

**SACRAMENTO MUNICIPAL UTILITY DISTRICT
UPPER AMERICAN RIVER PROJECT
(FERC NO. 2101)**

**MESOCARNIVORE
TECHNICAL REPORT**

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TABLE OF CONTENTS

Section & Description	Page
1.0 INTRODUCTION	1
2.0 BACKGROUND	2
2.1 Mesocarnivore Study Plan	2
2.2 Agency Requested Information	3
3.0 METHODS	4
4.0 RESULTS	5
4.1 Habitat Distribution	5
4.2 UARP Maintenance Activities.....	5
4.2.1 UARP Features and Facilities.....	5
4.2.2 Developed Recreation Facilities	6
4.3 Winter Helicopter Flights into Upper Elevations of the UARP	6
5.0 ANALYSIS.....	6
5.1 Sierra Nevada Red Fox	6
5.2 Ringtail.....	7
5.3 California Wolverine	8
5.4 American Marten	9
5.5 Pacific Fisher	10
6.0 LITERATURE CITED	11

LIST OF TABLES

Table No. & Description	Page
Table 3.0-1. Habitat associations and Limited Operating Periods for four mesocarnivore species.	5

LIST OF APPENDICES

Appendix & Description

APPENDIX A MESOCARNIVORE HABITAT MAPS

APPENDIX B ENF INCIDENTAL OBSERVATIONS OF FURBEARERS

LIST OF APPLICABLE STUDY PLANS

Description

- Mesocarnivore Study Plan

6.7 Special Status Mesocarnivore Study Plan¹

6.7.1 Pertinent Issue Questions

The special status mesocarnivore study addresses Terrestrial Resource Issue Question:

1. "What are the relevant and known factors (limiting and beneficial) affecting special status mesocarnivore populations in the Project area and how/where are these factors influenced by Project operations and maintenance?"

6.7.2 Background

Four special status species of mesocarnivores (a.k.a. furbearers) are of particular interest to the stakeholders involved in the UARP relicensing. These species are Sierra Nevada red fox, California wolverine, American marten, and Pacific fisher. Special status designations for these species are as follows:

- Sierra Nevada red fox - Federal Species of Concern, California Threatened, Forest Service Sensitive.
- California wolverine - Federal Species of Concern, California Threatened, Forest Service Sensitive, California Fully Protected.
- American Marten - Forest Service Sensitive.
- Pacific Fisher - Federal Species of Concern, California Species of Concern, Forest Service Sensitive

The preferred habitat of the **Sierra Nevada red fox** is thought to be openings and meadows in red fir and lodgepole pine forests in the subalpine and alpine zones of the Sierra Nevada. Although they may range from 4,000 to 12,000 feet elevation, they are seldom sighted below 5,000 feet, and most often occur above 7,000 feet [Note: UARP facilities are all located below 7,000 feet elevation]. It is likely that this species was never common. Dense vegetation, hollow logs, burrows, and rocky crevices are used for cover and den sites.

Scientists debate the persistence of **California wolverine** in the Sierra Nevada. Reports of sightings continue to be filed by mostly inexperienced observers, but none have been documented by photograph, track, or carcass. This is in spite of an intensive, multi-year cooperative research effort throughout suitable habitat in the central Sierras that employed Trailmaster camera bait stations; a technique that has been successful in other states with wolverine populations (Copeland and Kucera 1997). The California Natural Diversity Data Base (CNDDB) has one recent record from 1994 of a possible wolverine sighting at Island Lake in the Desolation Wilderness Area approximately 10 miles east of Union Valley Reservoir. The Eldorado National Forest (ENF) provided one record from July 7, 1994 near the north shore of Loon Lake Reservoir (ENF 1999). Although they use coniferous forest types predominantly, their significant use of non-forest alpine habitats distinguishes them from the fisher and marten (Banci 1994; Copeland 1996). However, some studies suggest that the wolverine avoids many large forest openings (Hornocker and Hash 1981), but not all forest openings (Copeland 1996). Dens are usually dug beneath snow, but caves, rock piles, trees, and downed logs are also used (Magoun and Copeland 1998).

The ENF has numerous records of **American marten** from throughout the forest. Most of these observations are from the southwest corner of the Desolation Wilderness, but unverified observations have also been reported from near Ice House Road and upper Tells Creek. Suitable habitat is present throughout much of the Project area and the species is expected to occur wherever suitable habitat exists. The species' core elevation range in the Sierra Nevada is from 5,500 to 10,000 feet, and they are most often found above 7,200 feet [Note: UARP facilities are all located below 7,000 feet elevation]. They prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. The marten selects stands with 40 to 60 percent canopy closure for both resting and foraging and tend to avoid stands with less than 30 percent canopy closure (Spencer et al. 1983). They generally avoid habitats that lack overhead cover, presumably

¹ Note: Because of overlap between ENF responsibilities for mesocarnivore management and the responsibilities of the Licensee to address issues raised during the Alternative Licensing Process, this study will be a collaborative effort among both parties with sharing of labor in a manner to be determined.

because these habitats do not provide protection from avian predators (Allen 1987; Bissonette et al. 1988; Buskirk and Powell 1994; Spencer et al. 1983). Various studies in the Sierra Nevada indicate that the marten has strong preferences for forest-meadow edges, and riparian forests appear to be important foraging habitats (Spencer et al. 1983; Martin 1987). Natal dens are typically found in cavities in large trees, snags, stumps, logs, burrows, caves, rocks, or crevices in rocky areas. Winter resting sites are typically in decayed wood beneath snow (Spencer 1987).

Recent surveys indicate that the **Pacific fisher** is absent from their former range for a distance of about 240 miles in the central and northern Sierra Nevada, from Yosemite National Park northward (Zielinski et al. 1995). This area includes the ENF and UARP area. Forest type is probably not as important to the fisher as the vegetative and structural aspects that lead to abundant prey populations and reduce fisher vulnerability to predation (Powell 1993). In general, the fisher uses forest or woodland landscape mosaics that include conifer-dominated stands, and they avoid entering open areas that have no overstory or shrub cover (Buskirk and Powell 1994). Riparian corridors (Heinemeyer and Jones 1994) and forested saddles between major drainages (Buck 1983) may provide important dispersal habitat or landscape linkages. The fisher rests in hollow logs, tree cavities, rocks, snags, ground burrows, fallen trees, canopy of live trees (often in witches broom), and slash piles (Heinemeyer and Jones 1994). However, in California, trees are the most commonly used rest sites. Natal (birth) dens are most common in tree cavities at heights of greater than 20 feet, while maternal (kit-rearing) dens are often in cavities closer to the ground so active kits can avoid injury in the event of a fall.

Project construction, operation, and maintenance activities and recreation developments have the potential to disturb mesocarnivores during their sensitive denning periods. The Sierra Nevada Forest Plan Amendment (USDA 2001) provides management direction to the ENF to evaluate the potential for new projects to impact these species. This study facilitates ENF compliance with the Forest Plan Amendment directives as follows:

For detections (i.e., photograph, track plate, or sighting verified by a wildlife biologist) of Sierra Nevada red fox and California wolverine, the ENF is directed to conduct an analysis to determine if activities within five miles of the detection have a potential to adversely affect the species. Activities that are determined to have an adverse impact are generally restricted from January 1 to June 30 for a period of two years following the detection.

For the American marten and Pacific fisher, the Forest Plan Amendment directs the ENF to establish 100-acre and 700-acre buffers, respectively, around known natal and maternal den sites. These buffers are to consist of the highest quality habitat in a compact arrangement surrounding the den site. These highest quality habitats for marten, in descending order of priority, are California Wildlife Habitat Relationships (CWHR) System types 6, 5D, 5M, 4D, and 4M. For fisher, highest quality habitats are CWHR size class 4 or greater and canopy cover greater than 60 percent. Buffers are to be protected from disturbance with a Limited Operating Period (LOP) (May 1 - July 31 for marten; March 1 - June 30 for fisher) for all new projects as long as habitat remains suitable or until another Regionally-approved management strategy is implemented. These LOPs may be waived for individual projects of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering the intensity, duration, timing, and specific location of the project activity.

In summary: 1) Pacific fisher and California wolverine are believed to no longer occur or are extremely rare in the ENF; 2) Sierra Nevada red fox and American marten occur most frequently above 7,000 feet elevation, which exceeds the maximum elevation of UARP facilities, although marten may range to lower elevations within the Project area; 3) no verified detections of mesocarnivores are available from the ENF or CNDDDB from the vicinity of UARP facilities/features, based on limited surveys; 4) ENF management direction (from the Forest Plan Amendment) for these species focuses on protection of den sites; and 5) den sites for these species are extremely difficult to detect and few have ever been recorded.

6.7.3 Study Objectives

This study assumes that focused field surveys for mesocarnivore dens will be a prerequisite of any future development or expansion of UARP facilities, and as a result, are premature at this phase of relicensing when no such proposals have been made by the Licensee. Instead, the objectives of the mesocarnivore study are: 1) determine the spatial relationship of known mesocarnivore habitats to new or ongoing activities associated with Project operation and maintenance, recreation, or planned project improvements; 2) determine which, if any, of

these Project-related activities are scheduled to occur during established LOPs for mesocarnivores; and 3) determine number, duration, and timing of winter helicopter flights into upper elevations of the UARP that may impact denning mesocarnivores.

6.7.4 Study Area and Sampling Sites

The study area for spatial/temporal analysis of Project-related activities relative to mesocarnivore habitat distribution and established LOPs (as identified by the USFS) is comprised of a 0.5-mile radius surrounding all Project-related facilities and features above 4,000 feet elevation, including all existing recreation development specified in the Project license, and all proposed improvements that may be conducted in the future. Field studies will be restricted to those lands where the Licensee has legal access (e.g., ownership/easement rights, public lands) and will not occur on private lands without prior permission from the landowner.

6.7.5 Information Needed From Other Studies

This study will be supported by information derived from the Vegetation Mapping Study, Land Management Study, Rights-Of-Way Management Study, Effects of Roads on Wildlife Study, and the various Recreation studies. Important information will also be derived from ENF and California Department of Fish and Game (CDFG) records and reports on mesocarnivore occurrence in the study area.

6.7.6 Study Methods and Schedule

As discussed above, focused field surveys for mesocarnivore dens are assumed to be a prerequisite of any future development, improvement, or expansion of UARP facilities and, as a result, are premature at this stage of relicensing when no such proposals have been made by the Licensee. Instead, the following methods will be implemented:

- Determine the spatial relationship of mesocarnivore habitats (as identified by the USFS) within 0.5-mile radius surrounding potential Project-related sources of disturbance (e.g., operation and maintenance activities, recreation developments, new proposed facility improvements). The distribution of mesocarnivore habitat (i.e., as described in the Sierra Nevada Forest Plan Amendment) will be delineated from existing ENF data and the results of the Vegetation Mapping Study. The location of potential Project-related sources of disturbance will be determined from SMUD facility descriptions and the various recreation studies. The results will be presented graphically on GIS maps at 1:12000 scale (i.e., as used for the Vegetation Mapping Study). [Note: this mapping effort is contingent upon the availability of adequate existing habitat data for the species in question and does not include a field inventory component beyond that proposed for the Vegetation Mapping Study].
- Based on the habitat mapping effort, determine which Project-related activities are scheduled to occur during established LOPs for mesocarnivores.

6.7.7 Analysis

The results of this study will be analyzed with respect to potential Project-related disturbance factors, proximity of mesocarnivore habitat, and any detections of animals, dens, or sign made during field surveys. This information will then be used to determine the potential for adverse impacts to mesocarnivore dens and the need for LOPs.

6.7.8 Study Output

Study results will be presented to the Terrestrial Resources Technical Working Group (TWG) and Plenary Group toward the end of 2002. However, the ultimate study output will be a written report that includes the issues addressed, objectives, study area, methods, analysis, results, discussion, and conclusions. The reports will be prepared in a format that allows the information to be inserted directly into the Licensee-prepared Draft Environmental Assessment that will be submitted to FERC with the Licensee's application for a new license.

6.7.9 Preliminary Estimated Study Cost

A preliminary estimated study cost will be prepared after the Plenary Group approves the plan.

6.7.10 TWG and Plenary Group Endorsement

On April 16, 2002 the following TWG participants gave approval to the plan: USFS, BLM and SMUD.

On May 1, 2002 the following participants gave Plenary Group approval to the plan: USFS, BLM, USFWS, Taxpayers of El Dorado County, Friends of El Dorado County, Camp Lotus, El Dorado County Water Agency, El Dorado County, Placer County Water Agency, California Department of Fish and Game, California State Water Resources Control Board, Pacific Gas and Electric and Friends of the River. None of the participants at the meeting said they could not “live with” this study plan.

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MESOCARNIVORE TECHNICAL REPORT

SUMMARY

This technical report addresses the spatial relationship between suitable habitat and UARP facilities for four species of mesocarnivores of particular interest to UARP stakeholders: Sierra Nevada red fox (*Vulpes vulpes necator*), California wolverine (*Gulo gulo luteus*), American martin (*Martes americana*), and Pacific fisher (*Martes pennanti*). Geographic Information System (GIS) maps are provided that delineates the gross distribution of suitable habitat above 4,000 feet elevation and within 0.5-mile of UARP facilities as per the study plan. The report also includes a general description of standard UARP maintenance and monitoring activities, including helicopter flights into Desolation Wilderness.

1.0 INTRODUCTION

This technical report is one in a series of reports prepared by Devine Tarbell & Associates, Inc., (DTA) for the Sacramento Municipal Utility District (SMUD) as an appendix to SMUD's application to the Federal Energy Regulatory Commission (FERC) for a new license for the Upper American River Project (UARP or Project). The report addresses four species of mesocarnivores of particular interest to UARP stakeholders: Sierra Nevada red fox (*Vulpes vulpes necator*), California wolverine (*Gulo gulo luteus*), American martin (*Martes americana*), and Pacific fisher (*Martes pennanti*). The report includes the following sections:

- **BACKGROUND** – Summarizes the applicable study plan approved by the UARP Relicensing Plenary Group; a brief description of the issue questions addressed, in part, by the study plan; the objectives of the study plan; the study area, and agency information requests. In addition, requests by resource agencies for additions to this technical report are described in this section.
- **METHODS** – A description of the methods used in the study.
- **RESULTS** – A description of the data obtained during the study.
- **ANALYSIS** – An analysis of the results, where appropriate.
- **LITERATURE CITED** – A listing of all literature cited in the report.

This technical report does not include a detailed description of the UARP Alternative Licensing Process (ALP) or the UARP, which can be found in the following sections of SMUD's application for a new license: The UARP Relicensing Process, Exhibit A (Project Description), Exhibit B (Project Operations), and Exhibit C (Construction).

Also, this technical report does not include a discussion regarding the effects of the UARP on mesocarnivores and their habitat, nor does the report include a discussion of appropriate protection, mitigation and enhancement measures. An impacts discussion regarding the UARP is included in the applicant-prepared preliminary draft environmental assessment (PDEA) document, which is part of SMUD's application for a new license. Development of resource

measures will occur in settlement discussions, commencing in early 2004, and will be reported on in the PDEA.

2.0 BACKGROUND

2.1 Mesocarnivore Study Plan

Four special status species of mesocarnivores are addressed by the UARP mesocarnivore study plan:

- Sierra Nevada red fox - Federal Species of Concern (FSC), California Threatened (CT), Forest Service Sensitive (FSS);
- California wolverine - FSC, CT, FSS, California Fully Protected (CFP);
- American martin – FSC, FSS; and
- Pacific fisher – FSC, California Species of Concern (CSC), FSS.

In response to the status and protections afforded these four species under the California Endangered Species Act, California Fish and Game Code, Eldorado National Forest (ENF) Land and Resource Management Plan (LRMP; USDA 1989) and other federal agency management directives, the UARP Terrestrial Resources Technical Working Group (TWG) developed the UARP Mesocarnivore Study Plan, which was approved by the TWG on April 16, 2002 and by the UARP Relicensing Plenary Group on May 1, 2002. The study plan was designed to address, in part, the following issue question developed by the Plenary Group:

Issue Question 1. What are the relevant and known factors (limiting and beneficial) affecting special status mesocarnivore populations in the Project area, and how/where are these factors influenced by Project Operations?

Based on a review and discussion of this issue question, the Terrestrial Resources TWG established the following objectives:

1. Determine the spatial relationship of known mesocarnivore habitats to new or ongoing activities associated with UARP operations and maintenance, recreation, or planned project improvements.
2. Determine which, if any, of these UARP-related activities are scheduled to occur during established Limited Operating Periods (LOPs) for mesocarnivores.
3. Determine number, duration, and timing of winter helicopter flights into upper elevations of the UARP that may impact denning mesocarnivores.

The study area for spatial/temporal analysis of UARP-related activities relative to mesocarnivore habitat distribution and established LOPs (as identified by the ENF) was all suitable habitat

above 4,000 feet elevation (e.g., above Jaybird Powerhouse) and within 0.5-mile¹ of UARP facilities that provide a potential source of ongoing disturbance to mesocarnivores due to operation and maintenance activities (e.g., dams, powerhouses, switchyards, primary access roads, and developed recreation facilities). Field studies, if necessary and appropriate, were to be restricted to those lands where SMUD has legal access (e.g., ownership/easement rights, public lands) and would not occur on private lands without prior permission from the landowner.

As noted above, this technical report does not address specific UARP impacts to mesocarnivores and, accordingly, does not address Issue Question 1 as it pertains to UARP impacts. The Settlement Negotiation Group will assess UARP impacts during settlement discussions.

2.2 Agency Requested Information

In a May 13, 2004 letter, the agencies stated in regards to the *Mesocarnivore Technical Report* (March 2004) the following:

- All studies will need GIS shape files showing habitat/vegetation types and spatial relationships with meta-data.
- Shape files will need to include survey locations and positive sightings/responses.
- To address study objective 2 of the study plan, the opportunity to observe and report snow tracks of mesocarnivores during the course of planned high elevation winter helicopter flights should be evaluated. This area has little to no information on species occupancy due to the limited ability to collect data during the winter by other means. Please coordinate with the Forest Service to collect these data.

The distribution of potential habitat for mesocarnivores is shown in a series of maps located in Appendix A. Incidental observations of mesocarnivores from the vicinity of the UARP are shown graphically in Appendix B.

SMUD occasionally uses helicopters to access high elevation areas for snow surveys and facility operation and maintenance (see Section 4.3). The possibility of using these helicopter flights to observe snow tracks of mesocarnivores was first proposed to the Terrestrial Resources TWG by ENF representative, Don Yasuda. The TWG discussed this request at its meeting on June 21, 2004 and SMUD noted that use of helicopters for this purpose would not be practical based on the following factors: 1) the number of flights are restricted under a Special Use permit issued by the Forest Service; 2) flights are conducted for specific, time-critical, operation and maintenance activities, which generally cannot accommodate deviations from flight paths or schedules; and 3) helicopters are typically fully-loaded with equipment and personnel and cannot accommodate extra passengers for surveys. Following a discussion of these points, Mr. Yasuda withdrew his proposal in favor of the recommendations listed below.

¹ As per guidelines for Limited Operating Periods presented in the Sierra Nevada Forest Plan Amendment (USDA 2004)

The Terrestrial Resources TWG met on June 21, 2004 to consider “conclusions” relative to mesocarnivores and to develop recommendations for consideration by the Settlement Negotiation Group. The TWG agreed on the following general conclusions:

1. The Issue Questions and Objectives stated in the Mesocarnivore Study Plan are adequately addressed by the information provided in the Mesocarnivore Technical Report.
2. Methods employed were adequate to address Issue Questions and Objectives; however, limited information on mesocarnivores was available.

The TWG also developed the following recommendations for consideration by the Settlement Negotiation Group:

1. Focused field surveys for mesocarnivore dens will be a prerequisite of any future development or expansion of UARP facilities in appropriate potential habitats and depending upon the specific activity proposed.
2. Once a conservation management plan for mesocarnivores is developed by the Forest Service, additional surveys may be required to provide UARP-specific information to supplement the objectives of the plan. In addition, UARP vegetation management practices may be assessed as part of the management plan.

3.0 METHODS

This study was designed to use existing information presumed to be available from the ENF (as a product of management actions prescribed by the SNFPA; USDA 2004) to map the distribution of mesocarnivore habitat in the study area for subsequent analysis. Field surveys for dens or other habitat attributes were not an objective of this study but were assumed to be a prerequisite for future developments, improvements, or expansion of UARP facilities. However, the mapping component of this study was constrained by the unanticipated lack of mesocarnivore habitat information from the ENF for the study area. In the absence of this important information, SMUD used “best available” information² on habitat suitability descriptors for the target species (Table 3.0-1) and compared that to maps presented in the UARP *Vegetation Mapping Technical Report* to delineate the gross distribution of suitable mesocarnivore habitat in the study area³. These habitats were then integrated into Geographic Information System (GIS) maps at a scale of 1:12000 and overlaid with additional data layers displaying reservoirs, primary access roads, powerhouses, dams, transmission lines, and developed recreation facilities above 4,000 feet elevation. SMUD provided information on standard operation and maintenance activities associated with these UARP features and facilities.

² “Best available” information on habitat suitability for mesocarnivores was derived from the Sierra Nevada Forest Plan Amendment (USDA 2004).

³ Note that these habitats, although generally suitable based on SNFPA habitat standards, are not necessarily occupied by the target species.

Species	Habitat	Limited Operating Period
Sierra Nevada red fox	Mixed conifer, red fir, lodgepole pine, and mixed pine forests in sub-alpine zones and alpine fell fields ^a	For 2 years after a detection, restrict activities that have an adverse impact from January 1 to June 30
California wolverine	Forests in alpine, boreal forest and mixed forest vegetation types ^b	For 2 years after a detection, restrict activities that have an adverse impact from January 1 to June 30
American martin	Red fir, lodgepole pine, sub-alpine conifer, mixed conifer-fir, and Jeffrey pine ^c	May 1 to July 31 for all new projects
Pacific fisher	Ponderosa pine, montane hardwood-conifer, and mixed conifer ^d	March 1 to June 30.
^a FEIS Volume 3, Chapter 3, part 4.4, page 36, from SNFPA, 2004 ^b FEIS Volume 3, Chapter 3, part 4.4, page 45, from SNFPA, 2004 ^c FEIS Volume 3, Chapter 3, part 4.4, page 19, from SNFPA, 2004 ^d FEIS Volume 3, Chapter 3, part 4.4, page 2, from SNFPA, 2004		

4.0 RESULTS

4.1 Habitat Distribution

GIS maps showing the spatial distribution of potentially suitable habitat in the 0.5-mile study area surrounding UARP facilities and features are shown in Figures 4.0-1 to 4.0-7, Appendix A. These forested habitats, as described in Table 3.0-1, are distributed sparsely at higher elevation facilities from Rubicon Reservoir to Loon Lake Reservoir, and then are distributed relatively evenly across the landscape surrounding UARP facilities from Loon Lake Reservoir and Ice House Reservoir downstream to Camino Reservoir.

Mixed Conifer/Fir is the dominant forest type surrounding UARP features from Rubicon Reservoir and Ice House Reservoir downstream to the northern and eastern shorelines of Union Valley Reservoir. Less dominant forested habitats around these higher elevation features are Lodgepole Pine and Ponderosa Pine (98% distribution in plantations associated with burn areas and timber harvest sites). Mixed Conifer/Pine and Ponderosa Pine (plantations) are the dominant forest types extending from the southern and western shorelines of Union Valley Reservoir downstream to Camino Reservoir at the 4,000-foot elevation.

4.2 UARP Maintenance Activities

4.2.1 UARP Features and Facilities

Maintenance, repair and monitoring activities for the UARP are performed throughout the year as needed to ensure reliable operation and safety concerns are met. These activities include, but are not limited to, dam structural repair, valve repair, turbine repairs, transmission line right-of-way maintenance, snow plowing, log boom repair, and other activities.

4.2.2 Developed Recreation Facilities

There are 34 developed recreation sites within the Crystal Basin that are operated and maintained by the ENF through a combination of funding from SMUD, concessionaire management and funding from the USFS fee demonstration project. Twenty-six of these sites are located adjacent to UARP reservoirs. In general, the recreation facilities of the UARP are utilized by the public from mid-May through mid-October. Prior to public use, the recreation facilities undergo maintenance that may involve debris removal resulting from winter storms. Debris removal can require the use of heavy equipment (chainsaw, loaders and trucks) for the removal of downed wood.

4.3 **Winter Helicopter Flights into Upper Elevations of the UARP**

UARP maintenance activities at upper elevation facilities within the Desolation Wilderness (e.g., Rubicon Reservoir and appurtenant facilities) require the use of a helicopter for up to eight permitted flights per year.⁴ Four of these flights are typically used for monitoring snow conditions during February-May, including measuring depth of the snow pack and checking snow pillow manometers at Lake Lois. Helicopter landings are made at pre-determined locations where the pilot and crew can have assurance of a stable landing and eventual take-off. The remaining four flights occur in late May, October, November and January. Flights are generally avoided during the peak recreation period between Memorial Day and Labor Day. Alternative modes of travel (e.g., pack animals, non-motorized transport) into the Desolation Wilderness for these maintenance visits are generally precluded by the need for heavy equipment (e.g., batteries, electric drills, and compressors). As part of the UARP relicensing proceedings, SMUD plans to propose a reassessment of the number of helicopter flights allowed into the Desolation Wilderness. SMUD has entered into discussions with the Forest Service on widening of the Rubicon Trail to permit access by four-wheel, off-road vehicles which could lessen the need for additional helicopter trips.

5.0 ANALYSIS

Although potential habitat for several species of mesocarnivores is widely distributed throughout the study area, there is limited empirical evidence of their occurrence, home range, habitat utilization, and behavioral response to human activities. Synopses of available information for species of interest within the context of this relicensing were initially presented in the UARP IIP (SMUD 2001) with excerpts provided below.

5.1 **Sierra Nevada Red Fox**

Little is known about the current distribution and status of California's only native red fox. It is largely nocturnal and seldom seen. Most sightings over the last 40 years have been brief glimpses by inexperienced observers. The majority of the sightings have come from Lassen and

⁴ Since motorized equipment is prohibited, helicopter flights into the Desolation Wilderness area are granted by special permission from the USFS. Four flights per year are granted to SMUD for UARP maintenance by the USFS; another four flights per year are "borrowed" from the State Department of Water Resources. SMUD coordinates with USFS on times of flights.

Yosemite National Parks, where their habitat is protected and the number of potential observers is high. Its preferred habitat is thought to be openings and meadows in red fir and lodgepole pine forests in the sub-alpine and alpine zones of the Sierra Nevada.

Historically, the Sierra Nevada red fox was distributed continuously at high elevations in the Sierra Nevada from Sierra County south to Tulare County. This species also occurred in the vicinity of Mt. Shasta and Lassen Peak westward to the Trinity Mountains (USDA 2004). Although they seem to range from 4,000 to 12,000 feet elevation, they are seldom sighted below 5,000 feet, and most often above 7,000 feet. Low prey availability and competition for this limited prey resource might be important factors that limit population densities. It is likely that this species was never common. However, there is some question as to whether the Sierra Nevada red fox is rare or just rarely seen. It is likely, however, that populations declined as a result of trapping, grazing, poisoning, and human activity in the early 1900s. Trapping for this species was banned in 1974. The primary current threats are logging, grazing, summer home development, and recreation.

The Sierra Nevada red fox hunts mostly small and medium-sized mammals such as ground squirrels, gophers, mice, marmots, woodrats, pikas, and rabbits. Dense vegetation, hollow logs, burrows, and rocky crevices are used for cover and den sites. Mating takes place during late winter (January to March), and the young are born in early spring (March to May), after a gestation period of about 52 days. Pups are dependent on their parents for six months, and become sexually mature at 10 months. Red foxes typically move downslope in winter into ponderosa pine and mixed conifer, moving upslope in summer to lodgepole pine, sub-alpine conifer, and red fir habitats.

The available literature and resource databases have been reviewed and resource agency personnel have been consulted to identify any known occurrences of the Sierra Nevada red fox in the UARP area. No such occurrences were identified through this effort. However, suitable habitat exists at higher elevations of the study area and the species may occur in very low numbers.

5.2 Ringtail

The ringtail is widely distributed throughout most of California. They are found in dense riparian growth, montane evergreen forests, oak woodlands, pinyon-juniper, chaparral, and deserts (CDFG 1995). Their territory is usually within one-half mile from a permanent water source. Hollow trees, logs, snags, caves, rocks, and burrows provide reproductive and resting cover. They mate in March and April, and young are born in May and June after a gestation period of 40 to 50 days. Rodents are the primary prey but ringtail will also feed on birds, reptiles, insects and fruit. The ringtail is almost exclusively nocturnal and, as a result, is rarely observed in the wild.

Suitable habitat for ringtail occurs throughout most of the study area and the species is expected to occur. On November 11, 2002, UARP biologists recorded an incidental observation of a road-killed ringtail on Highway 50 approximately 1.7 miles west of Fresh Pond.

5.3 California Wolverine

The persistence of California wolverine in the Sierra Nevada is a topic of debate among scientists. Reports of sightings continue to be filed by mostly inexperienced observers, but none have been documented by photograph, track, or carcass. This is in spite of an intensive, multi-year cooperative research effort throughout suitable habitat in the central Sierras that employed Trailmaster™ camera bait stations; a technique that has been successful in other states with wolverine populations (Copeland and Kucera 1997).

The wolverine were part of the early fur harvest in California and were distributed at low densities throughout most of the Sierra Nevada (Grinnell et al. 1937). In the early 1900s, their populations declined largely due to trapping (Dixon 1925; Seton 1929). By 1933, no more than 30 individuals were thought to occur in California (Grinnell et al. 1937). They occupied alpine, boreal, and mixed forest vegetation types (Grinnell et al. 1937; Schempf and White 1977). Although they use coniferous forest types predominantly, their significant use of non-forest alpine habitats distinguishes them from the fisher and marten (Banci 1994; Copeland 1996). However, some studies suggest that the wolverine avoids many large forest openings (Hornocker and Hash 1981), but not all forest openings (Copeland 1996). Because forests provide important cover for the wolverine, the connectivity and distribution of dense forest conditions is assumed to be important, especially in the northern Sierra Nevada (USDA 2004). This region may be an important linkage between habitat in California and habitat in Oregon and Washington; however, the region lacks the alpine zones that can buffer the wolverine from human activity. Instead, the wolverine must use forested habitat to move north and south, and these areas are managed for timber harvest and have numerous small communities, which subject the wolverine to potential disturbance.

The wolverine requires suitable high-elevation rocky substrates with woodpiles or boulders for natal dens. They also seem to select areas that are free from human disturbance. Breeding typically occurs in the summer, but implantation of blastocysts is delayed until at least December, or as late as March. Most young are born in February or March, grow rapidly, and leave their dens in April or May. Dens are usually dug beneath snow, but caves, rock piles, trees, and downed logs are also used. The wolverine feeds primarily on small mammals and carrion. Prey includes marmots, ground squirrels, gophers, mice, deer, birds, and fish. They may kill large, snowbound prey, but most large animals are eaten as carrion. Berries and insects are also eaten on occasion.

The available literature and resource databases have been reviewed and resource agency personnel have been consulted to identify any known occurrences of the wolverine in the UARP area. The CNDDDB has one recent record from 1994 of a possible wolverine sighting at Island Lake in the Desolation Wilderness Area approximately 10 miles east of Union Valley Reservoir. The ENF provided one record from July 7, 1994 near the north shore of Loon Lake Reservoir (ENF 1999). Suitable habitat appears to exist in the higher elevations of the UARP area but the absence of verified reports in recent years suggests that the wolverine may be extirpated from the Sierra Nevada, or occur in only extremely low numbers (USDA 2004).

5.4 American Marten

In California, the American marten was distributed historically throughout the Sierra Nevada, California Cascades, and the Coast range, from the Oregon border southward to Sonoma County. They are currently distributed throughout the Sierra Nevada and Cascades (Buskirk and Ruggiero 1994; Buskirk and Zielinski 1997). The species' core elevation range is from 5,500 to 10,000 feet, and they are most often found in the Sierra Nevada above 7,200 feet. Verified marten detections by track or photo exist for all national forests in the Sierra Nevada. Although the marten is classified as a furbearer in California, there has been no trapping season for the species since 1954. The marten distribution in the Sierra Nevada generally conforms to their known historical distribution (Kucera et al. 1995). A decline in marten population size and range during the early 1900s has been attributed to habitat modifications, with trapping and predator control as contributing factors (Bennett and Sampson 1984). Factors that make martens susceptible to local extirpation include: 1) low reproductive potential; 2) an affinity for overhead cover and avoidance of extensive open areas, especially in winter; and 3) very large home range size. Empirical data on population size of martens in California is generally lacking. The primary current threats to the species are timber harvest, grazing, recreation, fire suppression, and road kill.

The marten prefers coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersed of riparian areas and meadows. Important habitat attributes are: 1) vegetative diversity, with predominantly mature forest; snags; 2) dispersal cover; and 3) large woody debris (Allen 1987). The marten selects stands with 40 to 60 percent canopy closure for both resting and foraging and tend to avoid stands with less than 30 percent canopy closure (Spencer et al. 1983). They generally avoid habitats that lack overhead cover, presumably because these habitats do not provide protection from avian predators (Allen 1987; Bissonette et al. 1988; Buskirk and Powell 1994; Spencer et al. 1983). Various studies in the Sierra Nevada indicate that the marten has strong preferences for forest-meadow edges, and riparian forests appear to be important foraging habitats (Spencer et al. 1983; Martin 1987).

Marten breed in the summer and have a gestation period of 220 to 290 days, including delayed implantation. Natal dens are typically found in cavities in large trees, snags, stumps, logs, burrows, caves, rocks, or crevices in rocky areas. Most litters are born in March and April, but some are as late as June. The young stay with the female until fall, and then become solitary. Winter resting sites are typically in decayed wood beneath snow (Spencer 1987). The diet of the marten in the Sierra Nevada changes seasonally but is predominantly microtine rodents, tree squirrels, snowshoe hares and, especially in the summer, ground squirrels (Zielinski et al. 1983; 1997; Martin 1987).

The available literature and resource databases have been reviewed and resource agency personnel have been consulted to identify any known occurrences of the marten in the vicinity of the UARP. The ENF reports numerous observations of marten from throughout the forest (Appendix B). Most of these observations are from the southwest corner of the Desolation Wilderness, but observations have also been recorded from near Ice House Road, upper Tells

Creek, and the South Fork American River below Fresh Pond. On October 16, 2003, UARP biologists recorded an incidental observation of an animal that appeared to be a marten along the South Fork American River near the confluence of Hastings Creek at an unusually low elevation of approximately 670 feet. This sighting, although well below the typical range of the species in the Sierra Nevada (USDA 2004), was acknowledged by Dr. Reginald H. Barrett at the University of California, Berkeley, as having high probability of being a marten (personal communication with R. Williams, October 22, 2003).

5.5 Pacific Fisher

The distribution of the Pacific fisher has declined substantially from its historic range (Zielinski et al. 1997). Recent surveys indicate that the fisher is absent from their former range for a distance of about 240 miles in the central and northern Sierra Nevada, from Yosemite National Park northward (Zielinski et al. 1995). An intensive survey effort during the early 1990s surveyed for the fisher at 510 sites, ranging from Del Norte, Humboldt, and Siskiyou counties through the southern Cascades and Sierra Nevada to Kern County (Zielinski et al. 1995). The fisher was detected at least once at 90 of these survey sites; most detections were in the northwest (northern Coast Range and Klamath Mountains) and on the west slope in the southern Sierra Nevada. No verifiable evidence of fishers was collected in the area extending from northeastern Shasta County south to Yosemite National Park, even though 66 track-plate surveys (each with multiple stations) and 184 camera stations were deployed in this area. Detections were common in Sequoia National Forest, but decreased moving northward to Yosemite National Park. In Yosemite, two road-killed fishers were collected in 1993 and 1994. After several years of effort, fishers were also photographed in Yosemite at two camera stations.

The fisher is among the most habitat-specific mammals in North America. However, forest type is probably not as important to the fisher as the vegetative and structural aspects that lead to abundant prey populations and reduce fisher vulnerability to predation (Powell 1993). In general, the fisher uses forest or woodland landscape mosaics that include conifer-dominated stands, and they avoid entering open areas that have no overstory or shrub cover (Buskirk and Powell 1994). Riparian corridors (Heinemeyer and Jones 1994) and forested saddles between major drainages (Buck 1983) may provide important dispersal habitat or landscape linkages.

The fisher rests in hollow logs, tree cavities, rocks, snags, ground burrows, fallen trees, canopy of live trees (often in witches broom), and slash piles (Heinemeyer and Jones 1994). However, in California, trees are the most commonly used rest sites. Natal dens, where kits are born, are most commonly in tree cavities at heights of greater than 20 feet, while maternal dens, where kits are raised, may be in cavities closer to the ground so active kits can avoid injury in the event of a fall. The fisher is considered to be an opportunistic predator and is known to feed on rabbits, porcupines, squirrels, grouse, insects, berries, and truffles.

The available literature and resource databases have been reviewed and resource agency personnel have been consulted to identify any known occurrences of the fisher in the vicinity of the UARP. No recent records exist for this species and the ENF is within the central Sierra

Nevada region where the fisher is now considered to be extirpated. However, potential habitat does exist in mid-elevation forest stands in the vicinity of the UARP.

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APPENDIX A






MESOCARNIVORE HABITAT MAPS

Upper American River Project



Mapsheet 1

**Figure 4.0-1
Mesocarnivore Habitat Within
0.5-mile of UARP Facilities
and Features**








-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

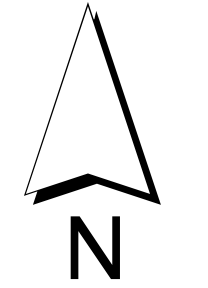
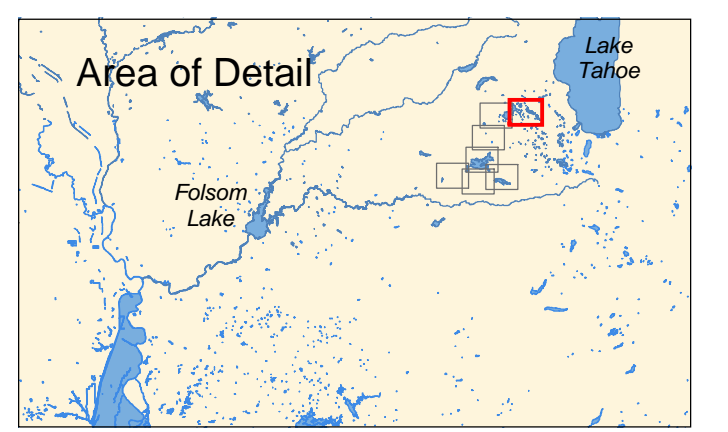
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

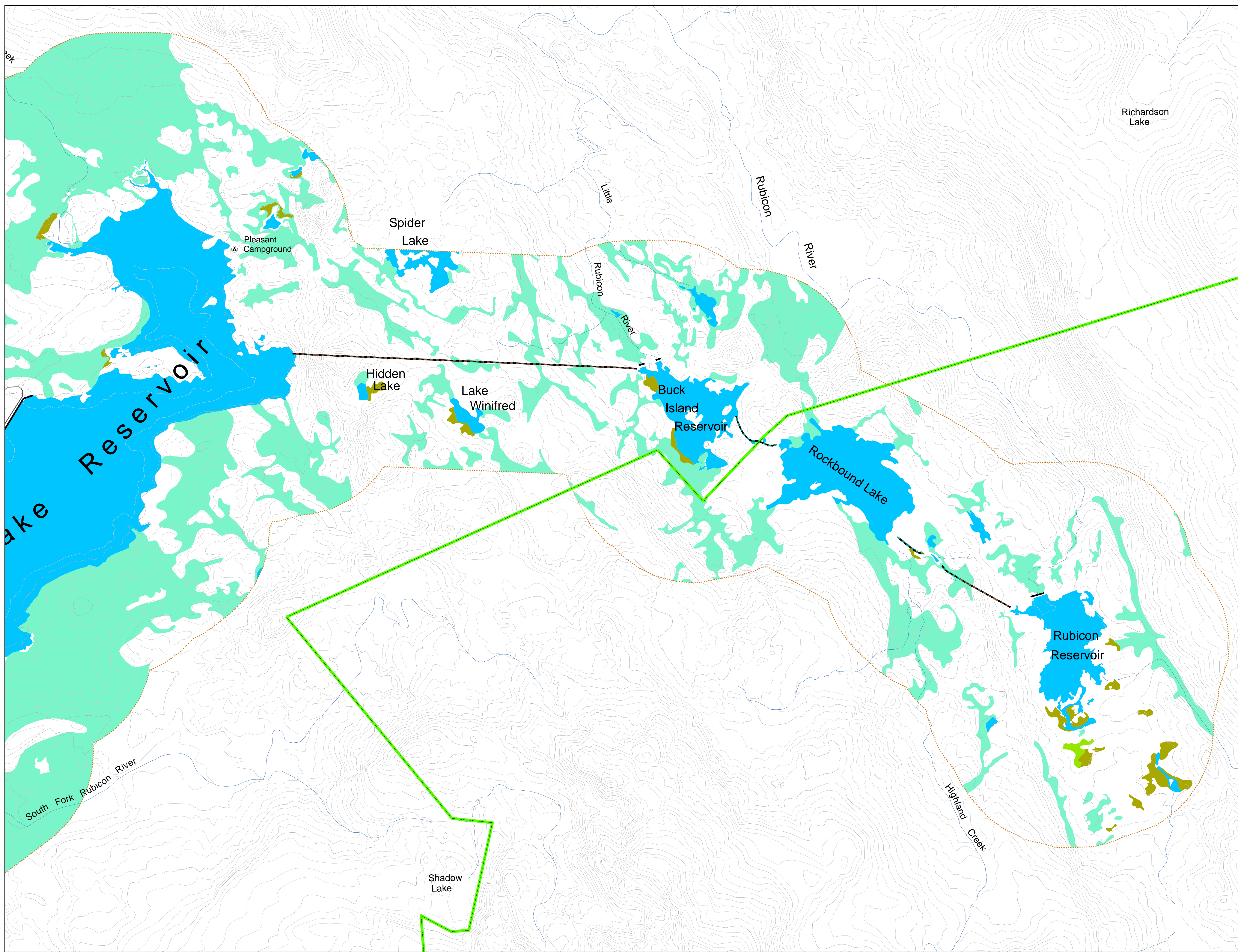
Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-Fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary








SCALE 1:12,000
0 0.1 0.2 0.3 0.4 Miles



Upper American River Project



Mapsheet 7
Figure 4.0-7
Mesocarnivore Habitat Within 0.5-mile of UARP Facilities and Features

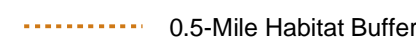






-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

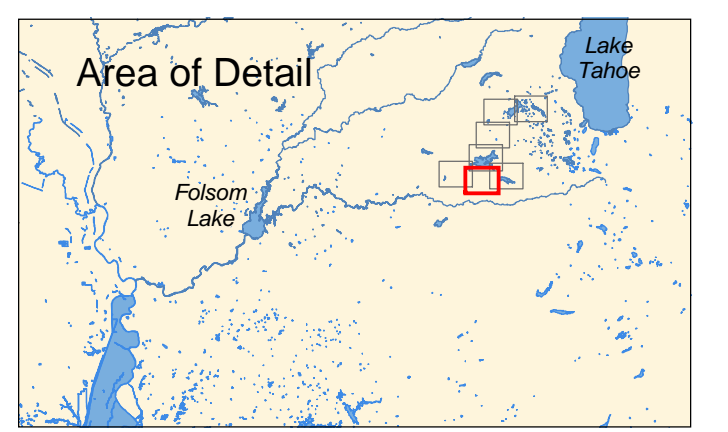
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

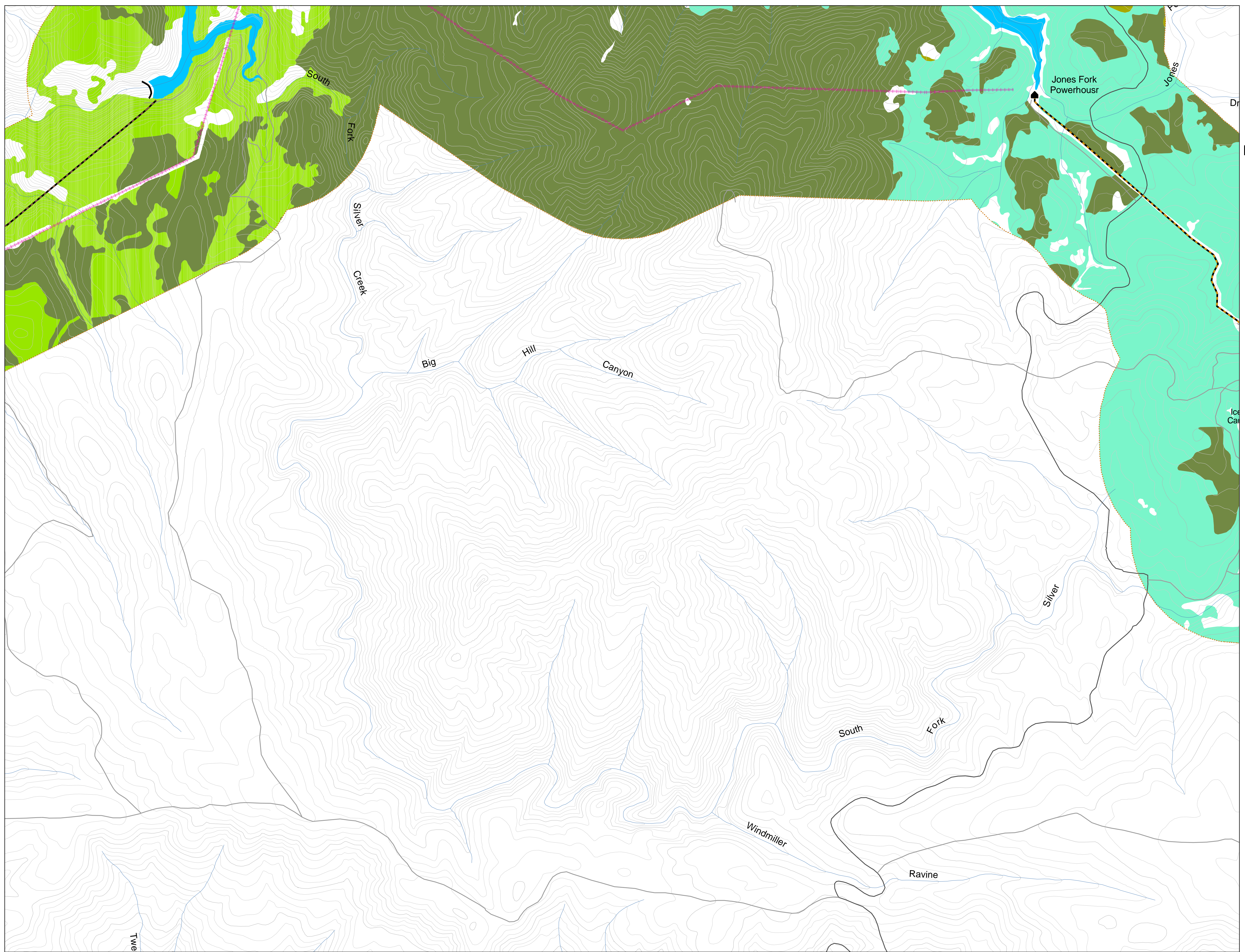
Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir, and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-Fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary








SCALE 1:12,000
 0 0.1 0.2 0.3 0.4 Miles



Upper American River Project



Mapsheet 6
Figure 4.0-6
Mesocarnivore Habitat Within
0.5-mile of UARP Facilities
and Features







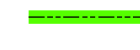
-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

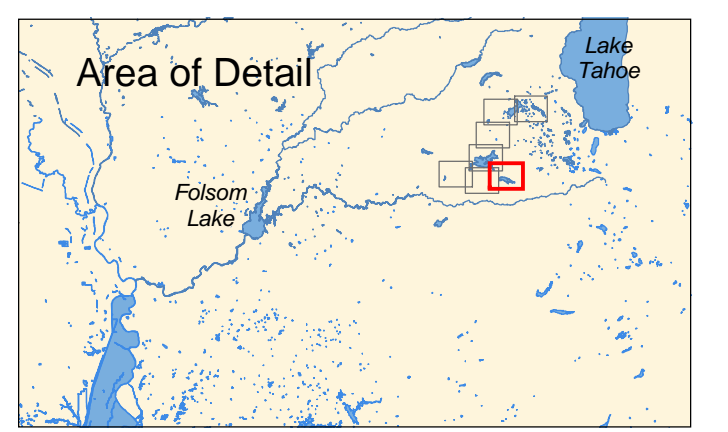
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

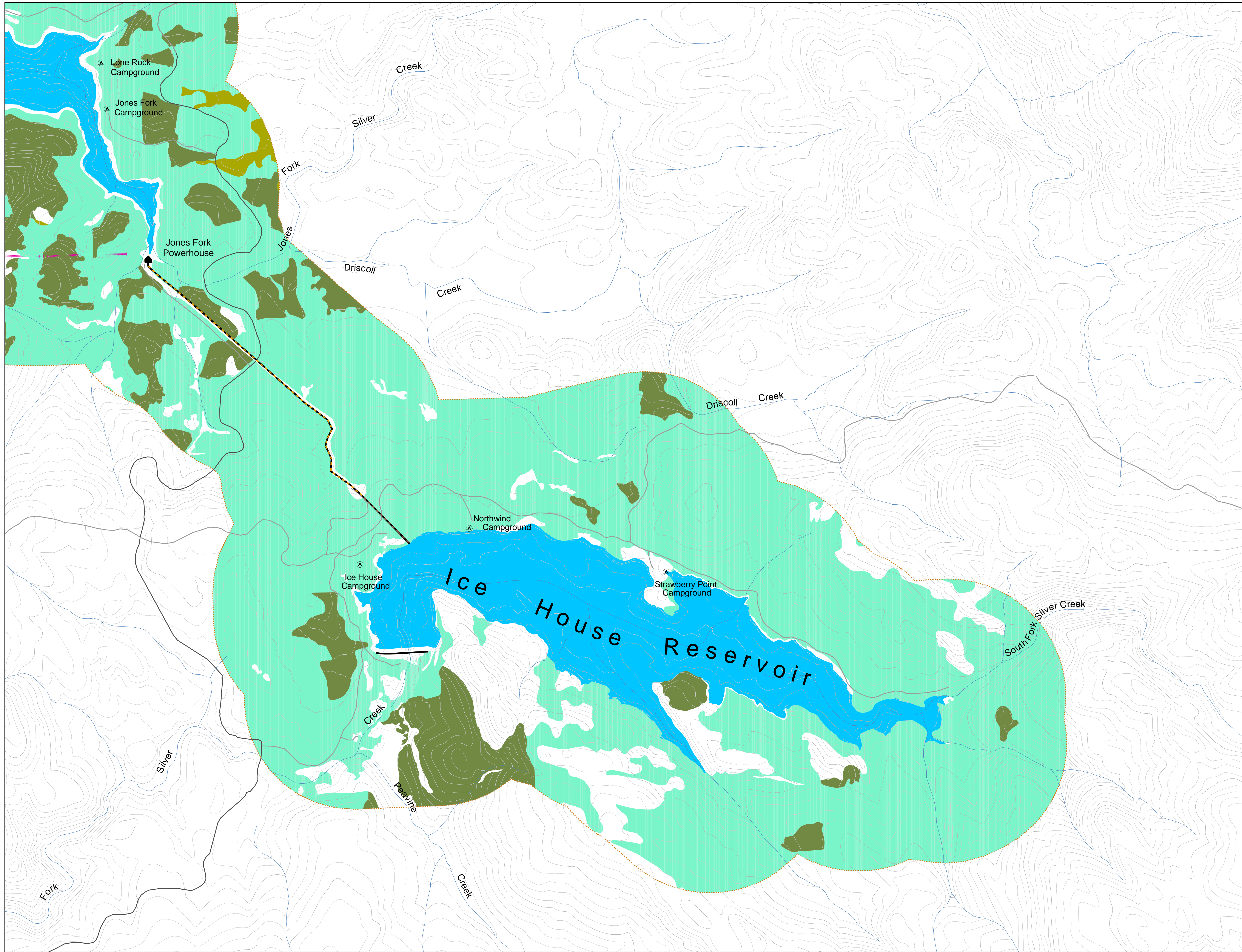
Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir, and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-Fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary



SCALE 1:12,000
 0 0.1 0.2 0.3 0.4 Miles








Upper American River Project



Mapsheet 5

Figure 4.0-5 Mesocarnivore Habitat Within 0.5-mile of UARP Facilities and Features








-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

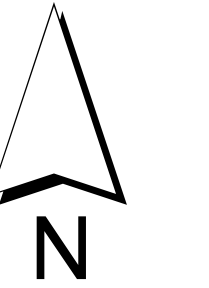
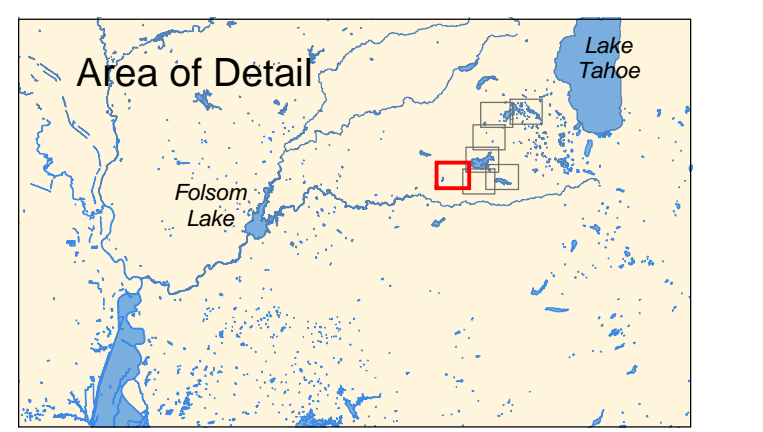
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir, and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary








SCALE 1:12,000
0 0.1 0.2 0.3 0.4 Miles



Upper American River Project



Mapsheet 4
Figure 4.0-4
Mesocarnivore Habitat Within
0.5-mile of UARP Facilities
and Features







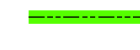
-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

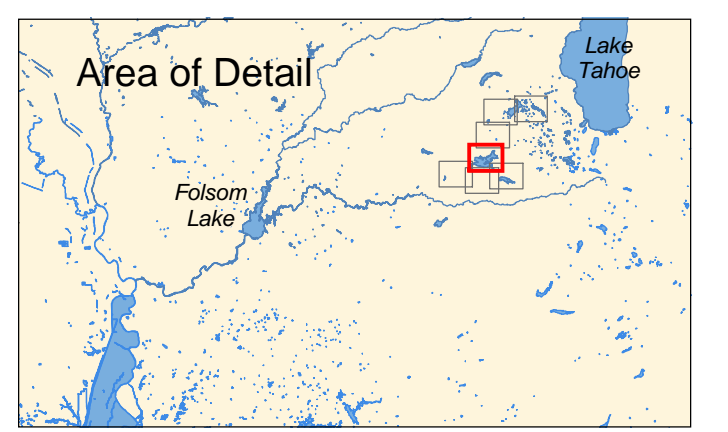
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

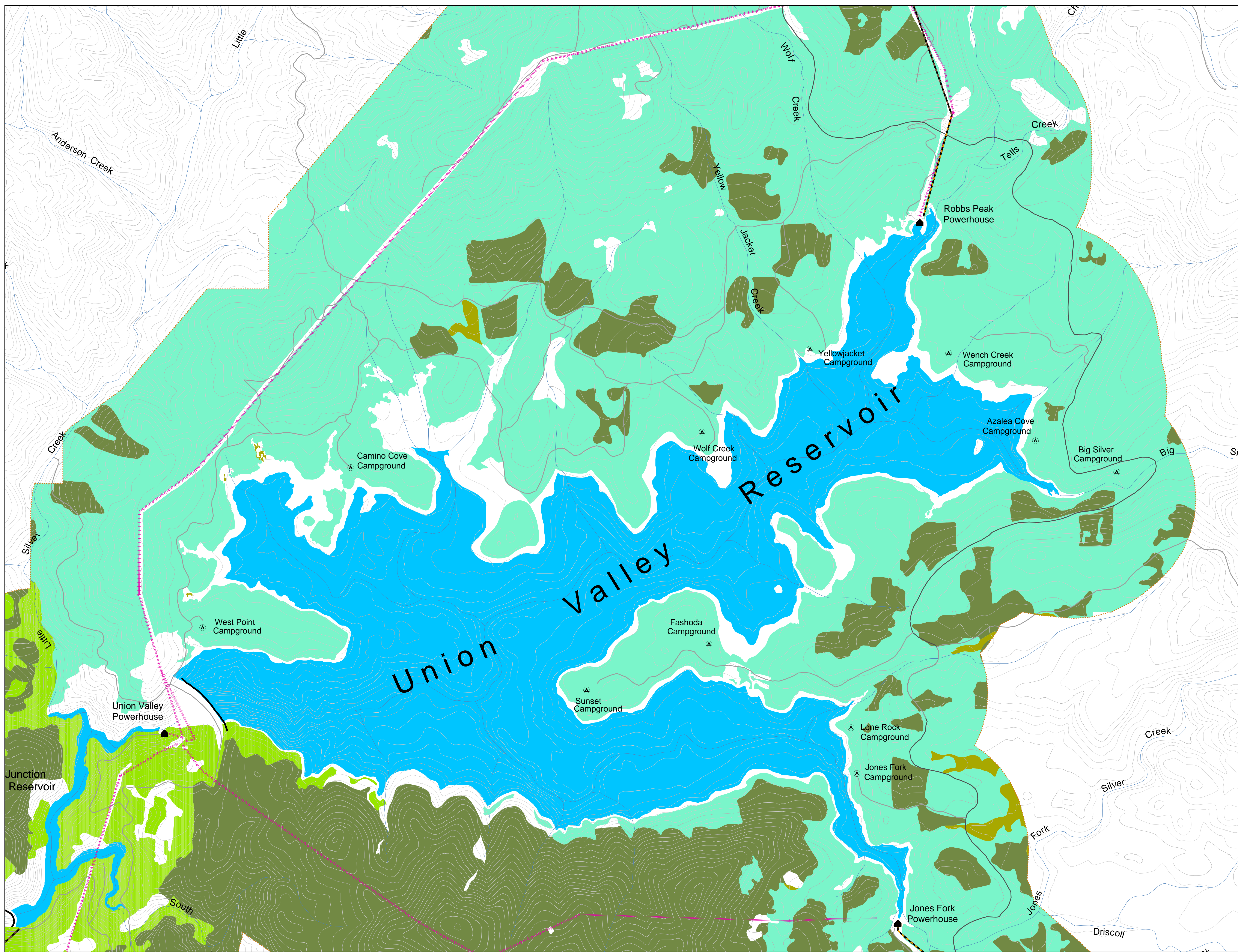
Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir, and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-Fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary








SCALE 1:12,000
 0 0.1 0.2 0.3 0.4 Miles



Upper American River Project



Mapsheet 3
Figure 4.0-3
Mesocarnivore Habitat Within
0.5-mile of UARP Facilities
and Features







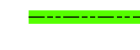
-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

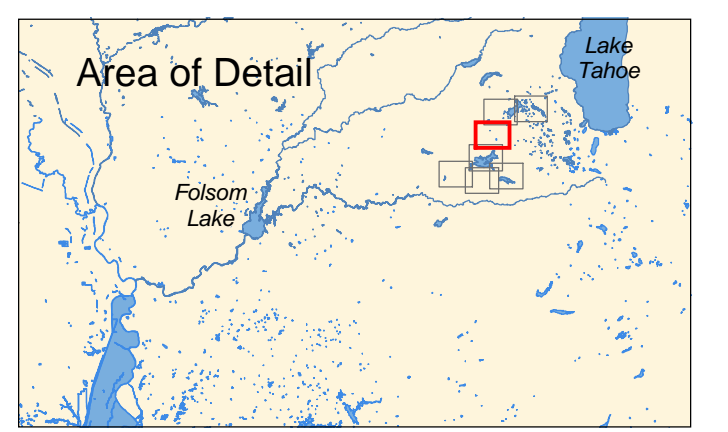
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

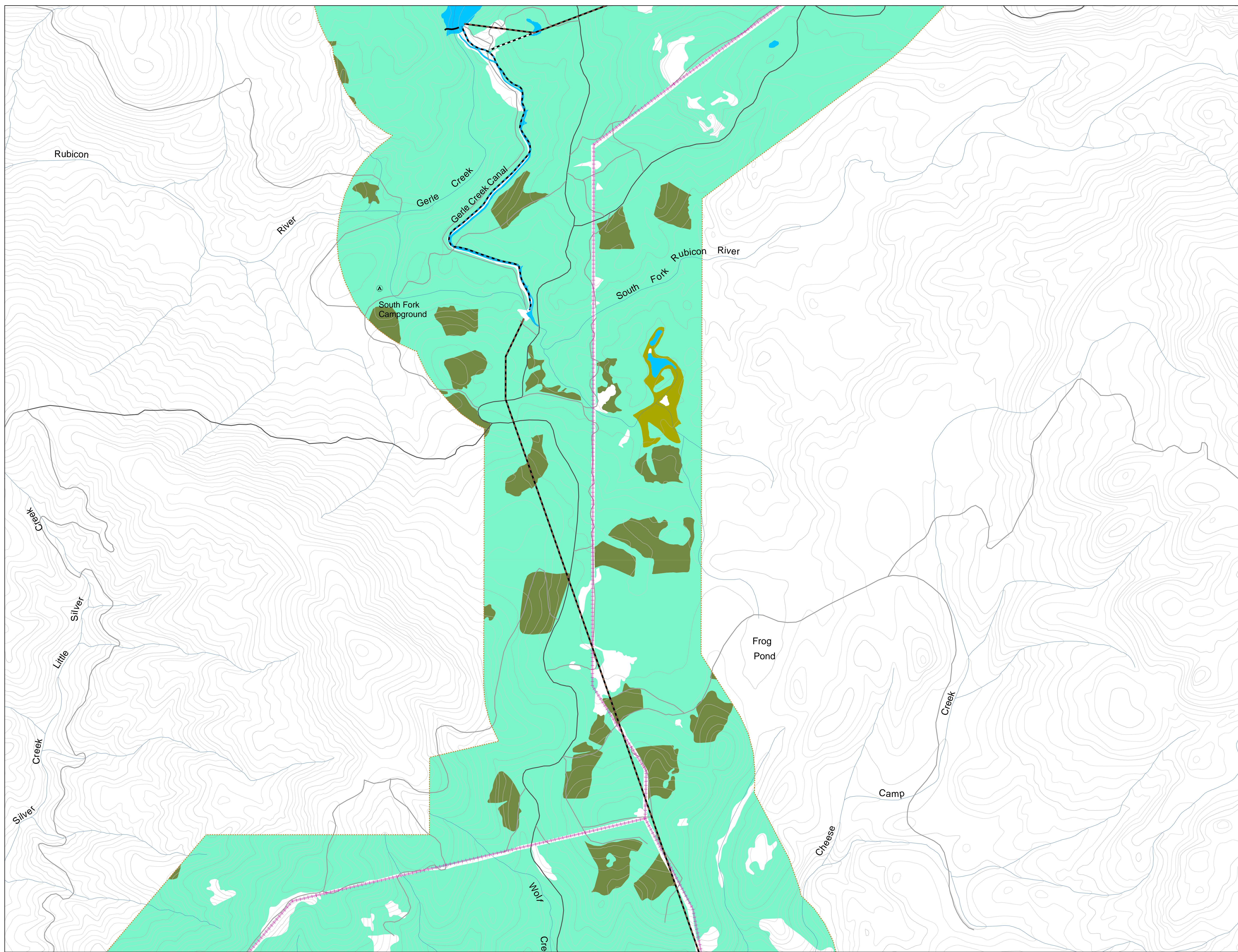
Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir, and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-Fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary








SCALE 1:12,000
 0 0.1 0.2 0.3 0.4 Miles



Upper American River Project



Mapsheet 2
Figure 4.0-2
Mesocarnivore Habitat Within 0.5-mile of UARP Facilities and Features

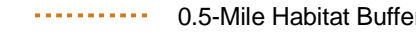






-  Lodgepole Pine
-  Mixed Conifer / Fir
-  Mixed Conifer / Pine
-  Ponderosa Pine 98% Plantation
-  Water

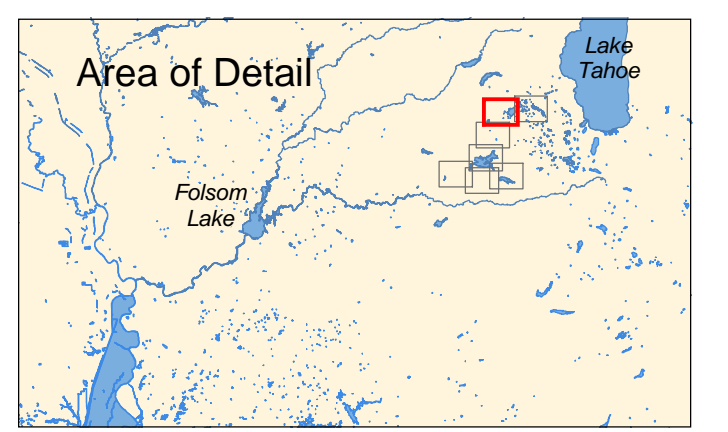
California Wolverine Habitat : Forests in alpine, boreal forest and mixed forest vegetation types.

Sierra Nevada Red Fox Habitat : Mixed conifer, red fir, lodgepole pine, mixed pine forest in the subalpine zone and alpine fell fields.

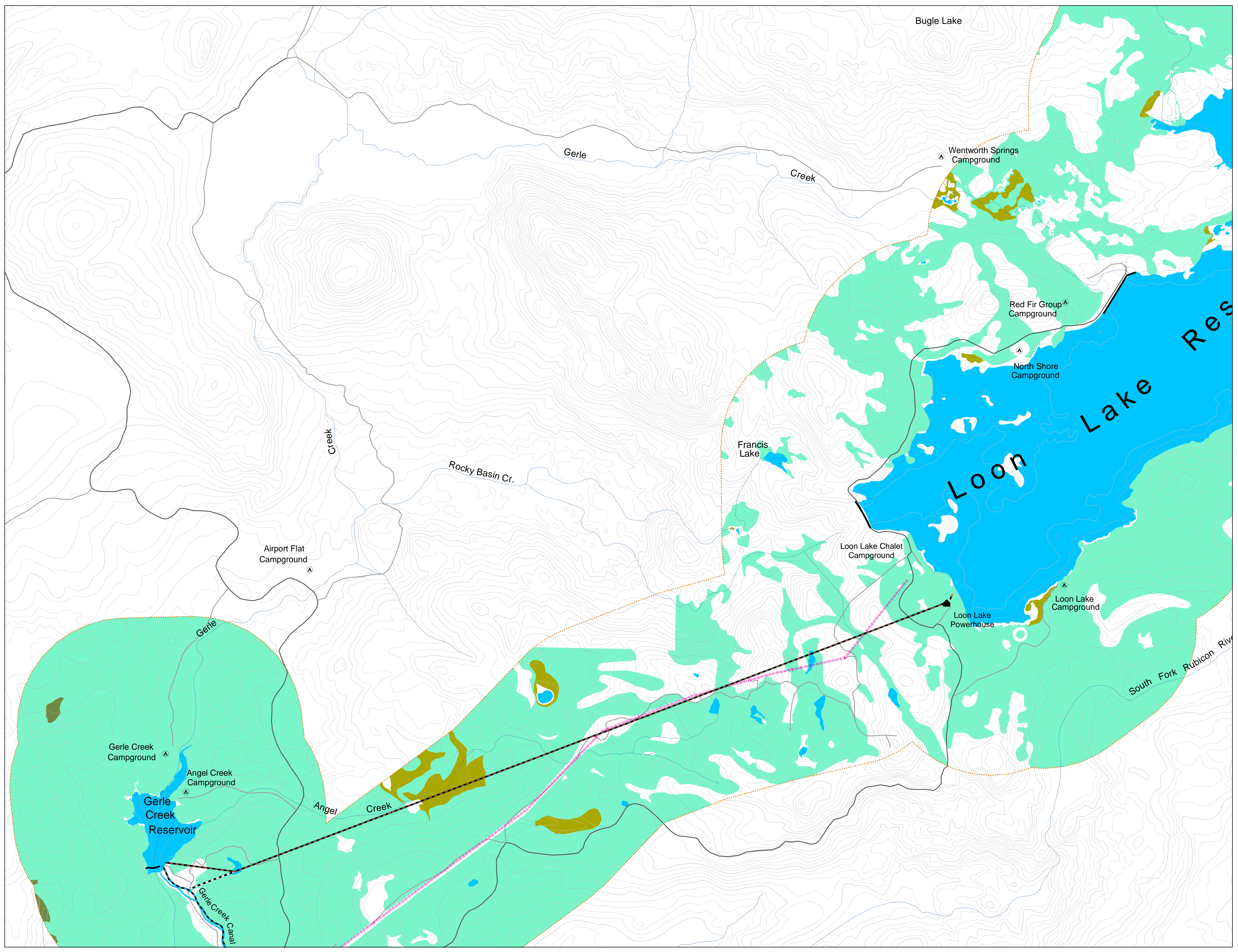
Pacific Fisher Habitat : Ponderosa pine, montane hardwood-conifer, mixed conifer-fir, and jeffery pine.

American Martin Habitat : Lodgepole pine, mixed conifer-Fir, mixed conifer-Pine and ponderosa pine.

-  0.5-Mile Habitat Buffer
-  Divided Highway
-  Other Highway
-  County Roads
-  Other Roads
-  UARP Transmission Lines
-  Wilderness Boundary



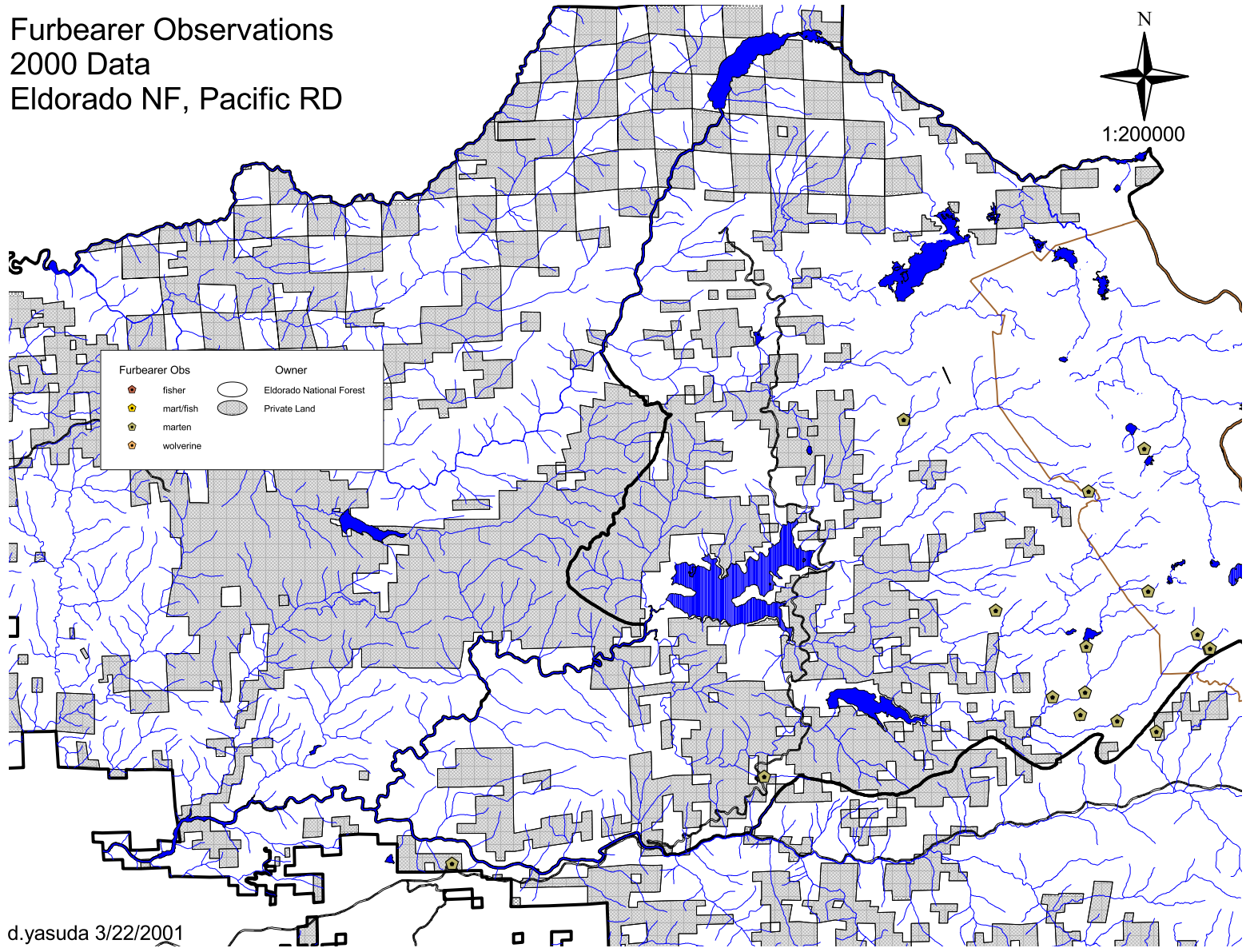
SCALE 1:12,000
 0 0.1 0.2 0.3 0.4 Miles



APPENDIX B

ENF INCIDENTAL OBSERVATIONS OF FURBEARERS

Furbearer Observations
2000 Data
Eldorado NF, Pacific RD



d.yasuda 3/22/2001