California Department of Fish and Game

JOB FINAL REPORT

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

<u>Job Number:</u> I-11 <u>Job Title:</u> Badger Distribution Study

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

SUMMARY:

Historically, the badger (Taxidea taxus) is known to occur throughout the state of California except for the humid forested region in the extreme northwestern corner. Badgers recently were included on the Department of Fish and Game's list of Mammalian Species of Special Concern, since it appears that there has been a substantial reduction in range and abundance in several areas where it was formerly common (Williams 1986).

Information on the current distribution of the badger was collected by requesting sighting reports from licensed trappers that had reported taking badgers, federal animal control personnel in each county, and state and federal agency field biologists. Observers reported sighting badgers at 521 locations in California, mainly during the 1970s and 1980s.

Current data indicate- that badgers are still distributed throughout their range, but recent sightings are not evenly distributed, indicating some potential problem areas. Sighting reports indicate that the greatest badger abundance occurs in the northeastern region of the state and along the south coastal area, and a moderate number occurs in the southeastern desert areas, on the east side of the southern Sierra Nevada, and in the southernmost portion of the San Joaquin Valley. Reported occurrences of badgers were lowest in the mid-Central Valley region and moderately low in the northern Coast Range.

BACKGROUND:

Although the badger is a large mustelid found throughout almost the entire state, little is known about its status, current distribution and relative abundance. No studies of its distribution and status in California have been completed since Grinnell et al. (1937). Badgers are distributed throughout California except for the extreme northeastern corner (Grinnell et al. 1937), but they have reportedly declined or disappeared in many large areas of the state, particularly areas west of the Cascade-Sierra Nevada mountain axis and in coastal basins of southern California (Williams 1986).

Prior to 1956 the badger was considered a predatory mammal with no season or bag limit. In 1957 it was classified as a furbearerand it may now be taken statewide during the designated trapping season with no bag or possession limit. In addition, the badger has long been considered a pest, especially in agricultural situations, and thus the target of many years of animal control activity. The badger was included on the Department of Fish and Game's list of Mammalian Species of Special Concern (Williams 1986). This list includes species or subspecies of mammals that are declining in California, sane of which may be on the verge of ex tinc tion, but are not designated by the Fish and Game Commission as Threatened or Endangered. This list was compiled by the Department for administrative purposes to identify potentially endangered species or subspecies in need of research and management attention. Species of Special Concern is not a classification under any California Administrative Code, and a species so listed is not afforded any additional protection under State law. This Job was initiated because the badger was included on the Special Concern list.

OBJECTIVES:

- 1. Determine current status and distribution of badgers in California.
- 2. Locate areas of concentration of badger populations.
- 3. Determine trends in relative population size and distribution by comparing past and present data.

PROCEDURES:

Data on badgers was gathered by requesting sighting reports from appropriate state and federal governmental agencies and from licensed fur trappers. A supply of "Furbearer Observation" report forms (Appendix A) was sent to federal agencies that regularly have personnel in the field. Some agencies keep detailed sighting records and provided numerous locations for this survey. Federal agencies queried include the U.S. Forest Service, National Park Service, and the U.S. Bureau of Land Management. Report forms also were sent to state agencies with field personnel, including the Department of Parks and Recreation and each region of the Department of Fish and Game. Letters and report forms were sent to each County Agricultural Canmissioner to obtain observations made during animal damage control activities. In addition, the Department of Health Services, Vector Biology and Control Section volunteered location information from badger carcasses originally submitted by animal control personnel for a study of plague in California.

Letters of inquiry with a map of the appropriate county were sent to all licensed fur trappers that reported capturing badgers during the last two years. Participants marked and returned the map indicating locations and dates of badgers that they had trapped or observed. "Furbearer Observation" report forms were included so they could report any future or additional sightings. A letter of inquiry and a supply of forms also was sent to the California Trappers Association, asking that they distribute them at one of their meetings.

Badger occurrence reports were collected, entered into a database file, and tabulated and reported by county (Appendix B). Individual sightings gathered during this survey were mapped and compared with the sighting map developed by

Grinnell et al. (1937, Fig. 131) using 1919 to 1924 trapping reports (Figure 1). Numbers of Occurrence reports from Grinnell and from this study also were tabulated by county (Table 1). Current sightings were then compared with historical sightings to determine any relative changes in distribution and abundance of badgers that may have occurred since early in this century.

Table	1. (County	distrib	oution	of l	badge	er occu	irrence	e rec	ords	in C	aliforn	ia.
Those	from	Grinne	ell et	al. (1	937,	Fig.	131)	are 19	919-1	924 t	rapp	ing rep	orts.
Occurr	rence	records	from	this s	tudy	are	mainly	from	the	1970s	and	1980s.	
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County	No. of Records, Grinnell	No. of Records, This Study	County	No. of Records, Grinnell	No. of Records, This Study	
	(1937)	Study	County	(1937)	Study	
Alameda	0	0	Orange	0	4	
Alpine	1	4	Placer	0	3	
Amador	0	0	Plumas	Ŏ	18	
Butte	1	0	Riverside	8	17	
Calaveras	1	0	Sacramento	2	0	
Colusa	3	2	San Benito	2	11	
Contra Costa	2	2	San Bernardi	no 5	46	
Del Norte	0	0	San Diego	9	30	
El Dorado	0	0	San Franci	isco Ó	0	
Fresno	3	5	San Joaquin	4	1	
Glenn	2	5	San Luis Obi	spo 3	25	
Humboldt	6	4	San Mateo	1	3	
Imperial	8	7	Santa Barbar	a 1	33	
Inyo	10	17	Santa Clara	1	2	
Kern	7	18	Santa Cruz	2	2	
Kings	2	1	Shasta	11	9	
Lake	1	1	Sierra	1	0	
Lassen	8	18	Siskiyou	9	53	
Los Angeles	5	28	Solano	1	0	
Madera	5	0	Sonoma	4	1	
Marin	3	0	Stanislaus	1	2	
Mariposa	7	0	Sutter	0	0	
Mendocino	9	2	Tehama	3	7	
Merced	4	0	Trinity	2	3	
Modoc	15	51	Tulare	13	13	
Mono	4	11	Tuolumne	3	0	
Monterey	3	33	Ventura	3	24	
Napa	2	6	Yolo	3	0	
Nevada	0	0	Yuba	0	0	



Figure 1. Badger (Taxidea taxus) sightings in California; comparison of distribution in the early 1900s (after Grinnell et al. 1937) and current distribution from observations collected in this study (1970s and 1980s). According to Grime11 et al. (1937), badgers are distributed throughout the state except for the extreme northwestern corner.

FINDINGS:

<u>Distribution</u> - All 521 badger observations collected during this study were made within the range of the badger as described by Grinnell et al. (1937). Although these current locations are not evenly distributed, and are, in fact, scarce or spotty in some areas, there appears to have been no change in the overall range of the badger in California since early in this century (Figure 1).

Recent badger sightings are most heavily clustered in the northeastern and south-coastal areas of the State, and in the central. southeastern desert region. Smaller clusters appear on the eastern side of the southern Sierras and in the southern-most section of the San Joaquin Valley (Figure 1).

Recent sightings are most scarce in the middle section of the Central Valley, and are relatively scarce in the northern Coast Range. The scarcity of recent records in these areas can be visually compared with recent sightings in other areas of the state, as well as with historical sightings (Figure 1).

<u>Abundance</u> - Since this survey was not conducted the same way as that of Grinnell et al. (1937), numbers of occurrences per county are not directly comparable. However, if the differences between these two surveys are taken into account, some inferences can be made from just such a comparison (Table 1). The sightings in Grinnell's Fig. 131 represent those made by relatively few observers over a rather short time period (1919-1924), so they are limited. The sighting reports obtained during this survey, in contrast, were provided by several governmental agencies and their field personnel, and by numerous licensed trappers. All except eight of the 521 sighting reports received were from the 1970s and 1980s, up to mid-1987, a 17.5-year period.

Taking these differences into account when comparing numbers of sightings in each county (Table 1), the magnitudes of increases or decreases between the 1919-1924 data set and the 1970-1987 data set have differing interpretations. An increase between the two time periods may either reflect a true increase in abundance, or indicate that the population remained stable because of the longer time period and larger number of observers affecting the recent data set. A decrease, on the other hand, could be reflecting a true decrease of abundance because of the greater opportunity to observe badgers in the recent time period. Numbers of sightings that are similar between the two data sets could also indicate a decrease, assuming that the number of sightings, if the population is remaining stable, would be proportionately larger.

Counties showing a possible increase in, or a stability of relative abundance of badgers include Siskiyou, Modoc, Lassen, and Plumas in the northeastern section; Inyo and Mono on the eastern side of the southern Sierra Nevada; San Bernardino and Riverside in the southeastern desert area; Kern at the southern end of San Joaquin Valley; and Monterey, San Benito, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, and San Diego in the south coastal region.

Counties showing a possible decrease in the relative abundance of badgers include Marin, Sonoma, and Mendocino in the northern Coast Range; and Madera, Mariposa, Merced, Tuolumne, San Joaquin, Sacramento, and Yolo in the middle section of the Central Valley.

ANALYSIS:

Formulating conclusions and determining trends is difficult with a survey of this sort. Information received in trapping and sightings reports can not be considered a random sample providing uniform coverage of the State and this type of data set is not statistically quantifiable. There tends to be a low response to voluntary surveys when participants are asked to search old records or memories. If one agency, or a portion thereof, does not or cannot provide information, compared with another that sends in hundreds of sightings, false or misleading trends could appear in the data set. The number of observers in a particular area could cause a cluster of sighting reports, which could appear as an overly important location when mapped. Also, since badgers are generally considered common or as a pest species, it is less likely that a sighting is considered important enough to be recorded by an observer.

Fur trapping results, when viewed in conjunction with the results of this survey, can give a more complete picture of the status of badgers. Badgers are not usually the target of trapping, since their pelt traditionally has a low value (\$2.70 - \$5.00 in the 1985-86 season), and they make up a very small percentage of the overall harvest (0.34% in 1985-86 season). In addition, they are very vicious, making them difficult to release from a trap; captured, non-target individuals probably are most often dispatched and discarded. Trappers actually attempt to avoid them by declining to set traps in areas with abundant sign. It is thus less likely that a trapper will document their occurrence if trapped. Licensed trappers officially reported taking 186 badgers during the 1985-86 season, but this number is probably artificially low. The counties with the highest reported take were San Bernardino (49), Kern (26), Fresno (14), and Modoc (13).

These trapping reports indicate that there may be a stable population of badgers in the southern end of the San Joaquin Valley. In Fresno County, this survey only records five sightings in the 1970s and 1980s, and Grinnell et al. (1937) shows only three sightings. Yet the licensed fur trapper reports show that 14 were taken in Fresno County in one season (1985-86).

The middle portion of the Central Valley is the region where current badger sightings are the sparsest in this survey. Williams (1986) reports that badgers have been almost completely eliminated from this portion of the state except for peripheral areas. This reduction most likely has resulted from a combination of the conversion of the badger's native scrub habitat to irrigated farmland and animal control activities involving direct removal of badgers as well as the poisoning of their principle prey, ground squirrels. This area should be considered a potential problem area.

The northern Coast Range area appears to presently support a reduced number of badgers when compared with historical data. Although intensive farming is probably not a problem in this area, there are active animal control activities in the region. The lack of current sightings also could be due to a failure to respond by governmental agencies in the region. Further attempts to obtain information from the region should be made to determine if this is a true population reduction, or simply due to incomplete data. The northern Coast Range also should be considered a potential problem area. Badger populations appear to be stable or increasing in the northeastern region of the state. Clusters of current sightings occur in almost every county, including Plumas, which had none in the historical data set. Modoc County ranks fourth in badgers captured (13) as reported by licensed trappers during the 1985-86 season, behind the southern San Joaquin Valley and southeastern desert regions. Intensive agriculture is rare in this region, but animal control activity continues to occur.

The southern coastal area contains large clusters of recent sightings. Williams (1986) reported that badgers survived in low numbers in eastern Monterey, San Benito, and San Luis Obispo counties, and that they have declined or disappeared from the south coastal basin. In contrast, this survey collected many recent sightings from observers indicating that badgers may be doing well in San Benito, Monterey, San Luis Obispo, and western Santa Further south, sightings are clustered in southeastern Barbara counties. Ventura and northwestern Los Angeles counties, between the larger metropolitan areas, and in eastern San Diego county. Scattered recent sightings also occur Badgers, of course, cannot readily survive in urbanized in Orange County. areas, but they seem to continue to exist in open areas. However, it is debatable whether the south coastal badger population is really doing as well as it may appear, or whether the large number of sightings in these areas is just a function of a large number of observers. If appropriate open areas disappear, badgers may be squeezed out of these in between areas.

The sightings collected in this survey seem to indicate that badgers are doing well in California on the eastern side of the southern Sierra Nevada, in Mono and Inyo counties, and in the southwestern desert area in San Bernardino County. In Grinnell et al. (1937) there were only a few reports from San Bernardino County, but this may have been due to general inaccessibility of the desert areas earlier in this century. Conversely, since both the eastern side of the southern Sierra Nevada and the southeastern desert areas are rather sparsely populated, even today, the clusters of recent sightings in these areas could either be a true reflection of a stable population or be due to a few observers that provided detailed records. It should be noted, however, that San Bernardino County did have the highest take of badgers (49) reported by licensed fur trappers in the 1985-86 season.

The tentative results of this survey indicate that badgers seem to be doing well in some areas of the state, specifically in the northeastern, south coastal, southern San Joaquin Valley, and southeastern desert regions, but appear to be declining in other areas, specifically the northern Coast Range and the middle Central Valley. These results, can in no way be considered conclusive, since the data is not quantitative. However, it would be prudent to devise a formal census method to more accurately determine status and abundance of badgers in California.

Although there are some potential problem areas in the state, it does not appear that badgers warrant formal listing as Threatened or Endangered at this time, especially in the absence of quantifiable data from a more formal status survey. The voluntary response to this survey can be considered good, and since it is the only one that has been conducted since early in this century, the potential problem areas identified should be taken seriously. In lieu of a formal survey, another survey of this type should be conducted in the future. The results would be more readily comparable, and if disturbing trends continue, more formal protection measures should be defined and implemented.

RECOMMENDATIONS:

- 1. Badgers should remain listed as a Species of Special Concern.
- 2. Surveys similar to this one, requesting sighting reports from licensed trappers and governmental agency field personnel, should be conducted every 10 to 15 years to establish observable trends.
- 3. A formal census method should be developed to more accurately determine status and abundance of badgers in California.
- 4. Animal control activities in potential problem areas, especially in the midsection of the Central Valley, should be shifted away from removal trapping of problem badgers to live-trapping and relocation operations whenever possible. Poisoning of ground squirrels should be kept to a minimum where badgers would be affected.

LITERATURE CITED:

- Grinnell, J., J. Dixon, and J. M. Linsdale. 1937. Fur-bearing mammals of California. 2 vol., University of California Press, Berkeley, 777 pp.
- Williams, D. F. 1986. Mammalian species of special concern in California. California Dept. Fish and Game, Wildl. Manag. Div. Admin. Rep. 86-1, Sacramento, 112 pp.

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