

### 1.0 EXECUTIVE SUMMARY

During 2001 and 2002, the literature review, agency consultation, and habitat mapping were completed, and incidental sightings were recorded. Four special-status mesocarnivores have the potential to occur within the Study Area: Sierra Nevada red fox (*Vulpes vulpes necator*), California wolverine (*Gulo gulo luteus*), pine marten (*Martes americana*), and Pacific fisher (*Martes pennanti pacifica*). Sierra Nevada red fox and California wolverine are listed as threatened in California, and all four species are considered Forest Service Sensitive. Pine marten and Pacific fisher are Sierra National Forest Management Indicator Species. Known occurrences of special-status mesocarnivores in the Study Area were mapped and incorporated into a GIS database. Mesocarnivores with no special-status were not studied as part of this study plan.

Appropriate habitat was determined to be coniferous forest from 7,000 to 12,000 feet for Sierra Nevada red fox and coniferous forest from 6,400 to 10,800 feet for California wolverine. Potential habitat for pine marten was determined to be coniferous forest with greater than 40 percent canopy cover from 5,500 to 10,000 feet. Potential habitat for Pacific fisher was determined to be coniferous forest with greater than 40 percent canopy cover from 3,500 to 8,000 feet. However, pine marten and Pacific fisher have specific habitat requirements beyond the vegetation community type and canopy cover. These include snags and large diameter trees, as well as others.

There were no incidental sightings of special-status mesocarnivores during the field surveys for the ALP.

### 2.0 STUDY OBJECTIVES

- Determine if appropriate habitat is present near Project facilities and bypass and flow-augmented reaches.

### 3.0 STUDY IMPLEMENTATION

#### 3.1 STUDY ELEMENTS COMPLETED

- Compiled information on special-status mesocarnivores during the literature review for common and special-status wildlife species. Mapped known occurrences of special-status mesocarnivores near Project facilities and bypass and flow-augmented reaches and incorporated into a GIS database.
- Identified, mapped, and incorporated into a confidential GIS database potential denning and foraging habitat for special-status mesocarnivores. Recorded incidental sightings of special-status mesocarnivores during all other field surveys for the ALP.

### 3.2 OUTSTANDING STUDY ELEMENTS

- There are no outstanding study components.

## 4.0 STUDY METHODOLOGY

### 4.1 REVIEW OF EXISTING INFORMATION

Information on special-status mesocarnivores was compiled from a literature review and agency consultation during 2001 and 2002. This included review of: (1) the *California Natural Diversity Database* (CDFG 2003); (2) *Wildlife Habitat Relationships System* (CDFG 2002); (3) *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988); (4) U.S. Forest Service's (USDA-FS) *Threatened, Endangered, and Forest Service Sensitive Species Database for the Terrestrial Species of the Sierra National Forest* (USDA-FS 2001b); and (5) other documents that are referenced as appropriate in this report. Information on known occurrences of special-status mesocarnivores near Project facilities and bypass and flow-augmented reaches was mapped and incorporated into a GIS database. These occurrences are not necessarily in the Study Area (i.e., within the FERC Project boundaries). They may be located well outside of the Study Area in the Project vicinity, but provide information on the distribution of this species.

### 4.2 HABITAT MAPPING

Vegetation communities and wildlife habitats were mapped as part of TERR-1, Vegetation Communities, during the fall and winter of 2001/2002. Refer to TERR-1, Vegetation Communities, for a detailed description of methodology. Refer to TERR-5, Common and Special-status Wildlife Species, for a description of the wildlife habitats. Appropriate habitat for each special-status mesocarnivore species was determined through literature review, particularly the Sierra Nevada Framework (USDA-FS 2001a), Mayer and Laudenslayer (1988), and Zeiner et al. (1988-1990). Appropriate habitat was determined to be coniferous forest from 7,000 to 12,000 feet for Sierra Nevada red fox and coniferous forest from 6,400 to 10,800 feet for California wolverine. Potential habitat for pine marten was determined to be coniferous forest with greater than 40 percent canopy cover from 5,500 to 10,000 feet. Appropriate habitat for American fisher was determined to be coniferous forest with greater than 40 percent canopy cover from 3,500 to 8,000 feet. Canopy cover was determined visually from aerial photographs projected in a GIS and delineated in a GIS layer as areas with greater than 40 percent and areas less than 40 percent canopy cover following USDA-FS guidelines (USDA-FS 2002).

A GIS layer was created to indicate Sierran mixed coniferous forest, Sierran mixed coniferous forest with rock substrate, Jeffrey pine forest, Jeffrey pine forest with rock substrate, Jeffrey pine/fir forest, Jeffrey pine/fir forest with rock substrate, westside ponderosa pine forest, westside ponderosa pine forest with rock substrate, and lodgepole pine forest from 7,000 to 12,000 feet as

appropriate habitat for Sierra Nevada red fox (Figure TERR-13-1a through d). Appropriate habitat for California wolverine was indicated as the same vegetation communities but from 6,400 to 10,800 feet (Figure TERR-13-2a through d). Potential habitat for pine marten was determined to be the same vegetation communities but only those areas with greater than 40 percent canopy cover from 5,500 to 10,000 feet (Figure TERR-13-3a through d). Pacific fisher potential habitat was determined to be the same vegetation communities but only those areas with greater than 40 percent canopy cover from 3,500 to 8,000 feet (Figure TERR-13-4a through d).

The map that was created for the pine marten and Pacific fisher species identifies potential habitat based on the vegetation community mapping and estimation of canopy cover based on aerial photographs. However, there are specific additional components that must be present in order it to support the species. These components are described under Study Results and Analysis for each species.

### 4.3 INCIDENTAL SIGHTINGS

Incidental sightings of special-status mesocarnivores and potential special-status mesocarnivores were to be recorded during all other field surveys completed as part of the Big Creek ALP.

## 5.0 STUDY RESULTS AND ANALYSIS

### 5.1 REVIEW OF EXISTING INFORMATION

Four Forest Service Sensitive mesocarnivores have the potential to occur within the study area: Sierra Nevada red fox (*Vulpes vulpes necator*), California wolverine (*Gulo gulo luteus*), pine marten (*Martes americana*), and Pacific fisher (*Martes pennanti pacifica*). Sierra Nevada red fox and California wolverine are California threatened species, and pine marten and Pacific fisher are Sierra National Forest Management Indicator Species. The life history, habitat requirements, and potential for occurrence for each of these species are described below.

#### 5.1.1 STATE THREATENED SPECIES

**Sierra Nevada Red Fox (*Vulpes vulpes necator*; California Threatened, Federal Species of Special Concern, and Forest Service Sensitive).** The Sierra Nevada red fox occurs throughout the Sierra Nevada at elevations above 7,000 feet, in forests interspersed with meadows or alpine fell-fields. It is found in the Cascades in Siskiyou County and from Lassen County south to Tulare County. Little is known about the habits of this species. The Sierra Nevada red fox uses open areas for hunting and forested habitats for cover and reproduction. It may be found in a variety of habitats, including alpine dwarf-shrub, wet meadow, subalpine conifer, lodgepole pine, red fir, aspen, montane chaparral, montane riparian, mixed conifer, ponderosa pine, Jeffrey pine, eastside pine, and

montane hardwood-conifer. It feeds on small and medium-sized mammals, such as ground squirrels and mice. Den sites include rock outcrops, hollow logs, and stumps, and burrows in deep, loose soil. Denning occurs in late winter and early spring. Mating takes place in late winter (January-March), young are born in early spring (March-May), and pups are dependent on parents until November.

There were several CNDDDB records of Sierra Nevada red fox. These were located at Shaver Lake near Rock Haven close to the Study Area in 1965; at Florence Lake in 1971; along Highway 168 between Auberry and Shaver Lake in 1987; near the Brown Cone area near Mammoth Pool in 1964; near Soda Springs Campground near Mammoth Pool in 1973; near Fuller Meadow by Mammoth Pool in 1920; and at Papoose Lake, north of Lake Edison, outside of the Study Area in 1991 (Figure TERR-13-1a through d; CDFG 2003). There are several sightings of Sierra Nevada red fox in the USDA-FS database scattered throughout the Study Area (Figure TERR-13-1a through d; USDA-FS 2001b). There were no incidental observations and no focused surveys were conducted for this species. Appropriate denning and foraging habitat is present in coniferous forest in the Study Area.

**California Wolverine (*Gulo gulo luteus*; California Threatened, California Fully Protected, Federal Species of Special Concern, and Forest Service Sensitive).** The California wolverine occurs in a variety of habitat types, mixed conifer, red fir, and lodgepole habitats, and probably sub-alpine conifer, alpine dwarf shrub, wet meadow, and montane riparian habitats. Wolverine denning is restricted to rocky areas free of human disturbance (USDA-FS 2001b). It occurs in the Sierra Nevada from 4,300 to 10,800 feet, but usually above 6,400 feet. Scarce sightings range from Del Norte and Trinity counties, east through Siskiyou and Shasta counties, and south through Tulare County. The wolverine feeds primarily on small mammals and carrion. Dens are located in caves, cliffs, hollow logs, cavities in the ground, under rocks, under snow, or in old beaver lodges. Denning occurs from late winter through early spring. The breeding period lasts from January to July.

There were several records, all historical, of California wolverine at Hilton Lake at Mount Stanford in 1979; at the heads of Grizzly and Iron creeks in 1921; at Silver Pass between Chief Lake and Silver Pass Lake in 1929; and at Rae Lake near Fleming Mountain in 1946 (Figure TERR-13-2a through d; CDFG 2003). The USDA-FS database contains a few California wolverine sightings scattered throughout the Study Area (Figure TERR-13-2a through d; USDA-FS 2001b). There were no incidental observations and no focused surveys were conducted for this species. Appropriate foraging and denning habitat is present in coniferous forest, meadow, and riparian habitat in the Study Area.

#### 5.1.2 FOREST SERVICE SENSITIVE SPECIES

**Pine Marten (*Martes americana*; Forest Service Sensitive, Sierra National Forest Management Indicator Species, and Federal Species of Special Concern).** The pine marten occurs throughout the Sierra Nevada in montane

forests from 4,000 to 13,000 feet. Martens prefer coniferous forest with large diameter trees and snags, large downed logs, moderate-to-high canopy closure, and an interspersed of riparian areas and meadows (USDA-FS 2001b). Optimal habitats are various mixed evergreen forests with more than 40 percent crown closure and large trees and snags for den sites. USDA-FS (2001b) provides the following specific habitat components for westside suitable habitat in the marten core elevation range (5,500 to 10,000 feet):

- canopy cover of  $\geq 40$  percent for traveling and foraging and of  $\geq 70$  percent for denning and resting;
- $\geq$  six largest live conifers of 24 " dbh per acre for traveling and foraging and  $\geq$  nine for denning and resting;
- live tree basal area of  $\geq 350$  sq ft/acre;
- average of 2.5 largest snags of  $\geq 24$  " dbh per acre for traveling and foraging and 5 per acre for denning and resting; and
- coarse woody debris of large logs ( $\geq 15$  ft long) for 5-10 tons/acre in Decay Classes 1-3 for traveling and foraging and in Decay Classes 1-2 for denning and resting.

Denning occurs from late winter through early spring. Dens are located in cavities and are lined with leaves, grass, moss, or other vegetation. Young are born in March and leave their mothers in the fall. The pine marten ranges from the foothills to the higher slopes of the Sierra Nevada, including the Sierra National Forest.

There was one CNDDDB record of pine marten south of Coon Creek near Huntington Lake in 1989 (Figure TERR-13-3a through d; CDFG 2003). There are many detections of pine marten throughout the Study Area with a concentration to the south and east of Huntington Lake in the USDA-FS database (Figure TERR-13-3a through d; USDA-FS 2001b). There were no incidental observations and no focused surveys were conducted for this species. Potential denning and foraging habitat is present in coniferous forest in the Study Area.

**Pacific (American) Fisher (*Martes pennanti pacifica*; California Species of Special Concern, Federal Species of Special Concern, Sierra National Forest Management Indicator Species, and Forest Service Sensitive).** The Pacific fisher is among the most habitat-specific mammals in North America (USDA-FS 2001b). Forest type is not as important as vegetative and structural aspects. The Pacific fisher occurs in a variety of forest types that are generally mature, dense forest stands with snags and greater than 40 percent canopy closure. It is known from 3,500 to 8,000 feet elevations in the Sierra National Forest. It requires standing dead trees, downed logs, and rocky areas for denning sites. USDA-FS (2001b) lists the following key habitat features for Pacific fisher resting and denning sites in the southern Sierra:

- mean den tree dbh of 49" conifer and 27" oak;
- mean rest site tree dbh of 44" conifer and 26" oak;
- mean rest site basal area of 273 sq ft/acre;
- mean den canopy closure of 94%; and
- mean rest site canopy closure of 93%.

Denning occurs from late winter through early spring. The Pacific fisher dens in cavities and broken treetops and snags from winter to May.

The Study Area is within the Southern Sierra Fisher Conservation Area. The Southern Sierra Fisher Conservation Area encompasses the known occupied range of the Pacific fisher in the Sierra Nevada. This consists of an elevational band from 3,500 to 8,000 feet on the Sierra and Sequoia National Forests. There were also several records of Pacific fisher at Red Top Camp near Dinkey Creek in 1913; near Dinkey Creek in 1974; south of Coon Creek near Huntington Lake in 1989; and at Marcella Lake 12 miles north of Mono Hot Springs in 1978 (Figure TERR-13-4a through d; CDFG 2003). There are many detections of pine marten and American fisher throughout the Study Area with a concentration to the south and east of Huntington Lake (Figures TERR-13-3a through d and 4a through d; USDA-FS 2001b). There were no incidental observations and no focused surveys were conducted for this species. Potential denning and foraging habitat is present in coniferous forest in the Study Area.

## **5.2 HABITAT MAPPING**

Known occurrences of special-status mesocarnivores were mapped along with appropriate habitat in the Study Area (Figures TERR-13-1a through d and 4a through d). Appropriate habitat was determined to be coniferous forest from 7,000 to 12,000 feet for Sierra Nevada red fox and coniferous forest from 6,400 to 10,800 feet for California wolverine. Pine marten potential habitat was determined to be coniferous forest with greater than 40 percent canopy cover from 5,500 to 10,000 feet. Potential habitat for American fisher was determined to be coniferous forest with greater than 40 percent canopy cover from 3,500 to 8,000 feet. This map identifies potential habitat based on the vegetation community mapping. However, there are specific additional habitat components that must be present in order to support pine marten and Pacific fisher. These additional components were described above for each species.

## **5.3 INCIDENTAL SIGHTINGS**

There were no incidental sightings of special-status mesocarnivores or special-status mesocarnivore sign in 2001 or 2002 during the ALP field surveys.

## 6.0 LITERATURE CITED

- California Department of Fish and Game (CDFG). 2002. Wildlife Habitat Relationships System. Sacramento, California.
- California Department of Fish and Game (CDFG). 2003. Rarefind II. California Natural Diversity Database. Electronic database. Updated April 2003. Sacramento, California.
- Mayer, K.E., and W.F. Laudenslayer. 1988. A Guide to Wildlife Habitats of California. California Department of Fish and Game, Sacramento, California.
- U.S. Forest Service. 2001a. Sierra Nevada Forest Plan Amendment. Final Environmental Impact Statement. U.S. Department of Agriculture, U.S. Forest Service, Pacific Southwest Region. January 2001.
- U.S. Forest Service. 2001b. Threatened, Endangered, and Forest Service Sensitive Species Database for the Terrestrial Species of the Sierra National Forest. Electronic database. Updated 2002.
- U.S. Forest Service (USDA-FS). 2002. Forest inventory and analysis national core field guide, volume 1: field data collection procedures for phase 2 plots, version 1.6. U.S. Department of Agriculture, Forest Service, Washington Office. Internal report. On file with: U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis, 201 14<sup>th</sup> St., Washington, D.C., 20250 U. S. Forest Service (USDA-FS). 2002. FIA Field Methods Guide for Phase 2 Measurements.

## FIGURES



## **Placeholder for Figures**

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