APPENDICES

APPENDIX A

SOIL SURVEY REPORT

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sierra National Forest Area Parts of Fresno, California

June 1, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

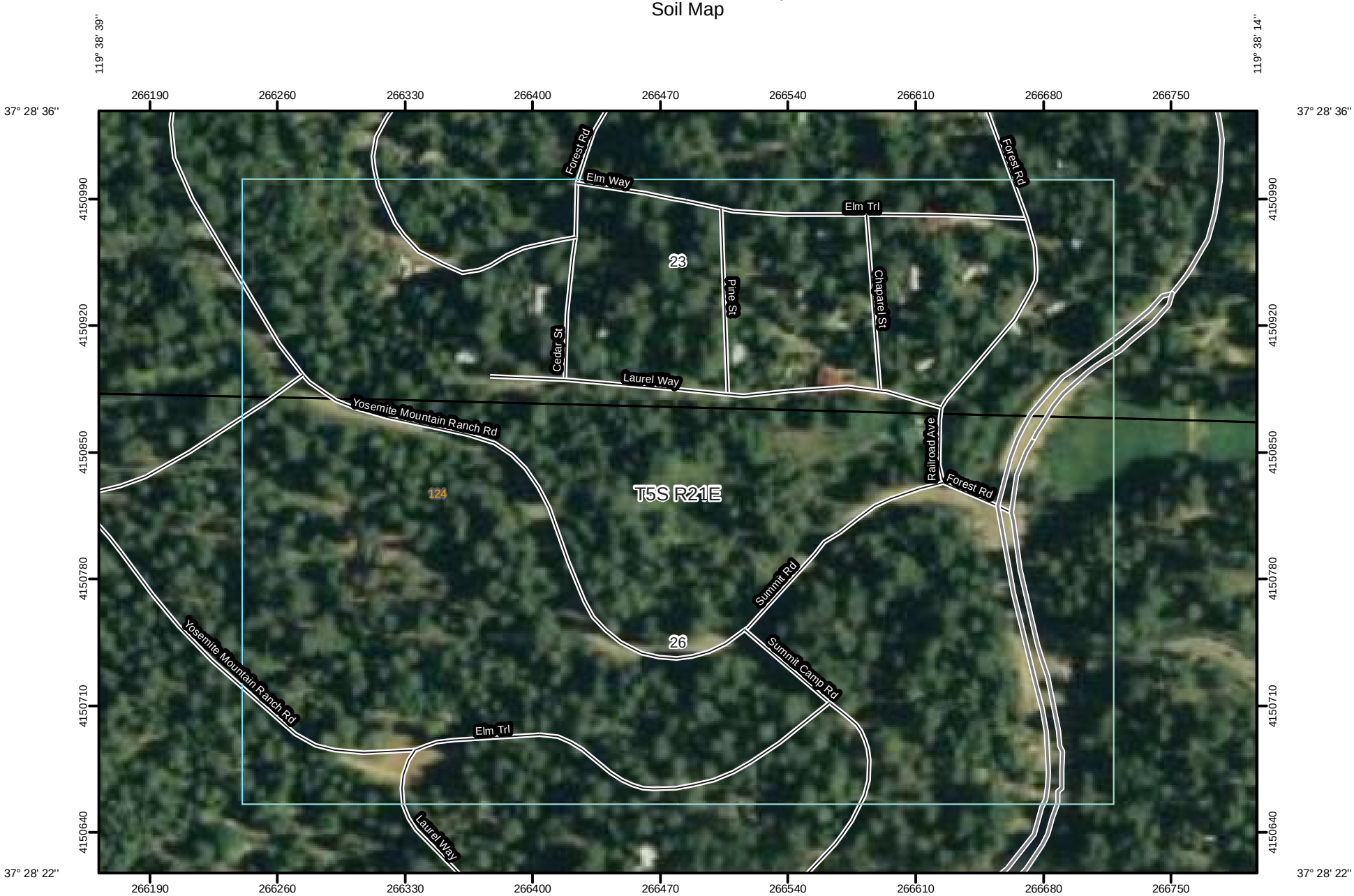
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,010 if printed on A size (8.5" x 11") sheet.

N

Meters
0 40 80 160 240

Feet
0 150 300 600 900

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities
- PLSS Township and Range
- PLSS Section

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:3,010 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sierra National Forest Area Parts of Fresno, California
Survey Area Data: Version 6, Sep 1, 2009

Date(s) aerial images were photographed: 6/11/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Sierra National Forest Area Parts of Fresno, California (CA750)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
124	CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES	40.7	100.0%
Totals for Area of Interest		**40.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sierra National Forest Area Parts of Fresno, California

124—CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES

Map Unit Setting

Elevation: 3,600 to 5,800 feet
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 100 to 225 days

Map Unit Composition

Chaix family and similar soils: 45 percent
Holland family and similar soils: 40 percent
Minor components: 15 percent

Description of Chaix Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from granodiorite

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 36 to 40 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.2 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 6 inches: Coarse sandy loam
6 to 36 inches: Coarse sandy loam
36 to 40 inches: Weathered bedrock

Description of Holland Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from granodiorite

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 66 to 70 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.2 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 7 inches: Sandy loam
7 to 60 inches: Sandy clay loam
60 to 66 inches: Sandy loam
66 to 70 inches: Weathered bedrock

Minor Components

Rock outcrop

Percent of map unit: 5 percent

Chaix family, deep

Percent of map unit: 5 percent

Holland family

Percent of map unit: 5 percent

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Erosion Factors

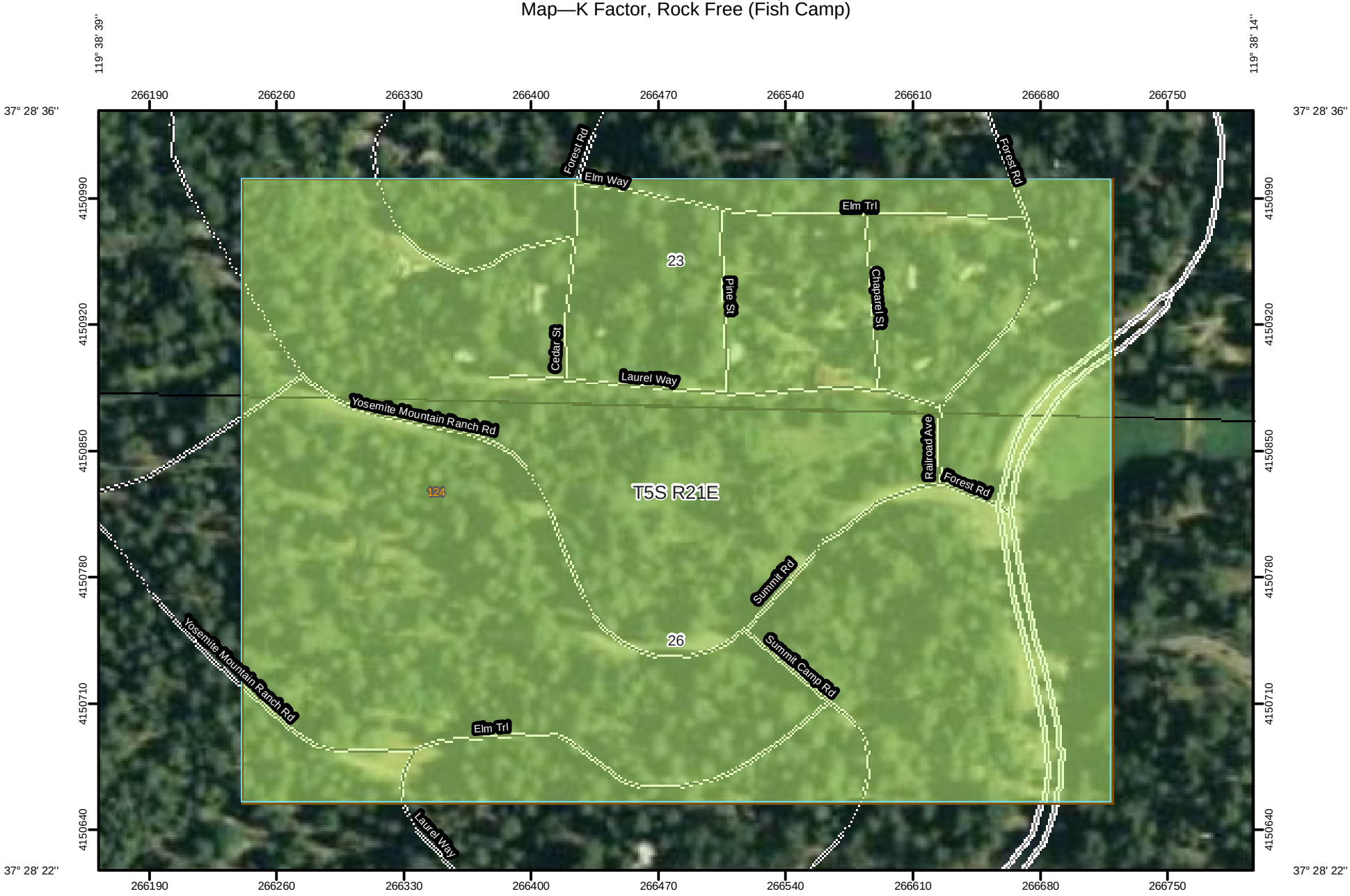
Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

K Factor, Rock Free (Fish Camp)

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Custom Soil Resource Report
Map—K Factor, Rock Free (Fish Camp)



Map Scale: 1:3,010 if printed on A size (8.5" x 11") sheet.

N

Meters: 0, 40, 80, 160, 240

Feet: 0, 150, 300, 600, 900

119° 38' 39''

119° 38' 13''

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

.02

.05

.10

.15

.17

.20

.24

.28

.32

.37

.43

.49

.55

.64

Not rated or not available

Political Features

Cities

PLSS Township and Range

PLSS Section

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:3,010 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

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Soil Survey Area: Sierra National Forest Area Parts of Fresno, California
Survey Area Data: Version 6, Sep 1, 2009

Date(s) aerial images were photographed: 6/11/2005

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Table—K Factor, Rock Free (Fish Camp)

K Factor, Rock Free— Summary by Map Unit — Sierra National Forest Area Parts of Fresno, California				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
124	CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES	.24	40.7	100.0%
Totals for Area of Interest			**40.7**	**100.0%**

Rating Options—K Factor, Rock Free (Fish Camp)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options: Surface Layer

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Linear Extensibility (Fish Camp)

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Linear Extensibility (Fish Camp)

Map Scale: 1:3,010 if printed on A size (8.5" x 11") sheet.

N

Meters: 0, 40, 80, 160, 240

Feet: 0, 150, 300, 600, 900

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Low (0 - 3)
- Moderate (3 - 6)
- High (6 - 9)
- Very High (9 - 30)
- Not rated or not available

Political Features

- Cities
- PLSS Township and Range
- PLSS Section

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

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The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Linear Extensibility (Fish Camp)

Linear Extensibility— Summary by Map Unit — Sierra National Forest Area Parts of Fresno, California				
Map unit symbol	**Map unit name**	**Rating (percent)**	**Acres in AOI**	**Percent of AOI**
124	CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES	1.5	40.7	100.0%
Totals for Area of Interest			**40.7**	**100.0%**

Rating Options—Linear Extensibility (Fish Camp)

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options: Surface Layer

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend (Fish Camp)

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend (Fish Camp)

Component Legend– Sierra National Forest Area Parts of Fresno, California						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
124—CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES						
	45	Chaix family	Family	15	25	35
	40	Holland family	Family	15	25	35

Sanitary Facilities

This folder contains a collection of tabular reports that present soil interpretations related to sanitary facilities. The reports (tables) include all selected map units and components for each map unit, limiting features and interpretive ratings. Sanitary facilities interpretations are tools designed to guide the user in site selection for the safe disposal of sewage and solid waste. Example interpretations include septic tank absorption fields, sewage lagoons, and sanitary landfills.

Sewage Disposal (CA) (Fish Camp)

This table shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (Ksat) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a Ksat rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Report—Sewage Disposal (CA) (Fish Camp)

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top limitations for any given soil. The soil may have additional limitations]

Sewage Disposal (CA)– Sierra National Forest Area Parts of Fresno, California					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (CA)		Sewage lagoons (CA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
124—CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES					
Chaix family	45	Limitations		Limitations	
		Slopes > 15%	1.00	Bedrock (soft) < 40" depth	1.00
		Depth to bedrock < 40"	1.00	Slopes > 8%	1.00
		Seepage in bottom layer	1.00	Permeability > 2"/hr (seepage)	1.00
Holland family	40	Limitations		Limitations	
		Permeability < .6"/hr in 24-60" (slow perc)	1.00	Slopes > 8%	1.00
		Slopes > 15%	1.00	Permeability .6-2"/hr (some seepage)	0.50
		Depth to bedrock 40 - 72"	0.06		

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties (Fish Camp)

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties– Sierra National Forest Area Parts of Fresno, California												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
124—CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES												
Chaix family	0-6	*Coarse sandy loam	SM	A-2, A-1	0	0-5	90-100	75-95	45-65	20-35	0-0	NP
	6-36	*Coarse sandy loam, Sandy loam	SM	A-1, A-2	0	0-5	90-100	75-95	45-65	20-35	0-0	NP
	36-40	*Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Holland family	0-7	*Sandy loam	SM	A-4, A-2	0	0	90-100	85-100	60-70	25-45	20-30	NP-5
	7-60	*Sandy clay loam, Clay loam	SC, CL	A-6	0	0	90-100	85-100	70-90	40-70	25-40	10-20
	60-66	*Sandy loam, Loam	CL-ML, ML, SC-SM, SM	A-4	0	0	90-100	85-100	60-85	35-60	20-30	NP-10
	66-70	*Weathered bedrock	—	—	—	—	—	—	—	—	—	—

Physical Soil Properties (Fish Camp)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion.

There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Physical Soil Properties– Sierra National Forest Area Parts of Fresno, California														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
124—CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES														
Chaix family	0-6	-68-	-22-	5-10- 15	1.00-1.25	14.00-42.00	0.07-0.11	0.0-2.9	2.0-6.0	.20	.24	2	8	0
	6-36	-68-	-22-	5-10- 15	1.35-1.50	14.00-42.00	0.07-0.11	0.0-2.9	0.5-1.0	.20	.24			
	36-40	—	—	—	—	0.01-1.00	—	—	—					
Holland family	0-7	-66-	-19-	10-15- 20	1.10-1.35	14.00-42.00	0.09-0.12	0.0-2.9	2.0-5.0	.28	.28	4	8	0
	7-60	-56-	-15-	25-30- 35	1.20-1.40	4.00-14.00	0.14-0.18	3.0-5.9	0.5-1.0	.24	.24			
	60-66	-66-	-19-	10-15- 20	1.40-1.60	4.00-14.00	0.10-0.16	0.0-2.9	0.3-0.8	.24	.32			
	66-70	—	—	—	—	0.01-1.00	—	—	—					

Soil Qualities and Features

This folder contains tabular reports that present various soil qualities and features. The reports (tables) include all selected map units and components for each map unit. Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Soil Features (Fish Camp)

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel

or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Soil Features– Sierra National Forest Area Parts of Fresno, California									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
124—CHAIX-HOLLAND FAMILIES COMPLEX, 15 TO 35 PERCENT SLOPES									
Chaix family	Paralithic bedrock	36-40	—	Moderately cemented	—	—	None	Moderate	Moderate
Holland family	Paralithic bedrock	66-70	—	Moderately cemented	—	—	None	Moderate	Moderate

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://soils.usda.gov/

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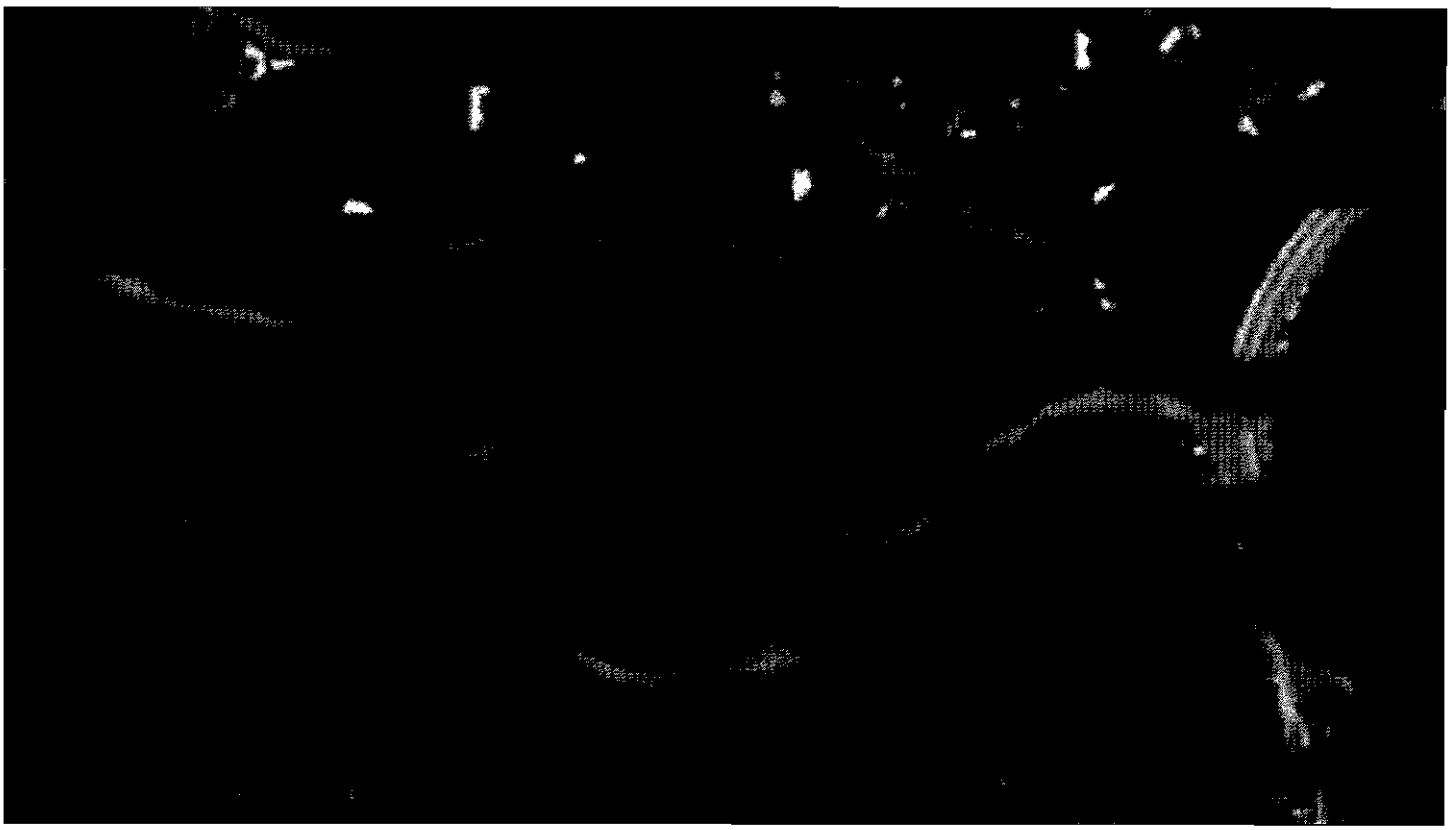
APPENDIX B

BIOLOGICAL RESOURCES TECHNICAL MEMORANDUM



BIOLOGICAL RESOURCE ASSESSMENT
MARIPOSA FIRE STATIONS
FISH CAMP

JUNE 2010

PREPARED FOR:

Mariposa County
4639 Ben Bur Road
Mariposa, CA 95338

PREPARED BY:

Analytical Environmental Services
1801 7th Street, Suite 100
Sacramento, CA 95811

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ATTACHMENTS

Attachment 1 USFWS, CNDDB, and CNPS Lists
Attachment 2 Regionally Occurring Special-Status Species

PURPOSE

This Biological Resources Assessment (BRA) documents sensitive biological habitats and special-status species that may occur or be affected by the construction (Proposed Project) of the County of Mariposa's (County) Fish Camp Fire Station project being funded under the American Recovery and Reinvestment Act Assistance to Firefighters Fire Station Construction Grants program (CFDA 97-115), administered by the Department of Homeland Security's Federal Emergency Management Agency (FEMA) Assistance to Firefighters Program Office (Federal action). The purpose of this BRA is to determine whether the Grantee's proposal would jeopardize the continued existence of any federally listed or proposed threatened and endangered species (i.e., plants or animals, fish, or invertebrates), or destroy or adversely modify designated or proposed critical habitat. This BRA was prepared in accordance with the requirements set forth under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536 (c)) concerning the effects of the Proposed Project and the potential need to consult with the United States Fish and Wildlife Service (USFWS). This BRA also identifies state-listed special-status species, although state listed special-status species are not granted protection under ESA.

PROJECT LOCATION

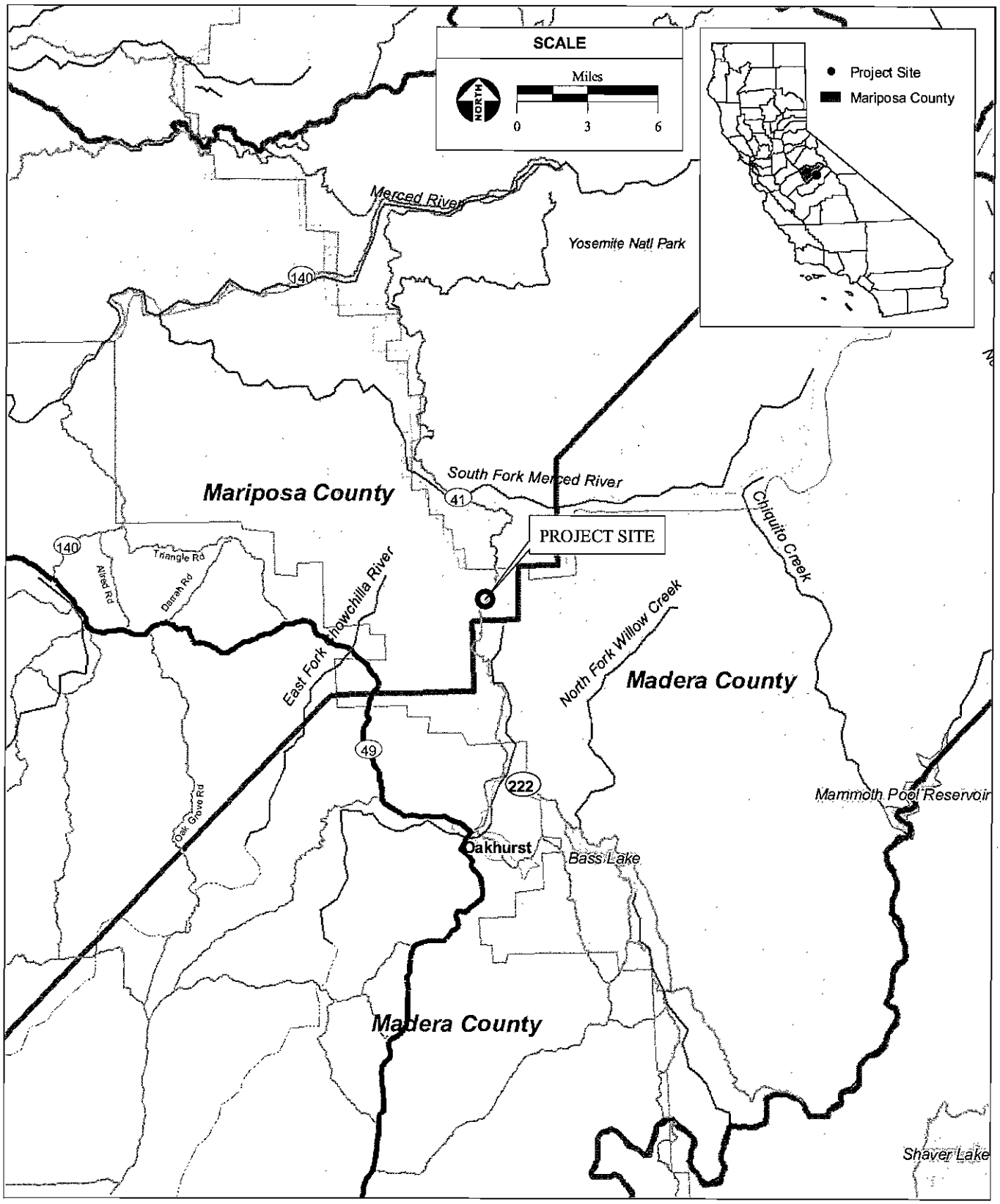
The Proposed Project study area (study area) is located in the community of Fish Camp in Mariposa County, California (**Figure 1**). The approximately 2.99-acre study area is situated on assessor's parcel number (APN) 001-230-011. The study area is located on Section 23, T 5 S, R 21 E, Mt. Diablo Baseline and Meridian, of the Fish Camp, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (quad). The centroid of the study area is 37° 28' 29" N, 119° 38' 23.8" W. A topographic map and an aerial photograph of the study area are shown in **Figures 2** and **3**, respectively.

PROJECT DESCRIPTION

Funding provided by FEMA would result in the construction of the proposed Fish Camp Fire Station. The County would construct a 4,800 square foot steel building erected within the study area that was recently logged in a Timber Exclusive Zone. New paved access roads would be built to the fire station and a concrete apron would be poured at each end of the building. The area to the east of the building would be either gravel or asphalt.

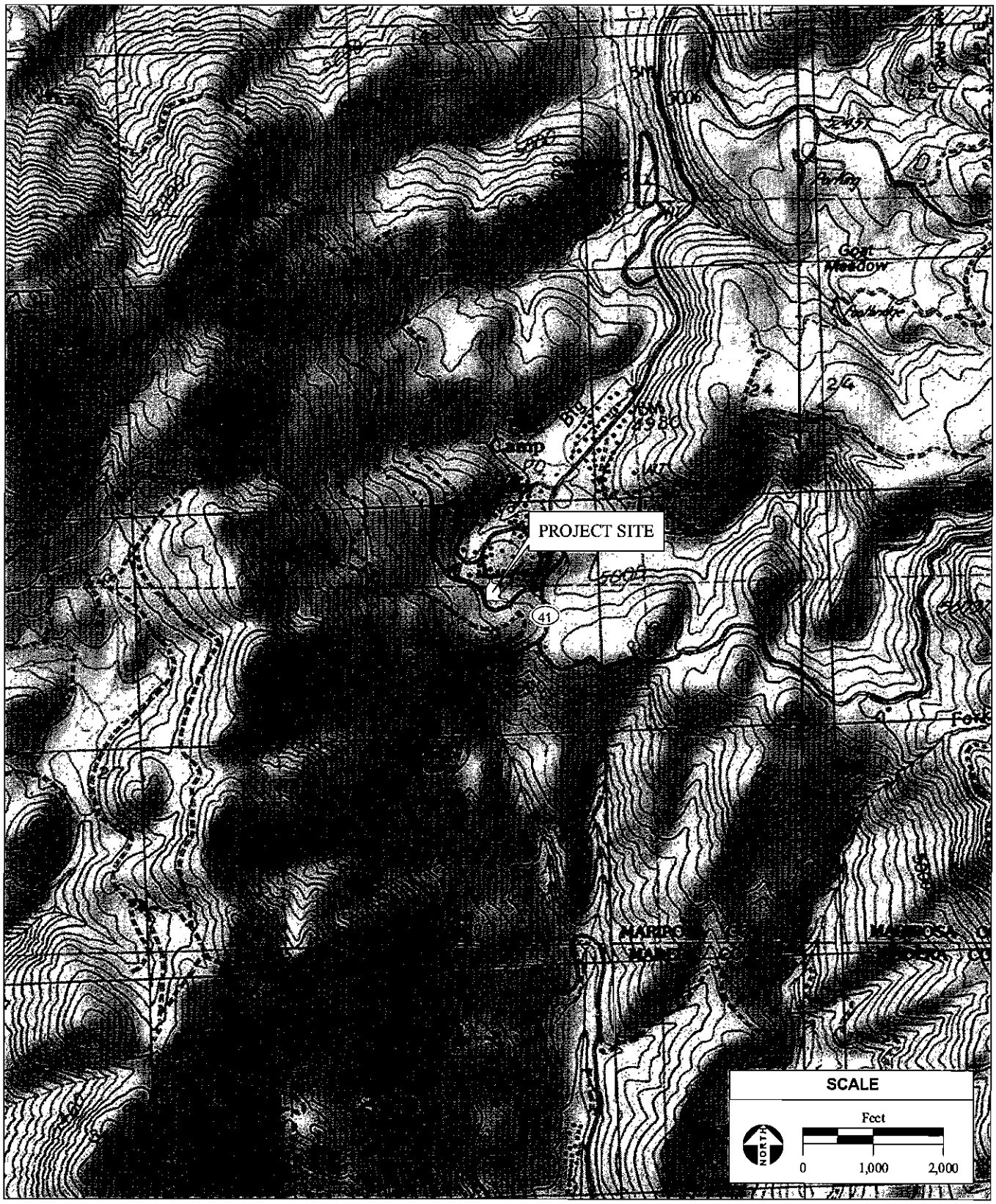
Auxiliary components of the fire station would include a new concrete driveway and a septic system. The "engineered" septic system would be installed to handle wastewater on-site. Wastewater disposal would consist of leach fields contained within the study area. The footprint of the new fire station and driveway would cover approximately 5,685 square feet (0.13 acres).

A gravel or asphalt parking area would be provided on the east side of the new building. The proposed leach field would be located west and slightly down-slope of the proposed fire station. Access to the fire station would be constructed from Summit and Laurel Roads.



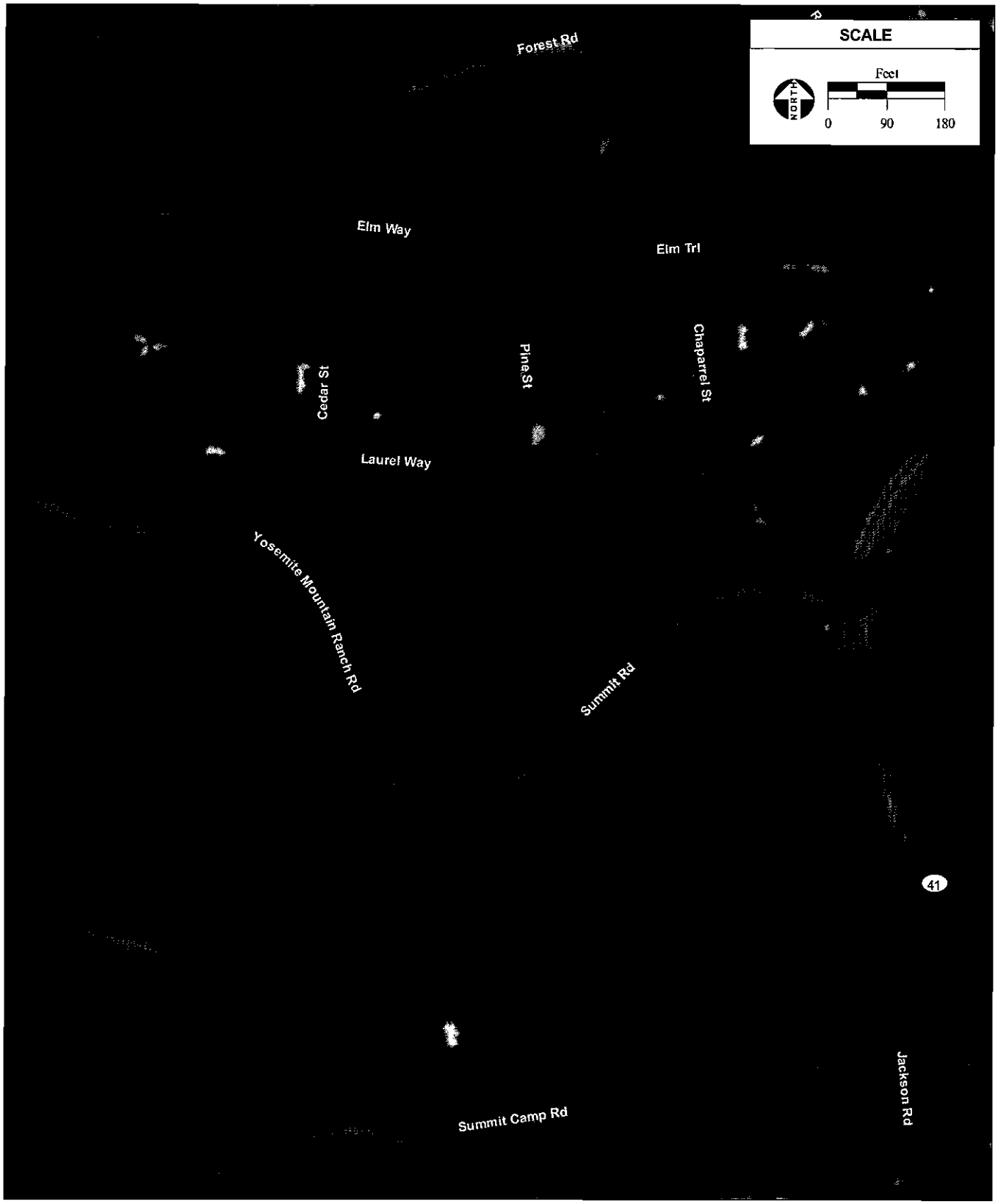
SOURCE: ESRI Data, 2007; AES 2010

Figure 1
Regional Location Map



SOURCE: "Fish Camp, CA" USGS 7.5 Minute Topographic Quadrangle, Section 23, T5S R21E, Mt. Diablo Baseline & Meridian; AES, 2010

Figure 2
Site and Vicinity



SOURCE: Mariposa County, 2009; NAIP aerial photograph, 2005; AES, 2009

Figure 3
Aerial Photograph

METHODOLOGY

Definition of Special-Status

For the purposes of this assessment, federally listed special-status species has been defined to include those species that are listed as endangered or threatened under the ESA (or formally proposed for, or candidates for, listing).

For consideration within this assessment, state-listed special-status species have been defined to include those species that are:

- Listed as endangered or threatened under California Endangered Species Act (or proposed for listing);
- Designated as endangered or rare, pursuant to California Fish and Game Code (§1901);
- Designated as fully protected, pursuant to California Fish and Game Code (§3511, §4700, or §5050);
- Designated as species of concern to the California Department of Fish and Game (CDFG);
- Defined as rare or endangered under California Environmental Quality Act (CEQA); or,
- Considered rare, threatened, or endangered in California", according to the California Native Plant Society (CNPS) (Lists 1a, 1B, and 2).

Standard references used for the biology and taxonomy of plants include: Abrams (1951, 1960), CNPS (2010), CDFG (2003), Hickman, ed. (1993), Mason (1957), Munz (1959), and Sawyer and Keeler-Wolf (1995). Standard references used for the biology and taxonomy of wildlife include: CDFG (1990, 2005), Ehrlich et al. (1988), Jennings and Hayes (1994), Peterson (1990), Sibley (2003), and Stebbins (2003).

Potential to Occur

Preliminary information on biological resources in the vicinity of the study area was obtained from the following sources prior to conducting a biological survey to assess the potential for federally-listed special-status species to occur within the study area, and to consider state-listed special-status species:

- U.S. Fish and Wildlife Service (USFWS) list, last updated April 29, 2010, of federally-listed special-status species with the potential to occur on or be affected by projects on the Fish Camp quad (USFWS, 2010) (**Attachment 1**).
- California Natural Diversity DataBase (CNDDB) query, updated November 1, 2009, of special-status species documented to occur within the Fish Camp quad and the eight surrounding quads (Buckingham Mountain, Wawona, Mariposa Grove, Stumpfield Mountain, White Chief Mountain, Horsecamp Mountain, Ahwahnee, and Bass Lake) (CDFG, 2003) (**Attachment 1**).

- CNPS query of special-status species known to occur within the Fish Camp quad and the eight surrounding quads (CNPS, 2010) (**Attachment 1**).
- Special-status species occurrences within 5 miles of the study area (CDFG, 2003) (**Figure 4**).
- Aerial photographs and topographic maps of the study area (Mariposa County, 2009).
- Soil data from the Web Soil Survey (NRCS, 2009).

Field Survey and Analysis

Analytical Environmental Services (AES) biologist Kelly Buja, M.S. conducted a general biological survey and an informal delineation on June 2, 2010. The biological survey consisted of evaluating biological communities and documenting potential habitat for federally-listed special-status species and consideration of state-listed special-status species with the potential to occur within the study area based on information obtained from the resources above. Photographs of the study area are found in **Figure 5**.

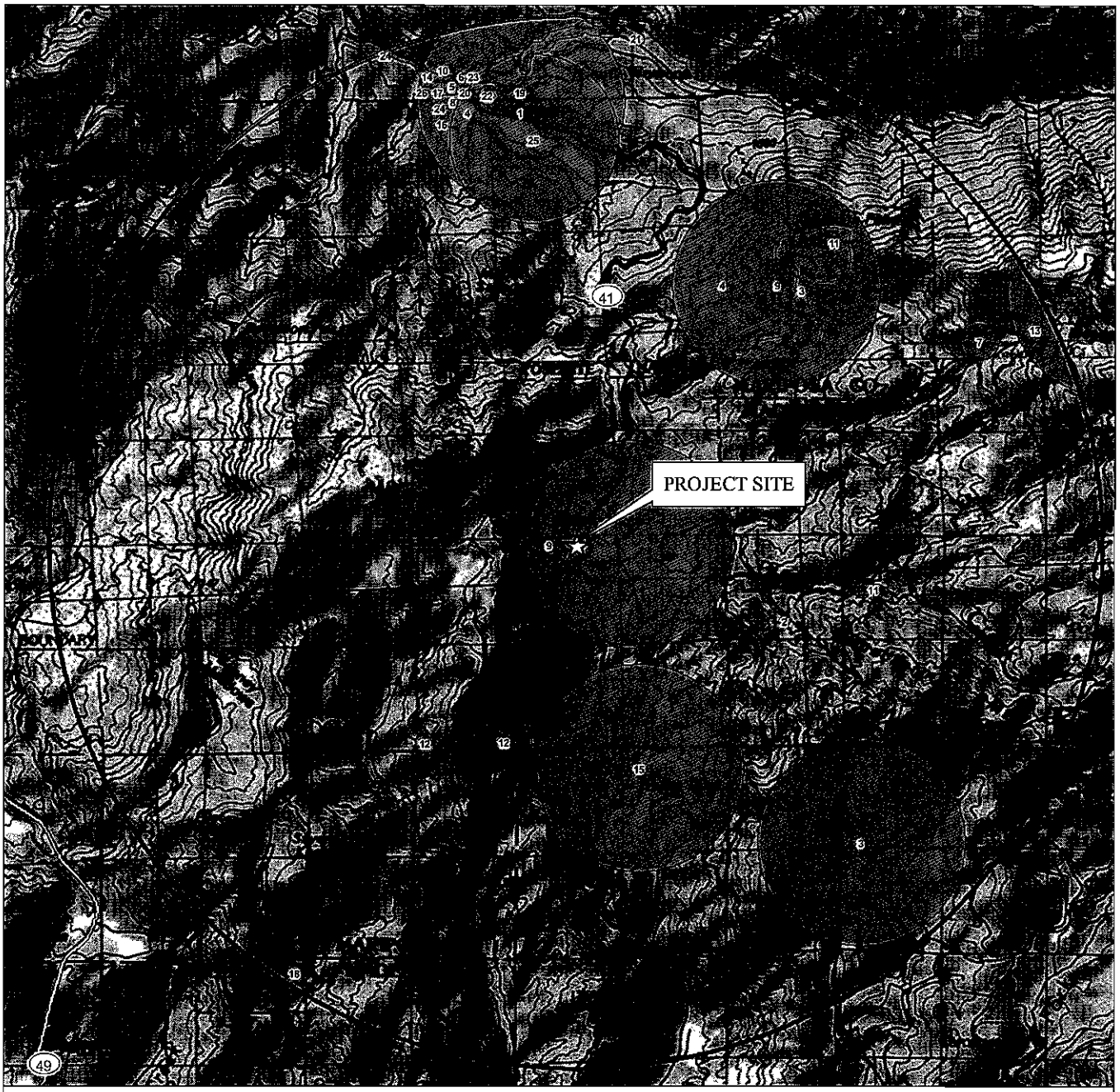
Table 1 in **Attachment 2** provides a summary of special-status species in the vicinity of the study area based on the USFWS file data and CNPS and CNDDB queries and provides a rationale as to whether the species has the potential to occur within the study area. Presence of species or their habitat was evaluated during the biological survey. Species without the potential to occur in the study area are not further discussed.

ENVIRONMENTAL SETTING

Topography in the study area is relatively flat with a slight incline in elevation from 5,120 feet in the south to 5,150 feet in the north.

Soils

The study area is comprised entirely of Chaix-Holland families complex, 15 to 35 percent slopes (124). This family complex is found on backslopes of mountains with parent material derived from residuum weathered from granodiorite. A typical profile for the Chaix family soil type consists of coarse sandy loam from 0 to 36 inches and unweathered bedrock from 36 to 40 inches. The Chaix family complex is a somewhat excessively drained soil with a restrictive layer of 15 to 35 inches to paralithic bedrock and a depth to water table of more than 80 inches. The Holland family complex is a well drained soil with a restrictive layer of 66 to 70 inches to paralithic bedrock and a depth to water table of more than 80 inches. A typical profile for the Holland family soil type consists of sandy loam from 0 to 7 inches, sandy clay loam from 7 to 60 inches, sandy loam from 60 to 66 inches, and unweathered bedrock from 66 to 70 inches (NRCS, 2009).



CNNDB OCCURRENCE DATA

5-Mile Radius

CNDDB Occurrences

Feet

NORTH

0 4,000 8,000

1 - American badger
2 - aquatic felt lichen
3 - Big Tree Forest
4 - Bolander's woodreed
5 - 1ringed myotis
6 - hoary bat
7 - Leach's skyline diving beetle
8 - ong-eared myotis
9 - Pacific fisher
10 - pallid bat
11 - short-leaved hulsea
12 - Sierra marten
13 - Sierra Nevada red fox
14 - Sierra Nevada yellow-legged frog
15 - Sierra pygmy grasshopper
16 - silver-haired bat
17 - slender-stalked monkeyflower
18 - Small's southern clarkia
19 - spotted bat
20 - Townsend's big-eared bat
21 - Wawona riffle beetle
22 - western mastiff bat
23 - western red bat
24 - western small-footed myotis
25 - willow flycatcher
26 - Yuma myotis

SOURCE: "Shaver Lake CA" USGS 100k Topographic Quadrangle, Mt. Diablo Baseline & Meridian; California Natural Diversity Database 5/2010; AES, 2010

Figure 4

CNDDB Occurrences Within a 5-Mile Radius

PHOTO 1: View northeast of the white fir-mixed conifer habitat type from the central portion of the study area.

PHOTO 2: View northwest of the ruderal/disturbed areas from the central portion of the study area.

PHOTO 3: View northwest of the ruderal/disturbed areas from the southeastern portion of the study area.

PHOTO 4: View northwest of a slash pile within the ruderal/disturbed areas from the central portion of the study area.

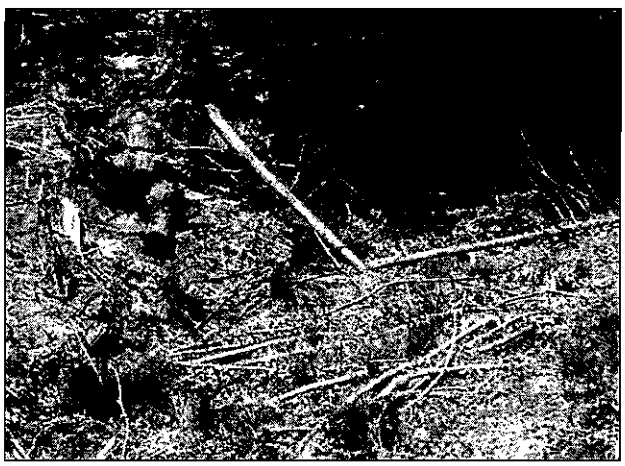


PHOTO 5: View eastward of the ephemeral drainage from the southeastern portion of the study area.

PHOTO 6: View south of ruderal/disturbed area and white fir-mixed conifer habitat type from the northern portion of the study area.

SOURCE: AES, 2010

Figure 5
Site Photographs

Terrestrial Habitat Types

Two terrestrial habitat types occur within the study area: white fir/mixed conifer and ruderal/disturbed. Aquatic habitat types are discussed in the "Waters of the U.S." section below. Photographs of the habitat types are shown in **Figure 5**. A habitat map is illustrated on **Figure 6**.

White fir/mixed conifer occurs within a portion of the study area (**Figure 5**: **Photographs 1** and **6**). Vegetation observed within this habitat type includes: white fir (*Abies concolor*), incense cedar (*Calocedrus decurrens*), sugar pine (*Pinus lambertiana*), mountain misery (*Chamaebatia foliolosa*), snowberry (*Symphoricarpos mollis*), and mountain strawberry (*Fragaria virginiana*).

The majority of the study area is ruderal/disturbed (**Figure 5**: **Photographs 2**, **3**, **4**, and **6**). This habitat type includes areas where the study area has been logged. This habitat is comprised of slash piles and dirt roads. Vegetation observed within the ruderal/disturbed habitat type includes: mountain strawberry, Sierra Mariposa lily (*Calochortus minimus*), pine violet (*Viola lobata*), California milkweed (*Asclepias californica)*, fairy bells (*Prosartes hookeri*), mullein (*Verbascum* sp.), and conyza (*Conyza* sp.).

Potential Waters of the U.S.

A small, approximately one-foot wide ephemeral drainage occurs on the southeast side of the study area (**Figure 5**: **Photograph 5**; **Figure 6**). The ephemeral drainage receives water through direct precipitation and runoff from the study area. No other wetland features were observed during the biological survey of the study area. No other potential wetlands or other waters of the U.S. occur within the study area.

SPECIAL-STATUS SPECIES

Based on the results of the queries (**Attachment 1**) and the site visit, the following species have the potential to occur on the study area.

Federally-Listed Special-Status Species

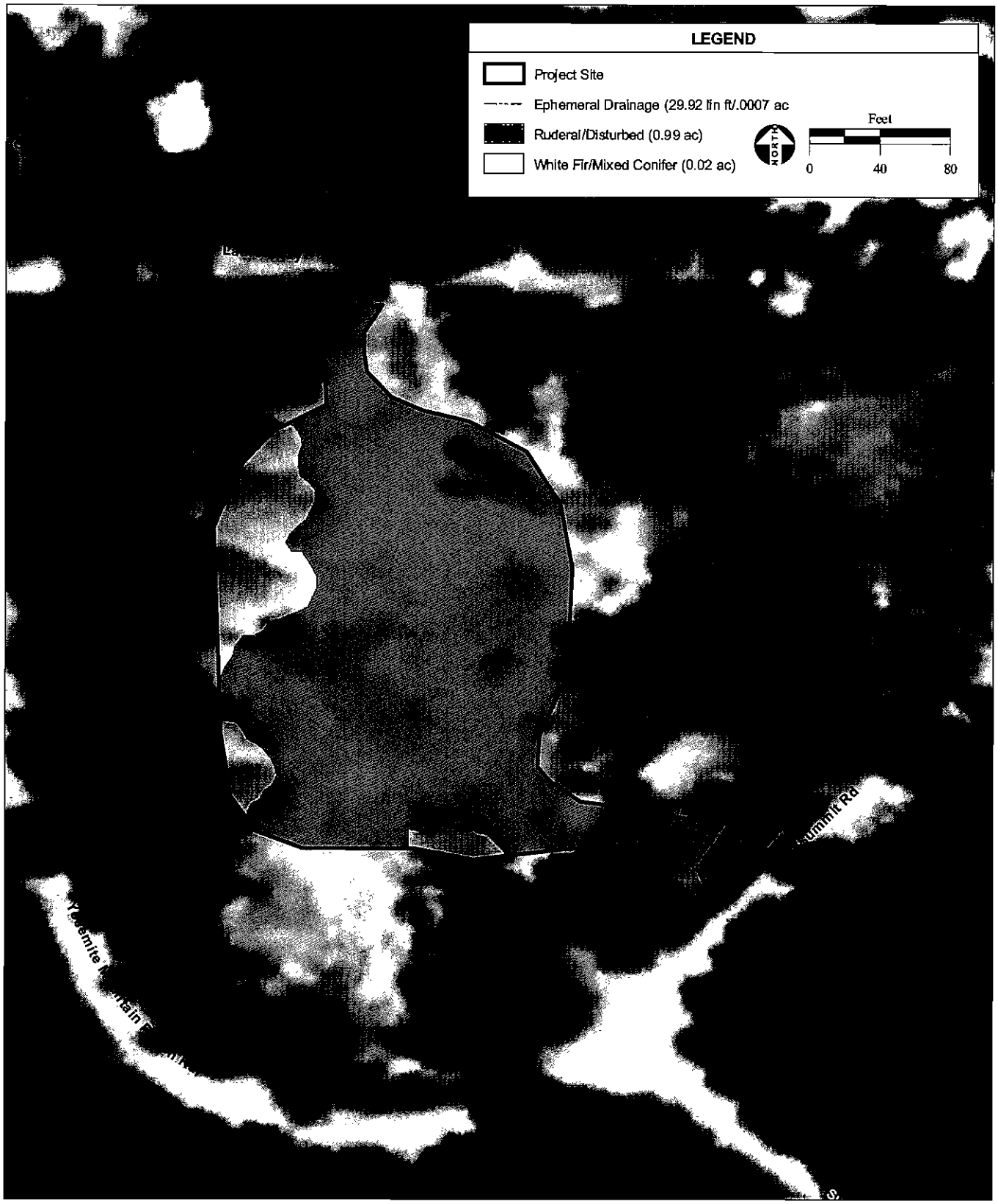
Special-Status Plants

No federally-listed special-status plant species have the potential to occur within the study area.

Special-Status Wildlife

Fisher (*Martes pennanti*)
Federal Status – Candidate for Listing
State Status – None

Fishers occur in intermediate to large tree stages of coniferous forests and deciduous riparian habitats with greater than 50 percent canopy cover. Within California, they are found in the



SOURCE: Mariposa County, 2009; Aerial Express aerial photograph, 6/2009; AES, 2010

Figure 6
Habitat Map

Sierra Nevada, Klamath, and Cascade mountains and within a few areas along the North Coast ranges. Fishers require cavities in large trees, snags, logs, rock areas, or shelters created by slash or brush piles for dens and protection. Fishers are primarily nocturnal and crepuscular foragers with some diurnal behavior (NatureServe, 2009). There are 2 CNDDB occurrences of this species within 5 miles of the study area (**Figure 4**). The nearest CNDDB occurrence overlaps the study area. The trees within the white fir/mixed conifer forest within the study area provide denning habitat for this species. This species was not observed during the biological survey within the study area. This species has the potential to occur within the study area.

Migratory Birds and Bird of Prey

Fish and Game Code 3503.5 protects all birds in the orders Falconiformes and Strigiformes (collectively known as birds of prey). The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711) protects migratory birds by making it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR 10 including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Migratory birds and other birds of prey have the potential to nest in the trees within and in the vicinity of the study area. No birds were observed nesting during the biological survey of the study area.

State-Listed Special-Status Species

Special-Status Plants

Yosemite Onion (*Allium yosemitense*)
Federal Status – None
State Status – Rare
Other – CNPS List 1B

This species is a bulbiferous herb usually found on rocky, metamorphic, or granitic soils in broadleafed upland, chaparral, cismontane woodland, and lower montane coniferous forest from 535 to 2,200 meters. Blooming occurs from April through July (CNPS, 2010). There are no CNDDB records for this species within 5 miles of the study area. The study area provides habitat for this species within the white fir/mixed conifer forest. The June 2, 2010 biological survey was conducted within the evident and identifiable period for Yosemite onion. This species was not observed during the biological survey of the study area. This species does not occur within the study area.

Big Scale Balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)
Federal Status – None
State Status – None
Other – CNPS List 1B

This species is a perennial herb sometimes found on serpentinite soils in chaparral, cismontane woodland, and valley and foothill grassland from 90 to 1,555 meters. Blooming occurs from

March through June (CNPS, 2010). There are no CNDDB records for this species within 5 miles of the study area. The study area provides habitat for this species within the white fir/mixed conifer forest and ruderal/disturbed areas. The June 2, 2010 biological survey was conducted within the evident and identifiable period for big scale balsamroot. This species was not observed during the biological survey of the study area. This species does not occur within the study area.

Small's Southern Clarkia (*Clarkia australis*)
Federal Status – None
State Status – None
Other – CNPS List 1B

This species is an annual herb found in cismontane woodland and lower montane coniferous forest from 800 to 2,075 meters. Blooming occurs from May through August (CNPS, 2010). There is one CNDDB record for this species within 5 miles of the study area. The study area provides habitat for this species within the white fir/mixed conifer forest. The June 2, 2010 biological survey was conducted within the evident and identifiable period for Small's southern clarkia. This species was not observed during the biological survey of the study area. This species does not occur within the study area.

Congdon's Wooly Sunflower (*Eriophyllum congdonii*)
Federal Status – None
State Status – Rare
Other – CNPS List 1B

This species is an annual herb usually found on rocky, metamorphic soil in chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland from 500 to 1,900 meters. Blooming period is from April through June (CNPS, 2010). There are no CNDDB records for this species within 5 miles of the study area. The study area provides habitat for this species within the white fir/mixed conifer forest and ruderal/disturbed areas. The June 2, 2010 biological survey was conducted within the evident and identifiable period for Congdon's woolly sunflower. This species was not observed during the biological survey of the study area. This species does not occur within the study area.

Yosemite Woolly Sunflower (*Eriophyllum nubigenum*)
Federal Status – None
State Status – None
Other – CNPS List 1B

This species is an annual herb usually found on gravelly, granitic soils in chaparral and lower and upper montane coniferous forest from 1,525 to 2,750 meters. Blooming period is from May through August (CNPS, 2010). The study area provides habitat for this species within the white fir/mixed conifer forest. The June 2, 2010 biological survey was conducted within the evident

and identifiable period for Yosemite woolly sunflower. This species was not observed during the biological survey of the study area. This species does not occur within the study area.

Madera Leptosiphon (*Leptosiphon serrulatus*)
Federal Status – None
State Status – None
Other – CNPS List 1B

This species is an annual herb found in cismontane woodland and lower montane coniferous forest from 300 to 1,300 meters. Blooming period is from April through May (CNPS, 2010). There are no CNDDB records for this species within 5 miles of the study area. The study area provides habitat for this species within the white fir/mixed conifer forest. This species was not observed during the biological survey of the study area. Because the biological survey was conducted outside of the evident and identifiable period for Madera leptosiphon, the species could potentially be present within the study area and not have been detected. This species has the potential to occur within the study area.

Congdon's Lewisia (*Lewisia congdonii*)
Federal Status – None
State Status – Rare
Other – CNPS List 1B

Congdon's lewisia is a perennial herb usually found on granitic or metamorphic, rocky, mesic areas within chaparral, cismontane woodland, lower and upper montane coniferous forests, and valley and foothill grassland from 500 to 2,800 meters. Blooming period is from April through June (CNPS, 2010). There are no CNDDB records for this species within 5 miles of the study area. The June 2, 2010 biological survey was conducted within the evident and identifiable period for Congdon's lewisia. This species was not observed during the biological survey of the study area. This species does not occur within the study area.

Special-Status Wildlife

Pallid Bat (*Antrozous pallidus*)
Federal – None
State – Species of Concern

Pallid bats are found in grasslands, shrublands, woodlands, and forests from sea level up to mixed conifer forests through 2,000 meters. The species commonly occurs in open, dry habitats with rocky areas for roosting. Other roosts include cliffs, abandoned buildings, bird boxes, and under bridges (Harris, 2000). Pallid bats are most active during the dawn and dusk hours and forage over open ground. This species establishes daytime roosts in caves, crevices, mines, large hollow trees, and unoccupied buildings. Pallid bats mate from October through February and most young are born from April through July (Harris, 2000). They occur in arid and semi-arid regions

across much of the American west, up and down the coast from Canada and Mexico (Arizona-Sonora Desert Museum, 2006-2009).

There is one CNDDB record for this species within 5 miles of the study area. The trees within the white fir/mixed conifer habitat type provide roosting habitat for this species. Pallid bats were not observed during the biological survey within the study area. This species has the potential to roost and forage within the study area.

Townsend's Big-Eared Bat (*Corynorhinus townsendii*)
Federal Status – None
State Status – Species of Concern

Townsend's big-eared bat is found throughout California in habitats other than alpine and subalpine. This species prefers habitats near water and forages at night on small moths and beetles. Roosting habitat consists of caves, mines, tunnels, or human-made structures. These sites are generally cold (though not below 32°F). These bats roost during the day and from October to April when hibernating. Maternity colonies are comprised of groups of females and their young, which roost in relatively warm sites in caves, tunnels, mines, and occasionally in abandoned buildings. These colonies form in May or June when the young are born and remain in the roost until August, by which time the young have been weaned and fledged (CDFG, 2005).

There is one CNDDB record for this species within 5 miles of the study area. The trees within the white fir/mixed conifer habitat type provide roosting habitat for this species. Townsend's big-eared bats were not observed during the biological survey within the study area. This species has the potential to roost within the study area.

Spotted Bat (*Euderma maculatum*)
Federal Status – None
State Status – Species of Concern

Spotted bats are found in foothills, mountains, and desert regions with vegetation types ranging from desert to sub-alpine meadows including desert scrub, pinyon juniper woodland, ponderosa pine, mixed conifer forest, canyon bottoms, rim of cliffs, riparian areas, fields, and open grassland from 0 to 3,000 meters (NatureServe, 2009).

There is one CNDDB record for this species within 5 miles of the study area. The trees within the white fir/mixed conifer habitat type provide roosting habitat for this species. Townsend's big-eared bats were not observed during the biological survey within the study area. This species has the potential to roost within the study area.

Western Mastiff Bat (*Eumops perotis californicus*)
Federal Status – None
State Status – Species of Special Concern

Western mastiff bat is found in open semi-arid and arid habitats, which include conifer, deciduous woodland, coastal scrub, grassland, palm oases, chaparral, and desert scrub. It is also found in urban areas. This species is not migratory, but moves among alternate day time roosts. Roosting takes place in crevices within rock outcrops, high buildings, trees, and tunnels. Roosting sites require vertical faces in order to drop-off into flight. Western mastiff bat either roosts alone or in small groups, typically less than a hundred bats. Young are born from April to August and occasionally into September. Western mastiff bat is known from central California, southward to central Mexico. In California, this species is known from Butte County southward in the western lowlands through the southern California coastal basins and the western portions of the southeastern desert region (Ahlborn, 2000).

There is one CNDDB record for this species within 5 miles of the study area. The trees within the white fir/mixed conifer habitat type provide roosting habitat for this species. Western mastiff bats were not observed during the biological survey within the study area. This species has the potential to roost within the study area.

Western Red Bat (*Lasiurus blossevillii*)
Federal Status – None
State Status – Species of Special Concern

The western red bat is found throughout California, west of the Sierra Nevada and Cascade crest and deserts, from Shasta County south to Mexico. This species roosts in forests and woodlands from sea level to mixed conifer forests. Roosts are commonly solitary in trees near streams, fields, or urban areas. Edges or habitat mosaics with water are the most suitable habitats. This species is migratory. In California, the western red bat will migrate short distances between summer and winter ranges and can be found in unusual habitats during this time. Hibernation takes place during the coolest months when temperatures drop below 68°F. Young are born from late May through early July (NatureServe, 2009).

There is one CNDDB record for western red bat within 5 miles of the study area. The trees within the white fir/mixed conifer habitat type provide roosting habitat for this species. Western red bats were not observed during the biological survey within the study area. This species has the potential to roost within the study area.

American Badger (*Taxidea taxus*)
Federal Status – None
State Status – Species of Concern

American badger is found in dry, open habitats including grassland and open woodland. Suitable burrowing habitat requires dry, often sandy soil. Breeding occurs in summer and early fall, with young being born from March to April (CDFG, 2005). American badger is known throughout California, except in the northern North Coast (Ahlborn, 2005).

There is one CNDDB record for American badger within five miles of the study area. American badgers were not observed during the biological survey within the study area. American badger has the potential to occur within the study area.

SUMMARY OF FINDINGS

Waters of the U.S.

The Proposed Project has the potential to affect an ephemeral drainage, a potentially jurisdictional waters of the U.S.

Recommendations for Ephemeral Drainage

A preliminary delineation should be conducted within the study area.

Federally-Listed Special-Status Species

The Proposed Project does not have the potential to affect federally-listed special-status plants. The Proposed Project has the potential to impact one federally-listed candidate wildlife species, the fisher. Consultation with USFWS as addressed under Section 7 of ESA is not required for the Proposed Project because these species have not been formally listed, as they are candidates for listing. The Proposed Project has the potential to affect nest sites for state and federally protected migratory birds and other birds of prey.

Recommendations for Fisher

A qualified biologist should survey whether any fishers or their dens occur within the white fir/mixed conifer habitat type no more than 2 weeks prior to commencement of construction activities. If surveys show that there is no evidence of fishers or their dens, then no additional mitigation is recommended.

Should the biologist determine that fisher dens occur within the Proposed Project footprint, a 25-foot buffer zone should be established around the den, and consultation with the USFWS would occur within one day following the preconstruction survey. No construction activities would commence until consultation between FEMA and the USFWS has been completed. Otherwise, federal funding for the proposal could be jeopardized.

Recommendations for Migratory Birds and Other Birds of Prey
If construction begins during the nesting season for migratory birds and other birds of prey (between February 1 and October 1), a qualified biologist should conduct a preconstruction survey for nests no more than 2 weeks prior to construction. If surveys show that there is no evidence of nests, then no additional mitigation would be recommended.

If any active nests are identified within the project site during the preconstruction survey, a buffer zone should be established around the nests. A qualified biologist should monitor nests weekly during construction to evaluate potential nesting disturbance by construction activities. The biologist should delimit the buffer zone with construction tape or pin flags within an appropriate buffer, depending on the species, of the active nest and maintain the buffer zone until the end of breeding season or the young have fledged. Guidance from USFWS would be requested if establishing an appropriate buffer zone is impractical.

State-Listed Special-Status Species
The Proposed Project has the potential to affect one CNPS-listed plant species, the Madera leptosiphon. The Proposed Project has the potential to affect the following state-listed wildlife: pallid bat, Townsend's big-eared bat, spotted bat, western mastiff bat, western red bat, and American badger. These species are not granted protection under ESA review.

Recommendations for Madera Leptosiphon
A focused botanical survey should be conducted during the blooming period for Madera leptosiphon (April through May). A letter report would be submitted to the County within 30 days following the preconstruction survey to document the results. Should no Madera leptosiphon be observed, then no additional mitigation is recommended.

Should Madera leptosiphon be observed during the focused botanical survey, the biologist would contact the County within one day following the preconstruction survey to report the findings. A 10-foot buffer would be established around Madera leptosiphon using construction flagging prior to commencement of construction activities.

Should avoidance of Madera leptosiphon be infeasible, then the CDFG should be notified at least 10 days prior to commencement of ground-breaking activities to provide the CDFG the opportunity to transplant the species from the study area. An additional letter report should be submitted to the County within 30 days to document the results.

If the CDFG does not intend to transplant Madera leptosiphon offsite within 10 days prior to commencement of ground-breaking activities, the County should salvage and relocate plants within the same type of habitat onsite and develop a mitigation and monitoring plan. The County should monitor the species for 5 years and submit an annual monitoring report to the CDFG.

Recommendations for Pallid Bat, Townsend's Big-Eared Bat, Spotted Bat, Western Mastiff Bat, and Western Red Bat

A preconstruction survey should be conducted by a qualified biologist for bat roosting sites within the study area no more than 2 weeks prior to commencement of construction activities. If construction begins during the nesting season for birds of prey and migratory birds (between February 1 and October 1), a preconstruction bird survey for nesting sites may be conducted concurrently with the bat survey. The qualified biologist should document and submit the results of the preconstruction survey in a letter to the CDFG and the County within 30 days following the survey. The letter would include: a description of the methodology including dates of field visits, the names of survey personnel, and a list of references cited and persons contacted; and a map showing the location(s) of any roost sites observed on the study area. If no active roosts are identified during the preconstruction survey, then no further mitigation is recommended.

If any active roosts are identified during the preconstruction survey within the study area, a 25-foot buffer zone would be established around the roosts. A qualified biologist would monitor roosts weekly during construction to evaluate potential disturbance by construction activities. The biologist would delimit the buffer zone with construction tape or pin flags within 25 feet of the active roost and maintain the buffer zone until the end of the breeding season or until the young have fledged. Guidance from the CDFG would be requested if establishing a 25-foot buffer zone is impractical.

Recommendations for American Badger

A preconstruction survey should be conducted by a qualified biologist to determine whether American badger dens occur within the study area. If unoccupied dens are located within the study area, the dens would be covered to prevent the American badger from re-occupying the den prior to construction. If construction is intended to commence during the breeding season (February through May) and occupied dens are located within in the study area, a 25-foot buffer zone would be established around the den. A qualified biologist would monitor den weekly during construction to evaluate potential disturbance by construction activities. The biologist would delimit the buffer zone with construction tape or pin flags within 25 feet of the occupied den and maintain the buffer zone until the den is no longer occupied. Guidance from the CDFG would be requested if establishing a 25-foot buffer zone is impractical.

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ATTACHMENT 1

USFWS, CNDDB, AND CNPS LISTS

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the FISH CAMP (418B) U.S.G.S. 7 1/2 Minute Quad

Database last updated: April 29, 2010

Report Date: May 17, 2010

Listed Species

Fish

Hypomesus transpacificus

delta smelt (T)

Oncorhynchus mykiss

Central Valley steelhead (T) (NMFS)

Amphibians

Rana draytonii

California red-legged frog (T)

Candidate Species

Mammals

Martes pennanti

fisher (C)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	***Actinemys marmorata*** western pond turtle	ARAAD02030			G3G4	S3	SC
2	***Allium yosemitense*** Yosemite onion	PMLIL022L0		Rare	G2	S2.3	1B.3
3	***Anaxyrus canorus*** Yosemite toad	AAABB01040	Candidate		G2	S2	SC
4	***Andrena macswaini*** An andrenid bee	IIHYM35040			G1G3	S1S3	
5	***Antrozous pallidus*** pallid bat	AMACC10010			G5	S3	SC
6	***Atractelmis wawona*** Wawona riffle beetle	IICOL58010			G1G3	S1S2	
7	***Balsamorhiza macrolepis var. macrolepis*** big-scale balsamroot	PDAST11061			G3G4T2	S2.2	1B.2
8	***Big Tree Forest***	CTT84250CA			G3	S3.2	
9	***Calyptridium pulchellum*** Mariposa pussypaws	PDPOR09060	Threatened		G1	S1.1	1B.1
10	***Carex arcta*** northern clustered sedge	PMCYP030X0			G5	S1S2	2.2
11	***Central Valley Drainage Hardhead/Squawfish Stream***	CARA2443CA			G?	SNR	
12	***Cinna bolanderi*** Bolander's woodreed	PMPOA1H040			G1	S1.2	1B.2
13	***Clarkia australis*** Small's southern clarkia	PDONA05040			G2	S2.2	1B.2
14	***Clarkia biloba ssp. australis*** Mariposa clarkia	PDONA05051			G4G5T2	S2.2	1B.2
15	***Collomia rawsoniana*** Rawson's flaming trumpet	PDPLM02080			G2	S2.2	1B.2
16	***Corynorhinus townsendii*** Townsend's big-eared bat	AMACC08010			G4	S2S3	SC
17	***Cryptantha mariposae*** Mariposa cryptantha	PDBOR0A1Q0			G2	S2.3	1B.3
18	***Desmocerus californicus dimorphus*** valley elderberry longhorn beetle	IICOL48011	Threatened		G3T2	S2	
19	***Empidonax traillii*** willow flycatcher	ABPAE33040		Endangered	G5	S1S2	
20	***Erigeron mariposanus*** Mariposa daisy	PDAST3M5L0			GH	SH	1A
21	***Eriophyllum congdonii*** Congdon's woolly sunflower	PDAST3N030		Rare	G2	S2.2	1B.2
22	***Euderma maculatum*** spotted bat	AMACC07010			G4	S2S3	SC
23	***Eumops perotis californicus*** western mastiff bat	AMACD02011			G5T4	S3?	SC
24	***Gulo gulo*** California wolverine	AMAJF03010		Threatened	G4	S2	

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
25 ***Haliaeetus leucocephalus*** bald eagle	ABNKC10010	Delisted	Endangered	G5	S2	
26 ***Hulsea brevifolia*** short-leaved hulsea	PDAST4Z020			G3	S3.2	1B.2
27 ***Hydroporus leechi*** Leech's skyline diving beetle	IICOL55040			G1?	S1?	
28 ***Lasionycteris noctivagans*** silver-haired bat	AMACC02010			G5	S3S4	
29 ***Lasiurus blossevillii*** western red bat	AMACC05060			G5	S3?	SC
30 ***Lasiurus cinereus*** hoary bat	AMACC05030			G5	S4?	
31 ***Leptosiphon serrulatus*** Madera leptosiphon	PDPLM09130			G1?	S1?	1B.2
32 ***Lewisia congdonii*** Congdon's lewisia	PDPOR04040		Rare	G1	S1.3	1B.3
33 ***Lomatium congdonii*** Congdon's lomatium	PDAPI1B0B0			G2	S2.2	1B.2
34 ***Lupinus citrinus var. citrinus*** orange lupine	PDFAB2B103			G2T2	S2.2	1B.2
35 ***Lupinus citrinus var. deflexus*** Mariposa lupine	PDFAB2B102		Threatened	G2T1	S1.2	1B.2
36 ***Martes americana sierrae*** Sierra marten	AMAJF01014			G5T3T4	S3S4	
37 ***Martes pennanti (pacifica) DPS*** Pacific fisher	AMAJF01021	Candidate	unknown code...	G5	S2S3	SC
38 ***Mimulus filicaulis*** slender-stemmed monkeyflower	PDSCR1B150			G2	S2.2	1B.2
39 ***Mimulus gracilipes*** slender-stalked monkeyflower	PDSCR1B1C0			G3	S3.2	1B.2
40 ***Mimulus pulchellus*** yellow-lip pansy monkeyflower	PDSCR1B280			G2G3	S2S3.2	1B.2
41 ***Myotis ciliolabrum*** western small-footed myotis	AMACC01140			G5	S2S3	
42 ***Myotis evotis*** long-eared myotis	AMACC01070			G5	S4?	
43 ***Myotis thysanodes*** fringed myotis	AMACC01090			G4G5	S4	
44 ***Myotis yumanensis*** Yuma myotis	AMACC01020			G5	S4?	
45 ***Peltigera hydrothyria*** aquatic felt lichen	NLLEC83010			G4	S3.2	
46 ***Rana boylii*** foothill yellow-legged frog	AAABH01050			G3	S2S3	SC
47 ***Rana sierrae*** Sierra Nevada yellow-legged frog	AAABH01340	Candidate		G1	S1	SC

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
48	***Taxidea taxus*** American badger	AMAJF04010			G5	S4	SC
49	***Tetrix sierrana*** Sierra pygmy grasshopper	IIORT27010			G1G2	S1S2	
50	***Trifolium bolanderi*** Bolander's clover	PDFAB400G0			G3	S3.2	1B.2
51	***Vulpes vulpes necator*** Sierra Nevada red fox	AMAJA03012		Threatened	G5T3	S1	

CNPS List for the Fish Camp Quad and 8 Surrounding Quads
Status: Plant Press Manager window with 18 items - Mon, Jun. 14, 2010 18:32 c

- During each visit, we provide you with an empty "Plant Press" for collecting items of interest.
- Several report formats are available. Use the CSV and XML options to download raw data.

Reformat list as:

DELETE unchecked items | check all

open	save	scientific	common	family	CNPS
		Allium yosemitense	Yosemite onion	Liliaceae	List 1B.3
		Balsamorhiza macrolepis var. macrolepis	big-scale balsamroot	Asteraceae	List 1B.2
		Calyptridium pulchellum	Mariposa pussypaws	Portulacaceae	List 1B.1
		Carex arcta	northern clustered sedge	Cyperaceae	List 2.2
		Cinna bolanderi	Bolander's woodreed	Poaceae	List 1B.2
		Clarkia australis	Small's southern clarkia	Onagraceae	List 1B.2
		Collomia rawsoniana	Rawson's flaming-trumpet	Polemoniaceae	List 1B.2
		Eriophyllum congdonii	Congdon's woolly sunflower	Asteraceae	List 1B.2
		Eriophyllum nubigenum	Yosemite woolly sunflower	Asteraceae	List 1B.3
		Hulsea brevifolia	short-leaved hulsea	Asteraceae	List 1B.2
		Leptosiphon serrulatus	Madera leptosiphon	Polemoniaceae	List 1B.2
		Lewisia congdonii	Congdon's lewisia	Portulacaceae	List 1B.3

	Lupinus citrinus var. citrinus	orange lupine	Fabaceae	List 1B.2
	Mimulus acutidens	Kings River monkeyflower	Scrophulariaceae	List 3
	Mimulus filicaulis	slender-stemmed monkeyflower	Scrophulariaceae	List 1B.2
	Mimulus gracilipes	slender-stalked monkeyflower	Scrophulariaceae	List 1B.2
	Mimulus pulchellus	yellow-lip pansy monkeyflower	Scrophulariaceae	List 1B.2
	Trifolium bolanderi	Bolander's clover	Fabaceae	List 1B.2

DELETE unchecked items | check all

ATTACHMENT 2

REGIONALLY OCCURRING SPECIAL STATUS SPECIES TABLE

ATTACHMENT 2
FEDERAL, STATE, AND CNPS POTENTIALLY OCCURRING SPECIAL-STATUS SPECIES

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/ CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Plants					
Allium yosemitense *Yosemite onion*	--/CR/1B	Known from Mariposa and Tuoloumne counties (CNPS, 2010).	Bulbiferous herb usually found on rocky, metamorphic, or granitic soils in broadleafed upland, chaparral, cismontane woodland, and lower montane coniferous forest from 535 to 2, 200 meters (CNPS, 2010).	April-July	Yes. See text.
Balsamorhiza macrolepis var. *macrolepis* big scale balsamroot	--/--/1B	Known from Alameda, Butte, Colusa, El Dorado, Lake, Mariposa, Napa, Placer, Santa Clara, Solano, Sonoma, Tehama counties (CNPS, 2010).	Found in chaparral, cismontane woodland, Valley and foothill grassland, sometimes on serpentinite, from 90 to 1,555 meters (CNPS, 2010).	Mar-June	Yes. See text.
Calyptridium pulchellum Mariposa pussypaws	FT/--/1B	Known from Fresno, Madera, and Mariposa counties (CNPS, 2010).	Annual herb usually found on rocky, sandy, or granitic soils in cismontane woodland and chaparral from 400 to 1,220 meters (CNPS, 2010).	April-August	No. The study area does not provide habitat for this species.
Carex arcta Northern clustered sedge	--/--/2	Known from Del Norte, Humboldt, Mendocino, Mariposa, and Tulare counties in California (CNPS, 2010).	Perennial herb occasionally found in mesic areas in bogs and fens and North Coast coniferous forest from 60 to 1,400 meters (CNPS, 2010).	June-September	No. The study area does not provide habitat for this species.
Clarkia australis Small's southern clarkia	--/--/1B	Known from Calaveras, Madera, Mariposa, and Tuolumne counties (CNPS, 2010).	Annual herb found in cismontane woodland and lower montane coniferous forest from 800 to 2,075 meters (CNPS, 2010).	May-August	Yes. See text.
Clarkia biloba ssp. *australis* Mariposa Clarkia	--/--/1B	Known from El Dorado, Mariposa, and Tuolumne counties (CNPS, 2010).	Annual herb usually found on serpentinite soils in chaparral and cismontane woodland from 300 to 985 meters (CNPS, 2010).	May-July	No. The study area does not provide habitat for this species.
Clarkia lingulata Merced clarkia	--/CE/1B	Known from Mariposa County (CNPS, 2010).	Annual herb found in chaparral and cismontane woodland from 400 to 455 meters (CNPS, 2010).	May-June	No. The study area does not provide habitat for this species.
Cryptantha mariposae Mariposa cryptantha	--/--/1B	Known from Calaveras, Mariposa, Stanislaus, and Tuolumne counties (CNPS, 2010).	Found in chaparral, occasionally on serpentinite, rocky soils, from 200 to 650 meters (CNPS, 2010).	Apr-Jun	No. The study area does not provide habitat for this species.
Entosthodon kochii Koch's cord moss	--/--/1B	Known from Mendocino, Mariposa, Marin, and San Luis Obispo (CNPS, 2010).	Moss found occasionally on soil in cismontane woodland from 180 to 1,000 meters (CNPS, 2010).	Unknown	No. The study area does not provide habitat for this species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/ CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Erigeron mariposanus Mariposa daisy	--/--/1A	Known from Mariposa County (CNPS, 2010).	Perennial herb found in cismontane woodland from 600 to 800 meters (CNPS, 2010).	June-July	No. The study area does not provide habitat for this species.
Eriophyllum congdonii Congdon's wooly sunflower	--/CR/1B	Known from Fresno, Madera, Merced, Stanislaus, Tulare, and Tuolumne counties (CNPS, 2010).	Annual herb usually found on rocky, metamorphic soil in chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland from 500 to 1,900 meters (CNPS, 2010).	April-June	Yes. See text.
Eriophyllum nubigenum Yosemite woolly sunflower	--/--/1B	Known from Madera, Mariposa, and Tuolumne counties (CNPS, 2010).	Annual herb usually found on gravelly, granitic soils in chaparral and lower and upper montane coniferous forest from 1,525 to 2,750 meters (CNPS, 2010).	May-August	Yes. See text.
Horkelia parryi Parry's horkelia	--/--/1B	Known from Amador, Calaveras, El Dorado, and Mariposa counties (CNPS, 2010).	Found on ione formation and other soils in chaparral and cismontane woodland from 80 to 1,035 meters (CNPS, 2010).	April-September	No. The study area does not provide habitat for this species.
Leptosiphon serrulatus Madera leptosiphon	--/--/1B	Known from Fresno, Kern, Madera, Mariposa, and Tulare counties (CNPS, 2010).	Annual herb found in cismontane woodland and lower montane coniferous forest from 300 to 1,300 meters (CNPS, 2010).	April-May	Yes. See text.
Lomatium congdonii Congdon's lomatium	--/--/1B	Calaveras, Mariposa, and Tuolumne counties (CNPS, 2010).	Found on serpentinite soils in chaparral and cismontane woodland from 300 to 2,100 meters (CNPS, 2010).	March-June	No. The study area does not provide habitat for this species.
Lupinus citrinus var. *deflexus* Mariposa lupine	--/CE/1B	Known from Mariposa County (CNPS, 2010).	Annual herb usually found on granitic, sandy soil in chaparral and cismontane woodland from 400 to 610 meters (CNPS, 2010).	April-May	No. The study area does not provide habitat for this species.
Mielichhoferia elongata elongate copper moss	--/--/2	Known from Fresno, Humboldt, Lake, Mariposa, Marin, Nevada, Placer, Santa Cruz, Trinity, and Tulare counties in California (CNPS, 2010).	Moss usually found on metamorphic, rocky, vernally mesic soil in cismontane woodland from 500 to 1,300 meters (CNPS, 2010).	Unknown	No. The study area does not provide habitat for this species.
Mimulus filicaulis slender-stemmed monkeyflower	--/--/1B	Known from Mariposa and Tuolumne counties (CNPS, 2010).	Found in vernally mesic areas in cismontane woodland, lower montane coniferous forest, meadows and seeps, and upper montane coniferous forest from 900 to 1,750 meters (CNPS, 2010).	April-August	No. The study area does not provide habitat for this species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/ CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Mimulus gracilipes Slender-stalked monkeyflower	--/--/1B	Known from Fresno, Madera, and Mariposa counties (CNPS, 2010).	Annual herb usually found on decomposed granitic, often in burned or disturbed areas, in chaparral, cismontane woodland, and lower montane coniferous forest from 500 to 1,300 meters (CNPS, 2010).	April-June	Yes. See text.
Mimulus pulchellus yellow-lip pansy monkeyflower	--/--/1B	Known from Calaveras, Mariposa, and Tuolumne counties (CNPS, 2010).	Found in vernally mesic, often disturbed areas, on clay, in lower montane coniferous forest and meadows and seeps from 600 to 2,000 meters (CNPS, 2010).	April-July	Yes. See text.
Schizymenium shevockii Shevock's copper moss	--/--/1B	Known from Fresno, Mariposa, Riverside, and Tulare counties (CNPS, 2010).	Moss usually found on mesic, metamorphic rock in cismontane woodland from 750 to 1,400 meters (CNPS, 2010).	Uknown	No. The study area does not provide habitat for this species.
Animals					
Invertebrates					
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT	Known from Amador, Butte, Calaveras, Colusa, El Dorado, Fresno, Glenn, Kern, Madera, Mariposa, Merced, Napa, Placer, Fresno, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba counties (NatureServe, 2010).	Found in riparian forest communities from 0 to 762 meters. Exclusive host plant is elderberry (*Sambucus* species), which must have stems at least one inch in diameter for the beetle.	Year round	No. The study area does not contain habitat for this species.
Hydromantes brunus Limestone salamander	--/CT/--	Known along the Merced River from Lake McClure to about 4 miles NE of Briceburg, Mariposa County. Also occurs along the Merced River tributaries including Bear Creek and its feeder creeks, south of Briceburg (CaliforniaHerps.com, 2010).	Inhabits mossy limestone crevices and talus in Grey Pine/Oak/Buckeye/ Chaparral belt of the lower Merced Canyon (CaliforniaHerps.com, 2010).	Rain events in fall, winter, and spring during moderate temperatures	No. The study area does not provide habitat for this species.
Fish					
Hypomesus transpacificus Delta smelt	FT/CT/--	Known almost exclusively in the Sacramento-San Joaquin estuary, from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties. May also occur in the San Francisco Bay.	Found in estuarine waters. Majority of life span is spent within the freshwater outskirts of the mixing zone (saltwater-freshwater interface) within the Delta.	Consult Agency	No. The study area does not contain habitat for this species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/ CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Oncorhynchus mykiss steelhead Central Valley Steelhead	FT/--/--	Spawn in the Sacramento and San Joaquin rivers and tributaries before migrating to the Delta and Bay Area.	Found in cool, clear, fast-flowing permanent streams and rivers with riffles and ample cover from riparian vegetation or overhanging banks. Spawning: streams with pool and riffle complexes. For successful breeding, require cold water and gravelly streambed.	Consult Agency	No. The study area does not contain habitat for this species.
Amphibians					
Rana boylii Foothill yellow-legged frog	--/CSC/--	Known from northern Oregon west of the Cascades south along the foothills of the western side of the Sierra Nevada Mountains to the Tehachapi Mountains, with an isolated population in the San Pedro Martir Mountains of Baja California (CaliforniaHerps.com, 2010).	Found in rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands from sea level to 2,040 meters. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools (CaliforniaHerps.com, 2010).	March - June (breeding) July - September (non-breeding)	Yes. The study area provides upland habitat for this species. See text.
Rana sierrae Sierra Nevada yellow-legged frog	FC/CSC/--	Known from southern Plumas County to southern Tulare County (Center for Biological Diversity, 2010).	Inhabits lakes, ponds, meadow streams, isolated pools, and sunny riverbanks in the Sierra Nevada Mountains from 370 to 3,660 meters. Waters that do not freeze to the bottom are required. Open stream and lake edges with a gentle slope up to a depth of 5 to 8 cm seem to be preferred (CaliforniaHerps.com, 2010).	April-August (breeding)	Yes. The study area provides upland habitat for this species. See text.
Reptiles					
Actinemys marmorata western pond turtle	--/CSC/--	Known along the west coast of North America from southern Washington to northern Baja California, Mexico. Many populations have been extirpated and others continue to decline throughout the range, especially in southern California.	Requires aquatic habitats with suitable basking sites. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	All year	Yes. The study area provides nesting habitat for this species. See text.
Birds					

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/ CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Strix nebulosa Great gray owl	--/CE/--	Known throughout Canada. In the U.S., known from. Alaska, Washington, Idaho, Montana south through the Cascade and Sierra Nevada ranges to central-eastern California, central- western Nevada, and northwestern Wyoming (Cornell Laboratory of Ornithology, 2010).	In California, prefers pine and fir forests adjacent to montane meadows between 750 and 2,250 meters in California (Cornell Laboratory of Ornithology, 2010).	All Year	No. The study area does not provide habitat for this species.
Mammals					
Antrozous pallidus pallid bat	--/CSC/--	Locally common species at low elevations. It occurs throughout California except for the high Sierra Nevada from Shasta to Kern counties, and the northwestern corner of the state from Del Norte and western Siskiyou counties to northern Mendocino County (NatureServe, 2010).	Inhabits grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests, generally below 2,000 meters. The species is most common in open, dry habitats with rocky areas for roosting. Roosts also include cliffs, abandoned buildings, bird boxes, and under bridges (NatureServe, 2010).	All Year	Yes. See text.
Euderma maculatum Spotted bat	--/CSC/--	Known from southern California (NatureServe, 2010).	Found mostly in foothills, mountains, and desert regions with vegetation types ranging from desert to sub-alpine meadows including desert scrub, pinyon juniper woodland, ponderosa pine, mixed conifer forest, canyon bottoms, rim of cliffs, riparian areas, fields, and open grassland from 0 to 3,000 meters (NatureServe, 2010).	All year	Yes. See text.
Lasiurus blossevillii Western red bat	--/CSC/--	Occurs from Shasta County to the Mexican border, west of the Sierra Nevada/Cascade crest and deserts (NatureServe, 2010).	The winter range includes western lowlands and coastal regions south of San Francisco Bay. Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests. Roosts primarily in trees (less often in shrubs) along the edge of habitats adjacent to streams, fields or urban areas. Foraging habitats occurs in open areas. They may be found in unusual habitats during migration (NatureServe, 2010).	Year Round (spring migrations March to May AND autumn migrations September to October)	

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/ CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION	POTENTIAL TO OCCUR ON-SITE
Martes pennanti Fisher	FC/CSC/--	Distributed along the Sierra Nevada, Cascades and Klammath Mountains and in a few areas in the north Coast Ranges (NatureServe, 2010).	Found in intermediate to dense mature stands of trees (coniferous forests) and deciduous riparian habitats with a high percent canopy closure. Utilizes cavities in large trees, snags, logs, rock areas, or shelters provided by slash or brush piles (NatureServe, 2010).	Year Round	

STATUS CODES

FEDERAL: United States Fish and Wildlife Service
FE Federally Endangered
FT Federally Threatened
FC Federal Candidate for Listing

STATE: California Department of Fish and Game
CE California Listed Endangered
CR California Listed Rare
CT California Listed Threatened
CSC California Species of Special Concern
CFP California Fully-Protected

CNPS: California Native Plant Society
List 1A Plants Presumed Extinct in California
List 1B Plants Rare, Threatened, or Endangered in California and Elsewhere
List 2 Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

SOURCE: CDFG, 2003; CNPS, 2010; USFWS, 2010.

APPENDIX C

CULTURAL RESOURCES TECHNICAL MEMORANDUM

THE HISTORICAL PROPERTIES REPORT CONTAINS SENSITIVE AND CONFIDENTIAL INFORMATION AND IS RETAINED AT THE OFFICES OF FEMA UNDER SEPARATE COVER. THIS TECHNICAL REPORT HAS BEEN PRESENTED TO THE APPROPRIATE REGULATORY AGENCIES RELATING TO CONSULTATION REQUIREMENTS OF THE NATIONAL HISTORIC PRESERVATION ACT.