FIVE-YEAR STATUS REPORT

I. COMMON NAME: Wolverine
SCIENTIFIC NAME: Gulo gulo
CURRENT CLASSIFICATION: Threatened

II. RECOMMENDED ACTION:

Retain Threatened classification

III. SUMMARY OF REASONS FOR RECOMMENDED ACTION:

So little is known about the Wolverine in California that it makes planning for its management and protection difficult. In their review of the status of six furbearer species in California Schempf and White (1977) considered the Wolverine to be second only to the Sierra Nevada Red Fox (Vulpes vulpes necator) (SNRF) in rarity among this group of mammals in the state. Although their analysis of available sighting records seems to indicate a moderate increase in abundance, Schempf and White (1977) caution that bias such as greater number of observers and greater interest in the species may confound the data and mask the actual population trend. Schempf and White (1977) further point to the need for thorough field studies to determine actual distribution and density of the Wolverine in California.

Based on the lack of available data relative to other managed wildlife populations in the state, and in the absence of a comprehensive approach to Wolverine research and management, it would be imprudent to recommend changes in the classification of this rare species at this time. The Wolverine is a difficult and expensive animal to study. In spite of this, there is a need for the Department of Fish and Game (DFG), U.S. Forest Service (USFS), and other concerned state and federal agencies to engage in long-term research and management planning for the Wolverine in California.

IV. NATURE AND DEGREE OF THREAT:

The Wolverine is a wilderness species in the truest sense. It inhabits remote, high elevation regions of the state in the Cascade Mountains and Sierra Nevada (Grinnell et al. 1937, Schempf and White 1977). Although sparsely populated with humans and still relatively pristine compared to the remainder of California, these areas are coming under increasing pressure by such exploitive activities as timber harvest, mining, development of recreational facilities, and greater numbers of humans seeking back country wilderness recreation such as hiking, skiing, snowmobiling, fishing, and hunting. This increase in humans entering

subalpine and alpine life zones. The mean elevation of 143 sightings analyzed by Schempf and White (1977) was just under 8,000 feet.

VI. HISTORIC AND CURRENT ABUNDANCE:

Grinnell et al. (1937) estimated the Wolverine population of the early 1930's to be only 15 pairs. Schempf and White (1977) concluded that between the 1930's and the late 1970's Wolverines had reoccupied parts of their former range in California. Relative abundance between years may be inferred by review of sighting data in recent decades. Based on these data Schempf and White (1977) concluded that a moderate increase may have been evident for the Southern Sierra Nevada populations. They hasten to add, however, that such factors as increased interest or numbers of observers may be biasing the data and that actual trend may not be discernible from these sighting records.

White and Barrett (1979) estimated a population of 50 to 100 Wolverines in California. In the absence of more recent data this estimate must serve as today's population estimate. No density data on the current population is available and, due to the difficulties involved in the study of Wolverines, may not be available any time in the near future. It may be desirable to know the exact number of Wolverines in the state, in order to address the minimum viability issue. Also important is knowledge of habitat relationships and the ecological needs of the Wolverine, so that management plans may take these into account to ensure continued survival of the species in California.

VII. SPECIES DESCRIPTION AND BIOLOGY:

The Wolverine was described as a "super weasel" of the far north and boreal forest by Sumner and Dixon (1953). This is an apt description because the Wolverine does retain much of the ferocity, cunning, fearlessness and endurance of its smaller cousin only in a much larger package. The Wolverine resembles a small, short-legged bear with a coarse coat and bushy tail. The coat is heavy and dark with two broad light-colored bands extending from the shoulder to meet at the base of the tail (White and Barrett 1979). Wolverines weigh 15-150 lbs., measure 35-45 inches long (including a 6-10 inch tail) and stand 14-18 inches high at the shoulder (White and Barrett 1979). The head is broad with small round ears. The jaw musculature is powerful, adapted to easily crush and shear frozen meat and large bones. The feet are strongly clawed and the five-toe track is diagnostic of the weasel family of which the Wolverine is the second largest member (only the Sea Otter (Enhyda lutris) is larger). Typical tracks (often best seen in snow) are 4-5 inches for front and 3-4 inches for hind feet. With its compact powerful body and indomitable fighting qualities Nowak (1973) and Haley (1975) considered that the Wolverine may be the world's strongest mammal for its size. Sexes appear similar except that males are often 25-35% larger than females (White and Barrett 1979).

The Wolverine, like some other members of the weasel family, is a tireless hunter and scavenger. The diet ranges from large mammals (typically carrion but sometimes as prey) to mice, birds, insects,

IX. CURRENT AND RECOMMENDED MANAGEMENT:

The classification of the Wolverine as a protected furbearer and as a Threatened species in California were significant management actions that eliminated legal persecution of the species through trapping. These actions were taken in the absence of scientific information on the species. However, the prudence of such measures is very apparent today. A sparse Wolverine population, though not currently threatened with extinction, could become endangered through deterioration of its environment (White and Barrett 1979). This population could not long withstand the added complication of systematic human persecution in the form of fur trapping.

A proactive planning approach to the management of Wolverines in California is urgently needed. This would include coordinated interagency schemes for management of timberlands of the state to consider the needs of this species. Most of the best Wolverine habitat of the state is administered by the USFS and the U.S. National Park Service (NPS). Any planning effort on behalf of the Wolverine must have the endorsement and active participation of these two federal land management agencies if it is to succeed.

The DFG can play an important leadership role in any recovery effort or management planning concerning the Wolverine. Initial efforts need to be directed toward comprehensive programs of research to learn more about the Wolverine's population status, habitat relationships, and ecological needs within its broad California range.

Current forest management direction as exhibited in recent USFS management planning documents is contrary to the habitat needs of species dependent on climax forest. Diversity of timber types must be preserved in order to maintain diverse and dense populations of wildlife on forested lands. Wolverines, if they are to move back into their former forest habitats and expand their range and population, will require an abundant source of food. Sensitive forest management, including timber, wilderness, and recreational resource concerns, will be essential on national forest lands in the effort to maintain a healthy population of Wolverines in California.

A program of research should include the following studies as recommended by White and Barrett (1979):

- Refinement of Wolverine distribution information in the state paying particular attention to evidence of range expansion and reoccupancy of former habitats.
- Studies of habitat relationships and basic ecological requirements.
- Population studies including census and relative abundance of populations occurring in various habitats within the entire range of the species in the state.
- Feeding habits relative to time of year, habitat, and other ecological considerations.

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30 April 1987 (revised 16 November 1987)

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- Effects of human activities on Wolverine populations.

- Movements and behavior studies to determine home range size and other relevant information.

- Reproductive requirements.

The above studies should be long-term and jointly funded by concerned agencies such as the DFG, USFS, and NPS. These studies could form the basis for effective management planning for Wolverines and other rare furbearing species by the close of this century.

X. SOURCES OF INFORMATION:

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berries, and fungi (White and Barrett 1979). Fry (1923) listed the principal foods of Sierra Nevada Wolverines to be marmots, carrion, gophers, rats, mice, and an occasional big game animal taken in a weakened condition.

White and Barrett (1979) believed that carrion (in the form of large ungulates) was an important component of the diet, making up half of the annual and most of the winter food.

Adult Wolverines live a solitary life and are capable of traveling great distances in a single day. They are active year round and are primarily nocturnal except during winter when they may be seen during daylight hours (Fry 1923, Haglund 1966, White and Barrett 1979). Ewer (1973) estimated home ranges of up to 770 sq. mi. for males and 150-200 sq. mi. for female Wolverines.

Breeding biology of the species is not well documented in California but assumed to be similar to that reported for other populations. The fact that Wolverines like other members of the Mustelidae have delayed implantation of embryos extends the time between mating and birth several months. This time period may be seven months or more (White and Barrett 1979). Wolverine litters are 1-5 young with 2-4 most common. Birth of young takes place in dens of various configurations of rocks, hollow logs, and vegetation (Summer and Dixon 1953).

VIII. HABITAT REQUIREMENTS:

The Wolverine is generally regarded as a creature of high elevation montane habitat in the state. However, examination of the elevational data reveals that the species can exist in a variety of habitat types. White and Barrett (1979) felt that the survival of Wolverines in the state was dependent on access to mature conifer forest habitat, especially in winter. Schempf and White (1977) examined sighting records indicating the Wolverine inhabited habitat ranging from treeless alpine and sparsely forested subalpine areas to denser mixed conifer types and dense mature stands of Douglas-fir in the North Coast region of the state. Mixed conifer appears to be most important in Northern Sierra Wolverine habitat relationships while lodgepole pine is the most important timber type in the Southern Sierra range of the species (White and Barrett 1979). Barren treeless areas are the second most important Wolverine habitats in the Southern Sierra region of the state. White and Barrett (1979) felt that conifer forest was once a principal habitat type two centuries ago and that the population has only recently returned to these areas. Man's exploitation of timber and deliberate persecution of Wolverines may have caused their long absence from the lower elevation, forested regions of the state. Within suitable habitat, Wolverine numbers are regulated by availability of food. The species is known for its long distance wanderings chiefly in search of food (often large mammal carrion). It makes sense that the species would prefer to inhabit regions of high prey (primarily small mammals) density and that these supplies would be more abundant below timberline than above it. In winter, Wolverines move to lower elevations and into the cover of mature timber stands where food is more readily available (White and Barrett 1979).

Wolverine range may in part account for a greater number of sightings recently. Recent studies indicate the Wolverine requires large tracts of land to establish a home range (Whitman et al. 1986). Although their studies were in remote areas of Alaska and the data may not be directly comparable to the situation in California, the 100 - 500+ km^2 home ranges reported by Whitman et al. (1986) indicate the species requires great expanses of wilderness in order to pursue its particular life-style. As activities increase in Wolverine range the species may find it more and more difficult to avoid contact and possible conflict with humans.

There is currently no management focus on Wolverines in California. Little research information is available to provide a factual basis for such a focus. This lack of information by which to make informed management decisions is a main concern and in and of itself may pose a threat to the existence of this species in the state. In addition there is a concern about the issue of minimum viable populations and how this may relate to a small and possibly inbred population of Wolverines in California.

V. HISTORIC AND CURRENT DISTRIBUTION:

Historic

The pristine range of the Wolverine can be considered to be that reported in Hall and Kelson (1959). Grinnell (1913) described the range as occurring from Mount Shasta on the north to Monache Meadows in Tulare County on the south. Hall and Kelson (1959) included early accounts on the North Coast and North Sierra regions of the state. Recent sightings in these areas confirm the wisdom of including them in the pristine range of the species (Schempf and White 1977).

Current

The present range of the species extends from Del Norte County and Trinity counties to the north eastward through Siskiyou and Shasta counties and then south along the Sierra Crest to Tulare County (various authors in Schempf and White 1977).

The Wolverine inhabits semi-open terrain at or above timberline in the Cascade Mountains and Sierra Nevada in California. According to Schempf and White (1977) most Wolverines in the Southern Sierra will be found above 8,000 with extremes recorded as 5,000 feet at Camp Nelson, Tulare County to 14,200 feet at White Mountain Peak in Mono County. Wolverines in the North Coast region of the state have been recorded between 1,600 and 4,800 feet with the average sighting at 2,800 feet. Northern Sierra Wolverines have been sighted between 4,300 and 7,300 feet, the average being 5,800 feet (Schempf and White 1977). From these elevational data it is clear that the species occupies a great range of habitats in the state all the way from great river drainages of the North Coast in the Douglas-fir fir timber belt to alpine habitat above timberline in the Southern Sierra. Notwithstanding this huge elevational range of sightings, the Wolverine can be generally considered a species of remote montane wilderness areas of the state primarily in the treeless