

Figure 13-3f. Special-Status Wildlife Occurring in Shasta Lake and Vicinity

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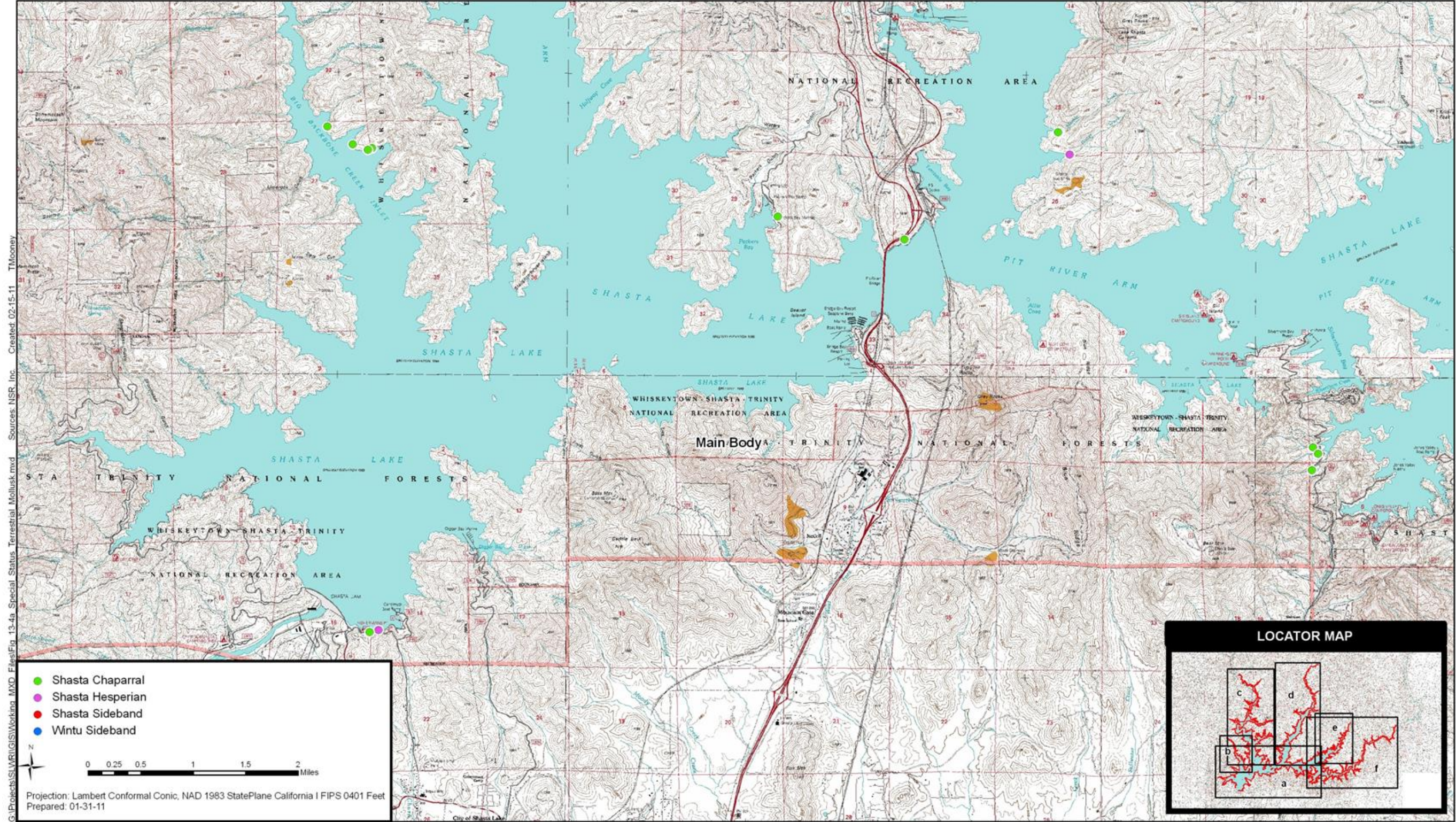


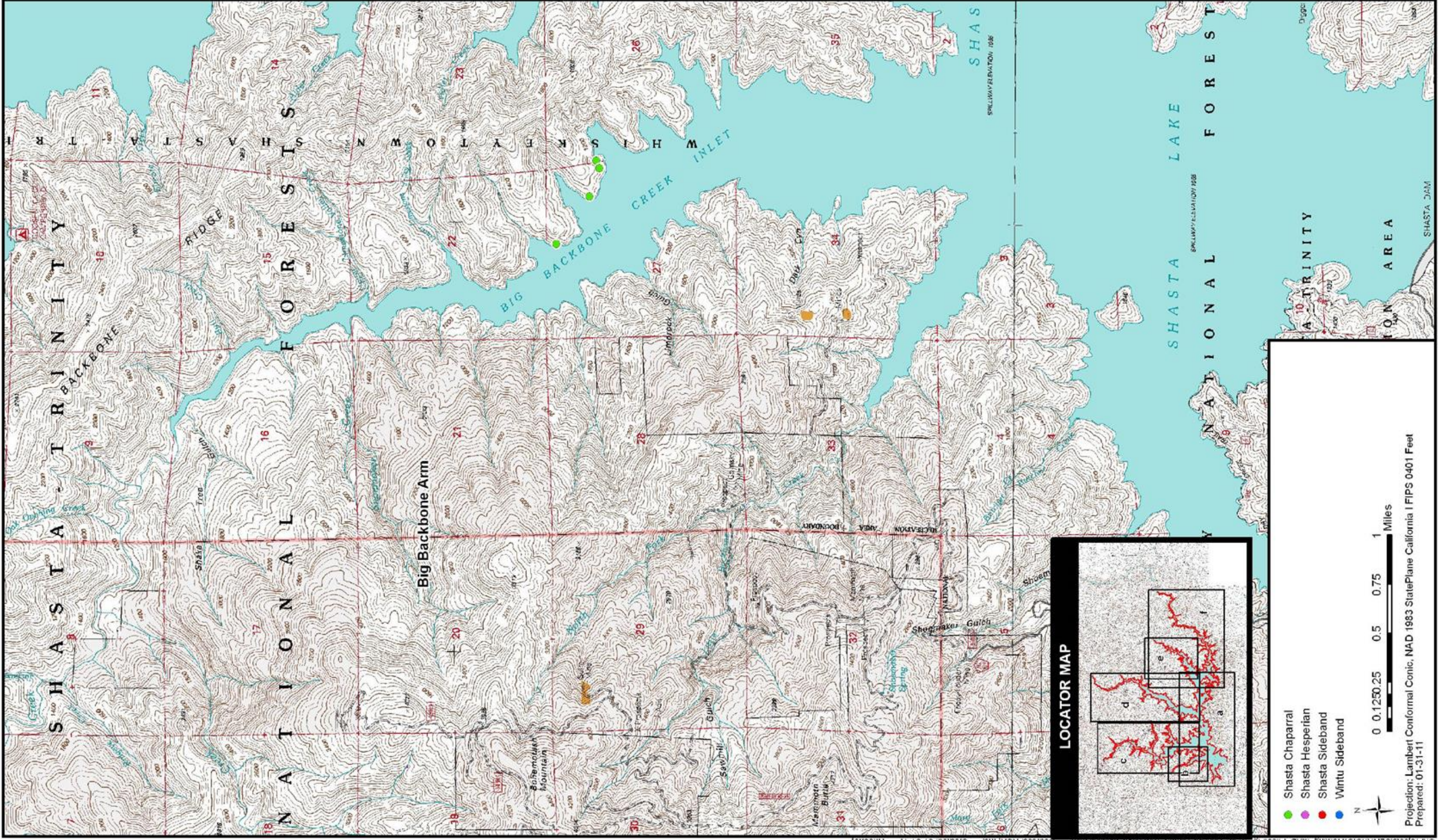
Figure 13-4a. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity

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Figure 13-4b. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity

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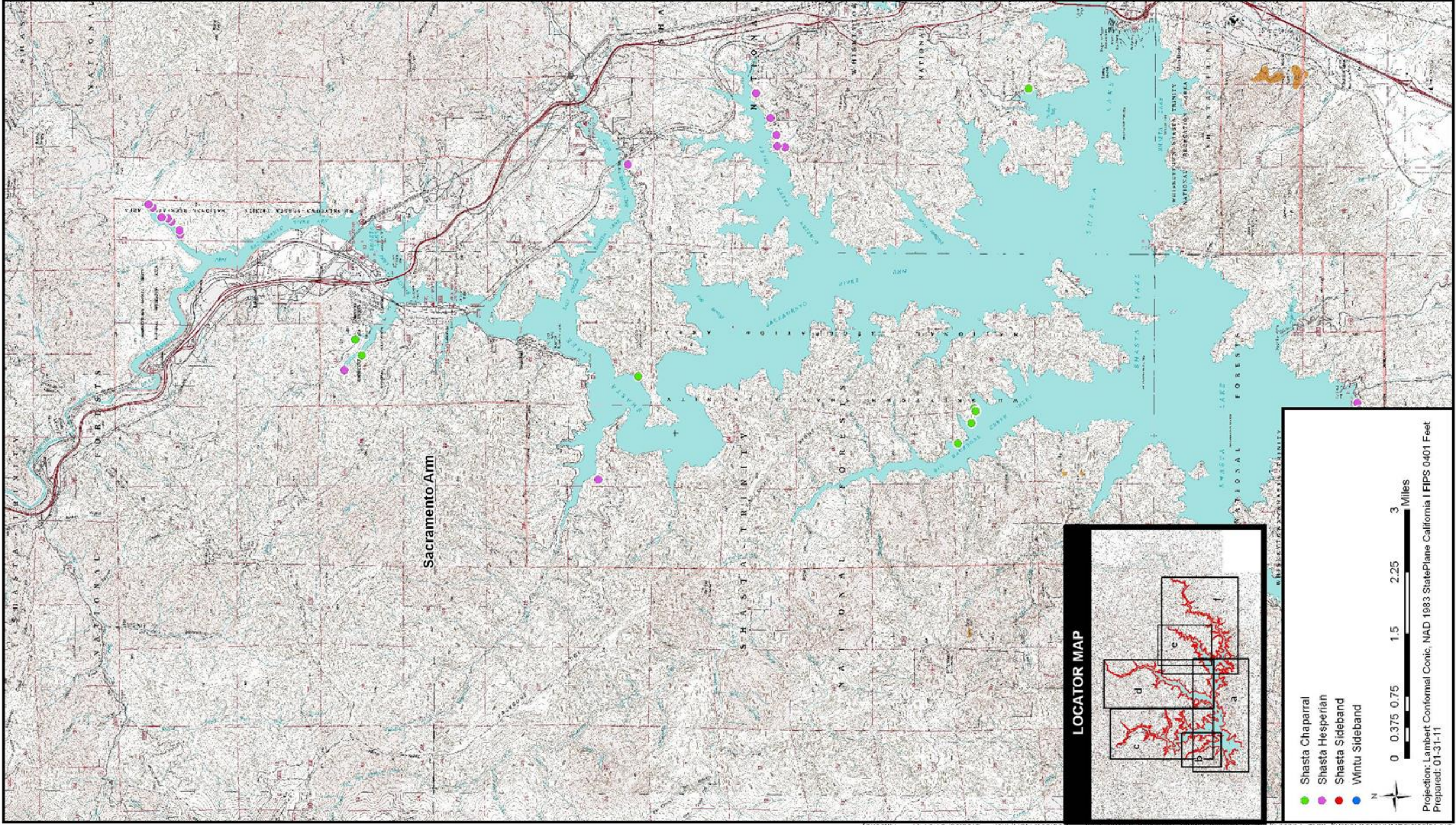


Figure 13-4c. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity

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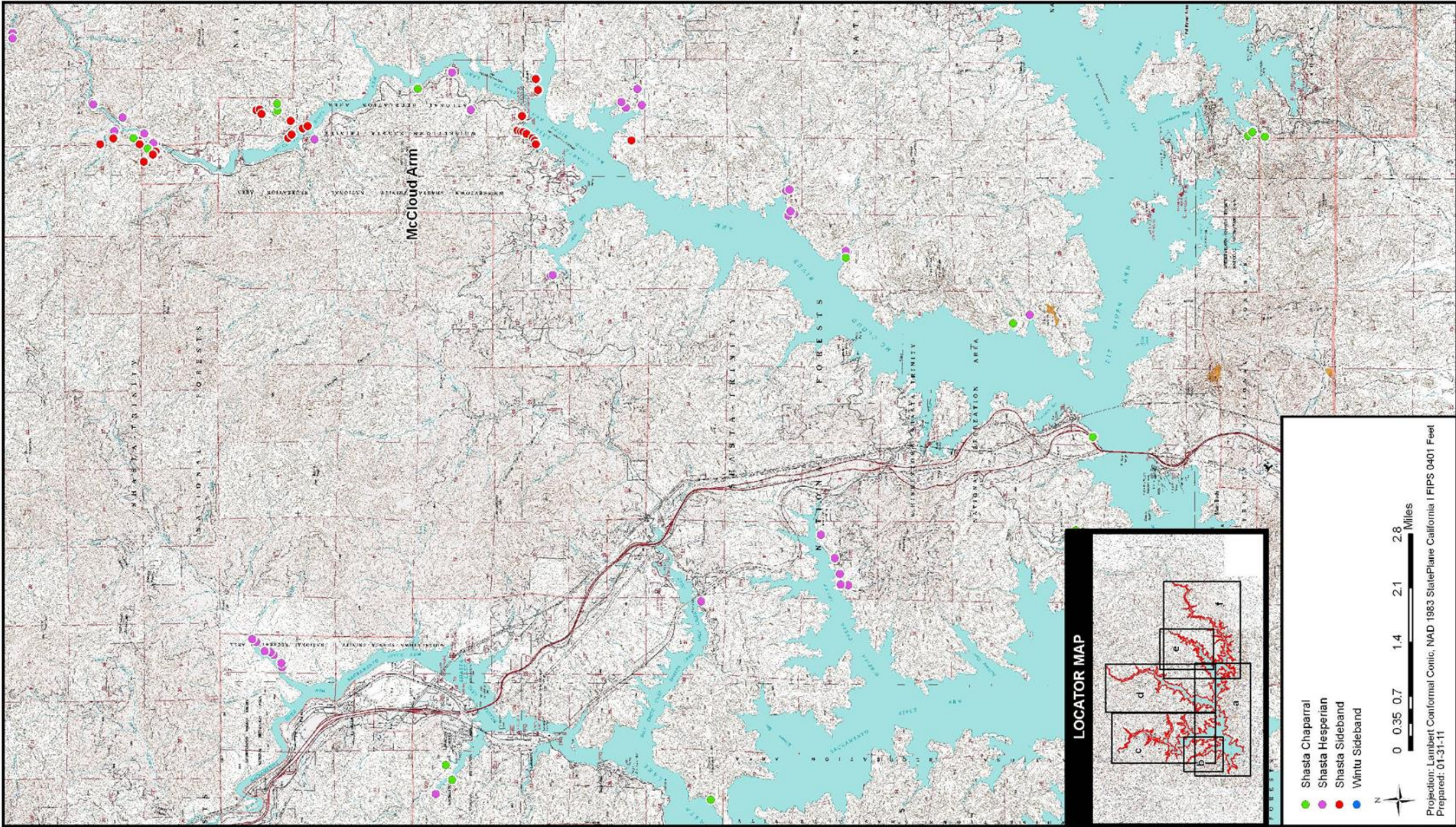


Figure 13-4d. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity

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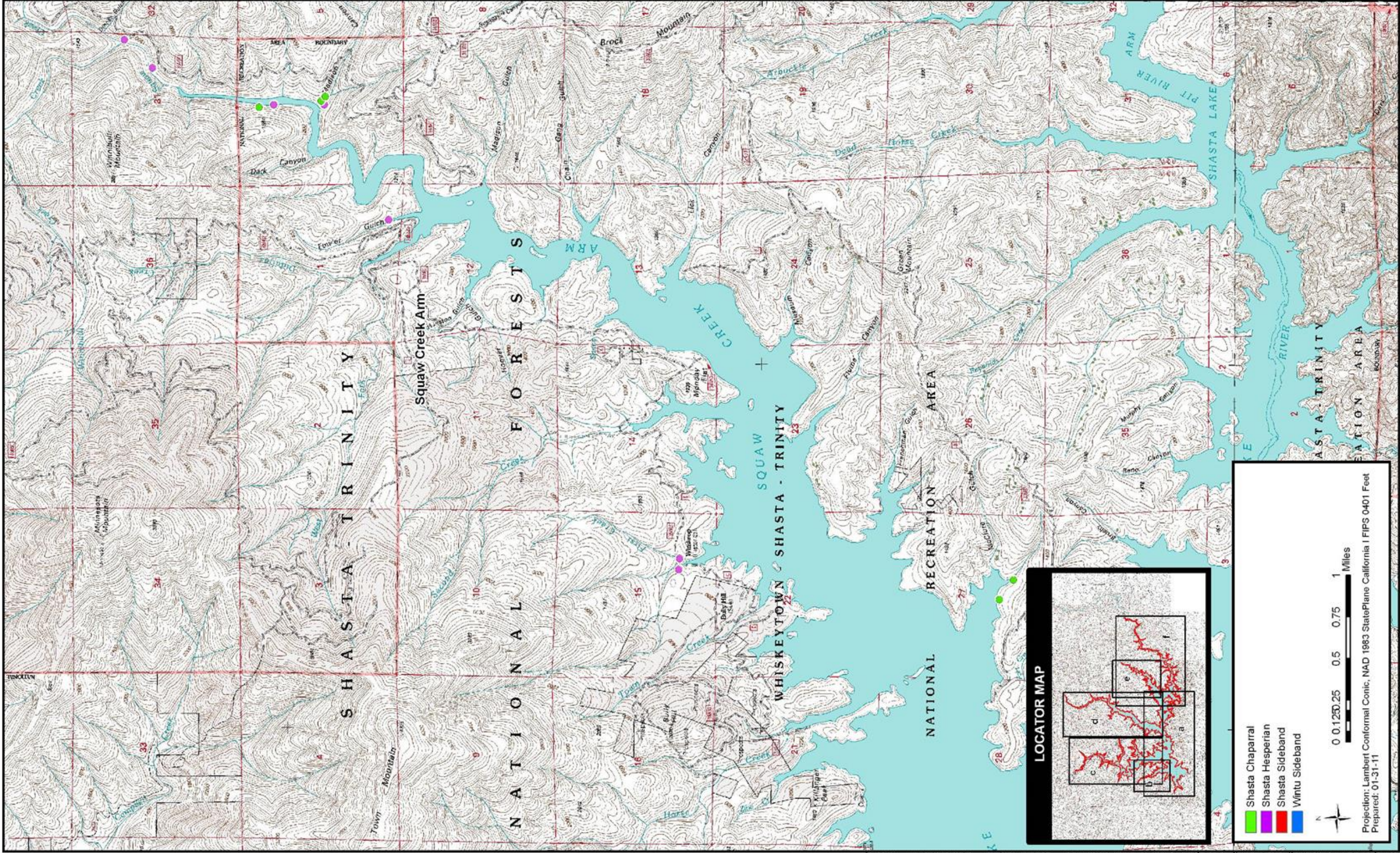


Figure 13-4e. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity

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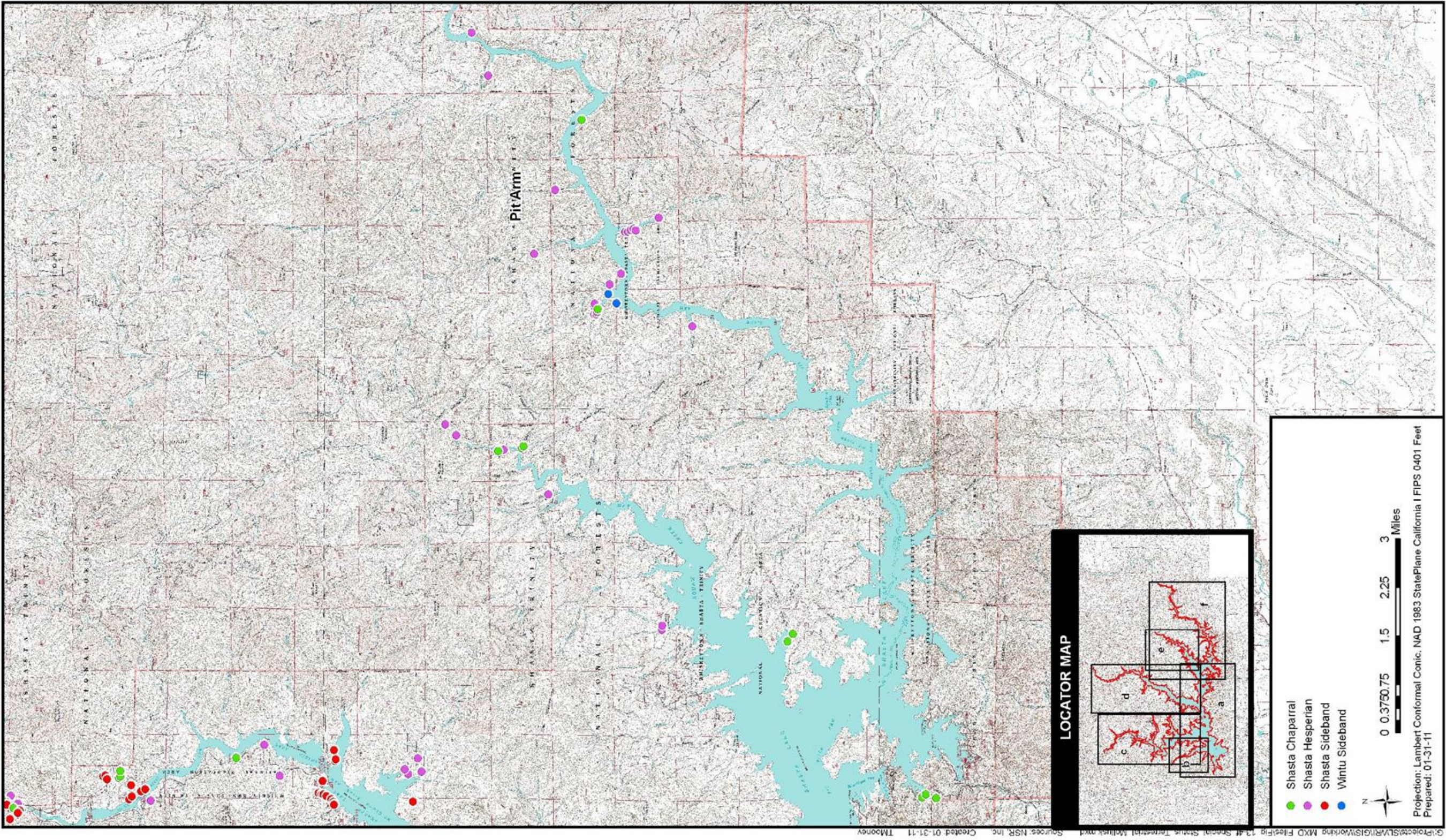


Figure 13-4f. Special-Status Terrestrial Mollusks Occurring in Shasta Lake and Vicinity

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1 These surveys also provided a basic understanding of purple martin ecology in
2 the Shasta Lake and vicinity portion of the primary study area. Purple martin
3 monitoring has continued through 2012, providing additional information on
4 species distribution and habitat use (Figures 13-3d through 13-3f). The nesting
5 purple martin population has totaled 18, 21, 24, 28, 42, and 27 pairs from 2007
6 through 2012, respectively. Most nest sites occur in flooded snags located in the
7 reservoir; however, recent monitoring results show an increase in use of upland
8 nest sites. Limited historical information from purple martin surveys
9 information from 1978 to 2001 showed 14 to 19 nesting pairs at Shasta Lake.
10 During the monitoring period, the nesting purple martin population showed
11 small increases from 2007 through 2010, a somewhat large increase in 2011,
12 and then generally returned to 2009 and 2010 levels in 2012. Considering
13 historical information and the 2007 to 2012 monitoring results, the nesting
14 purple martin population has remained somewhat stable and has increased
15 overall.

16 **Forest Carnivore Surveys** Reclamation conducted surveys for sensitive forest
17 carnivore species (forest carnivores) in the Shasta Lake and vicinity portion of
18 the primary study area during 2003 to 2005. The specific sensitive forest
19 carnivore species (i.e., “target species”) surveyed included the Sierra Nevada
20 red fox (*Vulpes vulpes nescator*), American marten (*Martes americana*), Pacific
21 fisher (*Martes pennanti*), and wolverine (*Gulo gulo*). One target forest carnivore
22 species, the Pacific fisher, was detected. Pacific fisher was detected at
23 13 locations scattered in all areas of the Shasta Lake and vicinity portion of the
24 primary study area, except the McCloud Arm (Figures 13-3a through 13-3f).
25 Forest carnivore surveys conducted during 2007 and 2010 along the McCloud
26 Arm for this project and another unrelated project detected Pacific fisher and
27 found that the species occurs in all areas of the Shasta Lake and vicinity portion
28 of the primary study area. Additionally, the ringtail, a California fully protected
29 species, was detected in all areas of the Shasta Lake and vicinity portion of the
30 primary study area during the forest carnivore surveys.

31 The Pacific fisher survey results provide additional information on habitat use
32 and distribution of the species in Northern California. The survey findings
33 represent the southeastern-most Pacific fisher occurrences in the Klamath
34 region. Additionally, these findings show Pacific fishers in areas generally
35 (previously) not considered habitat in California, including open second-growth
36 conifer, hardwood–conifer, and hardwood habitats that have extensive chaparral
37 components. Pacific fishers were also detected in forest habitats that were
38 barren or semi-barren 50 to 60 years ago because of historical copper mining
39 and smelting activities, and near commercial, rural residential, and industrial
40 development areas.

41 **California Red-Legged Frog Assessment** Reclamation conducted a
42 California red-legged frog habitat assessment in the Shasta Lake and vicinity
43 portion of the primary study area in 2010 and 2012. In consultation with the
44 USFWS, an assessment area was developed and field surveys of aquatic habitats

1 were conducted in accordance with *Revised Guidance on Site Assessments and*
2 *Field Surveys for the California Red-Legged Frog* (USFWS 2005a). A
3 California red-legged frog habitat assessment report is currently being
4 completed for USFWS review.

5 ***Upper Sacramento River (Shasta Dam to Red Bluff)***

6 A list of special-status wildlife species with the potential to occur in the primary
7 study area from Shasta Dam to the Red Bluff Pumping Plant (Table 13-4) was
8 compiled based on habitat suitability and known occurrences within the area
9 covered in the Shasta Dam, Redding, Enterprise, Cottonwood, Balls Ferry,
10 Bend, and Red Bluff East U.S. Geological Survey 7.5-minute quadrangle maps
11 (CNDDDB 2012; USFWS 2011). This list also includes species that are identified
12 by USFS as sensitive, or endemic; identified by BLM as sensitive; designated
13 by the *Northwest Forest Plan* as survey and manage; or designated as MSCS
14 covered species. See the *Wildlife Resources Technical Report* for a description
15 of the life history of special-status wildlife species known or likely to occur in
16 the area and figures depicting the recorded locations of special-status species.

17 **Table 13-4. Special-Status Wildlife Species Known or with Potential to Occur in**
18 **the Primary Study Area, Along the Sacramento River from Shasta Dam to Red**
19 **Bluff Pumping Plant**

Common Name	Scientific Name	Status	Potential for Occurrence
Invertebrates			
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	FE, MSCS	Unlikely to occur. No suitable habitat is present along the river corridor.
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FPD, FT, MSCS	Known to occur. Elderberry shrubs are present within the riparian woodland community along the Sacramento River.
Vernal pool tadpole shrimp Critical Habitat	<i>Lepidurus packardii</i>	FE, MSCS	Unlikely to occur. No suitable habitat is present along the river corridor. Critical habitat does not occur within the river corridor.
Vernal pool fairy shrimp Critical Habitat	<i>Branchinecta lynchi</i>	FT, MSCS	Unlikely to occur. No suitable habitat is present along the river corridor. Critical habitat does not occur within the river corridor.
Amphibians			
Shasta salamander	<i>Hydromantes shastae</i>	CT, BLM S, USFS S	Unlikely to occur. Suitable habitat generally is not found within the river corridor downstream from Shasta Dam.
California red-legged frog	<i>Rana aurora draytonii</i>	FT, CSC, MSCS	Unlikely to occur. No longer occurs on the floor of the Central Valley.
Foothill yellow-legged frog	<i>Rana boylei</i>	CSC, USFS S, MSCS	Unlikely to occur in the Sacramento River because of the lack of suitable substrate and hydrology.

1 **Table 13-4. Special-Status Wildlife Species Known or with Potential to Occur in**
 2 **the Primary Study Area, Along the Sacramento River from Shasta Dam to Red**
 3 **Bluff Pumping Plant (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Amphibians (contd.)			
Western spadefoot toad	<i>Spea hammondi</i>	CSC, MSCS	Unlikely to occur. No suitable habitat is present along the Sacramento River corridor.
Reptiles			
Giant garter snake	<i>Thamnophis gigas</i>	FT, CT, MSCS	Unlikely to occur in the primary study area; however, known to occur in the extended study area.
Western pond turtle	<i>Actinemys (Clemmys) marmorata</i>	CSC, USFS S, MSCS	Known to occur. Suitable habitat is present in the primary study area.
Birds			
Cackling goose (Aleutian Canada goose)	<i>Branta hutchinsii leucopareia</i>	FD, MSCS	Unlikely to occur within the banks of the Sacramento River where flows could be altered.
American peregrine falcon (nesting)	<i>Falco peregrinus anatum</i>	CP, USFS S, MSCS	Unlikely to nest in this portion of the study area; however, may forage in areas of open water with large concentrations of waterbirds.
Bald eagle (nesting and wintering)	<i>Haliaeetus leucocephalus</i>	FD, CE, CP, USFS S, MSCS	Known to occur along the Sacramento River in the primary study area.
Bank swallow (nesting)	<i>Riparia riparia</i>	CT, MSCS	Known to occur along the Sacramento River in the primary study area.
Black-crowned night heron (rookery)	<i>Nycticorax nycticorax</i>	BLM S, MSCS	Could nest in trees adjacent to the Sacramento River.
California gull (nesting colony)	<i>Larus californicus</i>	MSCS	Not within breeding range. Could occur in the study area during winter or migration.
Cooper's hawk (nesting)	<i>Accipiter cooperii</i>	MSCS	Could occur. Suitable nesting and foraging habitat is present in the primary study area.
Double-crested cormorant (rookery)	<i>Phalacrocorax auritus</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Golden eagle	<i>Aquila chrysaetos</i>	CP, BLM S, MSCS	No suitable nesting habitat along the Sacramento River. Unlikely to forage along the river corridor.
Great blue heron (rookery)	<i>Ardea herodias</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Great egret (rookery)	<i>Casmerodius albus</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Greater sandhill crane (nesting and wintering)	<i>Grus canadensis tabida</i>	CT, CP, MSCS	Unlikely to breed in the primary study area. Unlikely to use the Sacramento River corridor during winter or migration.
Least bittern (nesting)	<i>Ixobrychus exilis</i>	CSC, MSCS	Could nest along the Sacramento River if suitable habitat is present.
Lesser sandhill crane (wintering)	<i>Grus canadensis canadensis</i>	CSC	Does not breed in California. Unlikely to use the Sacramento River corridor during winter or migration.

1 **Table 13-4. Special-Status Wildlife Species Known or with Potential to Occur in**
 2 **the Primary Study Area, Along the Sacramento River from Shasta Dam to Red**
 3 **Bluff Pumping Plant (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Little willow flycatcher (nesting)	<i>Empidonax traillii brewsteri</i>	CE, MSCS	Unlikely to breed in the primary study area because of the area's elevation, but may use riparian woodlands during migration.
Loggerhead shrike (nesting)	<i>Lanius ludovicianus</i>	CSC	Likely to nest and forage in woodlands and scrub habitats in the primary study area.
Long-billed curlew (nesting)	<i>Numenius americanus</i>	MSCS	Does not breed in the primary study area. Unlikely to use the Sacramento River corridor during winter or migration.
Long-eared owl (nesting)	<i>Asio otus</i>	CSC, MSCS	Does not nest in lowland Central Valley areas. Unlikely to forage along the Sacramento River corridor where flows would be altered.
Northern harrier (nesting)	<i>Circus cyaneus</i>	CSC, MSCS	Likely to occur. Suitable nesting and foraging habitat is present in the primary study area.
Northern spotted owl (nesting) (critical habitat)	<i>Strix occidentalis caurina</i>	FT, MSCS	Unlikely to occur along the Sacramento River corridor because of a lack of suitable habitat. Critical habitat does not occur in the primary study area.
Osprey (nesting)	<i>Pandion haliaetus</i>	MSCS	Known to nest along the Sacramento River in the primary study area.
Purple martin (nesting)	<i>Progne subis</i>	CSC	Could occur. Potentially suitable habitat is present along the Sacramento River corridor.
Short-eared owl (nesting)	<i>Asio flammeus</i>	CSC, MSCS	Could occur. Potentially suitable habitat is present in the primary study area.
Snowy egret (rookery)	<i>Egretta thula</i>	MSCS	Could nest in trees adjacent to the Sacramento River.
Swainson's hawk (nesting)	<i>Buteo swainsoni</i>	CT, USFS S, MSCS	Could occur. Suitable nesting and foraging habitat is present in the primary study area.
Tricolored blackbird (nesting colony)	<i>Agelaius tricolor</i>	CSC, MSCS	Could occur. Potentially suitable habitat is present in the primary study area.
Western yellow-billed cuckoo (nesting)	<i>Coccyzus americanus occidentalis</i>	FC, CE, USFS S, MSCS	Likely to nest and forage in the primary study area.
Western burrowing owl (burrow sites)	<i>Athene cunicularia hypugea</i>	CSC, MSCS	Unlikely to occur along the Sacramento River corridor because of a lack of suitable nesting habitat.
White-tailed kite (nesting)	<i>Elanus leucurus</i>	CP, MSCS	Likely to occur. Suitable nesting and foraging habitat is present in the primary study area.
Yellow-breasted chat (nesting)	<i>Icteria virens</i>	CSC, MSCS	Likely to nest and forage in the primary study area
Yellow warbler (nesting)	<i>Setophaga (Dendroica) petechia</i>	CSC, MSCS	Could nest and forage in the primary study area. Likely to use riparian woodlands during migration.

4

1 **Table 13-4. Special-Status Wildlife Species Known or with Potential to Occur in**
 2 **the Primary Study Area, Along the Sacramento River from Shasta Dam to Red**
 3 **Bluff Pumping Plant (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Mammals			
Pacific fisher	<i>Martes pennanti</i>	FC, CSC, USFS S	Unlikely to occur. No suitable habitat is available along the Sacramento River corridor.
Ringtail	<i>Bassariscus astutus</i>	CP, MSCS	Could occur. Potentially suitable habitat is present along the Sacramento River corridor.
Pallid bat	<i>Antrozous pallidus (roosting)</i>	CSC, BLM S, USFS S	Could occur. Potentially suitable habitat is present in woodland in the primary study area.
Western mastiff bat (roosting)	<i>Eumops perotis californicus</i>	CSC, BLM S, MSCS	Unlikely to roost along the Sacramento River corridor because suitable roost sites are lacking.
Western red bat	<i>Lasiurus blossevillei</i>	CSC, USFS S	Could occur. Potentially suitable habitat is present in woodland in the primary study area.
Sierra Nevada red fox	<i>Vulpes vulpes necator</i>	CT, USFS S	Unlikely to occur in the primary study area because the vegetation communities are different than preferred and the area is generally below the preferred elevation range.

Sources: CNDDDB 2012; USFWS 2011; CALFED 2000b; Shuford and Gardali 2008

Key:

BLM S = U.S. Department of the Interior, Bureau of Land Management sensitive

CE = California endangered

CP = California fully protected

CSC = California species of special concern

CT = California Threatened

FC = Federal candidate for listing

FD = Federally delisted

FE = Federally listed as endangered

FPD = Proposed for Federal delisting

FT = Federally listed as threatened

MSCS = Multi-Species Conservation Strategy covered species

USFS S = U.S. Department of Agriculture, Forest Service sensitive

4 **Lower Sacramento River and Delta**

5 Numerous special-status wildlife species are associated with riparian,
 6 floodplain, and side-channel wetland habitats along the Sacramento River and
 7 in the Delta (Table 13-5). However, as stated above, the roughly 300 miles of
 8 the Sacramento River can be subdivided into distinct reaches. The reaches in the
 9 extended study area are discussed separately below because of differences in
 10 morphology, riparian vegetation, and habitat functions. The sensitive species
 11 discussed in this section are representative species selected from the many
 12 species present in the extended study area and are presented as examples to
 13 illustrate the breadth of resources. The *Wildlife Resources Technical Report*
 14 contains a comprehensive list of all sensitive wildlife species in the extended
 15 study area that have been reported to the CNDDDB.

1 **Table 13-5. Representative Sensitive Wildlife Species of Riparian and Perennial**
2 **Wetland Communities Along the Sacramento River and in the Delta**

r	Scientific Name	Status ¹	Habitat Description
Invertebrates			
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT	Elderberries in riparian woodlands or savanna communities.
Reptiles			
Western pond turtle	<i>Actinemys (Clemmys) marmorata</i>	CSC	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with abundant vegetation and either rocky or muddy bottoms, in woodland, forest, and grassland.
Giant garter snake	<i>Thamnophis giga</i>	FT CT	Marshes, sloughs, drainage canals, and irrigation ditches, especially around rice fields, and occasionally in slow-moving creeks from sea level to 400 feet. Prefers locations with vegetation close to the water for basking.
Birds			
Tricolored blackbird	<i>Agelaius tricolor</i>	CSC	<i>Foraging:</i> On ground in croplands, grassy fields, flooded land, and along edges of ponds. <i>Nesting:</i> Dense cattails, tules, or thickets near fresh water.
Swainson's hawk	<i>Buteo swainsoni</i>	CT	<i>Foraging:</i> Open desert, grassland, or cropland containing scattered, large trees or small groves. <i>Nesting:</i> Open riparian habitat, in scattered trees or small groves in sparsely vegetated flatlands. Usually found near water in the Central Valley.
Northern harrier	<i>Circus cyaneus</i>	CSC	<i>Nesting:</i> Tall grasses and forbs in emergent wetland, along rivers or lakes, grasslands, grain fields, or on sagebrush flats several miles from water.
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	FC CE	<i>Nesting:</i> Extensive deciduous riparian thickets or forests with dense, low-level or understory foliage adjacent to slow-moving watercourses, backwaters, or seeps. Willow is almost always a dominant component of the vegetation. In the Sacramento Valley, also utilizes adjacent walnut orchards.
Yellow warbler	<i>Setophaga (Dendroica) petechia</i>	CSC	<i>Nesting:</i> Low, open-canopy riparian deciduous woodlands with a heavy brush understory; sometimes in montane shrubbery in open conifer forests.
White-tailed kite	<i>Elanus leucurus</i>	FP	<i>Foraging:</i> Undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. <i>Nesting:</i> Large groves of dense, broad-leafed deciduous trees close to foraging areas.
Greater sandhill crane	<i>Grus canadensis tabida</i>	CT FP	<i>Foraging:</i> Open grasslands, grain fields, and open wetlands. <i>Roosting:</i> In flocks standing in moist fields or in shallow water. <i>Nesting:</i> Open habitats with shallow lakes and fresh emergent wetlands.

3

1 **Table 13-5. Representative Sensitive Wildlife Species of Riparian and Perennial**
2 **Wetland Communities Along the Sacramento River and in the Delta (contd.)**

Species		Status ¹	Species
Birds (contd.)			
Bald eagle	<i>Haliaeetus leucocephalus</i>	CE FP	<i>Foraging:</i> Large bodies of water or free-flowing rivers with abundant fish and adjacent snags or other perches. <i>Nesting:</i> Large, old-growth trees or snags in remote, mixed stands near water.
Yellow-breasted chat	<i>Icteria virens</i>	CSC	<i>Foraging and nesting:</i> Riparian thickets of willow and other brushy species near streams or other watercourses.
California black rail	<i>Laterallus jamaicensis coturniculus</i>	CT FP	<i>Foraging and nesting:</i> Tidal emergent wetlands dominated by pickleweed, in the high wetland zones near upper limit of tidal flooding, or in brackish marshes supporting bulrushes and pickleweed. In freshwater, usually found in bulrushes, cattails, and saltgrass adjacent to tidal sloughs.
Suisun song sparrow	<i>Melospiza melodia maxillaries</i>	CSC	<i>Foraging:</i> The bare surface of tidally exposed mud among tules and along slough margins in brackish marshes. <i>Nesting:</i> Along edges of sloughs and bays supporting mixed stands of bulrush, cattail, and other emergent vegetation.
Bank swallow	<i>Riparia riparia</i>	CT	<i>Foraging:</i> Open riparian areas, grassland, wetlands, water, and cropland. <i>Nesting:</i> Vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, and lakes.
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	CSC	<i>Foraging:</i> Fresh emergent wetland and sometimes along shorelines and in nearby open fields, preferably on moist ground. <i>Nesting:</i> Dense emergent wetland of cattails and tules, often along border of lake or pond.
Pallid bat	<i>Antrozous pallidus</i>	CSC	<i>Foraging:</i> Relatively open oak woodlands, over water near riparian and upland forests and woodlands, and orchards and vineyards. <i>Roosting:</i> Rocky outcrops, cliffs, and crevices.
Western mastiff bat	<i>Eumops perotis</i>	CSC	<i>Foraging:</i> Over water in broad, open areas near riparian and upland forests and woodlands. <i>Roosting:</i> Crevices in vertical cliffs, usually granite or consolidated sandstone, and in broken terrain with exposed rock faces.
Western red bat	<i>Lasiurus blossevillii</i>	CSC	<i>Foraging:</i> Over water edges in open areas near riparian and upland forests and woodlands; orchards. <i>Roosting:</i> Trees along edges or in habitat mosaics in a variety of habitats and orchards.
Townsend's big-eared bat	<i>Plecotus townsendii</i>	CSC	<i>Foraging:</i> Water edges in open areas near riparian and upland forests and woodlands. <i>Roosting:</i> Caves, mines, tunnels, buildings, or other human-made structures in woodlands. Prefers mesic habitats.

3

1 **Table 13-5. Representative Sensitive Wildlife Species of Riparian and Perennial**
 2 **Wetland Communities Along the Sacramento River and in the Delta (contd.)**

Species		Status ¹	Species
Mammals			
Salt-marsh harvest mouse	<i>Reithrodontomys raviventris</i>	FE CE FP	Salt marsh dominated by pickleweed and salt grass. Generally requires nonsubmerged, salt-tolerant vegetation for escape during high tides.

Source: CNDDDB 2012

Note:

¹Status definitions:

Key:

CE = California listed as endangered

CSC = California species of special concern

CT = California listed as threatened

FC = federal candidate for listing

FE = Federally listed as endangered

FP = California fully protected

FT = Federally listed as threatened

3 **Sacramento River from Red Bluff Pumping Plant to the Delta** Many of the
 4 special-status wildlife species described above for the upper Sacramento River
 5 corridor have the potential to occur in the middle and lower reaches of the
 6 Sacramento River. Wildlife species listed under the Federal Endangered Species
 7 Act (ESA) and/or California Endangered Species Act (CESA) that have the
 8 potential to occur in a portion of the extended study area from Red Bluff
 9 Pumping Plant to the Delta include valley elderberry longhorn beetle
 10 (*Desmocerus californicus dimorphus*), giant garter snake (*Thamnophis gigas*),
 11 bald eagle (*Haliaeetus leucocephalus*), Swainson's hawk (*Buteo swainsoni*),
 12 western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), willow
 13 flycatcher (*Empidonax traillii*), and bank swallow (*Riparia riparia*).

14 **Sacramento–San Joaquin River Delta** Many special-status species are
 15 known or likely to occur in the Delta because of the presence of extensive
 16 wetland habitats. Tidal marshes and emergent wetlands support several
 17 special-status wildlife species: California black rail (*Laterallus jamaicensis*
 18 *coturniculus*), California clapper rail (*Rallus longirostris obsoletus*), greater
 19 sandhill crane (*Grus canadensis tabida*), salt marsh common yellowthroat
 20 (*Geothlypis trichas sinuosa*), salt marsh harvest mouse (*Reithrodontomys*
 21 *raviventris*), Suisun ornate shrew (*Sorex ornatus sinuosus*), Suisun song
 22 sparrow (*Melospiza melodia maxillaris*), and tricolored blackbird (*Agelaius*
 23 *tricolor*). The giant garter snake is known to inhabit sloughs, canals, and low-
 24 gradient streams and freshwater marshes in the Delta. Vernal pools and other
 25 freshwater seasonal wetlands support several special-status crustaceans,
 26 including vernal pool tadpole shrimp (*Lepidurus packardi*) and vernal pool fairy
 27 shrimp (*Branchinecta lynchi*). The valley elderberry longhorn beetle has been
 28 found in the Delta region on McCormack-Williamson and New Hope tracts
 29 (CNDDDB 2012).

30 **San Joaquin River Basin to the Delta** The current wildlife habitat value of
 31 this area is somewhat limited by the predominance of agricultural lands, which
 32 support a relatively low diversity of wildlife species. Remnant native vegetation
 33 patches are likely to support a high diversity of wildlife species. More than 100

1 special-status wildlife and plant species occur in the San Joaquin River region.
2 Most of the special-status wildlife species are associated with grasslands (which
3 include vernal pools), freshwater emergent wetlands, lakes, and rivers that occur
4 on the valley floor. Many of the species have been listed by Federal and State
5 wildlife agencies because of habitat losses associated with agricultural
6 development and water projects.

7 **CVP/SWP Service Areas**

8 The CVP and SWP service areas are dominated by agricultural land and urban
9 development. These areas support many wildlife species, most of which are
10 highly adapted to these altered environments. The conflict between urban
11 growth and conservation of native habitat has resulted in the listing of a number
12 of wildlife species that were threatened with extinction. The region also
13 supports a variety of exotic species, some of which are detrimental to survival
14 of native species.

15 The California condor (*Gymnogyps californianus*), lightfooted clapper rail
16 (*Rallus longirostris levipes*), California least tern (*Sternula antillarum brownie*),
17 least Bell's vireo (*Vireo bellii pusillus*), Belding's Savannah sparrow
18 (*Passerculus sandwichensis beldingi*), southwestern willow flycatcher
19 (*Empidonax traillii extimus*), California gnatcatcher (*Polioptila californica*),
20 Mohave ground squirrel (*Spermophilus mohavensis*), and Morro Bay kangaroo
21 rat (*Dipodomys heermanni morroensis*) are examples of species that have been
22 listed as threatened or endangered under the ESA and/or CESA and that could
23 occur within the CVP and SWP service areas.

24 **13.1.3 Other Wildlife Resources**

25 **Shasta Lake and Vicinity**

26 **Critical Deer Range** Critical black-tailed deer winter range for the McCloud
27 Flats and Cow Creek herds is located in the Shasta Lake and vicinity portion of
28 the primary study area in all five arms of the lake. Critical fawning range also is
29 found along the south-facing slopes of Little Sugarloaf Creek (CDFG 1998).
30 Critical deer winter range can include movement corridors, staging areas where
31 deer congregate, and habitats with high-quality winter forage or other elements
32 that help deer to survive the winter. Winter ranges are at lower elevations and
33 are fewer in number than summer ranges, and thus are more vulnerable to
34 human impact. Deer from different summer ranges may use common winter
35 ranges when breeding typically occurs, which contributes to genetic diversity
36 (CDFG 1998).

37 **USFWS Habitat Evaluation Procedure Analysis** Reclamation is working
38 with USFWS to complete a Habitat Evaluation Procedure analysis to help
39 quantify potential project impacts and meet Fish and Wildlife Coordination Act
40 consultation requirements. To date, Habitat Evaluation Procedure studies and
41 analyses have been completed for part of the Shasta Lake and vicinity portion of
42 the primary study area. Additional planning and coordination are ongoing.

1 **Incidental Observations** Reclamation maintains a database of special-status
2 wildlife species incidentally observed during all biological surveys performed
3 since 2002. The incidental species observations include the foothill yellow-
4 legged frog, western pond turtle (*Actinemys marmorata*), osprey (*Pandion*
5 *haliaetus*), peregrine falcon (*Falco peregrinus anatum*), yellow-breasted chat
6 (*Icteria virens*), yellow warbler (*Dendroica petechia brewsteri*), and
7 Townsend’s big-eared bat (*Plecotus townsendii*) (Figures 13-3a through 13-3f).

8 **Upper and Lower Sacramento River, Delta, and CVP/SWP Service Areas**
9 For the upper and lower Sacramento River, Delta, and CVP/SWP service areas,
10 no other wildlife resources were evaluated in addition to wildlife habitats,
11 wildlife, and special-status wildlife as described previously in Sections 13.1.1
12 and 13.1.2.

13 **13.2 Regulatory Framework**

14 Biological resources in California are protected and/or regulated by a variety of
15 Federal and State laws and policies. Key regulatory and conservation planning
16 issues applicable to the project and alternatives under consideration are
17 discussed below.

18 **13.2.1 Federal**

19 **Federal Endangered Species Act**

20 Pursuant to the ESA, USFWS and NMFS have authority over projects that may
21 result in “take” of a Federally listed species. In general, ESA Section 7 prohibits
22 persons (including private parties) from “taking” listed endangered or
23 threatened fish and wildlife species on private property, and from “taking” listed
24 endangered or threatened plant species in areas under Federal jurisdiction or in
25 violation of State law (16 U.S. Code (USC) 1532, 50 Code of Federal
26 Regulations (CFR) 17.3).

27 Under the ESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot,
28 wound, kill, trap, capture, or collect, or to attempt to engage in any such
29 conduct” as part of an intentional or negligent act or omission. The term “harm”
30 includes acts that result in death or injury to wildlife. Such acts may include
31 significant habitat modification or degradation if it results in death or injury to
32 wildlife by significantly impairing essential behavioral patterns, including
33 breeding, feeding, or sheltering.

34 Section 7(a) of the ESA, as amended, requires Federal agencies to evaluate their
35 actions with respect to any species that is proposed for listing or is listed as
36 endangered or threatened. Section 7(a)(2) requires Federal agencies to ensure
37 that activities they authorize, fund, or carry out are not likely to jeopardize the
38 continued existence of a listed species or to destroy or adversely modify its
39 designated critical habitat. If a Federal action may affect a listed species or its

1 designated critical habitat, the responsible Federal agency must enter into
2 formal consultation with USFWS or NMFS, depending on the species.

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

10 ***Fish and Wildlife Coordination Act***

11 The Fish and Wildlife Coordination Act (16 USC 661–667e, as amended)
12 provides the basic authority for the involvement of USFWS in evaluating
13 impacts on fish and wildlife from proposed water resource development
14 projects. It requires that fish and wildlife resources receive consideration equal
15 to that of other project features. It also requires Federal agencies that construct,
16 license, or permit water resource development projects to first consult with
17 USFWS (and NMFS in some instances) and State fish and wildlife agencies
18 regarding the impacts of the proposed action on fish and wildlife resources and
19 measures to mitigate these impacts.

20 ***Bald Eagle Protection Act***

21 The bald eagle and golden eagle are Federally protected under the Bald Eagle
22 Protection Act (16 USC 668–668c). It is illegal to take, possess, sell, purchase,
23 barter, offer to sell or purchase or barter, transport, export, or import a live or
24 dead bald or golden eagle or any eagle part, nest, or egg unless authorized by
25 the Secretary of the Interior. The Bald Eagle Protection Act defines “take” as
26 “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or
27 disturb” (16 USC 668–668d). USFWS has further defined “disturb” under the
28 act as follows (72 *Federal Register* 31132–31140 (June 5, 2007)):

29 *Disturb means to agitate or bother a bald or golden eagle to a*
30 *degree that causes, or is likely to cause, based on the best*
31 *scientific information available, (1) injury to an eagle; (2) a*
32 *decrease in its productivity, by substantially interfering with*
33 *normal breeding, feeding, or sheltering behavior; or (3) nest*
34 *abandonment, by substantially interfering with normal*
35 *breeding, feeding, or sheltering behavior.*

36 Active nest sites are also protected from disturbance during the breeding season,
37 generally January through August.

38 USFWS has proposed new permit regulations to authorize the take of bald and
39 golden eagles under the Bald Eagle Protection Act, generally where the take to
40 be authorized is associated with otherwise lawful activities (72 *Federal Register*
41 31141–31155 (June 5, 2007)). With the delisting of the bald eagle from the ESA

1 in 2007, this act is the primary law protecting bald eagles and golden eagles.
2 Violators are subject to fines and/or imprisonment for up to 1 year.

3 ***Migratory Bird Treaty Act***

4 Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of
5 1918 (16 USC 703–711). The MBTA makes it unlawful to take, possess, buy,
6 sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including
7 feathers or other parts, nests, eggs, or products, except as allowed by
8 implementing regulations (50 CFR 21). This prohibition includes direct and
9 indirect acts, although harassment and habitat modifications are not included
10 unless they result in direct loss of birds, nests, or eggs. The current list of
11 species protected by the MBTA, which can be found in Title 50, Section 10.13
12 of the CFR, includes several hundred species, essentially all native birds. Loss
13 of nonnative species, such as house sparrows (*Passer domesticus*), European
14 starlings (*Sturnus vulgaris*), and rock pigeons (*Columba livia*), is not covered by
15 this statute.

16 ***U.S. Forest Service Sensitive Species***

17 The National Forest Management Act requires USFS to “provide for a diversity
18 of plant and animal communities” (16 USC 1604(g)(3)(B)) as part of its
19 multiple-use mandate. USFS must maintain “viable populations of existing
20 native and desired nonnative species in the planning area” (36 CFR 219.19).
21 The Sensitive Species program is designed to meet this mandate and to
22 demonstrate USFS’s commitment to maintaining biodiversity on National
23 Forest System lands. The program is a proactive approach to conserving species
24 to prevent a trend toward listing under the ESA and to ensure the continued
25 existence of viable, well-distributed populations. A “Sensitive Species” is any
26 species of plant or animal that has been recognized by the Regional Forester to
27 need special management to prevent the species from becoming threatened or
28 endangered.

29 ***Shasta-Trinity National Forest Land and Resource Management Plan***

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

36 ***Biological Diversity***

37 *Goals (STNP LRMP, p. 4-4)* Integrate multiple resource management on a
38 landscape level to provide and maintain diversity and quality of habitats that
39 support viable populations of plants, fish, and wildlife.

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

- 2 • **Natural Openings** – Management of natural openings will be
3 determined at the project level consistent with desired future
4 conditions.
- 5 • **Snags** – Over time, provide the necessary number of replacement snags
6 to meet density requirements as prescribed for each land allocation
7 and/or management prescription. Live, green culls and trees exhibiting
8 decadence and/or active wildlife use are preferred.
- 9 • **Hardwood** – Apply the following standards in existing hardwood
10 types:
- 11 – Manage hardwood types for sustainability.
- 12 – Conversion to conifers will only take place to meet desired future
13 ecosystem conditions.
- 14 – Where hardwoods occur naturally within existing conifer types on
15 suitable timber lands, manage for a desired future condition for
16 hardwoods as identified during ecosystem analysis consistent with
17 management prescription standards and guidelines. Retain groups
18 of hardwoods over single trees.

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

20 *Goals (STNF LRMP, p. 4-5)*

- 21 • Monitor and protect habitat for Federally listed Threatened and
22 Endangered and candidate species. Assist in recovery efforts for
23 Threatened and Endangered species. Cooperate with the State to meet
24 objectives for State-listed species.
- 25 • Manage habitat for sensitive plants and animals in a manner that will
26 prevent any species from becoming a candidate for Threatened and
27 Endangered status.

28 *Goals (STNF LRMP, p. 4-6)*

- 29 • Meet habitat or population objectives established for management
30 indicators.
- 31 • Cooperate with Federal, State, and local agencies to maintain or
32 improve wildlife habitat.
- 33 • Maintain natural wildlife species diversity by continuing to provide
34 special habitat elements within Forest ecosystems.

1 *Standards and Guidelines (STNF LRMP, pp. 4-29 through 4-30)*

- 2 • Minimize accidental electrocution of raptors by ensuring that newly
3 constructed overhead power lines meet safe design standards.

- 4 • Consider transplants, introductions, or reintroductions of wildlife
5 species only after ecosystem analysis and coordination with other
6 agencies and the public.

- 7 • Manage habitat for neotropical migrant birds to maintain viable
8 population levels.

- 9 • Develop interpretation/view sites for wildlife viewing, photography,
10 and study. Provide pamphlets, slide shows, and other educational
11 material that enhance the watchable wildlife and other interpretive
12 programs.

- 13 • Maintain and/or enhance habitat for Federally listed threatened and
14 endangered or USFS sensitive species consistent with individual
15 species recovery plans.

16 ***U.S. Forest Service Survey and Manage***

17 *Standards and Guidelines* The 1994 Record of Decision for Amendments to
18 Forest Service and Bureau of Land Management Planning Documents Within
19 the Range of the Northern Spotted Owl and Standards and Guidelines for
20 Management for Late-Successional and Old-Growth Related Species in the
21 Range of the Northern Spotted Owl (Northwest Forest Plan (NWFP) ROD)
22 amended or was incorporated into BLM and USFS land management plans to
23 require certain actions for rare amphibians, mammals, bryophytes, mollusks,
24 vascular plants, fungi, lichens, and arthropods that occupy late-successional and
25 old-growth forests (USFS and BLM 1994). These rare species were identified in
26 Appendix C of the NWFP ROD collectively as Survey and Manage (S&M)
27 Species. The NWFP ROD also established protection buffers on matrix lands
28 for certain species (i.e., protection buffer species) that were not on the 1994
29 S&M list and required that those buffers be managed as part of the Late
30 Successional Reserve network. Four survey strategies were developed to guide
31 management of S&M species: (1) manage known sites, (2) survey before
32 ground-disturbing activities, (3) conduct extensive surveys, and (4) conduct
33 general regional surveys.

34 The NWFP ROD also established overall objectives for managing S&M species
35 populations that were referred to as “persistence objectives.” These objectives
36 were based on the USFS viability provision in the 1982 National Forest System
37 Land and Resource Management Planning Regulation for the National Forest
38 Management Act of 1976. This provision is targeted toward vertebrate species,
39 but also was applied to nonvertebrate species to the greatest extent practicable,
40 as described in the NWFP ROD. The provision generally states that the USFS
41 will manage habitat “to maintain viable populations of existing native and

1 desired non-native vertebrate species in the planning area” (36 CFR 219.19).
2 Although the viability standard is part of the USFS planning regulations, the
3 protections for S&M species were also applied to BLM lands in the NWFP
4 ROD with a goal of protecting the long-term health and sustainability of all
5 Federal forests within the range of the northern spotted owl and the species that
6 inhabit them. Because of the uncertainty associated with the continued
7 persistence of species due to natural factors, the NWFP ROD noted that
8 compliance with the planning regulations is not subject to precise numerical
9 interpretations and cannot be fixed at any single threshold; rather, “as in any
10 administrative field, common sense and agency expertise must be applied”
11 (NWFP ROD, p. 44).

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

31 In 2004 and again in 2007, the BLM and USFS issued a ROD to eliminate the
32 S&M requirements of the 2001 ROD and to provide protection for species on
33 the S&M lists by managing them under the agencies’ special-status species
34 programs. As a result of litigation, the requirements of the 2001 S&M ROD
35 were reinstated. In a subsequent court-mandated settlement agreement (USFS
36 and BLM 2011), the list of S&M species was modified. The settlement
37 agreement also made the following modifications: (1) acknowledged existing
38 exemption categories (2006 Pechman Exemptions), (2) updated the 2001 S&M
39 species list, (3) established a transition period for application of the species list,
40 and (4) established new exemption categories (2011 Exemptions). Agency
41 decisions made after September 30, 2012, are required to use the 2011 S&M
42 list. Some species considered in the S&M program also occur on non-Federal
43 lands. The requirements of the 1994 NWFP and 2001 RODs as modified under
44 the 2011 Settlement Agreement apply only to lands managed by the BLM and
45 USFS within the range of the northern spotted owl. Currently the BLM and

1 USFS are implementing the January 2001 ROD as modified by the 2011
2 Settlement Agreement.

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

5 The *Management Guide for the Whiskeytown-Shasta-Trinity National
6 Recreation Area*, including the Shasta Unit of the National Recreation Area,
7 contains management strategies intended to achieve or maintain a desired
8 condition. These strategies take into account opportunities, management
9 recommendations for specific projects, and mitigation measures needed to
10 achieve specific goals. The following strategies relative to wildlife resource
11 issues associated with the project site were excerpted from the management
12 guide (USFS 1996).

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

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

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

- 20 • Bald eagle nest territories will be inventoried and vegetation
21 management plans will be developed to ensure that suitable nest and
22 perch trees are maintained over time.

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

- 25 • Interpretive materials will address the need to conserve rare plant
26 communities in accordance with the National Recreation Area
27 Interpretive Plan.

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

32 **Wildlife (Management Guide, pp. IV-19 through IV-20)**

- 33 • Management activities will assure population viability for all native and
34 nonnative desirable species. Management to insure viability will occur
35 within occupied habitat for bald eagle, peregrine falcon, northern
36 spotted owl, northern goshawk, willow flycatcher, northwestern pond
37 turtle, Pacific fisher, Shasta salamander, and candidate species in
38 accordance with species and/or territory management plans, Forest
39 Orders, and appropriate laws and policy.

- 1 • Surveys will continue within potential suitable habitats to determine
2 occupancy status for Threatened, Endangered, sensitive, and candidate
3 species.
- 4 • Cooperation will continue with the CDFW and the USFWS regarding
5 habitat management of wildlife species inhabiting the National
6 Recreation Area. Consultation with USFWS will continue regarding
7 habitat management for threatened and endangered species.

8 ***U.S. Bureau of Land Management Resource Management Plan***

9 BLM manages a number of public land areas within the primary study area,
10 including the Shasta/Chappie Off-Highway Vehicle Area west of Shasta Dam.
11 These areas fall under the Northern California BLM district and the resource
12 management plan of the Redding BLM field office. The purpose of BLM's
13 resource management plans is to provide overall direction for managing and
14 allocating public resources in the planning area. BLM is responsible for
15 administering the following strategies related to resource issues common to the
16 portion of the Redding Resource Area lands located near the study area and
17 vicinity (BLM 1992, 1993, 2005).

- 18 • Provide a regional opportunity for motorized recreation with a focus
19 within the Shasta/Chappie Off-Highway Vehicle Area.
- 20 • Enhance non-motorized recreation opportunities within the area via a
21 greenway connecting Redding to Shasta Dam along the Sacramento
22 River.
- 23 • Maintain or improve the long-term sustained yield of forest products
24 available from commercial forest lands.
- 25 • Improve the long-term condition and protection of deer winter range
26 habitat.
- 27 • Maintain special-status species habitat.
- 28 • Maintain the existing scenic quality of the areas.
- 29 • Maintain opportunities to explore and develop freely available minerals
30 on public lands.

31 ***Section 404 of the Clean Water Act***

32 USACE regulates discharges of dredged or fill materials into waters of the
33 United States under Section 404 of the Clean Water Act. Waters of the United
34 States include lakes, rivers, streams, and relatively permanent tributaries and
35 adjacent wetlands. Wetlands are defined under Section 404 as areas that are
36 inundated or saturated by surface water or groundwater at a frequency and
37 duration sufficient to support (and that do support under normal circumstances)

1 a prevalence of vegetation typically adapted for life in saturated soil conditions.
2 Activities that require a permit under Section 404 include but are not limited to
3 placing fill or riprap, grading, mechanized land clearing, and dredging. Any
4 activity that results in the deposit of dredged or fill material below the ordinary
5 high-water mark of waters of the United States or within a jurisdictional
6 wetland usually requires a Section 404 permit, even if the area is dry at the time
7 the activity takes place.

8 ***Executive Order 11312: Invasive Species***

9 Executive Order 11312 directs Federal agencies to use relevant programs and
10 authorities to do all of the following:

- 11 • Prevent the introduction of invasive species
- 12 • Detect and respond rapidly to and control populations of such species
13 in a cost-effective and environmentally sound manner
- 14 • Monitor invasive species populations accurately and reliably
- 15 • Provide for restoration of native species and habitat conditions in
16 ecosystems that have been invaded
- 17 • Conduct research on invasive species and develop technologies to
18 prevent introduction and provide for environmentally sound control of
19 invasive species
- 20 • Promote public education on invasive species and the means to address
21 them
- 22 • Refrain from authorizing, funding, or carrying out actions that it
23 believes are likely to cause or promote the introduction or spread of
24 invasive species in the United States or elsewhere unless, pursuant to
25 guidelines that it has prescribed, the agency has determined and made
26 public its determination that the benefits of such actions clearly
27 outweigh the potential harm caused by invasive species; and that all
28 feasible and prudent measures to minimize risk of harm will be taken in
29 conjunction with the actions

30 Executive Order 11312 established a national Invasive Species Council made up
31 of Federal agencies and departments and a supporting Invasive Species
32 Advisory Committee composed of State, local, and private entities. The
33 Invasive Species Council and Advisory Committee oversee and facilitate
34 implementation of the executive order, including preparation of a national
35 invasive species management plan.

1 ***Executive Order 11990: Protection of Wetlands***

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

7 ***Executive Order 13186: Migratory Birds***

8 Executive Order 13186 directs executive departments and agencies to take
9 certain actions to further implement the MBTA. It requires that each Federal
10 agency taking actions that have, or are likely to have, a measurable negative
11 effect on migratory bird populations develop and implement a memorandum of
12 understanding with USFWS that shall promote the conservation of migratory
13 bird populations.

14 ***Executive Order 13443: Facilitation of Hunting Heritage and Wildlife***
15 ***Conservation***

16 Executive Order 13443 directs Federal agencies that have programs and
17 activities that have a measurable effect on public land management, outdoor
18 recreation, and wildlife management, including the U.S. Department of the
19 Interior and the U.S. Department of Agriculture, to facilitate the expansion and
20 enhancement of hunting opportunities and the management of game species and
21 their habitat.

22 **13.2.2 State**

23 ***California Endangered Species Act***

24 Under the CESA, CDFW has the responsibility for maintaining a list of
25 endangered and threatened species (California Fish and Game Code, Section
26 2070). CDFW also maintains a list of “candidate species,” which are species for
27 which CDFW has issued a formal notice that they are under review for addition
28 to the list of endangered or threatened species. In addition, CDFW maintains
29 lists of “species of special concern,” which serve as species “watch lists.”
30 Pursuant to the requirements of CESA, an agency reviewing a proposed project
31 within its jurisdiction must determine whether any State-listed endangered or
32 threatened species may be present in the project study area and, if so, whether
33 the proposed project would have a potentially significant impact on any of these
34 species. In addition, CDFW encourages informal consultation on any proposed
35 project that may affect a species that is a candidate for state listing.

36 Project-related impacts on species listed as endangered or threatened under the
37 CESA would be considered significant. State-listed species are protected under
38 the mandates of the CESA. “Take” of protected species incidental to otherwise
39 lawful management activities may be authorized under Section 2081 of the
40 California Fish and Game Code. Under the CESA, “take” is defined as an
41 activity that would directly or indirectly kill an individual of a species, but the

1 definition does not include “harm” or “harass,” as the Federal act does. As a
2 result, the threshold for take under the CESA is higher than that under the ESA.

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

8 ***Sections 3503 and 3513 of the California Fish and Game Code –***
9 ***Protection of Birds of Prey***

10 Under Section 3503 of the California Fish and Game Code, it is unlawful to
11 take, possess, or needlessly destroy the nest or eggs of any bird, except as
12 otherwise provided in other sections. Section 3503.5 specifically states that it is
13 unlawful to take, possess, or destroy any raptors (birds in the order of
14 Falconiformes or Strigiformes (birds of prey) – i.e., eagles, hawks, owls, and
15 falcons), including their nests or eggs. Section 3513 provides for adoption of the
16 MBTA’s provisions. It states that it is unlawful to take or possess any migratory
17 nongame bird as designated in the MBTA or any part of such migratory
18 nongame bird. These State codes offer no statutory or regulatory mechanism for
19 obtaining an incidental take permit for the loss of nongame, migratory birds.
20 Typical violations include destruction of active raptor nests resulting from
21 removal of vegetation in which the nests are located. Violation of Sections
22 3503.5 and 3513 could also include disturbance of nesting pairs that results in
23 failure of an active raptor nest.

24 ***Fully Protected Species Under the Fish and Game Code***

25 Protection of fully protected species is described in four sections of the Fish and
26 Game Code (Sections 3511, 4700, 5050, and 5515) that list 37 fully protected
27 species. These statutes prohibit take or possession at any time of fully protected
28 species. CDFW is unable to authorize incidental take of fully protected species
29 when activities are proposed in areas inhabited by those species. CDFW has
30 informed non-Federal agencies and private parties that they must avoid take of
31 any fully protected species in carrying out projects.

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

34 Diversions, obstructions, or changes to the natural flow or bed, channel, or bank
35 of any river, stream, or lake in California that supports wildlife resources are
36 subject to regulation by CDFW, pursuant to Section 1602 of the California Fish
37 and Game Code. The regulatory definition of a stream is a body of water that
38 flows at least periodically or intermittently through a bed or channel having
39 banks and supports wildlife, fish, or other aquatic life. This includes
40 watercourses that have a surface or subsurface flow that supports or has
41 supported riparian vegetation. CDFW’s jurisdiction within altered or artificial
42 waterways is based on the value of those waterways to fish and wildlife. A

1 CDFW streambed alteration agreement must be obtained for a project that
2 would result in an impact on a river, stream, or lake.

3 ***Section 401 Water Quality Certification/Porter-Cologne Water Quality***
4 ***Control Act***

5 Under Section 401 of the Clean Water Act, an applicant for a Section 404
6 permit must obtain a certificate from the appropriate State agency stating that
7 the intended dredging or filling activity is consistent with the State’s water
8 quality standards and criteria. In California, the authority to grant water quality
9 certification is delegated by the State Water Resources Control Board to the
10 nine regional water quality control boards (RWQCB). Each of the RWQCBs
11 must prepare and periodically update basin plans for water quality control in
12 accordance with the Porter-Cologne Water Quality Control Act. Each basin plan
13 sets forth water quality standards for surface water and groundwater, as well as
14 actions to control nonpoint and point sources of pollution to achieve and
15 maintain these standards. Basin plans offer an opportunity to protect wetlands
16 through the establishment of water quality objectives. The RWQCB’s
17 jurisdiction includes Federally protected waters as well as areas that meet the
18 definition of “waters of the state.” A water of the State is defined as any surface
19 water or groundwater, including saline waters, within the boundaries of
20 California. The RWQCB has the discretion to take jurisdiction over areas not
21 Federally protected under Section 401, provided that those areas meet the
22 definition of waters of the State. Mitigation requiring no net loss of wetlands
23 functions and values of waters of the State is typically required by the RWQCB.

24 ***California Department of Fish and Wildlife Species Designations***

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

31 **13.2.3 Regional and Local**

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

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

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

6 Tehama County’s general plan update provides an overarching guide to future
7 development and establishes goals, policies, and implementation measures
8 designed to address potential changes in county land use and development. The
9 general plan identifies the importance of retaining agriculture as one of the
10 primary uses of land in Tehama County (Tehama County 2009).

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

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

18 Sutter County’s general plan contains policies that generally address
19 preservation of natural vegetation, including wetlands. It requires that new
20 development mitigate the loss of Federally protected wetlands to achieve “no
21 net loss,” but it does not include any other specific requirements (Sutter County
22 2010).

23 Sacramento County’s general plan contains goals and policies that promote
24 management, protection, and restoration of natural habitats and sensitive species
25 of plants and animals throughout the county (Sacramento County 2011). This
26 includes policies for “no net loss” of riparian and oak woodland. The
27 Sacramento County general plan includes specific setbacks from streams that
28 can be 200 feet wide; development within setbacks is prohibited except for
29 passive recreation and stormwater facilities in the outside-most 50 feet. It also
30 addresses the need to conserve vernal pools and ephemeral wetlands to ensure
31 no net loss of vernal pool acreage. Several policies specifically promote
32 protection of native oak trees, and, in some areas of the county, seek to ensure
33 that there is no net loss of canopy area.

34 Chapter 12.56, “Trees Generally,” of the City of Sacramento Municipal Code
35 addresses the protection of trees within the city boundaries, including general
36 protection of all trees on city property and specific protection of heritage trees.

37 Yolo County’s general plan aims to provide an active and productive buffer of
38 farmland and open space separating the Bay Area from Sacramento, and
39 integrating green spaces into its communities (Yolo County 2009).

1 **13.2.4 Federal, State, and Local Programs and Projects**

2 ***California Bay-Delta Authority***

3 The California Bay-Delta Authority (CBDA) was established as a State agency
4 in 2003 to oversee implementation of CALFED for the 25 Federal and State
5 agencies working cooperatively to improve the quality and reliability of
6 California's water supplies while restoring the Bay-Delta ecosystem. The July
7 2000 CALFED *Final Programmatic EIS/EIR* (CALFED 2000c) analyzed a
8 range of alternatives to address these needs and included a Multi-Species
9 Conservation Strategy (MSCS) to provide a framework for compliance with
10 ESA, CESA, and Natural Community Conservation Planning Act. The August
11 2000 CALFED Programmatic ROD identified 12 action plans, including
12 Ecosystem Restoration, Watersheds, and Water Supply Reliability, among
13 others (CALFED 2000d). The Ecosystem Restoration Program has provided a
14 funding source for projects that include those involving acquisition of lands
15 within the Sacramento River Conservation Area, initial baseline monitoring and
16 preliminary restoration planning, and preparation of long-term habitat
17 restoration management and monitoring plans. In 2009, the California
18 Legislature passed sweeping water reform legislation, including the
19 establishment of the Delta Stewardship Council (DSC). The DSC was
20 transferred all the responsibilities, programs, staff and most of the funding from
21 the CBDA, and the CBDA was dissolved. The DSC was also given additional
22 mandates, including the development of a Delta Plan to guide activities and
23 programs of State and local programs in the legal Delta through a consistency
24 determination process. The Delta Plan is currently undergoing the final public
25 review.

26 ***Cantara Trustee Council***

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

36 ***Resource Conservation Districts***

37 There are numerous resource conservation districts (RCD) within the study
38 area. Once known as soil conservation districts, RCDs were established under
39 California law with a primary purpose to implement local conservation
40 measures. Although RCDs are locally governed agencies with locally
41 appointed, independent boards of directors, they often have close ties to county
42 agencies and the U.S. National Resources Conservation Service. RCDs are
43 empowered to conserve resources within their districts by implementing
44 projects on public and private lands and to educate landowners and the public

1 about resource conservation. They are often involved in the formation and
2 coordination of watershed working groups and other conservation alliances. In
3 the Shasta Lake and upper Sacramento River vicinity, districts include the
4 Western Shasta County RCD and the Tehama County RCD. To the east are the
5 Fall River and Pit River RCDs, and to the west and north are the Trinity County
6 and Shasta Valley RCDs.

7 ***Riparian Habitat Joint Venture***

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

- 12 • Promote an understanding of the issues affecting riparian habitat
13 through data collection and analysis.
- 14 • Double riparian habitat in California by funding and promoting on-the-
15 ground conservation projects.
- 16 • Guide land managers and organizations to prioritize conservation
17 actions.

18 RHJV conservation and action plans are documented in *The Riparian Bird*
19 *Conservation Plan* (RHJV 2004). The conservation plan targets 14 “indicator”
20 species of riparian-associated birds and provides recommendations for habitat
21 protection, restoration, management, monitoring, and policy. The report notes
22 habitat loss and degradation as one of the most important factors causing the
23 decline of riparian birds in California. The RHJV has participated in monitoring
24 efforts within the Sacramento National Wildlife Refuge Complex and other
25 conservation areas. The RHJV’s conservation plan identifies lower Clear Creek
26 as a prime breeding area for yellow warblers (*Setophaga petechia*) and song
27 sparrows (*Melospiza melodia*), advocating a continuous riparian corridor along
28 lower Clear Creek.

29 ***Sacramento River Advisory Council***

30 In 1986 the California Legislature passed Senate Bill 1086, which called for a
31 management plan for the Sacramento River and its tributaries to protect, restore,
32 and enhance fisheries and riparian habitat in an area stretching from the
33 confluence of the Sacramento River with the Feather River and continuing
34 northward to Keswick Dam about 4 miles north of Redding. The law
35 established an advisory council that included representatives of Federal and
36 State agencies, county supervisors, and representatives of landowners, water
37 contractors, commercial and sport fisheries, and general wildlife and
38 conservation interests. Responsibilities of the advisory council included
39 development of the *Sacramento River Conservation Area Forum Handbook*
40 (Resources Agency 2003). This action also resulted in formation in May 2000
41 of the Sacramento River Conservation Area Forum, a nonprofit, public benefit

1 corporation with a board of directors that includes private landowners and
2 public interest representatives from a seven-county area, an appointee of the
3 California Resources Agency, and ex-officio members from six Federal and
4 State resource agencies.

5 ***Sacramento River Conservation Area Program***

6 The Sacramento River Conservation Area Program has an overall goal of
7 preserving remaining riparian habitat and reestablishing a continuous riparian
8 ecosystem along the Sacramento River between Redding and Chico, and
9 reestablishing riparian vegetation along the river from Chico to Verona. The
10 program is to be accomplished through an incentive-based, voluntary river
11 management plan. The *Upper Sacramento River Fisheries and Riparian Habitat*
12 *Management Plan* (Resources Agency 1989), identifies specific actions to help
13 restore the Sacramento River fishery and riparian habitat between the Feather
14 River and Keswick Dam. The *Sacramento River Conservation Area Forum*
15 *Handbook* (Resources Agency 2003) is a guide to implementing the program.
16 The Keswick Dam to Red Bluff portion of the conservation area includes areas
17 within the 100-year floodplain, existing riparian bottomlands, and areas of
18 contiguous valley oak woodland, totaling approximately 22,000 acres. The 1989
19 fisheries restoration plan recommended several actions specific to the study
20 area:

- 21 • Fish passage improvements at Red Bluff Diversion Dam (completed)
- 22 • Modification of the Spring Creek Tunnel intake for temperature control
23 (completed)
- 24 • Spawning gravel replacement program (ongoing)
- 25 • Development of side-channel spawning areas, such as those at Turtle
26 Bay in Redding (ongoing)
- 27 • Structural modifications to the Anderson-Cottonwood Irrigation
28 District Dam to eliminate short-term flow fluctuations (completed)
- 29 • Maintaining instream flows through coordinated operation of water
30 facilities (ongoing)
- 31 • Improvements at the Coleman National Fish Hatchery (partially
32 complete)
- 33 • Measures to reduce acute toxicity caused by acid mine drainage and
34 heavy metals (ongoing)
- 35 • Various fisheries improvements on Clear Creek (partially complete)

- 1 • Flow increases, fish screens, and revised gravel removal practices on
2 Battle Creek (beginning summer 2006, ongoing monitoring)
- 3 • Control of gravel mining, improvements of spawning areas,
4 improvements of land management practices in the watershed, and
5 protection and restoration of riparian vegetation along Cottonwood
6 Creek (ongoing)

7 **Sacramento River National Wildlife Refuge**

8 The Sacramento River National Wildlife Refuge (SRNWR) is composed of
9 many units between the cities of Red Bluff and Princeton. The SRNWR along
10 the middle Sacramento River is part of the Sacramento National Wildlife
11 Refuge Complex, consisting of five refuges and three wildlife management
12 areas within the Sacramento Valley. Reaches and subreaches of the river are
13 delineated based generally on transitions in fluvial geomorphic riverine
14 conditions, although county boundaries were considered as well. The middle
15 Sacramento River region between Red Bluff and Colusa includes three units
16 within the Chico Landing Subreach that contain restoration project sites
17 addressed in the *Sacramento River–Chico Landing Subreach Habitat*
18 *Restoration Draft Environmental Impact Report* (CBDA 2005). In addition,
19 three areas proposed for restoration in this area occur within the larger SRNWR
20 units that were evaluated in the *Environmental Assessment for Proposed*
21 *Restoration Activities on the Sacramento River National Wildlife Refuge*
22 (USFWS 2001; CBDA 2005).

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

35 **Sacramento River Wildlife Area**

36 The Sacramento River Wildlife Area is managed by CDFW and consists of
37 approximately 3,770 acres of important riparian habitat located along a 70-mile
38 reach of the lower Sacramento River. These lands are managed to protect and
39 enhance habitat for wildlife species, and to provide the public with compatible,
40 wildlife-related recreational uses. This management is guided by the
41 *Sacramento River Comprehensive Management Plan* prepared in 2004.

1 ***Sacramento River Preservation Trust***

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

8 ***Sacramento River Watershed Program***

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

24 ***Sacramento Watersheds Action Group***

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

37 ***Shasta Land Trust***

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

1 ***The Nature Conservancy***

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

13 ***The Trust for Public Land***

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

22 **13.3 Environmental Consequences and Mitigation Measures**

23 This section describes the environmental evaluation methods, assumptions, and
24 specific criteria used to determine significance for each resource area, and
25 discusses impacts and proposed mitigation measures. This impacts assessment
26 evaluates the project's compliance with requirements outlined in the *Wildlife*
27 *Resources Technical Report*. Mitigation measures are presented (as needed) to
28 reduce impacts to a less-than-significant level.

29 **13.3.1 Methods and Assumptions**

30 The following sections describe the methods, processes, procedures, and
31 assumptions used to formulate and conduct the environmental impact analysis.

32 This analysis of impacts on wildlife resources resulting from implementation of
33 the project alternatives under consideration is based on review of existing
34 documentation that addresses biological resources in or near the primary and
35 extended study areas and on geographic information systems analysis.

36 Where specific habitat data were not available, suitable habitat data defined by
37 California Wildlife Habitat Relationships (CWHR) were used to determine
38 impacts.

1 The following assumptions about activity at Shasta Lake and vicinity have been
2 made for the purposes of the impact analysis:

- 3 • Activity areas (construction areas for infrastructure and relocation
4 areas) would be completely cleared.
- 5 • Cutting/clearing of vegetation would be conducted from late summer
6 through late winter, to the extent feasible.
- 7 • Removal of cleared material could occur during the typical breeding
8 season for birds in Shasta County.
- 9 • Removal of cleared vegetation would be done using conventional
10 yarding systems and aerial (helicopter) systems.
- 11 • With the exception of Arbuckle Flat, no vegetation would be removed
12 along the Pit Arm upstream from Painter Creek.
- 13 • No blasting would be required for the mining of materials within the
14 current boundary of Shasta Lake.

15 For the upper Sacramento River and extended study area, the project has the
16 potential to affect common wildlife and special-status wildlife species through
17 the following impact mechanisms:

- 18 • Change in inundated width of the river from spring through fall
- 19 • Reduced frequency, duration, or magnitude of intermediate to large
20 flows
- 21 • Altered geomorphic processes (e.g., meander, channel avulsion) along
22 rivers
- 23 • Altered availability of groundwater
- 24 • Altered vegetative communities within the river corridor, including
25 construction-related changes at the potential restoration sites
- 26 • Temporary or permanent disturbance of habitat at restoration and
27 gravel augmentation sites
- 28 • Mortality of individuals of special-status species at restoration and
29 gravel augmentation sites

30 Potential effects on the upper Sacramento River and extended study area
31 resulting from these impact mechanisms were assessed for common wildlife and
32 special-status wildlife species associated with riparian and wetland habitats
33 located between Shasta Dam and the Red Bluff Pumping Plant and within the

1 extended study area that may be affected by altered hydrologic flows. It is
2 assumed that construction-related activities at the dam, their effects, and
3 mitigation were considered in the “Shasta Lake and Vicinity” section.

4 The assessment of potential effects on resources downstream from Keswick
5 Dam was based on review of the output from the SLWRI 2012 Benchmark
6 Version CalSim-II model. Monthly averages by water year type¹ were reviewed
7 for substantial trends in stage or flow that could alter habitat used by sensitive
8 species or affect species directly. Trend data generated by CalSim-II were
9 considered representative of the potential changes resulting from the project
10 alternatives. A change of less than 2 percent (plus or minus) was considered
11 essentially equivalent to baseline operations and therefore not a substantial
12 change. When monthly average values were changed more than 2 percent, the
13 alternative was considered to result in a substantial change in a species habitat
14 or directly affect the species. The use of averages in the evaluation was
15 considered more representative of potential long-term changes in flows than
16 values from the individual months. Results for individual months (e.g.,
17 December 1944) were not used in this analysis because the extreme values
18 presented there are sometimes artifacts of model operations and not indicative
19 of how the system would actually operate. The differences in flow regime
20 among the alternatives are described in detail in Chapter 6, “Hydrology,
21 Hydraulics, and Water Management.” For a detailed discussion of CalSim-II
22 operations, please see the Modeling Appendix.

23 **13.3.2 Criteria for Determining Significance of Effects**

24 Significance criteria used to analyze the potential impacts of the project on
25 wildlife resources include factual and scientific information and regulatory
26 standards of county, State, and Federal agencies, including the State CEQA
27 Guidelines. These criteria have been developed to establish thresholds to
28 determine the significance of impacts pursuant to CEQA (Section 15064.7) and
29 should not be confused with a “take” or adverse effect under the ESA. An
30 environmental document prepared to comply with NEPA must consider the
31 context and intensity of the environmental effects that would be caused by, or
32 result from, the proposed action. Under NEPA, the significance of an effect is
33 used solely to determine whether an EIS must be prepared. An EIS must
34 identify reasonable means to “mitigate adverse environmental impacts” (40 E
35 1502.16(h)). An environmental document prepared to comply with CEQA must
36 identify the potentially significant environmental effects of a proposed project.
37 A “[s]ignificant effect on the environment” means a substantial, or potentially
38 substantial, adverse change in any of the physical conditions within the area
39 affected by the project” (State CEQA Guidelines, Section 15382). CEQA also
40 requires that the environmental document propose feasible measures to avoid or

¹ Throughout this document, water year types are defined according to the Sacramento Valley Index Water Year Hydrologic Classification, unless specified otherwise.

1 substantially reduce significant environmental effects (State CEQA Guidelines,
2 Section 15126.4(a)).

3 The following significance criteria were developed based on guidance provided
4 by the State CEQA Guidelines, and consider the context and intensity of the
5 environmental effects as required under NEPA. Impacts of an alternative on
6 wildlife would be significant if project implementation would do any of the
7 following:

- 8 • Result in mortality of State-listed or Federally listed wildlife species, or
9 species that are candidates for listing or proposed for listing
- 10 • Have the potential to substantially reduce the habitat of any wildlife
11 species, including those that are listed as endangered or threatened or
12 are candidates or proposed for endangered or threatened status
- 13 • Have the potential to cause a wildlife population to drop below self-
14 sustaining levels
- 15 • Have a substantial adverse effect, either directly or through habitat
16 modifications, on any non-special-status wildlife species
- 17 • Substantially adversely affect, either directly or through habitat
18 modifications, any wildlife species identified as a candidate, sensitive,
19 or special-status species in local or regional plans, policies, or
20 regulations or by CDFW or USFWS
- 21 • Interfere substantially with the movement of any native resident or
22 migratory wildlife species or with established native resident or
23 migratory wildlife corridors, or impede the use of native wildlife
24 nursery sites
- 25 • Conflict with or violate the provisions of an adopted habitat
26 conservation plan, natural community conservation plan, or other
27 approved local, regional, State, or Federal habitat conservation plan
28 relating to the protection of wildlife species
- 29 • Conflict with any State or local policies or ordinances protecting
30 biological resources, such as a tree preservation policy or ordinance
- 31 • Substantially reduce the habitat of a wildlife species, cause a wildlife
32 species to drop below self-sustaining levels, threaten to eliminate an
33 animal community, or substantially reduce the number or restrict the
34 range of an endangered, rare, or threatened species

35 Significance statements are relative to both existing conditions (2005) and
36 future conditions (2030) unless stated otherwise. Impact conclusions are made

1 using the significance criteria described above and include consideration of the
2 “context” of the action and the “intensity” (severity) of its effects in accordance
3 with NEPA guidance (40 CFR 1508.27).

4 **13.3.3 Topics Eliminated from Further Consideration**

5 No topics related to wildlife resources that are included in the significance
6 criteria listed above were eliminated from further consideration. All relevant
7 topics are analyzed below.

8 **13.3.4 Direct and Indirect Effects**

9 This section identifies how wildlife could be affected by the project. The project
10 could affect wildlife by doing any of the following:

- 11 • Causing construction-related effects at Shasta Dam and around Shasta
12 Lake
- 13 • Altering flow regimes downstream from Shasta Lake and downstream
14 from other reservoirs with altered operations
- 15 • Increasing water supply reliability, which in turn could contribute to
16 human population growth or changes in agricultural land uses in the
17 CVP and SWP service areas

18 By altering storage and reservoir operations, the project would change flow
19 regimes in downstream waterways. In turn, these alterations to the flow regime
20 could affect wildlife, particularly by affecting their riparian and wetland habitats
21 along several waterways.

22 ***No-Action Alternative***

23 Under the No-Action Alternative, Reclamation would not pursue an action to
24 enlarge Shasta Dam. No new facilities would be constructed at Shasta Dam and
25 no facilities around Shasta Lake would be relocated to accommodate higher
26 lake levels; thus, there would be no construction-related impacts. In addition,
27 releases from Shasta Dam or other CVP reservoirs would not change as a result
28 of a Shasta Dam enlargement. Reasonably foreseeable projects identified
29 elsewhere in this DEIS, however, would occur and have effects on wildlife but
30 those effects are unknown, largely speculative for many such projects, and
31 therefore are not addressed in detail below.

32 **Shasta Lake and Vicinity**

33 *Impact Wild-1 (No-Action): Take and Loss of Habitat for the Shasta*
34 *Salamander* No direct take of the Shasta salamander or loss of its habitat
35 would occur because the project would not be constructed. No impact would
36 occur. Mitigation is not required for the No-Action Alternative.

37 *Impact Wild-2 (No-Action): Impacts on the Foothill Yellow-Legged Frog and*
38 *Tailed Frog and Their Habitat* No impacts or loss of habitat for the foothill

1 yellow-legged frog or tailed frog would occur because the project would not be
2 constructed. No impact would occur. Mitigation is not required for the No-
3 Action Alternative.

4 *Impact Wild-3 (No-Action): Impacts on the Northwestern Pond Turtle and Its*
5 *Habitat* No direct take or decrease of habitat quality for the northwestern pond
6 turtle would occur because the project would not be constructed. No impact
7 would occur. Mitigation is not required for the No-Action Alternative.

8 *Impact Wild-4 (No-Action): Impacts on the American Peregrine Falcon* No
9 impact on the American peregrine falcon would occur because the project
10 would not be constructed. No impact would occur. Mitigation is not required for
11 the No-Action Alternative.

12 *Impact Wild-5 (No-Action): Take and Loss of Habitat for the Bald Eagle* No
13 take of loss of habitat for the bald eagle would occur because the project would
14 not be constructed. No impact would occur. Mitigation is not required for the
15 No-Action Alternative.

16 *Impact Wild-6 (No-Action): Take and Loss of Nesting and Foraging Habitat for*
17 *the Northern Spotted Owl* No take or loss of nesting and foraging habitat for
18 the northern spotted owl would occur because the project would not be
19 constructed. No impact would occur. Mitigation is not required for the No-
20 Action Alternative.

21 *Impact Wild-7 (No-Action): Impacts on the Purple Martin and Its Nesting*
22 *Habitat* No impacts or loss of nesting habitat for the purple martin would
23 occur because the project would not be constructed. No impact would occur.
24 Mitigation for this impact is not needed, and thus not proposed.

25 *Impact Wild-8 (No-Action): Impacts on the Willow Flycatcher, Vaux's Swift,*
26 *Yellow Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting*
27 *Habitat* No impacts or loss of foraging and nesting habitat for the willow
28 flycatcher, Vaux's swift, yellow warbler, and yellow-breasted chat would occur
29 because the project would not be constructed. No impact would occur.
30 Mitigation is not required for the No-Action Alternative.

31 *Impact Wild-9 (No-Action): Impacts on the Long-Eared Owl, Northern*
32 *Goshawk, Cooper's Hawk, Great Blue Heron, and Osprey and Their Foraging*
33 *and Nesting Habitat* No impact or loss of foraging and nesting habitat for the
34 long-eared owl, northern goshawk, Cooper's hawk, great blue heron, and osprey
35 would occur because the project would not be implemented. No impact would
36 occur. Mitigation is not required for the No-Action Alternative.

37 *Impact Wild-10 (No-Action): Take and Loss of Habitat for the Pacific Fisher*
38 No take or loss of habitat for the Pacific fisher would occur because the project
39 would not be implemented. No impact would occur. Mitigation is not required
40 for the No-Action Alternative.

1 *Impact Wild-11 (No-Action): Impacts on Special-Status Bats (Pallid Bat,*
2 *Spotted Bat, Western Red Bat, Western Mastiff Bat, Townsend's Big-Eared Bat,*
3 *Long-Eared Myotis, and Yuma Myotis), the American Marten, and Ringtail and*
4 *Their Habitat* No impact or loss of habitat for special-status bats (the pallid
5 bat, spotted bat, western red bat, western mastiff bat, Townsend's big-eared bat,
6 long-eared myotis, and Yuma myotis), the American marten, and ringtail would
7 occur because the project would not be implemented. No impact would occur.
8 Mitigation is not required for the No-Action Alternative.

9 *Impact Wild-12 (No-Action): Impacts on Special-Status Terrestrial Mollusks*
10 *(Shasta Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian)*
11 *and Their Habitat* No impact or loss of habitat for special-status terrestrial
12 mollusks (Shasta sideband, Wintu sideband, Shasta chaparral, and Shasta
13 hesperian) would occur because the project would not be implemented. No
14 impact would occur. Mitigation is not required for the No-Action Alternative.

15 *Impact Wild-13 (No-Action): Permanent Loss of Wildlife Habitat* No
16 permanent loss of habitat would occur because the project would not be
17 implemented. No impact would occur. Mitigation is not required for the No-
18 Action Alternative.

19 *Impact Wild-14 (No-Action): Impacts on Other Birds of Prey (i.e., red-tailed*
20 *hawk and red-shouldered hawk) and Migratory Bird Species (i.e., American*
21 *robin, Anna's hummingbird) and their Foraging and Nesting Habitat* No
22 impact or loss of foraging and nesting habitat for other birds of prey and
23 migratory bird species would occur because the project would not be
24 implemented. No impact would occur. Mitigation is not required for the No-
25 Action Alternative.

26 *Impact Wild-15 (No-Action): Loss of Critical Deer Winter and Fawning Range*
27 No loss of deer winter and fawning range would occur because the project
28 would not be implemented. No impact would occur. Mitigation is not required
29 for the No-Action Alternative.

30 *Impact Wild-16 (No-Action): Take and Loss of California Red-Legged Frog*
31 No loss of California red-legged frog habitat would occur because the project
32 would not be implemented. No impact would occur. Mitigation is not required
33 for the No-Action Alternative.

34 **Upper Sacramento River (Shasta Dam to Red Bluff)**

35 *Impact Wild-17 (No-Action): Impacts on Riparian-Associated Special-Status*
36 *Wildlife Resulting from Modifications to the Existing Flow Regime in the*
37 *Primary Study Area* Effects on riparian vegetation in the upper Sacramento
38 River area from continuing the existing dam operation under the No-Action
39 Alternative would not have a substantial adverse effect on special-status
40 wildlife. This impact would be less than significant.

1 Implementing the No-Action Alternative would not result in changes to existing
2 facilities or reservoir operations. The No-Action Alternative would continue to
3 alter the structure and species composition of riparian vegetation resulting from
4 continued operation of the existing Shasta Dam, as described in Chapter 12,
5 “Botanical Resources and Wetlands.” Operation of the dam has decreased early
6 successional riparian communities and increased the extent of mid-successional
7 riparian communities. Although early and mid-successional riparian vegetation
8 provides different habitat values and some shifts in species use may occur,
9 implementing the No-Action Alternative would not have a substantial adverse
10 effect on special-status wildlife associated with riparian vegetation, nor would it
11 be likely to cause a population to be eliminated. Therefore, this impact would be
12 less than significant. Mitigation is not required for the No-Action Alternative.

13 *Impact Wild-18 (No-Action): Impacts on Bank Swallow in the Primary Study*
14 *Area Resulting from Modifications of Geomorphic Processes* Future conditions
15 for bank swallows are not expected to differ substantially from existing
16 conditions because of the restoration projects being implemented on the
17 Sacramento River (see Section 12.2, “Regulatory Framework,” in Chapter 12,
18 “Botanical Resources and Wetlands”). This impact would be less than
19 significant.

20 Because water from high-flow events would be captured and stored and would
21 be metered out in an even fashion, dam operations under the No-Action
22 Alternative would continue to alter geomorphic processes. Loss of eroding
23 banks during winter flood flows could limit the formation of suitable nesting
24 habitat for bank swallow. However, future conditions for bank swallows are not
25 expected to differ substantially from existing conditions because of independent
26 restoration projects being implemented on the Sacramento River. Therefore, this
27 impact would be less than significant. Mitigation is not required for the No-
28 Action Alternative.

29 *Impact Wild-19 (No-Action): Disturbance or Removal of Vernal Pool Habitat*
30 *for Special-Status Wildlife from Changes in Flow Regime* The No-Action
31 Alternative would not alter vernal pool hydrology or affect vernal pool-
32 associated wildlife in the upper Sacramento River area. Because the No-Action
33 Alternative would not affect this resource, no impact would occur. Mitigation is
34 not required for the No-Action Alternative.

35 *Impact Wild-20 (No-Action): Consistency with Local and Regional Plans with*
36 *Goals of Promoting Riparian Habitat in the Primary Study Area* Riparian
37 habitat conditions along the upper Sacramento River under the No-Action
38 Alternative would not differ from baseline conditions. The No-Action
39 Alternative would not conflict with existing plans promoting conservation,
40 protection, and restoration of riparian habitat. Local plans and policies that
41 influence riparian management would remain in place and continue to be locally
42 enforced. Because conditions would not differ from the existing baseline, no
43 impact would occur. Mitigation is not required for the No-Action Alternative.

1 *Impact Wild-21 (No-Action): Impacts on Riparian-Associated Special-Status*
2 *Wildlife Resulting from the Gravel Augmentation Program* Under the No-
3 Action Alternative, the gravel augmentation program would not be
4 implemented. No impact would occur. Mitigation is not required for the No-
5 Action Alternative.

6 *Impact Wild-22 (No-Action): Impacts on Riparian-Associated Special-Status*
7 *Wildlife Species Resulting from Restoration Projects* Under the No-Action
8 Alternative, none of the restoration work described in Chapter 2, “Alternatives,”
9 would be conducted downstream from Shasta Dam. Thus, special-status wildlife
10 species found in riparian habitat would not be affected. No impact would occur.
11 Mitigation is not required for the No-Action Alternative.

12 **Lower Sacramento River and Delta**

13 *Impact Wild-23 (No-Action): Impacts on Riparian-Associated and Aquatic*
14 *Special-Status Wildlife Resulting from Modifications to Existing Flow Regimes*
15 *in the Lower Sacramento River and Delta* Effects on riparian vegetation in the
16 lower Sacramento River and Delta areas from continuing the existing dam
17 operation under the No-Action Alternative would not have a substantial adverse
18 effect on special-status wildlife. This impact would be less than significant.

19 This impact would be similar to Impact Wild-17 (No-Action) for the primary
20 study area. The No-Action Alternative would continue to alter the structure and
21 species composition of riparian habitat along the lower Sacramento River and
22 into the Delta resulting from continued operation of Shasta Dam. Dam
23 operation, which has led to a decrease in early successional riparian
24 communities and an increase in the extent of mid-successional riparian
25 communities, would continue under the No-Action Alternative. Thus, the
26 No-Action Alternative would affect habitats used by special-status wildlife
27 species because early- and mid-successional riparian vegetation provides
28 different habitat values. However, this change is expected to be small and is not
29 likely to have a substantial adverse effect on special-status species, nor would it
30 be likely to cause a population to be eliminated. Therefore, this impact would be
31 less than significant. Mitigation is not required for the No-Action Alternative.

32 *Impact Wild-24 (No-Action): Impacts on Bank Swallow Along the Lower*
33 *Sacramento River Resulting from Modifications of Geomorphic Processes*
34 Future conditions for bank swallows along the lower Sacramento River are not
35 expected to differ substantially from existing conditions because of restoration
36 projects being planned for implementation on the Sacramento River
37 independently of this proposed action. This impact would be less than
38 significant.

39 This impact would be similar to Impact Wild-18 (No-Action) for the primary
40 study area. By altering channel-forming flow events, dam operations under the
41 No-Action Alternative would continue to alter geomorphic processes along the
42 lower Sacramento River. Loss of eroding banks during winter flood flows could

1 limit the formation of suitable nesting habitat for bank swallow. However,
2 future conditions for bank swallows are not expected to differ substantially from
3 existing conditions because of restoration projects being planned for
4 implementation on the Sacramento River regardless of this proposed project
5 (see Section 12.2, “Regulatory Framework,” in Chapter 12, “Botanical
6 Resources and Wetlands”). Therefore, this impact would be less than
7 significant. Mitigation is not required for the No-Action Alternative.

8 *Impact Wild-25 (No-Action): Disturbance or Removal of Vernal Pool Habitat*
9 *for Special-Status Wildlife Along the Lower Sacramento River and in the Delta*
10 *from Changes in Flow Regime of the Sacramento River and Affected*
11 *Tributaries, and Changes in Seasonal Water Availability* The No-Action
12 Alternative would not affect the hydrology of vernal pools or have an adverse
13 effect on vernal pool–associated wildlife species in the lower Sacramento River
14 and Delta area. Because the No-Action Alternative would not affect this
15 resource, no impact would occur. Mitigation is not required for the No-Action
16 Alternative.

17 *Impact Wild-26 (No-Action): Consistency with Local and Regional Plans with*
18 *Goals of Promoting Riparian Habitat along the Lower Sacramento River and in*
19 *the Delta* Riparian habitat conditions along the lower Sacramento River or in
20 the Delta would not differ from baseline under the No-Action Alternative. The
21 No-Action Alternative would not conflict with existing plans promoting
22 conservation, protection, and restoration of riparian habitat along the lower
23 Sacramento River and in the Delta. Because conditions would not differ from
24 the existing baseline, no impact would occur. Mitigation is not required for the
25 No-Action Alternative.

26 **CVP/SWP Service Areas**

27 *Impact Wild-27 (No-Action): Impacts on Riparian-Associated or Aquatic*
28 *Special-Status Wildlife in the CVP/SWP Service Areas Resulting from*
29 *Modifications to Existing Flow Regimes* Changes to CVP and SWP water
30 deliveries that would occur while the existing dam operation continues under
31 the No-Action Alternative would not have a substantial adverse effect on
32 special-status wildlife. This impact would be less than significant.

33 This impact would be similar to Impact Wild-17 (No-Action) for the primary
34 study area and Impact Wild-21 (No-Action) for the lower Sacramento River and
35 Delta. Although Shasta Dam would not be altered under the No-Action
36 Alternative, CVP and SWP water storage, conveyance, and deliveries to the
37 CVP and SWP service areas could change because of several reasonably
38 foreseeable projects that could occur with or without enlarging Shasta Dam.
39 CVP and SWP deliveries could increase or decrease based on any number of
40 factors between now and 2030. Given environmental regulations to protect
41 sensitive habitats and species, these changes are not likely to have a substantial
42 adverse effect on special-status species, nor would they be likely to cause a

1 population to be eliminated. For these reasons, this impact would be less than
2 significant. Mitigation is not required for the No-Action Alternative.

3 ***CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply***
4 ***Reliability***

5 CP1 focuses on increasing water supply reliability while contributing to
6 increased survival of anadromous fish, actions that are consistent with the 2000
7 CALFED ROD. In addition to the common features above, CP1 primarily
8 involves raising Shasta Dam 6.5 feet, an elevation change that would increase
9 the reservoir's full pool by 8.5 feet and would enlarge the total storage space in
10 the reservoir by 256,000 acre-feet. Under this plan, Shasta Dam operational
11 guidelines would continue unchanged, with the additional storage retained for
12 water supply reliability and increased anadromous fish survival.

13 ***Shasta Lake and Vicinity***

14 ***Impact Wild-1 (CP1): Take and Loss of Habitat for the Shasta Salamander***

15 Ground-disturbing activities and vegetation removal associated with dam
16 construction activities, construction activities in the relocation areas, and
17 removal of various amounts of vegetation in the impoundment areas could
18 result in direct take of the Shasta salamander, a State-listed species, USFS
19 sensitive species, survey and manage species, MSCS-covered species, and BLM
20 sensitive species. Additionally, the raising of Shasta Dam would result in the
21 inundation of habitat for this species. This impact would be significant.

22 Collectively, 38 Shasta salamander sites are known to occur within the
23 impoundment and relocation areas surveyed by Reclamation. Shasta
24 salamanders have been found or are known to occur in nearly every CWHR
25 habitat present along each arm. These known locations occur in CWHR
26 habitats characterized by the presence (limestone habitat) or absence
27 (nonlimestone habitat) of limestone substrate. Within the impoundment area,
28 the presence of the Shasta salamander is presumed in all CHWR habitats,
29 except "non-habitat" barren areas (e.g., paved parking lots, boat ramps). For the
30 purposes of this impact analysis, all CWHR habitats in the impoundment and
31 relocation areas are stratified as limestone or nonlimestone habitat.

32 Inundation resulting from a 6.5-foot dam raise would result in a loss of
33 approximately 7 acres of limestone habitat and 1,186 acres of nonlimestone
34 habitat. Impacts on limestone and nonlimestone habitats in the impoundment
35 area are summarized in Table 13-6.

Table 13-6. Impacts on Suitable Habitat for the Shasta Salamander in the Impoundment Area (6.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Limestone	0.00	0.82	0.00	5.43	0.00	1.50
Nonlimestone	222.31	42.48	343.21	199.40	121.55	257.57
Total	22.31	43.30	343.21	204.83	121.55	259.07

Note:

*Acres are approximate.

Direct mortality of Shasta salamanders would occur in areas of suitable habitat where complete vegetation clearing is implemented and/or mechanized construction equipment is employed if these activities occur during the wet season when salamanders are on the surface. Construction activities in relocation areas would result in a loss of up to 35 acres of limestone habitat and 2,870 acres of nonlimestone habitat. This impact would be significant. Impacts on limestone and nonlimestone habitat by CWHR type providing suitable habitat in the relocation areas are summarized in Table 13-7.

Table 13-7. Impacts on Suitable Habitat for the Shasta Salamander in Relocation Areas

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Limestone	0.00	0.00	0.00	34.61	0.00	0.00
Nonlimestone	384.53	0.00	1049.36	954.53	121.55	199.42
Total	384.53	0.00	1049.36	989.14	121.55	199.42

Note:

*Acres are approximate.

Implementation of the project would take place over 3 to 4 years. Mortality of individuals could occur over multiple years if ground-disturbing activities are conducted during the wet season. This impact would be significant.

Shasta salamander surveys are ongoing, and it is anticipated that these surveys will provide additional information about the species' range and habitat associations as well as the presence or absence of the species within individual construction footprints. Additional impact analysis will be conducted in relation to suitable habitats available in the Shasta Lake watershed or in the species' range (if appropriate). Direct and indirect impacts based on those results will be analyzed in the Final EIS. Additionally, other indirect and temporary impacts will be analyzed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

1 *Impact Wild-2 (CP1): Impact on the Foothill Yellow-Legged Frog and Tailed*
2 *Frog and Their Habitat* Ground-disturbing activities and vegetation removal
3 associated with dam construction activities, construction activities in the
4 relocation areas, and removal of various amounts of vegetation in the
5 impoundment areas could result in direct take of the foothill yellow-legged frog,
6 a California species of special concern, a USFS sensitive species, an MSCS-
7 covered species, and a BLM sensitive species, and the tailed frog, a California
8 species of special concern. Operation of equipment in or adjacent to riverine or
9 riparian habitat would result in direct impacts on these species. In addition,
10 inundation caused by the raising of Shasta Dam would result in the conversion
11 of suitable riverine and riparian habitat to unsuitable lacustrine habitat. These
12 impacts would be potentially significant.

13 Foothill yellow-legged frogs occur in many perennial streams within the
14 impoundment area. They have been found in streams on all arms and the main
15 body of the lake. Tailed frogs have not been found during surveys, but there are
16 known occurrences in the McCloud and upper Sacramento arms. CWHR habitat
17 types, montane riparian and riverine, are suitable habitat where these species
18 might occur.

19 Individual foothill yellow-legged frog and tailed frogs will not be affected by
20 the inundation caused by the raise of the dam. These animals will be able to
21 swim upstream to suitable habitat.

22 Although frogs may move out of harm's way, direct take of foothill yellow-
23 legged frog and tailed frog could also occur as a result of project-associated
24 construction activities in or near suitable aquatic habitat. Potential construction
25 impacts include mortality of individuals because of equipment use and vehicle
26 traffic within suitable aquatic and upland habitat. The potential for direct take
27 would be temporary, occurring only during project construction. Project
28 implementation could result in the degradation of suitable aquatic habitat
29 because of increased erosion, sedimentation, or accidental fuel leaks and spills.
30 These impacts would be potentially significant.

31 Implementation of the project would take place over 3 to 4 years. Mortality of
32 individuals could occur over multiple years if construction activities are
33 conducted in perennial streams. This impact would be potentially significant.

34 Implementation of a 6.5-foot dam raise would result in inundation of
35 approximately 33 acres of habitat for the foothill yellow-legged frog and tailed
36 frog. Approximately 9 acres of suitable habitat would be lost because of
37 vegetation removal associated with dam construction and construction in the
38 relocation areas. Summaries of suitable habitat loss by arm are presented in
39 Table 13-8.

40 Additional analysis of impacts will be conducted in relation to suitable habitats
41 available in the Shasta Lake watershed or in the species range (if appropriate).

1 Indirect and temporary impacts will be analyzed in the Final EIS. Mitigation for
2 this impact is proposed in Section 13.3.5.

3 **Table 13-8. Impacts on Suitable Habitat for the Foothill Yellow-Legged and**
4 **Tailed Frog in the Impoundment Area and Relocation Areas (6.5-Foot Dam**
5 **Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Riverine	0.00	0.35	2.30	3.81	0.59	0.00
Total	1.54	2.83	18.22	8.41	1.17	0.80
Relocation Areas						
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Riverine	0.00	0.00	0.39	0.00	0.00	0.00
Total	0.34	0.00	4.67	3.93	0.23	0.37

Note:

*Acres are approximate

6 *Impact Wild-3 (CPI): Impact on the Northwestern Pond Turtle and Its Habitat*
7 Ground-disturbing activities and vegetation removal associated with dam
8 construction activities, construction activities in the relocation areas, and
9 removal of various amounts of vegetation in the impoundment areas could
10 result in direct take of the northwestern pond turtle, a California species of
11 special concern, a USFS sensitive species, and an MSCS-covered species.
12 These impacts would be potentially significant.

13 Individual northwestern pond turtles will not be impacted by the inundation
14 caused by the raise of the dam. Lacustrine is suitable habitat for the
15 northwestern pond turtle.

16 The northwestern pond turtle occurs throughout the perimeter of the
17 impoundment area. In addition to aquatic habitats, this species uses upland
18 habitats for nesting and overwintering. Nests are generally located on south-
19 facing slopes of less than 60 degrees averaging 200 meters (660 feet) from an
20 aquatic site (CDFG 1994). Thus, loss of upland habitats adjacent to suitable
21 aquatic habitat (within approximately 660 feet) could adversely affect this
22 species.

23 Direct take of northern pond turtle eggs or juveniles could occur during the first
24 inundation of habitat above 1,070 feet above msl. Turtles may lay eggs in
25 suitable habitat that subsequently becomes inundated, resulting in the death of
26 the eggs or overwintering juveniles. In addition, inundation caused by the
27 raising of Shasta Dam would result in the conversion of suitable habitat to
28 unsuitable lacustrine habitat. These impacts would be potentially significant.

1 Direct take of northwestern pond turtles could also occur as a result of project-
2 associated construction activities in or near suitable aquatic and upland habitat.
3 Potential construction impacts include mortality of individuals because of
4 equipment use and vehicle traffic within suitable aquatic and upland habitat. In
5 addition, project implementation could result in the degradation of suitable
6 aquatic habitat because of increased erosion, sedimentation, or accidental fuel
7 leaks and spills. Additionally, it is assumed that all vegetation will be removed
8 within the relocation areas.

9 Implementation of the project would occur over 3 to 4 years. Mortality of
10 individuals could occur over multiple years if construction activities are
11 conducted in suitable aquatic and upland habitat. This impact would be
12 potentially significant.

13 Implementation of a 6.5-foot raise of the dam would result in conversion of
14 approximately 33 acres of suitable habitat for the northwestern pond turtle.
15 Approximately 7 acres of riverine habitat would be converted to lacustrine
16 habitat. Because there are equally valuable components lost or gained in either
17 habitat, the quality of the habitat would not be compromised. However,
18 maximum lake elevation is infrequent and would not benefit the species
19 throughout the remainder of the year. Thus, the conversion of suitable habitats
20 to lacustrine habitat remains an impact on northwestern pond turtle habitat.

21 Approximately 9 acres of suitable aquatic habitat would be lost because of
22 vegetation removal associated with dam construction and construction of the
23 relocation areas. Summaries of suitable habitat lost by arm are presented in
24 Table 13-9.

25 Additional analysis of impacts will be conducted in relation to suitable habitats
26 available in the Shasta Lake watershed or in the species range (if appropriate).
27 Impacts on upland habitats will be quantified based on proximity to aquatic
28 habitat. Upland habitats will be quantified based on suitable slope, soil
29 composition, and proximity to aquatic habitats. Indirect and temporary impacts
30 will be analyzed in the Final EIS. Mitigation for this impact is proposed in
31 Section 13.3.5.

Table 13-9. Impacts on Suitable Habitat for the Northwestern Pond Turtle in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Riverine	0.00	0.35	2.30	3.81	0.59	0.00
Total	1.54	2.83	18.22	8.41	1.17	0.80
Relocation Areas						
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Riverine	0.00	0.00	0.39	0.00	0.00	0.00
Total	0.34	0.00	4.67	3.93	0.23	0.37

Note:

*Acres are approximate.

Impact Wild-4 (CPI): Impact on the American Peregrine Falcon Construction activities and vegetation removal associated with dam construction activities, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of American peregrine falcons, a State fully protected and MSCS-covered species. This impact would be potentially significant.

Cliffs within the Shasta Lake and vicinity portion of the primary study area provide suitable nesting habitat for the peregrine falcon. Overstory and complete vegetation removal is expected to occur within the impoundment area in suitable cliff habitat. Thus, overstory vegetation removal occurring in or near suitable cliff habitat during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests. Additionally, because of the steep terrain, trees would be yarded by helicopter. Noise generated by chainsaws and helicopter yarding could cause the abandonment of nests, resulting in the incidental loss of fertile eggs or nestlings. This impact would be potentially significant.

No known eyries would be inundated by a 6.5-foot raise in lake elevation; however, 8.5 vertical feet (full pool) of cliff habitat would be inundated. Peregrine falcons nest on sheer cliffs ranging in height from 75 to 2,000 feet. Eyries are generally located between 40 and 80 percent of total cliff height (Pagel 1992). Based on the large area required for suitable nesting habitat for peregrine falcons, impacts on suitable cliff habitat for nesting would be less than significant. The conversion of uplands to lacustrine habitat would not adversely affect foraging habitat for the species because they frequently forage over water.

Implementation of the project would occur over 3 to 4 years. Impacts on nesting American peregrine falcons could occur over multiple years if construction

1 activities were conducted in or adjacent to active nests. This impact would be
2 potentially significant.

3 Construction or vegetation removal related to relocation areas is not anticipated
4 to occur in suitable cliff habitat.

5 Additional analysis of impacts will be conducted in relation to suitable habitats
6 available in the Shasta Lake watershed or in the species range (if appropriate).
7 Suitable cliff habitats will be quantified and impacts on cliff habitats will be
8 assessed. Indirect and temporary impacts will be analyzed in the Final EIS.
9 Mitigation for this impact is proposed in Section 13.3.5.

10 *Impact Wild-5 (CPI): Take and Loss of Habitat for the Bald Eagle* Ground-
11 disturbing activities and vegetation removal associated with dam construction
12 activities, construction activities in the relocation areas, and removal of various
13 amounts of vegetation in the impoundment areas in addition to inundation
14 caused by the raising of Shasta Dam during the nesting season would result in
15 the loss of nest and perch trees used by the bald eagle, a State-listed, fully
16 protected, and USFS sensitive species, MSCS-covered species, and a BLM
17 sensitive species. This impact would be significant.

18 Typically, 24 to 28 pairs nest in the vicinity of Shasta Lake. Vegetation removal
19 within the impoundment area during the nesting season could result in the
20 incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment
21 of bald eagle nests. Noise generated by vegetation removal, such as noise
22 caused by helicopter yarding and chainsaw use, could also lead to nest
23 abandonment, resulting in the incidental loss of fertile eggs or nestlings. The
24 loss of nesting and foraging habitat would be a potentially significant impact.

25 Three known bald eagle nest trees would be affected by inundation with a 6.5-
26 foot dam raise. When inundation occurs, nest trees within the impoundment
27 area would die. Because peak inundation generally occurs in late April or early
28 June, nest trees would be flooded toward the end of the nesting season. If eagles
29 were nesting in these trees, it would be likely that young would fledge before
30 the nest tree died from the effects of inundation. Because of inundation timing,
31 it is not likely that individuals would be affected. Because bald eagles generally
32 use the same nest for multiple years, the loss of nest trees would be a significant
33 impact.

34 Inundation could also affect erosion and bank stability, which could affect nest
35 trees that are in close proximity to the impoundment area. This would be a
36 potentially significant impact.

37 The increase in lake elevation may increase access to eagle nests by recreational
38 boaters. The increase in noise and human disturbance may lead to nest
39 abandonment and the incidental loss of fertile eggs or young. Additionally,

1 habitat inundated within the impoundment area would result in a loss of
2 roosting and potential nest trees. This impact would be significant.

3 One eagle nest is located in the relocation area at Gregory Beach. Removal of
4 nest trees would be a potentially significant impact. Additionally, one nest
5 occurs near the Bailey Cove trail, which could be impacted by noise generated
6 by vegetation removal activities. Vegetation removal and additional
7 construction activities in the relocation areas would result in the same impacts
8 on nesting bald eagles as described for vegetation removal activities proposed in
9 the impoundment areas. This impact would be significant.

10 Implementation of the project would occur over 3 to 4 years. Impacts on nesting
11 bald eagles could occur over multiple years if construction activities are
12 conducted at or adjacent to active nest sites. This impact would be significant.

13 Dam construction, vegetation removal, and inundation resulting from a 6.5-foot
14 dam raise would result in a loss of approximately 804 acres of bald eagle
15 nesting and roosting habitat in the impoundment area and 2,343 acres in the
16 relocation areas. Potential nest and roost trees occur in blue oak woodland, blue
17 oak–foothill pine, Douglas-fir, montane hardwood, montane hardwood–conifer,
18 montane riparian, and ponderosa pine habitats and are typically found in trees
19 with diameters greater than 24 inches. Impacts on suitable bald eagle habitat by
20 CWHR type in the impoundment area and relocation areas are summarized in
21 Table 13-10.

22 **Table 13-10. Impacts on Suitable Habitat for the Bald Eagle in the**
23 **Impoundment Area and Relocation Areas (6.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.32
Blue oak–foothill pine	4.96	0.00	0.00	0.00	1.40	4.04
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood	39.08	18.13	86.75	32.23	9.44	1.28
Montane hardwood–conifer	34.65	0.50	69.23	68.73	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.24	25.06	29.93
Total	189.17	36.46	256.65	186.82	92.18	43.05

Table 13-10. Impacts on Suitable Habitat for the Bald Eagle in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise) (contd.)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Relocation Areas						
Blue oak woodland	0.00	0.00	0.00	3.68	0.00	1.08
Blue oak-foothill pine	3.61	0.00	0.00	0.00	0.00	8.86
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood-conifer	121.63	0.00	203.65	319.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.30
Total	358.79	0.00	873.25	934.43	91.87	85.41

Note:

*Acres are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. Bald eagle nesting activity changes from year to year. The number of bald eagle nests is subject to change based on eagle activity at the time of construction and the subsequent inundation. Reclamation is currently working with the USFS to determine the current eagle activity to revise the number of nest trees that may be impacted. Indirect and temporary impacts will be analyzed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-6 (CPI): Take and Loss of Nesting and Foraging Habitat for the Northern Spotted Owl Construction activities and vegetation removal associated with the dam construction activities, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the northern spotted owl, a Federally listed as threatened species and MSCS-covered species. In addition, inundation caused by the raising of Shasta Dam could result in inundation of nest trees and would result in the loss of habitat. This impact would be potentially significant.

Vegetation removal within the impoundment area during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the northern spotted owl. Noise generated by vegetation removal activities, including helicopter yarding and chainsaw use could also lead to nest abandonment resulting in the incidental loss of fertile eggs or nestlings. This impact would be potentially significant. The loss of nesting and foraging habitat would be a potentially significant impact.

1 A 6.5-foot dam raise could result in inundation of nest trees and would result in
2 the loss of nesting and foraging habitat for this species. Once inundation of the
3 impoundment area occurs, nest trees within the impoundment area would die.
4 Because peak inundation generally occurs in late April or early June, nest trees
5 would be flooded toward the end of the nesting season. If owls were nesting in
6 these trees, it is likely that young would fledge before the nest tree dies from the
7 effects of inundation. Because of inundation timing, it is not likely that
8 individuals would be affected.

9 The increase in lake elevation could increase access to owl nests by recreational
10 boaters. The increase in noise and human disturbance could lead to nest
11 abandonment and the incidental loss of fertile eggs or young. This would be a
12 potentially significant impact.

13 Additionally, construction activities and vegetation removal in relocation areas
14 would also result in a loss of northern spotted owl nesting and foraging habitat.
15 This would be a potentially significant impact.

16 Implementation of the project would occur over 3 to 4 years. Impacts on nesting
17 northern spotted owls could occur over multiple years if construction activities
18 were conducted at or adjacent to active nest sites. This impact would be
19 potentially significant.

20 Dam construction, vegetation removal, and construction in the relocation areas,
21 and inundation resulting from a 6.5-foot dam raise would result in a loss of
22 northern spotted owl nesting and foraging habitat, including approximately 767
23 acres in the impoundment area and 2,317 acres in the relocation areas. Impacts
24 on suitable spotted owl habitat by CWHR type in the impoundment area and
25 relocation areas are summarized in Table 13-11. Detailed analysis of northern
26 spotted owl nesting, roosting, and foraging habitats are incomplete.

Table 13-11. Impacts on Suitable Habitat for the Northern Spotted Owl in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood	39.08	18.13	86.75	32.23	9.44	1.28
Montane hardwood-conifer	34.65	0.50	69.23	68.73	55.70	5.68
Ponderosa pine	108.93	15.36	84.75	81.24	25.06	29.93
Relocation Areas						
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood-conifer	121.63	0.00	203.65	309.12	42.22	37.85
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total	354.84	0.00	868.98	926.82	91.64	75.10

Note:

*Acres are approximate.

Additional impact analysis will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect and temporary impacts will be analyzed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-7 (CP1): Impact on the Purple Martin and Its Nesting Habitat
 Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of purple martins, a California species of special concern. In addition, inundation caused by the raising of Shasta Dam would result in the loss of nest trees. This impact would be significant.

Shasta Lake is the largest and one of only a few known purple martin breeding locations in interior northern California. Between 18 and 42 nesting pairs occur at Shasta Lake based on monitoring performed by Reclamation since 2007. The purple martin nest sites are found in flooded snags located in the existing reservoir and adjacent uplands, and occur from the vicinity of Jones Valley east up the Pit Arm. Overstory vegetation removal is proposed for the relocation of the Klikapudi Trail (Jones Valley area). With the exception of Arbuckle Flat, no vegetation removal is proposed on the Pit Arm east of the Painter Creek inlet.

Inundation of the impoundment area would result in the loss of nest trees in the lake and several known upland nest trees. Each nest tree contains several potential nest cavities at various heights above the water. Therefore, with an

1 increase in inundation levels, fewer potential nest cavities could be available
2 from year to year. Loss of nest trees may be temporary, as trees that are
3 inundated would die, become snags, and provide potential nest sites. The
4 temporal loss of nesting snags would be a significant impact.

5 Overstory vegetation removal is proposed for the relocation of the Klikapudi
6 Trail. This could include removal of snags that are actively used for nesting or
7 could provide nesting habitat for purple martin. Construction activities such as
8 tree removal, site grading, and excavation and vegetation removal, including
9 noise caused by helicopter yarding and chainsaw use during the nesting season,
10 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
11 nest abandonment. Loss of fertile eggs or nesting adults, or any activities
12 resulting in nest abandonment, would be significant.

13 Implementation of the project would occur over 3 to 4 years. Impacts on nesting
14 purple martins could occur over multiple years if construction activities were
15 conducted at or adjacent to active nest sites. This impact would be significant.

16 Purple martins forage high in the air and above the tree canopy. Conversion of
17 upland habitats to lacustrine habitat would not have an effect on foraging
18 habitat. Therefore, there would be no impact on foraging habitat.

19 Additional impact analysis will be conducted in relation to suitable habitats
20 available in the Shasta Lake watershed. An analysis of indirect and temporary
21 impacts will be completed in the Final EIS. Mitigation for this impact is
22 proposed in Section 13.3.5.

23 *Impact Wild-8 (CPI): Impacts on the Willow Flycatcher, Vaux's Swift, Yellow*
24 *Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat*
25 Construction activities and vegetation removal associated with dam construction
26 activities, construction activities in the relocation areas, and removal of various
27 amounts of vegetation in the impoundment areas during the nesting season
28 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
29 the abandonment of nests of the willow flycatcher, a State-listed endangered,
30 USFS sensitive, and MSCS-covered species; the Vaux's swift, a California
31 species of special concern; and the yellow warbler and yellow-breasted chat,
32 both California species of special concern and MSCS-covered species. In
33 addition, the raising of Shasta Dam would result in the loss of habitat, including
34 nesting habitat, for these species. This impact would be potentially significant.

35 Vegetation removal within the impoundment area during the nesting season
36 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
37 the abandonment of nests of these species. Noise generated by vegetation
38 removal activities, including helicopter yarding and chainsaw use, could also
39 lead to nest abandonment, resulting in the incidental loss of fertile eggs or
40 nestlings. This impact would be potentially significant. The loss of nesting and
41 foraging habitat would be a potentially significant impact.

1 A 6.5-foot dam raise would result in inundation of nesting and foraging habitat
2 for these species. Understory vegetation in 15 percent of the impoundment area
3 would be removed before inundation; the remainder would not survive the
4 inundation. Therefore, inundation of the impoundment area would reduce the
5 nesting habitat for these species. If removal were completed outside of the
6 breeding season, nesting would not be affected. However, 63 percent of
7 vegetation would not be removed and would be inundated. Because peak
8 inundation generally occurs in late April through early June, active nests
9 established before and while lake levels were rising could be flooded. The loss
10 of nests and nesting and foraging habitat from inundation would be a potentially
11 significant impact.

12 Construction activities, such as tree removal, site grading, excavation, and
13 vegetation removal, at the dam and in relocation areas during the nesting season
14 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
15 nest abandonment. Additionally, noise generated by project construction
16 activities and vegetation removal, including helicopter yarding and chainsaw
17 use, could lead to nest abandonment resulting in the incidental loss of fertile
18 eggs or nestlings. Vegetation removal in relocation areas would also result in a
19 loss of nesting and foraging habitat. This would be a potentially significant
20 impact.

21 Implementation of the project would occur over 3 to 4 years. Impacts on these
22 species could occur over multiple years if construction activities were
23 conducted adjacent to active nests. This impact would be potentially significant.

24 Dam construction, vegetation removal, and inundation resulting from a 6.5-foot
25 dam raise would result in a loss of approximately 792 acres in the impoundment
26 area and 2,326 acres in the relocation areas of potential nesting and foraging
27 habitat for the Vaux's swift. These activities would also result in the loss of
28 approximately 26 acres in the impoundment area and 9 acres in the relocation
29 areas of willow flycatcher, yellow warbler, and yellow-breasted chat habitat.

30 Impacts on suitable willow flycatcher, Vaux's swifts, yellow warblers, and
31 yellow-breasted chats habitat by CWHR type in the impoundment area and
32 relocation areas are summarized in Table 13-12.

33 Additional analysis of impacts will be conducted in relation to suitable habitats
34 available in the Shasta Lake watershed. An analysis of indirect and temporary
35 impacts will be completed in subsequent documents. Mitigation for this impact
36 is proposed in Section 13.3.5.

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Table 13-12. Impacts on Suitable Habitat for the Willow Flycatcher, Vaux’s Swift, Yellow Warbler, and Yellow-Breasted Chat in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Vaux’s Swift						
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood	39.08	18.13	86.75	34.61	9.44	1.28
Montane hardwood–conifer	34.65	0.50	69.23	66.31	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Total Vaux’s Swift Habitat	184.20	36.47	256.65	186.73	90.78	37.69
Willow Flycatcher, Yellow Warbler, and Yellow-Breasted Chat						
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Total Habitat	1.54	2.48	15.92	4.60	0.58	0.80
Relocation Areas						
Vaux’s Swift						
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood–conifer	121.63	0.00	208.65	319.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total Vaux’s Swift Habitat	355.18	0.00	873.25	930.75	91.87	75.47
Willow Flycatcher, Yellow Warbler, and Yellow-Breasted Chat						
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Total Habitat	0.34	0.00	4.28	3.93	0.23	0.37

Note:
*Acres are approximate.

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Impact Wild-9 (CPI): Impacts on the Long-Eared Owl, Northern Goshawk, Cooper’s Hawk, Great Blue Heron, and Osprey and Their Foraging and Nesting Habitat Construction activities and vegetation removal associated with the dam construction activities, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the long-eared owl, a California species of special concern and an MSCS-covered species; northern goshawk, a California species of special concern, a USFS sensitive species, and a BLM sensitive species; and the Cooper’s hawk, the great blue heron, and the osprey, which are MSCS-covered species. Higher lake levels caused by raising Shasta Dam would result in the loss of foraging and nesting habitat for the long-eared owl, northern goshawk, and Cooper’s hawk. This impact would be

1 potentially significant. Higher lake levels would also result in the loss of nesting
2 habitat for osprey and great blue heron. This impact would be potentially
3 significant. Foraging habitat would increase for osprey and great blue heron. No
4 impact to foraging habitat for these species would occur.

5 Vegetation removal within the impoundment area during the nesting season
6 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
7 the abandonment of nests of these species. Noise generated by vegetation
8 removal activities, including helicopter yarding and chainsaw use, could also
9 lead to nest abandonment, resulting in the incidental loss of fertile eggs or
10 nestlings. This impact would be potentially significant. The loss of nesting and
11 foraging habitat would be a potentially significant impact.

12 A 6.5-foot dam raise could result in inundation of nest trees and would result in
13 the loss of nesting and foraging habitat for this species. When inundation of the
14 impoundment area occurs, nest trees within the impoundment area would die.
15 Because peak inundation generally occurs in late April through early June, nest
16 trees would be flooded toward the end of the nesting season. If these species
17 were nesting in these trees, it is likely that young would fledge before the nest
18 tree dies from the effects of inundation. Because of inundation timing, it is not
19 likely that individuals would be affected. However, the loss of nesting and
20 foraging habitat would be a potentially significant impact.

21 The increase in lake elevation could increase access to nests by recreational
22 boaters. The increase in noise and human disturbance could lead to nest
23 abandonment and the incidental loss of fertile eggs or young. This would be a
24 potentially significant impact.

25 Construction activities, such as tree removal, site grading, excavation, and
26 vegetation removal, at the dam and in relocation areas during the nesting season
27 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
28 nest abandonment. Additionally, noise generated by project construction
29 activities and vegetation removal, including helicopter yarding and chainsaw
30 use, could lead to nest abandonment, resulting in the incidental loss of fertile
31 eggs or nestlings. Vegetation removal in relocation areas would also result in a
32 loss of nesting and foraging habitat. This would be a potentially significant
33 impact.

34 Implementation of the project would occur over 3 to 4 years. Impacts on these
35 species could occur over multiple years if construction activities were
36 conducted adjacent to active nests. This impact would be potentially significant.

37 Dam construction, vegetation removal, and inundation resulting from a 6.5-foot
38 dam raise would result in a loss of approximately 577 acres in the impoundment
39 area and 1,850 acres in the relocation areas of long-eared owl and northern
40 goshawk nesting and foraging habitat. There would be a loss of approximately

1 1,050 acres in the impoundment area and 2,429 acres in the relocation areas of
2 Cooper's hawk and great blue heron nesting and foraging habitat.

3 Impacts on suitable habitat by CWHR type in the impoundment area and
4 relocation areas are summarized in Table 13-13.

5 **Table 13-13. Impacts on Suitable Habitat for the Long-Eared Owl, Northern**
6 **Goshawk, Cooper's Hawk, and Great Blue Heron in the Impoundment Area and**
7 **Relocation Areas (6.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Long-Eared Owl and Northern Goshawk						
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood–conifer	34.65	0.50	69.23	66.31	55.70	5.68
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Total Habitat	143.59	15.86	153.98	147.52	80.76	35.61
Cooper's Hawk and Great Blue Heron						
Blue oak–foothill pine	4.96	0.00	0.00	0.00	1.40	4.04
Closed-cone pine-cypress	17.75	0.00	6.30	10.78	23.95	188.29
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood	39.08	18.13	86.75	34.61	9.44	1.28
Montane hardwood–conifer	34.65	0.50	69.23	66.31	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Total Habitat	206.91	36.46	262.95	197.51	116.13	230.03
Relocation Areas						
Long-Eared Owl and Northern Goshawk						
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood–conifer	121.63	0.00	203.65	309.12	42.22	37.85
Ponderosa pine	185.06	0.00	466.77	402.08	43.08	36.00
Total Habitat	306.68	0.00	670.41	714.22	85.30	73.86

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1 **Table 13-13. Impacts on Suitable Habitat for the Long-Eared Owl, Northern**
 2 **Goshawk, Cooper’s Hawk, and Great Blue Heron in the Impoundment Area and**
 3 **Relocation Areas (6.5-Foot Dam Raise) (contd.)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Cooper’s Hawk and Great Blue Heron						
Blue oak–foothill pine	3.61	0.00	0.00	0.00	0.00	8.86
Closed-cone pine-cypress	0.11	0.00	56.90	10.06	1.94	20.99
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood–conifer	121.63	0.00	203.65	309.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	3.93
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total Habitat	358.90	0.00	930.15	940.81	93.81	105.33

Note:
 *Acres are approximate

4 Impacts on osprey are similar to those described for the bald eagle (Impact
 5 Wild-5 (CPI) and the other raptors addressed above).

6 There are 54 osprey nest trees within the perimeter of Shasta Lake. Six nest
 7 trees would be affected by a 6.5-foot dam raise. Eleven osprey nests are located
 8 in relocation areas. Removal of nest trees would be a potentially significant
 9 impact. Because osprey generally use the same nest for multiple years, the loss
 10 of 17 nest trees (31 percent of the total in the Shasta Lake and vicinity) between
 11 the impoundment area and relocation areas would be a potentially significant
 12 impact.

13 Osprey nests also occur on towers and structures around the dam, otherwise,
 14 there is no suitable habitat for raptors near the dam. Blasting may occur in the
 15 vicinity of the dam. This would have a similar impact on nesting ospreys as
 16 noise generated by helicopter yarding or large construction equipment, which
 17 could result in nest abandonment and the loss of fertile eggs or young. This
 18 would be a potentially significant impact.

19 Additional analysis of impacts will be conducted in relation to suitable habitats
 20 available in the Shasta Lake watershed. Osprey nesting activity changes from
 21 year to year. The number of osprey nests is subject to change based on osprey
 22 activity at the time of construction and the subsequent inundation. An analysis
 23 of indirect and temporary impacts will be completed in the Final EIS.
 24 Mitigation for this impact is proposed in Section 13.3.5.

25 *Impact Wild-10 (CPI): Take and Loss of Habitat for the Pacific Fisher*
 26 Construction activities and vegetation removal associated with the construction

1 of raising the dam, construction activities in the relocation areas, and removal of
2 various amounts of vegetation in the impoundment areas would result in a loss
3 of habitat for the Pacific fisher, a Federal candidate for listing, a California
4 species of special concern, a USFS sensitive species, and a BLM sensitive
5 species. Furthermore, take (including mortality of individuals because of
6 destruction or disturbance of active roost sites or dens) could result from
7 construction activities and vegetation clearing. This impact would be potentially
8 significant.

9 Vegetation removal within the impoundment area while Pacific fisher kits (i.e.,
10 young) are in natal den trees could result in the incidental loss of kits. Noise
11 generated by vegetation removal activities, including helicopter yarding and
12 chainsaw use, may also lead to abandonment of young. However, females
13 frequently move kits if the natal den is disturbed or threatened. Because females
14 will move kits, it is not likely that individuals would be affected. However, the
15 loss of denning, resting, and foraging habitat would be a potentially significant
16 impact.

17 A 6.5-foot dam raise could result in inundation of natal den trees and would
18 result in the loss of denning, resting, and foraging habitat for this species. When
19 inundation of the impoundment area occurs, natal den trees within the
20 impoundment area would die. Females frequently move kits if threatened or
21 disturbed. Because females will move kits, it is not likely that individuals would
22 be affected. However, the loss of denning, resting, and foraging habitat would
23 be a potentially significant impact.

24 Construction activities, such as tree removal, site grading, excavation, and
25 vegetation removal, at the dam and in relocation areas while kits are in natal den
26 trees could result in the incidental loss of kits. Impacts on habitat would be the
27 same as described for the impoundment area. This would be a potentially
28 significant impact.

29 Implementation of the project would occur over 3 to 4 years. Impacts on the
30 Pacific fisher could occur over multiple years if construction activities were
31 conducted adjacent to denning or resting habitat. This impact would be
32 potentially significant.

33 Dam construction, vegetation removal, and inundation resulting from a 6.5-foot
34 dam raise would result in a loss of approximately 603 acres of Pacific fisher
35 habitat in the impoundment area. Approximately 1,859 acres of Pacific fisher
36 habitat would be lost in the relocation areas. This impact would be potentially
37 significant.

38 Impacts on suitable habitat by CWHR type in the impoundment area and
39 relocation areas are summarized in Table 13-14.

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Table 13-14. Impacts on Suitable Habitat for the Pacific Fisher in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood-conifer	34.65	0.50	69.23	66.31	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Total Habitat	145.13	18.34	169.90	152.12	81.34	36.41
Relocation Areas						
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood-conifer	121.63	0.00	203.65	309.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total Habitat	307.01	0.00	674.69	718.15	85.53	74.23

Note:
 *Acres are approximate

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Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

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Impact Wild-11 (CPI): Impacts on Special-Status Bats (Pallid Bat, Spotted Bat, Western Red Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, Long-Eared Myotis, and Yuma Myotis), the American Marten, and Ringtail and Their Habitat Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas would result in a loss of habitat for the pallid bat, a California species of special concern, a USFS sensitive species, and a BLM sensitive species; the western red bat, a USFS sensitive species; the western mastiff bat, a California species of special concern, an MSCS-covered species, and a BLM sensitive species; the Townsend's big-eared bat, a California species of special concern, a USFS sensitive species, and a BLM sensitive species; the long-eared myotis, a BLM sensitive species; the Yuma myotis, a BLM sensitive species; the American marten, a USFS sensitive species; and the ringtail, a State fully protected and

1 MSCS-covered species. Furthermore, take (including mortality of individuals
2 because of destruction or disturbance of active roost sites or dens) could result
3 from construction activities and vegetation clearing. This impact would be
4 potentially significant.

5 Vegetation removal within the impoundment area while young bats are in
6 maternity colonies or kits are in natal den trees could result in the incidental loss
7 of young. Noise generated by vegetation removal activities, including helicopter
8 yarding and chainsaw use, could also lead to young abandonment. Furthermore,
9 depending on the season, the removal of large trees with cavities could result in
10 the loss of pallid bat and Townsend's big-eared bat colonies. Potential direct
11 impacts include the take of a maternity colony (females and young) and the take
12 of individuals in a hibernaculum, which could eliminate an entire colony
13 because of the loss of pregnant females. Mortality of young and the loss of
14 reproductive and foraging habitat would be a potentially significant impact.

15 Inundation of a 6.5-foot dam raise would result in a loss of roosting and
16 foraging habitat for special-status bats (pallid bat, spotted bat, western red bat,
17 western mastiff bat, Townsend's big-eared bat, long-eared myotis, and Yuma
18 myotis) that roost in hollow trees, snags, bridges, and caves. Loss of young
19 could occur during the first inundation (above 1,070 feet msl) of bat maternity
20 colony habitat because active maternity colonies could be flooded before young
21 are volant (capable of flight). American marten and ringtails, which also use
22 snags, hollow logs, and debris piles for reproduction and cover, could also be
23 impacted. This impact would be potentially significant.

24 Two known caves, one occupied by Townsend's big-eared bats, are located on
25 the Big Backbone Arm and would be wholly or partially inundated if the dam
26 were raised. Inundation of cave/cliff habitat could result in the loss of
27 Townsend's big-eared bat, western mastiff bat, and long-eared myotis colonies.
28 Potential direct impacts include the take of a maternity colony and the take of
29 individuals in a hibernaculum, which could eliminate an entire colony because
30 of the loss of pregnant females.

31 Spotted bats and long-eared myotis could also roost in crevices and caves in the
32 Shasta Lake and vicinity portion of the primary study area. However,
33 inundation of cave/cliff habitat is less likely to result in a significant impact on
34 these species because they do not roost colonially; thus, inundation of a cave
35 would not result in the loss of an entire maternity colony.

36 Special-status bats may roost in bridges and could also be affected by bridge
37 modification or removal. Direct impacts, including mortality and the loss of
38 roosting habitat, would be significant.

39 Construction activities, such as tree removal, site grading, excavation, and
40 vegetation removal, at the dam and in relocation areas while young bats are in
41 maternity colonies or kits are in natal den trees could result in the incidental loss

1 of young. Impacts on habitat would be the same as described for the
2 impoundment area. This would be a potentially significant impact.

3 Implementation of the project would occur over 3 to 4 years. Impacts on these
4 species could occur over multiple years if construction activities are conducted
5 in or adjacent to reproductive habitat. This impact would be potentially
6 significant.

7 Foraging habitat for the pallid bat, spotted bat, western mastiff bat, and
8 Townsend's big-eared bat includes Douglas-fir, fresh emergent wetland,
9 lacustrine, montane hardwood, montane hardwood-conifer, montane riparian,
10 and ponderosa pine. These habitats are regionally abundant and therefore
11 impacts on foraging habitat by inundation or vegetation removal in the
12 relocation areas would be less than significant.

13 Dam construction, vegetation removal, and inundation resulting from a 6.5-foot
14 dam raise would result in the loss of approximately 13 acres of reproductive and
15 roosting habitat for the pallid bat, spotted bat, western mastiff bat, Townsend's
16 big-eared bat, and Yuma myotis in the impoundment area. Approximately 28
17 acres of reproductive and roosting habitat for these species would be lost in the
18 relocation areas. Additionally, one limestone cave located on the Big Backbone
19 Arm that is a known Townsend's big-eared bat roost would be affected by
20 flooding. A 6.5-foot dam raise would result in the loss of approximately 1,194
21 acres of reproductive and roosting habitat for the western red bat and long-eared
22 myotis. Approximately 2,732 acres of reproductive and roosting habitat for
23 these species would be lost in the relocation areas. These impacts would be
24 potentially significant.

25 Dam construction, vegetation removal, and inundation resulting from a 6.5-foot
26 dam raise would result in the loss of approximately 1,194 acres of ringtail
27 habitat. Approximately 2,732 acres of ringtail habitat would be lost in the
28 relocation areas. A 6.5-foot dam raise would result in the loss of approximately
29 603 acres of American martin habitat in the impoundment area and 1,859 acres
30 in the relocation areas. These impacts would be potentially significant.

31 Impacts on suitable habitat by CWHR type in the impoundment area and
32 relocation areas are summarized in Table 13-15.

33

1 **Table 13-15. Impacts on Suitable Habitat for Special-Status Bats, American**
 2 **Marten, and Ringtail in the Impoundment Area and Relocation Areas (6.5-Foot**
 3 **Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Pallid Bat, Spotted Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, and Yuma myotis						
Barren	0.57	0.64 ¹	0.25	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.32
Blue oak–foothill pine	4.96	0.00	0.00	0.00	1.40	4.04
Total Habitat	5.53	0.00	0.25	0.00	1.40	5.36
Western Red Bat, Long-Eared Myotis and Ringtail						
Barren	0.57	0.00	0.25	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.32
Blue oak–foothill pine	4.96	0.00	0.00	0.00	1.40	4.04
Closed-cone pine-cypress	17.75	0.00	6.30	10.74	23.95	188.29
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Mixed chaparral	14.83	6.83	80.01	7.28	5.43	27.73
Montane hardwood	39.08	18.13	86.75	32.23	9.44	1.28
Montane hardwood–conifer	34.65	0.50	69.23	68.73	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.24	25.06	29.93
Total Habitat	222.31	43.30	343.21	204.84	121.56	259.07
American Marten						
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood–conifer	34.65	0.50	69.23	66.31	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Total Habitat	145.13	18.34	169.90	152.12	81.34	36.41

4

1 **Table 13-15. Impacts on Suitable Habitat for Special-Status Bats, American**
 2 **Marten, and Ringtail in the Impoundment Area and Relocation Areas (6.5-Foot**
 3 **Dam Raise) (contd.)**

Habitat	Area (acres [*])					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Relocation Areas						
Townsend's Big-Eared Bat, Spotted Bat, Pallid Bat, Western Mastiff Bat, and Yuma Myotis						
Barren	0.00	0.00	0.00	0.00	11.53	0.00
Blue oak woodland	0.00	0.00	0.00	3.68	0.00	1.08
Blue oak–foothill pine	3.61	0.00	0.00	0.00	0.00	8.86
Total Habitat	3.61	0.00	0.00	3.68	11.53	9.94
Western Red Bat, Long-Eared Myotis, and Ringtail						
Barren	0.00	0.00	0.00	0.00	11.53	0.00
Blue oak woodland	0.00	0.00	0.00	3.68	0.00	1.08
Blue oak–foothill pine	3.61	0.00	0.00	0.00	0.00	8.86
Closed-cone pine-cypress	0.00	0.00	56.90	10.06	1.94	20.99
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Mixed chaparral	25.63	0.00	119.21	44.65	4.44	93.01
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood–conifer	121.63	0.00	203.65	309.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total Habitat	384.53	0.00	1049.36	989.14	109.77	199.42
American Marten						
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Montane hardwood–conifer	121.63	0.00	203.65	309.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total Habitat	307.01	0.00	674.69	718.15	85.53	74.23

*Acres are approximate.

¹Represents the amount of the limestone outcrop impacted at the Big Backbone Arm cave location.

4 Additional analysis of impacts will be conducted in relation to suitable habitats
 5 available in the Shasta Lake watershed. An analysis of indirect and temporary

1 impacts will be completed in the Final EIS. Mitigation for this impact is
2 proposed in Section 13.3.5.

3 *Impact Wild-12 (CP1): Impacts on Special-Status Terrestrial Mollusks (Shasta*
4 *Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their*
5 *Habitat* All of these species are designated USFS sensitive and survey and
6 manage species and are proposed for Federal listing. The Shasta sideband is
7 also an MSCS-covered species. Ground-disturbing activities and vegetation
8 removal associated with the construction of raising the dam, construction
9 activities in the relocation areas, and removal of various amounts of vegetation
10 in the impoundment areas could result in direct take and/or loss of suitable
11 habitat for special-status terrestrial mollusks. In addition, the raising of Shasta
12 Dam would result in the inundation of suitable habitat and direct take of these
13 species. This impact would be significant.

14 These species are found in nearly all CWHR habitats along the lake. The Shasta
15 sideband and Wintu sideband are associated with limestone formations in the
16 McCloud River and in the Pit and Squaw Creek arms, respectively. For the
17 purposes of this impact analysis for Shasta sideband and Wintu sideband, all
18 CWHR habitats in the impoundment and relocation areas are stratified as
19 limestone or nonlimestone habitat. Shasta chaparral occurs in many CWHR
20 habitats and Shasta hesperian is found in riparian habitats.

21 Vegetation removal in the impoundment areas and construction activities, such
22 as tree removal, site grading, excavation, and vegetation removal at the dam and
23 in relocation areas in suitable habitat could result in direct take. In addition,
24 these activities and the inundation caused by a 6.5-foot dam raise would result
25 in the mortality of individuals and the permanent loss of suitable habitat.

26 Dam construction, vegetation removal and construction in the relocation areas,
27 and inundation resulting from a 6.5-foot dam raise would result in the loss of
28 approximately 1,194 and 2,732 acres of Shasta chaparral habitat in the
29 impoundment area and relocation areas, respectively. Shasta hesperian habitat
30 loss in the impoundment area and relocation areas would be approximately 26
31 and 9 acres, respectively. The 6.5-foot dam raise would also result in the loss of
32 approximately 5 acres of Shasta sideband habitat in the impoundment area and
33 34 acres in the relocation areas. Wintu sideband habitat loss includes
34 approximately 1.50 acres in the impoundment area. These impacts would be
35 potentially significant.

36 Impacts on suitable habitat by CWHR type in the impoundment area and
37 relocation areas are summarized in Table 13-16.

1 **Table 13-16. Impacts on Suitable Habitat for Special-Status Terrestrial Mollusks**
 2 **in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area: Shasta Sideband						
Limestone	0.00	0.00	0.00	5.43	0.00	0.00
Impoundment Area: Wintu Sideband						
Limestone	0.00	0.00	0.00	0.00	0.00	1.50
Impoundment Area: Shasta Chaparral						
Barren	0.57	0.00	0.25	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.32
Blue oak–foothill pine	4.96	0.00	0.00	0.00	1.40	4.04
Closed-cone pine–cypress	17.75	0.00	6.30	10.74	23.95	188.29
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Mixed chaparral	14.83	6.83	80.01	7.28	5.43	27.73
Montane hardwood	39.08	18.13	86.75	32.23	9.44	1.28
Montane hardwood–conifer	34.65	0.50	69.23	68.73	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.24	25.06	29.93
Total Habitat	222.31	43.30	343.21	204.83	121.56	259.07
Impoundment Area: Shasta Hesperian						
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Total Habitat	1.54	2.48	15.92	4.60	0.58	0.80
Relocation Areas: Shasta Sideband						
Limestone	0.00	0.00	0.00	34.69	0.00	0.00
Relocation Areas: Wintu Sideband						
Limestone	0.00	0.00	0.00	0.00	0.00	0.00
Relocation Areas: Shasta Chaparral						
Barren	0.00	0.00	0.00	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	3.68	11.53	1.08
Blue oak–foothill pine	3.61	0.00	0.00	0.00	0.00	8.86
Closed-cone pine–cypress	0.11	0.00	56.90	10.06	1.94	20.99

3

1 **Table 13-16. Impacts on Suitable Habitat for Special-Status Terrestrial Mollusks**
2 **in the Impoundment Area and Relocation Areas (6.5-Foot Dam Raise) (contd.)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Mixed chaparral	25.63	0.00	119.21	44.65	4.44	93.01
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood–conifer	121.63	0.00	203.65	309.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Total Habitat	384.53	0.00	1049.36	989.14	109.77	199.42
Relocation Areas: Shasta Hesperian						
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Total Habitat	0.34	0.00	4.28	3.93	0.23	0.37

Note:

*Acres are approximate.

3 Additional analysis of impacts will be conducted in relation to suitable habitats
4 available in the Shasta Lake watershed. An analysis of indirect and temporary
5 impacts will be provided in the Final EIS. Mitigation for this impact is proposed
6 in Section 13.3.5.

7 *Impact Wild-13 (CPI): Permanent Loss of General Wildlife Habitat*

8 Construction activities and vegetation removal associated with the construction
9 of raising the dam, construction activities in the relocation areas, and removal of
10 various amounts of vegetation in the impoundment areas would result in a
11 permanent loss of habitat. In addition, inundation caused by the raising of
12 Shasta Dam would result in the permanent loss of habitat. This would be a
13 potentially significant impact.

14 Dam construction, vegetation removal and construction in the relocation areas,
15 and inundation resulting from a 6.5-foot dam raise would result in a loss of
16 1,221 acres of general wildlife habitat in the impoundment area and 3,127 acres
17 of general wildlife habitat in the relocation areas. Impacts on general wildlife
18 habitat by CWHR type in the impoundment area and relocation areas are
19 summarized in Tables 13-17 and 13-18.

1 **Table 13-17. Impacts on CWHR Habitats in the Impoundment Area (6.5-Foot**
2 **Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Annual grassland	0.07	0.00	0.96	0.37	0.00	0.00
Barren	1.02	0.00	4.04	0.85	0.00	1.64
Blue oak–foothill pine	4.96	0.00	0.00	0.00	1.40	4.04
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.32
Closed-cone pine–cypress	17.75	0.00	6.30	10.78	23.95	188.29
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Mixed chaparral	14.83	6.83	80.01	7.32	5.43	27.73
Montane hardwood	39.08	18.13	86.75	34.61	9.44	1.28
Montane hardwood–conifer	34.65	0.50	69.23	66.31	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Riverine	0.00	0.35	2.30	3.81	0.59	0.00
Urban	10.95	0.00	1.37	4.74	0.00	0.75
Total	233.79	43.65	351.64	214.60	122.14	261.46

Note:

*Acreage values are approximate.

Key:

CWHR = California Wildlife Habitat Relationships

3 **Table 13-18. Impacts on CWHR Habitats in the Relocation Areas**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Annual grassland	5.05	0.00	28.84	10.40	0.84	0.88
Barren	23.81	0.00	86.26	36.37	11.53	20.91
Blue oak–foothill pine	3.61	0.00	0.00	0.00	0.00	18.17
Blue oak woodland	0.00	0.00	0.00	3.68	0.00	1.08
Closed-cone pine–cypress	0.11	0.00	56.90	10.06	1.94	20.99
Douglas-fir	0.00	0.00	0.00	3.02	0.00	0.00
Mixed chaparral	25.63	0.00	119.21	44.65	4.44	93.01
Montane hardwood	48.17	0.00	198.56	212.60	6.34	1.24
Montane hardwood–conifer	121.63	0.00	203.65	309.12	42.22	37.85
Montane riparian	0.34	0.00	4.28	3.93	0.23	0.37
Ponderosa pine	185.04	0.00	466.77	402.08	43.08	36.00
Riverine	0.00	0.00	0.39	0.00	0.00	0.00
Urban	21.71	0.00	230.21	0.48	0.00	0.57
Total	434.11	0.00	1395.07	1036.68	110.61	219.03

Note:

*Acreage values are approximate.

Key:

CWHR = California Wildlife Habitat Relationships

1 Additional analysis of impacts will be conducted in relation to suitable habitats
2 available in the Shasta Lake watershed. An analysis of indirect impacts and
3 temporary impacts will be completed in the Final EIS. Mitigation for this
4 impact is proposed in Section 13.3.5.

5 *Impact Wild-14 (CP1): Impacts on Other Birds of Prey (i.e., red-tailed hawk*
6 *and red-shouldered hawk) and Migratory Bird Species (i.e., American robin,*
7 *Anna's hummingbird) and their Foraging and Nesting Habitat* Construction
8 activities and vegetation removal associated with the construction of raising the
9 dam, construction activities in the relocation areas, and removal of various
10 amounts of vegetation in the impoundment areas during the nesting season
11 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
12 the abandonment of nests of other birds of prey and migratory bird species. In
13 addition, inundation caused by the raising of Shasta Dam could result in the loss
14 of active nests and habitat for these species. This impact would be potentially
15 significant.

16 Approximately 36 percent of the impoundment area would have either complete
17 (15 percent) or overstory (21 percent) vegetation removal. If vegetation removal
18 were to occur prior to or after the breeding season, there would be no impact on
19 migratory birds or raptors. When inundation of the impoundment area occurs,
20 nest trees within the impoundment area would die. Because peak inundation
21 generally occurs between late April and early June, nest trees would be flooded
22 toward the end of the nesting season. If raptors were nesting in these trees, it is
23 likely young would fledge before the nest tree died from the effects of
24 inundation. However, approximately 84 percent of understory vegetation
25 inundated could have ground or shrub nesting birds that would be impacted by
26 inundation. Impacts on ground or understory nesters would be potentially
27 significant.

28 Maximum inundation would occur in late April through early June during the
29 breeding season and many nests could be established before and while lake
30 levels are rising. In the portions of the impoundment where vegetation removal
31 is not implemented, active bird nests would flood, resulting in mortality of
32 young still dependent on the nest. This would be a potentially significant
33 impact.

34 Additionally, removal of structures providing for raptor nests (e.g., power poles)
35 in the relocation areas could result in mortality of young. This would be a
36 potentially significant impact.

37 Vegetation in relocation areas would be completely removed. If vegetation
38 removal occurred during the breeding season, there would a potentially
39 significant impact on migratory birds or raptors.

40 Implementation of the project would occur over 3 to 4 years. Impacts on these
41 species could occur over multiple years if construction activities were

1 conducted in or adjacent to reproductive habitat. This impact would be
2 potentially significant.

3 Additional analysis of impacts will be conducted in relation to suitable habitats
4 available in the Shasta Lake watershed. An analysis of indirect impacts and
5 temporary impacts will be completed in the Final EIS. Mitigation for this
6 impact is proposed in Section 13.3.5.

7 *Impact Wild-15 (CP1): Loss of Critical Deer Winter and Fawning Range*
8 Construction activities and vegetation removal associated with the construction
9 of raising the dam, construction activities in the relocation areas, and removal of
10 various amounts of vegetation in the impoundment areas would result in a loss
11 of critical deer winter and fawning range. In addition, inundation caused by the
12 raising of Shasta Dam would result in the loss of critical deer range. This impact
13 would be potentially significant.

14 Impacts caused by construction and vegetation clearing for the dam and
15 relocation areas under a 6.5-foot raise of Shasta Dam would result in the loss of
16 approximately 3,962 acres of critical deer winter and/or fawning range. This
17 impact would be potentially significant.

18 Additional analysis of impacts will be conducted in relation to suitable habitats
19 available in the Shasta Lake watershed. An analysis of indirect impacts and
20 temporary impacts will be completed in the Final EIS. Mitigation for this
21 impact is proposed in Section 13.3.5.

22 *Impact Wild-16 (CP1): Take and Loss of the California Red-Legged Frog*
23 Reclamation is concurrently completing an assessment of California red-legged
24 frog habitat in coordination with the USFWS. The assessment results will
25 enable Reclamation and the USFWS to determine if habitat for the species
26 occurs, if impacts are anticipated, and if additional surveys are needed. Impacts
27 on the California red-legged frog will be assessed if surveys are conducted and
28 the California red-legged frog is found. Impacts for each alternative will not be
29 assessed until USFWS has determined whether suitable habitat is present and
30 whether surveys would be required. Mitigation for this impact is discussed in
31 Section 13.3.5.

32 **Upper Sacramento River (Shasta Dam to Red Bluff)**

33 *Impact Wild-17 (CP1): Impacts on Riparian-Associated Special-Status Wildlife*
34 *Resulting from Modifications to the Existing Flow Regime in the Primary Study*
35 *Area* Implementing CP1 would increase available water storage in Shasta
36 Reservoir and result in a modified flow regime. This modification would reduce
37 the frequency, duration, and magnitude of intermediate to large flows
38 downstream from Shasta Dam during winter and spring in some water years,
39 especially wet and above-normal years. Conversely, CP1 would increase flow
40 volumes in summer and fall of most years, most dramatically in September and
41 October, because more water would be available for delivery in the driest

1 months. This change in surface and subsurface hydrology could affect habitats
2 adjacent to the river channel and reduce the formation of off-channel habitats in
3 the long term, which would adversely affect the habitat of western pond turtle.
4 Although the total amount of riparian vegetation would not decline
5 substantially, the portion in early successional stages would be reduced. These
6 early successional stages provide habitat for some special-status wildlife
7 species. These changes could result in substantial effects on the distribution or
8 abundance of riparian-nesting special-status bird species, particularly western
9 yellow-billed cuckoos. Because CP1 would substantially alter habitat for a
10 variety of riparian-dependent special-status species, this impact would be
11 potentially significant.

12 The operation of Shasta Dam has substantially modified the natural flow regime
13 in the primary study area. As discussed previously, dam construction and
14 operation has limited the frequency and magnitude of intermediate to large
15 flows downstream from the dam in winter and spring, and has increased flow
16 volumes during the active growing season (primarily March through October).
17 Implementation of CP1 would be expected to amplify these effects (Table 13-
18 19) because CP1 would increase available storage. These changes are most
19 noticeable in the modeling data for wet and above-normal water years.
20 Reducing the magnitude, frequency, and duration of intermediate to large flows
21 could alter the dynamics and structure of wetland and riparian habitats that
22 support special-status wildlife species along the Sacramento River, downstream
23 from Shasta Dam, throughout the primary study area. (See Chapter 12,
24 “Botanical Resources,” for more information.)

25 The effects of modified flow regimes would be somewhat attenuated
26 downstream because of the cumulative tributary flow adding to the Sacramento
27 River. However, many of these tributaries are also part of the CVP and SWP
28 and would likely be operated differently should CP1 be implemented. CP1
29 would increase the volume of flows in summer and fall of most years, most
30 dramatically in September and October. This change is also a result of increased
31 storage, which allows more water to be available for delivery in the driest
32 months of the year. Although the relative contribution of CP1 to overall changes
33 downstream from Keswick Dam would attenuate, it appears based on the
34 modeling that in September of dry and critical water years, the effect of CP1
35 would be a substantial increase in flows all the way down to Freeport (Table
36 13-19).

37

Table 13-19. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP1

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Keswick Dam												
Wet	1.6%	0.8%	-6.0%	-2.9%	-0.5%	0.4%	0.3%	0.1%	0.2%	0.3%	0.3%	0.4%
Above Normal	5.1%	-1.5%	-1.4%	-2.2%	-5.2%	-2.2%	0.0%	-3.0%	-1.4%	0.1%	0.9%	5.9%
Below Normal	0.9%	-0.7%	0.1%	-0.9%	-0.7%	-1.1%	0.2%	-2.6%	1.1%	0.2%	0.0%	1.3%
Dry	2.4%	4.1%	-2.0%	-2.0%	-1.0%	0.0%	0.7%	1.4%	2.3%	1.5%	2.3%	3.9%
Critical	2.3%	4.8%	1.0%	-0.6%	1.7%	0.8%	1.0%	1.8%	0.6%	0.7%	-0.2%	5.6%
Bend Bridge												
Wet	1.4%	1.4%	-3.1%	-1.2%	-0.3%	0.3%	0.2%	0.1%	0.2%	0.3%	0.3%	0.4%
Above Normal	4.0%	-1.1%	-0.6%	-1.2%	-2.8%	-1.3%	0.0%	-2.1%	-1.0%	0.0%	0.8%	5.5%
Below Normal	0.8%	-0.1%	0.0%	-0.5%	-0.4%	-0.8%	0.1%	-1.6%	1.0%	0.2%	-0.1%	1.2%
Dry	2.1%	3.1%	-1.0%	-1.0%	-0.5%	0.0%	0.5%	1.1%	2.1%	1.5%	2.3%	3.6%
Critical	1.6%	3.9%	0.8%	-0.4%	1.5%	0.6%	0.8%	1.6%	0.5%	0.6%	-0.2%	5.2%
Butte City												
Wet	1.6%	2.0%	-2.3%	-0.7%	-0.2%	0.3%	0.1%	-0.1%	0.0%	0.2%	0.2%	0.4%
Above Normal	4.3%	-0.8%	-0.4%	-0.9%	-1.9%	-0.8%	0.2%	-2.4%	-1.2%	-0.3%	0.8%	5.8%
Below Normal	1.2%	0.2%	0.3%	-0.6%	-0.3%	-0.7%	-0.3%	-1.5%	1.4%	0.3%	0.0%	1.0%
Dry	2.4%	3.2%	-0.7%	-0.5%	-0.2%	0.0%	0.8%	1.0%	3.2%	2.3%	3.2%	3.8%
Critical	1.4%	4.3%	0.8%	-0.5%	1.4%	0.5%	1.1%	2.2%	0.6%	0.9%	-0.2%	4.8%
Wilkins Slough												
Wet	1.6%	2.2%	-1.6%	-0.2%	0.0%	0.3%	0.1%	-0.1%	0.0%	0.2%	0.2%	0.4%
Above Normal	4.3%	-0.8%	-0.4%	-0.6%	-1.1%	-0.4%	0.2%	-2.4%	-1.2%	-0.3%	0.8%	5.8%
Below Normal	1.2%	0.2%	0.3%	-0.6%	0.0%	-0.7%	-0.3%	-1.5%	1.4%	0.3%	0.0%	1.0%
Dry	2.4%	3.2%	-0.7%	-0.4%	-0.2%	0.0%	0.8%	1.0%	3.2%	2.3%	3.2%	3.8%
Critical	1.4%	4.3%	0.8%	-0.5%	1.4%	0.5%	1.1%	2.2%	0.6%	0.9%	-0.2%	4.8%
Verona												
Wet	1.5%	1.7%	-1.3%	-0.2%	0.0%	0.2%	0.1%	-0.2%	0.0%	0.1%	-0.1%	0.2%
Above Normal	3.2%	-0.1%	-0.3%	-0.4%	-1.3%	-0.2%	0.1%	-1.0%	-0.8%	-0.2%	0.4%	2.3%
Below Normal	0.6%	0.1%	-0.1%	0.0%	0.1%	-0.5%	-0.2%	-0.4%	1.4%	0.1%	-0.1%	-0.3%
Dry	1.3%	2.5%	-0.8%	-0.2%	-0.2%	0.0%	0.5%	0.7%	-1.0%	1.1%	1.8%	5.7%
Critical	0.5%	3.6%	0.8%	-0.2%	1.1%	0.4%	0.7%	2.0%	0.5%	0.8%	-1.5%	3.1%

Table 13-19. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP1 (contd.)

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Freeport												
Wet	0.7%	0.5%	-0.3%	-0.2%	0.1%	0.1%	0.0%	-0.2%	0.0%	0.0%	0.0%	0.0%
Above Normal	1.2%	-0.5%	0.0%	0.0%	-0.5%	-0.1%	0.1%	-0.8%	-0.6%	-0.1%	0.0%	0.5%
Below Normal	-0.1%	-0.6%	0.5%	0.5%	0.3%	-0.3%	0.1%	-0.5%	0.3%	-0.1%	-0.4%	0.0%
Dry	1.2%	1.4%	-0.5%	-0.1%	-0.1%	-0.1%	0.2%	0.5%	-0.2%	0.7%	1.7%	4.3%
Critical	0.1%	1.8%	0.8%	-0.2%	0.9%	-0.1%	0.4%	0.9%	0.0%	1.4%	0.5%	2.4%

1 Special-status wildlife that could be affected by these changes include special-
2 status invertebrates, reptiles, amphibians, birds, and mammals, as discussed
3 below.

- 4 • **Invertebrates** – Blue elderberry shrubs, the host plants for the valley
5 elderberry longhorn beetle, are found throughout much of the
6 Sacramento River’s riparian corridor. Shrubs within the corridor are
7 unlikely to be affected by modification of the existing flow regimes.
8 Elderberry shrubs are not commonly found growing immediately next
9 to the river’s edge, but are often found on floodplain terraces or higher
10 up the bank. Most of the effect of CP1 on flow regime, including
11 inundation during the growing season, would be concentrated in a
12 narrow strip along the river channel that is already subjected to
13 seasonal inundation. Elderberry shrubs growing in these areas already
14 experience periodic seasonal inundation. CP1 would alter flows
15 substantially (beyond the ± 2 percent threshold), but the change in river
16 stage is predicted by CalSim-II to generally be less than about 4 inches.
17 Because of this relatively small vertical change in water surface
18 elevation, implementing CP1 is not likely to prevent establishment or
19 substantially reduce the vigor of existing elderberry shrubs in the
20 primary study area. Therefore, the impact of CP1 on invertebrate
21 species would be less than significant.

- 22 • **Reptiles and Amphibians** – The presence of western pond turtle
23 within the Sacramento River has been documented, and suitable habitat
24 for the species is provided in the primary study area, including
25 tributaries. Although they will use low-velocity areas of the main
26 channels, western pond turtles also rely on habitat types (e.g., oxbow
27 lakes) that have relatively slow rates of formation. Creation of new off-
28 channel water bodies requires periodic intermediate to large fall and
29 winter flow events that drive the processes of meander migration and
30 channel cutoff. Similarly, off-channel water bodies gradually become
31 terrestrial habitats as they fill with sediment and organic detritus and
32 are colonized by riparian vegetation. Consequently, activities that
33 prevent the long-term formation of off-channel water bodies (e.g.,
34 constructing levees and installing bank armor) reduce the extent of this
35 important type of habitat for pond turtles. The increase in mean stage
36 elevation resulting from implementation of CP1 could provide
37 additional aquatic habitat for the species during some months of some
38 years. However, less aquatic habitat for western pond turtle could be
39 available during winter, spring, and drought periods. Modifying the
40 flow regime by capturing channel-forming flows could also reduce the
41 formation of off-channel water bodies in the long term. These changes
42 in habitat availability could reduce the size of the western pond turtle
43 population along the Sacramento River in the long term by reducing
44 turtle survival and reproductive success. Therefore, the impact of CP1

1 on the western pond turtle and its habitat would be potentially
2 significant.

- 3 • **Birds** – The riparian and wetland habitats along the Sacramento River
4 floodway provide potential nesting and foraging habitat for western
5 yellow-billed cuckoo, California yellow warbler, and yellow-breasted
6 chat, all of which are special-status birds that nest in riparian
7 vegetation. In addition, northern harrier and short-eared owl may nest
8 in marshes in or adjacent to the stream channel. Other raptors (e.g.,
9 Cooper’s hawk, Swainson’s hawk, white-tailed kite, bald eagle, and
10 osprey) may nest in trees in the riparian or oak woodlands in the study
11 area. As described above, altering the flow regime could alter some
12 existing riparian habitat. Over time, there would be less early
13 successional (willow, cottonwood, and herbaceous dominated) and
14 more mid-successional (mixed woodland) vegetation, and a smaller
15 amount of acreage recently disturbed by erosion or scouring after
16 intermediate to large flows. (See Chapter 12, “Botanical Resources.”)
17 These long-term changes to the structure of riparian vegetation are
18 expected to change habitat values, causing the loss of, and in some
19 cases expanding, nesting territories or affecting the reproductive
20 success of some riparian foraging and nesting birds. The birds most
21 adversely affected by this alteration would be those that make the most
22 extensive use of willow thickets and cottonwood- and willow-
23 dominated riparian forests, such as yellow-billed cuckoo and yellow-
24 breasted chat. This loss of nesting habitat would eventually lead to a
25 reduction in local populations of sensitive bird species as habitat
26 became unsuitable for nesting. Although some species, such as raptors
27 that nest in later successional riparian habitats, could benefit from the
28 long-term changes, the impact of CP1 on special-status bird species that
29 nest in early successional riparian vegetation would be potentially
30 significant.

- 31 • **Mammals** – Special-status mammals potentially occurring in the
32 project area include pallid bat, western red bat, and ringtail. Riparian
33 habitat can provide important foraging and roosting habitat for bats, but
34 these species are not typically dependent on riparian habitats. The
35 amount of potential foraging habitat would not decrease under CP1,
36 and available roosting areas in riparian habitats—even if modified by the
37 new flow regime downstream from Shasta Dam—would not be subject
38 to a substantial reduction. Therefore, the impact of CP1 on special-
39 status bats would be less than significant. Potential changes in riparian
40 vegetation along the river channel in the primary study area would not
41 substantially reduce habitat for ringtail because this species is known to
42 use a variety of habitats and forage on a wide array of items that would
43 not be substantially altered (Belluomini 1980). Therefore, the impact of
44 CP1 on special-status mammals would be less than significant.

1 Implementing CP1 would result in substantial long-term effects on the habitat
2 of western pond turtle and some riparian-nesting special-status bird species.
3 Therefore, this impact would be potentially significant. Mitigation for this
4 impact is proposed in Section 13.3.5.

5 *Impact Wild-18 (CP1): Impacts on Bank Swallow in the Primary Study Area*
6 *Resulting from Modifications of Geomorphic Processes* Implementing CP1
7 would cause a small reduction in the magnitude, duration, and frequency of
8 intermediate to large flows in the Sacramento River in the primary study area.
9 This reduction also would alter the river's geomorphic processes. The rate of
10 bank erosion would be reduced, but the length of eroding banks would not be
11 substantially altered, and thus, nesting habitat for bank swallows would not
12 decline substantially. High flows during the nesting season that may cause
13 localized nest failure would not increase. The impact on habitat for bank
14 swallow nesting colonies, and therefore bank swallows themselves, would be
15 less than significant.

16 There are seven known colonies of bank swallow along the Sacramento River in
17 the primary study area (CNDDDB 2012). The bank swallow forms nesting
18 colonies in steep-cut, eroding river banks. Generally installed to protect upland
19 land uses, bank revetment has been preferentially applied to actively migrating
20 bends that otherwise would be among the most suitable sites for bank swallow
21 nests. The reduction in intermediate to large flows by CP1 would cause a small
22 reduction in the rate of erosion at the cut banks that remain unprotected by
23 revetment. This alteration would not reduce the amount of bank swallow nesting
24 habitat in the short or long term. As modeled, spring flows at Keswick Dam and
25 Bend Bridge would be substantially reduced under some water year conditions
26 (e.g., February and March of above-normal years, May of above-normal and
27 below-normal years), but generally would remain within the ± 2 percent
28 threshold that is considered essentially equivalent to existing conditions (Table
29 13-19). Therefore, the potential for spring flows to cause localized bank
30 swallow nest failure would remain comparable to existing and no-action
31 conditions.

32 The rate of bank failure is not expected to change substantially, and nest failure
33 caused by spring flows may be reduced under certain conditions. Therefore, the
34 impact of CP1 on bank swallow would be less than significant. Mitigation for
35 this impact is not needed, and thus not proposed.

36 *Impact Wild-19 (CP1): Disturbance or Removal of Vernal Pool Habitat for*
37 *Special-Status Wildlife from Changes in Flow Regime* Vernal pools are present
38 in upland areas near the Sacramento River and its tributaries in the primary
39 study area. These pools provide habitat for numerous special-status species,
40 such as vernal pool tadpole shrimp, vernal pool fairy shrimp, and western
41 spadefoot toad. Critical habitat for three special-status wildlife species
42 (Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole
43 shrimp) is located within the primary study area. Critical habitat for these

1 species in the primary study area is confined to vernal pool communities
2 (USFWS 2006). However, vernal pools are generally not present within the
3 active floodplain of the upper Sacramento River in the primary study area; thus,
4 vernal pools are not anticipated to be affected by changes in flows that could
5 result from implementation of CP1. Changes in flow regime in the primary
6 study area likely would not affect vernal pool special-status species. Because
7 CP1 would not affect vernal pool habitat or the species that occur within the
8 habitat, no impact would occur. Mitigation for this impact is not needed, and
9 thus not proposed.

10 *Impact Wild-20 (CP1): Consistency with Local and Regional Plans with Goals*
11 *of Promoting Riparian Habitat in the Primary Study Area* Several
12 conservation and management plans have been adopted in the primary and
13 extended study areas with goals of promoting riparian habitat along the
14 Sacramento River. Because flow regimes and riverine geomorphic processes
15 could be altered with project implementation, riparian habitat could be affected
16 in such a manner that the goals of the local and regional plans would be more
17 difficult to attain. Therefore, this impact would be potentially significant.

18 Several local and regional plans have been developed and adopted to promote
19 conservation and enhancement of riparian habitat in the primary and extended
20 study areas. Examples of these include the RHJV, Sacramento River Advisory
21 Council Forum, Sacramento River Conservation Area Program, and SRNWR
22 comprehensive conservation plan and environmental assessment. (See Section
23 13.2, “Regulatory Setting.”)

24 Because CP1 may have a potentially significant impact on riparian vegetation in
25 the primary and extended study areas, the quality of riparian habitat may be
26 reduced or distribution may be limited. This potential consequence of the
27 project could conflict with the goals developed in local and regional
28 conservation plans for the Sacramento River. This impact would be potentially
29 significant. Mitigation for this impact is proposed in Section 13.3.5.

30 *Impact Wild-21 (CP1): Impacts on Riparian-Associated Special-Status Wildlife*
31 *Resulting from the Gravel Augmentation Program* Gravel augmentation is not
32 included as part of CP1. Therefore, no impact would occur. Mitigation for this
33 impact is not needed, and thus not proposed.

34 *Impact Wild-22 (CP1): Impacts on Riparian-Associated Special-Status Wildlife*
35 *Species Resulting from Restoration Projects* CP1 would not include any
36 specific restoration components. Therefore, no impact would occur. Mitigation
37 for this impact is not needed, and thus not proposed.

38 **Lower Sacramento River and Delta** By altering storage and operations at
39 several reservoirs, CP1 would change flow regimes in several downstream
40 waterways. In turn, these alterations to the flow regime could particularly affect
41 riparian and wetland habitats along these waterways. The potential effects on

1 wildlife are similar to those discussed for the primary study area above.
2 However, potential effects on flow and stages of the middle Sacramento River
3 would be smaller than those for the upper Sacramento River; changes in flows
4 and stages would diminish downstream from Red Bluff because of the effects of
5 inflows from tributaries, and the effects of diversions and flood bypasses.

6 *Impact Wild-23 (CP1): Impacts on Riparian-Associated and Aquatic Special-*
7 *Status Wildlife Resulting from Modifications to Existing Flow Regimes in the*
8 *Lower Sacramento River and Delta* Implementing CP1 would modify the flow
9 regime and would reduce the frequency, duration, and magnitude of
10 intermediate to large flows in the lower Sacramento River during winter and
11 spring in some years. It also would increase flow volumes in fall of most years.
12 This change in surface and subsurface hydrology would be of a smaller
13 magnitude than in the upper Sacramento River, but could affect habitats
14 adjacent to the river channel and the long-term formation of off-channel habitats
15 along the lower Sacramento River, which would adversely affect the habitat of
16 western pond turtle. Although the total amount of riparian vegetation would not
17 decline substantially, the portion in early successional stages would be reduced.
18 These early successional stages provide habitat for some special-status wildlife
19 species. These changes could result in substantial effects on the distribution or
20 abundance of riparian-nesting special-status bird species. Because CP1 would
21 substantially alter habitat for a variety of riparian-dependent special-status
22 species, this impact would be potentially significant.

23 This impact would be similar to Impact Wild-17 (CP1) for the upper
24 Sacramento River. However, the effect of CP1 on flow in the Sacramento River
25 would generally attenuate downstream from Red Bluff Pumping Plant because
26 of the inflows from tributaries, and because of other diversions and flood
27 bypasses. CalSim-II modeling indicates that in most months and under most
28 types of water years, changes in flows from Bend Bridge downstream would be
29 within the ± 2 percent to be considered essentially equivalent to existing
30 conditions (Table 13-19). The exceptions to this are in September of dry and
31 critical water years, for which the model predicts substantial flow increases.
32 Nonetheless, along the middle Sacramento River, flow alterations could be
33 sufficient to substantially affect habitat of western pond turtle and riparian-
34 nesting birds as described for the upper Sacramento River (Impact Wild-17
35 (CP1)). This impact would be potentially significant.

36 Flow alterations may not be sufficient to measurably affect special-status
37 wildlife in the bypasses, along the Sacramento River downstream from Colusa,
38 or in the Delta, for several reasons:

- 39 • Flow alterations are more attenuated downstream by tributaries,
40 diversions, and bypasses, and the results of CalSim-II modeling
41 indicate little change in the frequency and duration of bypass
42 inundation.

- Downstream from Colusa, the river is confined to a narrow channel closely bordered by levees lined with riprap; thus, geomorphic processes and riparian habitats are relatively unresponsive to small changes in river flows.

The effects of flow alterations are unlikely to extend to the Delta because the Central Valley's reservoirs and diversions are managed as a single integrated system (consisting of the CVP and SWP). The CVP and SWP are managed to maintain standards for Delta inflow. CVP and SWP operations are constrained by USFWS's 2008 Formal ESA Consultation on the Proposed Coordinated Operations of the CVP and SWP (2008 USFWS BO) and NMFS's 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (2009 NMFS BO).

Thus, implementation of CP1 is not anticipated to cause an alteration in Sacramento River flow to the Delta sufficient to alter habitat for special-status wildlife species in the lower Sacramento River and Delta portion of the extended study area. However, because of the potential for substantial effects on western pond turtle and riparian-nesting birds in the lower Sacramento River (i.e., Red Bluff Pumping Plant to Colusa), this impact would be potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-24 (CP1): Impacts on Bank Swallow Along the Lower Sacramento River Resulting from Modifications of Geomorphic Processes Implementing CP1 would cause a small reduction in the magnitude, duration, and frequency of intermediate to large flows in the lower Sacramento River. This reduction also would alter the river's geomorphic processes. The rate of bank erosion would be reduced, but the length of eroding banks would not be substantially altered, and thus, nesting habitat for bank swallows would not decline substantially. High flows during the nesting season that may cause localized bank and nest failure would not increase. The impact on habitat for bank swallow nesting colonies, and therefore bank swallows themselves, would be less than significant.

There are more than 100 presumed extant colonies of bank swallow in Butte, Glenn, Colusa, Yuba, Yolo, Sutter, and Sacramento counties (CNDDDB 2012). The effect of CP1 on bank swallow along the lower Sacramento River would be similar to that described for the upper Sacramento River. There would be a small reduction in the rate of bank erosion, but not a substantial change in the amount of bank swallow nesting habitat, or increases in spring flows that may cause a substantial increase in localized nest failure. However, the effect of altered flow regimes on bank swallow nesting habitat along the lower Sacramento River would be smaller than the effect along the upper Sacramento River (described in Impact Wild-18 (CP1)). Flow alterations in the Sacramento River downstream from Red Bluff Pumping Plant would be attenuated by tributary inflow, and by other diversions and flood bypasses that would also alter instream flows. For these reasons, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

1 *Impact Wild-25 (CP1): Disturbance or Removal of Vernal Pool Habitat for*
2 *Special-Status Wildlife Along the Lower Sacramento River and in the Delta*
3 *from Changes in Flow Regime of the Sacramento River and Affected*
4 *Tributaries, and Changes in Seasonal Water Availability* Vernal pools are
5 present in upland areas near the Sacramento River and its tributaries in the
6 extended study area. These pools provide habitat for numerous special-status
7 species. Critical habitat for three special-status species (vernal pool fairy
8 shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp) is located
9 within the extended study area. Critical habitat for these species is confined to
10 vernal pool communities (USFWS 2006). However, vernal pools are generally
11 not present within the active floodplain of regulated rivers along the lower
12 Sacramento River and in the Delta. The largest increase in water surface
13 elevation predicted to occur under CP1 for locations in the lower river is about 4
14 inches at Verona in September of dry water years. This increase would not
15 result in river inundation of vernal pool habitat. Because all of the other
16 predicted increases in water surface elevation are less than this, vernal pool
17 special-status species would not likely be affected by changes in flow regime in
18 the extended study area. Because CP1 would not affect vernal pool habitat or
19 the species that occur within the habitat, no impact would occur. Mitigation for
20 this impact is not needed, and thus not proposed.

21 *Impact Wild-26 (CP1): Consistency with Local and Regional Plans with Goals*
22 *of Promoting Riparian Habitat Along the Lower Sacramento River and in the*
23 *Delta* Several conservation and management plans have been adopted in the
24 primary and extended study areas with goals of promoting riparian habitat along
25 the Sacramento River. Because flow regimes and riverine geomorphic processes
26 could be altered with project implementation, riparian habitat could be affected
27 in such a manner that the goals of the local and regional plans would be more
28 difficult to attain. Therefore, this impact would be potentially significant.

29 This impact is similar to Impact Wild-20 (CP1) for the upper Sacramento River.
30 For the same reasons as described for the upper Sacramento River, this impact
31 would be potentially significant. Mitigation for this impact is proposed in
32 Section 13.3.5.

33 **CVP/SWP Service Areas** Increased water supplies or increased supply
34 reliability could reduce a limitation on growth or on other activities that could
35 affect wildlife in the primary and extended study areas, potentially resulting in
36 significant effects. The effects of this growth would be analyzed in general plan
37 EIRs and in project-level CEQA compliance documents for the local
38 jurisdictions in which the growth would occur. Mitigation of these effects would
39 be the responsibility of these local jurisdictions, and not of Reclamation.

40 The expected increase in water yield relative to the entire CVP/SWP service
41 areas would be small, however. Assuming that this new yield could be provided
42 to any number of geographic areas within the CVP and SWP service areas, the
43 project's impact on growth that could affect wildlife habitat for sensitive species

1 would be minor. Similarly, projects potentially affecting sensitive habitats and
2 listed species would require permits from CDFW, USACE, and USFWS; it is
3 anticipated that effects on these resources would be avoided, minimized, and/or
4 mitigated during those agency consultations. Because the extent, location, and
5 timing of induced growth is currently highly uncertain, and in the future the
6 effects of this growth would be analyzed and mitigated during land use planning
7 and environmental review for specific projects, growth-inducing effects on
8 wildlife are not discussed further in this chapter. However, additional discussion
9 of growth-inducing effects specific to the project alternatives is provided in
10 Section 26.4, “Growth-Inducing Impacts,” in Chapter 26, “Other Required
11 Disclosures.”

12 *Impact Wild-27 (CP1): Impacts on Riparian-Associated or Aquatic Special-*
13 *Status Wildlife in the CVP/SWP Service Areas Resulting from Modifications to*
14 *Existing Flow Regimes* By altering storage and operations at several reservoirs
15 associated with the CVP and SWP service areas, CP1 would change flow
16 regimes in several downstream waterways. Modified flow regimes would
17 reduce the frequency, duration, and magnitude of intermediate to large flows
18 along the Sacramento River. The change in surface and subsurface hydrology
19 could affect habitats adjacent to the river channel that provide habitat for
20 special-status wildlife species. These changes are unlikely to result in
21 substantial effects on the distribution or abundance of riparian-associated or
22 aquatic special-status wildlife species in the CVP and SWP service areas
23 outside of the primary study area. Therefore, this impact would be less than
24 significant.

25 Several riparian-associated or aquatic special-status wildlife species may be
26 present in the CVP and SWP service areas, such as least Bell’s vireo and arroyo
27 toad. As discussed for the upper Sacramento River and the lower Sacramento
28 River and Delta under Impact Wild-17 (CP1) and Impact Wild-21 (CP1),
29 respectively, construction and operation of Shasta Dam has limited the
30 frequency and magnitude of intermediate to large flows in winter and spring,
31 and has increased flow volumes during the active growing season (primarily
32 March–October). Implementation of CP1 would be expected to amplify these
33 effects.

34 However, the effect of project-related alteration of flow regimes would
35 attenuate somewhat in the Sacramento River downstream from Red Bluff
36 Pumping Plant because of the inflows from tributaries, and because of other
37 diversions and flood bypasses. Effects of flow alterations from Shasta Dam are
38 also unlikely to extend to the CVP and SWP service areas because the
39 reservoirs and diversions are managed as a single integrated system (consisting
40 of the CVP and SWP). The CVP and SWP are managed to maintain standards
41 for Delta inflow. CVP and SWP operations are constrained by the 2008 USFWS
42 BO and NMFS’s 2009 BO. Thus, this project is not anticipated to sufficiently
43 alter flow to the CVP/SWP service areas to have a substantial effect on riparian
44 habitat upon which special-status wildlife species depend. Therefore, this

1 impact would be less than significant. Mitigation for this impact is not needed,
2 and thus not proposed.

3 **CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply**
4 **Reliability**

5 Like CP1, this comprehensive plan focuses on enlarging Shasta Dam and Shasta
6 Lake consistent with the goals of the 2000 CALFED ROD, and was formulated
7 for the primary purposes of increased water supply reliability and increased
8 survival of anadromous fish. In addition to the common features above, CP2
9 involves raising Shasta Dam 12.5 feet, an elevation change that would raise the
10 full pool by 14.5 feet (6 feet higher than under CP1) and would enlarge the total
11 storage space in the reservoir by 443,000 acre-feet.

12 With respect to wildlife impacts, dam construction activities for CP1 through
13 CP5 would be so similar that they are considered to be identical for purposes of
14 this analysis. Because CP2 would result in higher lake levels than CP1, CP2
15 would also require more relocation of utilities, public service facilities, and
16 recreational facilities than CP1, including a loss of up to 35 acres of limestone
17 habitat and 2,870 acres of nonlimestone habitat. Because CP2 would result in
18 higher lake levels than CP1, CP2 would also result in a larger (and deeper) area
19 of inundation than CP1, in turn requiring more vegetation clearing within the
20 inundation area than CP1.

21 **Shasta Lake and Vicinity**

22 *Impact Wild-1 (CP2): Take and Loss of Habitat for the Shasta Salamander*
23 Ground-disturbing activities associated with construction could result in direct
24 take of the Shasta salamander, a State-listed species, USFS sensitive species,
25 survey and manage species, MSCS-covered species, and BLM sensitive species.
26 In addition, the raising of Shasta Dam would result in the inundation of habitat
27 for this species. This impact would be significant.

28 Impacts caused by construction and vegetation clearing for the dam and
29 relocation areas would be similar to CP1. However, inundation caused by a
30 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
31 for the Shasta salamander. This impact would be significant.

32 Inundation resulting from a 12.5-foot dam raise would result in a loss of
33 approximately 10 acres of limestone habitat and 1,666 acres of nonlimestone
34 habitat. Impacts to limestone and nonlimestone habitats in the impoundment
35 area are summarized in Table 13-20.

Table 13-20. Impacts on Suitable Habitat for the Shasta Salamander in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Limestone	0.00	1.14	0.00	7.64	0.00	2.06
Nonlimestone	309.64	59.64	485.89	282.19	170.34	358.90
Total	309.64	60.78	485.89	289.83	170.34	360.96

Note:

*Acreage values are approximate.

Shasta salamander surveys are ongoing, and it is anticipated that these surveys will provide additional information about the species' range and habitat associations as well as the presence or absence of the species within individual construction footprints. Additional impact analysis will be conducted in relation to suitable habitats available in the Shasta Lake watershed or in the species' range, if appropriate. Direct and indirect impacts based on those results will be reported in the Final EIS. Additionally, temporary impacts will be analyzed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-2 (CP2): Impact on the Foothill Yellow-Legged Frog and Tailed Frog and Their Habitat Ground-disturbing activities associated with construction could result in direct take (e.g., because of operation of equipment in or adjacent to riverine or riparian habitat) of the foothill yellow-legged frog, a California species of special concern, a USFS sensitive species, an MSCS-covered species, and a BLM sensitive species, and of the tailed frog, a California species of special concern. In addition, the raising of Shasta Dam would result in the conversion of suitable riverine and riparian habitat to unsuitable lacustrine habitat. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by a 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for the foothill yellow-legged and tailed frogs. This impact would be potentially significant.

Implementation of a 12.5-foot raise of the dam would result in inundation of approximately 44 acres of habitat for the foothill yellow-legged frog and tailed frog. A summary of suitable habitat loss by arm is presented in Table 13-21.

Table 13-21. Impacts on Suitable Habitat for the Foothill Yellow-Legged and Tailed Frog in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Riverine	0.00	0.42	4.02	4.51	0.84	0.00
Total	2.72	3.65	24.59	10.63	1.84	1.19

Note:

*Acreage values are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-3 (CP2): Impact on the Northwestern Pond Turtle and Its Habitat
 Ground-disturbing activities associated with construction could result in direct take (e.g., because of operation of equipment in or adjacent to riverine or riparian habitat) of the northwestern pond turtle, an MSCS-covered species, a California species of special concern, and a USFS sensitive species. In addition, project implementation could result in the degradation of suitable aquatic habitat because of increased erosion and sedimentation. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by a 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for the northwestern pond turtle. This impact would be potentially significant.

Implementation of a 12.5-foot raise of the dam would result in conversion of approximately 35 acres of montane riparian and 9 acres of riverine habitat to lacustrine habitat. Because there are equally valuable components lost or gained in either habitat, the quality of the habitat would not be compromised. However, maximum lake inundation would be infrequent (at most 1 month per year) and would not benefit the species throughout the remainder of the year. Thus, the conversion to lacustrine remains an impact on northwestern pond turtle habitat. A summary of suitable habitat loss by arm is presented in Table 13-22.

Table 13-22. Impacts on Suitable Habitat for the Northwestern Pond Turtle in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Riverine	0.00	0.42	4.02	4.51	0.84	0.00
Total	2.72	3.65	24.59	10.63	1.84	1.19

Note:

*Acreage values are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed or in the species range. Analysis impacts on upland habitats will be quantified. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-4 (CP2): Impact on the American Peregrine Falcon Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of American peregrine falcons, a State fully protected species and MSCS-covered species. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by a 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for the American peregrine falcon.

Similar to CP1, overstory and complete vegetation removal is expected to occur within the impoundment area in suitable cliff habitat. Thus, overstory vegetation removal occurring in or near suitable cliff habitat during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests. Additionally, because of the steep terrain, trees would be yarded by helicopter. Noise generated by chainsaws and helicopter yarding could cause the abandonment of nests, resulting in the incidental loss of fertile eggs or nestlings. This impact would be potentially significant.

No known eyries would be inundated with a 12.5-foot raise in lake elevation; however, 14.5 vertical feet (full pool) of cliff habitat would be inundated. Based on the large area required for suitable nesting habitat for peregrine falcons, impacts on suitable cliff habitat for nesting would be less than significant. The conversion of uplands to lacustrine habitat would not adversely affect foraging

1 habitat for the species because they frequently forage over water. Mitigation for
2 this impact is proposed in Section 13.3.5.

3 *Impact Wild-5 (CP2): Take and Loss of Habitat for the Bald Eagle*

4 Construction activities and vegetation removal associated with the construction
5 of raising the dam, construction activities in the relocation areas, and removal of
6 various amounts of vegetation in the impoundment areas in addition to
7 inundation caused by the raising of Shasta Dam during the nesting season would
8 result in the loss of nest and perch trees used by the bald eagle, a State-listed
9 species, fully protected species, and USFS sensitive species, an MSCS-covered
10 species, and a BLM sensitive species. This impact would be significant.

11 Impacts caused by construction and vegetation clearing for the dam and
12 relocation areas would be similar to CP1. However, inundation caused by a
13 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
14 for the bald eagle. This impact would be potentially significant.

15 Six known bald eagle nest trees would be affected by a 12.5-foot dam raise due
16 to inundation. When inundation occurs, nest trees within the impoundment area
17 would die. Because peak inundation generally occurs in late April or early June,
18 nest trees would be flooded toward the end of the nesting season. If eagles were
19 nesting in these trees, it would be likely that young would fledge before the nest
20 tree died from the effects of inundation. Because of inundation timing, it is not
21 likely that individuals would be affected. Because bald eagles generally use the
22 same nest for multiple years, the loss of nest trees would be a significant impact.

23 Inundation could also affect erosion and bank stability, which could affect nest
24 trees that are in close proximity to the impoundment area. This would be a
25 potentially significant impact.

26 Inundation resulting from a 12.5-foot dam raise would result in a loss of
27 approximately 1,132 acres of bald eagle nesting and roosting habitat. Impacts
28 on suitable bald eagle habitat by CWHR type in the impoundment area are
29 summarized in Table 13-23.

1 **Table 13-23. Impacts on Suitable Habitat for the Bald Eagle in the Impoundment**
2 **Area (12.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.65
Blue oak–foothill pine	7.05	0.00	0.00	0.00	2.46	5.27
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Montane hardwood	53.30	25.75	120.47	48.59	13.31	1.77
Montane hardwood–conifer	48.77	0.70	99.06	94.36	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total	263.88	51.21	363.82	263.88	130.26	58.53

Note:
*Acres are approximate.

3 Additional analysis of impacts will be conducted in relation to suitable habitats
4 available in the Shasta Lake watershed. Bald eagle nesting activity changes
5 from year to year. The number of bald eagle nests is subject to change based on
6 eagle activity at the time of construction and the subsequent inundation.
7 Reclamation is currently working with USFS to determine the current eagle
8 activity to revise the number of nest trees that may be impacted. Indirect and
9 temporary impacts will be analyzed in the Final EIS. Mitigation for this impact
10 is proposed in Section 13.3.5.

11 *Impact Wild-6 (CP2): Take and Loss of Nesting and Foraging Habitat for the*
12 *Northern Spotted Owl* Construction activities and vegetation removal
13 associated with the construction of raising the dam, construction activities in the
14 relocation areas, and removal of various amounts of vegetation in the
15 impoundment areas during the nesting season could result in the incidental loss
16 of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the
17 northern spotted owl, a Federally listed as threatened species and MSCS-
18 covered species. In addition, inundation caused by the raising of Shasta Dam
19 would result in the loss of habitat for this species. This impact would be
20 potentially significant.

21 Impacts caused by construction and vegetation clearing for the dam and
22 relocation areas would be similar to CP1. However, inundation caused by a
23 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
24 for the northern spotted owl. This impact would be potentially significant.

25 Inundation resulting from a 12.5-foot dam raise would result in a loss of
26 approximately 1,080 acres of nesting and foraging habitat for the northern
27 spotted owl. Impacts on suitable habitat for the spotted owl by CWHR type in
28 the impoundment area are summarized in Table 13-24.

Table 13-24. Impacts on Suitable Habitat for the Northern Spotted Owl in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Montane hardwood	53.30	25.75	120.48	48.59	13.31	1.77
Montane hardwood-conifer	48.77	0.70	99.06	94.36	78.41	7.73
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total	254.11	47.99	343.25	257.73	126.80	50.42

Note:

*Acres are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-7 (CP2): Impact on the Purple Martin and Its Nesting Habitat

Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of purple martins, a California species of special concern. In addition, inundation caused by the raising of Shasta Dam would result in the loss of nest trees. This impact would be significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. Similar to CP1, nest trees occurring in the lake could be adversely affected by inundation and related vegetation removal. These impacts would be potentially significant.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-8 (CP2): Impacts on the Willow Flycatcher, Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat

Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the willow flycatcher, a State-listed as endangered species, USFS sensitive species, and MSCS-covered species; the Vaux's swift, a California species of special concern; and the yellow warbler and yellow-breasted chat, both California species of special concern and MSCS-

covered species. In addition, the raising of Shasta Dam would result in the loss of habitat, including nesting habitat, for these species. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by a 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for these species. This impact would be potentially significant.

Inundation resulting from a 12.5-foot dam raise would result in a loss of approximately 1,115 acres of Vaux’s swift nesting and foraging habitat in the impoundment area. Additionally, approximately 35 acres of willow flycatcher, yellow warbler, and yellow-breasted chat habitat would be lost in the impoundment area.

Impacts on suitable habitats for the willow flycatcher, Vaux’s swifts, yellow warbler, and yellow-breasted chat habitat by CWHR type in the impoundment area is summarized in Table 13-25.

Table 13-25. Impacts on Suitable Habitat for the Willow Flycatcher, Vaux’s Swift, Yellow Warbler, and Yellow-Breasted Chat in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Vaux’s Swift						
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Montane hardwood	53.30	25.75	120.48	48.59	13.31	1.77
Montane hardwood–conifer	48.77	0.70	99.06	94.36	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total Vaux’s Swift Habitat	256.83	51.22	363.82	263.85	127.80	51.61
Willow Flycatcher, Yellow Warbler, and Yellow-Breasted Chat						
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Total Habitat	2.72	3.23	20.57	6.12	1.00	1.19

Note:

*Acres are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-9 (CP2): Impacts on the Long-Eared Owl, Northern Goshawk, Cooper’s Hawk, Great Blue Heron, and Osprey and Their Foraging and Nesting Habitat Construction activities and vegetation removal associated with

1 the construction of raising the dam, construction activities in the relocation
2 areas, and removal of various amounts of vegetation in the impoundment areas
3 during the nesting season could result in the incidental loss of fertile eggs or
4 nestlings or otherwise lead to the abandonment of nests of the long-eared owl, a
5 California species of special concern and an MSCS-covered species; the
6 northern goshawk, a California species of special concern, a USFS sensitive
7 species, and a BLM sensitive species; the Cooper's hawk, an MSCS-covered
8 species; the great blue heron, an MSCS-covered species; and the osprey, an
9 MSCS-covered species. In addition, the raising of Shasta Dam would result in
10 the loss of foraging and nesting habitat for these species. This impact would be
11 potentially significant.

12 Impacts caused by construction and vegetation clearing for the dam and
13 relocation areas would be similar to CP1. However, inundation caused by a
14 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
15 for these species. This impact would be potentially significant.

16 Inundation resulting from a 12.5-foot dam raise would result in a loss of
17 approximately 817 acres of nesting and foraging habitat for long-eared owl and
18 northern goshawk, approximately 1,473 acres of nesting and foraging habitat for
19 the Cooper's hawk, and approximately 1,473 acres of nesting habitat for the
20 great blue heron. Foraging habitat would increase for osprey and great blue
21 heron. No impact to foraging habitat for these species would occur.

22 Impacts on suitable habitat by CWHR type in the impoundment area are
23 summarized in Table 13-26.

1 **Table 13-26. Impacts on Suitable Habitat for the Long-Eared Owl, Northern**
 2 **Goshawk, Cooper’s Hawk, and Great Blue Heron in the Impoundment Area (12.5-**
 3 **Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Long-Eared Owl and Northern Goshawk						
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Montane hardwood–conifer	48.77	0.70	99.06	94.36	78.41	7.73
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total Habitat	200.81	22.23	222.77	209.13	113.49	48.65
Cooper’s Hawk and Great Blue Heron						
Blue oak–foothill pine	7.05	0.00	0.00	0.00	2.46	5.27
Closed-cone pine–cypress	24.40	0.00	8.95	14.89	32.72	262.31
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Montane hardwood	53.30	25.75	120.48	48.59	13.31	1.77
Montane hardwood–conifer	48.77	0.70	99.06	94.36	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total Habitat	288.28	51.22	372.77	278.81	162.98	319.19

Note:
*Acres are approximate.

4 Impacts to osprey would be the same as described for CP1. There are 54 osprey
 5 nests within the perimeter of Shasta Lake. Six nest trees would be affected by a
 6 12.5-foot dam raise and 11 nests are located in relocation areas. Removal of
 7 nest trees would be a potentially significant impact. Because osprey generally
 8 use the same nest for multiple years, the loss of 17 nest trees (31 percent of the
 9 total in the Shasta Lake and vicinity) between the impoundment area and
 10 relocation areas would be a potentially significant impact.

11 Additional analysis of impacts will be conducted in relation to suitable habitats
 12 available in the Shasta Lake watershed. Osprey nesting activity changes from
 13 year to year. The number of osprey nests is subject to change based on current
 14 eagle activity at the time of construction and the subsequent inundation. An
 15 analysis of indirect impacts and temporary impacts will be completed in the
 16 Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

17 *Impact Wild-10 (CP2): Take and Loss of Habitat for the Pacific Fisher*
 18 Construction activities and vegetation removal associated with the construction
 19 of raising the dam, construction activities in the relocation areas, and removal of
 20 various amounts of vegetation in the impoundment areas would result in a loss
 21 of habitat for the Pacific fisher, a Federal candidate for listing, a California
 22 species of special concern, a USFS sensitive species, and a BLM sensitive
 23 species. Furthermore, take (including mortality of individuals because of

1 destruction or disturbance of active roost sites or dens) could result from
 2 construction activities and vegetation clearing. This impact would be potentially
 3 significant.

4 Impacts caused by construction and vegetation clearing for the dam and
 5 relocation areas would be similar to CP1. However, inundation caused by a
 6 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
 7 for these species. This impact would be potentially significant.

8 Inundation resulting from a 12.5-foot dam raise would result in a loss of
 9 approximately 852 acres of Pacific fisher habitat.

10 Impacts on suitable habitat by CWHR type in the impoundment area are
 11 summarized in Table 13-27.

12 **Table 13-27. Impacts on Suitable Habitat for the Pacific Fisher in the**
 13 **Impoundment Area (12.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Montane hardwood-conifer	48.77	0.70	99.06	94.36	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total Habitat	203.53	25.47	243.34	215.23	114.49	49.84

Note:

*Acres are approximate.

14 Additional analysis of impacts will be conducted in relation to suitable habitats
 15 available in the Shasta Lake watershed. An analysis of indirect impacts and
 16 temporary impacts will be completed in the Final EIS. Mitigation for this
 17 impact is proposed in Section 13.3.5.

18 *Impact Wild-11 (CP2): Impacts on Special-Status Bats (Pallid Bat, Spotted Bat,*
 19 *Western Red Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, Long-Eared*
 20 *Myotis, and Yuma Myotis), the American Marten, and Ringtail and Their*
 21 *Habitat* Construction activities and vegetation removal associated with the
 22 construction of raising the dam, construction activities in the relocation areas,
 23 and removal of various amounts of vegetation in the impoundment areas would
 24 result in a loss of habitat for the pallid bat, a California species of special
 25 concern, a USFS sensitive species, and a BLM sensitive species; the western red
 26 bat, a USFS sensitive species; the western mastiff bat, a California species of
 27 special concern, an MSCS-covered species, and a BLM sensitive species; the

1 Townsend's big-eared bat, a California species of special concern, a USFS
2 sensitive species, and a BLM sensitive species; the long-eared myotis, a BLM
3 sensitive species; the Yuma myotis, a BLM sensitive species; the American
4 marten, a USFS sensitive species; and the ringtail, a State fully protected and
5 MSCS-covered species. Furthermore, take (including mortality of individuals
6 because of destruction or disturbance of active roost sites or dens) could result
7 from construction activities and vegetation clearing. This impact would be
8 potentially significant.

9 Impacts caused by construction and vegetation clearing for the dam and
10 relocation areas would be similar to CP1. However, inundation caused by a
11 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
12 for these species. This impact would be potentially significant.

13 Dam construction, vegetation removal, and construction in the relocation areas,
14 and inundation resulting from a 12.5-foot dam raise would result in the loss of
15 approximately 18 acres of reproductive and roosting habitat for the pallid bat,
16 spotted bat, western mastiff bat, Townsend's big-eared bat, and Yuma myotis in
17 the impoundment area. Additionally, one limestone cave located on the Big
18 Backbone Arm that is a known Townsend's big-eared bat roost would be
19 affected by flooding. A 12.5-foot dam raise would result in the loss of
20 approximately 1,677 acres of reproductive and roosting habitat for the western
21 red bat and long-eared myotis. These impacts would be potentially significant.

22 Dam construction, vegetation removal, and inundation resulting from a 12.5-
23 foot dam raise would result in the loss of approximately 1,677 acres of ringtail
24 habitat. A 12.5-foot dam raise would result in the loss of approximately 852
25 acres of American martin habitat in the impoundment area. These impacts
26 would be potentially significant.

27 Impacts on suitable habitat by CWHR type in the impoundment area are
28 summarized in Table 13-28.

1 **Table 13-28. Impacts on Suitable Habitat for Special-Status Bats, American**
2 **Marten, and Ringtail in the Impoundment Area (12.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Pallid Bat, Spotted Bat, Western Mastiff Bat, Townsend's Big-Eared Bat and, Yuma Myotis						
Barren	0.77	0.89 ¹	0.36	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.65
Blue oak-foothill pine	7.05	0.00	0.00	0.00	2.46	5.27
Total	7.82	0.00	0.36	0.00	2.46	6.92
Western Red Bat, Long-Eared Myotis, and Ringtail						
Barren	0.77	0.00	0.36	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.65
Blue oak-foothill pine	7.05	0.00	0.00	0.00	2.46	5.27
Closed-cone pine-cypress	24.40	0.00	8.95	14.89	32.72	262.31
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Mixed chaparral	20.58	9.56	112.76	10.97	7.35	40.11
Montane hardwood	53.30	25.75	120.48	45.31	13.31	1.77
Montane hardwood-conifer	48.77	0.70	99.06	97.70	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.78	35.08	40.92
Total Habitat	309.64	60.78	485.90	289.83	170.34	360.96
American Marten						
Douglas-fir	0.00	0.00	0.00	0.01	0.00	0.00
Montane hardwood-conifer	34.65	0.50	69.23	66.31	55.70	5.68
Montane riparian	1.54	2.48	15.92	4.60	0.58	0.80
Ponderosa pine	108.93	15.36	84.75	81.20	25.06	29.93
Total Habitat	145.13	18.34	169.90	152.12	81.34	36.41

Notes:

*Acres are approximate.

¹ Represents the amount of the limestone outcrop impacted at the Big Backbone Arm cave location.

3 Additional analysis of impacts will be conducted in relation to suitable habitats
4 available in the Shasta Lake watershed. An analysis of indirect impacts and
5 temporary impacts will be completed in subsequent documents. Mitigation for
6 this impact is proposed in Section 13.3.5.

7 *Impact Wild-12 (CP2): Impacts on Special-Status Terrestrial Mollusks (Shasta*
8 *Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their*
9 *Habitat* All of these species are designated USFS sensitive and survey and
10 manage species and are proposed for Federal listing. The Shasta sideband is

also an MSCS-covered species. Ground-disturbing activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas could result in direct take and/or loss of suitable habitat for special-status terrestrial mollusks. In addition, the raising of Shasta Dam would result in the inundation of suitable habitat and direct take of this species. This would be a significant impact.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by a 12.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for these species. This impact would be potentially significant.

Inundation resulting from a 12.5-foot dam raise would result in the loss of approximately 1,677 acres of Shasta chaparral habitat and 35 acres of Shasta hesperian habitat in the impoundment area. Approximately 7 acres of Shasta sideband habitat and 2 acres of Wintu sideband would be lost. These impacts would be potentially significant.

Impacts on suitable habitat by CWHR type in the impoundment area are summarized in Table 13-29.

Table 13-29. Impacts on Suitable Habitat for Special-Status Terrestrial Mollusks in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area: Shasta Sideband						
Limestone	0.00	0.00	0.00	7.64	0.00	0.00
Impoundment Area: Wintu Sideband						
Limestone	0.00	0.00	0.00	0.00	0.00	2.06
Impoundment Area: Shasta Chaparral						
Barren	0.77	0.00	0.36	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.65
Blue oak–foothill pine	7.05	0.00	0.00	0.00	2.46	5.27
Closed-cone pine–cypress	24.40	0.00	8.95	14.96	32.72	262.31
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Mixed chaparral	20.58	9.56	112.76	11.02	7.35	40.11
Montane hardwood	53.30	25.75	120.47	48.59	13.31	1.77
Montane hardwood–conifer	48.77	0.70	99.06	94.36	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Total Habitat	310.00	60.78	485.89	289.83	170.34	360.96

1 **Table 13-29. Impacts on Suitable Habitat for Special-Status Terrestrial**
 2 **Mollusks in the Impoundment Area (12.5-Foot Dam Raise) (contd.)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area: Shasta Hesperian						
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Total Habitat	2.72	3.23	20.57	6.12	1.00	1.19

Note:
 *Acres are approximate.

3 Additional analysis of impacts will be conducted in relation to suitable habitats
 4 available in the Shasta Lake watershed. An analysis of indirect impacts and
 5 temporary impacts will be completed in the Final EIS. Mitigation for this
 6 impact is proposed in Section 13.3.5.

7 *Impact Wild-13 (CP2): Permanent Loss of General Wildlife Habitat*
 8 Construction activities and vegetation removal associated with the construction
 9 of raising the dam, construction activities in the relocation areas, and removal of
 10 various amounts of vegetation in the impoundment areas would result in a
 11 permanent loss of habitat. In addition, inundation caused by the raising of
 12 Shasta Dam would result in a permanent loss of habitat. This would be a
 13 potentially significant impact.

14 Impacts caused by construction and vegetation clearing for the dam and
 15 relocation areas would be similar to CP1. However, inundation caused by a
 16 12.5-foot raise of Shasta Dam would result in a greater loss of general wildlife
 17 habitat. This impact would be potentially significant.

18 Inundation resulting from a 12.5-foot dam raise would result in a loss of
 19 approximately 1,723 acres of general wildlife habitat in the impoundment area.
 20 Impacts on general wildlife habitat by CWHR type in the impoundment area are
 21 summarized in Table 13-30.

Table 13-30. Impacts on CWHR Habitats in the Impoundment Area (12.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Annual grassland	0.36	0.00	1.53	0.53	0.00	0.00
Barren	1.40	0.00	5.58	1.86	0.00	2.56
Blue oak–foothill pine	7.05	0.00	0.00	0.00	2.46	5.27
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.65
Closed-cone pine–cypress	24.40	0.00	8.95	14.96	32.72	262.31
Douglas-fir	0.00	0.00	0.00	0.06	0.00	0.00
Mixed chaparral	20.58	9.56	112.76	11.02	7.35	40.11
Montane hardwood	53.30	25.75	120.48	48.59	13.31	1.77
Montane hardwood–conifer	48.77	0.70	99.06	94.36	78.41	7.73
Montane riparian	2.72	3.23	20.57	6.12	1.00	1.19
Ponderosa pine	152.04	21.54	123.71	114.71	35.08	40.92
Riverine	0.00	0.42	4.02	4.51	0.84	0.00
Urban	16.65	0.00	1.63	6.42	0.00	1.24
Total	327.28	61.20	498.30	303.14	171.18	364.75

Note:

*Acres are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-14 (CP2): Impacts on Other Birds of Prey (i.e., red-tailed hawk and red-shouldered hawk) and Migratory Bird Species (i.e., American robin, Anna’s hummingbird) and their Foraging and Nesting Habitat Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of other birds of prey and migratory bird species. In addition, inundation caused by the raising of Shasta Dam could result in the loss of active nests and habitat for these species. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by a 12.5-foot raise of Shasta Dam would result in greater impacts on nesting migratory birds and raptors. This impact would be potentially significant.

1 Additional analysis of impacts will be conducted in relation to suitable habitats
2 available in the Shasta Lake watershed. An analysis of indirect impacts and
3 temporary impacts will be completed in the Final EIS. Mitigation for this
4 impact is proposed in Section 13.3.5.

5 *Impact Wild-15 (CP2): Loss of Critical Deer Winter and Fawning Range*
6 Construction activities and vegetation removal associated with the construction
7 of raising the dam, construction activities in the relocation areas, and removal of
8 various amounts of vegetation in the impoundment areas would result in a loss
9 of critical deer winter and fawning range. In addition, inundation caused by the
10 raising of Shasta Dam would result in the loss of critical deer range. This would
11 be a potentially significant impact.

12 Impacts caused by construction and vegetation clearing for the dam and
13 relocation areas would be similar to CP1. However, inundation caused by a
14 12.5-foot raise of Shasta Dam would result in the loss of approximately 4,446
15 acres of critical deer winter and/or fawning range. This impact would be
16 potentially significant.

17 Additional analysis of impacts will be conducted in relation to suitable habitats
18 available in the Shasta Lake watershed. An analysis of indirect impacts and
19 temporary impacts will be completed in the Final EIS. Mitigation for this
20 impact is proposed in Section 13.3.5.

21 *Impact Wild-16 (CP2): Take and Loss of the California Red-Legged Frog*
22 Reclamation is concurrently completing an assessment of California red-legged
23 frog habitat in coordination with the USFWS. The assessment results will
24 enable Reclamation and the USFWS to determine if habitat for the species
25 occurs, if impacts are anticipated, and if additional surveys are needed. Impacts
26 on the California red-legged frog will be assessed if surveys are conducted and
27 the California red-legged frog is found. Impacts for each alternative will not be
28 assessed until USFWS has determined whether suitable habitat is present and
29 whether surveys would be required. Mitigation for this impact is discussed in
30 Section 13.3.5.

31 **Upper Sacramento River (Shasta Dam to Red Bluff)**

32 *Impact Wild-17 (CP2): Impacts on Riparian-Associated Special-Status Wildlife*
33 *Resulting from Modifications to the Existing Flow Regime in the Primary Study*
34 *Area* Implementing CP2 would increase available water storage in Shasta
35 Reservoir and result in a modified flow regime. This modification would reduce
36 the frequency, duration, and magnitude of intermediate to large flows
37 downstream from Shasta Dam from December through January in most types of
38 water years, extending through March in above-normal water years. Conversely,
39 CP2 would increase the volume of flows from summer through fall of most
40 years, especially in dry and critical water years. One of the goals of CP2 is to
41 improve water supply during the driest of years, so this increase is not
42 unexpected. This change in surface and subsurface hydrology could affect

1 habitats adjacent to the river channel and reduce the long-term formation of off-
2 channel habitats, which would adversely affect the habitat of western pond
3 turtle. Although the total amount of riparian vegetation would not decline
4 substantially, the portion in early successional stages would be reduced. These
5 early successional stages provide habitat for some special-status wildlife
6 species. These changes could result in substantial effects on the distribution or
7 abundance of riparian-nesting special-status bird species. Because CP2 would
8 substantially alter habitat for a variety of riparian-dependent special-status
9 species, this impact would be potentially significant.

10 This impact would be similar to Impact Wild-17 (CP1). CP2 would affect
11 habitat for sensitive species through the same pathways (alteration of off-
12 channel habitat for western pond turtles, changes to successional patterns of
13 vegetation) as discussed for CP1. The only difference between the two is the
14 extent of the impact. Under CP2, the reductions in winter flows would be both
15 more frequent and of larger magnitude than modeled to occur under CP1. In all
16 water year types (except below-normal years and December of critical years),
17 flows would be reduced by CP2 in December and January by on average about
18 2.2 and 8.0 percent. In above-normal years, this extends through February (-6.3
19 percent) and March (-5.2 percent) (Table 13-31). This impact would be
20 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

Table 13-31. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP2

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Keswick												
Wet	1.2%	2.0%	-8.0%	-4.7%	-1.3%	0.4%	0.3%	0.4%	0.5%	0.5%	0.7%	0.9%
Above Normal	3.6%	0.0%	-2.5%	-2.2%	-6.3%	-5.2%	0.1%	-3.0%	-3.2%	0.3%	0.9%	8.6%
Below Normal	2.7%	-0.6%	-0.8%	-1.6%	-1.2%	-1.8%	0.5%	-4.0%	1.3%	0.1%	0.3%	1.3%
Dry	5.8%	5.3%	-2.8%	-3.3%	-0.6%	0.0%	1.8%	2.2%	3.9%	2.5%	4.9%	7.3%
Critical	3.6%	6.5%	1.5%	2.4%	1.6%	0.9%	0.9%	1.3%	0.8%	3.6%	-0.2%	9.4%
Bend Bridge												
Wet	1.1%	2.3%	-4.2%	-2.0%	-0.8%	0.3%	0.2%	0.4%	0.5%	0.4%	0.6%	0.8%
Above Normal	2.8%	-0.4%	-0.9%	-1.2%	-3.5%	-2.9%	0.1%	-2.0%	-2.4%	0.3%	0.8%	8.2%
Below Normal	2.4%	0.0%	-0.5%	-0.9%	-0.7%	-1.3%	0.4%	-2.6%	1.2%	0.1%	0.2%	1.2%
Dry	4.8%	4.6%	-1.5%	-1.6%	-0.3%	0.0%	1.4%	1.8%	3.7%	2.5%	4.8%	6.7%
Critical	2.7%	5.3%	1.3%	2.1%	1.4%	0.7%	0.8%	1.2%	0.7%	3.5%	-0.2%	8.6%
Butte City												
Wet	1.2%	3.0%	-3.2%	-1.2%	-0.5%	0.2%	0.2%	0.1%	0.3%	0.3%	0.6%	0.7%
Above Normal	3.3%	0.0%	-0.6%	-0.9%	-2.6%	-1.9%	0.2%	-2.6%	-2.8%	0.0%	0.7%	8.8%
Below Normal	2.5%	0.3%	-0.3%	-1.1%	-0.4%	-1.1%	-0.2%	-2.5%	1.6%	-0.1%	0.1%	0.9%
Dry	5.3%	5.0%	-1.1%	-1.0%	0.1%	-0.1%	2.2%	1.9%	5.3%	3.4%	6.6%	6.8%
Critical	2.5%	5.8%	1.3%	1.7%	1.3%	0.6%	1.1%	1.7%	1.0%	5.4%	-0.1%	8.6%
Wilkins Slough												
Wet	1.2%	3.2%	-2.0%	-0.5%	-0.1%	0.3%	0.2%	0.1%	0.3%	0.3%	0.6%	0.7%
Above Normal	3.3%	0.0%	-0.6%	-0.7%	-1.3%	-0.9%	0.2%	-2.6%	-2.8%	0.0%	0.7%	8.8%
Below Normal	2.5%	0.3%	0.0%	-1.1%	0.1%	-1.1%	-0.2%	-2.5%	1.6%	-0.1%	0.1%	0.9%
Dry	5.3%	5.0%	-1.1%	-0.9%	0.0%	-0.1%	2.2%	1.9%	5.3%	3.4%	6.6%	6.8%
Critical	2.5%	5.8%	1.3%	1.7%	1.3%	0.6%	1.1%	1.7%	1.0%	5.4%	-0.1%	8.6%
Verona												
Wet	0.4%	2.4%	-1.8%	-0.4%	-0.1%	0.2%	0.1%	0.0%	0.2%	0.0%	0.0%	0.4%
Above Normal	2.2%	0.7%	-0.5%	-0.4%	-1.7%	-0.5%	0.1%	-1.1%	-1.6%	0.0%	0.4%	3.5%
Below Normal	1.4%	1.0%	-0.5%	-0.4%	0.1%	-0.7%	-0.1%	-1.0%	1.6%	-0.1%	0.1%	-0.3%
Dry	3.2%	3.7%	-1.1%	-0.5%	-0.1%	0.0%	1.3%	1.0%	-1.5%	2.6%	3.4%	10.1%
Critical	0.7%	4.1%	0.8%	1.3%	0.8%	0.3%	0.7%	2.0%	1.2%	6.2%	-1.4%	5.4%

Table 13-31. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP2 (contd.)

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Freeport												
Wet	0.4%	0.7%	-0.3%	-0.4%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Above Normal	1.9%	-0.4%	-0.1%	0.2%	-0.4%	-0.4%	0.1%	-0.9%	-1.3%	-0.1%	0.1%	0.6%
Below Normal	0.4%	0.2%	0.3%	0.5%	0.2%	-0.5%	0.2%	-1.1%	0.4%	-0.3%	-0.4%	0.2%
Dry	2.3%	2.8%	-0.7%	-0.3%	0.1%	0.1%	1.0%	0.7%	-0.5%	1.7%	2.8%	8.0%
Critical	-0.1%	2.8%	1.0%	1.5%	0.7%	0.0%	0.7%	0.9%	0.0%	2.1%	0.6%	3.6%

1 *Impact Wild-18 (CP2): Impacts on Bank Swallow in the Primary Study Area*
2 *Resulting from Modifications of Geomorphic Processes* Implementing CP2
3 would cause a small reduction in the magnitude, duration, and frequency of
4 intermediate to large flows in the Sacramento River in the primary study area.
5 This reduction also would alter the river's geomorphic processes, including the
6 rate of bank erosion. However, the length of eroding banks would not be
7 substantially altered, and thus, nesting habitat for bank swallows would not
8 decline substantially. High flows during the nesting season that may cause
9 localized nest failure would not increase substantially (generally less than an
10 average of a 3-inch increase in water surface elevation in the worst case). For
11 these reasons, the impact on habitat for bank swallow nesting colonies would be
12 less than significant.

13 This impact would be similar to Impact Wild-18 (CP1). The extent of the
14 impact could be greater under CP2 than under CP1 because reductions in
15 channel-forming flows could be more extensive than under CP1. Nonetheless,
16 for the same reasons as discussed for CP1, this impact would be less than
17 significant. Mitigation for this impact is not needed, and thus not proposed.

18 *Impact Wild-19 (CP2): Disturbance or Removal of Vernal Pool Habitat for*
19 *Special-Status Wildlife from Changes in Flow Regime* As mentioned in Impact
20 Wild-19 (CP1), vernal pools are generally not present within the active
21 floodplain of the upper Sacramento River in the primary study area; vernal
22 pools are found in upland locations outside of the main river channel and the
23 floodplain. Thus, vernal pools are not anticipated to be affected by changes in
24 flows that could result from implementation of CP2. Because CP2 would not
25 affect vernal pool habitat or the species that occur within the habitat, no impact
26 would occur. Mitigation for this impact is not needed, and thus not proposed.

27 *Impact Wild-20 (CP2): Consistency with Local and Regional Plans with Goals*
28 *of Promoting Riparian Habitat in the Primary Study Area* Several
29 conservation and management plans have been adopted in the primary and
30 extended study areas with goals of promoting riparian habitat along the
31 Sacramento River. Because flow regimes and riverine geomorphic processes
32 could be altered with project implementation, riparian habitat could be affected
33 in such a manner that the goals of the local and regional plans would be more
34 difficult to attain. Therefore, this impact would be potentially significant.

35 This impact would be similar to Impact Wild-20 (CP1). The extent of the
36 impact could be greater under CP2 than under CP1. This impact would be
37 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

38 *Impact Wild-21 (CP2): Impacts on Riparian-Associated Special-Status Wildlife*
39 *Resulting from the Gravel Augmentation Program* Gravel augmentation is not
40 included as part of CP2. Therefore, no impact would occur. Mitigation for this
41 impact is not needed, and thus not proposed.

1 *Impact Wild-22 (CP2): Impacts on Riparian-Associated Special-Status Wildlife*
2 *Species Resulting from Restoration Projects* CP2 would not include any
3 specific restoration components. Therefore, no impact would occur. Mitigation
4 for this impact is not needed, and thus not proposed.

5 **Lower Sacramento River and Delta**

6 *Impact Wild-23 (CP2): Impacts on Riparian-Associated and Aquatic Special-*
7 *Status Wildlife Resulting from Modifications to Existing Flow Regimes in the*
8 *Lower Sacramento River and Delta* Implementing CP2 would modify the flow
9 regime and would reduce the frequency, duration, and magnitude of
10 intermediate to large flows in the lower Sacramento River during winter in
11 some years. It also would increase the flow volumes in late summer and fall of
12 most years. Although this change in surface and subsurface hydrology would be
13 of a smaller magnitude than in the upper Sacramento River, it could affect
14 habitats adjacent to the river channel and the formation of off-channel habitats
15 along the lower Sacramento River, which would adversely affect the habitat of
16 western pond turtle. Although the total amount of riparian vegetation would not
17 decline substantially, the portion in early successional stages would be reduced.
18 These early successional stages provide habitat for some special-status wildlife
19 species. These changes could result in substantial effects on the distribution or
20 abundance of riparian-nesting special-status bird species. Because CP2 would
21 substantially alter habitat for a variety of riparian-dependent special-status
22 species, this impact would be potentially significant.

23 This impact would be similar to Impact Wild-23 (CP1). Because CP2 could
24 substantially reduce available habitat for special-status wildlife, this impact
25 would be potentially significant. Mitigation for this impact is proposed in
26 Section 13.3.5.

27 *Impact Wild-24 (CP2): Impacts on Bank Swallow Along the Lower Sacramento*
28 *River Resulting from Modifications of Geomorphic Processes* Implementing
29 CP2 would cause a small reduction in the magnitude, duration, and frequency of
30 intermediate to large flows in the lower Sacramento River. This reduction also
31 would alter the river's geomorphic processes. The rate of bank erosion would be
32 reduced, but the length of eroding banks would not be substantially altered, and
33 thus, nesting habitat for bank swallows would not decline substantially. High
34 flows during the nesting season that may cause localized bank and nest failure
35 would not increase substantially. The impact on habitat for bank swallow
36 nesting colonies, and therefore bank swallows themselves, would be less than
37 significant.

38 This impact would be similar to Impact Wild-24 (CP1). The effect of CP2 on
39 bank swallow habitat along the lower Sacramento River would be similar to the
40 effect along the upper Sacramento River, but smaller because the effect of CP2
41 on river flows would attenuate with distance downstream. Because the extent of
42 bank erosion and flooding of nesting sites is not expected to substantially

1 change under CP2, this impact would be less than significant. Mitigation for this
2 impact is not needed, and thus not proposed.

3 *Impact Wild-25 (CP2): Disturbance or Removal of Vernal Pool Habitat for*
4 *Special-Status Wildlife Along the Lower Sacramento River and in the Delta*
5 *from Changes in Flow Regime of the Sacramento River and Affected*
6 *Tributaries, and Changes in Seasonal Water Availability* Vernal pools are
7 present in upland areas near the Sacramento River and its tributaries in the
8 extended study area. These pools provide habitat for numerous special-status
9 species. Critical habitat for three special-status species (vernal pool fairy
10 shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp) is located
11 within the extended study area. Critical habitat for these species is confined to
12 vernal pool communities (USFWS 2006). However, vernal pools are generally
13 not present within the active floodplain of regulated rivers along the lower
14 Sacramento River and in the Delta. Because the sensitive habitat and species are
15 located outside of the area affected by the changes in flows, CP2 would not alter
16 this habitat. Therefore, no impact would occur. Mitigation for this impact is not
17 needed, and thus not proposed.

18 *Impact Wild-26 (CP2): Consistency with Local and Regional Plans with Goals*
19 *of Promoting Riparian Habitat Along the Lower Sacramento River and in the*
20 *Delta* Several conservation and management plans have been adopted in the
21 primary and extended study areas with goals of promoting riparian habitat along
22 the Sacramento River. Because flow regimes and riverine geomorphic processes
23 could be altered with project implementation, riparian habitat could be affected
24 in such a manner that the goals of the local and regional plans would be more
25 difficult to attain. Therefore, this impact would be potentially significant.

26 This impact would be similar to Impact Wild-26 (CP1) and would be potentially
27 significant. Mitigation for this impact is proposed in Section 13.3.5.

28 **CVP/SWP Service Areas**

29 *Impact Wild-27 (CP2): Impacts on Riparian-Associated or Aquatic Special-*
30 *Status Wildlife in the CVP/SWP Service Areas Resulting from Modifications to*
31 *Existing Flow Regimes* By altering storage and operations at several reservoirs
32 associated with the CVP and SWP service areas, CP2 would change flow
33 regimes in several downstream waterways. Modified flow regimes would
34 reduce the frequency, duration, and magnitude of intermediate to large flows
35 along the Sacramento River. The change in surface and subsurface hydrology
36 could affect habitats adjacent to the river channel that provide habitat for
37 special-status wildlife species. These changes are unlikely to result in
38 substantial effects on the distribution or abundance of riparian-associated or
39 aquatic special-status wildlife species in the CVP and SWP service areas
40 outside of the primary study area. Therefore, this impact would be less than
41 significant.

1 This impact would be similar to Impact Wild-27 (CP1). The CVP and SWP are
2 operated as an integrated system with the same downstream management targets
3 and goals. CVP and SWP operations are constrained by the 2008 USFWS BO
4 and the 2009 NMFS BO. Thus, implementation of CP2 is not anticipated to
5 sufficiently alter flow to the CVP/SWP service areas to have a substantial effect
6 on the riparian habitat upon which special-status wildlife species depend. For
7 these reasons, this impact would be less than significant. Mitigation for this
8 impact is not needed, and thus not proposed.

9 **CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and**
10 **Anadromous Fish Survival**

11 CP3 is similar to CP1 and CP2. It focuses on the greatest practical enlargement
12 of Shasta Dam and Shasta Lake consistent with the goals of the 2000 CALFED
13 ROD, and was formulated for the primary purposes of increased water supply
14 reliability and increased survival of anadromous fish. In addition to the common
15 features above, CP3 involves raising Shasta Dam 18.5 feet, an elevation change
16 that would increase the full pool by 20.5 feet and enlarge the total storage space
17 in the reservoir by 634,000 acre-feet to 5.19 million acre-feet.

18 With respect to wildlife impacts, dam construction activities for CP1 through
19 CP5 would be so similar that they are considered to be identical for purposes of
20 this analysis. Because CP3 would result in higher lake levels than CP2, CP3
21 would also require more relocation of utilities, public service facilities, and
22 recreational facilities than CP2, including a loss of up to 35 acres of limestone
23 habitat and 2,870 acres of nonlimestone habitat. Because CP3 would result in
24 higher lake levels than CP2, CP3 would also result in a larger (and deeper) area
25 of inundation than CP2, in turn requiring more vegetation clearing within the
26 inundation area than CP2.

27 **Shasta Lake and Vicinity**

28 *Impact Wild-1 (CP3): Take and Loss of Habitat for the Shasta Salamander*
29 Ground-disturbing activities associated with construction could result in direct
30 take of the Shasta salamander, a State-listed species, USFS sensitive species,
31 survey and manage species, MSCS-covered species, and BLM sensitive species.
32 In addition, the raising of Shasta Dam would result in the inundation of habitat
33 for this species. This impact would be significant.

34 Impacts caused by construction and vegetation clearing for the dam and
35 relocation areas would be similar to CP1. However, inundation caused by an
36 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
37 for the Shasta salamander. This impact would be significant.

38 Inundation resulting from an 18.5-foot dam raise would result in a loss of
39 approximately 16 acres of limestone habitat and 2,396 acres of nonlimestone
40 habitat. Impacts on limestone and nonlimestone habitats in the impoundment
41 area are summarized in Table 13-32.

1 **Table 13-32. Impacts on Suitable Habitat for the Shasta Salamander in the**
 2 **Impoundment Area (18.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Limestone	0.00	1.63	0.00	11.09	0.00	2.85
Nonlimestone	436.74	89.15	710.31	407.76	241.57	511.00
Total	436.74	90.78	710.31	407.76	241.57	513.85

Note:

*Acres are approximate.

3 Shasta salamander surveys are ongoing, and it is anticipated that these surveys
 4 will provide additional information about the species' range and habitat
 5 associations as well as the presence or absence of the species within individual
 6 construction footprints. Additional impact analysis will be conducted in relation
 7 to suitable habitats available in the Shasta Lake watershed or in the species'
 8 range, if appropriate. Direct and indirect impacts based on those results will be
 9 reported in the Final EIS. Additionally, other indirect and temporary impacts
 10 will be analyzed in the Final EIS. Mitigation for this impact is proposed in
 11 Section 13.3.5.

12 *Impact Wild-2 (CP3): Impact on the Foothill Yellow-Legged Frog and Tailed*
 13 *Frog and Their Habitat* Ground-disturbing activities associated with
 14 construction could result in direct take (e.g., because of operation of equipment
 15 in or adjacent to riverine or riparian habitat) of the foothill yellow-legged frog, a
 16 California species of special concern, a USFS sensitive species, an MSCS-
 17 covered species, and a BLM sensitive species, and of the tailed frog, a
 18 California species of special concern. In addition, the raising of Shasta Dam
 19 would result in the conversion of suitable riverine and riparian habitat to
 20 unsuitable lacustrine habitat. This impact would be potentially significant.

21 Impacts caused by construction and vegetation clearing for the dam and
 22 relocation areas would be similar to CP1. However, inundation caused by an
 23 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
 24 for the foothill yellow-legged and tailed frogs. This impact would be potentially
 25 significant.

26 Implementation of an 18.5-foot raise of the dam would result in inundation of
 27 approximately 77 acres of foothill yellow-legged frog and tailed frog habitat. A
 28 summary of suitable habitat loss by arm is presented in Table 13-33.

29 Additional analysis of impacts will be conducted in relation to suitable habitats
 30 available in the Shasta Lake watershed. An analysis of indirect impacts and
 31 temporary impacts will be completed in the Final EIS. Mitigation for this
 32 impact is proposed in Section 13.3.5.

Table 13-33. Impacts on Suitable Habitat for the Foothill Yellow-Legged and Tailed Frog in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Riverine	0.00	0.88	5.24	15.43	1.41	0.00
Total	4.16	7.55	31.40	29.34	2.94	1.57

Note:

*Acres are approximate.

Impact Wild-3 (CP3): Impact on the Northwestern Pond Turtle and Its Habitat
Ground-disturbing activities associated with construction could result in direct take (e.g., because of operation of equipment in or adjacent to riverine or riparian habitat) of the northwestern pond turtle, an MSCS-covered species, a California species of special concern, and a USFS sensitive species. In addition, project implementation could result in the degradation of suitable aquatic habitat because of increased erosion and sedimentation. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by an 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for the northwestern pond turtle. This impact would be potentially significant.

Implementation of an 18.5-foot raise of the dam would result in the conversion of approximately 54 acres of montane riparian and 23 acres of riverine habitat to lacustrine habitat. Because equally valuable components are lost or gained in either habitat, the quality of the habitat would not be compromised. However, maximum lake inundation would be infrequent (at most 1 month per year) and would not benefit the species throughout the remainder of the year. Thus, the conversion to lacustrine habitat would remain an impact on northwestern pond turtle habitat. A summary of suitable habitat loss by arm is presented in Table 13-34.

Table 13-34. Impacts on Suitable Habitat for the Northwestern Pond Turtle in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Riverine	0.00	0.88	5.24	15.43	1.41	0.00
Total	4.16	7.55	31.40	29.34	2.94	1.57

Note:

*Acres are approximate.

1 Additional analysis of impacts will be conducted in relation to suitable habitats
2 available in the Shasta Lake watershed or in the species range (if appropriate).
3 Analysis impacts on upland habitats will be quantified. An analysis of indirect
4 impacts and temporary impacts will be completed in the Final EIS. Mitigation
5 for this impact is proposed in Section 13.3.5.

6 *Impact Wild-4 (CP3): Impact on the American Peregrine Falcon* Construction
7 activities and vegetation removal associated with the construction of raising the
8 dam, construction activities in the relocation areas, and removal of various
9 amounts of vegetation in the impoundment areas during the nesting season
10 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
11 the abandonment of nests of American peregrine falcons, a State fully protected
12 species and MSCS-covered species. This impact would be potentially
13 significant.

14 Impacts caused by construction and vegetation clearing for the dam and
15 relocation areas would be similar to CP1. However, inundation caused by an
16 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
17 for the American peregrine falcon.

18 Similar to CP1, overstory and complete vegetation removal is expected to occur
19 within the impoundment area in suitable cliff habitat. Thus, overstory vegetation
20 removal occurring in or near suitable cliff habitat during the nesting season
21 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
22 the abandonment of nests. Additionally, because of the steep terrain, trees
23 would be yarded by helicopter. Noise generated by chainsaws and helicopter
24 yarding could cause the abandonment of nests, resulting in the incidental loss of
25 fertile eggs or nestlings. This impact would be potentially significant.

26 No known eyries would be inundated with an 18.5-foot raise in lake elevation;
27 however, 20.5 (full pool) vertical feet of cliff habitat would be inundated. Based
28 on the large area required for suitable nesting habitat for peregrine falcons,
29 impacts on suitable cliff habitat for nesting would be less than significant. The
30 conversion of uplands to lacustrine habitat would not adversely affect foraging
31 habitat for the species because they frequently forage over water. Mitigation for
32 this impact is proposed in Section 13.3.5.

33 *Impact Wild-5 (CP3): Take and Loss of Habitat for the Bald Eagle*
34 Construction activities and vegetation removal associated with the construction
35 of raising the dam, construction activities in the relocation areas, and removal of
36 various amounts of vegetation in the impoundment areas in addition to
37 inundation caused by the raising of Shasta Dam during the nesting season would
38 result in the loss of nest and perch trees used by the bald eagle, a State-listed
39 species, fully protected species, and USFS sensitive species, an MSCS-covered
40 species, and a BLM sensitive species. This impact would be significant.

1 Impacts caused by construction and vegetation clearing for the dam and
2 relocation areas would be similar to CPI. However, inundation caused by an
3 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
4 for the bald eagle. This impact would be potentially significant.

5 Six known bald eagle nest trees would be affected by an 18.5-foot dam raise
6 due to inundation. When inundation occurs, nest trees within the impoundment
7 area would die. Because peak inundation generally occurs in late April or early
8 June, nest trees would be flooded toward the end of the nesting season. If eagles
9 were nesting in these trees, it would be likely that young would fledge before
10 the nest tree died from the effects of inundation. Because of inundation timing,
11 it is not likely that individuals would be affected. Because bald eagles generally
12 use the same nest for multiple years, the loss of nest trees would be a significant
13 impact.

14 Inundation could also affect erosion and bank stability, which could affect nest
15 trees that are in close proximity to the impoundment area. This would be a
16 potentially significant impact.

17 Inundation resulting from an 18.5-foot dam raise would result in a loss of
18 approximately 1,637 acres of bald eagle nesting and roosting habitat. Impacts
19 on suitable bald eagle habitat by CWHR type in the impoundment area are
20 summarized in Table 13-35.

21 **Table 13-35. Impacts on Suitable Habitat for the Bald Eagle in the**
22 **Impoundment Area (18.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	1.94
Blue oak-foothill pine	10.36	0.00	0.00	0.00	4.29	6.81
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood	73.49	38.76	171.01	70.55	19.43	2.49
Montane hardwood-conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.64	49.56	57.50
Total	373.80	77.15	535.78	382.82	186.44	80.87

Note:

*Acres are approximate.

23 Additional analysis of impacts will be conducted in relation to suitable habitats
24 available in the Shasta Lake watershed. Bald eagle nesting activity changes
25 from year to year. The number of bald eagle nests is subject to change based on
26 eagle activity at the time of construction and the subsequent inundation.
27 Reclamation is currently working with the USFS to determine the current eagle

activity to revise the number of nest trees that may be impacted. Indirect and temporary impacts will be analyzed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-6 (CP3): Take and Loss of Nesting and Foraging Habitat for the Northern Spotted Owl Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the northern spotted owl, a Federally listed as threatened species and MSCS-covered species. In addition, inundation caused by the raising of Shasta Dam would result in the loss of habitat for this species. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by an 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for the northern spotted owl. This impact would be potentially significant.

Inundation resulting from an 18.5-foot dam raise would result in a loss of approximately 1,560 acres of northern spotted owl nesting and foraging habitat. Impacts on suitable spotted owl habitat by CWHR type in the impoundment area are summarized in Table 13-36.

Table 13-36. Impacts on Suitable Habitat for the Northern Spotted Owl in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood	73.49	38.76	171.01	70.55	19.43	2.49
Montane hardwood-conifer	70.68	0.99	150.42	36.36	111.63	10.55
Ponderosa pine	215.11	30.72	188.19	161.44	49.56	57.50
Total	359.28	70.47	509.62	368.91	180.62	70.54

Note:

*Acres are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-7 (CP3): Impact on the Purple Martin and Its Nesting Habitat Construction activities and vegetation removal associated with the construction

1 of raising the dam, construction activities in the relocation areas, and removal of
2 various amounts of vegetation in the impoundment areas during the nesting
3 season could result in the incidental loss of fertile eggs or nestlings or otherwise
4 lead to the abandonment of nests of purple martins, a California species of
5 special concern. In addition, inundation caused by the raising of Shasta Dam
6 would result in the loss of nest trees. This impact would be significant.

7 Impacts caused by construction and vegetation clearing for the dam and
8 relocation areas would be similar to CP1. Similar to CP1, nest trees occurring in
9 the lake could be adversely affected by inundation and related vegetation
10 removal. These impacts would be potentially significant.

11 Additional analysis of impacts will be conducted in relation to suitable habitats
12 available in the Shasta Lake watershed. An analysis of indirect impacts and
13 temporary impacts will be completed in the Final EIS. Mitigation for this
14 impact is proposed in Section 13.3.5.

15 *Impact Wild-8 (CP3): Impacts on the Willow Flycatcher, Vaux's Swift, Yellow*
16 *Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat*
17 Construction activities and vegetation removal associated with the construction
18 of raising the dam, construction activities in the relocation areas, and removal of
19 various amounts of vegetation in the impoundment areas during the nesting
20 season could result in the incidental loss of fertile eggs or nestlings or otherwise
21 lead to the abandonment of nests of the willow flycatcher, a State-listed as
22 endangered species, USFS sensitive species, and MSCS-covered species; the
23 Vaux's swift, a California species of special concern; and the yellow warbler
24 and yellow-breasted chat, both California species of special concern and MSCS-
25 covered species. In addition, the raising of Shasta Dam would result in the loss
26 of habitat, including nesting habitat, for these species. This impact would be
27 potentially significant.

28 Impacts caused by construction and vegetation clearing for the dam and
29 relocation areas would be similar to CP1. However, inundation caused by an
30 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
31 for these species. This impact would be potentially significant.

32 Inundation resulting from an 18.5-foot dam raise would result in a loss of
33 approximately 1,613 acres of Vaux's swift nesting and foraging habitat in the
34 impoundment area. Additionally, approximately 54 acres of willow flycatcher,
35 yellow warbler, and yellow-breasted chat habitat would be lost in the
36 impoundment area.

37 Impacts on suitable habitats for the willow flycatcher, Vaux's swift, yellow
38 warbler, and yellow-breasted chat by CWHR type in the impoundment area are
39 summarized in Table 13-37.

Table 13-37. Impacts on Suitable Habitat for the Vaux’s Swift, Yellow Warbler, and Yellow-Breasted Chat in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area						
Vaux’s Swift						
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood	73.49	38.76	171.01	70.55	19.43	2.49
Montane hardwood–conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.76	49.56	57.50
Total Vaux’s Swift Habitat	363.44	77.14	535.78	382.82	182.15	72.11
Willow Flycatcher, Yellow Warbler, and Yellow-Breasted Chat						
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Total Habitat	4.16	6.67	26.16	13.91	1.53	1.57

Note:
 *Acres are approximate.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

Impact Wild-9 (CP3): Impacts on the Long-Eared Owl, Northern Goshawk, Cooper’s Hawk, Great Blue Heron, and Osprey and Their Foraging and Nesting Habitat Construction activities and vegetation removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas during the nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the long-eared owl, a California species of special concern and an MSCS-covered species; the northern goshawk, a California species of special concern, a USFS sensitive species, and a BLM sensitive species; the Cooper’s hawk, an MSCS-covered species; the great blue heron, an MSCS-covered species; and the osprey, an MSCS-covered species. In addition, the raising of Shasta Dam would result in the loss of foraging and habitat for these species. This impact would be potentially significant.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by an 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for these species. This impact would be potentially significant.

Inundation resulting from an 18.5-foot dam raise would result in a loss of approximately 1,184 acres of nesting and foraging habitat for the long-eared owl and northern goshawk, approximately 2,120 acres of nesting and foraging habitat for the Cooper’s hawk, and approximately 2,120 acres of nesting habitat for the great blue heron. Foraging habitat would increase for osprey and the great blue heron. No impact to foraging habitat for these species would occur.

Impacts on suitable habitat by CWHR type in the impoundment area are summarized in Table 13-38.

Table 13-38. Impacts on Suitable Habitat for the Long-Eared Owl, Northern Goshawk, Cooper’s Hawk, and Great Blue Heron in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Long-Eared Owl and Northern Goshawk						
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood–conifer	70.68	0.99	150.42	136.36	111.63	10.55
Ponderosa pine	215.11	30.72	188.19	161.76	49.56	57.50
Total Habitat	285.80	31.72	338.61	298.36	161.19	68.06
Cooper’s Hawk and Great Blue Heron						
Blue oak–foothill pine	10.36	0.00	0.00	0.00	4.29	1.94
Closed-cone pine-cypress	32.68	0.00	12.95	20.89	44.72	373.48
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood	73.49	38.76	171.01	70.55	19.43	2.49
Montane hardwood–conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.74	49.56	57.50
Total Habitat	406.48	77.14	548.73	403.70	231.16	447.53

Note:

*Acres are approximate.

Impacts to osprey would be similar to those described for CP1. There are 54 osprey nests within the perimeter of Shasta Lake. Seven nest trees would be affected by a 12.5-foot dam raise, and 11 nests are located in relocation areas. Removal of nest trees would be a potentially significant impact. Because osprey generally use the same nest for multiple years, the loss of 18 nest trees (33 percent of the total in the Shasta Lake and vicinity) between the impoundment area and relocation areas would be a potentially significant impact.

Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. Osprey nesting activity changes from

1 year to year. The number of osprey nests is subject to change based on current
2 osprey activity at the time of construction and the subsequent inundation. An
3 analysis of indirect impacts and temporary impacts will be completed in the
4 Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

5 *Impact Wild-10 (CP3): Take and Loss of Habitat for the Pacific Fisher*
6 Construction activities and vegetation removal associated with the construction
7 of raising the dam, construction activities in the relocation areas, and removal of
8 various amounts of vegetation in the impoundment areas would result in a loss
9 of habitat for the Pacific fisher, a Federal candidate for listing, a California
10 species of special concern, a USFS sensitive species, and a BLM sensitive
11 species. Furthermore, take (including mortality of individuals because of
12 destruction or disturbance of active roost sites or dens) could result from
13 construction activities and vegetation clearing. This impact would be potentially
14 significant.

15 Impacts caused by construction and vegetation clearing for the dam and
16 relocation areas would be similar to CP1. However, inundation caused by an
17 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
18 for these species. This impact would be potentially significant.

19 Inundation resulting from an 18.5-foot dam raise would result in a loss of
20 approximately 1,238 acres of Pacific fisher habitat.

21 Impacts on suitable habitat by CWHR type in the impoundment area are
22 summarized in Table 13-39.

23 **Table 13-39. Impacts on Suitable Habitat for the Pacific Fisher in the**
24 **Impoundment Area (18.5-Foot Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood-conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.64	49.56	57.50
Total Habitat	289.95	38.38	364.77	312.27	162.72	69.62

Note:

*Acres are approximate

25 Additional analysis of impacts will be conducted in relation to suitable habitats
26 available in the Shasta Lake watershed. An analysis of indirect impacts and
27 temporary impacts will be completed in the Final EIS. Mitigation for this
28 impact is proposed in Section 13.3.5.

1 *Impact Wild-11 (CP3): Impacts on Special-Status Bats (Pallid Bat, Spotted Bat,*
2 *Western Red Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, Long-Eared*
3 *Myotis, and Yuma Myotis), the American Marten, and Ringtail and Their*
4 *Habitat* Construction activities and vegetation removal associated with the
5 construction of raising the dam, construction activities in the relocation areas,
6 and removal of various amounts of vegetation in the impoundment areas would
7 result in a loss of habitat for the pallid bat, a California species of special
8 concern, a USFS sensitive species, and a BLM sensitive species; the western red
9 bat, a USFS sensitive species; the western mastiff bat, a California species of
10 special concern, an MSCS-covered species, and a BLM sensitive species; the
11 Townsend's big-eared bat, a California species of special concern, a USFS
12 sensitive species, and a BLM sensitive species; the long-eared myotis, a BLM
13 sensitive species; the Yuma myotis, a BLM sensitive species; the American
14 marten, a USFS sensitive species; and the ringtail, a State fully protected and
15 MSCS-covered species. Furthermore, take (including mortality of individuals
16 because of destruction or disturbance of active roost sites or dens) could result
17 from construction activities and vegetation clearing. This impact would be
18 potentially significant.

19 Impacts caused by construction and vegetation clearing for the dam and
20 relocation areas would be similar to CP1. However, inundation caused by an
21 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat
22 for these species. This impact would be potentially significant.

23 Dam construction, vegetation removal, and inundation resulting from an 18.5-
24 foot dam raise would result in the loss of approximately 25 acres of
25 reproductive and roosting habitat for the pallid bat, spotted bat, western mastiff
26 bat, Townsend's big-eared bat and Yuma myotis in the impoundment area.
27 Additionally, one limestone cave located on the Big Backbone Arm that is a
28 known Townsend's big-eared bat roost would be affected by flooding. An 18.5-
29 foot dam raise would result in the loss of approximately 2,412 acres of
30 reproductive and roosting habitat for the western red bat and long-eared myotis.
31 These impacts would be potentially significant.

32 Dam construction, vegetation removal, and inundation resulting from an 18.5-
33 foot dam raise would result in the loss of approximately 2,412 acres of ringtail
34 habitat. An 18.5-foot dam raise would result in the loss of approximately 1,238
35 acres of American martin habitat in the impoundment area. These impacts
36 would be potentially significant.

37 Impacts on suitable habitat by CWHR type in the impoundment area are
38 summarized in Table 13-40.

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Table 13-40. Impacts on Suitable Habitat for Special-Status Bats, American Marten, and Ringtail in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Pallid Bat, Spotted Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, and Yuma Myotis						
Barren	1.06	1.28 ¹	0.55	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	6.81
Blue oak-foothill pine	10.36	0.00	0.00	0.00	4.29	1.94
Total	11.42	0.00	0.55	0.00	4.29	8.76
Western Red Bat, Long-Eared Bat, and Ringtail						
Barren	1.06	0.00	0.55	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	6.81
Blue oak-foothill pine	10.36	0.00	0.00	0.00	4.29	1.94
Closed-cone pine-cypress	32.68	0.00	12.95	20.79	44.72	373.48
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Mixed chaparral	29.19	13.64	161.04	15.06	10.35	59.50
Montane hardwood	73.49	38.76	171.01	66.06	19.43	2.49
Montane hardwood-conifer	70.68	0.99	150.42	140.93	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.74	49.56	57.50
Total Habitat	436.74	90.78	710.32	418.85	241.51	513.85
American Marten						
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Montane hardwood-conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.64	49.56	57.50
Total Habitat	289.95	38.38	364.77	312.27	162.72	69.62

Notes:

* Acres are approximate.

¹ Represents the amount of the limestone outcrop impacted at the Big Backbone Arm cave location.

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Additional analysis of impacts will be conducted in relation to suitable habitats available in the Shasta Lake watershed. An analysis of indirect impacts and temporary impacts will be completed in the Final EIS. Mitigation for this impact is proposed in Section 13.3.5.

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Impact Wild-12 (CP3): Impacts on Special-Status Terrestrial Mollusks (Shasta Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their Habitat All of these species are designated USFS sensitive and survey and manage species and are proposed for Federal listing. The Shasta sideband is also an MSCS-covered species. Ground-disturbing activities and vegetation

removal associated with the construction of raising the dam, construction activities in the relocation areas, and removal of various amounts of vegetation in the impoundment areas could result in direct take and/or loss of suitable habitat for special-status terrestrial mollusks. In addition, the raising of Shasta Dam would result in the inundation of suitable habitat and direct take of this species. This would be a significant impact.

Impacts caused by construction and vegetation clearing for the dam and relocation areas would be similar to CP1. However, inundation caused by an 18.5-foot raise of Shasta Dam would result in a greater loss of suitable habitat for these species. This impact would be potentially significant.

Inundation resulting from an 18.5-foot dam raise would result in the loss of approximately 2,412 acres of Shasta chaparral habitat and 54 acres of Shasta hesperian habitat in the impoundment area. Approximately 11 acres of Shasta sideband habitat and 3 acres of Wintu sideband habitat would be lost. These impacts would be potentially significant.

Impacts on suitable habitat by CWHR type in the impoundment area are summarized in Table 13-41.

Table 13-41. Impacts on Suitable Habitat for Special-Status Terrestrial Mollusks in the Impoundment Area (18.5-Foot Dam Raise)

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area: Shasta Sideband						
Limestone	0.00	0.00	0.00	11.09	0.00	0.00
Impoundment Area: Wintu Sideband						
Limestone	0.00	0.00	0.00	0.00	0.00	2.85
Impoundment Area: Shasta Chaparral						
Barren	1.06	0.00	0.55	0.00	0.00	0.00
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	6.81
Blue oak–foothill pine	10.36	0.00	0.00	0.00	4.29	1.94
Closed-cone pine-cypress	32.68	0.00	12.95	20.79	44.72	373.48
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Mixed chaparral	29.19	13.64	161.04	15.14	10.35	59.50
Montane hardwood	73.49	38.76	171.01	70.55	19.43	2.49
Montane hardwood–conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.74	49.56	57.50
Total Habitat	436.74	90.78	710.31	418.85	241.51	513.85

1 **Table 13-41. Impacts on Suitable Habitat for Special-Status Terrestrial**
 2 **Mollusks in the Impoundment Area (18.5-Foot Dam Raise) (contd.)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Impoundment Area: Shasta Hesperian						
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Total Habitat	4.16	6.67	26.16	13.91	1.53	1.57

Note:
 *Acres are approximate

3 Additional analysis of impacts will be conducted in relation to suitable habitats
 4 available in the Shasta Lake watershed. An analysis of indirect impacts and
 5 temporary impacts will be completed in the Final EIS. Mitigation for this
 6 impact is proposed in Section 13.3.5.

7 *Impact Wild-13 (CP3): Permanent Loss of General Wildlife Habitat*
 8 Construction activities and vegetation removal associated with the construction
 9 of raising the dam, construction activities in the relocation areas, and removal of
 10 various amounts of vegetation in the impoundment areas would result in a
 11 permanent loss of habitat. In addition, inundation caused by the raising of
 12 Shasta Dam would result in a permanent loss of habitat. This would be a
 13 potentially significant impact.

14 Impacts caused by construction and vegetation clearing for the dam and
 15 relocation areas would be similar to CP1. However, inundation caused by an
 16 18.5-foot raise of Shasta Dam would result in a greater loss of general wildlife
 17 habitat. This impact would be potentially significant.

18 Inundation resulting from an 18.5-foot dam raise would result in a loss of
 19 approximately 2,492 acres of general wildlife habitat in the impoundment area.
 20 Impacts on general wildlife habitat by CWHR type in the impoundment area are
 21 summarized in Table 13-42.

1 **Table 13-42. Impacts on CWHR Habitats in the Impoundment Area (18.5-Foot**
2 **Dam Raise)**

Habitat	Area (acres*)					
	Main Body	Big Backbone Arm	Sacramento Arm	McCloud Arm	Squaw Creek Arm	Pit Arm
Annual grassland	0.44	0.00	3.10	0.70	0.00	0.00
Barren	2.30	0.00	10.60	3.56	0.00	4.13
Blue oak–foothill pine	10.36	0.00	0.00	0.00	4.29	1.94
Blue oak woodland	0.00	0.00	0.00	0.00	0.00	6.81
Closed-cone pine–cypress	32.68	0.00	12.95	20.89	44.72	373.48
Douglas-fir	0.00	0.00	0.00	0.36	0.00	0.00
Mixed chaparral	29.19	13.64	161.04	15.14	10.35	59.50
Montane hardwood	73.49	38.76	171.01	70.55	19.43	2.49
Montane hardwood–conifer	70.68	0.99	150.42	136.36	111.63	10.55
Montane riparian	4.16	6.67	26.16	13.91	1.53	1.57
Ponderosa pine	215.11	30.72	188.19	161.64	49.56	57.50
Riverine	0.00	0.88	5.24	15.43	1.41	0.00
Urban	21.95	0.00	1.95	7.96	0.00	1.92
Total	460.37	91.67	730.66	446.49	242.92	519.90

Note:

*Acreage values are approximate.

3 Additional analysis of impacts will be conducted in relation to suitable habitats
4 available in the Shasta Lake watershed. An analysis of indirect impacts and
5 temporary impacts will be completed in the Final EIS. Mitigation for this
6 impact is proposed in Section 13.3.5.

7 *Impact Wild-14 (CP3): Impacts on Other Birds of Prey (i.e., red-tailed hawk*
8 *and red-shouldered hawk) and Migratory Bird Species(i.e., American robin,*
9 *Anna’s hummingbird) and their Foraging and Nesting Habitat* Construction
10 activities and vegetation removal associated with the construction of raising the
11 dam, construction activities in the relocation areas, and removal of various
12 amounts of vegetation in the impoundment areas during the nesting season
13 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
14 the abandonment of nests of other birds of prey and migratory bird species. In
15 addition, inundation caused by the raising of Shasta Dam could result in the loss
16 of active nests and habitat for these species. This impact would be potentially
17 significant.

18 Impacts caused by construction and vegetation clearing for the dam and
19 relocation areas would be similar to CP1. However, inundation caused by an
20 18.5-foot raise of Shasta Dam would result in greater impacts on nesting
21 migratory birds and raptors. This impact would be potentially significant.

1 Additional analysis of impacts will be conducted in relation to suitable habitats
2 available in the Shasta Lake watershed. An analysis of indirect impacts and
3 temporary impacts will be completed in the Final EIS. Mitigation for this
4 impact is proposed in Section 13.3.5.

5 *Impact Wild-15 (CP3): Loss of Critical Deer Winter and Fawning Range*
6 Construction activities and vegetation removal associated with the construction
7 of raising the dam, construction activities in the relocation areas, and removal of
8 various amounts of vegetation in the impoundment areas would result in a loss
9 of critical deer winter and fawning range. In addition, inundation caused by the
10 raising of Shasta Dam would result in the loss of critical deer range. This would
11 be a potentially significant impact.

12 Impacts caused by construction and vegetation clearing for the dam and
13 relocation areas would be similar to CP1. However, inundation caused by an
14 18.5-foot raise of Shasta Dam would result in the loss of approximately 5,182
15 acres of critical deer winter and/or fawning range. This impact would be
16 potentially significant.

17 Additional analysis of impacts will be conducted in relation to suitable habitats
18 available in the Shasta Lake watershed. An analysis of indirect impacts and
19 temporary impacts will be completed in the Final EIS. Mitigation for this
20 impact is proposed in Section 13.3.5.

21 *Impact Wild-16 (CP3): Take and Loss of the California Red-Legged Frog*
22 Reclamation is concurrently completing an assessment of California red-legged
23 frog habitat in coordination with the USFWS. The assessment results will
24 enable Reclamation and the USFWS to determine if habitat for the species
25 occurs, if impacts are anticipated, and if additional surveys are needed. Impacts
26 on the California red-legged frog will be assessed if surveys are conducted and
27 the California red-legged frog is found. Impacts for each alternative will not be
28 assessed until USFWS has determined whether suitable habitat is present and
29 whether surveys would be required. Mitigation for this impact is discussed in
30 Section 13.3.5.

31 **Upper Sacramento River (Shasta Dam to Red Bluff)**

32 *Impact Wild-17 (CP3): Impacts on Riparian-Associated Special-Status Wildlife*
33 *Resulting from Modifications to the Existing Flow Regime in the Primary Study*
34 *Area* Implementing CP3 would increase available water storage in Shasta
35 Reservoir and result in a modified flow regime. This modification would reduce
36 the frequency, duration, and magnitude of intermediate to large flows
37 downstream from Shasta Dam during winter and spring in some water years,
38 and would increase the volume of flows from spring through fall of some water
39 year types. This change in surface and subsurface hydrology could affect
40 habitats adjacent to the river channel and reduce the formation of off-channel
41 habitats, which would adversely affect the habitat of western pond turtle.
42 Although the total amount of riparian vegetation would not decline

1 substantially, the portion in early successional stages would be reduced. These
2 early successional stages provide habitat for some special-status wildlife
3 species. These changes could result in substantial effects on the distribution or
4 abundance of riparian-nesting special-status bird species. Because CP3 would
5 substantially alter habitat for a variety of riparian-dependent special-status
6 species, this impact would be potentially significant.

7 This impact would be similar to Impact Wild-17 (CP1). The goal of CP3 is to
8 increase agricultural water supply reliability, as is evident in the CalSim-II
9 modeling results. As modeled, in dry and critical water years, flows are
10 generally higher – substantially so in several months – for the entire growing
11 season, extending into November (Table 13-43). This additional water is
12 available during the growing season because of the increase in reservoir storage.
13 Similar to results for CP1 and CP2, flows are shown to be substantially lower in
14 winter and early spring as the larger reservoir captures more runoff. As
15 discussed in Impact Wild-17 (CP1), the increased storage capacity reduces the
16 frequency of channel-forming flows that create habitat for sensitive species like
17 western pond turtle. This reduction in flows would also lead to a long-term
18 reduction in early successional stage riparian habitat used by many species of
19 riparian-dependent sensitive species of birds. The change in flow regimes would
20 substantially reduce habitat for sensitive species of riparian-dependent wildlife.
21 For this reason, this impact would be potentially significant. Mitigation for this
22 impact is proposed in Section 13.3.5.

Table 13-43. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP3

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Keswick												
Wet	1.0%	2.7%	-10.2%	-6.2%	-1.4%	0.3%	0.3%	0.6%	0.7%	0.7%	0.8%	2.7%
Above Normal	5.9%	1.1%	-4.3%	-3.5%	-6.8%	-8.0%	0.8%	-2.2%	-3.0%	0.4%	1.2%	10.4%
Below Normal	1.7%	-0.2%	-1.8%	-1.5%	0.5%	-2.1%	2.0%	-1.8%	1.2%	1.2%	1.9%	3.0%
Dry	6.6%	7.0%	-2.6%	-3.3%	-1.2%	-0.1%	2.6%	4.3%	3.4%	2.2%	6.3%	3.5%
Critical	1.1%	7.2%	2.8%	-1.8%	1.0%	0.3%	1.9%	2.0%	1.0%	0.8%	2.0%	6.2%
Bend Bridge												
Wet	0.9%	2.7%	-5.4%	-2.7%	-0.8%	0.2%	0.2%	0.5%	0.6%	0.7%	0.7%	2.4%
Above Normal	4.7%	0.1%	-2.0%	-2.0%	-3.8%	-4.5%	0.6%	-1.4%	-2.2%	0.3%	1.0%	9.9%
Below Normal	1.5%	0.3%	-1.2%	-0.8%	0.4%	-1.5%	1.4%	-0.9%	1.2%	1.1%	1.7%	2.6%
Dry	5.3%	6.1%	-1.4%	-1.6%	-0.6%	0.0%	2.0%	3.4%	3.1%	2.1%	6.1%	3.0%
Critical	0.7%	5.9%	2.4%	-1.4%	0.9%	0.2%	1.5%	1.7%	0.9%	0.8%	2.0%	5.6%
Butte City												
Wet	1.1%	3.4%	-4.1%	-1.6%	-0.6%	0.2%	0.3%	0.1%	0.2%	0.3%	0.5%	2.3%
Above Normal	5.1%	0.3%	-1.7%	-1.3%	-2.9%	-3.0%	0.8%	-2.1%	-2.9%	-0.4%	0.6%	10.7%
Below Normal	1.9%	0.6%	-0.9%	-1.0%	0.5%	-1.4%	1.5%	-0.9%	1.0%	0.7%	1.3%	2.1%
Dry	5.8%	6.7%	-1.0%	-1.0%	-0.2%	-0.1%	2.6%	3.1%	3.4%	1.6%	7.6%	2.4%
Critical	0.7%	6.5%	2.7%	-1.3%	1.0%	0.1%	1.9%	2.1%	1.0%	0.7%	2.3%	5.6%
Wilkins Slough												
Wet	1.1%	3.6%	-2.3%	-0.8%	-0.1%	0.3%	0.3%	0.1%	0.2%	0.3%	0.5%	2.3%
Above Normal	5.1%	0.3%	-1.4%	-0.8%	-1.4%	-1.5%	0.8%	-2.1%	-2.9%	-0.4%	0.6%	10.7%
Below Normal	1.9%	0.6%	-0.2%	-1.0%	0.7%	-1.4%	1.5%	-0.9%	1.0%	0.7%	1.3%	2.1%
Dry	5.8%	6.7%	-1.0%	-0.9%	-0.2%	-0.1%	2.6%	3.1%	3.4%	1.6%	7.6%	2.4%
Critical	0.7%	6.5%	2.7%	-1.3%	1.0%	0.1%	1.9%	2.1%	1.0%	0.7%	2.3%	5.6%
Verona												
Wet	0.9%	2.7%	-2.3%	-0.6%	-0.1%	0.1%	0.1%	-0.1%	0.2%	0.1%	-0.1%	0.9%
Above Normal	3.6%	1.3%	-1.1%	-0.5%	-1.9%	-1.0%	0.5%	-0.7%	-1.7%	-0.1%	0.4%	4.4%
Below Normal	1.7%	0.4%	0.9%	-0.3%	0.3%	-1.4%	0.9%	0.0%	1.2%	0.5%	0.5%	0.5%
Dry	3.7%	4.7%	-0.9%	-0.4%	-0.3%	-0.1%	1.7%	2.0%	2.8%	1.6%	2.3%	2.6%
Critical	0.1%	4.8%	2.1%	-0.8%	0.8%	0.0%	1.2%	0.3%	0.9%	2.4%	2.3%	3.9%

Table 13-43. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP3 (contd.)

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Freeport												
Wet	0.5%	1.1%	-0.5%	-0.5%	0.1%	0.1%	0.1%	-0.1%	0.1%	0.0%	-0.1%	0.3%
Above Normal	1.9%	-0.6%	-0.4%	0.2%	-0.5%	-0.8%	0.4%	-0.5%	-1.4%	-0.2%	0.1%	0.8%
Below Normal	0.4%	-0.2%	1.5%	0.5%	0.4%	-1.2%	0.9%	-0.5%	0.1%	0.1%	0.2%	0.6%
Dry	2.2%	3.4%	-0.6%	-0.3%	0.1%	0.1%	1.5%	1.5%	-0.3%	0.7%	2.6%	2.0%
Critical	0.0%	3.1%	2.0%	-0.6%	0.9%	0.4%	0.9%	0.0%	-0.1%	1.7%	1.6%	1.5%

1 *Impact Wild-18 (CP3): Impacts on Bank Swallow in the Primary Study Area*
2 *Resulting from Modifications of Geomorphic Processes* Implementing CP3
3 would cause a reduction in the magnitude, duration, and frequency of
4 intermediate to large flows in the Sacramento River in the primary study area.
5 This reduction also would alter the river's geomorphic processes, including the
6 rate of bank erosion. However, the length of eroding banks would not be
7 substantially altered, and thus, nesting habitat for bank swallows would not
8 decline substantially. High flows during the nesting season that may cause
9 localized nest failure would not increase. The impact on habitat for bank
10 swallow nesting colonies would be less than significant.

11 This impact would be similar to Impact Wild-18 (CP1). Generally installed to
12 protect upland land uses, bank revetment has been preferentially applied to
13 actively eroding and migrating bends that otherwise would be among the most
14 suitable sites for bank swallow nests. The reduction in intermediate to large
15 flows by CP3 would cause a small reduction in the rate of erosion at the cut
16 banks that remain unprotected by revetment. This alteration would not reduce
17 the amount of bank swallow nesting habitat in the short or long term. The
18 increase in water surface elevation is modeled to average about 2 inches or less
19 during the breeding season (April–July) in all water year types. Although the
20 flow increase exceeds the ± 2 percent threshold that is used to discriminate
21 between conditions essentially equivalent to existing conditions, the actual
22 increase in elevation is not likely to result in additional flooding of bank
23 swallow colonies. Because CP3 would not result in a substantial reduction in
24 available habitat or in nesting colonies, this impact would be less than
25 significant. Mitigation for this impact is not needed, and thus not proposed.

26 *Impact Wild-19 (CP3): Disturbance or Removal of Vernal Pool Habitat for*
27 *Special-Status Wildlife from Changes in Flow Regime* As mentioned in Impact
28 Wild-19 (CP1), vernal pools are generally not present within the active
29 floodplain of the upper Sacramento River in the primary study area; vernal
30 pools are found in upland locations outside of the main river channel and the
31 floodplain. Thus, vernal pools are not anticipated to be affected by changes in
32 flows that could result from implementation of CP3. Because CP3 would not
33 affect vernal pool habitat or the species that occur within the habitat, no impact
34 would occur. Mitigation for this impact is not needed, and thus not proposed.

35 *Impact Wild-20 (CP3): Consistency with Local and Regional Plans with Goals*
36 *of Promoting Riparian Habitat in the Primary Study Area* Several
37 conservation and management plans have been adopted in the primary and
38 extended study areas with goals of promoting riparian habitat along the
39 Sacramento River. Because flow regimes and riverine geomorphic processes
40 could be altered with project implementation, riparian habitat could be affected
41 in such a manner that the goals of the local and regional plans would be more
42 difficult to attain. Therefore, this impact would be potentially significant.

1 This impact would be similar to Impact Wild-20 (CP1). The alteration of flows
2 resulting from CP2 would continue to adversely affect riparian habitat. This
3 would make the achievement of restoration, preservation, and conservation
4 goals under regional and local plans and policies more difficult to attain.
5 Therefore, this impact would be potentially significant. Mitigation for this
6 impact is proposed in Section 13.3.5.

7 *Impact Wild-21 (CP3): Impacts on Riparian-Associated Special-Status Wildlife*
8 *Resulting from the Gravel Augmentation Program* Gravel augmentation is not
9 included as part of CP3. Therefore, no impact would occur. Mitigation for this
10 impact is not needed, and thus not proposed.

11 *Impact Wild-22 (CP3): Impacts on Riparian-Associated Special-Status Wildlife*
12 *Species Resulting from Restoration Projects* CP3 would not include any
13 specific restoration components. Therefore, no impact would occur. Mitigation
14 for this impact is not needed, and thus not proposed.

15 **Lower Sacramento River and Delta**

16 *Impact Wild-23 (CP3): Impacts on Riparian-Associated and Aquatic Special-*
17 *Status Wildlife Resulting from Modifications to Existing Flow Regimes in the*
18 *Lower Sacramento River and Delta* Implementing CP3 would modify the flow
19 regime and would reduce the frequency, duration, and magnitude of
20 intermediate to large flows in the lower Sacramento River during winter and
21 spring in some years, but generally not above the ± 2 percent threshold that
22 separates the alternative from existing conditions. Under CP3 there would be
23 increases in lower Sacramento River flows during the growing season,
24 especially in the drier water years, that would occur as water was delivered to
25 agricultural diversions. Many of these increases would exceed the ± 2 percent
26 threshold and therefore are considered substantial flow changes. Although this
27 change in surface and subsurface hydrology would be of a smaller magnitude
28 than in the upper Sacramento River, it could affect habitats adjacent to the river
29 channel and the formation of off-channel habitats, which would adversely affect
30 the habitat of western pond turtle. Although the total amount of riparian
31 vegetation would not decline substantially, the portion in early successional
32 stages would be reduced. These early successional stages provide habitat for
33 some special-status wildlife species. These changes could result in substantial
34 effects on the distribution and abundance of riparian-nesting special-status bird
35 species. Because CP3 would substantially alter habitat for a variety of riparian-
36 dependent special-status species, this impact would be potentially significant.

37 This impact would be similar to Impact Wild-23 (CP1). Implementing CP3
38 would modify the flow regime and would reduce the frequency, duration, and
39 magnitude of intermediate to large flows in the lower Sacramento River during
40 winter and spring in some years, but generally not above the ± 2 percent
41 threshold that separates the alternative from existing conditions (except at
42 Verona in December of wet water years). Because the focus of CP3 is the
43 delivery of water for agricultural uses, under CP3 there would be increases in

1 lower Sacramento River flows during the growing season, especially in the drier
2 water years, that would occur as water was delivered to agricultural diversions.
3 As modeled, many of these increases in lower Sacramento River flows exceed
4 the ± 2 percent threshold (Table 13-43) and therefore are considered substantial
5 flow changes. Because CP3 could substantially reduce available habitat for
6 special-status wildlife, this impact would be potentially significant. Mitigation
7 for this impact is proposed in Section 13.3.5.

8 *Impact Wild-24 (CP3): Impacts on Bank Swallow along the Lower Sacramento*
9 *River Resulting from Modifications of Geomorphic Processes* Implementing
10 CP3 would cause a small reduction in the magnitude, duration, and frequency of
11 intermediate to large flows in the lower Sacramento River. This reduction also
12 would alter the river's geomorphic processes. The rate of bank erosion could be
13 different than the existing rate, but the length of eroding banks would not be
14 substantially altered, and thus, nesting habitat for bank swallows would not be
15 decline substantially. High flows during the nesting season that may cause
16 localized bank and nest failure would not increase substantially. The impact on
17 habitat for bank swallow nesting colonies, and therefore bank swallows
18 themselves, would be less than significant.

19 This impact would be similar to Impact Wild-24 (CP1). The factors affecting
20 bank erosion have been discussed previously. The effect of CP3 on bank
21 swallow habitat along the lower Sacramento River would be similar to the effect
22 along the upper Sacramento River, but smaller because the effect of CP3 on
23 river flows would attenuate somewhat with distance downstream. The different
24 operational goals of CP3 would actually increase average flows in the lower
25 Sacramento River during November and December. Modeling shows only
26 minor reductions in flows (less than 2 percent) during January and February.
27 The changes in flows predicted by CalSim-II are not expected to substantially
28 alter the rate or extent of bank erosion. The maximum increase in average
29 monthly water surface elevation predicted for the lower Sacramento River is
30 generally less than 3 inches; this is not expected to result in a substantial
31 increase in flooding of bank swallow nesting colonies. Because CP3 would not
32 result in substantial changes in available habitat, this impact would be less than
33 significant. Mitigation for this impact is not needed, and thus not proposed.

34 *Impact Wild-25 (CP3): Disturbance or Removal of Vernal Pool Habitat for*
35 *Special-Status Wildlife Along the Lower Sacramento River and in the Delta*
36 *from Changes in Flow Regime of the Sacramento River and Affected*
37 *Tributaries, and Changes in Seasonal Water Availability* Vernal pools are
38 present in upland areas near the Sacramento River and its tributaries in the
39 extended study area. These pools provide habitat for numerous special-status
40 species. Critical habitat for three special-status species (vernal pool fairy
41 shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp) is located
42 within the extended study area. Critical habitat for these species is confined to
43 vernal pool communities (USFWS 2006). However, vernal pools are generally
44 not present within the active floodplain of regulated rivers along the lower

1 Sacramento River and in the Delta. Because the sensitive habitat and species are
2 located outside of the area affected by the changes in flows, CP3 would not alter
3 this habitat. Therefore, no impact would occur. Mitigation for this impact is not
4 needed, and thus not proposed.

5 *Impact Wild-26 (CP3): Consistency with Local and Regional Plans with Goals*
6 *of Promoting Riparian Habitat along the Lower Sacramento River and in the*
7 *Delta* Several conservation and management plans have been adopted in the
8 primary and extended study areas with goals of promoting riparian habitat along
9 the Sacramento River. Because flow regimes and riverine geomorphic processes
10 could be altered with project implementation, riparian habitat could be affected
11 in such a manner that the goals of the local and regional plans would be more
12 difficult to attain. Therefore, this impact would be potentially significant.

13 This impact would be similar to Impact Wild-26 (CP1) and would be potentially
14 significant. Mitigation for this impact is proposed in Section 13.3.5.

15 **CVP/SWP Service Areas**

16 *Impact Wild-27 (CP3): Impacts on Riparian-Associated or Aquatic Special-*
17 *Status Wildlife in the CVP/SWP Service Areas Resulting from Modifications to*
18 *Existing Flow Regimes* By altering storage and operations at several reservoirs
19 associated with the CVP and SWP service areas, CP3 would change flow
20 regimes in several downstream waterways. Most potential noticeable changes in
21 flows and stages would diminish downstream from Red Bluff. The change in
22 surface and subsurface hydrology could affect habitats adjacent to the river
23 channel that provide habitat for special-status wildlife species. These changes
24 are unlikely to result in substantial effects on the distribution or abundance of
25 riparian-associated or aquatic special-status wildlife species in the CVP and
26 SWP service areas outside of the primary study area. Therefore, this impact
27 would be less than significant.

28 This impact would be similar to Impact Wild-27 (CP1). Modified flow regimes
29 would change the frequency, duration, and magnitude of intermediate to large
30 flows along the Sacramento River. However, based on the CalSim-II modeling
31 results, the hydrologic effects in tributaries with CVP and SWP dams, outside of
32 the primary study area, are expected to be less than effects on the Sacramento
33 River. The CVP and SWP are operated as an integrated system with the same
34 downstream management targets and goals. CVP and SWP operations must be
35 consistent with the Operations Criteria and Plan (OCAP) to allow coverage by
36 USFWS's and NMFS's OCAP BOs. Thus, this alternative is not anticipated to
37 sufficiently alter flow to the CVP/SWP service areas to have a substantial effect
38 on the riparian habitat upon which special-status wildlife species depend.
39 Therefore, this impact would be less than significant. Mitigation for this impact
40 is not needed, and thus not proposed.

1 **CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply**
2 **Reliability**

3 The primary function of CP4 is to address survival of anadromous fish, while
4 still improving water supply reliability. CP4 focuses on increasing the volume
5 of cold water available to the temperature control device through reservoir
6 reoperations and on raising Shasta Dam by 18.5 feet. As with CP3 and the
7 common features above, this raise would increase the full pool by 20.5 feet and
8 enlarge total reservoir storage space by 634,000 acre-feet.

9 In addition to the activities common to CP1–CP3, CP4 includes augmenting
10 locations along the Upper Sacramento River segment of the study area with
11 gravel to increase spawning habitat for anadromous fish. Gravel placement
12 would occur at one or more sites per year over a 10-year period and would be
13 accomplished by one of three methods; lateral berms, talus cone, direct
14 placement in river; as appropriate depending on specific conditions, including
15 geomorphology, of the augmentation site. To the extent available, existing river
16 access points would be used to deliver gravel to the river; however, temporary
17 new access roads would be needed in some cases, mostly adjacent to the river,
18 and would be extended from existing dirt roads. Furthermore, under CP4,
19 riparian, floodplain, and side channel habitat restoration would be implemented
20 at up to six potential sites on the upper Sacramento River to restore habitat for
21 anadromous salmonids.

22 With respect to wildlife impacts, dam construction activities for CP1–CP5
23 would be so similar that they are considered to be identical for purposes of this
24 analysis. Because CP4 would result in lake levels identical to those under CP3,
25 CP4 would require the same relocation of utilities, public service facilities, and
26 recreational facilities as CP3, including a loss of up to 35 acres of limestone
27 habitat and 2,870 acres of nonlimestone habitat. Because CP4 would result in
28 identical lake levels as CP3, CP4 would result the same area of inundation as
29 CP3, in turn requiring identical vegetation clearing within the inundation area as
30 CP3. CP4 would also involve some vegetation clearing in the Upper
31 Sacramento River portion of the study area to provide access for gravel
32 augmentation.

33 **Shasta Lake and Vicinity**

34 *Impact Wild-1 (CP4): Take and Loss of Habitat for the Shasta Salamander*

35 Ground-disturbing activities associated with construction could result in direct
36 take of the Shasta salamander, a State-listed species, USFS sensitive species,
37 survey and manage species, MSCS-covered species, and BLM sensitive species.
38 In addition, the raising of Shasta Dam would result in the inundation of habitat
39 for this species. This impact would be significant.

40 This impact would be similar to Impact Wild-1 (CP3) and would be significant.
41 Mitigation for this impact is proposed in Section 13.3.5.

1 *Impact Wild-2 (CP4): Impact on the Foothill Yellow-Legged Frog and Tailed*
2 *Frog and Their Habitat* Ground-disturbing activities associated with
3 construction could result in direct take (e.g., because of operation of equipment
4 in or adjacent to riverine or riparian habitat) of the foothill yellow-legged frog, a
5 California species of special concern, a USFS sensitive species, an MSCS-
6 covered species, and a BLM sensitive species, and of the tailed frog, a
7 California species of special concern. In addition, the raising of Shasta Dam
8 would result in the conversion of suitable riverine and riparian habitat to
9 unsuitable lacustrine habitat. This impact would be potentially significant.

10 This impact would be similar to Impact Wild-2 (CP3) and would be potentially
11 significant. Mitigation for this impact is proposed in Section 13.3.5.

12 *Impact Wild-3 (CP4): Impact on the Northwestern Pond Turtle and Its Habitat*
13 *Ground-disturbing activities associated with construction could result in direct*
14 *take (e.g., because of operation of equipment in or adjacent to riverine or*
15 *riparian habitat) of the northwestern pond turtle, an MSCS-covered species, a*
16 *California species of special concern, and a USFS sensitive species. In addition,*
17 *project implementation could result in the degradation of suitable aquatic*
18 *habitat because of increased erosion and sedimentation. This impact would be*
19 *potentially significant.*

20 This impact would be similar to Impact Wild-3 (CP3) and would be potentially
21 significant. Mitigation for this impact is proposed in Section 13.3.5.

22 *Impact Wild-4 (CP4): Impact on the American Peregrine Falcon* Construction
23 activities and vegetation removal associated with the construction of raising the
24 dam, construction activities in the relocation areas, and removal of various
25 amounts of vegetation in the impoundment areas during the nesting season
26 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
27 the abandonment of nests of American peregrine falcons, a State fully protected
28 species and MSCS-covered species. This impact would be potentially
29 significant.

30 This impact would be similar to Impact Wild-4 (CP3) and would be potentially
31 significant. Mitigation for this impact is proposed in Section 13.3.5.

32 *Impact Wild-5 (CP4): Take and Loss of Habitat for the Bald Eagle*
33 Construction activities and vegetation removal associated with the construction
34 of raising the dam, construction activities in the relocation areas, and removal of
35 various amounts of vegetation in the impoundment areas in addition to
36 inundation caused by the raising of Shasta Dam during the nesting season would
37 result in the loss of nest and perch trees used by the bald eagle, a State-listed
38 species, fully protected species, and USFS sensitive species, an MSCS-covered
39 species, and a BLM sensitive species. This impact would be significant.

1 This impact would be similar to Impact Wild-5 (CP3) and would be potentially
2 significant. Mitigation for this impact is proposed in Section 13.3.5.

3 *Impact Wild-6 (CP4): Take and Loss of Nesting and Foraging Habitat for the*
4 *Northern Spotted Owl* Construction activities and vegetation removal
5 associated with the construction of raising the dam, construction activities in the
6 relocation areas, and removal of various amounts of vegetation in the
7 impoundment areas during the nesting season could result in the incidental loss
8 of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the
9 northern spotted owl, a Federally listed as threatened species and MSCS-
10 covered species. In addition, inundation caused by the raising of Shasta Dam
11 would result in the loss of habitat for this species. This impact would be
12 potentially significant.

13 This impact would be similar to Impact Wild-6 (CP3) and would be potentially
14 significant. Mitigation for this impact is proposed in Section 13.3.5.

15 *Impact Wild-7 (CP4): Impact on the Purple Martin and Its Nesting Habitat*
16 Construction activities and vegetation removal associated with the construction
17 of raising the dam, construction activities in the relocation areas, and removal of
18 various amounts of vegetation in the impoundment areas during the nesting
19 season could result in the incidental loss of fertile eggs or nestlings or otherwise
20 lead to the abandonment of nests of purple martins, a California species of
21 special concern. In addition, inundation caused by the raising of Shasta Dam
22 would result in the loss of nest trees. This impact would be significant.

23 This impact would be similar to Impact Wild-7 (CP3) and would be significant.
24 Mitigation for this impact is proposed in Section 13.3.5.

25 *Impact Wild-8 (CP4): Impacts on the Willow Flycatcher, Vaux's Swift, Yellow*
26 *Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat*
27 Construction activities and vegetation removal associated with the construction
28 of raising the dam, construction activities in the relocation areas, and removal of
29 various amounts of vegetation in the impoundment areas during the nesting
30 season could result in the incidental loss of fertile eggs or nestlings or otherwise
31 lead to the abandonment of nests of the willow flycatcher, a State-listed as
32 endangered species, USFS sensitive species, and MSCS-covered species; the
33 Vaux's swift, a California species of special concern; and the yellow warbler
34 and yellow-breasted chat, both California species of special concern and MSCS-
35 covered species. In addition, the raising of Shasta Dam would result in the loss
36 of habitat, including nesting habitat, for these species. This impact would be
37 potentially significant.

38 This impact would be similar to Impact Wild-8 (CP3) and would be potentially
39 significant. Mitigation for this impact is proposed in Section 13.3.5.

1 *Impact Wild-9 (CP4): Impacts on the Long-Eared Owl, Northern Goshawk,*
2 *Cooper's Hawk, Great Blue Heron, and Osprey and Their Foraging and*
3 *Nesting Habitat* Construction activities and vegetation removal associated with
4 the construction of raising the dam, construction activities in the relocation
5 areas, and removal of various amounts of vegetation in the impoundment areas
6 during the nesting season could result in the incidental loss of fertile eggs or
7 nestlings or otherwise lead to the abandonment of nests of the long-eared owl, a
8 California species of special concern and an MSCS-covered species; the
9 northern goshawk, a California species of special concern, a USFS sensitive
10 species, and a BLM sensitive species; the Cooper's hawk, an MSCS-covered
11 species; the great blue heron, an MSCS-covered species; and the osprey, an
12 MSCS-covered species. In addition, the raising of Shasta Dam would result in
13 the loss of foraging and nesting habitat for these species. This impact would be
14 potentially significant.

15 This impact would be similar to Impact Wild-9 (CP3) and would be potentially
16 significant. Mitigation for this impact is proposed in Section 13.3.5.

17 *Impact Wild-10 (CP4): Take and Loss of Habitat for the Pacific Fisher*
18 Construction activities and vegetation removal associated with the construction
19 of raising the dam, construction activities in the relocation areas, and removal of
20 various amounts of vegetation in the impoundment areas would result in a loss
21 of habitat for the Pacific fisher, a Federal candidate for listing, a California
22 species of special concern, a USFS sensitive species, and a BLM sensitive
23 species. Furthermore, take (including mortality of individuals because of
24 destruction or disturbance of active roost sites or dens) could result from
25 construction activities and vegetation clearing. This impact would be potentially
26 significant.

27 This impact would be similar to Impact Wild-10 (CP3) and would be potentially
28 significant. Mitigation for this impact is proposed in Section 13.3.5.

29 *Impact Wild-11 (CP4): Impacts on Special-Status Bats (Pallid Bat, Spotted Bat,*
30 *Western Red Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, Long-Eared*
31 *Myotis, and Yuma Myotis), the American Marten, and Ringtail and Their*
32 *Habitat* Construction activities and vegetation removal associated with the
33 construction of raising the dam, construction activities in the relocation areas,
34 and removal of various amounts of vegetation in the impoundment areas would
35 result in a loss of habitat for the pallid bat, a California species of special
36 concern, a USFS sensitive species, and a BLM sensitive species; the western red
37 bat, a USFS sensitive species; the western mastiff bat, a California species of
38 special concern, an MSCS-covered species, and a BLM sensitive species; the
39 Townsend's big-eared bat, a California species of special concern, a USFS
40 sensitive species, and a BLM sensitive species; the long-eared myotis, a BLM
41 sensitive species; the Yuma myotis, a BLM sensitive species; the American
42 marten, a USFS sensitive species; and the ringtail, a State fully protected and
43 MSCS-covered species. Furthermore, take (including mortality of individuals

1 because of destruction or disturbance of active roost sites or dens) could result
2 from construction activities and vegetation clearing. This impact would be
3 potentially significant.

4 This impact would be similar to Impact Wild-11 (CP3) and would be potentially
5 significant. Mitigation for this impact is proposed in Section 13.3.5.

6 *Impact Wild-12 (CP4): Impacts on Special-Status Terrestrial Mollusks (Shasta*
7 *Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their*
8 *Habitat* All of these species are designated USFS sensitive and survey and
9 manage species and are proposed for Federal listing. The Shasta sideband is
10 also an MSCS-covered species. Ground-disturbing activities and vegetation
11 removal associated with the construction of raising the dam, construction
12 activities in the relocation areas, and removal of various amounts of vegetation
13 in the impoundment areas could result in direct take and/or loss of suitable
14 habitat for special-status terrestrial mollusks. In addition, the raising of Shasta
15 Dam would result in the inundation of suitable habitat and direct take of this
16 species. This would be a significant impact.

17 This impact would be similar to Impact Wild-12 (CP3) and would be
18 significant. Mitigation for this impact is proposed in Section 13.3.5.

19 *Impact Wild-13 (CP4): Permanent Loss of General Wildlife Habitat*
20 Construction activities and vegetation removal associated with the construction
21 of raising the dam, construction activities in the relocation areas, and removal of
22 various amounts of vegetation in the impoundment areas would result in a
23 permanent loss of habitat. In addition, inundation caused by the raising of
24 Shasta Dam would result in a permanent loss of habitat. This would be a
25 potentially significant impact.

26 This impact would be similar to Impact Wild-13 (CP3) and would be potentially
27 significant. Mitigation for this impact is proposed in Section 13.3.5.

28 *Impact Wild-14 (CP4): Impacts on Other Birds of Prey (i.e., red-tailed hawk*
29 *and red-shouldered hawk) and Migratory Bird Species (i.e., American robin,*
30 *Anna's hummingbird) and their Foraging and Nesting Habitat* Construction
31 activities and vegetation removal associated with the construction of raising the
32 dam, construction activities in the relocation areas, and removal of various
33 amounts of vegetation in the impoundment areas during the nesting season
34 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
35 the abandonment of nests of other birds of prey and migratory bird species. In
36 addition, inundation caused by the raising of Shasta Dam could result in the loss
37 of active nests and habitat for these species. This impact would be potentially
38 significant.

39 This impact would be similar to Impact Wild-14 (CP3) and would be potentially
40 significant. Mitigation for this impact is proposed in Section 13.3.5.

1 *Impact Wild-15 (CP4): Loss of Critical Deer Winter and Fawning Range*
2 Construction activities and vegetation removal associated with the construction
3 of raising the dam, construction activities in the relocation areas, and removal of
4 various amounts of vegetation in the impoundment areas would result in a loss
5 of critical deer winter and fawning range. In addition, inundation caused by the
6 raising of Shasta Dam would result in the loss of critical deer range. This would
7 be a potentially significant impact.

8 This impact would be identical to Impact Wild-15 (CP3) and would be
9 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

10 *Impact Wild-16 (CP4): Take and Loss of the California Red-Legged Frog*
11 Reclamation is concurrently completing an assessment of California red-legged
12 frog habitat in coordination with the USFWS. The assessment results will
13 enable Reclamation and the USFWS to determine if habitat for the species
14 occurs, if impacts are anticipated, and if additional surveys are needed. Impacts
15 on the California red-legged frog will be assessed if surveys are conducted and
16 the California red-legged frog is found. Impacts for each alternative will not be
17 assessed until USFWS has determined whether suitable habitat is present and
18 whether surveys would be required. Mitigation for this impact is discussed in
19 Section 13.3.5.

20 **Upper Sacramento River (Shasta Dam to Red Bluff)**

21 *Impact Wild-17 (CP4): Impacts on Riparian-Associated Special-Status Wildlife*
22 *Resulting from Modifications to the Existing Flow Regime in the Primary Study*
23 *Area* Implementing CP4 would increase available water storage in Shasta
24 Reservoir and result in a modified flow regime. This modification would reduce
25 the frequency, duration, and magnitude of intermediate to large flows
26 downstream from Shasta Dam during winter and spring in some years,
27 especially wet and above-normal water years. Conversely, CP4 would increase
28 flow volumes in summer and fall of most years, most dramatically in September
29 and October, because more water would be available to enhance conditions for
30 anadromous fish (the goal of CP4) in the driest months. This change in surface
31 and subsurface hydrology could affect habitats adjacent to the river channel and
32 reduce the formation of off-channel habitats, which would adversely affect the
33 habitat of western pond turtle. Although the total amount of riparian vegetation
34 would not decline substantially, the portion in early successional stages would
35 be reduced. These early successional stages provide habitat for some special-
36 status wildlife species. These changes could result in substantial effects on the
37 distribution or abundance of riparian-nesting special-status bird species.
38 Because CP4 would substantially alter habitat for a variety of riparian-
39 dependent special-status species, this impact would be potentially significant.

40 The operational rules that govern the management of reservoirs and delivery of
41 water under CP4 are identical to those that guided the modeling for CP1. Table
42 13-44 shows the changes in monthly flows that would occur under CP4.
43 Therefore, this impact would be the same as Impact Wild-17 (CP1) and would

1 be potentially significant. Mitigation for this impact is proposed in Section
2 13.3.5.

3

Table 13-44. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP4

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Keswick												
Wet	1.6%	0.8%	-6.0%	-2.9%	-0.5%	0.4%	0.3%	0.1%	0.2%	0.3%	0.3%	0.4%
Above Normal	5.1%	-1.5%	-1.4%	-2.2%	-5.2%	-2.2%	0.0%	-3.0%	-1.4%	0.1%	0.9%	5.9%
Below Normal	0.9%	-0.7%	0.1%	-0.9%	-0.7%	-1.1%	0.2%	-2.6%	1.1%	0.2%	0.0%	1.3%
Dry	2.4%	4.1%	-2.0%	-2.0%	-1.0%	0.0%	0.7%	1.4%	2.3%	1.5%	2.3%	3.9%
Critical	2.3%	4.8%	1.0%	-0.6%	1.7%	0.8%	1.0%	1.8%	0.6%	0.7%	-0.2%	5.6%
Bend Bridge												
Wet	1.4%	1.4%	-3.1%	-1.2%	-0.3%	0.3%	0.2%	0.1%	0.2%	0.3%	0.3%	0.4%
Above Normal	4.0%	-1.1%	-0.6%	-1.2%	-2.8%	-1.3%	0.0%	-2.1%	-1.0%	0.0%	0.8%	5.5%
Below Normal	0.8%	-0.1%	0.0%	-0.5%	-0.4%	-0.8%	0.1%	-1.6%	1.0%	0.2%	-0.1%	1.2%
Dry	2.1%	3.1%	-1.0%	-1.0%	-0.5%	0.0%	0.5%	1.1%	2.1%	1.5%	2.3%	3.6%
Critical	1.6%	3.9%	0.8%	-0.4%	1.5%	0.6%	0.8%	1.6%	0.5%	0.6%	-0.2%	5.2%
Butte City												
Wet	1.6%	2.0%	-2.3%	-0.7%	-0.2%	0.3%	0.1%	-0.1%	0.0%	0.2%	0.2%	0.4%
Above Normal	4.3%	-0.8%	-0.4%	-0.9%	-1.9%	-0.8%	0.2%	-2.4%	-1.2%	-0.3%	0.8%	5.8%
Below Normal	1.2%	0.2%	0.3%	-0.6%	-0.3%	-0.7%	-0.3%	-1.5%	1.4%	0.3%	0.0%	1.0%
Dry	2.4%	3.2%	-0.7%	-0.5%	-0.2%	0.0%	0.8%	1.0%	3.2%	2.3%	3.2%	3.8%
Critical	1.4%	4.3%	0.8%	-0.5%	1.4%	0.5%	1.1%	2.2%	0.6%	0.9%	-0.2%	4.8%
Wilkins Slough												
Wet	1.6%	2.2%	-1.6%	-0.2%	0.0%	0.3%	0.1%	-0.1%	0.0%	0.2%	0.2%	0.4%
Above Normal	4.3%	-0.8%	-0.4%	-0.6%	-1.1%	-0.4%	0.2%	-2.4%	-1.2%	-0.3%	0.8%	5.8%
Below Normal	1.2%	0.2%	0.3%	-0.6%	0.0%	-0.7%	-0.3%	-1.5%	1.4%	0.3%	0.0%	1.0%
Dry	2.4%	3.2%	-0.7%	-0.4%	-0.2%	0.0%	0.8%	1.0%	3.2%	2.3%	3.2%	3.8%
Critical	1.4%	4.3%	0.8%	-0.5%	1.4%	0.5%	1.1%	2.2%	0.6%	0.9%	-0.2%	4.8%
Verona												
Wet	1.5%	1.7%	-1.3%	-0.2%	0.0%	0.2%	0.1%	-0.2%	0.0%	0.1%	-0.1%	0.2%
Above Normal	3.2%	-0.1%	-0.3%	-0.4%	-1.3%	-0.2%	0.1%	-1.0%	-0.8%	-0.2%	0.4%	2.3%
Below Normal	0.6%	0.1%	-0.1%	0.0%	0.1%	-0.5%	-0.2%	-0.4%	1.4%	0.1%	-0.1%	-0.3%
Dry	1.3%	2.5%	-0.8%	-0.2%	-0.2%	0.0%	0.5%	0.7%	-1.0%	1.1%	1.8%	5.7%
Critical	0.5%	3.6%	0.8%	-0.2%	1.1%	0.4%	0.7%	2.0%	0.5%	0.8%	-1.5%	3.1%

Table 13-44. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP4 (contd.)

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Freeport												
Wet	0.7%	0.5%	-0.3%	-0.2%	0.1%	0.1%	0.0%	-0.2%	0.0%	0.0%	0.0%	0.0%
Above Normal	1.2%	-0.5%	0.0%	0.0%	-0.5%	-0.1%	0.1%	-0.8%	-0.6%	-0.1%	0.0%	0.5%
Below Normal	-0.1%	-0.6%	0.5%	0.5%	0.3%	-0.3%	0.1%	-0.5%	0.3%	-0.1%	-0.4%	0.0%
Dry	1.2%	1.4%	-0.5%	-0.1%	-0.1%	-0.1%	0.2%	0.5%	-0.2%	0.7%	1.7%	4.3%
Critical	0.1%	1.8%	0.8%	-0.2%	0.9%	-0.1%	0.4%	0.9%	0.0%	1.4%	0.5%	2.4%

1 *Impact Wild-18 (CP4): Impacts on Bank Swallow in the Primary Study Area*
2 *Resulting from Modifications of Geomorphic Processes* Implementing CP4
3 would cause a small reduction in the magnitude, duration, and frequency of
4 intermediate to large flows in the Sacramento River in the primary study area.
5 This reduction also would alter the river's geomorphic processes, including the
6 rate of bank erosion. However, the length of eroding banks would not be
7 substantially altered, and thus, nesting habitat for bank swallows would not be
8 substantially reduced. High flows during the nesting season that may cause
9 localized nest failure would not be increased. The impact on habitat for bank
10 swallow nesting colonies would be less than significant.

11 The operational rules that govern the management of reservoirs and delivery of
12 water under CP4 are identical to those that guided the modeling for CP1.
13 Therefore, this impact would be the same as Impact Wild-18 (CP1) and would
14 be less than significant. Mitigation for this impact is proposed in Section 13.3.5.

15 *Impact Wild-19 (CP4): Disturbance or Removal of Vernal Pool Habitat for*
16 *Special-Status Wildlife from Dam Construction and from Changes in Flow*
17 *Regime* As mentioned in Impact Wild-19 (CP1), vernal pools are generally not
18 present within the active floodplain of the upper Sacramento River in the
19 primary study area; vernal pools are found in upland locations outside of the
20 main river channel and the floodplain. Thus, vernal pools are not anticipated to
21 be affected by changes in flows that could result from implementation of CP4.
22 The operational rules that govern the management of reservoirs and delivery of
23 water under CP4 are identical to those that guided the modeling for CP1.
24 Therefore, this impact would be the same as Impact Wild-19 (CP1). Because
25 CP4 would not affect vernal pool habitat or the sensitive wildlife species that
26 occur within the habitat, no impact would occur. Mitigation for this impact is
27 not needed, and thus not proposed.

28 *Impact Wild-20 (CP4): Consistency with Local and Regional Plans with Goals*
29 *of Promoting Riparian Habitat in the Primary Study Area* Several
30 conservation and management plans have been adopted in the primary and
31 extended study areas with goals of promoting riparian habitat along the
32 Sacramento River. Because flow regimes and riverine geomorphic processes
33 could be altered with project implementation, riparian habitat could be affected
34 in such a manner that the goals of the local and regional plans would be more
35 difficult to attain. Therefore, this impact would be potentially significant.

36 The operational rules that govern the management of reservoirs and delivery of
37 water under CP4 are identical to those that guided the modeling for CP1.
38 Therefore, this impact would be the same as Impact Wild-20 (CP1) and would
39 be potentially significant. Mitigation for this impact is proposed in Section
40 13.3.5.

41 *Impact Wild-21 (CP4): Impacts on Riparian-Associated Special-Status Wildlife*
42 *Resulting from the Gravel Augmentation Program* CP4 would include the

1 gravel augmentation program, as described in Chapter 2, “Alternatives.”
2 Implementing the gravel augmentation program could result in temporary and
3 short-term disturbance of riparian vegetation that has the potential to support
4 special-status wildlife. There are no vernal pools or other seasonal wetland
5 habitats at the augmentation sites. However, riparian-associated special-status
6 wildlife species could be killed during removal of riparian vegetation. This
7 impact would be potentially significant.

8 CP4 would include a gravel augmentation program. Implementing this program
9 could result in temporary disturbance of habitat or removal of riparian
10 vegetation that has the potential to support special-status wildlife. Gravel
11 augmentation would occur at one to three sites per year over a 10-year period,
12 so the area of impact in a given year would be relatively small. Although a total
13 of 15 potential augmentation sites have been identified between Keswick Dam
14 and Shea Island, the choice of specific sites would be made annually through an
15 agency consultation process that would minimize impacts and maximize
16 benefits of the deposited gravel.

17 Gravel placement itself is not expected to result in substantial adverse effects on
18 any wildlife species because the gravel would all be placed within the active
19 stream channel where there are no vernal pools or other seasonal wetland
20 habitats. The main avenue of impact for riparian-dependent species would be
21 construction of access roads required to allow equipment to reach the river. This
22 would be a short-term habitat loss that would not be sufficient to substantially
23 affect any wildlife species. However, riparian-associated special-status wildlife
24 species could be killed during riparian vegetation removal. Direct loss of
25 riparian-associated special-status species during vegetation removal would be a
26 potentially significant impact. Potential effects on special-status wildlife species
27 are as follows:

- 28 • **Invertebrates** – Blue elderberry shrubs, the host plant for the valley
29 elderberry longhorn beetle, are found throughout much of the
30 Sacramento River’s riparian corridor. Gravel augmentation activities
31 have the potential to directly and indirectly affect blue elderberry
32 shrubs, as well as valley elderberry longhorn beetles potentially present
33 in the shrubs. Eleven individual elderberry shrubs and/or clumps are
34 present within 100 feet of areas that would be disturbed during gravel
35 augmentation; these shrubs are located 20 feet or more from the access
36 trail. As currently designed, no elderberry shrub removal is required;
37 the nearest project activity is restricted to use of the access trail. Should
38 access routes need to be adjusted or elderberry shrubs become
39 established in an access route between augmentation intervals, the
40 resulting disturbance of elderberry shrubs would be a potentially
41 significant impact.
- 42 • **Reptiles and Amphibians** – The western pond turtle has been
43 documented within the Sacramento River and suitable habitat for the

1 species is provided in the primary study area. Riparian vegetation that
2 would be removed along the river corridor provides potential cover and
3 foraging habitat for western pond turtle. Augmentation activities would
4 take place during the western pond turtle's breeding season; thus, the
5 potential also exists to affect nests, eggs, nesting females, or juvenile
6 turtles during vegetation clearing, grading, and gravel placement.
7 Therefore, loss of habitat for the western pond turtle would be a
8 potentially significant impact.

- 9 • **Birds** – The riparian and wetland habitats along the Sacramento River
10 floodway provide potential nesting and foraging habitat for western
11 yellow-billed cuckoo, California yellow warbler, and yellow-breasted
12 chat, all of which are special-status birds that nest in riparian
13 vegetation. In addition, northern harrier and short-eared owl may nest
14 in marshes in or adjacent to the stream channel. Other raptors
15 (Cooper's hawk, Swainson's hawk, white-tailed kite, bald eagle, and
16 osprey) may nest in trees in the riparian habitat in the study area.
17 Gravel augmentation activities would be limited to a 1-month window
18 from late August to September each year. Therefore, gravel
19 augmentation would generally be conducted outside of the nesting
20 season of most of these species. However, there would still be some
21 potential for active nests to be present in gravel augmentation and
22 vegetation removal areas until mid-September. For example, the
23 nesting season for Swainson's hawk, white-tailed kite, and other raptors
24 is from March 1 to September 15 and the nesting season of many other
25 species extends through August 31. Therefore, vegetation removal or
26 disturbance of active nests could result in direct mortality or loss or
27 abandonment of active nests. This would be a potentially significant
28 impact.
- 29 • **Mammals** – Special-status mammals potentially occurring in the
30 project area include pallid bat, western red bat, and ringtail. Riparian
31 habitat can provide important foraging and roosting habitat for bats, but
32 while they may roost there, these species are not typically dependent on
33 riparian habitats. The amount of potential foraging and roosting habitat
34 would not substantially decrease, so impacts on special-status bats
35 would be less than significant. Removal of small amounts of riparian
36 vegetation along the river channel in the study area to create access
37 routes for gravel augmentation would not substantially reduce habitat
38 for ringtail. Therefore, impacts on special-status mammals would be
39 less than significant.

40 Because creation and maintenance of access routes to gravel augmentation sites
41 has the potential to affect valley elderberry longhorn beetle, western pond turtle,
42 and riparian-associated special-status birds, this impact would be potentially
43 significant. Mitigation for this impact is proposed in Section 13.3.5.

1 *Impact Wild-22 (CP4): Impacts on Riparian-Associated Special-Status Wildlife*
2 *Species Resulting from Restoration Projects* Under CP4, riparian, floodplain,
3 and side-channel habitat restoration would occur at one or a combination of
4 potential locations along the upper Sacramento River. Restoration measures for
5 the six potential restoration sites would generally involve riparian, floodplain,
6 and side-channel restoration. Restoration actions could require removing
7 vegetation, site grading and excavation, and planting of riparian species. This
8 could require the construction of access routes, use of heavy equipment to
9 excavate side channels and restore floodplains, and installation of native
10 riparian plant species when earth-moving is complete, Disturbances would
11 generally be related to construction-related activities, but it would take years for
12 the installed plants to recover to the degree that the new community would
13 function as high-quality riparian habitat. Overall, restoration work could result
14 in disturbance and short-term removal of riparian vegetation that support
15 riparian-associated special-status wildlife species that could be killed during
16 riparian vegetation removal. This impact would be potentially significant.

17 CP4 would include restoration actions at up to six proposed sites. Potential
18 effects of these actions on special-status wildlife species are as follows:

- 19 • **Invertebrates** – Blue elderberry shrubs, the host plant for the valley
20 elderberry longhorn beetle, are found throughout much of the
21 Sacramento River’s riparian corridor. Elderberry shrubs may be present
22 at any of the six proposed sites but have been documented near the
23 Henderson Open Space, Anderson Island, and Reading Island sites.
24 Construction activities have the potential to directly and indirectly
25 affect blue elderberry shrubs, as well as valley elderberry longhorn
26 beetles potentially present in the shrubs. Disturbance of elderberry
27 shrubs would be a potentially significant impact.

- 28 • **Reptiles and Amphibians** – The western pond turtle has been
29 documented within the Sacramento River, and suitable habitat for the
30 species is provided within the primary study area. Riparian vegetation
31 that would be removed along the river corridor provides potential cover
32 and foraging habitat for western pond turtle. Pond turtles may use the
33 historic and partially or intermittently connected side channels found at
34 most of the restoration sites. Enhancement of these channels to provide
35 spawning habitat for Chinook salmon could alter the channels to the
36 extent that they are unsuitable for western pond turtles. This would
37 primarily occur through an increase in water velocities required for
38 spawning salmon and removal of complex cover and basking sites that
39 turtles require. Habitat restoration activities would take place during the
40 western pond turtle’s breeding season; thus, the potential also exists to
41 affect nests, eggs, juveniles, nesting females, and non-nesting adults
42 during vegetation clearing, grading, and gravel placement. Therefore,
43 loss of habitat for the western pond turtle or direct impacts on turtles
44 themselves would be a potentially significant impact.

- 1 • **Birds** – The riparian habitat along the Sacramento River provides
2 potential nesting and foraging habitat for western yellow-billed cuckoo,
3 California yellow warbler, and yellow-breasted chat, all of which are
4 special-status birds that nest in riparian vegetation. In addition, northern
5 harrier and short-eared owl may nest in marshes in or adjacent to the
6 stream channel. Other raptors (e.g., Cooper’s hawk, Swainson’s hawk,
7 white-tailed kite, bald eagle, and osprey) may nest in trees in the
8 riparian habitat along these waterways. Bald eagles have been
9 documented nesting at Reading Island and Kapusta Island. The
10 streambanks at Tobiason Island and Reading Island provide nesting
11 habitat for bank swallows. The proposed restoration activities all would
12 require removing existing riparian vegetation to allow access to the
13 work areas, staging equipment, removing soil, and site grading.
14 Although riparian vegetation would be replanted after site work is
15 complete, the removal or disturbance of active nests could result in
16 direct mortality or loss or abandonment of active nests. This would be a
17 potentially significant impact.
- 18 • **Mammals** – Special-status mammals potentially occurring in the
19 project area include pallid bat, western red bat, and ringtail. Riparian
20 habitat can provide important foraging and roosting habitat for bats, but
21 these species are not typically dependent on riparian habitats. The
22 amount of potential foraging habitat would not decrease appreciably
23 during restoration activities. Available riparian habitats would still be
24 sufficient for roosting habitat, so impacts on special-status bats would
25 be less than significant. Vegetation removal would occur at any of the
26 sites proposed for restoration. Although ringtail are not reported in the
27 CNDDDB (2012) from any of these locations, this species is known to
28 occur in riparian habitat. The amount of vegetation to be removed
29 would not substantially reduce available habitat for ringtail in the
30 vicinity of these sites. Removal of small amounts of riparian vegetation
31 along the river corridor would not substantially reduce habitat for
32 ringtail. Therefore, impacts on special-status mammals would be less
33 than significant.

34 Because of the potential to affect valley elderberry longhorn beetle, western
35 pond turtle, and riparian-associated special-status birds, this impact would be
36 potentially significant. Most of these impacts are relatively short term during
37 construction and lasting for several years after restoration is complete.
38 Eventually conditions at the restoration sites would likely be the same as or
39 higher quality than what exists now. Mitigation for this impact is proposed in
40 Section 13.3.5.

41 **Lower Sacramento River and Delta**
42 *Impact Wild-23 (CP4): Impacts on Riparian-Associated and Aquatic Special-*
43 *Status Wildlife Resulting from Modifications to Existing Flow Regimes in the*
44 *Lower Sacramento River and Delta* Implementing CP4 would modify the flow

1 regime and would reduce the frequency, duration, and magnitude of
2 intermediate to large flows in the lower Sacramento River during winter and
3 spring in some years. It also would increase the volume of flows in fall of most
4 years. Although this change in surface and subsurface hydrology would be of a
5 smaller magnitude than in the upper Sacramento River, it could affect habitats
6 adjacent to the river channel and the formation of off-channel habitats along the
7 lower Sacramento River, which would adversely affect the habitat of western
8 pond turtle. Although the total amount of riparian vegetation would not decline
9 substantially, the portion in early successional stages would be reduced. These
10 early successional stages provide habitat for some special-status wildlife
11 species. These changes could result in substantial effects on the distribution or
12 abundance of riparian-nesting special-status bird species. Because CP4 would
13 substantially alter habitat for a variety of riparian-dependent special-status
14 species, this impact would be potentially significant.

15 The operational rules that govern the management of reservoirs and delivery of
16 water under CP4 are identical to those that guided the modeling for CP1.
17 Therefore, this impact would be the same as Impact Wild-23 (CP1) and would
18 be potentially significant. Mitigation for this impact is proposed in Section
19 13.3.5.

20 *Impact Wild-24 (CP4): Impacts on Bank Swallow Along the Lower Sacramento*
21 *River Resulting from Modifications of Geomorphic Processes* Implementing
22 CP4 would cause a small reduction in the magnitude, duration, and frequency of
23 intermediate to large flows in the lower Sacramento River. This reduction also
24 would alter the river's geomorphic processes. The rate of bank erosion would be
25 reduced, but the length of eroding banks would not be substantially altered, and
26 thus, nesting habitat for bank swallows would not decline substantially. High
27 flows during the nesting season that may cause localized bank and nest failure
28 would not increase. The impact on habitat for bank swallow nesting colonies,
29 and therefore bank swallows themselves, would be less than significant.

30 The operational rules that govern the management of reservoirs and delivery of
31 water under CP4 are identical to those that guided the modeling for CP1. The
32 effect of CP4 on bank swallow habitat along the lower Sacramento River would
33 be similar to the effect along the upper Sacramento River, but smaller because
34 the effect of CP4 on river flows would attenuate with distance downstream.
35 Therefore, this impact would be the same as Impact Wild-24 (CP1), and would
36 be less than significant. Mitigation for this impact is not needed, and thus not
37 proposed.

38 *Impact Wild-25 (CP4): Disturbance or Removal of Vernal Pool Habitat for*
39 *Special-Status Wildlife Along the Lower Sacramento River and in the Delta*
40 *from Changes in Flow Regime of the Sacramento River and Affected*
41 *Tributaries, and Changes in Seasonal Water Availability* Vernal pools are
42 present in upland areas near the Sacramento River and its tributaries in the
43 extended study area. These pools provide habitat for numerous special-status

1 species. Critical habitat for three special-status species (vernal pool fairy
2 shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp) is located
3 within the extended study area. Critical habitat for these species is confined to
4 vernal pool communities (USFWS 2006). However, vernal pools are generally
5 not present within the active floodplain of regulated rivers along the lower
6 Sacramento River and in the Delta. The operational rules that govern the
7 management of reservoirs and delivery of water under CP4 are identical to those
8 that guided the modeling for CP1. Because CP4 would not affect this habitat or
9 these species, no impact would occur. Mitigation for this impact is not needed,
10 and thus not proposed.

11 *Impact Wild-26 (CP4): Consistency with Local and Regional Plans with Goals*
12 *of Promoting Riparian Habitat along the Lower Sacramento River and in the*
13 *Delta* Several conservation and management plans have been adopted in the
14 primary and extended study areas with goals of promoting riparian habitat along
15 the Sacramento River. Because flow regimes and riverine geomorphic processes
16 could be altered with project implementation, riparian habitat could be affected
17 in such a manner that the goals of the local and regional plans would be more
18 difficult to attain. Therefore, this impact would be potentially significant.

19 The operational rules that govern the management of reservoirs and delivery of
20 water under CP4 are identical to those that guided the modeling for CP1.
21 Therefore, this impact would be the same as Impact Wild-26 (CP1) and would
22 be potentially significant. Mitigation for this impact is proposed in Section
23 13.3.5.

24 **CVP/SWP Service Areas**

25 *Impact Wild-27 (CP4): Impacts on Riparian-Associated or Aquatic Special-*
26 *Status Wildlife in the CVP/SWP Service Areas Resulting from Modifications to*
27 *Existing Flow Regimes* By altering storage and operations at several reservoirs
28 associated with the CVP and SWP service areas, CP4 would change flow
29 regimes in several downstream waterways. Modified flow regimes would
30 reduce the frequency, duration, and magnitude of intermediate to large flows
31 along the Sacramento River. The change in surface and subsurface hydrology
32 could affect habitats adjacent to the river channel that provide habitat for
33 special-status wildlife species. These changes are unlikely to result in
34 substantial effects on the distribution or abundance of riparian-associated or
35 aquatic special-status wildlife species in the CVP and SWP service areas
36 outside of the primary study area. Therefore, this impact would be less than
37 significant.

38 The operational rules that govern the management of reservoirs and delivery of
39 water under CP4 are identical to those that guided the modeling for CP1.
40 Therefore, this impact would be the same as Impact Wild-27 (CP1) and would
41 be less than significant. Mitigation for this impact is not needed, and thus not
42 proposed.

1 **CP5 – 18.5-Foot Dam Raise, Combination Plan**

2 CP5 would address both the primary and secondary planning objectives. It
3 involves enlarging Shasta Dam by 18.5 feet, which is consistent with the
4 objectives of the 2000 CALFED ROD, and also includes the common features
5 described above. In addition, CP5 involves (1) implementing environmental
6 restoration features along the lower reaches of major tributaries to Shasta Lake,
7 (2) constructing shoreline fish habitat around Shasta Lake, and (3) constructing
8 either additional or improved recreation features at various locations around
9 Shasta Lake to increase the value of the recreational experience. Formulation of
10 specific environmental restoration features and increased recreation components
11 is included in the Draft Feasibility Report.

12 CP5 would also include implementing the same gravel augmentation program
13 and the same riparian, floodplain, and side channel habitat restoration at up to
14 six locations along the upper Sacramento River as described for CP4.

15 **Shasta Lake and Vicinity**

16 *Impact Wild-1 (CP5): Take and Loss of Habitat for the Shasta Salamander*
17 Ground-disturbing activities associated with construction could result in direct
18 take of the Shasta salamander, a State-listed species, USFS sensitive species,
19 survey and manage species, MSCS-covered species, and BLM sensitive species.
20 In addition, the raising of Shasta Dam would result in the inundation of habitat
21 for this species. This impact would be significant.

22 This impact would be similar to Impact Wild-1 (CP3) and would be significant.
23 Mitigation for this impact is proposed in Section 13.3.5.

24 Additional impacts may occur depending on specific restoration and recreation
25 enhancement details. These impacts will be quantified when the details of the
26 proposed actions are developed.

27 *Impact Wild-2 (CP5): Impact on the Foothill Yellow-Legged Frog and Tailed*
28 *Frog and Their Habitat* Ground-disturbing activities associated with
29 construction could result in direct take (e.g., because of operation of equipment
30 in or adjacent to riverine or riparian habitat) of the foothill yellow-legged frog, a
31 California species of special concern, a USFS sensitive species, an MSCS-
32 covered species, and a BLM sensitive species, and of the tailed frog, a
33 California species of special concern. In addition, the raising of Shasta Dam
34 would result in the conversion of suitable riverine and riparian habitat to
35 unsuitable lacustrine habitat. This impact would be potentially significant.

36 This impact would be similar to Impact Wild-2 (CP3) and would be potentially
37 significant. Mitigation for this impact is proposed in Section 13.3.5.

38 Additional impacts may occur depending on specific restoration and recreation
39 enhancement details. These impacts will be quantified when the details of the
40 proposed actions are developed.

1 *Impact Wild-3 (CP5): Impact on the Northwestern Pond Turtle and Its Habitat*
2 Ground-disturbing activities associated with construction could result in direct
3 take (e.g., because of operation of equipment in or adjacent to riverine or
4 riparian habitat) of the northwestern pond turtle, an MSCS-covered species, a
5 California species of special concern, and a USFS sensitive species. In addition,
6 project implementation could result in the degradation of suitable aquatic
7 habitat because of increased erosion and sedimentation. This impact would be
8 potentially significant.

9 This impact would be similar to Impact Wild-3 (CP3) and would be potentially
10 significant. Mitigation for this impact is proposed in Section 13.3.5.

11 Additional impacts may occur depending on specific restoration and recreation
12 enhancement details. These impacts will be quantified when the details of the
13 proposed actions are developed.

14 *Impact Wild-4 (CP5): Impact on the American Peregrine Falcon* Construction
15 activities and vegetation removal associated with the construction of raising the
16 dam, construction activities in the relocation areas, and removal of various
17 amounts of vegetation in the impoundment areas during the nesting season
18 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
19 the abandonment of nests of American peregrine falcons, a State fully protected
20 species and MSCS-covered species. This impact would be potentially
21 significant.

22 This impact would be similar to Impact Wild-4 (CP3) and would be potentially
23 significant. Mitigation for this impact is proposed in Section 13.3.5.

24 Additional impacts may occur depending on specific restoration and recreation
25 enhancement details. These impacts will be quantified when the details of the
26 proposed actions are developed.

27 *Impact Wild-5 (CP5): Take and Loss of Habitat for the Bald Eagle*
28 Construction activities and vegetation removal associated with the construction
29 of raising the dam, construction activities in the relocation areas, and removal of
30 various amounts of vegetation in the impoundment areas in addition to
31 inundation caused by the raising of Shasta Dam during the nesting season would
32 result in the loss of nest and perch trees used by the bald eagle, a State-listed
33 species, fully protected species, and USFS sensitive species, an MSCS-covered
34 species, and a BLM sensitive species. This impact would be significant.

35 This impact would be similar to Impact Wild-5 (CP3) and would be significant.
36 Mitigation for this impact is proposed in Section 13.3.5.

37 Additional impacts may occur depending on specific restoration and recreation
38 enhancement details. These impacts will be quantified when the details of the
39 proposed actions are developed.

1 *Impact Wild-6 (CP5): Take and Loss of Nesting and Foraging Habitat for the*
2 *Northern Spotted Owl* Construction activities and vegetation removal
3 associated with the construction of raising the dam, construction activities in the
4 relocation areas, and removal of various amounts of vegetation in the
5 impoundment areas during the nesting season could result in the incidental loss
6 of fertile eggs or nestlings or otherwise lead to the abandonment of nests of the
7 northern spotted owl, a Federally listed as threatened species and MSCS-
8 covered species. In addition, inundation caused by the raising of Shasta Dam
9 would result in the loss of habitat for this species. This impact would be
10 potentially significant.

11 This impact would be similar to Impact Wild-6 (CP3) and would be potentially
12 significant. Mitigation for this impact is proposed in Section 13.3.5.

13 Additional impacts may occur depending on specific restoration and recreation
14 enhancement details. These impacts will be quantified when the details of the
15 proposed actions are developed.

16 *Impact Wild-7 (CP5): Impact on the Purple Martin and Its Nesting Habitat*
17 Construction activities and vegetation removal associated with the construction
18 of raising the dam, construction activities in the relocation areas, and removal of
19 various amounts of vegetation in the impoundment areas during the nesting
20 season could result in the incidental loss of fertile eggs or nestlings or otherwise
21 lead to the abandonment of nests of purple martins, a California species of
22 special concern. In addition, inundation caused by the raising of Shasta Dam
23 would result in the loss of nest trees. This impact would be significant.

24 This impact would be similar to Impact Wild-7 (CP3) and would be significant.
25 Mitigation for this impact is proposed in Section 13.3.5.

26 Additional impacts may occur depending on specific restoration and recreation
27 enhancement details. These impacts will be quantified when the details of the
28 proposed actions are developed.

29 *Impact Wild-8 (CP5): Impacts on the Willow Flycatcher, Vaux's Swift, Yellow*
30 *Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat*
31 Construction activities and vegetation removal associated with the construction
32 of raising the dam, construction activities in the relocation areas, and removal of
33 various amounts of vegetation in the impoundment areas during the nesting
34 season could result in the incidental loss of fertile eggs or nestlings or otherwise
35 lead to the abandonment of nests of the willow flycatcher, a State-listed as
36 endangered species, USFS sensitive species, and MSCS-covered species; the
37 Vaux's swift, a California species of special concern; and the yellow warbler
38 and yellow-breasted chat, both California species of special concern and MSCS-
39 covered species. In addition, the raising of Shasta Dam would result in the loss
40 of habitat, including nesting habitat, for these species. This impact would be
41 potentially significant.

1 This impact would be similar to Impact Wild-8 (CP3) and would be potentially
2 significant. Mitigation for this impact is proposed in Section 13.3.5.

3 Additional impacts may occur depending on specific restoration and recreation
4 enhancement details. These impacts will be quantified when the details of the
5 proposed actions are developed.

6 *Impact Wild-9 (CP5): Impacts on the Long-Eared Owl, Northern Goshawk,*
7 *Cooper's Hawk, Great Blue Heron, and Osprey and Their Foraging and*
8 *Nesting Habitat* Construction activities and vegetation removal associated with
9 the construction of raising the dam, construction activities in the relocation
10 areas, and removal of various amounts of vegetation in the impoundment areas
11 during the nesting season could result in the incidental loss of fertile eggs or
12 nestlings or otherwise lead to the abandonment of nests of the long-eared owl, a
13 California species of special concern and an MSCS-covered species; the
14 northern goshawk, a California species of special concern, a USFS sensitive
15 species, and a BLM sensitive species; the Cooper's hawk, an MSCS-covered
16 species; the great blue heron, an MSCS-covered species; and the osprey, an
17 MSCS-covered species. In addition, the raising of Shasta Dam would result in
18 the loss of foraging and nesting habitat for these species. This impact would be
19 potentially significant.

20 This impact would be similar to Impact Wild-9 (CP3) and would be potentially
21 significant. Mitigation for this impact is proposed in Section 13.3.5.

22 Additional impacts may occur depending on specific restoration and recreation
23 enhancement details. These impacts will be quantified when the details of the
24 proposed actions are developed.

25 *Impact Wild-10 (CP5): Take and Loss of Habitat for the Pacific Fisher*
26 Construction activities and vegetation removal associated with the construction
27 of raising the dam, construction activities in the relocation areas, and removal of
28 various amounts of vegetation in the impoundment areas would result in a loss
29 of habitat for the Pacific fisher, a Federal candidate for listing, a California
30 species of special concern, a USFS sensitive species, and a BLM sensitive
31 species. Furthermore, take (including mortality of individuals because of
32 destruction or disturbance of active roost sites or dens) could result from
33 construction activities and vegetation clearing. This impact would be potentially
34 significant.

35 This impact would be similar to Impact Wild-10 (CP3) and would be potentially
36 significant. Mitigation for this impact is proposed in Section 13.3.5.

37 Additional impacts may occur depending on specific restoration and recreation
38 enhancement details. These impacts will be quantified when the details of the
39 proposed actions are developed.

1 *Impact Wild-11 (CP5): Impacts on Special-Status Bats (Pallid Bat, Spotted Bat,*
2 *Western Red Bat, Western Mastiff Bat, Townsend’s Big-Eared Bat, Long-Eared*
3 *Myotis, and Yuma Myotis), the American Marten, and Ringtail and Their*
4 *Habitat* Construction activities and vegetation removal associated with the
5 construction of raising the dam, construction activities in the relocation areas,
6 and removal of various amounts of vegetation in the impoundment areas would
7 result in a loss of habitat for the pallid bat, a California species of special
8 concern, a USFS sensitive species, and a BLM sensitive species; the western red
9 bat, a USFS sensitive species; the western mastiff bat, a California species of
10 special concern, an MSCS-covered species, and a BLM sensitive species; the
11 Townsend’s big-eared bat, a California species of special concern, a USFS
12 sensitive species, and a BLM sensitive species; the long-eared myotis, a BLM
13 sensitive species; the Yuma myotis, a BLM sensitive species; the American
14 marten, a USFS sensitive species; and the ringtail, a State fully protected and
15 MSCS-covered species. Furthermore, take (including mortality of individuals
16 because of destruction or disturbance of active roost sites or dens) could result
17 from construction activities and vegetation clearing. This impact would be
18 potentially significant.

19 This impact would be similar to Impact Wild-11 (CP3) and would be potentially
20 significant. Mitigation for this impact is proposed in Section 13.3.5.

21 Additional impacts may occur depending on specific restoration and recreation
22 enhancement details. These impacts will be quantified when the details of the
23 proposed actions are developed.

24 *Impact Wild-12 (CP5): Impacts on Special-Status Terrestrial Mollusks (Shasta*
25 *Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their*
26 *Habitat* All of these species are designated USFS sensitive and survey and
27 manage species and are proposed for Federal listing. The Shasta sideband is
28 also an MSCS-covered species. Ground-disturbing activities and vegetation
29 removal associated with the construction of raising the dam, construction
30 activities in the relocation areas, and removal of various amounts of vegetation
31 in the impoundment areas could result in direct take and/or loss of suitable
32 habitat for special-status terrestrial mollusks. In addition, the raising of Shasta
33 Dam would result in the inundation of suitable habitat and direct take of this
34 species. This would be a significant impact.

35 This impact would be similar to Impact Wild-12 (CP3) and would be a
36 significant impact. Mitigation for this impact is proposed in Section 13.3.5.

37 Additional impacts may occur depending on specific restoration and recreation
38 enhancement details. These impacts will be quantified when the details of the
39 proposed actions are developed.

40 *Impact Wild-13 (CP5): Permanent Loss of General Wildlife Habitat*
41 Construction activities and vegetation removal associated with the construction

1 of raising the dam, construction activities in the relocation areas, and removal of
2 various amounts of vegetation in the impoundment areas would result in a
3 permanent loss of habitat. In addition, inundation caused by the raising of
4 Shasta Dam would result in a permanent loss of habitat. This would be a
5 potentially significant impact.

6 This impact would be similar to Impact Wild-13 (CP3) and would be potentially
7 significant. Mitigation for this impact is proposed in Section 13.3.5.

8 Additional impacts may occur depending on specific restoration and recreation
9 enhancement details. These impacts will be quantified when the details of the
10 proposed actions are developed.

11 *Impact Wild-14 (CP5): Impacts on Other Birds of Prey (i.e., red-tailed hawk*
12 *and red-shouldered hawk) and Migratory Bird Species (i.e., American robin,*
13 *Anna's hummingbird) and their Foraging and Nesting Habitat* Construction
14 activities and vegetation removal associated with the construction of raising the
15 dam, construction activities in the relocation areas, and removal of various
16 amounts of vegetation in the impoundment areas during the nesting season
17 could result in the incidental loss of fertile eggs or nestlings or otherwise lead to
18 the abandonment of nests of other birds of prey and migratory bird species. In
19 addition, inundation caused by the raising of Shasta Dam could result in the loss
20 of active nests and habitat for these species. This impact would be potentially
21 significant.

22 This impact would be similar to Impact Wild-14 (CP3) and would be potentially
23 significant. Mitigation for this impact is proposed in Section 13.3.5.

24 Additional impacts may occur depending on specific restoration and recreation
25 enhancement details. These impacts will be quantified when the details of the
26 proposed actions are developed.

27 *Impact Wild-15 (CP5): Loss of Critical Deer Winter and Fawning Range*
28 Construction activities and vegetation removal associated with the construction
29 of raising the dam, construction activities in the relocation areas, and removal of
30 various amounts of vegetation in the impoundment areas would result in a loss
31 of critical deer winter and fawning range. In addition, inundation caused by the
32 raising of Shasta Dam would result in the loss of critical deer range. This would
33 be a potentially significant impact.

34 This impact would be similar to Impact Wild-15 (CP3) and would be potentially
35 significant. Mitigation for this impact is proposed in Section 13.3.5.

36 Additional impacts may occur depending on specific restoration and recreation
37 enhancement details. These impacts will be quantified when the details of the
38 proposed actions are developed.

1 *Impact Wild-16 (CP5): Take and Loss of the California Red-Legged Frog*
2 Reclamation is concurrently completing an assessment of California red-legged
3 frog habitat in coordination with the USFWS. The assessment results will
4 enable Reclamation and the USFWS to determine if habitat for the species
5 occurs, if impacts are anticipated, and if additional surveys are needed. Impacts
6 on the California red-legged frog will be assessed if surveys are conducted and
7 the California red-legged frog is found. Impacts for each alternative will not be
8 assessed until USFWS has determined whether suitable habitat is present and
9 whether surveys would be required. Mitigation for this impact is discussed in
10 Section 13.3.5.

11 **Upper Sacramento River (Shasta Dam to Red Bluff)**

12 *Impact Wild-17 (CP5): Impacts on Riparian-Associated Special-Status Wildlife*
13 *Resulting from Modifications to the Existing Flow Regime in the Primary Study*
14 *Area* Implementing CP5 would increase available water storage in Shasta
15 Reservoir and result in a modified flow regime. This modification would reduce
16 the frequency, duration, and magnitude of intermediate to large flows
17 downstream from Shasta Dam during winter and spring in some water years,
18 and would increase the volume of flows in fall of most years. This change in
19 surface and subsurface hydrology could affect habitats adjacent to the river
20 channel and reduce the formation of off-channel habitats, which would
21 adversely affect the habitat of western pond turtle. Although the total amount of
22 riparian vegetation would not decline substantially, the portion in early
23 successional stages would be reduced. These early successional stages provide
24 habitat for some special-status wildlife species. These changes could result in
25 substantial effects on the distribution or abundance of riparian-nesting special-
26 status bird species. Because CP5 would substantially alter habitat for a variety
27 of riparian-dependent special-status species, this impact would be potentially
28 significant.

29 This impact would be similar to Impact Wild-17 (CP1). The pathways by which
30 sensitive species would be affected under CP5 are similar to those for CP1. The
31 differences are in the magnitude of changes. For example, implementing CP5
32 would result in a reduction in average monthly flow downstream from Keswick
33 Dam of between 2 and 10 percent in December of dry through wet water year
34 types; similar although smaller reductions extend through March (Table 13-45).
35 Because one of the goals of CP5 is increased water supply reliability, average
36 monthly flows in critical water years are generally increased under CP5. As
37 modeled, average monthly flows are substantially higher in April through
38 August of dry water years and in September and October under most types of
39 water years. Sensitive species could be affected by these changes through flow-
40 caused alteration of riparian habitat and altered flow regimes. Because the
41 changes would be substantial, they could result in increased mortality or
42 reductions in reproductive success. Therefore, this impact would be potentially
43 significant. Mitigation for this impact is proposed in Section 13.3.5.

44

Table 13-45. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP5

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Keswick												
Wet	1.6%	1.7%	-9.9%	-6.4%	-2.0%	0.3%	0.3%	0.5%	0.7%	0.3%	0.5%	2.8%
Above Normal	5.8%	1.0%	-3.7%	-3.2%	-7.0%	-8.0%	0.2%	-2.3%	-3.1%	0.3%	0.9%	10.2%
Below Normal	1.8%	-1.1%	-2.1%	-1.5%	-1.4%	-2.3%	1.1%	-3.3%	-0.6%	0.8%	0.8%	1.9%
Dry	6.4%	6.1%	-2.7%	-3.3%	-1.8%	0.0%	2.5%	3.9%	6.0%	3.7%	8.0%	8.8%
Critical	5.1%	7.1%	2.8%	2.8%	1.4%	1.0%	0.8%	1.1%	0.9%	4.6%	-1.5%	14.1%
Bend Bridge												
Wet	1.5%	2.0%	-5.2%	-2.8%	-1.2%	0.3%	0.2%	0.4%	0.6%	0.3%	0.5%	2.4%
Above Normal	4.7%	0.0%	-1.5%	-1.8%	-4.0%	-4.5%	0.1%	-1.5%	-2.3%	0.2%	0.8%	9.7%
Below Normal	1.5%	-0.5%	-1.3%	-0.8%	-0.8%	-1.7%	0.9%	-2.1%	-0.3%	0.7%	0.7%	1.6%
Dry	5.3%	5.3%	-1.4%	-1.6%	-1.0%	0.0%	2.0%	3.2%	5.6%	3.6%	7.8%	8.1%
Critical	3.9%	5.7%	2.4%	2.4%	1.2%	0.7%	0.6%	1.0%	0.9%	4.5%	-1.5%	12.9%
Butte City												
Wet	1.8%	2.7%	-3.9%	-1.7%	-0.8%	0.2%	0.2%	0.0%	0.2%	-0.2%	0.2%	2.3%
Above Normal	5.2%	0.3%	-1.2%	-1.2%	-3.1%	-2.9%	0.2%	-2.1%	-2.9%	-0.3%	0.6%	10.5%
Below Normal	1.7%	-0.3%	-1.1%	-1.0%	-0.5%	-1.5%	0.7%	-2.2%	-0.9%	0.5%	0.0%	1.1%
Dry	5.9%	5.8%	-1.0%	-1.0%	-0.4%	-0.1%	2.7%	2.9%	7.6%	4.3%	10.4%	7.9%
Critical	3.9%	6.2%	2.7%	2.0%	1.2%	0.6%	0.8%	1.5%	1.2%	6.8%	-1.7%	12.8%
Wilkins Slough												
Wet	1.8%	2.9%	-2.3%	-0.8%	-0.2%	0.3%	0.2%	0.0%	0.2%	-0.2%	0.2%	2.3%
Above Normal	5.2%	0.3%	-1.2%	-0.8%	-1.5%	-1.5%	0.2%	-2.1%	-2.9%	-0.3%	0.6%	10.5%
Below Normal	1.7%	-0.3%	-0.4%	-1.0%	0.0%	-1.5%	0.7%	-2.2%	-0.9%	0.5%	0.0%	1.1%
Dry	5.9%	5.8%	-1.0%	-0.9%	-0.4%	-0.1%	2.7%	2.9%	7.6%	4.3%	10.4%	7.9%
Critical	3.9%	6.2%	2.7%	2.0%	1.2%	0.6%	0.8%	1.5%	1.2%	6.8%	-1.7%	12.8%
Verona												
Wet	0.5%	2.2%	-2.3%	-0.6%	-0.1%	0.2%	0.1%	-0.1%	0.2%	-0.3%	-0.3%	1.0%
Above Normal	3.5%	1.1%	-1.0%	-0.5%	-2.1%	-0.9%	0.1%	-0.7%	-1.7%	-0.1%	0.3%	4.2%
Below Normal	1.9%	0.8%	-0.3%	-0.3%	-0.1%	-1.0%	0.5%	-0.8%	-0.1%	0.3%	0.0%	0.2%
Dry	3.9%	4.4%	-1.0%	-0.5%	-0.5%	-0.1%	1.6%	1.8%	-1.2%	3.4%	6.2%	9.2%
Critical	0.9%	5.5%	2.2%	2.0%	0.7%	0.3%	0.5%	1.8%	1.5%	8.2%	-4.7%	7.9%

Table 13-45. Percent Change in Average Monthly Flows at Keswick Dam and Downstream Under CP5 (contd.)

Water Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Freeport												
Wet	0.8%	0.5%	-0.5%	-0.6%	0.0%	0.1%	0.0%	-0.1%	0.1%	-0.2%	-0.2%	0.4%
Above Normal	2.2%	-0.8%	-0.4%	0.2%	-0.7%	-0.7%	0.1%	-0.5%	-1.4%	-0.2%	0.1%	0.6%
Below Normal	0.8%	0.0%	0.5%	0.5%	0.1%	-0.9%	0.6%	-1.0%	-0.8%	-0.1%	-0.4%	0.7%
Dry	2.6%	3.1%	-0.7%	-0.3%	-0.2%	0.1%	1.4%	1.5%	-0.6%	2.4%	5.2%	7.5%
Critical	-0.3%	3.1%	2.1%	1.8%	0.5%	-0.1%	0.3%	0.4%	0.0%	3.9%	-0.4%	5.9%

1 *Impact Wild-18 (CP5): Impacts on Bank Swallow in the Primary Study Area*
2 *Resulting from Modifications of Geomorphic Processes* Implementing CP5
3 would cause a small reduction in the magnitude, duration, and frequency of
4 intermediate to large flows in the Sacramento River in the primary study area.
5 This reduction also would alter the river's geomorphic processes, including the
6 rate of bank erosion. However, the length of eroding banks would not be
7 substantially altered, and thus, nesting habitat for bank swallows would not
8 decline substantially. Therefore, the impact on habitat for bank swallow nesting
9 colonies and the colonies themselves would be less than significant.

10 This impact would be the same as Impact Wild-18 (CP3). Modeling for CP5
11 predicts that increases in water surface elevation during the bank swallow
12 nesting season would be at most an average of about 5–6 inches. These
13 increases are not high enough that they would be expected to substantially
14 increase the rate of localized nest failure. Therefore, this impact would be less
15 than significant. Mitigation for this impact is not needed, and thus not proposed.

16 *Impact Wild-19 (CP5): Disturbance or Removal of Vernal Pool Habitat for*
17 *Special-Status Wildlife from Dam Construction and from Changes in Flow*
18 *Regime* As mentioned in Impact Wild-19 (CP1), vernal pools are generally not
19 present within the active floodplain of the upper Sacramento River in the
20 primary study area; vernal pools are found in upland locations outside of the
21 main river channel and the floodplain. Thus, vernal pools are not anticipated to
22 be affected by changes in flows that could result from implementation of CP5.
23 Because CP5 would not affect vernal pool habitat or the species that occur
24 within the habitat, no impact would occur. Mitigation for this impact is not
25 needed, and thus not proposed.

26 *Impact Wild-20 (CP5): Consistency with Local and Regional Plans with Goals*
27 *of Promoting Riparian Habitat in the Primary Study Area* Several
28 conservation and management plans have been adopted in the primary and
29 extended study areas with goals of promoting riparian habitat along the
30 Sacramento River. Because flow regimes and riverine geomorphic processes
31 could be altered with project implementation, riparian habitat could be affected
32 in such a manner that the goals of the local and regional plans would be more
33 difficult to attain. Therefore, this impact would be potentially significant.

34 This impact would be the same as Impact Wild-20 (CP1) and would be
35 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

36 *Impact Wild-21 (CP5): Impacts on Riparian-Associated Special-Status Wildlife*
37 *Resulting from the Gravel Augmentation Program* CP5 includes the gravel
38 augmentation program. Implementing the gravel augmentation program could
39 result in temporary and short-term disturbance or removal of riparian vegetation
40 that has the potential to support special-status wildlife. Gravel augmentation
41 would occur at one to three sites per year over a 10-year period (distributed at
42 up to 15 different sites overall), so the area of impact in a given year would be

1 very small. Thus, gravel placement is not expected to result in any substantial
2 short- or long-term adverse effects on any wildlife species. However, riparian-
3 associated special-status wildlife species could be killed during disturbance or
4 removal of riparian vegetation. This impact would be potentially significant.

5 This impact would be the same as Impact Wild-21 (CP4) and would be
6 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

7 *Impact Wild-22 (CP5): Impacts on Riparian-Associated Special-Status Wildlife*
8 *Species Resulting from Restoration Projects* Under CP5, riparian, floodplain,
9 and side-channel habitat restoration would occur at one or a combination of
10 potential locations along the upper Sacramento River. Restoration measures for
11 the six potential restoration sites would generally involve riparian, floodplain,
12 and side-channel restoration. Restoration actions could require removing
13 vegetation, site grading and excavation, and planting riparian species. This
14 could require the construction of access routes, use of heavy equipment to
15 excavate side channels and restore floodplains, and installation of native
16 riparian plant species when earth-moving is complete. Disturbances would
17 generally be related to construction-related activities, but it would take years for
18 the installed plants to recover to the degree that the new community would
19 function as high-quality riparian habitat. Overall, restoration work could result
20 in disturbance and short-term removal of riparian vegetation that support
21 riparian-associated special-status wildlife species that could be killed during
22 riparian vegetation removal. This impact would be potentially significant.

23 This impact would be the same as Impact Wild-22 (CP4) and would be
24 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

25 **Lower Sacramento River and Delta**

26 *Impact Wild-23 (CP5): Impacts on Riparian-Associated and Aquatic Special-*
27 *Status Wildlife Resulting from Modifications to Existing Flow Regimes in the*
28 *Lower Sacramento River and Delta* Implementing CP5 would modify the flow
29 regime and would reduce the frequency, duration, and magnitude of
30 intermediate to large flows in the lower Sacramento River during winter and
31 spring in some years. It also would increase the volume of flows in fall of most
32 years. Although this change in surface and subsurface hydrology would be of
33 smaller magnitude than in the upper Sacramento River, it could affect habitats
34 adjacent to the river channel and the formation of off-channel habitats along the
35 lower Sacramento River, which would adversely affect the habitat of western
36 pond turtle. Although the total amount of riparian vegetation would not decline
37 substantially, the portion in early successional stages would be reduced. These
38 early successional stages provide habitat for some special-status wildlife
39 species. These changes could result in substantial effects on the distribution or
40 abundance of riparian-nesting special-status bird species. Because CP5 would
41 substantially alter habitat for a variety of riparian-dependent special-status
42 species, this impact would be potentially significant.

1 This impact would be the same as Impact Wild-23 (CP1). The pathways of the
2 impact under CP5 would be the same as those under CP1. Because flows would
3 be substantially altered under CP5, impacts on sensitive riparian-dependent
4 species would be potentially significant. Mitigation for this impact is proposed
5 in Section 13.3.5.

6 *Impact Wild-24 (CP5): Impacts on Bank Swallow Along the Lower Sacramento*
7 *River Resulting from Modifications of Geomorphic Processes* Implementing
8 CP5 would cause a small reduction in the magnitude, duration, and frequency of
9 intermediate to large flows in the lower Sacramento River. This reduction also
10 would alter the river's geomorphic processes. The rate of bank erosion would be
11 reduced, but the length of eroding banks would not be substantially altered, and
12 thus, nesting habitat for bank swallows would not decline substantially. High
13 flows during the nesting season that may cause localized bank and nest failure
14 would not increase. The impact on habitat for bank swallow nesting colonies,
15 and therefore bank swallows themselves, would be less than significant.

16 This impact would be the same as Impact Wild-24 (CP1). The pathways of the
17 impact under CP5 would be the same as those under CP1. The effect of CP5 on
18 bank swallow habitat along the lower Sacramento River would be similar to the
19 effect along the upper Sacramento River, but smaller because the effect of CP5
20 on river flows would attenuate somewhat with distance downstream. This
21 impact would be less than significant. Mitigation for this impact is not needed,
22 and thus not proposed.

23 *Impact Wild-25 (CP5): Disturbance or Removal of Vernal Pool Habitat for*
24 *Special-Status Wildlife Along the Lower Sacramento River and in the Delta*
25 *from Changes in Flow Regime of the Sacramento River and Affected*
26 *Tributaries, and Changes in Seasonal Water Availability* Vernal pools are
27 present in upland areas near the Sacramento River and its tributaries in the
28 extended study area. These pools provide habitat for numerous special-status
29 species. Critical habitat for three special-status species (vernal pool fairy
30 shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp) is located
31 within the extended study area. Critical habitat for these species is confined to
32 vernal pool communities (USFWS 2006). However, vernal pools are generally
33 not present within the active floodplain of regulated rivers along the lower
34 Sacramento River and in the Delta. Because the sensitive habitat and species are
35 located outside of the area affected by the changes in flows, CP5 would not alter
36 this habitat. No impact would occur. Mitigation for this impact is not needed,
37 and thus not proposed.

38 *Impact Wild-26 (CP5): Consistency with Local and Regional Plans with Goals*
39 *of Promoting Riparian Habitat along the Lower Sacramento River and in the*
40 *Delta* Several conservation and management plans have been adopted in the
41 primary and extended study areas with goals of promoting riparian habitat along
42 the Sacramento River. Because flow regimes and riverine geomorphic processes
43 could be altered with project implementation, riparian habitat could be affected

1 in such a manner that the goals of the local and regional plans would be more
2 difficult to attain. Therefore, this impact would be potentially significant.

3 This impact would be the same as Impact Wild-26 (CP1) and would be
4 potentially significant. Mitigation for this impact is proposed in Section 13.3.5.

5 **CVP/SWP Service Areas**

6 *Impact Wild-27 (CP5): Impacts on Riparian-Associated or Aquatic Special-*
7 *Status Wildlife in the CVP/SWP Service Areas Resulting from Modifications to*
8 *Existing Flow Regimes* By altering storage and operations at several reservoirs
9 associated with the CVP and SWP service areas, CP5 would change flow
10 regimes in several downstream waterways. The change in surface and
11 subsurface hydrology could affect habitats adjacent to the river channel that
12 provide habitat for special-status wildlife species. These changes are unlikely to
13 result in substantial effects on the distribution or abundance of riparian-
14 associated or aquatic special-status wildlife species in the CVP and SWP
15 service areas outside of the primary study area. Therefore, this impact would be
16 less than significant.

17 This impact is similar to Impact Wild-27 (CP1). Modified flow regimes under
18 CP5 would reduce the frequency, duration, and magnitude of intermediate to
19 large flows along the Sacramento River. Most potential noticeable changes in
20 flows and stages would diminish downstream from Red Bluff, but substantial
21 changes are predicted in the Sacramento River downstream as far as Freeport in
22 some water years (Table 13-45). The CVP and SWP are operated as an
23 integrated system with the same downstream management targets and goals.
24 CVP and SWP operations must be consistent with the OCAP to allow coverage
25 by USFWS's and NMFS's OCAP BOs. Thus, this alternative is not anticipated
26 to sufficiently alter flow to the CVP/SWP service areas to have a substantial
27 effect on riparian habitat upon which special-status wildlife species depend.
28 Therefore, this impact would be less than significant. Mitigation for this impact
29 is not needed, and thus not proposed.

30 **13.3.5 Mitigation Measures**

31 Table 13-46 presents a summary of mitigation measures for wildlife resources.

32 **No-Action Alternative**

33 No mitigation measures are required for this alternative.

34 **CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply** 35 **Reliability**

36 No mitigation is required for Impacts Wild-18 (CP1), Wild-19 (CP1), Wild-21
37 (CP1), Wild-22 (CP1), Wild-24 (CP1), Wild-25 (CP1), and Wild-27 (CP1).
38 Mitigation is provided below for the remaining impacts of CP1 on wildlife
39 species.

Table 13-46. Summary of Mitigation Measures for Wildlife Resources

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-1: Take and Loss of Habitat for the Shasta Salamander	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Wild-1: Avoid, Relocate, and Acquire Mitigation Lands for Shasta Salamander.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-2: Impact on the Foothill Yellow-Legged Frog and Tailed Frog and Their Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-2: Avoid, Relocate, and Acquire Mitigation Lands for Foothill Yellow-Legged Frog and Tailed Frog.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-3: Impact on the Northwestern Pond Turtle and Its Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-3: Avoid, Relocate, and Acquire Mitigation Lands for Northwestern Pond Turtle.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-4: Impact on the American Peregrine Falcon	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-4: Conduct Preconstruction Surveys for the American Peregrine Falcon and Establish Buffers.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-5: Take and Loss of Habitat for the Bald Eagle	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Wild-5: Acquire and Preserve Mitigation Lands; Conduct Protocol-Level Surveys for the Bald Eagle and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-6: Take and Loss of Nesting and Foraging Habitat for the Northern Spotted Owl	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-6: Acquire and Preserve Mitigation Lands; Conduct Protocol-Level Surveys for the Northern Spotted Owl and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-7: Impact on the Purple Martin and Its Habitat	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Wild-7: Conduct a Preconstruction Survey for the Purple Martin and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-8: Impacts on the Willow Flycatcher, Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-8: Acquire and Preserve Mitigation Lands; Conduct a Preconstruction Survey for the Willow Flycatcher, Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-9: Impacts on the Long-Eared Owl, Northern Goshawk, Cooper's Hawk, Great Blue Heron, and Osprey and Their Foraging and Nesting Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-9: Acquire and Preserve Mitigation Lands; Conduct a Preconstruction Survey for the Long-Eared Owl, Northern Goshawk, Cooper's Hawk, Great Blue Heron, and Osprey and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-10: Take and Loss of Habitat for the Pacific Fisher	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-10: Acquire and Preserve Mitigation Lands; Conduct Preconstruction Surveys for the Pacific Fisher and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-11: Impacts on Special-Status Bats (Pallid Bat, Spotted Bat, Western Red Bat, Western Mastiff Bat, Townsend's Big-Eared Bat, Long-Eared Myotis, and Yuma Myotis), the American Marten, and Ringtails and Their Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-11: Acquire and Preserve Mitigation Lands; Conduct a Preconstruction Survey for Special-Status Bats, American Marten, and Ringtails and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-12: Impacts on Special-Status Terrestrial Mollusks (Shasta Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their Habitat	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Wild-12: Avoid Suitable Habitat; Acquire and Preserve Mitigation Lands for Special-Status Terrestrial Mollusks.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-13: Permanent Loss of General Wildlife Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-13: Acquire and Preserve Mitigation Lands for Permanent Loss of General Wildlife Habitat.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-14: Impacts on Other Birds of Prey (i.e., Red-Tailed Hawk and Red-Shouldered Hawk) and Migratory Bird Species (i.e., American Robin, Anna's Hummingbird) and Their Foraging and Nesting Habitat	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-14: Acquire and Preserve Mitigation Lands and Conduct Preconstruction Surveys for Other Nesting Raptors and Migratory Birds and Establish Buffers.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-15: Loss of Critical Deer Winter and Fawning Range	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-15: Acquire and Preserve Mitigation Lands for Permanent Loss of Critical Deer Wintering and Fawning Range.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Wild-16: Take and Loss of the California Red-Legged Frog	LOS before Mitigation	NI	TBD	TBD	TBD	TBD	TBD
	Mitigation Measure	None required.	TBD				
	LOS after Mitigation	NI	TBD	TBD	TBD	TBD	TBD

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-17: Impacts on Riparian-Associated Special-Status Wildlife Resulting from Modifications to the Existing Flow Regime in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-17: Implement Mitigation Measure Bot-7: Develop and Implement a Rivierine Ecosystem Mitigation and Adaptive Management Plan to Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian and Wetland Communities.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Wild-18: Impacts on Bank Swallow in the Primary Study Area Resulting from Modifications of Geomorphic Processes	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Wild-19: Disturbance or Removal of Vernal Pool Habitat for Special-Status Wildlife from Changes in Flow Regime	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI
Impact Wild-20: Consistency with Local and Regional Plans with Goals of Promoting Riparian Habitat in the Primary Study Area	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-20: Implement Mitigation Measure Bot-7: Develop and Implement a Rivierine Ecosystem Mitigation and Adaptive Management Plan to Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian and Wetland Communities.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-21: Impacts on Riparian-Associated Special-Status Wildlife Resulting from the Gravel Augmentation Program	LOS before Mitigation	NI	NI	NI	NI	PS	PS
	Mitigation Measure	None required.	None needed; thus, none proposed.			Mitigation Measure Wild-21: Conduct Preconstruction Surveys for Elderberry Shrubs, Northwestern Pond Turtle, and Nesting Riparian Raptors and Other Nesting Birds. Avoid Removal or Degradation of Elderberry Shrubs and Avoid Vegetation Removal near Active Nest Sites.	
	LOS after Mitigation	NI	NI	NI	NI	LTS	LTS
Impact Wild-22: Impacts on Riparian-Associated Special-Status Wildlife Species Resulting from Restoration at Reading Island	LOS before Mitigation	NI	NI	NI	NI	PS	PS
	Mitigation Measure	None required.	None needed; thus, none proposed.			Mitigation Measure Wild-22: Implement Mitigation Measure Wild-21: Conduct Preconstruction Surveys for Elderberry Shrubs, Northwestern Pond Turtle, and Nesting Riparian Raptors and Other Nesting Birds. Avoid Removal or Degradation of Elderberry Shrubs and Avoid Vegetation Removal near Active Nest Sites.	
	LOS after Mitigation	NI	NI	NI	NI	LTS	LTS
Impact Wild-23: Impacts on Riparian-Associated and Aquatic Special-Status Wildlife Resulting from Modifications to Existing Flow Regimes in the Lower Sacramento River and Delta	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-23: Implement Mitigation Measure Bot-7: Develop and Implement a Rivierine Ecosystem Mitigation and Adaptive Management Plan to Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian and Wetland Communities.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-24: Impacts on Bank Swallow Along the Lower Sacramento River Resulting from Modifications of Geomorphic Processes	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Wild-25: Disturbance or Removal of Vernal Pool Habitat for Special-Status Wildlife Along the Lower Sacramento River and in the Delta from Changes in Flow Regime of the Sacramento River and Affected Tributaries, and Changes in Seasonal Water Availability	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI
Impact Wild-26: Consistency with Local and Regional Plans with Goals of Promoting Riparian Habitat along the Lower Sacramento River and in the Delta	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Wild-26: Implement Mitigation Measure Bot-7: Develop and Implement a Riverine Ecosystem Mitigation and Adaptive Management Plan to Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian and Wetland Communities.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Table 13-46. Summary of Mitigation Measures for Wildlife Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Wild-27: Impacts on Riparian-Associated or Aquatic Special-Status Wildlife in the CVP/SWP Service Areas Resulting from Modifications to Existing Flow Regimes	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS

Key:

- LOS = level of significance
- LTS = less than significant
- NI = no impact
- PS = potentially significant
- S = significant
- SU = significant and unavoidable
- TBD = to be determined

1 **Mitigation Measure Wild-1 (CP1): Avoid, Relocate, and Acquire**
2 **Mitigation Lands for Shasta Salamander** To avoid or minimize impacts on
3 the Shasta salamander, the following measures will be implemented.

4 *Inundation Area* It is unfeasible to quantify the number of individual Shasta
5 salamanders that would be lost in the impoundment area. Direct loss of
6 individuals and of limestone habitat from inundation cannot be mitigated.
7 Mitigation lands will be acquired and placed in conservation easements to
8 mitigate for the loss of Shasta salamander habitat.

9 Potential mitigation lands containing comparable Shasta salamander habitat
10 have been identified adjacent to the project. Shasta salamander has been found
11 in both limestone and nonlimestone habitat in this site. Additional discussion of
12 how these lands could be applied as mitigation will be presented in the Final
13 EIS.

14 *Vegetation Removal and Construction Activities*

- 15 • Protocol-level surveys will be conducted in all relocation areas to
16 determine presence or absence of the Shasta salamander. If absent, no
17 further mitigation is required.

- 18 • When feasible, use of heavy equipment and excavation in limestone
19 substrates will be avoided.

- 20 • To minimize impacts on individuals, preconstruction surveys, in
21 consultation with CDFW and USFS, will be conducted by a qualified
22 biologist prior to construction activities during the wet season.
23 Individuals will be relocated to suitable limestone habitat in the vicinity
24 of detection.

- 25 • In occupied relocation areas, mitigation measures developed for loss of
26 suitable limestone and nonlimestone habitat in the impoundment area
27 will be applied.

28 The avoidance and relocation measures for vegetation removal and construction
29 activities would effectively mitigate impacts caused by those activities.
30 However, the effectiveness of providing compensatory mitigation by acquiring
31 and conserving habitat mitigation lands to mitigate inundation impacts cannot
32 be accurately determined without additional details. This impact, therefore, is
33 considered significant and unavoidable.

34 **Mitigation Measure Wild-2 (CP1): Avoid, Relocate, and Acquire**
35 **Mitigation Lands for Foothill Yellow-Legged Frog and Tailed Frog** To
36 avoid or minimize impacts on the foothill yellow-legged frog and tailed frog,
37 the following measures will be implemented.

1 *Inundation Area* Individual foothill yellow-legged frog and tailed frogs will
2 not be affected by the inundation caused by the raise of the dam. Animals will
3 be able to swim upstream to suitable habitat.

4 It is anticipated that mitigation lands will be acquired and placed in
5 conservation easements to mitigate for the loss of foothill yellow-legged frog
6 and tailed frog habitat lost to inundation. Additionally, opportunities for
7 restoration and enhancement of habitat will be explored and defined.

8 Potential mitigation lands containing comparable foothill yellow-legged frog
9 and tailed frog habitat have been identified adjacent to the project. The foothill
10 yellow-legged frog is found in this area. Additional discussion of how these
11 lands could be applied as mitigation will be presented in the Final EIS.

12 *Vegetation Removal and Construction Activities*

- 13 • To the extent feasible, projects planned in relocation areas will be
14 designed to avoid construction in perennial streams and their associated
15 riparian zones.

- 16 • When instream construction activities must occur, a preconstruction
17 survey of the foothill yellow-legged frog and tailed frog adults, larvae,
18 and eggs will be conducted by a qualified biologist before ground-
19 disturbing activities begin in perennial stream and riparian habitat. This
20 survey will be conducted within the construction boundary no more
21 than 1 week before instream or adjacent riparian construction activities
22 begin. If foothill yellow-legged frog or tailed frog adults, larvae, or
23 eggs are detected, the biologist in coordination with CDFW and USFS
24 will relocate them to a suitable stream habitat outside the construction
25 boundary. If frogs are absent, no further surveys will be required.

- 26 • If adults are found to use the stream where construction activities are
27 intended to take place, a qualified biologist will relocate all individuals
28 to suitable habitat outside the construction zone daily before instream
29 activities resume.

30 The avoidance and relocation measures for vegetation removal and construction
31 activities would effectively mitigate impacts caused by those activities.
32 However, the effectiveness of providing compensatory mitigation by acquiring
33 and conserving habitat mitigation lands to mitigate inundation impacts cannot
34 be accurately determined without additional details. This impact, therefore, is
35 considered significant and unavoidable.

36 **Mitigation Measure Wild-3 (CP1): Avoid, Relocate, and Acquire**
37 **Mitigation Lands for Northwestern Pond Turtle** To avoid or minimize
38 impacts on the northwestern pond turtle, the following measures will be
39 implemented.

1 *Inundation Area* Individual northwestern pond turtles will not be impacted by
2 the inundation caused by the raise of the dam. Lacustrine is suitable habitat for
3 the northwestern pond turtle. The loss of northwestern pond turtle nests in the
4 inundation zone if inundated while eggs are in the nest is unavoidable.

5 It is anticipated that mitigation lands will be acquired and placed in
6 conservation easements to mitigate for the loss of northwestern pond turtle
7 habitat. Additionally, opportunities for restoration and enhancement of habitat
8 will be explored and defined.

9 Potential mitigation lands containing comparable northwestern pond turtle
10 habitat have been identified adjacent to the project. Additional discussion of
11 how these lands could be applied as mitigation will be presented in the Final
12 EIS.

13 *Vegetation Removal and Construction Activities*

- 14 • To the extent feasible, projects planned in relocation areas will be
15 designed to avoid all suitable aquatic habitat and its associated riparian
16 zone.
- 17 • When construction activities are to occur within suitable northwestern
18 pond turtle habitat as defined in Impact Wild-3 (CP1), a qualified
19 biologist will conduct a minimum of one preconstruction survey for
20 northwestern pond turtles and their nests. The survey will be conducted
21 no more than 1 week prior to construction. If a pond turtle nest is
22 found, the biologist will flag the site and determine whether
23 construction activities can avoid impacting the nest. If the nest cannot
24 be avoided, CDFW and the USFS will be contacted for further
25 direction and construction activities in that location will be halted.
- 26 • In the event that a pond turtle is observed within the construction limits,
27 the contractor will temporarily halt construction activities until a
28 qualified biologist has moved the turtle to a safe location within
29 suitable habitat outside of the construction limits.

30 The avoidance and relocation measures for vegetation removal and construction
31 activities would effectively mitigate impacts caused by those activities.
32 However, the effectiveness of providing compensatory mitigation by acquiring
33 and conserving habitat mitigation lands to mitigate inundation impacts cannot
34 be accurately determined without additional details. This impact, therefore, is
35 considered significant and unavoidable.

36 **Mitigation Measure Wild-4 (CP1): Conduct Preconstruction Surveys for**
37 **the American Peregrine Falcon and Establish Buffers** To avoid or
38 minimize impacts on nesting American peregrine falcons, the following
39 measures will be implemented.

1 *Inundation Area* Individual American peregrine falcons will not be impacted
2 by the inundation caused by the raise of the dam.

3 *Vegetation Removal and Construction Activities*

- 4 • To the extent feasible, projects planned in relocation areas will be
5 designed to avoid suitable cliff habitat.

- 6 • If vegetation removal or construction occurs outside of the breeding
7 season (August 1 through March 31), no further mitigation will be
8 necessary. If the breeding season cannot be completely avoided, the
9 following measure will be implemented.

- 10 • For proposed construction activities between February 1 and July 31
11 within 0.5 mile of a known American peregrine falcon eyrie or suitable
12 habitat identified in Impact Wild-4 (CP1), a qualified biologist will
13 conduct a protocol-level survey. The survey will be conducted no more
14 than 2 weeks before construction begins. If an active nest is found, a
15 qualified biologist, in consultation with CDFW, will determine the
16 construction-free buffer zone to be established around the nest until the
17 young have fledged. In consultation with CDFW, a plan will be
18 developed to monitor whether construction activity is disturbing the
19 nesting process and to determine when the young have fledged.

20 Implementation of this mitigation measure will reduce impacts on American
21 peregrine falcon to a less-than-significant level.

22 **Mitigation Measure Wild-5 (CP1): Acquire and Preserve Mitigation**
23 **Lands; Conduct Protocol-Level Surveys for the Bald Eagle and Establish**
24 **Buffers** To avoid or minimize impacts on nesting bald eagles, the following
25 measures will be implemented.

26 *Inundation Area*

- 27 • For each year of project activity, all active bald eagle nests will be
28 located using the National Bald Eagle Management Guidelines
29 (USFWS 2007b).

- 30 • During initial inundation of the impoundment area, active eagle nests
31 occurring within the inundation area will be protected by the placement
32 of floating buoys and signage prohibiting access to the established
33 buffer developed in consultation with CDFW, USFS, and USFWS (see
34 measures below).

- 35 • It is anticipated that mitigation lands will be acquired and placed in
36 conservation easements to mitigate for the loss of bald eagle habitat.
37 Additionally, opportunities for restoration and enhancement of habitat
38 will be explored and defined. Potential mitigation lands containing
39 comparable bald eagle habitat have been identified adjacent to the

1 project. Additional discussion of how these lands could be applied as
2 mitigation will be presented in the Final EIS.

3 *Vegetation Removal and Construction Activities*

- 4 • For each year of vegetation removal or construction activity, all active
5 bald eagle nests will be located and mapped using the National Bald
6 Eagle Management Guidelines (USFWS 2007b).
- 7 • If vegetation removal or construction occurs outside of the breeding
8 season (August 2 through December 31), no further mitigation will be
9 necessary. If the breeding season cannot be completely avoided, the
10 following measure will be implemented.
- 11 • If vegetation removal is to occur between January 1 and August 1, a
12 660-foot to 0.5-mile buffer will be established around active nests in
13 consultation with CDFW and USFS. No vegetation removal or
14 construction activity will occur within the established buffer during the
15 limited operating period.

16 The avoidance and relocation measures for vegetation removal and construction
17 activities and the nest protection measures within the inundation area would
18 effectively mitigate impacts caused by those activities. However, the
19 effectiveness of providing compensatory mitigation by acquiring and
20 conserving habitat mitigation lands to mitigate inundation impacts cannot be
21 accurately determined without additional details. This impact, therefore, is
22 considered significant and unavoidable.

23 **Mitigation Measure Wild-6 (CP1): Acquire and Preserve Mitigation**
24 **Lands; Conduct Protocol-Level Surveys for the Northern Spotted Owl and**
25 **Establish Buffers** To avoid or minimize impacts on nesting northern spotted
26 owls, the following measures will be implemented.

27 *Inundation Area*

- 28 • All suitable habitat within 1.3 miles of the impoundment and relocation
29 areas will be delineated by type using California Forest Practice Rules
30 to determine suitable nesting and roosting habitat for the northern
31 spotted owl.
- 32 • For each year of vegetation removal or construction activity, protocol-
33 level surveys using current approved USFWS protocol will be
34 conducted in all delineated suitable northern spotted owl habitat.
- 35 • If nests are found, during initial inundation of the impoundment area,
36 active northern spotted owl nests located within the inundation area
37 will be protected by the placement of floating buoys and signage
38 prohibiting access to the established buffer developed in consultation
39 with CDFW and USFS (see measures below).

- 1 • It is anticipated that mitigation lands will be acquired and placed in
2 conservation easements to mitigate for the loss of northern spotted owl
3 habitat. Additionally, opportunities for restoration and enhancement of
4 habitat will be explored and defined. Potential mitigation lands located
5 on private property containing comparable northern spotted owl habitat
6 have been identified adjacent to the project. Additional discussion of
7 how these lands may be applied as mitigation will be presented in the
8 Final EIS.

9 *Vegetation Removal and Construction Activities*

- 10 • For each year of vegetation removal or construction activity, protocol-
11 level surveys using current approved USFWS protocol will be
12 conducted in all delineated suitable northern spotted owl habitat.
- 13 • If vegetation removal or construction occurs outside of the breeding
14 season (August 1 through March 31), no further mitigation will be
15 necessary. If the breeding season cannot be completely avoided, the
16 following measure will be implemented.
- 17 • If vegetation removal is to occur between February 1 and August 31, a
18 660-foot to 0.5-mile buffer will be established around active nests in
19 consultation with CDFW, USFS and USFWS. No vegetation removal
20 or construction activity will occur within the established buffer during
21 the limited operating period.

22 The avoidance and relocation measures for vegetation removal and construction
23 activities and the nest protection measures within the inundation area would
24 effectively mitigate impacts caused by those activities. However, the
25 effectiveness of providing compensatory mitigation by acquiring and
26 conserving habitat mitigation lands to mitigate inundation impacts cannot be
27 accurately determined without additional details. This impact, therefore, is
28 considered significant and unavoidable.

29 **Mitigation Measure Wild-7 (CP1): Conduct a Preconstruction Survey for**
30 **the Purple Martin and Establish Buffers** To avoid or minimize impacts on
31 nesting purple martins, the following measures will be implemented.

32 *Inundation Area* Individual purple martins actively nesting within the
33 impoundment area could be flooded when the lake reaches maximum
34 inundation. These potential losses cannot be mitigated.

35 *Vegetation Removal and Construction Activities*

- 36 • To the extent feasible, all snags in the Pit Arm will be retained.
37 Vegetation will not be removed from the Pit Arm from Painter Creek
38 north, with exception of Arbuckle Campground, which will recruit
39 snags from trees that will die from inundation.

- 1 • If vegetation removal or construction occurs outside of the breeding
2 season (September 1 through March 31), no further mitigation will be
3 necessary. If the breeding season cannot be completely avoided, the
4 following measure will be implemented.

- 5 • If proposed vegetation removal and construction activities are to take
6 place on the Pit Arm from April 1 through August 31, a qualified
7 biologist will conduct a protocol-level survey to locate active nests. The
8 survey will be conducted no more than 2 weeks before construction
9 begins. If an active nest is found, a qualified biologist, in consultation
10 with CDFW, will determine a construction-free buffer zone to be
11 established around the nest until the young have fledged. In
12 consultation with CDFW, a plan will be developed to monitor whether
13 construction activity is disturbing the reproductive process and to
14 determine when the young have fledged.

- 15 • A monitoring and adaptive management plan will be developed to
16 explore and develop options to provide additional nesting habitat for
17 the purple martin (e.g., artificial nesting structures, girdling trees to
18 develop snags).

19 Implementation of this mitigation measure will reduce impacts on individual
20 purple martins nesting during the implementation of the project; however, these
21 measures would not protect purple martins actively nesting within the
22 impoundment area when the lake reaches maximum inundation and might not
23 fully mitigate the loss of snags used for nesting. This impact, therefore, is
24 considered significant and unavoidable.

25 **Mitigation Measure Wild-8 (CP1): Acquire and Preserve Mitigation**
26 **Lands; Conduct a Preconstruction Survey for the Willow Flycatcher,**
27 **Vaux’s Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish**
28 **Buffers** To avoid or minimize impacts on nesting willow flycatchers, Vaux’s
29 swifts, yellow warblers, and yellow-breasted chats, the following measures will
30 be implemented.

31 *Inundation Area* Individuals actively nesting within the impoundment area
32 could be flooded when the lake reaches maximum inundation. These potential
33 losses cannot be mitigated.

34 It is anticipated that mitigation lands will be acquired and placed in
35 conservation easements to mitigate for the loss of willow flycatcher, Vaux’s
36 swift, yellow warbler, and yellow-breasted chat habitat. Additionally,
37 opportunities for restoration and enhancement of habitat will be explored and
38 defined.

39 Potential mitigation lands containing comparable willow flycatcher, Vaux’s
40 swift, yellow warbler, and yellow-breasted chat habitat have been identified

1 adjacent to the project. Additional discussion of how these lands could be
2 applied as mitigation will be presented in the Final EIS.

3 *Vegetation Removal and Construction Activities*

- 4 • To the extent feasible, projects planned in relocation areas will be
5 designed to avoid riparian habitat.

- 6 • To the extent feasible, construction activities will be avoided within
7 riparian habitat and snags suitable for Vaux's swift nesting.

- 8 • If vegetation removal or construction occurs outside of the breeding
9 season (September 1 through March 31), no further mitigation will be
10 necessary. If the breeding season cannot be completely avoided, the
11 following measure will be implemented.

- 12 • If proposed vegetation removal and construction activities are to occur
13 within 250 feet of suitable habitat for willow flycatchers, Vaux's
14 swifts, yellow warblers, and yellow-breasted chats between April 1 and
15 August 31, a qualified biologist will conduct a preconstruction survey
16 no more than 2 weeks before construction activities begin. If an active
17 nest is found, a qualified biologist, in consultation with CDFW, will
18 determine a construction-free buffer zone to be established around the
19 nest until the young have fledged. In consultation with CDFW, a plan
20 will be developed to monitor whether construction activity is disturbing
21 the reproductive process and to determine when the young have
22 fledged.

- 23 • If willow flycatchers are detected during the preconstruction survey,
24 protocol-level surveys using a current approved protocol will be
25 conducted to locate and monitor active nests.

26 The avoidance and relocation measures for vegetation removal and construction
27 activities would effectively mitigate impacts caused by those activities;
28 however, these measures would not protect individuals actively nesting within
29 the impoundment area when the lake reaches maximum inundation. Also, the
30 effectiveness of providing compensatory mitigation by acquiring and
31 conserving habitat mitigation lands to mitigate inundation impacts cannot be
32 accurately determined without additional details. This impact, therefore, is
33 considered significant and unavoidable.

34 **Mitigation Measure Wild-9 (CP1): Acquire and Preserve Mitigation**
35 **Lands; Conduct a Preconstruction Survey for the Long-Eared Owl,**
36 **Northern Goshawk, Cooper's Hawk, Great Blue Heron, and Osprey and**
37 **Establish Buffers** To avoid or minimize impacts to these species, the
38 following measures will be implemented.

1 *Inundation Area* It is anticipated that mitigation lands will be acquired and
2 placed in conservation easements to mitigate for the loss of habitat of these
3 species. Additionally, opportunities for restoration and enhancement of habitat
4 will be explored and defined.

5 Potential mitigation lands containing comparable habitat have been identified
6 adjacent to the project. Additional discussion of how these lands could be
7 applied as mitigation will be presented in the Final EIS.

8 *Vegetation Removal and Construction Activities*

- 9 • To the extent feasible, construction activities will be avoided within
10 riparian habitat.
- 11 • If vegetation removal or construction takes place outside of the
12 breeding season (March 31 through September 1), no further mitigation
13 will be necessary. If the breeding season cannot be completely avoided,
14 the following measure will be implemented.
- 15 • If proposed vegetation removal and construction activities are to take
16 place within 0.25 mile of suitable habitat for the long-eared owl,
17 northern goshawk, Cooper's hawk, and great blue heron between
18 February 1 and August 31, a qualified biologist will conduct a
19 preconstruction survey no more than 2 weeks before construction
20 activities begin. Protocol-level surveys will be conducted in suitable
21 goshawk habitat.
- 22 • If vegetation removal is to occur between February 1 and August 31, a
23 construction-free buffer will be established around active nests in
24 consultation with CDFW and USFS. No vegetation removal or
25 construction activity will occur within the established buffer during the
26 limited operating period.

27 The avoidance and relocation measures for vegetation removal and construction
28 activities would effectively mitigate impacts caused by those activities.
29 However, the effectiveness of providing compensatory mitigation by acquiring
30 and conserving habitat mitigation lands to mitigate inundation impacts cannot
31 be accurately determined without additional details. This impact, therefore, is
32 considered significant and unavoidable.

33 **Mitigation Measure Wild-10 (CP1): Acquire and Preserve Mitigation**
34 **Lands; Conduct a Preconstruction Surveys for the Pacific Fisher and**
35 **Establish Buffers** To avoid or minimize impacts on Pacific fisher natal dens,
36 the following measures will be implemented.

37 *Inundation Area* Pacific fisher natal dens within the impoundment area could
38 be flooded when the lake reaches maximum inundation. These potential losses

1 cannot be mitigated. However, female fishers often move young to alternate
2 natal dens if threatened or disturbed.

3 It is anticipated that mitigation lands will be acquired and placed in
4 conservation easements to mitigate for the loss of Pacific fisher habitat.
5 Additionally, opportunities for restoration and enhancement of habitat will be
6 explored and defined.

7 Potential mitigation lands containing comparable habitat and where Pacific
8 fishers are known to occur have been identified adjacent to the project.
9 Additional discussion of how these lands could be applied as mitigation will be
10 presented in the Final EIS.

11 *Vegetation Removal and Construction Activities*

- 12 • If vegetation removal or construction occurs outside of the breeding
13 season (February 1 through May 1), no further mitigation will be
14 necessary. If the breeding season cannot be completely avoided, the
15 following measure will be implemented.

- 16 • If proposed vegetation removal and construction activities are to occur
17 in suitable habitat for the Pacific fisher between February 1 and May 1,
18 a qualified biologist will conduct a preconstruction survey for potential
19 natal or maternity den trees no more than 2 weeks before construction
20 activities begin. If an active den is found, a qualified biologist, in
21 consultation with USFS, BLM (if on BLM land), and USFWS, will
22 determine a construction-free buffer zone to be established around the
23 den until the mother and young have dispersed. In consultation with
24 USFWS, a plan will be developed to monitor whether construction
25 activity is disturbing the reproductive success and to determine when
26 the young have dispersed.

27 The avoidance and relocation measures for vegetation removal and construction
28 activities would effectively mitigate impacts caused by those activities.
29 However, the effectiveness of providing compensatory mitigation by acquiring
30 and conserving habitat mitigation lands to mitigate inundation impacts cannot
31 be accurately determined without additional details. This impact, therefore, is
32 considered significant and unavoidable.

33 **Mitigation Measure Wild-11 (CP1): Acquire and Preserve Mitigation**
34 **Lands; Conduct a Preconstruction Survey for Special-Status Bats,**
35 **American Marten, and Ringtails and Establish Buffers** To avoid or
36 minimize impacts on bats and ringtails, the following measures will be
37 implemented.

38 *Inundation Area* Maternity colonies or natal dens within the impoundment area
39 could be flooded when the lake reaches maximum inundation. These potential
40 losses cannot be mitigated. However, female western red bats, American

1 martens, and ringtails would be expected to move young to alternate locations if
2 threatened or disturbed.

3 It is anticipated that mitigation lands will be acquired and placed in
4 conservation easements to mitigate for the loss of habitat of these species.
5 Additionally, opportunities for restoration and enhancement of habitat will be
6 explored and defined.

7 Potential mitigation lands containing comparable habitat where these species
8 are known to be found have been identified adjacent to the project. Additional
9 discussion of how these lands could be applied as mitigation and at what ratios
10 will be presented in the Final EIS.

11 *Vegetation Removal and Construction Activities*

- 12 • A preconstruction survey conducted by a qualified bat biologist for
13 roosting bats will be conducted prior to the inundation or removal of
14 any bridges, buildings, known caves or trees 12 inches or larger in
15 diameter at breast height. If no active roosts are found, then no further
16 action will be warranted. If a maternity roost is present, in consultation
17 with CDFW, a qualified bat biologist will determine the extent of
18 construction-free zones around active nurseries. If either a maternity
19 roost or a hibernacula is present, either of the following measures will
20 be implemented.

21 To the extent feasible, the project will be redesigned to avoid the loss of the
22 maternity or hibernacula roost.

- 23 • If the project cannot be redesigned, removal of the occupied tree or
24 structure should begin before maternity colonies form (i.e., prior to
25 March 1) or after young are volant (flying) (i.e., after July 31). The
26 established disturbance-free buffer will be observed during the
27 maternity roost season (March 1 through July 31).
- 28 • If a nonbreeding bat hibernacula is found in a structure or tree
29 scheduled for removal, the individuals will be safely evicted, under the
30 direction of a qualified bat biologist (as determined by a memorandum
31 of understanding with CDFW), by opening the roosting area to allow
32 air flow through the cavity. Removal of the tree or structure will follow
33 not before the following day (i.e., there should be at least 1 night
34 between initial disturbance for air flow and the demolition). This action
35 will allow bats to leave during dark hours, thus increasing their chance
36 of finding new roosts with a minimum of potential predation during
37 daylight. Trees with roosts that need to be removed should first be
38 disturbed at dusk, just prior to removal that same evening, to allow bats
39 to escape at night.

- 1 • For the American marten and ringtail, if vegetation removal or
2 construction occurs outside of the breeding season (May 2 through
3 January 31), no further mitigation is necessary. If the breeding season
4 cannot be completely avoided, the following measure will be
5 implemented.

- 6 • If proposed vegetation removal and construction activities are to occur
7 in suitable habitat for the American marten and ringtail between
8 February 1 and May 1, a qualified biologist will conduct a
9 preconstruction survey for potential natal or maternity den trees no
10 more than 2 weeks before construction activities begin. If an active den
11 is found, a qualified biologist, in consultation with CDFW and USFS,
12 will determine a construction-free buffer zone to be established around
13 the den until the mother and young have dispersed. In consultation with
14 CDFW and USFS, a plan will be developed to monitor whether
15 construction activity is disturbing the reproductive success and to
16 determine when the young have dispersed.

17 The avoidance and relocation measures for vegetation removal and construction
18 activities would effectively mitigate impacts caused by those activities.
19 However, the loss of some individuals from inundation cannot be mitigated.
20 Also, the effectiveness of providing compensatory mitigation by acquiring and
21 conserving habitat mitigation lands to mitigate inundation impacts cannot be
22 accurately determined without additional details. This impact, therefore, is
23 considered significant and unavoidable.

24 **Mitigation Measure Wild-12 (CP1): Avoid Suitable Habitat; Acquire and**
25 **Preserve Mitigation Lands for Special-Status Terrestrial Mollusks** To
26 avoid or minimize impacts on special-status terrestrial mollusks, the following
27 measures will be implemented.

28 *Inundated Area* It is infeasible to quantify the loss of individuals in the
29 impoundment area. The loss of individuals and loss of limestone habitat (for
30 Shasta and Wintu sideband snails) cannot be mitigated. Suitable limestone
31 habitat will be quantified. It is anticipated that mitigation lands will be acquired
32 and placed in conservation easements to mitigate for the loss of the habitat of
33 these species. Additionally, opportunities for restoration and enhancement of
34 habitat will be explored and defined.

35 Potential mitigation lands containing comparable special-status habitat have
36 been identified adjacent to the project. Shasta sideband, Shasta chaparral, and
37 Shasta hesperian snails have been found at this site. Additional discussion of
38 how these lands could be applied as mitigation and at what ratios will be
39 presented in the Final EIS.

1 *Vegetation Removal and Construction Activities*

- 2 • When feasible, use of heavy equipment and excavation in limestone
3 substrates and riparian or mesic habitats will be avoided.
- 4 • Guidelines provided in Management Recommendations for Survey and
5 Manage Terrestrial Mollusks (Burke et al. 1999) will be applied.

6 The avoidance and relocation measures for vegetation removal and construction
7 activities would effectively mitigate impacts caused by those activities.
8 However, the loss of some individuals from inundation cannot be mitigated.
9 Also, the effectiveness of providing compensatory mitigation by acquiring and
10 conserving habitat mitigation lands to mitigate inundation impacts cannot be
11 accurately determined without additional details. This impact, therefore, is
12 considered significant and unavoidable.

13 **Mitigation Measure Wild-13 (CP1): Acquire and Preserve Mitigation**
14 **Lands for Permanent Loss of General Wildlife Habitat** It is anticipated that
15 mitigation lands will be acquired and placed in conservation easements to
16 mitigate for the loss of wildlife habitat. Additionally, opportunities for
17 restoration and enhancement of habitat will be explored and defined. Potential
18 mitigation lands containing comparable habitat and where these species are
19 known to occur have been identified adjacent to the project. Additional
20 discussion of how these lands could be applied as mitigation will be presented
21 in the Final EIS. However, the effectiveness of providing compensatory
22 mitigation by acquiring and conserving habitat mitigation lands to mitigate
23 inundation impacts cannot be accurately determined without additional details.
24 This impact, therefore, is considered significant and unavoidable.

25 **Mitigation Measure Wild-14 (CP1): Acquire and Preserve Mitigation**
26 **Lands and Conduct Preconstruction Surveys for Other Nesting Raptors**
27 **and Migratory Birds and Establish Buffers** To avoid or minimize impacts
28 on nesting raptors and migratory birds, the following measures will be
29 implemented.

30 *Inundation Area* Individuals actively nesting within the impoundment area
31 could be flooded when the lake reaches maximum inundation. These potential
32 losses cannot be mitigated.

33 It is anticipated that mitigation lands will be acquired and placed in
34 conservation easements to mitigate for the loss of the habitat of these species.
35 Additionally, opportunities for restoration and enhancement of habitat will be
36 explored and defined.

37 Potential mitigation lands containing comparable habitat have been identified
38 adjacent to the project. Additional discussion of how these lands could be
39 applied as mitigation and at what ratios will be presented in the Final EIS.

1 *Vegetation Removal and Construction Activities*

- 2 • To the extent feasible, construction activities will be avoided within
3 riparian habitat.
- 4 • If vegetation removal or construction occurs outside of the breeding
5 season (March 31 through September 1), no further mitigation will be
6 necessary. If the breeding season cannot be completely avoided, the
7 following measure will be implemented.
- 8 • If project-related vegetation removal or construction will occur during
9 the breeding season (February 1 through August 31), a qualified
10 biologist will conduct a preconstruction survey for nesting birds. For
11 migratory birds (non-raptors), preconstruction surveys will occur
12 within the construction footprint and 250 feet beyond the construction
13 footprint boundary. Surveys will be conducted no more than 2 weeks
14 before construction. For raptors, preconstruction surveys will occur in
15 suitable raptor nesting habitat within 0.25 mile of the construction
16 footprint boundary. If an active nest is found, a qualified biologist, in
17 consultation with CDFW, will determine a construction-free buffer
18 zone to be established around the nest until the young have fledged. In
19 consultation with CDFW, a plan will be developed to monitor whether
20 construction activity is disturbing the reproductive process and to
21 determine when the young have fledged.

22 The avoidance and relocation measures for vegetation removal and construction
23 activities would effectively mitigate impacts caused by those activities.
24 However, the loss of some individuals from inundation cannot be mitigated.
25 Also, the effectiveness of providing compensatory mitigation by acquiring and
26 conserving habitat mitigation lands to mitigate inundation impacts cannot be
27 accurately determined without additional details. This impact, therefore, is
28 considered significant and unavoidable.

29 **Mitigation Measure Wild-15 (CP1): Acquire and Preserve Mitigation**
30 **Lands for Permanent Loss of Critical Deer Wintering and Fawning Range**
31 Implement Mitigation Measure Wild-13 for loss of critical deer wintering and
32 fawning range. Similar to Mitigation Measure Wild-13 (CP1), this impact is
33 considered significant and unavoidable.

34 **Mitigation Measure Wild-16 (CP1)** Mitigation has yet to be determined for
35 potential impacts to the California red-legged frog. At this time, no feasible
36 mitigation has been determined. This impact is considered significant and
37 unavoidable.

38 **Mitigation Measure Wild-17 (CP1): To Reduce Impacts on Riparian-**
39 **Associated and Aquatic Special-Status Wildlife in the Primary Study Area,**
40 **Implement Mitigation Measure Bot-7: Develop and Implement a Riverine**
41 **Ecosystem Mitigation and Adaptive Management Plan** Reclamation will

1 implement Mitigation Measure Bot-7 (CP1), “Develop and Implement a
2 Riverine Ecosystem Mitigation and Adaptive Management Plan to Avoid and
3 Compensate for the Impact of Altered Flow Regimes on Riparian and Wetland
4 Communities,” described in Chapter 12, “Botanical Resources and Wetlands.”
5 Implementation of this mitigation measure would reduce Impact Wild-17 (CP1)
6 to a less-than-significant level.

7 **Mitigation Measure Wild-20 (CP1): To Promote Consistency with Local
8 and Regional Plans with Goals of Promoting Riparian Habitat in the
9 Primary Study Area, Implement Mitigation Measure Bot-7: Develop and
10 Implement a Riverine Ecosystem Mitigation and Adaptive Management
11 Plan** Reclamation will implement Mitigation Measure Bot-7 (CP1), “Develop
12 and Implement a Riverine Ecosystem Mitigation and Adaptive Management
13 Plan to Avoid and Compensate for the Impact of Altered Flow Regimes on
14 Riparian and Wetland Communities,” described in Chapter 12, “Botanical
15 Resources and Wetlands.” Implementation of this mitigation measure would
16 reduce Impact Wild-20 (CP1) to a less-than-significant level.

17 **Mitigation Measure Wild-23 (CP1): To Reduce Impacts on Riparian-
18 Associated and Aquatic Special-Status Wildlife along the Lower
19 Sacramento River Resulting from Modifications of Geomorphic Processes,
20 Implement Mitigation Measure Bot-7: Develop and Implement a Riverine
21 Ecosystem Mitigation and Adaptive Management Plan** Reclamation will
22 implement Mitigation Measure Bot-7 (CP1), “Develop and Implement a
23 Riverine Ecosystem Mitigation and Adaptive Management Plan to Avoid and
24 Compensate for the Impact of Altered Flow Regimes on Riparian and Wetland
25 Communities,” described in Chapter 12, “Botanical Resources and Wetlands.”
26 Implementation of this mitigation measure would reduce Impact Wild-23 (CP1)
27 to a less-than-significant level.

28 **Mitigation Measure Wild-26 (CP1): To Promote Consistency with Local
29 and Regional Plans with Goals of Promoting Riparian Habitat along the
30 Lower Sacramento River and in the Delta, Implement Mitigation Measure
31 Bot-7: Develop and Implement a Riverine Ecosystem Mitigation and
32 Adaptive Management Plan** Reclamation will implement Mitigation
33 Measure Bot-7 (CP1), “Develop and Implement a Riverine Ecosystem
34 Mitigation and Adaptive Management Plan to Avoid and Compensate for the
35 Impact of Altered Flow Regimes on Riparian and Wetland Communities,”
36 described in Chapter 12, “Botanical Resources and Wetlands.” Implementation
37 of this mitigation measure would reduce Impact Wild-26 (CP1) to a less-than-
38 significant level.

39 ***CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply
40 Reliability***

41 No mitigation is required for Impacts Wild-18 (CP2), Wild-19 (CP2), Wild-21
42 (CP2), Wild-22 (CP2), Wild-24 (CP2), Wild-25 (CP2), and Wild-27 (CP2).

1 Mitigation is provided below for the remaining impacts of CP2 on wildlife
2 species.

3 **Mitigation Measure Wild-1 (CP2): Avoid, Relocate, and Acquire**
4 **Mitigation Lands for Shasta Salamander** This mitigation measure is
5 identical to Mitigation Measure Wild-1 (CP1). Implementation of this
6 mitigation measure will reduce impacts on the Shasta salamander; however,
7 because impacts cannot be fully mitigated, Impact Wild-1 (CP2) is considered
8 significant and unavoidable.

9 **Mitigation Measure Wild-2 (CP2): Avoid, Relocate, and Acquire**
10 **Mitigation Lands for Foothill Yellow-Legged Frog and Tailed Frog** This
11 mitigation measure is identical to Mitigation Measure Wild-2 (CP1).
12 Implementation of this mitigation measure will reduce impacts on these species;
13 however, because impacts cannot be fully mitigated, Impact Wild-2 (CP2) is
14 considered significant and unavoidable.

15 **Mitigation Measure Wild-3 (CP2): Avoid, Relocate, and Acquire**
16 **Mitigation Lands for Northwestern Pond Turtle** This mitigation measure is
17 identical to Mitigation Measure Wild-3 (CP1). Implementation of this
18 mitigation measure will reduce impacts on these species; however, because
19 impacts cannot be fully mitigated, Impact Wild-3 (CP2) is considered
20 significant and unavoidable.

21 **Mitigation Measure Wild-4 (CP2): Conduct Preconstruction Surveys for**
22 **the American Peregrine Falcon and Establish Buffers** This mitigation
23 measure is identical to Mitigation Measure Wild-4 (CP1). Implementation of
24 this mitigation measure will reduce Impact Wild-4 (CP2) to a less-than-
25 significant level.

26 **Mitigation Measure Wild-5 (CP2): Acquire and Preserve Mitigation**
27 **Lands; Conduct Protocol-Level Surveys for the Bald Eagle and Establish**
28 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-5
29 (CP1). Implementation of this mitigation measure will reduce impacts on
30 individual bald eagles nesting during the implementation of the project;
31 however, all nest trees in the inundation zone will be lost; therefore, Impact
32 Wild-5 (CP2) is considered significant and unavoidable.

33 **Mitigation Measure Wild-6 (CP2): Acquire and Preserve Mitigation**
34 **Lands; Conduct Protocol-Level Surveys for the Northern Spotted Owl and**
35 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
36 Wild-6 (CP1). Implementation of this mitigation measure will reduce impacts
37 on individual northern spotted owls nesting during the implementation of the
38 project; however, nest trees located within the inundation zone will be lost;
39 therefore, Impact Wild-6 (CP2) is considered significant and unavoidable.

1 **Mitigation Measure Wild-7 (CP2): Conduct a Preconstruction Survey for**
2 **the Purple Martin and Establish Buffers** This mitigation measure is
3 identical to Mitigation Measure Wild-7 (CP1). Implementation of this
4 mitigation measure will reduce impacts on individual purple martins nesting
5 during the implementation of the project; however, these measures might not
6 fully mitigate the loss of snags used for nesting; therefore, Impact Wild-7 (CP2)
7 is considered significant and unavoidable.

8 **Mitigation Measure Wild-8 (CP2): Acquire and Preserve Mitigation**
9 **Lands; Conduct a Preconstruction Survey for the Willow Flycatcher,**
10 **Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish**
11 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-8
12 (CP1). Implementation of this mitigation measure will reduce impacts on these
13 species; however, because impacts cannot be fully mitigated, Impact Wild-8
14 (CP2) is considered significant and unavoidable.

15 **Mitigation Measure Wild-9 (CP2): Acquire and Preserve Mitigation**
16 **Lands; Conduct Preconstruction Surveys for the Long-Eared Owl,**
17 **Northern Goshawk, Cooper's Hawk, Great Blue Heron, and Osprey and**
18 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
19 Wild-9 (CP1). Implementation of this mitigation measure will reduce impacts
20 on these species; however, because impacts cannot be fully mitigated, Impact
21 Wild-9 (CP2) is considered significant and unavoidable.

22 **Mitigation Measure Wild-10 (CP2): Acquire and Preserve Mitigation**
23 **Lands; Conduct Preconstruction Surveys for the Pacific Fisher and**
24 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
25 Wild-10 (CP1). Implementation of this mitigation measure will reduce impacts
26 on these species; however, because impacts cannot be fully mitigated, Impact
27 Wild-10 (CP2) is considered significant and unavoidable.

28 **Mitigation Measure Wild-11 (CP2): Acquire and Preserve Mitigation**
29 **Lands; Conduct Preconstruction Surveys for Special-Status Bats,**
30 **American Marten, and Ringtails and Establish Buffers** This mitigation
31 measure is identical to Mitigation Measure Wild-11 (CP1). Implementation of
32 this mitigation measure will reduce impacts on these species; however, because
33 impacts cannot be fully mitigated, Impact Wild-11 (CP2) is considered
34 significant and unavoidable.

35 **Mitigation Measure Wild-12 (CP2): Avoid Suitable Habitat; Acquire and**
36 **Preserve Mitigation Lands for Special-Status Terrestrial Mollusks** This
37 mitigation measure is identical to Mitigation Measure Wild-12 (CP1).
38 Implementation of this mitigation measure will reduce impacts on special-status
39 terrestrial mollusks; however, because impacts cannot be fully mitigated,
40 Impact Wild-12 (CP2) is considered significant and unavoidable.

1 **Mitigation Measure Wild-13 (CP2): Acquire and Preserve Mitigation**
2 **Lands for Permanent Loss of General Wildlife Habitat** This mitigation
3 measure is identical to Mitigation Measure Wild-13 (CP1). Implementation of
4 this mitigation measure will reduce impacts on these species; however, because
5 impacts cannot be fully mitigated, Impact Wild-13 (CP2) is considered
6 significant and unavoidable.

7 **Mitigation Measure Wild-14 (CP2): Acquire and Preserve Mitigation**
8 **Lands and Conduct Preconstruction Survey for Other Nesting Raptors and**
9 **Migratory Birds and Establish Buffers** This mitigation measure is identical
10 to Mitigation Measure Wild-14 (CP1). Implementation of this mitigation
11 measure will reduce impacts on these species; however, because impacts cannot
12 be fully mitigated, Impact Wild-14 (CP2) is considered significant and
13 unavoidable.

14 **Mitigation Measure Wild-15 (CP2): Acquire and Preserve Mitigation**
15 **Lands for Permanent Loss of Critical Deer Wintering and Fawning Range**
16 This mitigation measure is identical to Mitigation Measure Wild-15 (CP1).
17 Implementation of this mitigation measure will reduce impacts on these species;
18 however, because impacts cannot be fully mitigated, Impact Wild-15 (CP2) is
19 considered significant and unavoidable.

20 **Mitigation Measure Wild-16 (CP2)** Mitigation has yet to be determined for
21 potential impacts to the California red-legged frog. At this time, no feasible
22 mitigation has been determined. This impact is considered significant and
23 unavoidable.

24 **Mitigation Measure Wild-17 (CP2): To Reduce Impacts on Riparian-**
25 **Associated and Aquatic Special-Status Wildlife in the Primary Study Area,**
26 **Implement Mitigation Measure Bot-7: Develop and Implement a Riverine**
27 **Ecosystem Mitigation and Adaptive Management Plan** This mitigation
28 measure is identical to Mitigation Measure Bot-7 (CP2), described in Chapter
29 12, “Botanical Resources and Wetlands.” Implementation of this mitigation
30 measure would reduce Impact Wild-17 (CP2) to a less-than-significant level.

31 **Mitigation Measure Wild-20 (CP2): To Promote Consistency with Local**
32 **and Regional Plans with Goals of Promoting Riparian Habitat in the**
33 **Primary Study Area, Implement Mitigation Measure Bot-7: Develop and**
34 **Implement a Riverine Ecosystem Mitigation and Adaptive Management**
35 **Plan** This mitigation measure is identical to Mitigation Measure Bot-7 (CP2),
36 described in Chapter 12, “Botanical Resources and Wetlands.” Implementation
37 of this mitigation measure would reduce Impact Wild-20 (CP2) to a less-than-
38 significant level.

39 **Mitigation Measure Wild-23 (CP2): To Reduce Impacts on Riparian-**
40 **Associated and Aquatic Special-Status Wildlife along the Lower**
41 **Sacramento River Resulting from Modifications of Geomorphic Processes,**

1 **Implement Mitigation Measure Bot-7: Develop and Implement a Riverine**
2 **Ecosystem Mitigation and Adaptive Management Plan** This mitigation
3 measure is identical to Mitigation Measure Bot-7 (CP2), described in Chapter
4 12, “Botanical Resources and Wetlands.” Implementation of this mitigation
5 measure would reduce Impact Wild-23 (CP2) to a less-than-significant level.

6 **Mitigation Measure Wild-26 (CP2): To Promote Consistency with Local**
7 **and Regional Plans with Goals of Promoting Riparian Habitat along the**
8 **Lower Sacramento River and in the Delta, Implement Mitigation Measure**
9 **Bot-7: Develop and Implement a Riverine Ecosystem Mitigation and**
10 **Adaptive Management Plan** This mitigation measure is identical to
11 Mitigation Measure Bot-7 (CP2), described in Chapter 12, “Botanical
12 Resources and Wetlands.” Implementation of this mitigation measure would
13 reduce Impact Wild-26 (CP2) to a less-than-significant level.

14 ***CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and***
15 ***Anadromous Fish Survival***

16 No mitigation is required for Impacts Wild-18 (CP3), Wild-19 (CP3), Wild-21
17 (CP3), Wild-22 (CP3), Wild-24 (CP3), Wild-25 (CP3), and Wild-27 (CP3).
18 Mitigation is provided below for the remaining impacts of CP3 on wildlife
19 species.

20 **Mitigation Measure Wild-1 (CP3): Avoid, Relocate, and Acquire**
21 **Mitigation Lands for Shasta Salamander** This mitigation measure is
22 identical to Mitigation Measure Wild-1 (CP1). Implementation of this
23 mitigation measure will reduce impacts on the Shasta salamander; however,
24 because impacts cannot be fully mitigated, Impact Wild-1 (CP3) is considered
25 significant and unavoidable.

26 **Mitigation Measure Wild-2 (CP3): Avoid, Relocate, and Acquire**
27 **Mitigation Lands for Foothill Yellow-Legged Frog and Tailed Frog** This
28 mitigation measure is identical to Mitigation Measure Wild-2 (CP1).
29 Implementation of this mitigation measure will reduce impacts on these species;
30 however, because impacts cannot be fully mitigated, Impact Wild-2 (CP3) is
31 considered significant and unavoidable.

32 **Mitigation Measure Wild-3 (CP3): Avoid, Relocate, and Acquire**
33 **Mitigation Lands for Northwestern Pond Turtle** This mitigation measure is
34 identical to Mitigation Measure Wild-3 (CP1). Implementation of this
35 mitigation measure will reduce impacts on these species; however, because
36 impacts cannot be fully mitigated, Impact Wild-3 (CP3) is considered
37 significant and unavoidable.

38 **Mitigation Measure Wild-4 (CP3): Conduct Preconstruction Surveys for**
39 **the American Peregrine Falcon and Establish Buffers** This mitigation
40 measure is identical to Mitigation Measure Wild-4 (CP1). Implementation of

1 this mitigation measure will reduce Impact Wild-4 (CP3) to a less-than-
2 significant level.

3 **Mitigation Measure Wild-5 (CP3): Acquire and Preserve Mitigation**
4 **Lands; Conduct Protocol-Level Surveys for the Bald Eagle and Establish**
5 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-5
6 (CP1). Implementation of this mitigation measure will reduce impacts on
7 individual bald eagles nesting during the implementation of the project;
8 however, all nest trees in the inundation zone will be lost; therefore, Impact
9 Wild-5 (CP3) is considered significant and unavoidable.

10 **Mitigation Measure Wild-6 (CP3): Acquire and Preserve Mitigation**
11 **Lands; Conduct Protocol-Level Surveys for the Northern Spotted Owl and**
12 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
13 Wild-6 (CP1). Implementation of this mitigation measure will reduce impacts
14 on individual northern spotted owls nesting during the implementation of the
15 project; however, nest trees located within the inundation zone will be lost;
16 therefore, Impact Wild-6 (CP3) is considered significant and unavoidable.

17 **Mitigation Measure Wild-7 (CP3): Conduct a Preconstruction Survey for**
18 **the Purple Martin and Establish Buffers** This mitigation measure is
19 identical to Mitigation Measure Wild-7 (CP1). Implementation of this
20 mitigation measure will reduce impacts on individual purple martins nesting
21 during the implementation of the project; however, these measures might not
22 fully mitigate the loss of snags used for nesting; therefore, Impact Wild-7 (CP3)
23 is considered significant and unavoidable.

24 **Mitigation Measure Wild-8 (CP3): Acquire and Preserve Mitigation**
25 **Lands; Conduct a Preconstruction Survey for the Willow Flycatcher,**
26 **Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish**
27 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-8
28 (CP1). Implementation of this mitigation measure will reduce impacts on these
29 species; however, because impacts cannot be fully mitigated, Impact Wild-8
30 (CP3) is considered significant and unavoidable.

31 **Mitigation Measure Wild-9 (CP3): Acquire and Preserve Mitigation**
32 **Lands; Conduct Preconstruction Surveys for the Long-Eared Owl,**
33 **Northern Goshawk, Cooper's Hawk, Great Blue Heron, and Osprey and**
34 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
35 Wild-9 (CP1). Implementation of this mitigation measure will reduce impacts
36 on these species; however, because impacts cannot be fully mitigated, Impact
37 Wild-9 (CP3) is considered significant and unavoidable.

38 **Mitigation Measure Wild-10 (CP3): Acquire and Preserve Mitigation**
39 **Lands; Conduct Preconstruction Surveys for the Pacific Fisher and**
40 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
41 Wild-10 (CP1). Implementation of this mitigation measure will reduce impacts

1 on these species; however, because impacts cannot be fully mitigated, Impact
2 Wild-10 (CP3) is considered significant and unavoidable.

3 **Mitigation Measure Wild-11 (CP3): Acquire and Preserve Mitigation**
4 **Lands; Conduct Preconstruction Surveys for Special-Status Bats,**
5 **American Marten, and Ringtails and Establish Buffers** This mitigation
6 measure is identical to Mitigation Measure Wild-11 (CP1). Implementation of
7 this mitigation measure will reduce impacts on these species; however, because
8 impacts cannot be fully mitigated, Impact Wild-11 (CP3) is considered
9 significant and unavoidable.

10 **Mitigation Measure Wild-12 (CP3): Avoid Suitable Habitat; Acquire and**
11 **Preserve Mitigation Lands for Special-Status Terrestrial Mollusks** This
12 mitigation measure is identical to Mitigation Measure Wild-12 (CP1).
13 Implementation of this mitigation measure will reduce impacts on special-status
14 terrestrial mollusks; however, because impacts cannot be fully mitigated,
15 Impact Wild-12 (CP3) is considered significant and unavoidable.

16 **Mitigation Measure Wild-13 (CP3): Acquire and Preserve Mitigation**
17 **Lands for Permanent Loss of General Wildlife Habitat** This mitigation
18 measure is identical to Mitigation Measure Wild-13 (CP1). Implementation of
19 this mitigation measure will reduce impacts on these species; however, because
20 impacts cannot be fully mitigated, Impact Wild-13 (CP3) is considered
21 significant and unavoidable.

22 **Mitigation Measure Wild-14 (CP3): Acquire and Preserve Mitigation**
23 **Lands and Conduct Preconstruction Survey for Other Nesting Raptors and**
24 **Migratory Birds and Establish Buffers** This mitigation measure is identical
25 to Mitigation Measure Wild-14 (CP1). Implementation of this mitigation
26 measure will reduce impacts on these species; however, because impacts cannot
27 be fully mitigated, Impact Wild-14 (CP3) is considered significant and
28 unavoidable.

29 **Mitigation Measure Wild-15 (CP3): Acquire and Preserve Mitigation**
30 **Lands for Permanent Loss of Critical Deer Wintering and Fawning Range**
31 This mitigation measure is identical to Mitigation Measure Wild-15 (CP1).
32 Implementation of this mitigation measure will reduce impacts on these species;
33 however, because impacts cannot be fully mitigated, Impact Wild-15 (CP3) is
34 considered significant and unavoidable.

35 **Mitigation Measure Wild-16 (CP3)** Mitigation has yet to be determined for
36 potential impacts to the California red-legged frog. At this time, no feasible
37 mitigation has been determined. This impact is considered significant and
38 unavoidable.

39 **Mitigation Measure Wild-17 (CP3): To Reduce Impacts on Riparian-**
40 **Associated and Aquatic Special-Status Wildlife in the Primary Study Area,**

1 **Implement Mitigation Measure Bot-7** This mitigation measure is identical to
2 Mitigation Measure Bot-7 (CP3), described in Chapter 12, “Botanical
3 Resources and Wetlands.” Implementation of this mitigation measure would
4 reduce Impact Wild-17 (CP3) to a less-than-significant level.

5 **Mitigation Measure Wild-20 (CP3): To Promote Consistency with Local
6 and Regional Plans with Goals of Promoting Riparian Habitat in the
7 Primary Study Area, Implement Mitigation Measure Bot-7** This mitigation
8 measure is identical to Mitigation Measure Bot-7 (CP3), described in Chapter
9 12, “Botanical Resources and Wetlands.” Implementation of this mitigation
10 measure would reduce Impact Wild-20 (CP3) to a less-than-significant level.

11 **Mitigation Measure Wild-23 (CP3): To Reduce Impacts on Riparian-
12 Associated and Aquatic Special-Status Wildlife along the Lower
13 Sacramento River Resulting from Modifications of Geomorphic Processes,
14 Implement Mitigation Measure Bot-7** This mitigation measure is identical to
15 Mitigation Measure Bot-7 (CP3), described in Chapter 12, “Botanical
16 Resources and Wetlands.” Implementation of this mitigation measure would
17 reduce Impact Wild-23 (CP3) to a less-than-significant level.

18 **Mitigation Measure Wild-26 (CP3): To Promote Consistency with Local
19 and Regional Plans with Goals of Promoting Riparian Habitat along the
20 Lower Sacramento River and in the Delta, Implement Mitigation Measure
21 Bot-7** This mitigation measure is identical to Mitigation Measure Bot-7 (CP3),
22 described in Chapter 12, “Botanical Resources and Wetlands.” Implementation
23 of this mitigation measure would reduce Impact Wild-26 (CP3) to a less-than-
24 significant level.

25 ***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply
26 Reliability***

27 No mitigation is needed for Impacts Wild-18 (CP4), Wild-19 (CP4), Wild-24
28 (CP4), Wild-25 (CP4), and Wild-27 (CP4). Mitigation is provided below for the
29 remaining impacts of CP4 on wildlife species.

30 **Mitigation Measure Wild-1 (CP4): Avoid, Relocate, and Acquire
31 Mitigation Lands for Shasta Salamander** This mitigation measure is
32 identical to Mitigation Measure Wild-1 (CP1). Implementation of this
33 mitigation measure will reduce impacts on the Shasta salamander; however,
34 because impacts cannot be fully mitigated, Impact Wild-1 (CP4) is considered
35 significant and unavoidable.

36 **Mitigation Measure Wild-2 (CP4): Avoid, Relocate, and Acquire
37 Mitigation Lands for Foothill Yellow-Legged Frog and Tailed Frog** This
38 mitigation measure is identical to Mitigation Measure Wild-2 (CP1).
39 Implementation of this mitigation measure will reduce impacts on these species;
40 however, because impacts cannot be fully mitigated, Impact Wild-2 (CP4) is
41 considered significant and unavoidable.

1 **Mitigation Measure Wild-3 (CP4): Avoid, Relocate, and Acquire**
2 **Mitigation Lands for Northwestern Pond Turtle** This mitigation measure is
3 identical to Mitigation Measure Wild-3 (CP1). Implementation of this
4 mitigation measure will reduce impacts on these species; however, because
5 impacts cannot be fully mitigated, Impact Wild-3 (CP4) is considered
6 significant and unavoidable.

7 **Mitigation Measure Wild-4 (CP4): Conduct Preconstruction Surveys for**
8 **the American Peregrine Falcon and Establish Buffers** This mitigation
9 measure is identical to Mitigation Measure Wild-4 (CP1). Implementation of
10 this mitigation measure will reduce Impact Wild-4 (CP4) to a less-than-
11 significant level.

12 **Mitigation Measure Wild-5 (CP4): Acquire and Preserve Mitigation**
13 **Lands; Conduct Protocol-Level Surveys for the Bald Eagle and Establish**
14 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-5
15 (CP1). Implementation of this mitigation measure will reduce impacts on
16 individual bald eagles nesting during the implementation of the project;
17 however, all nest trees in the inundation zone will be lost; therefore, Impact
18 Wild-5 (CP4) is considered significant and unavoidable.

19 **Mitigation Measure Wild-6 (CP4): Acquire and Preserve Mitigation**
20 **Lands; Conduct Protocol-Level Surveys for the Northern Spotted Owl and**
21 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
22 Wild-6 (CP1). Implementation of this mitigation measure will reduce impacts
23 on individual northern spotted owls nesting during the implementation of the
24 project; however, nest trees located within the inundation zone will be lost;
25 therefore, Impact Wild-6 (CP4) is considered significant and unavoidable.

26 **Mitigation Measure Wild-7 (CP4): Conduct a Preconstruction Survey for**
27 **the Purple Martin and Establish Buffers** This mitigation measure is
28 identical to Mitigation Measure Wild-7 (CP1). Implementation of this
29 mitigation measure will reduce impacts on individual purple martins nesting
30 during the implementation of the project; however, these measures might not
31 fully mitigate the loss of snags used for nesting; therefore, Impact Wild-7 (CP4)
32 is considered significant and unavoidable.

33 **Mitigation Measure Wild-8 (CP4): Acquire and Preserve Mitigation**
34 **Lands; Conduct a Preconstruction Survey for the Willow Flycatcher,**
35 **Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish**
36 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-8
37 (CP1). Implementation of this mitigation measure will reduce impacts on these
38 species; however, because impacts cannot be fully mitigated, Impact Wild-8
39 (CP4) is considered significant and unavoidable.

40 **Mitigation Measure Wild-9 (CP4): Acquire and Preserve Mitigation**
41 **Lands; Conduct Preconstruction Surveys for the Long-Eared Owl,**

1 **Northern Goshawk, Cooper’s Hawk, Great Blue Heron, and Osprey and**
2 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
3 Wild-9 (CP1). Implementation of this mitigation measure will reduce impacts
4 on these species; however, because impacts cannot be fully mitigated, Impact
5 Wild-9 (CP4) is considered significant and unavoidable.

6 **Mitigation Measure Wild-10 (CP4): Acquire and Preserve Mitigation**
7 **Lands; Conduct Preconstruction Surveys for the Pacific Fisher and**
8 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
9 Wild-10 (CP1). Implementation of this mitigation measure will reduce impacts
10 on these species; however, because impacts cannot be fully mitigated, Impact
11 Wild-10 (CP4) is considered significant and unavoidable.

12 **Mitigation Measure Wild-11 (CP4): Acquire and Preserve Mitigation**
13 **Lands; Conduct Preconstruction Surveys for Special-Status Bats,**
14 **American Marten, and Ringtails and Establish Buffers** This mitigation
15 measure is identical to Mitigation Measure Wild-11 (CP1). Implementation of
16 this mitigation measure will reduce impacts on these species; however, because
17 impacts cannot be fully mitigated, Impact Wild-11 (CP4) is considered
18 significant and unavoidable.

19 **Mitigation Measure Wild-12 (CP4): Avoid Suitable Habitat; Acquire and**
20 **Preserve Mitigation Lands for Special-Status Terrestrial Mollusks** This
21 mitigation measure is identical to Mitigation Measure Wild-12 (CP1).
22 Implementation of this mitigation measure will reduce impacts on special-status
23 terrestrial mollusks; however, because impacts cannot be fully mitigated,
24 Impact Wild-12 (CP4) is considered significant and unavoidable.

25 **Mitigation Measure Wild-13 (CP4): Acquire and Preserve Mitigation**
26 **Lands for Permanent Loss of General Wildlife Habitat** This mitigation
27 measure is identical to Mitigation Measure Wild-13 (CP1). Implementation of
28 this mitigation measure will reduce impacts on these species; however, because
29 impacts cannot be fully mitigated, Impact Wild-13 (CP4) is considered
30 significant and unavoidable.

31 **Mitigation Measure Wild-14 (CP4): Acquire and Preserve Mitigation**
32 **Lands and Conduct Preconstruction Survey for Other Nesting Raptors and**
33 **Migratory Birds and Establish Buffers** This mitigation measure is identical
34 to Mitigation Measure Wild-14 (CP1). Implementation of this mitigation
35 measure will reduce impacts on these species; however, because impacts cannot
36 be fully mitigated, Impact Wild-14 (CP4) is considered significant and
37 unavoidable.

38 **Mitigation Measure Wild-15 (CP4): Acquire and Preserve Mitigation**
39 **Lands for Permanent Loss of Critical Deer Wintering and Fawning Range**
40 This mitigation measure is identical to Mitigation Measure Wild-15 (CP1).
41 Implementation of this mitigation measure will reduce impacts on these species;

1 however, because impacts cannot be fully mitigated, Impact Wild-15 (CP4) is
2 considered significant and unavoidable.

3 **Mitigation Measure Wild-16 (CP4)** Mitigation has yet to be determined for
4 potential impacts to the California red-legged frog. At this time, no feasible
5 mitigation has been determined. This impact is considered significant and
6 unavoidable.

7 **Mitigation Measure Wild-17 (CP4): To Reduce Impacts on Riparian-**
8 **Associated and Aquatic Special-Status Wildlife in the Primary Study Area,**
9 **Implement Mitigation Measure Bot-7** This mitigation measure is identical to
10 Mitigation Measure Bot-7 (CP4), described in Chapter 12, “Botanical
11 Resources and Wetlands.” Implementation of this mitigation measure would
12 reduce Impact Wild-17 (CP4) to a less-than-significant level.

13 **Mitigation Measure Wild-20 (CP4): To Promote Consistency with Local**
14 **and Regional Plans with Goals of Promoting Riparian Habitat in the**
15 **Primary Study Area, Implement Mitigation Measure Bot-7** This mitigation
16 measure is identical to Mitigation Measure Bot-7 (CP4), described in Chapter
17 12, “Botanical Resources and Wetlands.” Implementation of this mitigation
18 measure would reduce Impact Wild-20 (CP4) to a less-than-significant level.

19 **Mitigation Measure Wild-21 (CP4): Conduct Preconstruction Surveys for**
20 **Elderberry Shrubs, Western Pond Turtle, and Nesting Riparian Raptors**
21 **and Other Nesting Birds; Avoid Removal or Degradation of Elderberry**
22 **Shrubs; and Avoid Vegetation Removal Near Active Nest Sites** To avoid
23 impacts on valley elderberry longhorn beetle, western pond turtle, and nesting
24 raptors, and other nesting birds, Reclamation will implement the following
25 measures at gravel augmentation sites with the potential to affect these species:

26 *Valley Elderberry Longhorn Beetle*

- 27 • A worker awareness training program for construction personnel will
28 be conducted by a qualified biologist/restoration ecologist before gravel
29 augmentation activities begin. The program will inform all construction
30 personnel about the life history and status of the beetle, the need to
31 avoid damaging the elderberry plants, and the possible penalties for not
32 complying with these requirements. Written documentation of the
33 training will be submitted to USFWS within 30 days of the completion
34 of training.
- 35 • Elderberry shrubs shall be protected through establishment of a fenced
36 avoidance area. Fencing will be placed at least 20 feet from the dripline
37 of the shrubs where they occur along any access routes. Signs will be
38 posted along the avoidance area. The signs will state: “This area is the
39 habitat of the valley elderberry longhorn beetle, a threatened species,
40 and must not be disturbed. This species is protected by the Endangered
41 Species Act of 1973, as amended. Violators are subject to prosecution,

1 fines, and imprisonment.” Signs will be readable from a distance of 20
2 feet. Fencing and signs will be maintained at gravel recruitment sites
3 during construction activities.

- 4 • If removal of elderberry shrubs during construction of access routes is
5 unavoidable, Reclamation will consult with USFWS as required under
6 Section 7 of the ESA as appropriate. No project construction will
7 proceed in areas potentially containing valley elderberry longhorn
8 beetle until a BO has been issued by USFWS, and Reclamation has
9 abided by all pertinent conditions in the BO relating to the proposed
10 construction.
- 11 • Elderberry shrubs will be mitigated for according to the transplantation
12 guidelines outlined in the Beetle Conservation Guidelines (USFWS
13 1999). These transplantation guidelines dictate the necessary timing
14 and details of the transplanting. At the discretion of USFWS, shrubs
15 that are unlikely to survive transplantation because of poor condition or
16 location, or a plant that would be extremely difficult to move because
17 of access problems, may be exempted from transplantation. In cases
18 where transplantation is not possible, compensation ratios would be
19 increased to offset the additional habitat loss.
- 20 • Relocation of existing elderberry shrubs and planting of new elderberry
21 seedlings will be implemented on a no-net-loss basis. Compensatory
22 mitigation for elderberry shrubs that would be removed from their
23 current locations will be developed in consultation with USFWS during
24 the Section 7 consultation process. Compensatory mitigation may
25 include planting replacement elderberry seedlings or cuttings and
26 associated native plants or purchasing credits at an approved mitigation
27 bank, or a combination thereof. Relocated and replacement shrubs and
28 associated native plantings will be placed in conservation areas
29 providing a minimum of 1,800 square feet per transplanted shrub.
- 30 • No insecticides, herbicides, fertilizers, or other chemicals that might
31 harm the beetle or its host plant will be used within 100 feet of
32 elderberry shrubs. Roadways and disturbed areas within 100 feet of
33 elderberry shrubs will be watered at least twice a day and as needed to
34 minimize dust emissions.

35 *Western Pond Turtle*

- 36 • When construction activities are to occur within suitable western pond
37 turtle habitat as defined in Impact Wild-3 (CP1), a qualified biologist
38 will conduct a minimum of one preconstruction survey for western
39 pond turtles and their nests. The survey will be conducted no more than
40 1 week prior to construction. If a pond turtle nest is found, the biologist
41 will flag the site and determine whether construction activities can
42 avoid impacting the nest. If the nest cannot be avoided, CDFW will be

1 contacted for further direction and construction activities in that
2 location will be halted.

- 3 • In the event that a pond turtle is observed within the construction limits,
4 the contractor will temporarily halt construction activities until a
5 qualified biologist has moved the turtle to a safe location within
6 suitable habitat outside of the construction limits.
- 7 • When feasible, work areas will be surrounded by exclusion fencing
8 consisting of silt fence securely staked into the ground, with the bottom
9 edge buried at least 6 inches to prevent turtles from accessing the work
10 sites from upland locations.

11 *Birds*

- 12 • For each year of vegetation removal for gravel augmentation activity,
13 all active bald eagle nests will be located and mapped using the
14 National Bald Eagle Management Guidelines (USFWS 2007).
- 15 • In consultation with CDFW and USFS, a 660-foot to 0.5-mile buffer
16 will be established around active nests. Vegetation will be retained and
17 no construction activities will occur within this buffer.
- 18 • If proposed vegetation removal would occur between April 1 and
19 August 31, a qualified biologist will conduct a preconstruction survey
20 for nesting special-status birds no more than 2 weeks before
21 construction activities begin. If an active nest is found, a qualified
22 biologist, in consultation with CDFW, will determine a construction-
23 free buffer zone to be established around the nest until the young have
24 fledged. In consultation with CDFW, a plan will be developed to
25 monitor whether construction activity is disturbing the reproductive
26 process and to determine when the young have fledged.

27 Implementation of this mitigation measure would reduce Impact Wild-21 (CP4)
28 to a less-than-significant level.

29 **Mitigation Measure Wild-22 (CP4): Implement Mitigation Measure Wild-**
30 **21: Conduct Preconstruction Surveys for Elderberry Shrubs, Western**
31 **Pond Turtle, and Nesting Riparian Raptors and Other Nesting Birds;**
32 **Avoid Removal or Degradation of Elderberry Shrubs; and Avoid**
33 **Vegetation Removal Near Active Nest Sites** To avoid impacts on valley
34 elderberry longhorn beetle, western pond turtle, nesting raptors, and other
35 nesting birds, Reclamation will implement the following measures as part of the
36 gravel augmentation activities project at augmentation sites with the potential to
37 affect these species:

1 *Valley Elderberry Longhorn Beetle* This mitigation measure is identical to
2 Mitigation Measure Wild-21 (CP4) for valley elderberry longhorn beetle, except
3 that the following additional measures will be implemented:

- 4 • Before implementation of any vegetation improvements or other
5 activities associated with gravel augmentation, including constructing
6 access routes, a survey will be conducted to identify and map all
7 elderberry shrubs.
- 8 • New roads, trails, and staging areas will be constructed a minimum of
9 100 feet from elderberry shrubs.
- 10 • Removal and disturbance of elderberry shrubs will be avoided, to the
11 extent feasible.

12 *Western Pond Turtle* This mitigation measure is identical to Mitigation
13 Measure Wild-21 (CP4) for western pond turtles.

14 *Birds* This mitigation measure is identical to Mitigation Measure Wild-21
15 (CP4) for birds.

16 Implementation of this mitigation measure would reduce Impact Wild-22 (CP4)
17 to a less-than-significant level.

18 **Mitigation Measure Wild-23 (CP4): To Reduce Impacts on Riparian-**
19 **Associated and Aquatic Special-Status Wildlife along the Lower**
20 **Sacramento River Resulting from Modifications of Geomorphic Processes,**
21 **Implement Mitigation Measure Bot-7** This mitigation measure is identical to
22 Mitigation Measure Bot-7 (CP4), described in Chapter 12, “Botanical
23 Resources and Wetlands.” Implementation of this mitigation measure would
24 reduce Impact Wild-23 (CP4) to a less-than-significant level.

25 **Mitigation Measure Wild-26 (CP4): To Promote Consistency with Local**
26 **and Regional Plans with Goals of Promoting Riparian Habitat along the**
27 **Lower Sacramento River and in the Delta, Implement Mitigation Measure**
28 **Bot-7** This mitigation measure is identical to Mitigation Measure Bot-7 (CP4),
29 described in Chapter 12, “Botanical Resources and Wetlands.” Implementation
30 of this mitigation measure would reduce Impact Wild-26 (CP4) to a less-than-
31 significant level.

32 ***CP5 – 18.5-Foot Dam Raise, Combination Plan***

33 No mitigation is required for Impacts Wild-18 (CP5), Wild-19 (CP5), Wild-24
34 (CP5), Wild-25 (CP5), and Wild-27 (CP5). Mitigation is provided below for the
35 remaining impacts of CP5 on wildlife species.

36 **Mitigation Measure Wild-1 (CP5): Avoid, Relocate, and Acquire**
37 **Mitigation Lands for Shasta Salamander** This mitigation measure is
38 identical to Mitigation Measure Wild-1 (CP1). Implementation of this

1 mitigation measure will reduce impacts on the Shasta salamander; however,
2 because impacts cannot be fully mitigated, Impact Wild-1 (CP5) is considered
3 significant and unavoidable.

4 **Mitigation Measure Wild-2 (CP5): Avoid, Relocate, and Acquire**
5 **Mitigation Lands for Foothill Yellow-Legged Frog and Tailed Frog** This
6 mitigation measure is identical to Mitigation Measure Wild-2 (CP1).
7 Implementation of this mitigation measure will reduce impacts on these species;
8 however, because impacts cannot be fully mitigated, Impact Wild-2 (CP5) is
9 considered significant and unavoidable.

10 **Mitigation Measure Wild-3 (CP5): Avoid, Relocate, and Acquire**
11 **Mitigation Lands for Northwestern Pond Turtle** This mitigation measure is
12 identical to Mitigation Measure Wild-3 (CP1). Implementation of this
13 mitigation measure will reduce impacts on these species; however, because
14 impacts cannot be fully mitigated, Impact Wild-3 (CP5) is considered
15 significant and unavoidable.

16 **Mitigation Measure Wild-4 (CP5): Conduct Preconstruction Surveys for**
17 **the American Peregrine Falcon and Establish Buffers** This mitigation
18 measure is identical to Mitigation Measure Wild-4 (CP1). Implementation of
19 this mitigation measure will reduce Impact Wild-4 (CP5) to a less-than-
20 significant level.

21 **Mitigation Measure Wild-5 (CP5): Acquire and Preserve Mitigation**
22 **Lands; Conduct Protocol-Level Surveys for the Bald Eagle and Establish**
23 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-5
24 (CP1). Implementation of this mitigation measure will reduce impacts on
25 individual bald eagles nesting during the implementation of the project;
26 however, all nest trees in the inundation zone will be lost; therefore, Impact
27 Wild-5 (CP5) is considered significant and unavoidable.

28 **Mitigation Measure Wild-6 (CP5): Acquire and Preserve Mitigation**
29 **Lands; Conduct Protocol-Level Surveys for the Northern Spotted Owl and**
30 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
31 Wild-6 (CP1). Implementation of this mitigation measure will reduce impacts
32 on individual northern spotted owls nesting during the implementation of the
33 project; however, nest trees located within the inundation zone will be lost;
34 therefore, Impact Wild-6 (CP5) is considered significant and unavoidable.

35 **Mitigation Measure Wild-7 (CP5): Conduct a Preconstruction Survey for**
36 **the Purple Martin and Establish Buffers** This mitigation measure is
37 identical to Mitigation Measure Wild-7 (CP1). Implementation of this
38 mitigation measure will reduce impacts on individual purple martins nesting
39 during the implementation of the project; however, these measures might not
40 fully mitigate the loss of snags used for nesting; therefore, Impact Wild-7 (CP5)
41 is considered significant and unavoidable.

1 **Mitigation Measure Wild-8 (CP5): Acquire and Preserve Mitigation**
2 **Lands; Conduct a Preconstruction Survey for the Willow Flycatcher,**
3 **Vaux’s Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish**
4 **Buffers** This mitigation measure is identical to Mitigation Measure Wild-8
5 (CP1). Implementation of this mitigation measure will reduce impacts on these
6 species; however, because impacts cannot be fully mitigated, Impact Wild-8
7 (CP5) is considered significant and unavoidable.

8 **Mitigation Measure Wild-9 (CP5): Acquire and Preserve Mitigation**
9 **Lands; Conduct Preconstruction Surveys for the Long-Eared Owl,**
10 **Northern Goshawk, Cooper’s Hawk, Great Blue Heron, and Osprey and**
11 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
12 Wild-9 (CP1). Implementation of this mitigation measure will reduce impacts
13 on these species; however, because impacts cannot be fully mitigated, Impact
14 Wild-9 (CP5) is considered significant and unavoidable.

15 **Mitigation Measure Wild-10 (CP5): Acquire and Preserve Mitigation**
16 **Lands; Conduct Preconstruction Surveys for the Pacific Fisher and**
17 **Establish Buffers** This mitigation measure is identical to Mitigation Measure
18 Wild-10 (CP1). Implementation of this mitigation measure will reduce impacts
19 on these species; however, because impacts cannot be fully mitigated, Impact
20 Wild-10 (CP5) is considered significant and unavoidable.

21 **Mitigation Measure Wild-11 (CP5): Acquire and Preserve Mitigation**
22 **Lands; Conduct Preconstruction Surveys for Special-Status Bats,**
23 **American Marten, and Ringtails and Establish Buffers** This mitigation
24 measure is identical to Mitigation Measure Wild-11 (CP1). Implementation of
25 this mitigation measure will reduce impacts on these species; however, because
26 impacts cannot be fully mitigated, Impact Wild-11 (CP5) is considered
27 significant and unavoidable.

28 **Mitigation Measure Wild-12 (CP5): Avoid Suitable Habitat; Acquire and**
29 **Preserve Mitigation Lands for Special-Status Terrestrial Mollusks** This
30 mitigation measure is identical to Mitigation Measure Wild-12 (CP1).
31 Implementation of this mitigation measure will reduce impacts on special-status
32 terrestrial mollusks; however, because impacts cannot be fully mitigated,
33 Impact Wild-12 (CP5) is considered significant and unavoidable.

34 **Mitigation Measure Wild-13 (CP5): Acquire and Preserve Mitigation**
35 **Lands for Permanent Loss of General Wildlife Habitat** This mitigation
36 measure is identical to Mitigation Measure Wild-13 (CP1). Implementation of
37 this mitigation measure will reduce impacts on these species; however, because
38 impacts cannot be fully mitigated, Impact Wild-13 (CP5) is considered
39 significant and unavoidable.

1 **Mitigation Measure Wild-14 (CP5): Acquire and Preserve Mitigation**
2 **Lands and Conduct Preconstruction Survey for Other Nesting Raptors and**
3 **Migratory Birds and Establish Buffers** This mitigation measure is identical
4 to Mitigation Measure Wild-14 (CP1). Implementation of this mitigation
5 measure will reduce impacts on these species; however, because impacts cannot
6 be fully mitigated, Impact Wild-14 (CP5) is considered significant and
7 unavoidable.

8 **Mitigation Measure Wild-15 (CP5): Acquire and Preserve Mitigation**
9 **Lands for Permanent Loss of Critical Deer Wintering and Fawning Range**
10 This mitigation measure is identical to Mitigation Measure Wild-15 (CP1).
11 Implementation of this mitigation measure will reduce impacts on these species;
12 however, because impacts cannot be fully mitigated, Impact Wild-15 (CP5) is
13 considered significant and unavoidable.

14 **Mitigation Measure Wild-16 (CP5)** Mitigation has yet to be determined for
15 potential impacts to the California red-legged frog. At this time, no feasible
16 mitigation has been determined. This impact is considered significant and
17 unavoidable.

18 **Mitigation Measure Wild-17 (CP5): To Reduce Impacts on Riparian-**
19 **Associated and Aquatic Special-Status Wildlife in the Primary Study Area,**
20 **Implement Mitigation Measure Bot-7** This mitigation measure is identical to
21 Mitigation Measure Bot-7 (CP5), described in Chapter 12, “Botanical
22 Resources and Wetlands.” Implementation of this mitigation measure would
23 reduce Impact Wild-17 (CP5) to a less-than-significant level.

24 **Mitigation Measure Wild-20 (CP5): To Promote Consistency with Local**
25 **and Regional Plans with Goals of Promoting Riparian Habitat in the**
26 **Primary Study Area, Implement Mitigation Measure Bot-7** This mitigation
27 measure is identical to Mitigation Measure Bot-7 (CP5), described in Chapter
28 12, “Botanical Resources and Wetlands.” Implementation of this mitigation
29 measure would reduce Impact Wild-20 (CP5) to a less-than-significant level.

30 **Mitigation Measure Wild-21 (CP5): Conduct Preconstruction Surveys for**
31 **Elderberry Shrubs, Western Pond Turtle, and Nesting Riparian Raptors**
32 **and Other Nesting Birds; Avoid Removal or Degradation of Elderberry**
33 **Shrubs; and Avoid Vegetation Removal Near Active Nest Sites** This
34 mitigation measure is identical to Mitigation Measure Wild-21 (CP4).
35 Implementation of this mitigation measure would reduce Impact Wild-21 (CP5)
36 to a less-than-significant level.

37 **Mitigation Measure Wild-22 (CP5): Implement Mitigation Measure Wild-**
38 **21: Conduct Preconstruction Surveys for Elderberry Shrubs, Western**
39 **Pond Turtle, and Nesting Riparian Raptors and Other Nesting Birds;**
40 **Avoid Removal or Degradation of Elderberry Shrubs; and Avoid**
41 **Vegetation Removal Near Active Nest Sites** This mitigation measure is

1 identical to Mitigation Measure Wild-22 (CP4). Implementation of this
2 mitigation measure would reduce Impact Wild-22 (CP5) to a less-than-
3 significant level.

4 **Mitigation Measure Wild-23 (CP5): To Reduce Impacts on Riparian-**
5 **Associated and Aquatic Special-Status Wildlife along the Lower**
6 **Sacramento River Resulting from Modifications of Geomorphic Processes,**
7 **Implement Mitigation Measure Bot-7** This mitigation measure is identical to
8 Mitigation Measure Bot-7 (CP5), described in Chapter 12, “Botanical
9 Resources and Wetlands.” Implementation of this mitigation measure would
10 reduce Impact Wild-23 (CP5) to a less-than-significant level.

11 **Mitigation Measure Wild-26 (CP5): To Promote Consistency with Local**
12 **and Regional Plans with Goals of Promoting Riparian Habitat along the**
13 **Lower Sacramento River and in the Delta, Implement Mitigation Measure**
14 **Bot-7** This mitigation measure is identical to Mitigation Measure Bot-7 (CP5),
15 described in Chapter 12, “Botanical Resources and Wetlands.” Implementation
16 of this mitigation measure would reduce Impact Wild-26 (CP5) to a less-than-
17 significant level.

18 **13.3.6 Cumulative Effects**

19 A large number of past actions have occurred in the study area. These past
20 actions have substantially degraded wildlife resources in the primary and
21 extended study areas. This degradation is in part indicated by the number of
22 species that have been listed as threatened or endangered under the CESA and
23 ESA, or considered species of special concern by CDFW.

24 Past actions have caused these effects by converting habitat to developed or
25 agricultural land uses, altering biotic interactions or physical processes, and
26 damaging or causing mortality from human activities (e.g., vegetation removal
27 during agricultural, road, dam, levee, or utility maintenance).

28 Flood control and water supply projects have also altered physical processes
29 within the study area’s remaining natural vegetation. Levees have isolated large
30 areas of floodplain from rivers and streams throughout the study area, reducing
31 (or entirely eliminating) the frequency of inundation and sediment scour and
32 deposition and altering the extent and quality of riparian habitats. By reducing
33 the magnitude and frequency of winter and spring peak flows and increasing the
34 volume of summer and fall flows, water storage projects have altered the
35 riparian habitats that were not isolated from rivers by levees. In particular, the
36 operation of Shasta Dam (beginning in 1945) and the other major reservoirs of
37 the CVP and SWP has strongly affected aquatic and riparian communities along
38 the Sacramento River, other Central Valley rivers, and in the Delta (Fremier
39 2003, TNC et al. 2008).

40 The effects of climate change on operations at Shasta Lake could potentially
41 affect wildlife both at the lake and downstream. As described in the Climate

1 Change Projection Appendix, climate change could result in higher reservoir
2 releases in the future because of an increase in winter and early-spring inflow
3 into the lake from high-intensity storm events. The change in reservoir releases
4 could be necessary to manage for flood events resulting from these potentially
5 larger storms. The potential increase in releases from the reservoir could lead to
6 long-term changes in flooding frequency, downstream habitat for wildlife, and
7 water temperatures which could affect habitat along the Sacramento River and
8 in the Delta. Climate change is also expected to result in changes to conditions
9 for agricultural land and forest land, which are both habitat types. See Chapter
10 10, “Agriculture and Important Farmland,” for a detailed discussion of effects
11 on these habitat types.

12 ***Shasta Lake and Vicinity***

13 The construction of Shasta Dam and the subsequent flooding of the area now
14 known as Shasta Lake affected botanical and wildlife resources endemic to the
15 region. For example, based on population locations, Shasta snow-wreath
16 populations may have connected at the confluence of the Pit River, Squaw
17 Creek, McCloud River, and Sacramento River prior to inundation. The creation
18 of Shasta Lake fragmented this species habitat and populations. As a result,
19 these populations are more vulnerable to extirpation.

20 As described in Section 13.3, without mitigation, CP1 through CP5 could cause
21 potentially significant effects on wildlife habitats and special-status wildlife
22 species in the primary and extended study areas. These effects could be caused
23 by project construction activities; increased elevations of the water surface of
24 Shasta Lake; and alteration of the flow regime of the Sacramento River and
25 associated geomorphic processes, and thus of riparian vegetation. Although
26 causing similar effects, CP1 through CP5 differ in the magnitude of their
27 effects. At Shasta Lake and its vicinity, these potential adverse effects would be
28 similar for all alternatives, but differ with the height of the dam raise: the effects
29 of CP2 would be greater than CP1, but less than CP3 through CP5 (which
30 would be identical). Along the upper Sacramento River and in the extended
31 study area, potential adverse effects would be the result of altered flow regimes
32 and would differ with both the height of the dam raise and operation of the dam:
33 the effects of CP2 would be greater than CP1 and CP4 (which would be
34 identical), but less than CP3 and CP5 (which also would have identical effects).

35 At Shasta Lake and vicinity, CP1 through CP5 would cause the take and loss of
36 habitat for numerous species, including Shasta salamander, foothill yellow-
37 legged frog, tailed frog, Northwestern pond turtle, American peregrine falcon,
38 bald eagle, northern spotted owl, purple martin, Vaux’s swift, yellow warbler,
39 yellow-breasted chat, long-eared owl, northern goshawk, Cooper’s hawk,
40 osprey, Pacific fisher, and other special-status species. The wildlife mitigation
41 measures described in Section 13.3.5 would reduce impacts on wildlife
42 resources, although the adverse effects of CP1 through CP5 caused by
43 construction activities and inundation would not be eliminated. Because the
44 overall effect of past actions on these species has been cumulatively significant,

1 and the likely additional effects of reasonably foreseeable future actions on
2 wildlife habitat at Shasta Lake and in its vicinity, the adverse effects under CP1
3 through CP5 would cause a cumulatively considerable incremental contribution
4 to the significant cumulative impact on wildlife.

5 ***Upper Sacramento River and Extended Study Area***

6 **CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply**
7 **Reliability** As described in Chapter 2, “Alternatives,” without mitigation, CP1
8 could cause potentially significant effects on vegetation, wildlife habitats, and
9 special-status wildlife species in the primary and extended study areas. These
10 effects could be caused by alteration of the flow regime of the Sacramento
11 River and associated geomorphic processes in the primary study area or the
12 extended study area, or both. Given major past alterations to vegetation and
13 wildlife habitat along the Sacramento River, the adverse effects from CP1
14 would be a cumulatively considerable incremental contribution to significant
15 cumulative effects on vegetation, wildlife habitats, and special-status wildlife
16 species. With implementation of Mitigation Measure Bot-7, “Develop and
17 Implement a Riverine Ecosystem Mitigation and Adaptive Management Plan to
18 Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian
19 and Wetland Communities” (see Chapter 12, “Botanical Resources and
20 Wetlands”), adverse effects from CP1 would no longer result in a cumulatively
21 considerable incremental contribution to significant cumulative effects on these
22 resources.

23 As stated previously, effects of climate change on operations at Shasta Lake
24 could include a higher frequency of high-flow events, potentially resulting in
25 changes to downstream habitats. Potentially significant effects on vegetation,
26 wildlife habitats, and special-status wildlife species that would occur with
27 implementation of CP1 could contribute to potentially significant effects of
28 climate change on habitat acreages and distribution. However, with
29 implementation of the mitigation measures listed above to reduce project-
30 related impacts of CP1, CP1 would not make a cumulatively considerable
31 incremental contribution to a significant cumulative effect.

32 **CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply**
33 **Reliability** The cumulative effects of CP2 would be similar to those of CP1,
34 but greater in magnitude. Given major past alterations to vegetation and wildlife
35 habitat along the Sacramento River, the contributing adverse effects from CP2
36 would be a cumulatively considerable incremental contribution to significant
37 cumulative effects on vegetation, wildlife habitats, and special-status wildlife
38 species. With implementation of Mitigation Measure Bot-7, “Develop and
39 Implement a Riverine Ecosystem Mitigation and Adaptive Management Plan to
40 Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian
41 and Wetland Communities” (see Chapter 12, “Botanical Resources and
42 Wetlands”), adverse effects from CP2 would no longer result in a cumulatively
43 considerable incremental contribution to significant cumulative effects on these
44 resources.

1 As stated previously, effects of climate change on operations at Shasta Lake
2 could include a higher frequency of high-flow events, potentially resulting in
3 changes to downstream habitats. Potentially significant effects on vegetation,
4 wildlife habitats, and special-status wildlife species that would occur with
5 implementation of CP2 could contribute to potentially significant effects of
6 climate change on habitat acreages and distribution. However, with
7 implementation of the mitigation measures listed above to reduce project-
8 related impacts of CP2, CP2 would not make a cumulatively considerable
9 incremental contribution to a significant cumulative effect.

10 **CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and**
11 **Anadromous Fish Survival** The cumulative effects of CP3 would be similar
12 to those of CP1, but greater in magnitude. Given major past alterations to
13 vegetation and wildlife habitat along the Sacramento River, the contributing
14 adverse effects from CP3 would be a cumulatively considerable incremental
15 contribution to significant cumulative effects on vegetation, wildlife habitats,
16 and special-status wildlife species. With implementation of Mitigation Measure
17 Bot-7, “Develop and Implement a Riverine Ecosystem Mitigation and Adaptive
18 Management Plan to Avoid and Compensate for the Impact of Altered Flow
19 Regimes on Riparian and Wetland Communities” (see Chapter 12, “Botanical
20 Resources and Wetlands”), adverse effects from CP3 would no longer result in
21 a cumulatively considerable incremental contribution to significant cumulative
22 effects on these resources.

23 As stated previously, effects of climate change on operations at Shasta Lake
24 could include a higher frequency of high-flow events, potentially resulting in
25 changes to downstream habitats. Potentially significant effects on vegetation,
26 wildlife habitats, and special-status wildlife species that would occur with
27 implementation of CP3 could contribute to potentially significant effects of
28 climate change on habitat acreages and distribution. However, with
29 implementation of the mitigation measures listed above to reduce project-
30 related impacts of CP3, CP3 would not make a cumulatively considerable
31 incremental contribution to a significant cumulative effect.

32 **CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply**
33 **Reliability** The cumulative effects of CP4 would be similar to those of CP1,
34 but greater in magnitude. Given major past alterations to vegetation and wildlife
35 habitat along the Sacramento River, the contributing adverse effects from CP4
36 would be a cumulatively considerable incremental contribution to significant
37 cumulative effects on vegetation, wildlife habitats, and special-status wildlife
38 species. With implementation of Mitigation Measure Bot-7, “Develop and
39 Implement a Riverine Ecosystem Mitigation and Adaptive Management Plan to
40 Avoid and Compensate for the Impact of Altered Flow Regimes on Riparian
41 and Wetland Communities” (see Chapter 12, “Botanical Resources and
42 Wetlands”), adverse effects from CP4 would no longer result in a cumulatively
43 considerable incremental contribution to significant cumulative effects on these
44 resources.

1 As stated previously, effects of climate change on operations at Shasta Lake
2 could include a higher frequency of high-flow events, potentially resulting in
3 changes to downstream habitats. Potentially significant effects on vegetation,
4 wildlife habitats, and special-status wildlife species that would occur with
5 implementation of CP4 could contribute to potentially significant effects of
6 climate change on habitat acreages and distribution. However, with
7 implementation of the mitigation measures listed above to reduce project-
8 related impacts of CP4, CP4 would not make a cumulatively considerable
9 incremental contribution to a potentially significant cumulative effect.

10 **CP5 – 18.5-Foot Dam Raise, Combination Plan** The cumulative effects of
11 CP5 would be similar to those of CP1, but greater in magnitude. Given major
12 past alterations to vegetation and wildlife habitat along the Sacramento River,
13 the contributing adverse effects from CP5 would be a cumulatively considerable
14 incremental contribution to significant cumulative effects on vegetation,
15 wildlife habitats, and special-status wildlife species. With implementation of
16 Mitigation Measure Bot-7, “Develop and Implement a Riverine Ecosystem
17 Mitigation and Adaptive Management Plan to Avoid and Compensate for the
18 Impact of Altered Flow Regimes on Riparian and Wetland Communities” (see
19 Chapter 12, “Botanical Resources and Wetlands”), adverse effects from CP5
20 would no longer result in a cumulatively considerable incremental contribution
21 to significant cumulative effects on these resources.

22 As stated previously, effects of climate change on operations at Shasta Lake
23 could include a higher frequency of high-flow events, potentially resulting in
24 changes to downstream habitats. Potentially significant effects on vegetation,
25 wildlife habitats, and special-status wildlife species that would occur with
26 implementation of CP5 could contribute to potentially significant effects of
27 climate change on habitat acreages and distribution. However, with
28 implementation of the mitigation measures listed above to reduce project-
29 related impacts of CP5, CP5 would not make a cumulatively considerable
30 incremental contribution to a significant cumulative effect.

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