

State of California
THE RESOURCES AGENCY
Department of Fish and Game

THE STATUS OF HARVESTED FURBEARERS IN CALIFORNIA -
BADGER, BEAVER, GRAY FOX, MINK, MUSKRAT AND RACCOON^{1/}

by

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The attached species accounts are summaries of the present knowledge of six species of furbearers harvested in California. These are the only furbearing mammals, as defined by Section 4000 of the Fish and Game Code, that can be taken under regulations established by the Fish and Game Commission. The remaining eight furbearers are completely protected and may not be taken at any time except for scientific purposes under strict permit control. Nongame mammals, those not classified as a game mammal, furbearer or fully protected mammal, that are taken for their fur (i.e., coyote, bobcat, skunk) are not included in this report. Similar status reports will be prepared to cover the protected furbearers and the nongame furbearing mammals.

These reports are only the condensation of information on taxonomy, legal status, natural history, distribution and harvest gathered through previous research, literature searches, and Departmental reporting procedure. Because of the broad nature of these reports they are not intended to present definitive data or the total scope of information available to the Department.

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BADGER

INTRODUCTION

Taxonomy. This large burrowing mustelid (Taxidea taxus) was once fairly common and widespread in the state. Grinnell et al. (1937) describe two subspecies of badger in California; the California badger (T. t. neglecta) which is found throughout the state except in the extreme northwest and the southeastern desert region, and the Mexican badger (T. t. berlandieri) which replaces neglecta in the southern desert and on the east slope of the Sierra Nevada north to Kern and Inyo counties.

Legal Status. Prior to 1956 the badger was considered a predatory mammal with no season or bag limit. In 1957 the badger became classified as a furbearing mammal and may now be taken from November 16 through the last day of February, statewide. There is no bag or possession limit. Houndsmen may pursue badger for the purpose of training or practicing their dogs from March 1 through November 15, providing that no badgers are killed or injured (California Dept. of Fish and Game. Trapping Regulations 1977-78).

NATURAL HISTORY

Habitat. Grasslands, savannas and high mountain meadows with abundant rodents are ideal badger habitats. Badgers avoid extensive agricultural areas because prey items are reduced and cultivation destroys the burrows that are necessary for diurnal retreats and raising young. There is no evidence that badgers hibernate but they may at high elevations. They have been observed at 200 feet below sea level in Death Valley and in the White Mountains at 13,000 feet.

Food Habits. Food habit studies in Iowa by Errington (1937) and Snead (1942) show ground squirrels to be the most important food item, comprising over half the badgers diet. Mice, rabbits and insects were also important items with traces of gophers, birds, eggs, snakes and grass. Carp (Drake et al. 1950) and honey (Grinnell et al. 1937) have also been reported. Badgers are mainly nocturnal and catch most of their food by digging for it. They can easily enlarge rodent burrows and capture sleeping and hibernating animals. Knopf and Balph (1969) observed badgers covering up accessory squirrel burrow entrances before digging into the main entrance. They also observed a preference for squirrel burrows containing females with litters. Balph (1961) suggests that badgers may conceal themselves in a squirrel burrow system and capture returning prey and those attempting to leave.

Reproduction. Grinnell et al. (1937) cite litter sizes of one to five, averaging two. He also shows elevational differences in breeding times with most San Joaquin Valley litters born between February and March and those above 10,000 feet between April and May.

DISTRIBUTION

Current distribution data is largely taken from licensed fur trapper reports. This information is biased because many reports are inaccurate, trapping effort is not uniform throughout the state and most badgers are taken incidental to trapping effort directed at other species. Many trappers fail to report. Data from the 1975-76 trapping report indicate that Fresno, Inyo, Lassen, Modoc and San Bernardino counties may contain substantial populations and badger were trapped in at least 21 other counties (Table 1). These reports provide no information on altitudinal distribution.

HARVEST

Fur Trapping. Badger have never been heavily sought after for their fur in California. Although formerly common they were probably never very abundant. Skinning badger and preparing the pelts is difficult and time consuming. In addition, average pelt prices were below \$3.00 until 1971. Table 2 shows few badger trapped from 1957 to 1973, indicating a small stable harvest. The increased reported harvests for 1974-77 indicate increased trapping effort probably due to the rapid rise in wholesale fur prices (Table 2). Since badger habitat is reduced every year, an increased harvest necessitates a better understanding of badger biology in order to properly manage them.

Animal Control. Most property damage by badgers is due to their burrowing activities. Ranchers are concerned that badger burrows may result in leg injuries to livestock. Burrows in irrigation levees and predation of poultry are other problems. Landowners may legally remove any badger causing property damage but most animal control activities are carried out by the U. S. Fish and Wildlife Service. The Service reported the take of 4,086 badgers during fiscal years 1966-1976 (Table 2). The number of animals taken reflects their competition with humans and does not necessarily indicate relative abundance and distribution. Fewer animals are being taken now than in the past due to a de-emphasis of blanket control and a concentrated effort in problem areas. Also, nontarget animals trapped incidentally during predator control activities are now released if they are uninjured.

Annual harvest of badgers for animal damage control has been much greater than fur trapper harvest (Table 2). Even with increased fur trapping effort, in the last two years, fewer badgers are now being harvested annually because of the reduction in the take of badgers by animal control agencies.

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TABLE 1

NUMBER OF BADGER REPORTED TAKEN BY
LICENSED FUR TRAPPERS 1975-76 TRAPPING SEASON

<u>County</u>	<u>Take</u>
Alameda	1
Alpine	1
Butte	1
Fresno	8
Humboldt	2
Imperial	1
Inyo	7
Kern	4
Lake	2
Lassen	11
Los Angeles	3
Merced	1
Modoc	30
Mono	4
Plumas	1
Riverside	5
Sacramento	2
San Bernardino	11
San Diego	1
San Luis Obispo	2
Santa Barbara	1
Shasta	3
Siskiyou	2
Stanislaus	1
Trinity	1
Ventura	<u>1</u>
Total	107

TABLE 2

REPORTED TAKE OF BADGER
1957-1976

<u>Season</u>	<u>Average Price Per Pelt</u>	<u>Trapper Take</u>	<u>Animal Control¹⁾</u>	<u>Total</u>
1957-58	.50	10		
1958-59	1.00	4		
1959-60	1.40	20		
1960-61	1.40	12		
1961-62	.90	8		
1962-63	1.00	22		
1963-64	2.30	18		
1964-65	1.50	18		
1965-66	1.90	18	862	880
1966-67	.90	13	637	650
1967-68	1.80	10	513	523
1968-69	2.40	29	524	553
1969-70	2.30	38	451	489
1970-71	1.00	8	367	375
1971-72	3.00	36	312	348
1972-73	3.10	21	207	228
1973-74	8.00	51	69	120
1974-75	10.00	87	73	160
1975-76	18.75	<u>107</u>	<u>71</u>	<u>178</u>
Total		530	4086	4504

1) U. S. Fish and Wildlife Service reported take.

State of California
THE RESOURCES AGENCY
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BEAVER

INTRODUCTION

Taxonomy. Grinnell et al. (1937) describe three native subspecies of California beaver (Castor canadensis): the Shasta beaver (C. c. shastensis) of the drainage basins of the Klamath and Pit Rivers in the extreme northern part of the state, the Sonora beaver (C. c. frondator) of the Lower Colorado River and its tributaries, and the golden beaver (C. c. subauratus) of the lower courses of the San Joaquin and Sacramento Rivers and their larger tributaries.

The high demand for beaver pelts played an important role in the exploration and settlement of California. The earliest account of commercial trapping for beaver dates from 1827. James Ohio Pattie took large numbers of Sonoran pelts from the Colorado River. Substantial populations of golden beaver were reported by Jedediah Smith in the northern Central Valley in 1828. From 1828 to 1846 Hudson's Bay Company sent up to 200 trappers annually to California. After General Sutter settled on the Sacramento River, he competed with Hudson's Bay Company for the purchase of furs and persuaded the government to levy and collect export duties on beaver pelts. This action together with the increased scarcity of beaver in the state forced Hudson's Bay Company to abandon trapping efforts in California in 1846.

Legal Status. Prior to 1911 there were no restrictions on the take of beaver in California. Faced with possible extermination, legislation was enacted in 1911 to provide for complete protection of beaver (Sec. 626P, Fish and Game Code, 1911-12). Beaver populations rebounded so well that the Fish and Game Commission allowed the take of beaver causing damage to reclamation levees. A trapping season was established in Regions 1, 2 and 3 in 1925 but unlawful trapping was occurring throughout the state to such an extent that the beaver was again granted full protection in 1933.

Another increase in beaver related damage necessitated legislation in 1939 to provide for control of beaver where they damaged or threatened lands, crops, levees or other irrigation structures. This status remained unchanged until 1957 when the beaver became classified as a furbearing mammal. The beaver is still a furbearer with a season of take between November 16 and the last day of February. There is no bag limit.

NATURAL HISTORY

Habitat. Completely dependent upon water, beaver inhabit slow to moderate flowing streams, and ponds and lakes where sufficient food exists. They inhabit areas from sea level to 10,000 feet in the Sierra Nevada. Most low elevation beavers in California dig burrows in river banks and levees. Beavers living on higher, faster flowing streams may construct dams to reduce the flow and increase water depth. Lodges may be built where burrowing is difficult. Both types of shelter have underwater entrances, serve as a refuge from predators and harsh weather and as a place to rest and raise young. Beavers are nocturnal and do not hibernate.

Food Habits. Bark and twigs of willow, cottonwood and aspen as well as roots, bulbs, grasses and cattails are the preferred food of the beaver. Food is stored where winter freezes prevent foraging but in most of California beaver can forage year round.

Reproduction. The reproductive cycle in beaver in California begins in January and mating continues until March (Grinnell et al. 1937). Gestation is between 90 and 120 days with most kits born in April. The average litter size is three. Males tend to avoid their mates and her young during the spring and summer but return in the fall when the kits are weaned. A typical beaver colony consists of the parents with their progeny of the previous year and the kits of the current year. Young are usually forced out of the colony during their second year. Sexual maturity is probably reached the third year.

DISTRIBUTION

In 1942 Tappe (1942) estimated the total beaver population of California to be 1,300. A large-scale program was begun by the Division of Fish and Game in 1945 to transplant beaver into the Sierra Nevada. The goal was to ensure beaver survival and enhance wildlife habitat. Previous to this the U. S. Forest Service made 234 transplants into Plumas and Tuolumne counties. From 1945 to 1949, 974 beaver were transplanted. By 1950 there were an estimated 20,000 beaver in the state (Fish and Game report, unpublished).

Current distribution data is largely taken from licensed fur trapper reports. This information is biased because many reports are inaccurate and trapping effort is not uniform throughout the state. Many trappers fail to report. The reports for the 1975-76 season indicate that most beaver were taken from the northern Central Valley, and Lassen, Plumas and Shasta counties (Table 1). These data should indicate the relative abundance and distribution of beaver in the state but reports of few or no beaver from a county may reflect the inaccessibility of a population and not the lack of one.

HARVEST

Fur Trapping. The take of California beaver has been relatively constant during the last 27 years indicating a stable harvest (Table 2). Beaver have not recently been heavily trapped in California because of low prices and the time it takes to prepare a pelt. Current prices have doubled since 1974-75 but this increase is much lower than that experienced by most furbearers, especially the long-haired species that are now in the greatest demand.

Animal Control. Like many other rodents, beaver have a high reproductive rate in the absence of natural controls and can easily exceed the carrying capacity of their habitat (Hall 1960, Colo. Game and Fish, 1964). There is need for control where this condition exists. Control measures also become necessary when beavers dam irrigation ditches or cause damage to headgates, levees and orchards. Problem animals may be destroyed or live-trapped and displaced.

Beaver are generally considered to improve trout habitat by providing an increased food supply (Gard 1961). Usually there are sufficient spawning beds upstream for trout living in beaver ponds. This is not the case for the threatened Paiute cutthroat trout or the native golden trout. Adverse effects on these trout by

introduced beaver are documented in the Upper Kern River, Cottonwood Creek and Golden Trout Creek in the Sequoia-Kings National Park and the Sequoia and Inyo National Forests (U. S. Forest Service, 1976. Proposed Beaver Removal in Cottonwood Creek, unpublished). Control programs were implemented in 1969 and 1976 by the U. S. Fish and Wildlife Service and continued surveillance is maintained to ensure the survival of these native fish.

Beaver damage control is conducted by the U. S. Fish and Wildlife Service. Summary of their activities from 1969-1976 (Table 3) indicates counties where depredating beaver were taken and does not reflect relative abundance or distribution.

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TABLE 1

NUMBER OF BEAVER REPORTED TAKEN BY
LICENSED FUR TRAPPERS 1975-76

<u>County</u>	<u>Take</u>
Butte	64
Colusa	3
Contra Costa	20
El Dorado	1
Fresno	14
Glenn	30
Humboldt	2
Imperial	1
Inyo	24
Kern	3
Lassen	47
Merced	10
Modoc	9
Mono	4
Nevada	9
Placer	14
Plumas	68
Sacramento	118
San Joaquin	136
Shasta	64
Sierra	22
Siskiyou	39
Solano	47
Stanislaus	32
Sutter	8
Tehama	24
Yolo	20
Yuba	<u>23</u>
Total	856

No beaver were reported taken from the following counties:
Alameda, Alpine, Amador, Calaveras, Del Norte, Kings, Lake,
Los Angeles, Madera, Marin, Mariposa, Mendocino, Monterey,
Napa, Orange, Riverside, San Benito, San Bernardino, San Diego,
San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa
Clara, Santa Cruz, Sonoma, Trinity, Tulare, Tuolumne, Ventura.

TABLE 2

REPORTED TAKE OF BEAVER IN CALIFORNIA BY
 LICENSED FUR TRAPPERS
 1925-1976^{1/}

<u>Season</u>	<u>Take</u>	<u>Average Price Per Felt</u>
1925-26	4,019	\$12.40
1926-27	692	12.90
1927-28	700	14.10
1928-29	No Data	-
1929-30	No Data	-
1930-31	60	9.20
1931-32	58	5.40
1932-47	Fully Protected	-
1947-48	843	17.40
1948-49	0	-
1949-50	1,511	9.20
1950-51	690	14.20
1951-52	1,642	6.80
1952-53	690	5.90
1953-54	947	4.90
1954-55	1,006	7.70
1955-56	1,467	6.90
1956-57	2,247	5.42
1957-58	1,755	5.80
1958-59	1,838	5.70
1959-60	1,703	7.60
1960-61	2,002	7.20
1961-62	1,366	7.20
1962-63	1,606	7.60
1963-64	1,651	8.10
1964-65	1,679	7.30
1965-66	1,686	8.10
1966-67	1,384	8.90
1967-68	1,184	9.30
1968-69	1,542	11.40
1969-70	1,301	8.70
1970-71	539	4.90
1971-72	817	9.80
1972-73	1,709	10.40
1973-74	1,053	7.00
1974-75	855	7.00
1975-76	856	15.00
Total	43,098	

^{1/} The reported take of beaver between 1947 and 1957 was by permit for property damage control.

TABLE 3

TAKE OF BEAVER BY
U. S. FISH AND WILDLIFE SERVICE FOR ANIMAL CONTROL
1969-1976

<u>County</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Amador								8
Butte								4
Calaveras					2	5		
Contra Costa			3					
Del Norte				2				
El Dorado						4		
Fresno				30				
Humboldt			1					
Inyo								3
Kern								1
Kings							6	
Lake								2
Lassen			1			1		
Madera								10
Modoc			2		3	8	4	4
Mono			12					2
Nevada					1		2	
Placer							1	1
Shasta		5	24	33	19	31	22	29
Siskiyou		1	2	3	9	1	2	
Tehama		7						
Tulare	4	106	30			74	5	3
Tuolumne							1	
Yolo				1				
Yuba				2	1			
Total	4	119	75	71	35	124	43	67

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GRAY FOX

INTRODUCTION

Taxonomy. Grinnell et al. (1937) describe three races of gray fox (*Urocyon cinereoargenteus*) in California: *U. c. townsendi* of the northern two-thirds of the state, *U. c. californicus* restricted to the southwestern corner, and *U. c. scottii* of the southeastern desert. Although the gray fox is abundant and wide-spread in California, there is an astounding lack of information on its biology. A good review of the literature is given by Trapp and Hallberg (1975) and is the major source of information for this report.

Legal Status. The gray fox was first designated as a furbearing mammal in 1917. There is currently a season of take from November 16 to the last day of February statewide with no bag or possession limit. Also, they may be pursued by dogs from March 1 through November 15 for the purpose of breaking, training or practicing providing that no gray fox are killed or injured.

NATURAL HISTORY

Habitat. Chaparral, dense brush and riparian woodland from sea level to 5,000 feet elevation are preferred habitats. Gray fox have also adapted well to agricultural areas and to the outskirts of cities.

Food Habits. Food habit studies indicate the gray fox is an opportunistic omnivore. Lagomorphs, rodents, carrion, small birds, insects and plants are primary foods. Seasonal preferences reflect the abundance and availability of food items throughout the year.

Reproduction. Mating occurs in California between February and March with gestation lasting 53 to 63 days. One litter per year is born averaging four pups. Dens are usually in tree cavities, hollow logs, among rocks or in burrows. The pups are weaned in July and may remain with the family unit until the following January.

High fertility coupled with high mortality suggests that fox populations are essentially an "annual crop." Data from several studies show that 48-73% of each population were juveniles. Annual reproductive potentials for New York and Florida-Georgia populations are 1.8 and 2.3 young per adult per year respectively. Reported densities ranging from 1 to 27 foxes per square mile probably reflect habitat productivity. The unusually high estimate of 27 foxes per square mile was reported by Errington (1933) in Wisconsin in December 1932. Grinnell et al. (1937) estimated one fox per square mile in typical California chaparral at the start of the trapping season. A sex ratio of 1:1 is reported by most authors.

DISTRIBUTION

Current distribution data is largely taken from licensed fur trapper reports. This information is biased because many reports are inaccurate and trapping effort is not uniform throughout the state. Many trappers fail to report. Data from the 1975-76 trapping report indicate gray fox populations in most counties with Humboldt, Lake, San Diego and Tehama reporting the largest harvest (Table 1).

HARVEST

Fur Trapping. The take of gray fox in California was fairly constant from 1950 to 1973. The 1973-74 trapping season marked a significant increase in the reported take (Table 2). This increased harvest is due to the dramatic rise in wholesale prices for gray fox pelts. This trend is continuing as prices have doubled since 1973-74 to a record high average of \$24.80. With such an increased demand for long haired furs it will be imperative to determine the effects of harvesting on gray fox populations.

Animal Control. Gray fox are often taken during predator control programs. Although some damage to crops and poultry may be attributed to gray fox, they pose no serious property damage threat. Problem animals may be destroyed and some are taken incidentally during other predator control programs.

The U. S. Fish and Wildlife Service reported the take of 9,302 gray fox during fiscal years 1966-1976 (Table 2) for animal damage control. Fewer animals are being taken now than in the past due to a de-emphasis of blanket control and a concentrated effort in problem areas. Also nontarget animals trapped during predator control activities are released if uninjured. The increase in fur trapper harvest combined with more selective animal control programs has resulted in a fairly stable total annual harvest (Table 2).

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TABLE 1

NUMBER OF GRAY FOX REPORTED TAKEN BY LICENSED FUR TRAPPERS
1975-76

<u>County</u>	<u>Take</u>
Alameda	31
Alpine	4
Amador	1
Butte	82
Colusa	22
Del Norte	2
El Dorado	17
Fresno	53
Glenn	48
Humboldt	157
Imperial	18
Inyo	19
Kern	75
Lake	147
Lassen	1
Los Angeles	18
Madera	1
Mariposa	19
Mendocino	81
Merced	22
Mono	27
Monterey	25
Napa	29
Nevada	5
Placer	31
Plumas	5
Riverside	46
Sacramento	8
San Benito	3
San Bernardino	66
San Diego	125
San Joaquin	72
San Luis Obispo	40
Santa Barbara	24
Shasta	72
Siskiyou	14
Solano	87
Sonoma	24
Stanislaus	42
Sutter	6
Tehama	122
Trinity	39
Tulare	10
Tuolumne	11
Ventura	28
Yolo	60
Yuba	41
Total	1880

TABLE 2

TAKE OF GRAY FOX
1950-1976

<u>Season</u>	<u>Average Price Per Felt</u>	<u>Trapper Take</u>	<u>Animal Control^{1/}</u>	<u>Total</u>
1950-51	.40	670		
1951-52	.30	387		
1952-53	.40	517		
1953-54	.50	554		
1954-55	.30	281		
1955-56	.30	272		
1956-57	.30	449		
1957-58	.30	259		
1958-59	.30	193		
1959-60	.70	145		
1960-61	.90	187		
1961-62	.80	213		
1962-63	.90	275		
1963-64	.90	213		
1964-65	1.10	222		
1965-66	1.90	247	2,630	2,877
1966-67	1.00	168	1,898	2,066
1967-68	1.00	129	1,240	1,369
1968-69	2.80	289	895	1,184
1969-70	2.51	363	961	1,324
1970-71	2.70	314	605	919
1971-72	3.50	219	579	798
1972-73	7.30	570	158	728
1973-74	12.20	1,061	98	1,159
1974-75	12.10	930	109	1,039
1975-76	24.80	<u>1,880</u>	<u>129</u>	<u>2,009</u>
Total		11,007	9,302	15,472

^{1/}U. S. Fish and Wildlife Service

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MINK

INTRODUCTION

Taxonomy. Although occurring in several different habitats and possessing various pelages, there is one race of mink in California, Mustela vison aestuarina (Grinnell et al. 1937). Other geographical races have escaped from fur farms but they appear to have had little effect on the gene pool and distribution of native mink.

Legal Status. Mink were first classified as furbearers in 1917 and their status has remained unchanged to date. There is currently a statewide season of take from November 16 through the last day of February with no bag or possession limit.

NATURAL HISTORY

Habitat. Always associated with water, mink historically occurred in marshy lands of the lower courses of large Central Valley rivers, mountain streams of the northern Coast Ranges and the Sierra Nevada and the ocean shores north of San Francisco Bay (Grinnell et al. 1937). Dens are usually in accumulated piles of driftwood, rocks or a tree cavity near water.

Food Habits. In an analysis of 149 mink stomachs from California, fish, birds, mammals, mussels and crayfish were preferred food items (Grinnell et al. 1937). Errington (1954) studied mink-muskrat relationships in Iowa and concluded that even though mink eat a substantial number of muskrats most were probably dead or dying of hemorrhagic disease. He stated that most muskrat predation was during drought or freeze-outs when muskrats were easy prey. Since adult muskrats out-weigh adult minks, Errington believes that mink will select smaller, easier prey when it is available. Yeager (1943) describes many mink food caches including one in Illinois, found during the winter, which contained 13 muskrats, two mallards and one coot.

Reproduction. Reproduction data are lacking for California, but Grinnell et al. (1937) suggest that four to seven kits are born in May. Using baculum morphology to determine age, Hibbard (1957) found ratios of yearlings to adults of 4.32:1 and 5.55:1. These data are from commercially trapped mink indicating that trapping pressure is mostly on yearlings.

DISTRIBUTION

Current distribution data is taken largely from reports of licensed fur trappers. This information is biased because many reports are inaccurate and trapping effort is not uniform throughout the state. Many trappers fail to report. The 1975-76 trapping report indicates substantial harvests from Lake, Merced, Modoc, Sacramento, San Joaquin and Siskiyou counties. No mink were reported taken from the San Francisco Bay area and few were taken from the Sierra Nevada (Table 1).

This probably reflects the lack of suitable habitat in the bay area and inaccessibility of Sierran populations to trappers. Counties harvesting more than 50 mink also reported large harvests of muskrats. This probably indicates similar habitat requirements and not a dependence of mink upon muskrats.

HARVEST

Fur Trapping. Until the mid-1960s mink were one of the most important furbearers in the state. The high demand for mink garments brought average pelt prices to \$14.80 in 1945, and much more for prime pelts. Pelt prices and harvest began to decline in 1956 and the 1975-76 trapping reports indicate only a slight increase in harvest and pelt value (Table 2). The increase in value is much less than that experienced by most other furbearers. A new fashion demand for longer-haired pelts has resulted in a decreased demand for mink and other short-haired pelts.

Animal Control. Although an occasional mink may prey on domestic fowl this damage is minimal. There is no established state or federal program to control mink.

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TABLE 1

NUMBER OF MINK REPORTED TAKEN BY LICENSED FUR TRAPPERS
1975-76

<u>County</u>	<u>Take</u>
Butte	1
Contra Costa	2
Fresno	10
Humboldt	4
Lake	43
Madera	8
Mendocino	1
Merced	52
Modoc	68
Mono	2
Placer	1
Plumas	7
Sacramento	57
San Joaquin	104
Shasta	12
Siskiyou	177
Solano	3
Stanislaus	7
Tehama	2
Trinity	<u>9</u>
Total	570

TABLE 2

REPORTED TAKE OF MINK BY LICENSED FUR TRAPPERS
1957-1976

<u>Season</u>	<u>Take</u>	<u>Average Price Per Pelt</u>
1957-58	1,947	6.90
1958-59	1,634	8.70
1959-60	1,486	8.70
1960-61	1,467	6.40
1961-62	1,298	6.80
1962-63	1,086	7.90
1963-64	1,244	7.00
1964-65	935	7.00
1965-66	1,121	7.30
1966-67	643	6.20
1967-68	482	5.40
1968-69	654	6.50
1969-70	708	5.60
1970-71	283	2.80
1971-72	354	4.00
1972-73	502	7.10
1973-74	367	5.20
1974-75	442	6.60
1975-76	570	10.40

State of California
THE RESOURCES AGENCY
Department of Fish and Game
Nongame Wildlife Investigations
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MUSKRAT

INTRODUCTION

The muskrat (Ondatra zibethica) is probably California's most familiar and abundant furbearer. First reported in 1890 from the Colorado River, the muskrat has continued to be of significant economic importance because of its value as a furbearer and the damage it causes to irrigation dikes that are so important to agriculture in the state.

Taxonomy. Grinnell et al. (1937) describe two native subspecies of muskrat in California: the Colorado River muskrat (O. z. bernardi) found originally in the Colorado River along the Arizona border and the Nevada muskrat (O. z. mergens) which was found in scattered localities on the east side of the Sierra Nevada from Lassen County to Mono County (Fig. 1). Because of the variety of races that were introduced, the current taxonomy of California muskrats is uncertain.

Legal Status. Following the rapid spread of muskrats and subsequent concern for irrigation canals in Imperial and Kern counties, legislation was enacted in 1933 to prohibit their introduction into any watershed except the Klamath River (1933 Fish and Game Code, Section 1323). Current regulations list the muskrat as a furbearing mammal with a season for take from November 16 through March 31 statewide with no bag or possession limit.

NATURAL HISTORY

Habitat. Muskrats prefer freshwater marshes and slow moving water courses with sufficient vegetation for cover and forage at low elevations throughout the state. Burrows in river banks and levees are the most common type of shelter used by muskrats in the milder regions of California. Since burrow entrances are below water level, the construction of lodges becomes necessary in areas that freeze or in extensive marshes where burrowing is impossible. Errington's studies (1961) indicate that muskrats show some territoriality and are not likely to move as long as food and water are plentiful. They are most active during the night and do not hibernate.

Food Habits. Preferred foods are the shoots and roots of cattails and bermuda grass although some crops and occasionally small animals will be eaten (Errington 1961).

Reproduction. Grinnell et al. (1937) report that reproduction occurs year-round in southern California. Errington (1961) gives April through August as the breeding season for Iowa muskrats averaging 2.5 litters per year and seven kits per litter. Two breeding seasons is thought to be the average life span of females.

Errington (1961) believes that muskrats exhibit behavior that naturally limits their density. High densities may trigger reduced reproductive success and emigration whereas low densities in good habitat may increase litter sizes and

the number of litters per year. This is a common phenomenon of many animals and is well documented for laboratory rats. This results in muskrats easily repopulating areas that are heavily trapped and explains the rapid colonization of the Central Valley. Errington (1961) suggests that a one-year moratorium on trapping is sufficient to restore muskrat populations in all but the most severely depleted areas providing the habitat is suitable. Besides man, the probable enemies of the muskrat are dogs, coyotes, mink, horned owls, trematodes and round worms (Ingles 1965). Drought is also a threat to muskrats. Limited water reduces available food and prevents escape from predators (Errington 1961).

Errington (1961) suggests hemorrhagic disease as an important element in the population dynamics of muskrats. He documents many "hot spots" within his Iowa study area where this contagious disease reoccurred regularly. The mortality of each epidemic would vary, but he found that almost an entire local population could be eliminated.

DISTRIBUTION

Storer (1938) and Twining and Hensley (1943) document the rapid spread of muskrats in California following introductions and escapes from fur farms in the 1930s. Muskrats were so successful in colonizing previously uninhabited areas that in the 1940-41 season they were reported from 14 counties outside their native range. An additional 11 counties of the Central Valley reported significant catches in 1952-53 (Seymour 1959). Licensed fur trapper's reports for the 1975-76 season indicate relative distribution in the state with few or no muskrats reported taken from most counties of its original range (Table 1). Some of the biases of the trapper reports are that many reports are inaccurate and trapping effort is not uniform throughout the state. Many trappers fail to report.

HARVEST

Fur Trapping. From 1937 to the 1974-75 trapping season, muskrats were caught in greater numbers and brought in more revenue than any other California furbearer. Licensed fur trapper reports for the 1975-76 season show that muskrats still represent the majority of furs taken (83.6%). Seymour (1954) summarized the harvest and value of California muskrats from 1939 to 1953. Table 2 provides a summary for 1953 to 1976. The number of muskrats reported taken over the past 40 years has been relatively constant. The average price paid per pelt has only recently begun to rise. This increased value and two years of drought may have a significant impact on muskrat populations in the near future.

Animal Control. The activities of licensed trappers provide for effective damage control by reducing muskrat numbers in problem areas. State and federal refuge agents contract fur trappers to control muskrat damage in waterfowl management areas.

In 1919 and 1920 two water companies in the Imperial Valley paid a \$.25 bounty on muskrat tails in an effort to reduce animal damage. In the first year, one company paid bounties on 2,395 muskrats. Programs to eliminate vegetation in irrigation ditches were then initiated to reduce muskrat numbers. This practice continues today. Damage to the sandy soil dikes of southern California is much greater than the damage to dikes of the northern Central Valley where clay soils

are used in construction. The Department of Water Resources conducted muskrat control three years ago in the Los Banos area. Damage control programs on private lands are usually coordinated by the County Agricultural Commissioner, who instructs the landowner on methods and provides materials at government cost (Dell Clark, Dept. of Food and Agriculture, pers. comm.). Trapping is the most efficient method of control but requires some experience to be successful.

Anticoagulant baits are used also and are preferred by a number of landowners because they require less time. Pival R (Pivalyl-1, Indandione) treated bait was found to be the best accepted anticoagulant and is used in floating bait boxes or mixed with paraffin and placed on stakes that are inserted near burrow entrances. This "lollipop" is less selective than floating bait boxes but is the most preferred method since its placement is easier and it requires no maintenance or rebaiting during a typical control program (Miller ca. 1973).

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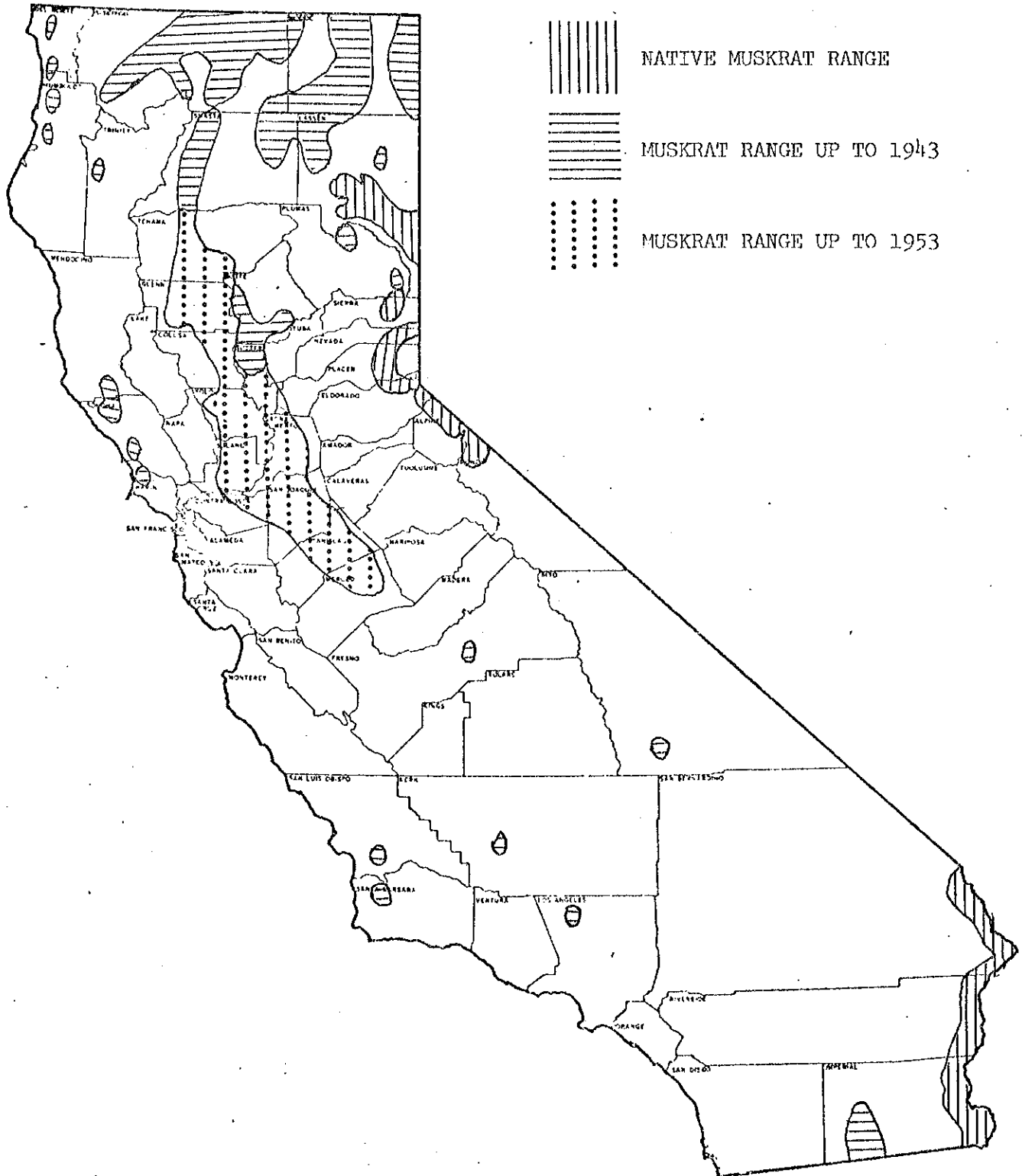


Figure 1. Distribution of muskrats in California up to 1953, based on trapping records and field observations. Drawing by Cliffa Corson. (Seymour, 1954).

TABLE 1

NUMBER OF MUSKRAT REPORTED TAKEN BY LICENSED
FUR TRAPPERS 1975-76

<u>County</u>	<u>Take</u>	<u>County</u>	<u>Take</u>
Alameda ⁴	31	Placer ¹	545
Alpine ¹	0	Plumas ¹	296
Amador ⁵	0	Riverside ¹	1
Butte ²	9304	Sacramento ³	3432
Calaveras ³	0	San Benito ⁵	0
Colusa ³	5521	San Bernardino ¹	0
Contra Costa ³	450	San Diego ⁴	24
Del Norte ²	0	San Francisco ⁵	0
El Dorado ¹	6	San Joaquin ³	5322
Fresno ⁴	1216	San Luis Obispo ²	0
Glenn ³	3544	San Mateo ⁵	0
Humboldt ²	0	Santa Barbara ⁵	0
Imperial ¹	729	Santa Clara ⁵	0
Inyo ²	0	Santa Cruz ⁵	0
Kern ²	73	Shasta ²	8533
Kings ⁵	0	Sierra ¹	0
Lake ²	27	Siskiyou ²	5122
Lassen ¹	1077	Solano ³	3867
Los Angeles ²	0	Sonoma ²	0
Madera ⁴	806	Stanislaus ⁴	3091
Marin ⁵	0	Sutter ²	3997
Mariposa ⁵	0	Tehama ³	251
Mendocino ²	0	Trinity ²	0
Merced ³	5137	Tulare ⁵	0
Modoc ²	2519	Tuolumne ⁵	0
Mono ¹	13	Ventura ⁵	0
Monterey ⁵	0	Yolo ³	5756
Napa ⁴	65	Yuba ³	2029
Nevada ¹	3		
Orange ⁵	0	Total	72787

- 1 - County of original distribution
- 2 - Colonized by 1940-41
- 3 - Colonized by 1952-53
- 4 - Colonized after 1953
- 5 - Colonization not reported

TABLE 2

TAKE OF MUSKRAT BY LICENSED FUR TRAPPERS
1953-1976

<u>Season</u>	<u>Take</u>	<u>Average Price Per Pelt</u>
1953-54	95,311	.70
1954-55	100,844	1.00
1955-56	77,128	1.00
1956-57	73,795	.70
1957-58	74,291	.70
1958-59	64,106	.70
1959-60	46,175	.70
1960-61	47,303	.60
1961-62	49,449	.70
1962-63	66,068	1.00
1963-64	88,398	1.10
1964-65	60,976	1.00
1965-66	59,178	1.30
1966-67	44,160	.90
1967-68	40,370	.60
1968-69	45,215	.80
1969-70	51,525	1.00
1970-71	46,742	1.00
1971-72	52,179	1.30
1972-73	45,175	1.90
1973-74	51,072	2.20
1974-75	64,444	2.40
1975-76	72,787	3.20
Total	<u>1,416,691</u>	

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RACCOON

INTRODUCTION

Taxonomy. The raccoon (Procyon lotor) is one of California's most familiar furbearers. Grinnell et al. (1937) describe three subspecies in California. The California coon (P. l. psora) from throughout the state except the north-eastern and northwestern corners and the southwestern desert; the Snake River Valley coon (P. l. excelsus) from the northeastern corner of Modoc County; and the Pallid coon (P. l. pallidus) from the Colorado Desert.

Legal Status. Between 1915 and 1956 the raccoon was classified as a nonprotected predator in California with no conditions on its take. In 1957 the raccoon became classified as a furbearing mammal. There is currently a season in most parts of the state from November 16 to March 31 with no bag or possession limit. Raccoons may be trailed by hounds from April 1 to November 15 for training or practicing dogs providing that no raccoon is killed or injured.

NATURAL HISTORY

Habitat. The raccoon adapts easily to various environmental conditions and is limited mainly by a source of water. They range from sea level to 6,000 feet and are commonly found near human settlements.

Food Habits. The raccoon's food habits are reflected by its dependence on water as fish, amphibians and aquatic invertebrates are important food items. Wild fruits, cultivated crops, small mammals, birds and their eggs, reptiles and insects are other important foods of this omnivorous nocturnal mammal.

Reproduction. Data collected by Grinnell et al. (1937) suggest that raccoon litters range in size from 3 to 7, averaging 4. There is probably one litter per year born during April and May.

Home Range. Using telemetry Urban (1970) determined the average home range of adults in a marsh habitat in Ohio to be 220 acres. Size of home range varied, depending on the age-class of the individual. Densities of raccoons per square mile has been estimated to be 27.1 (Butterfield 1944), 20.7 (Stuewer 1943), and 45.3 (Urban 1970).

DISTRIBUTION

Current distribution data is taken largely from licensed fur trapper reports. This information is biased because many reports are inaccurate and trapping effort is not uniform throughout the state. Many trappers do not report. For the 1975-76 trapping season raccoons were reported taken in all but six counties with those of the Central Valley and the northern part of the state reporting the greatest harvest (Table 1).

HARVEST

Fur Trapping. Table 2 shows that during the 1920s raccoons were trapped in greater numbers than at any other time in the state's history of licensed fur trapping. For many years raccoon pelts brought in more revenue than any other furbearer. Beginning in the 1930s the demand for raccoon fur dropped resulting in decreased trapping effort. Pelt prices remained low until 1972-73 when the price per pelt increased to \$5.00 (the average price during the 1920s). During the last five years the demand for "long" fur has increased and the average price per pelt for raccoon has increased from \$2.90 in 1971-72 to a record high of \$22.80 in 1975-76.

Animal Control. Because raccoons eat game bird eggs, crops and livestock, there are control efforts by county and federal agencies. The Fish and Wildlife Service reported the take of 11,952 raccoons during fiscal years 1966-1976 (Table 2). Most of these were taken from Nevada, Santa Barbara and Sonoma counties during 1976 (Table 1). Fewer animals are being taken now than in the past due to a de-emphasis of blanket control and a concentrated effort in problem areas. Also, nontarget animals trapped incidentally during predator control activities are now released if they are uninjured. No data are available on control efforts by county agencies.

The recent increase in fur trapper harvest combined with more selective animal control programs has resulted in a fairly stable total annual harvest (Table 2).

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TABLE 1

NUMBER OF RACCOON REPORTED TAKEN BY LICENSED FUR TRAPPERS
1975-76

<u>County</u>	<u>Trapper Take</u>	<u>Animal Control</u>
Alameda	35	-
Alpine	3	-
Amador	2	9
Butte	210	5
Calaveras	31	8
Colusa	66	11
Contra Costa	4	-
El Dorado	28	7
Fresno	26	-
Glenn	178	8
Humboldt	290	12
Imperial	6	-
Inyo	32	-
Kern	4	5
Kings	-	1
Lake	141	12
Lassen	40	5
Los Angeles	2	-
Madera	9	5
Marin	8	-
Mariposa	8	7
Mendocino	94	-
Merced	110	-
Modoc	91	1
Mono	6	-
Monterey	27	-
Napa	48	38
Nevada	7	73
Placer	187	34
Plumas	23	-
Riverside	21	-
Sacramento	295	2
San Benito	14	-
San Bernardino	10	-
San Diego	40	-
San Joaquin	185	2
San Luis Obispo	6	-
San Mateo	11	14
Santa Barbara	10	122
Santa Cruz	-	2
Shasta	218	9
Sierra	3	-
Siskiyou	128	10
Solano	146	13
Sonoma	90	81
Stanislaus	152	-
Sutter	22	-
Tehama	245	-
Trinity	52	-
Tulare	20	1
Tuolumne	14	17
Ventura	5	-
Yolo	56	4
Yuba	30	-
Total	3489	518

TABLE 2

THE TAKE OF RACCOON 1925-1976

<u>Season</u>	<u>Average Price Per Pelt</u>	<u>Trapper Take</u>	<u>Animal Control^{1/}</u>
1925-26	4.40	13,358	
1926-27	5.60	15,527	
1927-28	5.50	19,182	
1928-29	--	No Data	
1929-30	--	No Data	
1930-31	3.00	3,373	
1931-32	2.10	3,582	
1932-33	1.30	1,883	
1933-34	2.00	2,589	
1934-35	1.80	2,662	
1935-36	2.10	3,809	
1936-37	2.70	5,873	
1937-38	1.30	5,049	
1938-39	1.00	4,067	
1939-40	1.00	4,922	
1940-41	1.30	7,265	
1941-42	1.50	8,880	
1942-43	1.90	4,473	
1943-44	2.70	6,554	
1944-45	1.60	6,567	
1945-46	1.30	6,756	
1946-47	.80	5,042	
1947-48	.90	2,429	
1948-49	.70	2,489	
1949-50	.50	1,652	
1950-51	.98	2,160	
1951-52	.60	1,595	
1952-53	.70	1,665	
1953-54	.70	1,688	
1954-55	.70	1,448	
1955-56	.90	1,193	
1956-57	1.10	2,220	
1957-58	1.20	1,679	
1958-59	1.20	1,295	
1959-60	1.60	1,370	
1960-61	1.40	1,342	
1961-62	1.50	1,729	
1962-63	2.00	1,247	
1963-64	1.50	1,424	
1964-65	1.30	1,091	
1965-66	2.00	1,221	1,927
1966-67	1.70	895	1,490
1967-68	1.80	668	1,677
1968-69	2.70	1,022	1,329
1969-70	2.50	1,174	1,396
1970-71	1.60	719	1,250
1971-72	2.90	1,052	1,060
1972-73	5.00	1,230	485
1973-74	8.50	2,064	361
1974-75	9.80	2,047	457
1975-76	22.80	3,489	520
Total		176,710	11,952