure monitoring should be reinstated.

The bobcat take in northeastern California has been monitored every year because the age and sex structures had not increased to levels comparable to other areas of the state during the time the Department monitored these population parameters. The population now appears to continue to support a stable, if slightly cyclic harvest (Table 11). 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. The local harvest has been below this level for the last two seasons.

Table 11. Recent Commercial Harvest of Bobcats in Northeastern California.

| Season  | County              |       |        |        | Total<br>Northeastern<br>California |
|---------|---------------------|-------|--------|--------|-------------------------------------|
|         | Eastern<br>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                                 |
| 1987-88 | 148                 | 223   | 187    | 43     | 601                                 |
| 1988-89 | 60                  | 107   | 85     | 30     | 282                                 |
| 1989-90 | 36                  | 62    | 85     | 47     | 230                                 |

The disparity between the information provided by the annual hunter survey and the sport hunting tag program continues. However, the disparity is much less than in previous years. The take reported from sport hunting tags is 68% of the estimated sport hunting take, and represents a substantial improvement over previous years. Likewise, the number of sport hunting tag buyers is about 94% of the estimated number of bobcat hunters (Table 12).

Table 12. Sport Hunting Tag Program Compliance, 1982-83 to 1989-90

|   | Season  |         |         |         |         |         |         |         |
|---|---------|---------|---------|---------|---------|---------|---------|---------|
|   | 1982-83 | 1983-84 | 1984-85 | 1985-86 | 1986-87 | 1987-88 | 1988-89 | 1989-90 |
| No. of Sport Hunting Tag Buyers               | 384     | 495     | 547     | 777     | 823     | 908     | 807     | 890     |
| Estimated No. of Bobcat Hunters *             | 3408    | 2594    | 3058    | 2050    | 1354    | 1818    | 1597    | 952     |
| Percent of Hunters Buying Tags                | 11.3    | 19.1    | 17.9    | 37.9    | 60.8    | 49.9    | 50.5    | 93.5    |
| Take Reported by Return of Sport Hunting Tags | 87      | 107     | 156     | 149     | 147     | 177     | 205     | 280     |
| Estimated Sport Hunting Take **               | 1865    | 1291    | 1591    | 1689    | 619     | 1796    | 1069    | 412     |
| Percent of Take Reported                      | 4.7     | 8.3     | 9.8     | 8.8     | 23.7    | 9.9     | 19.2    | 68.0    |

\* 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.

### RECOMMENDATION

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