Draft

Botanical Resources and Wetlands Technical Report

Shasta Lake Water Resources Investigation, California

Prepared by:

United States Department of the Interior
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Mid-Pacific Region

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Attachments

Attachment 1. Lists of All Special-Status Plant Species Known from or Potentially Present in the Primary and Extended Study Areas

Attachment 2. List of Plant Species Observed in the Shasta Lake and Vicinity Portion of the Primary Study Area

Attachment 3. Special-Status Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area

Attachment 4. List of All Sensitive Plant Species in the Extended Study Area Reported to the CNDDB

Attachment 5. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread

Abbreviations and Acronyms

Bay-Delta	San Francisco Bay/Sacramento–San Joaquin River Delta
BLM	U.S. Department of the Interior, Bureau of Land Management
CALFED	CALFED Bay-Delta Program
Cal-IPC	California Invasive Plant Council
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CVP	Central Valley Project
CWA	Clean Water Act
Delta	Sacramento–San Joaquin River Delta
ESA	Federal Endangered Species Act
FAC	facultative plants
FACU	facultative upland plants
FACW	facultative wetland plants
Final EIS	final environmental impact statement
GIS	geographic information system
I-5	Interstate 5
LRMP	land and resource management plan
MCV	A Manual of California Vegetation
MSCS	Multi-Species Conservation Strategy
msl	mean sea level
NCCP	Natural Community Conservation Plan
NI	no indicator
NL	not listed
NRA	National Recreation Area
NSO	northern spotted owl
NWFP	Northwest Forest Plan
OBL	obligate wetland plants

OHWM	ordinary high-water mark
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
RBPP	Red Bluff Pumping Plant
RCD	resource conservation district
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RHJV	Riparian Habitat Joint Venture
ROD	Record of Decision
RWQCB	regional water quality control board
S&M	Survey and Manage
SB	Senate Bill
SLWRI	Shasta Lake Water Resources Investigation
SRCA	Sacramento River Conservation Area
SRNWR	Sacramento River National Wildlife Refuge
STNF	Shasta-Trinity National Forest
SWAG	Sacramento Watersheds Action Group
SWP	State Water Project
TES	Threatened and Endangered Species
TNC	The Nature Conservancy
UPL	obligate upland plants
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

Chapter 1
Affected Environment

This chapter describes the affected environment related to botanical resources and wetlands for the dam and reservoir modifications that are proposed under the Shasta Lake Water Resources Investigation (SLWRI).

The botanical resources and wetlands setting for the Shasta Lake and vicinity portion of the primary study area consists of the impoundment area (five arms and the Main Body of Shasta Lake, as described below) and the relocation areas (Figure 1-1).

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) established project boundaries for focused surveys in the areas that would be subject to inundation under the various enlargement scenarios. The lower boundary corresponds to the current full pool elevation defined by Reclamation (1,070-foot-mean-sea-level (msl) contour line). The upper boundary was established using the 1,090-foot-msl contour line around the entire lake. This area is referred to as the "impoundment area" (Figure 1-1).

Areas subject to physical disturbance as an indirect result of the project (i.e., areas proposed as relocation sites for roadways, bridges, utilities, and campgrounds that would be inundated after the enlargement of Shasta Dam as well as proposed dike locations) were incorporated into the Shasta Lake and vicinity portion of the primary study area. These locations are hereafter referred to as "relocation areas" (Figure 1-1).

To examine the biological resources along riverine reaches that would be subject to inundation if Shasta Dam were enlarged, reaches of 11 streams and rivers that are tributary to Shasta Lake were also incorporated into the Shasta Lake and vicinity portion of the primary study area. These streams were selected by Reclamation in conjunction with the U.S. Forest Service (USFS) as an initial sampling of streams representative of riverine and riparian habitats. Subsequently, botany studies have been expanded into select areas of the impoundment area and within all of the relocation areas.

For the purposes of this investigation, approximate acreages for vegetation types and waters of the United States are reported by arm of the lake. For a relocation area that falls between two arms, the area is included with the arm that has the most acreage of the vegetation type or water of the United States.

Vegetation communities and special-status plant species in the extended study area are discussed in less detail. The extended study area includes the

Sacramento River basin from Red Bluff Pumping Plant (RBPP) south to the Sacramento–San Joaquin River Delta (Delta). It also includes the San Francisco Bay/Sacramento–San Joaquin River Delta (Bay-Delta) area and portions of the American River basin, San Joaquin River basin, and the water service areas of the Central Valley Project (CVP) and the State Water Project (SWP).

Descriptions of biological resources were derived primarily from the following sources:

- Shasta Lake Water Resources Investigation Mission Statement Milestone Report (Reclamation 2003)
- Shasta Lake Water Resources Investigation Initial Alternatives Information Report (Reclamation 2004)
- Chapter 3, "Biological Environment," in the Draft Shasta Lake Water Resources Investigation Plan Formulation Report (Reclamation 2007)
- U.S. Fish and Wildlife Service (USFWS) Endangered Species Lists
- The California Natural Diversity Database (CNDDB)
- The California Native Plant Society (CNPS) online inventory
- Numerous technical studies of botanical and wetland resources conducted in the Shasta Lake and vicinity portion of the primary study area since 2002

Several attachments provide detailed lists and descriptions of special-status species present in the primary and extended study areas:

- Attachment 1, "Lists of All Special-Status Plant Species Known from or Potentially Present in the Primary and Extended Study Areas"
- Attachment 2, "List of Plant Species Observed in the Shasta Lake and Vicinity Portion of the Primary Study Area"
- Attachment 3, "Special-Status Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area"
- Attachment 4, "List of All Sensitive Plant Species in the Extended Study Area Reported to the CNDDB"
- Attachment 5, "Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread"

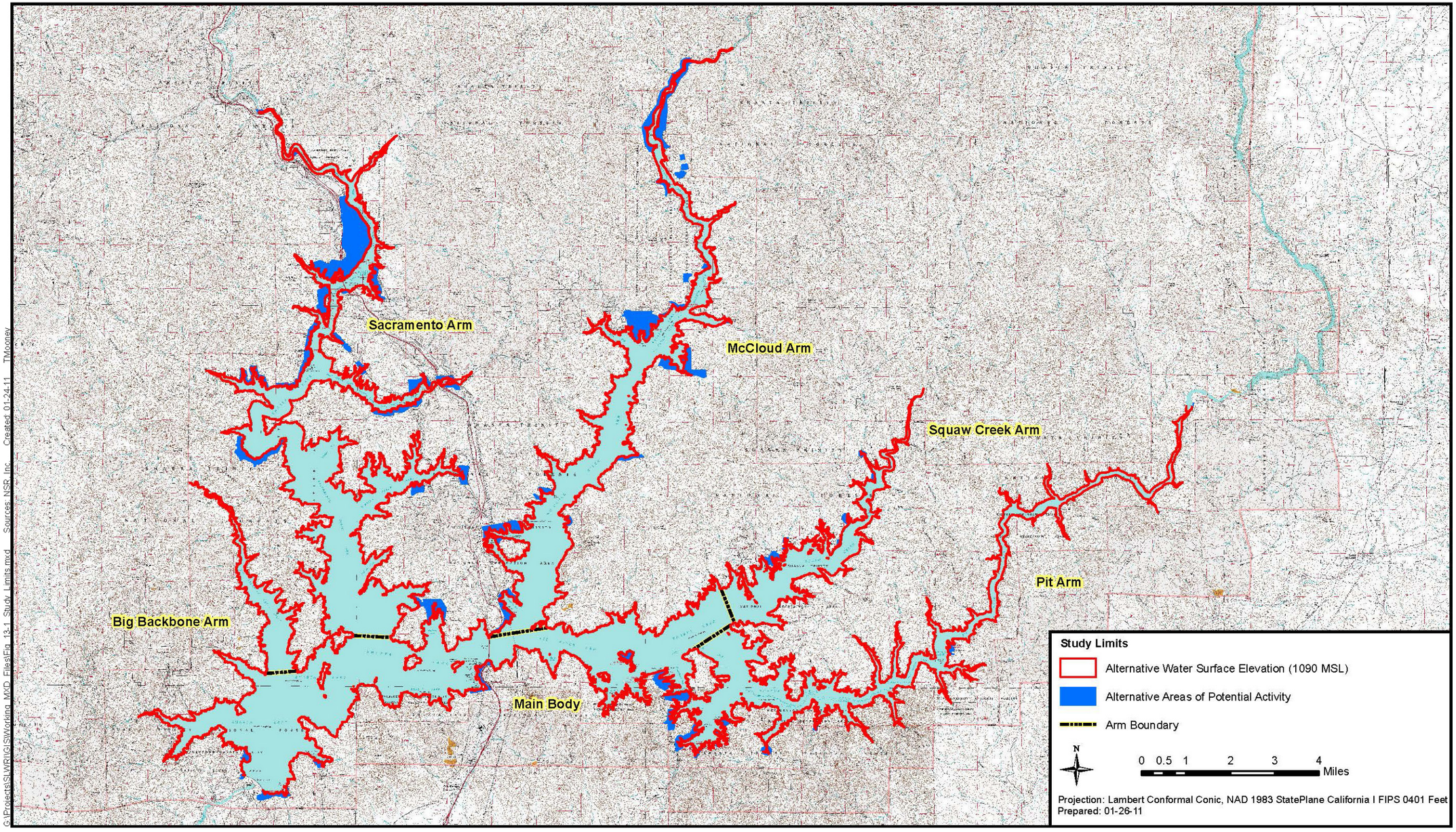

Figure 1-1. Study Limits

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Environmental Setting

Overview for Shasta Lake and Vicinity

Shasta Dam and Shasta Lake are located on the upper Sacramento River in Northern California. Shasta Dam is located about 9 miles northwest of Redding, and the dam and entire reservoir are located within Shasta County. Elevations in the Shasta Lake vicinity portion of the primary study area range between approximately 1,070 and 1,200 feet, and the terrain is moderate to steep.

Biological resources in the Shasta Lake and vicinity portion of the primary study area result from a wealth and diversity of climatic and vegetative associations within and adjacent to the study area. Influences from the Coast Ranges, southeastern Klamath Mountains, southern Cascades, northern Sierra Nevada, the Great Basin, and the Central Valley provide for a unique mix of biota.

Vegetation Communities

Primary Study Area

Shasta Lake and Vicinity Reclamation conducted extensive mapping to characterize the plant communities in the Shasta Lake and vicinity portion of the primary study area. The study area for botanical resources and wetlands in the Shasta Lake and vicinity portion of the primary study area corresponds to the area that would be subject to inundation under the five action alternatives and areas where infrastructure would be removed, modified, or relocated (Figure 1-1). The vegetation mapping followed the technical approach described in A Manual of California Vegetation (MCV) (Sawyer and Keeler-Wolf 1995), using the vegetation alliance classification system described in A Manual of California Vegetation, Second Edition (Sawyer, Keeler-Wolf, and Evens 2009).

MCV represents the most recent effort to provide a common and accepted vegetation classification system for use throughout California. It classifies vegetation into a set of plant alliances, provisional alliances, special stands, or semi-natural stands. In this system, the plant species dominance or importance in the layer (i.e., tree, shrub, and ground) with the greatest amount of cover determines the vegetation alliance classification. The same approach used to describe and classify MCV types was applied when other vegetation types not described in the current MCV were encountered and determined to be significant vegetative components.

Vegetation mapping was conducted using recent 1:2,400-scale rectified color aerial photography. All vegetation mapping was performed in the field by ground truthing the primary study area from boat, vehicle, and/or on foot. MCV plant alliances were identified and delineated onto the aerial photographs. The delineated boundaries were digitized and generated in ArcGIS/ArcInfo software for display and data query purposes.

The Shasta Lake and vicinity area is characterized by a variety of vegetation types typical of transitional mixed woodland and low-elevation forest habitats. MCV plant series types in this portion of the primary study area are birch-leaf mountain mahogany chaparral, black willow thicket, blue oak woodland, Brewer's oak scrub, buck brush chaparral, California annual grassland, California black oak forest, California ash chaparral, California buckeye groves, California yerba santa scrub, canyon live oak forest, deer brush chaparral, Fremont cottonwood forest, ghost pine woodland, Himalayan blackberry brambles, interior live oak chaparral, interior live oak woodland, knobcone pine forest, mixed willow, Oregon ash groves, Oregon white oak woodland, pale spike rush marshes, ponderosa pine–Douglas fir forest, ponderosa pine forest, red osier thickets, sandbar willow thickets, spicebush thickets, valley oak woodland, white alder groves, and white leaf manzanita chaparral. Vegetation in each of these series varies, with dramatic changes often occurring in relation to aspect, slope, geologic substrate, or juxtaposition with other habitats.

The acreage of MCV types found in the impoundment area along the Main Body and the five arms of Shasta Lake is shown in Table 1-1, and the acreage of MCV types found in the relocation areas along the Main Body and the five arms of Shasta Lake is shown in Table 1-2. The locations of each type are depicted in Figures 1-2a through 1-2f. General descriptions of each type are provided below. Plant taxonomy follows Baldwin et al. (2012).

Table 1-1. Summary of Plant Communities in the Impoundment Area

Plant Series	Area (Acres)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Arroyo willow thickets	0.15	0.00	13.16	11.18	0.00	2.84
Barren[1]	2.30	0.00	0.55	0.00	0.00	0.00
Birch-leaf mountain-mahogany chaparral	0.00	0.00	0.00	2.23	0.00	0.00
Black willow thicket	0.00	0.00	0.02	0.00	0.00	0.02
Blue oak woodland	1.27	0.00	0.00	0.70	0.00	4.08
Brewer oak scrub	9.78	0.17	51.62	4.99	4.51	7.78
Buck brush chaparral	0.90	2.42	2.11	1.59	0.67	0.19
California annual grassland	0.58	0.34	4.17	0.94	0.00	0.33
California black oak forest	71.45	14.14	160.32	47.44	1.72	5.06
California buckeye groves	0.00	0.00	0.20	0.01	0.00	0.00
California yerba santa scrub	0.75	0.00	0.00	0.00	0.00	11.58
Canyon live oak forest	9.80	18.41	53.80	48.31	26.78	110.51
Deer brush chaparral	0.18	0.00	0.00	0.08	0.00	2.34

Table 1-1. Summary of Plant Communities in the Impoundment Area (contd.)

Plant Series	Area (Acres)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Fremont cottonwood forest	0.00	0.00	0.07	0.00	0.00	0.05
Ghost pine woodland	54.05	0.00	51.29	13.50	22.03	30.54
Himalayan blackberry brambles	0.00	0.00	0.00	0.00	0.00	0.44
Interior live oak chaparral	1.24	0.00	10.05	0.01	0.00	24.22
Interior live oak woodland	2.00	0.00	0.14	0.09	0.00	2.28
Knobcone pine forest	32.96	0.40	16.38	20.72	47.87	79.83
Mixed willow	1.39	1.46	14.56	0.16	0.19	0.83
Oregon ash groves	0.00	0.00	0.00	0.17	0.00	0.00
Oregon white oak woodland	0.00	0.00	0.00	1.09	0.00	0.66
Ponderosa pine–Douglas fir forest	5.02	0.00	28.37	50.04	69.02	127.51
Ponderosa pine forest	225.95	36.67	212.79	208.77	59.33	101.18
Red osier thickets	0.00	0.00	0.00	0.12	0.00	0.00
Riverine[1]	0.00	0.88	5.24	15.43	1.41	0.00
Sandbar willow thickets	0.00	0.00	0.00	0.28	0.07	0.00
Spicebush thickets	0.00	0.00	0.00	0.06	0.00	0.00
Urban[1]	22.04	0.00	0.00	0.00	0.00	1.92
White alder groves	1.34	4.47	9.70	12.40	1.18	2.85
White leaf manzanita chaparral	16.60	12.30	98.22	6.21	7.49	2.86
Total	459.76	91.67	732.20	446.49	242.28	519.90

Note:
[1] California Wildlife Habitat Relationships Wildlife Habitat Type; no corresponding plant series type.

Table 1-2. Summary of Plant Communities in the Relocation Areas

Plant Series	Area (Acres)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Barren[1]	23.75	0.00	87.90	36.33	11.53	18.87
Birch-leaf mountain-mahogany chaparral	0.00	0.00	0.07	0.41	0.00	0.00
Black willow thicket	0.00	0.00	0.03	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	3.68	0.00	1.09
Brewer oak scrub	9.24	0.00	39.30	23.83	0.00	0.27
Buck brush chaparral	0.00	0.00	1.30	2.11	0.00	0.08
California annual grassland	5.02	0.00	23.06	10.40	0.84	0.88
California ash chaparral	0.00	0.00	0.00	0.68	0.00	0.00
California black oak forest	45.03	0.00	190.50	125.40	1.29	0.23
California buckeye groves	0.30	0.00	0.00	1.58	0.00	0.00
California yerba santa scrub	0.33	0.00	0.00	0.00	0.00	14.30
Canyon live oak forest	1.18	0.00	13.92	96.62	4.98	23.85
Deer brush chaparral	0.18	0.00	0.00	0.57	0.00	5.64
Fremont cottonwood forest	0.00	0.00	0.56	0.00	0.00	0.05
Ghost pine woodland	124.50	0.00	84.08	48.74	13.48	13.68
Himalayan blackberry brambles	0.18	0.00	0.00	0.06	0.00	0.16
Interior live oak chaparral	0.00	0.00	2.42	0.00	0.00	45.35
Interior live oak woodland	0.72	0.00	0.00	0.00	0.00	1.12
Knobcone pine forest	0.11	0.00	55.68	13.61	1.94	23.21
Lacustrine[1]	0.00	0.00	0.00	0.16	0.00	0.00
Mixed willow	0.079	0.00	1.26		0.06	0.35
Oregon ash groves	0.00	0.00	0.00	0.50	0.00	0.00
Oregon white oak woodland	0.00	0.00	0.00	5.72	0.07	0.00
Pale spike rush marshes	0.00	0.00	6.51	0.00	0.00	0.00
Ponderosa pine–Douglas fir forest	0.00	0.00	23.78	149.91	28.80	19.27
Ponderosa pine forest	185.34	0.00	555.71	497.08	43.08	50.13

Table 1-2. Summary of Plant Communities in the Relocation Areas (contd.)

Plant Series	Area (Acres)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Riverine[1]	0.00	0.00	0.39	0.00	0.00	0.00
Sandbar willow thickets	0.00	0.00	0.00	0.09	0.00	0.00
Spicebush thickets	0.00	0.00	0.00	0.64	0.00	0.00
Urban[1]	20.71	0.00	229.37	0.48	0.00	0.57
Valley oak woodland	0.00	0.00	1.05	0.00	0.00	0.00
White alder groves	0.00	0.00	2.51	2.75	0.17	0.00
White leaf manzanita chaparral	15.93	0.00	77.38	15.51	4.38	0.17
Total	432.60	0.00	1,396.35	1,036.70	110.61	219.04

Note:
[1] California Wildlife Habitat Relationships Wildlife Habitat Type; no corresponding plant series type included in *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995).

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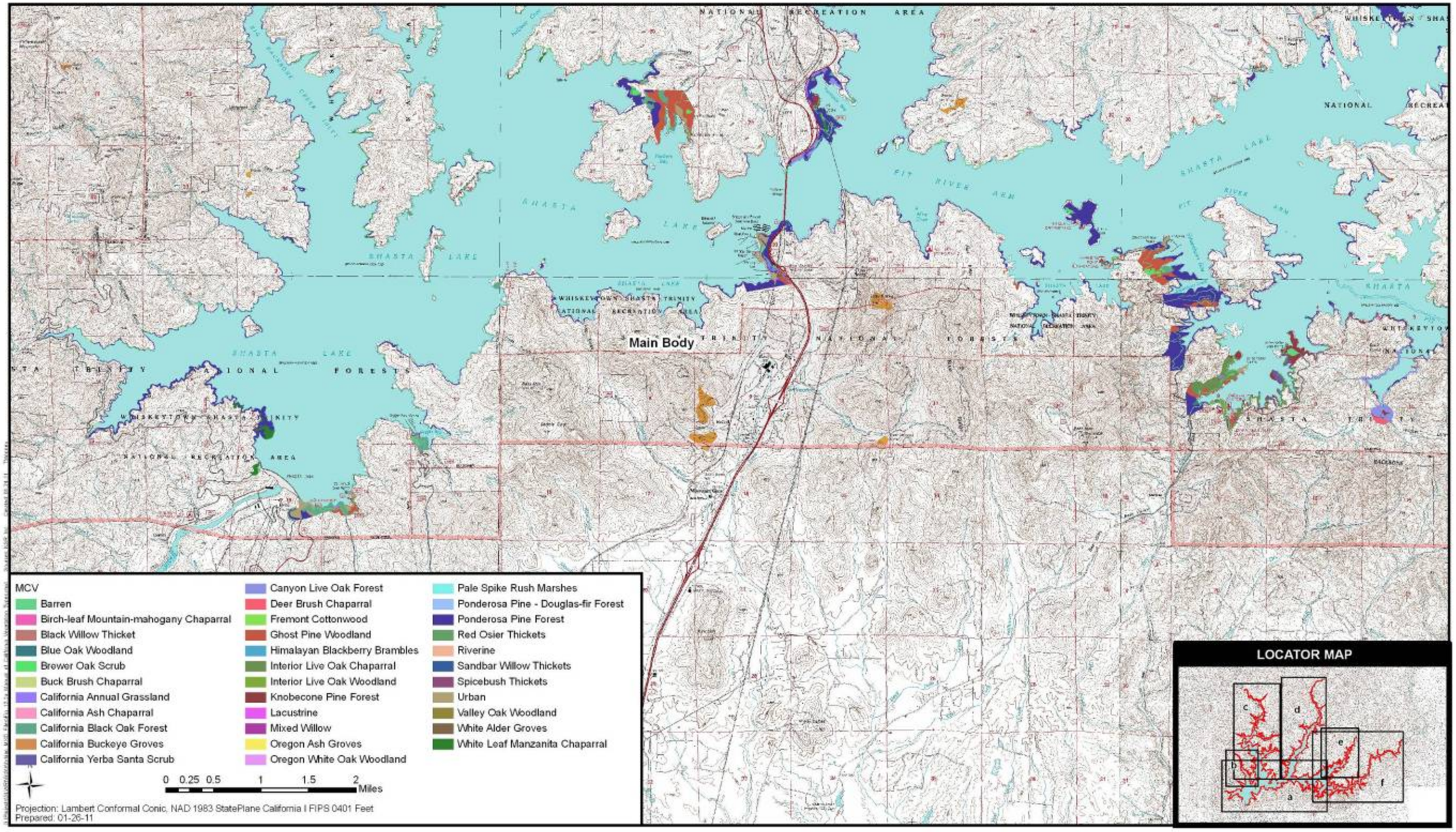

Figure 1-2a. Manual of California Vegetation Types

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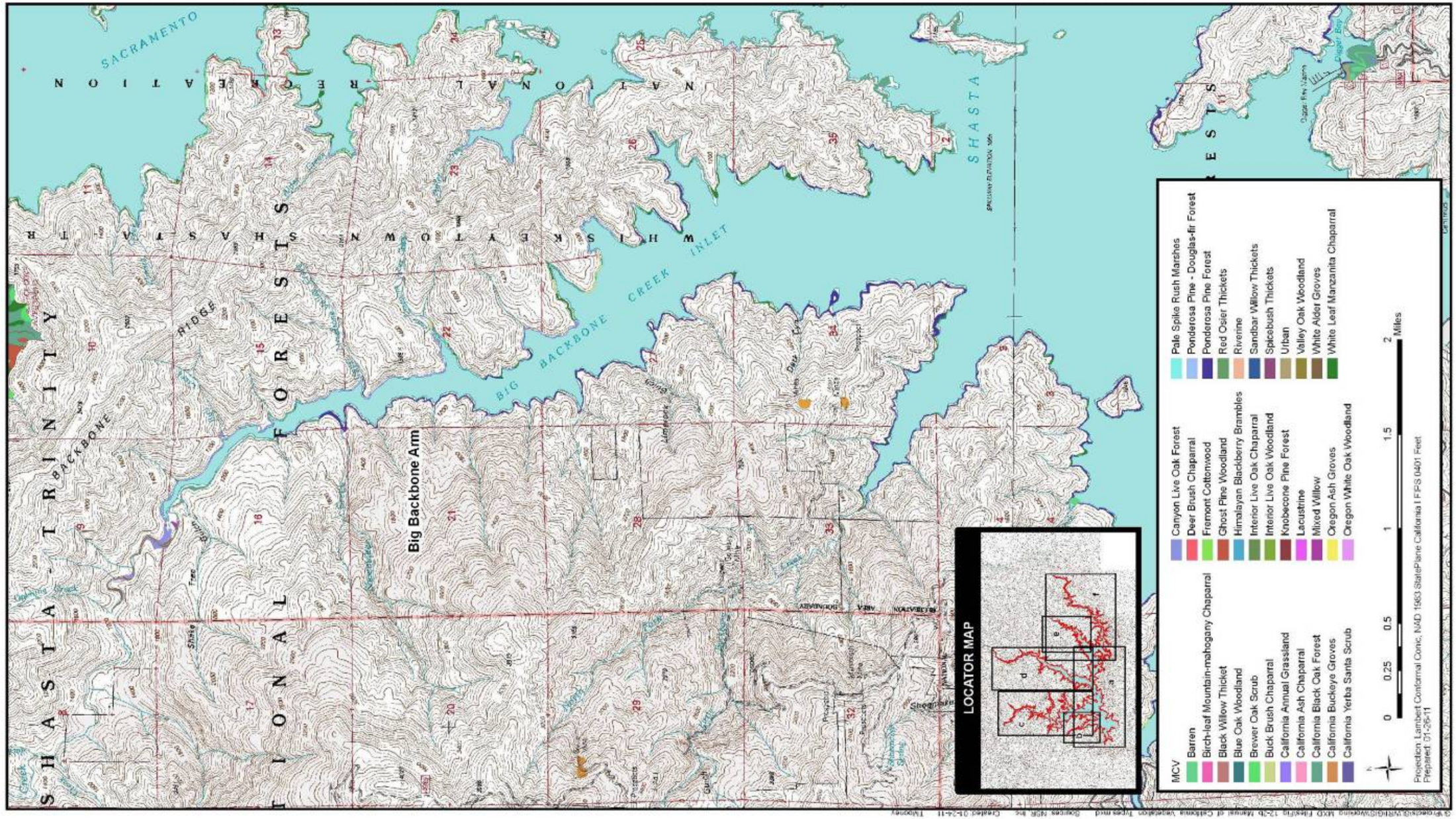

Figure 1-2b. Manual of California Vegetation Types

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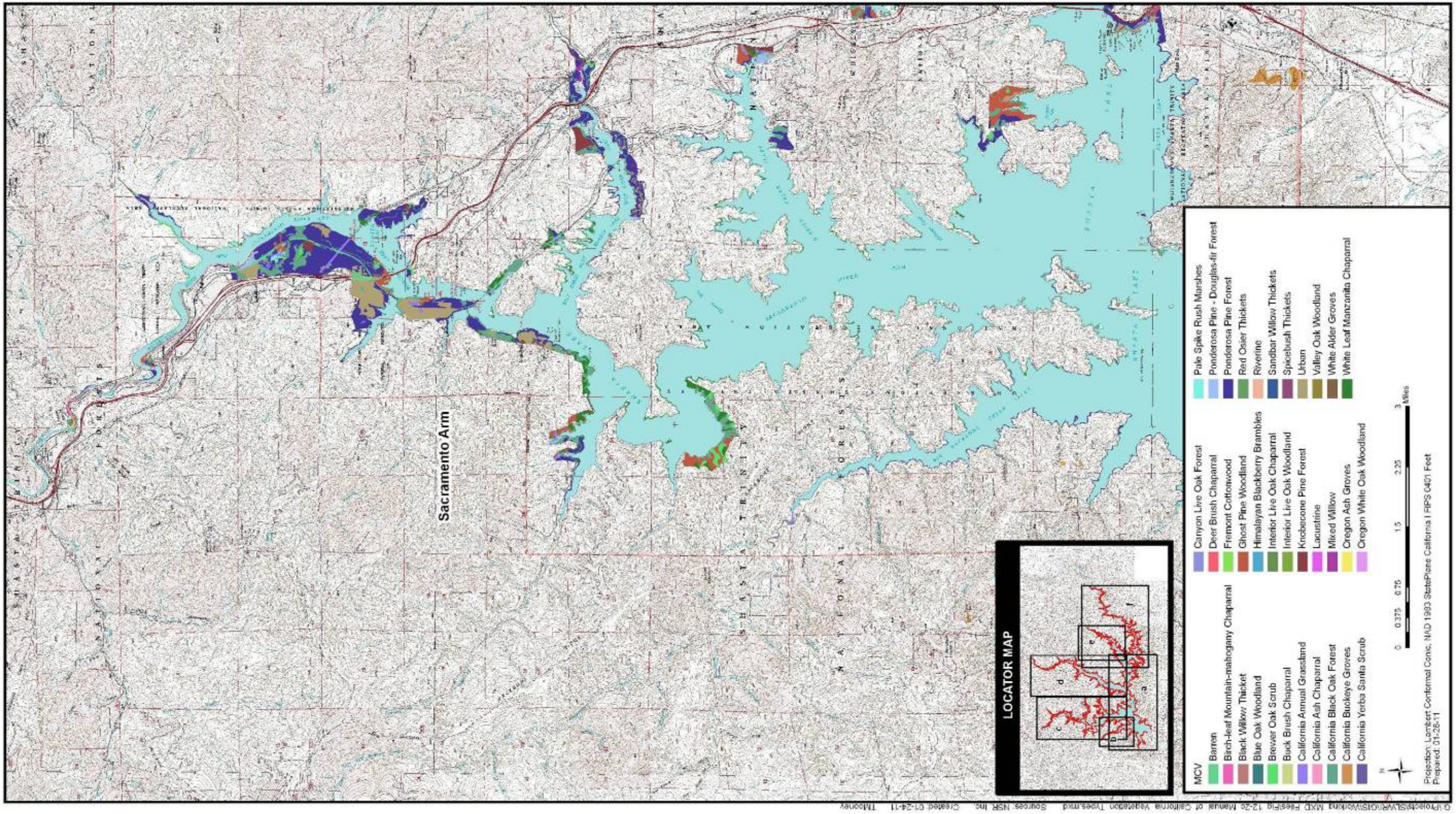

Figure 1-2c. Manual of California Vegetation Types

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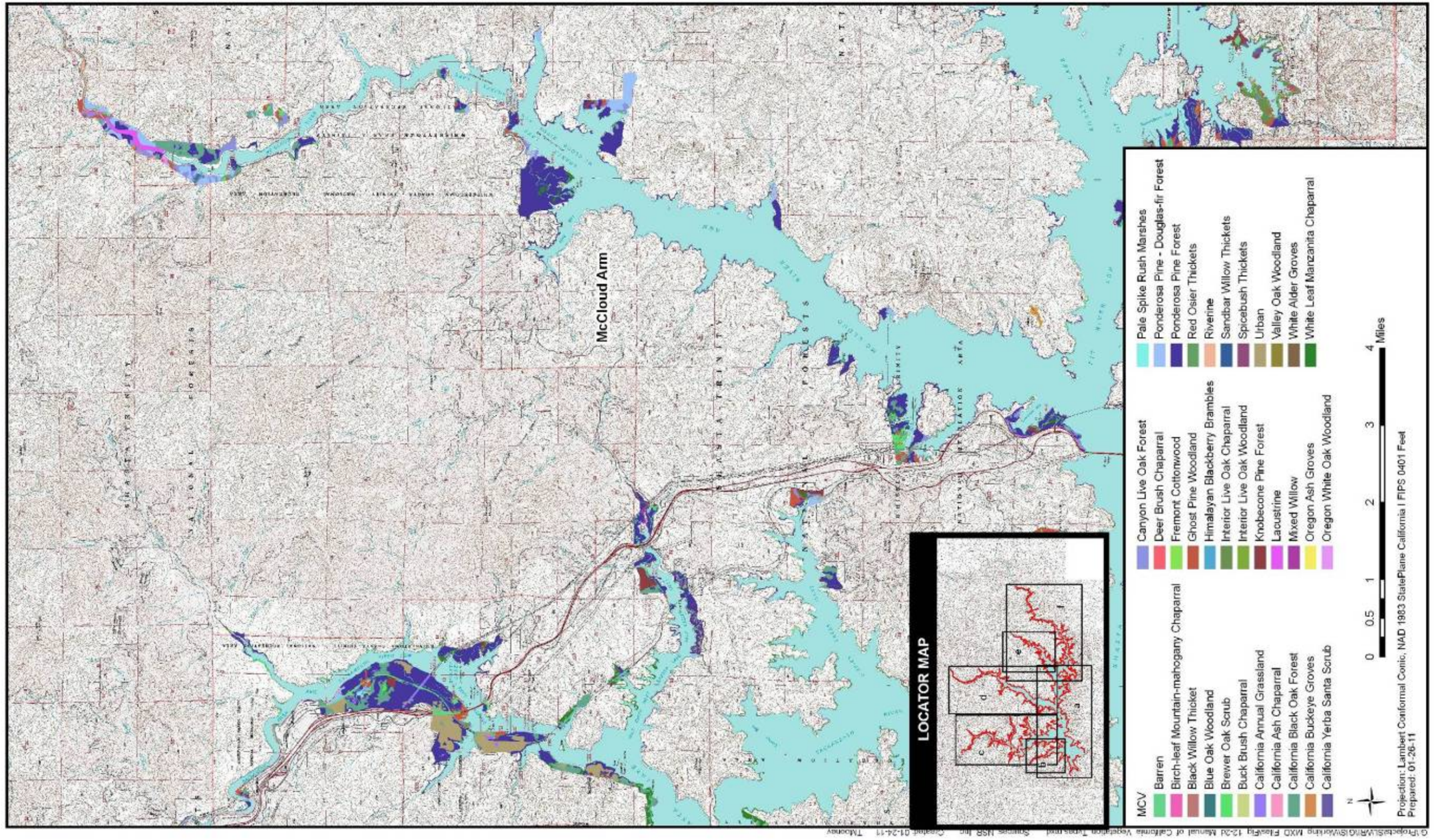

Figure 1-2d. Manual of California Vegetation Types

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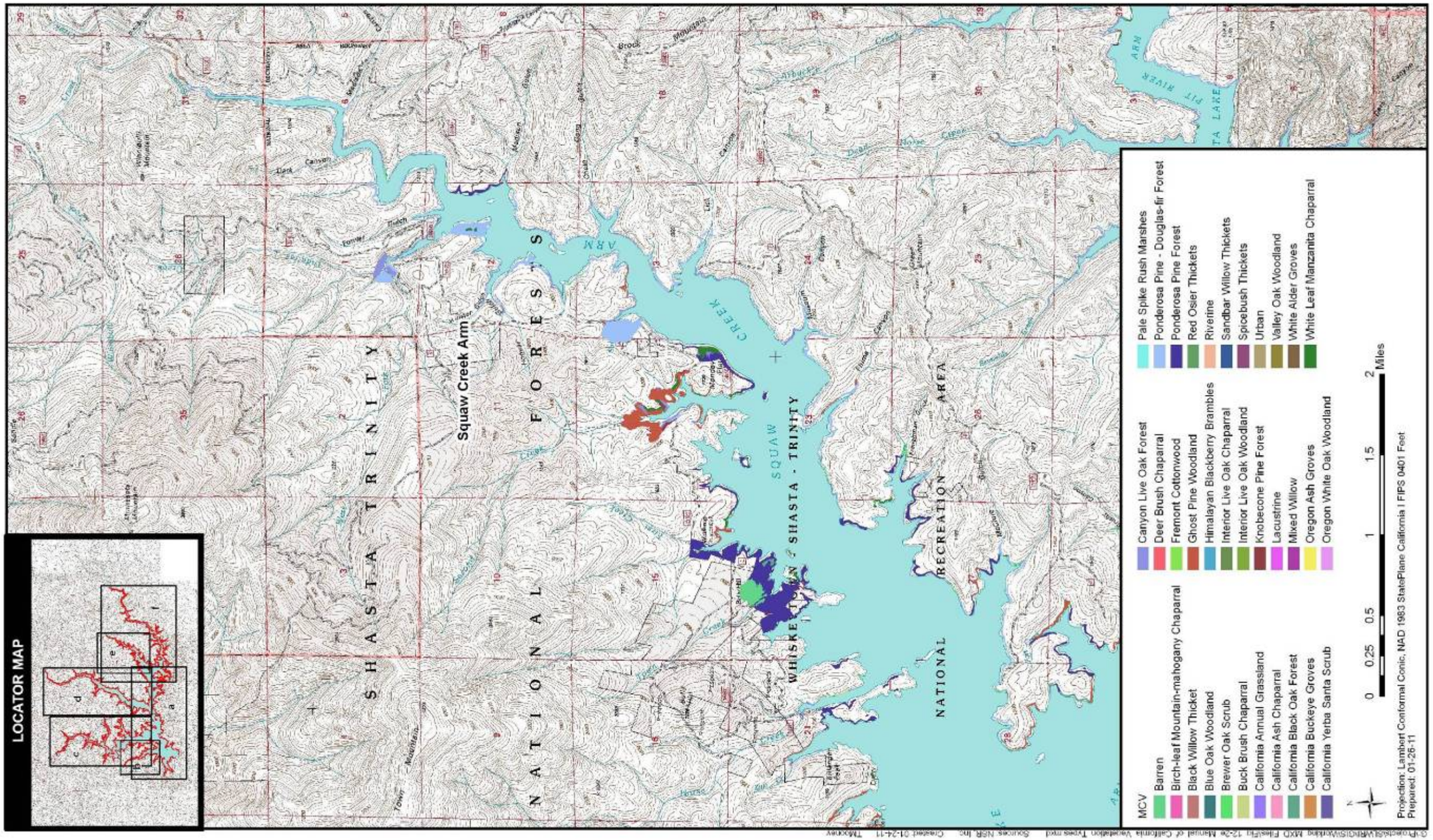

Figure 1-2e. Manual of California Vegetation Types

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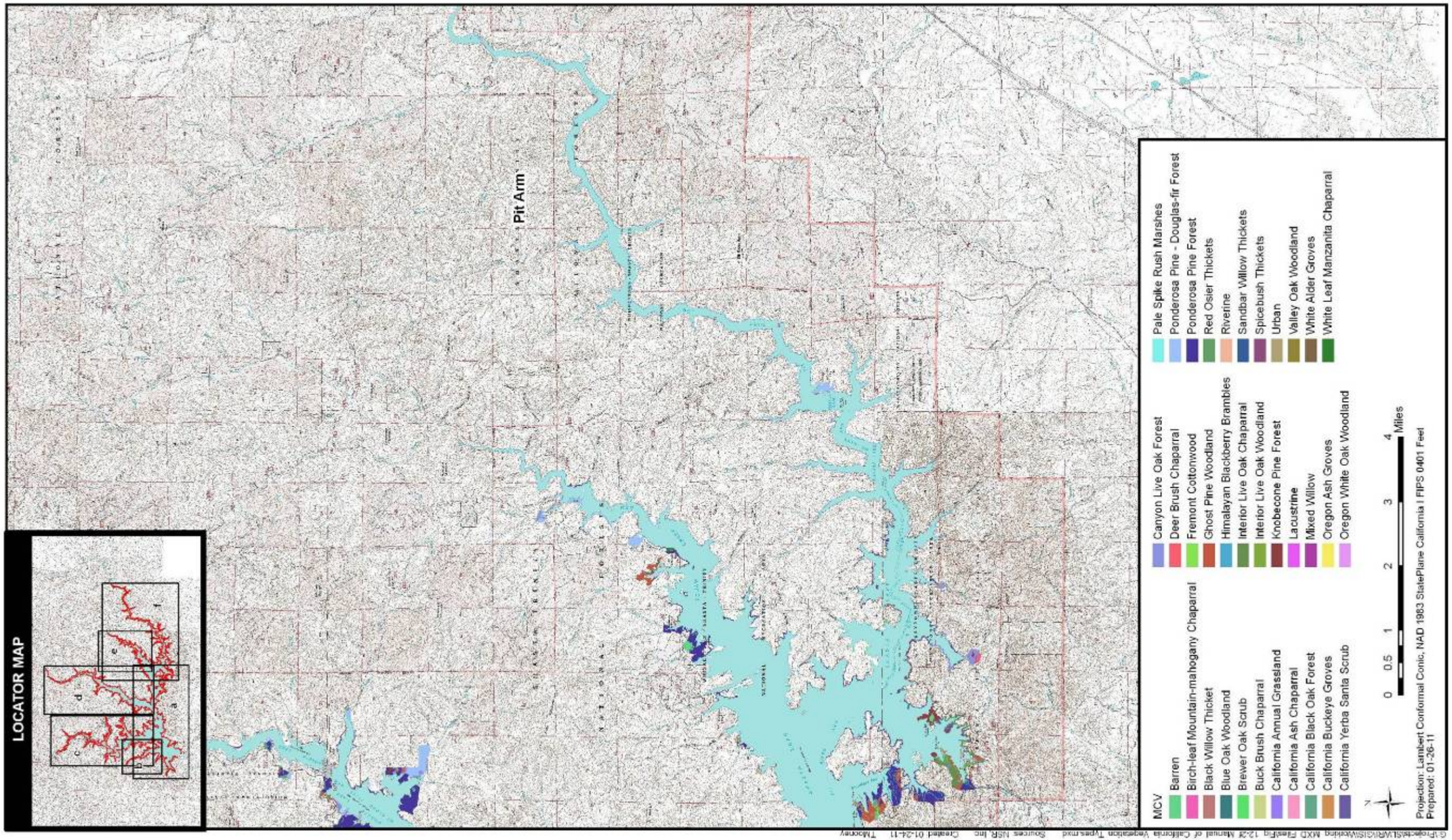

Figure 1-2f. Manual of California Vegetation Types

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Barren Barren habitat consists mainly of nonvegetated man-made features. Barren habitat is scattered throughout the Shasta Lake and vicinity portion of the primary study area, including boat ramps, parking lots, and roads. Other barren habitats are a large gravel plain feature at the confluence of Butcher Creek and Shasta Lake (Main Body) and a sealed riprap feature adjacent to Interstate 5 (I-5) near the upper Sacramento Arm and Shasta Lake confluence. Vegetation is usually not present, although sparse opportunistic grasses/forbs or weedy species may occur.

Birch Leaf Mountain-Mahogany Chaparral Birch-leaf mountain-mahogany chaparral is a relatively common associate species in many chaparral and woodland plant series types. As a plant series, birch-leaf mountain-mahogany occurs in the Shasta Lake and vicinity portion of the primary study area along the upper McCloud and Sacramento arms. These sites are located on floodplain terraces and are characterized as moderate to dense chaparral stands dominated by birch-leaf mountain-mahogany (*Cercocarpus betuloides*), with occasional buck brush (*Ceanothus cuneatus*), poison oak (*Toxicodendron diversilobum*), western redbud (*Cercis occidentalis*), yerba santa (*Eriodictyon californicum*), and Brewer oak (*Q. garryana* var. b*reweri*).

Black Willow Thicket Although commonly associated with willow and other riparian plant series types, black willow thicket is uncommon in the Shasta Lake and vicinity portion of the primary study area. This plant series is dominated by black willow (*Salix gooddingii*), with spicebush (*Calycanthus occidentalis*), rushes (*Juncus* spp.), and California grape (*Vitis californica*). It occurs at only two locations in the Shasta Lake and vicinity portion of the primary study area, one along the Sacramento Arm and the other in the Jones Valley area (Pit Arm).

Blue Oak Woodland The blue oak plant series occurs mainly as small inclusions within other more prevalent plant series types; however, moderate-sized stands also occur. This plant series occurs at scattered locations along the Main Body, McCloud Arm, and Pit Arm and is characterized by open to moderate woodlands dominated by blue oak (*Quercus douglasii*). Associated tree species include occasional interior live oak (*Q. wislizenii* var. *wislizenii*) and gray pine (*Pinus sabiniana*). The shrub layer is open or absent, and a moderate to dense forb layer dominates the understory.

Brewer Oak Scrub The Brewer oak plant series consists of moderate to very dense stands of Brewer oak, the shrub form of Oregon white oak (*Q. garryana* var. *garryana*). This plant series type is widespread throughout the Shasta Lake and vicinity portion of the primary study area. Brewer oak stands are often nearly pure; occasionally, however, shrub species such as poison oak, white leaf manzanita, yerba santa, buck brush, bush poppy (*Dendromecon rigida*), Fremont's silktassel (*Garrya fremontii*), deer brush (*Ceanothus integerrimus*), skunkbrush (*Rhus trilobata*), and snowdrop bush (*Styrax officinalis*) occur in association with Brewer oak.

Buck Brush Chaparral Buck brush chaparral occurs at scattered locations throughout the Shasta Lake and vicinity portion of the primary study area. This plant series is dominated by moderate to dense stands of buck brush. Associated species include white leaf manzanita, poison oak, western redbud, yerba santa, Brewer oak, birch-leaf mountain-mahogany, and coffeeberry (*Frangula* sp.).

California Annual Grassland California annual grassland is uncommon in the Shasta Lake and vicinity portion of the primary study area, occurring only as small inclusions in other more prevalent plant series types or in areas subjected to previous disturbance. Dominant species include wild oat (*Avena fatua*), downy brome (*Bromus tectorum*), ripgut (*B. diandrus*), yellow star-thistle (*Centaurea solstitialis*), squirreltail (*Elymus elymoides*), and European hairgrass (*Aira caryophyllea*).

California Ash Chaparral California ash (*Fraxinus dipetala*) is a relatively common associate species in many chaparral and woodland plant series types. As a plant series, California ash chaparral occurs in the Shasta Lake and vicinity portion of the primary study area at several locations along the McCloud Arm. This plant series is characterized as a moderate to dense chaparral stand dominated by California ash, with occasional birch-leaf mountain-mahogany, buck brush, poison oak, western redbud, yerba santa, and Brewer oak.

California Black Oak The black oak series is characterized by moderate to dense stands of California black oak (*Quercus kelloggii*). This plant series is relatively common throughout the Shasta Lake and vicinity portion of the primary study area. Understory associates include white leaf manzanita (*Arctostaphylos viscida*), poison oak, snowdrop bush (*Styrax officinalis*), and buck brush. The ground layer is open to dense and is dominated by various grasses and forbs.

California Buckeye Groves Although a common associate in many plant series types in the Shasta Lake and vicinity portion of the primary study area, California buckeye groves are uncommon as a plant series type. This plant series is dominated by California buckeye (*Aesculus californica*). Associated species include poison oak, Brewer oak, buck brush, and various grasses and forbs. It occurs at only several scattered locations in the Sacramento Arm, McCloud Arm, and Pit Arm.

California Yerba Santa Scrub California yerba santa scrub is a relatively common associate species in many chaparral and woodland plant series types. California yerba santa is a pioneer species that readily responds to various disturbances and wildfire. As a plant series, California yerba santa scrub occurs in the Shasta Lake and vicinity portion of the primary study area at two general locations subject to recent wildfire: the Dry Creek area (Main Body) and the Jones Valley area (Pit Arm). This plant series is characterized as moderate to dense chaparral stands dominated by California yerba santa, with occasional

shrub interior live oak, shrub canyon live oak, buck brush, poison oak, western redbud, and Brewer oak.

Canyon Live Oak Forest The canyon live oak plant series is characterized by moderate to dense stands of canyon live oak (*Quercus chrysolepis*). This plant series is relatively common throughout the Shasta Lake and vicinity portion of the primary study area. Associated tree species include occasional California black oak. Understory associates include white leaf manzanita and poison oak. The ground layer is open to moderate and is dominated by various grasses and forbs.

Deer Brush Chaparral Deer brush chaparral is a relatively common associate in chaparral and forest plant series types in the Shasta Lake and vicinity portion of the primary study area; however, deer brush is uncommon in the study area as a plant series type. This plant series is dominated by deer brush. It occurs at several scattered locations along the Main Body, McCloud Arm, and Pit Arm.

Fremont Cottonwood Forest In the Shasta Lake and vicinity portion of the primary study area, Fremont cottonwood forest is an uncommon plant series type that occurs as single stands of trees along small portions of the upper Sacramento Arm and the Pit Arm. The dominant species is Fremont cottonwood (*Populus fremontii*).

Ghost (Gray) Pine The ghost pine plant series occurs in all parts of the Shasta Lake and vicinity portion of the primary study area except along the Big Backbone Arm. This plant series type is characterized by open to moderate stands of gray pine. Associated species include blue oak, canyon live oak, interior live oak, and California black oak. Shrub species are moderate to dense and include white leaf manzanita, western redbud, buck brush, Brewer oak, poison oak, and yerba santa.

Himalayan Blackberry Brambles Himalayan blackberry (*Rubusarmeniacus*) is a common associate in many riparian plant series and in various other plant series with mesic microhabitats and/or previous disturbance. As a plant series, Himalayan blackberry brambles occur in portions of the Dry Creek (Main Body) and Jones Valley (Pit Arm) areas recently disturbed by wildfire. This plant series occurs in and along drainage and stream features and is characterized as dense thickets of Himalayan blackberry. Associated species include spicebush, willow, and rushes.

Interior Live Oak Chaparral In the Shasta Lake and vicinity portion of the primary study area, the interior live oak chaparral plant series is relatively uncommon, occurring mainly along the Sacramento Arm. However, this plant series also occurs at scattered locations along the Main Body, the McCloud Arm, and the Pit Arm. This plant series is dominated by moderate to dense stands of the shrub form of interior live oak. Associated species include Brewer oak, white leaf manzanita, poison oak, and buck brush.

Interior Live Oak Woodland The interior live oak woodland plant series is uncommon in the Shasta Lake and vicinity portion of the primary study area. It occurs in several small areas along the Sacramento Arm, the Pit Arm, the McCloud Arm, and the Main Body.

Knobcone Pine Forest The knobcone pine forest plant series consists of open to dense knobcone pine (*Pinus contorta*) stands. This plant series is scattered throughout all portions of the Shasta Lake and vicinity portion of the primary study area. Knobcone pine forest often occurs at locations characterized by disturbances, including historic mining activities and past or recent wildfires. Dominant species include knobcone pine, with occasional canyon live oak, California black oak, ponderosa pine (*Pinus ponderosa*), and gray pine. The shrub layer is moderate to dense and is dominated by white leaf manzanita and poison oak. The ground layer varies and is dominated by various grasses and forbs.

Lacustrine Lacustrine habitat consists of the area regularly inundated by Shasta Lake (i.e., areas at and below the 1,070-foot elevation). Most of this area is barren of vegetation and is characterized as exposed soil and/or rock. Portions of the lacustrine habitat do support vegetation, including woody riparian species such as black willow, button willow (*Cephalanthus occidentalis*), Fremont cottonwood, and various grasses and forbs, during draw-down periods.

Mixed Willow Mixed willow is the most common willow plant series type in the Shasta Lake and vicinity portion of the primary study area and occurs throughout the entire area. Dominant species include red willow (*Salix laevigata*), black willow, shining willow (*S. lasiandra*), arroyo willow (*S. lasiolepis*), and narrowleaf willow (*S. exigua*).

Oregon Ash Groves Oregon ash groves are an uncommon plant series type in the Shasta Lake and vicinity portion of the primary study area. This type occurs along the upper McCloud Arm and is dominated by open to moderate stands of Oregon ash (*Fraxinus latifolia*) with willow, California grape, mock orange, brickellbush (*Brickellia* sp.), and poison oak.

Oregon White Oak Woodland The Oregon white oak woodland plant series is uncommon in the Shasta Lake and vicinity portion of the primary study area and occurs as small inclusions in other more prevalent plant series types. This plant series is characterized by open to moderate woodlands dominated by Oregon white oak. Associated tree species include occasional canyon live oak, blue oak, and California black oak. The shrub layer is open or absent, and a moderate to dense forb layer dominates the understory.

Pale Spike Rush Marshes Pale spike rush is an uncommon plant series in the Shasta Lake and vicinity portion of the primary study area; it is known to occur only in a portion of one relocation area near Lakehead (Sacramento Arm). This plant series is characterized as a seasonal wetland dominated by a complex of

annual and perennial upland and wetland plant species. Dominant species include pale spike rush (*Eleocharis macrostachya*), jointed coyote-thistle (*Eryngium articulatum*), pennyroyal (*Mentha pulegium*), panic grass (*Panicum acuminatum*), iris-leaf rush (*Juncus xiphioides*), sedges (*Carex* spp.), rushes, poison oak, white leaf manzanita, western choke-cherry (*Prunus virginiana*), interior rose (*Rosa woodsii*), and Himalayan blackberry.

Ponderosa Pine–Douglas-Fir Ponderosa pine–Douglas-fir is the second-most-common conifer plant series type in the Shasta Lake and vicinity portion of the primary study area, occurring everywhere except along the Big Backbone Arm. This plant series is characterized by open to dense conifer stands dominated by Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine. Associated species include occasional sugar pine (*P. lambertiana*), incense cedar (*Calocedrus decurrens*), canyon live oak, and California black oak. Associated understory species vary and include Pacific dogwood (*Cornus nuttallii*), mock orange (*Philadelphus lewisii*), poison oak, snowdrop bush, and white leaf manzanita. The ground layer is open to moderate and is dominated by various grasses and forbs.

Ponderosa Pine Ponderosa pine is the most common conifer plant series type in the Shasta Lake and vicinity portion of the primary study area and is scattered throughout all portions of the area. This plant series is characterized by open to dense conifer stands dominated by ponderosa pine. Associated species include occasional Douglas-fir, sugar pine, incense cedar, canyon live oak, and California black oak. Associated understory species vary and include redbud, buck brush, mock orange, poison oak, snowdrop bush, and white leaf manzanita. The ground layer is open to moderate and is dominated by various grasses and forbs.

Red Osier Thickets Red osier is a common associate in many riparian plant series types in the Shasta Lake and vicinity portion of the primary study area. As a plant series, red osier thickets are an uncommon plant series type. In the vicinity of Shasta Lake, red osier thickets are found along the upper McCloud Arm. Dominant species include red osier (*Cornus stolonifera*), brown dogwood (*C. glabrata*), mock orange, spicebush, and California grape.

Riverine Riverine habitat includes the free-flowing portions of the larger Shasta Lake tributaries occurring in the Shasta Lake and vicinity portion of the primary study area. The riverine habitat is highly variable and ranges from moderate, low-gradient to steep, well-confined stream reaches.

Sandbar Willow Thickets Sandbar willow thicket is an uncommon plant series that occurs at one location each along the McCloud Arm and the Squaw Creek Arm. Dominant species include narrowleaf willow, with occasional red willow, black willow, shining willow, and arroyo willow.

Spicebush Thickets Spicebush is a common associate in many riparian plant series types in the Shasta Lake and vicinity portion of the primary study area. As a plant series, spicebush thickets are an uncommon plant series type. This plant series occurs at several locations along the McCloud Arm. Dominant species include spicebush, red osier, mock orange, and California grape.

Urban Urban habitat consists of various man-made features scattered throughout the Shasta Lake and vicinity portion of the primary study area, including resorts and a portion of the visitor center complex at Shasta Dam. These features are typically a combination of various buildings, pavement areas with manicured landscaping, and lawns.

Valley Oak Woodland Valley oak woodland is an uncommon plant series and occurs at two small locations in the Lakehead area (Sacramento Arm). Dominant species include valley oak (*Quercus lobata*) with white leaf manzanita, redbud, poison oak, and various grasses and forbs.

White Alder Groves The white alder plant series occurs in the riparian vegetation found in drainages throughout the Shasta Lake and vicinity portion of the primary study area. This plant series is characterized as narrow bands of vegetation occurring in and along the margins of rivers, streams, or other drainages. Dominant species include white alder (*Alnus rhombifolia*) with occasional Oregon ash, red osier, big-leaf maple (*Acer macrophyllum*), narrowleaf willow, red willow, shining willow, and arroyo willow. Associated shrubs include spicebush, mock orange, California blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), ninebark (*Physocarpus capitatus*), and western azalea (*Rhododendron occidentale*). Common lianas include California grape, pipevine (*Aristolochia californica*), greenbriar (*Smilax californica*), and virgin's bower (*Clematis ligusticifolia*). The ground layer is open to dense and is dominated by sedges with various grasses and forbs.

White Leaf Manzanita Chaparral White leaf manzanita is the most common chaparral plant series type in the Shasta Lake and vicinity portion of the primary study area and is scattered throughout all portions of the area. The dominant species is white leaf manzanita. Associated species include occasional common manzanita (*A. manzanita*), western redbud, buck brush, deer brush, poison oak, birch-leaf mountain-mahogany, interior live oak (shrub form), Fremont's silktassel, bush poppy, yerba santa, and Brewer's oak.

Upper Sacramento River (Shasta Dam to Red Bluff) Vegetation within the Sacramento River Valley includes a variety of both upland and lowland plant communities, including a number of communities that are considered sensitive. Plant community names and descriptions used in this report are based primarily on the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986). Additional plant community information was obtained from *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer

1988), and the Shasta Lake Water Resources Investigation Initial Alternatives Report (Reclamation 2004). Also, for each plant community, the corresponding Natural Community Conservation Plan (NCCP) habitat type of the Multi-Species Conservation Strategy (MSCS) for the CALFED Bay-Delta Program (CALFED) (2000a) is noted. The plant communities present in the primary study area between Shasta Dam and RBPP are grouped into common and sensitive communities, and the relevant aspects of their ecology are discussed. These descriptions are generally applicable to the extended study area as well.

Common Plant Communities Common plant communities present within the primary study area include annual grassland, chaparral, and agricultural lands. The upper banks along steep-sided, bedrock constrained segments of the Sacramento River and its tributaries are characterized primarily by upland communities including blue oak woodland, foothill pine–oak woodland, and chaparral. These segments occur primarily between Shasta Dam and Redding.

Annual Grassland Annual grassland is an herbaceous plant community characterized by a dense cover of nonnative annual grasses with numerous species of nonnative annual forbs, as well as native wildflowers. Typical grass species include bromes (*Bromus diandrus*, *B. hordeaceus*, and *B. madritensis* ssp. *rubens*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), medusahead (*Elymus caput-medusae*), and Italian ryegrass (*Festuca perennis*). Common nonnative forbs include vetches (*Vicia* spp.), filarees (*Erodium* spp.), and clovers (*Trifolium* spp.). Native wildflowers such as California poppy (*Eschscholzia californica*), frying pans (*Eschscholzia lobbii*), California goldfields (*Lasthenia californica*), Fremont's tidy-tips (*Layia fremontii*), rusty popcorn flower (*Plagiobothrys nothofulvus*), and Fitch's tarweed (*Centromadia fitchii*) are also a common component of the annual grassland community. This plant community occurs in openings and disturbed areas and also characterizes the understory of the woodland plant communities. Annual grassland corresponds to the MSCS NCCP habitat "grassland."

Although the annual grasslands of the Central Valley and surrounding foothills are dominated by a small number of nonnative annual grasses, this natural community includes a large number of species, particularly species with an annual life history, both natives and nonnatives. These species differ substantially in the timing and duration of germination, growth, and reproduction. As a consequence, grassland structure and species composition vary substantially both throughout the growing season and from year to year. In response to annual patterns of temperature and rainfall, grassland structure and species composition also varies from one year to the next.

Chaparral Chaparral communities are characterized by dense cover of drought-tolerant shrubs, generally 6–12 feet tall. This plant community typically occurs on dry, rocky, thin-soiled slopes that are often steep and have southern aspects. Chaparral communities in the primary study area are typically dominated by common manzanita or buckbrush and have only a sparse

herbaceous layer. Chaparral communities in the extended study area may be dominated by any one of several species of manzanita or ceanothus, or may be dominated by other species such as chamise (*Adenostoma fasciculatum*), scrub oak (*Quercus dumosa*), or interior live oak. Chaparral communities are within the MSCS habitat type "upland scrub."

The dynamics of chaparral are closely related to fire. Because the crowns of chaparral shrubs are at or within several feet of the ground surface, they are killed by fire. However, many chaparral shrubs produce new stems from their stem bases. These "sprouters" and a number of nonsprouting species (of both shrubs and herbaceous species) also have a soil seedbank of dormant seed that are stimulated to germinate following fire. Following fire, sprouts and seedlings rapidly restore the shrub layer, which after reforming changes in structure and species composition much more slowly than during the first decade following a fire.

Agricultural Lands Much of the land within the Sacramento River Valley has been converted to agricultural uses. A variety of crops are cultivated in the fertile floodplain soils between Redding and Red Bluff, including irrigated row and field crops (e.g., rice, beans, melons, and alfalfa) and orchards and vineyards (e.g., grapes, walnuts, almonds, and grapes). Vegetation on the edges of agricultural fields is typically dominated by invasive annual grasses and forbs such as ripgut brome (*Bromus diandrus*), wild oats, Italian ryegrass, wild radish (*Raphanus sativus*), and field bindweed (*Convolvulus arvensis*). MSCS habitats include a "seasonally flooded agricultural land" category that includes any agricultural land that requires at least 1 week of flooding as a management practice. The MSCS does not include any habitat types for other agricultural lands.

These lands go through frequent, often seasonal cycles of tillage, seedbed preparation, seeding, crop growth, and harvesting, with applications of irrigation water, fertilizers, pesticides, and herbicides. Consequently, they progress from exposed soil to formation of a uniform, low, layer of herbaceous plants (dominated by a single species), to disturbance of the herbaceous layer and the underlying soil. The vegetation is low (1 foot to several feet high), uniform in structure, and except for irrigated pastures, generally of a single crop species and associated weeds.

Sensitive Plant Communities Sensitive plant communities include those that are of special concern to resource agencies or are afforded specific consideration through the California Environmental Quality Act (CEQA), Section 1602 of the California Fish and Game Code, Section 404 of the Federal Clean Water Act (CWA), and the State's Porter-Cologne Water Quality Control Act (Porter-Cologne Act), as discussed under "Regulatory Framework" below. Sensitive natural communities may be of special concern to these agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to

common and special-status species. Many of these communities are tracked in the California Department of Fish and Wildlife's (CDFW, formerly known as California Department of Fish and Game [CDFG]) CNDDB, a statewide inventory of the locations and conditions of the state's rarest plant and animal taxa and vegetation types. Many riparian and wetland plant communities occurring in the primary study area are considered sensitive by regulatory agencies. In addition, valley oak woodland is identified as a sensitive natural community by CDFW, and CEQA requires counties to consider treat all oak woodlands as sensitive communities. (Oak trees present in the study area also may be eligible for protection under local ordinances.) In the primary study area, in addition to the oak woodland, riparian, and wetland communities described above, sensitive natural communities include waters of the United States, including wetlands and navigable waters, which are subject to U.S. Army Corps of Engineers (USACE) jurisdiction. Potential waters of the United States in the primary study area include wetland communities and several named sloughs, canals, and irrigation ditches.

Figures 1-3a through 1-3j map the potential locations of sensitive plant communities along the Sacramento River from Shasta Dam to RBPP.

Oak Woodlands Oak woodlands present in the primary study area include blue oak woodland, blue oak savanna, foothill pine–oak woodland, and valley oak woodland.

Blue Oak Woodland Blue oak woodland is a broadleaved deciduous woodland plant community. The understory varies from grassy to shrubby. This plant community is dominated by blue oak (*Quercus douglasii*), but other oaks, including canyon live oak (*Q. chrysolepis*) and interior live oak (*Q. wislizeni*), are also typically present, as well as foothill pine (*Pinus sabiniana*). Common understory shrubs include common manzanita (*Arctostaphylos manzanita* ssp. *manzanita*), buckbrush (*Ceanothus cuneatus*), toyon (*Heteromeles arbutifolia*), redberry buckthorn (*Rhamnus crocea*), and poison oak (*Toxicodendron diversilobum*). Blue oak woodland occurs in valley uplands and on gentle to steep slopes with shallow, rocky, infertile soils that are moderately to excessively drained. Blue oak woodland is a community within the MSCS habitat type "valley/foothill woodland and forest."

Blue Oak Savanna Blue oak savanna is a broadleaved deciduous plant community characterized by an open tree canopy (typically less than 10 percent cover) and an understory of nonnative annual grasses and forbs interspersed with native wildflowers. The tree canopy is dominated by blue oak. Individual foothill pine trees occur occasionally in this community and patches of shrubs such as buckbrush, common manzanita, or toyon may also be present. Blue oak savanna typically occurs on south-facing slopes with thinner soils. Blue oak savanna is a community in the MSCS habitat type "valley/foothill woodland and forest."

Foothill Pine–Oak Woodland Foothill pine-oak woodland is an evergreen plant community characterized by a foothill pine–dominated tree canopy with oaks including blue oak and interior live oak as subdominants. This is a moderately open woodland community with an annual grassland understory. Shrub species including toyon, buckbrush, mountain mahogany (*Cercocarpus betuloides*), and common manzanita are often present. Foothill pine-oak woodland is widespread on east and northeast aspects. Foothill pine-oak woodland is a community in the MSCS habitat type "valley/foothill woodland and forest."

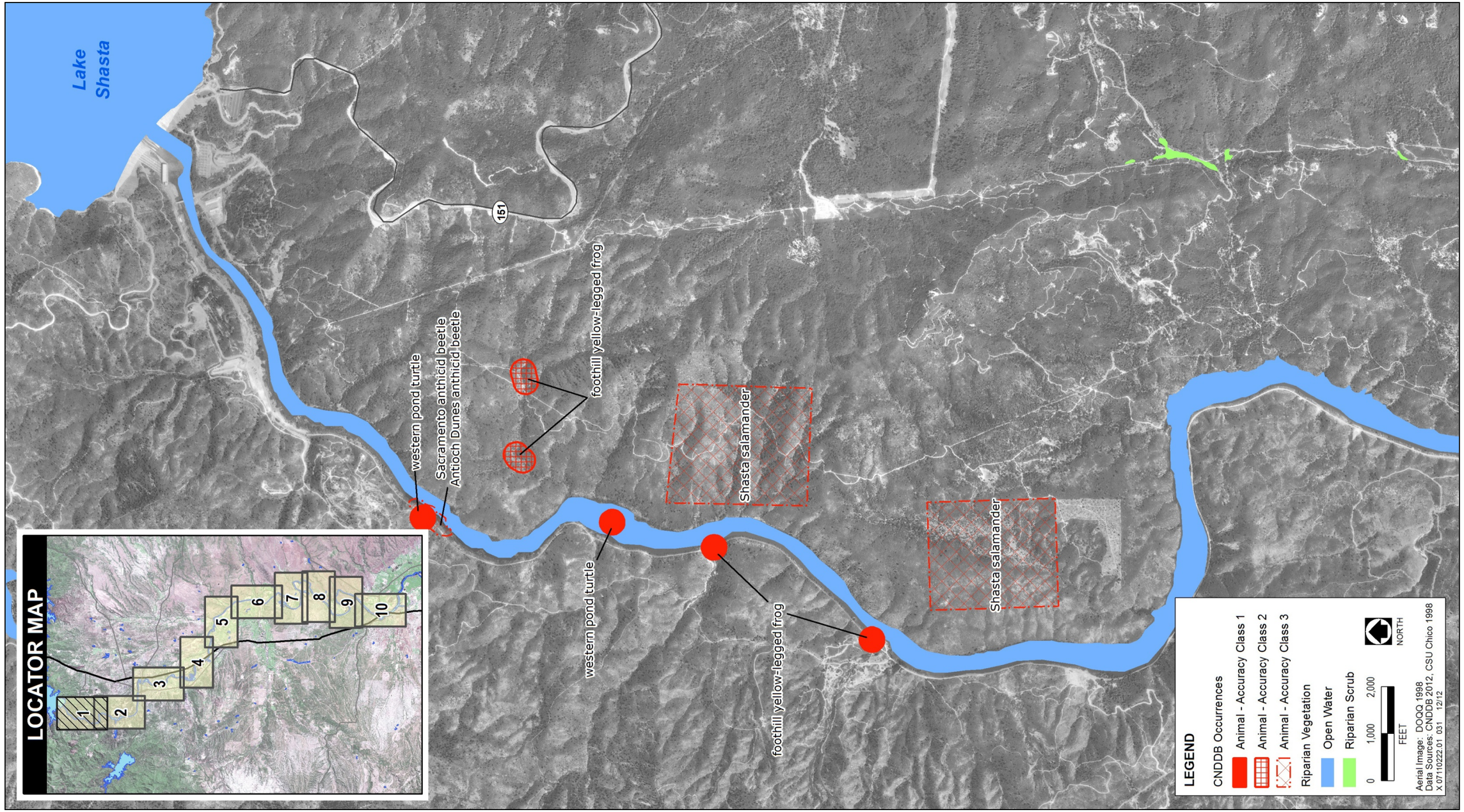

Figure 1-3a. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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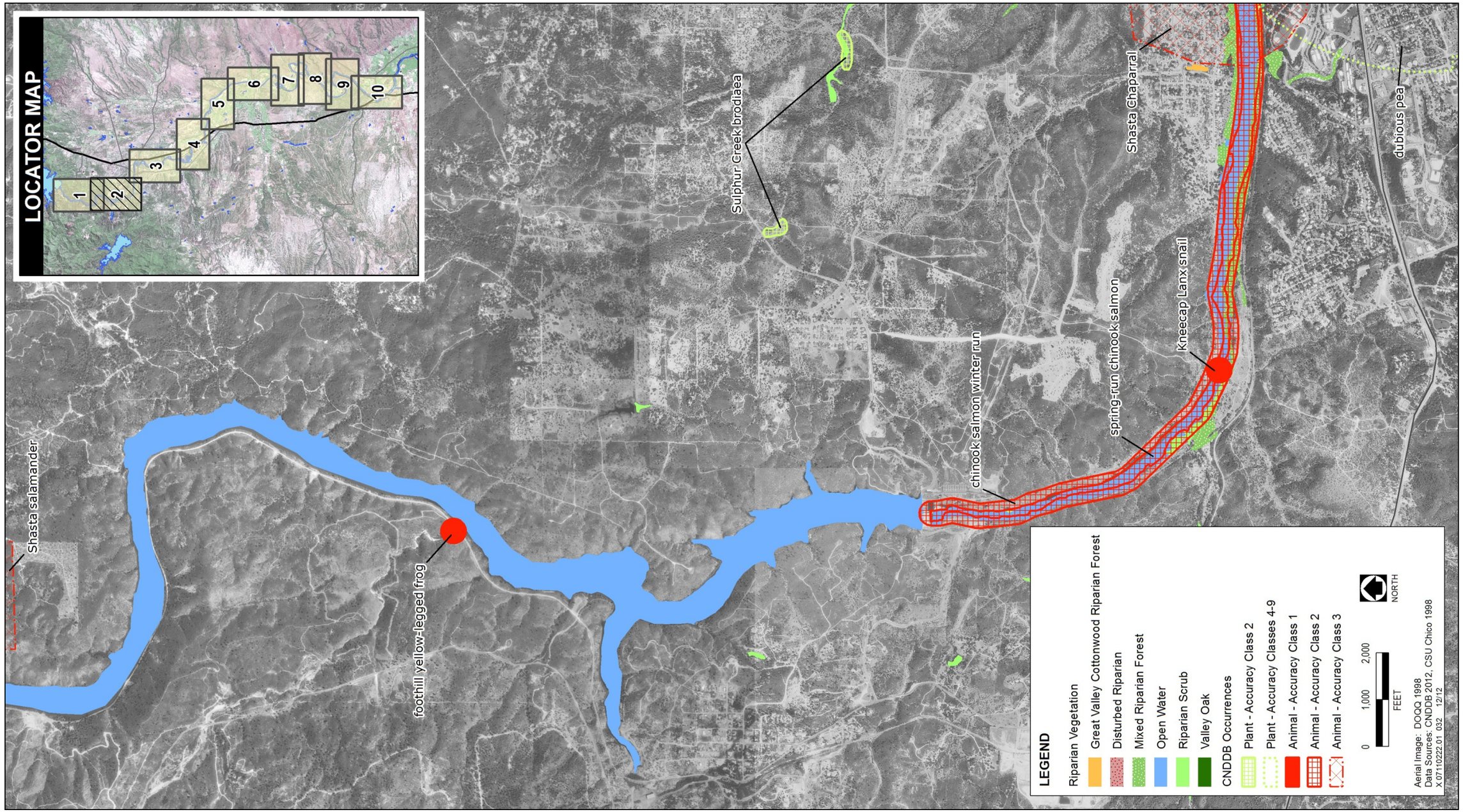

Figure 1-3b. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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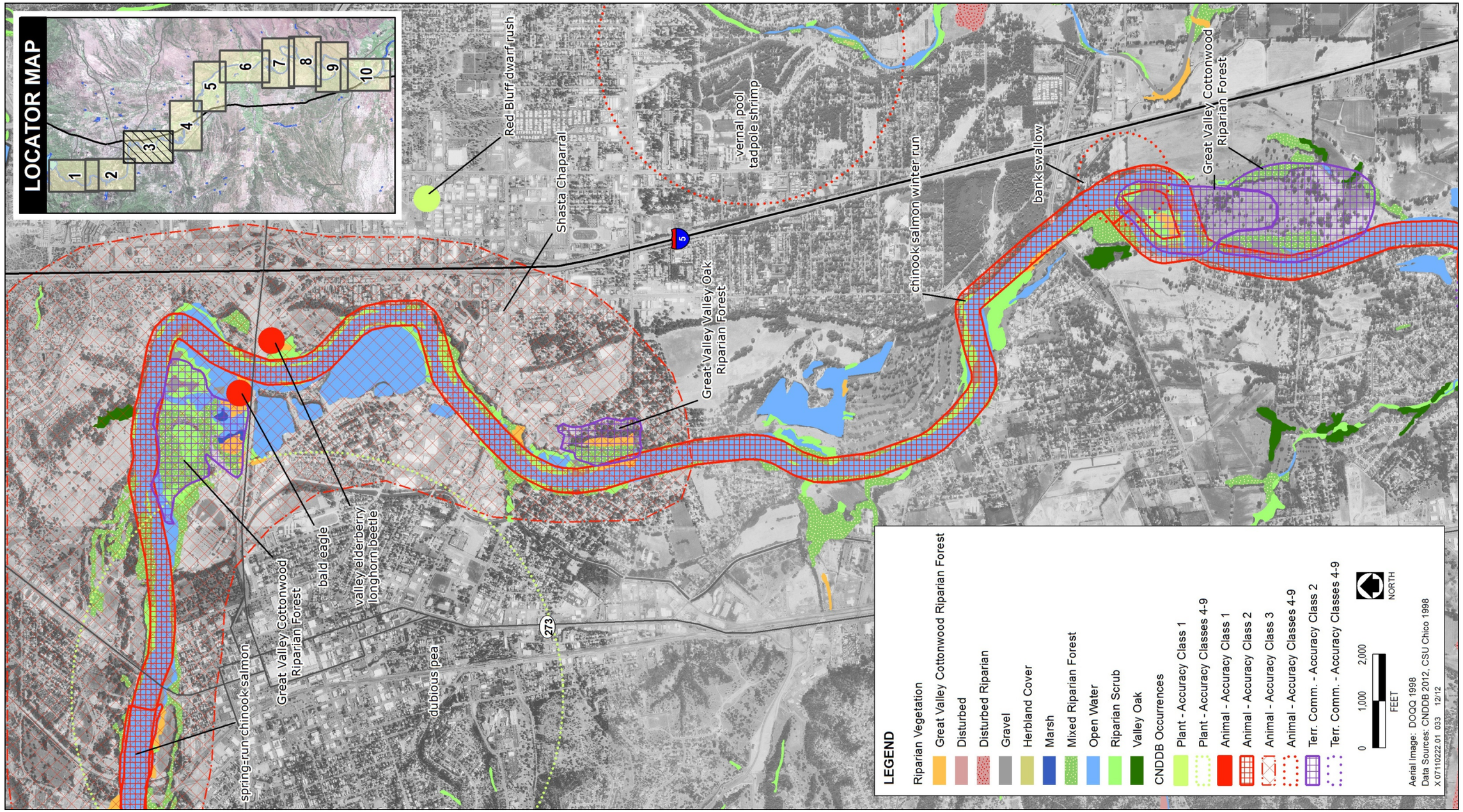

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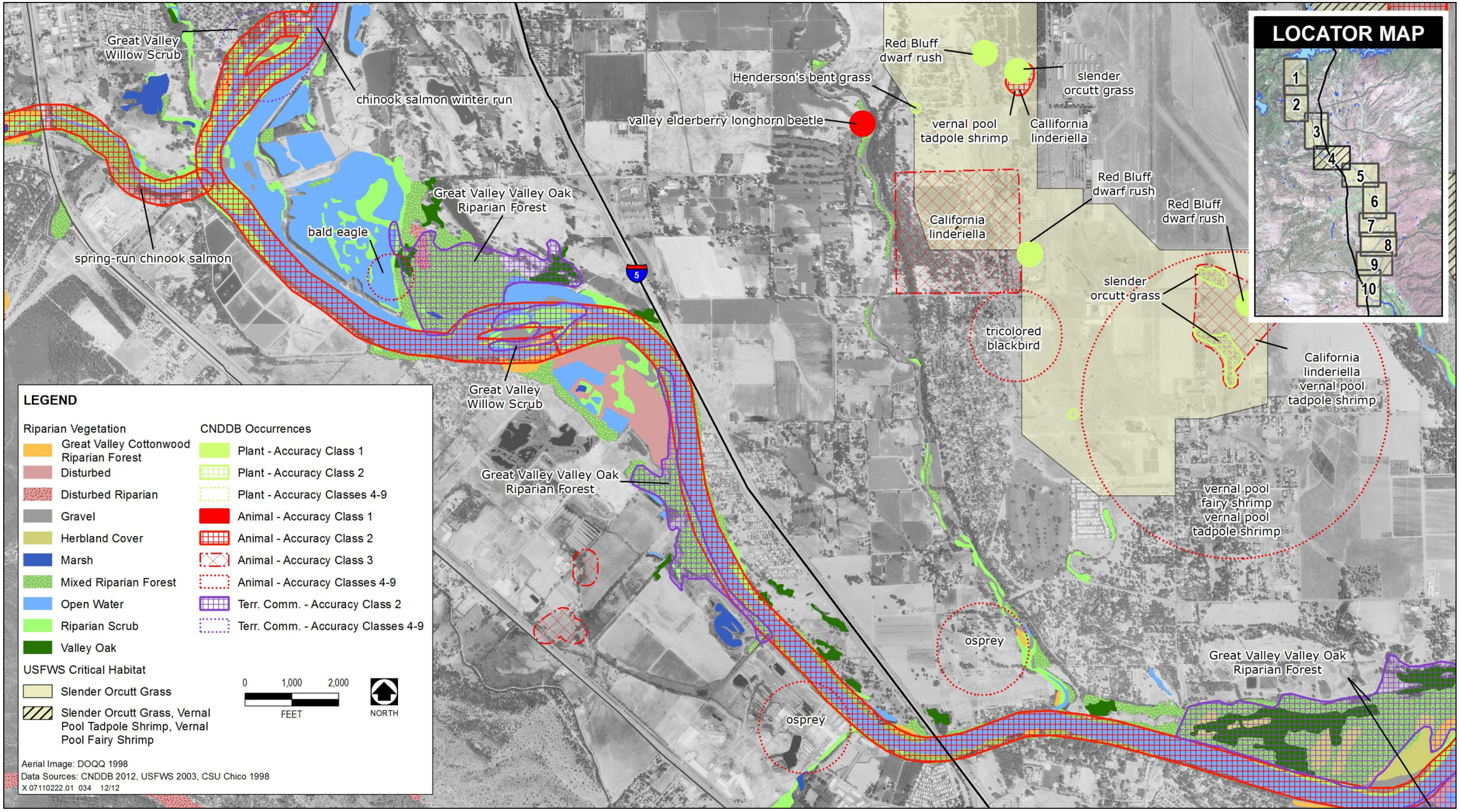

Figure 1-3d. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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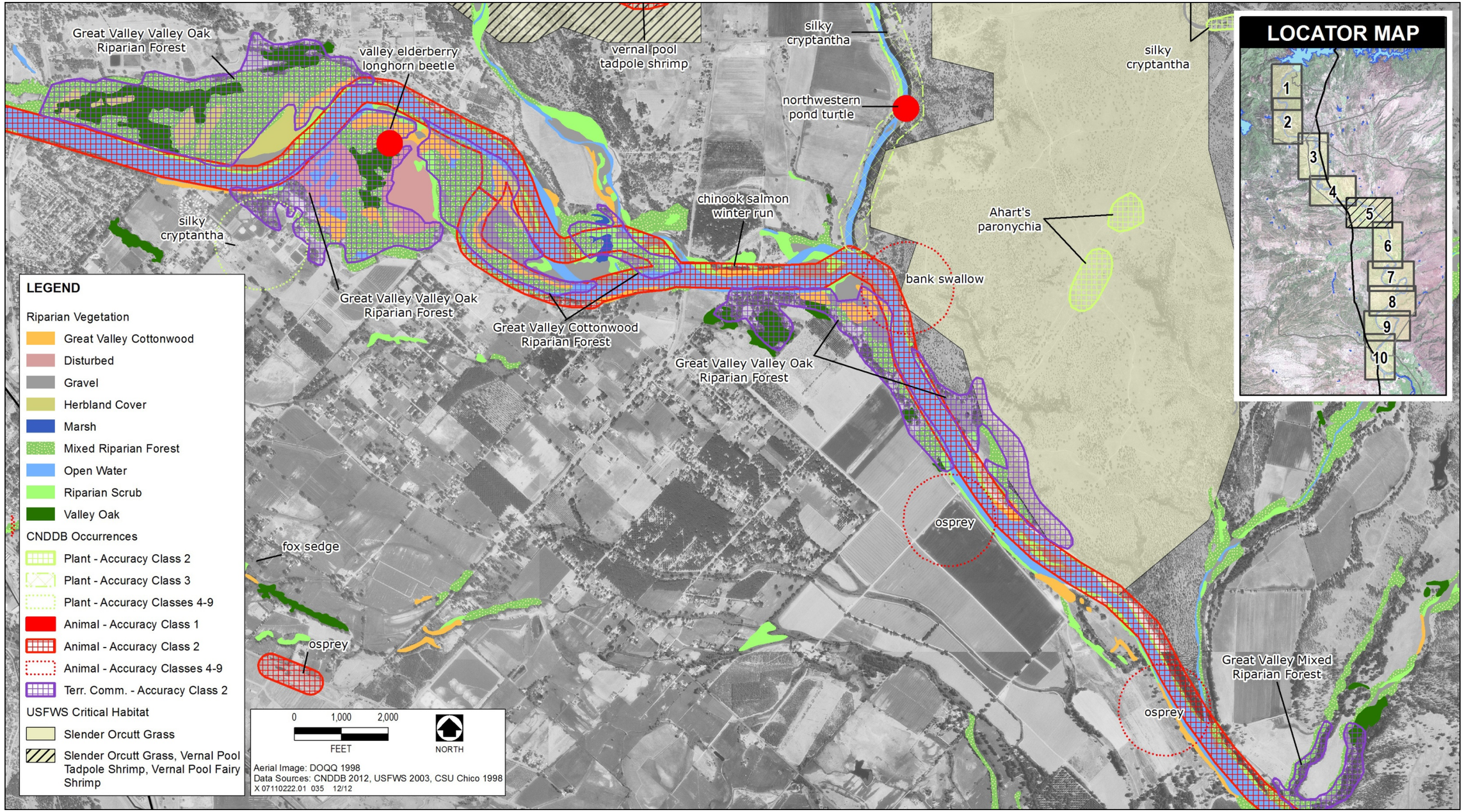

Figure 1-3e. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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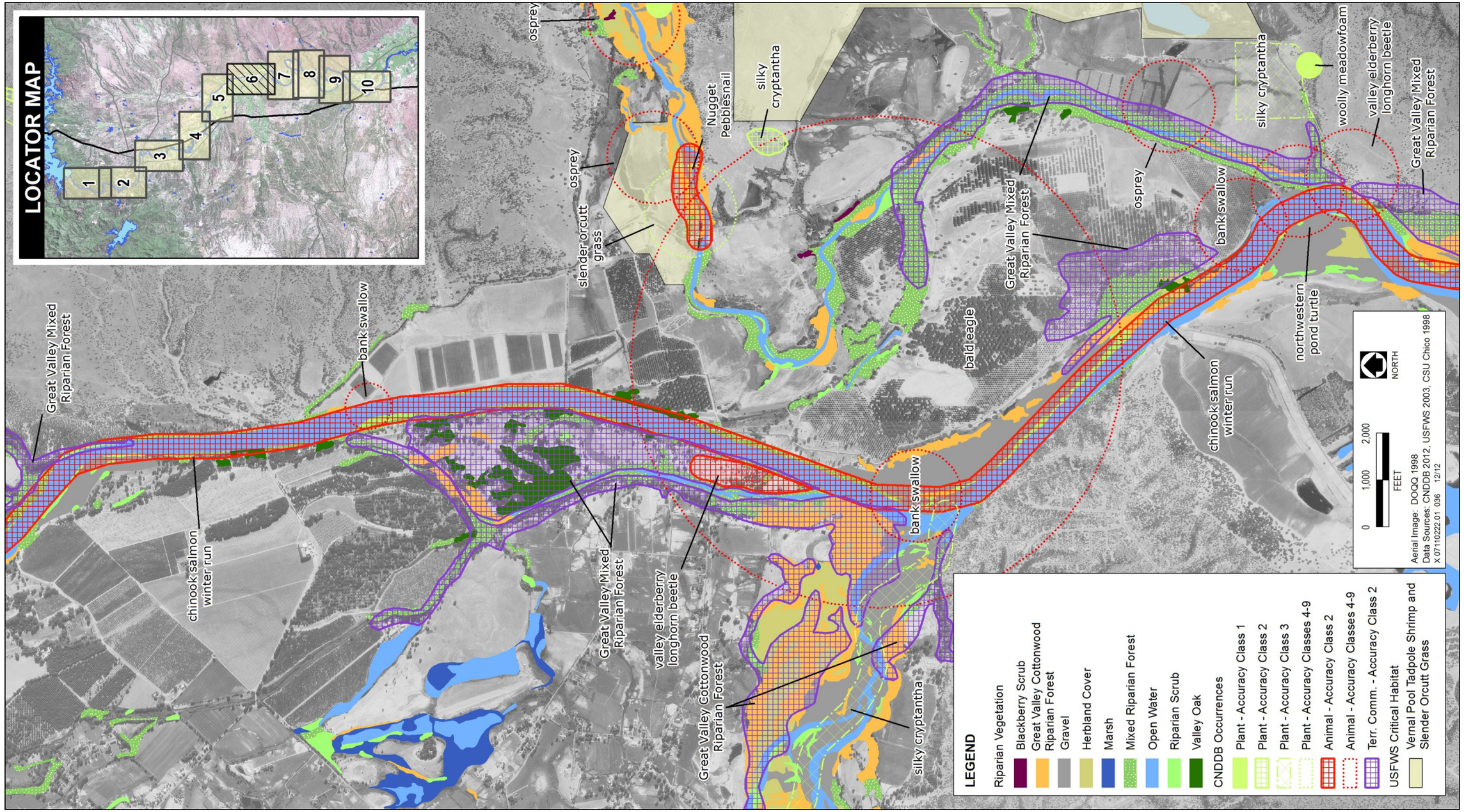

Figure 1-3f. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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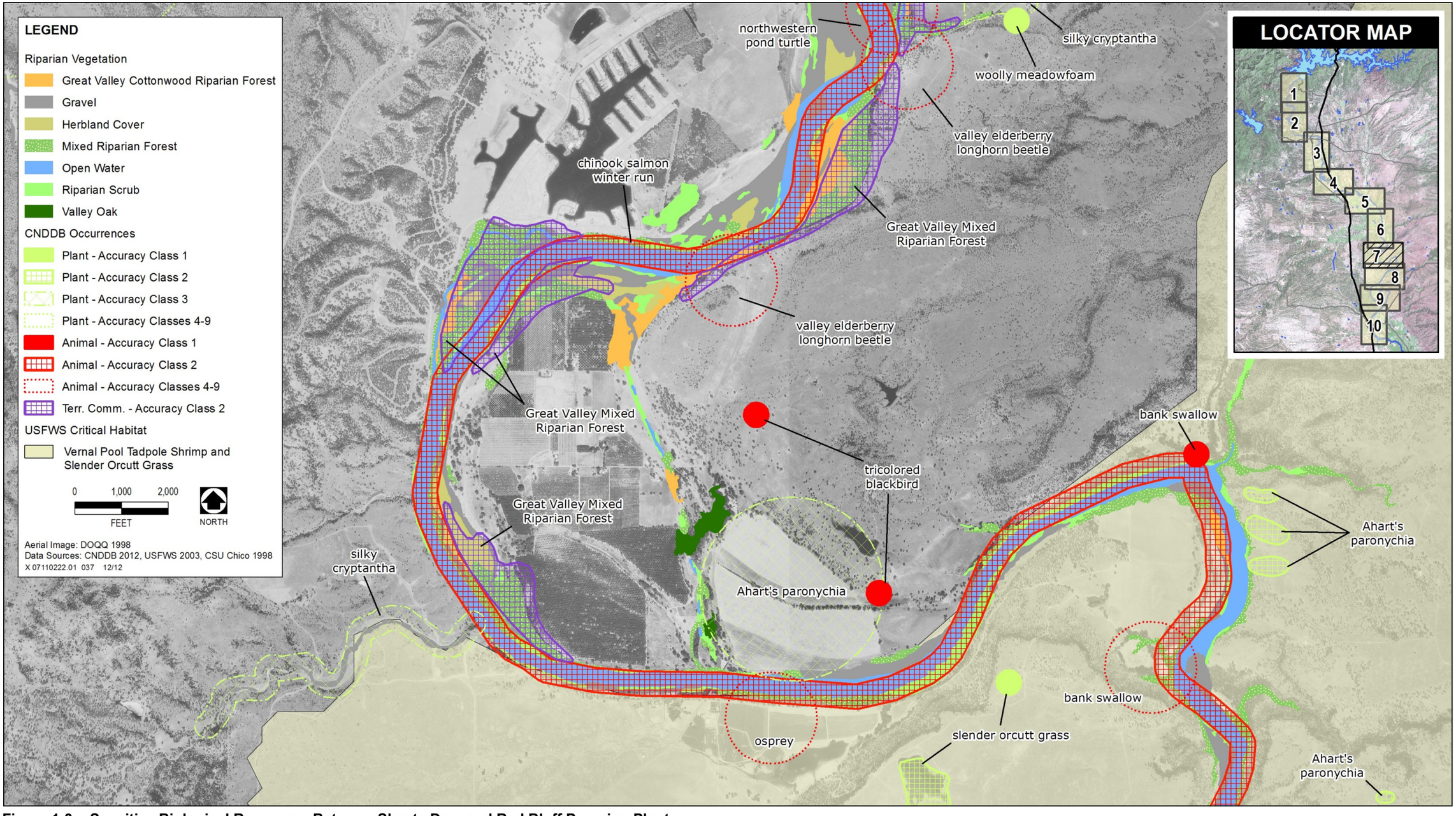

Figure 1-3g. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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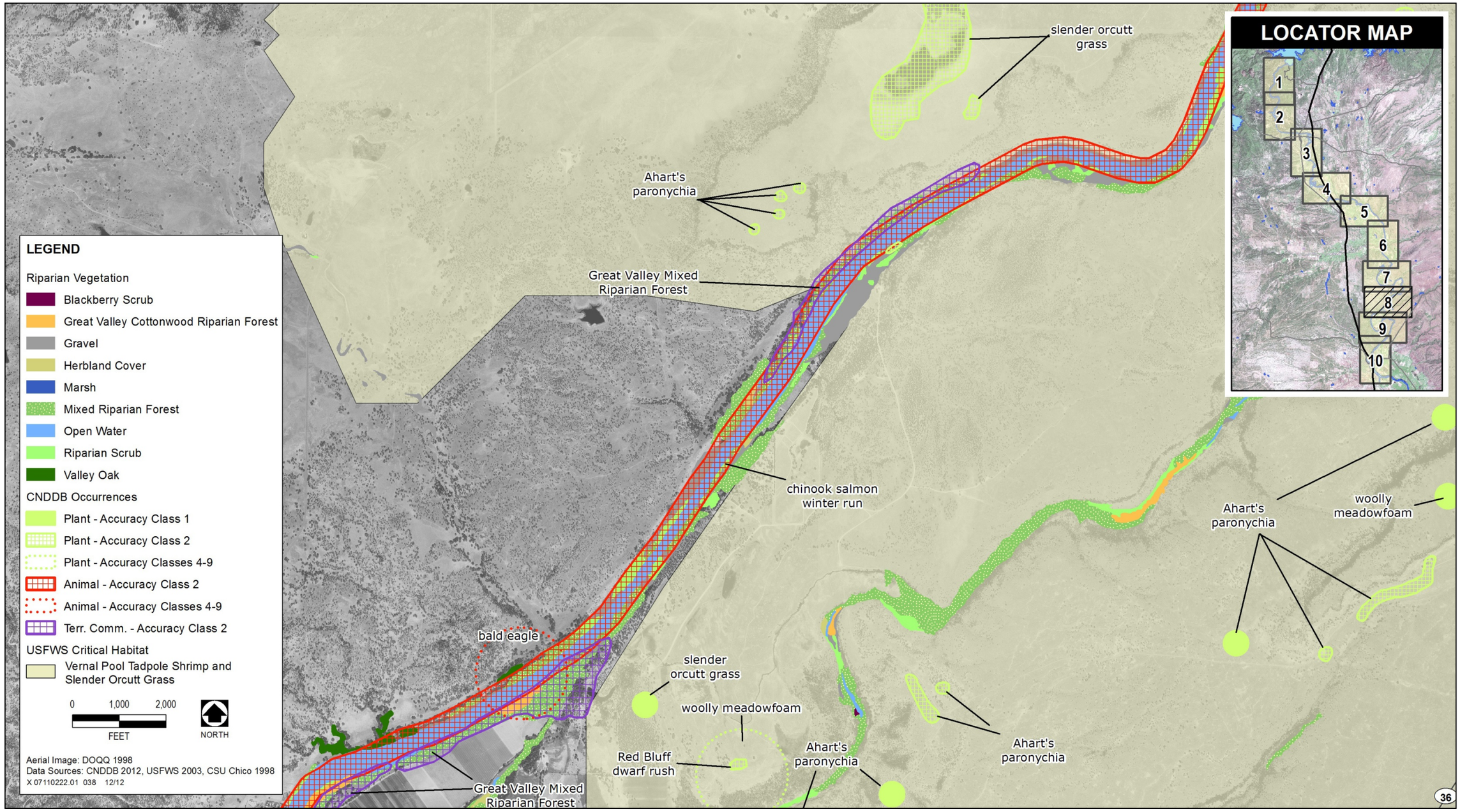

Figure 1-3h. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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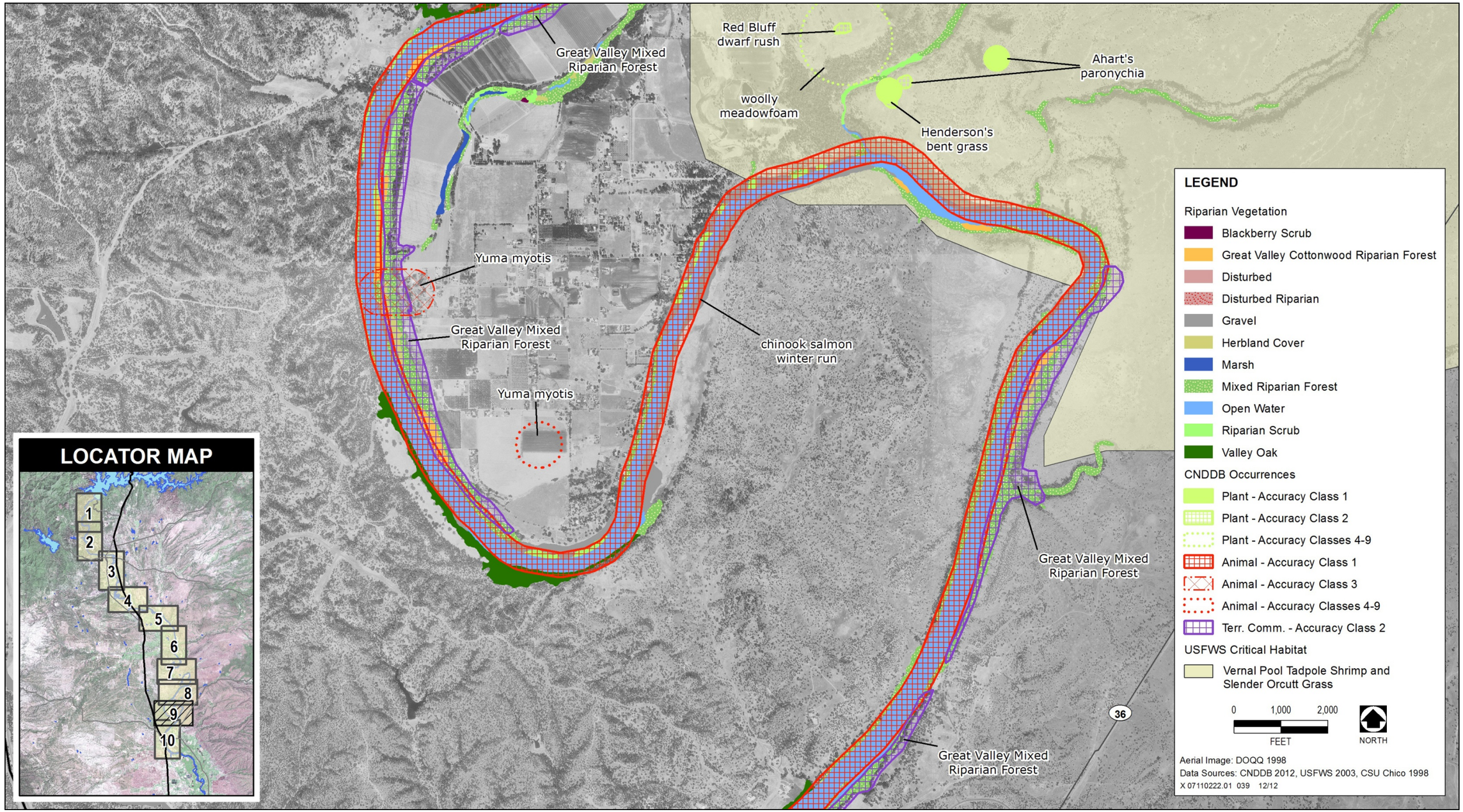

Figure 1-3i. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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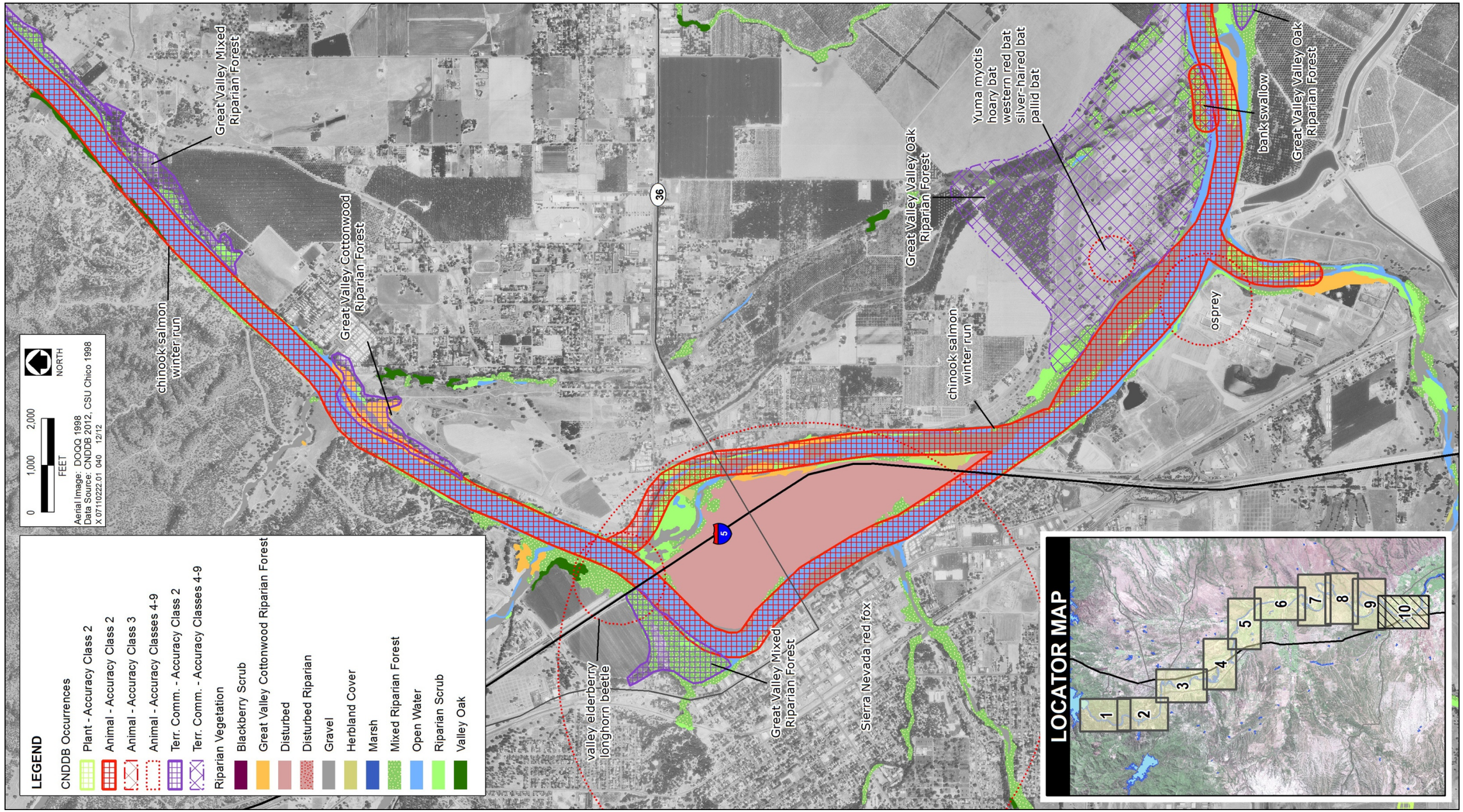

Figure 1-3j. Sensitive Biological Resources Between Shasta Dam and Red Bluff Pumping Plant

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Valley Oak Woodland This habitat type consists of an open savanna of valley oak (*Quercus lobata*) trees and an annual grassland understory. Valley oak is typically the only tree species present and shrubs are generally absent except for occasional poison oak. Canopy cover rarely exceeds 30–40 percent in valley oak woodland. This community occupies the highest portions of the floodplain terrace where flooding is infrequent and shallow. Valley oak woodland is a community in the MSCS habitat type "valley/foothill woodland and forest."

The oaks that dominate the tree layer of oak savannas and woodlands are long-lived trees that are resilient to damage; their stems often survive fire, and when their stems are killed by fire or are cut down, basal sprouts often grow into new stems. (Valley oak also tolerates inundation during winter before it has leafed out.)

Nonetheless, there are concerns regarding the status and ongoing trends of tree canopies of blue oak- and valley oak-dominated savannas and woodlands (Tyler, Kuhn, and Davis 2006). When canopy oaks die, their replacement through the growth of saplings or the remaining canopy trees is necessary to maintain the tree canopy. Currently, saplings are absent or at low densities on many sites; thus, their recruitment into the canopy is very infrequent. The infrequent recruitment of saplings appears to be a consequence of climate, interactions with herbivores, competition for resources with herbaceous plants, and the reproductive biology of the oaks themselves.

Riparian Communities Riparian communities in the primary study area are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code because they are associated with streambanks. They are identified as sensitive natural communities by CDFW because of their declining status statewide and because of the important habitat values they provide to both common and special-status plant and animal species. These habitat types are tracked in the CNDDB. In addition, areas containing riparian habitat may be subject to USACE jurisdiction under Section 404 of the CWA, if they meet the three wetland criteria described below under "Regulatory Framework."

California's riparian and wetland communities have experienced the most extensive reductions in their acreage, and in the Sacramento Valley approximately 90 percent of riparian vegetation has been converted to agriculture or development, and the remainder substantially altered by dams, diversions, gravel mining, grazing practices, and invasive species (Hunter et al. 1999; CALFED 2000b). Consequently, riparian and wetland communities are considered sensitive.

Much of the vast riparian habitat that once existed along the Sacramento River has been eliminated by agricultural clearing, flood control projects, and urbanization. Historically, belts of riparian forest more than 5 miles wide occurred along the Sacramento River (Jepson 1893; Thompson 1961, cited in

Hunter et al. 1999). Only narrow remnants of these riparian forests remain in the Sacramento River Valley. In the primary study area, much of the Sacramento River from Shasta Dam to Redding is deeply entrenched in bedrock, which precludes development of extensive areas of riparian vegetation. The river corridor between Redding and Red Bluff, however, still maintains extensive areas of riparian vegetation.

Riparian communities present within the floodplain of the Sacramento River, within the primary study area, include blackberry scrub, Great Valley willow scrub, Great Valley cottonwood riparian forest, Great Valley mixed riparian forest, and Great Valley valley oak riparian forest. Willow and blackberry scrub and cottonwood- and willow-dominated riparian communities are present along active channels and on the lower flood terraces whereas valley oak–dominated communities occur on higher flood terraces. These communities are all in the MSCS habitat type "valley/foothill riparian," and are described below.

Blackberry Scrub Blackberry scrub is dominated by Himalayan blackberry (*Rubus discolor*), a species that is listed as invasive by the California Invasive Plant Council (Cal-IPC). Cover of Himalayan blackberry is extremely dense in this community, leaving little opportunity for the establishment of native tree seedlings or shrubs beneath its canopy. Herbaceous cover is also very sparse. Scattered individual trees and shrubs may be interspersed through the blackberry scrub community. Himalayan blackberry generally establishes in gaps created by natural or human disturbances. Although Himalayan blackberry is an invasive species, this community does provide nesting habitat for some bird species and may be regulated under Section 1602 of the California Fish and Game Code when located within the bed, channel, or bank of a stream and may be subject to USACE jurisdiction under Section 404 of the CWA.

Great Valley Willow Scrub Great Valley willow scrub is a deciduous broadleaved community with open to dense cover of shrubby willows. This community type may be dominated by a single species of willow or by a mixture of willow species. Dense stands have very little understory while more open stands have herbaceous understories, usually dominated by grasses characteristic of the annual grassland community. Characteristic plant species include sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), shining willow (*S. lucida*), and California wild rose (*Rosa californica*). This community occupies point bars and narrow corridors along the active river channel that are repeatedly disturbed by high flows.

Great Valley Cottonwood Riparian Forest Great Valley cottonwood riparian forest is a deciduous broadleaved forest community with a dense tree canopy dominated by Fremont cottonwood (*Populus fremontii*) and often including a high abundance of black willow (*Salix gooddingii*). This community also has a dense understory of seedlings, saplings, and sprouts of the canopy dominants and shade-tolerant species including California box elder (*Acer negundo*) and Oregon ash (*Fraxinus latifolia*). Characteristic shrub species

include California buttonbush (*Cephalanthus occidentalis* var. *californicus*) and willows (*Salix* spp.). Lianas such as California grape (*Vitis californica*) are typically present as well. This community occupies lower floodplain terraces that are flooded annually.

Great Valley Mixed Riparian Forest Great Valley mixed riparian forest is a deciduous broadleaved forest community with a moderately dense to dense tree canopy that typically includes several species as codominates. Shrubs and lianas are also typically present. Mixed riparian forest is typically dominated by sycamore (*Platanus racemosa*) and valley oak (*Quercus lobata*) with Fremont cottonwood, white alder (*Alnus rhombifolia*), willow, and Oregon ash also occurring frequently. Common shrub species in this community type include blue elderberry (*Sambucus nigra* ssp. *canadensi*), California buttonbush, spicebush (*Calycanthus occidentalis*), and Himalayan blackberry. The herbaceous understory consists primarily of annual grasses and forbs similar to those found in the annual grassland communities but with a higher proportion of shade-tolerant species such as miner's lettuce (*Claytonia parviflora*), common bedstraw (*Galium aparine*), bur-chervil (*Anthriscus caucalis*), and meadow nemophila (*Nemophila pedunculata*). At stream edges, the herbaceous understory of this community is characterized by species that grow entirely or partially in water, such as tall flatsedge (*Cyperus eragrostis*), common tule (*Schoenoplectus acutus*), cattail (*Typha* spp.), sedges (*Carex* spp.), deergrass (*Muhlenbergia rigens*), and seep monkeyflower (*Mimulus guttatus*). This community occupies intermediate flood terraces that are subject to occasional high-flow disturbance.

Great Valley Valley Oak Riparian Forest Great Valley valley oak riparian forest is a deciduous broadleaved forest community with a closed canopy. This community type is similar to the Great Valley mixed riparian forest community described above but is clearly dominated by valley oak. Characteristic species include many of the same associates found in the Great Valley mixed riparian forest community type, but tree and shrub associates are more widely scattered. This community occupies upper floodplain terraces where flooding is infrequent but soil moisture is high.

More than 15 native species of deciduous trees and shrubs occur in the riparian forests, woodlands, and scrubs of the Central Valley and the Delta (Conard, MacDonald, and Holland 1977; Sawyer and Keeler-Wolf 1995; Vaghti and Greco 2007). Flow regime, disturbance, and species attributes determine the species composition and physical structure of this woody vegetation. Although flow regime influences the dispersal, establishment, growth, and survival of all the woody riparian species, Fremont's cottonwood (*Populus fremontii*) and the willow species (*Salix* sp.) particularly depend on specific hydrologic events for their recruitment. During seed release, flows must be high enough to disperse seed to surfaces where scouring by subsequent flows does not occur, yet not so high that seedlings desiccate after flows recede, and flows must recede

gradually to enable germination and seedling establishment while the substrate is still moist (Mahoney and Rood 1998).

Fremont's cottonwood and willow species are rapidly growing, shade intolerant and relatively short-lived (Burns and Honkala 1990, Vaghti and Greco 2007). Within 10–20 years, initially shrubby thickets have reached 10–40 feet in height. Other species, such as Oregon ash (*Fraxinus latifolia*) and valley oak (*Quercus lobata*), establish concurrently or subsequent to the willows and cottonwood, grow more slowly but are more tolerant of shade, and are longer-lived (Burns and Honkala 1990, Tu 2000). In the absence of frequent disturbance, these species enter the canopy, particularly after 50 years, as mortality of willows and cottonwood frees space. Conversely, frequent disturbance prevents the transition to mature mixed riparian or valley oak forests.

Riparian trees and shrubs are readily top-killed by fire (valley oak is somewhat more resistant to fire); however, most species will produce new shoots from the base of their previous trunks or from their roots. Important consequences of frequent fire can include shifts in species composition, more open vegetation, and an absence of larger trees (which are important habitat components for some species of wildlife).

None of the native woody species of the Central Valley's riparian areas germinate and establish seedlings underwater, and all tolerate inundation during the dormant season (i.e., late fall to early spring). Tolerance of inundation during the growing season varies among species. Most species can withstand a prolonged period of inundation if at least a portion of their foliage is above the water surface.

Wetland Communities Similar to riparian communities, much of the wetland habitat that once occurred in the Sacramento River Valley has been eliminated as a consequence of land use conversion to agriculture and urbanization. It is estimated that nearly 1.5 million acres of wetlands once occurred in the Central Valley. Today, approximately 123,000 acres remain. Wetland communities that are likely to occur in the primary study area between Shasta Dam and RBPP include freshwater marsh, freshwater seep, northern hardpan vernal pools, northern volcanic mudflow vernal pools, and other seasonal wetlands. Riparian communities in the primary study area are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code because they are associated with streambanks. They are identified as sensitive natural communities by CDFW because of their declining status statewide and because of the important habitat values they provide to both common and special-status plant and animal species. These habitat types are tracked in the CNDDB. In addition, areas containing riparian habitat may be subject to USACE jurisdiction under Section 404 of the CWA, if they meet the three wetland criteria described below under "Regulatory Framework."

Freshwater Marsh Freshwater marshes are herbaceous wetland plant communities that occur along rivers and lakes and are characterized by dense cover of perennial, emergent plant species. Marshes are typically perennial wetlands, but may dry out for short periods of time. Characteristic freshwater marsh species include common tule (*Schoenoplectus acutus*), narrowleaf cattail (*Typha angustifolia*), broadleaf cattail (*Typha latifolia*), common reed (*Phragmites australis*), tall flatsedge, common spikerush (*Eleocharis macrostachya*), and sedges (*Carex* spp.). Freshwater marshes in the primary study area are communities in the MSCS habitat type "nontidal freshwater permanent emergent."

In marsh vegetation, vegetation structure and species richness are strongly influenced by disturbance, changes in water levels, and the range of elevations present at a site (Keddy 2000). Disturbances, and water level drawdowns that expose previously submerged surfaces, provide opportunities for annuals, short-lived perennials, and other species to establish, which creates diversity in species composition and vegetation structure.

Although seedling establishment takes place on exposed surfaces, clonal growth allows many plants to subsequently occupy sites at lower elevations (i.e., in deeper water). The growth of emergent macrophytes is reduced, however, by submergence and by damage to their culms from wave action; thus vegetation dominated by emergent macrophytes is restricted to shallow water, typically less than 2 feet in depth (Coops, Boeters, and Smith. 1991; Coops, Van Der Brink, and Van Der Velde 1996).

At upper and lower elevations, wetlands frequently intergrade with adjacent vegetation. At upper elevations, emergent wetlands often intergrade with the woody vegetation of adjacent riparian areas; at lower elevations, wetlands often intergrade with aquatic vegetation, and a characteristic feature of this transitional zone is floating mats of plants such as water primrose (*Ludwigia* spp.) and knotgrass (*Paspalum distichum*).

Freshwater Seep Freshwater seep is a wetland plant community characterized by dense cover of perennial herb species usually dominated by rushes, sedges, and grasses. Freshwater seep communities occur on sites with permanently moist or wet soils resulting from daylighting groundwater. Species commonly observed in freshwater seeps in the area include rushes (*Juncus* spp.), sedges, flatsedges (*Cyperus* spp.), deergrass, cattail, bull thistle (*Cirsium vulgare*), blue-eyed grass (*Sisyrinchium bellum*), and willow (*Salix* spp.). The MSCS does not designate a habitat type that includes freshwater seeps.

Vernal Pools Vernal pools are seasonal wetlands that fill during winter rains and dry up in spring. They occur in undulating or mima mound (i.e., mound-intermound) topography where the soil or underlying rock has layers that are relatively impermeable to water. Vernal pools may be isolated from one another, but more often they are interconnected by swales or ephemeral

drainages in vernal pool complexes that may extend for hundreds of acres. Vernal pool complexes generally include water features.

Vernal pools are considered sensitive because they provide potential habitat for Federally listed species, including slender Orcutt grass (*Orcuttia tenuis*) and vernal pool crustaceans; provide important ecological values and functions; and are likely considered waters of the State subject to jurisdiction of the Central Valley Regional Water Quality Control Board under the Porter-Cologne Act.

Vernal pool communities are included in the MSCS habitat type "natural seasonal wetland." The two predominant types of vernal pool communities in the primary study area, northern hardpan vernal pools and northern volcanic mudflow vernal pools, are described below.

Northern Hardpan Vernal Pool

This is an herbaceous plant community characterized by low-growing annual grasses and forbs adapted to live both on land and in water. In this type of vernal pool, the restrictive layer is composed of cemented hardpan soils that are very acidic. This type of vernal pool occurs on alluvial terraces with hummocky (i.e., mound and depression) topography. The pools form in depressions between mounds. Northern hardpan vernal pool communities are dominated by native plant species; characteristic species include Fremont's goldfields (*Lasthenia fremontii*), toothed downingia (*Downingia cuspidata*), Sacramento Valley pogogyne (*Pogogyne zizyphoroides*), stalked popcornflower (*Plagiobothrys stipitatus*), common blennosperma (*Blennosperma nanum*), pigmy-weed (*Crassula aquatica*), and water starwort (*Callitriche marginata*).

Northern Volcanic Mudflow Vernal Pool

This is an herbaceous plant community characterized by an open mixture of very low-growing annual grasses and forbs adapted to live both on land and in water. This type of vernal pool is restricted to small, irregular depressions in tertiary pyroclastic flows. In this case, the restrictive layer is composed of volcanic mudflow material. Typical plant species encountered in these vernal pool communities include smooth goldfields (*Lasthenia glaberrima*), bristled downingia (*Downingia bicornuta*), Douglas' meadowfoam (*Limnanthes douglasii*), stalked popcornflower, white-headed navarretia (*Navarretia leucocephala*), pigmy-weed, and woolly marbles (*Psilocarphus brevissimus*). Northern volcanic mudflow vernal pool is a community in the MSCS habitat type "natural seasonal wetland."

Pool size and the depth, duration, and seasonal timing of ponding are important factors that influence the composition and diversity of plant and animal species in vernal pools (Solomeshch, Barbour, and Holland 2007). Consequently, the vegetation of vernal pools can vary substantially from year to year in response to interannual fluctuations in climate.

Management activities such as grazing and burning also influence species composition and diversity. In fact, recent research indicates that the abundance of nonnative grasses, grazing practices, and hydrology are strongly interrelated and can substantially affect the plant communities of vernal pools (Robins and Vollmar 2002, Pyke 2004, Marty 2005).

Seasonal Wetlands Seasonal wetlands are ephemeral wetlands that pond or remain flooded for long periods during a portion of the year, generally the rainy winter season, then dry up, typically in spring. They often occur in shallow depressions on flood terraces that are occasionally to infrequently flooded. Seasonal wetlands are herbaceous communities typically characterized by species adapted for growth in both wet and dry conditions, and may contain considerable cover of upland species as well. Species commonly present in seasonal wetlands include tall flatsedge, dallisgrass (*Paspalum dilatatum*), Bermudagrass (*Cynodon dactylon*), Italian ryegrass, Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and curly dock (*Rumex crispus*).

Seasonal wetlands differ from vernal pools in that they do not have a restrictive hardpan layer and are usually dominated by nonnative plant species, especially nonnative grasses. Vernal pools are typically distinguished by a unique host of native and endemic plant species adapted to the extreme conditions created by the cycles of inundation and drying. Seasonal wetlands differ from freshwater marshes and seeps in that they are not permanently flooded or saturated. The seasonal wetland community type is not included in the Holland or Sawyer and Keeler-Wolf classification systems, but it is recognized by USACE and may be subject to USACE jurisdiction under Section 404 of the CWA. Seasonal wetland communities are in both the MSCS “natural seasonal wetland” and “managed seasonal wetland” habitat types.

Extended Study Area

The extended study area extends from RBPP south to the Delta and includes the lower Sacramento River, as well as the lower Feather and American Rivers downstream from SWP and CVP reservoirs. It also includes the Bay-Delta area and portions of the American River basin, San Joaquin River basin, and the water service areas of the CVP and SWP. (See Figure 1-4.)

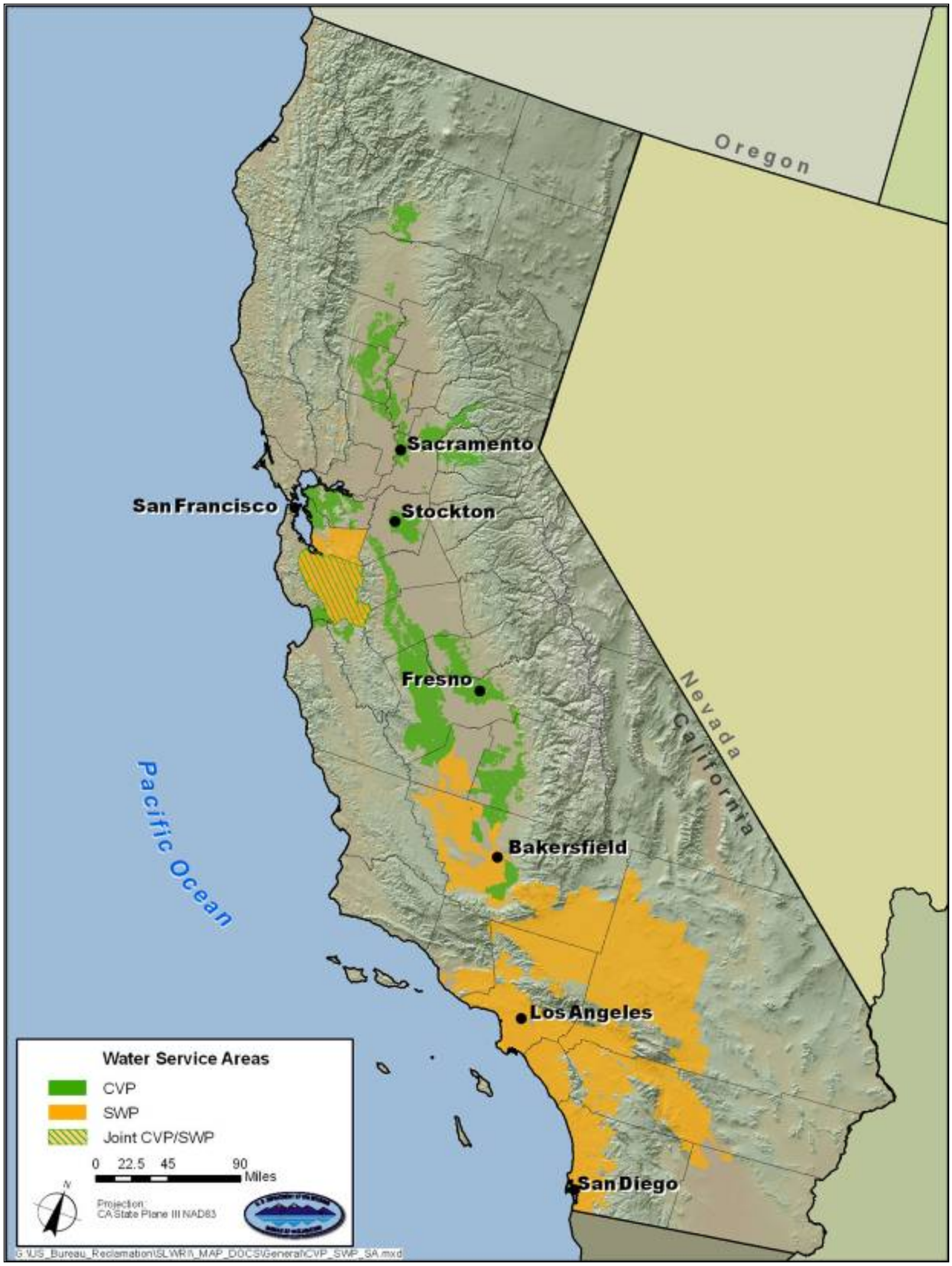

Figure 1-4. Central Valley Project and State Water Project Service Areas

This vast area includes a large number of plant communities. The types of plant communities include the following:

- Submerged aquatic vegetation
- Permanent wetlands (fresh, brackish, and saline; tidal and nontidal)
- Riparian scrubs, woodlands, and forests
- Vernal pools and other seasonal wetlands
- Grasslands
- Oak woodlands
- Montane hardwood and conifer forests
- Coastal and desert scrubs
- Chaparrals

A number of these natural plant communities occur in the primary study area and are described above. The other natural plant communities are described in the following sections, and in Mayer and Laudenslayer (1988), Sawyer and Keeler-Wolf (1995), and CALFED (2000b).

In addition to natural plant communities, plant communities of agricultural and urban areas occupy extensive areas in the extended study area. Agricultural plant communities include alfalfa and other irrigated pastures, field and row crops, orchards and vineyards, and rice. Plant communities in developed areas, as described in Mayer and Laudenslayer (1988), include those of golf courses and parks, ruderal (disturbed) areas, landscaped development, and small areas of natural plant communities. Currently, agricultural and urban vegetation occupies nearly 70 percent of the Central Valley, and more than 70 percent of terrestrial habitats in the Delta. This extensive conversion of natural vegetation to agricultural and urban vegetation has reduced the extent of some natural plant communities more than others.

Lower Sacramento River and Delta The roughly 300 miles of the Sacramento River can be subdivided into distinct reaches. These reaches are discussed separately below because the differences among them in topography, hydrology, and geomorphology strongly affect riparian vegetation and associated habitat functions. This section focuses on the reaches of the main stem Sacramento River from RBPP to Colusa, from Colusa to the Delta, and in the Delta. Each of these reaches is discussed individually along with the main tributaries and floodplain bypasses to the Sacramento River. (See the Fisheries and Aquatic Ecosystem technical report for more information.)

Sacramento River from RBPP to the Delta The Sacramento River from RBPP to the Delta is described below by reach from RBPP to Colusa, and Colusa to the Delta. Primary tributaries to the lower Sacramento River and floodplain bypasses are also described.

Red Bluff Pumping Plant to Colusa In this approximately 54-mile reach, the Sacramento River is classified as a meandering river, where relatively stable, straight sections alternate with more sinuous, dynamic sections (Resources Agency 2003). The active channel is fairly wide in some stretches and the river splits into multiple forks at many different locations, creating gravel islands often with riparian vegetation. Historic bends in the river are visible throughout this reach and appear as scars of the historic channel locations with the riparian corridor and oxbow lakes still present in many locations. Well-developed riparian woodland occurs in many locations. The channel remains active and has the potential to migrate in times of high water. Point bars, islands, high and low terraces, instream woody cover, early-successional riparian plant growth, and other evidence of river meander and erosion are common in this reach.

As is characteristic of this section of the lower Sacramento River, major physiographic features include floodplains, basins, terraces, active and remnant channels, and oxbow sloughs. These features, together with the historic and current hydrology and dynamic meander pattern of the Sacramento River, sustain a diverse array of riparian plant communities along the river channel, intermixed in a broad arable floodplain. Although most of the mature valley oak woodland and savanna and other mature riparian forest community types farther from the river's edge are now absent from much of the lower Sacramento River corridor, this meandering section of the Sacramento River nonetheless supports a variety of habitat types: annual grassland, blackberry scrub, Great Valley willow scrub, Great Valley cottonwood forest, Great Valley mixed riparian forest, Great Valley valley oak woodland, and freshwater marsh. All of these habitat types are described above under the "Upper Sacramento River (Shasta Dam to Red Bluff)."

Colusa to the Delta The general character of the Sacramento River changes quite drastically downstream from Colusa from a dynamic and active meandering channel to a confined, narrow channel restricted from migration. Surrounding agricultural lands encroach directly adjacent to the levees, which have cut the river off from most of its riparian corridor, especially on the eastern side of the river. Most of the levees in this reach are lined with riprap, allowing the river no erodible substrate and limiting the extent of riparian vegetation.

Urban and agricultural encroachment, development, dams, levees, and demand for fuel resulted in the removal and fragmentation of most riparian areas along the lower Sacramento River. Native perennial grasslands once covered vast areas in the region but have since been farmed or invaded by nonnative annuals. Low-lying areas in the region once were routinely flooded, replenishing

nutrients and providing water to many portions of the region not situated along waterways. However, diking and construction of levees to protect agricultural lands and residential areas have changed this, and the extent of many vegetation communities that depend on regular floods has been greatly reduced. Vernal pools, important wetland resources that were historically abundant, have decreased dramatically with agriculture and development in the last two centuries.

Primary Tributaries to the Lower Sacramento River The primary tributaries to the lower Sacramento River are the American and Feather Rivers; each is described separately below.

Lower Feather River The aquatic ecosystem in the lower Feather River, down to the confluence with the Sacramento River at Verona, is influenced by the California Department of Water Resources' Oroville Facilities. The upper extent is fairly confined by levees as the river flows through the city of Oroville. Downstream from Oroville, the Feather River is fairly active and meanders its way south to Marysville. However, this stretch is bordered by active farmland, which confines the river into an incised channel in certain stretches and limits the width of riparian woodland. Some of this adjacent farmland is in the process of being restored to floodplain habitat with the relocation of levees to become setback levees.

Lower American River The lower American River (below Folsom and Nimbus Dams) is fairly low gradient. Most of the lower American River is surrounded by the American River Parkway, which preserves the surrounding riparian zone. The river channel does not migrate to a large degree because it has become deeply incised, leaving tall cliffs and bluffs adjacent to the river.

Sacramento River Floodplain Bypasses Multiple water diversion structures in the lower Sacramento River move floodwaters into floodplain bypass areas during high-flow events. These floodplain bypass areas – the Butte basin, Sutter Bypass, and Yolo Bypass – provide broad, inundated floodplain habitat during wet years. Unlike other Sacramento River and Delta habitats, floodplains and floodplain bypasses are seasonally dewatered (as high flows recede).

Sacramento–San Joaquin River Delta The Delta comprises an area of approximately 750,000 acres divided into a number of islands by hundreds of miles of waterways. Surface-water resources in the Delta are influenced by the interaction of tributary inflows, tides, Delta hydrodynamics, and diversions and transfers. The Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras Rivers all discharge directly into the Delta.

Before reclamation, the Delta was inundated each year by winter and spring runoff, which changed channel geometry in response to flood conditions and

tidal influence. Consequently, there were extensive areas of marsh in the Delta, and large areas of peat soils (Histosols) formed.

Nearly all of the Delta's marshland has since been reclaimed by agriculture, peat production, and urban and industrial uses. More than 1,000 miles of levees protect this reclaimed land (CALFED 2000c). Reclaiming the land exposed the previously submerged peat soils to the atmosphere, and they began to oxidize and diminish. As a result, reclaimed Delta islands have been subsiding, and some are now as much as 25 feet below sea level.

Agriculture dominates the Delta area, with agricultural lands occupying approximately 72 percent of the region's total land area (CALFED 2000c). Agricultural vegetation includes agricultural lands that are seasonally flooded and those that are not. Major crops and cover types in agricultural production include small grains (such as wheat and barley), field crops (such as corn, sorghum, and safflower), truck crops (such as tomatoes and sugar beets), forage crops (such as hay and alfalfa), pastures, orchards, and vineyards. The distribution of seasonal crops varies annually, depending on crop-rotation patterns and market forces. Recent agricultural trends in the Delta include an increase in the acreage of orchards and vineyards. General cropping practices result in monotypic stands of vegetation for the growing season and bare ground in fall and winter. In areas not intensively cultivated, such as fallow fields, roads, ditches, and levee slopes, regular maintenance precludes the establishment of ruderal vegetation or native vegetation communities.

Grassland and ruderal (i.e., disturbed upland) communities are present throughout the Delta region. Historically, native grasslands and seasonal wetlands occurred in the Delta region, but vernal pools were not common. However, vernal pools that occur in grasslands along the margins of the Delta region, such as the Jepson Prairie Preserve, support a wide diversity of native plants. The grassland, ruderal, and seasonal wetland communities of the Delta are similar to those of the upper and lower Sacramento River portions of the combined primary and extended study areas.

Although about one-half of the Delta's historical wetland areas have been diked and drained, some small islands remain in a quasinatural state, as do some other areas with aquatic and wetland communities (e.g., "flooded islands" that were once reclaimed land, but have been abandoned after levee failures). The species composition and ecology of these riparian, marsh, and aquatic plant communities differ from the composition and ecology of communities in the upper and lower Sacramento River portions of the study area. These are all sensitive communities and are described below.

Riparian Communities Along the lower Sacramento River and in the Delta, riparian vegetation is characterized by narrow linear strips of trees and shrubs, in single- to multiple-story canopies. Tree canopies may be continuous or discontinuous, or absent altogether (as in riparian scrubs). These patches of

riparian vegetation may be on or at the toe of levees (particularly in the Delta). Riparian communities in this region include cottonwood-willow woodland, Valley oak riparian woodland, riparian scrub, and willow scrub. These communities are described below.

Cottonwood-willow Woodland

Cottonwood-willow woodland typically can be found on channel islands, on levees, and along unmaintained channel banks of Delta sloughs and rivers. The riparian zone along leveed islands is usually very narrow, but more extensive riparian areas occur on in-channel islands or in other unleveed areas. Dominant understory species include black willow, sandbar willow, and shining willow. Other understory species include Himalayan blackberry, California blackberry, California button-willow, Indian hemp, California rose, coyote brush, and California black walnut. Herbaceous cover occurs where shrubs are sparse or absent and includes Santa Barbara sedge, hoary nettle, creeping wildrye, and numerous nonnative species. Cottonwood-willow woodland is a community in the MSCS NCCP habitat "valley/foothill riparian."

Valley Oak Riparian Woodland

Valley oak riparian woodland includes areas where the dominant overstory is valley oak. Associated species are similar to those described for the cottonwood-willow woodland vegetation. Valley oak riparian woodland is a community in the MSCS NCCP habitat "valley/foothill riparian."

Riparian Scrub

Riparian scrub is typically found on channel islands on levees and along narrow channel banks of creeks, waterways, and major tributaries in the Delta region. It is dominated by dense stands of shrubs, such as California button-willow, wild rose, Himalayan blackberry, and white alder. Where shrub cover is absent, herbaceous cover is often abundant and includes Indian hemp, yellow iris, centaury, vervain, umbrella sedge, creeping bent grass, bugleweed, and hedge-nettle. Riparian scrub also includes blackberry thickets, which intergrade with other riparian habitats. These thickets are characteristically monotypic stands of Himalayan blackberry, with scattered and isolated trees and shrubs, including coyote brush, sandbar willow, shining willow, and white alder. Blackberry thickets occur in association with ruderal habitats; however, an herbaceous understory is not evident within these thickets. Elderberry shrubs may also be associated with this community type. Riparian scrub is a community in the MSCS NCCP habitat "valley/foothill riparian."

Willow Scrub

Willow scrub is a type of riparian scrub habitat dominated by willow species, particularly sandbar willow and young trees of other willow species, such as shining willow and black willow. In disturbed areas, willow scrub intergrades with blackberry vegetation. Willow scrub is a community in the MSCS NCCP habitat "valley/foothill riparian."

In the Delta, riparian areas are frequently dominated by nonnative invasive species, particularly along levees and berms. The most abundant of these are giant reed (*Arundo donax*), blue gum eucalyptus (*Eucalyptus globulus*), fennel (*Foeniculum vulgare*), perennial pepperweed, black locust (*Robinia pseudoacacia*), and Himalayan blackberry. However, a number of other species, such as fig (*Ficus carica*) and tree-of-heaven (*Ailanthus altissima*), are locally problematic.

The dynamics of riparian communities along the lower Sacramento River and in the Delta are similar to those described for riparian communities along the upper Sacramento River. However, along the Sacramento River south of Colusa, in the flood bypasses, and in the Delta, the disturbances that remove riparian vegetation, or create newly exposed surfaces where riparian vegetation can establish, differ somewhat from those along the upper Sacramento River. In these downstream areas, disturbances related to meander migration are more limited, and anthropogenic (human-caused) disturbances, such as levee maintenance and trampling, are greater than those upstream. This is because of the close proximity to levees, extensive placement of bank protection, and greater human population.

Marsh Communities Tidal freshwater and brackish-water emergent marsh is dominated by clonal perennial plants, particularly bulrushes (tules, *Scirpus* sp.), and to a lesser extent cattails (*Typha* sp.), common reed (*Phragmites australis*), and waterpepper (*Persicaria hydropiperoides*). Tules, cattails, and giant reed are emergent macrophytes, large (up to 10 feet in height) rhizomatous plants rooted in the substrate with stems (culms) above the water surface. This community occurs on instream islands and along tidally influenced waterways. Tidal freshwater and brackish-water emergent marsh corresponds to the MSCS NCCP habitat "tidal freshwater emergent."

In tidal marsh vegetation, vegetation structure and species richness are strongly influenced by disturbance (e.g., wave action, fire), the range of elevations present at a site, and salinity. Disturbance provides opportunities for annuals and short-lived perennials to regenerate and for additional species (also primarily clonal perennials) to colonize the site, and it creates structural diversity. Disturbances in Delta marshes result from erosion, human uses, and fires. Erosion of channel banks creates eroded "scallops" and slumped sections of bank that are colonized by a number of species (Hart and Hunter 2004). Human uses include the clearing of trails, construction and use of blinds, and maintenance of ponds and clearing of vegetation to create open water. The diversity of native plant species in such disturbed areas can be noticeably greater than in relatively undisturbed areas nearby. Fires occur in the marshes of some Delta islands (e.g., Lower Sherman Island). Overall, these fires reduce thatch and aboveground biomass, and increase the availability of nutrients; this benefits annual and short-lived perennial species and increases the diversity of marsh vegetation.

In the Delta's tidal wetlands, the cover of woody species and the richness (i.e., number) of species increase with elevation, and dominance frequently shifts from California bulrush (*Schoenoplectus californicus*) to softstem bulrush. (Softstem bulrush is deciduous and California bulrush is evergreen; thus, these two species probably differ in their hydraulic roughness during the winter, and in the habitat they provide during winter and spring.)

The species composition of tidal marshes changes at upper elevations from that found at middle elevations. In brackish marshes, upper elevations may support halophytes such as saltgrass (*Distichlis spicata*) and pickleweed (*Salicornia* species). A number of species typical of freshwater and saline marshes may grow together in these high marsh areas. Areas with higher soil salinities support pickleweed, saltgrass, fat-hen, and gumplant (*Grindelia hirsutula*). If salinity levels are lower in the high marsh areas, brass buttons (*Cotula coronopifolia*) and Baltic rush (*Juncus balticus*) may be more prevalent. Alternatively, emergent wetlands may intergrade with the woody vegetation of adjacent riparian areas. Most woody plants in this transitional zone are shrubs and vines, including red osier dogwood, buttonbush, and willows. In the northern and central Delta, a transition from mid-level marsh to woody vegetation occurs (e.g., at Delta Meadows State Park), and in the western Delta mid-level marsh may transition to either woody vegetation or to an upper elevation marsh dominated by halophytes.

At lower elevations, there is also a transitional zone between marsh and aquatic vegetation. In this zone there are fewer species of emergent plants, tule stems are at a lower density, and occasionally clumps of submerged aquatics exist. A characteristic feature of this transition zone is floating mats of plants that are rooted in the substrate but have creeping stems that are prostrate on the water. Native plants on the fringes of the marsh with this form of growth include creeping water primrose (both the native *Ludwigia peploides* ssp. *peploides* and the nonnative *L. p.* ssp. *montevidensis*), which has both native and nonnative subspecies, and floating pennywort (*Hydrocotyle ranunculoides*). This floating fringe may be absent, or discontinuous and narrow (less than 3 feet), or it may extend out across the water surface for 3–12 feet with plants rooted in the substrate at the marsh's edge, and floating as a mat over deeper water. Other, smaller species of pennywort (*Hydrocotyle umbellata*, *H. verticillata*) also grow at the marsh's edge, but tend to be on exposed muddy banks and flats.

Regional salinity gradients also affect the species composition of the Delta's tidal marshes. Delta waters generally have minimal salt concentrations, but the water is brackish in areas of the lower Delta (like Lower Sherman Island) that are close to Suisun Bay. Salinity levels in the soil are driven primarily by the interaction between the salinity concentration of tidal waters, local weather conditions, and the marsh vegetation itself (Atwater and Hedel 1976). The presence of a certain plant species within different marsh vegetation types is the result of individual physiological tolerances and competition between species. In general, larger monocots inhabit the lowest marsh surfaces, which are

inundated by most high tides, and surfaces at or above high-tide levels are dominated by broadleaf species and a few species of smaller monocots. Marshes flooded by fresh or brackish water support a more diverse assemblage of species that generally tolerate low to moderate salinity concentrations (Atwater and Hedel 1976).

There is currently little cover of nonnative invasive species in Delta marshes. However, perennial pepperweed (*Lepidium latifolium*) has become abundant in the upper elevations of many marshes; it is extremely difficult to eradicate. Purple loosestrife (*Lythrum salicaria*) may be a problematic invader in the future; elsewhere in the Delta it has established patches in the tidal zone. Other species create localized problems: water hyacinth will root in tidal marsh, and black locust, giant reed, and Himalayan blackberry shade or encroach on the tidal zone at the base of levees and berms. Also, several nonnative species not generally considered invasive, such as dallisgrass (*Paspalum dilatatum*), are abundant within the tidal zone and may be reducing available habitat for native species.

Aquatic Communities Aquatic vegetation consists of submerged plants generally rooted in the substrate, whose stems may partially extend above the water surface (e.g., during flowering) and floating plants that are generally not rooted in the substrate. This section focuses on vascular plants because of their dominance of aquatic vegetation in much of the Delta.

Submerged plants generally die back to their stem bases, rhizomes, and/or other overwintering vegetative structures (e.g., turions) as water temperatures drop in the late fall. Throughout spring and summer, active growth increases stem biomass (i.e., standing crop) to a peak in early fall. Although these plants flower and produce seed, reproduction via vegetative propagules (e.g., turions, specialized buds, and stem fragments) is their primary means of reproduction. The availability of light (which decreases with depth), turbidity, and shade cast by overtopping vegetation can restrict submerged plants to relatively shallow areas. In the Delta (which has turbid waters), most submerged vegetation appears to be restricted to areas less than 5–10 feet deep. The velocity of flows may contribute to this depth restriction. Native species of submerged plants include coontail (*Ceratophyllum demersum*), common elodea (*Elodea canadensis*), waterbuttercup (*Ranunculus aquatilis*), and pondweeds (*Potamogeton* sp.). Nonnative species include curlyleaf pondweed (*Potamogeton crispus*), egeria (*Egeria densa*), parrotfeather (*Myriophyllum aquaticum*), and Eurasian milfoil (*Myriophyllum spicatum*).

Most floating plants also depend primarily on vegetative reproduction. The growth rate of most species, and consequently their abundance, increases in late spring and summer, and then diminishes in late fall to early spring. Species also produce overwintering buds, spores, and seeds. Native species of floating plants in the Delta include duckweeds (*Lemna* sp., *Spirodela* sp.) and mosquito ferns

(*Azolla* sp.). In addition, the nonnative water hyacinth (*Eichhornia crassipes*) is widespread and abundant.

Aquatic plant communities are in the MSCS NCCP habitat "tidal perennial aquatic."

San Joaquin River Basin to the Delta The San Joaquin River basin includes the Central Valley south of the Delta. It is drier than the Sacramento Valley, and flows into the Delta from the San Joaquin River are considerably lower than those from the Sacramento River. Inflows from the Merced, Tuolumne, and Stanislaus Rivers historically contribute more than 60 percent of the flows in the San Joaquin River. Flows in these river systems are highly altered and are managed for flood control and water supply purposes. Numerous dams, reservoirs, and diversions are located on these rivers and others in the San Joaquin system. Historically, approximately 70 percent of the river's runoff has been diverted to the Friant-Kern and Madera Canals, primarily for agricultural uses.

The San Joaquin River region has many similarities to the Sacramento River region; however, the San Joaquin River region's riparian regions are not and have never been as extensive as those found in the Sacramento River region, and a larger portion of the land in the San Joaquin River region is devoted to agriculture (CALFED 2000c). Riparian communities and wetlands have been reduced by water diversions, reclamation activities, and conversion to agricultural land uses (CALFED 2000c). Wetlands are situated in the northern and western reaches in the region but are less abundant in other parts of the region. Almost 70 percent of the lowlands have been converted to irrigated agriculture, and remaining natural vegetation has been fragmented.

CVP/SWP Service Areas The Delta region provides water to most of California's agriculture and to urban and industrial communities across the state. Within the Delta, CVP and SWP pumping plants move water from the Delta to a system of canals and reservoirs for agriculture, municipal, industrial, and environmental uses in the Central Valley, the Bay Area, along the central coast, and portions of Southern California.

Agricultural and urban areas dominate much of these service areas. Agricultural plant communities include alfalfa and other irrigated pastures, field and row crops, orchards and vineyards, and rice. Plant communities in developed areas, as described in Mayer and Laudenslayer (1988), include those of golf courses and parks, ruderal (disturbed) areas, landscaped development, and small areas of natural plant communities.

Although agricultural and urban land uses have substantially reduced the area and connectivity of natural vegetation, the service areas still contain a large diversity of both lowland and upland plant communities, including many sensitive plant communities (CALFED 2000c, Attachment 1). The most

dramatic difference between historical and existing conditions is the fragmentation of what were once large contiguous blocks of habitat, such as chamise-redshank chaparral, coastal sage scrub, grassland, oak woodland, oak savanna, southern oak woodland-forest, riparian woodland-forest, succulent scrub, sand dune habitat, alkali desert scrub, desert riparian habitat, desert wash, freshwater/saltwater marsh, and coastal strand (CALFED 2000c). Significant changes to the natural landscape in the region occurred in the late 1800s and early 1900s with land conversions to agriculture, a pattern similar to that in the Central Valley. However, that pattern shifted dramatically compared to the pattern in the Central Valley, as urban growth in the region that started in the 1900s began to convert large areas of agricultural lands and of remaining natural vegetation to developed land uses.

Special-Status Species

Special-status species addressed in this section include plants that are legally protected or are otherwise considered sensitive by Federal, State, or local resource conservation agencies and organizations. These include species that are State listed and/or Federally listed as rare, threatened, or endangered; those considered as candidates or proposed for listing as threatened or endangered; species identified by CDFW as Species of Special Concern or USFS as sensitive, endemic, or needing additional survey or management actions; and plants considered jointly by CDFW and CNPS to be rare, threatened, or endangered; and species afforded protection under local planning documents, including the CALFED MSCS.

Primary Study Area

Shasta Lake and Vicinity Within the Shasta Lake and vicinity portion of the primary study area are a wide variety of vegetative communities and habitat components that support a large diversity of plant species. To aid in determining the potential impacts of the project, a list of potential plant species of concern was developed.

For the purposes of this evaluation, botanical species of concern are plants, lichen, and fungi that fall into any of the following categories:

- Designated as rare or listed as threatened or endangered by the State or Federal government
- Proposed for designation as rare or listing as threatened or endangered by the State or Federal government
- Candidate species for State or Federal listing as threatened or endangered
- Ranked as California Rare Plant Rank (CRPR) 1A, 1B, 2, 3, or 4 (formerly CNPS List 1A, 1B, 2, 3, or 4)

- Considered sensitive or endemic by USFS
- Considered a survey and manage species by USFS or U.S. Department of the Interior, Bureau of Land Management (BLM)
- Designated as an MSCS covered species by CALFED

Potentially occurring plant species of concern were determined by performing several database searches, reviewing USFWS and CDFW special-status species lists for Shasta County, reviewing other appropriate literature, discussions with resource agency personnel, and professional experience in the region. Additionally, results from the various vegetation habitat mapping efforts, botanical surveys, and wildlife surveys conducted in the area by Reclamation since 2002 were used in developing the list of species of concern.

Table 1-3 summarizes special-status plant species identified as having a potential to occur in the Shasta Lake and vicinity portion of the primary study area.

Table 1-3. Plant Species of Concern with Potential to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area

Common Name	Scientific Name	Status[1]
Shasta ageratina	*Ageratina shastensis*	CRPR 1B.2, USFS E
Bent-flowered fiddleneck	*Amsinckia lunaris*	CRPR 1B.2, BLMS
Mallory's manzanita	*Arctostaphylos malloryi*	CRPR 4.3
Shasta County arnica	*Arnica venosa*	CRPR 4.2, USFS E
Depauperate milk-vetch	*Astragalus pauperculus*	CRPR 4.3
Moonwort, grape-fern	*Botrychium subgenus Botrychium*	USFS S, S&M
Yellow-twist horsehair	*Bryoria tortuosa*	BLMS
Green bug moss	*Buxbaumia viridis*	USFS S, BLMS, S&M
Callahan's mariposa lily	*Calochortus syntrophus*	CRPR 1B.1
Butte County morning-glory	*Calystegia atriplicifolia* ssp. *buttensis*	CRPR 4.2
Castle Crags harebell	*Campanula shetleri*	CRPR 1B.3, USFS S, BLMS
Buxbaum's sedge	*Carex buxbaumii*	CRPR 4.2
Bristly sedge	*Carex comosa*	CRPR 2.1, MSCS r
Shasta clarkia	*Clarkia borealis* ssp. *arida*	CRPR 1B.1, MSCS m, BLMS
Northern clarkia	*Clarkia borealis* ssp. *borealis*	CRPR 1B.3, BLMS
Silky cryptantha	*Cryptantha crinita*	CRPR 1B.2, MSCS m, BLMS
California lady's-slipper	*Cypripedium californicum*	CRPR 4.2
Clustered lady's-slipper	*Cypripedium fasciculatum*	CRPR 4.2, USFS S, BLMS, S&M
Mountain lady's-slipper	*Cypripedium montanum*	CRPR 4.2, USFS S, BLMS, S&M
Butte County fritillary	*Fritillaria eastwoodiae*	CRPR 3.2, USFS S
Dubious pea	*Lathyrus sulphureus* var. *argillaceus*	CRPR 3
Broad-lobed linanthus	*Leptosiphon latisectus*	CRPR 4.3
Cantelow's lewisia	*Lewisia cantelovii*	CRPR 1B.2, USFS S, BLMS
Howell's lewisia	*Lewisia cotyledon* var. *howellii*	CRPR 3.2

Table 1-3. Plant Species of Concern with Potential to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)

Common Name	Scientific Name	Status[1]
Bellinger's meadowfoam	*Limnanthes floccosa* ssp. *bellingeriana*	CRPR 1B.2, MSCS m, BLMS
Awl-leaved navarretia	*Navarretia subuligera*	CRPR 4.3
Shasta snow-wreath	*Neviusia cliftonii*	CRPR 1B.2, USFS S, MSCS m, BLMS
Shasta huckleberry	*Vaccinium* sp. nov.	Genetically and morphologically distinct from coastal and Sierra Nevada populations; taxonomic treatment in preparation. Considered a special-status species for the purposes of this evaluation.
Thread-leaved beardtongue	*Penstemon filiformis*	CRPR 1B.3, MSCS m, USFS S, BLMS
Narrow-petaled rein orchid	*Piperia leptopetala*	CRPR 4.3
Bidwell's knotweed	*Polygonum bidwelliae*	CRPR 4.3
Eel-grass pondweed	*Potamogeton zosteriformis*	CRPR 2.2, MSCS m
Pacific fuzzwort	*Ptilidium californicum*	USFS S, BLMS, S&M
Brownish beaked-rush	*Rhynchospora capitellata*	CRPR 2.2
Sanford's arrowhead	*Sagittaria sanfordii*	CRPR 1B.2, MSCS m, BLMS
Marsh skullcap	*Scutellaria galericulata*	CRPR 2.2, MSCS m
Canyon Creek stonecrop	*Sedum obtusatum* ssp. *paradisum*	CRPR 1B.3, USFS S, BLMS
English Peak greenbriar	*Smilax jamesii*	CRPR 1B.3, USFS S, MSCS m, BLMS
Obtuse starwort	*Stellaria obtusa*	CRPR 4.3
Slender false lupine	*Thermopsis gracilis* var. *gracilis*	CRPR 4.3
Oval-leaved viburnum	Viburnum ellipticum	CRPR 2.3

Notes:
[1] Status Codes
CRPR 1B = Plants rare, threatened, or endangered in California and elsewhere
CRPR 2 = Plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3 = Plants for which more information is need – a review list
CRPR 4 = Plants of limited distribution – a watch list

CRPR Threat Ranks
0.1 = Seriously threatened in California
0.2 = Fairly threatened in California
0.3 = Not very threatened in California

Multi Species Conservation Strategy (MSCS) covered species
R = Recovery. Recover species' populations within the MSCS focus area to levels that ensure the species' long-term survival in nature.
r = Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations within the MSCS focus area.
m = Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED actions will be fully offset through implementation of actions beneficial to the species (CALFED 2000c).
Key:
BLMS = BLM sensitive
CRPR = California Rare Plant Rank
MSCS = Multi Species Conservation Strategy
S&M = Survey and Manage Species
USFS = U.S. Forest Service
USFS E = USFS Endemic Species
USFS S = USFS Sensitive Species

The CNDDB was reviewed for records of special-status plant species in or near the Shasta Lake and vicinity portion of the primary study area. The CNDDB is a

database consisting of historical observations of special-status plant species, wildlife species, and natural communities. The CNDDB is limited to reported sightings and is not a comprehensive list of special-status species that may occur in a particular area.

A search of the CNPS Electronic Inventory was also conducted. The Electronic Inventory allows users to query the database using a set of variable search criteria. The result of the search is a list of potentially occurring special-status plant species. The criteria used for the query included all CRPR 1A, 1B, 2, 3, and 4 plants occurring in Shasta County in closed-cone coniferous forest, chaparral, cismontane woodland, lower montane coniferous forest, marshes and swamps, pebble plain, valley and foothill grasslands, riparian forest, riparian woodland, and riparian scrub habitats between the elevations of approximately 900 feet and 2,500 feet.

Botanical Surveys Because botanical studies are ongoing, detailed technical memoranda describing methods, results, and conclusions will be provided in the final environmental impact statement (Final EIS).

Reclamation conducted several botanical surveys for special-status plant species in the Shasta Lake and vicinity portion of the primary study area. Botanical surveys were conducted in 2002, 2003, 2004, 2009, and 2010. A list of species observed during the surveys is provided as Attachment 2. Plant taxonomy follows Baldwin et al. (2012).

Botanical surveys were performed during 2002 along the Big Backbone and Squaw Creek arms. In 2003, botanical surveys were conducted along 11 selected riverine reaches: Little Backbone Creek, Sugarloaf Creek, upper Sacramento River, middle Salt Creek, Salt Creek, Nosoni Creek, Dekkas Creek, Campbell Creek, Flat Creek, Ripgut Creek, and Potem Creek. The surveys were conducted in general accordance with the technical methods prescribed by Nelson (1994). In 2004, botanical surveys were conducted at a series of randomly and nonrandomly selected locations. Nonrandomly selected sites were located throughout the Shasta Lake and vicinity portion of the primary study area (not including relocation areas) based on 2002 and 2003 survey results. Sites were selected based on the presence of unique habitat and ecological attributes, such as recently burned areas, unique geologic substrates, late-seral forests, and uncommon plant series. Nonrandomly selected sites varied in size and often included several plant series types. Randomly selected sites were selected throughout the area using plant series polygons developed from previously completed vegetation mapping. Using geographic information systems (GIS), individual vegetation polygons were assigned a unique number, and 100 numbers (i.e., vegetation polygons) were then randomly selected.

Based on previous surveys resulting in discoveries of Shasta snow-wreath (*Neviusia cliftonii*) and Shasta huckleberry (*Vaccinium* sp. nov), specific surveys for these species have been conducted since 2009. These surveys were

designed to identify potential habitat for and locate populations of these species outside of the project area. Pedestrian surveys were conducted to search the focus areas identified. Using methods described in Lindstrand and Nelson (2006), potential survey areas were identified using soil and geologic information at known sites and choosing areas with those same characteristics. In addition, survey sites were identified using intuitive techniques, such as selecting areas with vegetative cover types similar to those of known populations and areas near known populations (regardless of vegetative cover).

A genetic study of the Shasta snow-wreath was conducted in 2009 and 2010 to help determine potential project impacts on this species and to evaluate potential mitigation measures. The goal of the genetic study was to (1) determine whether all Shasta snow-wreath populations are genetically identical, (2) determine whether there are several homogeneous population clusters, or (3) whether some other pattern is present. Twenty-one of the 23 known Shasta snow-wreath sites were included in the study. The genetic study determined that the species is characterized by low genetic diversity and high levels of genetic differentiation (National Forest Genetics Laboratory 2010, DeWoody et al. 2012a). No strong patterns were found between the Shasta snow-wreath populations and several physical and geographic variables, including soil, geology, population size, and geographic location. Although high levels of genetic differentiation and no strong population patterns are present, the genetic study found three general population clusters, providing insight and basic species information for potential mitigation planning.

A separate study was conducted in 2009 and 2010 to describe the genetics of Shasta *Vaccinium* (huckleberry). The goal of the study was to determine whether the Shasta *Vaccinium* was different genetically from coastal and Sierra Nevada *Vaccinium* populations and, if so, to determine whether it warrants recognition as a new taxon (species). The genetic study determined that the species is genetically distinct from the other *Vaccinium* populations (National Forest Genetics Laboratory 2010, DeWoody et al. 2012b). Based on the results of the genetic study, and distinct morphologic and ecologic characteristics, the Shasta huckleberry appears to be an uncommon and geographically restricted species, warranting recognition as a new species. The taxonomic treatment is in preparation.

In 2010, botanical surveys were conducted in all relocation areas including the dam footprint. The surveys were conducted in general accordance with the technical methods prescribed by Nelson (1994).

Seven special-status plant species were found during the survey efforts and/or incidentally during other technical studies: Shasta County arnica (*Arnica venosa*), Northern clarkia (*Clarkia borealis* ssp. *borealis*), Cantelow's lewisia (*Lewisia cantelovii*), Shasta snow-wreath, slender false lupine (*Thermopsis gracilis* var. *gracilis*), Shasta huckleberry, and oval-leaved viburnum (*Viburnum ellipticum*).

One population of Shasta County arnica was found in ponderosa pine habitat south of Bridge Bay Resort along the Main Body and another near the privately owned cabins on USFS lands in the Salt Creek inlet on the Sacramento Arm. Additionally, USFS has located a population along the Sacramento Arm north of Slaughterhouse Island during surveys conducted in 2010 (Figures 1-5a and 1-5c).

One population of northern clarkia was found in hardwood-conifer/chaparral habitat near Bailey Cove on the McCloud Arm, and another population was found in hardwood-conifer/chaparral habitat in Sugarloaf Cove west of Beehive Point on the Sacramento Arm. The northern clarkia locations are shown in Figures 1-5c and 1-5d.

One population of Cantelow's lewisia was discovered on a rock outcrop on the right bank of the upper Sacramento River near the Shasta Lake/upper Sacramento River transition zone. Additionally, three populations were found along the Sacramento Arm near Elmore Mountain during surveys conducted in 2010 (Figure 1-5c).

Shasta snow-wreath is currently known from 23 locations, most of which occur at or near the periphery of Shasta Lake. Ten Shasta snow-wreath populations occur in habitats associated with limestone formations, and 13 occur in other habitat types. Most populations are associated with stream drainages or the lower portions of upland slopes. Of these, 13 Shasta snow-wreath populations were discovered during the botanical surveys along the McCloud Arm (south of Shasta Caverns and Keluche Creek), Pit Arm (Brock Creek, Ripgut Creek, Flat Creek, Stein Creek, and west of Stein Creek), and the Main Body (Blue Ridge east, Blue Ridge west, Blue Ridge middle, Cove Creek, south of Cove Creek, and Jones Valley). Locations of Shasta snow-wreath found incidentally and during the surveys are shown in Figures 1-5a through 1-5f.

Slender false lupine populations were discovered in all portions of the primary study area, generally on low-gradient slopes. Locations of slender false lupine found during the surveys and incidentally are shown in Figures 1-5a through 1-5f.

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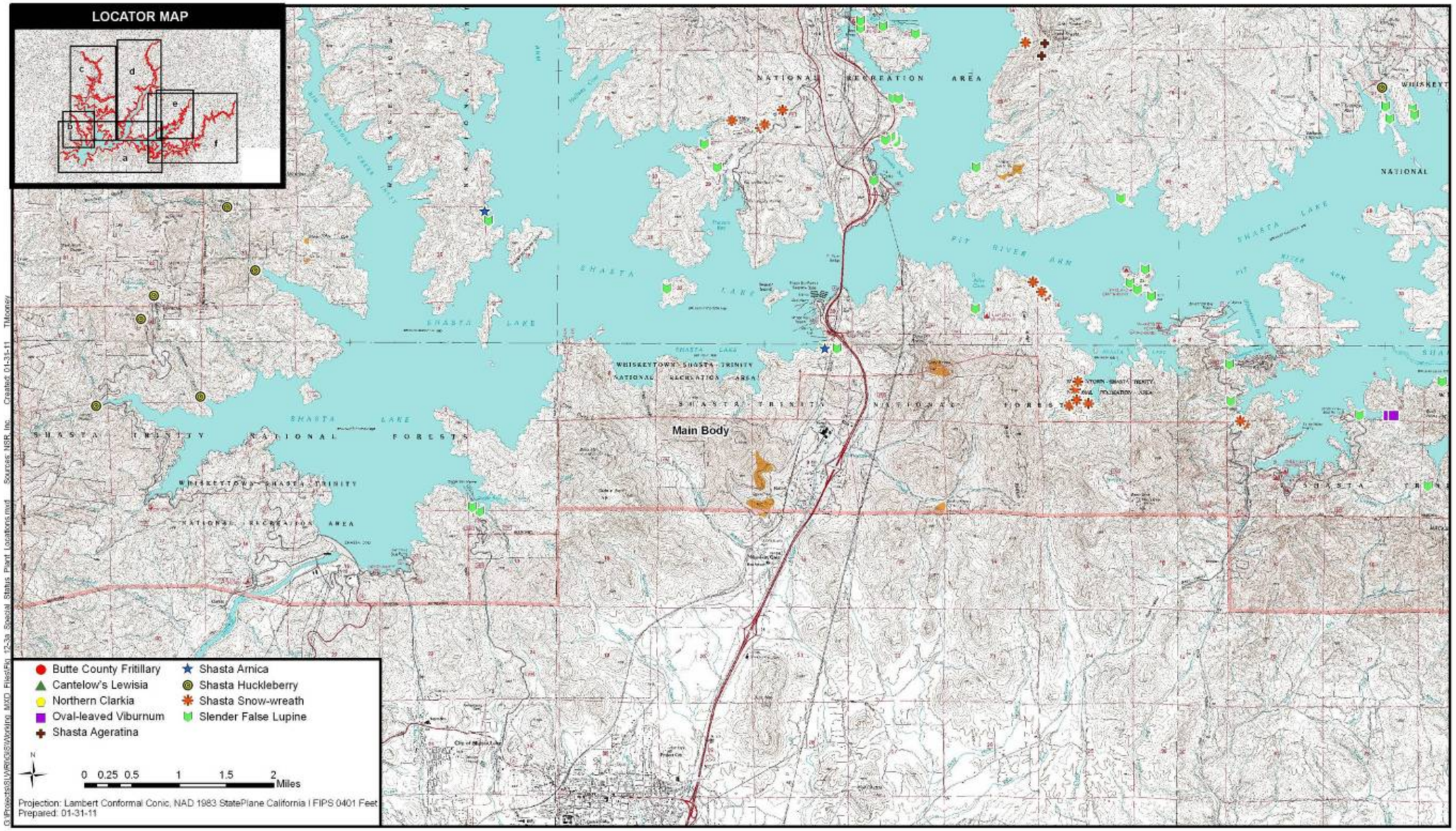

Figure 1-5a. Special-Status Plant Species Occurring in Shasta Lake and Vicinity

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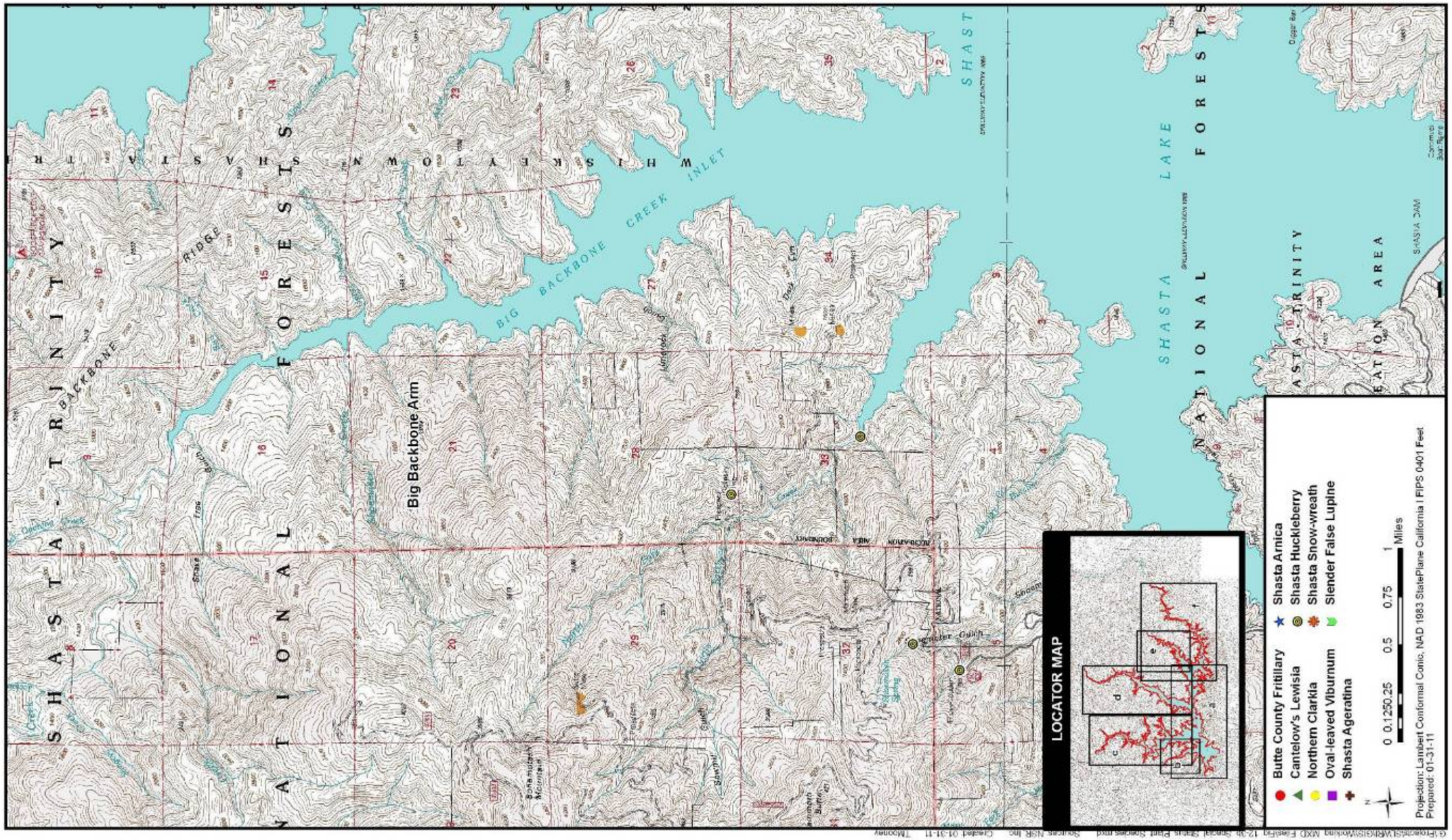

Figure 1-5b. Special-Status Plant Species Occurring in Shasta Lake and Vicinity

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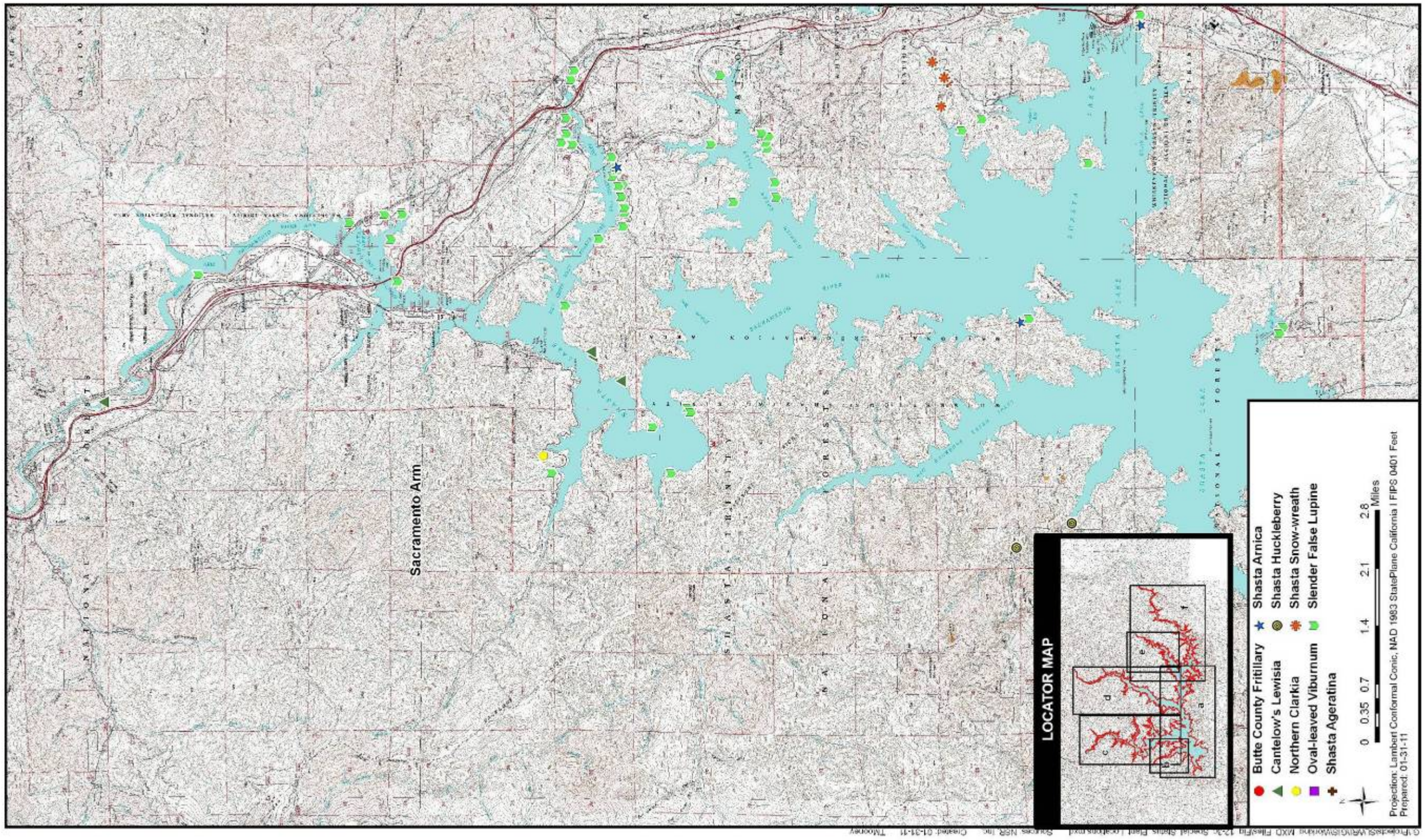

Figure 1-5c. Special-Status Plant Species Occurring in Shasta Lake and Vicinity

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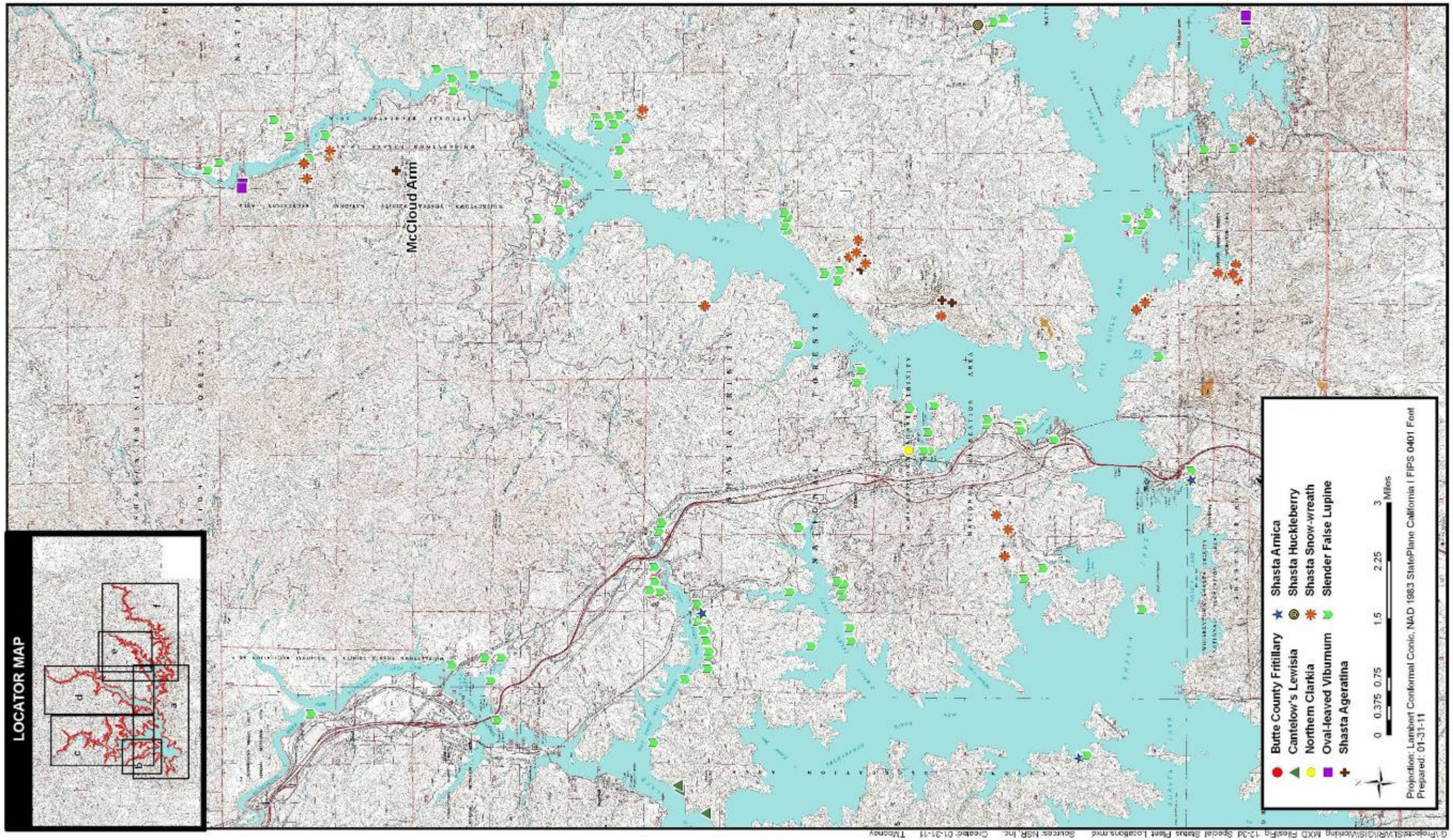

Figure 1-5d. Special-Status Plant Species Occurring in Shasta Lake and Vicinity

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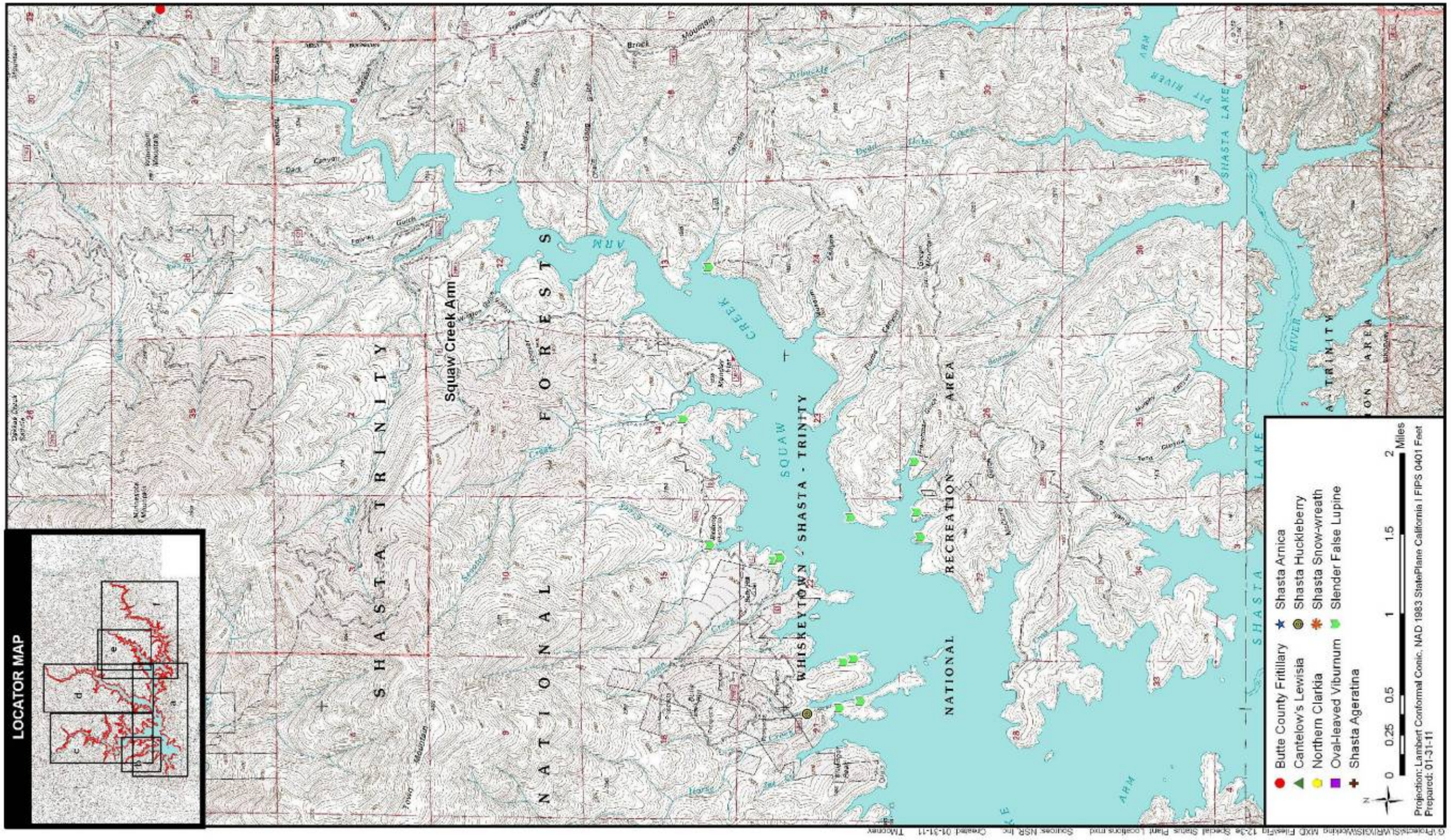

Figure 1-5e. Special-Status Plant Species Occurring in Shasta Lake and Vicinity

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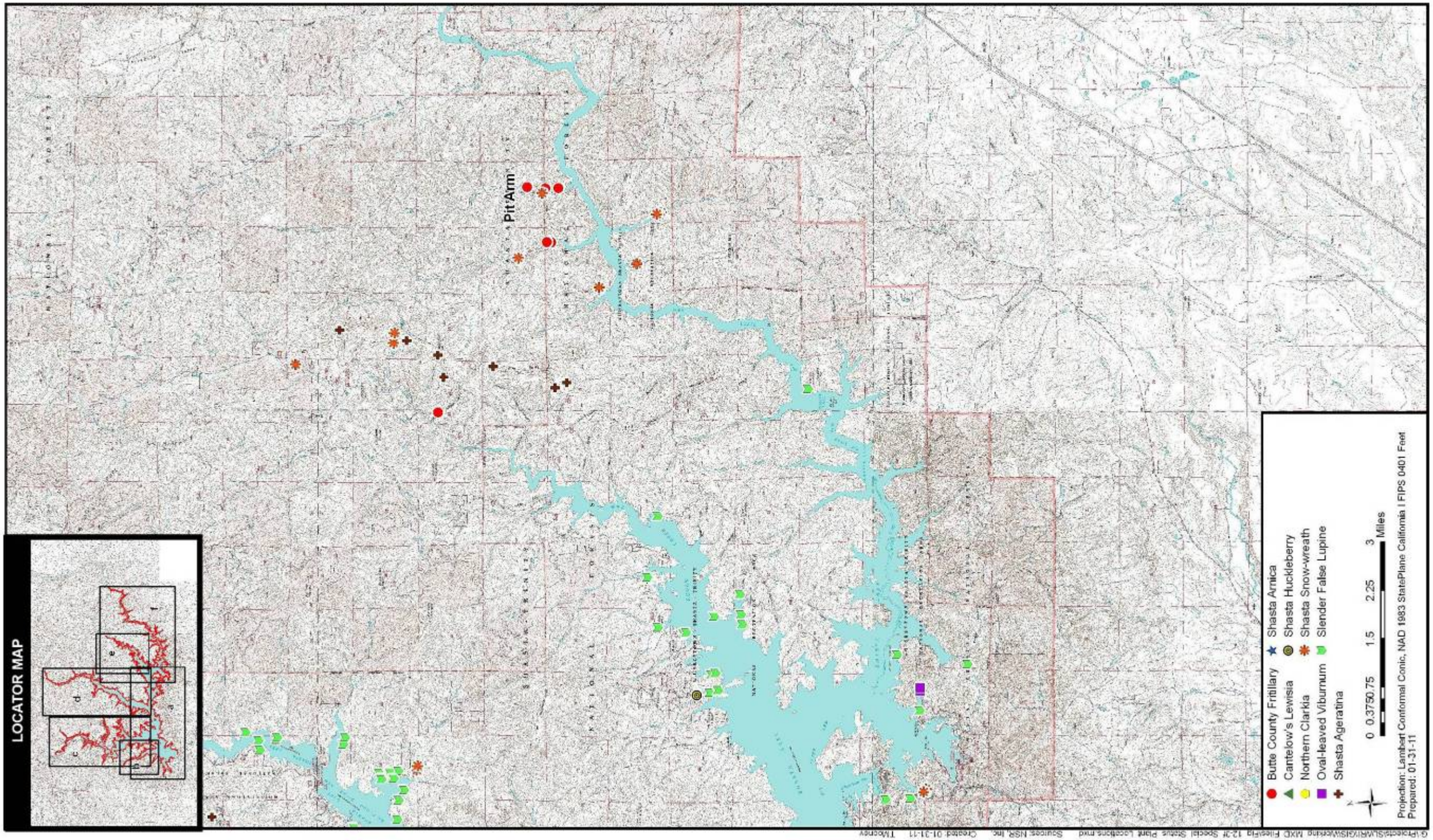

Figure 1-5f. Special-Status Plant Species Occurring in Shasta Lake and Vicinity

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Shasta huckleberry is currently known from 21 general locations in the upper Spring Creek, Dry Fork, (little) Squaw Creek, Shoemaker Gulch, and Little Backbone Creek drainages. Other general locations include South Fork Mountain, Bohemotash Mountain, and the vicinity of Bully Hill. All locations occur in an area historically known as the Copper Belt of Shasta County and many in the immediate vicinity of historic copper mining activities. Shasta huckleberry occurs at four locations in the SLWRI project area: (little) Squaw Creek, Shoemaker Gulch, Little Backbone Creek, and Horse Creek near Bully Hill. Locations of Shasta huckleberry found during the surveys are shown in Figures 1-5a through 1-5f.

Two oval-leaved viburnum populations were found during the surveys. One population was found in a forested upland slope west of Pine Point Campground along the McCloud Arm and a second in chaparral habitat at Jones Valley along the Pit Arm near the Clikapudi Trail. Locations of oval-leaved viburnum found during the surveys are shown in Figures 1-5d and 1-5f.

Upper Sacramento River (Shasta Dam to Red Bluff) Based on review of CNDDB and CNPS database searches, a USFWS list of species that could be potentially affected in this portion of the primary study area, and previously prepared biological reports for the area, 25 special-status plant species were identified as possibly occurring in the primary study area between Shasta Dam and RBPP; therefore, their potential to occur in this portion of the study area was evaluated further. These special-status plant species, along with the legal status, habitat, and potential for occurrence of each species, are identified in Table 1-4.

Table 1-4. Special-Status Plant Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Pumping Plant

Species	Legal Status[1]					Habitat and Blooming Period	Potential for Occurrence
	USFWS	CDFW	MSCS	USFS	CRPR		
Shasta ageratina *Ageratina shastensis*	–	–	–	E	1B.2	Rocky carbonate outcrops in chaparral and lower montane coniferous forest; 1,300–5,900 feet elevation. Blooms June–October.	Could occur near Shasta Dam if suitable outcrops are present. Potential is low because most of the primary study area is below species' known elevation range.
Henderson's bent grass *Agrostis hendersonii*	–	–	m	–	3.2	Mesic sites in valley and foothill grassland, vernal pools; 230–1,000 feet elevation. Blooms April–May.	Could occur along the Sacramento River if suitable vernally mesic habitat is present.
Shasta County arnica *Arnica venosa*	–	–	–	E	4.2	Cismontane woodlands and lower montane coniferous forests, often in disturbed areas and roadcuts; 1,300 – 4,900 feet elevation. Blooms May – July.	Could occur along the Sacramento River and tributaries within the primary study area. Potential is low because most of the study area is below species' known elevation range.
Silky cryptantha *Cryptantha crinita*	–	–	m	–	1B.2	Gravelly streambeds within cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland, valley and foothill grassland; 275 – 4,000 feet elevation. Blooms April – May.	Could occur along the Sacramento River and tributaries within the primary study area.
Clustered lady's slipper *Cypripedium fasciculatum*	–	–	–	SM	4.2	Lower montane coniferous forest, North Coast coniferous forest; often in serpentinite seeps or on streambanks; 300 – 8,000 feet elevation. Blooms March – July.	Unlikely; no coniferous forest known in the primary study area.
Mountain lady's slipper *Cypripedium montanum*	–	–	–	SM	4.2	Broadleaved upland forest, cismontane woodland, lower montane coniferous forest, North Coast coniferous forest; 500 – 7,000 feet elevation. Blooms March – July.	Could occur at Shasta Dam or along the Sacramento River and tributaries.
Dwarf downingia *Downingia pusilla*	–	–	–	–	2.2	Mesic sites in valley and foothill grassland, vernal pools. Blooms March – May.	Could occur along the Sacramento River if suitable vernally mesic habitat is present.

Table 1-4. Special-Status Plant Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam (contd.)

Species	Legal Status[1]					Habitat and Blooming Period	Potential for Occurrence
	USFWS	CDFW	MSCS	USFS	CRPR		
Butte County fritillary *Fritillaria eastwoodiae*	–	–	–	S	3.2	Openings and sometimes serpentine areas in chaparral, cismontane woodland, and lower montane coniferous forest; 160 – 4,900 feet elevation. Blooms March – June.	Could occur along the Sacramento River and tributaries within the primary study area.
Adobe-lily *Fritillaria pluriflora*	–	–	m	–	1B.2	Chaparral, cismontane woodland, valley and foothill grassland; often in adobe soils; 200 – 2,300 feet elevation. Blooms February – April.	Could occur at Shasta Dam and along the Sacramento River.
Boggs Lake hedge-hyssop *Gratiola heterosepala*	–	E	m	–	1B.2	Marshes and swamps, vernal pools; 30 – 8,000 feet elevation. Blooms April – August.	Could occur along the Sacramento River and tributaries.
Rose mallow *Hibiscus lasiocarpus* var. *occidentalis*	–	–	m	–	1B.2	Freshwater marshes and swamps.	Could occur along the Sacramento River and tributaries.
Ahart's dwarf rush *Juncus leiospermus* var. *ahartii*	–	–	m	–	1B.2	Mesic sites in valley and foothill grassland; 100 – 300 feet elevation. Blooms March – May.	Could occur along the Sacramento River if suitable vernally mesic habitat is present. Shasta Dam is higher than species' known elevation range.
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*	–	–	–	–	1B.1	Vernally mesic sites in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools; 100 –3,350 feet elevation. Blooms March – May.	Could occur at Shasta Dam or along the Sacramento River if suitable vernally mesic habitat is present.
Dubious pea *Lathyrus sulphureus* var. *argillaceous*	–	–	–	–	3	Cismontane woodland, lower montane coniferous forest, upper montane coniferous forest; 500 – 1,000 feet elevation. Blooms in April.	Could occur at Shasta Dam and along the Sacramento River.
Greene's legenere *Legenere limosa*	–	–	m	–	1B.1	Vernal pools; 1 – 3,000 feet elevation. Blooms April – June.	Could occur along Sacramento River if suitable vernal pool habitat is present.

Table 1-4. Special-Status Plant Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam (contd.)

Species	Legal Status[1]					Habitat and Blooming Period	Potential for Occurrence
	USFWS	CDFW	MSCS	USFS	CRPR		
Cantelow's lewisia *Lewisia cantelovii*	–	–	–	S	1B.2	Mesic granitic sites within broadleaved upland forest, chaparral, cismontane woodland, and lower montane coniferous forest; 1,250 – 4,500 feet. Sometimes in serpentinite seeps. Blooms May – October.	Could occur in the Shasta Dam area. The remainder of the primary study area is below species' known elevation range.
Bellinger's meadowfoam *Limnanthes floccosa* ssp. *bellingeriana*	–	–	m	–	1B.2	Mesic sites in cismontane woodland, meadows and seeps; 950 – 3,600 feet elevation. Blooms April – June.	Could occur at Shasta Dam. Potential along Sacramento River is low because majority of the primary study area is below species' known elevation range.
Shasta snow wreath *Neviusia cliftonii*	–	–	m	S	1B.2	Carbonate substrates in lower montane coniferous forest and riparian woodland; 1,000 – 1,600 feet elevation. Blooms May – June.	Could occur in Shasta Dam area. Unlikely to occur along Sacramento River because the primary study area is lower than species' known elevation range.
Slender Orcutt grass *Orcuttia tenuis*	E	E	m	–	1B.1	Vernal pools; 100 – 6,000 feet elevation. Blooms May – October.	Could occur along the Sacramento River if suitable vernal pool habitat is present. Federally designated critical habitat for this species occurs east of the Sacramento River, east of Cottonwood (Units 3A and 3B) and northeast of Anderson (Units 2C and 2D).
Ahart's paronychia *Paronychia ahartii*	–	–	m	–	1B.1	Cismontane woodland, valley and foothill grassland, vernal pools; 100 – 1,700 feet elevation. Blooms March – June.	Could occur at Shasta Dam and along the Sacramento River.
Pacific fuzzwort *Ptilidium californicum*	–	–	–	SM	4.3	An epiphytic on bark at the base of standing mature to old-growth trees or recently fallen logs; rarely on other organic substrates such as decaying logs and stumps, or humus covering boulders; 1,275 – 5,725 feet elevation.	Could occur along the Sacramento River and tributaries within the primary study area. Potential is low because most of the study area is below species' known elevation range.

Table 1-4. Special-Status Plant Species Known or with Potential to Occur in the Primary Study Area, Along the Sacramento River from Shasta Dam to Red Bluff Diversion Dam (contd.)

Species	Legal Status[1]					Habitat and Blooming Period	Potential for Occurrence
	USFWS	CDFW	MSCS	USFS	CRPR		
Canyon Creek stonecrop *Sedum paradisum*	–	–	–	S	1B.3	Granitic, rocky areas in broadleafed upland forest, chaparral, lower montane coniferous forest, subalpine coniferous forest; 980 – 6,100 feet elevation. Blooms May – June.	Could occur along the Sacramento River and tributaries within the primary study area. Potential is low because most of the study area is below species' known elevation range.
English Peak greenbriar *Smilax jamesii*	–	–	m	S	1B.3	Found along streambanks and lake margins in broadleafed upland forest, lower montane, upper montane, and north coast coniferous forests, and marshes and swamps; 1,600 – 8,200 feet elevation. Blooms May – July, rarely through August.	Could occur along the Sacramento River and tributaries within the primary study area. Potential is low because most of the study area is below species' known elevation range.
Oval-leaved viburnum *Viburnum ellipticum*	–	–	–	–	2.3	Chaparral, cismontane woodland, lower montane coniferous forest; 800 – 4,600 feet elevation. Blooms May – June.	Could occur at Shasta Dam and along the Sacramento River.

Sources: CNDDB 2007, CNPS 2011, USFS 1995a, USFWS 2011

Notes:

[1] Legal Status

U.S. Fish and Wildlife Service Federal Listing Categories:

T Threatened

E Endangered

U.S. Forest Service Listing Categories:

E Endemic to specific region or National Forest

S Sensitive

SM Species considered rare or threatened and recommended for survey and management per Northwest Forest Plan 2002

MSCS (Multi-Species Conservation Strategy) Listing Categories:

R recovery

r contribute to recovery

m maintain

California Department of Fish and Wildlife State Listing Categories:

R California Rare

T California Threatened

E California Endangered

California Rare Plant Rank Categories:

1B Plants rare, threatened, or endangered in California and elsewhere

2 Plants rare, threatened, or endangered in California but more common elsewhere

3 Plants for which more information is needed – a review list

4 Plants of limited distribution – a watch list

Sixteen of the special-status plant species listed in Table 1-4 have the potential to occur within habitat present along the Sacramento River between Shasta Dam and RBPP. Many of these species, such as Boggs Lake hedge-hyssop (*Gratiola heterosepala*) (State listed as endangered, MSCS m, CRPR 1B.2), Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*) (MSCS m, CRPR 1B.2), Ahart's paronychia (*Paronychia ahartii*) (MSCS m, CRPR 1B.1), dwarf downingia

(*Downingia pusilla*) (CRPR 2.2), Greene's legenere (*Legenere limosa*) (MSCS m, CRPR 1B.1), Henderson's bent grass (*Agrostis hendersonii*) (MSCS m, CRPR 3.2), Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*) (CRPR 1B.2), and slender Orcutt grass (*Orcuttia tenuis*) (Federally listed as endangered, State listed as endangered, MSCS m, CRPR 1B.1), typically occur in vernal pools, which are generally not present within the active floodplain of regulated rivers in the extended study area. Other special-status plants, however, could occur in the extended study area in the freshwater marshes, swamps, and riparian woodlands that are found along the river corridor. These species include rose mallow (*Hibiscus lasiocarpus* var. *occidentalis*) (MSCS m, CRPR 2) and silky cryptantha (*Cryptantha crinita*) (USFS SM, CRPR 1B.2). The remaining five species – adobe-lily (*Fritillaria pluriflora*) (MSCS m, CRPR 1B.2), Butte County fritillary (*Fritillaria eastwoodiae*) (USFS S, CRPR 3.2), dubious pea (*Lathyrus sulphureus* var. *agillaceous*) (CRPR 3), mountain lady's slipper (*Cypripedium fasciculatum*) (USFS SM, CRPR 4.2), and oval-leaved viburnum (*Viburnum ellipticum*) (CRPR 2.3) – may occur in annual grassland, chaparral, cismontane woodland, and lower montane coniferous forest vegetation communities along the river corridor.

Of the special-status species that could occur along the upper Sacramento River, four are known to occur along the edge of the Sacramento River channel or along a Sacramento River tributary within 0.2 mile of the river proper, and their establishment and reproduction could potentially be affected by changes in flow regime: silky cryptantha, rose mallow, and Ahart's paronychia (CNDDB 2007, University of California 2011).

Extended Study Area

Most of the special-status plant species listed in Table 1-4 have the potential to occur within the extended study area. Numerous additional special-status plant species could occur in the extended study area. Attachment 4 of this technical report contains comprehensive lists of all sensitive plant species in the extended study area that have been reported to the CNDDB, or that otherwise have the potential to occur in the extended study area.

Lower Sacramento River and Delta A number of special-status plant species could be affected in the lower Sacramento River and Delta by changes in hydrology (CALFED 2000a). These include species associated with vernal pool, riparian, marsh, and aquatic plant communities; and several other species with restricted distributions on or near channel banks, active floodplains, flood bypasses, and Delta waterways. These assemblages of special-status species are described below.

Species of Vernal Pool Communities In addition to species that are potentially present in the primary study area (Table 1-4), special-status plant species that may be associated with vernal pools along the lower Sacramento River and in the Delta region include alkali milk-vetch (*Astragalus tener* var. *tener*), brittlescale (*Atriplex depressa*), Hoover's spurge (*Euphorbia hooveri*), Contra

Costa goldfields (*Lasthenia conjugens*), hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), bearded popcornflower (*Plagiobothrys hystriculus*), Delta woolly-marbles (*Psilocarphus brevissimus* var. *multiflorus*), Crampton's tuctoria (*Tuctoria mucronata*), and Greene's tuctoria (*Tuctoria greenei*). The following is a description of each of these species:

- *Brittlescale* is a CRPR 1B.2 and MSCS "m" ("maintain") species. Suitable habitat for this annual plant consists of vernal pools, seeps, grassland, chenopod scrub, and playas. It is known from Alameda, Butte, Colusa, Contra Costa, Fresno, Glenn, Merced, Solano, Stanislaus, Tulare, and Yolo Counties. Threats to this species include habitat loss because of development, incompatible grazing practices, and trampling (CNPS 2011).

- *Alkali milk-vetch* is a CRPR 1B.2 and MSCS "r" ("contribute to recovery") species. Suitable habitat for this annual plant consists of moist, level settings on alkaline soils with high clay content. It has been observed in varied vegetation including grassland, borders of drainages, fallow rice fields, and among weedy grasses and forbs. Although once more widely distributed, its current known distribution is centered in Solano County, and it also is known from Alameda, Merced, Napa, and Yolo counties. Several occurrences are on public land managed for game species. Threats to this species include habitat loss, incompatible grazing and game management practices (e.g., inundation of land for waterfowl during the growing season of Ferris's milkvetch), competition from the nonnative plants that now dominate much of the vegetation in which Ferris's milk vetch occurs, and small population sizes (10–400 individuals) that leave Ferris's milkvetch vulnerable to extirpation from chance events (CNDDB 2007; CNPS 2011).

- *Hoover's spurge* is Federally listed as threatened and is a CRPR 1B.2 and MSCS "m" species. Suitable habitat for this annual plant consists of relatively large, deep vernal pools among the rolling hills, remnant alluvial fans, and depositional stream terraces at the base of the Sierra Nevada foothills. This species is now concentrated primarily in the Vina Plains in Tehama and Butte Counties, with other occurrences in Glenn County as well as the Visalia-Yettem area of Tulare County and the Hickman–La Grange area of Stanislaus County. Critical habitat for this species occurs in the extended study area in Stanislaus, Merced, and Tulare Counties. Threats to this species include habitat loss, incompatible agricultural and grazing practices, and nonnative species (CNDDB 2007; CNPS 2011).

- *Contra Costa goldfields* is Federally listed as endangered and is a CRPR 1B.1 and MSCS "m" species. Suitable habitat for this annual plant consists of vernal pools and seasonally wet areas within woodland, alkaline playa, and valley and foothill grassland

communities. The historic distribution of Contra Costa goldfields was once more extensive, but it is still known from at least one location in seven counties: Alameda, Contra Costa, Marin, Monterey, Napa, Solano, and Sonoma Counties. Threats to this species include habitat loss, hydrological alterations, incompatible grazing practices and nonnative plants (CNPS 2011).

- *Hairy Orcutt grass* is Federally listed as endangered and is a CRPR 1B.1 and MSCS "m" species. Suitable habitat for this annual plant consists of vernal pools in rolling topography on remnant alluvial fans and stream terraces in the Central Valley. The historical range included the eastern margins of Sacramento and San Joaquin Valleys from Tehama County south to Stanislaus County and through Merced and Madera Counties. This species is now concentrated primarily in the Vina Plains in Tehama County, with an isolated occurrence in central Butte County and other occurrences in Glenn, Madera, and eastern Stanislaus Counties. Critical habitat for this species occurs in the extended study area in Tehama, Stanislaus, Merced, and Madera Counties. Threats to this species include habitat loss, incompatible grazing practices, nonnative species, and trampling (CNDDB 2007; CNPS 2011).

- *Slender Orcutt grass* is Federally listed as threatened and is a CRPR 1B.1 and MSCS "m" species. Suitable habitat for this annual plant consists of vernal pools on remnant alluvial fans and high stream terraces and recent basalt flows in valley grassland and blue oak woodland. It has some ability to colonize artificial habitats, such as the margins of stock ponds. This species is now concentrated primarily in the vicinity of Dales, Tehama County. A secondary area of concentration is the Modoc Plateau in Lassen, Plumas, Shasta, and Siskiyou Counties, with a few occurrences in the Lake-Napa and Southeastern Sacramento Valley Vernal Pool Regions. Critical habitat for this species occurs in the extended study area in Tehama County. Threats to this species include habitat loss, incompatible grazing practices, nonnative species, and off-road vehicle use and trampling (CNDDB 2007; CNPS 2011).

- *Bearded popcornflower* is a CRPR 1B.1 species. This species was rediscovered in 2005 after not being seen since 1892. Suitable habitat for this annual plant consists of vernal pools, vernal swales, and other moist areas in grassland. It is currently known from vernal pools and mesic grasslands in Solano County. Threats to this species include habitat loss, discing of remaining habitat, and competition from the nonnative plants that now dominate much of the vegetation in which bearded popcornflower occurs (CNPS 2011).

- *Delta woolly-marbles* is a CRPR 4.2 species. Suitable habitat for this annual plant consists of vernal pools, vernal swales, and other moist areas in grassland. This vernal pool species is currently known from Alameda, Napa, San Diego, San Joaquin, Santa Clara, Solano, Stanislaus, and Yolo Counties (CNPS 2011).

- *Crampton's tuctoria*, also known as Solano grass, is Federally listed and State listed as endangered, and is a CRPR 1B.1 and MSCS "r" species. Crampton's tuctoria is an annual plant of vernal pools. This species is thought to have once grown in isolated parts of the northern Delta in areas that flooded during the wet season, but any former habitat there has been long since reclaimed for agriculture. Only a few individuals of the plant now exist, mostly in Yolo County. Threats to this species include habitat loss, incompatible grazing practices, and small population sizes (10–400 individuals) that leave Crampton's tuctoria vulnerable to extirpation from chance events (CNDDB 2007; CNPS 2011).

- *Greene's tuctoria* is Federally listed as endangered and is a CRPR 1B.1 and MSCS "m" species. Suitable habitat for this annual plant species consists of vernal pools in valley grasslands. This species is currently found in widely separated occurrences in Butte, Merced, Shasta, and Tehama Counties. Sixty percent of the extant occurrences are in the Vina Plains area of Tehama and Butte Counties. Eastern Merced County has about 30 percent of the known occurrences. Other occurrences are located in Glenn and Shasta Counties. The species has been extirpated from Fresno, Madera, San Joaquin, Stanislaus, and Tulare Counties. Critical habitat for this species occurs in the extended study area in Tehama, Stanislaus, Tuolumne, Merced, Mariposa, and Madera Counties. Threats to this species include habitat loss, and incompatible grazing and agricultural practices (CNDDB 2007; CNPS 2011).

Species of Riparian and Marsh Communities In addition to species considered potentially present in the primary study area (Table 1-4), special-status plant species potentially associated with riparian and marsh communities along the lower Sacramento River and in the Delta region include bristly sedge (*Carex comosa*), Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*), Soft bird's-beak (*Chloropyron molle* ssp. *molle*), Delta button-celery (*Eryngium racemosum*), Northern California black walnut (*Juglans hindsii*), Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), Delta mudwort (*Limosella australis*), Sanford's arrowhead (*Sagittaria sanfordii*), Marsh skullcap (*Scutellaria galericulata*), blue skullcap (*Scutellaria lateriflora*), and Suisun Marsh aster (*Symphyotrichum lentum*). The following is a description of each of these species:

- *Bristly sedge* is a CRPR 2.1 and MSCS "r" species. This perennial, rhizomatous herb grows on lake edges and wet places in marshes and swamps across much of North America, but it is most abundant in the glaciated regions of Eastern North America (Flora of North America Editorial Committee 2002). It is widely distributed but rarely collected in California; it is known from Contra Costa, Lake, Mendocino, Sacramento, Santa Cruz, Shasta, San Joaquin, and Sonoma Counties. The conversion of wetlands to other land uses may have contributed to the rarity of bristly sedge in the Delta. Threats to this species include additional habitat loss, marsh drainage, and other alterations to hydrology, as well as road maintenance activities (CNPS 2011).

- *Suisun thistle* is Federally listed as endangered and is a CRPR 1B.1 and MSCS "R" ("Recovery") species. Habitat for this species is restricted to a narrow tidal band within large saltwater or brackish tidal marshes that have fully developed tidal channel networks. This species does not generally occur in fringe tidal marshes that are less than 300 feet wide (USFWS 1995). This species was thought to be extinct until it was rediscovered on Grizzly Island in 1989 (CNPS 2011). There are only two known occurrences of Suisun thistle remaining, both within Suisun Marsh in Solano County. Threats to this species include alterations to marsh hydrology, nonnative species, and trampling (CNPS 2011).

- *Soft bird's-beak* is Federally listed as endangered and State listed as rare, and is a CRPR 1B.2 and MSCS "R" species. This hemiparasitic annual species grows in saline and brackish marshes and is restricted to a narrow band, typically in a marsh's higher elevations. The species is known from Contra Costa, Napa, and Solano Counties. The remaining populations range in size from a single individual to more than 100,000 plants. Within populations the number of individuals fluctuates considerably from year to year, often by more than an order of magnitude. Conversion of wetlands to other land uses has contributed to the decline of soft bird's-beak. Current threats to the remaining populations include competition from nonnative plants (in particular perennial pepperweed, *Lepidium latifolium*), alteration of wetland hydrology (including trenching of wetlands for mosquito abatement and diking), grazing and trampling, and erosion (USFWS 1995; CNDDB 2007; CNPS 2011).

- *Delta button-celery* is a CRPR 1B.1 and MSCS "r" species. This biennial plant grows in open riparian scrub on river floodplains, primarily along the San Joaquin River; most occupied habitat receives periodic inundation. The species is known from Calaveras, Contra Costa, Merced, Stanislaus, and San Joaquin Counties. Threats to this species include conversion of habitat to agricultural land uses, flood control, incompatible grazing practices, and various anthropogenic

disturbances (e.g., off-road vehicles, road maintenance) (CNDDB 2007; CNPS 2011).

- *Northern California black walnut* is a CRPR 1B.1 and MSCS "r" species. Since the 1850s this tree species has experienced significant changes in its distribution, abundance, and the genetic composition of its populations. Before the 1850s native stands of Northern California black walnut appear to have been confined to three areas. The most extensive of these areas was along the lower Sacramento River in the vicinity of Walnut Grove (including Andrus and Grand Islands and adjacent islands). However, no pre-1850 individuals remain along the lower Sacramento River (Jepson 1910, Smith 1912). Despite practically being eliminated from an initially restricted distribution, Northern California black walnut has become widely distributed and abundant. Currently, Northern California black walnut occurs in riparian zones, on agricultural lands, along roadsides and as an urban "weed tree" throughout the Sacramento Valley and beyond (Griffin and Critchfield 1972; Resources Agency 2003). This change in its distribution was brought about by widespread planting as an ornamental, and its use as a rootstock for the English walnut (*Juglans regia*), and its subsequent dispersal and establishment within natural and ruderal vegetation. The initial plantings of Eastern black walnut, and the subsequent and extensive cultivation of English walnut, has led to hybridization of Northern California black walnut with these species. Therefore, although most existing Northern California black walnut trees closely resemble the early descriptions and collections of this species, their ancestry to some extent is likely to include other walnut species (CNPS 2011).

- *Delta tule pea* is a CRPR 1B.2 and MSCS "r" species. This perennial vine typically grows above the tidal zone in riparian scrub or at the edges of riparian forest, although it also occurs in marsh vegetation. The species is known from Contra Costa, Napa, Sacramento, San Joaquin, Solano, and Sonoma Counties. The decline of Delta tule pea populations has resulted primarily from habitat loss, installation of riprap and maintenance of levees, hydrologic alterations, and competition from nonnative invasive plants. These continue to threaten the species (CNDDB 2007; CNPS 2011).

- *Mason's lilaeopsis* is a CRPR 1B.1 and MSCS "R" species. This diminutive (less than 10 inches), rhizomatous perennial grows within the tidal zone on open sites along shores and eroding banks, at the toes of cut banks, and in adjacent marshes (Mason 1957, CNDDB 2007). The species is known from Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, and Solano Counties. The decline of Mason's lilaeopsis populations has resulted primarily from habitat loss, altered hydrodynamics, installation of riprap and maintenance of

levees, and accelerated erosion (resulting in part from boat wakes). These continue to be the primary threats affecting the species (CNDDB 2007; CNPS 2011).

- *Delta mudwort* is a CRPR 2.1 and MSCS "r" species. Like Mason's lilaeopsis, this diminutive (less than 10 inches), rhizomatous perennial grows within the tidal zone on open sites along shores, on eroding banks, at the toes of cut banks, and in adjacent marshes (Mason 1957, CNDDB 2007). The species is known from Contra Costa, Marin, Sacramento, San Joaquin, and Solano Counties. The decline of Delta mudwort populations has resulted primarily from habitat loss, altered hydrodynamics, installation of riprap and maintenance of levees, and accelerated erosion (resulting in part from boat wakes). These continue to be the primary threats affecting the species (CNDDB 2007; CNPS 2011).

- *Sanford's arrowhead* is a CRPR 1B.2 and MSCS "m" species. This rhizomatous, perennial plant grows as an emergent in freshwater (nontidal) marshes, ponds, ditches, and various other shallow, slow-moving freshwater habitats. It is widely distributed in the Central Valley but rare. Threats to this species include habitat loss, channel maintenance, and hydrologic alterations (Hickman 1993; CNPS 2011).

- *Marsh skullcap* and *blue skullcap* are CRPR 2.2 and MSCS "m" species. These rhizomatous perennial herbs are widely distributed in wetlands across North America, but are rare in California. These species are known from Sacramento and San Joaquin Counties in the Delta, and in California marsh skullcap also occurs in several counties in the northern Sierra Nevada and Modoc Plateau. Marsh skullcap is known from just three sites in the Delta, and all were growing in tidal marsh vegetation. Blue skullcap is known from just two sites. The conversion of wetlands to other land uses may have contributed to the rarity of these species in the Delta (CNDDB 2007; CNPS 2011).

- *Suisun Marsh aster* is a CRPR 1B.2 species. This perennial grows primarily within the tidal zone, in patches of one to several hundred stems. However, although it does grow along banks, it also often is away from the water's edge and within vegetation denser than vegetation surrounding Mason's lilaeopsis or Delta mudwort. The decline of Suisun aster populations has been caused primarily by habitat loss, installation of riprap and maintenance of levees, hydrologic alterations, and competition from nonnative invasive plants. These continue to be the primary threats affecting the species (CNDDB 2007; CNPS 2011).

Species of Aquatic Communities Eel-grass pondweed (*Potamogeton zosteriformis*) is a CRPR 2.2 and MSCS "m" species. This submerged aquatic

plant of assorted freshwater habitats is rare in California but more common elsewhere. In California, it has been documented in Contra Costa, Lake, Lassen, Modoc, and Shasta Counties. Overall, the distribution, abundance, and threats affecting this species in California are not well known (CNPS 2011).

CVP/SWP Service Areas Special-status plants are not likely to occur in a substantial portion of the CVP and SWP service areas because the agricultural and urban land uses tend to preclude suitable habitat for most native species.

General agricultural practices result in monotypic stands of vegetation for the growing season and bare ground in fall and winter. Special-status plant species are unlikely to occur in agricultural habitat because of the soil disturbance inherent in the agricultural practices. In areas not intensively cultivated, such as fallow fields, roads, ditches, and levee slopes, regular maintenance precludes the establishment of ruderal vegetation or native vegetation communities; thus, such areas are not likely to support many special-status plant species. Further, because agricultural ditches are generally subject to maintenance, they have minimal suitable habitat for special-status plants.

Developed land includes areas with roads and buildings but also includes barren areas that have been disturbed and are unvegetated. Special-status plant species are unlikely to occur in developed land areas because most vegetation has been removed, and these areas remain highly disturbed.

Areas with ruderal vegetation are dominated by herbaceous, nonnative, weedy species and may support stands of noxious weeds. Ruderal vegetation generally occurs in areas subject to periodic disturbances, and the species in this land cover type are generally weedy to invasive. For these reasons, no special-status plants are expected to occur in ruderal vegetation communities.

Although agricultural and developed land uses account for most of the CVP and SWP service areas, a portion of these areas still remains in natural vegetation, Because of the large size of the CVP and SWP service areas, this natural vegetation is distributed over a wide range of climate and soils, and is varied in structure and species composition. Consequently, a large number of special-status plant species has the potential to occur in the natural vegetation that remains within the CVP and SWP service areas. (See Attachment 1.)

Invasive Species

Primary Study Area

Shasta Lake and Vicinity Nonnative plant species introduced to the region are of concern in the Shasta Lake and vicinity portion of the primary study area. When plants that evolved in one region of the globe are moved by humans to another region, a few flourish, crowding out native vegetation and wildlife that feed on the native species. Some invasive plants can even change ecosystem processes such as hydrology, fire regimes, and soil chemistry. These invasive

plants have a competitive advantage because they are no longer controlled by their natural predators and can quickly spread. In California, approximately 3 percent of the plant species growing in the wild are considered invasive, but they inhabit a much greater proportion of the landscape (Cal-IPC 2007).

Plant pests are defined by law, regulation, policy, and technical organizations, and are regulated by many different bodies, including the California Department of Food and Agriculture (CDFA), U.S. Department of Agriculture, and the Cal-IPC. CDFA uses an action-oriented pest-rating system. The low rating assigned to a pest by CDFA does not necessarily mean that the pest is not a problem; rather, the rating system is meant to prioritize response by CDFA and county agricultural commissioners. Plants on CDFA's highest priority "A" list are defined as plants "of known economic importance subject to state-county enforced action involving eradication, quarantine regulation, containment, rejection or other holding action."

Cal-IPC has developed a list of plant pests specific to California wildlands. The Cal-IPC list is based on information submitted by land managers, botanists, and researchers throughout the state and on published sources. To determine plant pests potentially occurring in the Shasta Lake and vicinity portion of the primary study area, this list was reviewed and local agencies (BLM, USFS, California Department of Transportation, and Shasta County Department of Agriculture) were contacted to gather information about known weed locations (Table 1-5). Additional noxious weed information has been recorded by Reclamation from observations made during botanical and other technical studies. Attachment 5 describes each weed source location, the potential mode of spread, and the risk of spread at each of the known sites.

Management actions have been required to prevent the loss of habitat caused by some of the more invasive exotic species that outcompete native vegetation. However, these management actions have been limited and have been confined primarily to areas adjacent to campgrounds and USFS facilities.

Table 1-5. Nonnative Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area

Common Name	Scientific Name	Cal-IPC Rating[1]	CDFA Ranking[2]	Habitat
Silver wattle	*Acacia dealbata*	Moderate	None	Mixed woodlands, riparian
Tree of heaven	*Ailanthus altissima*	Moderate	None	Grassland, oak woodland, riparian
Slender wild oats	*Avena barbata*	Moderate	None	Coastal scrub, grassland, oak woodland, forest
Common wild oats	*Avena fatua*	Moderate	None	Coastal scrub, grassland, oak woodland, forest

Table 1-5. Nonnative Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)

Common Name	Scientific Name	Cal-IPC Rating[1]	CDFA Ranking[2]	Habitat
Rattlesnake grass	*Briza maxima*	Limited	None	Grassland
Ripgut brome	*Bromus diandrus*	Moderate	None	Dunes, scrub, grassland, woodland, forest
Soft brome	*Bromus hordeaceus*	Limited	None	Grassland, sage brush, serpentine soils
Red brome	*Bromus madritensis* ssp. *rubens*	High	None	Interior scrub, woodlands, grassland
Cheatgrass	*Bromus tectorum*	High	None	Interior scrub, woodlands, grassland
Lenspod whitetip	*Cardaria chalapensis*	Moderate-ALERT	B	Central Valley wetlands
Italian thistle	*Carduus pycnocephalus*	Moderate	None	Forest, scrub, grasslands, woodlands.
White knapweed	*Centaurea diffusa*	Moderate	A	Great Basin scrub, coastal prairie
Spotted knapweed	*Centaurea maculosa*	High	A	Riparian, grassland, wet meadows, forests
Yellow star-thistle	*Centaurea solstitialis*	High	C	Grassland, woodlands, occasionally riparian
Squarrose knapweed	*Centaurea virgata var. squarrosa*	Moderate	A	Scrub, grassland, pinyon-juniper woodland
Rush skeleton weed	*Chondrilla juncea*	Moderate	A	Grassland
Canada thistle	*Cirsium arvense*	Moderate	B	Grassland, riparian areas, forests
Bull thistle	*Cirsium vulgare*	Moderate	None	Riparian areas, marshes, meadows
Field bindweed	*Convolvulus arvensis*	Evaluated, not listed	C	Agricultural weed
Bermuda grass	*Cynodon dactylon*	Moderate	C	Riparian scrub, common landscape weed
Scotch broom	*Cystis scoparius*	High	C	Coastal scrub, oak woodland

Table 1-5. Nonnative Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)

Common Name	Scientific Name	Cal-IPC Rating[1]	CDFA Ranking[2]	Habitat
Longbeak stork's bill	*Erodium botrys*	Evaluated, not listed	None	Many upland habitats
Redstem stork's bill	*Erodium cicutarium*	Limited	None	Many upland habitats
Leafy spurge	*Euphorbia esula*	High-ALERT	A	Forests, woodlands, juniper forests
Fig	*Ficus carica*	Moderate	None	Riparian woodland
Fennel	*Foeniculum vulgare*	High	None	Grassland, scrub
French broom	*Genista mospessulana*	High	C	Coastal scrub, oak woodland, grassland
English ivy	*Hedera helix*	High	None	Coastal forest, riparian areas
Mediterranean barley, foxtail	*Hordeum marinum, H. murinum*	Moderate	None	Grassland
Common St. John's wort	*Hypericum perforatum*	Moderate	C	Many habitats, disturbed
Dyer's woad, Marlahan mustard	*Isatis tinctoria*	Moderate	B	Great Basin scrub and grassland
Dalmation toadflax	*Linaria dalmatica*	Moderate	A	Grassland, forest clearings
Italian ryegrass	*Lolium multiflorum*	Moderate	None	Grassland, oak woodlands, pinyon-juniper woodland
Oleander	*Nerium oleander*	Evaluated, not listed	None	Riparian areas
Pokeweed	*Phytolacca americana*	None	None	Riparian forest, riparian woodland
Black locust	*Robinia pseudoacacia*	Limited	None	Riparian areas, canyons
Himalayan blackberry	*Rubus armeniacus*	High	None	Riparian areas, marshes, oak woodlands
Cutleaf blackberry	*Rubus laciniatus*	None	None	Riparian areas, marshes, oak woodlands
Curly dock	*Rumex crispus*	Limited	None	Grassland, vernal pools, meadows, riparian
Tansy ragwort	*Senecio jacobaea*	Limited	B	Grassland, riparian
Johnsongrass	*Sorghum halepense*	None	C	Disturbed sites, moist places
Spanish broom	*Spartium junceum*	High	None	Coastal scrub, grassland, wetlands, oak woodland, forests

Table 1-5. Nonnative Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area (contd.)

Common Name	Scientific Name	Cal-IPC Rating[1]	CDFA Ranking[2]	Habitat
Medusa-head	*Taeniatherum caput-medusae*	High	C	Grassland, scrub, woodland
Spreading hedgeparsley	*Torilis arvensis*	Moderate	None	Widespread
Common mullein	*Verbascum thapsus*	Limited	None	Meadows, riparian, sagebrush, pinyon-juniper woodland
Periwinkle	*Vinca major*	Moderate	None	Riparian, oak woodlands, coastal scrub
Rat-tail fescue	*Vulpia myuros*	Moderate	None	Coastal sage scrub, chaparral

Notes:
[1] Cal-IPC Inventory Categories
High — Severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Widely distributed ecologically.
Moderate — Substantial and apparent ecological impacts on physical processes, plant and animal communities, and vegetation structure. Reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
Limited — These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic (Cal-IPC 2013).
[2] CDFA Pest Ratings of Noxious Weed Species and Noxious Weed Seed
A – Eradication, containment, rejection, or other holding action at the state-county level.
B – Intensive control or eradication, where feasible, at the county level.
C – Control or eradication as local conditions warrant, at the county level.
Q – Rating as "A" is pending at the state or county level.

Key:
Cal-IPC = California Invasive Plant Council
CDFA = California Department of Food and Agriculture

Upper Sacramento River (Shasta Dam to Red Bluff) and Lower Sacramento River and Delta A number of nonnative species have been introduced and become abundant in the riparian areas and marshes (fresh emergent wetlands) of the Sacramento Valley and Delta (Hunter et al. 2003). Several of these invasive nonnatives, including red sesbania (*Sesbania punicea*), Himalayan blackberry (*Rubus discolor*), giant reed (*Arundo donax*), and perennial pepperweed (*Lepidium latifolium*), form dense, monotypic stands that preclude the establishment of native species (Bossard, Randall, and Hoshovsky 2000). In general, these species displace native plants, reduce biodiversity, alter river flows, and reduce wildlife habitat values. Table 1-6 lists the most problematic of those species in Sacramento Valley and Delta riparian areas and marshes – invasive species rated by Cal-IPC; many of these species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure (Cal-IPC 2006).

Table 1-6. Cal-IPC High-Rated Invasive Plants of Sacramento Valley and Delta Riparian and Marsh Habitats

Scientific Name Common Name	Cal-IPC Rating	CDFA Rating	Primary Riparian/ Marsh Habitat(s)	Plant Type
Ailanthus altissima Tree-of-heaven, Chinese sumac	M	C	Marsh, riparian forest/woodland/scrub	Tree
Arundo donax Giant reed	H	B	Riparian forest/scrub	Perennial grass
Bromus diandrus Ripgut brome, great brome	M	–	Riparian scrub	Annual grass
Bromus madritensis ssp. *rubens* Red brome, foxtail chess	H	–	Riparian woodland/scrub	Annual grass
Centaurea melitensis Malta starthistle, tocalote	M	C	Riparian scrub	Annual herb
Centaurea solstitialis Yellow starthistle	H	C	Riparian scrub	Annual herb
Cirsium vulgare Bull thistle	M	C	Marsh	Perennial herb
Conium maculatum Poison hemlock	M	–	Riparian forest	Perennial herb
Cortaderia selloana, Cortaderia jubata Pampasgrass, white pampasgrass, jubatagrass	H	B	Riparian scrub	Perennial grass
Delairea odorata Cape-ivy, German ivy	H	–	Riparian forest	Perennial vine
Dipsacus fullonum Common teasel, wild teasel	M	–	Bog and fen, riparian scrub, marsh	Perennial herb
Egeria densa Brazilian waterweed, egeria	H	C	Lakes, ponds, reservoirs	Perennial aquatic herb
Eucalyptus globules Bluegum, Tasmanian bluegum	M	–	Marsh, riparian forest/woodland	Tree
Ficus carica Edible fig	M	–	Riparian forest, marsh	Shrub/tree
Foeniculum vulgare fennel	H	–	Riparian scrub/woodland	Perennial herb
Geranium dissectum Cutleaf geranium	L	–	Riparian woodland	Annual herb
Hedera helix, Hedera canariensis English ivy and Algerian ivy	H	–	Riparian forest, marsh	Perennial vine/shrub
Hypochaeris glabra Smooth cat's-ear	L	–	Riparian woodland	Annual herb
Hypochaeris radicata Common cat's ear, rough cat's-ear	M	–	Riparian forest/woodland/scrub	Annual herb
Lepidium latifolium Perennial pepperweed, tall whitetop	H	B	Tidal and nontidal marsh, riparian scrub	Perennial herb
Lolium multiforum, Festuca perennis Italian ryegrass	M	–	Riparian scrub	Annual/biennial grass
Ludwigia peploides Creeping waterprimrose, California waterprimrose	H	–	Rivers, streams, canals	Perennial aquatic herb

Table 1-6. Cal-IPC High-Rated Invasive Plants of Sacramento Valley and Delta Riparian and Marsh Habitats (contd.)

Scientific Name Common Name	Cal-IPC Rating	CDFA Rating	Primary Riparian/ Marsh Habitat(s)	Plant Type
Lytrum hyssopifolium Hyssop loosestrife, grass poly	L	–	Marsh	Perennial herb
Lythrum salicaria Purple loosestrife	H	B	Tidal and nontidal marsh	Perennial herb
Mentha pulegium Pennyroyal, European pennyroyal	M	–	Marsh, bog and fen, riparian forest	Perennial herb
Myoporum laetum Ngaio tree, false sandalwood	M	–	Marsh	Shrub/tree
Myriophyllum spicatum Spike watermilfoil	H	C	Lakes, ponds, reservoirs	Perennial aquatic herb
Potamogeton crispus Curly-leaved pondweed, curled pondweed	M	–	Lakes, ponds, reservoirs, rivers, streams, canals	Perennial aquatic herb
Pyracantha angustifolia, P. crenulata, P. coccinea Narrowleaf firethorn, scarlet firethorn	L	–	Riparian woodland	Shrub
Ranunculus repens Creeping buttercup	L	–	Riparian forest/woodland	Perennial herb
Rubus armeniacus (= R. discolor) Himalayan blackberry	H	–	Riparian woodland/forest/scrub, nontidal marsh	Shrub
Rumex acetosella Sheep sorrel	M	–	Riparian scrub	Perennial herb
Rumex crispus Curly dock	L	–	Bog and fen, riparian forest/woodland	Perennial herb
Saponaria officinalis Bouncing-bet, bouncing betty	L	–	Riparian woodland	Perennial herb
Sesbania punicea Red sesbania, scarlet wisteria	H, A	B	Riparian woodland, marsh	Tree
Tamarix chinensis, T. gallica, T. parviflora, T. ramosissima Chinese tamarisk, French tamarisk, small flower tamarisk, salt cedar	H	B	Riparian forest/woodland, marsh	Tree, shrub
Torilis arvensis Hedgeparsley, spreading hedgeparsley	M	–	Riparian woodland	Annual herb
Verbascum thapsus Common mullein, wooly mullein	L	–	Riparian scrub	Perennial herb

Source: Cal-IPC 2006

Table 1-6. Cal-IPC High-Rated Invasive Plants of Sacramento Valley and Delta Riparian and Marsh Habitats (contd.)

Scientific Name Common Name	Cal-IPC Rating	CDFA Rating	Primary Riparian/ Marsh Habitat(s)	Plant Type

Notes:
Cal-IPC Inventory Ratings:
A = Alert – Plant species with the potential to spread explosively; infestations currently small and localized
H = High – species that have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure
M = Moderate –species that have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure
L = Limited –species that are invasive but their impacts are minor on a statewide level or there was not enough information to justify a higher score
CDFA Weed Ratings:
B = known to be of economic or environmental detriment, and of limited distribution, if present in California
C = known to be of economic or environmental detriment, and usually widespread, if present in California
Key:
Cal-IPC = California Invasive Plant Council
CDFA = California Department of Food and Agriculture

Waters of the United States, Including Wetlands, in Shasta Lake and Vicinity

Reclamation delineated wetlands and other waters of the United States under Federal jurisdiction (jurisdictional waters) in the impoundment area between 2004 and 2010. Between 2009 and 2010, jurisdictional waters in the relocation areas were delineated on all public lands and on private lands where access was granted. Additional field work is planned for additional private lands in the relocation areas where access has been granted. These data will be provided in a wetland delineation report prepared for submittal to the USACE and included the Final EIS. The wetland delineation is on-going and has not been verified by the USACE. All information regarding jurisdictional waters is preliminary.

Jurisdictional waters occur in the impoundment and relocation areas as wetlands and other waters. Wetlands include fresh emergent/riparian wetland, intermittent swale, riparian wetland, seasonal wetland, seep/spring wetland, and vegetated ditch. Other waters include ephemeral, intermittent, and perennial streams, roadside ditches, seep/spring waters, and lacustrine. Because some construction activities associated with the impoundment and relocation areas extend into Shasta Lake below the existing full pool elevation, the surface area of the lake is included in the delineation results. Approximately 51 acres of wetlands and 30,092 acres of other waters occur in the impoundment and relocation areas. Total jurisdictional waters in the impoundment and relocation areas, excluding Shasta Lake at full pool, include approximately 51 acres of wetlands and 121 acres of other waters.

The delineation was conducted in accordance with the routine on-site method identified in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2006). Each on-site wetland determination was based on field observations of

soil, vegetation, and hydrologic characteristics. Delineation of "other waters" was based on the presence of an ordinary high-water mark (OHWM) and whether the feature is tributary to waters of the United States. Data points were characterized and documented for 10 percent of all wetland features delineated. In each relocation area, at least one pair of data points was recorded for each wetland feature type. Soil pits were dug to a depth sufficient to document the presence or confirm the absence of hydric soil or hydrology indicators. The indicator status of wetland plants was determined using the National List of Plant Species That Occur in Wetlands: California Region 0 (Reed 1988). Positive indicators of hydric soils were observed in the field in accordance with the criteria outlined in Field Indicators of Hydric Soils in the United States (NRCS 2006). The hydric status of each soil map unit located in the Shasta Lake and vicinity portion of the primary study area was reviewed using the Web Soil Survey (Soil Survey Staff 2010). Indicators of depth and duration of soil saturation, ponding, and drainage patterns and the OHWM were observed in the field. The boundaries of each wetland feature and the three-parameter data points were mapped using rectified color aerial photography and/or a Trimble Pathfinder Pro XH Global Positioning System capable of sub-foot accuracy.

Main Body

The wetland delineation of the impoundment area along the Main Body was conducted from January to April 2010. Jurisdictional waters include seep/spring, riparian, and vegetated ditch wetlands and ephemeral stream, intermittent stream, perennial stream, seep/spring, and roadside ditch waters. Total acres of jurisdictional waters occurring in the Main Body are summarized in Table 1-7.

Big Backbone Arm

The wetland delineation along the Big Backbone Arm was conducted during November 2006. Jurisdictional waters included seep/spring and riparian wetlands and ephemeral stream, intermittent stream, and perennial stream waters. Total acres of jurisdictional waters occurring in the Big Backbone Arm are summarized in Table 1-7.

Table 1-7. Jurisdictional Waters in the Impoundment Area

Jurisdictional Water Type	Area (Acres)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Wetlands						
Fresh emergent/ riparian wetland	0.00	0.00	5.30	0.00	0.00	0.00
Intermittent swale	0.00	0.002	0.00	0.00	0.00	0.04
Riparian wetland	1.04	1.71	6.63	8.34	1.49	0.74
Seasonal wetland	0.00	0.00	0.31	0.00	0.14	0.02
Seep/spring wetland	0.77	0.23	0.80	0.31	0.16	0.47
Vegetated ditch	0.13	0.00	0.00	0.02	0.00	0.00
Total wetlands	1.94	1.94	12.24	8.67	1.79	1.27
Other Waters of the United States						
Ephemeral stream	0.29	0.02	0.62	0.28	0.13	0.12
Intermittent stream	1.42	0.25	2.38	0.93	0.93	2.69
Perennial stream	1.55	3.00	9.76	20.26	2.37	1.48
Roadside ditch	0.00	0.00	0.03	0.00	0.00	0.00
Seep/spring other waters	0.03	0.00	0.001	0.01	0.0001	0.00
Lacustrine	10,196.88	1,014.12	7,225.14	5,032.68	2,081.60	4,372.80
Total other waters	10,200.17	1,017.39	7,237.93	5,054.15	2,085.03	4,377.09
Total waters of the United States	10,202.11	1,019.33	7,250.99	5,062.82	2,086.82	4,374.07

Note:
* Acreage values are approximate.

Big Backbone Arm

The wetland delineation along the Big Backbone Arm was conducted during November 2006. Jurisdictional waters included seep/spring and riparian wetlands and ephemeral stream, intermittent stream, and perennial stream waters. Total acres of jurisdictional waters occurring in the Big Backbone Arm are summarized in Table 1-7.

Sacramento Arm

The wetland delineation along the Sacramento Arm was conducted from September through early December 2010 and during March, April, and June 2010. Jurisdictional waters include seep/spring, riparian, seasonal, and riparian/fresh emergent wetlands and ephemeral stream, intermittent stream, perennial stream, seep/spring, and roadside ditch waters. Total acres of jurisdictional waters occurring in the Sacramento Arm are summarized in Table 1-7.

McCloud Arm

The wetland delineation along the McCloud Arm was conducted during December 2009 and in April, June, and November 2010. Jurisdictional waters

include seep/spring, riparian, and vegetated ditch wetlands and ephemeral stream, intermittent stream, perennial stream, and seep/spring waters. Total acres of jurisdictional waters occurring in the McCloud Arm are summarized in Table 1-7.

Squaw Creek Arm

The wetland delineation along the Squaw Creek Arm was conducted from late August through September 2004. Jurisdictional waters include seep/spring, riparian, and seasonal wet meadow wetlands and ephemeral stream, intermittent stream, perennial stream, and seep/spring waters. Total jurisdictional acres of waters occurring in the Squaw Creek Arm are summarized in Table 1-7.

Pit Arm

The wetland delineation along the Pit Arm was conducted from late November 2006 through April 2007. Jurisdictional waters include riparian, seep/spring, seasonal, and intermittent swale wetlands and ephemeral stream, intermittent stream, and perennial stream waters. Total acres of jurisdictional waters occurring in the Pit Arm are summarized in Table 1-7.

Relocation Areas

Wetland delineations at the relocation areas were conducted between January 2010 and September 2011. Jurisdictional waters include wetlands and other waters. Wetlands include fresh emergent, intermittent swale, riparian, seep/spring, and seasonal wetlands and vegetated ditches. Other waters present include ephemeral, intermittent, and perennial streams; seep/spring; and roadside ditches. Total acres of jurisdictional waters occurring in the relocation areas are summarized in Table 1-8.

Characterization of Wetland Features

Jurisdictional wetlands occurring in the Shasta Lake and vicinity portion of the primary study area include fresh emergent/riparian wetland, intermittent swale, riparian wetland, seasonal wetland, seep/spring wetland, and vegetated ditch.

Fresh emergent/riparian wetlands are uncommon in the Shasta Lake and vicinity portion of the primary study area, occurring at only one location along the Sacramento Arm. This location consists of a former USFS recreation site developed at the confluence of Salt Creek and Shasta Lake, immediately east of I-5. This former recreation site, coupled with an undercrossing at I-5, has partially impounded the flows of Salt Creek, resulting in the development of an area characterized by a complex of fresh emergent and riparian wetland vegetation.

Table 1-8. Jurisdictional Waters in the Relocation Areas

Jurisdictional Water Type	Relocation Acres					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Wetlands						
Fresh emergent wetland	0.00	NA	0.02	0.01	0.00	0.00
Intermittent swale	0.00	NA	0.78	0.00	0.00	0.02
Riparian wetland	0.15	NA	5.87	3.89	0.18	0.82
Seasonal wetland	0.01	NA	10.61	0.00	0.02	0.00
Seep/spring wetland	0.03	NA	0.09	0.26	0.05	0.43
Vegetated ditch	0.06	NA	0.002	0.01	0.002	0.00
Total wetlands	0.24	NA	17.37	4.17	0.25	1.27
Other Waters of the United States						
Ephemeral stream	0.30	NA	1.37	1.40	0.03	0.18
Intermittent stream	0.89	NA	4.16	2.17	0.22	1.74
Perennial stream	0.00	NA	1.27	10.44	0.30	0.00
Roadside ditch	0.02	NA	0.16	0.00	0.00	0.00
Seep/spring other waters	0.00	NA	0.00	0.00	0.03	0.00
Total other waters	1.21	NA	6.97	14.01	0.58	1.92
Total waters of the United States	1.45	NA	24.34	18.18	0.83	3.19

Note:
*Acreage values are approximate.

Dominant overstory species include Goodding's black willow (OBL[1]), arroyo willow (FACW), red willow (assume FACW), and shining willow (OBL). Fresh emergent species include pennyroyal (*Mentha pulegium*–OBL), willow dock (*Rumex salicifolius*–OBL), and broadleaf cattail (*Typha latifolia*). Wetland hydrology and soils criteria are met through evidence of frequent flooding, including sediment deposits, watermarks, drift lines, and drainage patterns.

Intermittent swales occur along the Big Backbone and Pit arms. These features are characterized as linear, or somewhat linear, drainages that lack evidence of scour and are dominated by wetland plant species resulting from seasonally saturated soils. Typical species occurring in these features include seep monkey flower (*Mimulus guttatus*–OBL), spiny fruit buttercup (*Ranunculus muricatus*–FACW), slender rush (*Juncus tenuis*–FACW), and centaury (*Centaurium venustum*–NL). Wetland hydrology and soils criteria are met through evidence

[1] OBL = Obligate Wetland Plants—Estimated probability of occurring in wetland >99 percent.
FACW = Facultative Wetland Plants—Estimated probability of occurring in wetland >67 percent to 99 percent.
FAC = Facultative Plants—Estimated probability of occurring in wetland 33 percent to 67 percent.
FACU = Facultative Upland Plants—Estimated probability of occurring in wetland 1 percent to <33 percent.
UPL = Obligate Upland Plants—Estimated probability of occurring in wetland <1 percent.
NI = No Indicator—Plants for which insufficient information was available to determine an indicator status.
NL = Not listed—Plants not listed in Reed 1988.

of long-duration saturation, including saturation in the upper 12 inches, aquic moisture regime, and drainage patterns.

Riparian wetlands are common throughout the Shasta Lake and vicinity portion of the primary study area and generally occur as "stringers," or narrow features found immediately adjacent to intermittent or perennial streams. Typical species found in riparian wetlands include arroyo willow (FACW), Goodding's black willow (OBL), white alder (FACW), Oregon ash (FACW), Indian rhubarb (*Darmera peltata*-NL), mugwort (*Artemisia douglasiana*-FACW), California wild grape (FACW), and Himalayan blackberry (FACW). Wetland hydrology and soils criteria are met through evidence of frequent flooding, including sediment deposits, watermarks, drift lines, and drainage patterns.

Seasonal wetlands occur along the Sacramento, Squaw Creek, and Pit arms. These features are dominated by herbaceous vegetation and are typically adjacent to other wetland features or are depressions that frequently pond. Typical plant species found in these features include slender rush (FACW), sword leaf rush (*Juncus ensifolius*–FACW), seep monkey flower (OBL), yampah (*Perideridia californica*–FACW), annual checker bloom (*Sidalcea calycosa*–OBL), little quaking grass (*Briza minor*–FACW), California oatgrass (*Danthonia californica*–FACW), and spiny fruit buttercup (FACW). Wetland hydrology and soils criteria are met through evidence of long-duration saturation, including saturation in the upper 12 inches, an aquic moisture regime, and drainage patterns.

Seep/spring wetlands are found throughout the Shasta Lake and vicinity portion of the primary study area. These features form at locations where groundwater flows meet the ground surface. Hydrophytic vegetation typically colonizes the area where water is provided by the seep/spring. Typical species include white alder (FACW), chain fern (*Woodwardia fimbriata*–FACW), goat's beard (*Aruncus dioicus*–FACW), Indian rhubarb (NL), seep monkey flower (*Mimulus guttatus*–OBL), horsetail (*Equisetum arvense* –FAC), red stem dogwood (*Cornus stolonifera*–FACW), spicebush (NL), Himalayan blackberry (FACW), and western azalea (FAC). The wetland hydrology and soils criteria are met through evidence of long-duration saturation, including inundation, saturation in the upper 12 inches, watermarks, and drainage patterns.

Vegetated ditches are uncommon in the Shasta Lake and vicinity portion of the primary study area but do occur along the Main Body, along the McCloud Arm, and in several relocation areas. These features consist of ditches that have been excavated to drain adjacent uplands, parking areas, roads, or railways. These features are generally low gradient and provide hydrologic conditions suitable for colonization by hydrophytic vegetation. Dominant plant species include nutsedge (*Cyperus eragrostis*–FACW), seep monkey flower (OBL), broadleaf cattail, and rush (*Juncus* sp.–assume FACW). Wetland hydrology and soil criteria were met by long-duration inundation and long-duration saturation.

Jurisdictional waters (i.e., other waters) occurring in the Shasta Lake and vicinity portion of the primary study area include ephemeral, intermittent, and perennial streams, roadside ditches, and seep/spring waters.

Ephemeral streams are common throughout the Shasta Lake and vicinity portion of the primary study area. These features are linear drainages characterized by indicators of scour and deposition, minor drift lines, and sediment deposits, but lack a groundwater component that contributes to their flow. The wetland hydrology is provided by sheet flow; these features typically cease flowing soon after storm or runoff events. Ephemeral streams are characterized by poorly defined wetland hydrology indicators and are typically found in headwater areas with relatively small drainage areas.

Intermittent streams are the most common jurisdictional feature in the Shasta Lake and vicinity portion of the primary study area. Intermittent streams range from small, poorly defined tributaries to larger, well-defined streams that flow into the summer. Like ephemeral streams, intermittent streams flow seasonally, but, in addition to precipitation and sheet flow from adjacent slopes, these features have a groundwater component to their flow regime. Intermittent streams are characterized by the presence of a defined bed and bank, and scour and deposition. Other characteristics, such as algae growth or hydrophytic vegetation in or adjacent to the stream, indicate longer inundation periods. Wetland hydrology and hydric soil criteria are met through evidence of frequent flooding, including water marks, algal matting, drift lines, and sediment deposits.

Perennial streams occur throughout the Shasta Lake and vicinity portion of the primary study area. These features are characterized by perennial flow and are often bounded by riparian wetlands. Dominant substrates consist of boulders, bedrock, cobble, sand, and gravel. Wetland hydrology and hydric soil criteria are met through evidence of frequent flooding, including water marks, algal matting, drift lines, and sediment deposits.

Roadside ditches are uncommon in the Shasta Lake and vicinity portion of the primary study area, but some are found along the Sacramento Arm. These ditch features occur near roadways and railroad tracks and have been excavated solely to drain uplands. Wetland vegetation is sparse or absent. The wetland boundaries were indicated by sediment and drift deposits.

Seep/spring other waters are uncommon in the Shasta Lake and vicinity portion of the primary study area, but some are found along the Main Body, the Sacramento Arm, the McCloud Arm, and the Squaw Creek Arm. These features form at locations where groundwater flows meet the ground surface; however, the features are not dominated by hydrophytic vegetation. The wetland hydrology and soils criteria are met through evidence of long-duration saturation, including inundation, saturation in the upper 12 inches, watermarks, and drainage patterns.

Regulatory Framework

Biological resources in California are protected and/or regulated by a variety of Federal and State laws and policies. In addition, in many parts of California, there are local or regional habitat and species conservation planning efforts in which a project applicant may participate. Key regulatory and conservation planning issues applicable to the project and alternatives under consideration are discussed below.

Federal

Endangered Species Act

Pursuant to the Federal Endangered Species Act (ESA), USFWS and the National Marine Fisheries Service have authority over projects that may result in "take" of a Federally listed species. In general, ESA Section 7 prohibits persons (including private parties) from "taking" listed endangered or threatened fish and wildlife species on private property, and from "taking" listed endangered or threatened plant species in areas under Federal jurisdiction or in violation of State law (16 U.S. Code (USC) 1532, 50 Code of Federal Regulations (CFR) 17.3). Under the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" as part of an intentional or negligent act or omission. The term "harm" includes acts that result in death or injury to wildlife. Such acts may include significant habitat modification or degradation if it results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Section 7(a) of the ESA, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed for listing or is listed as endangered or threatened. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with USFWS.

As defined in the ESA, critical habitat is a specific geographic area that is essential for the conservation of a threatened or endangered species and that may require special management and protection. It may include an area that is not currently occupied by the species but that will be needed for its recovery. Critical habitats are designated to ensure that actions authorized by Federal agencies will not destroy or adversely modify critical habitat, thereby protecting areas necessary for the conservation of the species.

Clean Water Act

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. USACE regulates discharges of fill or dredged materials into waters of the United States under Section 404 of the CWA (33 USC 1251–1376). Waters of the United States include lakes, rivers,

streams, and their tributaries and adjacent wetlands. Wetlands are defined under Section 404 as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support (and that do support under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3, 40 CFR 230.3). Activities resulting in a discharge of dredged or fill material that require a permit under Section 404 include, but are not limited to, placing fill or riprap, grading, mechanized land clearing, and dredging. Any activity that results in the deposit of dredged or fill material below the ordinary high-water mark of waters of the United States or within a jurisdictional wetland usually requires a Section 404 permit, even if the area is dry at the time the activity takes place. To comply with the Section 404 policy that there be no net loss of wetlands, the project cannot affect the total acreage of wetlands within the project boundary.

Section 401 Water Quality Certification

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate State agency stating that the intended dredging or filling activity is consistent with the State's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board to the nine regional water quality control boards (RWQCB).

Rivers and Harbors Act

USACE regulates the construction of structures in, over, or under; excavation of material from; or deposition of material into "navigable waters of the United States" under Section 10 of the Federal Rivers and Harbors Act (33 USC 401 et seq.). Navigable waters of the United States are defined as those waters subject to the ebb and flow of the tide shoreward to the mean high-water mark or those that are currently used, have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. A letter of permission or permit from USACE is required before any work may be completed within navigable waters. Projects are permitted under either individual or general (i.e., nationwide) permits. The specific applicability of the permit types is determined by USACE on a case-by-case basis. Based on a preliminary conversation with the USACE (San Francisco District, Eureka Field Office), the project is expected to be permitted under Nationwide Permit Number 27.

U.S. Forest Service Sensitive Species

The National Forest Management Act requires USFS to "provide for a diversity of plant and animal communities" (16 USC 1604(g)(3)(B)) as part of its multiple-use mandate. USFS must maintain "viable populations of existing native and desired nonnative species in the planning area" (36 CFR 219.19). The Sensitive Species program is designed to meet this mandate and to demonstrate USFS's commitment to maintaining biodiversity on National Forest System lands. The program is a proactive approach to conserving species to prevent a trend toward listing under the ESA and to ensure the continued existence of viable, well-distributed populations. A "Sensitive Species" is any

species of plant or animal that has been recognized by the Regional Forester to need special management to prevent the species from becoming threatened or endangered.

Shasta-Trinity National Forest Land and Resource Management Plan

The Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP) contains forest goals, standards, and guidelines designed to guide the management of the STNF. The following goals, standards, and guidelines related to botanical resource issues associated with the primary study area were excerpted from the STNF LRMP (USFS 1995).

Biological Diversity

Goals (LRMP, p. 4-4)

- Integrate multiple resource management on a landscape level to provide and maintain diversity and quality of habitats that support viable populations of plants, fish, and wildlife.

Standards and Guidelines (LRMP, p. 4-14)

- **Natural Openings** – Management of natural openings will be determined at the project level consistent with desired future conditions.

- **Snags** – Over time, provide the necessary number of replacement snags to meet density requirements as prescribed for each land allocation and/or management prescription. Live, green culls and trees exhibiting decadence and/or active wildlife use are preferred.

- **Hardwood** – Apply the following standards in existing hardwood types:

  – Manage hardwood types for sustainability.

  – Conversion to conifers will only take place to meet desired future ecosystem conditions.

  – Where hardwoods occur naturally within existing conifer types on suitable timber lands, manage for a desired future condition for hardwoods as identified during ecosystem analysis consistent with management prescription standards and guidelines. Retain groups of hardwoods over single trees.

Threatened, Endangered, and Sensitive Species (Plants and Animals)

Goals (LRMP, p. 4-5)

- Monitor and protect habitat for Federally listed threatened and endangered and candidate species. Assist in recovery efforts for

threatened and endangered species. Cooperate with the State to meet objectives for state listed species.

- Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for threatened and endangered status.

Botany (Sensitive and Endemic Plants)

Standards and Guidelines (LRMP, pp. 4-14 through 4-16)

- Map, record, and protect essential habitat for known and newly discovered sensitive and endemic plant species until conservation strategies are developed.

- Analyze the potential effects of all ground-disturbing projects on sensitive and endemic plants and their habitat. Mitigate project effects to avoid a decline in species viability at the Forest level.

- Monitor the effects of management activities on sensitive and endemic plants. If monitoring results show a decline in species viability, alter management strategy.

- Provide reports of sensitive plant populations to the CDFW annually.

- Coordinate sensitive plant inventory and protection efforts with the CDFW, the USFWS, the Nature Conservancy, CNPS, and other concerned agencies, organizations, and adjacent landowners.

- Protect type localities of sensitive and endemic plants for their scientific value.

U.S. Forest Service Survey and Manage Standards and Guidelines

The 1994 Record of Decision for Amendments to USFS and BLM Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management for Late-Successional and Old-Growth Related Species in the Range of the Northern Spotted Owl (Northwest Forest Plan (NWFP) Record of Decision (ROD)) amended or was incorporated into BLM and USFS land management plans to require certain actions for rare amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods that occupy late-successional and old-growth forests (USFS and BLM 1994). These rare species were identified in Appendix C of the NWFP ROD collectively as Survey and Manage (S&M) Species. The NWFP ROD also established protection buffers on matrix lands for certain species (i.e., protection buffer species) that were not on the 1994 S&M list and required that those buffers be managed as part of the Late Successional Reserve network. Four survey strategies were developed to guide management of S&M species: (1)

manage known sites; (2) survey prior to ground-disturbing activities; (3) conduct extensive surveys; and (4) conduct general regional surveys.

The NWFP ROD also established overall objectives for managing S&M species populations that were referred to as "persistence objectives." These objectives were based on the USFS viability provision in the 1982 National Forest System Land and Resource Management Planning Regulation for the National Forest Management Act of 1976. This provision is targeted toward vertebrate species, but was also applied to nonvertebrate species to the extent practicable, as described in the NWFP ROD. The provision generally states that the USFS shall manage habitat "to maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 CFR 219.19). Although the viability standard is part of the USFS planning regulations, the protections for S&M species were also applied to BLM lands in the NWFP ROD with a goal of protecting the long-term health and sustainability of all Federal forests within the range of the northern spotted owl (NSO) and the species that inhabit them. Because of the uncertainty associated with the continued persistence of species due to natural factors, the NWFP ROD noted that compliance with the planning regulations is not subject to precise numerical interpretations and cannot be fixed at any single threshold; rather, "as in any administrative field, common sense and agency expertise must be applied" (NWFP ROD, p. 44).

In 2001, the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001 ROD) (USFS and BLM 2001) modified the management direction provided in the NWFP ROD for S&M and protection buffer species and amended BLM and USFS land management plans in the range of the northern spotted owl accordingly. The list of S&M species was also modified to remove 72 species in all or part of their range because new information indicated they were secure or otherwise did not meet the basic criteria for S&M. Species remaining on the list were assigned to one of six categories using the following criteria: their relative rarity, the ability to reasonably and consistently locate occupied sites during surveys prior to habitat disturbing activities, and the level of information known about the species or group of species. The 2001 ROD also removed the direction specific to protection buffer species, excluding these species from S&M Standards and Guidelines requirements. As part of the 2001 Standards and Guidelines, objectives, criteria, and management direction were defined for each category. Specific criteria were also established to add, remove, or change species categories based on new information and as part of the annual species review processes.

In 2004 and again in 2007, the BLM and USFS issued a ROD to eliminate the S&M requirements of the 2001 ROD and to provide protection for species on the S&M lists by managing them under the agencies' special-status species programs. As a result of litigation, the requirements of the 2001 S&M ROD

were reinstated. In a subsequent court-mandated settlement agreement (USFS and BLM 2011), the list of S&M species was modified. The settlement agreement also made the following modifications: (1) acknowledged existing exemption categories (2006 Pechman Exemptions); (2) updated the 2001 S&M species list; (3) established a transition period for application of the species list; and (4) established new exemption categories (2011 Exemptions). Agency decisions made after September 30, 2012, are required to use the 2011 S&M list. Some species considered in the S&M program also occur on non-federal lands. The requirements of the 1994 NWFP and 2001 RODs as modified under the 2011 Settlement Agreement apply only to lands managed by the BLM and USFS within the range of the northern spotted owl. Currently the BLM and USFS are implementing the January 2001 ROD as modified by the 2011 Settlement Agreement.

Management Guide for the Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity National Recreation Area

A portion of the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) is included in the Shasta Lake and vicinity portion of the primary study area. The Management Guide for the Whiskeytown-Shasta-Trinity NRA, including the Shasta Unit, contains management strategies intended to achieve or maintain a desired condition. These strategies take into account opportunities, management recommendations for specific projects, and mitigation measures needed to achieve specific goals. The following strategies related to botanical and wetland resource issues associated with the Shasta Lake and vicinity portion of the primary study area were excerpted from the Management Guide (USFS 1996).

Vegetation (Management Guide, pp. IV-18 through IV-19)

- Prescribed burning, fuel break construction, and other forms of vegetation manipulation will be used to reduce fire hazards and improve forest health.

- Hazard trees in traditionally high use recreation areas which pose safety hazards to people or property will be identified and removed.

- Recreation sites will be inventoried and vegetative management plans will be developed to ensure healthy and safe vegetation complexes are maintained over time.

- Protect known populations of Threatened and Endangered Species (TES) plant species and their habitat and implement mitigation measures if necessary to maintain or enhance their continued viability. Conservation strategies for TES plant species will be utilized as they are developed.

- Implement management practices which promote restoration of native plant diversity.

- Implement a program to restore native vegetation to highly disturbed or degraded areas using native plants. Local in-kind, on-site seed or other propagation sources will be used in order to maintain genetic integrity.

- Chaparral and woodland habitat management will occur to meet wildlife objectives.

- Interpretive materials will address the need to conserve rare plant communities in accordance with the NRA Interpretive Plan.

- Rare plants in or near camping areas will be monitored on a regular basis.

- Diversity of native species will be emphasized. Eradication program will be implemented for nonnative, introduced species in areas where healthy, botanically diverse plant communities are necessary to meet ecosystem management objectives.

- Native plants from local gene pools will be utilized when landscaping campgrounds, interpretive facilities, etc.

- Partnerships will be utilized to assist with collection of seed, propagation of seeds/propagules, and planting.

U.S. Forest Service Noxious Weed Management Policy 20900

USFS Manual Policy 20900, Noxious Weed Management (USFS 2011), includes the following policy for the management of aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens), based on an integrated pest management approach, throughout the National Forest System:

1. Initiate, coordinate, and sustain actions to prevent, control, and eliminate priority infestations of invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach, and collaborate with stakeholders to implement cooperative invasive species management activities in accordance with law and policy.

2. When applicable, invasive species management actions and standards should be incorporated into resource management plans at the forest level, and in programmatic environmental planning and assessment documents at the regional or national levels.

3. Determine the vectors, environmental factors, and pathways that favor the establishment and spread of invasive species in aquatic and terrestrial areas the National Forest System, and design management

practices to reduce or mitigate the risk for introduction or spread of invasive species in those areas.

4. Determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.

5. Ensure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas. Integrate visitor use strategies with invasive species management activities on aquatic and terrestrial areas of the National Forest System. At no time are invasive species to be promoted or used in site restoration or re-vegetation work, watershed rehabilitation projects, planted for bio-fuels production, or other management activities on national forests and grasslands.

6. Use contract and permit clauses to require that the activities of contractors and permittees are conducted to prevent and control the introduction, establishment, and spread of aquatic and terrestrial invasive species. For example, where determined to be appropriate, use agreement clauses to require contractors or permittees to meet Forest Service-approved vehicle and equipment cleaning requirements/standards prior to using the vehicle or equipment in the National Forest System.

7. Make every effort to prevent the accidental spread of invasive species carried by contaminated vehicles, equipment, personnel, or materials (including plants, wood, plant/wood products, water, soil, rock, sand, gravel, mulch, seeds, grain, hay, straw, or other materials).

   a) Establish and implement standards and requirements for vehicle and equipment cleaning to prevent the accidental spread of aquatic and terrestrial invasive species on the National Forest System or to adjacent areas.

   b) b. Make every effort to ensure that all materials used on the National Forest System are free of invasive species and/or noxious weeds (including free of reproductive/propagative material such as seeds, roots, stems, flowers, leaves, larva, eggs, veligers, and so forth).

8. Where States have legislative authority to certify materials as weed-free (or invasive-free) and have an active State program to make those State-certified materials available to the public, forest officers shall

develop rules restricting the possession, use, and transport of those materials unless proof exists that they have been State-certified as weed-free (or invasive-free), as provided in 36 CFR 261 and Departmental Regulation 1512-1.

9. Monitor all management activities for potential spread or establishment of invasive species in aquatic and terrestrial areas of the National Forest System.

10. Manage invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach to achieve the goals and objectives identified in Forest Land and Resource Management plans, and other Forest Service planning documents, and other plans developed in cooperation with external partners for the management of natural or cultural resources.

11. Integrate invasive species management funding broadly across a variety of National Forest System programs, while associating the funding with the specific aquatic or terrestrial invasive species that is being prioritized for management, as well as the purpose and need of the project or program objective.

12. Develop and utilize site-based and species-based risk assessments to prioritize the management of invasive species infestations in aquatic and terrestrial areas of the National Forest System. Where appropriate, use a structured decision making process and adaptive management or similar strategies to help identify and prioritize invasive species management approaches and actions.

13. Comply with the Forest Service performance accountability system requirements for invasive species management to ensure efficient use of limited resources at all levels of the Agency and to provide information for adapting management actions to meet changing program needs and priorities. When appropriate, utilize a structured decision making process to address invasive species management problems in changing conditions, uncertainty, or when information is limited.

14. Establish and maintain a national record keeping database system for the collection and reporting of information related to invasive species infestations and management activities, including invasive species management performance, associated with the National Forest System. Require all information associated with the National Forest System invasive species management (including inventories, surveys, and treatments) to be collected, recorded, and reported consistent with national program protocols, rules, and standards.

15. Where appropriate, integrate invasive species management activities, such as inventory, survey, treatment, prevention, monitoring, and so forth, into the National Forest System management programs. Use inventory and treatment information to help set priorities and select integrated management actions to address new or expanding invasive species infestations in aquatic and terrestrial areas of the National Forest System.

16. Assist and promote cooperative efforts with internal and external partners, including private, State, tribal, and local entities, research organizations, and international groups to collaboratively address priority invasive species issues affecting the National Forest System.

17. Coordinate as needed with Forest Service Research and Development and State and Private Forestry programs, other agencies included under the National Invasive Species Council, and external partners to identify priority/high-risk invasive species that threaten aquatic and terrestrial areas of the National Forest System. Encourage applied research to develop techniques and technology to reduce invasive species impacts to the National Forest System.

18. As appropriate, collaborate and coordinate with adjacent landowners and other stakeholders to improve invasive species management effectiveness across the landscape. Encourage cooperative partnerships to address invasive species threats within a broad geographical area.

U.S. Bureau of Land Management Resource Management Plan

BLM manages a number of public lands in the primary study area and vicinity generally located west of Shasta Dam. These areas are included in the Shasta Management Area and specifically include the Interlakes Special Recreation Management Area. These areas fall under the Northern California BLM district and the resource management plan of the Redding BLM field office. The purpose of BLM's resource management plans is to provide overall direction for managing and allocating public resources in the planning area. BLM is responsible for administering the following strategies related to resource issues common to the portion of the Redding District lands located near the primary study area and vicinity (BLM 1992, 1993):

- Provide a regional opportunity for motorized recreation with a focus within the Chappie-Shasta Off-Highway Vehicle Area.

- Enhance nonmotorized recreation opportunities within the area via a greenway connecting Redding to Shasta Dam along the Sacramento River.

- Maintain or improve the long-term sustained yield of forest products available from commercial forestlands.

- Improve the long-term condition and protection of deer winter range habitat.
- Maintain special-status species habitat.
- Maintain the existing scenic quality of the areas.
- Maintain opportunities to explore and develop freely available minerals on public lands.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 established the protection of wetlands and riparian systems as the official policy of the Federal government. It requires all Federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

Executive Order 11312: Invasive Species

Executive Order 11312 directs all Federal agencies to prevent and control introductions of invasive nonnative species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. Executive Order 11312 established a national Invasive Species Council made up of Federal agencies and departments and a supporting Invasive Species Advisory Committee composed of State, local, and private entities. The Invasive Species Council and Advisory Committee oversee and facilitate implementation of the Executive Order, including preparation of a National Invasive Species Management Plan.

State

California Endangered Species Act

Under the California Endangered Species Act (CESA), CDFW has the responsibility for maintaining a list of endangered and threatened species (California Fish and Game Code, Section 2070). CDFW also maintains a list of "candidate species," which are species for which CDFW has issued a formal notice that they are under review for addition to the list of endangered or threatened species. In addition, CDFW maintains lists of "species of special concern," which serve as species "watch lists." Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project study area and, if so, whether the proposed project would have a potentially significant impact on any of these species. In addition, CDFW encourages informal consultation on any proposed project that may affect a species that is a candidate for State listing.

Project-related impacts on species listed as endangered or threatened under the CESA would be considered significant. State-listed species are fully protected

under the mandates of the CESA. "Take" of protected species incidental to otherwise lawful management activities may be authorized under Section 2081 of the California Fish and Game Code. Under the CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include "harm" or "harass," as the Federal act does. As a result, the threshold for take under the CESA is higher than that under the ESA.

Authorization from CDFW would be in the form of an incidental take permit or as a consistency determination (Section 2080.1(a) of the Fish and Game Code). Section 2080.1(a) of the Fish and Game Code authorizes CDFW to accept a Federal biological opinion as the take authorization for a State-listed species when a species is listed under both the ESA and the CESA.

California Native Plant Protection Act

The Native Plant Protection Act (California Fish and Game Code Sections 1900–1913) prohibits the taking, possessing, or sale within the state of any plants with a State designation of rare, threatened, or endangered, as defined by CDFW. The act's definition of "endangered" and "rare" closely parallel the CESA definitions of "endangered" and "threatened" plant species. Project impacts on these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the project.

Section 1602 of the California Fish and Game Code – Streambed Alteration

Diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW, pursuant to Section 1602 of the California Fish and Game Code. The regulatory definition of stream is a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports wildlife, fish, or other aquatic life. This includes watercourses that have a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for a project that would result in an impact on a river, stream, or lake.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB's jurisdiction includes Federally protected waters as well as areas that meet the definition of "waters of the State." "Waters of the State" is defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCB has the

discretion to take jurisdiction over areas not Federally protected under Section 401 provided they meet the definition of waters of the State. Mitigation requiring no net loss of wetlands functions and values of waters of the State is typically required by the RWQCB.

California Department of Fish and Wildlife Species Designations

CDFW maintains an informal list of species called "species of special concern." These are broadly defined as plant and wildlife species that are of concern to CDFW because of population declines and restricted distributions, and/or because they are associated with habitats that are declining in California. These species are inventoried in the CNDDB regardless of their legal status. Impacts on species of special concern may be considered significant.

California Department of Fish and Wildlife /California Native Plant Society Species Designations

CNPS is a statewide nonprofit organization that seeks to increase understanding of California's native flora and to preserve this rich resource for future generations. CDFW and CNPS assign rare plant ranks through the collaborative efforts of the Rare Plant Status Review Group composed of over 300 botanical experts from government, academia, nongovernment organizations, and the private sector and managed jointly by CDFW and CNPS. California native plants meeting the rarity or endangerment criteria are assigned a CRPR. These plants were formerly referred to as CNPS listed species; however, in March 2010, CDFW adopted the name CRPR for the rarity and endangerment categories to eliminate the false impression that these assignments are the exclusive work of CNPS and that CNPS has had undue influence over the regulatory process. CRPR 1 and 2 species generally qualify as endangered, rare, or threatened within the definition of State CEQA Guidelines (California Code of Regulations Section 15380). In general, CRPR 3 and 4 species do not meet the definition of endangered, rare, or threatened pursuant to CEQA Section 15380; however, these species may be evaluated by the lead agency on a case-by-case basis to determine significance criteria under CEQA.

Local

Shasta, Tehama, Glenn, Sutter, Sacramento, and Yolo counties and the cities of Redding, Colusa, and Sacramento have established codes and policies that address protection of natural resources, including vegetation, sensitive species, and trees, and are applicable to the project.

Shasta County's general plan emphasizes that the maintenance and enhancement of quality fish and wildlife habitat is critical to the recreation and tourism industry, and acknowledges that any adverse and prolonged decline of these resources could result in negative impacts on an otherwise vibrant industry. The general plan identifies efforts to protect and restore these habitats to sustain the long-term viability of the tourism and recreation industry (Shasta County 2004).

The City of Redding's general plan strives to strike a balance between development and conservation by implementing several measures such as creek-corridor protection, sensitive hillside development, habitat protection, and protection of prominent ridge lines that provide a backdrop to the city (City of Redding 2000).

Tehama County's general plan update provides an overarching guide to future development and establishes goals, policies, and implementation measures designed to address potential changes in county land use and development. The general plan identifies the importance of retaining agriculture as one of the primary uses of land in Tehama County.

Glenn County's general plan provides a comprehensive plan for growth and development in Glenn County for the next 20 years (2007–2027). This plan recognizes that public lands purchased for wildlife preservation generate economic activity as scientists and members of the public come to view and study remnant ecosystems (Glenn County 1993).

The City of Colusa's general plan seeks to promote its natural resources through increased awareness and improved public access (City of Colusa 2007).

Sutter County's general plan contains policies that generally address preservation of natural vegetation, including wetlands. It requires that new development mitigate the loss of Federally protected wetlands to achieve "no net loss," but it does not include any other specific requirements.

Sacramento County's general plan contains policies that promote protection of marsh and riparian areas, including specification of setbacks and "no net loss" of riparian woodland or marsh acreage (Sacramento County 1993). It also addresses the need to conserve vernal pools and ephemeral wetlands to ensure no net loss of vernal pool acreage. Several policies specifically promote protection of native oak trees, and, in some areas of the county, seek to ensure that there is no net loss of canopy area. The general plan for the County of Sacramento is currently under revision.

The City of Sacramento Municipal Code addresses the protection of trees within the city boundaries, including general protection of all trees on city property and specific protection of heritage trees.

Yolo County's general plan aims to provide an active and productive buffer of farmland and open space separating the Bay Area from Sacramento, and integrating green spaces into its communities.

Federal, State, and Local Programs and Projects

California Bay-Delta Authority

The California Bay-Delta Authority was established as a State agency in 2003 to oversee implementation of CALFED for the 25 Federal and State agencies

working cooperatively to improve the quality and reliability of California's water supplies while restoring the Bay-Delta ecosystem. The CALFED Ecosystem Restoration Program has provided a funding source for projects that include those involving acquisition of lands within the Sacramento River Conservation Area, initial baseline monitoring and preliminary restoration planning, and preparation of long-term habitat restoration management and monitoring plans.

Cantara Trustee Council

The Cantara Trustee Council administers a grant program that has provided funding for numerous environmental restoration projects in the primary study area, including programs in the Fall River watershed, Sulphur Creek, the upper Sacramento River, Middle Creek, lower Clear Creek, Battle Creek, Salt Creek, and Olney Creek. The Cantara Trustee Council is a potential local sponsor for future restoration actions in the primary study area. The Cantara Trustee Council includes representatives from CDFW, USFWS, the Central Valley RWQCB, California Sportfishing Protection Alliance, and Shasta Cascade Wonderland Association.

Resource Conservation Districts

Numerous resource conservation districts (RCD) are within the study area. Once known as soil conservation districts, RCDs were established under California law with a primary purpose to implement local conservation measures. Although RCDs are locally governed agencies with locally appointed, independent boards of directors, they often have close ties to county agencies and the National Resources Conservation Service. RCDs are empowered to conserve resources within their districts by implementing projects on public and private lands and to educate landowners and the public about resource conservation. They are often involved in the formation and coordination of watershed working groups and other conservation alliances. In the Shasta Lake and upper Sacramento River vicinity, districts include the Western Shasta County RCD and the Tehama County RCD. To the east are the Fall River and Pit River RCDs, and to the west and north are the Trinity County and Shasta Valley RCDs.

Riparian Habitat Joint Venture

The Riparian Habitat Joint Venture (RHJV) was initiated in 1994 and includes signatories from 18 Federal, State, and private agencies. The RHJV promotes conservation and the restoration of riparian habitat to support native bird population through three goals:

- Promote an understanding of the issues affecting riparian habitat through data collection and analysis.
- Double riparian habitat in California by funding and promoting on-the-ground conservation projects.

- Guide land managers and organizations to prioritize conservation actions.

RHJV conservation and action plans are documented in the Riparian Bird Conservation Plan (RHJV 2004). The conservation plan targets 14 "indicator" species of riparian-associated birds and provides recommendations for habitat protection, restoration, management, monitoring, and policy. The report notes habitat loss and degradation as one of the most important factors causing the decline of riparian birds in California. The RHJV has participated in monitoring efforts within the Sacramento National Wildlife Refuge Complex and other conservation areas. The RHJV's conservation plan identifies lower Clear Creek as a prime breeding area for yellow warblers and song sparrows, advocating a continuous riparian corridor along lower Clear Creek. Other recommendations of the conservation plan apply to the North Delta Offstream Storage Investigation study area in general.

Sacramento River Advisory Council

In 1986 the California Legislature passed Senate Bill (SB) 1086, which called for a management plan for the Sacramento River and its tributaries to protect, restore, and enhance fisheries and riparian habitat in an area stretching from the confluence of the Sacramento River with the Feather River and continuing northward to Keswick Dam, about 4 miles north of Redding. The law established an advisory council that included representatives of Federal and State agencies, county supervisors, and representatives of landowners, water contractors, commercial and sport fisheries, and general wildlife and conservation interests. Responsibilities of the advisory council included development of the Sacramento River Conservation Area Forum Handbook to guide management of riparian habitat and agricultural uses along the river (Resources Agency 2003). This action also resulted in formation in May 2000 of the Sacramento River Conservation Area (SRCA) Forum, a nonprofit, public benefit corporation with a board of directors that includes private landowners and public interest representatives from a seven-county area, an appointee of the California Resources Agency, and ex-officio members from six Federal and State resource agencies. The work of the organization is generally focused on planning actions and river management within the SRCA planning area.

Sacramento River Conservation Area Program

SB 1086 called for a management plan for the Sacramento River and its tributaries to protect, restore, and enhance both fisheries and riparian habitat. The SRCA Program has an overall goal of preserving remaining riparian habitat and reestablishing a continuous riparian ecosystem along the Sacramento River between Redding and Chico, and reestablishing riparian vegetation along the river from Chico to Verona. The program is to be accomplished through an incentive-based, voluntary river management plan. The Upper Sacramento River Fisheries and Riparian Habitat Management Plan(Resources Agency 1989), identifies specific actions to help restore the Sacramento River fishery and riparian habitat between the Feather River and Keswick Dam. The

Sacramento River Conservation Area Forum Handbook (Resources Agency 2003) is a guide to implementing the program. The Keswick Dam–to–Red Bluff portion of the conservation area includes areas within the 100-year floodplain, existing riparian bottomlands, and areas of contiguous valley oak woodland, totaling approximately 22,000 acres. The 1989 fisheries restoration plan recommended several actions specific to the extended study area:

- Fish passage improvements at RBPP (partially complete)
- Modification of the Spring Creek Tunnel intake for temperature control (completed)
- Spawning gravel replacement program (ongoing)
- Development of side-channel spawning areas, such as those at Turtle Bay in Redding (ongoing)
- Structural modifications to Anderson-Cottonwood Irrigation District Dam to eliminate short-term flow fluctuations (completed)
- Maintaining instream flows through coordinated operation of water facilities (ongoing)
- Improvements at Coleman National Fish Hatchery (partially complete)
- Measures to reduce acute toxicity caused by acid mine drainage and heavy metals (ongoing)
- Various fisheries improvements on Clear Creek (partially complete)
- Flow increases, fish screens, and revised gravel removal practices on Battle Creek (beginning summer 2006)
- Control of gravel mining, improvements of spawning areas, improvements of land management practices in the watershed, and protection and restoration of riparian vegetation along Cottonwood Creek

Sacramento River National Wildlife Refuge

The Sacramento River National Wildlife Refuge (SRNWR) is composed of many units between the cities of Red Bluff and Princeton. The SRNWR along the middle Sacramento River is part of the Sacramento National Wildlife Refuge Complex, consisting of five refuges and three wildlife management areas within the Sacramento Valley. Reaches and subreaches of the river are delineated based generally on transitions in fluvial geomorphic riverine conditions, although county boundaries were considered as well. The middle Sacramento River region between Red Bluff and Colusa includes three units

within the Chico Landing Subreach that contain restoration project sites addressed in the Sacramento River–Chico Landing Subreach Habitat Restoration Draft Environmental Impact Report (CBDA 2005). In addition, three areas proposed for restoration in this area occur within the larger SRNWR units that were evaluated in the Environmental Assessment for Proposed Restoration Activities on the Sacramento River National Wildlife Refuge (USFWS 2001; CBDA 2005).

In June 2005, USFWS issued the Sacramento River National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment and Finding of No Significant Impact (USFWS 2005) to serve as an integrated management plan for land that it acquires and manages for inclusion in the SRNWR. The SRNWR final comprehensive conservation plan includes goals, objectives, and strategies to guide management of lands within the SRNWR. It also includes assessments of and establishes parameters for "compatible uses," which are uses that are considered compatible with the primary purposes for which the area was established. Riparian habitat restoration projects are being implemented under cooperative agreements between USFWS and other entities such as The Nature Conservancy (TNC) in accordance with the SRNWR final comprehensive conservation plan.

Sacramento River Preservation Trust

The Sacramento River Preservation Trust is a private, nonprofit organization active in environmental education and advocacy to preserve the natural environmental values of the Sacramento River. The trust has participated in various conservation and land acquisition projects, including securing lands for the SRNWR. The group is pursuing designation of a portion of the Sacramento River between Redding and Red Bluff as a national conservation area.

Sacramento River Watershed Program

The Sacramento River Watershed Program is an effort to bring stakeholders together to share information and work together to address water quality and other water-related issues within the Sacramento River watershed. The group is funded congressionally through the U.S. Environmental Protection Agency. The program's primary goal is "to ensure that current and potential uses of Sacramento River watershed resources are sustained, restored, and where possible, enhanced while promoting the long-term social and economic vitality of the region." The Sacramento River Watershed Program manages grants for the Sacramento River Toxic Pollutants Control Program; performs extensive water quality monitoring, data collection, and data management for the watershed; and is instrumental in the study and monitoring of toxic pollutants. Although the program does not implement restoration projects, it is a potential partner for coordinating research and monitoring through consensus-based collaborative partnerships and promoting mutual education among the stakeholders of the Sacramento River watershed.

Sacramento Watersheds Action Group

The Sacramento Watersheds Action Group (SWAG) is a nonprofit corporation that secures funding for, designs, and implements projects that provide watershed restoration, streambank and slope stabilization, erosion control, watershed analysis, and road removal. SWAG has successfully worked with local groups, agencies, and organizations to fund and complete restoration projects on the Sacramento River and tributaries downstream from Keswick Dam. Their projects include development of the Sulphur Creek Watershed Analysis and Action Plan, the Whiskeytown Lake Shoreline Erosion Control Project, the Sulphur Creek Crossing Restoration Project, and the Lower Sulphur Creek Realignment and Riparian Habitat Enhancement Project. SWAG is a potential local sponsor for watershed restoration actions in the study area.

Shasta Land Trust

The Shasta Land Trust is a regional, nonprofit organization dedicated to conserving open space, wildlife habitat, and agricultural land. The trust works with public agencies and private landowners and is funded primarily through membership dues and donations. It employs various voluntary programs to protect and conserve valuable lands using conservation easements, land donations, and property acquisitions. The trust is a potential local partner for restoration activities in the Shasta Dam–to–Red Bluff area.

The Nature Conservancy

TNC is a private, nonprofit organization involved in environmental restoration and conservation throughout the United States and the world. TNC approaches environmental restoration primarily through strategic land acquisition from willing sellers and obtaining conservation easements. Some of the lands are retained by TNC for active restoration, research, or monitoring activities, while others are turned over to government agencies such as USFWS or CDFW for long-term management. Lower in the Sacramento River basin, TNC has been instrumental in acquiring and restoring lands in the SRNWR and managing several properties along the Sacramento River. It also has pursued conservation easements on various properties at tributary confluences, including Cottonwood and Battle Creeks.

The Trust for Public Land

The Trust for Public Land is a national, nonprofit organization involved in preserving lands with natural, historic, cultural, or recreational value, primarily through conservation real estate. The trust's Western Rivers Program has been involved in conservation efforts along the Sacramento River between Redding and Red Bluff (BLM's Sacramento River Bend Management Area), Battle Creek, Paynes Creek, Inks Creek, and Fenwood Ranch in Shasta County. The group promotes public ownership of conservation lands to ensure public access and enjoyment.

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Chapter 2
Botanical Resources and Wetlands Attachments

This technical report includes the following attachments:

- Attachment 1, "Lists of All Special-Status Plant Species Known from or Potentially Present in the Primary and Extended Study Areas"
- Attachment 2, "List of Plant Species Observed in the Shasta Lake and Vicinity Portion of the Primary Study Area"
- Attachment 3, "Special-Status Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area"
- Attachment 4, "List of All Sensitive Plant Species in the Extended Study Area Reported to the CNDDB"
- Attachment 5, "Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread"

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Chapter 3
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Draft

Attachment 1
Lists of All Special-Status Plant Species Known from or Potentially Present in the Primary and Extended Study Areas

Botanical Resources and Wetlands Technical Report

Shasta Lake Water Resources Investigation, California

Prepared by:

United States Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

U.S. Department of the Interior
United States Department of the Interior **June 2013**

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1]

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
chaparral sand-verbena	*Abronia villosa* var. *aurita*	-	-	-	1B.1					X
San Diego thorn-mint	*Acanthomintha ilicifolia*	-	T	E	1B.1					X
California adolphia	*Adolphia californica*	-	-	-	2.1					X
Shaw's agave	*Agave shawii*	-	-	-	2.1					X
Shasta ageratina	*Ageratina shastensis*	-	Endemic	-	4	P	P			
Henderson's bent grass	*Agrostis hendersonii*	m	-	-	3.2		X			X
Hoover's bent grass	*Agrostis hooveri*	-	-	-	1B.2					X
mountain bent grass	*Agrostis humilis*	-	-	-	2.3					X
Jepson's onion	*Allium jepsonii*	-	-	-	1B.2					X
Yucaipa onion	*Allium marvinii*	-	-	-	1B.1					X
Munz' onion	*Allium munzii*	-	E	T	1B.1					X
Franciscan onion	*Allium peninsulare* var. *franciscanum*	-	-	-	1B.2					X
Sharsmith's onion	*Allium sharsmithiae*	m	-	-	1B.3					X
Spanish Needle onion	*Allium shevockii*	-	-	-	1B.3					X
three-bracted onion	*Allium tribracteatum*	-	-	-	1B.2					X
Rawhide Hill onion	*Allium tuolumnense*	m	-	-	1B.2					X
Sonoma alopecurus	*Alopecurus aequalis* var. *sonomensis*	m	E	-	1B.1					
San Diego bur-sage	*Ambrosia chenopodiifolia*	-	-	-	2.1					X
San Diego ambrosia	*Ambrosia pumila*	-	E	-	1B.1					X
large-flowered fiddleneck	*Amsinckia grandiflora*	m	E	E	1B.1					X
bent-flowered fiddleneck	*Amsinckia lunaris*	-	-	-	1B.2	X				X
Santa Ynez groundstar	*Ancistrocarphus keilii*	-	-	-	1B.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
slender silver-moss	*Anomobryum julaceum*	-	-	-	2.2					X
Deep Canyon snapdragon	*Antirrhinum cyathiferum*	-	-	-	2.3					X
dimorphic snapdragon	*Antirrhinum subcordatum*	m	-	-	4.3		P	P		P
aphanisma	*Aphanisma blitoides*	-	-	-	1B.2					X
pinyon rock cress	*Arabis dispar*	-	-	-	2.3					X
Johnston's rock cress	*Arabis johnstonii*	-	-	-	1B.2					X
Darwin rock cress	*Arabis pulchra* var. *munciensis*	-	-	-	2.3					X
Santa Cruz manzanita	*Arctostaphylos andersonii*	-	-	-	1B.2					X
Mt. Diablo manzanita	*Arctostaphylos auriculata*	m	-	-	1B.3				X	X
Baker's manzanita	*Arctostaphylos bakeri* ssp. *bakeri*	m	-	Rare	1B.1					
Arroyo de la Cruz manzanita	*Arctostaphylos cruzensis*	-	-	-	1B.2					X
Gabilan Mountains manzanita	*Arctostaphylos gabilanensis*	-	-	-	1B.2					X
Del Mar manzanita	*Arctostaphylos glandulosa* ssp. *crassifolia*	-	E	-	1B.1					X
Hooker's manzanita	*Arctostaphylos hookeri* ssp. *hookeri*	-	-	-	1B.2					X
Klamath manzanita	*Arctostaphylos klamathensis*	m	-	-	1B.2					
Mallory's manzanita	*Arctostaphylos malloryi*	-	-	-	4	P				

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Contra Costa manzanita	*Arctostaphylos manzanita* ssp. *Laevigata*	m	-	-	1B.2					X
Morro manzanita	*Arctostaphylos morroensis*	-	T	-	1B.1					X
Ione manzanita	*Arctostaphylos myrtifolia*	m	T	-	1B.2					X
Nissenan manzanita	*Arctostaphylos nissenana*	-	-	-	1B.2					X
Otay manzanita	*Arctostaphylos otayensis*	-	-	-	1B.2					X
Pajaro manzanita	*Arctostaphylos pajaroensis*	-	-	-	1B.1					X
pallid manzanita	*Arctostaphylos pallida*	m	T	E	1B.1					X
Peninsular manzanita	*Arctostaphylos peninsularis* ssp. *peninsularis*	-	-	-	2.3					X
La Purisima manzanita	*Arctostaphylos purissima*	-	-	-	1B.1					X
Rainbow manzanita	*Arctostaphylos rainbowensis*	-	-	-	1B.1					X
Refugio manzanita	*Arctostaphylos refugioensis*	-	-	-	1B.2					X
Kings Mountain manzanita	*Arctostaphylos regismontana*	-	-	-	1B.2					X
sand mesa manzanita	*Arctostaphylos rudis*	-	-	-	1B.2					X
Eastwood's manzanita	*Arctostaphylos tomentosa* ssp. *Eastwoodiana*	-	-	-	1B.1					X
Kusche's sandwort	*Arenaria macradenia* var. *kuschei*	-	-	-	1B.1					X
marsh sandwort	*Arenaria paludicola*	-	E	E	1B.1					X
Shasta County arnica	*Arnica venosa*	-	Endemic	-	4	P	P			

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Greata's aster	*Aster greatae*	-	-	-	1B.3					X
Suisun Marsh aster	*Aster lentus*	R	-	-	1B.2					X
Braunton's milk-vetch	*Astragalus brauntonii*	-	E	-	1B.1					X
Dean's milk-vetch	*Astragalus deanei*	-	-	-	1B.1					X
Miles' milk-vetch	*Astragalus didymocarpus* var. *milesianus*	-	-	-	1B.2					X
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	-	E	-	1B.2					X
Big Bear Valley woollypod	*Astragalus leucolobus*	m	-	-	1B.2					X
San Diego milk-vetch	*Astragalus oocarpus*	-	-	-	1B.2					X
Jaeger's milk-vetch	*Astragalus pachypus* var. *jaegeri*	-	-	-	1B.1					X
Depauperate milk-vetch	*Astragalus pauperculus*	-	-	-	4	P				
Lancaster milk-vetch	*Astragalus preussii* var. *laxiflorus*	-	-	-	1B.1					X
Ventura Marsh milk-vetch	*Astragalus pycnostachyus* var. *lanosissimus*	-	E	E	1B.1					X
Jepson's milk-vetch	*Astragalus rattanii* var. *jepsonianus*	m	-	-	1B.2					X
Ferris' milk-vetch	*Astragalus tener* var. *ferrisiae*	m	-	-	1B.1			X	X	X
alkali milk-vetch	*Astragalus tener* var. *tener*	r	-	-	1B.2				X	X
coastal dunes milk-vetch	*Astragalus tener* var. *titi*	-	E	E	1B.1					X
triple-ribbed milk-vetch	*Astragalus tricarinatus*	-	E	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
heartscale	*Atriplex cordulata*	m	-	-	1B.2			X	X	X
San Jacinto Valley crownscale	*Atriplex coronata* var. *notatior*	-	E	-	1B.1					X
Coulter's saltbush	*Atriplex coulteri*	-	-	-	1B.2					X
brittlescale	*Atriplex depressa*	m	-	-	1B.2			X	X	X
Earlimart orache	*Atriplex erecticaulis*	-	-	-	1B.2					X
San Joaquin spearscale	*Atriplex joaquiniana*	m	-	-	1B.2			X	X	X
lesser saltscale	*Atriplex minuscula*	m	-	-	1B.1			X		X
South Coast saltscale	*Atriplex pacifica*	-	-	-	1B.2					X
Parish's brittlescale	*Atriplex parishii*	-	-	-	1B.1					X
vernal pool smallscale	*Atriplex persistens*	m	-	-	1B.2					X
Davidson's saltscale	*Atriplex serenana* var. *davidsonii*	-	-	-	1B.2					X
subtle orache	*Atriplex subtilis*	-	-	-	1B.2					X
Bakersfield smallscale	*Atriplex tularensis*	-	-	E	1B.1					X
Lost Hills crownscale	*Atriplex vallicola*	m	-	-	1B.2					X
ayenia	*Ayenia compacta*	-	-	-	2.3					X
Malibu baccharis	*Baccharis malibuensis*	-	-	-	1B.1					X
Encinitas baccharis	*Baccharis vanessae*	-	T	E	1B.1					X
big-scale balsamroot	*Balsamorhiza macrolepis* var. *macrolepis*	-	-	-	1B.2					X
Nevin's barberry	*Berberis nevinii*	-	E	E	1B.1					X
golden-spined cereus	*Bergerocactus emoryi*	-	-	-	2.2					X
Sonoma sunshine	*Blennosperma bakeri*	m	E	E	1B.1					
big tarplant	*Blepharizonia plumosa*	m	-	-	1B.1				X	X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
moonwort, grape-fern	*Botrychium* subgenus *Botrychium*	-	S	-	-	P				
scalloped moonwort	*Botrychium crenulatum*	-	S	-	2.2	P				
Indian Valley brodiaea	*Brodiaea coronaria* ssp. *Rosea*	m	-	E	1B.1					X
thread-leaved brodiaea	*Brodiaea filifolia*	-	T	E	1B.1					X
Orcutt's brodiaea	*Brodiaea orcuttii*	-	-	-	1B.1					X
Chinese Camp brodiaea	*Brodiaea pallida*	m	T	E	1B.1					X
Bolander's bruchia	*Bruchia bolanderi*	-	-	-	2.2					X
elephant tree	*Bursera microphylla*	-	-	-	2.3					X
green bug moss	*Buxbaumia virdis*	-	S	-	-	P				
round-leaved filaree	*California macrophylla*	-	-	-	1B.1				X	X
Pleasant Valley mariposa lily	*Calochortus clavatus* var. *avius*	-	-	-	1B.2					X
slender mariposa lily	*Calochortus clavatus* var. *gracilis*	-	-	-	1B.2					X
Dunn's mariposa lily	*Calochortus dunnii*	-	-	Rare	1B.2					X
long-haired star-tulip	*Calochortus longebarbatus* var. *longebarbatus*	-	S	-	1B.2	P				
Munz' mariposa lily	*Calochortus palmeri* var. *Munzii*	-	-	-	1B.2					X
Palmer's mariposa lily	*Calochortus palmeri* var. *palmeri*	-	-	-	1B.2					X
Plummer's mariposa lily	*Calochortus plummerae*	-	-	-	1B.2					X
Mt. Diablo fairy-lantern	*Calochortus pulchellus*	m	-	-	1B.2					X
alkali mariposa lily	*Calochortus striatus*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Callahan's mariposa lily	*Calochortus syntrophus*	-	-	-	3	P				
Tiburon mariposa lily	*Calochortus tiburonensis*	m	T	T	1B.1					
intermediate mariposa lily	*Calochortus weedii* var. *intermedius*	-	-	-	1B.2					X
late-flowered mariposa lily	*Calochortus weedii* var. *vestus*	-	-	-	1B.2					X
Hoover's calycadenia	*Calycadenia hooveri*	-	-	-	1B.3					X
Butte County morning-glory	*Calystegia atriplicifolia* spp. *buttensis*	-	-	-	1B.2	P				
coastal bluff morning-glory	*Calystegia purpurata* ssp. *saxicola*	-	-	-	1B.2					X
Santa Barbara morning-glory	*Calystegia sepium* ssp. *binghamiae*	-	-	-	1A					X
Stebbins' morning-glory	*Calystegia stebbinsii*	m	E	E	1B.1					X
San Benito evening-primrose	*Camissonia benitensis*	m	T	-	1B.1					X
chaparral harebell	*Campanula exigua*	-	-	-	1B.2					X
Sharsmith's harebell	*Campanula sharsmithiae*	m	-	-	1B.2					X
Castle Crags harebell	*Campanula shelteri*	-	-	-	1B.3	P				
Wilkin's bellflowero	*Campanula wilkinsiana*	-	S	-	1B.2					
white sedge	*Carex albida*	m	E	E	1B.1					
Buxbaum's sedge	*Carex buxbaumii*	-	-	-	4	P				
bristly sedge	*Carex comosa*	r	-	-	2.1	P			X	X
pointed broom sedge	*Carex scoparia*	-	-	-	2.2					X
Sheldon's sedge	*Carex sheldonii*	-	-	-	2.2					X
fox sedge	*Carex vulpinoidea*	-	-	-	2.2	P	X	X	X	X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
tree-anemone	*Carpenteria californica*	m	-	T	1B.1					
Tiburon Indian paintbrush	*Castilleja affinis* ssp. *neglecta*	m	E	T	1B.2					X
succulent owl's-clover	*Castilleja campestris* ssp. *succulenta*	m	T	E	1B.2					X
Mt. Gleason Indian paintbrush	*Castilleja gleasonii*	-	-	Rare	1B.2					X
San Bernardino Mountains owl's-clover	*Castilleja lasiorhyncha*	-	-	-	1B.2					X
pink creamsacs	*Castilleja rubicundula* ssp. *Rubicundula*	-	-	-	1B.2					X
California jewel-flower	*Caulanthus californicus*	-	E	E	1B.1					X
Lemmon's jewelflower	*Caulanthus coulteri* var. *lemmonii*	-	-	-	1B.2					X
Lakeside ceanothus	*Ceanothus cyaneus*	-	-	-	1B.2					X
Coyote ceanothus	*Ceanothus ferrisiae*	-	E	-	1B.1					X
Mason's ceanothus	*Ceanothus masonii*	m	-	Rare	1B.1					
Vail Lake ceanothus	*Ceanothus ophiochilus*	-	T	E	1B.1					X
Otay Mountain ceanothus	*Ceanothus otayensis*	-	-	-	1B.2					X
Pine Hill ceanothus	*Ceanothus roderickii*	m	E	Rare	1B.2					X
wart-stemmed ceanothus	*Ceanothus verrucosus*	-	-	-	2.2					X
southern tarplant	*Centromadia parryi* ssp. *Australis*	-	-	-	1B.1					X
Congdon's tarplant	*Centromadia parryi* ssp. *Congdonii*	m	-	-	1B.2					X
pappose tarplant	*Centromadia parryi* ssp. *Parryi*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
smooth tarplant	*Centromadia pungens* ssp. *Laevis*	-	-	-	1B.1					X
alpine dusty maidens	*Chaenactis douglasii* var. *alpine*	-	-	-	2.3					X
Orcutt's pincushion	*Chaenactis glabriuscula* var. *orcuttiana*	-	-	-	1B.1					X
Parish's chaenactis	*Chaenactis parishii*	-	-	-	1B.3					X
Shasta chaenactis	*Chaenactis suffrutescens*	-	S	-	1B.3	P				
Arizona spurge	*Chamaesyce arizonica*	-	-	-	2.3					X
Hoover's spurge	*Chamaesyce hooveri*	m	T	-	1B.2			X		X
Stony Creek spurge	*Chamaesyce ocellata* ssp. *rattanii*	-	-	-	1B.2					X
flat-seeded spurge	*Chamaesyce platysperma*	-	-	-	1B.2					X
Red Hills soaproot	*Chlorogalum grandiflorum*	-	-	-	1B.2					X
dwarf soaproot	*Chlorogalum pomeridianum var. minus*	m	-	-	1B.2		P	P		P
San Benito spineflower	*Chorizanthe biloba* var. *immemora*	-	-	-	1B.2					X
San Francisco Bay spineflower	*Chorizanthe cuspidata* var. *cuspidata*	-	-	-	1B.2					X
Orcutt's spineflower	*Chorizanthe orcuttiana*	-	E	E	1B.1					X
San Fernando Valley spineflower	*Chorizanthe parryi* var. *fernandina*	-	C	E	1B.1					X
Parry's spineflower	*Chorizanthe parryi* var. *parryi*	-	-	-	3.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
long-spined spineflower	*Chorizanthe polygonoides* var. *longispina*	-	-	-	1B.2					X
Monterey spineflower	*Chorizanthe pungens* var. *pungens*	-	T	-	1B.2					X
straight-awned spineflower	*Chorizanthe rectispina*	-	-	-	1B.3					X
robust spineflower	*Chorizanthe robusta* var. *robusta*	-	E	-	1B.1					X
Sonoma spineflower	*Chorizanthe valida*	m	E	E	1B.2					
white-bracted spineflower	*Chorizanthe xanti* var. *leucotheca*	-	-	-	1B.2					X
Franciscan thistle	*Cirsium andrewsii*	-	-	-	1B.2					X
slough thistle	*Cirsium crassicaule*	m	-	-	1B.1				X	X
Mt. Hamilton thistle	*Cirsium fontinale* var. *campylon*	-	-	-	1B.2					X
Suisun thistle	*Cirsium hydrophilum* var. *hydrophilum*	R	E	-	1B.1				P	P
La Graciosa thistle	*Cirsium loncholepis*	-	E	T	1B.1					X
lost thistle	*Cirsium praeteriens*	-	-	-	1A					X
Surf thistle	*Cirsium rhothophilum*	-	-	T	1B.2					X
Small's southern clarkia	*Clarkia australis*	-	-	-	1B.2					X
Mariposa clarkia	*Clarkia biloba* ssp. *Australis*	m	-	-	1B.2					P
Brandegee's clarkia	*Clarkia biloba* ssp. *Brandegeeae*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Shasta clarkia	*Clarkia borealis* ssp. *Arida*	m	-	-	1B	P				
northern clarkia	*Clarkia borealis* ssp. *Borealis*	-	-	-	1B.3	P				X
delicate clarkia	*Clarkia delicata*	-	-	-	1B.2					X
Presidio clarkia	*Clarkia franciscana*	-	E	E	1B.1					X
beaked clarkia	*Clarkia rostrata*	m	-	-	1B.3					X
Pismo clarkia	*Clarkia speciosa* ssp. *Immaculata*	-	E	Rare	1B.1					X
Vasek's clarkia	*Clarkia tembloriensis* ssp. *Calientensis*	-	-	-	1B.1					X
San Francisco collinsia	*Collinsia multicolor*	-	-	-	1B.2					X
summer holly	*Comarostaphylis diversifolia* ssp. *diversifolia*	-	-	-	1B.2					X
salt marsh bird's-beak	*Cordylanthus maritimus* ssp. *maritimus*	-	E	E	1B.2					X
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	r	-	-	1B.2					X
hispid bird's-beak	*Cordylanthus mollis* ssp. *hispidus*	m	-	-	1B.1					X
soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*	R	E	Rare	1B.2				X	X
Mt. Diablo bird's-beak	*Cordylanthus nidularis*	m	-	Rare	1B.1					
Orcutt's bird's-beak	*Cordylanthus orcuttianus*	-	-	-	2.1					X
palmate-bracted bird's-beak	*Cordylanthus palmatus*	m	E	E	1B.1			X	X	X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
seaside bird's-beak	*Cordylanthus rigidus* ssp. *littoralis*	-	-	E	1B.1					X
Mt. Hamilton coreopsis	*Coreopsis hamiltonii*	m	-	-	1B.2					X
sea dahlia	*Coreopsis maritima*	-	-	-	2.2					X
San Diego sand aster	*Corethrogyne filaginifolia* var. *incana*	-	-	-	1B.1					X
Del Mar Mesa sand aster	*Corethrogyne filaginifolia* var. *linifolia*	-	-	-	1B.1					X
Catalina crossosoma	*Crossosoma californicum*	-	-	-	1B.2					X
Clokey's cryptantha	*Cryptantha clokeyi*	-	-	-	1B.1					X
silky cryptantha	*Cryptantha crinita*	m	-	-	1B.2	P	X	X		X
subalpine cryptantha	*Cryptantha crymophila*	-	-	-	1B.3					X
Hoover's cryptantha	*Cryptantha hooveri*	-	-	-	1A				X	X
Mariposa cryptantha	*Cryptantha mariposae*	-	-	-	1B.3					X
Tecate cypress	*Cupressus forbesii*	-	-	-	1B.1					X
desert cymopterus	*Cymopterus deserticola*	-	-	-	1B.2					X
California lady's slipper	*Cypripedium californicum*	-	-	-	4	P				
Clustered lady's slipper	*Cypripedium fasciculatum*	-	SM	-	4	P				
Mountain lady's slipper	*Cypripedium montanum*	-	SM	-	4	P	P			
Red Rock tarplant	*Deinandra arida*	-	-	Rare	1B.2					X
Livermore tarplant	*Deinandra bacigalupii*	-	-	-	1B.2					X
Otay tarplant	*Deinandra conjugens*	-	T	E	1B.1					X
Hall's tarplant	*Deinandra halliana*	m	-	-	1B.1					X
leafy tarplant	*Deinandra increscens* ssp. *Foliosa*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Santa Susana tarplant	*Deinandra minthornii*	-	-	Rare	1B.2					X
Mojave tarplant	*Deinandra mohavensis*	-	-	E	1B.3					X
Baker's larkspur	*Delphinium bakeri*	m	E	E	1B.1					
Hospital Canyon larkspur	*Delphinium californicum* ssp. *Interius*	m	-	-	1B.2					X
yellow larkspur	*Delphinium luteum*	m	E	Rare	1B.1					
dune larkspur	*Delphinium parryi* ssp. *blochmaniae*	-	-	-	1B.2					X
recurved larkspur	*Delphinium recurvatum*	m	-	-	1B.2				X	X
umbrella larkspur	*Delphinium umbraculorum*	-	-	-	1B.3					X
Norris' beard-moss	*Didymodon norrisii*	-	-	-	2.2					X
western leatherwood	*Dirca occidentalis*	-	-	-	1B.2					X
glandular ditaxis	*Ditaxis claryana*	-	-	-	2.2					X
California ditaxis	*Ditaxis serrata* var. *californica*	-	-	-	3.2					X
beach spectaclepod	*Dithyrea maritima*	-	-	T	1B.1					X
slender-horned spineflower	*Dodecahema leptoceras*	-	E	E	1B.1					X
dwarf downingia	*Downingia pusilla*	-	-	-	2.2		P		X	X
rock draba	*Draba corrugata* var. *saxosa*	-	-	-	1B.3					X
San Bernardino Mountains dudleya	*Dudleya abramsii* ssp. *affinis*	-	-	-	1B.2					X
Orcutt's dudleya	*Dudleya attenuata* ssp. *orcuttii*	-	-	-	2.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Blochman's dudleya	*Dudleya blochmaniae* ssp. *blochmaniae*	-	-	-	1B.1					X
short-leaved dudleya	*Dudleya brevifolia*	-	-	E	1B.1					X
Agoura Hills dudleya	*Dudleya cymosa* ssp. *agourensis*	-	T	-	1B.2					X
San Gabriel River dudleya	*Dudleya cymosa* ssp. *crebrifolia*	-	-	-	1B.2					X
marcescent dudleya	*Dudleya cymosa* ssp. *marcescens*	-	T	Rare	1B.2					X
Santa Monica Mountains dudleya	*Dudleya cymosa* ssp. *ovatifolia*	-	T	-	1B.2					X
San Gabriel Mountains dudleya	*Dudleya densiflora*	-	-	-	1B.1					X
many-stemmed dudleya	*Dudleya multicaulis*	-	-	-	1B.2					X
Conejo dudleya	*Dudleya parva*	-	T	-	1B.2					X
Santa Clara Valley dudleya	*Dudleya setchellii*	-	E	-	1B.1					X
Laguna Beach dudleya	*Dudleya stolonifera*	-	T	T	1B.1					X
variegated dudleya	*Dudleya variegata*	-	-	-	1B.2					X
Verity's dudleya	*Dudleya verityi*	-	T	-	1B.2					X
island green dudleya	*Dudleya virens* ssp. *Insularis*	-	-	-	1B.2					X
sticky dudleya	*Dudleya viscida*	-	-	-	1B.2					X
Four-angled spikerush[4]	*Eleocharis quadrangulata*	m	-	-	2	P	P			
Grants Pass willowherb	*Epilobium oreganum*	-	S	-	1B.2	P				
Kern mallow	*Eremalche kernensis*	-	E	-	1B.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Brandegee's eriastrum	*Eriastrum brandegeeae*	m	-	-	1B.2	P				X
Santa Ana River woollystar	*Eriastrum densifolium* ssp. *sanctorum*	-	E	E	1B.1					X
Hoover's eriastrum	*Eriastrum hooveri*	m	Delisted	-	4.2					P
Tracy's eriastrum	*Eriastrum tracyi*	-	-	Rare	1B.2					X
Eastwood's goldenbush	*Ericameria fasciculata*	-	-	-	1B.1					X
Palmer's goldenbush	*Ericameria palmeri* ssp. *palmeri*	-	-	-	2.2					X
Blochman's leafy daisy	*Erigeron blochmaniae*	-	-	-	1B.2					X
Lompoc yerba santa	*Eriodictyon capitatum*	-	E	Rare	1B.2					X
Trinity buckwheat	*Eriogonum alpinum*	-	S	E	1B.2	P				
Ione buckwheat	*Eriogonum apricum* var. *prostratum*	m	E	E	1B.1					
Conejo buckwheat	*Eriogonum crocatum*	-	-	Rare	1B.2					X
leafy buckwheat	*Eriogonum foliosum*	-	-	-	1B.2					X
southern alpine buckwheat	*Eriogonum kennedyi* var. *alpigenum*	-	-	-	1B.3					X
Pinnacles buckwheat	*Eriogonum nortonii*	-	-	-	1B.3					X
Ben Lomond buckwheat	*Eriogonum nudum* var. *decurrens*	m	-	-	1B.1					X
Temblor buckwheat	*Eriogonum temblorense*	-	-	-	1B.2					X
Mt. Diablo buckwheat	*Eriogonum truncatum*	-	-	-	1B.1				X	X
Barstow woolly sunflower	*Eriophyllum mohavense*	-	-	-	1B.2					X
Hoover's button-celery	*Eryngium aristulatum* var. *hooveri*	-	-	-	1B.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
San Diego button-celery	*Eryngium aristulatum* var. *parishii*	-	E	E	1B.1					X
Loch Lomond button-celery	*Eryngium constancei*	m	E	E	1B.1					
Pendleton button-celery	*Eryngium pendletonensis*	-	-	-	1B.1					X
Tuolumne button-celery	*Eryngium pinnatisectum*	-	-	-	1B.2					X
Delta button-celery	*Eryngium racemosum*	r	-	E	1B.1				X	X
spiny-sepaled button-celery	*Eryngium spinosepalum*	m	-	-	1B.2					X
coast wallflower	*Erysimum ammophilum*	-	-	-	1B.2					X
Contra Costa wallflower	*Erysimum capitatum* ssp. *angustatum*	R	E	E	1B.1				X	X
Yadon's wallflower	*Erysimum menziesii* ssp. *yadonii*	-	E	E	1B.1					X
Roderick's fawnlily	*Erythronium citrinum* var. *roderickii*	-	S	-	1B.3	P				
Tuolumne fawn lily	*Erythronium tuolumnense*	-	-	-	1B.2					X
Tejon poppy	*Eschscholzia lemmonii* ssp. *kernensis*	-	-	-	1B.1					X
Red Rock poppy	*Eschscholzia minutiflora* ssp. *twisselmannii*	-	-	-	1B.2					X
diamond-petaled California poppy	*Eschscholzia rhombipetala*	m	-	-	1B.1				X	X
cliff spurge	*Euphorbia misera*	-	-	-	2.2					X
San Diego barrel cactus	*Ferocactus viridescens*	-	-	-	2.1					X
hot springs fimbristylis	*Fimbristylis thermalis*	-	-	-	2.2					X
Palmer's frankenia	*Frankenia palmeri*	-	-	-	2.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Pine Hill flannelbush	*Fremontodendron decumbens*	m	E	Rare	1B.2					X
Mexican flannelbush	*Fremontodendron mexicanum*	-	E	Rare	1B.1					X
Butte County fritillary	*Fritillaria eastwoodiae*	-	S	-	3.2	P	P			X
talus fritillary	*Fritillaria falcata*	-	-	-	1B.2					X
fragrant fritillary	*Fritillaria liliacea*	-	-	-	1B.2				X	X
Ojai fritillary	*Fritillaria ojaiensis*	-	-	-	1B.2					X
adobe-lily	*Fritillaria pluriflora*	m	-	-	1B.2		P	X		X
striped adobe-lily	*Fritillaria striata*	-	-	T	1B.1					X
San Benito fritillary	*Fritillaria viridea*	-	-	-	1B.2					X
San Jacinto Mountains bedstraw	*Galium angustifolium* ssp. *Jacinticum*	-	-	-	1B.3					X
California bedstraw	*Galium californicum* ssp. *Primum*	-	-	-	1B.2					X
El Dorado bedstraw	*Galium californicum* ssp. *Sierrae*	m	E	Rare	1B.2					X
San Gabriel bedstraw	*Galium grande*	-	-	-	1B.2					X
Campbell's liverwort	*Geothallus tuberosus*	-	-	-	1B.1					X
sand gilia	*Gilia tenuiflora* ssp. *Arenaria*	-	E	T	1B.2					X
Mission Canyon bluecup	*Githopsis diffusa* ssp. *Filicaulis*	-	-	-	3.1					X
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	m	-	E	1B.2		P		X	X
Orcutt's hazardia	*Hazardia orcuttii*	-	C	T	1B.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Diablo helianthella	*Helianthella castanea*	m	-	-	1B.2					X
Bisbee Peak rush-rose	*Helianthemum suffrutescens*	-	-	-	3.2					X
Los Angeles sunflower	*Helianthus nuttallii* ssp. *Parishii*	-	-	-	1A					X
two-carpellate western flax	*Hesperolinon bicarpellatum*	-	-	-	1B.2					X
Brewer's western flax	*Hesperolinon breweri*	m	-	-	1B.2				X	X
Marin western flax	*Hesperolinon congestum*	m	T	T	1B.1					
drymaria-like western flax	*Hesperolinon drymarioides*	m	-	-	1B.2					P
Napa western flax	*Hesperolinon* sp. *Nov. "serpentinum"*	m	-	-	1B.1					X
Tehama County western flax	*Hesperolinon tehamense*	m	-	-	1B.3					X
shaggy-haired alumroot	*Heuchera hirsutissima*	-	-	-	1B.3					X
rose-mallow	*Hibiscus lasiocarpus*	m	-	-	2.2		P	X	X	X
Loma Prieta hoita	*Hoita strobilina*	-	-	-	1B.1					X
Santa Cruz tarplant	*Holocarpha macradenia*	m	T	E	1B.1					X
Bolander's horkelia	*Horkelia bolanderi*	-	-	-	1B.2					X
mesa horkelia	*Horkelia cuneata* ssp. *puberula*	-	-	-	1B.1					X
Kellogg's horkelia	*Horkelia cuneata* ssp. *sericea*	-	-	-	1B.1					X
Parry's horkelia	*Horkelia parryi*	m	-	-	1B.2					X
Ramona horkelia	*Horkelia truncata*	-	-	-	1B.3					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Baker's globe mallow	*Iliamna bakeri*	-	S	-	4.2	P				
Tuolumne iris	*Iris hartwegii* ssp. *columbiana*	-	-	-	1B.2					X
Carquinez goldenbush	*Isocoma arguta*	m	-	-	1B.1				X	X
decumbent goldenbush	*Isocoma menziesii* var. *decumbens*	-	-	-	1B.2					X
San Diego marsh-elder	*Iva hayesiana*	-	-	-	2.2					X
silver-haired ivesia	*Ivesia argyrocoma*	-	-	-	1B.2					X
Castle Crags ivesia	*Ivesia longibracteata*	-	S	-	1B.3	P				
Northern California black walnut	*Juglans hindsii*	r	-	-	1B.1				X	X
Ahart's dwarf rush	*Juncus leiospermus* var. *ahartii*	m	-	-	1B.2		P			X
Red Bluff dwarf rush	*Juncus leiospermus* var. *leiospermus*	-	-	-	1B.1		X	X		X
Contra Costa goldfields	*Lasthenia conjugens*	m	E	-	1B.1				X	X
Coulter's goldfields	*Lasthenia glabrata* ssp. *coulteri*	-	-	-	1B.1					X
Delta tule pea	*Lathyrus jepsonii* var. *jepsonii*	r	-	-	1B.2				X	X
Dubious pea	*Lathyrus sulphureus* var. *argillaceous*	-	-	-	3	P	P			
rayless layia	*Layia discoidea*	-	-	-	1B.1					X
pale-yellow layia	*Layia heterotricha*	m	-	-	1B.1					X
Jones' layia	*Layia jonesii*	-	-	-	1B.2					X
Comanche Point layia	*Layia leucopappa*	-	-	-	1B.1					X
Munz' tidy-tips	*Layia munzii*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Colusa layia	*Layia septentrionalis*	-	-	-	1B.2					X
legenere	*Legenere limosa*	m	-	-	1B.1		P		X	X
heart-leaved pitcher sage	*Lepechinia cardiophylla*	-	-	-	1B.2					X
Gander's pitcher sage	*Lepechinia ganderi*	-	-	-	1B.3					X
Panoche pepper-grass	*Lepidium jaredii* ssp. *album*	m	-	-	1B.2					X
Heckard's pepper-grass	*Lepidium latipes* var. *heckardii*	m	-	-	1B.2			X	X	X
Robinson's pepper-grass	*Lepidium virginicum* var. *robinsonii*	-	-	-	1B.2					X
Santa Rosa Mountains leptosiphon	*Leptosiphon floribundus* ssp. *Hallii*	-	-	-	1B.3					X
Madera leptosiphon	*Leptosiphon serrulatus*	m	-	-	1B.2					X
smooth lessingia	*Lessingia micradenia* var. *glabrata*	-	-	-	1B.2					X
Cantelow's lewisia	*Lewisia cantelovii*	-	S	-	1B.2	X				X
Howell's lewisia	*Lewisia cotyledon* var. *howellii*	-	-	-	3	P				
saw-toothed lewisia	*Lewisia serrata*	m	-	-	1B.1					P
Mason's lilaeopsis	*Lilaeopsis masonii*	R	-	Rare	1B.1				X	X
Pitkin Marsh lily	*Lilium pardalinum* ssp. *pitkinense*	m	E	E	1B.1					
lemon lily	*Lilium parryi*	-	-	-	1B.2					X
Bellinger's meadowfoam	*Limnanthes floccosa* ssp. *bellingeriana*	m	-	-	1B	P	P			
Butte County meadowfoam	*Limnanthes floccosa* ssp. *californica*	m	E	E	1B.1		P	P		P

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Parish's meadowfoam	*Limnanthes gracilis* ssp. *parishii*	-	-	E	1B.2					X
Sebastopol meadowfoam	*Limnanthese vinculans*	m	E	E	1B.1					
Delta mudwort	*Limosella subulata*	r	-	-	2.1				X	X
San Gabriel linanthus	*Linanthus concinnus*	-	-	-	1B.2					X
broad-lobed linanthus	*Linanthus latisectus*	-	-	-	4	P				
Little San Bernardino Mtns. Linanthus	*Linanthus maculatus*	-	-	-	1B.2					X
Mt. Tedoc linanthus	*Linanthus nutallii* ssp. *howellii*	m	-	-	1B.3	P				
Orcutt's linanthus	*Linanthus orcuttii*	-	-	-	1B.3					X
sagebrush loeflingia	*Loeflingia squarrosa* var. *artemisiarum*	-	-	-	2.2					X
Congdon's lomatium	*Lomatium congdonii*	m	-	-	1B.2					X
Mt. Hamilton lomatium	*Lomatium observatorium*	-	-	-	1B.2					X
Stebbins' lomatium	*Lomatium stebbinsii*	-	-	-	1B.1					X
Santa Barbara honeysuckle	*Lonicera subspicata* var. *subspicata*	-	-	-	1B.2					X
Nuttall's lotus	*Lotus nuttallianus*	-	-	-	1B.1					X
red-flowered lotus	*Lotus rubriflorus*	m	-	-	1B.1		P	P		P
Peirson's lupine	*Lupinus peirsonii*	-	-	-	1B.3					X
shaggyhair lupine	*Lupinus spectabilis*	m	-	-	1B.2					X
Santa Catalina Island desert-thorn	*Lycium brevipes* var. *hassei*	-	-	-	1B.1					X
Parish's desert-thorn	*Lycium parishii*	-	-	-	2.3					X
Ziegler's aster	*Machaeranthera canescens* var. *ziegleri*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
showy madia	*Madia radiata*	m	-	-	1B.1				X	X
Stebbins' madia	*Madia stebbinsii*	-	S	-	1B.2	P				
Indian Valley bush mallow	*Malacothamnus aboriginum*	-	-	-	1B.2					X
arcuate bush mallow	*Malacothamnus arcuatus*	-	-	-	1B.2					X
Davidson's bush mallow	*Malacothamnus davidsonii*	-	-	-	1B.2					X
Hall's bush mallow	*Malacothamnus hallii*	m	-	-	1B.2					X
Parish's bush mallow	*Malacothamnus parishii*	-	-	-	1A					X
Carmel Valley malacothrix	*Malacothrix saxatilis* var. *arachnoidea*	-	-	-	1B.2					X
California marina	*Marina orcuttii* var. *orcuttii*	-	-	-	1B.3					X
spearleaf	*Matelea parvifolia*	-	-	-	2.3					X
Oregon meconella	*Meconella oregana*	-	-	-	1B.1					X
creamy blazing star	*Mentzelia tridentata*	-	-	-	1B.3					X
marsh microseris	*Microseris paludosa*	-	-	-	1B.2					X
elongate copper-moss	*Mielichhoferia elongata*	-	-	-	2.2					X
calico monkeyflower	*Mimulus pictus*	-	-	-	1B.2					X
pansy monkeyflower	*Mimulus pulchellus*	-	-	-	1B.2					X
Whipple's monkeyflower	*Mimulus whipplei*	-	-	-	1A					X
peanut sandwort	*Minuartia rosei*	-	S	-	4.2	P				
light gray lichen	*Mobergia calculiformis*	-	-	-	(blank)					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
San Antonio Hills monardella	*Monardella antonina* ssp. *Antonina*	m	-	-	3					P
crisp monardella	*Monardella crispa*	-	-	-	1B.2					X
veiny monardella	*Monardella douglasii* ssp. *venosa*	-	-	-	1B.1					X
Follett's monardella	*Monardella follettii*	-	-	-	1B.2					X
San Luis Obispo monardella	*Monardella frutescens*	-	-	-	1B.2					X
felt-leaved monardella	*Monardella hypoleuca* ssp. *lanata*	-	-	-	1B.2					X
flax-like monardella	*Monardella linoides* ssp. *oblonga*	-	-	-	1B.3					X
Hall's monardella	*Monardella macrantha* ssp. *hallii*	-	-	-	1B.3					X
Pringle's monardella	*Monardella pringlei*	-	-	-	1A					X
Robison's monardella	*Monardella robisonii*	-	-	-	1B.3					X
robust monardella	*Monardella villosa* ssp. *Globosa*	-	-	-	1B.2					X
willowy monardella	*Monardella viminea*	-	E	E	1B.1					X
San Joaquin woollythreads	*Monolopia congdonii*	m	E	-	1B.2					X
San Diego goldenstar	*Muilla clevelandii*	-	-	-	1B.1					X
little mousetail	*Myosurus minimus* ssp. *Apus*	-	-	-	3.1					X
mud nama	*Nama stenocarpum*	-	-	-	2.2					X
Gambel's water cress	*Nasturtium gambelii*	-	E	T	1B.1					X
spreading navarretia	*Navarretia fossalis*	-	T	-	1B.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*	-	-	-	1B.1				X	X
few-flowered navarretia	*Navarretia leucocephala* ssp. *pauciflora*	m	E	T	1B.1					
many-flowered navarretia	*Navarretia leucocephala* ssp. *plieantha*	m	E	E	1B.2					
pincushion navarretia	*Navarretia myersii* ssp. *myersii*	m	-	-	1B.1					X
shining navarretia	*Navarretia nigelliformis* ssp. *radians*	-	-	-	1B.2					X
Baja navarretia	*Navarretia peninsularis*	-	-	-	1B.2					X
prostrate navarretia	*Navarretia prostrata*	-	-	-	1B.1					X
Piute Mountains navarretia	*Navarretia setiloba*	-	-	-	1B.1					X
awl-leaved navarretia	*Navarretia subuligera*	-	-	-	4	P				
coast woolly-heads	*Nemacaulis denudata* var. *denudata*	-	-	-	1B.2					X
slender woolly-heads	*Nemacaulis denudata* var. *gracilis*	-	-	-	2.2					X
Colusa grass	*Neostapfia colusana*	m	T	E	1B.1			X	X	X
Shasta snow-wreath	*Neviusia cliftonii*	m	S	-	1B.2	X				X
chaparral nolina	*Nolina cismontana*	-	-	-	1B.2					X
Dehesa nolina	*Nolina interrata*	-	-	E	1B.1					X
Antioch Dunes evening-primrose	*Oenothera deltoides* ssp. *howellii*	R	E	E	1B.1				X	X
short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	-	E	E	1B.1					X
snake cholla	*Opuntia californica* var. *californica*	-	-	-	1B.1					X
California Orcutt grass	*Orcuttia californica*	-	E	E	1B.1					X
San Joaquin Valley orcutt grass	*Orcuttia inaequalis*	m	T	E	1B.1					X
hairy orcutt grass	*Orcuttia pilosa*	m	E	E	1B.1					X
slender orcutt grass	*Orcuttia tenuis*	m	T	E	1B.1		X	X		X
Sacramento orcutt grass	*Orcuttia viscida*	m	E	E	1B.1					X
woolly mountain-parsley	*Oreonana vestita*	-	-	-	1B.3					X
Baja California birdbush	*Ornithostaphylos oppositifolia*	-	-	E	2.1					X
Spjut's bristle-moss	*Orthotrichum spjutii*	-	-	-	1B.3					X
white-margined oxytheca	*Oxytheca emarginata*	-	-	-	1B.3					X
Gander's ragwort	*Packera ganderi*	-	-	Rare	1B.2					X
Layne's ragwort	*Packera layneae*	m	T	Rare	1B.2					X
Ahart's paronychia	*Paronychia ahartii*	m	-	-	1B.1		X			X
California beardtongue	*Penstemon californicus*	-	-	-	1B.2					X
thread-leaved beardtongue	*Penstemon filiformis*	m	-	-	1B	P				
Santa Cruz Mountains beardtongue	*Penstemon rattanii* var. *kleei*	-	-	-	1B.2					X
white-rayed pentachaeta	*Pentachaeta bellidiflora*	m	E	E	1B.1					P
slender pentachaeta	*Pentachaeta exilis* ssp. *aeolica*	-	-	-	1B.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Lyon's pentachaeta	*Pentachaeta lyonii*	-	E	E	1B.1					X
Parish's yampah	*Perideridia parishii* ssp. *parishii*	-	-	-	2.2					X
Merced phacelia	*Phacelia ciliata* var. *opaca*	m	-	-	1B.2					P
Scott Valley phacelia	*Phacelia greenei*	-	S	-	1B.2	P				
Charlotte's phacelia	*Phacelia nashiana*	-	-	-	1B.2					X
Mt. Diablo phacelia	*Phacelia phacelioides*	m	-	-	1B.2					X
Brand's phacelia	*Phacelia stellaris*	-	C	-	1B.1					X
slender-stem bean	*Phaseolus filiformis*	-	-	-	2.3					X
moss phlox	*Phlox muscoides*	-	-	-	2.3					X
torrey pine	*Pinus torreyana* ssp. *torreyana*	-	-	-	1B.2					X
narrow-petaled rein orchid	*Piperia leptopetala*	-	-	-	4	P				
Yadon's rein orchid	*Piperia yadonii*	-	E	-	1B.1					X
Choris' popcorn-flower	*Plagiobothrys chorisianus* var. *chorisianus*	-	-	-	1B.2					X
San Francisco popcorn-flower	*Plagiobothrys diffusus*	-	-	E	1B.1					X
hairless popcorn-flower	*Plagiobothrys glaber*	-	-	-	1A					X
bearded popcorn-flower	*Plagiobothrys hystriculus*	-	-	-	1B.1				X	X
Parish's popcorn-flower	*Plagiobothrys parishii*	-	-	-	1B.1					X
Calistoga popcorn-flower	*Plagiobothrys strictus*	m	E	T	1B.1					
hooked popcorn-flower	*Plagiobothrys uncinatus*	-	-	-	1B.2					X
North Coast semaphore grass	*Pleuropogon hooverianus*	m	-	T	1B.1					

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Napa bluegrass	*Poa napensis*	m	E	E	1B.1					
San Diego mesa mint	*Pogogyne abramsii*	-	E	E	1B.1					X
Otay Mesa mint	*Pogogyne nudiuscula*	-	E	E	1B.1					X
Mason's sky pilot	*Polemonium chartaceum*	-	S	-	1B.3	P				
Bidwell's knotweed	*Polygonum bidwelliae*	-	-	-	4	P				
Marin knotweed	*Polygonum marinense*	m	-	-	3.1				P	P
slender-leaved pondweed	*Potamogeton filiformis*	-	-	-	2.2					X
eel-grass pondweed	*Potamogeton zosteriformis*	m	-	-	2.2	P			X	
Ballona cinquefoil	*Potentilla multijuga*	-	-	-	1A					X
Newberry's cinquefoil	*Potentilla newberryi*	-	-	-	2.3					X
cliff cinquefoil	*Potentilla rimicola*	-	-	-	2.3					X
Hartweg's golden sunburst	*Pseudobahia bahiifolia*	m	E	E	1B.1					X
San Joaquin adobe sunburst	*Pseudobahia peirsonii*	m	T	E	1B.1					X
California chalk-moss	*Pterygoneurum californicum*	-	-	-	1B.1					X
Pacific fuzzwort	*Ptilidium californicum*	-	SM	-	-	P	P			
Nuttall's scrub oak	*Quercus dumosa*	-	-	-	1B.1					X
showy raillardella	*Raillardella pringlei*	-	S	-	1B.2	P				
scabrid raillardella	*Raillardiopsis scabrida*	-	S	-	1B.3	P				
California beaked-rush	*Rhynchospora californica*	m	-	-	1B.1					P
brownish beaked-rush	*Rhynchospora capitellata*	-	-	-	2.2	P				X
Moreno currant	*Ribes canthariforme*	-	-	-	1B.3					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Parish's gooseberry	*Ribes divaricatum* var. *parishii*	-	-	-	1A					X
Santa Catalina Island currant	*Ribes viburnifolium*	-	-	-	1B.2					X
Columbia yellow cress	*Rorippa columbiae*	-	-	-	1B.2	P				X
small-leaved rose	*Rosa minutifolia*	-	-	E	2.1					X
Sanford's arrowhead	*Sagittaria sanfordii*	m	-	-	1B.2	P			X	X
Latimer's woodland-gilia	*Saltugilia latimeri*	-	-	-	1B.2					X
Munz' sage	*Salvia munzii*	-	-	-	2.2					X
adobe sanicle	*Sanicula maritima*	-	-	Rare	1B.1					X
rock sanicle	*Sanicula saxatilis*	m	-	Rare	1B.2					X
San Miguel savory	*Satureja chandleri*	-	-	-	1B.2					X
Shevock's copper-moss	*Schizymenium shevockii*	-	-	-	1B.2					X
black sedge	*Schoenus nigricans*	-	-	-	2.2					X
tongue-leaf copper-moss	*Scopelophila cataractae*	-	-	-	2.2					X
black-flowered figwort	*Scrophularia atrata*	-	-	-	1B.2					X
southern skullcap	*Scutellaria bolanderi* ssp. *austromontana*	-	-	-	1B.2					X
marsh skullcap	*Scutellaria galericulata*	m	-	-	2.2	P			X	
mad-dog skullcap	*Scutellaria lateriflora*	m	-	-	2.2				X	
Canyon Creek stonecrop	*Sedum paradisum*	-	S	-	1B	P	P			
desert spike-moss	*Selaginella eremophila*	-	-	-	2.2					X
rayless ragwort	*Senecio aphanactis*	-	-	-	2.2				X	X
Red Hills ragwort	*Senecio clevelandii* var. *heterophyllus*	m	-	-	1B.2					X
Coves' cassia	*Senna covesii*	-	-	-	2.2					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Hammitt's clay-cress	*Sibaropsis hammittii*	-	-	-	1B.2					X
Marin checkerbloom	*Sidalcea hickmanii* ssp. *viridis*	m	-	-	1B.3					
Salt Spring checkerbloom	*Sidalcea neomexicana*	-	-	-	2.2					X
marsh checkerbloom	*Sidalcea oregana* ssp. *hydrophila*	m	-	-	1B.3					P
Kenwood Marsh checkerbloom	*Sidalcea oregana* ssp. *valida*	m	E	E	1B.1					
bird-foot checkerbloom	*Sidalcea pedata*	-	E	E	1B.1					X
Scadden Flat checkerbloom	*Sidalcea stipularis*	-	-	E	1B.1					X
English Peak greenbriar	*Smilax jamesii*	m	S	-	1B	P	P			
bottle liverwort	*Sphaerocarpos drewei*	-	-	-	1B.1					X
purple stemodia	*Stemodia durantifolia*	-	-	-	2.1					X
Metcalf Canyon jewel-flower	*Streptanthus albidus* ssp. *albidus*	-	E	-	1B.1					X
most beautiful jewel-flower	*Streptanthus albidus* ssp. *peramoenus*	m	-	-	1B.2					X
green jewel-flower	*Streptanthus breweri* var. *hesperidis*	-	-	-	1B.2					X
Mt. Hamilton jewel-flower	*Streptanthus callistus*	m	-	-	1B.3					X
southern jewel-flower	*Streptanthus campestris*	-	-	-	1B.3					X
Mt. Diablo jewel-flower	*Streptanthus hispidus*	m	-	-	1B.3					X
Arbura ranch jewel-flower	*Streptanthus insignis* ssp. *lyonii*	m	-	-	1B.2					P
Tiburon jewel-flower	*Streptanthus niger*	m	E	E	1B.1					
oil neststraw	*Stylocline citroleum*	-	-	-	1B.1					X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
Mason's neststraw	*Stylocline masonii*	-	-	-	1B.1					X
California seablite	*Suaeda californica*	m	E	-	1B.1					X
estuary seablite	*Suaeda esteroa*	-	-	-	1B.2					X
splitting yarn lichen	*Sulcaria isidiifera*	-	-	-	(blank)					X
San Bernardino aster	*Symphyotrichum defoliatum*	-	-	-	1B.2					X
Suisun Marsh aster	*Symphyotrichum lentum*	-	-	-	1B.2				X	
Parry's tetracoccus	*Tetracoccus dioicus*	-	-	-	1B.2					X
woven-spored lichen	*Texosporium sancti-jacobi*	-	-	-	(blank)					X
Sonoran maiden fern	*Thelypteris puberula* var. *sonorensis*	-	-	-	2.2					X
slender false-lupine	*Thermopsis gracilis* var. *gracilis*	-	-	-	4	X				
California screw-moss	*Tortula californica*	-	-	-	1B.2					X
Wright's trichocoronis	*Trichocoronis wrightii* var. *wrightii*	-	-	-	2.1			X	X	X
showy indian clover	*Trifolium amoenum*	m	E	-	1B.1					X
saline clover	*Trifolium depauperatum* var. *hydrophilum*	-	-	-	1B.2					X
caper-fruited tropidocarpum	*Tropidocarpum capparideum*	-	-	-	1B.1				X	X
Greene's tuctoria	*Tuctoria greenei*	m	E	Rare	1B.1			X		X
Crampton's tuctoria	*Tuctoria mucronata*	r	E	E	1B.1				X	
California vervain	*Verbena californica*	m	T	T	1B.1					X
crownbeard	*Verbesina dissita*	-	T	T	1B.1					X
oval-leaved viburnum	*Viburnum ellipticum*	-	-	-	2.3	P	P			X

Table A1-1. Special-Status Plant Species Known or with Potential to Occur in the Primary and Extended Study Areas, Excluding Species Not Known But Potentially Present in CVP/SWP Service Areas[1] (contd.)

Common Name	Scientific Name	Status[2]				Distribution in Primary and Extended Study Area[3]				
		MSCS	Federal	State	CNPS	Shasta Lake and Vicinity	Sacramento River		Delta	CVP/SWP Service Areas
							Upper	Lower		
golden violet	*Viola aurea*	-	-	-	2.2					X
grey-leaved violet	*Viola pinetorum* ssp. *grisea*	-	-	-	1B.3					X
jackass-clover	*Wislizenia refracta* ssp. *refracta*	-	-	-	2.2					X
Brazilian watermeal	*Wolffia brasiliensis*	-	-	-	2.3			X		
El Dorado County mule ears	*Wyethia reticulata*	-	-	-	1B.2					X
Mecca-aster	*Xylorhiza cognata*	-	-	-	1B.2					X
Orcutt's woody-aster	*Xylorhiza orcuttii*	-		-	1B.2					X

Notes:

[1] Based on California Natural Diversity Database (2007), CNPS Rare Plant Inventory (2007), USFWS list. Plants concluded to be unlikely to occur in the study areas are not included.

[2] Status

[3] P = Species with the potential to occur in an area, but not known. X = species known to occur in the area.

[4] *Eleocharis quadrangulata* is considered naturalized, not native in California in The Jepson Manual, Ed. 2.

MSCS Status Categories:
- m Maintain
- r Contribute to recovery
- R Recovery

Federal Status Categories:
- T USFWS Threatened
- E USFWS Endangered
- S USFS Sensitive
- SM USFS recommended for survey and management per Northwest Forest Plan 2002
- Endemic USFS Endemic to specific region or National Forest

State Status Categories:
- Rare California Rare
- T California Threatened
- E California Endangered

California Native Plant Society (CNPS) Status Categories:
- 1B Plants rare, threatened, or endangered in California and elsewhere
- 2 Plants rare, threatened, or endangered in California but more common elsewhere
- 3 Plants for which more information is needed – a review list
- 4 Plants of limited distribution – a watch list

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2]

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Acanthomintha lanceolata Santa Clara thorn-mint	List 4.2			Chaparral (often on serpentinite), Cismontane woodland, Coastal scrub; in rocky habitats; 80-1200 m	ALA, FRE, MER, MNT, SBT, SCL, SJQ, STA
Acanthomintha obovata ssp. cordata heart-leaved thorn-mint	List 4.2			Chaparral (in openings), Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland; on clay; 785-1540 m	LAX, MNT, SBA, SLO, VEN
Acanthomintha obovata ssp. obovata San Benito thorn-mint	List 4.2			Chaparral, Cismontane woodland, Valley and foothill grassland; on heavy clay, alkaline, and serpentinite substrates; 395-1500 m	FRE, MNT, SBT, SLO
Acanthoscyphus parishii var. abramsii Abrams' oxytheca	List 1B.2			Chaparral (on sandy or shale substrates); 1143-2057 m	SBA, VEN
Acanthoscyphus parishii var. goodmaniana Cushenbury oxytheca	List 1B.1		E	Pinyon and juniper woodland (on carbonate, talus); 1219-2377 m	SBD
Acanthoscyphus parishii var. parishii Parish's oxytheca	List 4.2			Chaparral, Lower montane coniferous forest; on sandy or gravelly substrates; 1220-2600 m	LAX, SBD, VEN
Achnatherum diegoense San Diego County needle grass	List 4.2			Chaparral, Coastal scrub; on rocky, often mesic sites; 10-700 m	ANA, SBA, SCZ,SDG, SMI, SNI, SRO, VEN
Acleisanthes longiflora angel trumpets	List 2.3			Sonoran desert scrub (on carbonate); 90-95 m	RIV
Allium atrorubens var. cristatum Inyo onion	List 4.3			Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland; on sandy or rocky substrates; 1200-2560 m	INY,KRN, INY,KRN, SBD
Allium howellii var. clokeyi Mt. Pinos onion	List 1B.3			Great Basin scrub, Pinyon and juniper woodland; 1300-1850 m	KRN, KRN, LAX, SBA, SLO, VEN
Allium parishii Parish's onion	List 4.3			Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland; on rocky sites; 900-1465 m	RIV, SBD, SDG
Allium sanbornii var. congdonii Congdon's onion	List 4.3			Chaparral, Cismontane woodland; serpentinite or volcanic substrates; 300-700 m	ELD, MPA, NEV, PLA, TUO
Allium sanbornii var. sanbornii Sanborn's onion	List 4.2			Chaparral, Cismontane woodland, Lower montane coniferous forest; usually on serpentinite, gravelly sites; 260-1510 m	BUT,CAL, ELD, NEV, PLA,PLU, SHA, TEH, TUO, YUB

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2]

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Allium yosemitense Yosemite onion	List 1B.3	R		Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest; on rocky, metamorphic or granitic substrates; 535-2200 m	MPA, TUO
Aloysia wrightii oreganillo	List 4.3			Joshua tree "woodland", Pinyon and juniper woodland; on rocky substrates, often on carbonate; 900-1600 m	RIV, SBD
Amaranthus watsonii Watson's amaranth	List 4.3			Mojavean desert scrub, Sonoran desert scrub; 20-1700 m	IMP, IMP, LAX, SBD
Ambrosia monogyra singlewhorl burrobrush	List 2.2			Chaparral, Sonoran desert scrub; on sandy substrates; 10-500 m	RIV, SBD, SDG
Ammoselinum giganteum desert sand-parsley	List 2.3			Sonoran desert scrub; 400-400 m	RIV
Amsinckia douglasiana Douglas' fiddleneck	List 4.2			Cismontane woodland, Valley and foothill grassland; on Monterey shale, in dry habitats; 0-1950 m	KRN, MNT, SBT, SBA, SLO, VEN
Amsinckia vernicosa var. furcata forked fiddleneck	List 4.2			Cismontane woodland, Valley and foothill grassland; 50-1000 m	FRE, KRN, KNG, MER, SBT, SLO
Androsace elongata ssp. acuta California androsace	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland; 150-1200 m	ALA, COL,CCA, FRE,GLE, KRN, LAX, MER, RIV, SBT, SBD,SCL, SDG, SIS,SJQ,SLO, SMT, SOL, STA, THE
Androstephium breviflorum small-flowered androstephium	List 2.3			Desert dunes, Mojavean desert scrub (bajadas); 220-640 m	INY, INY, RIV, SBD
Angelica callii Call's angelica	List 4.3			Cismontane woodland, Lower montane coniferous forest; in mesic habitats; 1100-2000 m	FRE, KRN, KRN, TUL
Anomobryum julaceum slender silver-moss	List 2.2			Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest; on damp rock and soil on outcrops, usually on roadcuts; 100-1000 m	BUT, CCA, HUM, LAX, MPA, SBA, SCR, SHA, SON
Antirrhinum ovatum oval-leaved snapdragon	List 4.2			Chaparral, Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland; on clay or gypsum, often on alkaline substrates; 200-1000 m	FRE, KRN, KRN, MNT, SBT, SBA, SLO, VEN
Arabis blepharophylla coast rock cress	List 4.3			Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub; on rocky substrates; 3-1100 m	CCA, LAK, MRN, MNT, SCR, SFO, SMT, SON
Arabis modesta modest rock cress	List 4.3			Chaparral, Lower montane coniferous forest; 120-800 m	LAK, NAP, SIS, SOL, TRI, YOL

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Arabis parishii Parish's rock cress	List 1B.2			Pebble plain, Pinyon and juniper woodland, Upper montane coniferous forest; on rocky substrates, quartzite on clay, or sometimes carbonate; 1770-2900 m	SBD
Arabis shockleyi Shockley's rock cress	List 2.2			Pinyon and juniper woodland (on carbonate or quartzite, rocky or gravelly substrates); 875-2310 m	INY, INY, MNO, SBD
Arctostaphylos gabrielensis San Gabriel Manzanita	List 1B.2			Chaparral (on rocky sites); 1500-1500 m	LAX
Arctostaphylos luciana Santa Lucia Manzanita	List 1B.2			Chaparral, Cismontane woodland; on shale substrates; 350-850 m	SLO
Arctostaphylos mewukka ssp. truei True's Manzanita	List 4.2			Chaparral, Lower montane coniferous forest; sometimes along roadsides; 425-1310 m	BUT, ELD, NEV, PLA, PLU, YUB
Arctostaphylos parryana ssp. tumescens interior manzanita	List 4.3			Chaparral (montane), Cismontane woodland; 2100-2310 m	LAX, SBD
Arctostaphylos pechoensis Pecho Manzanita	List 1B.2			Closed-cone coniferous forest, Chaparral, Coastal scrub; on siliceous shale; 125-850 m	SBA, SLO
Arctostaphylos pilosula Santa Margarita manzanita	List 1B.2			Closed-cone coniferous forest, Chaparral, Cismontane woodland; 170-1100 m	MNT, SLO
Arctostaphylos tomentosa ssp. subcordata Santa Cruz Island Manzanita	List 4.2			Closed-cone coniferous forest, Chaparral; on rocky sites; 100-730 m	LAX, SBA, SCZ, SLO, SRO
Arctostaphylos wellsii Wells' Manzanita	List 1B.1			Broadleafed upland forest, Closed-cone coniferous forest, Chaparral; on sandstone; 30-400 m	SLO
Arenaria lanuginosa ssp. saxosa rock sandwort	List 2.3			Subalpine coniferous forest, Upper montane coniferous forest; in mesic habitats, on sandy substrates; 1800-2600 m	SBD
Arenaria ursina Big Bear Valley sandwort	List 1B.2		T	Meadows and seeps, Pebble plain, Pinyon and juniper woodland; in mesic, rocky habitats; 1800-2900 m	SBD
Artemisia palmeri San Diego sagewort	List 4.2			Chaparral, Coastal scrub, Riparian forest, Riparian scrub, Riparian woodland; in sandy, mesic habitats; 15-915 m	SDG
Asclepias solanoana serpentine milkweed	List 4.2			Chaparral, Cismontane woodland, Lower montane coniferous forest; on serpentinite; 230-1860 m	COL, GLE, LAK, MEN, NAP, SHA, SON, TEH, TRI, YOL
Aspidotis carlotta-halliae Carlotta Hall's lace fern	List 4.2			Chaparral, Cismontane woodland; generally on serpentinite; 100-1400 m	ALA, MRN, MNT, SBT, SLO

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Asplenium vespertinum western spleenwort	List 4.2			Chaparral, Cismontane woodland, Coastal scrub; on rocky sites; 180-1000 m	LAX, ORA, RIV, SBD, SDG, VEN
Astragalus albens Cushenbury milk-vetch	List 1B.1		E	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland; usually on carbonate, rarely on granitic substrates; 1095-2000 m	SBD
Astragalus bicristatus crested milk-vetch	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; on sandy or rocky substrates, mostly on carbonate; 1700-2745 m	LAX, RIV, SBD
Astragalus breweri Brewer's milk-vetch	List 4.2			Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland (in open, often gravelly habitats); often on serpentinite or volcanic substrates; 90-730 m	COL, LAK, MRN, MEN, NAP, SON, YOL
Astragalus clevelandii Cleveland's milk-vetch	List 4.3			Chaparral, Cismontane woodland, Riparian forest; at serpentinite seeps; 200-1500 m	COL, LAK, NAP, SBT, SON, TEH, YOL
Astragalus crotalariae Salton milk-vetch	List 4.3			Sonoran desert scrub (sandy or gravelly); -60-250 m	IMP, IMP, RIV, SDG
Astragalus douglasii var. perstrictus Jacumba milk-vetch	List 1B.2			Chaparral, Cismontane woodland, Pinyon and juniper woodland, Riparian scrub, Valley and foothill grassland; on rocky sites; 900-1370 m	SDG
Astragalus ertterae Walker Pass milk-vetch	List 1B.3			Pinyon and juniper woodland (sandy, granitic); 1705-1900 m	KRN
Astragalus hornii var. hornii Horn's milk-vetch	List 1B.1			Meadows and seeps, Playas; along lake margins, alkaline habitats; 60-850 m	INY,KRN, SBD, TUL
Astragalus insularis var. harwoodii Harwood's milk-vetch	List 2.2			Desert dunes, Mojavean desert scrub (sandy or gravelly); 0-710 m	RIV, SDG
Astragalus lentiginosus var. antonius San Antonio milk-vetch	List 1B.3			Lower montane coniferous forest, Upper montane coniferous forest; 1500-2600 m	LAX, SBD
Astragalus lentiginosus var. borreganus Borrego milk-vetch	List 4.3			Mojavean desert scrub, Sonoran desert scrub; on sandy substrates; 30-270 m	IMP, RIV, SBD, SDG
Astragalus lentiginosus var. sierrae Big Bear Valley milk-vetch	List 1B.2			Mojavean desert scrub, Meadows and seeps, Pinyon and juniper woodland, Upper montane coniferous forest; on gravelly or rocky substrates; 1800-2600 m	SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Astragalus macrodon Salinas milk-vetch	List 4.3			Chaparral(openings), Cismontane woodland, Valley and foothill grassland; on sandstone, shale, or serpentinite; 250-950 m	KRN, MNT, SBT, SLO, VEN
Astragalus nutans Providence Mountains milk-vetch	List 4.3			Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland, Sonoran desert scrub; on sandy or gravelly substrates; 450-1950 m	IMP,INY, RIV, SBD, SDG
Astragalus nuttallii var. nuttallii Nuttall's milk-vetch	List 4.2			Coastal bluff scrub, Coastal dunes; 3-120 m	ALA, MRN, MNT, SBA, SFO, SLO, SMT
Astragalus rattanii var. rattanii Rattan's milk-vetch	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest; along gravelly streambanks; 30-825 m	COL, GLE, HUM, LAK, MEN, SON, TEH, TRI
Astragalus subvestitus Kern County milk-vetch	List 4.3			Great Basin scrub, Meadows and seeps, Pinyon and juniper woodland; on gravelly or sandy substrates; 2450-2750 m	KRN, TUL
Atractylocarpus flagellaceus flagella-like atractylocarpus	List 2.2			Cismontane woodland; 100-500 m	BUT, TRI
Atriplex coronata var. coronata crownscale	List 4.2			Chenopod scrub, Valley and foothill grassland, Vernal pools; in alkaline habitats; 1-590 m	ALA, CCA, FRE, GLE, KRN, KNG, MER, MNT, SJQ, SLO, SOL, STA
Azolla mexicana Mexican mosquito fern	List 4.2			Marshes and swamps (in ponds, slow water); 30-100 m	BUT, KRN, LAK, MOD, NEV, PLU, SCL, SDG, TUL
Baccharis plummerae ssp. plummerae Plummer's Baccharis	List 4.3			Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub; on rocky sites; 5-425 m	ANA, LAX, SBA, SCZ, SLO, VEN
Berberis fremontii Fremont barberry	List 3			Chaparral, Joshua tree "woodland", Pinyon and juniper woodland; on rocky sites; 840-1850 m	SBD, SDG
Bolandra californica Sierra bolandra	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; on mesic, rocky sites; 975-2450 m	ALP, AMA, CAL, ELD, MPA, STA, TUO
Botrychium crenulatum scalloped moonwort	List 2.2			Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps (freshwater); 1268-3280 m	BUT, COL, LAK, LAS, LAX, MOD, MNO, PLA, PLU, SBD, SHA, TEH, TUL

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Botrychium minganense Mingan moonwort	List 2.2			Bogs and fens, Lower montane coniferous forest, Upper montane coniferous forest; in mesic habitats; 1500-2055 m	BUT, FRE, LAS, MOD, PLA, PLU, SBD, SHA, TEH, TUL
Brodiaea insignis Kaweah brodiaea	List 1B.2	E		Cismontane woodland, Meadows and seeps, Valley and foothill grassland; on granitic or clay substrates; 150-1400 m	TUL
Bulbostylis capillaris thread-leaved beakseed	List 4.2			Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; 395-2075 m	ALP, BUT, FRE, MPA, NEV, PLU, SHA, SIE, TEH, TUO
Calandrinia breweri Brewer's calandrinia	List 4.2			Chaparral, Coastal scrub; on sandy or loamy substrates, disturbed sites and burns; 10-1220 m	CCA, LAX, MRN, MPA, MEN, MNT, NAP, ORA, RIV, SBA, SBD, SCL, SCR, SCZ, SDG, SHA, SLO, SMT, SON, SRO, VEN
Calandrinia maritima seaside calandrinia	List 4.2			Coastal bluff scrub, Coastal scrub, Valley and foothill grassland; on sandy substrates; 5-300 m	ANA, LAX, ORA, SBR, SBA, SCM, SCT, SCZ, SDG, SRO, VEN
Calliandra eriophylla pink fairy-duster	List 2.3			Sonoran desert scrub (sandy or rocky); 120-1500 m	IMP, IMP, RIV, SDG
Calochortus catalinae Catalina mariposa lily	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; 15-700 m	LAX, ORA, SBA, SBD, SCT, SCZ, SDG, SLO, SRO, VEN
Calochortus clavatus var. clavatus club-haired mariposa lily	List 4.3			Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; usually on serpentinite, clay, rocky; 75-1300 m	LAX, SBT, SBA, SLO, VEN
Calochortus obispoensis San Luis mariposa lily	List 1B.2			Chaparral, Coastal scrub, Valley and foothill grassland; often on serpentinite; 75-730 m	SLO
Calochortus simulans La Panza mariposa lily	List 1B.3			Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; on sandy, often granitic substrates, sometimes on serpentinite; 395-1100 m	SBA, SLO

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Calochortus umbellatus Oakland star-tulip	List 4.2			Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; often on serpentinite; 100-700 m	ALA, CCA, LAK, MRN, SCL, SCR, SMT, STA
Calochortus westonii Shirley Meadows star-tulip	List 1B.2			Broadleafed upland forest, Lower montane coniferous forest, Meadows and seeps; on granitic substrates; 1500-2105 m	KRN, TUL
Calycadenia micrantha small-flowered calycadenia	List 1B.2			Chaparral, Meadows and seeps (on volcanic substrates), Valley and foothill grassland; along roadsides, in rocky, talus, or scree habitats, sometimes on serpentinite, and in sparsely vegetated areas; 5-1500 m	COL, LAK, MNT, NAP, TRI
Calycadenia villosa dwarf calycadenia	List 1B.1			Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland; on rocky, fine soils; 240-1350 m	FRE, MNT, SBA, SLO
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	List 3			Chaparral, Cismontane woodland; 305-1115 m	MNT, SBT, SCL, SCR
Calystegia collina ssp. oxyphylla Mt. Saint Helena morning-glory	List 4.2			Chaparral, Lower montane coniferous forest, Valley and foothill grassland; on serpentinite; 279-1010 m	LAK, MRN, MEN, NAP, SBT, SON
Calystegia collina ssp. venusta South Coast Range morning-glory	List 4.3			Chaparral, Cismontane woodland, Valley and foothill grassland; on serpentinite or sedimentary substrates; 425-1130 m	FRE, MNT, SBT, SBA, SCL
Calystegia peirsonii Peirson's morning-glory	List 4.2			Chaparral, Chenopod scrub, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland; 30-1500 m	LAX
Calystegia subacaulis ssp. episcopalis Cambria morning-glory	List 1B.2			Chaparral, Cismontane woodland, Coastal prairie; 60-500 m	SLO
Camissonia arenaria sand evening-primrose	List 4.3			Sonoran desert scrub (sandy or rocky); -70-915 m	IMP, IMP, RIV, SBD
Camissonia boothii ssp. boothii Booth's evening-primrose	List 2.3			Joshua tree "woodland", Pinyon and juniper woodland; 900-2400 m	INY, MNO, SBD
Camissonia integrifolia Kern River evening-primrose	List 1B.3			Chaparral; 700-1000 m	KRN

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Camissonia kernensis ssp. kernensis Kern County evening-primrose	List 4.3			Chaparral, Joshua tree "woodland", Pinyon and juniper woodland; on sandy or gravelly, granitic substrates; 790-2130 m	KRN, SBA
Camissonia lewisii Lewis' evening-primrose	List 3			Coastal bluff scrub, Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland; on sandy or clay substrates; 0-300 m	LAX, ORA, SDG
Camissonia sierrae ssp. sierrae Yosemite evening-primrose	List 4.3			Cismontane woodland, Lower montane coniferous forest; 500-1645 m	FRE, MAD, MPA, TUO
Canbya candida white pygmy-poppy	List 4.2			Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland; on gravelly, sandy, granitic substrates; 600-1460 m	IMP, INY, KRN, LAX, SBD
Cardamine pachystigma var. dissectifolia dissected-leaved toothwort	List 3			Chaparral, Lower montane coniferous forest; usually on serpentinite, rocky sites; 255-2100 m	BUT, GLE, MEN, PLA, SON, TEH
Carex limosa mud sedge	List 2.2			Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps, Upper montane coniferous forest; 1200-2700 m	BUT, ELD, FRE, LAS, NEV, PLU, SIS, TUO
Carex obispoensis San Luis Obispo sedge	List 1B.2			Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; often at serpentinite seeps, sometimes on gabbro; 10-790 m	MNT, SDG, SLO
Carex occidentalis western sedge	List 2.3			Lower montane coniferous forest, Meadows and seeps; 1645-3135 m	MNO, RIV, SBD
Carex tompkinsii Tompkins' sedge	List 4.3	R		Chaparral, Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest; sometimes on granitic substrates; 420-1830 m	FRE, MPA, TUO
Carlquistia muirii Muir's tarplant	List 1B.3			Chaparral (montane), Lower montane coniferous forest, Upper montane coniferous forest; 1100-2500 m	FRE, KRN, MNT, TUL
Castela emoryi crucifixion thorn	List 2.3			Mojavean desert scrub, Playas, Sonoran desert scrub; on gravelly substrates; 90-670 m	IMP, RIV, SBD
Castilleja cinerea ash-gray paintbrush	List 1B.2		T	Mojavean desert scrub, Meadows and seeps, Pebble plain, Pinyon and juniper woodland, Upper montane coniferous forest (in openings); 1800-2835 m	SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Castilleja densiflora ssp. obispoensis San Luis Obispo owl's-clover	List 1B.2			Meadows and seeps, Valley and foothill grassland; sometimes on serpentinite; 10-400 m	SLO
Castilleja plagiotoma Mojave paintbrush	List 4.3			Great Basin scrub (alluvial), Joshua tree "woodland", Lower montane coniferous forest, Pinyon and juniper woodland; 300-2500 m	KRN, LAX, SBD, SLO
Caulanthus amplexicaulis var. barbarae Santa Barbara jewel-flower	List 1B.1			Closed-cone coniferous forest, Chaparral, Cismontane woodland; on serpentinite; 470-1220 m	SBA
Caulanthus californicus California jewel-flower	List 1B.1	E	E	Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland; on sandy substrates; 70-1000 m	FRE, KRN, KNG, SBA, SLO, TUL
Caulanthus simulans Payson's jewel-flower	List 4.2			Chaparral, Coastal scrub; on sandy, granitic substrates; 90-2200 m	ORA, RIV, SDG
Ceanothus cuneatus var. fascicularis Lompoc ceanothus	List 4.2			Chaparral (on sandy substrates); 5-400 m	SBA, SLO
Ceanothus fresnensis Fresno ceanothus	List 4.3			Cismontane woodland, Lower montane coniferous forest; 900-2103 m	CAL, ELD, FRE, MAD, MPA, PLA, TUL, TUO
Ceanothus pinetorum Kern ceanothus	List 4.3			Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest; on rocky, granitic substrates; 1600-2745 m	INY, KRN, TUL
Ceanothus purpureus holly-leaved ceanothus	List 1B.2			Chaparral, Cismontane woodland; on volcanic, rocky substrates; 120-640 m	NAP, SHA, SOL, SON, TRI
Centromadia parryi ssp. rudis Parry's red tarplant	List 4.2			Valley and foothill grassland, Vernal pools; in alkaline, vernally mesic habitats, seeps, sometimes along roadsides; 0-100 m	BUT, COL, GLE, LAK, MER, SAC, SJQ, SOL, SUT, YOL
Cercocarpus betuloides var. blancheae island mountain-mahogany	List 4.3			Closed-cone coniferous forest, Chaparral; 30-600 m	LAX, SCT, SCZ, SRO, VEN
Chaenactis carphoclinia var. peirsonii Peirson's pincushion	List 1B.3			Sonoran desert scrub (sandy); 3-500 m	IMP, RIV, SDG
Chamaebatia australis southern mountain misery	List 4.2			Chaparral (on gabbroic or metavolcanic substrates); 300-700 m	LAX, SDG
Chamaesyce abramsiana Abrams' spurge	List 2.2			Mojavean desert scrub, Sonoran desert scrub; sandy; -5-915 m	IMP, RIV, SBD
Chamaesyce revoluta revolute spurge	List 4.3			Mojavean desert scrub (on rocky sites); 1095-3100 m	RIV, SBD, SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Chamaesyce vallis-mortae Death Valley sandmat	List 4.2			Mojavean desert scrub (on sandy or gravelly substrates); 230-1460 m	INY, KRN, SBD
Chorizanthe blakleyi Blakley's spineflower	List 1B.3			Chaparral; 600-1600 m	SBA, VEN
Chorizanthe breweri Brewer's spineflower	List 1B.3			Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub; on serpentinite, rocky or gravelly substrates; 45-800 m	MNT, SLO
Chorizanthe douglasii Douglas' spineflower	List 4.3			Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest; on sandy or gravelly substrates; 55-1600 m	MNT, SBT, SLO
Chorizanthe leptotheca Peninsular spineflower	List 4.2			Chaparral, Coastal scrub, Lower montane coniferous forest; on alluvial fans, granitic substrate; 300-1900 m	RIV, SBD, SDG
Chorizanthe palmeri Palmer's spineflower	List 4.2			Chaparral, Cismontane woodland, Valley and foothill grassland; on rocky, serpentinite substrates; 60-700 m	MNT, SBT, SBA, SLO
Chorizanthe spinosa Mojave spineflower	List 4.2			Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub; 6-1300 m	KRN, LAX, SBD, SLO
Chorizanthe ventricosa potbellied spineflower	List 4.3			Cismontane woodland, Valley and foothill grassland; on serpentinite; 65-1235 m	FRE, MNT, SBT, SLO
Cirsium fontinale var. obispoense San Luis Obispo fountain thistle	List 1B.2	E	E	Chaparral, Cismontane woodland, Valley and foothill grassland; at serpentinite seeps; 100-890 m	SLO
Cladium californicum California sawgrass	List 2.2			Meadows and seeps, Marshes and swamps (along lake margins); 60-600 m	INY, LAX, RIV, SBA, SBD, SLO
Clarkia breweri Brewer's clarkia	List 4.2			Chaparral, Cismontane woodland, Coastal scrub; often on serpentinite; 215-1000 m	ALA, FRE, MER, MNT, SBT, SCL, STA
Clarkia concinna ssp. automixa Santa Clara red ribbons	List 4.3			Chaparral, Cismontane woodland; 90-1500 m	ALA, SCL
Clarkia exilis slender clarkia	List 4.3			Cismontane woodland; 120-1000 m	KRN, TUL
Clarkia lewisii Lewis' clarkia	List 4.3			Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub; 30-610 m	MNT, SBT
Clarkia springvillensis Springville clarkia	List 1B.2	E	T	Chaparral, Cismontane woodland, Valley and foothill grassland; on granitic substrates; 245-1220 m	TUL

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Clarkia virgata Sierra clarkia	List 4.3			Cismontane woodland, Lower montane coniferous forest; 400-1615 m	AMA, CAL, ELD, MPA, PLU, TUO
Clarkia xantiana ssp. parviflora Kern Canyon clarkia	List 4.2			Chaparral, Cismontane woodland, Great Basin scrub, Valley and foothill grassland; often on sandy, sometimes rocky, slopes, sometimes along roadsides; 700-3620 m	INY, KRN, LAX, TUL
Claytonia lanceolata var. peirsonii Peirson's spring beauty	List 1B.1			Subalpine coniferous forest, Upper montane coniferous forest; on scree; 2135-2745 m	SBD
Claytonia parviflora ssp. grandiflora streambank spring beauty	List 4.2			Cismontane woodland; rocky sites; 250-1200 m	AMA, BUT, CAL, ELD, FRE, KRN, PLA, TUL, TUO
Clinopodium mimuloides monkey-flower savory	List 4.2			Chaparral, North Coast coniferous forest; along streambanks, in mesic habitats; 305-1800 m	LAX, MNT, SBA, SLO, VEN
Collomia diversifolia serpentine collomia	List 4.3			Chaparral, Cismontane woodland; on serpentinite, rocky or gravelly sites; 300-600 m	COL, CCA, GLE, LAK, MEN, NAP, SHA, STA, YOL
Colubrina californica Las Animas colubrina	List 2.3			Mojavean desert scrub, Sonoran desert scrub; 10-1000 m	IMP, RIV, SDG
Condalia globosa var. pubescens spiny abrojo	List 4.2			Sonoran desert scrub; 140-1000 m	IMP, RIV
Convolvulus simulans small-flowered morning-glory	List 4.2			Chaparral(openings), Coastal scrub, Valley and foothill grassland; on clay substrates, and at serpentinite seeps; 30-700 m	CCA, FRE, KRN, LAX, MER, ORA, RIV, SBT, SBA, SCM, SCT, SCZ, SDG, SJQ, SLO, STA
Cordylanthus eremicus ssp. kernensis Kern Plateau bird's-beak	List 1B.3			Great Basin scrub, Joshua tree "woodland", Pinyon and juniper woodland, Upper montane coniferous forest; 1675-3000 m	INY, KRN, TUL
Cordylanthus rigidus ssp. brevibracteatus short-bracted bird's-beak	List 4.3			Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest; in openings, on granitic substrates; 1000-2590 m	KRN, TUL
Coryphantha alversonii foxtail cactus	List 4.3			Mojavean desert scrub, Sonoran desert scrub; on sandy or rocky, usually granitic substrates; 75-1525 m	IMP, RIV, SBD
Crataegus castlegarensis Castlegar hawthorne	List 3			Riparian woodland; 0-975 m	MOD, SHA

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Croton wigginsii Wiggins' croton	List 2.2	R		Desert dunes, Sonoran desert scrub; 50-100 m	IMP
Cryptantha costata ribbed cryptantha	List 4.3			Desert dunes, Mojavean desert scrub, Sonoran desert scrub; on sandy substrates; -60-500 m	IMP, INY, RIV, SBD, SDG
Cryptantha excavata deep-scarred cryptantha	List 1B.3			Cismontane woodland (in sandy or gravelly habitats); 100-500 m	COL, LAK, MEN, YOL
Cryptantha ganderi Gander's cryptantha	List 1B.1			Desert dunes, Sonoran desert scrub (on sandy substrates); 160-400 m	IMP, SDG
Cryptantha holoptera winged cryptantha	List 4.3			Mojavean desert scrub, Sonoran desert scrub; 100-1690 m	IMP, INY, RIV, SBD, SDG
Cryptantha rattanii Rattan's cryptantha	List 4.3			Cismontane woodland, Riparian woodland, Valley and foothill grassland; 245-915 m	FRE, MER, MNT, SBT
Cupressus arizonica ssp. nevadensis Piute cypress	List 1B.2			Closed-cone coniferous forest, Chaparral, Cismontane woodland, Pinyon and juniper woodland; 720-1830 m	KRN, TUL
Cupressus bakeri Baker's cypress	List 4.2			Chaparral, Lower montane coniferous forest; on serpentinite or volcanic substrates; 820-1995 m	MOD, PLU, SHA, SIS, TEH
Cupressus stephensonii Cuyamaca cypress	List 1B.1			Closed-cone coniferous forest, Chaparral, Riparian forest; on gabbroic substrates; 1035-1705 m	SDG
Cuscuta californica var. apiculata pointed dodder	List 3			Mojavean desert scrub, Sonoran desert scrub; on sandy substrates; 0-500 m	RIV, SBD
Cynanchum utahense Utah vine milkweed	List 4.3			Mojavean desert scrub, Sonoran desert scrub; on sandy or gravelly substrates; 150-1435 m	IMP, RIV, SBD, SDG
Deinandra floribunda Tecate tarplant	List 1B.2			Chaparral, Coastal scrub; 70-1220 m	SDG
Deinandra increscens ssp. villosa Gaviota tarplant	List 1B.1	E	E	Coastal bluff scrub, Coastal scrub, Valley and foothill grassland; 35-430 m	SBA
Deinandra paniculata paniculate tarplant	List 4.2			Coastal scrub, Valley and foothill grassland, Vernal pools; usually in vernally mesic habitats; 25-940 m	ORA, RIV, SBD, SDG
Delphinium gypsophilum ssp. gypsophilum gypsum-loving larkspur	List 4.2			Chenopod scrub, Cismontane woodland, Valley and foothill grassland; 100-825 m	ALA, FRE, KRN, KNG, MAD, MER, MNT, SBT, SJQ, SLO, STA, VEN

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Delphinium hansenii ssp. ewanianum Ewan's larkspur	List 4.2			Cismontane woodland, Valley and foothill grassland; on rocky sites; 60-600 m	CAL, FRE, KRN, MAD, MER, TUL
Delphinium hesperium ssp. cuyamacae Cuyamaca larkspur	List 1B.2	R		Lower montane coniferous forest, Meadows and seeps; in mesic habitats; 1220-1631 m	RIV, SDG
Delphinium parishii ssp. subglobosum Colorado Desert larkspur	List 4.3			Chaparral, Cismontane woodland, Pinyon and juniper woodland, Sonoran desert scrub; 600-1800 m	IMP, RIV, SDG
Delphinium parryi ssp. purpureum Mt. Pinos larkspur	List 4.3			Chaparral, Mojavean desert scrub, Pinyon and juniper woodland; 1000-2600 m	KRN, VEN
Delphinium purpusii Kern County larkspur	List 1B.3			Chaparral, Cismontane woodland, Pinyon and juniper woodland; on rocky substrates, often carbonate; 300-1340 m	KRN, TUL
Dichondra occidentalis western dichondra	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; 50-500 m	LAX, MRN, ORA, SBA, SCT, SCZ, SDG, SMI, SRO, VEN
Dieteria asteroides var. lagunensis Mount Laguna aster	List 2.1	R		Cismontane woodland, Lower montane coniferous forest; 800-2400 m	SDG
Dieteria canescens var. ziegleri Ziegler's aster	List 1B.2			Lower montane coniferous forest, Upper montane coniferous forest; 1400-2470 m	RIV
Digitaria californica Arizona cottontop	List 2.3			Mojavean desert scrub, Sonoran desert scrub; at rocky sites; 290-1490 m	SBD, SDG
Ditaxis claryana glandular ditaxis	List 2.2			Mojavean desert scrub, Sonoran desert scrub; on sandy substrates; 0-465 m	IMP, RIV, SBD
Downingia concolor var. brevior Cuyamaca Lake downingia	List 1B.1	E		Meadows and seeps, Vernal pools; 1400-1500 m	SDG
Dryopteris filix-mas male fern	List 2.3			Upper montane coniferous forest (granitic, rocky substrates); 2400-3100 m	MNO, SBD
Dudleya abramsii ssp. murina mouse-gray dudleya	List 1B.3			Chaparral, Cismontane woodland, Valley and foothill grassland; on serpentinite; 90-440 m	SLO
Dudleya alainae Banner dudleya	List 3.2			Chaparral, Lower montane coniferous forest, Sonoran desert scrub; on rocky substrate; 740-1200 m	SDG
Dudleya calcicola limestone dudleya	List 4.3			Chaparral, Pinyon and juniper woodland; on carbonate; 500-2600 m	INY, KRN, TUL

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Dudleya cymosa ssp. crebrifolia San Gabriel River dudleya	List 1B.2			Chaparral; on volcanic, rocky substrates; 150-520 m	LAX
Eleocharis parvula small spikerush	List 4.3			Marshes and swamps; 1-3020 m	BUT, CCA, GLE, HUM, MNO, NAP, ORA, PLU, SHA, SIS, SLO, SON, VEN
Eriastrum virgatum virgate eriastrum	List 4.3			Coastal bluff scrub, Chaparral, Coastal dunes, Coastal scrub; on sandy substrates; 45-700 m	MNT, SBT
Ericameria albida white-flowered rabbitbrush	List 4.2			Chenopod scrub, Meadows and seeps, Playas; on saline or alkaline substrates; 300-1950 m	INY, KRN, MNO
Ericameria cuneata var. macrocephala Laguna Mountains goldenbush	List 1B.3			Chaparral (on granitic substrate); 1195-1850 m	SDG
Ericameria ophitidis serpentine goldenbush	List 4.3			Chaparral, Lower montane coniferous forest; generally on serpentinite; 1180-1690 m	SHA, TEH, TRI
Erigeron aequifolius Hall's daisy	List 1B.3			Broadleafed upland forest, Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest; on rocky, granitic substrates; 1500-2440 m	FRE, KRN, TUL
Erigeron biolettii streamside daisy	List 3			Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest; in rocky, mesic habitats; 30-1100 m	HUM, MRN, MEN, NAP, SOL, SON
Erigeron breweri var. jacinteus San Jacinto Mountains daisy	List 4.3			Subalpine coniferous forest, Upper montane coniferous forest; on rocky sites; 2700-2900 m	LAX, RIV, SBD
Erigeron nevadincola Nevada daisy	List 2.3			Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland; on rocky sites; 1400-2900 m	LAS, PLA, PLU, SIE
Erigeron parishii Parish's daisy	List 1B.1		T	Mojavean desert scrub, Pinyon and juniper woodland; usually on carbonate, sometimes granitic substrate; 800-2000 m	SBD
Erigeron petrophilus var. sierrensis northern Sierra daisy	List 4.3			Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest; sometimes on serpentinite; 300-2073 m	BUT, ELD, NEV, PLU, SIE, YUB
Erigeron sanctarum Saint's daisy	List 4.2			Chaparral, Cismontane woodland, Coastal scrub; 160-350 m	SBA, SCZ, SLO, SRO

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Eriodictyon altissimum Indian Knob mountainbalm	List 1B.1	E	E	Chaparral (maritime), Cismontane woodland, Coastal scrub; on sandstone; 80-270 m	SLO
Eriogonum argillosum clay-loving buckwheat	List 4.3			Cismontane woodland (on serpentinite or clay substrates); 150-800 m	MNT, SBT, SCL
Eriogonum breedlovei var. breedlovei Breedlove's buckwheat	List 1B.2			Pinyon and juniper woodland, Upper montane coniferous forest; often on carbonate; 1890-2590 m	KRN
Eriogonum breedlovei var. shevockii The Needles buckwheat	List 4.3			Pinyon and juniper woodland, Upper montane coniferous forest; on granitic, rocky substrates; 1615-2575 m	KRN, TUL
Eriogonum eastwoodianum Eastwood's buckwheat	List 1B.3			Cismontane woodland, Valley and foothill grassland; on sandy, shale, talus, or barren clay substrates; 200-1000 m	FRE, MNT
Eriogonum evanidum vanishing wild buckwheat	List 1B.1			Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland; on sandy substrates; 1200-2225 m	RIV, SBD, SDG
Eriogonum gossypinum cottony buckwheat	List 4.2			Chenopod scrub, Valley and foothill grassland; on clay; 100-550 m	FRE, KRN, KNG, SLO
Eriogonum heermannii var. occidentale western Heermann's buckwheat	List 4.2			Cismontane woodland (on clay or shale); 600-1000 m	FRE, MNT, SBT
Eriogonum kennedyi var. austromontanum southern mountain buckwheat	List 1B.2		T	Lower montane coniferous forest (on gravelly substrate), Pebble plain; 1770-2375 m	SBD, VEN
Eriogonum kennedyi var. pinicola Kern buckwheat	List 1B.1			Chaparral, Pinyon and juniper woodland; on clay; 1340-1950 m	KRN
Eriogonum libertini Dubakella Mountain buckwheat	List 4.2			Chaparral, Lower montane coniferous forest; on serpentinite; 1200-1720 m	SHA, SIS, TEH, TRI
Eriogonum luteolum var. caninum Tiburon buckwheat	List 1B.2			Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland; on serpentinite, sandy to gravelly substrates; 0-700 m	ALA, CCA, MRN, SON
Eriogonum microthecum var. alpinum northern limestone buckwheat	List 4.3			Alpine dwarf scrub, Great Basin scrub; sometimes in rocky or gravelly habitats; 2500-3300 m	ALP, MNO, SBD, TUO
Eriogonum microthecum var. johnstonii Johnston's buckwheat	List 1B.3			Subalpine coniferous forest, Upper montane coniferous forest; at rocky sites; 2225-2900 m	LAX, SBD
Eriogonum microthecum var. lacus-ursi Bear Lake buckwheat	List 1B.1			Great Basin scrub, Lower montane coniferous forest; on clay outcrops; 2000-2100 m	SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Eriogonum nudum var. indictum protruding buckwheat	List 4.2			Chaparral, Chenopod scrub, Cismontane woodland; on clay substrates, serpentinite; 150-1463 m	FRE, KRN, MER, MNT, SBT, SLO
Eriogonum nudum var. regirivum Kings River buckwheat	List 1B.2			Cismontane woodland (on carbonate, rocky substrates); 150-300 m	FRE
Eriogonum ovalifolium var. vineum Cushenbury buckwheat	List 1B.1		E	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland; on carbonate; 1400-2440 m	SBD
Eriogonum tripodum tripod buckwheat	List 4.2			Chaparral, Cismontane woodland; often on serpentinite; 200-1600 m	AMA, COL, ELD, GLE, LAK, MPA, NAP, PLA, TEH, TUO
Eriogonum umbellatum var. bahiiforme bay buckwheat	List 4.2			Alpine boulder and rock field, Chaparral, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest; on rocky sites, usually on serpentinite; 1700-2800 m	ALA, COL, CCA, GLE, HUM, LAK, MEN, MNT, NAP, SBT, SCL, SIS, SJQ, STA
Eriogonum umbellatum var. minus alpine sulfur-flowered buckwheat	List 4.3			Meadows and seeps, Upper montane coniferous forest; on volcanic, rocky substrates; 1855-2620 m	LAX, SBD
Eriogonum umbellatum var. torreyanum Donner Pass buckwheat	List 1B.2			Cismontane woodland, Lower montane coniferous forest; on rocky sites, often on serpentinite; 700-2200 m	NEV, PLA, SIE
Eriogonum vestitum Idria buckwheat	List 4.3			Valley and foothill grassland; 235-900 m	FRE, MER, SBT
Eriophyllum confertiflorum var. tanacetiflorum tansy-leaved woolly sunflower	List 4.3			Cismontane woodland, Lower montane coniferous forest; 305-1340 m	CAL, MPA
Eriophyllum jepsonii Jepson's woolly sunflower	List 4.3			Chaparral, Cismontane woodland, Coastal scrub; sometimes on serpentinite; 200-1025 m	ALA, CCA, KRN, MNT, SBT, SCL, SLO, STA, VEN
Eriophyllum lanatum var. hallii Fort Tejon woolly sunflower	List 1B.1			Chaparral, Cismontane woodland; 1065-1500 m	KRN, SBA
Eriophyllum lanatum var. obovatum southern Sierra woolly sunflower	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; on sandy loam substrates; 1114-2500 m	FRE, KRN, SBD, TUL
Eriophyllum nubigenum Yosemite woolly sunflower	List 1B.3			Chaparral, Lower montane coniferous forest, Upper montane coniferous forest; on gravelly, granitic substrates; 1525-2750 m	MAD, MPA, TUO

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Eryngium aristulatum var. hooveri Hoover's button-celery	List 1B.1			Vernal pools; 3-45 m	ALA, SBT, SCL, SDG, SLO
Erysimum capitatum ssp. lompocense San Luis Obispo wallflower	List 4.2			Chaparral, Coastal scrub; on sandy substrates; 60-500 m	SBA, SLO
Erysimum franciscanum San Francisco wallflower	List 4.2			Chaparral, Coastal dunes, Coastal scrub, Valley and foothill grassland; often on serpentinite or granitic substrates, sometimes along roadsides; 0-550 m	MRN, SCL, SCR, SFO, SMT, SON
Erysimum insulare ssp. suffrutescens suffrutescent wallflower	List 4.2			Coastal bluff scrub, Chaparral (maritime), Coastal dunes, Coastal scrub; 0-150 m	LAX, SBA, SLO, VEN
Eschscholzia hypecoides San Benito poppy	List 4.3			Chaparral, Cismontane woodland, Valley and foothill grassland; on serpentinite clay; 325-1500 m	FRE, IMP, MEN, MNT, SBT, SLO
Eschscholzia procera Kernville poppy	List 3			Cismontane woodland (on sandy floodplain); 810-1025 m	KRN
Eucnide rupestris annual rock-nettle	List 2.2			Sonoran desert scrub; 500-600 m	IMP, SDG
Fraxinus parryi chaparral ash	List 2.2			Chaparral; 213-620 m	SDG
Fritillaria agrestis stinkbells	List 4.2			Chaparral, Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland; on clay substrates and sometimes serpentinite; 10-1555 m	ALA, CCA, FRE, KRN, MPA, MEN, MER, MNT, PLA, SAC, SBT, SBA, SCL, SCR, SLO, SMT, STA, TUO, VEN, YUB
Fritillaria brandegeei Greenhorn fritillary	List 1B.3			Lower montane coniferous forest (on granitic substrates); 1415-2100 m	KRN, TUL
Fritillaria pinetorum pine fritillary	List 4.3			Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest; on granitic or metamorphic substrates; 1800-3300 m	ALP, FRE, KRN, LAX, MNO, SBD, TUL, VEN
Galium andrewsii ssp. gatense serpentine bedstraw	List 4.2			Chaparral, Cismontane woodland, Lower montane coniferous forest; on serpentinite, rocky sites; 150-1450 m	ALA, COL, CCA, FRE, LAX, MNT, SBT, SCL, SLO
Galium angustifolium ssp. gabrielense San Antonio Canyon bedstraw	List 4.3			Chaparral, Lower montane coniferous forest; on granitic, sandy or rocky substrates; 1200-2650 m	LAX, SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Galium angustifolium ssp. gracillimum slender bedstraw	List 4.2			Joshua tree "woodland", Sonoran desert scrub; on granitic, rocky substrates; 130-1550 m	RIV, SBD
Galium angustifolium ssp. jacinticum San Jacinto Mountains bedstraw	List 1B.3			Lower montane coniferous forest; 1350-2100 m	RIV
Galium angustifolium ssp. onycense Onyx Peak bedstraw	List 1B.3			Cismontane woodland, Pinyon and juniper woodland; on granitic, rocky substrates; 860-2300 m	KRN, TUL
Galium cliftonsmithii Santa Barbara bedstraw	List 4.3			Cismontane woodland; 200-1220 m	LAX, MNT, SBA, SLO, VEN
Galium jepsonii Jepson's bedstraw	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; on granitic, rocky or gravelly substrates; 1540-2500 m	LAX, SBD
Galium johnstonii Johnston's bedstraw	List 4.3			Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland, Riparian woodland; 1220-2300 m	LAX, RIV, SBD, SDG
Geraea viscida sticky geraea	List 2.3			Chaparral (often in disturbed areas); 450-1700 m	IMP, SDG
Gilia interior inland gilia	List 4.3			Cismontane woodland, Joshua tree "woodland", Lower montane coniferous forest; at rocky sites; 700-1700 m	KRN, TUL
Gilia latiflora ssp. cuyamensis Cuyama gilia	List 4.3			Pinyon and juniper woodland (on sandy substrates); 600-2000 m	KRN, LAX, SBA, SLO, VEN
Gilia leptantha ssp. leptantha San Bernardino gilia	List 1B.3			Lower montane coniferous forest (on sandy or gravelly substrates); 1500-2560 m	SBD
Gilia leptantha ssp. pinetorum pine gilia	List 4.3			Lower montane coniferous forest (on rocky or sandy substrate); 1500-2800 m	KRN, SBA, SLO, VEN
Githopsis pulchella ssp. serpentinicola serpentine bluecup	List 4.3			Cismontane woodland; on serpentinite or Ione formation; 320-610 m	AMA, ELD, MPA, STA, TUO
Githopsis tenella delicate bluecup	List 1B.3			Chaparral, Cismontane woodland; in mesic habitats; 1100-1900 m	KRN, MNT, TUL
Goodmania luteola golden goodmania	List 4.2			Mojavean desert scrub, Meadows and seeps, Playas, Valley and foothill grassland; on alkaline or clay substrates; 20-2200 m	FRE, INY, KRN, LAX, MAD, MNO, TUL
Grindelia hirsutula var. hallii San Diego gumplant	List 1B.2			Chaparral, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland; 185-1745 m	SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Grusonia parishii Parish club-cholla	List 2.3			Joshua tree "woodland", Mojavean desert scrub, Sonoran desert scrub; on sandy, rocky substrates; 300-1524 m	IMP, RIV, SBD
Hackelia amethystina amethyst stickseed	List 4.3			Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; in openings, disturbed areas; 1500-2130 m	GLE, LAK, LAS, MEN, PLA, PLU, TEH, TRI
Harmonia doris-nilesiae Niles' harmonia	List 1B.1			Chaparral, Cismontane woodland, Lower montane coniferous forest; usually on serpentinite, in openings, on rocky sites; 650-1660 m	SHA, TEH, TRI
Harmonia stebbinsii Stebbins' harmonia	List 1B.2			Chaparral, Lower montane coniferous forest; on serpentinite; 400-1580 m	SHA, TEH, TRI
Harpagonella palmeri Palmer's grapplinghook	List 4.2			Chaparral, Coastal scrub, Valley and foothill grassland; on clay; 20-955 m	LAX, ORA, RIV, SCT, SDG
Helianthus exilis serpentine sunflower	List 4.2			Chaparral, Cismontane woodland; at seeps on serpentinite; 150-1525 m	COL, GLE, LAK, NAP, SCL, SHA, SIS, SON, TEH, TRI
Hesperevax caulescens hogwallow starfish	List 4.2			Valley and foothill grassland (in mesic habitats, on clay substrates), Vernal pools; 0-505 m	ALA, AMA, BUT, COL, CCA, FRE, GLE, KRN, MER, MNT, NAP, SAC, SDG, SJQ, SLO, SOL, STA, SUT, TEH, YOL
Heterotheca shevockii Shevock's golden-aster	List 1B.3			Chaparral, Cismontane woodland; on sandy substrates; 230-900 m	KRN
Heuchera abramsii Abrams' alumroot	List 4.3			Upper montane coniferous forest (at rocky sites); 2800-3500 m	LAX, SBD
Heuchera brevistaminea Laguna Mountains alumroot	List 1B.3			Broadleafed upland forest, Chaparral, Cismontane woodland, Riparian forest; at rocky sites; 1370-2000 m	SDG
Heuchera elegans urn-flowered alumroot	List 4.3			Cismontane woodland, Lower montane coniferous forest, Riparian forest (montane), Upper montane coniferous forest; on rocky sites; 1155-2650 m	KRN, LAX, SBD
Heuchera parishii Parish's alumroot	List 1B.3			Alpine boulder and rock field, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest; on rocky, sometimes carbonate substrates; 1500-3800 m	RIV, SBD, SIS

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Heuchera rubescens var. versicolor San Diego County alumroot	List 2.3			Chaparral, Lower montane coniferous forest; on rocky substrate; 1500-4000 m	SDG
Holocarpha virgata ssp. elongata graceful tarplant	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; 60-1100 m	ORA, RIV, SDG
Hordeum intercedens vernal barley	List 3.2			Coastal dunes, Coastal scrub, Valley and foothill grassland (on saline flats and in depressions), Vernal pools; 5-1000 m	ANA, FRE, KNG, LAX, MNO, ORA, RIV, SBR, SBT, SBA, SCM, SCT, SCZ, SDG, SMI, SMT, SNI, SRO, VEN
Horkelia wilderae Barton Flats horkelia	List 1B.1			Chaparral (edges), Lower montane coniferous forest, Upper montane coniferous forest; 1675-2925 m	SBD
Horkelia yadonii Santa Lucia horkelia	List 4.2			Broadleafed upland forest, Chaparral, Cismontane woodland, Meadows and seeps, Riparian woodland; on granitic, sandy substrates; 300-1900 m	MNT, SBA, SLO
Horsfordia alata pink velvet-mallow	List 4.3			Sonoran desert scrub (on rocky sites); 100-500 m	IMP, RIV
Horsfordia newberryi Newberry's velvet-mallow	List 4.3			Sonoran desert scrub (on rocky sites); 3-800 m	IMP, RIV, SDG
Hulsea californica San Diego sunflower	List 1B.3			Chaparral, Lower montane coniferous forest, Upper montane coniferous forest; in openings and burned areas; 915-2915 m	RIV, SDG
Hulsea mexicana Mexican hulsea	List 2.3			Chaparral (on volcanic substrates, often on burns or disturbed areas); 1200-1200 m	IMP, SDG
Hulsea vestita ssp. callicarpha beautiful hulsea	List 4.2			Chaparral, Lower montane coniferous forest; on rocky or gravelly, granitic substrates; 915-3050 m	RIV, SDG
Hulsea vestita ssp. gabrielensis San Gabriel Mountains sunflower	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; on rocky sites; 1500-2500 m	LAX, SBD, VEN
Hulsea vestita ssp. parryi Parry's sunflower	List 4.3			Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest; on granitic or carbonate, rocky substrates, in openings; 1370-2895 m	KRN, LAX, MNO, SBD, VEN
Hulsea vestita ssp. pygmaea pygmy hulsea	List 1B.3			Alpine boulder and rock field, Subalpine coniferous forest; on granitic, gravelly substrates; 2835-3900 m	SBD, TUL

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Hymenothrix wrightii Wright's hymenothrix	List 4.3			Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; 1400-1550 m	SDG
Imperata brevifolia California satintail	List 2.1			Chaparral, Coastal scrub, Mojavean desert scrub, Meadows and seeps (often alkali), Riparian scrub; in mesic habitats; 0-500 m	BUT, FRE, INY, KRN, IMP, LAK, LAX, ORA, RIV, SBD, TEH, TUL, VEN
Ipomopsis tenuifolia slender-leaved ipomopsis	List 2.3			Chaparral, Pinyon and juniper woodland, Sonoran desert scrub; on gravelly or rocky substrates; 100-1200 m	IMP, SDG
Iris longipetala coast iris	List 4.2			Coastal prairie, Lower montane coniferous forest, Meadows and seeps; in mesic habitats; 0-600 m	ALA, CCA, HUM, MRN, MEN, MNT, NAP, SBT, SCL, SFO, SMT, SOL, SON
Isocoma menziesii var. diabolica Satan's goldenbush	List 4.2			Cismontane woodland; 15-400 m	SBT, SCL
Ivesia sericoleuca Plumas ivesia	List 1B.2			Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Vernal pools; in vernally mesic habitats, usually on volcanic substrates; 1465-2200 m	LAS, NEV, PLA, PLU, SIE
Jepsonia heterandra foothill jepsonii	List 4.3			Cismontane woodland, Lower montane coniferous forest; on rocky, metamorphic sites; 50-500 m	AMA, CAL, ELD, MPA, STA, TUO
Juglans californica Southern California black walnut	List 4.2			Chaparral, Cismontane woodland, Coastal scrub; alluvial habitats; 50-900 m	LAX, ORA, RIV, SBA, SBD, SDG, VEN
Juncus acutus ssp. leopoldii southwestern spiny rush	List 4.2			Coastal dunes (in mesic habitats), Meadows and seeps (alkaline seeps), Marshes and swamps (coastal salt); 3-900 m	IMP, LAX, ORA, SBA, SDG, SLO, VEN
Juncus cooperi Cooper's rush	List 4.3			Meadows and seeps (in mesic, alkaline or saline habitats); -260-1770 m	IMP, INY, RIV, SBD, SDG
Juncus duranii Duran's rush	List 4.3			Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; in mesic habitats; 1768-2804 m	LAX, RIV, SBD
Juncus marginatus var. marginatus red-anthered rush	List 2.2			Marshes and swamps; 820-1000 m	NEV

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Juncus nodosus knotted rush	List 2.3			Meadows and seeps, Marshes and swamps (along lake margins); 30-1980 m	INY, SBD, STA, TUL
Lasthenia ferrisiae Ferris' goldfields	List 4.2			Vernal pools (alkaline, clay substrates); 20-700 m	ALA, BUT, COL, CCA, FRE, KRN, KNG, MER, MNT, SAC, SBT, SJQ, SLO, SOL, STA, TUL, VEN, YOL
Lasthenia leptalea Salinas Valley goldfields	List 4.3			Cismontane woodland, Valley and foothill grassland; 60-1065 m	KRN, MNT, SLO
Lathyrus splendens pride-of-California	List 4.3			Chaparral; 200-1525 m	SDG
Lavatera assurgentiflora ssp. assurgentiflora island mallow	List 1B.1			Coastal bluff scrub, Coastal scrub; on sandy or rocky substrates; 15-245 m	ANA, SDG, SMI, SNI, SRO
Layia carnosa beach layia	List 1B.1	E	E	Coastal dunes, Coastal scrub (on sandy substrates); 0-60 m	HUM, MRN, MNT, SBA, SFO
Lepechinia fragrans fragrant pitcher sage	List 4.2			Chaparral; 20-1310 m	LAX, SCT, SCZ, SRO, VEN
Lepechinia rossii Ross' pitcher sage	List 1B.2			Chaparral; 305-790 m	LAX, VEN
Lepidium jaredii ssp. jaredii Jared's pepper-grass	List 1B.2			Valley and foothill grassland (on alkaline, adobe substrates); 335-1005 m	KRN, SLO
Leptosiphon acicularis bristly leptosiphon	List 4.2			Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland; 55-1500 m	ALA, BUT, CCA, FRE, HUM, LAK, MRN, MEN, NAP, SCL, SMT, SON
Leptosiphon ambiguus serpentine leptosiphon	List 4.2			Cismontane woodland, Coastal scrub, Valley and foothill grassland; usually on serpentinite; 120-1130 m	ALA, CCA, MER, SBT, SCL, SCR, SJQ, SMT, STA
Leptosiphon floribundus ssp. hallii Santa Rosa Mountains leptosiphon	List 1B.3			Pinyon and juniper woodland, Sonoran desert scrub; 1000-2000 m	RIV, SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Leptosiphon grandiflorus large-flowered leptosiphon	List 4.2			Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland; usually on sandy substrates; 5-1220 m	ALA, KRN, MAD, MRN, MER, MNT, SBA, SCL, SCR, SFO, SLO, SMT, SON
Leptosiphon latisectus broad-lobed leptosiphon	List 4.3			Broadleafed upland forest, Cismontane woodland; 170-1500 m	COL, DNT, GLE, HUM, LAK, MEN, NAP, SHA, SON, TEH, TRI
Lesquerella kingii ssp. bernardina San Bernardino Mountains bladderpod	List 1B.1		E	Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest; usually on carbonate; 1850-2700 m	SBD
Lessingia glandulifera var. tomentosa Warner Springs lessingia	List 1B.3			Chaparral (on sandy substrates); 870-1220 m	SDG
Lessingia hololeuca woolly-headed lessingia	List 3			Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland; on clay, serpentinite; 15-305 m	ALA, MRN, MNT, NAP, SCL, SMT, SOL, SON, YOL
Lessingia occidentalis western lessingia	List 4.3			Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; on clay or serpentinite; 450-850 m	FRE, MNT, SBT
Lessingia tenuis spring lessingia	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest; in openings; 300-2150 m	ALA, KRN, MNT, SBT, SBA, SCL, SLO, STA, VEN
Lewisia brachycalyx short-sepaled lewisia	List 2.2			Lower montane coniferous forest, Meadows and seeps; in mesic habitats; 1370-2300 m	SBD, SDG
Lewisia disepala Yosemite lewisia	List 1B.2			Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest; on granitic, sandy substrates; 1035-3500 m	FRE, KRN, MAD, MPA, TUL, TUO
Lilium humboldtii ssp. humboldtii Humboldt lily	List 4.2			Chaparral, openings, Cismontane woodland, openings, Lower montane coniferous forest; in openings; 90-1195 m	AMA, BUT, CAL, ELD, FRE, MAD, MPA, NEV, PLA, TEH, TUO, YUB
Lilium humboldtii ssp. ocellatum ocellated Humboldt lily	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland; in openings; 30-1800 m	ANA, LAX, ORA, RIV, SBA, SBD, SCZ, SDG, SLO, SRO, VEN

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Lilium rubescens redwood lily	List 4.2			Broadleafed upland forest, Chaparral, Lower montane coniferous forest, North Coast coniferous forest, Upper montane coniferous forest; sometimes on serpentinite, sometimes along roadsides; 30-1715 m	DNT, GLE, HUM, LAK, MEN, NAP, SCR, SHA, SIS, SON, TRI
Limnanthes floccosa ssp. floccosa woolly meadowfoam	List 4.2			Chaparral, Cismontane woodland, Valley and foothill grassland, Vernal pools; in vernally mesic habitats; 60-1095 m	BUT, LAK, NAP, SHA, SIS, TEH, TRI
Linanthus bellus desert beauty	List 2.3			Chaparral (on sandy substrates); 1000-1400 m	SDG
Lomatium repostum Napa lomatium	List 4.3			Chaparral, Cismontane woodland; on serpentinite; 90-830 m	LAK, NAP, SOL, SON
Lomatium shevockii Owens Peak lomatium	List 1B.3			Lower montane coniferous forest, Upper montane coniferous forest; on rocky sites; 1770-2200 m	KRN
Lotus crassifolius var. otayensis Otay Mountain lotus	List 1B.1			Chaparral (on metavolcanic substrates, often in disturbed areas); 915-1005 m	SDG
Lotus formosissimus harlequin lotus	List 4.2			Broadleafed upland forest, Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps, North Coast coniferous forest, Valley and foothill grassland; 0-700 m	DNT, HUM, MRN, MEN, MNT, SBT, SCR, SFO, SLO, SMT, SON
Lotus haydonii pygmy lotus	List 1B.3			Pinyon and juniper woodland, Sonoran desert scrub; on rocky sites; 520-1200 m	IMP, SDG
Lupinus excubitus var. johnstonii interior bush lupine	List 4.3			Chaparral, Lower montane coniferous forest; on decomposed granitic; 1500-2500 m	LAX
Lupinus excubitus var. medius Mountain Springs bush lupine	List 1B.3			Pinyon and juniper woodland, Sonoran desert scrub; 425-1370 m	IMP, SDG
Lupinus ludovicianus San Luis Obispo County lupine	List 1B.2			Chaparral, Cismontane woodland; on sandstone or sandy substrates; 50-525 m	SLO
Lycium californicum California box-thorn	List 4.2			Coastal bluff scrub, Coastal scrub; 5-150 m	ANA, LAX, ORA, SBR, SBD, SCM, SCT, SCZ, SDG, SMI, SNI

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Lycopodiella inundata inundated bog club-moss	List 2.2			Bogs and fens (in coastal areas), Lower montane coniferous forest (in mesic habitats), Marshes and swamps (along lake margins); 5-1000 m	HUM, NEV
Lyrocarpa coulteri var. palmeri Coulter's lyrepod	List 4.3			Sonoran desert scrub (on gravelly or rocky substrates); 120-795 m	IMP, SDG
Malacothamnus niveus San Luis Obispo County bush-mallow	List 4.3			Chaparral; 365-790 m	MNT, SBA, SLO
Malacothrix incana dunedelion	List 4.3			Coastal dunes, Coastal scrub; 2-35 m	SBA, SCM, SCZ, SDG, SLO, SMI, SNI, SRO, VEN
Malacothrix phaeocarpa dusky-fruited malacothrix	List 4.3			Closed-cone coniferous forest, Chaparral; in openings, burned or disturbed areas; 100-1400 m	MNT, SBA, SCL, SLO
Malacothrix saxatilis var. saxatilis cliff malacothrix	List 4.2			Coastal bluff scrub, Coastal scrub; 3-200 m	ORA, SBA, VEN
Malaxis monophyllos ssp. brachypoda white bog adder's-mouth	List 2.1			Bogs and fens, Meadows and seeps, Upper montane coniferous forest; in mesic habitats; 2200-2743 m	RIV, SBD
Malperia tenuis brown turbans	List 2.3			Sonoran desert scrub (on sandy substrates); 15-335 m	IMP, SDG
Meesia triquetra three-ranked hump-moss	List 4.2			Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest; mesic sites; 1300-2953 m	ALP, BUT, ELD, FRE, HUM, LAS, MAD, MPA, NEV, PLA, PLU, RIV, SHA, SIE, SIS, TEH, TUL
Meesia uliginosa broad-nerved hump-moss	List 2.2			Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest; on sites with damp soil; 1300-2804 m	ELD, FRE, MAD, NEV, PLU, RIV, SIE, SIS, TEH, TUL
Mentzelia eremophila solitary blazing star	List 4.2			Mojavean desert scrub; 700-1220 m	INY, KRN, SBD
Mentzelia hirsutissima hairy stickleaf	List 2.3			Sonoran desert scrub (on rocky sites); 0-700 m	IMP, SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Micropus amphibolus Mt. Diablo cottonweed	List 3.2			Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland; in rocky habitats; 45-825 m	ALA, COL, CCA, LAK, MRN, MNT, NAP, SBA, SCL, SCR, SJQ, SLO, SOL, SON
Microseris douglasii ssp. platycarpha small-flowered microseris	List 4.2			Cismontane woodland, Coastal scrub, Valley and foothill grassland, Vernal pools; on clay; 15-1070 m	LAX, ORA, RIV, SCM, SCT, SDG
Microseris sylvatica sylvan microseris	List 4.2			Chaparral, Cismontane woodland, Great Basin scrub, Pinyon and juniper woodland, Valley and foothill grassland; on serpentinite; 45-1500 m	ALA, AMA, BUT, COL, CCA, FRE, GLE, KRN, LAS, LAX, MER, NAP, NEV, PLA, SBT, SCL, SOL, STA, SUT, TEH, TUL, TUO, YOL
Mimulus aridus low bush monkeyflower	List 4.3			Chaparral (on rocky sites); 750-1100 m	IMP, SDG
Mimulus clevelandii Cleveland's bush monkeyflower	List 4.2			Chaparral, Cismontane woodland, Lower montane coniferous forest; on gabbroic, rocky substrates, often in disturbed areas or openings; 815-2000 m	ORA, RIV, SDG
Mimulus diffusus Palomar monkeyflower	List 4.3			Chaparral, Lower montane coniferous forest; on sandy or gravelly substrates; 1220-1830 m	ORA, RIV, SDG
Mimulus exiguus San Bernardino Mountains monkeyflower	List 1B.2			Meadows and seeps, Pebble plain, Upper montane coniferous forest; in mesic habitats, on clay; 1800-2315 m	SBD
Mimulus filicaulis slender-stemmed monkeyflower	List 1B.2			Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; in vernally mesic habitats; 900-1750 m	MPA, TUO
Mimulus fremontii var. vandenbergensis Vandenberg monkeyflower	List 1B.1			Chaparral (at Burton Mesa), Cismontane woodland, Coastal dunes; Central dune scrub; on sandy substrates, often in disturbed areas; 75-120 m	SBA
Mimulus glaucescens shield-bracted monkeyflower	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; on serpentinite at seeps; 60-1240 m	BUT, COL, LAK, NEV, SHA, TEH
Mimulus grayi Gray's monkeyflower	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; in mesic habitats; 550-2900 m	FRE, MAD, MPA, TUL, TUO

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Mimulus inconspicuus small-flowered monkeyflower	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest; in mesic habitats; 274-760 m	AMA, BUT, CAL, FRE, MPA, TUO
Mimulus johnstonii Johnston's monkeyflower	List 4.3			Lower montane coniferous forest (on scree, in disturbed areas, on rocky or gravelly sites, along roadsides); 975-2920 m	LAX, SBD
Mimulus laciniatus cut-leaved monkeyflower	List 4.3			Chaparral, Lower montane coniferous forest, Upper montane coniferous forest; 490-2650 m	AMA, BUT, FRE, MAD, MPA, PLU, TUL, TUO
Mimulus microphyllus small-leaved monkeyflower	List 4.3			Meadows and seeps; 1770-2450 m	KRN
Mimulus mohavensis Mojave monkeyflower	List 1B.2			Joshua tree "woodland", Mojavean desert scrub; on sandy or gravelly substrates, often in washes; 600-1200 m	SBD
Mimulus purpureus little purple monkeyflower	List 1B.2			Meadows and seeps, Pebble plain, Upper montane coniferous forest; 1900-2300 m	RIV, SBD
Mimulus shevockii Kelso Creek monkeyflower	List 1B.2			Joshua tree "woodland", Pinyon and juniper woodland; on granitic or metamorphic, sandy or gravelly substrates; 800-1340 m	KRN
Mirabilis tenuiloba slender-lobed four o'clock	List 4.3			Sonoran desert scrub; 300-1095 m	IMP, RIV, SBD, SDG
Monardella antonina ssp. benitensis San Benito monardella	List 4.3			Chaparral (on serpentinite); 500-915 m	MNT, SBT, SLO
Monardella candicans Sierra monardella	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest; sandy or gravelly sites; 150-800 m	AMA, CAL, ELD, FRE, KRN, MAD, MPA, NEV, PLA, SJQ, STA, TUL, TUO
Monardella cinerea gray monardella	List 4.3			Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest; 1800-3050 m	LAX, SBD
Monardella leucocephala Merced monardella	List 1A			Valley and foothill grassland (in sandy, mesic habitats); 35-100 m	MER, STA
Monardella nana ssp. leptosiphon San Felipe monardella	List 1B.2			Chaparral, Lower montane coniferous forest; 1200-1855 m	RIV, SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Monardella stoneana Jennifer's monardella	List 1B.2			Closed-cone coniferous forest, Chaparral, Coastal scrub, Riparian scrub; usually on rocky intermittent streambeds; 10-790 m	SDG
Monardella undulata curly-leaved monardella	List 4.2			Closed-cone coniferous forest, Chaparral, Coastal dunes, Coastal prairie, Coastal scrub, Lower montane coniferous forest (ponderosa pine sandhills); on sandy substrates; 0-305 m	MRN, MNT, SBA, SCR, SFO, SLO, SMT, SON
Monardella viridis ssp. saxicola rock monardella	List 4.2			Chaparral, Lower montane coniferous forest; on rocky sites; 500-1800 m	LAX, SBD
Monardella viridis ssp. viridis green monardella	List 4.3			Broadleafed upland forest, Chaparral, Cismontane woodland; 100-1010 m	LAK, NAP, SOL, SON
Mucronea californica California spineflower	List 4.2			Chaparral, Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland; on sandy substrates; 0-1400 m	KRN, LAX, MNT, RIV, SBA, SBD, SDG, SLO, VEN
Muhlenbergia appressa appressed muhly	List 2.2			Coastal scrub, Mojavean desert scrub, Valley and foothill grassland; on rocky sites; 20-1600 m	LAX, SBD, SCM
Muhlenbergia californica California muhly	List 4.3			Chaparral, Coastal scrub, Lower montane coniferous forest, Meadows and seeps; in mesic habitats, at seeps and streambanks; 100-2000 m	LAX, RIV, SBD
Muhlenbergia jonesii Jones' muhly	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; 1130-2130 m	LAS, MOD, MNO, NEV, PLA, PLU, SHA, SIS, TRI
Muilla coronata crowned muilla	List 4.2			Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland; 765-1960 m	INY, KRN, LAX, SBD, TUL
Navarretia cotulifolia cotula navarretia	List 4.2			Chaparral, Cismontane woodland, Valley and foothill grassland; on adobe substrates; 4-1830 m	ALA, BUT, COL, CCA, GLE, LAK, MRN, MEN, NAP, SBT, SCL, SIS, SOL, SON, SUT, YOL
Navarretia eriocephala hoary navarretia	List 4.3			Cismontane woodland, Valley and foothill grassland; on vernally mesic sites; 105-400 m	AMA, CAL, ELD, PLA, SAC
Navarretia heterandra Tehama navarretia	List 4.3			Valley and foothill grassland (in mesic habitats), Vernal pools; 30-1010 m	BUT, COL, LAK, NAP, SHA, TEH, TRI, YUB

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Navarretia jaredii Paso Robles navarretia	List 4.3			Cismontane woodland, Meadows and seeps, Valley and foothill grassland, Vernal pools; on clay, serpentinite substrates; 200-645 m	FRE, MNT, SBT, SBA, SLO, VEN
Navarretia nigelliformis ssp. nigelliformis adobe navarretia	List 4.2			Valley and foothill grassland (in vernally mesic habitats), Vernal pools (sometimes); on clay substrates, sometimes on serpentinite; 100-1000 m	ALA, BUT, COL, CCA, FRE, KRN, MER, MNT, PLA, SUT, TUL
Navarretia prolifera ssp. lutea yellow bur navarretia	List 4.3			Chaparral, Cismontane woodland; 900-1402 m	ELD, PLA
Nemacladus gracilis slender nemacladus	List 4.3			Cismontane woodland, Valley and foothill grassland; on sandy or gravelly substrates; 120-1900 m	FRE, KRN, KNG, LAX, MER
Nemophila parviflora var. quercifolia oak-leaved nemophila	List 4.3			Cismontane woodland, Lower montane coniferous forest; 700-2200 m	FRE, KRN, MAD, TUL
Ophioglossum californicum California adder's-tongue	List 4.2			Chaparral, Valley and foothill grassland, Vernal pools (at margins); in mesic habitats; 60-525 m	AMA, BUT, MPA, MER, MNT, ORA, SBD, SDG, STA, TUO
Ophioglossum pusillum northern adder's-tongue	List 2.2			Marshes and swamps (along margins), Valley and foothill grassland (on mesic sites); 1000-2000 m	ELD, LAK, MEN, SIS
Opuntia munzii Munz' cholla	List 1B.3			Sonoran desert scrub (on sandy or gravelly substrates); 150-600 m	IMP, RIV
Opuntia wigginsii Wiggins' cholla	List 3.3			Sonoran desert scrub (on sandy substrates); 30-885 m	IMP, RIV, SBD, SDG
Opuntia wolfii Wolf's cholla	List 4.3			Sonoran desert scrub; 100-1200 m	IMP, SDG
Orobanche parishii ssp. brachyloba short-lobed broomrape	List 4.2			Coastal bluff scrub, Coastal dunes, Coastal scrub; on sandy substrates; 3-305 m	LAX, SBA, SCT, SCZ, SDG, SLO, SMI, SNI, SRO
Orobanche valida ssp. valida Rock Creek broomrape	List 1B.2			Chaparral, Pinyon and juniper woodland; on granitic substrates; 1250-2000 m	LAX, SBD, VEN
Orthotrichum shevockii Shevock's bristle-moss	List 1B.3			Joshua tree "woodland", Pinyon and juniper woodland; on granitic, rocky substrate; 750-2100 m	KRN, MNO
Oxytropis oreophila var. oreophila rock-loving oxytrope	List 2.3			Alpine boulder and rock field, Subalpine coniferous forest; on gravelly or rocky substrates; 3400-3800 m	SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Packera bernardina San Bernardino ragwort	List 1B.2			Meadows and seeps (sometimes alkaline), Pebble plain, Upper montane coniferous forest; 1800-2300 m	SBD
Packera ionophylla Tehachapi ragwort	List 4.3			Lower montane coniferous forest, Upper montane coniferous forest; on granitic, rocky substrates; 1500-2700 m	KRN, LAX, SBD
Parnassia cirrata var. cirrata San Bernardino grass-of-Parnassus	List 1B.3			Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; in mesic habitats, on streamsides, sometimes on calcareous substrates; 1250-2440 m	LAX, SBD, SHA, SIS, TRI
Penstemon clevelandii var. connatus San Jacinto beardtongue	List 4.3			Chaparral, Pinyon and juniper woodland, Sonoran desert scrub; on rocky sites; 400-1500 m	IMP, RIV, SDG
Penstemon heterodoxus var. shastensis Shasta beardtongue	List 4.3			Broadleafed upland forest, Chaparral, Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; on volcanic, clay loam substrates; 1100-2400 m	BUT, LAS, MOD, PLU, SHA, SIS
Penstemon thurberi Thurber's beardtongue	List 4.2			Chaparral, Joshua tree "woodland", Pinyon and juniper woodland, Sonoran desert scrub; 500-1220 m	IMP, RIV, SBD, SDG
Pentachaeta aurea golden-rayed pentachaeta	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland, Valley and foothill grassland; 80-1850 m	LAX, ORA, RIV, SBD, SDG
Pentachaeta fragilis fragile pentachaeta	List 4.3			Chaparral, Lower montane coniferous forest (in sandy habitats); 45-2100 m	KRN, MAD, MER, MNT, SBA, SLO, TUO
Perideridia bacigalupii Bacigalupi's yampah	List 4.2			Chaparral, Lower montane coniferous forest; on serpentinite; 450-1000 m	AMA, BUT, CAL, KRN, MAD, MPA, NEV, TUO, YUB
Perideridia gairdneri ssp. gairdneri Gairdner's yampah	List 4.2			Broadleafed upland forest, Chaparral, Coastal prairie, Valley and foothill grassland, Vernal pools; in vernally mesic habitats; 0-365 m	CCA, DNT, KRN, LAX, MRN, MEN, MNT, NAP, ORA, SBT, SCL, SCR, SDG, SLO, SMT, SOL, SON
Perideridia pringlei adobe yampah	List 4.3			Chaparral, Cismontane woodland, Coastal scrub, Pinyon and juniper woodland; on serpentinite, often on clay; 300-1800 m	KRN, LAX, MNT, SBA, SLO, TUL, VEN

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Petradoria pumila ssp. pumila rock goldenrod	List 4.3			Pinyon and juniper woodland (on rocky, carbonate substrates); 1070-3400 m	SBD, TUL
Phacelia cicutaria var. hubbyi Hubby's phacelia	List 4.2			Chaparral, Coastal scrub, Valley and foothill grassland; on gravelly, rocky substrates, talus; 0-1000 m	KRN, LAX, SBA, VEN
Phacelia exilis Transverse Range phacelia	List 4.3			Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest; on sandy or gravelly substrates; 1100-2700 m	KRN, LAX, SBD, TUL, VEN
Phacelia mohavensis Mojave phacelia	List 4.3			Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland; on sandy or gravelly substrates; 1400-2500 m	LAX, SBD, TUL
Phacelia novenmillensis Nine Mile Canyon phacelia	List 1B.2			Broadleafed upland forest, Cismontane woodland, Pinyon and juniper woodland, Upper montane coniferous forest; on sandy or gravelly substrates; 1645-2640 m	INY, KRN, TUL
Phacelia parishii Parish's phacelia	List 1B.1			Mojavean desert scrub, Playas; on clay or alkaline substrates; 540-1200 m	SBD
Phacelia ramosissima var. austrolitoralis south coast branching phacelia	List 4.2			Chaparral, Coastal dunes, Coastal scrub, Marshes and swamps (coastal salt); on sandy, sometimes rocky substrates; 6-300 m	LAX, MNT, ORA, SBA, SDG, SLO, VEN
Phacelia stebbinsii Stebbins' phacelia	List 1B.2			Cismontane woodland, Lower montane coniferous forest, Meadows and seeps; 610-2010 m	ELD, NEV, PLA
Phacelia suaveolens ssp. keckii Santiago Peak phacelia	List 1B.3			Closed-cone coniferous forest, Chaparral; 610-1600 m	ORA, RIV
Phlox dolichantha Big Bear Valley phlox	List 1B.2			Pebble plain, Upper montane coniferous forest (in openings); 1830-2970 m	SBD
Pickeringia montana var. tomentosa Montana chaparral pea	List 4.3			Chaparral; on gabbroic, granitic, clay substrates; 0-1700 m	LAX, ORA, RIV, SBD, SDG
Pilostyles thurberi Thurber's pilostyles	List 4.3			Sonoran desert scrub; 0-365 m	IMP, RIV, SDG
Piperia colemanii Coleman's rein orchid	List 4.3			Chaparral, Lower montane coniferous forest; often on sandy sites; 1200-2300 m	BUT, CAL, COL, ELD, FRE, MAD, MPA, PLA, PLU, SHA, SIS, TEH, TUL, TUO

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Piperia cooperi chaparral rein orchid	List 4.2			Chaparral, Cismontane woodland, Valley and foothill grassland; 15-1585 m	LAX, ORA, RIV, SBD, SCT, SDG, VEN
Piperia michaelii Michael's rein orchid	List 4.2			Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest ; 3-915 m	ALA, AMA, BUT, CCA, FRE, HUM, LAX, MRN, MNT, SBT, SBA, SCL, SCR, SCZ, SFO, SLO, SMT, STA, TUL, TUO, VEN, YUB
Plagiobothrys chorisianus var. hickmanii Hickman's popcorn-flower	List 4.2			Chaparral, Coastal prairie, Coastal scrub; in mesic habitats; 15-160 m	MNT, SBT, SCL, SCR, SLO, SMT
Plagiobothrys glyptocarpus var. modestus Cedar Crest popcorn-flower	List 3			Cismontane woodland, Valley and foothill grassland (in mesic habitats); 870-870 m	NEV, YUB
Plagiobothrys myosotoides forget-me-not popcorn-flower	List 4.3			Chaparral; 500-2000 m	FRE, SCL, TUL
Poa atropurpurea San Bernardino blue grass	List 1B.2		E	Meadows and seeps; 1360-2455 m	SBD, SDG
Podistera nevadensis Sierra podistera	List 4.3			Alpine boulder and rock field; 3000-4000 m	ALP, ELD, MNO, PLA, SBD, TUO
Polygala acanthoclada thorny milkwort	List 2.3			Chenopod scrub, Joshua tree "woodland", Pinyon and juniper woodland; 760-2285 m	RIV, SBD
Polygala cornuta var. fishiae Fish's milkwort	List 4.3			Chaparral, Cismontane woodland, Riparian woodland; 100-1100 m	LAX, ORA, RIV, SBA, SDG, VEN
Polystichum kruckebergii Kruckeberg's sword fern	List 4.3			Subalpine coniferous forest, Upper montane coniferous forest; on rocky sites; 2100-3200 m	ALP, BUT, PLU, SBD, SHA, SIE, SIS, TUO
Portulaca halimoides desert portulaca	List 4.2			Joshua tree "woodland" (on sandy substrates); 1000-1200 m	RIV, SBD
Potamogeton epihydrus ssp. nuttallii Nuttall's pondweed	List 2.2			Marshes and swamps (in assorted shallow freshwater habitats); 369-1900 m	ELD, MPA, MEN, MOD, PLU, SHA
Potentilla glandulosa ssp. ewanii Ewan's cinquefoil	List 1B.3			Lower montane coniferous forest (near seeps and springs); 1900-2400 m	LAX, SBD
Proboscidea althaeifolia desert unicorn-plant	List 4.3			Sonoran desert scrub (on sandy substrates); 150-1000 m	IMP, RIV, SBD, SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Prunus fasciculata var. punctata sand almond	List 4.3			Chaparral (maritime), Cismontane woodland, Coastal dunes, Coastal scrub; on sandy substrates; 15-200 m	SBA, SLO
Pseudognaphalium leucocephalum white rabbit-tobacco	List 2.2			Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland; on sandy, gravelly substrates; 0-2100 m	LAX, ORA, RIV, SBA, SDG, SLO, VEN
Pseudostellaria sierrae Sierra starwort	List 3.2			Chaparral, Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest; 1250-2194 m	ELD, MPA, NEV, PLA, PLU, TUO
Psilocarphus brevissimus var. multiflorus Delta woolly-marbles	List 4.2			Vernal pools; 10-500 m	ALA, NAP, SCL, SDG, SJQ, SOL, STA, YOL
Psorothamnus arborescens var. arborescens Mojave indigo-bush	List 4.3			Mojavean desert scrub, Riparian scrub; 400-1185 m	KRN, SBD
Puccinellia parishii Parish's alkali grass	List 1B.1			Meadows and seeps (at alkaline springs and seeps); 700-1000 m	KRN, SBD
Pyrrocoma uniflora var. gossypina Bear Valley pyrrocoma	List 1B.2			Meadows and seeps, Pebble plain; 1600-2300 m	SBD
Quercus cedrosensis Cedros Island oak	List 2.2			Closed-cone coniferous forest, Chaparral, Coastal scrub; 255-490 m	SDG
Quercus durata var. gabrielensis San Gabriel oak	List 4.2			Chaparral, Cismontane woodland; 450-1000 m	LAX
Quercus engelmannii Engelmann oak	List 4.2			Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland; 120-1300 m	LAX, ORA, RIV, SCT, SDG
Quercus parvula var. parvula Santa Cruz Island oak	List 4.2			Closed-cone coniferous forest, Chaparral, Cismontane woodland; 30-915 m	SBA, SCZ
Ranunculus lobbii Lobb's aquatic buttercup	List 4.2			Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools; in mesic habitats; 15-470 m	ALA, CCA, MRN, MEN, NAP, SAC, SCL, SCR, SMT, SOL, SON
Ribes amarum var. hoffmannii Hoffmann's bitter gooseberry	List 3			Chaparral, Riparian woodland; 150-1190 m	SBA, SDG
Ribes menziesii var. ixoderme aromatic canyon gooseberry	List 1B.2			Chaparral, Cismontane woodland; 610-1160 m	FRE, KRN, TUL

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Ribes roezlii var. amictum hoary gooseberry	List 4.3			Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest; 120-2300 m	HUM, LAK, MEN, SHA, TRI
Ribes victoris Victor's gooseberry	List 4.3			Broadleafed upland forest, Chaparral; in mesic, shady habitats; 100-750 m	MRN, MEN, NAP, SOL, SON
Romneya coulteri Coulter's matilija poppy	List 4.2			Chaparral, Coastal scrub; often in burns; 20-1200 m	LAX, ORA, RIV, SDG
Rorippa gambelii Gambel's water cress	List 1B.1	E	E	Marshes and swamps (freshwater or brackish); 5-330 m	LAX, ORA, SBA, SBD, SDG, SLO
Rupertia rigida Parish's rupertia	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; 700-2500 m	RIV, SBD, SDG
Saltugilia caruifolia caraway-leaved woodland-gilia	List 4.3			Chaparral, Lower montane coniferous forest; on sandy substrates, in openings; 1400-2300 m	RIV, SDG
Salvia eremostachya desert sage	List 4.3			Sonoran desert scrub (on rocky or gravelly substrates); 700-1400 m	RIV, SDG
Salvia greatae Orocopia sage	List 1B.3			Mojavean desert scrub, Sonoran desert scrub; -40-825 m	IMP, RIV, SBD
Sanicula hoffmannii Hoffmann's sanicle	List 4.3			Broadleafed upland forest, Chaparral, Coastal scrub; often on serpentinite or clay; 30-300 m	MNT, SBA, SCR, SCZ, SLO, SMT, SRO
Sanicula tracyi Tracy's sanicle	List 4.2			Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest; in openings; 100-1585 m	BUT, DNT, HUM, TEH, TRI
Sclerocactus polyancistrus Mojave fish-hook cactus	List 4.2			Great Basin scrub, Joshua tree "woodland", Mojavean desert scrub; usually on carbonate; 640-2320 m	INY, KRN, SBD
Sedum laxum ssp. flavidum pale yellow stonecrop	List 4.3			Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest; on serpentinite or volcanic substrates; 455-2000 m	DNT, GLE, HUM, SHA, SIS, TEH, TRI
Sedum niveum Davidson's stonecrop	List 4.2			Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest; on rocky; 2075-3000 m	RIV, SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Selaginella asprella bluish spike-moss	List 4.3			Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest; on granitic, rocky substrates; 1600-2700 m	KRN, LAX, ORA, RIV, SBD, SDG, TUL
Senecio astephanus San Gabriel ragwort	List 4			Coastal bluff scrub, Chaparral; on rocky slopes; 400-1500 m	KRN, LAX, MNT, SBA, SBD, SDG, SLO
Sidalcea keckii Keck's checkerbloom	List 1B.1		E	Cismontane woodland, Valley and foothill grassland; on serpentinite, clay; 120-425 m	FRE, MER, TUL
Sidalcea malachroides maple-leaved checkerbloom	List 4.2			Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland; often in disturbed areas; 2-730 m	DNT, HUM, MEN, MNT, SCL, SCR, SON
Sidotheca caryophylloides chickweed oxytheca	List 4.3			Lower montane coniferous forest (on sandy substrates); 1114-2600 m	LAX, RIV, SBD, TUL, VEN
Sidotheca emarginata white-margined oxytheca	List 1B.3			Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland; 1200-2500 m	RIV
Silene campanulata ssp. campanulata Red Mountain catchfly	List 4.2	E		Chaparral, Lower montane coniferous forest; usually on serpentinite, rocky sites; 425-2085 m	COL, GLE, MEN, SHA, TEH, TRI
Silene occidentalis ssp. longistipitata long-stiped campion	List 1B.2			Chaparral, Lower montane coniferous forest, Upper montane coniferous forest; 1000-2000 m	BUT, PLU, SHA, THE, TRI
Silene verecunda ssp. verecunda San Francisco campion	List 1B.2			Coastal bluff scrub, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; in sandy habitats; 30-645 m	SCR, SFO, SMT, SUT
Sphenopholis obtusata prairie wedge grass	List 2.2			Cismontane woodland (mesic), Meadows and seeps; 300-2000 m	AMA, FRE, INY, MNO, RIV, SBD, SDG, TUL
Stellaria longifolia long-leaved starwort	List 2.2			Bogs and fens, Meadows and seeps, Riparian woodland, Upper montane coniferous forest; 900-1830 m	BUT, CAL, PLU, SHA
Stellaria obtusa obtuse starwort	List 4.3			Lower montane coniferous forest, Riparian woodland, Upper montane coniferous forest; in mesic habitats, and along streambanks; 150-2135 m	BUT, GLE, HUM, LAS, NEV, PLU, SHA, SIE, TEH, TUO
Streptanthus bernardinus Laguna Mountains jewel-flower	List 4.3			Chaparral, Lower montane coniferous forest; 670-2500 m	RIV, SBD, SDG

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Streptanthus cordatus var. piutensis Piute Mountains jewel-flower	List 1B.2			Broadleafed upland forest, Closed-cone coniferous forest, Pinyon and juniper woodland; on clay or metamorphic substrates; 1095-1735 m	KRN
Streptanthus drepanoides sickle-fruit jewel-flower	List 4.3			Chaparral, Cismontane woodland, Lower montane coniferous forest; on serpentinite; 275-1660 m	BUT, COL, GLE, LAK, MEN, SHA, TEH, TRI
Streptanthus farnsworthianus Farnsworth's jewel-flower	List 4.3			Cismontane woodland; 400-1400 m	FRE, KRN, MAD, TUL
Streptanthus longisiliqus long-fruit jewel-flower	List 4.3			Cismontane woodland, Lower montane coniferous forest; in openings; 715-1500 m	BUT, SHA, TEH
Stylocline sonorensis mesquite neststraw	List 1A			Sonoran desert scrub (on sandy substrates); 425-425 m	RIV
Suaeda taxifolia woolly seablite	List 4.2			Coastal bluff scrub, Coastal dunes, Marshes and swamps (margins of coastal salt); 0-50 m	ANA, LAX, ORA, SBR, SBA, SCM, SCT, SCZ, SDG, SLO, SNI, SRO, VEN
Swertia neglecta pine green-gentian	List 4.3			Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest; 1400-2500 m	KRN, LAX, SBD, VEN
Symphyotrichum greatae Greata's aster	List 1B.3			Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Riparian woodland; in mesic habitats; 300-2010 m	LAX, SBD, VEN
Syntrichopappus lemmonii Lemmon's syntrichopappus	List 4.3			Chaparral, Joshua tree "woodland", Pinyon and juniper woodland; on sandy or gravelly substrates; 500-1830 m	KRN, LAX, MNT, RIV, SBD
Tetracoccus hallii Hall's tetracoccus	List 4.3			Mojavean desert scrub, Sonoran desert scrub; 30-1200 m	IMP, RIV, SBD
Tetradymia argyraea striped horsebrush	List 4.3			Pinyon and juniper woodland (on rocky sites); 1400-2230 m	RIV, SBD
Thermopsis californica var. *argentata* silvery false lupine	List 4.3			Lower montane coniferous forest, Pinyon and juniper woodland; 900-1595 m	KRN, LAS, LAX, MOD, SBA, SHA, SIS, VEN
Thermopsis macrophylla Santa Ynez false lupine	List 1B.3	R		Chaparral (on sandy, granitic substrates, in disturbed areas); 425-1400 m	SBA
Tragia ramosa desert tragia	List 4.3			Chenopod scrub, Pinyon and juniper woodland; on rocky sites; 900-1860 m	RIV, SBD

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Trichostema micranthum small-flowered bluecurls	List 4.3			Lower montane coniferous forest (in mesic habitats), Meadows and seeps; 1525-2300 m	RIV, SBD
Trichostema ovatum San Joaquin bluecurls	List 4.2			Chenopod scrub, Valley and foothill grassland; 65-320 m	FRE, KRN, KNG, TUL
Trichostema rubisepalum Hernandez bluecurls	List 4.3			Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Vernal pools; on volcanic substrates or serpentinite, in gravelly habitats; 300-1000 m	MPA, NAP, SBT, TUO
Trifolium dedeckerae DeDecker's clover	List 1B.3			Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest; on granitic, rocky substrates; 2100-3500 m	INY, KRN, MNO, TUL
Trifolium jokerstii Butte County golden clover	List 1B.2			Valley and foothill grassland (in mesic habitats), Vernal pools; 50-385 m	BUT
Trifolium lemmonii Lemmon's clover	List 4.2			Great Basin scrub, Lower montane coniferous forest; 1500-1830 m	NEV, PLU, SIE
Triquetrella californica coastal triquetrella	List 1B.2			Coastal bluff scrub, Coastal scrub; 10-100 m	CCA, DNT, MRN, MEN, SDG, SFO, SMT, SON
Triteleia lugens dark-mouthed triteleia	List 4.3			Broadleafed upland forest, Chaparral, Coastal scrub, Lower montane coniferous forest; 100-1000 m	LAK, MNT, NAP, SBT, SOL, SON
Twisselmannia californica Kings gold	List 1B.1			Chenopod scrub; 65-65 m	KNG
Veratrum insolitum Siskiyou false-hellebore	List 4.3			Chaparral, Lower montane coniferous forest; on clay substrates; 45-1635 m	DNT, HUM, SHA, SIS, TRI
Viguiera laciniata San Diego County viguiera	List 4.2			Chaparral, Coastal scrub; 60-750 m	ORA, RIV, SDG
Viola tomentosa woolly violet	List 4.2			Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest; gravelly sites; 1435-2000 m	BUT, ELD, NEV, PLA, PLU, SIE

Table A1-2. Special-Status Plant Species Not Known but with Potential to Occur in the CVP/SWP Service Areas[1, 2](contd)

Scientific and Common Names	Status[3]			Habitat	Counties[4]
	CNPS	State	Federal		
Zigadenus micranthus var. fontanus marsh zigadenus	List 4.2			Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps; in vernally mesic habitats, often on serpentinite; 15-1000 m	LAK, MRN, MEN, MNT, NAP, SBT, SCR, SLO, SMT, SON

Notes:

[1] Based on plant habitat, distribution, and status information in the CNPS Rare Plant Inventory (2007), and GIS data layers of vegetation (CDF 2002), General Plan designations (California Resources Agency and University of California Davis 2004), and water district boundaries (Reclamation 2006).

[2] All MSCS species were included in Table X-1.

[3] Status codes are:

CNPS
- 1B Plants rare, threatened, or endangered in California and elsewhere
- 2 Plants rare, threatened, or endangered in California but more common elsewhere
- 3 Plants for which more information is needed – a review list
- 4 Plants of limited distribution – a watch list

State
- R California Rare
- T California Threatened
- E California Endangered

Federal
- T USFWS Threatened
- E USFWS Endangered

[4] County abbreviations follow CNPS (2007).

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Attachment 2
List of Plant Species Observed in the Shasta Lake and Vicinity Portion of the Primary Study Area

Botanical Resources and Wetlands Technical Report

Shasta Lake Water Resources Investigation, California

Prepared by:

United States Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

U.S. Department of the Interior
United States Department of the Interior **June 2013**

Table A2-1. Plant Species Observed at Shasta Lake

Scientific Name	Common Name	Family Name	Site
EMERGENT WETLAND			
Agrostis exarata	Spike bentgrass	Poaceae	SC
Artemesia douglasiana	Mugwort	Asteraceae	SC
Aruncus dioicus var. *pubescens*	Goat's beard	Rosaceae	SC
Carex nudata	Torrent sedge	Cyperaceae	SC
Chenopodium botrys	Jerusalum oak	Chenopodiaceae	SC
Cyperus eriogrostus	Nutsedge	Cyperaceae	SC
Darmera peltata	Umbrella plant	Saxifragaceae	SC
Datisca glomerata	Durango root	Datiscaceae	SC
Digitaria sanguinalis	Large crabgrass	Poaceae	SC
Equisetum arvense	Field horsetail	Equisetaceae	SC
Fraxinus latifolia	Oregon ash	Oleaceae	SC
Iris pseudacorus	Iris	Iridaceae	SC
Lathyrus latifolius	Everlasting peavine	Fabaceae	SC
Mentha pulegium	Pennyroyal	Lamiaceae	SC
Myriophyllum aquaticum	Parrot's feather	Haloragaceae	SC
Panicum acuminatum	Panicgrass	Poaceae	SC
Phalaris spp.	Canarygrass	Poaceae	SC
Phytolacca americana	Pokeweed	Phytolaccaceae	SC
Plantago major	Common plantain	Plantaganaceae	SC
Polygonum spp.	Knotweed	Polygonaceae	SC
Populus fremontii	Fremont cottonwood	Salicaceae	SC
Rubus discolor	Himalayan blackberry	Rosaceae	SC
Rumex crispus	Curly dock	Polygonaceae	SC
Salix exigua	Narrowleaf willow	Salicaceae	SC
Salix gooddingii	Black willow	Salicaceae	SC
Salix laevigata	Red willow	Salicaceae	SC
Salix lucida	Shining willow	Salicaceae	SC
Typha angustifolia	Narrow-leaved cattail	Typhaceae	SC
Vitis californica	California grape	Vitaceae	SC
Xanthium strumarium	Cocklebur	Asteraceae	SC

Table A2-1. Plant Species Observed at Shasta Lake

Scientific Name	Common Name	Family Name	Site
RIPARIAN			
Acer circinatum	Vine maple	Aceraceae	BB, CC, FC, MS, NS, PC, RP, SC, SL
Acer macrophyllum	Bigleaf maple	Aceraceae	BB, CC, DK, FC, LB, MS, NS, PC, RP, SC, SQ, SL, US
Achillea millifolium	Yarrow	Asteraceae	US
Adenocaulon bicolor	Trailplant	Asteraceae	CC, DK, FC
Adiantum capillus-veneris	Southern maiden-hair	Pteridaceae	BB, SQ
Adiantum jordanii	California maiden-hair	Pteridaceae	CC, DK, NS, PC, SL
Aesculus californica	California buckeye	Hippocastanaceae	LB, NS, SC, SL
Agrostis exarata	Spike bentgrass	Poaceae	PC, SC, SL, US
Aira caryophyllea	European hairgrass	Poaceae	BB
Allium amplectens	White lily	Liliaceae	US
Alnus rhombifolia	White alder	Betulaceae	BB, CC, DK, FC, LB, MS, NS, PC, RP, SC, SQ, SL, US
Amelanchier utahensis	Utah serviceberry	Rosaceae	FC, NS, PC, SC, SL, US
Andropogon virginicus var. *virginicus*	Broomsedge bluestem	Poaceae	BB, SQ
Anthoxanthum odoratum	Sweet vernal grass	Poaceae	BB
Antirrhinum spp.	Snapdragon	Scrophulariaceae	LB
Apium graveolens	Celery	Apiaceae	NS
Apocynum cannibinum	Indian hemp	Apocynaceae	NS, SC, US
Aquilegia formosa	Columbine	Ranunculaceae	DK, FC, MS, NS, RP, SC
Arabis glabra var. *glabra*	Smooth rock cress	Brassicaceae	SQ
Aralia californica	California spikenard	Araliaceae	CC, DK, FC, NS, PC, RP, SC, SL, US
Arbutus menziesii	Pacific madrone	Ericaceae	NS
Arctostaphylos viscida var. *viscida*	Whiteleaf manzanita	Ericaceae	BB
Aristolochia californica	Pipevine	Aristolochiaceae	BB, NS, RP, SQ
Artemisia douglasiana	Mugwort	Asteraceae	BB, DK, FC, RP, SQ, US
Aruncus dioicus var. *pubescens*	Goat's beard	Rosaceae	CC, DK, LB, MS, NS, PC, RP, SC, SQ, SL, US
Asarum hartwegii	Wild-ginger	Aristolochiaceae	BB
Asclepias cordifolia	Purple milkweed	Asclepiadaceae	BB
Asclepias fascicularis	Narrow-leaved milkweed	Asclepiadaceae	SQ

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Asclepias speciosa	Showy milkweed	Asclepiadaceae	US
Athyrium filix-femina	Lady fern	Dryopteridaceae	LB
Avena fatua	Wild oat	Poaceae	PC, SQ
Berberis aquifolium	Oregon grape	Berberidaceae	CC
Brickellia californica	Brickellbush	Asteraceae	CC, FC, NS, PC, SC, SL, US
Briza minor	Lesser quaking grass	Poaceae	BB
Brodiaea elegans	Harvest brodiaea	Liliaceae	SC
Bromus carinatus var. *carinatus*	California brome	Poaceae	BB, SQ
Bromus diandrus	Ripgut grass	Poaceae	BB, FC, PC, RP
Bromus hordeaceus	Soft chess	Poaceae	BB
Bromus madritensis ssp. *rubens*	Red brome	Poaceae	BB
Calochortus tolmiei	Pussy ears	Liliaceae	BB
Calycanthus occidentalis	Spicebush	Calycanthaceae	BB, CC, FC, LB, MS, NS, PC, RP, SC, SQ, SL, US
Calystegia occidentalis	Western morning-glory	Convolvulaceae	DK, NS
Carex barbarae	Santa Barbara sedge	Cyperaceae	SQ
Carex bolanderi	Sedge	Cyperaceae	DK, MS, SC
Carex deweyana var. *leptopoda*	Short-scaled sedge	Cyperaceae	BB, SQ
Carex feta	Greensheath sedge	Cyperaceae	BB, SQ
Carex nudata	Torrent sedge	Cyperaceae	BB, CC, DK, LB, MS, NS, PC, RP, SC, SQ, US
Catalpa speciosa	Catalpa	Bignoniaceae	US
Ceanothus integerrimus	Deer brush	Rhamnaceae	BB, CC
Centaurea solstitialis	Yellow star-thistle	Asteraceae	BB, SC
Centaurium venustum	Canchalagua	Gentianaceae	SQ, US
Cephalanthus occidentalis var. *californicus*	California button willow	Rubiaceae	MS, SQ, SL, US
Cercis occidentalis	Redbud	Fabaceae	BB, CC, NS, SC, SL, US
Cercocarpus betuloides	Birchleaf mountain mahogany	Rosaceae	CC
Cheilanthes gracillima	Cheilanthes	Pteridaceae	LB
Chenopodium botrys	Jerusalum oak	Chenopodiaceae	MS, US
Chlorogalum pomeridianum var. *pomeridianum*	Soap plant	Liliaceae	BB
Cirsium vulgare	Bull thistle	Asteraceae	CC, SL

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Claytonia perfoliata	Miner's lettuce	Portulaceae	DK
Claytonia rubra ssp. *rubra*	Red-stemmed miner's lettuce	Portulacaceae	BB, SQ
Clematis ligusticifolia	Virgin's bower	Ranunculaceae	CC, MS, NS, PC, SC, SQ, SL, US
Collinsia tinctoria	Sticky chinese houses	Scrophulariaceae	FC, RP
Collomia heterophylla	Variableleaf collomia	Polemoniaceae	BB, CC, DK, FC, PC, SQ
Conium maculatum	Poison hemlock	Apiaceae	US
Cornus nuttallii	Mountain dogwood	Cornaceae	CC, DK, FC, MS, NS, PC, RP, SC, SQ, SL, US
Cornus sericea	Red twig	Cornaceae	CC, MS, NS, SC, SL
Cornus sessilis	Miner's dogwood	Cornaceae	BB, CC, MS, NS, SC, SL
Corylus cornuta	Hazelnut	Betulaceae	BB, CC, FC, MS, RP, SQ, SL
Crataegus douglasii	Black Hawthorn	Rosaceae	FC, MS, NS, RP, SL, US
Cynodon dactylon	Bermuda grass	Poaceae	US
Cynosurus echinatus	Hedgehog dogtail	Poaceae	DK, NS, PC, SQ, US
Cyperus eragrostis	Tall flatsedge	Cyperaceae	BB
Cyperus eriogrostus	Nutsedge	Cyperaceae	NS, PC, SL, US
Cyperus esculentus	Yellow nut sedge	Cyperaceae	LB, PC
Cyperus squarrosus	Umbrella sedge	Cyperaceae	BB, SQ
Cytisus scoparius	Scotch broom	Fabaceae	US
Dactylis glomerata	Orchard grass	Poaceae	SC
Darmera peltata	Umbrella plant	Saxifragaceae	BB, CC, DK, FC, MS, NS, PC, RP, SC, SQ, SL, US
Datisca glomerata	Durango root	Datiscaceae	MS, NS, RP, SC, SQ
Daucus carota	Queen Anne's lace	Apiaceae	BB
Delphinium nudicaule	Red larkspur	Ranunculaceae	SQ
Deschampsia cespitosa	Tufted hairgrass	Poaceae	BB, SQ
Deschampsia danthonioides	Annual hairgrass	Poaceae	US
Dicentra formosa	Bleeding heart	Papaveraceae	CC
Dichelostemma capitatum ssp. *capitatum*	Blue dicks	Liliaceae	BB, US
Eleocharis spp.	Spike rush	Cyperaceae	US
Elymus elymoides	Squirreltail	Poaceae	US

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Elymus glaucus	Blue wild rye	Poaceae	BB, CC, DK, MS, NS, PC, SC, SQ, SL, US
Epilobium angustifolium ssp. *circumvagum*	Fireweed	Onagraceae	BB
Epilobium canum	California fuchsia	Onagraceae	CC, US
Epilobium ciliatum	Fireweed	Onagraceae	CC, DK, MS, NS, RP, SL
Epilobium torreyi	Boisduvalia	Onagraceae	BB
Epipactus gigantea	Stream orchid	Orchidaceae	MS, NS, US
Equisetum arvense	Field horsetail	Equisetaceae	NS, PC, SC, SQ, US
Equisetum laevigatum	Smooth scouring rush	Equisetaceae	US
Erigeron philadelphicus	Fleabane daisy	Asteraceae	CC, DK, FC, PC, RP, SQ
Eriodictyon californicum	Yerba Santa	Hydrophyllaceae	BB, LB
Eriogonum nudum	Naked buckwheat	Polygonaceae	BB, US
Eriogonum umbellatum	Sulfur flower	Polygonaceae	US
Eriophyllum lanatum	Wooly sunflower	Asteraceae	SL, US
Eriophyllum lanatum var. *grandiflorum*	Woolly sunflower	Asteraceae	BB
Erodium botrys	Broadleaf filaree	Geraniaceae	BB
Erodium cicutarium	Storksbill	Geraniaceae	RP
Eyrngium articulatum	Eryngium	Apiaceae	US
Ficus carica	Edible fig	Moraceae	BB, SQ
Fraxinus dipetala	California ash	Oleaceae	NS
Fraxinus latifolia	Oregon ash	Oleaceae	BB, CC, DK, FC, MS, NS, PC, RP, SC, SQ, SL, US
Galium bolanderi	Bolander's bedstraw	Rubiaceae	BB
Galium spp.	Bedstraw	Rubiaceae	CC, FC, PC, SC, SL
Gnaphalium spp.	Cudweed	Asteraceae	US
Hastingsia alba	Hastingsia	Liliaceae	LB, US
Heuchera micrantha	Crevice heuchera	Saxifragaceae	DK, FC, NS, RP, SC, SQ, SL, US
Hieracium albiflorum	Hawkweed	Asteraceae	CC, NS, US
Hoita orbicularis	Hoita	Fabaceae	US
Holcus lanatus	Velvet grass	Poaceae	SQ
Hypericum perforatum	Klamathweed	Hypericaceae	BB, CC, DK, FC, LB, NS, PC, RP, SQ, US
Hypochaeris radicata	Rough cat's-ear	Asteraceae	BB, SC
Iris tenuissima	Iris	Iridaceae	BB

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Juncus effusus	Common rush	Juncaceae	BB, SQ, SL, US
Juncus ensifolius	Sword-leaved rush	Juncaceae	SQ
Juncus mexicanus	Mexican rush	Juncaceae	US
Juncus sp.	Rush	Juncaceae	BB, LB, SQ
Juncus tenuis	Slender rush	Juncaceae	SQ
Juncus xiphioides	Rush	Juncaceae	US
Lactuca serriola	Prickly lettuce	Asteraceae	SQ
Lathyrus latifolius	Everlasting peavine	Fabaceae	CC, SC, US
Lathyrus polyphyllus	Wild pea	Fabaceae	DK, PC
Lathyrus sulphureus	Snub pea	Fabaceae	BB
Ledum glandulosum	Labrador tea	Ericaceae	LB
Lewisia cantelovii	Cantelow's lewisia	Portulacaceae	US
Lilium pardalinum ssp. *pardalinum*	Leopard lily	Liliaceae	BB, DK, FC, MS, NS, PC, RP, SC, SL
Lithocarpus densiflora	Tan oak	Fagaceae	LB
Lonicera hispidula var. *vacillans*	Hairy honeysuckle	Caprifoliaceae	BB, CC, LB, MS, NS, PC, SL
Lotus crassifolius	Lotus	Fabaceae	NS, SC
Lotus oblongifolius	Bird's-foot trefoil	Fabaceae	SC, US
Lotus oblongifolius var. *oblongifolius*	Streambank bird's-foot trefoil	Fabaceae	BB
Lotus purshianus var. *purshianus*	Spanish lotus	Fabaceae	US
Lupinus albifrons	Silver bush lupine	Fabaceae	BB, US
Lupinus bicolor	Miniature lupine	Fabaceae	BB
Madia spp.	Tarweed	Asteraceae	CC, DK, FC, PC, RP, SL
Marah watsonii	Watson's wild-cucumber	Cucurbitaceae	BB
Melica californica	California melic	Poaceae	BB
Melilotus alba	White sweet clover	Fabaceae	NS, US
Melissa officinalis	Melissa	Lamiaceae	FC, MS, NS, PC, RP, SC
Mentha pulegium	Pennyroyal	Lamiaceae	PC
Mimulus cardinalis	Scarlet monkey flower	Scrophulariaceae	DK, FC, LB, NS, PC, SC, US
Mimulus guttatus	Common monkeyflower	Scrophulariaceae	BB, CC, FC, LB, MS, NS, PC, RP, SC, SQ, SL, US
Montia parvifolia	Showy rock-montia	Portulacaceae	BB, DK, NS, PC, RP, SL
Muhlenbergia minutissima	Muhly	Poaceae	PC, SC, US

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Nemophila heterophylla	Variable-leaved nemophila	Hydrophyllaceae	BB, SQ
Neviusia cliftonii	Shasta snow-wreath	Rosaceae	CC
Osmorhiza chilensis	Mountain sweet-cicely	Apiaceae	FC, PC
Panicum acuminatum var. *acuminatum*	Panicgrass	Poaceae	BB, LB, NS, SC, SQ, SL, US
Pellaea mucronata var. *californica*	Bird's-foot fern	Pteridaceae	US
Pellaea mucronata var. *mucronata*	Bird's-foot fern	Pteridaceae	SQ
Penstemon azureus var. *azureus*	Azure beardtongue	Scrophulariaceae	SQ, US
Pentagramma triangularis ssp. *triangularis*	Goldback fern	Pteridaceae	BB, SC, US
Perideridia gairdneri	Yampah	Apiaceae	DK, RP, US
Petrorhagia dubia	Windmill pink	Caryophyllaceae	BB, SC, SQ, US
Phacelia hastata	Silverleaf phacelia	Hydrophyllaceae	SC
Phalaris arundinacea	Reed canary grass	Poaceae	SC
Philadelphis lewisii	Wild mock orange	Philadelphaceae	BB, CC, FC, MS, NS, PC, RP, SL, US
Physocarpus capitatus	Pacific ninebark	Rosaceae	CC, FC, MS, NS, PC, RP, SC, US
Phytolacca americana	Pokeweed	Phytolaccaceae	DK, NS, SC
Pinus attenuata	Knobcone pine	Pinaceae	SC
Pinus ponderosa	Ponderosa pine	Pinaceae	BB, SC
Plagiobothrys tener	Slender popcornflower	Boraginaceae	BB
Plantago lanceolata	English plantain	Plantaginaceae	BB, SC, SQ, US
Polygonum lapathifolium	Willow weed	Polygonaceae	BB, SQ
Polypogon interruptus	Rabbitfoot grass	Poaceae	CC, SC, US
Polypogon monspeliensis	Annual beard grass	Poaceae	BB
Polystichum imbricans	Narrowleaf sword fern	Dryopteridaceae	BB, SQ
Polystichum munitum	Swordfern	Dryopteridaceae	NS
Populus balsamifera ssp. *trichocarpa*	Black cottonwood	Salicaceae	DK, US
Populus fremontii	Fremont cottonwood	Salicaceae	BB, CC, MS, SC, SQ, SL, US
Potentilla spp.	Cinquefoil	Rosaceae	FC, NS, RP, US
Prunella vulgaris	Self-heal	Lamiaceae	FC, MS, NS, PC, RP, SC, SL, US

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Prunus subcordata	Klamath plum	Rosaceae	MS, NS
Prunus virginiana	Western choke-cherry	Rosaceae	SL
Pseudotsuga menziesii var. *menziesii*	Douglas-fir	Pinaceae	BB, CC, DK, FC, SC
Pteridium aquilinum var. *pubescens*	Western bracken fern	Dennstaedtiaceae	BB, MS, PC, SL, US
Pycnanthemum californicum	Mountain mint	Lamiaceae	BB, SQ
Quercus chrysolepis	Canyon live oak	Fagaceae	BB, DK, PC, SC, SQ, SL
Quercus kelloggii	Black oak	Fagaceae	BB, SC
Quercus lobata	Valley oak	Fagaceae	SC
Ranunculus californicus	California buttercup	Ranunculaceae	BB
Rhamnus purshiana	Cascara	Rhamnaceae	FC, PC
Rhododendron occidentale	Western azalea	Ericaceae	LB, MS, SL, US
Rhus trilobata	Skunkbrush	Anacardiaceae	BB, CC, SQ
Ribes aureum	Golden currant	Grossulariaceae	NS
Ribes divaricatum	Gooseberry	Grossulariaceae	BB, SQ
Ribes roezlii	Sierra gooseberry	Grossulariaceae	RP
Robinia pseudoacacia	Black locust	Fabaceae	US
Rosa californica	California rose	Rosaceae	MS, NS, SQ, US
Rosa gymnocarpa	Wood rose	Rosaceae	BB, FC
Rubus discolor	Himalayan blackberry	Rosaceae	BB, LB, MS, PC, SC, SQ, SL, US
Rubus laciniatus	Cut-leaved blackberry	Rosaceae	US
Rubus leucodermis	Western raspberry	Rosaceae	BB, CC, NS, SQ
Rubus parviflorus	Thimbleberry	Rosaceae	CC, PC, RP
Rubus ursinus	California blackberry	Rosaceae	BB, CC, DK, FC, MS, NS, PC, RP, SC, SQ, SL
Rumex acetosella	Red sorrel	Polygonaceae	CC, NS
Rumex crispus	Curly dock	Polygonaceae	PC, SC, SQ
Salix exigua	Narrow-leaved willow	Salicaceae	BB, CC, DK, MS, NS, PC, SQ
Salix gooddingii	Black willow	Salicaceae	CC, DK, MS, NS, PC, SL, US
Salix laevigata	Red willow	Salicaceae	BB, CC, FC, NS, PC, RP, SC, SQ, SL, US
Salix lasiolepis	Arroyo willow	Salicaceae	BB, NS, PC, SC, SL, US

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Salix lucida	Shining willow	Salicaceae	CC, LB, MS, NS, SC, SQ, SL, US
Saponaria officinalis	Bouncing bet	Caryophyllaceae	MS, SC, US
Scutellaria siphocampyloides	Narrowleaf skullcap	Lamiaceae	NS
Sedum spathulifolium	Pacific sedum	Crassulaceae	BB, CC, DK FC, LB, NS, RP, SC, SQ, US
Silene californica	California Indian pink	Caryophyllaceae	DK, NS
Smilacina racemosa	False solomon's seal	Liliaceae	CC, DK
Smilax californica	Greenbriar	Liliaceae	BB, CC, FC, MS, NS, RP, SC, SQ, SL, US
Solanum dulcamara	Bittersweet nightshade	Solanaceae	NS
Solanum parishii	Parish's nightshade	Solanaceae	BB
Solanum sarrachoides	White nightshade	Solanaceae	NS
Spiraea douglasii	Spiraea	Rosaceae	SC, US
Spiranthes romanzoffiana	Ladies tresses	Orchidaceae	SC, US
Stachys ajugoides	Hedge nettle	Lamiaceae	BB, MS, PC, SQ, US
Streptanthus tortuosus var. *tortuosus*	Mountain jewelflower	Brassicaceae	BB, LB
Styrax officianalis	Snowdrop bush	Styraceae	FC, NS
Symphoricarpos albus var. *laevigatus*	Snowberry	Caprifoliaceae	BB, CC, FC, NS, PC, RP, SC, SL
Taxus brevifolia	Pacific yew	Taxaceae	FC, NS, PC, SL
Tellima grandiflora	Fringe cups	Saxifragaceae	BB, CC, DK, FC, NS, PC, RP, SQ
Torilis arvensis	False hedge-parsley	Apiaceae	BB, DK, FC, NS, SQ
Toxicodendron diversilobum	Poison oak	Anacardiaceae	BB, CC, DK, FC, MS, NS, PC, RP, SC, SQ, SL, US
Trientalis latifolia	Starflower	Primulaceae	BB, NS
Trifolium hirtum	Rose clover	Fabaceae	BB, SQ
Trifolium variegatum	White-tipped clover	Fabaceae	BB, SQ
Trifolium willdenovii	Clover	Fabaceae	SC
Triteleia hyacinthina	White brodiaea	Liliaceae	BB, NS, RP, SC, SQ, US
Typha latifolia	Broad-leaved cattail	Typhaceae	SQ
Umbellularia californica	California bay	Lauraceae	BB, LB, SQ
Urtica dioica	Stinging nettle	Urticaceae	CC, PC, SC
Vaccinium parvifolium	Red huckleberry	Ericaceae	LB
Verbascum blattaria	Moth mullein	Scrophulariaceae	SC, US

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Verbascum thapsus	Woolly mullein	Scrophulariaceae	BB, SC, SQ
Verbena lasiostachys	Common verbena	Verbenaceae	BB, CC, FC, SQ
Viola glabella	Stream violet	Violaceae	BB, CC, SQ
Vitis californica	California grape	Vitaceae	BB, CC, DK, FC, MS, NS, SC, SQ, SL, US
Vulpia myuros	Rattail fescue	Poaceae	BB, SQ
Woodwardia fimbriata	Giant chain fern	Blechnaceae	CC, FC, LB, NS, PC, SQ, SL, US
Xanthium strumarium	Cocklebur	Asteraceae	MS, SQ
Zigadenus venenosus var. *venenosus*	Death camas	Liliaceae	SQ
UPLAND			
Acer circinatum	Vine maple	Aceraceae	CC, SC
Acer macrophyllum	Bigleaf maple	Aceraceae	BB, CC, DK, FC, PS, SC, SQ
Achillea millefolium	Yarrow	Asteraceae	BB, SQ
Achnatherum occidentale	Needle grass	Poaceae	SQ
Adenocaulon bicolor	Trail plant	Asteraceae	BB, DK, PS, SQ
Adiantum capillus-veneris	Southern maiden-hair	Pteridaceae	BB, SQ
Adiantum jordanii	California maiden-hair	Pteridaceae	CC, DK, FC, NS, PS, RP
Aesculus californica	California buckeye	Hippocastanaceae	BB, CC, DK, FC, NS, PS, RP, SQ, SL, US
Agoseris glauca	Mountain dandelion	Asteraceae	BB, SQ
Ailanthus altissima	Tree of heaven	Simaroubaceae	BB, US
Aira caryophylla	European hairgrass	Poaceae	SC, US
Aira caryophyllea	Silver European hairgrass	Poaceae	BB, SQ
Allium amplectens	Narrow-leaved onion	Liliaceae	SQ
Alnus rhombifolia	White alder	Betulaceae	SQ
Amelanchier utahensis	Utah serviceberry	Rosaceae	CC, FC, SQ, SL
Anaphalis margaritacea	Pearly everlasting	Asteraceae	BB, SQ
Andropogon virginicus var. *virginicus*	Broomsedge bluestem	Poaceae	BB, SQ
Anthoxanthum odoratum	Sweet vernal grass	Poaceae	BB, SQ
Anthriscus caucalis	Bur-chervil	Apiaceae	BB
Antirrhinum vexillo-calyculatum ssp. *breweri*	Brewer's sail-flower snapdragon	Scrophulariaceae	SQ
Apocynum cannibinum	Indian hemp	Apocynaceae	SC

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Aquilegia formosa	Columbine	Ranunculaceae	NS, PS, SQ
Arabis glabra var. *glabra*	Smooth rock cress	Brassicaceae	BB
Arbutus menziesii	Pacific madrone	Ericaceae	BB, NS, SQ
Arctostaphylos manzanita	Common manzanita	Ericaceae	BB, SC, US
Arctostaphylos viscida	Whiteleaf manzanita	Ericaceae	BB, LB, NS, SC, SQ, US
Aristolochia californica	Pipevine	Aristolochiaceae	BB, CC, DK, FC, PS, RP, SQ
Artemisia douglasiana	Mugwort	Asteraceae	BB, SC, SQ
Aruncus dioicus var. *pubescens*	Goat's beard	Rosaceae	SC
Asarum hartwegii	Wild ginger	Aristolochiaceae	CC, NS, PS, RP, SC, SQ
Asclepias cordifolia	Purple milkweed	Asclepiadaceae	BB
Asclepias fascicularis	Narrow-leaved milkweed	Asclepiadaceae	SC
Asclepias speciosa	Showy milkweed	Asclepiadaceae	SC
Athyrium filix-femina	Lady fern	Dryopteridaceae	FC, PS, RP
Avena fatua	Wild oat	Poaceae	BB, SC, SQ, US
Berberis aquifolium	Oregon grape	Berberidaceae	BB, CC, PS, SC, SQ
Brassica nigra	Black mustard	Brassicaceae	BB, US
Brodiaea coronaria	Brodiaea	Liliaceae	SC
Brodiaea coronaria ssp. *coronaria*	Harvest brodiaea	Liliaceae	BB
Bromus carinatus	California brome	Poaceae	SQ
Bromus diandrus	Ripgut grass	Poaceae	BB, DK, SC, SQ, US
Bromus hordeaceus	Softchess	Poaceae	BB, DK, SC, SQ, US
Bromus inermis	Smooth brome	Poaceae	LB
Bromus laevipes	Woodland brome	Poaceae	SQ
Bromus madritensis ssp. *rubens*	Red brome	Poaceae	BB, SQ
Bromus tectorum	Cheatgrass	Poaceae	SC, SQ
Calocedrus decurrens	Incense cedar	Cupressaceae	LB, NS, PS, RP, SC, SQ, US
Calycadenia fremontii	Fremont's calycadenia	Asteraceae	SQ
Calycadenia truncata	Rosin weed	Asteraceae	BB, SQ
Calycanthus occidentalis	Spicebush	Calycanthaceae	SQ
Calystegia occidentalis	Western morning glory	Convolvulaceae	BB, SC, SQ, US
Campanula prenanthoides	California bluebell	Campanulaceae	SC
Capsella bursa-pastoris	Shepherd's purse	Brassicaceae	BB

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Carex deweyana var. *leptopoda*	Short-scaled sedge	Cyperaceae	SQ
Castilleja applegatei	Wavy-leaved Indian paintbrush	Scrophulariaceae	SQ
Ceanothus cuneatus	Buck brush	Rhamnaceae	BB, SC, SQ
Ceanothus integerrimus	Deer brush	Rhamnaceae	BB, CC, FC, NS, PS, SC, SQ, SL
Ceanothus lemmonii	Lemmon's ceanothus	Rhamnaceae	SL
Centaurea solstitialis	Yellow star thistle	Asteraceae	BB, SC, SQ, US
Centaurium venustum	Canchalagua	Gentianaceae	SQ
Cercis occidentalis	Redbud	Fabaceae	BB, CC, DK, NS, RP, SC, SQ, SL, US
Cercocarpus betuloides	Birchleaf mountain mahogany	Rosaceae	CC, SC, SQ, US
Chlorogalum pomeridianum var. *pomeridianum*	Soap plant	Liliaceae	BB, SQ
Cirsium occidentalis	Snowy thistle	Asteraceae	BB
Cirsium sp.	Thistle	Asteraceae	SQ
Cirsium vulgare	Bull thistle	Asteraceae	NS
Clarkia purpurea	Purple clarkia	Onagraceae	BB, SQ
Claytonia perfoliata	Miner's lettuce	Portulaceae	NS
Claytonia rubra ssp. *rubra*	Red-stemmed miner's lettuce	Portulacaceae	BB, SQ
Clematis ligusticifolia	Virgin's bower	Ranunculaceae	SQ
Collomia heterophylla	Variableleaf collomia	Polemoniaceae	BB, NS, SQ
Conyza canadensis	Horseweed	Asteraceae	SQ
Cornus nuttallii	Mountain dogwood	Cornaceae	BB, CC, DK, FC, NS, PS, SC, SQ
Cornus sericea	American dogwood	Cornaceae	BB, SC, SQ
Corylus cornuta	Hazelnut	Betulaceae	BB, CC, DK, NS, PS, RP, SC, SQ, SL
Cynoglosssum grande	Hound's tongue	Boraginaceae	CC, SQ
Cynosurus echinatus	Hedgehog dogtail	Poaceae	BB, DK, FC, NS, RP, SC, SQ
Cyperus eriogrostus	Nutsedge	Cyperaceae	NS
Cyperus squarrosus	Umbrella sedge	Cyperaceae	SQ
Cytisus scoparius	Scotch broom	Fabaceae	SC, US
Datisca glomerata	Durango root	Datiscaceae	US
Datura stramonium	Jimson weed	Solanaceae	SQ

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Daucas carota	Wild carrot	Apiaceae	US
Daucus pusillus	Rattlesnake weed	Apiaceae	BB, SQ
Delphinium nudicaule	Red larkspur	Ranunculaceae	SQ
Dendromecon rigida	Bush poppy	Papaveraceae	BB, SQ
Dicentra formosa	Bleeding heart	Papaveraceae	CC, DK, NS
Dichelostemma capitatum	Blue dicks	Liliaceae	BB, DK, SQ
Dichelostemma ida-mae	Firecracker flower	Liliaceae	BB, SQ
Digitalis pupurea	Foxglove	Scrophulariaceae	LB
Disporum hookeri	Hooker's fairybells	Liliaceae	BB, SQ
Echinochloa crus-galli	Barnyard grass	Poaceae	SQ
Elymus elymoides	Squirreltail	Poaceae	LB, SC, SQ
Elymus glaucus	Blue wild rye	Poaceae	BB, DK, NS, RP, SC, SQ, SL, US
Epilobium pallidum	Large-flower spike-primrose	Onagraceae	BB
Epilobium sp.	Willow herb	Onagraceae	BB
Equisetum arvense	Common horsetail	Equisetaceae	SQ, US
Eremocarpus setigerus	Dove weed	Euphorbiaceae	BB, SQ
Eriodictyon californicum	Yerba Santa	Hydrophyllaceae	BB, SQ, US
Eriogonum nudum	Naked buckwheat	Polygonaceae	BB, SC, SQ
Eriophyllum lanatum	Woolly sunflower	Asteraceae	BB, CC, LB, SC, SQ, US
Erodium botrys	Filaree	Geraniaceae	BB
Eschscholzia caespitosa	Foothill poppy	Papaveraceae	BB, SQ
Eschscholzia californica	California poppy	Papaveraceae	SC
Fraxinus dipetala	California ash	Oleaceae	DK, SC, SQ
Fraxinus latifolia	Oregon ash	Oleaceae	DK, PS, SC, SQ
Galium bolanderi	Bolander's bedstraw	Rubiaceae	BB, SQ
Galium porrigens	Climbing bedstraw	Rubiaceae	BB, SQ
Galium sp.	Bedstraw	Rubiaceae	BB, CC, DK, NS, PS, RP, US
Galium triflorum	Sweet-scented bedstraw	Rubiaceae	SQ
Gastridium ventricosum	Nit grass	Poaceae	BB, SQ
Gilia capitata	Globe gilia	Polemoniaceae	BB, SQ
Gilia tricolor	Bird's eyes	Polemoniaceae	SQ
Gnaphalium sp.	Cudweed	Asteraceae	SQ

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Goodyera oblongifolia	Rattlesnake plantain	Orchidaceae	PS
Grindelia nana	Idaho gumweed	Asteraceae	SQ
Helianthella californica	California helianthella	Asteraceae	SQ
Heteromeles arbutifolia	Toyon	Rosaceae	BB, LB
Heuchera micrantha	Crevice heuchera	Saxifragaceae	NS
Hieracium albiflorum	White-flowered hawkweed	Asteraceae	BB, NS
Hieracium albiflorum	White-flowered hawkweed	Asteraceae	SQ, SL
Hypericum perforatum	Klamathweed	Hypericaceae	BB, CC, NS, SC, SQ, SL
Hypochaeris radicata	Rough cat's ears	Asteraceae	BB, SQ
Iris tenuissima	Slender iris	Iridaceae	BB, SQ
Juniperus spp.	Ornamental juniper	Cupressaceae	SC
Keckiella lemmonii	Lemmon's keckiella	Scrophulariaceae	CC, NS, SQ, SL
Lactuca serriola	Prickly lettuce	Asteraceae	SC, SQ
Lamium amplexicaule	Giraffehead	Lamiaceae	SQ
Lathyrus latifolius	Everlasting peavine	Fabaceae	SC
Lathyrus polyphyllus	Wild pea	Fabaceae	CC, SC, SL
Lathyrus sulphureus	Sulfur pea	Fabaceae	BB, SQ
Lepidium densiflorum var. *pubicarpum*	Hairy peppergrass	Brassicaceae	SQ
Lolium spp.	Ryegrass	Poaceae	SC
Lomatium macrocarpum	Lomatium	Apiaceae	US
Lomatium utriculatum	Common lomatium	Apiaceae	BB, SQ
Lonicera hispidula var. *vacillans*	Hairy honeysuckle	Caprifoliaceae	BB, DK, FC, NS, PS, RP, SC, SQ, SL, US
Lonicera interrupta	Chaparral honeysuckle	Caprifoliaceae	BB, SQ
Lonicera spp.	Ornamental honeysuckle	Caprifoliaceae	SC
Lotus denticulatus	Toothed lotus	Fabaceae	BB, SQ
Lotus humistratus	Foothill lotus	Fabaceae	BB, SQ
Lotus purshianus var. *purshianus*	Spanish lotus	Fabaceae	BB, SQ
Lupinus albifrons	Silver bush lupine	Fabaceae	BB, SQ
Lupinus bicolor	Bi-colored lupine	Fabaceae	BB, SQ
Luzula comosa	Common wood rush	Juncaceae	BB, SQ
Madia spp.	Tarweed	Asteraceae	NS, US
Marah watsonii	Watson's wild-cucumber	Cucurbitaceae	BB, SQ

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Medicago polymorpha	California burclover	Fabaceae	BB
Melica californica	California melic	Poaceae	BB, SQ
Mentha pulegium	Pennyroyal	Lamiaceae	SC
Micropus californicus	Slender cottonweed	Asteraceae	SQ
Mimulus guttatus	Seep-spring monkey flower	Scrophulariaceae	US
Mimulus kelloggii	Kellogg's monkeyflower	Scrophulariaceae	SQ
Minuartia californica	California sandwort	Caryophyllaceae	BB
Monardella odoratissima	Mountain monardella	Lamiaceae	SQ
Montia parviflora	Little-leaf montia	Portulaceae	SC
Nemophila heterophylla	Variable-leaved nemophila	Hydrophyllaceae	BB, SQ
Neviusia cliftonii	Shasta snow-wreath	Rosaceae	CC, RP
Oemlaria cerasiformis	Oso berry	Rosaceae	CC, SC
Osmorhiza chilensis	Sierran sweet-cicely	Apiaceae	DK, FC, NS, PS, RP, SC, SL
Osmorhiza occidentalis	Sierran sweet-cicely	Apiaceae	BB, SQ
Panicum acuminatum var. *acuminatum*	Panicgrass	Poaceae	BB, SC, SQ
Pellaea mucronata var. *mucronata*	Bird's-foot fern	Pteridaceae	BB, SQ
Penstemon heterophyllus var. *purdyi*	Foothill beardtongue	Scrophulariaceae	BB
Pentagramma triangularis	Goldenback fern	Pteridaceae	NS
Pentagramma triangularis ssp. *triangularis*	Goldback fern	Pteridaceae	BB, LB, SQ
Petrorhagia dubia	Windmill pink	Caryophyllaceae	BB, SC, SQ, SL
Phacelia hastata	Silverleaf phacelia	Hydrophyllaceae	BB, SC, SQ
Phacelia heterophylla	Phacelia	Hydrophyllaceae	SQ
Phalaris arundinacea	Reed canary grass	Poaceae	SQ, US
Philadelphus lewisii	Wild mock orange	Philadelphaceae	BB, DK, NS, RP, SC, SQ
Phoradendron villosum	Oak mistletoe	Viscaceae	BB, SQ
Physocarpus capitatus	Pacific ninebark	Rosaceae	CC, RP, SC, SQ
Pinus attenuata	Knobcone pine	Pinaceae	BB, CC, LB, SQ
Pinus lambertiana	Sugar pine	Pinaceae	SQ
Pinus ponderosa	Ponderosa pine	Pinaceae	BB, CC, DK, LB, NS, SC, SQ, SL, US
Pinus sabiniana	Gray pine	Pinaceae	BB, SC, SQ, US
Piperia elongata	Dense-flowered rein orchid	Orchidaceae	SQ

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Plagiobothrys tenellus	Pacific popcornflower	Boraginaceae	BB
Plantago lanceolata	English plantain	Plantaganaceae	NS, SC, SQ, US
Poa annua	Annual bluegrass	Poaceae	SQ
Polemonium micranthum	Annual sky pilot	Polemoniaceae	SQ
Polypodium calirhiza	Polypody	Polypodiaceae	NS
Polypogon maritimus	Mediterranean beard grass	Poaceae	SQ
Polystichum imbricans	Narrow-leaved sword fern	Dryopteridaceae	BB, SQ
Polystichum munitum	Swordfern	Dryopteridaceae	CC, DK, FC, LB, NS, PS, RP, SC, SL
Potentilla glandulosa	Common cinquefoil	Rosaceae	SQ
Potentilla spp.	Cinquefoil	Rosaceae	CC, NS, SC, SL
Prunella vulgaris	Self-heal	Lamiaceae	NS, SQ
Prunus cerasifera	Cherry plum	Rosaceae	SC
Prunus subcordata	Klamath plum	Rosaceae	CC, DK, FC, PS, SC
Prunus virginiana	Western choke-cherry	Rosaceae	NS, SC, SQ
Pseudotsuga menziesii var. *menziesii*	Douglas-fir	Pinaceae	BB, CC, DK, FC, LB, NS, PS, RP, SC, SQ, SL, US
Pteridium aquilinum var. *pubescens*	Western bracken fern	Dennstaedtiaceae	BB, CC, NS, PS, RP, SC, SQ
Quercus berberidifolia	Scrub oak	Fagaceae	BB, SQ
Quercus chrysolepis	Canyon live oak	Fagaceae	BB, CC, DK, FC, LB, NS, PS, RP, SC, SQ, SL, US
Quercus douglasii	Blue oak	Fagaceae	SQ
Quercus garryana	Oregon white oak	Fagaceae	SC
Quercus garryana var. *breweri*	Brewer's oak	Fagaceae	NS, SC, SL, US
Quercus garryana var. *garryana*	Oregon oak	Fagaceae	BB, SQ
Quercus kelloggii	Black oak	Fagaceae	BB, CC, FC, NS, PS, SC, SQ, SL, US
Quercus lobata	Valley oak	Fagaceae	SC
Quercus wislizenii	Interior live oak	Fagaceae	BB, SQ
Quercus x morehus	Oracle oak	Fagaceae	BB
Rhamnus purshiana	Cascara	Rhamnaceae	BB, NS
Rhamnus rubra	Sierra coffeeberry	Rhamnaceae	BB, CC, DK, LB, NS, PS, SC, SQ
Rhamnus tomentella ssp. *tomentella*	Hoary coffeeberry	Rhamnaceae	BB, SQ

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Rhododendron occidentale	Western azalea	Ericaceae	NS, SC, SQ, SL
Rhus trilobata	Skunkbrush	Anacardiaceae	BB, CC, DK, NS, RP, SC, SQ, SL
Ribes divaricatum	Gooseberry	Grossulariaceae	BB
Ribes roezlii	Sierra gooseberry	Grossulariaceae	DK, FC, SC, SQ, US
Rosa californica	California rose	Rosaceae	SQ
Rosa gymnocarpa	Wood rose	Rosaceae	BB, DK, NS, RP, SQ, SL
Rosmarinus spp.	Rosemary	Lamiaceae	SC
Rubus discolor	Himalayan blackberry	Rosaceae	BB, NS, PS, SC, SQ, SL
Rubus laciniatus	Cut-leaved blackberry	Rosaceae	US
Rubus leucodermis	Black cap raspberry	Rosaceae	DK, NS, SC
Rubus parviflorus	Thimbleberry	Rosaceae	BB, FC, NS, SC, SQ
Rubus ursinus	California blackberry	Rosaceae	CC, DK, FC, NS, PS, SQ, SL
Rumex acetosella	Red sorrel	Polygonaceae	SC
Rumex crispus	Curly dock	Polygonaceae	NS, SC, US
Salix laevigata	Red willow	Salicaceae	SQ
Salix lucida	Shining willow	Salicaceae	SC
Salvia sonomensis	Creeping sage	Lamiaceae	SQ
Sanicula bipinnatifida	Purple sanicle	Apiaceae	BB, SQ
Scutellaria antirrhinoides	Snapdragon skullcap	Lamiaceae	SQ
Scutellaria siphocampyloides	Skullcap	Lamiaceae	BB, SQ
Scutellaria tuberosa	Common skullcap	Lamiaceae	SQ
Sedum spathulifolium	Pacific sedum	Crassulaceae	SC, SQ
Silene californica	California Indian pink	Caryophyllaceae	CC, RP, SQ, US
Silene gallica	Common catchfly	Caryophyllaceae	BB
Smilax californica	Greenbriar	Liliaceae	BB, CC, DK, FC, NS, PS, RP, SQ, US
Solanum parishii	Parish's nightshade	Solanaceae	BB, SQ
Streptanthus tortuosus	Mountain jewelflower	Brassicaceae	BB, SQ
Streptopus amplexifolius var. *americanus*	Twisted stalk	Liliaceae	PS
Styrax officianalis	Snowdrop bush	Styraceae	BB, CC, DK, FC, LB, NS, PS, RP, SQ, US
Swertia albicaulis var. *nitida*	White-stemmed swertia	Gentianaceae	SQ
Symphoricarpos albus var. *laevigatus*	Snowberry	Caprifoliaceae	BB, CC, FC, NS, PS, RP, SC, SQ, SL

Table A2-1. Plant Species Observed at Shasta Lake (contd)

Scientific Name	Common Name	Family Name	Site
Taeniatherum caput-medusae	Medusahead	Poaceae	SC
Tellima grandiflora	Fringe cups	Saxifragaceae	RP, SQ, SL
Torilis arvensis	Hedge-parsley	Apiaceae	BB, CC, DK, DK, FC, RP, SC, SQ, SL, US
Toxicodendron diversilobum	Poison oak	Anacardiaceae	BB, CC, DK, FC, NS, PS, RP, SC, SQ, SL, US
Tragopogon dubius	Western salsify	Asteraceae	SQ
Trientalis latifolia	Starflower	Primulaceae	CC, DK, NS, PS, RP, SQ, SL
Trifolium hirtum	Rose clover	Fabaceae	BB, SC, SQ, US
Trifolium microcephalum	Small-headed clover	Fabaceae	SQ
Trillium albidum	Trillium	Liliaceae	CC, RP
Triteleia hyacinthina	White brodiaea	Liliaceae	SL
Umbellularia californica	California bay	Lauraceae	BB, SL
Verbascum blattaria	Moth mullein	Scrophulariaceae	BB, SQ, US
Verbascum thapsus	Woolly mullein	Scrophulariaceae	BB, SQ
Verbena lasiostachys	Common verbena	Verbenaceae	SC
Viola glabella	Stream violet	Violaceae	SQ
Viola lobata	Pine violet	Violaceae	CC, FC, NS, PS, RP, SL
Vitis californica	California grape	Vitaceae	BB, CC, DK, FC, PS, RP, SC, SQ, SL, US
Vulpia myuros	Rattail fescue	Poaceae	BB, SQ
Woodwardia fimbriata	Giant chain fern	Blechnaceae	SC, SQ
Xanthium strumarium	Cocklebur	Asteraceae	SC, SQ
Key: BB = Big Backbone Creek CC = Campbell Creek DK = Dekkas Creek	FC = Flat Creek LB = Little Backbone Creek MS = Middle Salt Creek NS = Nasoni Creek	PC = Potem Creek RP = Ripgut Creek SC = Salt Creek	SQ = Squaw Creek SL = Sugarloaf Creek US = Upper Sacramento River

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Attachment 3
Special-Status Plant Species Known to Occur in the Shasta Lake and Vicinity Portion of the Primary Study Area

Botanical Resources and Wetlands Technical Report

Shasta Lake Water Resources Investigation, California

Prepared by:

United States Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

Shasta Snow Wreath (*Neviusia cliftonii*)

Shasta snow-wreath is a recently discovered shrub of the rose family endemic to northern California in the vicinity of Shasta Lake, Shasta County. Shasta snow-wreath is now known to occur in limestone outcrops and adjacent slopes along drainages or small canyons; and in mixed woodland, ponderosa pine, and montane hardwood-conifer habitats with metasedimentary/metavolcanic geologic substrates along small drainages and stream corridors (Lindstrand and Nelson 2006). Elevations range between 1,070 and 1,800 feet.

Shasta snow-wreath has been recorded in 17 locations on the Pit River Arm, McCloud River Arm, and the main body of Shasta Lake. Up to 9 of these 17 known sites may be directly affected by the project.

Slender False Lupine (*Thermopsis macrophylla var. venosa*)

Slender false lupine is a rhizomatous herb in the family Fabaceae. It occurs at elevations from 328 to 4,495 feet in chaparral, cismontane woodland, lower montane coniferous forest, meadows, seeps, and north coast coniferous forests. Blooming occurs from March through July. This species is known to occur in Del Norte, Humboldt, Shasta, Siskiyou, and Trinity counties in California (California Native Plant Society 2007).

Many slender false-lupine occurrences were found throughout the ESL during the botanical surveys, and individuals at many of these sites would be directly impacted by the proposed project. However, this species has been found to be relatively common throughout the Shasta Lake and vicinity portion of the primary study area and general vicinity.

Cantelow's Lewisia (*Lewisia cantelovii*)

Cantelow's lewisia is a perennial herb found in moist rock outcrops in broad-leafed and conifer forests. It blooms from May through October, and occurs at elevations of 1,080 to 4,500 feet (California Native Plant Society 2007). This species is known to occur in Butte, Nevada, Plumas, Shasta, and Sierra counties.

The Cantelow's lewisia discovery within the Shasta Lake and vicinity portion of the primary study area consists of one occurrence found on a rock outcrop on the right bank of the Upper Sacramento River riverine reach near the Shasta Lake/Upper Sacramento River transition zone. Most likely, at least a portion of the individuals at this location would be directly affected by the project.

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Attachment 4
Lists of All Sensitive Plant Species in the Extended Study Area Reported to the CNDDB

Botanical Resources and Wetlands Technical Report

Shasta Lake Water Resources Investigation, California

Prepared by:

United States Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

U.S. Department of the Interior
United States Department of the Interior **June 2013**

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas

Common Name	Scientific Name	General Habitat Description	Micro Habitat
adobe sanicle	*Sanicula maritima*	Meadows and seeps, valley and foothill grassland, chaparral, coastal prairie.	Moist clay or ultramafic soils. 30–240m.
adobe-lily	*Fritillaria pluriflora*	Chaparral, cismontane woodland, foothill grassland.	Usually on clay soils; sometimes serpentine. 55–820m.
Agoura Hills dudleya	*Dudleya cymosa* ssp. *agourensis*	Chaparral, cismontane woodland.	Rocky, volcanic breccia. 200–500m.
Ahart's dwarf rush	*Juncus leiospermus* var. *ahartii*	Vernal pools.	Restricted to the edges of vernal pools. 30–100m.
Ahart's paronychia	*Paronychia ahartii*	Valley and foothill grassland, vernal pools, cismontane woodland.	Stony, nearly barren clay of swales and higher ground around vernal pools. 30–510m.
alkali mariposa lily	*Calochortus striatus*	Chaparral, chenopod scrub, mojavean desert scrub, meadows.	Alkaline meadows and ephemeral washes. 90–1,595m.
alkali milk-vetch	*Astragalus tener* var. *tener*	Alkali playa, valley and foothill grassland, vernal pools.	Low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 1–170m.
alpine dusty maidens	*Chaenactis douglasii* var. *alpine*	Alpine boulder and rock fields.	Open, subalpine to alpine gravel and crevices; granitic substrate. 2,725–3,400m.
Antioch Dunes evening-primrose	*Oenothera deltoides* ssp. *Howellii*	Interior dunes.	Remnant river bluffs and sand dunes east of Antioch. 0–30m.
aphanisma	*Aphanisma blitoides*	Coastal bluff scrub, coastal dunes, coastal scrub.	On bluffs and slopes near the ocean in sandy or clay soils. In steep decline on the islands and the mainland. 1–305m.
arcuate bush mallow	*Malacothamnus arcuatus*	Chaparral.	Gravelly alluvium. 80–355m.
Arizona spurge	*Chamaesyce arizonica*	Sonoran desert scrub.	Sandy soils. 50–300m.
Arroyo de la Cruz manzanita	*Arctostaphylos cruzensis*	Broadleafed upland forest, coastal bluff scrub, closed-cone coniferous forest, chaparral, coastal scrub, & grassland.	On sandy soils in several different habitat types from chaparral to coastal scrub to woodland. 60–310m.
ayenia	*Ayenia compacta*	Mojavean desert scrub, sonoran desert scrub.	Sandy and gravelly washes in the desert; dry desert canyons. 150–1,095m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Baja California birdbush	*Ornithostaphylos oppositifolia*	Chaparral.	Associated with ceanothus verrucosus and salvia mellifera in California. 55–800m.
Baja navarretia	*Navarretia peninsularis*	Lower montane coniferous forest, chaparral.	Wet areas in open forest. 1,500–2,425m.
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*	Cismontane woodland, meadows and seeps, vernal pools, valley and foothill grassland, lower montane coniferous forest.	Vernal pools and swales; adobe or alkaline soils. 5–950m.
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	Chenopod scrub, valley and foothill grassland, cismontane woodland.	Coarse or cobbly well-drained granitic sand on bluffs, low hills, and flats within grassland. 90–550m.
Bakersfield smallscale	*Atriplex tularensis*	Chenopod scrub, alkali meadow.	Historically in valley sink scrub or with saltgrass. 90–110m.
Ballona cinquefoil	*Potentilla multijuga*	Meadows and seeps.	Brackish meadows. 0–2m.
Barstow woolly sunflower	*Eriophyllum mohavense*	Desert chenopod scrub, mojavean desert scrub, desert playas.	Mostly in open, silty or sandy areas w/saltbush scrub, or creo. Bush scrub. Barren ridges or margins of playas. 500–900m
beach spectaclepod	*Dithyrea maritima*	Coastal dunes, coastal scrub. Formerly more widespread in coastal habitats in Southern California.	Sea shores, on sand dunes, and sandy places near the shore. 3–50m.
beaked clarkia	*Clarkia rostrata*	Cismontane woodland, valley and foothill grassland.	North-facing slopes; sometimes on sandstone. 60–460m.
bearded popcorn-flower	*Plagiobothrys hystriculus*	Vernal pools, valley and foothill grassland.	Wet sites. 10–50m.
Ben Lomond buckwheat	*Eriogonum nudum* var. *decurrens*	Chaparral, cismontane woodland, lower montane coniferous forest.	Ponderosa pine sandhills in Santa Cruz County. 50–800m.
bent-flowered fiddleneck	*Amsinckia lunaris*	Cismontane woodland, valley and foothill grassland.	50–500m.
Big Bear Valley woollypod	*Astragalus leucolobus*	Lower montane coniferous forest, pebble plain, pinyon and juniper woodland, upper montane coniferous forest.	Dry pine woods, gravelly knolls among sagebrush, or stony lake shores in the pine belt. (425) 1,670–2,515m.
big tarplant	*Blepharizonia plumosa*	Valley and foothill grassland.	Dry hills & plains in annual grassland. Clay to clay-loam soils; usually on slopes and often in burned areas. 15–455m.
big-scale balsamroot	*Balsamorhiza macrolepis* var. *macrolepis*	Valley and foothill grassland, cismontane woodland.	Sometimes on serpentine. 35–1,000m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
bird-foot checkerbloom	*Sidalcea pedata*	Meadows and seeps, pebble plains.	Vernally mesic sites in meadows or pebble plains. 1,600–2,500m.
Bisbee Peak rush-rose	*Helianthemum suffrutescens*	Chaparral.	Often on serpentine, gabbroic, or ione formation soils; in openings in chaparral. 45–610m.
black sedge	*Schoenus nigricans*	Marshes and swamps.	Often in alkaline marshes. 150–2,000m.
black-flowered figwort	*Scrophularia atrata*	Closed-cone coniferous forest, chaparral, coastal dunes, coastal scrub, riparian scrub.	Sand, diatomaceous shales, and soils derived from other parent material; around swales and in sand dunes. 10–250m.
Blochman's dudleya	*Dudleya blochmaniae* ssp. *blochmaniae*	Coastal scrub, coastal bluff scrub, valley and foothill grassland.	Open, rocky slopes; often in shallow clays over serpentine or in rocky areas w/little soil. 5–450m.
Blochman's leafy daisy	*Erigeron blochmaniae*	Coastal dunes.	Sand dunes and hills. 3–185m.
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	Marshes and swamps (freshwater), vernal pools.	Clay soils; usually in vernal pools, sometimes on lake margins. 5–2,400m.
Bolander's bruchia	*Bruchia bolanderi*	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest.	Moss which grows on damp soil. This species has an ephemeral nature and takes advantage of disturbed sites. 1,700–2,800m.
Bolander's horkelia	*Horkelia bolanderi*	Lower montane coniferous forest, chaparral, meadows, valley and foothill grassland.	Grassy margins of vernal pools and meadows. 450–850m.
bottle liverwort	*Sphaerocarpos drewei*	Chaparral, coastal scrub. Much of suitable habitat lost to urbanization.	Liverwort in openings; on soil. 90–600m.
Brandegee's clarkia	*Clarkia biloba* ssp. *brandegeeae*	Chaparral, cismontane woodland.	Often in roadcuts. 295–885m.
Brandegee's eriastrum	*Eriastrum brandegeeae*	Chaparral, cismontane woodland.	On barren volcanic soils; often in open areas. 345–1,000m.
Brand's phacelia	*Phacelia stellaris*	Coastal scrub, coastal dunes.	Open areas. 5–1,515m.
Braunton's milk-vetch	*Astragalus brauntonii*	Closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland.	Recent burns or disturbed areas; in stiff gravelly clay soils overlying granite or limestone. 4–640m.
Brewer's western flax	*Hesperolinon breweri*	Chaparral, cismontane woodland, valley and foothill grassland.	Often in rocky serpentine soil in serpentine chaparral and serpentine grassland. 30–885m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
bristly sedge	*Carex comosa*	Marshes and swamps.	Lake margins, wet places; site below sea level is on a delta island. -5–1,005m.
brittlescale	*Atriplex depressa*	Chenopod scrub, meadows, playas, valley and foothill grassland, vernal pools.	Usually in alkali scalds or alk. Clay in meadows or annual grassland; rarely assoc w/riparian, marshes, or v.p's. 1–320m.
brownish beaked-rush	*Rhynchospora capitellata*	Lower montane coniferous forest, meadows and seeps, marshes and swamps, upper montane coniferous forest.	Mesic sites. 455–2,000m.
Butte County fritillary	*Fritillaria eastwoodiae*	Chaparral, cismontane woodland, lower montane coniferous forest.	Usually on dry slopes but also found in wet places; soils can be serpentine, red clay, or sandy loam. 40–1,500m.
calico monkeyflower	*Mimulus pictus*	Broadleafed upland forest, cismontane woodland.	In bare ground around gooseberry bushes or around granite rock outcrops. 100–1,300m.
California adolphia	*Adolphia californica*	Chaparral, coastal sage scrub, valley and foothill grassland.	From sandy/gravelly to clay soils within grassland, coastal sage scrub, or chaparral; various exposures. 15–300m.
California beardtongue	*Penstemon californicus*	Chaparral, lower montane coniferous forest, pinyon-juniper woodland.	Stony slopes and shrubby openings; sandy or granitic soils. 1,160–2,300m.
California bedstraw	*Galium californicum* ssp. *primum*	Chaparral, lower montane coniferous forest.	Grows in shade of trees and shrubs at the lower edge of the pine belt, in pine forest-chaparral ecotone. 360m.
California chalk-moss	*Pterygoneurum californicum*	Chenopod scrub, alkali playas, valley and foothill grassland.	Moss growing on alkali soil. 10–100m
California ditaxis	*Ditaxis serrata* var. *californica*	Sonoran desert scrub.	On sandy washes and alluvial fans of the foothills and lower desert slopes. 30–1,000m.
California jewel-flower	*Caulanthus californicus*	Chenopod scrub, valley and foothill grassland, pinyon-juniper woodland.	Historical from various valley habitats in both the central valley and carrizo plain. 65–900m.
California marina	*Marina orcuttii* var. *orcuttii*	Pinyon and juniper woodland, sonoran desert scrub, chaparral.	Gravelly hillsides, rocky soil. 1,050–1,160m.
California Orcutt grass	*Orcuttia californica*	Vernal pools.	15–660m.
California screw-moss	*Tortula californica*	Chenopod scrub, valley and foothill grassland.	Moss growing on sandy soil. 10–1,460m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
California seablite	*Suaeda californica*	Marshes and swamps.	Margins of coastal salt marshes. 0–5m.
California vervain	*Verbena californica*	Cismontane woodland, valley and foothill grassland.	Mesic sites on serpentine; usually serpentine seeps or creeks. 255–400m.
Campbell's liverwort	*Geothallus tuberosus*	Coastal scrub, vernal pools. Most suitable habitat lost to urbanization.	Liverwort known from mesic soil. 10–600m.
Cantelow's lewisia	*Lewisia cantelovii*	Broadfleafed upland forest, lower montane coniferous forest, cismontane woodland, chaparral.	Mesic rock outcrops and wet cliffs, usually in moss or clubmoss; on granitics or sometimes on serpentine. 330–1,340m.
caper-fruited tropidocarpum	*Tropidocarpum capparideum*	Valley and foothill grassland.	Alkaline clay. 0–455m.
Carmel Valley malacothrix	*Malacothrix saxatilis* var. *arachnoidea*	Chaparral.	Rock outcrops or steep rocky roadcuts. 25–1,215m.
Carquinez goldenbush	*Isocoma arguta*	Valley and foothill grassland.	Alkaline soils, flats, lower hills. On low benches near drainages & on tops & sides of mounds in swale habitat. 1–20m.
Catalina crossosoma	*Crossosoma californicum*	Chaparral, coastal scrub.	On rocky sea bluffs, wooded canyons, and dry, open sunny spots on rocky clay. 0–500m.
chaparral harebell	*Campanula exigua*	Chaparral.	Rocky sites, usually on serpentine in chaparral. 300–1,250m.
chaparral nolina	*Nolina cismontana*	Chaparral, coastal scrub.	Primarily on sandstone and shale substrates; also known from gabbro. 140–1,275m.
chaparral sand-verbena	*Abronia villosa* var. *aurita*	Chaparral, coastal scrub	Sandy areas. 80–1,600m.
Charlotte's phacelia	*Phacelia nashiana*	Joshua tree woodland, mojavean desert scrub, pinyon-juniper woodland.	Granitic soils; sandy or rocky areas on steep slopes or flats. 600–2,200m.
Chinese Camp brodiaea	*Brodiaea pallida*	Valley and foothill grassland.	In flat, rocky, intermittent streambed on serpentine. 385m.
Choris' popcorn-flower	*Plagiobothrys chorisianus* var. *chorisianus*	Chaparral, coastal scrub, coastal prairie.	Mesic sites. 15–100m.
cliff cinquefoil	*Potentilla rimicola*	Subalpine coniferous forest, upper montane coniferous forest.	Granite crevices; rocky sites. 2,390–3,030m.
cliff spurge	*Euphorbia misera*	Coastal bluff scrub, coastal scrub.	Rocky sites. 10–500m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Clokey's cryptantha	*Cryptantha clokeyi*	Mojavean desert scrub.	Sandy or gravelly soils. One site: 850m.
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	Sonoran desert scrub.	Sandy flats, washes, outwash fans, sometimes on dunes. 60–360m.
coast wallflower	*Erysimum ammophilum*	Chaparral (maritime), coastal dunes, coastal scrub.	Sandy openings. 0–130m.
coast woolly-heads	*Nemacaulis denudata* var. *denudata*	Coastal dunes.	0–100m.
coastal bluff morning-glory	*Calystegia purpurata* ssp. *saxicola*	Coastal dunes, coastal scrub.	15–105m.
coastal dunes milk-vetch	*Astragalus tener* var. *titi*	Coastal bluff scrub, coastal dunes.	Moist, sandy depressions of bluffs or dunes along and near the pacific ocean; one site on a clay terrace. 1–50m.
Columbia yellow cress	*Rorippa columbiae*	Pinyon-juniper woodland, meadows and seeps, playas.	Moist sandy soil, low gravelly river banks, basaltic lava slopes. 360–1,800m.
Colusa grass	*Neostapfia colusana*	Vernal pools.	Usually in large, or deep vernal pool bottoms; adobe soils. 5–110m.
Colusa layia	*Layia septentrionalis*	Chaparral, cismontane woodland, valley and foothill grassland.	Scattered colonies in fields and grassy slopes in sandy or serpentine soil. 145–1,095m.
Comanche Point layia	*Layia leucopappa*	Chenopod scrub, valley and foothill grassland.	Dry hills in white-grey clay soils, often with weedy grasses. 100–350m.
Conejo buckwheat	*Eriogonum crocatum*	Chaparral, coastal scrub, valley and foothill grassland.	Conejo volcanic outcrops; rocky sites. 50–580m.
Conejo dudleya	*Dudleya parva*	Coastal scrub, valley and foothill grassland.	In clayey or volcanic soils on rocky slopes and grassy hillsides. 60–450m.
Congdon's lomatium	*Lomatium congdonii*	Cismontane woodland, chaparral.	Serpentine soils with serpentine chaparral plants and grey pines. 300–610m.
Congdon's tarplant	*Centromadia parryi* ssp. *congdonii*	Valley and foothill grassland.	Alkaline soils, sometimes described as heavy white clay. 1–230m.
Contra Costa goldfields	*Lasthenia conjugens*	Valley and foothill grassland, vernal pools, cismontane woodland. Extirpated from most of its range; extrem. Endangered.	Vernal pools, swales, low depressions, in open grassy areas. 1–445m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Contra Costa manzanita	*Arctostaphylos manzanita* ssp. *laevigata*	Chaparral.	Rocky slopes. 500–1,100m.
Contra Costa wallflower	*Erysimum capitatum* ssp. *angustatum*	Inland dunes.	Stabilized dunes of sand and clay near antioch along the san joaquin river. 3–20m.
Coulter's goldfields	*Lasthenia glabrata* ssp. *coulteri*	Coastal salt marshes, playas, valley and foothill grassland, vernal pools.	Usually found on alkaline soils in playas, sinks, and grasslands. 1–1,400m.
Coulter's saltbush	*Atriplex coulteri*	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland.	Ocean bluffs, ridgetops, as well as alkaline low places. 10–440m.
Coves' cassia	*Senna covesii*	Sonoran desert scrub.	Dry, sandy desert washes, slopes. 200–1,070m.
Coyote ceanothus	*Ceanothus ferrisiae*	Chaparral, valley and foothill grassland, coastal scrub.	Serpentine sites in the mt. Hamilton range. 120–455m.
creamy blazing star	*Mentzelia tridentata*	Mojavean desert scrub.	700–1,160m.
crisp monardella	*Monardella crispa*	Coastal dunes, coastal scrub.	Often on the borders of open, sand areas, usually adjacent to typical backdune scrub vegetation. 5–120m.
crownbeard	*Verbesina dissita*	90% in southern maritime chaparral, 10% in coastal sage scrub.	Steep, rocky, primarily n-facing slopes within 1.5 miles of the ocean, in gravelly soils. 45–210m.
Darwin rock cress	*Arabis pulchra* var. *munciensis*	Chenopod scrub, mojavean desert scrub.	On limestone. 1,100–2,075m.
Davidson's bush mallow	*Malacothamnus davidsonii*	Coastal scrub, riparian woodland, chaparral.	Sandy washes. 180–855m.
Davidson's saltscale	*Atriplex serenana* var. *davidsonii*	Coastal bluff scrub, coastal scrub.	Alkaline soil. 3–250m.
Dean's milk-vetch	*Astragalus deanei*	Chaparral, coastal scrub, riparian forest.	Open, brushy south-facing slopes in diegan coastal sage, sometimes on recently burned-over hillsides. 75–670m.
decumbent goldenbush	*Isocoma menziesii* var. *decumbens*	Coastal scrub.	Sandy soils; often in disturbed sites. 10–910m.
Deep Canyon snapdragon	*Antirrhinum cyathiferum*	Sonoran desert scrub.	Rocky sites. 0–800m.
Dehesa nolina	*Nolina interrata*	Chaparral.	Typically on rocky hillsides or ravines on ultramafic soils (gabbro or metavolcanic). 180–855m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Del Mar manzanita	*Arctostaphylos glandulosa* ssp. *crassifolia*	Chaparral, closed-cone coniferous forest.	Sandy coastal mesas and ocean bluffs; in chaparral or torrey pine forest. 0–365m.
Del Mar Mesa sand aster	*Corethrogyne filaginifolia* var. *linifolia*	Chaparral, coastal scrub.	In coastal, shrubby communities on maritime sediments and conglomerates. 30–150m.
delicate clarkia	*Clarkia delicata*	Cismontane woodland, chaparral.	235–1,000m.
Delta button-celery	*Eryngium racemosum*	Riparian scrub.	Seasonally inundated floodplain on clay. 3–75m.
Delta mudwort	*Limosella subulata*	Riparian scrub, freshwater marsh, brackish marsh. Probably the rarest of the suite of delta rare plants.	Usually on mud banks of the delta in marshy or scrubby riparian associations; often with lilaeopsis masonii. 0–3m.
Delta tule pea	*Lathyrus jepsonii* var. *jepsonii*	Freshwater and brackish marshes.	Often found w/ typha, aster lentus, rosa calif., juncus spp., scirpus, etc. Usually on marsh and slough edges.
desert cymopterus	*Cymopterus deserticola*	Joshua tree woodland, mojavean desert scrub. Most occurrences located near or in edwards afb.	On fine to coarse, loose, sandy soil of flats in old dune areas with well-drained sand. 625–910m.
desert spike-moss	*Selaginella eremophila*	Sonoran desert scrub.	Shaded sites, gravelly soils; crevices or among rocks. 300–2,425m.
Diablo helianthella	*Helianthella castanea*	Broadleaved upland forest, chaparral, cismontane wdlnd, coastal scrub, riparian woodland, valley & foothill grassland.	Usually in chaparral/oak woodland interface in rocky, azonal soils. Often in partial shade. 25–1,150m.
diamond-petaled California poppy	*Eschscholzia rhombipetala*	Valley and foothill grassland.	Alkaline, clay slopes and flats. 0–975m.
dune larkspur	*Delphinium parryi* ssp. *blochmaniae*	Chaparral, coastal dunes (maritime).	On rocky areas and dunes. 30–375m.
Dunn's mariposa lily	*Calochortus dunnii*	Closed-cone coniferous forest, chaparral.	On gabbro or metavolcanic soils; also known from sandstone; often assoc with chaparral. 375–1,830m.
dwarf downingia	*Downingia pusilla*	Valley and foothill grassland (mesic sites), vernal pools.	Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 1–485m.
Earlimart orache	*Atriplex erecticaulis*	Valley and foothill grassland.	40–100m.
Eastwood's goldenbush	*Ericameria fasciculata*	Closed-cone coniferous forest, chaparral (maritime), coastal scrub, coastal dunes.	In sandy openings. 30–275m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Eastwood's manzanita	*Arctostaphylos tomentosa* ssp. *eastwoodiana*	Chaparral.	In maritime chaparral in the la purisima ridge, burton mesa, and point sal areas. 90–365m.
El Dorado bedstraw	*Galium californicum* ssp. *sierrae*	Cismontane woodland, chaparral, lower montane coniferous forest.	More often in pine-oak woodland than in chaparral; restricted to gabbroic soils. 100–585m.
El Dorado County mule ears	*Wyethia reticulata*	Chaparral, cismontane woodland, lower montane coniferous forest.	Stony red clay and gabbroic soils; often in openings in gabbro chaparral. 180–630m.
elephant tree	*Bursera microphylla*	Sonoran desert scrub.	Hillsides and washes and on canyon sides in california; rocky sites. 200–700m.
elongate copper-moss	*Mielichhoferia elongata*	Cismontane woodland. Commonly called "copper mosses".	Moss growing on metamorphic rock; usually vernally mesic. 500–1,300m.
Encinitas baccharis	*Baccharis vanessae*	Chaparral.	On sandstone soils in steep, open, rocky areas with chaparral associates. 60–720m.
estuary seablite	*Suaeda esteroa*	Marshes and swamps.	Coastal salt marshes in clay, silt, and sand substrates. 0–5m.
felt-leaved monardella	*Monardella hypoleuca* ssp. *lanata*	Chaparral, cismontane woodland.	Occurs in understory in mixed chaparral, chamise chaparral, and southern oak woodland; sandy soil. 300–1,575m.
Ferris' milk-vetch	*Astragalus tener* var. *ferrisiae*	Meadows, valley and foothill grassland.	Subalkaline flats on overflow land in the central valley; usually seen in dry, adobe soil. 5–75m.
flat-seeded spurge	*Chamaesyce platysperma*	Sonoran desert scrub, desert dunes.	Sandy places or shifting dunes. Possibly a waif in california; more common in arizona and mexico. 60–950m.
flax-like monardella	*Monardella linoides* ssp. *oblonga*	Lower montane coniferous forest, upper montane coniferous forest, pinyon-juniper woodland.	On dry slopes of yellow pine forest, decomposed granitic soils; also in roadside disturbed areas. 1,695–2,470m.
Follett's monardella	*Monardella follettii*	Lower montane coniferous forest.	Open rocky serpentine slopes. 600–2,000m.
fox sedge	*Carex vulpinoidea*	Marshes and swamps, riparian woodland.	Wet places. 30–1,200m.
fragrant fritillary	*Fritillaria liliacea*	Coastal scrub, valley and foothill grassland, coastal prairie.	Often on serpentine; various soils reported though usually clay, in grassland. 3–410m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Franciscan onion	*Allium peninsulare* var. *franciscanum*	Cismontane woodland, valley and foothill grassland.	Clay soils; often on serpentine. Dry hillsides. 100–300m.
Franciscan thistle	*Cirsium andrewsii*	Coastal bluff scrub, broadleaved upland forest, coastal scrub.	Sometimes serpentine seeps. 0–135m.
Gabilan Mountains manzanita	*Arctostaphylos gabilanensis*	Chaparral, cismontane woodland.	Grainitic substrates. 300–700m.
Gambel's water cress	*Nasturtium gambelii*	Marshes and swamps.	Freshwater and brackish marshes at the margins of lakes and along streams, in or just above the water level. 5–1,305m.
Gander's pitcher sage	*Lepechinia ganderi*	Closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland.	Usu. Found in chap. Or coastal scrub; sometimes in tecate cypress wdlnd. Gabbro or metavolcanic substrate. 300–1,000m.
Gander's ragwort	*Packera ganderi*	Chaparral.	Recently burned sites and gabbro outcrops. 400–1,200m.
glandular ditaxis	*Ditaxis claryana*	Mojavean desert scrub, sonoran desert scrub.	In dry washes and on rocky hillsides. Sandy soils. 0–465m.
golden violet	*Viola aurea*	Great basin scrub, pinyon-juniper woodland.	Dry, sandy slopes. 835–1,800m.
golden-spined cereus	*Bergerocactus emoryi*	Coastal scrub, sometimes chaparral margins.	Limited to the coastal belt. Usually on clay soils. 3–395m.
Greata's aster	*Aster greatae*	Chaparral, cismontane woodland.	Mesic canyons. 800–1,500m.
green jewel-flower	*Streptanthus breweri* var. *hesperidis*	Chaparral, cismontane woodland.	Openings in chaparral or woodland; serpentine, rocky sites. 130–760m.
Greene's tuctoria	*Tuctoria greenei*	Vernal pools, valley and foothill grassland.	Dry bottoms of vernal pools in open grasslands. 30–1,065m.
grey-leaved violet	*Viola pinetorum* ssp. *grisea*	Subalpine coniferous forest, upper montane coniferous forest.	Dry mountain peaks and slopes. 1,800–2,600m.
hairless popcorn-flower	*Plagiobothrys glaber*	Meadows and seeps, marshes and swamps.	Coastal salt marshes and alkaline meadows. 5–180m.
hairy orcutt grass	*Orcuttia pilosa*	Vernal pools.	25–125m.
Hall's bush mallow	*Malacothamnus hallii*	Chaparral.	Some populations on serpentine. 10–550m.
Hall's monardella	*Monardella macrantha* ssp. *hallii*	Broadleaved upland forest, chaparral, lower montane coniferous forest, cismontane woodland, valley & foothill grassland.	Dry slopes and ridges in openings within the above communities. 695–2,195m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Hall's tarplant	*Deinandra halliana*	Cismontane woodland, chenopod scrub, valley and foothill grassland.	Reported from a variety of substrates incl. Clay, sand, and alkaline soils. 300–950m.
Hammitt's clay-cress	*Sibaropsis hammittii*	Valley and foothill grassland, chaparral.	Mesic microsites in open areas on clay soils in stipa grassland. Often surrounded by adenostoma chaparral. 730–1,065m.
Hartweg's golden sunburst	*Pseudobahia bahiifolia*	Valley and foothill grassland, cismontane woodland.	Clay soils, predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools. 15–150m.
heart-leaved pitcher sage	*Lepechinia cardiophylla*	Closed-cone coniferous forest, chaparral, cismontane woodland.	550–1,370m.
heartscale	*Atriplex cordulata*	Chenopod scrub, valley and foothill grassland, meadows.	Alkaline flats and scalds in the central valley, sandy soils. 1–150(600)m.
Heckard's pepper-grass	*Lepidium latipes* var. *heckardii*	Valley and foothill grassland, vernal pools.	Grassland, and sometimes vernal pool edges. Alkaline soils. 3–30m.
Henderson's bent grass	*Agrostis hendersonii*	Valley and foothill grassland, vernal pools.	Little information exists; moist places in grassland or vernal pool habitat. 70–305m.
hispid bird's-beak	*Cordylanthus mollis* ssp. *hispidus*	Meadows, playas, valley and foothill grassland.	In damp alkaline soils, especially in alkaline meadows and alkali sinks with distichlis. 10–155m.
hooked popcorn-flower	*Plagiobothrys uncinatus*	Chaparral, cismontane woodland, valley and foothill grassland, coastal bluff scrub.	Sandstone outcrops and canyon sides; often in burned or disturbed areas. 300–820m.
Hooker's manzanita	*Arctostaphylos hookeri* ssp. *hookeri*	Chaparral, coastal scrub, closed-cone coniferous forest, cismontane woodland.	Sandy soils, sandy shales, sandstone outcrops. 85–300m.
Hoover's bent grass	*Agrostis hooveri*	Chaparral, cismontane woodland, valley and foothill grassland.	Sandy sites. 60–600m.
Hoover's button-celery	*Eryngium aristulatum* var. *hooveri*	Vernal pools.	Alkaline depressions, vernal pools, roadside ditches and other wet places near the coast. 5–45m.
Hoover's calycadenia	*Calycadenia hooveri*	Cismontane woodland, valley and foothill grassland.	On exposed, rocky, barren soil. 65–260m.
Hoover's cryptantha	*Cryptantha hooveri*	Valley and foothill grassland.	In coarse sand. 5–150m.
Hoover's spurge	*Chamaesyce hooveri*	Vernal pools, valley and foothill grassland.	Vernal pools on volcanic mudflow or clay substrate. 25–130m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Hospital Canyon larkspur	*Delphinium californicum* ssp. *interius*	Cismontane woodland, chaparral.	In wet, boggy meadows, openings in chaparral and in canyons. 225–1,060m.
hot springs fimbristylis	*Fimbristylis thermalis*	Meadows (alkaline).	Near hot springs. 120–1,340m.
Indian Valley brodiaea	*Brodiaea coronaria* ssp. *rosea*	Closed-cone coniferous forest, chaparral, cismontane woodland, valley and foothill grassland, meadows.	Serpentine gravelly creek bottoms, and in meadows and swales. 335–1,450m.
Indian Valley bush mallow	*Malacothamnus aboriginum*	Cismontane woodland, chaparral.	Granitic outcrops and sandy bare soil, often in disturbed soils. 150–1,700m.
intermediate mariposa lily	*Calochortus weedii* var. *intermedius*	Coastal scrub, chaparral, valley and foothill grassland.	Dry, rocky open slopes and rock outcrops. 120–850m.
Ione manzanita	*Arctostaphylos myrtifolia*	Chaparral, cismontane woodland.	On ione clay with chaparral associates. Often comprises 50–80% cover. 75–560m.
island green dudleya	*Dudleya virens* ssp. *insularis*	Coastal bluff scrub, coastal scrub.	Rocky soils. 5–300m.
jackass-clover	*Wislizenia refracta* ssp. *refracta*	Playas, desert dunes, mojavean desert scrub, sonoran desert scrub.	Sandy washes, roadsides, alkaline flats. 130–800m.
Jaeger's milk-vetch	*Astragalus pachypus* var. *jaegeri*	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland.	Dry ridges and valleys and open sandy slopes; often in grassland and oak-chaparral. 365–915m.
Jepson's milk-vetch	*Astragalus rattanii* var. *jepsonianus*	Cismontane woodland, valley and foothill grassland, chaparral.	Commonly on serpentine in grassland or openings in chaparral. 320–700m.
Jepson's onion	*Allium jepsonii*	Cismontane woodland, lower montane coniferous forest.	On serpentine soils in sierra foothills, volcanic soil on table mtn. On slopes and flats; usu in an open area. 450–1,130m
Johnston's rock cress	*Arabis johnstonii*	Chaparral, lower montane coniferous forest.	Granitic soil with pleistocene,non-marine clay deposits. With adenostoma, quercus wislizenii. 1,350–2,150m.
Jones' layia	*Layia jonesii*	Chaparral, valley and foothill grassland.	Clay soils and serpentine outcrops. 5–155m.
Kellogg's horkelia	*Horkelia cuneata* ssp. *sericea*	Closed-cone coniferous forest, coastal scrub, chaparral.	Old dunes, coastal sandhills; openings. 10–200m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Kern mallow	*Eremalche kernensis*	Chenopod scrub, valley and foothill grassland.	On dry, open sandy to clayey soils; usually within valley saltbush scrub; often at edge of balds. 70–515m.
Kings Mountain manzanita	*Arctostaphylos regismontana*	Broadleaved upland forest, chaparral, north coast coniferous forest.	Granitic or sandstone outcrops. 305–730m.
Kusche's sandwort	*Arenaria macradenia* var. *kuschei*	Habitat little known.	Mojave desert. 1,220m.
La Graciosa thistle	*Cirsium loncholepis*	Coastal dunes, brackish marshes, riparian scrub.	Lake edges, riverbanks, other wetlands; often in dune areas. 5–185m.
La Purisima manzanita	*Arctostaphylos purissima*	Chaparral.	Sandstone outcrops, sandy soil. 120–300m.
Laguna Beach dudleya	*Dudleya stolonifera*	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland.	In thin soil on north-facing sandstone cliffs. 10–260m.
Lakeside ceanothus	*Ceanothus cyaneus*	Closed-cone coniferous forest, chaparral.	100–1,515m.
Lancaster milk-vetch	*Astragalus preussii* var. *laxiflorus*	Chenopod scrub.	Alkaline clay flats or gravelly or sandy washes and along draws in gullied badlands. 725m in California.
large-flowered fiddleneck	*Amsinckia grandiflora*	Cismontane woodland, valley and foothill grassland.	Annual grassland in various soils. 275–550m.
late-flowered mariposa lily	*Calochortus weedii* var. *vestus*	Chaparral, cismontane woodland.	Dry, open coastal woodland, chaparral; on serpentine. 270–1,910m.
Latimer's woodland-gilia	*Saltugilia latimeri*	Chaparral, mojavean desert scrub.	Rocky or sandy substrate. 400–1,900m.
Layne's ragwort	*Packera layneae*	Chaparral, cismontane woodland.	Ultramafic soil; occasionally along streams. 200–1,000m.
leafy buckwheat	*Eriogonum foliosum*	Chaparral, lower montane coniferous forest, pinyon and juniper woodland.	Sandy sites. 970–2,200m.
leafy tarplant	*Deinandra increscens* ssp. *foliosa*	Valley and foothill grassland.	300–500m.
legenere	*Legenere limosa*	Vernal pools. Many historical occurrences are extirpated.	In beds of vernal pools. 1–880m.
Lemmon's jewelflower	*Caulanthus coulteri* var. *lemmonii*	Pinyon-juniper woodland, valley and foothill grassland.	80–1,220m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
lemon lily	*Lilium parryi*	Lower montane coniferous forest, meadows and seeps, riparian forest, upper montane coniferous forest.	Wet, mountainous terrain; gen in forested areas; on shady edges of streams, in open boggy meadows & seeps. 1,300–2,790m.
lesser saltscale	*Atriplex minuscula*	Chenopod scrub, playas, valley and foothill grassland.	In alkali sink and grassland in sandy, alkaline soils. 20–100m.
light gray lichen	*Mobergia calculiformis*	Coastal scrub?	Abundant on cobbles in right habitat; only known from one site in Baja and one in San Diego area.
little mousetail	*Myosurus minimus* ssp. *apus*	Vernal pools. This subspecies has taxonomic problems; distinguishing between this and m. Sessilis is difficult. Hybrid?	Alkaline soils. 20-640m. (note: central valley EO's not mapped).
Little San Bernardino Mtns. linanthus	*Linanthus maculatus*	Desert dunes, sonoran desert scrub, mojavean desert scrub, joshua tree woodland.	Sandy places; microhab difficult to pin down. Usu. In light-colored quartz sand; often in wash or bajada. 195–2,075m.
Livermore tarplant	*Deinandra bacigalupii*	Meadows and seeps.	Alkaline meadows. 150–185m.
Loma Prieta hoita	*Hoita strobilina*	Chaparral, cismontane woodland, riparian woodland.	Serpentine; mesic sites.
Lompoc yerba santa	*Eriodictyon capitatum*	Closed-cone coniferous forest, chaparral.	Sandy soils on terraces. 40–455m.
long-spined spineflower	*Chorizanthe polygonoides* var. *longispina*	Chaparral, coastal scrub, meadows, valley and foothill grassland.	Gabbroic clay. 30–1,450m.
Los Angeles sunflower	*Helianthus nuttallii* ssp. *parishii*	Marshes and swamps (coastal salt and freshwater). Historical from southern california.	5–1,675m.
Lost Hills crownscale	*Atriplex vallicola*	Chenopod scrub, valley and foothill grassland, vernal pools.	In powdery, alkaline soils that are vernally moist with *frankenia, atriplex* spp. and distichlis. 0–605m.
lost thistle	*Cirsium praeteriens*	Little information exists on this plant; it was collected from the palo alto area at the turn of the 20th century.	Although not seen since 1901, this cirsium is thought to be quite distinct from other cirsiums acc. To d. Keil. 0–100m.
Lyon's pentachaeta	*Pentachaeta lyonii*	Chaparral, valley and foothill grassland.	Edges of clearings in chap., usually at the ecotone btwn grassland and chaparral or edges of firebreaks. 30–630m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Madera leptosiphon	*Leptosiphon serrulatus*	Cismontane woodland, lower montane coniferous forest.	Dry slopes; often on decomposed granite in woodland. 80–1,575m.
Malibu baccharis	*Baccharis malibuensis*	Coastal scrub, chaparral, cismontane woodland.	In conejo volcanic substrates, often on exposed roadcuts. Sometimes occupies oak woodland habitat. 150–260m.
many-stemmed dudleya	*Dudleya multicaulis*	Chaparral, coastal scrub, valley and foothill grassland.	In heavy, often clayey soils or grassy slopes. 0–790m.
marcescent dudleya	*Dudleya cymosa* ssp. *marcescens*	Chaparral.	On sheer rock surfaces and rocky volcanic cliffs. 180–520m.
Mariposa cryptantha	*Cryptantha mariposae*	Chaparral.	On serpentine outcrops. 200–650m.
marsh microseris	*Microseris paludosa*	Closed-cone coniferous forest,cismontane woodland, coastal scrub, valley and foothill grassland.	5–300m.
marsh sandwort	*Arenaria paludicola*	Marshes and swamps.	Growing up through dense mats of *typha, juncus, scirpus*, etc. In freshwater marsh. 10–170m.
Mason's lilaeopsis	*Lilaeopsis masonii*	Freshwater and brackish marshes, riparian scrub.	Tidal zones, in muddy or silty soil formed through river deposition or river bank erosion. 0–10m.
Mason's neststraw	*Stylocline masonii*	Chenopod scrub, pinyon-juniper woodland.	Sandy washes. 100–1,200m.
Mecca-aster	*Xylorhiza cognata*	Sonoran desert scrub.	Steep canyon slopes, in sandstone and clay. 20–305m.
mesa horkelia	*Horkelia cuneata* ssp. *puberula*	Chaparral, cismontane woodland, coastal scrub.	Sandy or gravelly sites. 70–810m.
Metcalf Canyon jewel-flower	*Streptanthus albidus* ssp. *albidus*	Valley and foothill grassland.	Relatively open areas in dry grassy meadows on serpentine soils; also on serpentine balds. 45–245m.
Mexican flannelbush	*Fremontodendron mexicanum*	Closed-cone coniferous forest, chaparral, cismontane woodland.	Usually scattered along the borders of creeks or in dry canyons; sometimes on gabbro soils. 10–490m.
Miles' milk-vetch	*Astragalus didymocarpus* var. *milesianus*	Coastal scrub.	Clay soils. 20–90m.
Mission Canyon bluecup	*Githopsis diffusa* ssp. *filicaulis*	Chaparral.	Probably in open, grassy places within chaparral; much overlooked. 450–700m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Mojave tarplant	*Deinandra mohavensis*	Riparian scrub, chaparral.	Low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 850–1,600m.
Monterey spineflower	*Chorizanthe pungens* var. *pungens*	Coastal dunes, chaparral, cismontane woodland, coastal scrub.	Sandy soils in coastal dunes or more inland within chaparral or other habitats. 0–150m.
Moreno currant	*Ribes canthariforme*	Chaparral.	Among boulders in oak-manzanita thickets; shaded or partially shaded sites. 340–1,200m.
Morro manzanita	*Arctostaphylos morroensis*	Chaparral, cismontane woodland, coastal dunes (pre-flandrian), coastal scrub.	On baywood sands usually with chaparral associates. 5–205m.
moss phlox	*Phlox muscoides*	Alpine boulder and rock field, subalpine coniferous forest, great basin scrub.	Open rocky slopes. 1,270–2,700m.
most beautiful jewel-flower	*Streptanthus albidus* ssp. *peramoenus*	Chaparral, valley and foothill grassland, cismontane woodland.	Serpentine outcrops, on ridges and slopes. 120–730m.
mountain bent grass	*Agrostis humilis*	Alpine boulder and rock field, meadows and seeps, subalpine coniferous forest.	Probably undercollected; high elevation grass. 2,700–3,200m.
Mt. Diablo buckwheat	*Eriogonum truncatum*	Chaparral, coastal scrub, valley and foothill grassland.	Dry, exposed clay or sandy substrates. 100–600m.
Mt. Diablo fairy-lantern	*Calochortus pulchellus*	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland.	On wooded and brushy slopes. 200–800m.
Mt. Diablo jewel-flower	*Streptanthus hispidus*	Valley and foothill grassland, chaparral.	Talus or rocky outcrops. 275–970m.
Mt. Diablo manzanita	*Arctostaphylos auriculata*	Chaparral.	In canyons and on slopes. On sandstone. 120–500m.
Mt. Diablo phacelia	*Phacelia phacelioides*	Chaparral, cismontane woodland.	Adjacent to trails, on rock outcrops and talus slopes; sometimes on serpentine. 500–1,370m.
Mt. Gleason Indian paintbrush	*Castilleja gleasonii*	Lower montane coniferous forest.	On open flats or slopes in granitic soil. Restricted to the san gabriel mountains. 1,650–1,830m.
Mt. Hamilton coreopsis	*Coreopsis hamiltonii*	Cismontane woodland.	On steep shale talus with open southwestern exposure. 530–1,300m.
Mt. Hamilton jewel-flower	*Streptanthus callistus*	Chaparral, cismontane woodland.	Open talus slopes on shale with grey pine and/or black oak. 600–790m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Mt. Hamilton lomatium	*Lomatium observatorium*	Cismontane woodland.	Open to partially shaded openings in pinus coulteri-oak woodland. Sedimentary franciscan rocks & volcanics. 1,219–1,330m.
Mt. Hamilton thistle	*Cirsium fontinale* var. *campylon*	Cismontane woodland, chaparral, valley and foothill grassland.	In seasonal and perennial drainages on serpentine. 95–890m.
mud nama	*Nama stenocarpum*	Marshes and swamps.	Lake shores, river banks, intermittently wet areas. 5–500m.
Munz' mariposa lily	*Calochortus palmeri* var. *munzii*	Lower montane coniferous forest, chaparral, meadows.	Seen in open jeffrey pine forest as well as in chaparral. 900–1,640m.
Munz' onion	*Allium munzii*	Chaparral, coastal scrub, cismontane woodland, pinyon-juniper woodland, valley and foothill grassland.	Heavy clay soils; grows in grasslands & openings within shrublands or woodlands. 300–1,035m.
Munz' sage	*Salvia munzii*	Coastal scrub, chaparral.	Rolling hills and slopes, in rocky soil. 120–1,090m.
Munz' tidy-tips	*Layia munzii*	Chenopod scrub, valley and foothill grassland.	Hillsides, in white-grey alkaline clay soils, w/grasses and chenopod scrub associates. 45–760m.
Napa western flax	*Hesperolinon* sp. *nov. "serpentinum"*	Chaparral.	Mostly found in serpentine chaparral. 225–850m.
Nevin's barberry	*Berberis nevinii*	Chaparral, cismontane woodland, coastal scrub, riparian scrub.	On steep, n-facing slopes or in low grade sandy washes. 290–1,575m.
Newberry's cinquefoil	*Potentilla newberryi*	Marshes and swamps.	Receding shorelines; drying marsh margins. 1,290–2,200m.
Nissenan manzanita	*Arctostaphylos nissenana*	Closed-cone coniferous forest, chaparral.	Usually on metamorphics, associated w/ other chaparral species. 450–1,100m.
Norris' beard-moss	*Didymodon norrisii*	Cismontane woodland, lower montane coniferous forest.	Moss from intermittently mesic sites; on rocks. 600–1,700m.
Northern California black walnut	*Juglans hindsii*	Riparian forest, riparian woodland. Few extant native stands remain; widely naturalized.	Deep alluvial soil associated with a creek or stream. 0–395m.
northern clarkia	*Clarkia borealis* ssp. *borealis*	Chaparral, cismontane woodland, lower montane coniferous forest.	400–800m.
Nuttall's lotus	*Lotus nuttallianus*	Coastal dunes, coastal scrub.	On sand dunes; plants are threatened by encroachment of exotics. 0–10m.
Nuttall's scrub oak	*Quercus dumosa*	Closed-cone coniferous forest, chaparral, coastal scrub. More common scrub oak now = *q. Berberidifolia.*	Generally on sandy soils near the coast; sometimes on clay loam. 15–400m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
oil neststraw	*Stylocline citroleum*	Shadscale Scrub, Coastal Sage Scrub	Flats, clay soils in oil-producing areas. 50–300m.
Ojai fritillary	*Fritillaria ojaiensis*	Broadleaved upland forest (mesic), chaparral, lower montane coniferous forest.	Rocky sites; one reported as "moist shale talus." 300–670m.
Orcutt's bird's-beak	*Cordylanthus orcuttianus*	Coastal scrub.	Found in coastal scrub associations on slopes; also reported from intermittently moist swales, and in washes. 100–200m
Orcutt's brodiaea	*Brodiaea orcuttii*	Vernal pools, valley and foothill grassland, closed-cone coniferous forest, cismontane woodland, chaparral, meadows.	Mesic, clay habitats; sometimes serpentine; usu in vernal pools and small drainages. 30–1,615m.
Orcutt's dudleya	*Dudleya attenuata* ssp. *orcuttii*	Coastal scrub, coastal bluff scrub, chaparral.	Rocky mesas, canyons, and ridges. 3–50m.
Orcutt's hazardia	*Hazardia orcuttii*	Chaparral, coastal scrub.	Often on clay; in grassy edges of chaparral and coastal scrub. 85m.
Orcutt's linanthus	*Linanthus orcuttii*	Chaparral, lower montane coniferous forest.	Sometimes in disturbed areas; often in gravelly clearings. 1,060–2,000m.
Orcutt's pincushion	*Chaenactis glabriuscula* var. *orcuttiana*	Coastal bluff scrub, coastal dunes.	Sandy sites. 3–100m.
Orcutt's spineflower	*Chorizanthe orcuttiana*	Coastal scrub, chaparral, closed-cone coniferous forest.	Sandy sites and openings; sometimes in transition zones. 3–125m.
Orcutt's woody-aster	*Xylorhiza orcuttii*	Sonoran desert scrub.	Arid canyons; often in washes. 265–365m.
Oregon meconella	*Meconella oregana*	Coastal prairie, coastal scrub.	Open, moist places. 250–500m.
Otay manzanita	*Arctostaphylos otayensis*	Chaparral, cismontane woodland.	Metavolcanic soils with other chaparral associates. 275–1,700m.
Otay Mesa mint	*Pogogyne nudiuscula*	Vernal pools.	Dry beds of vernal pools and moist swales w/*eryngium aristulatum* var *parishii* and *orcuttia californica*. 85–250m.
Otay Mountain ceanothus	*Ceanothus otayensis*	Chaparral.	Metavolcanic or gabbroic soils. 600–1,100m.
Otay tarplant	*Deinandra conjugens*	Coastal scrub, valley and foothill grassland.	Coastal plains, mesas, and river bottoms; often in open, disturbed areas; clay soils. 25–300m.
oval-leaved viburnum	*Viburnum ellipticum*	Chaparral, cismontane woodland, lower montane coniferous forest.	215–1,400m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Pajaro manzanita	*Arctostaphylos pajaroensis*	Chaparral.	Sandy soils. 30–760m.
pale-yellow layia	*Layia heterotricha*	Cismontane woodland, pinyon-juniper woodland, valley and foothill grassland.	Alkaline or clay soils; open areas. 270–1,365 (2,675)m.
pallid manzanita	*Arctostaphylos pallida*	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub.	Grows on uplifted marine terraces on siliceous shale or thin chert. May require fire. 185–465m.
palmate-bracted bird's-beak	*Cordylanthus palmatus*	Chenopod scrub, valley and foothill grassland.	Usually on pescadero silty clay which is alkaline, with distichlis, frankenia, etc. 5–155m.
Palmer's frankenia	*Frankenia palmeri*	Coastal dunes, marshes (coastal salt), playas.	0–10m.
Palmer's goldenbush	*Ericameria palmeri* ssp. *palmeri*	Coastal scrub, chaparral.	On granitic soils, on steep hillsides. Mesic sites. 100–600m.
Palmer's mariposa lily	*Calochortus palmeri* var. *palmeri*	Meadows and seeps, chaparral, lower montane coniferous forest.	Vernally moist places in yellow-pine forest, chaparral. 600–2,245m.
Panoche pepper-grass	*Lepidium jaredii* ssp. *album*	Valley and foothill grassland.	Alkali bottoms, slopes, washes, alluvial fans; clay and gypsum-rich soils. 65–910m.
pansy monkeyflower	*Mimulus pulchellus*	Lower montane coniferous forest, meadows and seeps.	Sandy decomposed granite soils and moist meadows; vernally wet sites. 600–2,000m.
pappose tarplant	*Centromadia parryi* ssp. *parryi*	Coastal prairie, meadows and seeps, coastal salt marsh, valley and foothill grassland.	Vernally mesic, often alkaline sites. 2–420m.
Parish's brittlescale	*Atriplex parishii*	Alkali meadows, vernal pools, chenopod scrub, playas.	Usually on drying alkali flats with fine soils. 4–140m.
Parish's bush mallow	*Malacothamnus parishii*	Chaparral, coastal sage scrub.	In a wash. One site known: 485m.
Parish's chaenactis	*Chaenactis parishii*	Chaparral.	Rocky sites. 1,300–2,500m.
Parish's desert-thorn	*Lycium parishii*	Coastal scrub, sonoran desert scrub.	300–1,000m.
Parish's gooseberry	*Ribes divaricatum* var. *parishii*	Riparian woodland.	Salix swales in riparian habitats. 65–100m.
Parish's meadowfoam	*Limnanthes gracilis* ssp. *parishii*	Meadows and seeps, vernal pools.	Vernally moist areas and temporary seeps of highland meadows and plateaus; often bordering lakes and streams. 600–1,760m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Parish's popcorn-flower	*Plagiobothrys parishii*	Great basin scrub, joshua tree woodland.	Alkaline soils; mesic sites. 750–1,400m.
Parish's yampah	*Perideridia parishii* ssp. *parishii*	Lower montane coniferous forest, meadows, upper montane coniferous forest.	Damp meadows or along streambeds-prefers an open pine canopy. 1,390–3,000m.
Parry's horkelia	*Horkelia parryi*	Chaparral, cismontane woodland.	Openings in chaparral or woodland; especially known from the Ione formation in Amador County. 80–1,035m.
Parry's spineflower	*Chorizanthe parryi* var. *parryi*	Coastal scrub, chaparral.	Dry slopes and flats; sometimes at interface of 2 veg types, such as chap and oak wdland; dry, sandy soils. 40–1,705m.
Parry's tetracoccus	*Tetracoccus dioicus*	Chaparral, coastal scrub.	Stony, decomposed gabbro soil. 150–1,000m.
Peirson's lupine	*Lupinus peirsonii*	Joshua tree woodland, pinyon-juniper woodland, upper montane coniferous forest.	Decomposed granite slide and talus, on slopes and ridges. 1000–2,000m.
Pendleton button-celery	*Eryngium pendletonensis*	Coastal bluff scrub, valley and foothill grassland, vernal pools.	Vernally mesic sites. 15–110m.
Peninsular manzanita	*Arctostaphylos peninsularis* ssp. *peninsularis*	Chaparral.	1,240–1,520m.
pincushion navarretia	*Navarretia myersii* ssp. *myersii*	Vernal pools, valley and foothill grassland.	Clay soils within nonnative grassland. 20–330m.
Pine Hill ceanothus	*Ceanothus roderickii*	Chaparral, cismontane woodland.	Gabbroic soils; often in "historically disturbed" areas with an ensemble of other rare plants. 260–630m.
Pine Hill flannelbush	*Fremontodendron decumbens*	Chaparral, cismontane woodland.	Rocky ridges; gabbro or serpentine endemic; often among rocks and boulders. 420–685m.
pink creamsacs	*Castilleja rubicundula* ssp. *rubicundula*	Chaparral, meadows and seeps, valley and foothill grassland.	Openings in chaparral or grasslands. On serpentine. 20–900m.
Pinnacles buckwheat	*Eriogonum nortonii*	Chaparral, valley and foothill grassland.	Sandy soils; often on recent burns; Wwestern Santa Lucias. 390–975m.
pinyon rock cress	*Arabis dispar*	Joshua tree woodland, pinyon-juniper woodland, mojavean desert scrub.	Granitic, gravelly slopes & mesas. Often under desert shrubs which support it as it grows. 1,200–2,400m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Pismo clarkia	*Clarkia speciosa* ssp. *immaculata*	Chaparral, cismontane woodland, valley and foothill grassland.	On ancient sand dunes not far from the coast. Sandy soils, openings. 25–185m.
Piute Mountains navarretia	*Navarretia setiloba*	Cismontane woodland, pinyon-juniper woodland, valley and foothill grassland.	Red clay soils, other clay soils, or on gravelly loam. 300–1,110m.
Pleasant Valley mariposa lily	*Calochortus clavatus* var. *avius*	Lower montane coniferous forest.	Josephine silt loam and volcanically derived soil; often in rocky areas. 305–1,700m.
Plummer's mariposa lily	*Calochortus plummerae*	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest.	Occurs on rocky and sandy sites, usually of granitic or alluvial material. Can be very common after fire. 90–1,610m.
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	Coastal salt marsh.	Usually in coastal salt marsh with salicornia, distichlis, jaumea, spartina, etc. 0–15m.
pointed broom sedge	*Carex scoparia*	Great basin scrub.	Wet, open places. 130–1,000m.
Presidio clarkia	*Clarkia franciscana*	Coastal scrub, valley and foothill grassland.	Serpentine outcrops in grassland or scrub. 20–335m.
Pringle's monardella	*Monardella pringlei*	Coastal scrub.	Sandy hills. 300–400m.
prostrate navarretia	*Navarretia prostrata*	Coastal scrub, valley and foothill grassland, vernal pools.	Alkaline soils in grassland, or in vernal pools. 15–700m.
purple stemodia	*Stemodia durantifolia*	Sonoran desert scrub.	Sandy soils; mesic sites. 180–300m.
Rainbow manzanita	*Arctostaphylos rainbowensis*	Chaparral. Previously called a. Peninsularis or considered a hybrid between a. Glandulosa & a. Glauca.	Usually found in gabbro chaparral in riverside and san diego counties. 270–790m.
Ramona horkelia	*Horkelia truncata*	Chaparral, cismontane woodland.	Habitats in california include: mixed chaparral, vernal streams, and disturbed areas near roads. Clay soil. 400–1,300m.
Rawhide Hill onion	*Allium tuolumnense*	Cismontane woodland.	Restricted to serpentine soil, usu in grey pine chaparral. Steep, rocky, s-facing slopes or small drainages. 300–600m.
rayless layia	*Layia discoidea*	Chaparral, cismontane woodland, lower montane coniferous forest.	On serpentine alluvium and serpentine talus. 785–1,585m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
rayless ragwort	*Senecio aphanactis*	Cismontane woodland, coastal scrub.	Drying alkaline flats. 20–575m.
recurved larkspur	*Delphinium recurvatum*	Chenopod scrub, valley and foothill grassland, cismontane woodland.	On alkaline soils; often in valley saltbush or valley chenopod scrub. 3–685m.
Red Bluff dwarf rush	*Juncus leiospermus* var. *leiospermus*	Chaparral, valley and foothill grassland, cismontane woodlands, vernal pools.	Vernally mesic sites. Sometimes on edges of vernal pools. 30–1,020m.
Red Hills ragwort	*Senecio clevelandii* var. *heterophyllus*	Cismontane woodland.	Drying serpentine soils; often along streams. 255–385m.
Red Hills soaproot	*Chlorogalum grandiflorum*	Cismontane woodland, chaparral, lower montane coniferous forest.	Occurs on both serpentine and gabbro substrates; often on “historically disturbed” sites. 240–760m.
Red Rock poppy	*Eschscholzia minutiflora* ssp. *twisselmannii*	Mojavean desert scrub.	Volcanic tuff; with *larrea, lycium, eriogonum, isomeris, hemizonia*. 680–1,230m.
Red Rock tarplant	*Deinandra arida*	Mojavean desert scrub.	Clay soil; dry to moist sites where water has collected along ephemeral streams, & along road edges. 300–950m.
Refugio manzanita	*Arctostaphylos refugioensis*	Chaparral.	On sandstone. 300–820m.
Robinson’s pepper-grass	*Lepidium virginicum* var. *robinsonii*	Chaparral, coastal scrub.	Dry soils, shrubland. 1–945m.
Robison’s monardella	*Monardella robisonii*	Pinyon-juniper woodland, joshua tree woodland.	Rocky desert slopes, often among granitic boulders. 1,000–1,500m.
robust monardella	*Monardella villosa* ssp. *globosa*	Broadleaved upland forest, chaparral, cismontane woodland, valley and foothill grassland.	Openings. 30–300m.
robust spineflower	*Chorizanthe robusta* var. *robusta*	Cismontane woodland, coastal dunes, coastal scrub.	Sandy terraces and bluffs or in loose sand. 3–120m.
rock draba	*Draba corrugata* var. *saxosa*	Alpine boulder and rock fields, subalpine coniferous forest, upper montane coniferous forest.	Rocky sites. 2,440–3,600m.
rock sanicle	*Sanicula saxatilis*	Broadleafed upland forest, chaparral, valley and foothill grassland.	Bedrock outcrops and talus slopes in chaparral or oak woodland habitat. 615–1,215m.
rose-mallow	*Hibiscus lasiocarpus*	Marshes and swamps (freshwater).	Moist, freshwater-soaked river banks & low peat islands in sloughs; in Calif., known from the delta watershed. 0–150m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
round-leaved filaree	*California macrophyllum*	Cismontane woodland, valley and foothill grassland.	Clay soils. 15–1,200m.
Sacramento orcutt grass	*Orcuttia viscida*	Vernal pools.	30–100m.
sagebrush loeflingia	*Loeflingia squarrosa* var. *artemisiarum*	Great basin scrub, sonoran desert scrub, desert dunes.	Sandy flats and dunes. Sandy areas around clay slicks w/*sarcobatus, atriplex, tetradymia*, etc. 700–1,200m.
saline clover	*Trifolium depauperatum* var. *hydrophilum*	Marshes and swamps, valley and foothill grassland, vernal pools.	Mesic, alkaline sites. 0–300m.
salt marsh bird's-beak	*Cordylanthus maritimus* ssp. *maritimus*	Coastal salt marsh, coastal dunes.	Limited to the higher zones of the salt marsh habitat. 0–30m.
Salt Spring checkerbloom	*Sidalcea neomexicana*	Alkali playas, brackish marshes, chaparral, coastal scrub, lower montane coniferous forest, mojavean desert scrub.	Alkali springs and marshes. 0–1,500m.
San Benito evening-primrose	*Camissonia benitensis*	Chaparral, cismontane woodland.	On gravelly serpentine alluvial terraces. 750–1,280m.
San Benito fritillary	*Fritillaria viridea*	Chaparral.	Serpentine slopes. 200–1,525m.
San Benito spineflower	*Chorizanthe biloba* var. *immemora*	Chaparral, cismontane woodland.	Sandy and gravelly soils on the east slope of the diablo range. 695–750m.
San Bernardino aster	*Symphyotrichum defoliatum*	Meadows and seeps, marshes and swamps, coastal scrub, cismontane woodland, lower montane coniferous forest, grassland.	Vernally mesic grassland or near ditches, streams and springs; disturbed areas. 2–2,040m.
San Bernardino Mountains dudleya	*Dudleya abramsii* ssp. *affinis*	Pebble (pavement) plain, upper montane coniferous forest, pinyon and juniper woodland.	Outcrops, granite or quartzite, rarely limestone. 1,270–2,600m.
San Bernardino Mountains owl's-clover	*Castilleja lasiorhyncha*	Meadows, pebble plain, upper montane coniferous forest, chaparral.	Mesic to drying soils in open areas of stream and meadow margins or of vernally wet areas. 1,135–2,390m.
San Diego ambrosia	*Ambrosia pumila*	Chaparral, coastal scrub, valley and foothill grassland, vernal pools.	Sandy loam or clay soil. In valleys; persists where disturbance has been superficial. 20–415m.
San Diego barrel cactus	*Ferocactus viridescens*	Chapparal, diegan coastal scrub, valley and foothill grassland.	Often on exposed, level or south-sloping areas; often in coastal scrub near crest of slopes. 3–485m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
San Diego bur-sage	*Ambrosia chenopodiifolia*	Coastal scrub, mostly associated with maritime succulent scrub.	Slopes of canyons in open succulent scrub usually with little herbaceous cover. 55–150m.
San Diego button-celery	*Eryngium aristulatum* var. *parishii*	Vernal pools, coastal scrub, valley and foothill grassland.	San Diego mesa hardpan & claypan vernal pools & southern interior basalt flow vernal pools; usu surr by scrub. 15–620m.
San Diego goldenstar	*Muilla clevelandii*	Chaparral, coastal scrub, valley and foothill grassland, vernal pools.	Mesa grasslands, scrub edges; clay soils. Often on mounds between vernal pools in fine, sandy loam. 50–1,090m.
San Diego marsh-elder	*Iva hayesiana*	Marshes and swamps, playas.	Riverwashes. 10–500m.
San Diego mesa mint	*Pogogyne abramsii*	Vernal pools.	Vernal pools within grasslands, chamise chaparral or coastal sage scrub communities; w/other rare plants. 90–200m.
San Diego milk-vetch	*Astragalus oocarpus*	Chaparral, cismontane woodland, meadows.	Openings in chaparral or on gravelly flats and slopes in thin oak woodland. 305–1,500m.
San Diego sand aster	*Corethrogyne filaginifolia* var. *incana*	Coastal scrub, coastal bluff scrub, chaparral.	Most sites are disturbed, so hard to tell: possibly in disturbed sites and ecotones. 3-115m.
San Diego thorn-mint	*Acanthomintha ilicifolia*	Chaparral, coastal scrub, valley and foothill grassland, vernal pools.	Endemic to active vertisol clay soils of mesas & valleys. Usu on clay lenses w/in grasslnd or chap communities. 10–935m.
San Fernando Valley spineflower	*Chorizanthe parryi* var. *fernandina*	Coastal scrub.	Sandy soils. 3–1,035m.
San Francisco Bay spineflower	*Chorizanthe cuspidata* var. *cuspidata*	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub.	Closely related to c. Pungens. Sandy soil on terraces and slopes. 5–550m.
San Francisco collinsia	*Collinsia multicolor*	Closed-cone coniferous forest, coastal scrub.	On decomposed shale (mudstone) mixed with humus. 30–250m.
San Francisco popcorn-flower	*Plagiobothrys diffusus*	Valley and foothill grassland, coastal prairie.	Historically from grassy slopes with marine influence. 60–485m.
San Gabriel bedstraw	*Galium grande*	Cismontane woodland, chaparral, broadleafed upland forest, lower montane coniferous forest.	Open chaparral and low, open oak forest; on rocky slopes; probably undercollected due to inaccessible hab. 425–1,200m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
San Gabriel linanthus	*Linanthus concinnus*	Lower montane coniferous forest, upper montane coniferous forest.	Dry rocky slopes, often in Jeffrey pine/canyon oak forest. 1,575–2,545m.
San Gabriel Mountains dudleya	*Dudleya densiflora*	Chaparral, coastal scrub, lower montane coniferous forest.	In crevices and on decomposed granite on cliffs and canyon walls. 300–520m.
San Gabriel River dudleya	*Dudleya cymosa* ssp. *crebrifolia*	Chaparral, coastal scrub.	On granite cliffs and outcrops, surrounded by scrub. 365m.
San Jacinto Mountains bedstraw	*Galium angustifolium* ssp. *jacinticum*	Lower montane coniferous forest.	Open mixed forest. 1,630–1,940m.
San Jacinto Valley crownscale	*Atriplex coronata* var. *notatior*	Playas, chenopod scrub, valley and foothill grassland, vernal pools.	Dry, alkaline flats in the San Jacinto River Valley. 400–500m.
San Joaquin adobe sunburst	*Pseudobahia peirsonii*	Valley and foothill grassland, cismontane woodland.	Grassy valley floors and rolling foothills in heavy clay soil. 85–800m.
San Joaquin spearscale	*Atriplex joaquiniana*	Chenopod scrub, alkali meadow, valley and foothill grassland.	In seasonal alkali wetlands or alkali sink scrub with *distichlis spicata, frankenia,* etc. 1–250m.
San Joaquin Valley orcutt grass	*Orcuttia inaequalis*	Vernal pools.	30–755m.
San Joaquin woollythreads	*Monolopia congdonii*	Chenopod scrub and valley and foothill grassland.	Alkaline or loamy plains; sandy soils, often with grasses and within chenopod scrub. 60–800m.
San Luis Obispo monardella	*Monardella frutescens*	Coastal dunes, coastal scrub.	Stabilized sand of the immediate coast. 10–100m.
San Miguel savory	*Satureja chandleri*	Chaparral, cismontane woodland, coastal scrub, rip woodland, valley and foothill grassland.	Rocky, gabbroic or metavolcanic substrate. 120–1,005m.
sand gilia	*Gilia tenuiflora* ssp. *arenaria*	Coastal dunes, coastal scrub, chaparral (maritime), cismontane woodland.	Bare, wind-sheltered areas often near dune summit or in the hind dunes; 2 records from pleistocene inland dunes. 0–245m.
sand mesa manzanita	*Arctostaphylos rudis*	Chaparral, coastal scrub.	On sandy soils in lompoc/nipomo area. 25–230m.
Sanford's arrowhead	*Sagittaria sanfordii*	Marshes and swamps.	In standing or slow-moving freshwater ponds, marshes, and ditches. 0–610m.
Santa Ana River woollystar	*Eriastrum densifolium* ssp. *sanctorum*	Coastal scrub, chaparral.	In sandy soils on river floodplains or terraced fluvial deposits. 150–610m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Santa Barbara honeysuckle	*Lonicera subspicata* var. *subspicata*	Chaparral, cismontane woodland, coastal scrub.	35–1,000m.
Santa Barbara morning-glory	*Calystegia sepium* ssp. *binghamiae*	Coastal marshes.	0–30m.
Santa Catalina Island currant	*Ribes viburnifolium*	Chaparral.	Among shrubs in canyons. 30–300m.
Santa Catalina Island desert-thorn	*Lycium brevipes* var. *hassei*	Coastal bluff scrub, coastal scrub.	Coastal bluffs and slopes. 10–300m.
Santa Clara Valley dudleya	*Dudleya setchellii*	Valley and foothill grassland, cismontane woodland.	On rocky serpentine outcrops and on rocks within grassland or woodland. 80–335m.
Santa Cruz manzanita	*Arctostaphylos andersonii*	Broadleaved upland forest, chaparral, north coast coniferous forest.	Open sites, redwood forest. 180–800m.
Santa Cruz Mountains beardtongue	*Penstemon rattanii* var. *kleei*	Chaparral, lower montane coniferous forest.	Sandy shale slopes; sometimes in the transition between forest and chaparral. 400–1,100m.
Santa Cruz tarplant	*Holocarpha macradenia*	Coastal prairie, valley and foothill grassland.	Light, sandy soil or sandy clay; often with nonnatives. 10–260m.
Santa Monica Mountains dudleya	*Dudleya cymosa* ssp. *ovatifolia*	Chaparral, coastal scrub.	In canyons on sedimentary conglomerates; primarily n-facing slopes. 210–500m.
Santa Rosa Mountains leptosiphon	*Leptosiphon floribundus* ssp. *hallii*	Sonoran desert scrub.	Desert canyons. 900–1,275m.
Santa Susana tarplant	*Deinandra minthornii*	Chaparral, coastal scrub.	On sandstone outcrops and crevices, in shrubland. 280–760m.
Santa Ynez groundstar	*Ancistrocarphus keilii*	Chaparral, cismontane woodland.	Sandy soils. 40–130m.
Scadden Flat checkerbloom	*Sidalcea stipularis*	Marshes and swamps.	Wet montane marshes fed by springs. 700–740m.
sea dahlia	*Coreopsis maritima*	Coastal scrub, coastal bluff scrub.	Occurs on a variety of soil types, including sandstone. 5–150m.
seaside bird's-beak	*Cordylanthus rigidus* ssp. *littoralis*	Closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub, coastal dunes.	Sandy, often disturbed sites, usually within chaparral or coastal scrub. 0–215m.
see individual subspecies!	*Streptanthus morrisonii*	Chaparral, cismontane woodland, closed-cone coniferous forest.	The complex has been mapped as the species, though at least 4 ssp. Have been recognized. On serpentine. 210–910m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
shaggyhair lupine	*Lupinus spectabilis*	Chaparral, cismontane woodland.	Open rocky slopes of serpentine. Mostly in serpentine chaparral surr. By grey pine woodland. 260–800m.
shaggy-haired alumroot	*Heuchera hirsutissima*	Subalpine coniferous forest, upper montane coniferous forest.	Often near large rocks. 1,500–3,500m.
Sharsmith's harebell	*Campanula sharsmithiae*	Chaparral.	Serpentine barrens. 480–1,820m.
Sharsmith's onion	*Allium sharsmithiae*	Cismontane woodland.	Rocky, serpentine slopes. 400–1,200m.
Shasta snow-wreath	*Neviusia cliftonii*	Lower montane coniferous forest, riparian woodland.	Shaded, north-facing, or sheltered canyons. Sometimes on limestone. Mesic areas. 300–500m.
Shaw's agave	*Agave shawii*	Coastal bluff scrub, coastal scrub.	Coastal bluffs and slopes within coastal sage scrub and adjacent to torrey pine forest at one site. 10–75m.
Sheldon's sedge	*Carex sheldonii*	Lower montane coniferous forest, marshes and swamps, riparian scrub.	Mesic sites; along creeks and in wet meadows. 1,065–1,755m.
Shevock's copper-moss	*Schizymenium shevockii*	Cismontane woodland.	Moss on metamorphic rocks, mesic sites. On rocks along roads, in same habitat as mielichhoferia elongata. 750–1,400m.
shining navarretia	*Navarretia nigelliformis* ssp. *radians*	Cismontane woodland, valley and foothill grassland, vernal pools.	Apparently in grassland, and not necessarily in vernal pools. 200–1,000m.
short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	Chaparral, joshua tree woodland, mojavean desert scrub, pinyon-juniper woodland, riparian woodland.	Sandy soil or coarse, granitic loam. 425–1,800m.
short-leaved dudleya	*Dudleya brevifolia*	Chaparral, coastal scrub.	On torrey sandstone soils; in pebbly openings. 30–250m.
showy indian clover	*Trifolium amoenum*	Valley and foothill grassland, coastal bluff scrub.	Sometimes on serpentine soil, open sunny sites, swales. Most recently sited on roadside and eroding cliff face. 5–560m.
showy madia	*Madia radiata*	Valley and foothill grassland, cismontane woodland, chenopod scrub.	Mostly on adobe clay in grassland or among shrubs. 25–1,125m.
silky cryptantha	*Cryptantha crinita*	Cismontane woodland, valley foothill grassland, lower montane coniferous forest, riparian forest, riparian woodland.	In gravelly stream beds. 85–220m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
silver-haired ivesia	*Ivesia argyrocoma*	Meadows, pebble plains, upper montane coniferous forest.	In pebble plains and meadows with other rare plants. 1,480–2,680m.
slender mariposa lily	*Calochortus clavatus* var. *gracilis*	Chaparral, coastal scrub.	Shaded foothill canyons; often on grassy slopes within other habitat. 420–760m
slender orcutt grass	*Orcuttia tenuis*	Vernal pools.	30–1,735m.
slender pentachaeta	*Pentachaeta exilis* ssp. *aeolica*	Cismontane woodland, valley and foothill grassland.	Grassy areas. 635–855m.
slender silver-moss	*Anomobryum julaceum*	Broadleafed upland forest, lower montane coniferous forest, north coast coniferous forest.	Moss which grows on damp rocks and soil; usually seen on roadcuts. 100–1,000m.
slender woolly-heads	*Nemacaulis denudata* var. *gracilis*	Coastal dunes, desert dunes, sonoran desert scrub.	In dunes or sand. 0–560m.
slender-horned spineflower	*Dodecahema leptoceras*	Chaparral, coastal scrub (alluvial fan sage scrub).	Flood deposited terraces and washes; assoc include *encelia, dalea, lepidospartum*, etc. 200–760m.
slender-leaved pondweed	*Potamogeton filiformis*	Marshes and swamps.	Shallow, clear water of lakes and drainage channels. 15–2,310m.
slender-stem bean	*Phaseolus filiformis*	Sonoran desert scrub.	Gravelly washes bordered by creosote bush-dominated rocky slopes. One site in california: 125m.
slough thistle	*Cirsium crassicaule*	Chenopod scrub, marshes and swamps, riparian scrub.	Sloughs, riverbanks, and marshy areas. 3–100m.
small-leaved rose	*Rosa minutifolia*	Coastal scrub, chaparral.	In the united states, on cobbly soil at the head of a small, dry canyon on otay mesa. 150–160m.
Small's southern clarkia	*Clarkia australis*	Cismontane woodland, lower montane coniferous forest.	Open, rocky sites in conifer forest or oak woodland. 900–2,060m.
smooth lessingia	*Lessingia micradenia* var. *glabrata*	Chaparral.	Serpentine; often on roadsides. 120–485m.
smooth tarplant	*Centromadia pungens* ssp. *laevis*	Valley and foothill grassland, chenopod scrub, meadows, playas, riparian woodland.	Alkali meadow, alkali scrub; also in disturbed places. 0–480m.
snake cholla	*Opuntia californica* var. *californica*	Chaparral, coastal scrub.	30–150m.
soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*	Coastal salt marsh.	In coastal salt marsh with *distichlis, salicornia, frankenia*, etc. 0–3m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Sonoran maiden fern	*Thelypteris puberula* var. *sonorensis*	Meadows and seeps.	Along streams, seepage areas. 50–550m.
South Coast saltscale	*Atriplex pacifica*	Coastal scrub, coastal bluff scrub, playas, chenopod scrub.	Alkali soils. 1–500m.
southern alpine buckwheat	*Eriogonum kennedyi* var. *alpigenum*	Alpine boulder and rock fields, subalpine coniferous forest.	Dry granitic gravel. 2,600–3,500m.
southern jewel-flower	*Streptanthus campestris*	Chaparral, lower montane coniferous forest, pinyon-juniper woodland.	Open, rocky areas. 600–2,790m.
southern skullcap	*Scutellaria bolanderi* ssp. *austromontana*	Chaparral, cismontane woodland, lower montane coniferous forest.	In gravelly soils on streambanks or in mesic sites in oak or pine woodland. 425–2,000m.
southern tarplant	*Centromadia parryi* ssp. *australis*	Marshes and swamps (margins), valley and foothill grassland, vernal pools.	Often in disturbed sites near the coast; also in alkaline soils sometimes with saltgrass; also vernal pools. 0–425m.
Spanish Needle onion	*Allium shevockii*	Pinyon-juniper woodland, upper montane coniferous forest.	In soil pockets on rock outcrops and talus slopes; bulbs mostly on margins of outcrops. 2,000–2,300m.
spearleaf	*Matelea parvifolia*	Mojavean desert scrub, sonoran desert scrub.	Dry rocky ledges and slopes. 440–1,095m.
spiny-sepaled button-celery	*Eryngium spinosepalum*	Vernal pools, valley and foothill grassland.	Some sites on clay soil of granitic origin; vernal pools, within grassland. 100–420m.
Spjut's bristle-moss	*Orthotrichum spjutii*	Lower montane coniferous forest, pinyon-juniper woodland, subalpine coniferous forest, upper montane coniferous forest.	Moss growing on granitic rock; known only from near sonora pass. 2,100–2,400m.
splitting yarn lichen	*Sulcaria isidiifera*	Chaparral, cismontane woodland.	On branches of oaks and shrubs. 20–30m.
spreading navarretia	*Navarretia fossalis*	Vernal pools, chenopod scrub, marshes and swamps, playas.	San Diego hardpan & San Diego claypan vernal pools; in swales & V.P's, often surr. By other habitat types. 30–1,300m.
Stebbins' lomatium	*Lomatium stebbinsii*	Lower montane coniferous forest, chaparral.	Thin, gravelly volcanic clay in open yellow pine forest. Grows where other vegetation is absent. 1,235–1,850m.
Stebbins' morning-glory	*Calystegia stebbinsii*	Chaparral, cismontane woodland.	On red clay soils of the pine hill formation; gabbro or serpentine; open areas. 180–725m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
sticky dudleya	*Dudleya viscida*	Coastal scrub, coastal bluff scrub, chaparral.	On north and south-facing cliffs and banks. 10–550m.
Stony Creek spurge	*Chamaesyce ocellata* ssp. *rattanii*	Valley and foothill grassland.	Sandy or rocky soils. 85–800m.
straight-awned spineflower	*Chorizanthe rectispina*	Chaparral, cismontane woodland, coastal scrub.	Often on granite in chaparral. 355–1,035m.
striped adobe-lily	*Fritillaria striata*	Cismontane woodland, valley and foothill grassland.	Heavy clay adobe soils in oak grassland. 135–1,455m.
subalpine cryptantha	*Cryptantha crymophila*	Subalpine coniferous forest.	On dry talus of volcanic formation. 2,600–3,200m.
subtle orache	*Atriplex subtilis*	Valley and foothill grassland.	Little info available. Madrono vol. 44 no.2 only source currently. 40–100m.
succulent owl's-clover	*Castilleja campestris* ssp. *succulenta*	Vernal pools, valley and foothill grassland.	Moist places, often in acidic soils. 25–750m.
Suisun Marsh aster	*Aster lentus*	Marshes and swamps (brackish and freshwater).	Most often seen along sloughs with *phragmites, scirpus*, blackberry, *typha,* etc. 0–3m.
summer holly	*Comarostaphylis diversifolia* ssp. *diversifolia*	Chaparral.	Often in mixed chaparral in California, sometimes post-burn. 30–550m.
Surf thistle	*Cirsium rhothophilum*	Coastal dunes, coastal bluff scrub.	Open areas in central dune scrub; usually in coastal dunes. 3–60m.
talus fritillary	*Fritillaria falcata*	Chaparral, cismontane woodland, lower montane coniferous forest.	On shale, granite, or serpentine talus. 300–1,525m.
Tecate cypress	*Cupressus forbesii*	Closed-cone coniferous forest, chaparral.	Primarily on north-facing slopes; groves often associated with chaparral. 250–1,500m.
Tehama County western flax	*Hesperolinon tehamense*	Chaparral, cismontane woodland.	Serpentine barrens in chaparral. 545–1,155m.
Tejon poppy	*Eschscholzia lemmonii* ssp. *kernensis*	Valley and foothill grassland.	Little information available on habitat. 250–750m.
Temblor buckwheat	*Eriogonum temblorense*	Valley and foothill grassland.	Barren clay or sandstone substrates. 300–1,000m.
thread-leaved brodiaea	*Brodiaea filifolia*	Cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools.	Usually associated with annual grassland and vernal pools; often surr by shrubland habitats. Clay soils. 25–860m.
three-bracted onion	*Allium tribracteatum*	Chaparral, lower montane coniferous forest, upper montane coniferous forest.	Volcanic slopes and ridges. 1,100–2,750m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
Tiburon Indian paintbrush	*Castilleja affinis* ssp. *neglecta*	Valley and foothill grassland.	Rocky serpentine sites. 75–400m.
tongue-leaf copper-moss	*Scopelophila cataractae*	Cismontane woodland.	Moss on metamorphic substrate; on soil. 400m.
torrey pine	*Pinus torreyana* ssp. *torreyana*	Closed-cone coniferous forest, chaparral.	On dry, sandstone slopes. 70–160m.
Tracy's eriastrum	*Eriastrum tracyi*	Chaparral, cismontane woodland.	Gravelly shale or clay; often in open areas. 315–760m.
triple-ribbed milk-vetch	*Astragalus tricarinatus*	Joshua tree woodland, sonoran desert scrub.	Hot, rocky slopes in canyons and along edge of boulder-strewn desert washes, w/ larrea and encelia. 450–790m.
Tuolumne button-celery	*Eryngium pinnatisectum*	Vernal pools, cismontane woodland, lower montane coniferous forest.	Volcanic soils; vernal pools and mesic sites within other natural communties. 250–450m.
Tuolumne fawn lily	*Erythronium tuolumnense*	Broadleaved upland forest, chaparral, lower montane coniferous forest.	Often on clay soils; on cliffs and near drainages. 510–1,460m.
Tuolumne iris	*Iris hartwegii* ssp. *columbiana*	Cismontane woodland, lower montane coniferous forest.	600–1,400m.
two-carpellate western flax	*Hesperolinon bicarpellatum*	Serpentine chaparral.	Serpentine barrens at edge of chaparral. 150–820m.
umbrella larkspur	*Delphinium umbraculorum*	Cismontane woodland.	Mesic sites. 400–1,600m.
Vail Lake ceanothus	*Ceanothus ophiochilus*	Chaparral.	Gabbro seams on north-facing ridges on the eastern sides of mountains. 620–825m.
variegated dudleya	*Dudleya variegata*	Chaparral, coastal scrub, cismontane woodland, valley and foothill grassland, vernal pools.	In rocky or clay soils; sometimes associated with vernal pool margins. 3–550m.
Vasek's clarkia	*Clarkia tembloriensis* ssp. *calientensis*	Valley and foothill grassland.	North-facing slopes with isomeris, other clarkia spp. 270–335m.
veiny monardella	*Monardella douglasii* ssp. *venosa*	Valley and foothill grassland, cismontane woodland.	In heavy clay; mostly with grassland associates. Rediscovered in 1992. 60–410m.
Ventura Marsh milk-vetch	*Astragalus pycnostachyus* var. *lanosissimus*	Coastal salt marsh.	Within reach of high tide or protected by barrier beaches, more rarely near seeps on sandy bluffs. 1–35m.
Verity's dudleya	*Dudleya verityi*	Chaparral, cismontane woodland, coastal scrub.	On volcanic rock outcrops in the Santa Monica mountains. 60–120m.

Table A4-1. Habitats of Special-Status Species Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Scientific Name	General Habitat Description	Micro Habitat
vernal pool smallscale	*Atriplex persistens*	Vernal pools.	Alkaline vernal pools. 10–115m.
wart-stemmed ceanothus	*Ceanothus verrucosus*	Chaparral.	1–380m.
western leatherwood	*Dirca occidentalis*	Broadleafed upland forest, chaparral, closed-cone conif for, cismontane wdlnd, n coast conif for, rip for, rip wdlnd.	On brushy slopes, mesic sites; mostly in mixed evergreen & foothill woodland communities. 30–550m.
Whipple's monkeyflower	*Mimulus whipplei*	Lower montane coniferous forest.	Hillsides and rocky places in yellow pine forest. One site known: 670m.
white-bracted spineflower	*Chorizanthe xanti* var. *leucotheca*	Mojavean desert scrub, pinyon-juniper woodland.	300–1,200m.
white-margined oxytheca	*Oxytheca emarginata*	Lower montane coniferous forest, pinyon and juniper woodland.	Gravelly to rocky soil in the san jacinto and santa rosa mtns. 1,200–2,500m.
willowy monardella	*Monardella viminea*	Coastal scrub/alluvial ephemeral washes with adjacent coastal scrub, chaparral, or sycamore woodland.	In canyons, in rocky and sandy places, sometimes in washes or floodplains; w/baccharis, iva, etc. 50–225m.
woolly mountain-parsley	*Oreonana vestita*	Subalpine coniferous forest, upper montane coniferous forest.	High ridges; on scree, talus, or gravel. 2,410–3,500m.
woven-spored lichen	*Texosporium sancti-jacobi*	Chaparral.	Open sites; in California w/*adenostoma fas., eriogonum, selaginella*. At pinnacles, on small mammal pellets. 290–660m.
Wright's trichocoronis	*Trichocoronis wrightii* var. *wrightii*	Marshes and swamps, riparian forest, meadows and seeps, vernal pools.	Mud flats of vernal lakes, drying river beds, alkali meadows. 5–435m.
Yadon's rein orchid	*Piperia yadonii*	Closed-cone coniferous forest, chaparral, coastal bluff scrub.	On sandstone and sandy soil, but poorly drained and often dry. 10–415m.
Yadon's wallflower	*Erysimum menziesii* ssp. *yadonii*	Coastal dunes.	Foredunes. 0–15m.
Yucaipa onion	*Allium marvinii*	Chaparral.	In openings on clay soils. 760–1,065m.
Ziegler's aster	*Machaeranthera canescens* var. *ziegleri*	Lower montane coniferous forest, upper montane coniferous forest.	Dry ridges scattered under pines, along roadsides, and in dry, somewhat disturbed clearings. 1,400–2,470m.

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas

Common Name	Community Type	Project Area	Water District
Alkali Meadow	Meadow and Seep	CVP	Byron-Bethany I.D.
			Contra Costa W.D.
			Placer Co. Water Agency Zone 1
Alkali Seep	Meadow and Seep	CVP	Contra Costa W.D.
			Placer Co. Water Agency Zone 1
		SWP	Buttonwillow Improvement Dist.
			Semitropic W.S.D.
Big Tree Forest	Lower Montane Coniferous Forest	CVP	Calaveras Co. W.D.
			Tuolumne Utilities District
California Walnut Woodland	Cismontane Woodland	CVP	Casitas M.W.D.
			United W.C.D.
		SWP	Metropolitan Water District
Canyon Live Oak Ravine Forest	Riparian Forest	SWP	Antelope Valley-East Kern W.A.
			Metropolitan Water District
			San Bernardino Valley M.W.D.
Central Coast Arroyo Willow Riparian Forest	Riparian Forest	CVP	Santa Ynez River W.C.D.
Central Dune Scrub	Coastal Dunes	CVP	Monterey Co. Recycling Project
			Pajaro Valley W.M.A.
			Santa Maria Valley W.C.D.
			Santa Ynez River W.C.D.
Central Foredunes	Coastal Dunes	CVP	Santa Maria Valley W.C.D.
Central Maritime Chaparral	Chaparral	CVP	Santa Ynez River W.C.D.
Cismontane Alkali Marsh	Wetland	CVP	Central California I.D.
			Contra Costa W.D.
			Grasslands W.D.
			Laguna W.D.
			San Luis Canal Co.
		SWP	Metropolitan Water District

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Coastal and Valley Freshwater Marsh	Wetland	CVP	Pacific Realty Associates, L.P. (M & T Chico Ranch)
			Pajaro Valley W.M.A.
			Reclamation District No. 1004
			San Luis Canal Co.
			Santa Maria Valley W.C.D.
			United W.C.D.
			West Stanislaus I.D.
		SWP	Metropolitan Water District
Coastal Brackish Marsh	Wetland	CVP	Contra Costa W.D.
			Monterey Co. Recycling Project
		SWP	Metropolitan Water District
Desert Fan Palm Oasis Woodland	Riparian Woodlands	SWP	Coachella Valley W.D.
			Desert Water Agency
			Metropolitan Water District
Elderberry Savanna	Riparian Scrubs	CVP	City of Sacramento W.S.A.
			City of West Sacramento
Great Valley Cottonwood Riparian Forest	Riparian Forest	CVP	Anderson-Cottonwood I.D.
			City of Redding
			City of Redding - 2871
			City of West Sacramento
			Eastside M.W.C.
			Glenn-Colusa I.D.
			Meridian Farms Water Company
			North Kern W.S.D.
			Pacific Realty Associates, L.P. (M & T Chico Ranch)
			R and J Anderson Properties, L.P.
			Shasta Co. W.A.
			Spence, Ruthann

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Great Valley Cottonwood Riparian Forest (contd.)	Riparian Forest (contd.)	CVP (contd.)	Sycamore Family Trust
		SWP	City of Yuba City W.S.A.
			Kern Co W.A. Improv.Dist. #4
			Rosedale-Rio Bravo W.S.D.
Great Valley Mesquite Scrub	Riparian Scrubs	CVP	City of Coalinga
			North Kern W.S.D.
			Westlands W.D.
		SWP	Kern Delta W.D.
			Rosedale-Rio Bravo W.S.D.
Great Valley Mixed Riparian Forest	Riparian Forest	CVP	Alta I.D.
			Anderson-Cottonwood I.D.
			Consolidated I.D.
			Driscoll Strawberry Associates, Inc.
			Driver, Gregory E.
			Eastside M.W.C.
			Exchange Bank (C/O Nature Conservancy)
			Feather W.D.
			Fresno I.D.
			Giovannetti, B.E.
			Glenn-Colusa I.D.
			Green Valley Corporation (5210)
			Griffin, Joseph, and Prater, Sharon
			J.B. Unlimited, Inc.
			Kings River W.D.
			Micke, Daniel and Nina
			Pacific Realty Associates, L.P. (M & T Chico Ranch)
			Reclamation District No. 108
			River Garden Farms Company
			Roberts Ditch Irrigation Company

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Great Valley Mixed Riparian Forest (contd.)	Riparian Forest (contd.)	CVP (contd.)	Shasta Co. W.A.
			Sutter M.W.C.
			Tenhunfeld, Fred, Wallace Jack, Et Al
Great Valley Valley Oak Riparian Forest	Riparian Forest	CVP	Anderson-Cottonwood I.D.
			City of Redding
			City of Redding - 2871
			Kaweah Delta W.C.D.
			Pacific Realty Associates, L.P. (M & T Chico Ranch)
			Shasta Co. W.A.
Great Valley Willow Scrub	Riparian Scrubs	CVP	Anderson-Cottonwood I.D.
			City of Redding
			City of Redding – 2871
			Glenn-Colusa I.D.
			Pacific Realty Associates, L.P. (M & T Chico Ranch)
			Shasta Co. W.A.
Ione Chaparral	Chaparral	CVP	Calaveras Co. W.D.
Maritime Succulent Scrub	Coastal Scrub	SWP	Metropolitan Water District
Mesquite Bosque	Riparian Forest	SWP	Desert Water Agency
Mojave Riparian Forest	Riparian Forest	SWP	Palmdale W.D.
Northern Claypan Vernal Pool	Vernal Pool	CVP	Alta I.D.
			Byron-Bethany I.D.
			City of Fresno Service Area
			City of Sacramento W.S.A.
			Exeter I.D.
			Fresno I.D.
			Kaweah Delta W.C.D.
			Pixley I.D.
			Solano I.D.

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Northern Claypan Vernal Pool	Vernal Pool	CVP	Tea Pot Dome W.D.
			Terra Bella I.D.
			Vandalia I.D.
			Westside W.D.
		SWP	Alameda Co Fc & Wcd Zone 7
Northern Coastal Salt Marsh	Wetland	CVP	Contra Costa W.D.
			East Bay M.U.D.
			Monterey Co. Recycling Project
			Pajaro Valley W.M.A.
			Santa Clara Valley W.D.
			Santa Ynez River W.C.D.
		SWP	Alameda County Water District
			Santa Clara Valley W.D.
Northern Hardpan Vernal Pool	Vernal Pool	CVP	Alta I.D.
			Chowchilla W.D.
			City of Roseville W.S.A.
			City of Sacramento W.S.A.
			Corning W.D.
			Garfield W.D.
			Madera I.D.
			Nevada I.D.
			Placer Co. Water Agency Zone 1
			Sacramento Co. Water Agency
			Sacramento M.U.D.
			San Juan W.D.
Northern Maritime Chaparral	Chaparral	CVP	East Bay M.U.D.
Northern Volcanic Mud Flow Vernal Pool	Vernal Pool	CVP	City of Roseville W.S.A.
			Placer Co. Water Agency Zone 1

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Open Engelmann Oak Woodland	Cismontane Woodland	SWP	Metropolitan Water District
Riversidian Alluvial Fan Sage Scrub	Coastal Scrub	SWP	Metropolitan Water District
			San Bernardino Valley M.W.D.
San Diego Mesa Claypan Vernal Pool	Vernal Pool	SWP	Metropolitan Water District
San Diego Mesa Hardpan Vernal Pool	Vernal Pool	SWP	Metropolitan Water District
Serpentine Bunchgrass	Valley and Foothill Grassland	CVP	East Bay M.U.D.
			Santa Clara Valley W.D.
		SWP	Santa Clara Valley W.D.
Southern Coast Live Oak Riparian Forest	Riparian Forest	CVP	Casitas M.W.D.
			Santa Ynez R.W.C.D. Imp. District No. 1
			Santa Ynez River W.C.D.
			United W.C.D.
		SWP	Metropolitan Water District
			San Bernardino Valley M.W.D.
			San Gorgonio Pass Water Agency
Southern Coastal Bluff Scrub	Coastal Bluff Scrub	SWP	Metropolitan Water District
Southern Coastal Salt Marsh	Wetland	CVP	Carpinteria Valley W.D.
			Casitas M.W.D.
			Goleta Co. W.D.
			United W.C.D.
		SWP	Metropolitan Water District
Southern Cottonwood Willow Riparian Forest	Riparian Forest	CVP	Santa Ynez R.W.C.D. Imp. District No. 1
			Santa Ynez River W.C.D.
			United W.C.D.
		SWP	Antelope Valley-East Kern W.A.
			Metropolitan Water District
			San Bernardino Valley M.W.D.

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Southern Cottonwood Willow Riparian Forest (contd.)	Riparian Forest (contd.)	SWP (contd.)	San Gorgonio Pass Water Agency
Southern Dune Scrub	Coastal Dunes	SWP	Metropolitan Water District
Southern Foredunes	Coastal Dunes	SWP	Metropolitan Water District
Southern Interior Basalt Flow Vernal Pool	Vernal Pool	SWP	Metropolitan Water District
Southern Interior Cypress Forest	Closed-Cone Coniferous Forest	SWP	Metropolitan Water District
Southern Maritime Chaparral	Chaparral	SWP	Metropolitan Water District
Southern Mixed Riparian Forest	Riparian Forest	CVP	United W.C.D.
		SWP	Metropolitan Water District
			San Bernardino Valley M.W.D.
Southern Riparian Forest	Riparian Forest	SWP	Antelope Valley-East Kern W.A.
			Desert Water Agency
			Metropolitan Water District
			San Bernardino Valley M.W.D.
Southern Riparian Scrub	Riparian Scrubs	CVP	United W.C.D.
		SWP	Antelope Valley-East Kern W.A.
			Metropolitan Water District
			San Bernardino Valley M.W.D.
Southern Sycamore Alder Riparian Woodland	Riparian Woodlands	CVP	Casitas M.W.D.
			United W.C.D.
		SWP	Antelope Valley-East Kern W.A.
			Crestline-Lake Arrowhead W.A.
			Metropolitan Water District
			Palmdale W.D.
			San Bernardino Valley M.W.D.
			San Gorgonio Pass Water Agency
Southern Willow Scrub	Riparian Scrubs	CVP	Santa Ynez R.W.C.D. Imp. District No. 1
			Santa Ynez River W.C.D.

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Southern Willow Scrub (contd.)	Riparian Scrubs (contd.)	CVP (contd.)	United W.C.D.
		SWP	Antelope Valley-East Kern W.A.
			Metropolitan Water District
			San Bernardino Valley M.W.D.
Stabilized Interior Dunes	Interior Dunes	CVP	Arvin-Edison W.S.D.
			Contra Costa W.D.
Sycamore Alluvial Woodland	Riparian Woodlands	CVP	Del Puerto W.D.
			Santa Clara Valley W.D.
		SWP	Alameda Co FC & WCD Zone 7
			Santa Clara Valley W.D.
Torrey Pine Forest	Closed-Cone Coniferous Forest	SWP	Metropolitan Water District
Valley Needlegrass Grassland	Valley and Foothill Grassland	CVP	Contra Costa W.D.
			East Bay M.U.D.
			Maine Prairie W.D.
			Solano I.D.
			United W.C.D.
		SWP	Antelope Valley-East Kern W.A.
			Metropolitan Water District
			Tehachapi-Cummings Co. W.D.
Valley Oak Woodland	Cismontane Woodland	CVP	Stockton-East W.D.
			United W.C.D.
		SWP	Antelope Valley-East Kern W.A.
			Metropolitan Water District
			Tejon-Castac W.D.
Valley Sacaton Grassland	Valley and Foothill Grassland	CVP	Grasslands W.D.
			Gravelly Ford W.D.
			Kaweah Delta W.C.D.
			Pixley I.D.

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Valley Saltbush Scrub	Chenopod Scrub	CVP	Buena Vista W.S.D.
			North Kern W.S.D.
			Southern San Joaquin M.U.D.
		SWP	Belridge W.S.D.
			Buena Vista W.S.D.
			Buttonwillow Improvement Dist.
			Dudley Ridge W.D.
			Hacienda W.D.
			Henry Miller W.D.
			Kern Delta W.D.
			Lost Hills W.D.
			Rosedale-Rio Bravo W.S.D.
			Semitropic W.S.D.
			West Kern W.D.
			Wheeler Ridge-Maricopa W.S.D.
Valley Sink Scrub	Chenopod Scrub	CVP	Buena Vista W.S.D.
			Byron-Bethany I.D.
			Central California I.D.
			Grasslands W.D.
			Heinlen M.W.C.
			San Luis Canal Co.
			San Luis W.D.
			Southern San Joaquin M.U.D.
		SWP	Alameda Co FC & WCD Zone 7
			Buena Vista W.S.D.
			Buttonwillow Improvement Dist.
			Henry Miller W.D.
			Kern Delta W.D.
			Lost Hills W.D.
			Rosedale-Rio Bravo W.S.D.

Table A4-2. Sensitive Natural Communities Known to Occur in the CVP/SWP Service Areas (contd)

Common Name	Community Type	Project Area	Water District
Valley Sink Scrub (contd.)	Chenopod Scrub (contd.)	SWP (contd.)	Semitropic W.S.D.
			Wheeler Ridge-Maricopa W.S.D.
Walnut Forest	Broadleaved Upland Forest	CVP	United W.C.D.
		SWP	Metropolitan Water District
Wildflower Field	Valley and Foothill Grassland	CVP	Lake Berryessa Resort Imp Dist
		SWP	Antelope Valley-East Kern W.A.
			Napa Co. F.C.W.C.D.

Draft

Attachment 5
Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread

Botanical Resources and Wetlands Technical Report

Shasta Lake Water Resources Investigation, California

Prepared by:

United States Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

U.S. Department of the Interior
United States Department of the Interior **June 2013**

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Aegilops triuncialis (Barbed goatgrass)	None identified		Perennial bunch grass with abundant seed production. Rapid rate of spread; can move long distance along roadsides.	
Ailanthus altissima (Tree of heaven)	Big Backbone Arm, Big Backbone Creek, Jones Valley Boat Ramp, Packer's Bay, Shasta Dam, Lakeshore, Riverview-Sacramento Arm		Prolific seed production; Seed dispersal by wind; sprouts vigorously from stumps and laterals, can quickly establish and dominate natural succession regimes. Used as ornamental, escaped cultivation.	
Andropogon virginicus (Broomsedge)	Big Backbone Creek, Squaw Creek		Perennial bunch grass promoted by fire. Seed dispersal by wind, adhering to clothing and animal fur, mud on shoes, vehicles, and road or farm equipment.	
Arundo donax (Giant reed, arundo)	None identified		Riparian species with rhizomes; roots at nodes; fragments will root as well. Spreads along stream channels. Flooding may transport fragments which can colonize other locations.	
Avena fatua (Common wild oats); *Avena barbata* (Slender wild oats)	Potem Creek, Squaw Creek, Big Backbone Arm, Mainstem, McCloud Arm, Pit Arm, Sacramento Arm, Squaw Creek Arm.		Seed dispersal through mud on shoes, vehicles, and road or farm equipment; contaminated hay.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Brassica nigra (Black mustard)	Big Backbone Creek, Upper Sacramento River, McCloud Arm, Squaw Arm.		Seeds are small and sticky when wet, sticking to equipment and movement through saltation.	
Brassica tournefortii (Asian mustard)	None identified		Seeds dispersed by hay contamination, mud on shoes, vehicles, and road or farm equipment; wind (tumbleweed). Establishes rapidly along roadsides.	
Briza maxima (Rattlesnake grass)	None identified		Seed dispersed by mud on shoes, vehicles, and road or farm equipment.	
Bromus diandrus (Ripgut brome)	Lake wide		Sharp seeds adhere to clothes, and animal fur; dispersed further by mud on shoes, vehicles, and road or farm equipment.	
Bromus hordeaceus (Soft brome)	Lake wide		Seeds dispersal by attachment to clothing and animal fur; contaminated seed mixes, hay/straw; mud on shoes, vehicles, and road or farm equipment.	
Bromus madritensis ssp. rubens (Red brome)	Big Backbone Creek, Squaw Creek, Big Backbone Arm, McCloud Arm, Pit Arm, Sacramento Arm.		Dispersal by attachment to clothing and animal fur; contaminated seed mixes, hay/straw; mud on shoes, vehicles, and road or farm equipment.	
Bromus tectorum (Cheatgrass)	Salt Creek, Squaw Creek, Big Backbone Arm, Main, McCloud Arm, Pit Arm, Sacramento Arm.		Seed dispersal by wind, attachment to clothing and animal fur; contaminated seed mixes, hay/straw; mud on shoes, vehicles, and road or farm equipment.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Cardaria chalapensis (Lenspod whitetop)	USFS		Prolific seed production, rhizomes, and readily re-sprouts, propagates from fragments. Dispersal by contaminated seed mixes, hay/straw; mud on shoes, vehicles, and road or farm equipment.	
Cardaria draba (Hoary cress)	None identified		Prolific seed production, rhizomes, and readily re-sprouts, propagates from fragments. Dispersal by contaminated seed mixes, hay/straw; mud on shoes, vehicles, and road or farm equipment.	
Cardaria pubescens (Hairy whitetop)	None identified		Spreads primarily by rhizomes and root fragments; wind and waterways. Not likely to be spread by humans.	
Carduus acanthoides (Spiny plumeless thistle)	None identified		Uncommon in California. Competes poorly with established grasses. Promoted by fire, overgrazing, disturbance. Achenes dispersed by wind rarely greater than 100m.	
Carduus nutans (Nodding plumeless thistle)	None identified		Competes poorly with grasses. Spreads slowly. Seeds disperse through wind water and small mammals.	
Carduus pycnocephalus (Italian thistle)	None identified		Seeds disperse mainly by wind, seeds sticky when wet; humans, animals vehicles, contaminated hay/straw. Germinates in drier conditions.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Centaurea diffusa (White knapweed)	Lakehead, Salt Creek		Prolific seed producer. Spreads in alfalfa hay production, water, and wind; mud on shoes, vehicles, and road or farm equipment.	
Centaurea maculosa (Spotted knapweed)	Shasta Dam		Prolific seed producer. Spreads by human activity, vehicles, logging equipment, trains, aircraft (infested landing strips), hay, florist use in floral arrangements.	
Centaurea melitensis (Maltese star-thistle)	None identified		Seeds spread by wind (short distances), animal fur, seed/soil contamination, human activity; mud on shoes, vehicles, and road or farm equipment.	
Centaurea solstitialis (Yellow star-thistle)	Lakewide		Prolific seed producer. Spread by wind, contaminated hay/seed, mud on shoes, vehicles, and road or farm equipment.	
Centaurea virgata var.squarrosa (Squarrose knapweed)	None identified		Spread by wind water, animals, mud on shoes, vehicles, and road or farm equipment, trains, and sheep.	
Chondrilla juncea (Rush skeleton weed)	Antlers Bridge, Lakeshore, Lakehead, Riverview		Generates from roots and root parts. Spread by wind, animal fur, and contaminated hay.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Chorispora tenella (Crossflower)	None identified		Reproduction: Annual seed Spreads when wet seeds stick to clothing or animals; mud on shoes, vehicles, and road or farm equipment; and use of contaminated seed, hay, and straw.	
Cirsium arvense (Canada thistle)	USFS		Prolific seed producer, viable for up to 20 years. Spread through cattle and horse droppings, contaminated hay, water.	
Cirsium vulgare (Bull thistle)	Lakewide		Prolific seed production and can re-sprout if cut. Dispersal by contaminated hay/straw, mud on shoes, vehicles, and road or farm equipment.	
Conium maculatum (Poison hemlock)	Upper Sacraemento River		Seeds dispersal by mud on shoes, vehicles, and road or farm equipment.	
Convolvulus arvensis (Field bindweed)	None identified		Prolific seed producer, viable for 20 years, roots from cuttings and fragments. Dispersal by mud on shoes, vehicles, and road or farm equipment; contaminated nursery stock.	
Cortaderia selloana (Pampas grass)	None identified		Prolific seed producer. Dispersal by wind, animal fur, nursery trade, ornamental.	
Cynodon dactylon (Bermudagrass)	Upper Sacramento River, McCloud Arm		Mainly reproduces by stolons and rhizomes. Dispersed by contaminated hay, seed or soil; vegetative parts transported in mud on shoes, vehicles, and road or farm equipment.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Cynoglossum officinale (Gypsyflower)	None identified		Prolific seed producer. Disperses by animal fur and hair.	
Cynosurus echinatus (Hedgehog dogtailgrass)	Lake wide		Disperses in water and mud on shoes, vehicles, and road or farm equipment.	
Cystis scoparius (Scotchbroom)	Upper Sacramento River, Salt Creek, Sacramento Arm, Ellery Creek Campground, Hirz Bay Boat Ramp, McClound Bridge Campground, Antlers Resort, Lakehead Campground, Packers Bay Boat Ramp, Gilman Road, Obrien Road, Shasta Dam, Lakeshore Drive		Prolific seed producer. Dispersal by nursery stock and mud on shoes, vehicles, and road or farm equipment.	
Dactylis glomerata (Orchardgrass)	Salt Creek		Spreads by rhizomes. Transported along roadways. Common forage plant.	
Descurainia sophia (Herb sophia)	None identified		Prolific seed producer. Contaminated hay; mud on shoes, vehicles, and road or farm equipment.	
Digitaria ischaemum (Smooth crabgrass)	None identified		Seed disperse by mud on shoes, vehicles, and road or farm equipment.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Dipsacus fullonum (common teasel)	None identified		Prolific seed producer. Dispersed by mud on shoes, vehicles, and road or farm equipment; road construction /maintenance; horticulture/nursery; floral arrangements.	
Dipsacus sativus (Fuller's teasel)	None identified		Prolific seed producer. Dispersed by mud on shoes, vehicles, and road or farm equipment; road construction/maintenance; horticulture/nursery; floral arrangements.	
Echinochloa crus-galli (Barnyardgrass)	Squaw Creek		Seeds are dispersed by mud on mud on shoes, vehicles, and road or farm equipment; contaminated hay and straw. Commonly found in gardens and disturbed areas.	
Elytrigia repens (Quackgrass)	None identified		Reproduces by seed or rhizomes, fragments produce new plants. Disperses by water, agricultural activities.	
Erodium botrys (Longbeak stork's bill)	Lake wide		Dispersed by cattle forage. Seeds stick to animal fur, clothing, etc.	
Erodium cicutarium (Redstem stork's bill)	Ripgut Creek		Dispersed by cattle forage. Seeds stick to animal fur, clothing, etc.	
Euphorbia esula (Leafy spurge)	None identified		Prolific seed producer. Roots spread vigorously and sprout from root nodes.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Festuca arundinacea (Tall fescue)	None identified		Can reproduce by vegetative fragments. Widely used as pasture and hay. Dispersal by contaminated hay and manure.	
Ficus carica (Fig)	Big Backbone Creek, Squaw Creek, Mainstem, Shasta Dam		Spreads by seed and sprouts from cuttings. Commercial crop and ornamental.	
Foeniculum vulgare (Fennel)	USFS		Prolific seed producer. Garden crop. Dispersed by mud on shoes, vehicles, and road or farm equipment; animals, and human activity.	
Genista mospessulana (French broom)	Silverthorn, Turntable Bay, Shasta Dam, Sugarloaf Creek.		Prolific seed producer. Resprouts after being cut. Dispersal by contaminated soil, vehicles, lumber operations, ornamentals.	
Geranium dissectum (Cutleaf geranium)	Pit Arm		Dispersed by animal fur; clothing and machinery; contaminated hay and grain.	
Geranium molle (Dove geranium)	None identified		Dispersed by animal fur; clothing and machinery; contaminated hay and grain.	
Hedera helix (English ivy)	None identified		Seeds dispersed by birds. Resprouts when vegetation removed; ornamental ground cover.	
Holcus lanatus (Common velvetgrass)	Squaw Creek		Prolific seed producer. Dispersal by wind.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Hordeum marinum, H. murinum (Mediterranean barley, foxtail)	McCloud Arm		Dispersal by wind, animals, contaminated hay, mud on shoes, vehicles, and road or farm equipment.	
Hydrilla verticillata (Waterthyme)	None identified		Vegetative parts readily produce an independent plant. Dispersal by human boating activities; popular in use for aquariums.	
Hypericum perforatum (Common St. Johnswort)	Lake wide		Prolific seed producer. Grown in home gardens. Dispersed by human activities, vehicles.	
Hypochaeris radicata (Rough cat's ear)	Lake wide		Prolific seed producer. Dispersal by attaching to clothing, animal fur, and vehicles.	
Iris pseudacorus (Paleyellow iris)	Salt Creek		Escaped from cultivation. Dispersal through waterways.	
Isatis tinctoria (Dyer's woad, Marlahan mustard)	I-5 corridor at O'Brien		Prolific seed producer. Dispersal by vehicles; contaminated seed and hay; farm equipment.	
Kochia scoparia (Mexican fireweed)	None identified		Prolific seed producer. Was planted as forage. Dispersal by wind (tumbleweed action).	
Lactuca serriola (Prickly lettuce)	Squaw Creek, Sugarloaf Creek, McCloud Arm		Prolific seed producer. Dispersal by wind, farm equipment, and human activities.	
Lathyrus latifolius (Perennial sweetpea)	Cambell Creek, Salt Creek, Upper Sacramento River, Sacramento Arm		Perennial forb reproduces by seed and rhizomes. Introduced as an ornamental.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Lepidium latifolium (Broadleaved pepperweed)	None identified		Spreads by seeds, rhizomes and fragments. Dispersal by wind, water, soil, waterfowl; contaminated hay/straw, floral arrangements	
Leucanthemum vulgare Ox-eye daisy	None identified		Prolific seed producer and spreads through rhizomes. Dispersal by mud on shoes, vehicles, and road or farm equipment, commercial wildflower seed packets.	
Linaria dalmatica (Damaltian toadflax)	USFS		Prolific seed producers and spreads through rhizomes. Dispersal by vehicles, equipment human activities.	
Lolium multiflorum (Italian ryegrass)	None identified		Widely distributed as hay and seed.	
Lotus corniculatus (Birdfoot deervetch)	None identified		Seeds and vegetative parts dispersed by vehicles, farm equipment, seed and feed contaminant. Was used for forage and along eroision.	
Lythrum hyssopifolia (Hyssop loosestrife)	None identified		Prolific seed producer. Seed dispersed by mud on vehicles, shoes, animal and bird feet.	
Lythrum salicaria (Purple loosestrife)	None identified		Prolific seed producer. Dispersed by mud on vehicles, shoes, animal and bird feet.	
Marrubium vulgare (Horehound)	None identified		Prolific seed producer. Fruits cling to shoes, vehicles; seeds in mud transported by human activity.	
Medicago lupulina (Black medic)	Pit Arm		Prolific seed producer. Dispersal through mud on shoes, vehicles, and road or farm equipment.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Medicago polymorpha (Burclover)	Big Backbone Arm		Seed dispersal through attachment to animal hair; contaminated seed.	
Melilotus officinalis (Yellow sweetclover)	None identified		Prolific seed producer. Dispersal by contaminants in weed and seed and other human activities.	
Mentha pulegium (Pennyroyal)	Lake wide		Dispersal through seeds, stolons, and rhizomes. Sold horticulturally.	
Nerium oleander (Oleander)	Mainstem, Packer's Bay, Shasta Dam		Widely planted as ornamental. Seed and vegetative dispersal mainly by waterways.	
Onopordum acanthium (Scotch cottonthistle)	None identified		Seed dispersal by wind, water, animals and human activities.	
Paspalum dilatatum (Dallisgrass)	None identified		Reproduces by seed. Common in pastures. Dispersal by mud on shoes, vehicles, and road or farm equipment; contaminated hay and straw.	
Phleum pratense (Timothy)	None identified		Seed dispersal in hay, vehicle and equipment mud. Used commonly in pastures.	
Phytolacca americana (Pokeweed)	Dekkas Creek, Nasoni Creek, Salt Creek, Squaw Creek Arm, Bailey Cove		Seeds primarily dispersed by birds.	
Plantago lanceolata (Narrowleaf plantain)	Lake wide		Seeds dispersed by mud on shoes, vehicles, and road or farm equipment, animals or other human activity.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Poa pratensis (Kentucky bluegrass)	None identified		Common turf and pasture planting. Rhizomes and seeds disperse by watercourses and human activities.	
Polygonum cuspidatum (Japanese knotweed)	None identified		Rhizome fragments develop into new plants that grow and spread rapidly. Fragments dispersed by vehicles and contaminated soil.	
Polygonum sachalinense (Giant knotweed)	None identified		Dispersal by seed and plant fragments. Fragments dispersed by vehicles and contaminated soil.	
Polypogon monospeliensis (Annual rabbitsfoot grass)	Big backbone		Dispersal by sticking to feet, fur or feathers of animals, and agricultural activities.	
Potamogeton crispis (Curly pondweed)	None identified		Disperses through water courses and transfer of boats between water features.	
Raphanus sativus (Wild radish)	None identified		Seeds are dispersed by agricultural activities and contaminated hay and crops.	
+-0000 (black locust)	USFS, Billiboka Club, McCloud River, Lakehead		Seed dispersal is unlikely. Spreads by suckers. Common landscaping and cultivation tree. Used for paneling, construction, fence posts, livestock forage, and honey bee production.	
Rubus discolor (Himalayan blackberry)	Lake wide		Seed and vegetative fragments are dispersal by cultivation, bird droppings, water courses. Roots at nodes touching the ground.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Rubus laciniatus (cutleaf blackberry)	Upper Sacramento River, Sacramento Arm		Seed and vegetative dispersal by cultivation, bird droppings, water courses.	
Rumex acetosella (Common sheep sorrel)	Cambell Creek, Nasoni Creek, Mainstem, Salt Creek, Sacramento Arm, Squaw Creek Arm		Seed and rhizomes are dispersed by wind, water, mud, animals, vehicles, farm operations, and seed and hay contaminants.	
Rumex crispus (Curly dock)	Lake wide		Prolific seed producer. Dispersed by mud on vehicles and animal; contaminated hay and straw and animal droppings.	
Salvia aethiopis (Mediterranean sage)	None identified		Prolific seed producer. Dispersed by vehicles, equipment, wind (tumbleweed), contaminated hay and straw.	
Saponaria officinalis (Bouncingbet)	None identified		Seeds, rhizomes and fragments are dispersed by cultivation and water courses.	
Senecio jacobaea (Tansy ragwort)	Mainstem, Pit Squaw Arm		Prolific seed producer and can regenerate from fragments. Dispersal by water courses; animal fur and feathers; farm equipment, vehicles and clothing; contaminated seed and hay; manure; and fire fighting activities.	
Senecio vulgaris (Old-man-in-the-sping)	None identified		Seed (achenes) dispersed by wind, water, mud on shoes, vehicles, and road or farm equipment. Common in disturbed sites.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Sesbania punicea (Rattlebox, scarlet wisteria)	None identified		Seed dispersed by water courses; commonly planted as ornamental.	
Sonchus arvensis (Field sowthistle)	None identified		Prolific seed producer. Perennial forb produces from rhizomes. Common in moist disturbed areas. "Haired" seeds are dispersed by wind, water, mud on shoes, vehicles, and road or farm equipment; clothing and animal fur.	
Sorghum halepense (Johnsongrass)	Antlers Boat Ramp, Jones Valley, Shasta Dam		Reproduces by seeds or rhizomes. Dispersed by mud on shoes, vehicles, and road or farm equipment.	
Spartium junceum (Spanish broom)	Shasta Dam, Riverview – Sacramento Arm		Prolific seed producer; mud, water, roadside maintenance.	
Symphytum asperum (Prickly comfrey)	None identified		Reproduces by seed and vegetative fragments. Escaped cultivation. Common in disturbed areas, gardens and cultivated crops. Dispersed by mud on shoes, vehicles, and farm equipment.	
Taeniatherum caput-medusae (Medusa-head)	Salt Creek, USFS		Prolific seed producer. Dispersal by mud on shoes, vehicles, and road or farm equipment, contaminated hay or straw.	
Tamarix ramosissima (Saltcedar)	None identified		Prolific seed producer and high germination rate. Disperses by wind, water, stem and root fragments floating downstream can regenerate, resprouts if burnt.	

Table A5-1. Known Weed Source Locations, Potential Mode of Spread, and Risk of Spread (contd)

Invasive Weed Species	General weed source location	Proximity to potential construction activity or other mode of transportation	Mode of spread	Risk of spread
Tribulus terrestris (Puncturevine)	None identified		Stout spines on seed; disperses by adhering to tires, clothing, shoes, animal fur and feathers.	
Torilis arvensis (Spreading hedgeparsley)	Lake wide		Burs stick to clothing, animal fur, vehicles and equipment. Also in contaminated hay and straw.	
Trifolium hirtum (Rose clover)	Big Backbone, Squaw Creek, Salt Creek, Upper Sacramento River, McCloud Arm, Pit Arm, Sacramento Arm		Used as rangeland forage. Dispersed by manure, clothing, farm activities, seed contaminant.	
Trifolium repens (White clover)	None identified		Reproduces from seed and roots at nodes. Important forage crop. Disperses by mud on shoes, vehicles, and road or farm equipment.	
Verbascum blattaria (Moth mullein)	Salt Creek, Upper Sacramento River, Pit Arn, Sacramento Arm, Squaw Arm		Reproduces by seed. Found in disturbed areas. Disperses by mud on shoes, vehicles, and road or farm equipment.	
Verbascum thapsus (Common mullein)	Big Backbone, Salt Creek, Squaw Creek, Big Backbone Arm, Mainstem, McCloud Arm, Pit Arm, Sacramento Arm, Squaw Arm		Prolific seed producer. Road maintenance activities. Favors disturbance.	
Vinca major/Vinca minor (Periwinkle)	Squaw Creek, Bully Mine, McCloud Bridge Campground, Lakehead, Shasta Marina, Shasta Dam, Lakeshore Drive.		Disperses by fragments and rhizomes. Used as a ground cover, spreads rapidly in riparian environments.	
Vulpia myuros (Rat-tail fescue)	Big Backbone, Squaw Creek, Big Backbone Arm, Mainstem, Sacramento Arm		Prolific seed banks. Dispersed by human activities, sticks to animal fur.	

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