KILARC-COW CREEK PROJECT
FERC No. 606

Botanical, and Terrestrial and Aquatic Wildlife Resources Report

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Section 1: Introduction

Pacific Gas and Electric Company (PG&E), the Licensee for the Kilarc-Cow Creek Hydroelectric Project, FERC No. 606 (Project), has been ordered by Federal Energy Regulatory Commission (FERC) to prepare a Surrender Application for the Project. As part of the surrender process, PG&E proposes to decommission as described in this Preliminary Proposed Decommissioning Plan (Plan PG&E 2007).

PG&E initially sought a new license for the Project and began to relicense the Project in 2002 as required by FERC for the continued operation of the Project. A Notice of Intent (NOI) to relicense the Project was filed in 2002. PG&E prepared the First Stage Consultation Package, and conducted the resource studies necessary to support relicensing. PG&E was in the process of compiling the study reports when it made the decision to decommission the Project instead of seeking a new license.

The resource studies conducted collected information on a wide variety of resources areas in the vicinity of the Project. Although the studies were originally planned to support relicensing of the Project, the data collected provides much of the information needed to support the development of the Surrender Application. At the time PG&E decided to decommission the Project, the resource studies were in various stages of completion. Completed reports were prepared for aquatic resources, wildlife resources, botanical resources, recreation resources and California red-legged frogs. The other resource studies conducted for relicensing contain information pertinent to decommissioning, however, that information has not been analyzed. These include cultural, historical and geomorphology studies. This information will be further evaluated and presented in the Surrender Application.

This resource report summarizes the pertinent information collected on wildlife resources, including the California red-legged frog, and botanical resources.

Section 2: Terrestrial & Aquatic Wildlife Resources

The following discussion of Project-related wildlife resources includes a description of general wildlife, game species, raptors, and special-status species. The nomenclature of habitats used in this report is based on *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988). The nomenclature of animals is based on *A Checklist of the Amphibians, Reptiles, Birds, and Mammals of California* (Laudenslayer et al., 1991).

The wildlife resources associated with the Kilarc-Cow Project (Project) include special-status species and commercially and recreationally valuable species, such as game species. The following discussion begins with a brief description of the methods used to evaluate wildlife resources associated with the Project. The methods section is followed by a description of the wildlife resources in the vicinity of the Project facilities and a discussion of potential Project impacts to these resources.

2.1 METHODS

The assessment of wildlife resources is based on a review of existing information relevant to the Project, agency consultation, and field surveys.

2.1.1 Literature Review

Information on the special-status wildlife of the Project Area was obtained through a search of the *California Natural Diversity Database* (CNDDB), California Department of Fish and Game (CDFG) 2003; the U.S. Fish and Wildlife Service (USFWS), Sacramento Office, Endangered Species Division's species list (USFWS, 2003); Cow Creek Watershed Assessment (SHN Consulting Engineers and Geologists, Inc. [SHN], 2001); Kilarc-Cow Hydroelectric Project FERC No. 606 First Stage Consultation Package (PG&E, June 2002a) and other biological studies completed in the Project vicinity. Relevant technical information from these documents is incorporated into this document and referenced as appropriate.

2.1.2 Agency Consultation

Principal agency consultations were conducted with USFWS and CDFG. The study plans were developed in consultation with agencies, as well as the State Water Resources Control Board (SWRCB) and National Oceanic & Atmospheric Administration Fisheries Division (NOAA Fisheries). Comment letters were submitted by the agencies on October 3, 2002 (CDFG); October 4, 2002 (SWRCB); November 6, 2002 (NOAA Fisheries); and January 30, 2003 (USFWS). Following submittal of the comment letters, Ms. Janelle Nolan-Summers and Ms. Tracy MacMillan (ENTRIX) met with Ms. Kathy Brown of the USFWS on February 24, 2003 to discuss wildlife survey protocols.

2.1.3 Field Surveys

Field surveys for wildlife resources were conducted in the Project Area in the spring, summer, and fall of 2003. This included a reconnaissance-level wildlife survey, a California red-legged frog site assessment and foothill yellow-legged frog surveys. Additional surveys for vegetation mapping (i.e., habitat mapping) were conducted in the summer and fall of 2003. Refer to Section 3.0 Botanical Resources, for a detailed description of vegetation mapping study methodology. The methods for conducting the Project wildlife surveys are described below.

2.1.3.1 Reconnaissance-Level Wildlife Survey

Reconnaissance-level surveys for terrestrial wildlife habitats were conducted in the Project Area from April 22 through April 24, 2003, and June 17 though 18, 2003. The study area consisted of (1) intake areas at the North Canyon Creek, South Canyon Creek, Kilarc, Mill Creek, and South Cow Creek diversion dams; (2) Kilarc Forebay, Kilarc Penstock, Kilarc Powerhouse, Cow Creek Forebay, Cow Creek Penstock, and Cow Creek Powerhouse; (3) North Canyon Creek Canal, South Canyon Creek Canal, Kilarc Main Canal, Mill Creek, and South Cow Creek Main Canal; and (4) diverted reaches of Old Cow Creek and South Cow Creek.

Wildlife habitats were identified, and all wildlife observed or detected through diagnostic sign (i.e., track, scat, feather, carcass, etc.) were identified to species and recorded. The objective of the surveys was to identify and evaluate the wildlife habitats present in the Project Area and record wildlife observations. Any special-status species observed or detected were recorded, CNDDB forms were completed, and locations were mapped.

Surveys were conducted in representative habitat for special-status wildlife species. Areas potentially supporting special-status species (i.e. California red-legged frog, foothill yellow-legged frog, northwestern pond turtle, bald eagle, California spotted owl, American peregrine falcon, willow flycatcher, California thrasher, ringtail, and several species of bats) were specifically targeted.

2.1.3.2 VELB Habitat Surveys

Focused VELB habitat surveys were conducted in the Project Area in conjunction with the special-status plant species surveys in May 2003 and June 2003, and riparian surveys in July 2003 and August 2003. The focused surveys were performed in all accessible areas within 25 feet of diverted reaches and 100 feet of Project facilities. Please refer to Section 2.4 for specific study areas. The locations of elderberry shrubs were mapped and are shown on Figure 1, Maps A and B. The number of stems in each of the following categories was recorded: less than 1 inch, 1 to 3 inches, 3 to 5 inches, and greater than 5 inches in diameter. Diameters were estimated for shrubs that were inaccessible. Observations of the presence or absence of stem holes and beetles were recorded.

2.1.3.3 California Red-Legged Frog Site Assessment

A Site Assessment for California red-legged frog was conducted according to USFWS protocols (1997). The following is a summary of the methods from the California red-legged frog report (ENTRIX, Inc. 2004).

Information was obtained from all available resources including literature on habitat requirements and life history of California red-legged frogs, a CNDDB search, a search of the catalogues of the two major western museum collections (Museum of Vertebrate Zoology, U.C. Berkeley, and California Academy of Sciences, San Francisco), topographic maps, aerial photographs, and preliminary information obtained during habitat mapping surveys and vegetation surveys conducted as part of other Project relicensing studies. Habitat information was also collected during helicopter surveys and ground surveys in representative sites in Project-affected reaches, and photographs were taken to document representative habitat.

Potential California red-legged frog spawning habitat within the Site Assessment Area was identified from a preliminary helicopter survey (detailed below), and from topographic maps, aerial photographs, and preliminary information obtained during habitat mapping surveys and vegetation surveys conducted as part of other Project relicensing studies. Project Area or Project-affected reaches (bypass reaches) in Old Cow Creek, South Cow Creek, diverted tributaries, Hooten Gulch, and diversion canals were divided into half-mile reaches on a topographic map and each half-mile reach was numbered. Half-mile reaches were used because they were short enough to document photographically yet long enough to intercept habitat changes that might occur along the streams. Springs and ponds within the Site Assessment Area not affected by the Project that could potentially support California red-legged frogs were also identified and numbered.

A helicopter reconnaissance survey was conducted on July 8, 2003, to document potential habitat within the Site Assessment Area during early summer when seasonal waterways capable of functioning as red-legged frog spawning habitat still contain sufficient water. Photographs of potential habitat were taken and waypoints of these sites were recorded during the flight. Time and accessibility constraints made complete ground Site Assessments of the entire Site Assessment Area or the Project Area impossible, so three representative reaches of Old Cow Creek and two reaches of South Cow Creek were selected for ground Site Assessments based on their seeming similarity to the remaining portions of the creeks from the helicopter surveys. Ground Site Assessments for potential California red-legged frog spawning or summer habitat identified during the helicopter surveys were conducted concurrently with daytime ground surveys for foothill yellow-legged frogs and habitat in project-affected reaches. Biologists conducted ground surveys between July 7-12 and September 5-6..

During ground surveys, factors that may affect California red-legged frogs, such as general habitat characteristics, the presence of pools and backwater areas, vegetation, cover, the presence of other aquatic species such as fish, aquatic garter snakes and bullfrogs, and the availability of insects that may provide forage for frogs or algae that may contribute to primary productivity, and water temperatures, were recorded in field notebooks. The start and end points of the surveys were documented with photographs and GPS coordinates (where signal strength was sufficient). Additional photographs were taken of representative habitats. Photographs were also taken of sites that contained habitat characteristics favorable for California red-legged frogs.

2.1.3.4 Foothill Yellow-Legged Frog

The Licensee's protocol (PG&E, 2002b) was used to survey for foothill yellow-legged frog. This approach included preliminary field planning, visual encounter surveys, and habitat assessments.

PRELIMINARY FIELD PLANNING

Preliminary field planning was conducted to identify survey sites with potentially suitable foothill yellow-legged frog habitat and select the timing of surveys. The selection of survey sites depended on existing data on foothill yellow-legged frogs in the study area, identification of potentially suitable habitat in the study area, and the results of preliminary habitat assessments. Survey site selection was based on information obtained from all available resources including literature on habitat requirements and life history of foothill yellow-legged frogs, a CNDDB search, topographic maps, aerial photographs, historical records from major northern California museums, preliminary information obtained during habitat mapping surveys and vegetation surveys, and an aerial (helicopter) survey. Kilarc and Cow diversion canals and bypass reaches in Old Cow Creek, South Cow Creek, and diverted tributaries were divided into numbered half-mile sections on topographic maps. Topographic and aerial maps were examined to identify potential habitat. A helicopter survey was conducted on July 8, 2003 to assess potential foothill yellow-legged frog habitat. Streams were photographed and GPS waypoints for potential habitat were recorded during the flight.

Survey sites were selected in representative sections of the study area that contain moderate- to high-value habitats for foothill yellow-legged frogs, based on species-specific criteria. All Project-affected reaches occur at elevations below 4,000 feet. Therefore, the downstream and upstream ends of South Cow and Old Cow creek bypass reaches were surveyed to include a range of elevations. A short reach (130 meters) of Hooten Gulch upstream of the Wild Oak Powerhouse, a private hydroelectric facility, was surveyed in September. North Canyon Creek was not surveyed because most of it was dry during the aerial survey and the wetted downstream portion was very shaded. Mill Creek (which also goes dry in some years) was surveyed for tadpoles downstream of the Mill Creek diversion, but was not surveyed further because it is small and densely vegetated. The diversion canals are relatively straight, concrete-lined or earthen channels with swiftly flowing water and no habitat complexity. Therefore, they do not contain primary foothill yellow-legged frog habitat. The survey team walked along three short segments of these canals, including segments downstream of the Mill Creek Diversion, downstream of the South Cow Creek Diversion, and directly upstream of the Kilarc Reservoir.

VISUAL ENCOUNTER SURVEYS

Two sets of visual encounter surveys were conducted from July 7 through July 12, 2003 and from September 2 through September 6, 2003 as specified in protocols developed by the Licensee. A tadpole survey was conducted in July 2003, after late spring flows had subsided. A second survey for juveniles, subadults, and adults was conducted in the first week of September. Teams searched for eggs, tadpoles, and frogs between 9:00 and 16:00 hours (10:00 and 16:00 in September when days were shorter) when frogs were expected to be basking. Adjacent aquatic habitat and suitable aquatic habitat was searched. All observations were recorded on visual encounter survey data sheets (PG&E, 2002). GPS coordinates and photographs were obtained to document the start and end points of visual encounter surveys, and photographs were taken of representative habitats. Factors were noted that may affect foothill yellow-legged frogs, such as

the presence of cobble bars and side channels, tributary or spring inputs, the presence of other aquatic species such as fish, turtles, aquatic garter snakes and bullfrogs, the availability of insects that may provide forage for frogs, and algae that may contribute to primary productivity.

HABITAT ASSESSMENT

Final survey boundaries were established and habitat was assessed immediately following the initial visual encounter surveys. If no foothill yellow-legged frog was found, habitat assessments were conducted in apparently suitable habitat in one or more subsites. Habitat was also assessed wherever foothill yellow-legged frogs were observed. Data were recorded on habitat assessment data sheets (PG&E, 2002). Photographs of the sites are provided in Appendix A.

2.1.3.5 Raptor Surveys

Two surveys were conducted for bald eagle and American peregrine falcon in the early morning hours (dawn) during the raptor-nesting season (April – June) to detect raptors or the presence of nests. Surveys were concentrated near the Kilarc Forebay, as the area was identified as a known perching and suspected foraging location. Biologists walked the perimeter of the forebay and performed a binocular survey of the surrounding area for duration of at least 30 minutes for each survey. Any raptors detected were identified, and the following information was recorded: date, time, location, sex, age, species, and behavior. Incidental sightings of raptors were also made by biologists during the course of other surveys for the Project. In addition, treetops were scanned for nesting sites during the aerial survey (helicopter overflight) completed on July 8, 2003.

2.1.4 Habitat Mapping

Surveys were conducted during 2003 to map the extent and location of vegetation communities and wildlife habitats in the Project Area (Figures 3 and 4). The habitat information was incorporated into a Geographical Information System (GIS) database. Habitat for common and special-status wildlife species within these vegetation communities was determined based on a comparison of the mapped plant communities with habitat types in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988). Details are provided in Section 2.1.

2.2 GENERAL WILDLIFE RESOURCES

The following description of the general wildlife resources occurring in different plant communities in the Project Area includes common, resident, and migratory species. This discussion is based on species observation and diagnostic sign (i.e., scat, feather, track, etc.) observed during field surveys and on species expected to occur in the Project Area based on habitats present (Figures 3 and 4). These habitat types are further discussed in Section 3.2, Plant Communities. Wildlife species observed in the Project Area are presented in Appendix B.

2.2.1 Sierran Mixed Conifer

This habitat type (Sierran Mixed Conifer in Figures 3 and 4) occurs in southern Oregon and California, dominating mid-elevation slopes in the western Sierra Nevada. Disjunct populations are also found in the Peninsular, Transverse, and Coast ranges of California. This forest habitat

generally forms a vegetation band ranging from 2,500 feet to 4,000 feet in the north to 4,000 to 10,000 feet in the southern Sierra Nevada (Mayer and Laudenslayer, 1988). This habitat is an assemblage of conifer and hardwood species and is composed of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii)*, ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*), incense-cedar (*Calocedrus decurrens*), and California black oak (*Quercus kelloggii*). Sierran mixed conifer forest is the most common forest type in the watershed and is widely distributed from 3,000 to 6,000 feet in elevation.

These forests provide habitat for small mammals, such as chipmunks (*Tamius* spp.), western gray squirrel (*Sciurus griseus*), deer mouse (*Peromyscus maniculatus*), and bats (*Myotis* spp.). Larger mammals typically found in these communities include gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), and mule deer (*Odocoileus hemionus*). Large trees and snags can also provide nesting areas for raptors, such as red-tailed hawk (*Buteo jamaicensis*). Reptiles, such as the western fence lizard (*Sceloporus occidentalis*), may also be present. Typical birds of coniferous forests in the Project Area include dark-eyed junco (*Junco hyemalis*), mountain chickadee (*Parus gambeli*), Steller's jay (*Cyanocitta stelleri*), western wood-pewee (*Contopus sordidulus*), and northern flicker (*Colaptes auratus*).

2.2.2 Ponderosa Pine

This habitat type (Ponderosa plantation in Figure 4) occurs at an elevational range from 2,000-5,000 feet in the north to 4,500-6,500 feet in the south (Mayer and Laudenslayer, 1988). This is the lowest-occurring montane forest type over most of its range and intergrades with Sierran Mixed Conifer on moist sites (often north-facing slopes) and Jeffrey Pine Forest on dry sites. The community is dominated by ponderosa pine and may also include white fir, incense cedar, and coulter pine (*Pinus coulteri*). Ponderosa Pine occurs as a plantation (rows) versus forest of trees within the Old Cow Creek vicinity of the Project Area.

This habitat sometimes serves as a wildlife corridor for deer and can be extremely important to deer nutrition in migration holding areas (Mayer and Laudenslayer, 1988). Early and late successional stages of this forest type provide habitat for several wildlife species. Wildlife species observed or expected to occur in this habitat include mountain quail (*Oreortyx pictus*), western scrub jay (*Aphelocoma californica*), and western gray squirrel. Large trees and snags can also provide nesting areas for raptors, such as red-tailed hawk.

2.2.3 Montane Hardwood

This habitat type (Interior Live Oak Woodland in Figure 3) occurs throughout California, mostly west of the Cascade-Sierra Nevada crest, and east of the crest in localized areas of Placer, El Dorado, Alpine, and San Bernardino counties (Mayer and Laudenslayer, 1988). Elevations range from 300 to 9,000 feet. Dominant plant species include interior live oak (*Quercus wislizenii*), canyon live oak (*Q. chrysolepis*), and Douglas fir. Interior live oak and canyon live oak trees are well represented in this woodland community that occurs along South Cow Creek within the Project Area.

Common wildlife species that may be present in this habitat include acorn disseminators and species that utilize acorns as a major food source, similar to blue oak-foothill pine described

below. Deer forage on hardwood foliage and several species of reptiles, birds, and mammals utilize the forest floor of this habitat including racer (*Coluber constrictor*), gopher snake (*Pituophis catenifer*), king snake (*Lampropeltis getula*), raptors, owls, and yellow-pine, Sonoma, and Allen's chipmunk (*Tamias amoenus, T. sonomae,* and *T. senex*).

2.2.4 Blue Oak-Foothill Pine

This habitat type (Blue Oak Woodland Foothill Pine in Figures 3 and 4) forms a nearly continuous belt around the Central Valley, between lower elevational grassland and lower montane mixed conifer forest, except for a gap in Tulare County where foothill pine (*Pinus sabiniana*) does not occur. This community is generally found on rocky or exposed shallow soil. Dominant plant species include blue oak (*Quercus douglasii*), live oak, and valley oak (Mayer and Laudenslayer, 1988). The community is dominated by two overstory species (blue oak and foothill pine) within the Project Area, with variations of the third primary species of whiteleaf manzanita (*Arctostaphylos viscida*), interior live oak, and buckbrush (*Ceanothus cuneatus*). The understory is characterized by non-native annual grasses and forbs. This plant community occurs on foothill slopes in the watershed from the valley floor to over 3,500 feet in elevation depending on aspect. Blue Oak-Foothill Pine occurs primarily in the South Cow Creek vicinity adjacent to Interior Live Oak Woodland.

This woodland provides breeding habitats for a large variety of species. For example, in the western Sierra Nevada, 29 species of amphibians and reptiles, 79 species of birds, and 22 species of mammals utilize this habitat for breeding. Wildlife species that enhance oak habitats through acorn dissemination include western scrub jay, yellow-billed magpie (*Pica nuttalli*), western gray squirrel, and California ground squirrel (*Spermophilus beecheyi*).

2.2.5 Montane Riparian

This habitat type (White alder riparian in Figures 3 and 4) occurs in the Klamath, Coast, and Cascade ranges and in the Sierra Nevada south to about Kern and northern Santa Barbara counties. Elevation of this habitat is usually below 8,000 feet (Mayer and Laudenslayer, 1988). Dominant plant species typically found in this community include white alder (*Alnus rhombifolia*), black cottonwood (*Populus trichocarpa*), and bigleaf maple (*Acer macrophyllum*). Common species found in the Project Area include white alder, willow (*Salix* spp.), and valley oak (*Quercus lobata*). Secondary vegetation consists of blue oak, non-native annual grass, and buckbrush. The Hooten Gulch and lower South Cow Creek area also contain limited elements of Valley Foothill Riparian habitat, with occurrences of California black walnut (*Juglans californica*) and valley oak. Montane riparian is the primary riparian forest community found in the Cow Creek Watershed. The community is found along sub-drainages and riparian vegetation is common along the edges of streams and creeks. Tree and shrub species are generally deciduous. The riparian corridor of this community is much narrower than other riparian communities common to the Sacramento Valley, due to the steep canyons, bedrock channels, and fast-flowing water common in the upper limits of the watershed.

Montane riparian communities associated with the drainages provide foraging and nesting habitats for birds such as yellow warbler (*Dendroica petechia*), American dipper (*Cinclus mexicanus*), solitary vireo (*Vireo solitarius*), and song sparrow (*Melospiza melodia*). Mammals

in this habitat include gray fox, long-tailed weasel (*Mustela frenata*), long-tailed vole (*Microtis longicaudus*), and western harvest mouse (*Reithrodontomys megalotis*). Amphibians found in this habitat include Pacific treefrog (*Hyla regilla*) and California newt (*Taricha torosa*).

2.2.6 Mixed Chaparral

This habitat type (Northern Mixed Chaparral in Figure 3) occurs in the Klamath Mountains and North Coast Ranges on interior slopes, coastal and interior slopes of the South Coast Range, western foothills of the Sierra Nevada, and Transverse and Peninsular ranges of southern California on slopes away from the deserts (Mayer and Laudenslayer, 1988). This habitat type generally becomes more abundant from north to south, usually below 3,000 feet in northern California and 5,000 feet in southern California. Dominant plant species include oaks, ceanothus, and manzanita. Mixed chaparral occurs primarily in the South Cow Creek vicinity adjacent to oak woodlands.

A wide variety of wildlife utilize mixed chaparral habitat. Wildlife that may be found in this habitat type include northern alligator lizard (*Gerrhonotus coeruleus*), mountain quail, calliope hummingbird (*Stellula calliope*), and dusky flycatcher (*Empidonax oberholseri*). Belding's ground squirrel (*Smermophilus beldingi*) may also occur in this habitat.

2.2.7 Annual Grassland

This habitat type (Non-native annual grassland or Annual Grassland in Figures 3 and 4) occurs throughout the Central Valley of California, in the coastal mountains as far north as Mendocino County, and in scattered locations in southern California from sea level to about 3,900 feet (Mayer and Laudenslayer, 1988). Dominant plant species include introduced annual grasses such as wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), barley (*Hordeum* spp.), and fescue (*Vulpia* spp.). Annual and perennial forbs are common associates. Non-native annual grassland is characteristically invaded by exotic species such as yellow starthistle *(Centaurea solstitialis),* medusahead grass *(Taeniatherum caput-medusae*), Klamath weed *(Hypericum perforatum),* Dalmation toadflax *(Linaria dalmatica*), and bull thistle *(Cirsium vulgare).* In the Project Area, non-native grassland occurs in the vicinity of both South Cow and Kilarc and extends into openings within oak woodlands and Sierran Mixed Conifer forest.

Common wildlife species that are typical of this habitat include western fence lizard, western rattlesnake (*Crotalus viridis*), turkey vulture (*Cathartes aura*), American kestrel (*Falco sparverius*), California ground squirrel, Botta's pocket gopher (*Thomomys bottae*), western harvest mouse, California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*).

2.2.8 Fresh Emergent Wetland

This habitat type (Water in Figures 3 and 4) occurs throughout California at nearly all elevations below 7,500 feet (Mayer and Laudenslayer, 1988). Saturated or periodically flooded soils support mesic plant species, including sedges and rushes. Wetter sites support cattail (*Typha* spp.) and bulrush (*Scirpus* spp.). Seeps or springs often occur in wet areas within non-native grasslands or meadows. There is a small area of fresh emergent wetland along the edge of the

Cow Creek Forebay. Freshwater marshes occur along the edges of lakes, ponds, and creeks located at lower elevations of the Kilarc Cow and Cow Creek forebays where the water becomes slow flowing, warm, and shallow. The water often contains a low level of dissolved oxygen. This zone supports emergent vegetation and algae.

Fresh emergent wetlands are among the most productive wildlife habitats in California and are important to wildlife for water and food. Common wildlife species in this habitat include Pacific treefrog, western aquatic garter snake (*Thamnophis couchii*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), red-winged blackbird (*Agelaius phoeniceus*), ornate shrew (*Sorex ornatus*), deer mouse, and muskrat (*Ondatra zibethicus*).

2.2.9 Riverine

This habitat occurs up to 8,000 feet throughout California (Mayer and Laudenslayer, 1988). The riverine habitat in the Project Area consists of the Old and South Cow Creeks from their respective diversions downstream to the powerhouses.

Riverine habitat can provide resting and escape cover for waterfowl. Several gulls and terns forage in open water. Near-shore waters provide food for waterfowl, herons, shorebirds, and belted kingfisher (*Ceryle alcyon*). Many species of insectivores (e.g., swallows, swifts, and flycatchers) forage over the water.

2.2.10 Lacustrine

This habitat type (Water in Figures 3 and 4) occurs throughout California at virtually all elevations and in all regions, although less abundant in arid regions. Lacustrine habitats are inland depressions or dammed riverine channels containing standing water, including both the near-shore (limnetic) and deepwater habitat (littoral). Lacustrine habitat in the Project Area consists of the Kilarc and Cow Creek forebays.

Lacustrine habitat is used by 18 mammal, 101 species of bird, nine reptile, and 22 amphibian species. Open water habitat provides resting and foraging habitat for several waterbirds, including the American coot (*Fulica americana*), common merganser (*Mergus merganser*), and great blue heron. The forebays may provide foraging habitat for the osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), and peregrine falcon (*Falco peregrinus*). The perimeter of the Kilarc Cow and Cow Creek Forebays may provide basking areas for amphibians and aquatic reptiles. Other characteristic species found in open water habitats include the eared grebe (*Podiceps nigricollis*), pied-billed grebe (*Podilymbus podiceps*), common goldeneye (*Bucephala clangula*), cliff swallow (*Petrochelidon pyrrhonota*), tree-swallow (*Tachycineta bicolor*), and several bat species (Mayer and Laudenslayer, 1988). Open water also provides a water source for many common mammal species.

2.2.11 Urban

The urban habitat (Developed in Figure 4) occurs throughout California and is the result of modifying presettlement vegetation and introducing new species. This habitat includes vegetated

landscaped areas, as well as human-made structures such as residential, commercial, and industrial areas (Mayer and Laudenslayer, 1988). Urban habitat occurs around facilities onsite, such as the Kilarc Powerhouse and Kilarc dwelling.

Several species of wildlife have adapted to this habitat. These species include rock dove (*Columba livia*), western scrub jay, northern mockingbird (*Mimus ploylottos*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), opossum (*Didelphis marsupialis*), raccoon, and striped skunk (*Mephitis mephitis*).

2.3 SPECIAL-STATUS WILDLIFE SPECIES

Figures 5 and 6 depict locations of special-status wildlife occurrences within a five-mile radius of the Project Area based on the CNDDB (CDFG 2003). Table 1 includes a list of special-status wildlife species, including common and scientific names, state and/or federal status, habitat requirements, and potential for occurrence in the Project Area based on the CNDDB and USFWS species list (USFWS, 2003). Special-status wildlife species that were determined not to be present, and/or for which appropriate habitat is not present in the Project Area, are not discussed further in this document. Special-status species that are known to occur or for which appropriate habitat is present in the Project Area are discussed in the following sections: Invertebrates, Amphibians and Reptiles, Birds, and Mammals. Information on distribution and habitat requirements included in this report is adapted from *California's Wildlife Volumes I-III* (Zeiner et al. 1988; 1990[a]; and 1990[b]) unless otherwise noted.

Special-status wildlife species include species federally listed as endangered or threatened (FE/FT), federal candidate species for listing (FC), species protected by the State of California as endangered or threatened (SE/ST), California species of special concern (CSC), California fully protected species (CFP), and other species identified as special animals (SA) by CDFG. Species recently delisted (FD) from federal special-status listing are also included.

2.3.1 Invertebrates

The CNDDB and USFWS species list indicated that five special-status invertebrate species could potentially occur in the Project Area. Based on the habitats detected in the Project Area during the reconnaissance-level wildlife survey, the valley elderberry longhorn beetle (*Desmocerus californicus dimorphis*) is the only invertebrate for which habitat is present in the Project Area.

2.3.1.1 Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) – FT

This species is associated with various species of elderberry (*Sambucus* spp.). The valley elderberry longhorn beetle (VELB) generally occurs along waterways and in floodplains that support remnant stands of riparian vegetation. Both larvae and adult VELB feed on elderberries. Larvae feed internally on the pith of the trunk and larger branches, while adult beetles appear to feed externally on elderberry flowers and foliage. Prior to metamorphosing into the adult life stage, VELB larvae chew an exit hole in the elderberry trunk, through which the adult beetle later exits the plant (CDFG, 2003).

OCCURRENCE IN THE PROJECT AREA

Elderberry surveys were conducted to determine the extent of potential habitat for the VELB within the Project Area. Elderberry shrubs were found at two locations in the Cow Project Area (Figure 1 Map A and B). One elderberry was observed on the south side of the canal, on the side opposite the canal trail. This elderberry had three stems: one less than one inch in diameter, one that was approximately one inch in diameter, and one that was approximately 1.5 inches in diameter. A second elderberry was observed near the trail on the steep, inaccessible slope between the canal and South Cow Creek. This elderberry had one stem, less than one inch in diameter. No holes were observed on either plant in the parts of the stems that were visible from the trail. Appropriate habitat is present in the two elderberry shrubs observed within the Project Area although no beetles were observed on these plants. There are no known occurrences of VELB within a 5-mile radius of the Project Area (CDFG, 2003).

2.3.2 Amphibian and Reptile Species

The CNDDB and USFWS species list indicated that four special-status amphibians and two reptiles could potentially occur in the Project Area. These species are listed in Table 1. Based on habitats present in the Project Area, only two of the amphibians and one of the reptiles have the potential to occur in the Project Area. These include California red-legged frog (*Rana aurora draytonii*), foothill yellow-legged frog (*Rana boylii*), and northwestern pond turtle (*Actinemys marmorata marmorata*). Each of these species is described briefly below.

2.3.2.1 California Red-Legged Frog (*Rana aurora draytonii*) – FT

California red-legged frogs spend most of their time in or near water. However, they can move considerable distances (up to a mile) within a drainage and move through terrestrial habitats. Most documented California red-legged frog sightings have occurred at elevations below 3,500 feet, although historical sightings were noted up to 5,200 feet (USFWS, 2002).

California red-legged frogs breed during the winter and early spring between late November and April. Eggs are laid in a loose, baseball-sized mass (500 to 2,000 eggs) attached to submerged vegetation in ponds or backwater pools in creeks. Breeding occurs in coastal lagoons, marshes, springs, permanent and semi-permanent ponds, ponded and backwater portions of streams, as well as artificial impoundments (such as dammed sites and stock ponds). Suitable spawning pools are almost always 0.7 to 1.0 meters in depth for at least 2.0 meters from the wetted edge, with dense bordering marshland/riparian vegetation (cattails [*Typha*], sedges [*Juncus*], tules [*Scirpus*], and willows [*Salix*]). Floating vegetation (*Potamogeton, Ludwigia*) is often present, and it provides especially favorable basking habitat for adult frogs and foraging cover for tadpoles. Eggs hatch in six to 14 days. Tadpoles remain in these habitats until metamorphosis, which generally occurs within three and a half to seven months. Juveniles are found in slow moving, shallow riffles in creeks or along margins of ponds.

In the summer, larger frogs are found close to spawning ponds or along deep, quiet pools in creeks with vegetative or other cover such as emergent vegetation, undercut banks, or rootwads, as well as in burrows in or above the banks. Bordering vegetation may be completely absent from such “summer habitat,” but secure shelters such as root masses are always available. California red-legged frogs are presumed to disperse along waterways such as streams and lake

borders, but little information is available on the timing or extent of that activity. California red-legged frogs spawn in ephemeral ponds, an advantage because such waterways to not support predatory fish. Springs and seeps that may not provide breeding habitat may provide habitat for foraging or refugia.

OCCURRENCE IN THE PROJECT AREA

The historical range of California red-legged frog included Shasta County. Shasta County is not included in the current range of the frog, although Shasta County occurs within the boundaries of the California red-legged frog Recovery Unit 1, Sierra Nevada Foothills and Central Valley, and Recovery Unit 2, North Coast Range Foothills and Western Sacramento River Valley (USFWS, 2002). The Project Area is located approximately 30 miles northeast of USFWS designated Core Area No. 8, Cottonwood Creek, for this species. The database search yielded no records of California red-legged frogs. The Licensee has no records of California red-legged frog surveys conducted within their Project boundaries prior to this study.

No habitat deemed capable of supporting California red-legged frog spawning activity was found within the Project Area during the Site Assessment, but several ponds on private land within the Site Assessment Area may be suitable. Potential "summer habitat" exists along Hooten Gulch within 100 meters of its confluence with South Cow Creek, but only if confirmed spawning habitat exists within one mile of Hooten Gulch (ENTRIX, 2004).

2.3.2.2 Foothill Yellow-Legged Frog (*Rana boylii*) – CSC

Foothill yellow-legged frogs inhabit foothill and mountain streams from sea level to about 6,000 feet elevation in the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles County, in most of northern California west of the Cascade crest, and along the western flank of the Sierra south to Kern County. Most records are below 3,500 feet. The foothill yellow-legged frog is found in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types (Zeiner et al, 1988).

Home ranges are small, but these frogs may move several hundred meters to spawning habitat. Adult frogs congregate at suitable spawning sites as spring runoff declines, when water temperatures reach 12 to 15ºC, usually any time from mid-March to May, depending on local water conditions. The breeding season at any locality is usually about two weeks for most populations. Spawning frogs favor low to moderately steep gradient streams (0 to 8 degrees). Females deposit eggs in shallow edgewater areas with water velocities less than 10 cm/sec (PG&E 2002). Egg masses are often attached to the downstream sides of cobbles and boulders, or to gravel, wood, or other materials. Eggs hatch in approximately five days. Tadpoles transform in three to four months and stay for a time in spawning habitat but eventually disperse. They feed on diatoms or algae on the surface of the substrate (Stebbins, 1951). Tadpoles favor calm, shallow water. Juvenile and adult frogs bask on midstream boulders or in terrestrial sites along riffles, cascades, main channel pools, and plunge-pools, often in dappled sunlight near low overhanging vegetation. They are relatively strong swimmers and prefer faster water habitat than do other foothill frog species such as the bullfrog (*Rana catesbeiana*) or the California red-legged frog. Adults generally avoid deep shade.

OCCURRENCE IN THE PROJECT AREA

Foothill yellow-legged frog adults and juveniles were found in South Cow Creek at the downstream end of the bypass reach. They were also found in the downstream portion of Hooten Gulch where the Powerhouse tailrace augments summer flow. They were also observed in Hooten Gulch, upstream of the Powerhouse, during general wildlife surveys. Bullfrog tadpoles were observed in the downstream portion of the South Cow bypass reach. Upstream of the reaches where foothill yellow-legged frogs were found was a steeper, boulder/cobble dominated creek, with mostly fast water and little edgewater. Suitable breeding habitat was not observed in this area.

Preliminary habitat mapping data and ground surveys suggest that Old Cow Creek contains little suitable spawning habitat. Frog colonization could be limited further by insufficient forage or basking sites. It is possible that Old Cow Creek has only small, isolated spots with sufficient sunlight and forage for foothill yellow-legged frogs. No foothill yellow-legged frog was found in the Old Cow Creek bypass within the 5,157 meters surveyed in the lower, middle and upper reaches.

Mill Creek is a small, heavily vegetated stream that offers little or no foothill yellow-legged frog basking, spawning, or tadpole habitat. Most of North Canyon Creek was dry, and the downstream portion that enters Old Cow Creek was also smaller and heavily shaded. The diversion canals had swiftly flowing water and no habitat complexity and are not likely to provide primary habitat.

2.3.2.3 Northwestern Pond Turtle (*Actinemys marmorata marmorata*) – CSC

The western pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest, from sea level to 6,000 feet. The northwestern pond turtle requires basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. Three to 11 eggs are laid from March to August depending on local conditions. The incubation period for eggs ranges from 73 to 80 days. Sexual maturity is attained in about eight years (Zeiner et al., 1988).

OCCURRENCE IN THE PROJECT AREA

A northwestern pond turtle was observed in Hooten Gulch during the focused amphibian surveys (Figure 1 Map H and I). Appropriate habitat is also present in the Kilarc and Cow Creek forebays, upstream from the diversion on South Cow Creek, and in Old Cow Creek. There is one CNDDB occurrence of northwestern pond turtle approximately two miles from the Project Area (CDFG, 2003).

2.3.3 Bird Species

The CNDDB and USFWS species list indicated that 29 special-status avian species could potentially occur in the Project Area. These species are listed in Table 1. Based on reconnaissance-level wildlife surveys and habitats present within the Project Area, only 17 of these species are known or could potentially occur within the Project Area. These include osprey, white-tailed kite (*Elanus leucurus)*, bald eagle, sharp-shinned hawk (*Accipiter striatus*), northern

goshawk (*A. gentilis*), Swainson's hawk (*Buteo swainsoni*), golden eagle (*Aquila chrysaetos*), American peregrine falcon, western burrowing owl (*Athene cunicularia hypugaea*), northern spotted owl (*Strix occidentalis caurina*), Vaux's swift (*Chaetura vauxi)*, rufous hummingbird (*Selasphorus rufus*), Lewis' woodpecker (*Melanerpes lewis*), willow flycatcher (*Empidonax traillii*), loggerhead shrike (*Lanius ludovicianus)*, hermit warbler (*Dendroica occidentalis*), and Lawrence's goldfinch *(carduelis lawrencei)*.

2.3.3.1 Osprey (*Pandion haliaetus*) - CSC (Nesting)

The osprey occurs along seacoasts, lakes, and rivers, primarily in ponderosa pine and mixed conifer habitats. It preys mostly on fish at or below the water surface, but will also take small mammals, birds, reptiles, amphibians, and invertebrates. Large snags and open trees near large, clear, open waters are required for foraging. The osprey typically swoops from flight, hover, or perch to catch prey. The osprey breeds primarily in northern California and typically build nests in large conifers, but may also use artificial platforms as nesting areas. The breeding season is from March to September. Nests are built on platforms of sticks at the top of large snags, dead-topped trees, on cliffs, or on human-made structures. A nest may be as much as 250 feet above ground and is usually within 1,000 feet of fish-producing water. Osprey need tall, open-branched "pilot trees" nearby for landing before approaching the nest and for use by young for flight practice. Typically, this species migrates in October south along the coast and the western slope of the Sierra Nevada to Central and South America.

OCCURRENCE IN THE PROJECT AREA

No osprey or osprey nests were observed in the Project Area during focused raptor surveys. Ospreys were observed during other surveys for the Project on two occasions: an adult was observed foraging at the Kilarc Forebay in June 2003; and an adult was observed in flight over the Kilarc Forebay in September 2003. Suitable foraging habitat also occurs at the Cow Creek Forebay and suitable nesting habitat occurs at the Kilarc Forebay. There are no other known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.2 White-Tailed Kite (*Elanus leucurus*) – CFP

This is a common to uncommon, yearlong resident in coastal and valley lowlands, and is rarely found away from agricultural areas. This species inhabits herbaceous and open stages of most habitats in cismontane California, and uses herbaceous lowlands with variable tree growth and dense populations of voles. Substantial groves of dense, broad-leaved deciduous trees are used for nesting and roosting. The white-tailed kite forages in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. White-tailed kite eats small rodents, especially the California vole as well as birds, snakes, lizards, frogs and large insects. Nests are built of twigs and sticks with an inner layer of grass or leaves in trees that are usually located on habitat edges. Nest-building occurs January through August (Dunk 1995). Egg laying begins in February and probably peaks in March and April. Peak fledging probably occurs in May and June with most fledging complete by October (Erichsen, 1995). Clutch size is most commonly four (Zeiner et al. 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may use the riparian trees in the Project Area as nest sites, and may forage on the uplands within the Project Area. No white-tailed kites were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.3 Bald Eagle (*Haliaeetus leucocephalus*) – FD (2007), SE, CFP

Formerly listed as FT under the ESA, the bald eagle was delisted in 2007 (Federal Register, 2007). However, this species will continue to be federally protected under the Bald and Golden Eagle Protection Act and federal Migratory Bird Treaty Act. This eagle also continues to be protected as endangered under the California Endangered Species Act. This species is a permanent resident and uncommon winter migrant in California. It is now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties. About half of the wintering population is in the Klamath Basin. The bald eagle is fairly common as a local winter migrant at a few favored inland waters in southern California. Largest numbers occur at Big Bear Lake, Cachuma Lake, Lake Matthews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River. Bald eagle is typically found in coniferous forest habitats with large, old growth trees near permanent water sources such as lakes, rivers, or ocean shorelines. It requires large bodies of water with abundant fish and adjacent snags or other perches for foraging. Bald eagle preys mainly on fish and occasionally on small mammals or birds, by swooping from a perch or from mid-flight. Nests are found in large, old growth, or dominant trees, especially ponderosa pine with an open branchwork, usually 50 to 200 feet above the ground. It breeds February through July, with peak activity from March to June. Clutch size is usually two. Incubation usually lasts 34 to 36 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

No bald eagles or eagle nests were observed in the Project Area during focused raptor surveys, although the bald eagle is known to occur at Kilarc Forebay (PG&E, pers. com.). Adult bald eagles have been observed roosting on a snag adjacent to the forebay. Juveniles have also been observed nearby. The presence of juvenile eagles indicates that the species may also nest nearby. There are no other known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.4 Sharp-Shinned Hawk (*Accipiter striatus*) – CSC (Nesting)

The sharp-shinned hawk is a fairly common migrant and winter resident throughout California, and is found in a variety of habitats, but prefers riparian habitats and north facing slopes. This hawk eats mostly small birds, but also small mammals, insects, reptiles, and amphibians. It usually nests in dense and small-tree coniferous stands, that are cool, moist, well shaded, with little ground cover, and near water. Nests are built on a platform or cup in dense foliage against the trunk or in the main crotch of a tree. It breeds from April through August with a peak from late May to July. Clutch size averages four to five eggs. Incubation lasts 34 to 35 days. Fledging occurs at about 60 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may forage or nest in riparian or mixed conifer forest in the Project Area. No sharp-shinned hawks were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.5 Northern Goshawk (*Accipiter gentilis*) – CSC

Northern goshawk inhabits middle to high elevation, mature, dense coniferous forests. During winter, it occurs in the foothills, in northern deserts in pinyon-juniper woodland, and in low elevation riparian habitats. This species breeds in the North Coast Ranges through the Sierra Nevada, Klamath, Cascade, and Warner mountains and possibly in the Mount Pinos, San Jacinto, San Bernardino, and White mountains. It remains yearlong in breeding areas as a scarce to uncommon resident. Optimal habitat contains trees for nesting, a closed canopy of greater than 50 percent for protection and thermal cover, and open spaces allowing maneuverability. It prefers middle and higher elevations and mature, dense conifer forests and feeds mostly on birds, using snags and dead treetops as observation platforms. Northern goshawks usually nest on north slopes, near water, in the densest parts of stands, but close to openings. Breeding occurs from April to June. Average clutch size is three eggs. Incubation lasts 36 to 41 days. Young usually fledge by 45 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may forage in riparian, blue oak-foothill pine woodland, or mixed conifer habitat in the Project Area and may also breed in forest habitats in the Project Area. No northern goshawks were observed during Project surveys. There is one CNDDB record for this species approximately five miles east of the Project Area (CDFG, 2003).

2.3.3.6 Swainson's Hawk (*Buteo swainsoni*) – ST

Swainson's hawk is restricted to portions of the Central Valley and Great Basin regions where suitable nesting and foraging habitat is still available. Central Valley populations are centered in Sacramento, San Joaquin, and Yolo counties. Over 85 percent of Swainson's hawk territories in the Central Valley are in riparian systems adjacent to suitable foraging habitats. Swainson's hawk often nests peripherally to riparian systems of the valley as well as utilizing lone trees or groves of trees in agricultural fields. Valley oak, Fremont cottonwood, walnut, and large willow with an average height of about 58 feet, and ranging from 41 to 82 feet, are the most commonly used nest trees in the Central Valley. Swainson's hawk requires large, open grasslands with abundant prey and suitable nest trees. Suitable foraging areas include native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. This species may use the riparian trees in the Project Area as nest sites, and they may forage on the uplands. Breeding occurs late March to late August, with peak activity late May through July. Clutch size is two to four eggs (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

Suitable foraging and nesting habitat for this species occurs within grassland (foraging) and woodland (nesting) habitats of the Project Area, particularly in the southern portion of the South

Cow Creek Project vicinity. No Swainson's hawks were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.7 Golden Eagle (*Aquila chrysaetos*) – CSC (Nesting and Wintering), CFP

This species is an uncommon permanent resident and migrant throughout California up to 11,500 feet, except the center of the Central Valley. It is more common in southern than in northern California. Typical habitat includes rolling foothills, mountain areas, sage-juniper flats, and desert. It nests on cliffs of all heights and in large trees in open areas in rugged, open habitats with canyons and escarpments. Large platform nests are built of sticks, twigs, and greenery. The golden eagle eats mostly rabbits and rodents, but also takes other mammals, birds, reptiles, and some carrion. Breeding occurs from late January through August with a peak from March through July. Clutch size averages two eggs, which are laid early February to mid-May. Incubation lasts 43 to 45 days, and the nestling period usually lasts 65 to 70 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

No golden eagle or golden eagle nests were observed in the Project Area during focused raptor surveys. Golden eagles were observed during other surveys for the Project on two occasions: an adult was observed in flight over the Kilarc Forebay on June 17, 2003, and on June 18, 2003, two adults were observed at the same location. This species may breed or forage in oak woodland, or mixed conifer forest and additionally forage in grasslands in the Project Area. There are no other known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.8 American Peregrine Falcon (*Falco peregrinus americana*) – FD (1999), SE, CFP

This species is a very uncommon breeding resident and uncommon migrant. Active nesting sites are known along the coast north of Santa Barbara, in the Sierra Nevada, and in other mountains of northern California. In winter, it is found inland throughout the Central Valley and occasionally on the Channel Islands. Migrants occur along the coast and in the western Sierra Nevada in spring and fall. Breeding mostly occurs in woodland, forest, and coastal habitats near wetlands, lakes, rivers, or other water or on high cliffs, banks, dunes, and mounds. Riparian areas and coastal and inland wetlands are important habitats yearlong, especially in non-breeding seasons. The nest is a scrape on a depression or ledge in an open site. The American peregrine falcon will also nest on human-made structures and occasionally uses tree or snag cavities or old nests of other raptors. It feeds on a variety of birds and occasionally takes mammals, insects, and fish. Breeding occurs from early March to late August. Clutch size averages three to four eggs. Incubation lasts about 32 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

No American peregrine falcon or falcon nests were observed in the Project Area during focused raptor surveys. There is documented nesting of American peregrine falcon in the Cow Creek watershed (Watershed Assessment 2001). This species may forage in or near Kilarc or Cow Creek forebays and in stream habitat in the Project Area. There are no other known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.9 Western Burrowing Owl (*Athene cunicularia hypugaea*) – CSC

This species is a yearlong resident of open, dry grassland and desert habitats and in grass, forb, and open shrub stages of pinyon-juniper and ponderosa pine habitats up to 5,300 feet. It was formerly common in appropriate habitats throughout the state, excluding the humid northwest coastal forests and high mountains. It usually nests in old burrows of ground squirrels or other small mammals, but may dig its own burrow in soft soil. The nest chamber is lined with excrement, pellets, debris, grass, and feathers. Pipes, culverts, and nest boxes are used where burrows are scarce. Breeding occurs from March through August, with peak activity in April and May. Clutch size averages five to six eggs. Young emerge from the burrow at about two weeks and fledge by about four weeks. Burrowing owls are semi-colonial (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

Suitable nesting, burrowing, and foraging habitat exists within grasslands in the Project Area. No burrowing owls were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.10 Northern Spotted Owl (*Strix occidentalis caurina*) – FT

The northern spotted owl occurs in dense, old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level up to approximately 7,600 feet. It prefers large trees and high canopy cover for nesting and foraging areas. Nesting habitat contains a dense canopy cover of greater than 70 percent with medium to large trees and a multi-storied structure. Nests are located in cavities or broken treetops. This species breeds from early March through June, with a peak in April and May. It generally has one brood per year, with a clutch size of one to four, with an average of two (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

The northern spotted owl may forage and breed in mixed conifer and blue oak-foothill pine woodland in the Project Area. No northern spotted owls were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.11 Vaux's Swift (*Chaetura vauxi*) – CSC

Vaux's swift is a summer resident of northern California, breeding fairly commonly in the Coast Range, in the Sierra Nevada, and possibly in the Cascade Range. It prefers redwood and Douglas fir habitats with nest-sites in large hollow trees and snags, especially tall, burned-out stubs. It is a fairly common migrant throughout most of the state in April, May, August, and September. Vaux's swift feeds high in the air over most terrain and habitats and also feed commonly at lower levels in forest openings, above burns, and especially above rivers and lakes. It nests in redwood, Douglas-fir, and occasionally other coniferous forests. The nest is typically built on the vertical inner wall of a large, hollow tree or snag, especially tall stubs charred by fire. This species enters the nesting tree from the top or through cracks in the side, and almost always locates the nest near the bottom of a cavity, regardless of the height of the entrance. The Vaux's swift occasionally nests in chimneys and buildings. Breeding occurs from early May to mid-August. Clutch size is three to seven eggs, and incubation lasts 18 to 20 days. The altricial

young[1] are tended by both parents and leave the nesting tree at about 28 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may forage and breed in mixed conifer forest near streams and forebays in the Project Area. No Vaux's swifts were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.12 Rufous Hummingbird (*Selasphorus rufus*) – SA

The rufous hummingbird uses a wide variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, riparian areas, open woodlands, chaparral, mountain meadows, and various chaparral habitats during migration. This species arrives in California in February and migrates north through lowlands and foothills until mid-April and early May. Postbreeder males begin to migrate south in late June and early July, with most individuals gone by mid-September, but a few regularly overwinter, particularly in southern California. In California, breeding only occurs in the Trinity Alps, in Humboldt County. Breeding season extends from late April through July, with an average of two eggs laid. Incubation period is unknown, but probably close to other Selasphorus species (16 to 22 days for Allen's hummingbird [*Selasphorus rufus*]). Young are altricial and are tended by females until fledging occurs at 22 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may forage or breed in oak woodland and mixed conifer habitats in the Project Area. No rufous hummingbirds were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.13 Lewis' Woodpecker (*Melanerpes lewis*) – SA

The Lewis' woodpecker is an uncommon, local winter resident occurring in open oak savannahs, broken deciduous and coniferous habitats. It is found along the eastern slopes of the Coast Ranges south to San Luis Obispo County and also winters in the Central Valley, Modoc Plateau, and the Transverse and other ranges in southern California. It breeds locally along eastern slopes of the Coast Ranges and in the Sierra Nevada, Warner Mountains, Klamath Mountains, and in the Cascade Range. It excavates a nest cavity in a snag or dead part of a live tree, usually five to 80 feet above ground. It usually nests in sycamore, cottonwood, oak, or conifer trees. It may nest near other pairs. Breeding occurs from early May through July, with a peak in late May and early June. Clutch size is four to nine, and incubation lasts 13 to 14 days, and fledging occurs at 28 to 34 days. The male incubates and broods at night and the female during the day. The pair bond may be permanent (Zeiner et al., 1990[a]).

[1] Altricial young are incapable of moving around soon after hatching, can not depart from the nest, and are fed by the parents. All passerines are altricial.

OCCURRENCE IN THE PROJECT AREA

This species was observed downstream from the Project Area along South Cow Creek and may forage or breed in oak woodland and mixed conifer habitats in the Project Area. There are no other known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.14 Willow Flycatcher (*Empidonax traillii brewsteri*) – SE (Nesting; All Subspecies)

The little willow flycatcher is a rare to locally uncommon, summer resident in wet meadow and montane riparian habitats from 2,000 to 8,000 feet in the Sierra Nevada and Cascade Range. It most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows. It is a common spring (mid-May to early June) and fall (mid-August to early September) migrant at lower elevations, primarily in riparian habitats throughout the state exclusive of the North Coast. Nests are an open cup shape, placed in an upright fork of a willow or other shrub, or occasionally on a horizontal limb, at a height of one to ten feet. Peak egg laying occurs in June. Incubation lasts 12 to 13 days, and clutch size averages three to four eggs. It is probably single-brooded. Both sexes care for altricial young. Fledging age is 13 to 14 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This subspecies may forage in riparian habitats in the Project Area and nesting and marginal breeding habitat occurs within reaches of South Cow Creek. No willow flycatchers were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.15 Loggerhead Shrike (*Lanius ludovicianus*) – CSC

The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Its highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. It occurs only rarely in heavily urbanized areas, but is often found in open cropland. It builds its nest on stable branch in densely-foliaged shrub or tree, usually well-concealed. Nest height is 1 to 50 feet above ground. It lays eggs from March into May, and young become independent in July or August. The loggerhead shrike is a monogamous, solitary nester with a clutch size of four to eight. Incubation lasts 14 to 15 days. Altricial young are tended by both parents and leave the nest at 18 to 19 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may forage in oak woodlands or riparian habitat in the Project Area. This species may also breed in oak woodlands in the Project Area. No loggerhead shrikes were observed during Project surveys, and there are no known occurrences within a 5-mile radius of the Project Area (CDFG, 2003).

2.3.3.16 Hermit Warbler (*Dendroica occidentalis*) – SA

The hermit warbler is a fairly common to common, summer visitor and migrant and a rare but regular visitor in winter. It breeds in major mountain ranges from the San Gabriel and San Bernardino Mountains northward, excluding coastal ranges south of Santa Cruz County. It is a common spring and fall migrant in mountains, an uncommon to fairly common visitor in lowlands in spring, and a rare to uncommon migrant in the fall. It breeds in mature ponderosa pine, montane hardwood-conifer, mixed conifer, Douglas fir, redwood, red fir, and Jeffrey pine habitats. In migration and winter, it also occurs in valley foothill hardwood habitat and in stands of planted pines. It builds its nest 25-125 ft above ground in a conifer. The nest is often well out on a horizontal branch. It breeds from late April into early July with peak activity in June, and lays three to five eggs (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may breed in mixed conifer forests and may forage in mixed conifer and oak-pine woodland in the Project Area. No hermit warblers were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.3.17 Lawrence's Goldfinch (*Carduelis lawrencei*) – SA

The Lawrence's goldfinch is highly erratic and localized in occurrence. It is rather common along the western edge of southern deserts, fairly common but erratic from year to year in Santa Clara County, and on the coastal slope from Monterey County south, and uncommon in foothills surrounding the Central Valley. It is migratory and present mostly from April through September. It breeds in open oak or other arid woodlands and chaparral, near water. It rarely breeds along the immediate coast. Typical habitats include valley foothill hardwood, valley foothill hardwood-conifer, and, in southern California, desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. Nearby herbaceous habitats are often used for feeding. It winters erratically in southern coastal lowlands and along the Colorado River Valley. A small number also winter in northern California. It builds its nest in dense foliage of a tree or shrub and prefers to nest in an oak, but also uses cypress or cedar, riparian thickets, and other species. The breeding season begins in late March or early April. Lawrence's goldfinch is a monogamous breeder and lays three to six eggs per clutch. Incubation lasts 12 to 13 days. Altricial young are tended by both parents and leave the nest at about 11 days (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may forage and breed in oak woodland or blue oak-foothill pine woodlands near streams or forebays in the Project Area. No Lawrence's goldfinches were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4 Mammals

The CNDDB (CDFG 2003) and USFWS species list (USFWS 2003) indicate that six special-status mammal species could potentially occur in the Project Area. These species are listed in Table 1. Only four of these species, spotted bat (*euderma maculatum*), pale Townsend's big-

eared bat (*Corynorhinus townsendii pallescens)*, Pacific fisher (*Martes pennanti pacifica*), and ringtail (*Bassariscus astutus*) could potentially occur in the Project Area based on the habitats present. These species are discussed further below.

2.3.4.1 Yuma Myotis Bat (*Myotis yumanensis*)

Yuma myotis is a year-round resident in most of California at lower elevations in a wide variety of habitats from coast to mid-elevation. It is very tolerant of human habitation and survives in urbanized environments. Day roosts are in buildings, trees, mines, caves, bridges, and rock crevices. Night roosts are in buildings, bridges, and other man-made structures. It is presumed to be non-migratory and hibernates in winter, but no large winter aggregations have been reported. A single young is born per year between June and July. Females form large maternity colonies of 200 to several thousand individuals. Males roost singly or in small groups. The Yuma myotis feeds on emergent aquatic insects, such as caddisflies and midges. Foraging occurs directly over the surface of still water ponds, reservoirs, or pools in streams and rivers (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area in Project facilities including powerhouses and tunnels. No Yuma myotis bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.2 Long-Eared Myotis Bat (*Myotis evotis*)

The long-eared myotis is a year-round resident in California, occurring in mixed hardwood/conifer forest and montane conifer forest in northern California, and in pinyon-juniper, mesquite scrub, and pine/oak woodland in southern California. Its distribution is broad, but it is not usually found in large numbers. It typically roosts singly or in small groups in hollow trees, under exfoliating bark, crevices in rock outcrops, and occasionally in mines, caves, and buildings during the day. Roost sites in these structures tend to be cryptic (i.e., in crevices and fissures). Night roosts are in caves, mines, bridges, building, and rock crevices. It is presumed to be non-migratory, and to hibernate locally in caves. A single young is born per year between June and July. Females may form small maternity colonies with less than 40 individuals. The long-eared myotis feeds on moths, flies, and small beetles. It forages along rivers and streams, over ponds, and within cluttered forests (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area on Project facilities including powerhouses and tunnels. It may also occur in snags, tree hollows, or beneath tree bark. No long-eared myotis bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.3 Fringed Myotis Bat (*Myotis thysanodes*)

The fringed myotis is found in western North America from British Columbia to Veracruz and Chiapas. Over most of its range, this species occurs at mid-elevations, but it has been found at high elevations in New Mexico and was found in the Sequoia National Forest above 6,000 feet.

Along the west coast, this bat is found at low elevations and is associated with redwood forests. Maternity colonies are large, up to 300 individuals and are in caves, mines, and buildings. Males roost separate from the maternity colonies. Night roosts are in similar features. Only one young per year is common. Little is known of the reproductive cycle of this species. This species primarily eats beetles (73% of its diet), moths, flies, leafhoppers, lacewings, crickets, and harvestmen (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area on Project facilities including powerhouses and tunnels. No fringed myotis bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.4 Long-Legged Myotis Bat (*Myotis volans*)

Long-legged myotis inhabits western North America from southeast Alaska to Central Mexico, and is found in an elevational range from sea level to 12,000 meters. It is primarily a coniferous forest bat although it may also be found in riparian and desert habitats. Maternity colonies can include up to 300 individuals. Maternity roosts are found in buildings, rock crevices, and under exfoliating bark. Males roost singly or in small numbers in rock crevices, buildings, and under tree bark. Night roosts are under bridges, in caves and mines, and in buildings. In the northern portion of their range, the species commonly hibernates. It is unknown whether this bat migrates in the portion of its range where winters are less severe. Mating takes place in the fall and sperm is stored over winter. Ovulation and fertilization takes place from March to May and parturition occurs from May to August. There is extensive variation in the timing of reproductive activity in this species. The species feeds primarily on moths (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area on Project facilities including powerhouses and tunnels. It may also utilize tree bark for roosting. No long-legged myotis bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.5 Small-Footed Myotis Bat (*Myotis ciliolabrum*)

The small-footed myotis ranges from British Columbia and Saskatchewan to the Southwestern United States and prefers areas where it associates with cliffs, talus fields, and steep riverbanks. Roosts tend to be in rock crevices, cliff faces, and in talus formations. Maternity roosts are found in similar sites and have been observed in buildings. Mating takes place in the fall. Usually one young is born in the summer (June to July), although twins are known to occur. Lactating females have been observed from June through August. The small-footed myotis forages over water, rock formations and along cliffs. The diet of this species consists of moths, flies, beetles, and bugs (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area on Project facilities including powerhouses and tunnels. No small-footed myotis bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.6 Spotted Bat (*Euderma maculatum*) – CSC

This species, considered to be one of North America's rarest mammals, has been found at a small number of localities, mostly in foothills, mountains, and desert regions of southern California. Little is known about the species in California. Habitats occupied range from arid deserts and grasslands through mixed conifer forests. The highest recorded elevation is 10,600 feet in New Mexico. Apparently the spotted bat prefers to roost in rock crevices and on cliffs, but is occasionally found in caves and buildings as well. Mating occurs in autumn, and most births occur before mid-June. One young is produced per year and is tended until August. It feeds over water and along marshes. Moths are their principal food (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area on Project facilities including powerhouses and tunnels. No spotted bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.7 Pale Townsend's Big-Eared Bat (*Corynorhinus townsendii pallescens*) – CSC

This species is found throughout California, but the details of its distribution are not well known. It is found in all but subalpine and alpine habitats and may be found at any season throughout its range. It is most abundant in mesic habitats and requires caves, mines, tunnels, buildings, or other human-made structures for roosting. Most mating occurs from November to February, but many females are inseminated before hibernation begins. Sperm is stored until ovulation occurs in spring. Gestation lasts 56 to 100 days, depending on temperature, size of the hibernating cluster, and time in hibernation. Births occur in May and June, peaking in late May. A single litter of one is produced annually. Young are weaned in 6 weeks and fly in 2.5 to 3 weeks after birth. The maternity group begins to break up in August (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species may occur in the Project Area on Project facilities including powerhouses and tunnels. No pale Townsend's big-eared bats were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.4.8 Pacific Fisher (*Martes pennanti pacifica*) – FC, CSC

The Pacific fisher is an uncommon permanent resident of the Sierra Nevada, Cascades, and Klamath Mountains, and also found in a few areas in the North Coast Ranges. Suitable habitat for fishers consists of large areas of mature, dense forest stands with snags and a canopy closure greater than 50 percent. Females breed a few days after parturition and the implantation of the embryo is delayed until the following winter. Post-implantation active growth lasts

approximately 30 days, and young are born February through May. Litter size ranges from one to four. The young remain with the female until late autumn. Males and females become sexually mature in the first or second year (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

This species was not observed during 2003 surveys although fishers are potentially present in the Project Area in mature, dense forest stands with snags, but are likely to avoid Project facilities and other areas with human activity. There are no known occurrences within a 5-mile radius of the Project Area (CDFG, 2003).

2.3.4.9 Ringtail (*Bassariscus astutus*) – CFP

The ringtail is a widely distributed, common to uncommon permanent resident. It occurs in various riparian habitats, and in brush stands of most forest and shrub habitats, at low to middle elevations. Little additional information is available on distribution and relative abundance among habitats. It nests in rock recesses, hollow trees, logs, snags, abandoned burrows, or woodrat nests. Young are born in May and June, with one litter per year. A litter averages three young and ranges from one to five. Gestation lasts 40 to 50 days. Females may drive males away three to four days prior to giving birth (Zeiner et al., 1990[a]).

OCCURRENCE IN THE PROJECT AREA

The ringtail may occur in forested areas in the Project Area. No ringtails were observed during Project surveys, and there are no known occurrences within a five-mile radius of the Project Area (CDFG, 2003).

2.3.5 Game Species

The Project Area supports a variety of local game species throughout the year. These species include mule deer; game birds, such as chukar (*Alectoris chukar*), California quail (*Callipepla californica*), and mourning dove; and mammals, such as western gray squirrel, black-tailed jackrabbit, brush rabbit (*Sylvilagus bachmani*), and desert cottontail rabbit (*S. auduboni*). Mule deer require cover in the form of dense timber and brush stands. This species forages in open, brushy areas or within relatively open timber stands on shrubs, grasses, forbs, and sometimes conifers. In general, upland game bird hunting season is from late summer to the end of winter. Mourning doves and several species of waterfowl are occasional in the Project Area, but their occurrence is far too limited to provide a significant hunting resource.

Section 3: Botanical Resources

This section provides a description of existing botanical resources in the Project Vicinity. The information presented here represents a combination of historical material from a literature review and recent material from field studies conducted from 2003 in support of relicensing the Kilarc-Cow Project. The recent studies were completed in consultation with state and federal agencies responsible for the management of terrestrial resources in the Old Cow Creek and South Cow Creek systems. The results of these studies are presented in the following discussion.

3.1 METHODS

A variety of methods were used to complete the studies of botanical resources. Methods for each study were developed in consultation with resource agencies and were described in the Kilarc-Cow Project Relicensing Final Study Plans (PG&E, 2003). The methods for each study and any modifications are provided in the following sections.

3.1.1 Vegetation Mapping

All occurrences of major plant communities within the immediate Project Vicinity were mapped using available aerial photographs. Visual coverage by foot and vehicle was used to field-check the vegetation/cover type map. Corrections were mapped on prints of aerial photographs during the field surveys. Plant community polygons were digitized as GIS layers. Acreages were derived from these layers. Community descriptions follow the Cow Creek Watershed Assessment (SHN 2001). Any additional types are after Holland (1986).

3.1.2 Special-Status Plant Study

A literature review was conducted to determine what special status plant species could potentially occur within the existing Project Boundaries. Species lists reviewed included those provided by USFWS (2000), the CDFG (2003a), and the California Native Plant Society (CNPS, 2000). For the purposes of this review, special status plant species were defined as those species listed, proposed, or under review as rare, threatened, or endangered by the federal government or the State of California, and those listed as rare or endangered by the CNPS (Table 2).

Surveys were conducted within the entire Project Area that was safely accessible**.** However, most of the steep banks of Old Cow Creek and South Cow Creek, including most of the siphon areas between the canal and Old Cow Creek, were not accessible and were viewed only from above or below.

The survey protocol followed “Guidelines for Assessing Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities” (CDFG, 2000[b]). All surveys were floristic. Multiple surveys were required to search for all potentially present special status plant species during appropriate seasons. A partial list of species observed during the botanical resource studies is provided in Appendix B.

Initial special-status species surveys were scheduled for early May. Vegetation in the Cow Development was at peak bloom during the May 5-10, 2003 survey period, and early season plants were flowering profusely in the lower elevations of the Kilarc Development. Project areas surveyed in May included the roads, diversions, canals, penstock, and powerhouse of the Cow Development, as well as the forebay, the penstock, the powerhouse, the diversion, and parts of the canal of the Kilarc Development. However, cold, late storms dropped snow along much of the canal and the higher elevation areas of the Kilarc Development during the course of the May surveys, including the North and South Canyon reaches and diversions. Plant growth in these areas was just beginning, and walking along much of the canal trail was unsafe. These areas were surveyed for the first time during the June 16-20, 2003 period. Both the Cow and Kilarc Developments were surveyed during the June 16-20, 2003 and the July-August 2003 surveys.

Because of the late precipitation, diverted reaches of Old Cow Creek and South Cow Creek maintained high flows later into the spring than in most years. These steeply-walled reaches could not safely be transversed when the May and June botanical studies were conducted, and all botanical studies on these reaches were conducted in July and August. However, most of the special-status species potentially present in the Project Area are identifiable in the summer. Because the two annual species that might not be identifiable in the summer are found around vernal pools and moist swales, they are not expected to occur in the forest and riparian habitats found along the diverted reaches.

The location of the only special status plant species observed within the Project Area was mapped on a print of an aerial photo**.** Photographs were taken showing diagnostic characteristics of this species. Voucher specimens were to be collected in accordance with government collecting regulations. Because the only special status plant population found consisted of two plants, no specimens were taken.

3.1.3 Riparian Study

Riparian vegetation in the Project Area was surveyed in July 2003 and August 2003. Riparian vegetation in the Project's diverted reaches of Old Cow Creek and South Cow Creek was described, and the distribution and width were mapped. Data collected included the species composition, an estimate of the percent cover, the height of the vegetation, and mortality, if any. Map polygons were a minimum of 0.25 acre in size. Additionally, the surveyors recorded the presence of seedlings and young saplings. Young saplings were observed in most of the reaches.

3.1.4 Elderberry Study

Elderberry surveys were conducted in conjunction with both the special status plant species surveys (May and June 2003), and the riparian surveys (July and August 2003). The locations of all elderberry shrubs found were mapped. The number of stems in each of the following categories was recorded: less than one inch, one to three inches, three to five inches, and greater than five inches in diameter. Diameters were estimated for shrubs that were inaccessible. Observations of the presence or absence of stem holes and beetles were recorded.

3.2 PLANT COMMUNITIES

The Project Area has a diverse flora and a variety of vegetation communities, which are a result of the varied topography, substrate, and elevations found in the watershed. Elevations range from approximately 820 feet at the Cow Creek Powerhouse to 3,900 feet at the North Canyon Creek diversion dam. Vegetation communities present within the Project Area include:

- Sierran mixed coniferous forest
- Ponderosa pine plantation
- Interior live oak woodland
- Blue oak-foothill pine woodland
- White alder riparian forest
- Northern mixed chaparral
- Annual grassland
- Wetlands (freshwater marsh and seeps)
- Developed/disturbed

The following descriptions of vegetation cover types within the Project Area has been derived primarily from the Cow Creek Watershed Assessment (SHN, 2001), and supplemented with descriptions from Holland (1986) for cover types not included in the Cow Creek Watershed Assessment. The higher elevations support coniferous forests and the middle elevations support blue oak-foothill pine woodland and interior live oak forest. The lower elevations support non-native grassland and blue oak-foothill pine woodland.

3.2.1 Sierran Mixed Conifer Forest

Sierran mixed conifer forest is widely distributed within the watershed from 3,000 to 6,000 feet in elevation (SHN, 2001). This mixed conifer forest has replaced much of the area once dominated by ponderosa pine forest. Historically, this vegetation type was confined to moist sites having north-facing or east-facing slopes and well-drained soils. More recently, exclusion of fire has resulted in the conversion of ponderosa pine forests to mixed conifer forests in much of the region. Ponderosa pine, incense cedar, Douglas fir, and white fir are the shared dominant species in the tree overstory. Associated species include black oak.

Sierran mixed conifer forest provides most of the vegetative cover in Old Cow Creek and is also present at the upper end of South Cow Creek. Part of the vegetation in Old Cow Creek and adjacent areas was burned in the Squirrel fire in 2002. At the time of the surveys, these areas were varying mixtures of unaffected and burned vegetation. Vegetation at the northeast side of the Kilarc forebay and along the penstock was also affected by this fire.

3.2.2 Ponderosa Pine Plantation

Areas within the Old Cow Creek vegetation study area were burned in the Fern fire in 1988. These areas were re-planted with ponderosa pine seedlings, which are now young trees. Part of

the replanted area and adjacent areas were burned in the Squirrel fire in 2002. At the time of the surveys, these recently-burned areas were varied mixes of unaffected and burned vegetation.

3.2.3 Interior Live Oak Woodland

Interior live oak woodland is broad-leafed woodland that is usually found on north-facing hillsides below 8,500 feet in elevation (Holland, 1986). This woodland is dominated by interior live oak. Associated species include California bay (*Umbellularia californica*), blue oak, buckeye, and poison oak. Interior live oak woodland was the most extensive cover type in the South Cow Creek vegetation study area, but was not mapped in the Old Cow Creek vegetation study area.

3.2.4 Blue Oak-Foothill Pine Woodland

Blue Oak-Foothill Pine Woodland occurs on foothill slopes in the Project Vicinity from the valley floor to over 3500 feet in elevation depending on aspect. This cover type is dominated by blue oak and foothill pine, but may include various co-dominants (SHN, 2001). Co-dominants include whiteleaf manzanita, interior live oak, and buckbrush.

The understory is now characterized by species typical of non-native annual grassland (see Section 2.2.7). In the absence of fire, a dense shrub community may develop including interior live oak, California buckeye (*Aesculus californica*), whiteleaf manzanita, poison oak (*Toxicodendron diversilobum)*, and California redbud (*Cercis occidentialis*). Drier, harsher sites tend to support chaparral and grass understory, and mesic sites are characterized by locally abundant occurrences of black oak (*Quercus kelloggii*) and poison oak.

3.2.5 White Alder Riparian Forest

White alder riparian forest is the primary riparian forest community found in the Project Vicinity (SHN, 2001). This riparian forest is found along Old Cow Creek, South Cow Creek, and their tributaries. Tree and shrub species are generally deciduous. White alder riparian is typically found along the edges of streams and creeks from the valley floor into the lower coniferous forest at elevations from 500 to 4,000 feet. The riparian corridor of this community is narrower than other riparian communities of the Sacramento Valley, due to the steep canyons, bedrock channels, and fast-flowing water common in the upper limits of the watershed. Common species include white alder, willow (*Salix* spp.), bigleaf maple and valley oak. Associated species include Oregon ash (*Fraxinus latifolia*), blue oak (*Quercus douglasii)*, non-native annual grasses, and buckbrush (*Ceanothus cuneatus).* Individuals or small stands of Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) are found scattered throughout the Project bypass reaches, and trees of western sycamore (*Platanus racemosa*) and California black walnut are present in a small area downstream of the Cow Powerhouse.

3.2.6 Northern Mixed Chaparral

Northern mixed chaparral is dominated by tall shrubs, forming dense, often nearly impenetrable vegetation at elevations below 3,000 feet where it occurs in northern California (Holland, 1986). In the Project Vicinity, this chaparral is dominated by manzanitas (*Arctostaphylos* spp.) and

various ceanothus species (*Ceanothus* spp.). A dense cover of annual herbs may appear during the first growing season after a fire, followed in subsequent years by perennial herbs and short-lived shrubs until the original shrub species re-establishment dominance by stump-sprouting. Small areas of chaparral are found at scattered locations in both Old Cow and South Cow vegetation study areas.

3.2.7 Non-Native Annual Grassland

Non-native annual grassland occurs at lower elevations and extends into openings within blue oak-foothill pine woodland in the foothill zone of the watershed (SHN 2001). The foothill zone generally occurs below 2,500 feet in elevation. All tree-less grazing lands within the vegetation study area have been included in this cover type. Annual grassland is present in both Old Cow and South Cow creeks.

Non-native annual grassland supports a variety of annual grasses and associated forbs. Dominant species include wild oats (*Avena* spp.), foxtail chess (*Bromus madritensis* ssp. *rubens*), soft chess (*Bromus hordeaceus*), dogtail grass (*Cynosurus echinatus*), and ripgut brome. Annual and perennial forbs are common associates and include native species such as California poppy *(Eschscholzia californica*), butter n' eggs (*Triphysaria eriantha* ssp. *eriantha*), and Sierra foothill silverpuffs (*Microseris acuminata*), as well as non-native species such as several filarees (*Erodium* spp.).

Non-native annual grassland is frequently infested with noxious weeds such as yellow starthistle, medusahead grass, Klamath weed *(Hypericum perforatum),* and bull thistle.

3.2.8 Wetland Communities

Wetland communities include freshwater marsh and seeps that could occur adjacent to Old Cow and South Cow creeks (SHN, 2001). In addition, seeps may also be seen adjacent to other Project facilities (e.g., Kilarc Powerhouse, Cow Creek Powerhouse, etc). Open water areas, such as Project-related forebays, are also present in the Project Area.

3.2.8.1 Freshwater Marsh

Freshwater marsh occurs along the edges of ponds and creeks located at lower elevations, including the Kilarc and South Cow Creek forebays (SHN, 2001). This zone supports emergent vegetation and algae. Common freshwater marsh species include broad-leaved cattail (*Typha latifolia*), tules *(Scirpus* spp.), rushes (*Juncus* spp.), and sedges (*Carex* spp.).

3.2.8.2 Seeps

Seeps or springs often occur in wet areas within non-native grasslands or meadows. These are usually associated with changes in geologic material, fractures, or faults (SHN, 2001). This wetland vegetation type is characterized by perennial herbaceous plant species that are associated with permanently moist or wet soil (Holland, 1986), and consists of sedges, rushes, and a variety of grass species. Seeps observed were all in the South Cow Creek study area, and were mostly too small to map. One seep was dominated by rushes, but the others were grass-dominated.

3.2.9 Developed/Disturbed

Developed land in the Project Vicinity includes residential areas and the area around the Kilarc Powerhouse. Disturbed land includes areas where slides have occurred on steep slopes and areas disturbed by human activities, particularly logging. Any vegetation present consists either of species from the surrounding vegetation or weedy species typical of disturbed areas. Areas in these categories that were large enough to map were all found along Old Cow Creek and were primarily related to logging activities.

3.3 SPECIAL-STATUS PLANT SPECIES

Based on the literature review, a list of special-status species with potential to occur in the Project Area was prepared (Table 2)[1]. None of these species on the initial list was observed within the FERC Project Boundary during the botanical surveys. While Bogg's Lake hedge-hyssop and Ahart's paronychia are annual species that might not be identifiable by July (when the first botanical surveys along the diverted reaches were conducted), neither of these species is expected to occur in the forest and riparian habitats found along these reaches.

A common species, scarlet fritillary (*Fritillaria recurva*), was observed in several locations both in the Kilarc Development and in the Cow Development during the May 2003 surveys. Fritillaries were observed along Kilarc Development penstock and at several locations along the Cow Development canal and the slopes above South Fork Cow Creek. Many similar plants were not identifiable to species due to inaccessibility or undeveloped flowers. By June, most of these plants were no longer visible or had lost their flowers and fruit. Fritillaries in fruit were also observed on the steep slopes above the diverted reaches when the July and August botanical surveys were conducted on these reaches. It is possible that some of the fritillaries are the CNPS List 3 species, Butte County fritillary (*Fritillaria eastwoodiae*), which is similar to scarlet fritillary.

One CNPS List 4 species[2], mountain lady's slipper (*Cypripedium montanum*), was found adjacent to the Kilarc canal (Figure 2 Map H). This population consisted of two plants growing at the base of the canal, at the top of a steep, eroding slope.

3.3.1 Mountain Lady's Slipper

Mountain lady's slipper (*Cypripedium montanum*) is included on CNPS List 4. List 4 species are limited in distribution and may become rarer. Mountain lady's slipper is a rhizomatous perennial herbaceous species that grows in broadleafed and coniferous woodlands and forests at elevations from 600 to 7300 feet (CNPS, 2000). This species is widely distributed, but most occurrences are small. Mountain lady's slipper flowers from March to August. Two stems of this species were growing at the base of an above-ground reach of the canal, at the top of a steep, bare slope failure. The surrounding vegetation was Sierran mixed coniferous forest.

[1] For the purpose of this review, special status plant species were defined as those species listed, proposed, or under review as rare, threatened, or endangered by the federal government or the State of California, and those listed as rare or endangered by the CNPS

[2] CNPS List 4: Plants of limited distribution – a watch list category. Plants in this category are of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears relatively low. While they are not "rare", they are uncommon enough that their status should be monitored regularly.

3.4 RIPARIAN STUDY

Riparian vegetation surveys were conducted to determine the type, extent, and condition of riparian vegetation in the Project Area and in the bypass and augmented flow reaches. Observations for each vegetation reach are summarized below, and the location of these reaches are shown in Figures 7 and 8. With the exception of Hooten Gulch, and parts of Old Cow Creek, these stream reaches are in steep, narrow canyons. White alder riparian forest occurs along South Cow Creek, Mill Creek, Old Cow Creek, North Canyon Creek, and South Canyon Creek. Along Hooten Gulch, species more typical of mixed riparian forest, such as western sycamore and California walnut also occur. However, these types are not distinct entities along Hooten Gulch, and the dominant species intermingle along the creek corridor. More detailed descriptions of the reaches are provided in Table C-1 in Appendix C.

3.4.1 Old Cow Creek

Areas with riparian vegetation in Old Cow Creek include the bypass reaches of Old Cow Creek, North Canyon Creek, and South Canyon Creek. These areas are discussed below.

Dominant species in the riparian vegetation along Old Cow Creek include white alder, Fremont cottonwood, bigleaf maple, and mountain dogwood (*Cornus nuttallii*). Fremont cottonwood is present as individual trees or small pockets in several locations along Old Cow Creek, but does not form stands. White alder and bigleaf maple are the common species along the reach, interspersed with mountain dogwood. Understory species in the riparian vegetation typically present include willows, vine maple (*Acer circinatum*), and Himalayan blackberry (*Rubus discolor*) interspersed with creek dogwood (*Cornus sericea*). The common herbaceous species present include Indian rhubarb (*Darmera peltata*), brickellbush (*Brickellia* sp.), arrow butterweed (*Senecio triangularis*), sedges and grasses, as well as the exotic Klamath weed. Upland tree species such as live oak, ponderosa pine, incense cedar (*Calocedrus decurrens*), white fir, Douglas fir (*Pseudotsuga menziesii* var. *menziesii*), and Pacific yew (*Taxus brevifolia*) are located upslope of the riparian zone and in some reaches were found adjacent to the stream.

The riparian vegetation along Old Cow Creek is generally a narrow strip found along both banks of the creek. The tree canopy ranges from 10 to 100 percent in cover. The width of the riparian zone ranges from 15 to 500 feet wide. The average height of the tree canopy within the riparian vegetation ranges from 8 to 35 feet tall. There were a few areas identified where white alder trees had died or had a large percent of decadence. These areas were located at the base of a slide upslope from the creek. Seedlings of the various riparian species along the channel were found on the banks and more often occupying mid-channel islands or bars. The herbaceous component of the riparian zone along the Old Cow Creek Project reach is fairly sparse along the banks. The cover is approximately 20 percent of the project reach.

3.4.1.1 North and South Canyon Creeks

Dominant species in the riparian vegetation along North and South Canyon Creeks include white alder, mountain dogwood, and bigleaf maple. Understory species in the riparian vegetation typically present include vine maple, Indian rhubarb, bracken fern (*Pteridium aquilinum* var. pubescens), and trail plant (*Adenocaulon bicolor*). Upland tree species such as live oak,

ponderosa pine, incense cedar, white fir, and Douglas fir are found upslope from the riparian zone.

The riparian vegetation along North Canyon Creek is a narrow strip found along both banks of the creek. The tree canopy ranges from 90 to 100 percent in cover. The width of the riparian zone ranges from 5 to 10 feet wide. The average height of the tree canopy within the riparian vegetation ranges from 50 to 60 feet tall. No unusual mortality was recorded along North Canyon Creek.

The riparian vegetation along South Canyon Creek is a narrow strip found along both banks of the creek. The tree canopy ranges from 90 to 100 percent in cover. The width of the riparian zone ranges from 5 to 10 feet wide. The average height of the tree canopy within the riparian vegetation ranges from 50 to 70 feet tall. No unusual mortality was recorded along South Canyon Creek.

3.4.2 South Cow Creek

Areas with riparian vegetation in South Cow Creek include the bypass reaches of South Cow Creek and Mill Creek, and the augmented flow reach of Hooten Gulch. These areas are discussed below.

Dominant species in the riparian vegetation along South Cow Creek include white alder, bigleaf maple, Oregon ash, and California bay. Fremont cottonwood is present as individual trees or small clusters in several locations along South Cow Creek, but do not form stands. Understory species typically include willows, Himalayan blackberry, poison oak, Indian rhubarb, California wild grape (*Vitis californica*), sedges, and grasses. Upland tree species such as ponderosa pine, canyon live oak (*Quercus chrysolepis*), interior live oak, and black oak are located upslope of the riparian zone and in some reaches were found adjacent to the stream.

The riparian vegetation along South Cow Creek is generally a narrow strip along both banks of the creek. The tree canopy of the riparian vegetation along South Cow Creek ranges from 60 to 99 percent cover and the shrub layer ranges from 50 to 80 percent cover. The width of the riparian zone ranges from 10 to 60 feet wide. The width of the riparian zone represents an average total of both banks of the creek and also includes riparian vegetation on mid-channel islands or bars when these features are present. The average height of the tree canopy within the riparian vegetation ranges from 10 to 40 feet tall. No unusual mortality was observed along South Cow Creek. Seedlings of the various riparian species along the channel were found on the banks and more often occupying mid-channel islands or bars. The herbaceous component of the riparian zone along the South Cow Creek reach is fairly sparse along the banks. Indian rhubarb and sedges are the dominant herbs found within this reach. These species grow between boulders or on the edges of banks and bars within the channel. Herbaceous cover is approximately 10 to 20 percent of the bypass reach.

3.4.3 Mill Creek

White alder is the dominant species along the Mill Creek bypass reach. It is interspersed with the codominant species, California bay and Oregon ash. Understory species typically present include

willows, Himalayan blackberry, California wild grape, Indian rhubarb, sedges, and grasses. Upland tree species such as ponderosa pine and black oak are located upslope of the riparian zone.

The riparian vegetation along Mill Creek is generally a narrow strip found along both banks of the creek. The tree canopy ranges from 50 to 90 percent in cover. The width of the riparian zone ranges from 20 to 30 feet wide. The average height of the tree canopy within the riparian vegetation ranges from 5 to 20 feet tall. No unusual mortality was observed along Mill Creek. There is a dense shrub and herbaceous understory along the channel.

3.4.4 Hooten Gulch

Dominant species in the riparian vegetation along Hooten Gulch include white alder, Fremont cottonwood, valley oak, and California black walnut. White alder and valley oak are more common along the reach, while cottonwood are found as scattered individuals. A few western sycamore were identified at the Cow Powerhouse. Understory species in the riparian vegetation typically present include willows, Himalayan blackberry, California wild grape, and western redbud. There are a few scattered California buckeye present within the riparian zone. Tree species such as foothill pine and valley oak are located upslope of the riparian zone.

The riparian vegetation along Hooten Gulch is generally a narrow strip found along both banks of the creek. The tree canopy ranges from 70 to 85 percent in cover. The width of the riparian zone ranges from 15 to 35 feet wide. The average height of the tree canopy within the riparian vegetation ranges from 30 to 60 feet tall. No unusual mortality was observed along Hooten Gulch. The riparian vegetation along the channel is comprised primarily of trees and shrubs. The herbaceous component is sparse.

A non-Project diversion (Wild Oak) is located a short distance downstream of the Cow Powerhouse on Hooten Gulch.

3.5 ELDERBERRY STUDY

Elderberry surveys were conducted to determine the extent of potential habitat for the valley elderberry longhorn beetle (federally listed as endangered) within the Project Area. Elderberry shrubs were found at two locations in the South Cow Creek area (Figure 1 Map A and B). One elderberry was observed on the south side of the canal, on the side opposite the canal trail. This elderberry had three stems: one less than one inch in diameter, one that was approximately one inch in diameter, and one that was approximately 1.5 inches in diameter. A second elderberry was observed near the trail on the steep, inaccessible slope between the canal and South Cow Creek. This elderberry had one stem, less than one inch in diameter. No holes were observed on either plant in the parts of the stems that were visible from the trail, and no beetles were observed on these plants.

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Tables

Table 1: Special-Status Wildlife Species Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Affiliation	Potential Occurrence
Invertebrates				
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT		Elderberry shrubs throughout the Central Valley and foothills below 3,000 feet in elevation.	May occur. Appropriate habitat is present in elderberry shrubs within the Project Area. Two shrubs are located near the South Cow Creek Canal. There are no known occurrences within a 5-mile radius of the Project Area. No VELB were detected during 2003 focused surveys.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	---	Central Valley vernal pools, swales, slumps, and basalt flow depressions, up to 950 feet in elevation.	Unlikely to occur due to lack of suitable habitat. There are no known occurrences within a 5-mile radius of the Project Area.
California linderiella fairy shrimp *Linderiella occidentalis*	---	---	Central Valley vernal pools, swales, slumps, and basalt flow depressions.	Unlikely to occur due to lack of suitable habitat. There are no known occurrences within a 5-mile radius of the Project Area.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	---	Central Valley vernal pools, swales, slumps, and basalt flow depressions, ranging from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County.	Unlikely to occur due to lack of suitable habitat. There are no known occurrences within a 5-mile radius of the Project Area.
Shasta crayfish *Pacifastacus forti*	FE	SE	Occurs only in Shasta County within the Pit River drainage system, generally in cool, spring-fed headwaters characterized by clean, volcanic cobbles and boulders overlying sand or gravel substrates.	Unlikely to occur in the Project Area. Project Area located outside of species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Amphibians				
Shasta salamander *Hydromantes shastae*	---	ST	Uncommon in limestone areas in the vicinity of Shasta Reservoir in Shasta County. Numerous small, isolated populations occurring in limestone areas in valley-foothill, hardwood-conifer, ponderosa pine and mixed conifer habitats from 1,100 to 2,550 feet.	Unlikely to occur in the Project Area. Project Area located outside of species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Western spadefoot toad *Scaphiopus hammondii*	---	CSC	Requires vernal pools and seasonal wetlands below 4,500 feet that lack predators for breeding. Also occurs in grassland habitat and occasionally in valley-foothill oak woodlands and orchards.	Unlikely to occur due to lack of suitable habitat. There are no known occurrences within a 5-mile radius of the Project Area.
California red-legged frog *Rana aurora draytonii*	FT	CSC	Breeds in quiet streams and permanent, deep, cool ponds with overhanging and emergent vegetation below 4,000 feet elevation. Known to occur adjacent to breeding habitats in riparian areas and heavily vegetated streamside shorelines, and in non-native grasslands.	May occur. No appropriate spawning habitat was found in the Project Area during the Site Assessment, but several ponds on private land within the Site Assessment Area may be suitable. Potential summer habitat exists along Hooten Gulch within 100 meters of its confluence with South Cow Creek. There are no known occurrences within a 5-mile radius of the Project Area. Not detected during amphibian surveys.
Foothill yellow-legged frog *Rana boylii*	---	CSC	Breeds in rocky streams with cool, clear water in a variety of habitats, including valley and foothill oak woodland, riparian forest, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadows; occurs at elevations ranging from 0 to 6,000 feet.	Known to occur. There is a CNDDB record for this species on Old Cow Creek (CDFG 2003). This species was detected in South Cow Creek and Hooten Gulch during 2003 reconnaissance wildlife surveys and focused foothill yellow-legged frog surveys.

Table 1: Special-Status Wildlife Species Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Affiliation	Potential Occurrence
Amphibians (Continued)				
Western tailed frog *Ascaphus truei*		CSC	Coastal Mendocino County north to the Oregon border with a disjunct population in the Shasta region. Occurs in permanent streams with low temperatures, with steep canyon walls, in conifer and hardwood-conifer habitats from 0 to 6,500 feet.	Unlikely to occur in the Project Area. Project Area located outside of species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Reptiles				
Northwestern pond turtle *Actinemys marmorata marmorata*		CSC	Perennial wetlands and slow moving creeks and ponds with overhanging vegetation up to 6,000 feet; suitable basking sites such as logs and rocks above the waterline.	Known to occur. There is one CNDDB occurrence approximately 2 miles from the Project Area (CDFG 2003). Detected incidentally in Hooten Gulch and near the Cow Creek Powerhouse during surveys.
California horned lizard *Phrynosoma coronatum frontale*		CSC	Exposed sandy-gravelly substrate with scattered shrubs, clearings in riparian woodlands, and annual grasslands. Ranges in the Central Valley from southern Tehama County south; in the Sierra foothills from Butte County to Tulare County below 4,000 feet; ranging from sea level to 4,000 feet in the Sierra foothills.	Unlikely to occur in the Project Area. Project Area located outside of species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Birds				
White-faced ibis *Plegadis chihi*		CSC	Uncommon summer resident in sections of Southern California, rare visitor in the Central Valley. Nests in dense, fresh emergent wetland. Forages in shallow water or muddy fields.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Aleutian Canada goose *Branta canadensis leucopareia*	FD 2001	SA	Occurs in pastures and grain fields in the Central Valley.	Unlikely to occur in the Project Area due to lack of suitable habitat. There are no known occurrences within a 5-mile radius of the Project Area.
Osprey *Pandion haliaetus*	---	CSC	Associated strictly with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats. Known to breed near Shasta Lake.	Known to occur. Not detected during focused surveys. Detected incidentally at Kilarc Forebay during other surveys for the Project. There are no CNDDB occurrences of this species within a 5-mile radius of the Project Area.
White-tailed kite *Elanus leucurus*		CFP	Coastal and valley lowlands. Herbaceous and open stages of most habitats; grasslands and agricultural areas are used for foraging; typically nests in tops of dense oak, willow, or other tree stands adjacent to open areas and agricultural fields.	May occur. Appropriate breeding and foraging habitat is present in South Cow Creek. There are no known occurrences within a 5-mile radius of the Project Area.
Bald eagle *Haliaeetus leucocephalus*	Delisted (2007)	SE, CFP	Year-round in Shasta County. Occurs in low to mid-range elevations of the Sierra Nevada. Nests in large, old-growth or dominant live tree with open branches. Perches in large trees, snags or broken-topped trees near water for foraging.	Known to occur. Have been observed roosting and foraging at the Kilarc Forebay (PG&E, pers. com.). Not observed during focused surveys. There are no CNDDB records within a 5-mile radius of the Project Area.
Sharp-shinned Hawk *Accipiter striatus*	---	CSC	Mid-elevation habitats. Roosts in intermediate to high-canopy forest. Nests in dense, even-aged, single-layered forest canopy. Winters in woodlands. Prefers, but not restricted to, riparian habitats. All habitats except alpine, open prairie, and bare dessert used in winter.	May forage in riparian habitat or nest in mixed conifer forest in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.

Table 1: Special-Status Wildlife Species Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Affiliation	Potential Occurrence
Birds (Continued)				
Northern Goshawk *Accipiter gentilis*	---	CSC	Prefers middle to high elevation, mature, dense conifer forests for foraging and nesting. Casual in foothills during winter, northern deserts in pinyon-juniper woodland, and low elevation riparian habitats. Nests on north-facing slopes near water.	May forage in riparian, oak woodland, or mixed conifer habitat and may also breed in forest habitats in the Project Area. There is one CNDDB record approximately 5 miles from the Project Area (CDFG 2003).
Swainson's Hawk *Buteo swainsoni*	---	ST	Breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Dessert. Requires large, open grasslands with abundant prey in association with suitable nest trees. Nests in mature riparian forest, groves of oaks, and mature roadside trees.	May occur. Appropriate habitat is present in the grassland (foraging) and woodland (nesting) habitats of the Project Area, particularly in the southern portion of the South Cow Creek Project vicinity. There are no known occurrences within a 5-mile radius of the Project Area.
Ferruginous hawk *Buteo regalis*	---	CSC	Forages in grasslands, sagebrush flats, desert scrub, low foothills, and pinyon-juniper in the Modoc Plateau, Central Valley, and Coast Ranges; breeds in the Great Basin and northern plains states.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Golden eagle *Aquila chrysaetos*	---	CSC, CFP	Habitat is typically rolling foothills, mountain areas, sage juniper flats, grasslands, and early successional forest.	Known to occur. Detected incidentally during surveys near the Cow Creek Forebay. May nest or forage in grasslands, oak woodland, or mixed conifer forest in the Project Area. There are no CNDDB occurrences within a 5-mile radius of the Project Area.
American peregrine falcon *Falco peregrinus americana*	FD 1999	SE, CFP	Breeds near wetlands, lakes, and rivers on high cliffs and banks.	Known to occur. Documented nesting in the Cow Creek watershed (Watershed Assessment 2001). May forage in or near Kilarc or Cow Creek Forebays and in stream habitat in Project Area. This species was not detected during 2003 focused surveys, and there are no CNDDB records within a 5-mile radius of the Project Area.
Long-billed curlew *Numenius americanus*		CSC	Found in wet meadow habitat in northeastern California in Siskiyou, Modoc, and Lassen counties. Winter visitor along the California coast and in the Central and Imperial valleys.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC	SE	Valley foothill and desert riparian habitats in scattered locations in California; breeds along the Colorado River, Sacramento and Owens valleys, South Fork of the Kern River, Santa Ana River, and the Amargosa River.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Flammulated owl *Otus flammeolus*		SA	Occurs in the North Coast and Klamath ranges, Sierra Nevada Mountains, and in mountains in southern California in a variety of conifer habitats from 6,000 to 10,000 feet.	Unlikely to occur in the Project Area. Project Area is not within documented species' elevational range. There are no known occurrences within a 5-mile radius of the Project Area.
Western burrowing owl *Athene cunicularia hypugaea*		CSC	Grasslands, oak woodlands, and ponderosa pine habitat, up to 5,300 feet.	May occur. Appropriate breeding and foraging habitat is present within grasslands in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Northern spotted owl *Strix occidentalis caurina*	FT	---	Occurs in dense, old-growth, multi-layered mixed conifer, redwood, and Douglas fir habitats, from sea level up to 7,600 feet.	May occur. Appropriate breeding and foraging habitat is present in mixed conifer within the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.

Table 1: Special-Status Wildlife Species Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Affiliation	Potential Occurrence
Birds (Continued)				
Short-eared owl *Asio flammeus*	---	CSC	Occurs in the Central Valley and western Sierra foothills in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. This species occurs only along the northeast edge of Shasta County.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Black swift *Cypseloides niger*		CSC	Breeds very locally in the Sierra Nevada and Cascade ranges. Nests in moist crevices or caves, or on cliffs near waterfalls in deep canyons. Forages widely over many habitats; seems to avoid arid regions.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Vaux's swift *Chaetura vauxi*		CSC	Prefers redwood and Douglas fir habitats with nest sites in large, hollow trees and snags, especially tall, burned-out stubs. Forages over moist terrain and habitats, preferring rivers and lakes. Summer resident of northern California.	May forage and breed in mixed conifer forest near streams and forebays in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Rufous hummingbird *Selasphorus rufus*		SA	Prefers redwood and Douglas fir habitats. Breeds in the Coastal Range north of Sonoma County, Sierra Nevada Mountains, and possibly in the Cascade Range. Fairly common migrant throughout most of California in April to May and August to September.	May breed or forage in mixed conifer within the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Little willow flycatcher *Empidonax traillii brewsteri*		SE (nesting; all subspecies)	Occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows, wet meadow and montane riparian habitats from 2,000 to 8,000 feet. Breeding seldom occurs below 5,000 feet.	May forage in riparian habitat and may breed within reaches of South Cow Creek in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Loggerhead shrike *Lanius ludovicianus*		CSC	Open habitats with sparse shrubs and trees (or other suitable perch sites) and bare ground and/or low, sparse herbaceous cover; oak woodlands for nesting. Found in lowlands and foothills throughout California.	May forage in oak woodlands or riparian habitat in the Project Area. May breed in oak woodlands in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Bank swallow *Riparia riparia*	---	ST	Migrant found primarily in riparian and other lowland habitats in California west of the deserts. Requires vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, or the ocean for nesting.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Hermit warbler *Dendroica occidentalis*		SA	Breeds in major mountain ranges from San Gabriel and San Bernardino mountains northward in mature ponderosa pine, montane hardwood-conifer, mixed conifer, Douglas fir, redwood, red fir, and Jeffrey pine habitats.	May breed in mixed conifer forests near the Project Area. May forage in mixed conifer and oak-pine woodland in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Lawrence's goldfinch *Carduelis lawrencei*		SA	Occurs in valley foothill hardwood and valley foothill hardwood-conifer. Breeds in open oak or other arid woodland and chaparral, near water.	May forage and breed in oak woodland or oak-pine woodlands near streams or forebays in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.

Table 1: Special-Status Wildlife Species Potentially Occurring in the Project Area				
Species	Federal Status	State Status	Habitat Affiliation	Potential Occurrence
Birds (Continued)				
Tri-colored blackbird *Agelaius tricolor*		CSC	Breeds near freshwater, preferably in emergent wetland with tall dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. Feeds in grassland and cropland habitats. Found throughout the Central Valley and on the coast.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution. There are no known occurrences within a 5-mile radius of the Project Area.
Mammals				
Yuma myotis bat *Myotis yumanensis*		CSC	Year-round resident in most of California at lower elevations in a wide variety of habitats from coast to mid-elevation. Very tolerant of human habitation and survives in urbanized environments. Day roosts are in buildings, trees, mines, caves, bridges, and rock crevices. Night roosts are in buildings, bridges, and other man-made structures.	May occur in open forests and woodlands and in Project facilities such as powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Long-eared myotis bat *Myotis evotis*		CSC	Year-round resident in California, occurring in mixed hardwood/conifer forest and montane conifer forest in northern California, and in pinyon-juniper, mesquite scrub, and pine/oak woodland in southern California. Typically roosts singly or in small groups in hollow trees, under exfoliating bark, crevices in rock outcrops, and occasionally in mines, caves, and buildings during the day.	May occur in mixed hardwood/conifer and montane conifer forests and in Project facilities such as powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Fringed myotis bat *Myotis thysanodes*		CSC	Widespread in California, occurring in all habitats excluding the Central Valley and Mojave desert. Occurs primarily in pinyon-juniper, valley-foothill hardwood, and hardwood conifer from 4,000 to 7,000 feet. Maternity colonies are in caves, mines, and buildings.	May occur in valley-foothill and hardwood conifer forests and in Project facilities such as powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Long-legged myotis bat *Myotis volans*		CSC	Common in California, occurring in the Coastal, Sierra, and Cascade ranges from sea level to 11,000 feet, primarily in coniferous forest, but also riparian and desert habitats. Maternity roosts are found in buildings, rock crevices, and under exfoliating bark. Males roost singly or in small numbers in rock crevices, buildings, and under tree bark. Night roosts are under bridges, in caves and mines, and in buildings.	May occur in mixed-conifer forests and in Project facilities such as powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Small-footed myotis bat *Myotis ciliolabrum*		CSC	Occurs in the Sierra Nevada and deserts, commonly in arid uplands near water, from sea level to 9,000 feet. Roosts tend to be in rock crevices, cliff faces, and in talus formations. Maternity roosts are found in similar sites and have been observed in buildings.	May occur in arid uplands and in Project facilities such as powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Spotted bat *Euderma maculatum*		CSC	Habitats range from arid deserts and grasslands through mixed conifer forests up to 10,600 feet. Prefers sites with adequate roosting habitat, such as cliffs. Often limited by the availability of cliff habitat. Feeds over water and along marshes.	May occur in mixed-conifer forest and in Project facilities such as powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.

Table 1: Special-Status Wildlife Species Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Affiliation	Potential Occurrence
Mammals (continued)				
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*		CSC	Occurs throughout California, in all but sub-alpine and alpine habitats. Most abundant in mesic habitats and requires caves, mines, tunnels, buildings, or other human-made structures for roosting.	May occur in mesic habitat and in Project facilities such powerhouses and tunnels in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
Sierra Nevada red fox *Vulpes vulpes necator*	---	ST	Occurs throughout the Sierra Nevada at elevations above 7,000 feet in forests interspersed with meadows or alpine forests. Open areas are used for hunting, forested habitats for cover and reproduction.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution and outside of species' elevational range. There are no known occurrences within a 5-mile radius of the Project Area.
Pacific fisher *Martes pennanti pacifica*	FC	CSC	Suitable habitat consists of large areas of mature, dense forest, red fir, lodgepole pine, ponderosa pine, mixed conifer, and Jeffery pine forests with snags and greater than 50% canopy closure. Known from 4,000 to 8,000 feet elevations.	May occur. Appropriate habitat is available in mixed conifer forests within the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.
California wolverine *Gulo gulo luteus*	---	ST, CFP	Mixed conifer, red fir, and lodgepole habitats, and probably sub-alpine conifer, alpine dwarf shrub, wet meadow, and montane riparian habitats. Occurs in Sierra Nevada from 4,300 to 10,800 feet. Majority of recorded sightings are found above 8,000 feet in elevation.	Unlikely to occur in the Project Area. Project Area is not within species' documented distribution.
Ringtail *Bassariscus astutus*	---	CFP	Widely distributed, occurs in various riparian habitats, and in brush stands of most forest and shrub habitats, at low to middle elevations. Little information available on distribution and relative abundance among habitats.	May occur. Appropriate habitat is available in valley-foothill riparian and montane riparian forests in the Project Area. There are no known occurrences within a 5-mile radius of the Project Area.

Legend:

FT = Federally Threatened

FE = Federally Endangered

FC = Federal Candidate Species

SA = State Special Animal

ST = State Threatened

SE = State Endangered

CSC = State Species of Special Concern

CFP = California Fully Protected

Life history and habitat information adapted from Zeiner et al. (1988-1990). California's Wildlife: Volumes I-III. California Department of Fish and Game, Rancho Cordova, California.

CDFG. 2003. Rarefind II: California Natural Diversity Database. Electronic database. Updated April 2003. California Department of Fish and Game, Rancho Cordova, California.

CDFG 2007. Special Animals. California Natural Diversity Database. Biogeographic Data Branch. Sacramento California. October 2007. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf

Table 2: Special-Status Plant Taxa Potentially Present in the Kilarc-Cow Project Vicinity

Scientific Name	Status	Flowering Period	Life Form
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	CE, CNPS 1B	Apr-Jun	Annual herb
Butte County fritillary *Fritillaeria eastwoodiae*	CNPS 3	Mar-May	Perennial herb (bulbiferous)
Shasta clarkia *Clarkia borealis* ssp. *arida*;	CNPS 1B	Jun-Aug	Annual herb
Ahart's paronychia *Paronychia ahartii*	CNPS 1B	Mar-Jun	Annual herb
Shasta snow wreath *Neviusia cliftonii*	CNPS 1B	May-Jun	Shrub (deciduous)

CE = listed by California as Endangered.

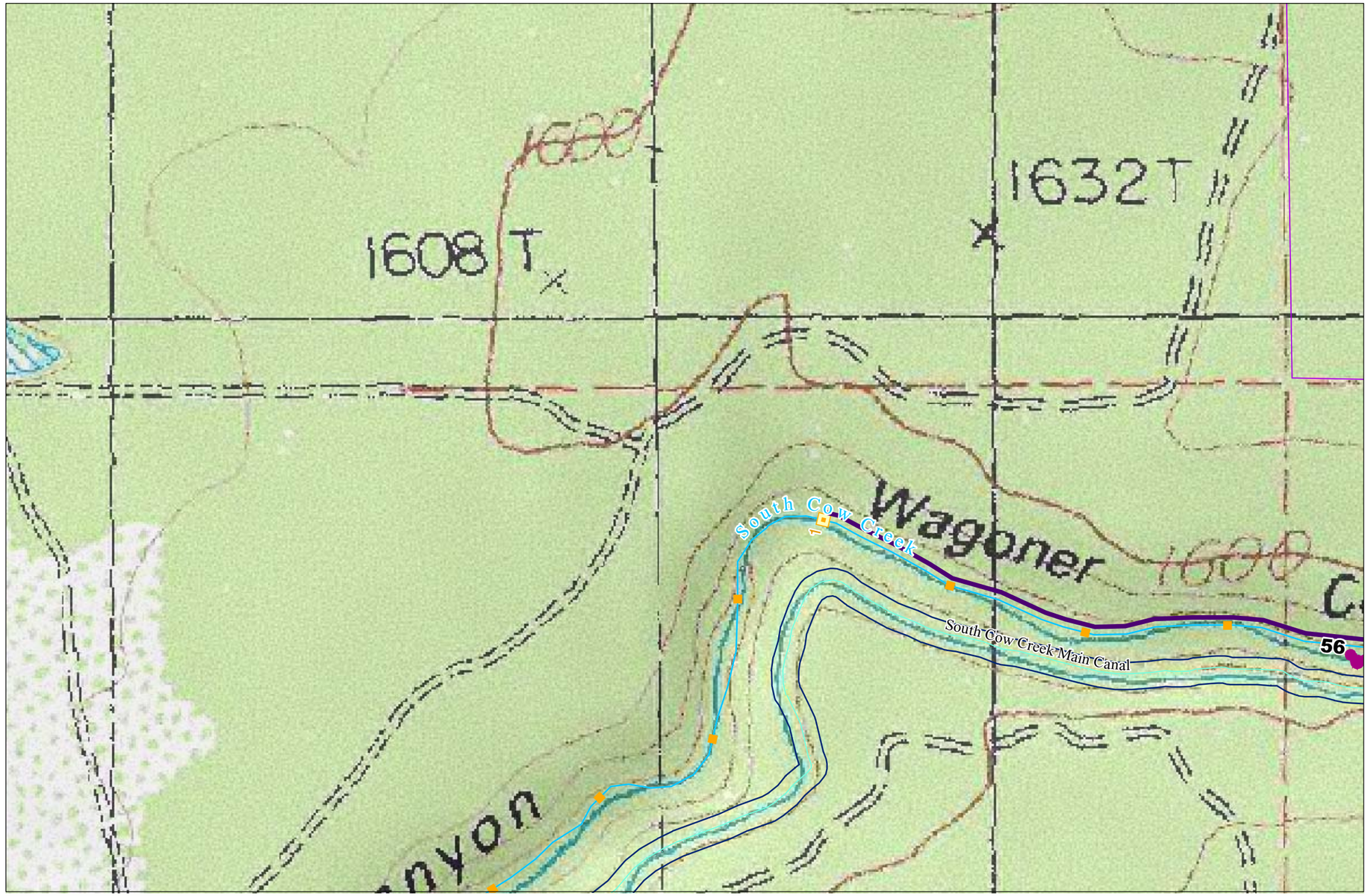
CNPS = California Native Plant Society

1B = rare, threatened or endangered in California and elsewhere.

3 = need more information

Status and flowering period information from CNDDB (CDFG 2003a) and CNPS data base (CNPS, 2000).

Figures



Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Golden Eagle
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
kilarc_cow_ferc_1mbf
Access Road
Canal
Penstock
Siphon
Spillway
Trail
FERC Boundary
Diverted Reach
PG&E Property
U.S. Public Land Survey System Section

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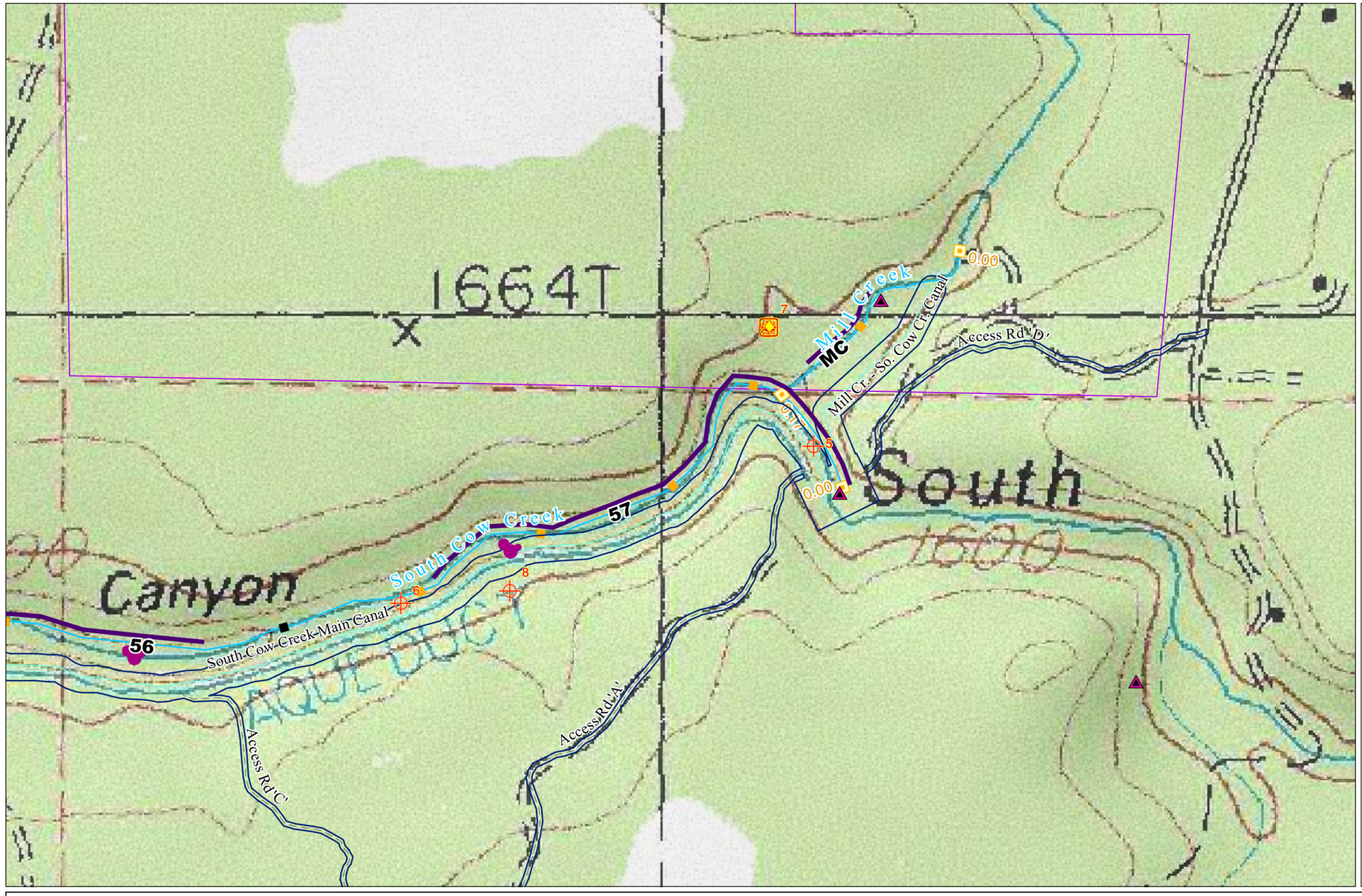
Projection: UTM Zone 10
Datum: NAD83

	Map A	Map B	
Map C	Map D	Map E	
Map F	Map G		
Map H	Map I		

Figure 1
Map A
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



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Diversion

ENTRIX Observed Species

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Penstock
Siphon
Spillway
Trail
FERC Boundary
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PG&E Property
U.S. Public Land Survey System Section

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Projection: UTM Zone 10
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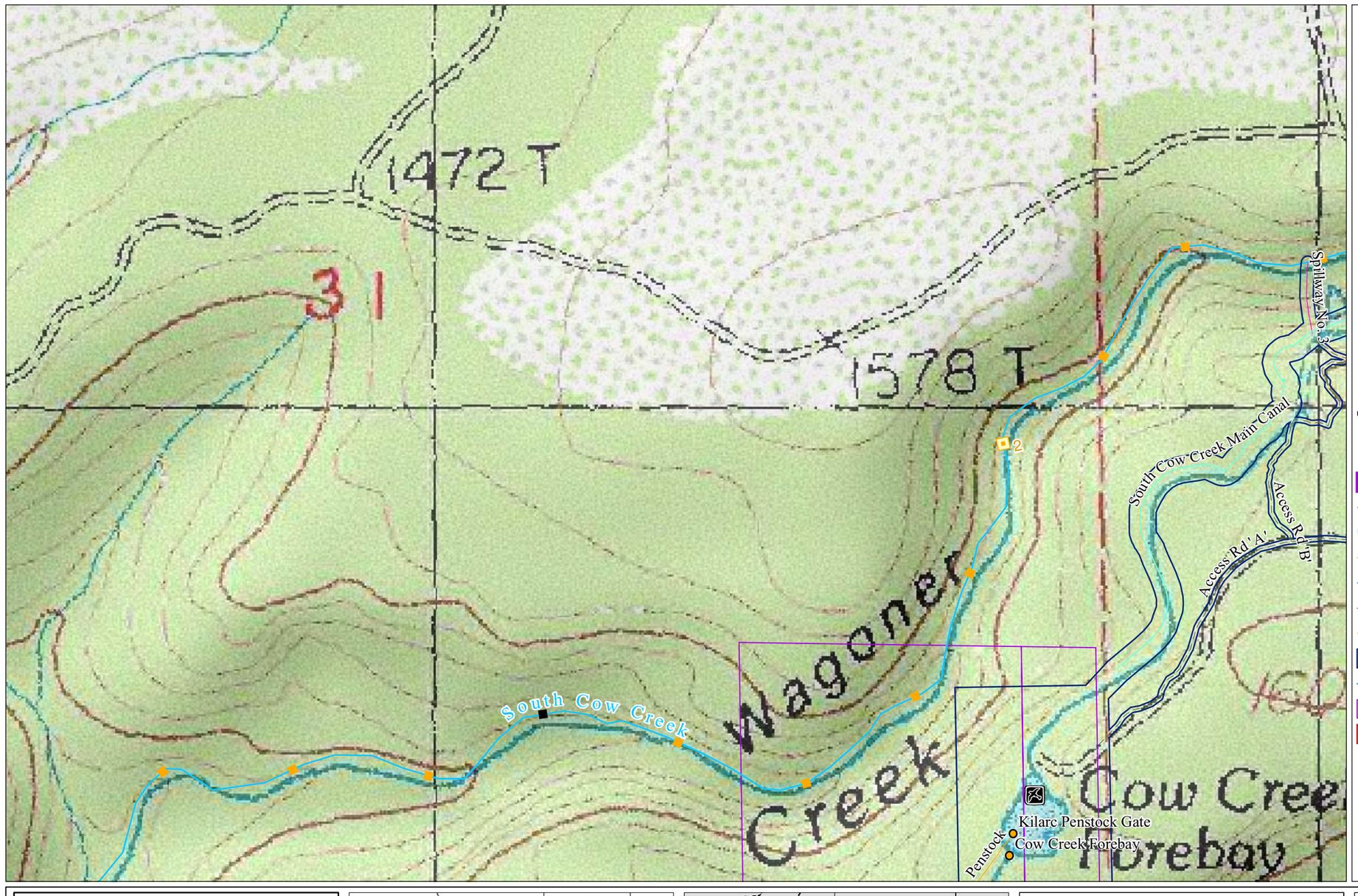
		Map A	Map B
	Map C	Map D	Map E
Map F	Map G		
Map H	Map I		

Figure 1
Map B
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



- Milepost
- Half Mile Milepost
- Tenth Mile Milepost
- Diversion

ENTRIX Observed Species

- Elderberry
- Golden Eagle
- Mountain Lady Slipper
- Osprey
- Pond Turtle
- Yellow-legged Frog
- Transect Start/End Point
- Frog Survey Transect
- PG&E Miscellaneous
- PG&E Facility
- kilarc_cow_ferc_1mbf
- Access Road
- Canal
- Penstock
- Siphon
- Spillway
- Trail
- FERC Boundary
- Diverted Reach
- PG&E Property
- U.S. Public Land Survey System Section

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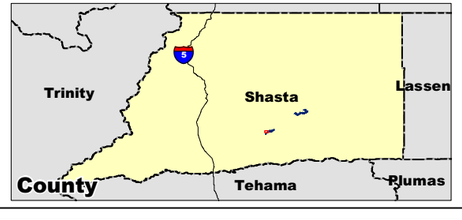
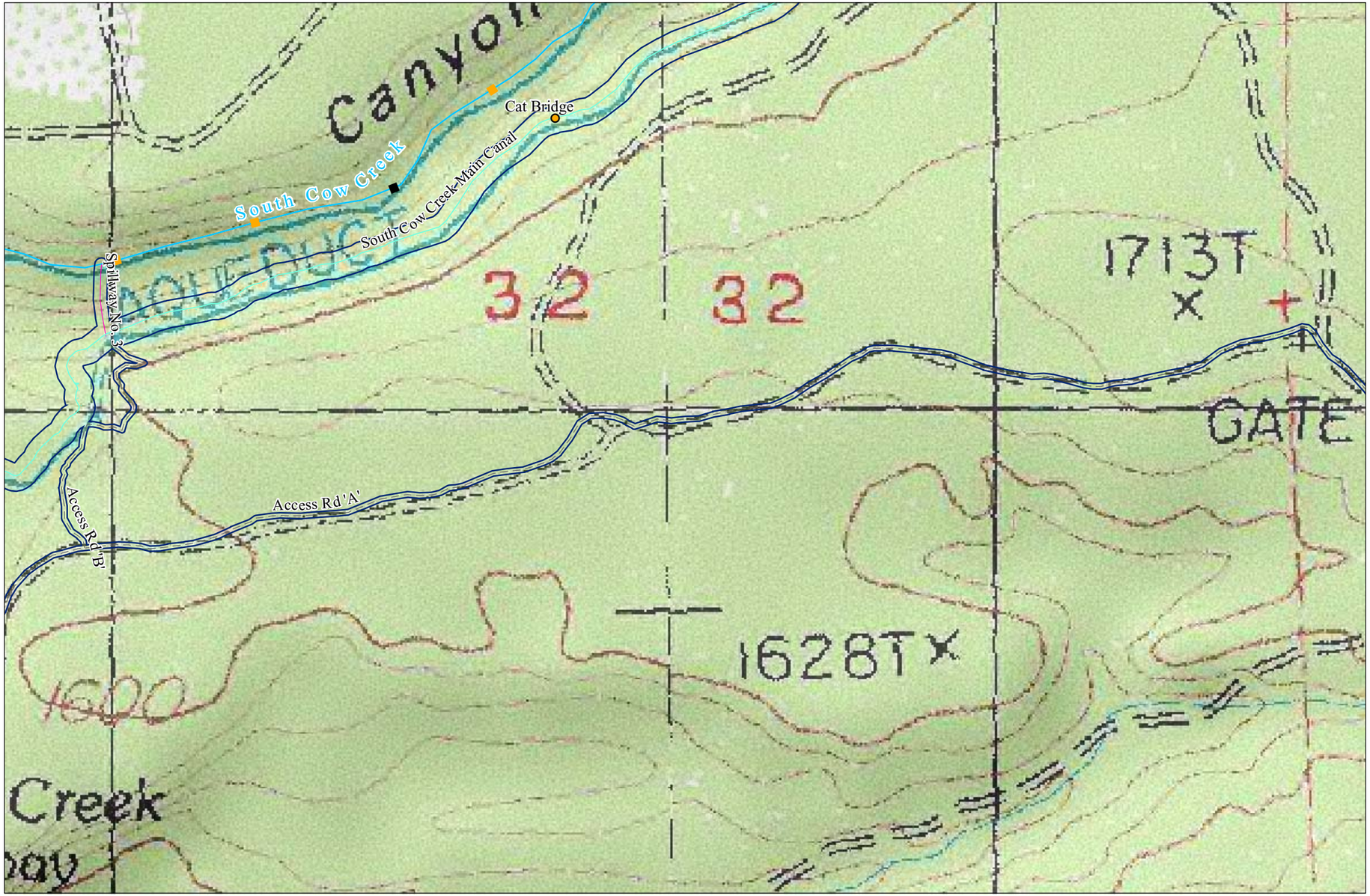


	Map A	Map B
Map C	Map D	Map E
Map F	Map G	
Map H	Map I	

Figure 1
Map C
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Golden Eagle
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Osprey
Pond Turtle
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Access Road
Canal
Penstock
Siphon
Spillway
Trail
FERC Boundary
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PG&E Property
U.S. Public Land Survey System Section

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Projection: UTM Zone 10
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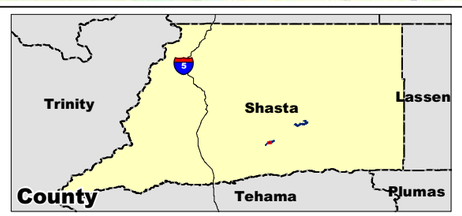
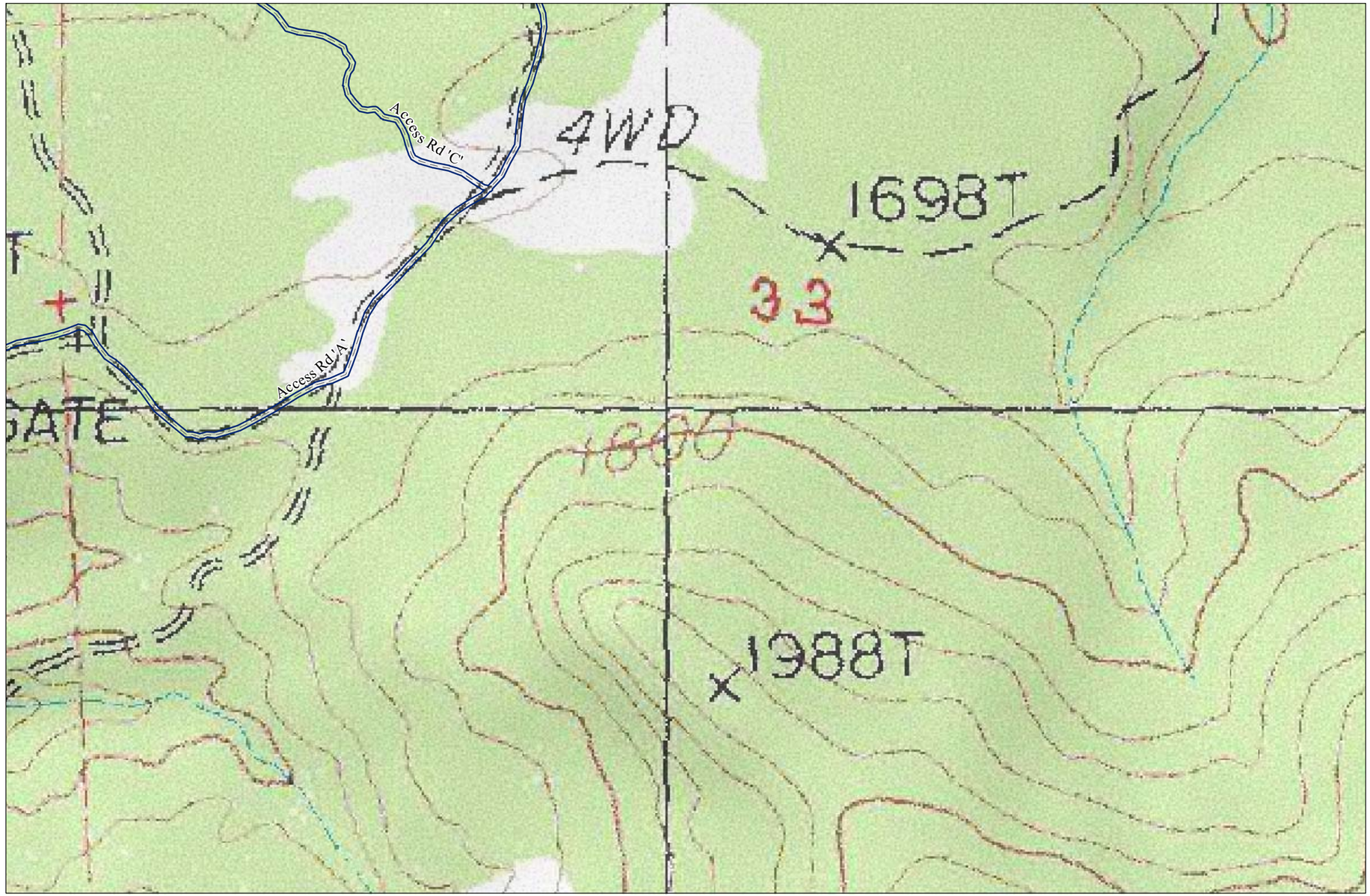


	Map A	Map B
Map C	Map D	Map E
Map F	Map G	
Map H	Map I	

Figure 1
Map D
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



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ENTRIX Observed Species

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Golden Eagle
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Frog Survey Transect
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PG&E Facility
kilarc_cow_ferc_1mbf
Access Road
Canal
Penstock
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Spillway
Trail
FERC Boundary
Diverted Reach
PG&E Property
U.S. Public Land Survey System Section

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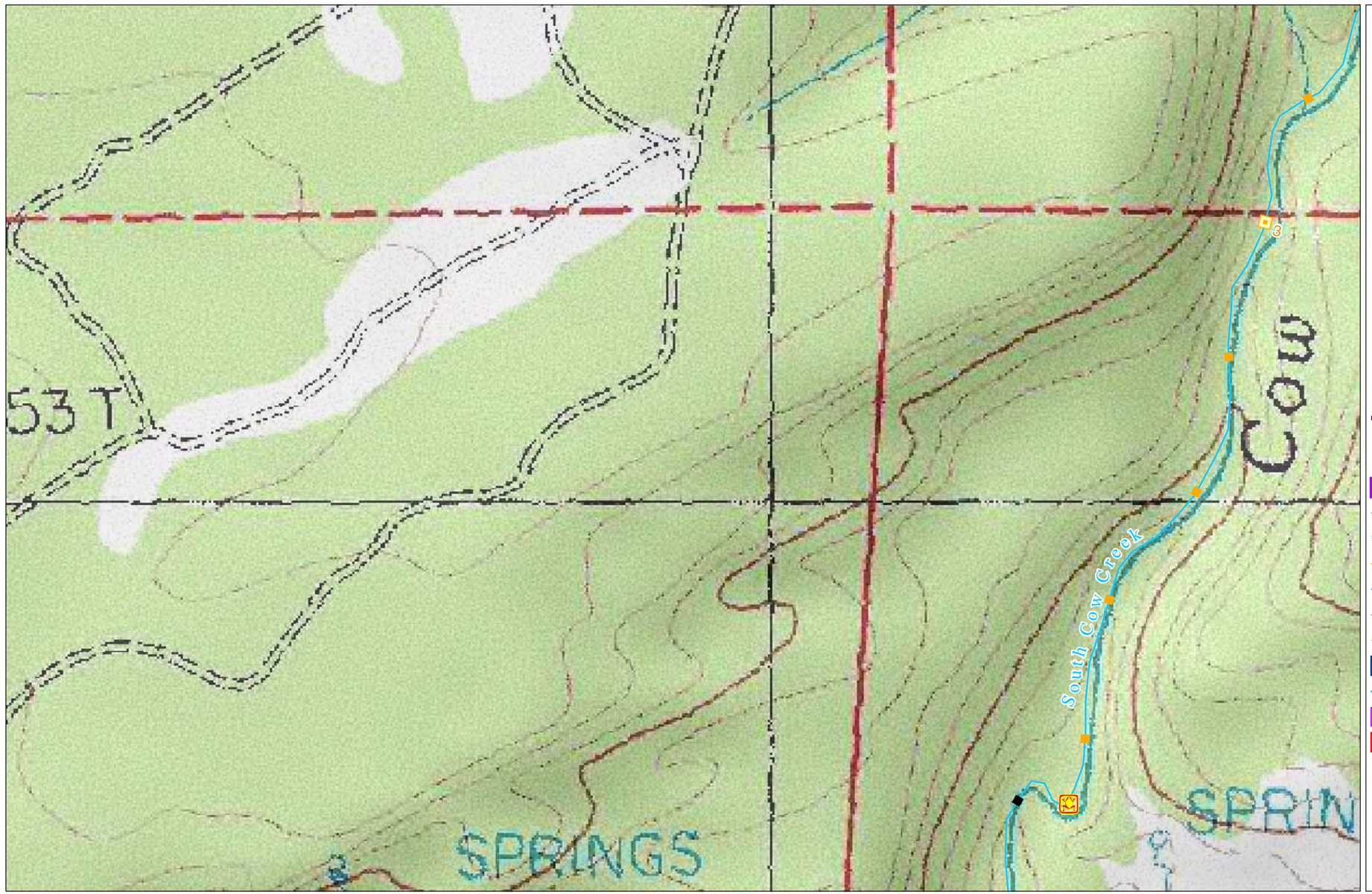
N W E S

Projection: UTM Zone 10
Datum: NAD83

	Map A	Map B
Map C	Map D	Map E
Map F	Map G	
Map H	Map I	

Figure 1
Map E
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
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Tenth Mile Milepost
Diversion

ENTRIX Observed Species

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Golden Eagle
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point

Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
kilarc_cow_ferc_1mbf
Access Road
Canal
Penstock
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Trail
FERC Boundary
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PG&E Property
U.S. Public Land Survey System Section

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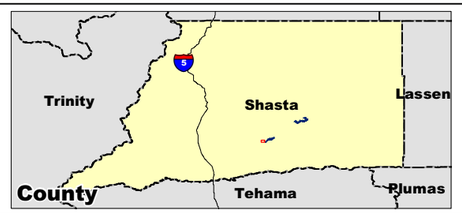
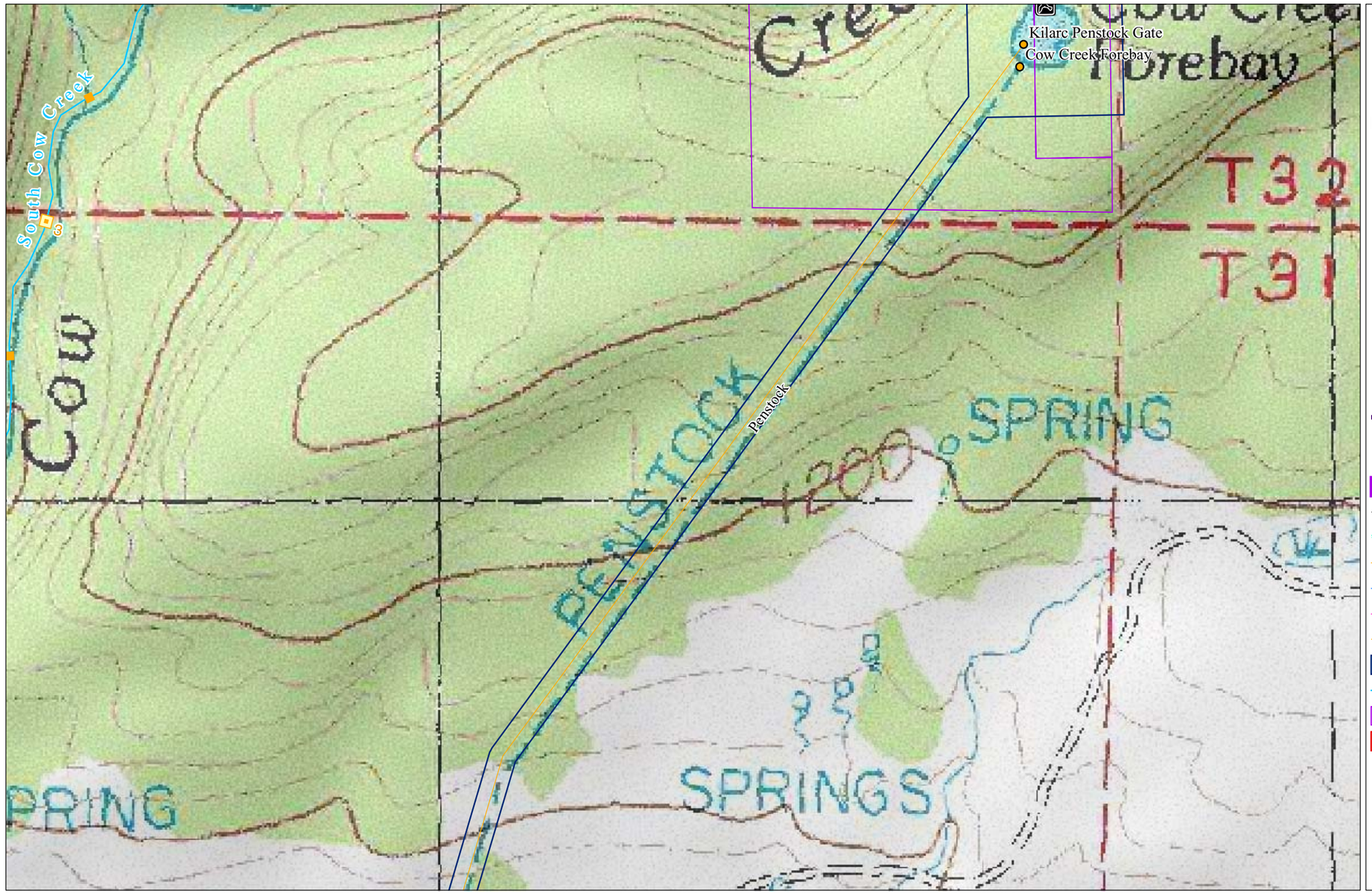


	Map A	Map B
Map C	Map D	Map E
Map F	Map G	
Map H	Map I	

Figure 1
Map F
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



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ENTRIX Observed Species

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Mountain Lady Slipper
Osprey
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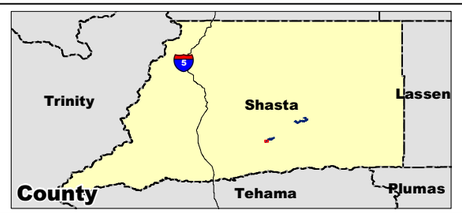

	Map A	Map B
Map C	Map D	Map E
Map F	Map G	
Map H	Map I	

Figure 1
Map G
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

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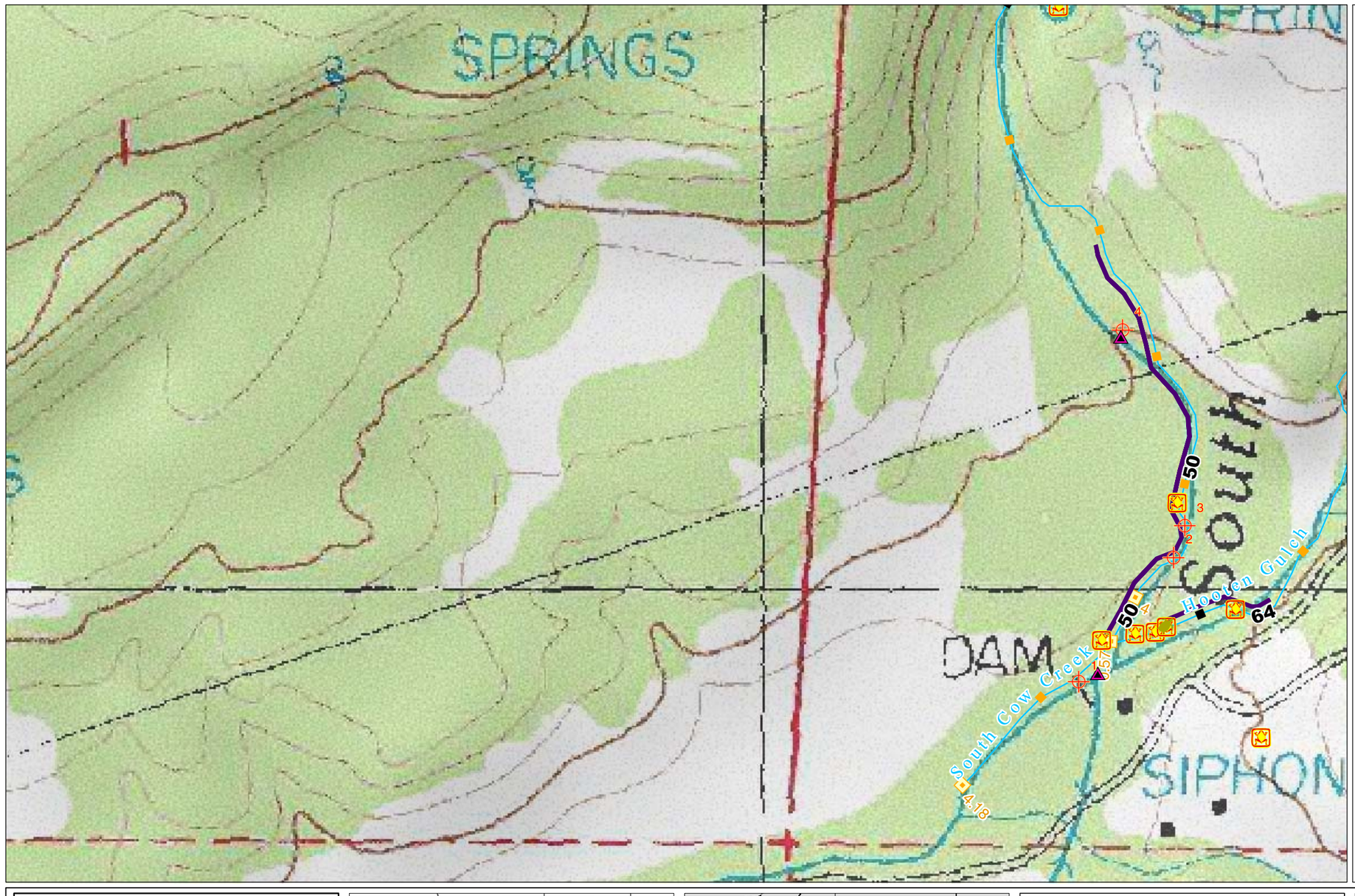

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ENTRIX Observed Species

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Projection: UTM Zone 10
Datum: NAD83

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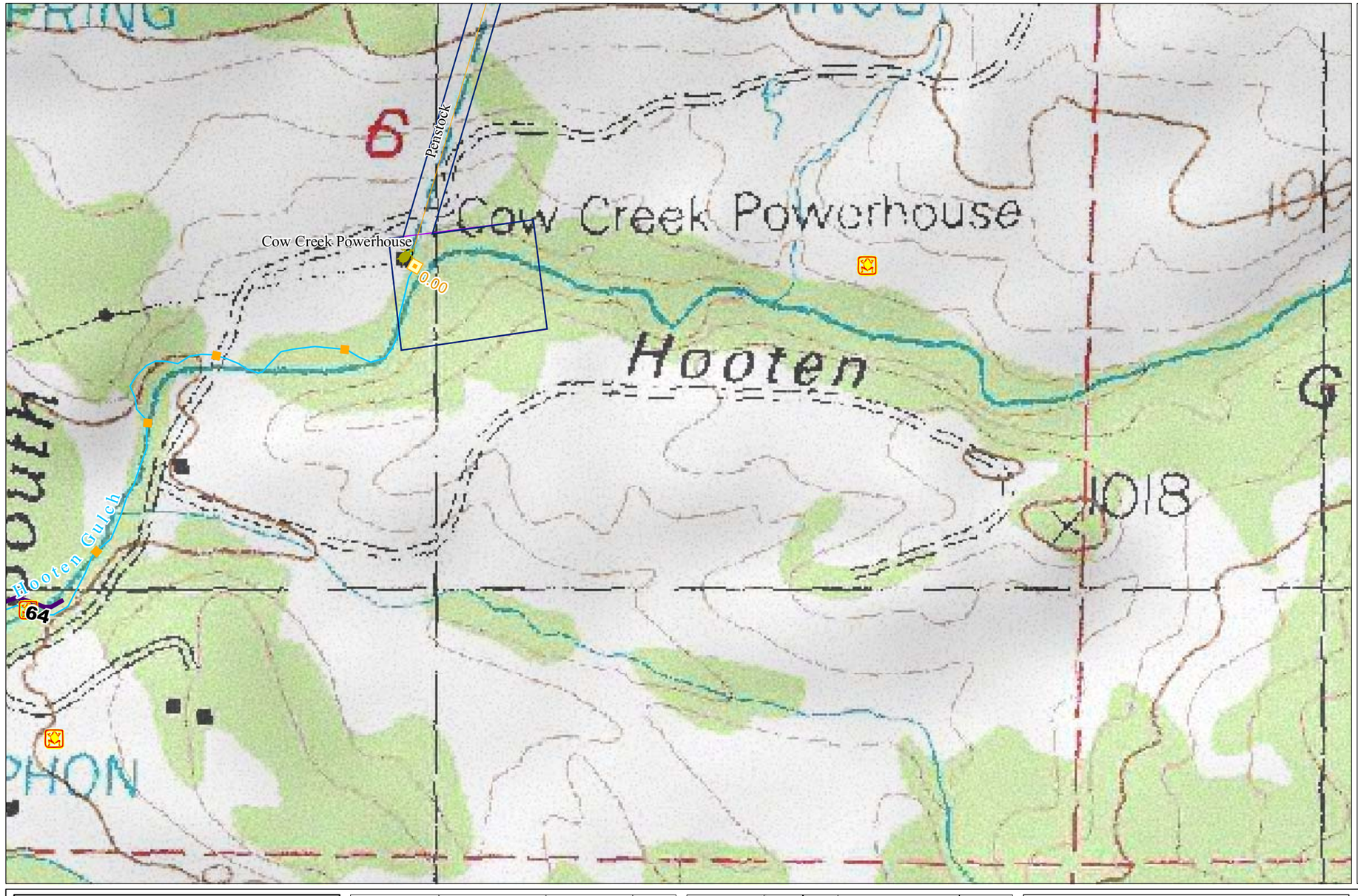
	Map A	Map B
Map C	Map D	Map E
Map F	Map G	
Map H	Map I	

Figure 1
Map H
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



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Diversion

ENTRIX Observed Species

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Golden Eagle
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Osprey
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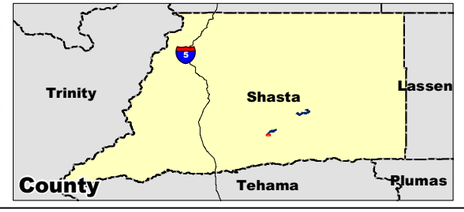
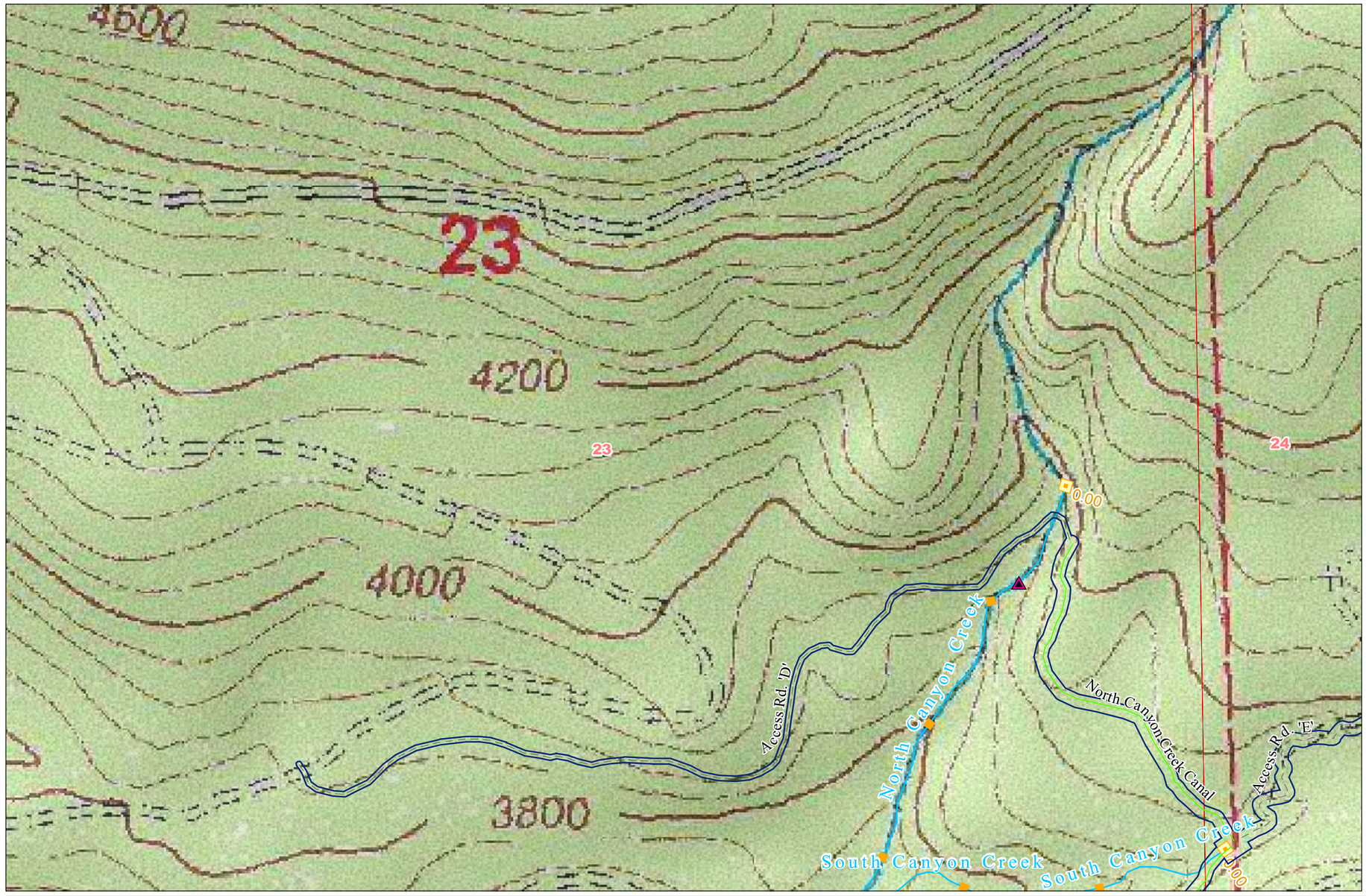


		Map A	Map B
	Map C	Map D	Map E
Map F	Map G		
Map H	Map I		

Figure 1
Map I
Kilarc-Cow Creek Project
South Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



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Diversion

ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
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PG&E Miscellaneous
PG&E Facility
FERC Boundary
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U.S. Public Land Survey System Section
Diverted Reach

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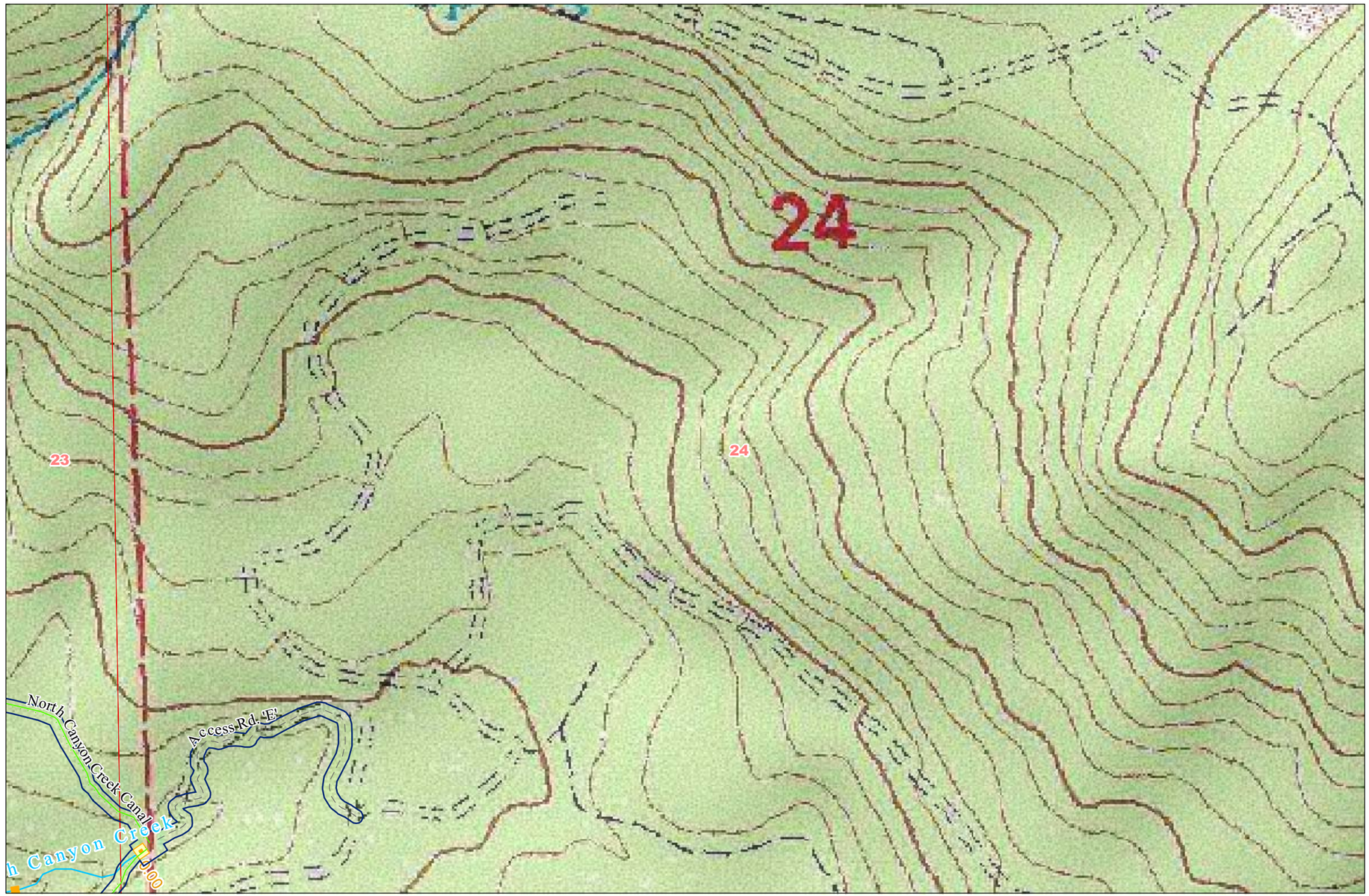
Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map A
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



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Elderberry
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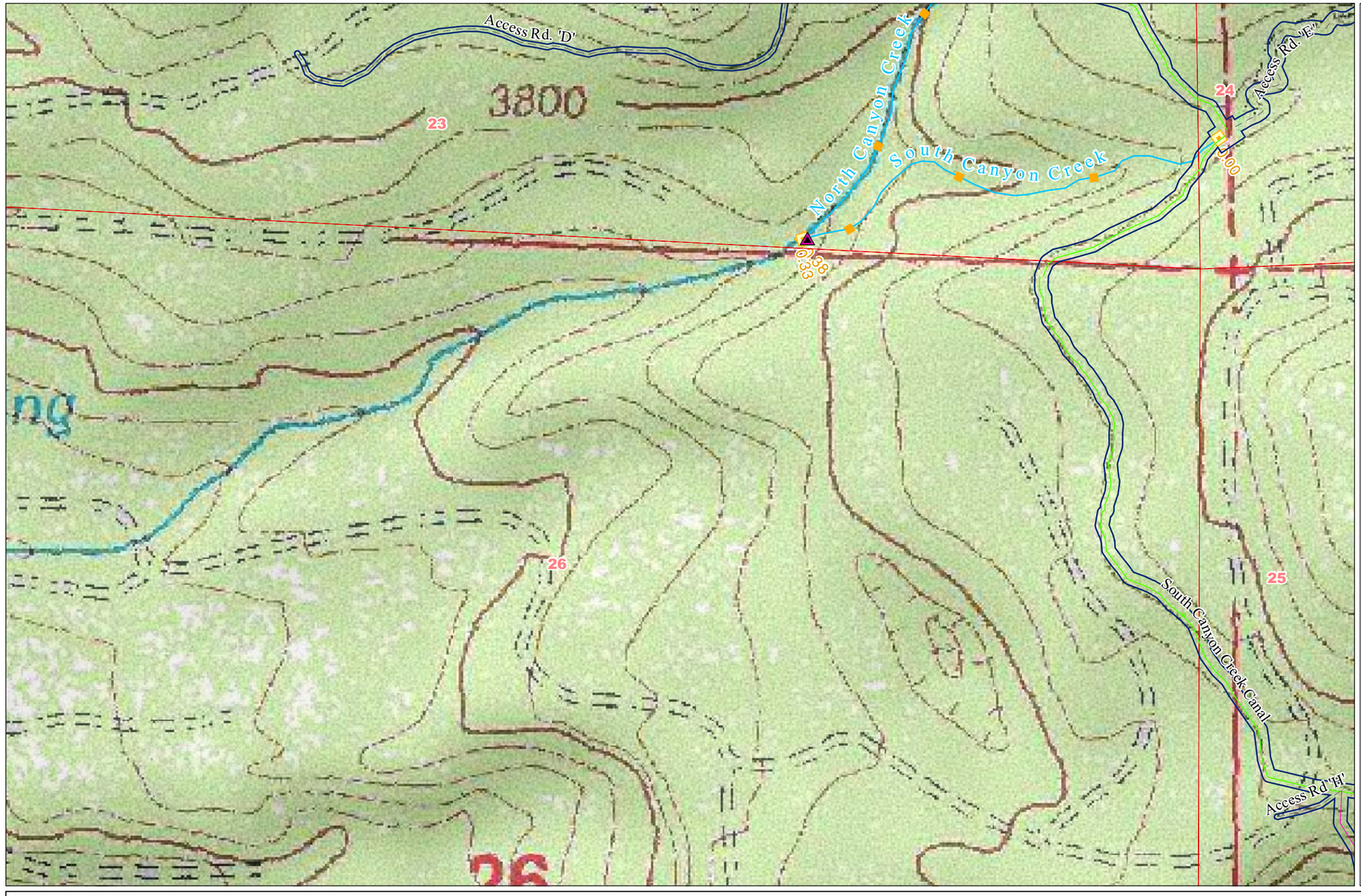
N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map B
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
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Diversion

ENTRIX Observed Species

Elderberry
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Diverted Reach

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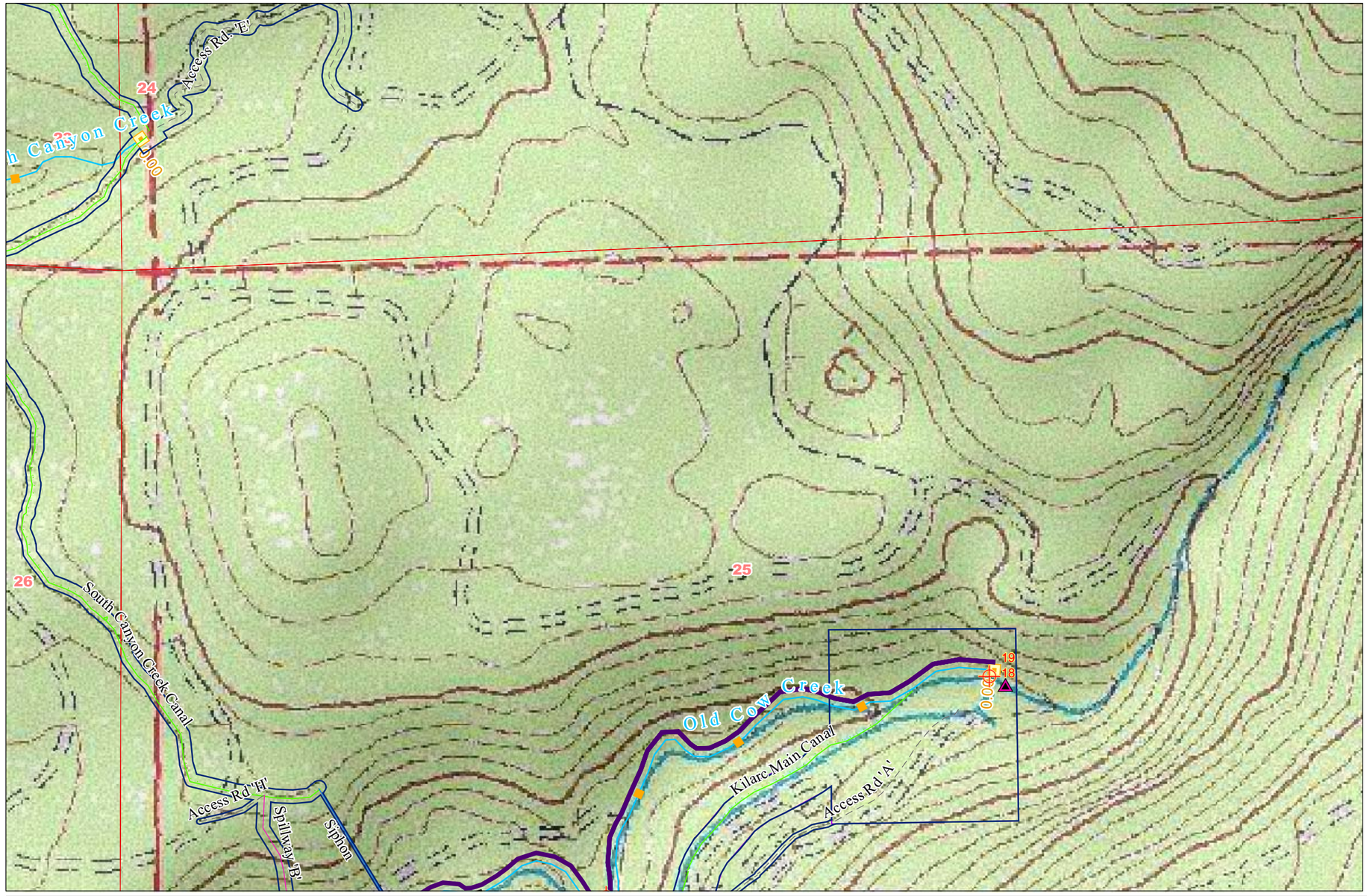
N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map C
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
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Osprey
Pond Turtle
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PG&E Miscellaneous
PG&E Facility
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Spillway
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PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

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N W E S

Projection: UTM Zone 10
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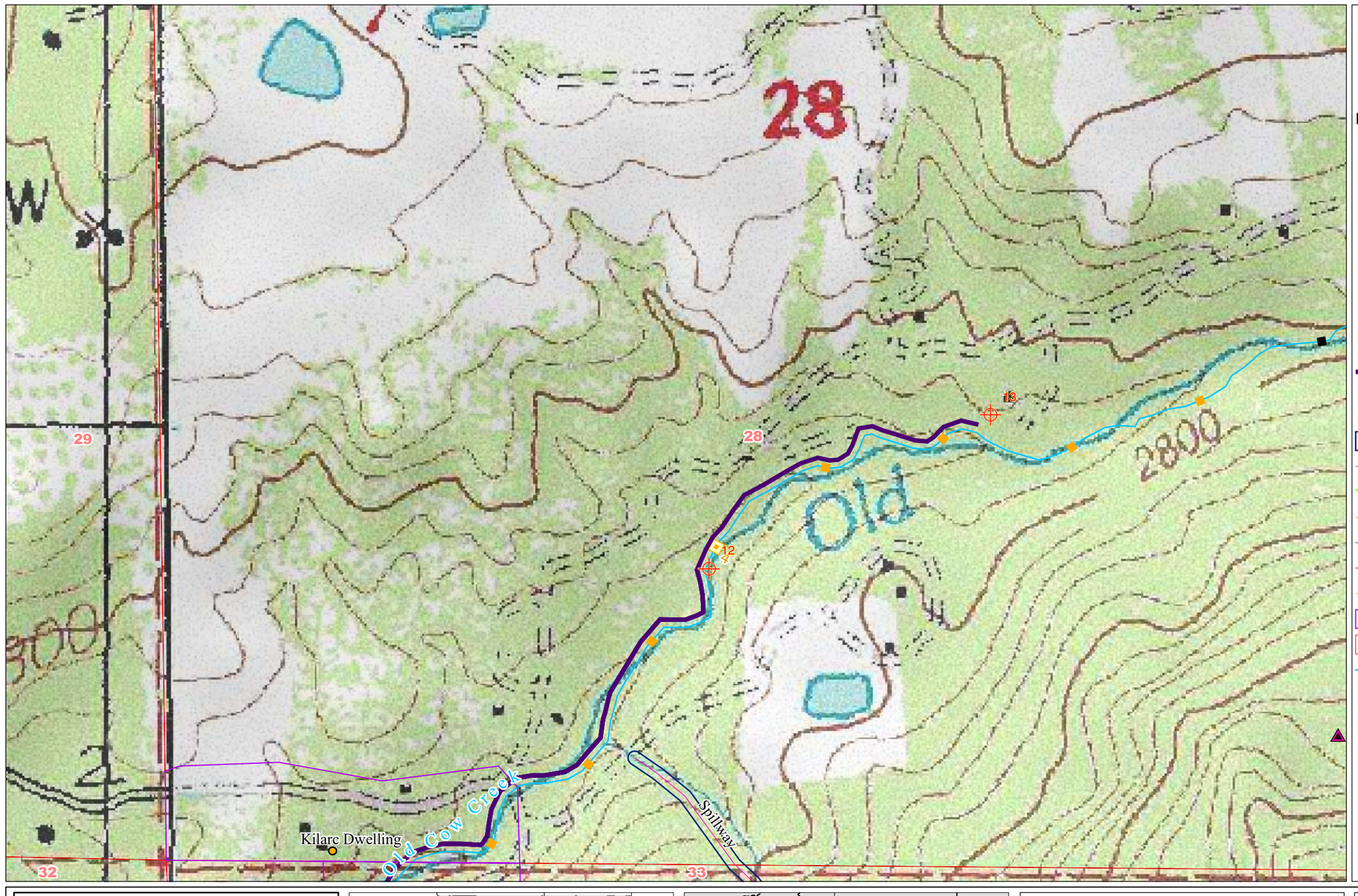
			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map D
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
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Elderberry
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PG&E Facility
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Spillway
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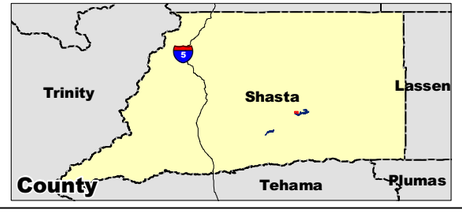
1:5,000

0 150 300 600 900 Feet

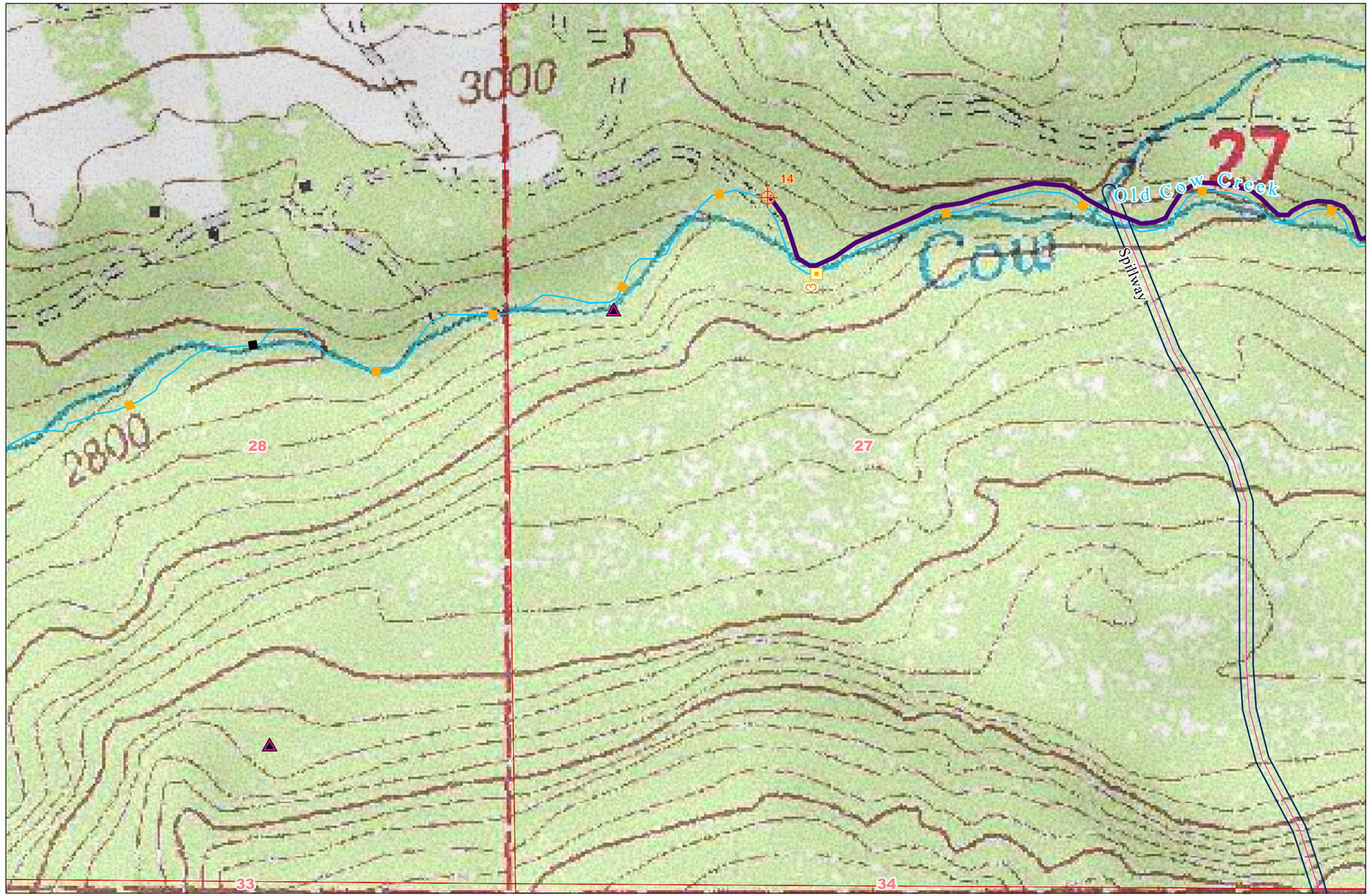
N W E S

Projection: UTM Zone 10
Datum: NAD83



			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map E
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
FERC Boundary
Access Road
Canal
Penstock
Siphon
Spillway
Trail
PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

1:5,000

0 150 300 600 900 Feet

N
W E
S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map F
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

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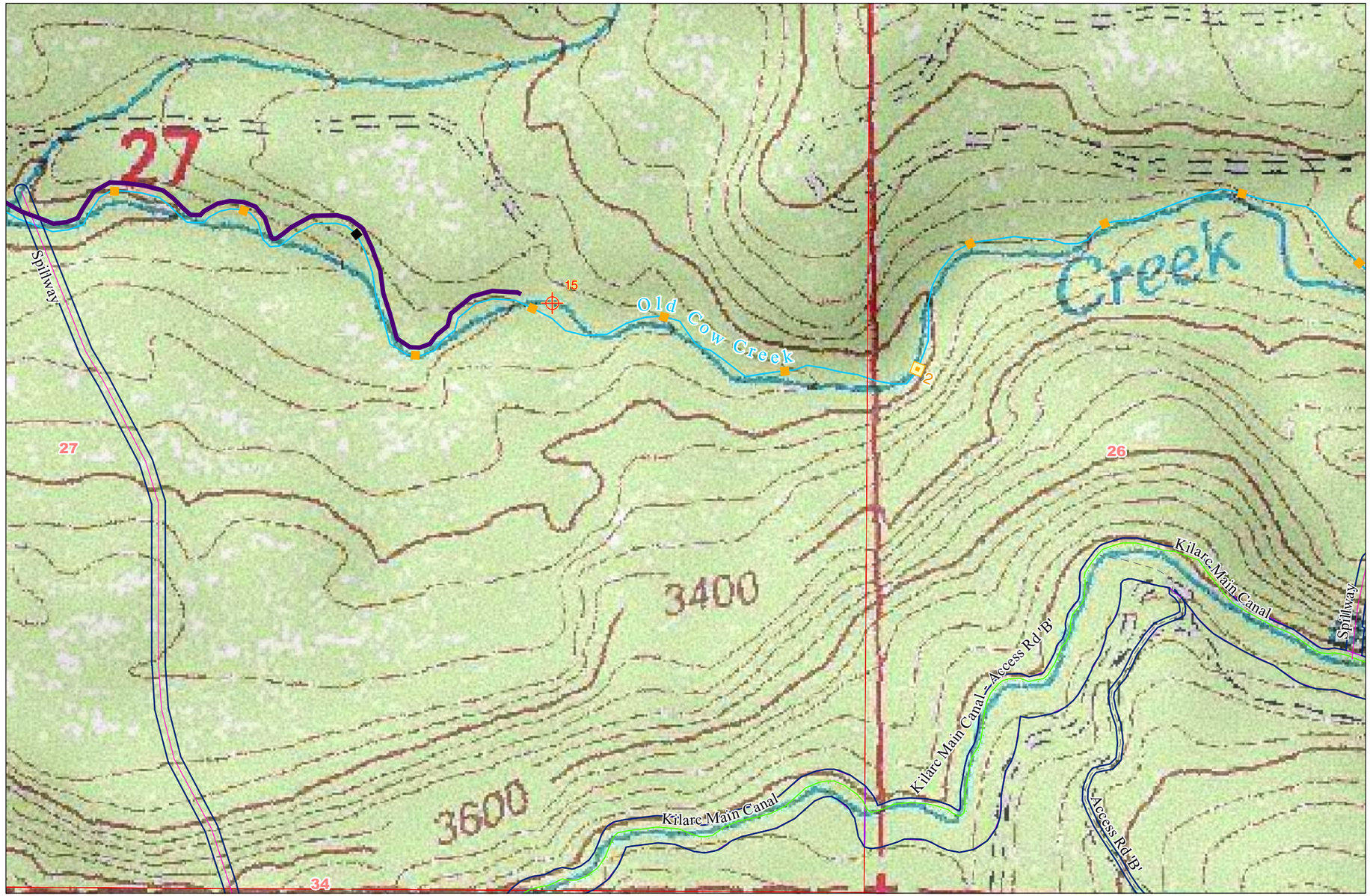

- Milepost
- Half Mile Milepost
- Tenth Mile Milepost
- Diversion

ENTRIX Observed Species

- Elderberry
- Mountain Lady Slipper
- Osprey
- Pond Turtle
- Yellow-legged Frog
- Transect Start/End Point
- Frog Survey Transect
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- Access Road
- Canal
- Penstock
- Siphon
- Spillway
- Trail
- PG&E Property
- U.S. Public Land Survey System Section
- Diverted Reach

1:5,000

0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map G
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

- Milepost
- Half Mile Milepost
- Tenth Mile Milepost
- Diversion

ENTRIX Observed Species

- Elderberry
- Mountain Lady Slipper
- Osprey
- Pond Turtle
- Yellow-legged Frog
- Transect Start/End Point
- Frog Survey Transect
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- Access Road
- Canal
- Penstock
- Siphon
- Spillway
- Trail
- PG&E Property
- U.S. Public Land Survey System Section
- Diverted Reach

1:5,000

0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map H
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

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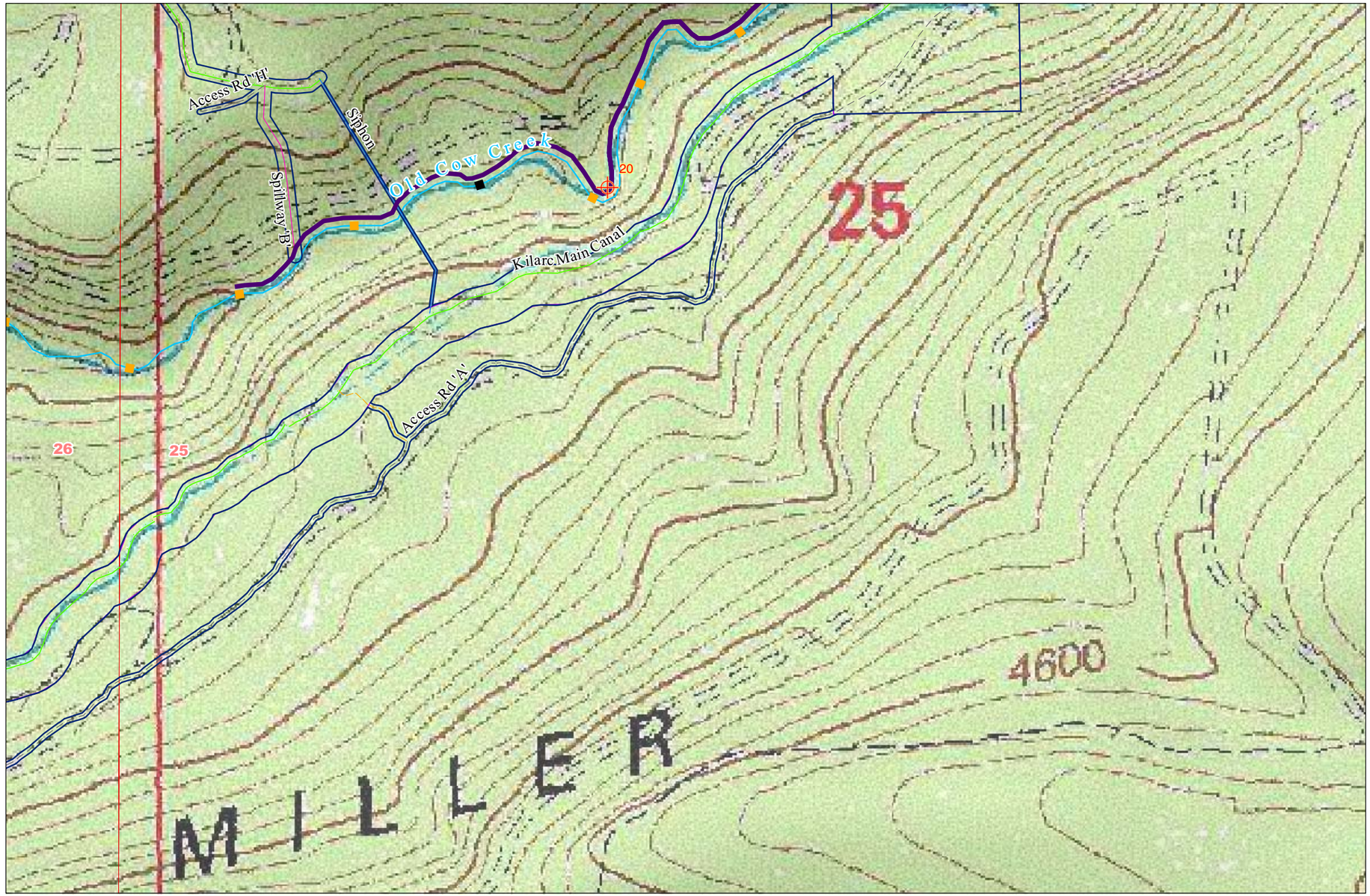


Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
FERC Boundary
Access Road
Canal
Penstock
Siphon
Spillway
Trail
PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

1:5,000

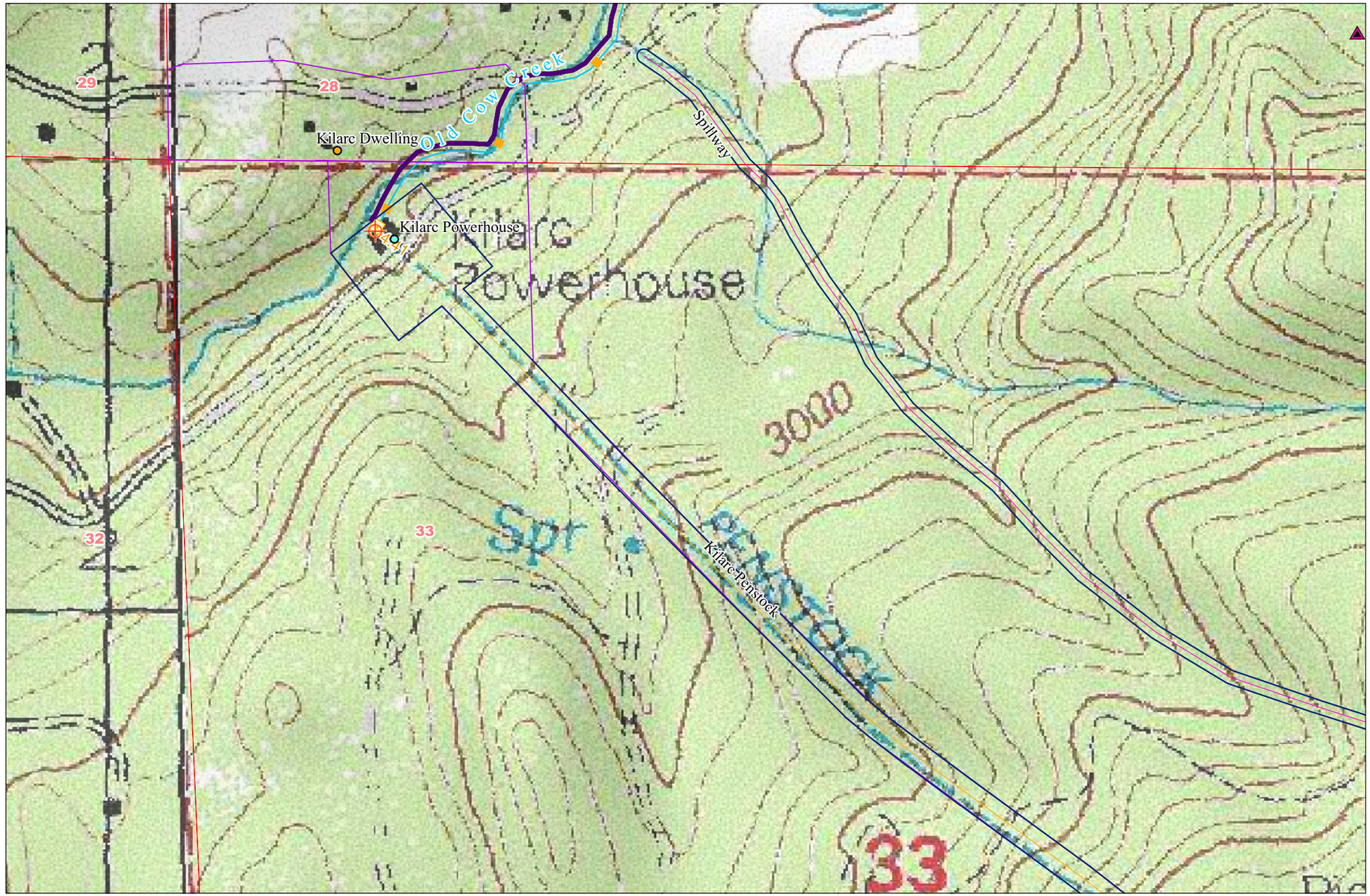
0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

				Map A	Map B
				Map C	Map D
Map E	Map F	Map G	Map H	Map I	
Map J	Map K	Map L	Map M		
Map N	Map O				

Figure 2
Map I
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



- Milepost
- Half Mile Milepost
- Tenth Mile Milepost
- Diversion

ENTRIX Observed Species

- Elderberry
- Mountain Lady Slipper
- Osprey
- Pond Turtle
- Yellow-legged Frog
- Transect Start/End Point
- Frog Survey Transect
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- Access Road
- Canal
- Penstock
- Siphon
- Spillway
- Trail
- PG&E Property
- U.S. Public Land Survey System Section
- Diverted Reach

1:5,000

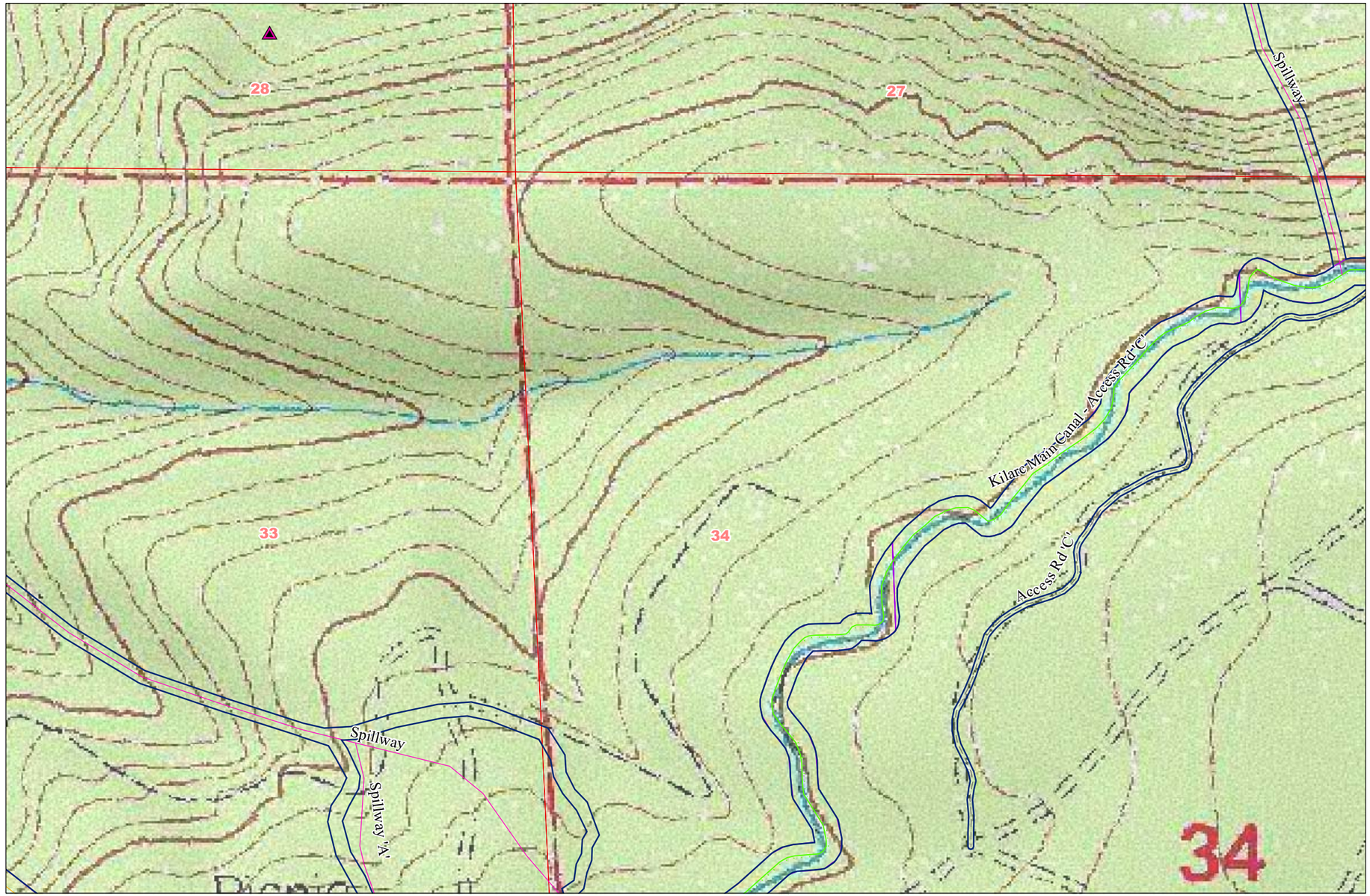
0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map J
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

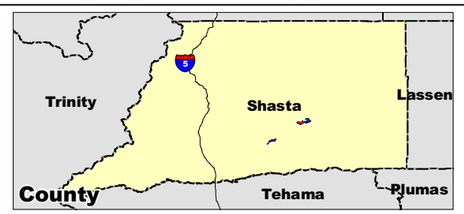
ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
FERC Boundary
Access Road
Canal
Penstock
Siphon
Spillway
Trail
PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

1:5,000

0 150 300 600 900 Feet

Projection: UTM Zone 10
Datum: NAD83



			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map K
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
FERC Boundary
Access Road
Canal
Penstock
Siphon
Spillway
Trail
PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

1:5,000

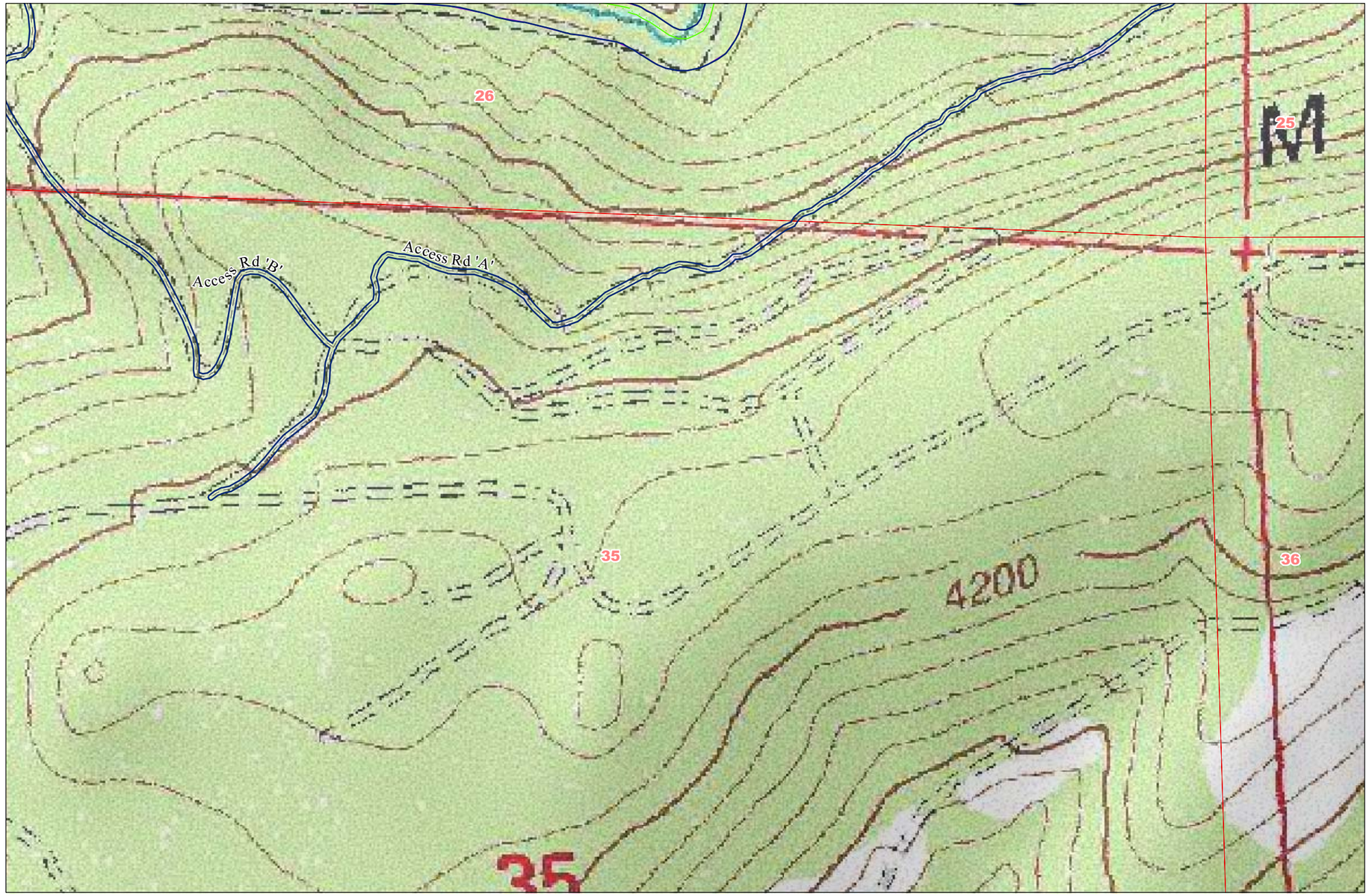
0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map L
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
FERC Boundary
Access Road
Canal
Penstock
Siphon
Spillway
Trail
PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

1:5,000

0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map M
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

Milepost
Half Mile Milepost
Tenth Mile Milepost
Diversion

ENTRIX Observed Species

Elderberry
Mountain Lady Slipper
Osprey
Pond Turtle
Yellow-legged Frog
Transect Start/End Point
Frog Survey Transect
PG&E Miscellaneous
PG&E Facility
FERC Boundary
Access Road
Canal
Penstock
Siphon
Spillway
Trail
PG&E Property
U.S. Public Land Survey System Section
Diverted Reach

1:5,000

0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map N
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys

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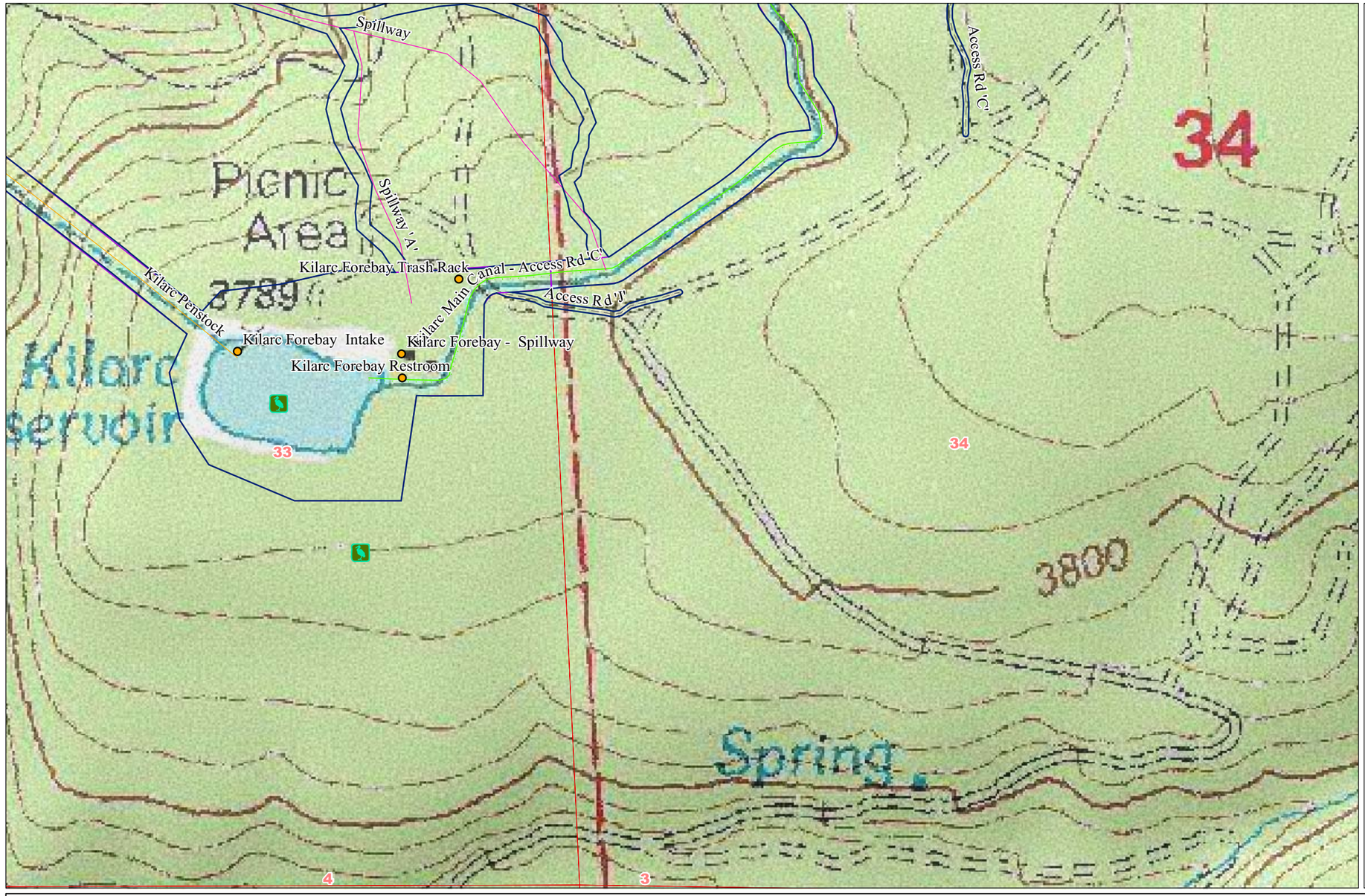


- Milepost
- Half Mile Milepost
- Tenth Mile Milepost
- Diversion

ENTRIX Observed Species

- Elderberry
- Mountain Lady Slipper
- Osprey
- Pond Turtle
- Yellow-legged Frog
- Transect Start/End Point
- Frog Survey Transect
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- Access Road
- Canal
- Penstock
- Siphon
- Spillway
- Trail
- PG&E Property
- U.S. Public Land Survey System Section
- Diverted Reach

1:5,000

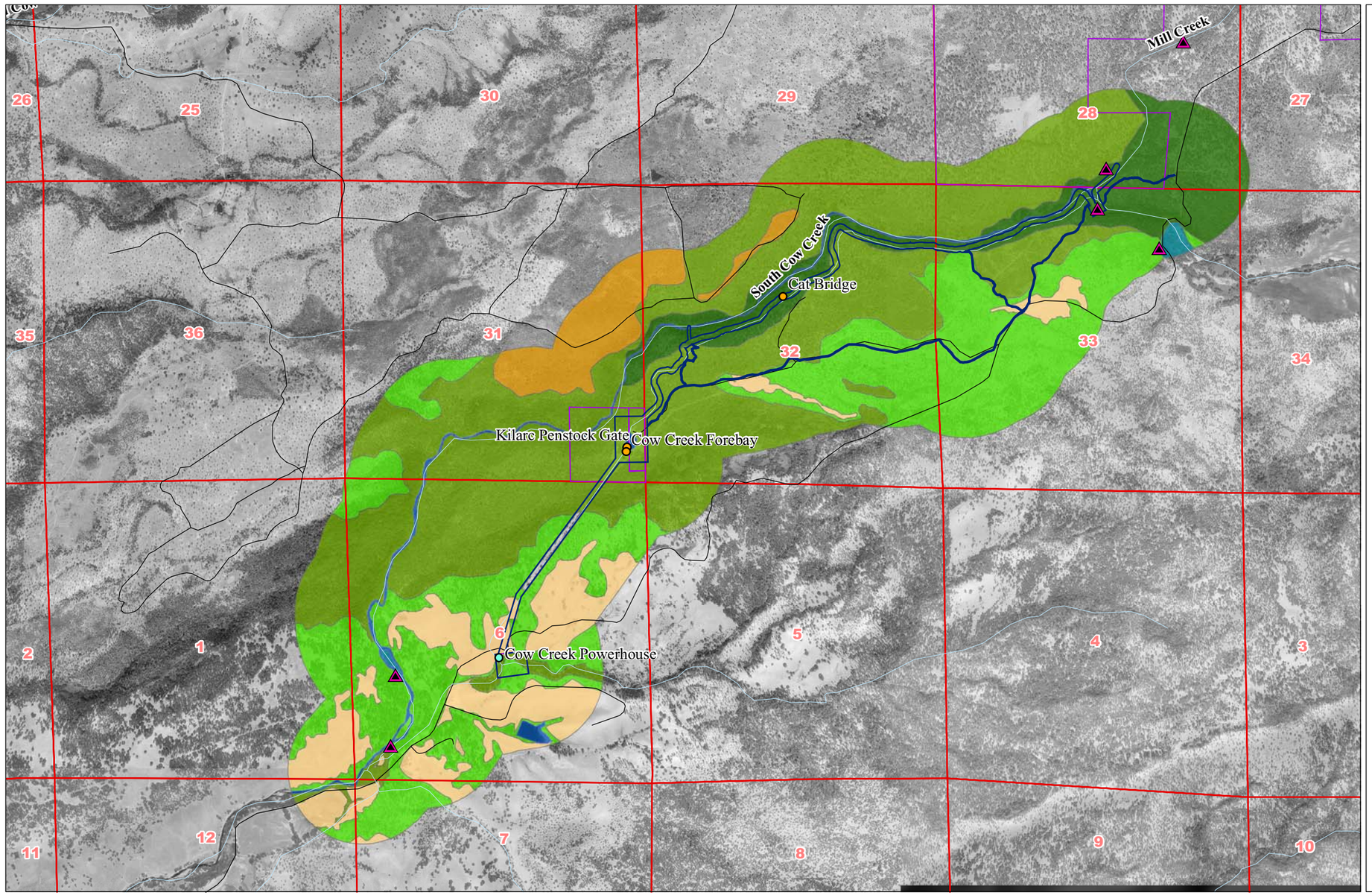
0 150 300 600 900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

			Map A	Map B
			Map C	Map D
Map E	Map F	Map G	Map H	Map I
Map J	Map K	Map L	Map M	
Map N	Map O			

Figure 2
Map O
Kilarc-Cow Creek Project
Old Cow Creek Study Area
Special-Status Wildlife Species
Observed during 2003 Surveys



Vegetation Community

- Annual grassland-chaparral-young forest
- Bare ground
- Blue oak-foothill pine woodland
- Developed
- Interior live oak woodland
- Non-native annual grassland
- Northern mixed chaparral
- Ponderosa plantation
- Riparian forest (white alder and mixed)
- Sierran mixed coniferous forest
- Water
- Diversion
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- Stream
- PG&E Property
- U.S. Public Land Survey System Section
- Road

1:24,000

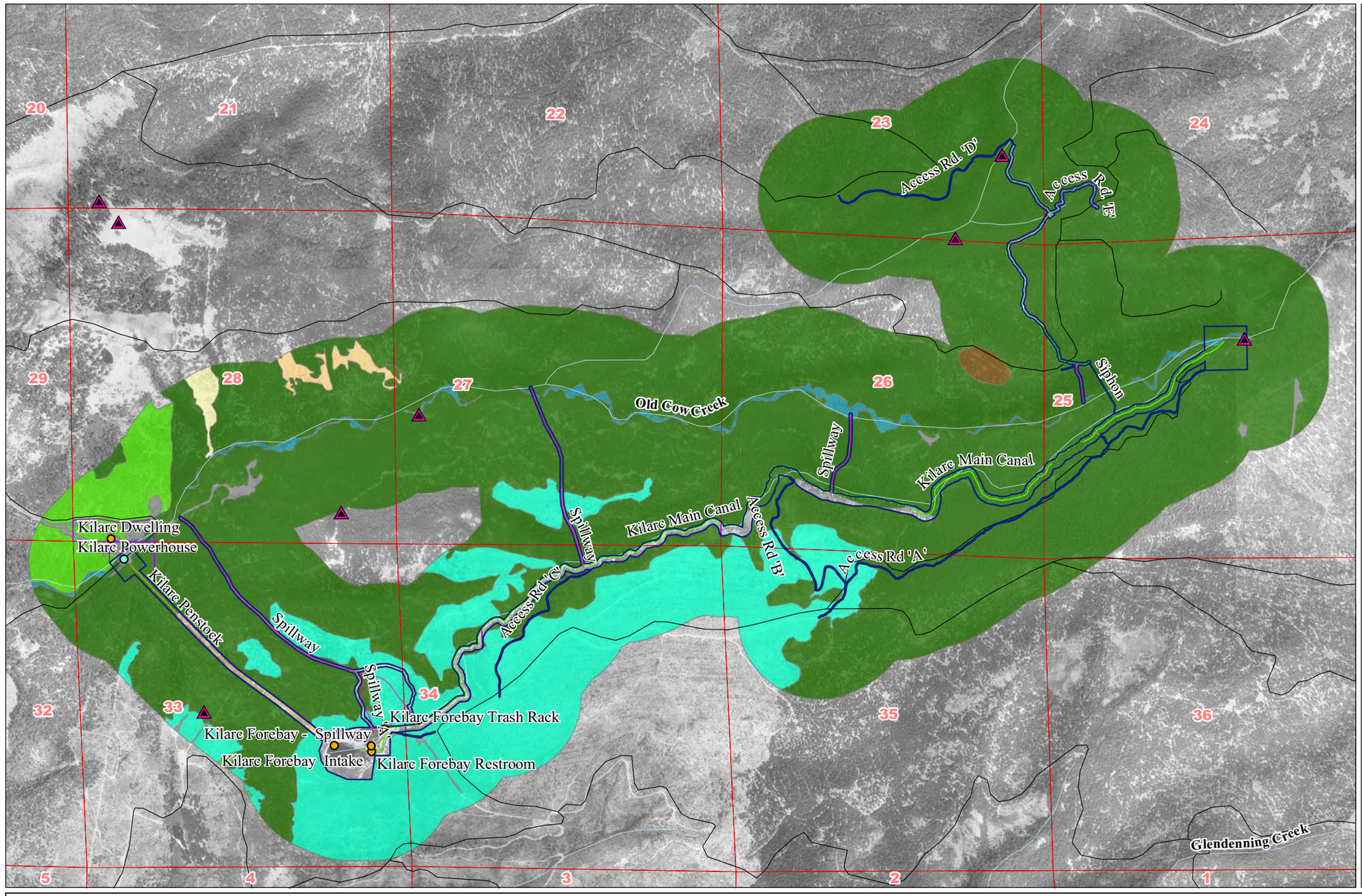
0 625 1,250 2,500 3,750 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

Figure 3

Kilarc-Cow Creek Project
South Cow Creek Study Area
Vegetation Communities and Wildlife Habitats



Vegetation Community

- Annual grassland-chaparral-young forest
- Bare ground
- Blue oak-foothill pine woodland
- Developed
- Interior live oak woodland
- Non-native annual grassland
- Northern mixed chaparral
- Ponderosa plantation
- Riparian forest (white alder and mixed)
- Sierran mixed coniferous forest
- Water
- Diversion
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- PG&E Property
- U.S. Public Land Survey System Section
- Stream
- Road

1:22,000

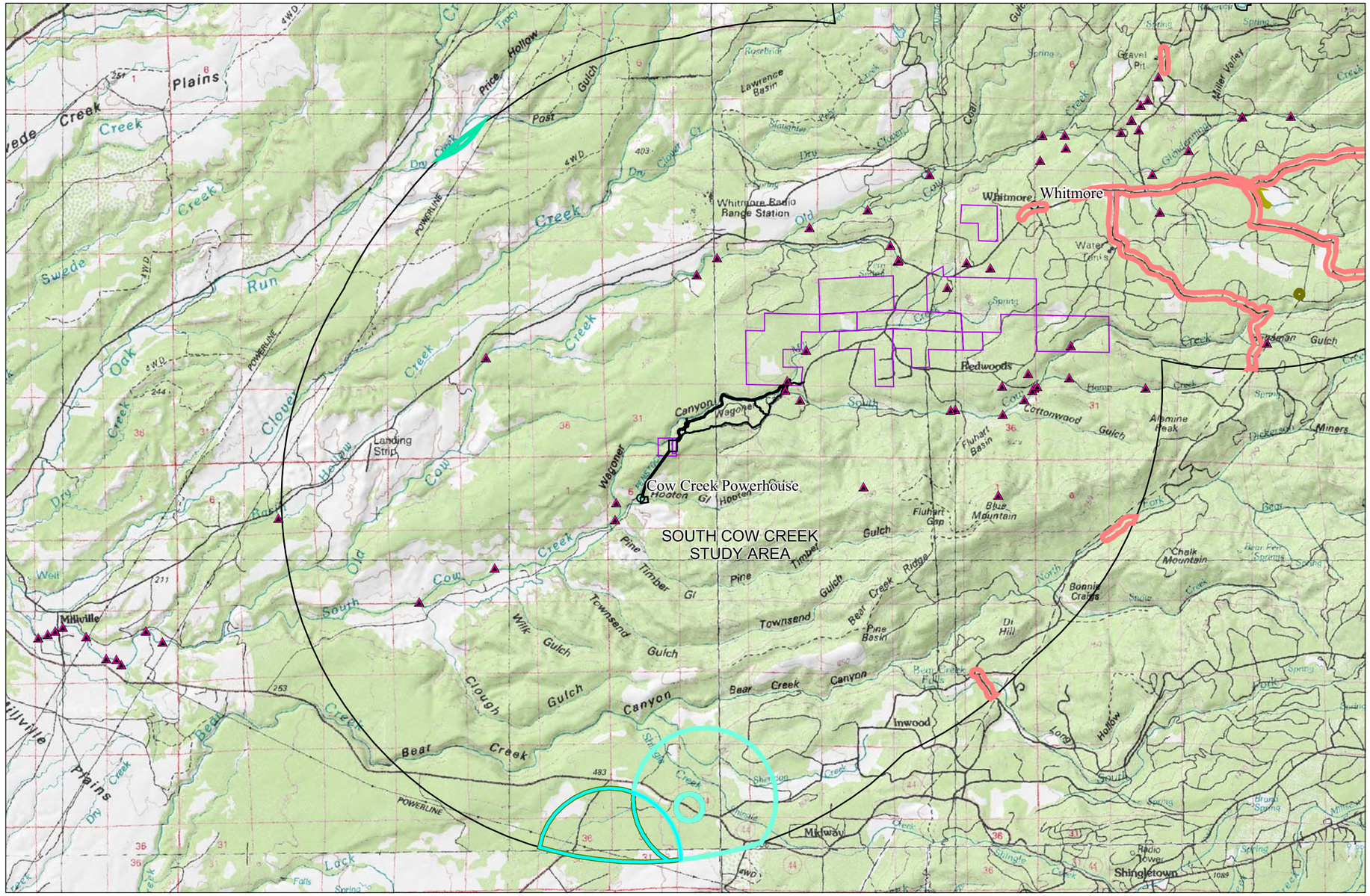
0 650 1,300 2,600 3,900 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

Figure 4

Kilarc-Cow Creek Project
Old Cow Creek Study Area
Vegetation Communities and Wildlife Habitats



CNDDB Species Occurence

- Ahart's Paronychia
- Butte County Fritillary
- Foothill Yellow-legged Frog
- Henderson's Bent Grass
- Northern Goshawk
- Northern Interior Cypress Forest
- Northwestern Pond Turtle
- Shasta Clarkia
- Silky Cryptantha
- Diversion
- PG&E Facility
- FERC Boundary
- Stream
- PG&E Property
- U.S. Public Land Survey System Section
- Road

The above species are listed by the CNDDB as Federal Species of Concern with the exception of Northern Interior Cypress Forest which caries no Federal ESA listing status.

1:100,000

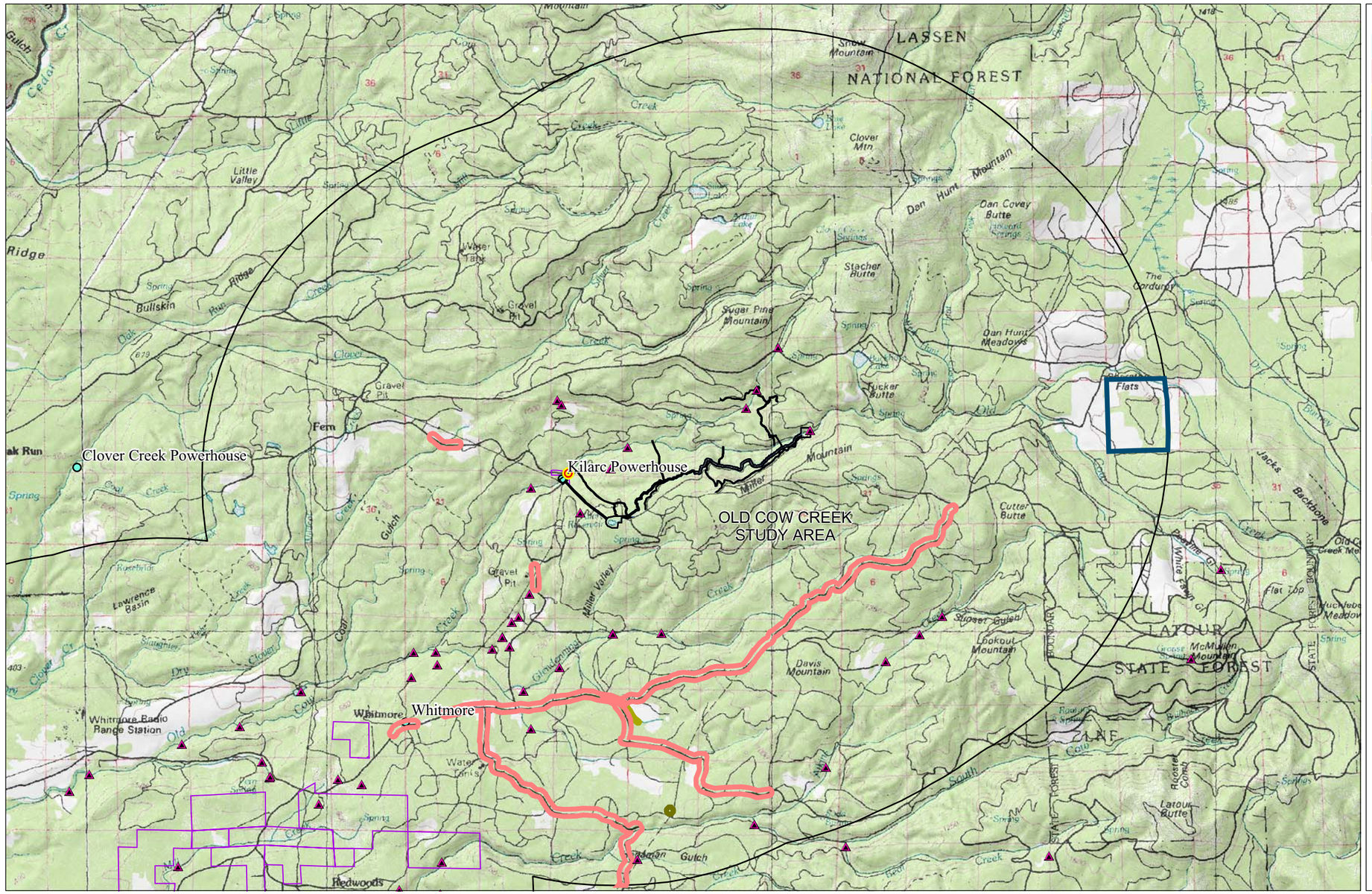
0 3,400 6,800 13,600 20,400 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

Figure 5

Kilarc-Cow Creek Project
South Cow Creek Study Area
CNDDB Special Status Species Occurences



CNDDB Species Occurence

- Ahart's Paronychia
- Butte County Fritillary
- Foothill Yellow-legged Frog
- Henderson's Bent Grass
- Northern Goshawk
- Northern Interior Cypress Forest
- Northwestern Pond Turtle
- Shasta Clarkia
- Silky Cryptantha
- Diversion
- PG&E Facility
- FERC Boundary
- Stream
- PG&E Property
- U.S. Public Land Survey System Section
- Road

The above species are listed by the CNDDB as Federal Species of Concern with the exception of Northern Interior Cypress Forest which caries no Federal ESA listing status.

1:100,000

0 3,400 6,800 13,600 20,400 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

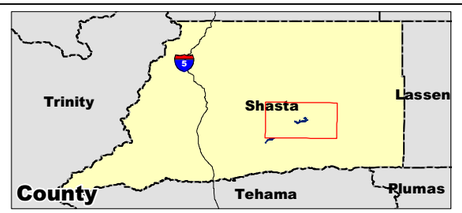
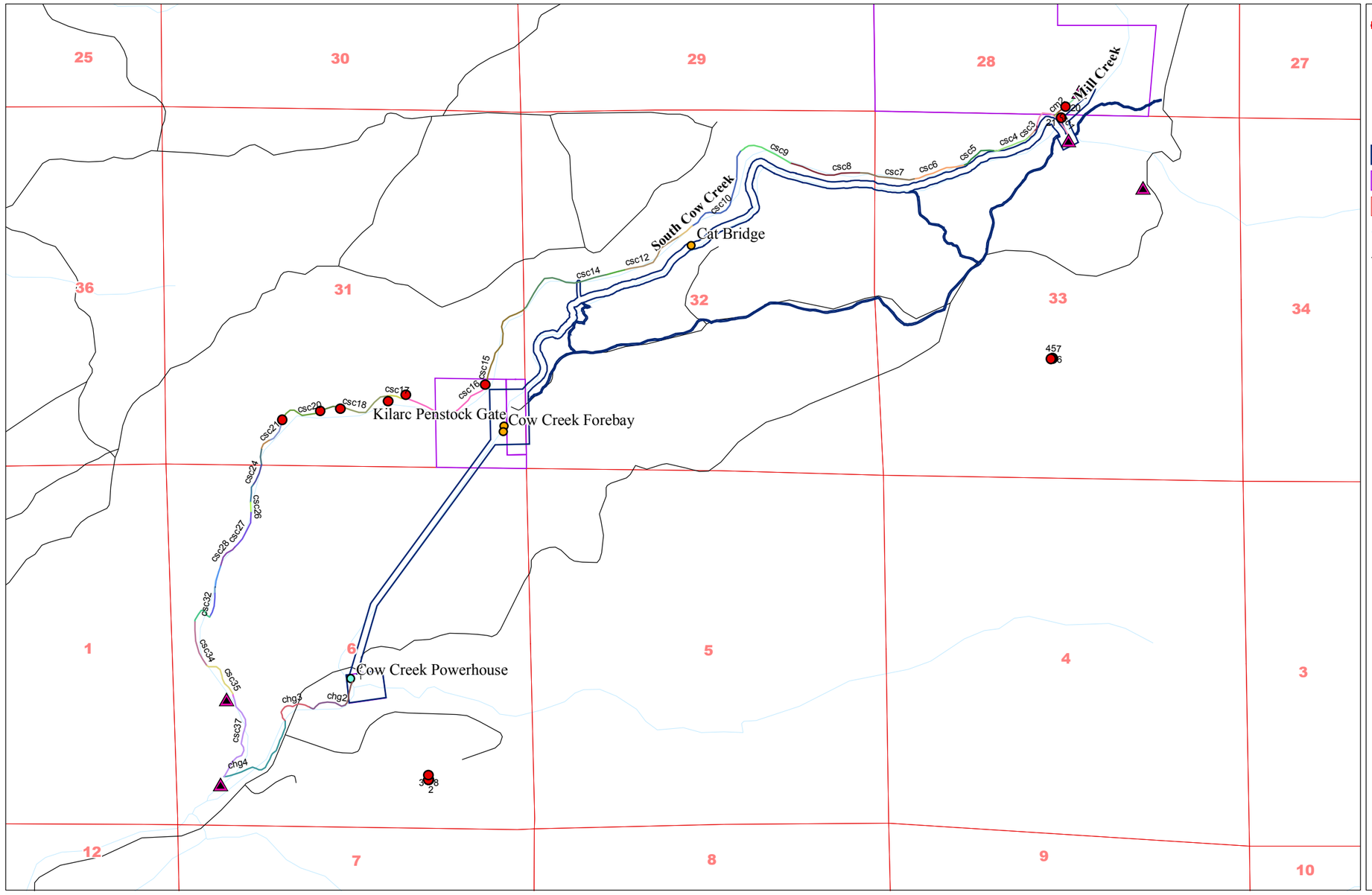


Figure 6

Kilarc-Cow Creek Project
Old Cow Creek Study Area
CNDDB Special Status Species Occurences



Riparian Vegetation Survey Reach
(See Table F-1 Appendix E for more details)

- kcrippnts point
- Diversion
- PG&E Miscellaneous
- PG&E Facility
- FERC Boundary
- PG&E Property
- U.S. Public Land Survey System Section
- Stream
- Road

1:20,000

0 600 1,200 2,400 3,600 Feet

N W E S

Projection: UTM Zone 10
Datum: NAD83

Figure 7

Kilarc-Cow Creek Project
South Cow Creek Study Area
Riparian Vegetation Survey Reaches

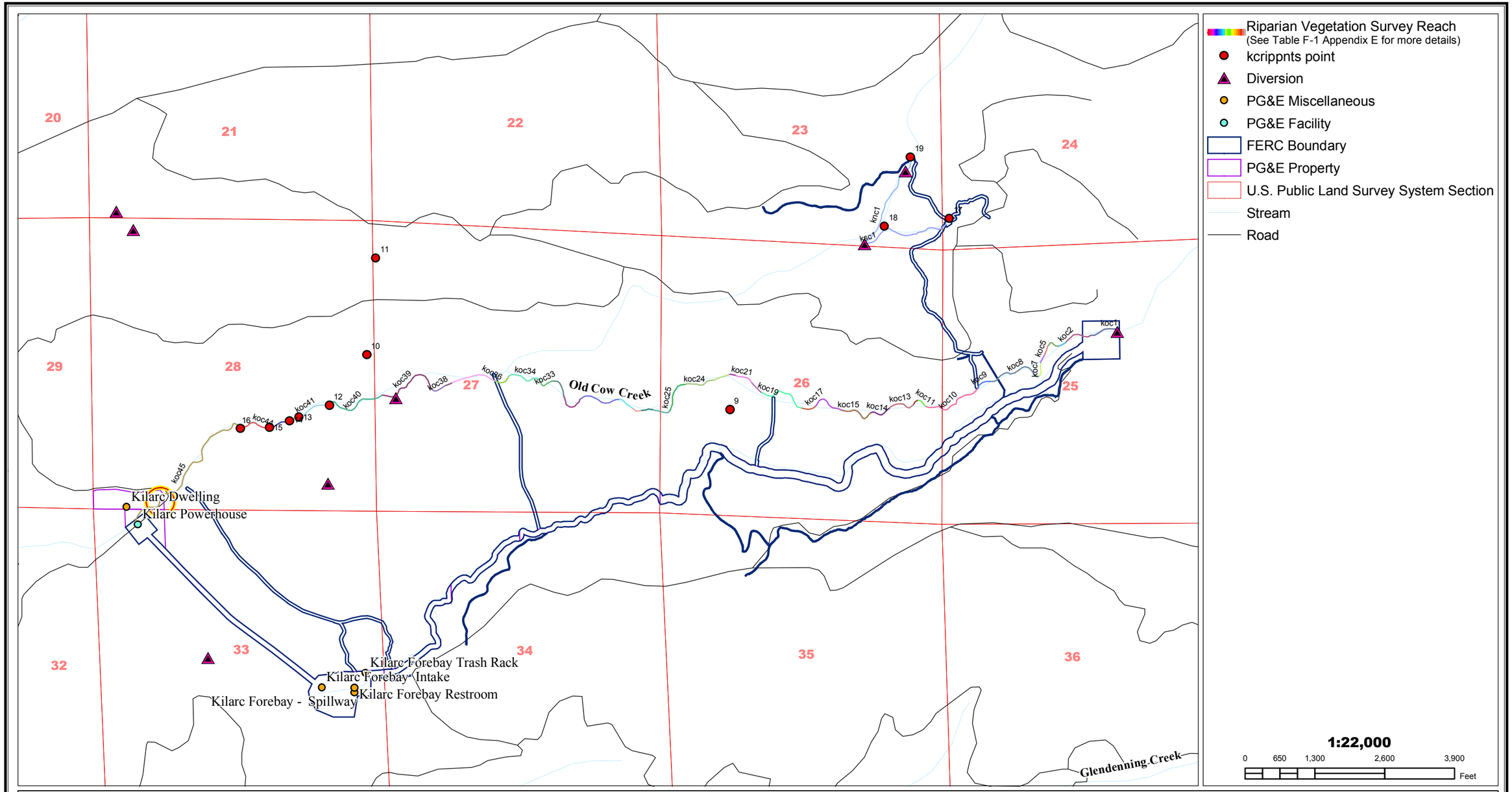


Figure 8

Kilarc-Cow Creek Project
Old Cow Creek Study Area
Riparian Vegetation Survey Reaches

APPENDIX A

FOOTHILL YELLOW-LEGGED FROG HABITAT PHOTOS

Table of Contents

Photo 1. South Cow Creek, Subsite 57 C, Downstream of the Diversion where a Foothill Yellow-legged Frog was Found

Photo 2. South Cow Creek, Subsite 50B and 50C, Downstream End of Bypass Reach where Foothill Yellow-legged Frogs were Found

Photo 3. South Cow Creek, Upstream End of Subsite 50D Looking Downstream where Foothill Yellow Frogs were Found

Photo 4. Hooten Gulch, Subsite 64A where Foothill Yellow-Legged Frogs were Found

Photo 5. Hooten Gulch, Subsite 64B where a Foothill Yellow-Legged Frog was Found

Photo 6. South Cow Creek, Downstream End of Survey Site 50 Looking Upstream

Photo 7. South Cow Creek, Upstream End of Survey Site 50 Looking Downstream

Photo 8. South Cow Creek, Downstream End of Bypass Reach where Foothill Yellow-legged Frogs were Found

Photo 9. South Cow Creek, Side Channel where Foothill Yellow-legged Frogs were Found

Photo 10. South Cow Creek, Downstream End of Subsite 50D Looking Upstream

Photo 11. South Cow Creek, Subsite 50A where Bullfrog Tadpoles were Observed

Photo 12. South Cow Creek, Subsite 50B where Foothill Yellow-legged Frogs were Found

Photo 13. South Cow Creek, Site 57, Typical Habitat

Photo 14. South Cow Creek, Site 57, Typical Habitat

Photo 15. South Cow Creek, Site 57A

Photo 16. South Cow Creek, Site 57B

Photo 17. Mill Creek Downstream of Diversion Dam

Photo 18. Old Cow Creek, Site 1 Upstream of Kilarc Powerhouse, Typical Habitat

Photo 19. Old Cow Creek, Site 1 Upstream of Kilarc Powerhouse, Typical Habitat

Photo 20. Old Cow Creek, Site 1 where a Bullfrog was Found

Photo 21. Old Cow Creek, Site 3, Downstream End Looking Upstream

Photo 22. Old Cow Creek, Site 3, Upstream End Looking Downstream

Photo 23. Old Cow Creek, Site 3A

Photo 24. Old Cow Creek, Site 3B

Photo 25. Old Cow Creek, Site 8, Upstream End Looking Downstream

Photo 26. Old Cow Creek, Site 8, Downstream End Looking Upstream

Photo 27. Old Cow Creek, Subsite 8A Looking Upstream

Photo 28. South Cow Creek Main Canal

Photo 29. Kilarc Main Canal

APPENDIX B

Wildlife and Plant Species Observed During Wildlife and Botanical Resource Studies

Table B-1: Wildlife Species Observed During Field Surveys
acorn woodpecker
American coot
American robin
aquatic garter snake
belted kingfisher
black phoebe
bobcat
Botta's pocket gopher
Brewer's blackbird
bullfrog
California ground squirrel
California quail
California towhee
Canadian goose
chipmunks
common merganser turkey vulture
common raven
coyote
dark-eyed junco
foothill yellow-legged frogs
golden eagle
great blue heron
great egret
great horned owl
house finch
house sparrow
Jack rabbit
killdeer
mallard
Mountain chickadee
mountain quail
mourning dove
mule deer
northern flicker
northern mockingbird
northwestern pond turtle
osprey
Pacific treefrog
raccoon
red-tailed hawk
redwinged blackbird
rough-skin newt
song sparrow
Steller's jay
western fence lizard
western gray squirrel
Western meadowlark
western scrub jay
western wood-pewee
Wood duck
yellow rumped warbler

Table B-2: Plant Species Observed During Field Surveys [partial]

Scientific Name	Common Name	Native /Exotic	Family
Abies concolor	white fir	n	Pinaceae
Acer circinatum	vine maple	n	Aceraceae
Acer macrophyllum	bigleaf maple	n	Aceraceae
Achillea millefolium	yarrow	n	Asteraceae
Achyrachaena mollis	blow-wives	n	Asteraceae
Adenocaulon bicolor	trail plant	n	Asteraceae
Adiantum sp.	maiden-hair fern	n	Pteridaceae
Aesculus californica	California buckeye	n	Hippocastanaceae
Aira caryophyllea	silver hairgrass	x	Poaceae
Allium amplectens	narrowleaf onion	n	Liliaceae
Alnus rhombifolia	alder	n	Betulaceae
Apocynum cannabinum	Indian hemp	n	Apocynaceae
Arabidopsis thaliana (cf)	mouse-ear cress	n	Brassicaceae
*Arctostaphylos*spp.	manzanita	n	Ericaceae
Arctostaphylos viscida ssp. viscida	smooth white manzanita	n	Ericaceae
Aristolochia californica	California dutchman's pipe	n	Aristolochiaceae
Asarum hartwegii	Hartweg's wildginger	n	Aristolochiaceae
Athysanus pusillus	common sandweed	n	Brassicaceae
Avena sp.	wild oats	x	Poaceae
Barbarea orthoceras	American yellowrocket	n	Brassicaceae
Berberis aquifolium var. repens	creeping Oregon grape	n	Berberidaceae
Brickellia sp.	brickellbush	n	Asteraceae
Bromus diandrus	ripgut brome	x	Poaceae
Bromus hordeaceus	soft chess	x	Poaceae
Bromus madritensis ssp. rubens	red brome	x	Poaceae
Callitriche sp.	waterstarwort	n	Callitrichaceae
Calocedrus decurrens	incense cedar	n	Cupressaceae
Calochortus monophyllus	yellow startulip	n	Liliaceae
Calochortus tolmiei	Tolmie startulip	n	Liliaceae
Calyptridium sp.	pussypaws	n	Portulacaceae
Cardamine californica	milkmaids	n	Brassicaceae
Cardaria pubescens	whitetop	x	Brassicaceae
Carex spp.	sedges	n	Cyperaceae
Castilleja applegatei ssp. pinetorum	wavyleaf paintbrush	n	Scrophulariaceae
Castilleja attenuata	valley tassels	n	Scrophulariaceae
Ceanothus cuneatus	buckbrush	n	Rhamnaceae
Ceanothus integerrimus	deerbrush	n	Rhamnaceae
Ceanothus prostratus	squawcarpet	n	Rhamnaceae
Centaurea solstitialis	yellow star thistle	x	Asteraceae
Cerastium glomeratum	mouse-ear chickweed	x	Caryophyllaceae
Cercis occidentialis	California redbud	n	Fabaceae
Cercocarpus betuloides	birchleaf mountain	n	Rosaceae
Chamomilla suaveolens	pineapple weed	x	Asteraceae
Chimaphila umbellata	pipsissewa	n	Ericaceae
Chlorogalum sp.		?	Liliaceae
Chorizanthe polygonoides var. polygonoides	knotweed spineflower	n	Polygonaceae
Cirsium vulgare	bullthistle	x	Asteraceae

Table B-2: Plant Species Observed During Field Surveys [partial]

Scientific Name	Common Name	Native /Exotic	Family
Claytonia exigua ssp. exigua	pale springbeauty	n	Portulacaceae
Claytonia parviflora ssp. parviflora	narrowleaf miner's lettuce	n	Portulacaceae
Claytonia rubra ssp. rubra	red-stemmed miner's lettuce	n	Portulacaceae
Collinsia sparsiflora	spinster's blue eyed Mary	n	Scrophulariaceae
Cornus nuttallii	mountain dogwood	n	Cornaceae
Cornus sericea	creek dogwood	n	Cornaceae
Cynoglossum grande	Pacific hound's tongue	n	Boraginaceae
Cynosurus echinatus	dogtail grass	x	Poaceae
Darmera peltata	umbrella plant	n	Saxifragaceae
Delphinium nudicaule	red larkspur	n	Ranunculaceae
Dicentra formosa	Pacific bleedingheart	n	Papaveraceae
Dichelostemma multiflorum	Wild hyacinth	n	Liliaceae
Dodecatheon hendersonii	mosquito bills	n	Primulaceae
Equisetum sp.	scouring rush		Equisetaceae
Eriogonum sp.	wild buckwheat		Polygonaceae
Erodium cicutarium	redstem stork's bill	x	redstem stork's bill
Erysimum capitatum ssp. capitatum	western wallflower	n	Brassicaceae
Eschscholzia californica	California poppy	n	Papaveraceae
Euphorbia crenulata	Chinese caps	n	Euphorbiaceae
Fraxinus latifolia	Oregon ash	n	Oleaceae
Fritillaria recurva	scarlet fritillary	n	Liliaceae
Gilia sinistra ssp. sinistra	miniature gilia	n	Polemoniaceae
Gilia tricolor ssp. diffusa	bird's eyes	n	Polemoniaceae
Heuchera micrantha	crevice alumroot	n	Saxifragaceae
Hydrophyllum capitatum var. alpinum	woolen-breeches	n	Hydrophyllaceae
Hypericum perforatum	Klamath weed	x	Hypericaceae
Iris pseudacorus	pale yellow iris	n	Iridaceae
Juglans californica	California black walnut	n	
Juncus spp.	rushes	n	Juncaceae
Lathyrus sulphureus	snub peavine	n	Fabaceae
Lesquerella occidentalis ssp. occidentalis	western bladderpod	n	Brassicaceae
Limnanthes alba ssp. versicolor	white meadowfoam	n	Limnanthaceae
Linanthus parviflorus	false babystars	n	Polemoniaceae
Lithospermum ruderale	western gromwell	n	Boraginaceae
Lonicera	honeysuckle	?	Caprifoliaceae
Lonicera interrupta	chaparral honeysuckle	n	Caprifoliaceae
Lotus micranthus	desert deervetch	n	Fabaceae
Lotus wrangelianus	Chilean trefoil	n	Fabaceae
Lupinus bicolor	bicolor lupine	n	Fabaceae
Lupinus nanus	sky lupine	n	Fabaceae
Lupinus pachylobus	big-pod lupine	n	Fabaceae
Lupinus sp.	lupine		Fabaceae
Marah sp.	man-root, wild cucumber	n	Cucurbitaceae
Melissa officinalis	bee balm	x	Lamiaceae
Microseris acuminata	Sierra foothill silverpuffs	n	Asteraceae
Mimulus bicolor	yellow and white monkeyflower	n	Scrophulariaceae
Minuartia californica	California sandwort	n	Caryophyllaceae

Table B-2: Plant Species Observed During Field Surveys [partial]

Scientific Name	Common Name	Native /Exotic	Family
Nemophila pedunculata	meadow nemophila	n	Hydrophyllaceae
Odontostomum hartwegii	Hartweg's odontostomum	n	Liliaceae
Osmorhiza chilensis	sweetcicely	n	Apiaceae
Paxistima myrsinites	Oregon boxwood	n	Celastraceae
Pectocarya pusilla	little combseed	n	Boraginaceae
Pedicularis densiflora	Indian warrior	n	Scrophulariaceae
Petrorhagia dubia	hairypink	x	Caryophyllaceae
Phlox gracilis	annual phlox	n	Polemoniaceae
Phoradendron villosum	Pacific mistletoe	n	Viscaceae
Pinus ponderosa	ponderosa pine	n	Pinaceae
Plagiobothrys austinae	Austin's allocarya	n	Boraginaceae
Plagiobothrys canescens	grey popcornflower	n	Boraginaceae
Plagiobothrys fulvus	fulvous popcornflower	n	Boraginaceae
Plantago erecta	rock plantago	n	Plantaginaceae
Plantago lanceolata	narrowleaf plantain	x	Plantaginaceae
Platanus racemosa	western sycamore	n	*Platanaceae*
Plectritis ciliosa ssp. ciliosa	longspur seablush	n	Valerianaceae
Polystichum imbricans ssp. imbricans	cliff sword fern	n	Dryopteridaceae
Populus fremontii ssp. fremontii	Fremont's cottonwood	n	Salicaceae
Pseudotsuga menziesii var. menziesii	Douglas-fir	n	Pinaceae
Pteridium aquilinum	bracken fern	n	Dennstaedtiaceae
Pyrola picta	whiteveined wintergreen	n	Ericaceae
Quercus chrysolepis	canyon live oak	n	Fagaceae
Quercus douglasii	blue oak	n	Fagaceae
Quercus kelloggii	California black oak	n	Fagaceae
Quercus wislizenii	interior live oak	n	Fagaceae
Ranunculus glaberrimus	smooth buttercup	n	Ranunculaceae
Rhamnus rubra	Sierra coffeeberry	n	Rhamnaceae
Ribes nevadense	Sierra currant	n	Grossulariaceae
Ribes roezlii ssp. roezlii	Sierra gooseberry	n	Grossulariaceae
Rubus discolor	Himalayan blackberry	x	Rosaceae
Rubus laciniatus	cut-leaved blackberry	x	Rosaceae
Salix spp.	willow	n	Salicaceae
Sambucus sp.	elderberry	n	Caprifoliaceae
Sanicula bipinnatifida	purple sanicle	n	Apiaceae
Scirpus spp.	tules	n	Cyperaceae
Senecio triangularis	arrow butterweed	n	Asteraceae
Sisyrinchium bellum	blue eyed-grass	n	Iridaceae
Symphoricarpos sp.	snowberry	n	Caprifoliaceae
Taeniatherum caput-medusae	Medusa-head	x	Poaceae
Taraxacum officinale	common dandelion	x	Asteraceae
Taxus brevifolia	Pacific yew	n	Taxaceae
Thysanocarpus curvipes	sand fringepod	n	Brassicaceae
Tonella tenella	lesser baby innocence	n	Scrophulariaceae
Toxicodendron diversilobum	poison oak	n	Anacardiaceae
Tragopogon dubius	yellow salsify	x	Asteraceae
Trientalis latifolia	starflower woodland star	n	Primulaceae

Table B-2: Plant Species Observed During Field Surveys [partial]

Scientific Name	Common Name	Native /Exotic	Family
Trifolium depauperatum var. depauperatum	dwarf sack clover	n	Fabaceae
Trifolium dubium	shamrock	x	Fabaceae
Trifolium monanthum	mountain carpet clover	n	Fabaceae
Trifolium willdenovii	tomcat clover	n	Fabaceae
Trillium albidum	giant white wakerobin	n	Liliaceae
Triphysaria eriantha ssp. eriantha	butter 'n' eggs	n	Scrophulariaceae
Triteleia hyacinthina	white brodiaea	n	Liliaceae
Typha latifolia	broad-leaved cattail	n	Typhaceae
Umbellularia californica	California bay	n	Lauraceae
Verbascum blattaria	moth mullein	x	Scrophulariaceae
Vicia americana var. americana	American vetch	n	Fabaceae
Vicia villosa ssp. villosa	hairy vetch	x	Fabaceae
Viola bakeri	Baker's violet	n	Violaceae
Viola lobata ssp. integrifolia	violet	n	Violaceae
Vitis californica	California wild grape	n	Vitaceae
Vulpia microstachys var. confusa	confusing fescue	n	Poaceae

APPENDIX C

Riparian Vegetation Table

Table C-1: Riparian Communities Occurring in Project Area

Riparian Reach	Species Composition	Percent Cover	Average Height (ft.)	Unusual Mortality	Width of Riparian Zone (ft.)**
CHG1	cottonwood, white alder, valley oak, walnut, blackberry, willow, wild grape, redbud	85	50	No	15
CHG2	cottonwood, white alder, valley oak, walnut, blackberry, willow, wild grape, redbud	70	30	No	15
CHG3	cottonwood, white alder, valley oak, walnut, blackberry, willow, wild grape, redbud	80	50	No	20
CHG4	white alder, valley oak, blackberry, willow, wild grape, redbud	80	60	No	35*
CSC1	white alder, willow, blackberry, herbaceous, sedges	95	40	No	30
CSC2	white alder, ash, bigleaf maple, blackberry, willow, herbaceous, sedges,	90	20	No	10
CSC3	white alder, ash, bigleaf maple, willow, blackberry, herbaceous, sedges	90	10	No	25*
CSC4	white alder, ash, bigleaf maple, willow, blackberry, herbaceous, sedges	90	20	No	25
CSC5	white alder, ash, bigleaf maple, willow, blackberry, herbaceous, sedges	90	15	No	25
CSC6	white alder, ash, bigleaf maple, willow, blackberry, herbaceous, sedges	95	30	No	25
CSC7	white alder, ash, bigleaf maple, willow, blackberry, herbaceous, sedges	99	15	No	25
CSC8	white alder, ash, bigleaf maple, blackberry, herbaceous, sedges	95	15	No	40
CSC9	white alder, ash, bigleaf maple, California bay, blackberry, herbaceous, sedges	95	25	No	40
CSC10	white alder, willow, blackberry, herbaceous, sedges	95	25	No	20
CSC11	white alder, willow, blackberry, herbaceous, sedges	95	15	No	20
CSC12	white alder, bigleaf maple, ash, willow, blackberry, herbaceous, sedges	85	40	No	20
CSC13	white alder, bigleaf maple, ash, willow, blackberry, herbaceous, sedges	60	40	No	20
CSC14	white alder, bigleaf maple, ash, willow, blackberry, herbaceous, sedges	95	30	No	25
CSC15	white alder, willow, blackberry, herbaceous, sedges	99	20	No	20
CSC16	white alder, bigleaf maple, California bay, willow, blackberry, poison oak, herbaceous, sedges	95	35	No	20
CSC17	white alder, bigleaf maple, California bay, cottonwood, willow, blackberry, poison oak, herbaceous, sedges	95	35	No	40*
CSC18	white alder, bigleaf maple, California bay, willow, blackberry, poison oak, herbaceous, sedges	80	20	No	20
CSC19	white alder, bigleaf maple, California bay, willow, blackberry, poison oak, herbaceous, sedges	90	20	No	20
CSC20	white alder, California bay, cottonwood, creek dogwood, willow, blackberry, poison oak, herbaceous, sedges	90	15	No	25
CSC21	white alder, California bay, ash, willow, blackberry, poison oak, herbaceous, sedges	95	15	No	50*
CSC22	white alder, California bay, ash, willow, blackberry, poison oak, herbaceous, sedges	90	15	No	20
CSC23	white alder, California bay, ash, willow, blackberry, poison oak, herbaceous, sedges	95	15	No	40
CSC24	white alder, California bay, ash, willow, blackberry, poison oak, herbaceous, sedges	90	15	No	20
CSC25	white alder, willow, herbaceous, sedges	80	30	No	50*
CSC26	white alder, California bay, ash, willow, blackberry, poison oak, herbaceous, sedges	90	15	No	20
CSC27	white alder, California bay, ash, willow, blackberry, poison oak, herbaceous, sedges	90	20	No	50*
CSC28	white alder, cottonwood, ash, willow, blackberry, poison oak, herbaceous, sedges	95	20	No	25
CSC29	white alder, cottonwood, ash, willow, blackberry, poison oak, herbaceous, sedges	95	20	No	60*
CSC30	white alder, cottonwood, ash, willow, blackberry, poison oak, herbaceous, sedges	95	20	No	25

Table C-1: Riparian Communities Occurring in Project Area

Riparian Reach	Species Composition	Percent Cover	Average Height (ft.)	Unusual Mortality	Width of Riparian Zone (ft.)**
CSC31	white alder, cottonwood, willow, blackberry, poison oak, herbaceous, sedges	80	10	No	20
CSC32	white alder, cottonwood, willow, blackberry, poison oak, herbaceous, sedges	99	30	No	35*
KOC1	white alder, bigleaf maple, vine maple, willow, herbaceous	90	30	No	20
KOC2	white alder, bigleaf maple, cottonwood, vine maple, willow, herbaceous	50	15	No	30*
KOC3	white alder, bigleaf maple, vine maple, willow, herbaceous	20	15	No	20
KOC4	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	40	12	No	30
KOC5	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous, sedges	80	30	No	20
KOC6	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	30	No	20
KOC7	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	30	No	20
KOC8	bigleaf maple, vine maple, willow, herbaceous	95	30	No	30*
KOC9	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	30	No	30
KOC10	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	30	No	30
KOC11	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	80	25	No	30
KOC12	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	60	25	No	30
KOC13	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	30	No	30
KOC14	white alder, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	30	No	20
KOC15	white alder, bigleaf maple, mountain dogwood, vine maple, willow, blackberry, herbaceous	20	10	No	15
KOC16	white alder, bigleaf maple, mountain dogwood, vine maple, willow, blackberry, herbaceous	80	15	No	15
KOC17	white alder, bigleaf maple, mountain dogwood, vine maple, willow, blackberry, herbaceous	20	8	No	15
KOC18	white alder, bigleaf maple, mountain dogwood, vine maple, willow, blackberry, herbaceous	20	8	No	500*
KOC19	white alder, bigleaf maple, mountain dogwood, vine maple, willow, blackberry, herbaceous	90	15	No	30
KOC20	white alder, cottonwood, willow, herbaceous	10	10	No	20
KOC21	white alder, cottonwood, bigleaf maple, willow, herbaceous	10	15	No	30
KOC22	white alder, cottonwood, bigleaf maple, willow, herbaceous	40	10	No	40*
KOC23	white alder, cottonwood, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	90	25	No	20
KOC24	white alder, cottonwood, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	70	30	No	30*
KOC25	white alder, cottonwood, bigleaf maple, mountain dogwood, vine maple, willow, herbaceous	95	25	No	20
KOC26	white alder, cottonwood, vine maple, willow, herbaceous	40	15	No	20
KOC27	white alder, bigleaf maple, vine maple, willow, herbaceous	99	15	No	20
KOC28	white alder, vine maple, willow, herbaceous	100	30	No	30
KOC29	white alder, vine maple, willow, herbaceous	95	30	No	20
KOC30	white alder, bigleaf maple, vine maple, willow, herbaceous	50	30	No	30
KOC31	white alder, bigleaf maple, vine maple, willow, herbaceous	80	25	No	20

Table C-1: Riparian Communities Occurring in Project Area

Riparian Reach	Species Composition	Percent Cover	Average Height (ft.)	Unusual Mortality	Width of Riparian Zone (ft.)**
KOC32	white alder, cottonwood, bigleaf maple, vine maple, willow, herbaceous	80	15	No	30
KOC33	white alder, bigleaf maple, vine maple, willow, herbaceous	80	15	No	40
KOC34	white alder, bigleaf maple, vine maple, willow, herbaceous	80	15	No	20
KOC35	white alder, bigleaf maple, vine maple, willow, herbaceous	90	25	No	20
KOC36	white alder, bigleaf maple, vine maple, willow, herbaceous	70	35	No	20
KOC37	white alder, bigleaf maple, vine maple, willow, herbaceous	70	25	No	30
KOC38	white alder, bigleaf maple, cottonwood, vine maple, willow, herbaceous	95	15	No	40*
KOC39	white alder, cottonwood, willow, blackberry, herbaceous	60	40	No	15
KOC40	white alder, cottonwood, willow, blackberry, herbaceous	95	20	No	15
KOC41	white alder, cottonwood, willow, blackberry, herbaceous	80	30	No	15
KOC42	white alder, cottonwood, willow, blackberry, herbaceous	70	30	No	15
KOC43	white alder, cottonwood, willow, blackberry, herbaceous	90	30	No	45
KOC44	white alder, cottonwood, willow, blackberry, herbaceous	70	35	No	15
KOC45	white alder, cottonwood, willow, blackberry, herbaceous	70	25	No	20
KSC1	white alder, bigleaf maple, mountain dogwood, vine maple, herbaceous	95	60	No	15
KNC1	white alder, bigleaf maple, mountain dogwood, vine maple, herbaceous	95	55	No	15
CM1	white alder, ash, California bay, blackberry, wild grape, sedges, and herbaceous	70	15	No	20
CM2	white alder, ash, California bay, blackberry, wild grape, sedges, and herbaceous	10	10	No	30
CM3	white alder, ash, California bay, blackberry, wild grape, sedges, and herbaceous	50	15	No	30

Willow seedlings and young saplings were present on all reaches with bars.

*Width of riparian zone includes mid-channel islands or bars.

**Width of riparian zone is a total average of both banks.

CHG: Hooten Gulch

CSC: South Cow Creek

KOC: Old Cow Creek

KNC: North Canyon Creek

KSC: South Canyon Creek

CM: Mill Creek