

Chapter 13

Wildlife Resources

13.1 Affected Environment

This section describes the affected environment related to wildlife resources, including special-status species, for the dam and reservoir modifications proposed under SLWRI action alternatives. For a more in-depth description, see the *Wildlife Resources Technical Report*.

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

The wildlife resources setting for the Shasta Lake and vicinity portion of the primary study area consists of the impoundment area (five arms and the main body of Shasta Lake) and the relocation areas (Figure 13-1). The Shasta Lake and vicinity portion of the primary study area is composed of Shasta Dam and Shasta Lake and the lower reaches of the tributaries draining into Shasta Lake.

Reclamation established project boundaries for focused surveys in the area that would be subject to inundation under various enlargement scenarios. The lower boundary corresponds to the current full-pool elevation defined by Reclamation (1,070-foot mean sea level (msl) contour line). The upper boundary was established using the 1,090-foot msl contour line around the entire lake. This area is hereafter referred to as the “impoundment area” (Figure 13-1).

To examine the physical and biological resources along riverine habitats that would be subject to inundation if Shasta Dam were enlarged, reaches of 11 streams and rivers that are tributary to Shasta Lake were also incorporated into the Shasta Lake and vicinity portion of the primary study area. These streams were selected by Reclamation in conjunction with USFS as an initial sampling of streams representative of riverine and riparian habitats.

Areas subject to physical disturbance as an indirect result of the proposed project (i.e., areas proposed as relocation sites for roadways, bridges, utilities, and campgrounds that would be inundated subsequent to the enlargement of Shasta Dam as well as proposed dike locations) were incorporated into the

1 Shasta Lake and vicinity portion of the primary study area. These locations are
2 hereafter referred to as “relocation areas” (Figure 13-1).

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

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

- 9 • Shasta Lake Water Resources Investigation Mission Statement
10 Milestone Report (Reclamation 2003)
- 11 • Shasta Lake Water Resources Investigation Initial Alternatives
12 Information Report (Reclamation 2004)
- 13 • Chapter 3, “Biological Environment,” in the Draft Shasta Lake Water
14 Resources Investigation Plan Formulation Report (Reclamation 2007)
- 15 • USFWS Endangered Species Database (USFWS 2011)
- 16 • The California Natural Diversity Database (CNDDDB) (2012)
- 17 • Numerous technical studies of wildlife resources conducted in the
18 Shasta Lake and vicinity portion of the primary study area since 2002.

19 Several attachments to the *Wildlife Resources Technical Report* provide detailed
20 lists and descriptions of special-status wildlife species present in the primary
21 and extended study areas:

- 22 • Attachment 1, “Special-Status Wildlife Species Potentially Occurring
23 in the Shasta Lake and Vicinity Portion of the Primary Study Area”
- 24 • Attachment 2, “Species Accounts for Special-Status Wildlife in the
25 Shasta Lake and Vicinity Portion of the Primary Study Area”
- 26 • Attachment 3, “Breeding Bird Survey Results – 2007”
- 27 • Attachment 4, “Species Accounts for Special-Status Wildlife in the
28 Primary Study Area Downstream from Shasta Dam”
- 29 • Attachment 5, “State and Federal Lists of Special-Status Wildlife
30 Species in the Vicinity of the Primary Study Area”
- 31 • Attachment 6, “Special-Status Wildlife Species with Potential to Occur
32 in the Primary and Extended Study Areas by Area”
- 33 • Attachment 7, “List of All Sensitive Wildlife Species in the Extended
34 Study Area Reported to the CNDDDB”

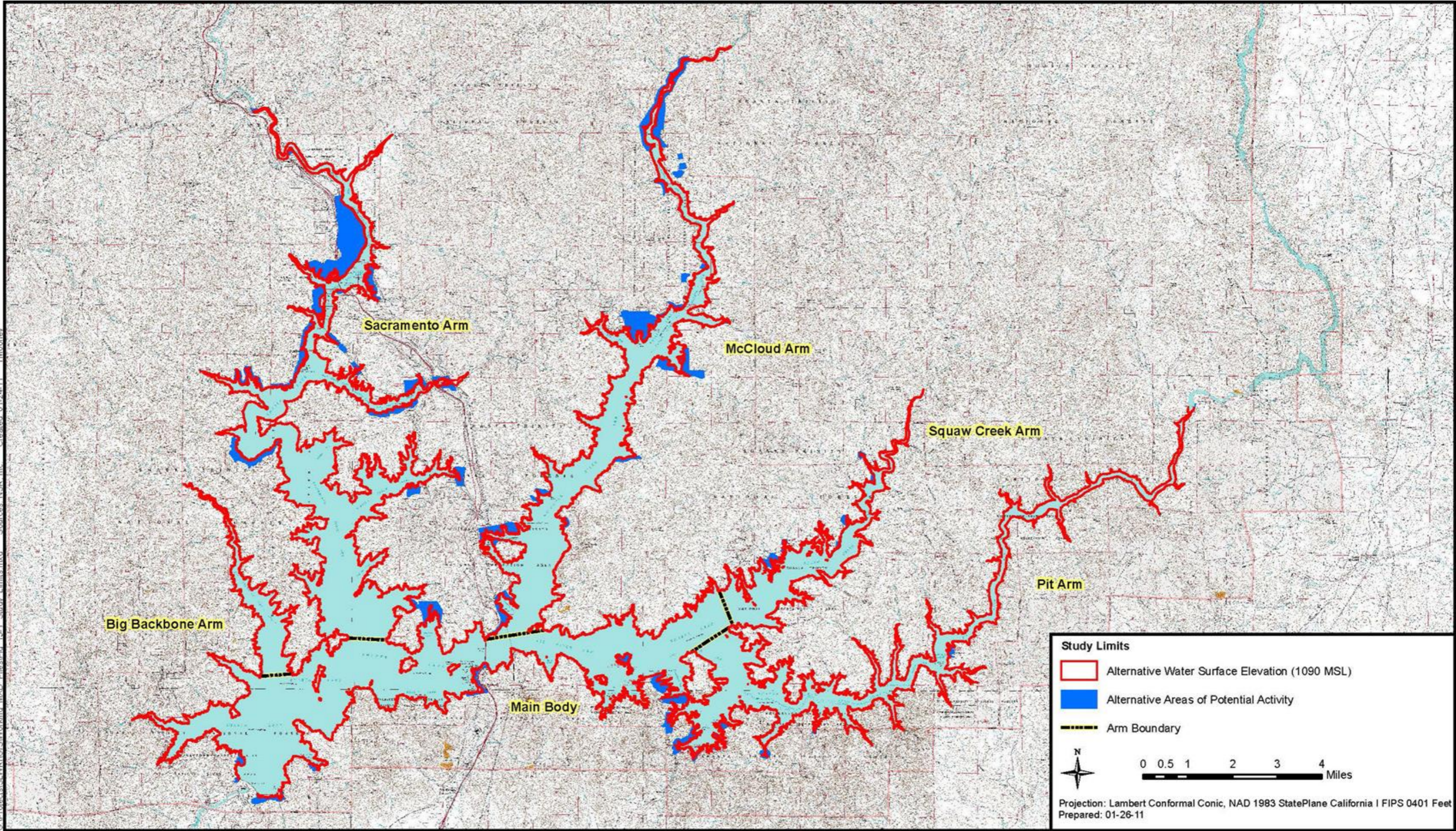


Figure 13-1. Study Limits

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1 **13.1.1 Wildlife**

2 ***Shasta Lake and Vicinity***

3 Wildlife resources described in this chapter result from the wealth and diversity
4 of climatic and vegetative associations in and adjacent to the Shasta Lake and
5 vicinity portion of the primary study area. Influences from the southeastern
6 Klamath Mountains, Coast Ranges, the southern Cascade Range, the northern
7 Sierra Nevada, the Great Basin, and the Central Valley provide for a unique mix
8 of biota. Much of this region, especially in the Central Valley, has been
9 modified by past and present land uses.

10 Prior to Euro-American settlement, the area was dominated by riparian
11 vegetation in the annual floodplains, with stands of valley oak (*Quercus lobata*)
12 and interior live oak (*Q. wislizenii*) on higher ground. Herbaceous wetland
13 bottoms and upland native grassland communities were common in this
14 vegetation mosaic. The extensive oak forests and riparian/wetland habitats
15 hosted a diverse and abundant wildlife community. Cattle grazing, deforestation
16 of the oak woodlands, water development, flood protection, and expansion of
17 agriculture onto the floodplains in the early to mid-1800s substantially altered
18 the historical floodplain and channel vegetation.

19 Rural development, fire suppression, recreation, and wildfires have affected the
20 population and distribution of wildlife in this area. Fire suppression, which has
21 generally increased understory vegetation, has had mixed effects on wildlife.
22 Bear, deer, and birds that prefer near-ground vegetation for food and cover have
23 generally benefited, whereas birds requiring aerial foraging habitat, such as the
24 golden eagle (*Aquila chrysaetos*), American peregrine falcon (*Falco peregrinus*
25 *anatum*), and great horned owl (*Bubo virginianus*), have declined. Species that
26 have adapted or thrived in the altered human environment include coyotes
27 (*Canis latrans*), raccoons (*Procyon lotor*), and various other late-successional
28 species. The quality of potential bat habitat, found primarily in the limestone
29 formations to the north and east of Shasta Lake, has suffered from increased use
30 by recreational rock climbers and spelunkers. Wildlife may also be affected by
31 fragmented travel corridors in certain portions of the area that prevent species
32 from moving between remaining suitable habitats.

33 **Wildlife Habitats** The Shasta Lake and vicinity portion of the primary study
34 area is characterized by a variety of habitats typical of mixed woodlands and
35 low-elevation forests found in the southeastern Klamath Mountains. These
36 habitats were mapped and classified using the *Guide to Wildlife Habitats of*
37 *California* (Mayer and Laudenslayer 1988). Habitats present in the Shasta Lake
38 and vicinity portion of the primary study area are summarized in Tables 13-1
39 and 13-2, and depicted in Figures 13-2a through 13-2f. General habitat
40 descriptions, including typically occurring wildlife species, are described below.
41 Plant taxonomy follows Baldwin et al. (2012).

1 **Table 13-1. Summary of Wildlife Habitats in the Impoundment Area**

Habitat	Area (acres ¹)					
	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:

¹ Acreage values are approximate.

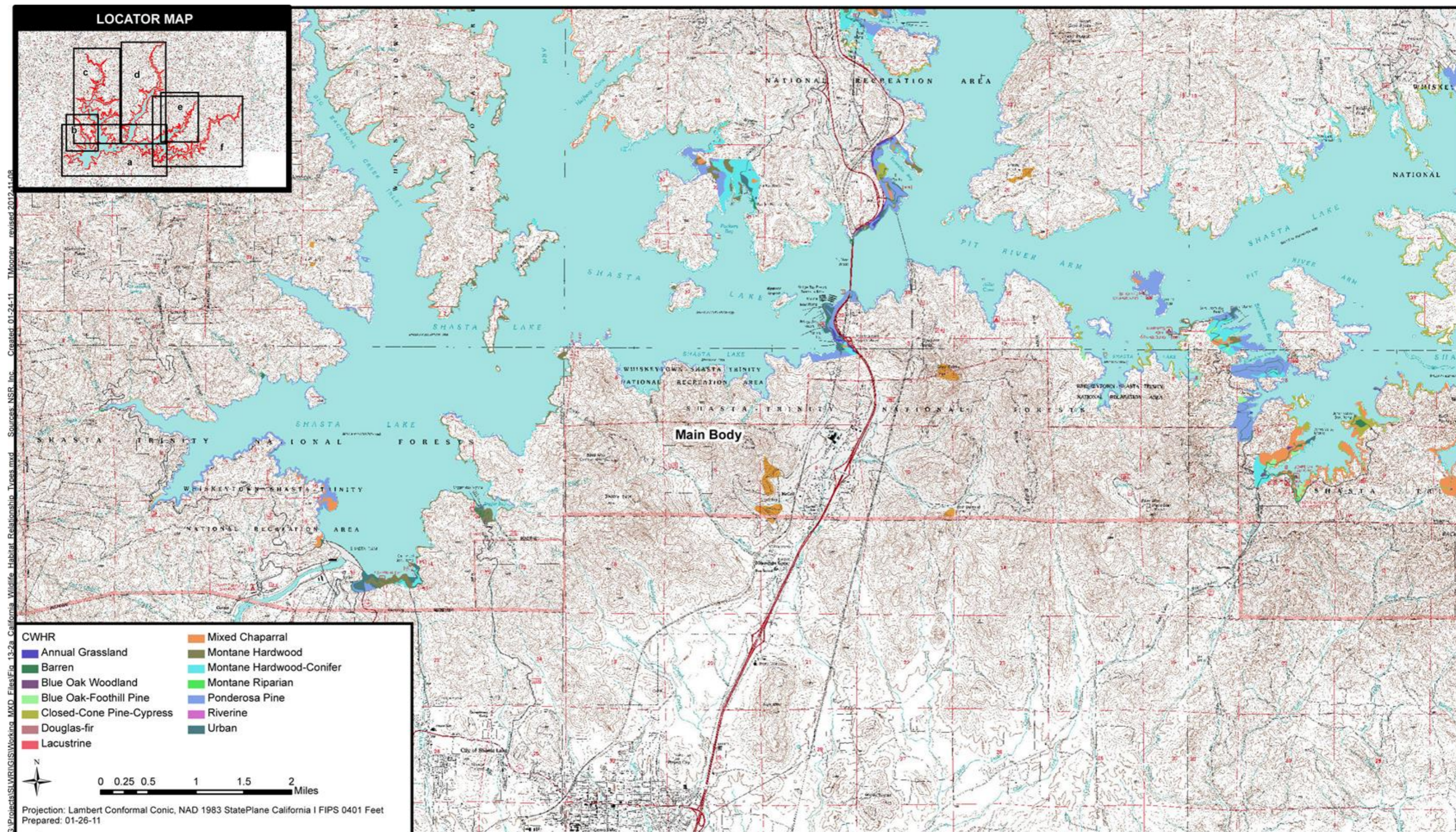
2 **Table 13-2. Summary of Wildlife Habitats in the Relocation Areas**

Habitat	Area (acres ¹)					
	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	1,395.07	1,036.68	110.61	219.03

Note:

¹ Acreage values are approximate.

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Figure 13-2a. California Wildlife Habitat Relationship Types

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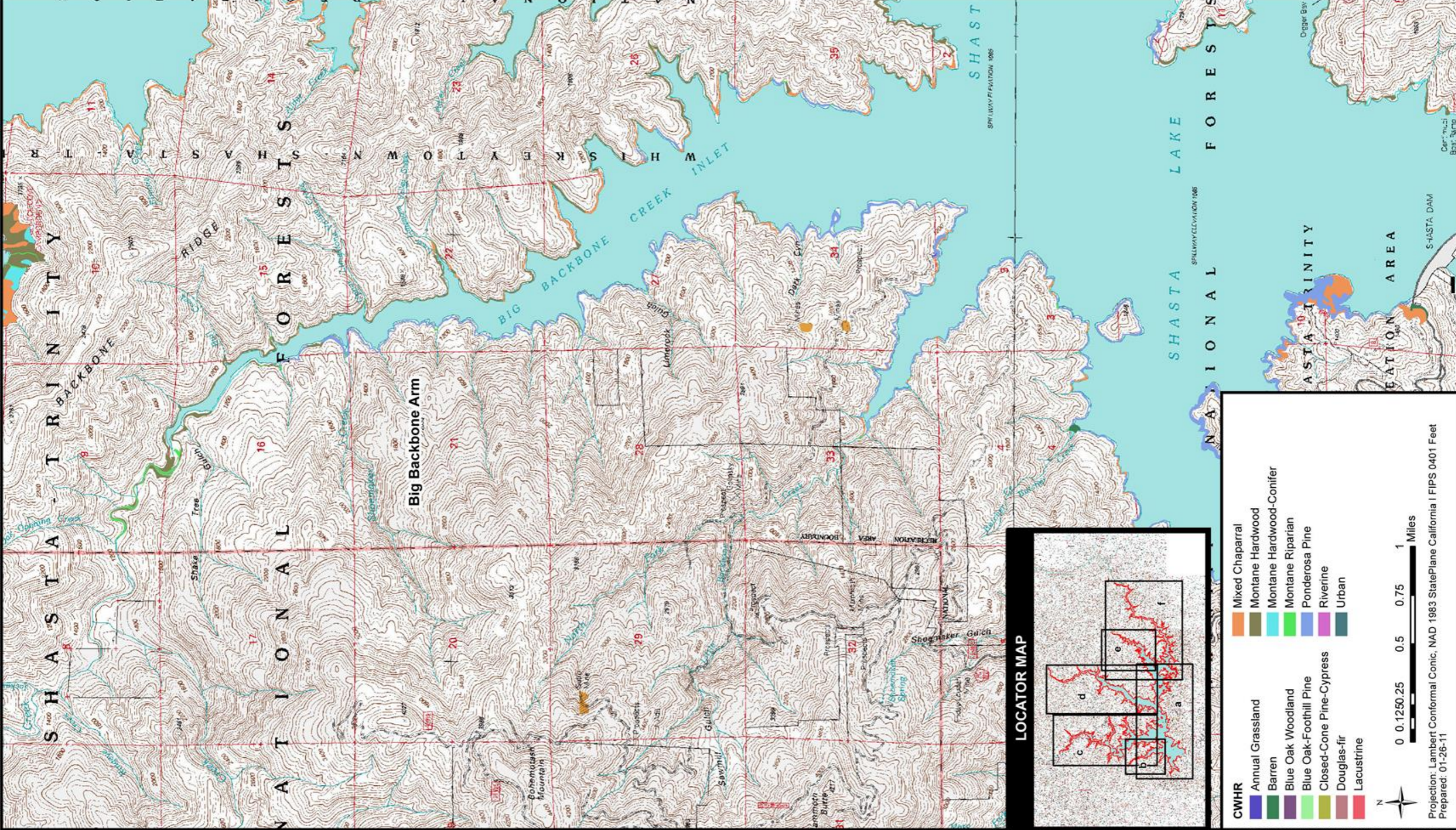
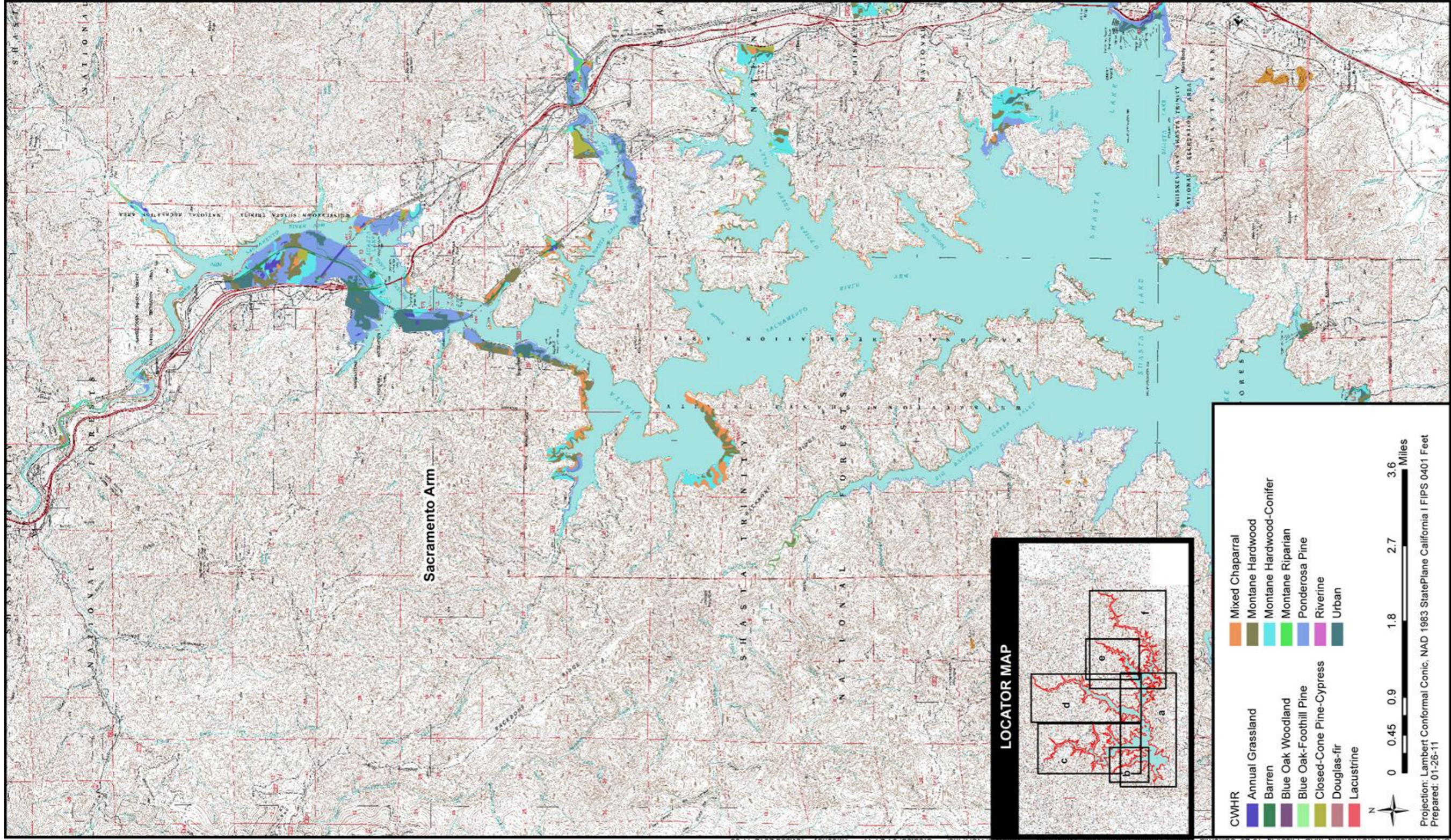


Figure 13-2b. California Wildlife Habitat Relationship Types

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Figure 13-2c. California Wildlife Habitat Relationship Types

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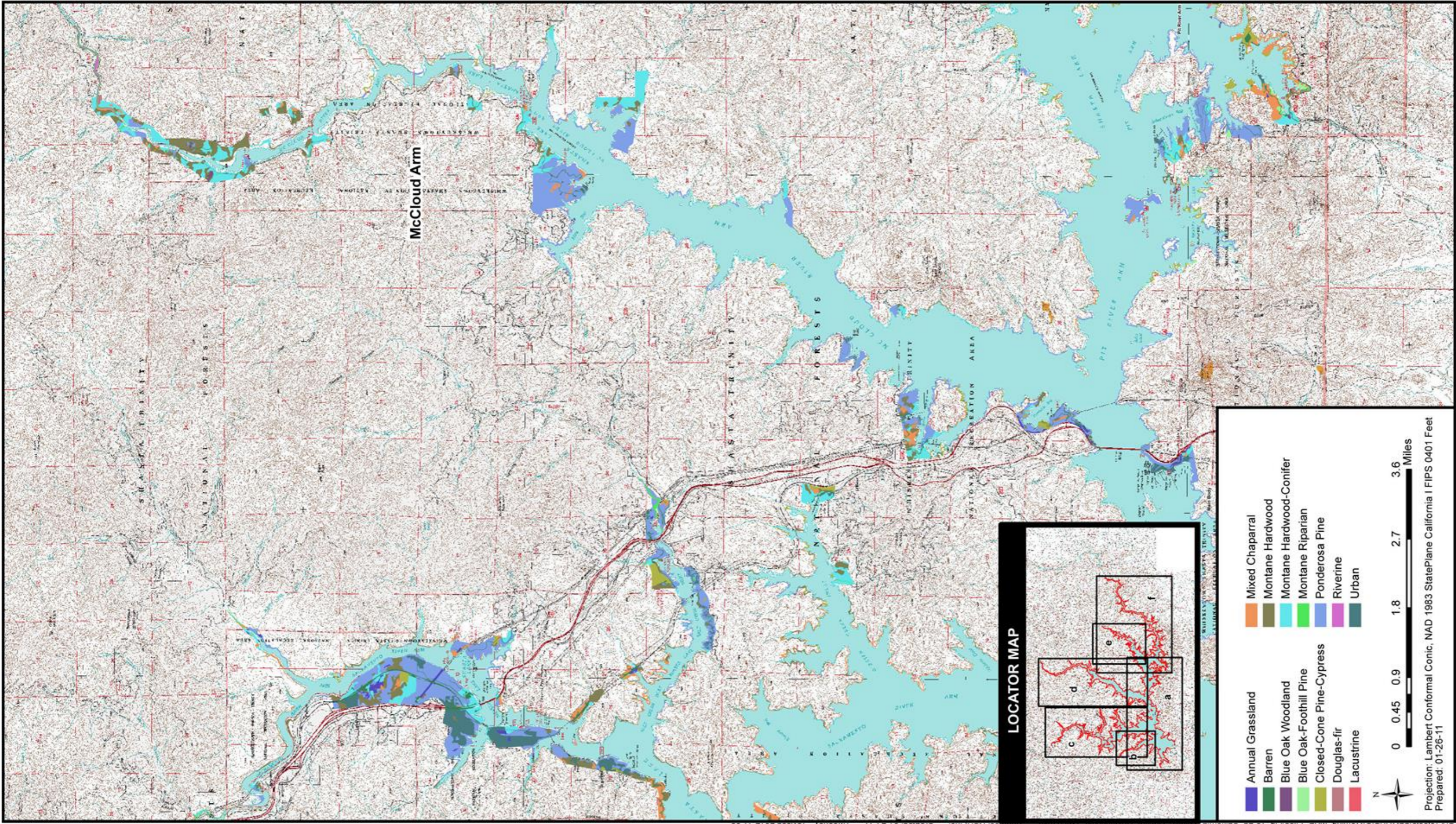


Figure 13-2d. California Wildlife Habitat Relationship Types

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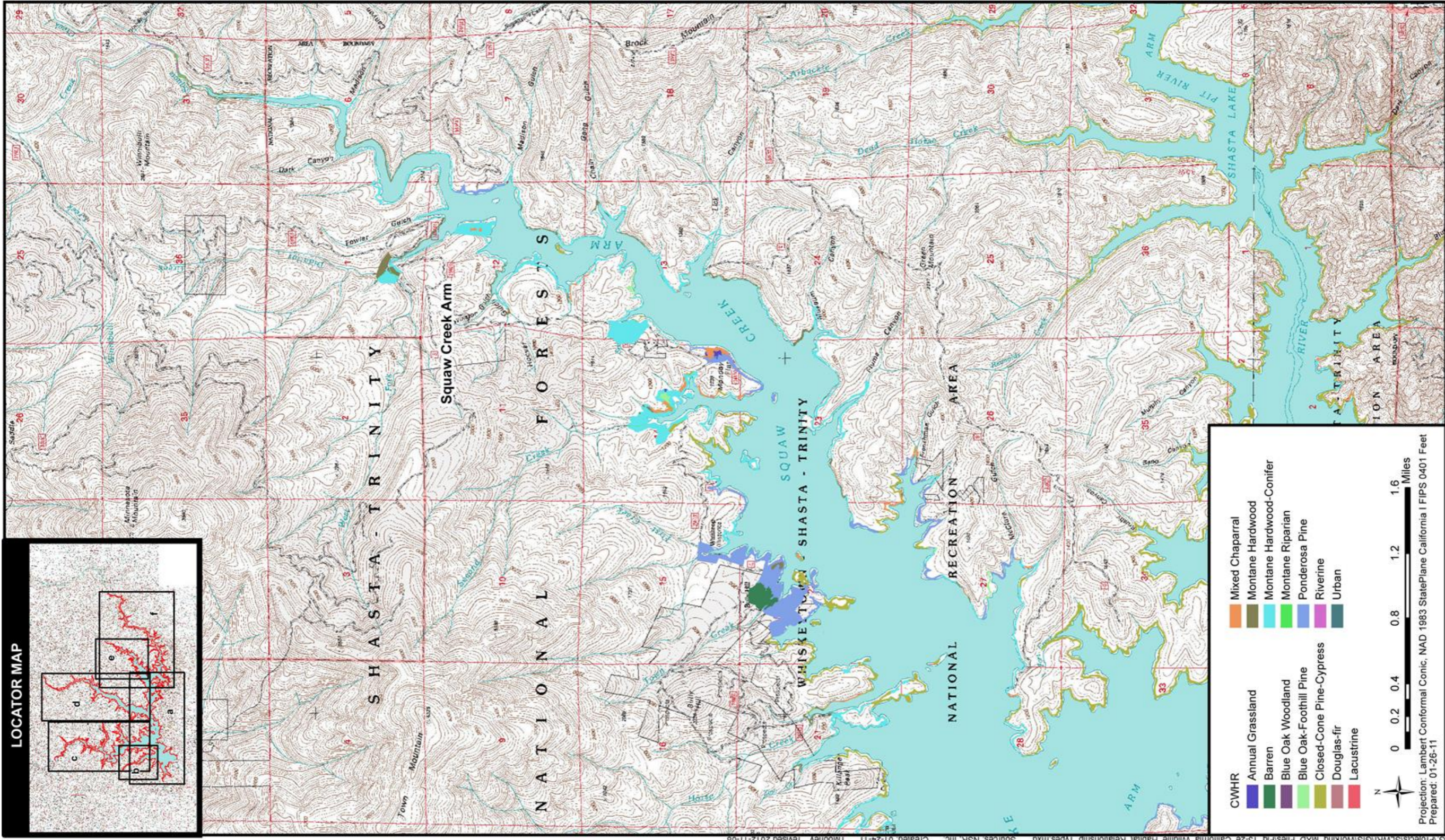


Figure 13-2e. California Wildlife Habitat Relationship Types

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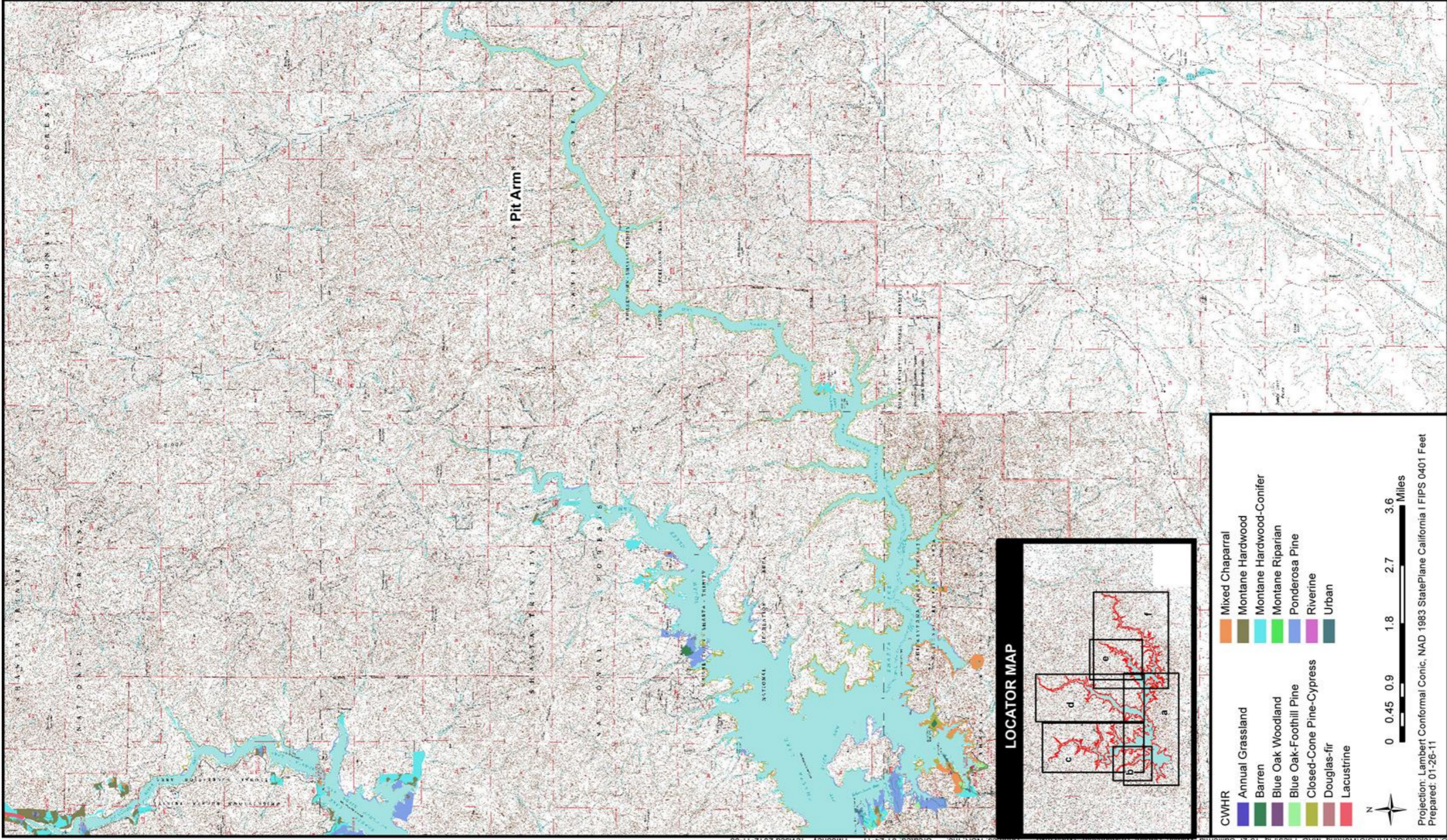


Figure 13-2f. California Wildlife Habitat Relationship Types

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1 **Annual Grassland** Annual grassland is uncommon in the Shasta Lake and
2 vicinity portion of the primary study area and occurs as small inclusions in other
3 more prevalent plant series types or in areas subjected to previous disturbance.
4 Dominant species include wild oat (*Avena fatua*), cheatgrass (*Bromus*
5 *tectorum*), ripgut (*B. diandrus*), yellow star-thistle (*Centaurea solstitialis*),
6 squirreltail (*Elymus elymoides*), and European hairgrass (*Aira caryophylla*).
7 Grassland bird species, such as the mourning dove (*Zenaida macroura*),
8 savannah sparrow (*Passerculus sandwichensis*), and white-crowned sparrow
9 (*Zonotrichia leucophrys*), as well as rodents, such as the California ground
10 squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*),
11 and deer mouse (*Peromyscus maniculatus*), may forage on the seed crop this
12 community provides. These species, in turn, attract predators, such as the
13 gopher snake (*Pituophis melanoleucus*), American kestrel (*Falco sparverius*),
14 red-tailed hawk (*Buteo jamaicensis*), and coyote. Reptile species expected to
15 inhabit this area include the western fence lizard (*Sceloporus occidentalis*),
16 western skink (*Eumeces skiltonianus*), western rattlesnake (*Crotalus viridis*),
17 and yellow-bellied racer (*Coluber constrictor*).

18 **Barren** Barren habitat consists mainly of human-made features without
19 vegetation scattered throughout the Shasta Lake and vicinity portion of the
20 primary study area, including boat ramps, parking lots, and roads. Other barren
21 habitats include a large gravel plain feature at the confluence of Butcher Creek
22 and Shasta Lake (Main Body) and a sealed riprap feature adjacent to Interstate 5
23 near the upper Sacramento Arm and Shasta Lake confluence. Vegetation is
24 usually not present, although a sparse cover of grasses/forbs or weedy species
25 may be present. Barren habitat has limited value for wildlife; however, many
26 species in adjacent habitats may use these areas occasionally as opportunities
27 arise, such as for feeding. Also, open nesting species, such as killdeer
28 (*Charadrius vociferus*), may use some barren surfaces for nesting.

29 **Blue Oak Woodland** Blue oak woodland occurs mainly as small inclusions
30 within other more prevalent habitats; however, moderate-sized stands also
31 occur. This habitat occurs at scattered locations along the Main Body, McCloud
32 Arm, and Pit Arm. Blue oak woodland is characterized by a moderate overstory
33 of blue oak (*Quercus douglasii*) with a dense herbaceous understory. Oak
34 woodlands produce acorns used as forage by a variety of species, including
35 acorn woodpeckers (*Melanerpes formicivorus*), western scrub-jays
36 (*Aphelocoma californica*), turkey (*Meleagris gallopavo*), western gray squirrels
37 (*Sciurus griseus*), and black-tailed deer (*Odocoileus hemionus columbianus*).
38 Snags and live trees containing cavities provide nesting habitat for species such
39 as the western bluebird (*Sialia mexicana*), tree swallow (*Tachycineta bicolor*),
40 American kestrel, and northern flicker (*Colaptes auratus*), as well as roost sites
41 for bats and denning sites for mammals, such as the raccoon, Virginia opossum
42 (*Didelphis virginiana*), and gray fox (*Urocyon cinereoargenteus*). Raptors,
43 including the red-tailed hawk and great horned owl, also nest in these
44 woodlands. Amphibian and reptile species found here include the Pacific chorus
45 frog (*Pseudacris regilla*), bullfrog (*Rana catesbeiana*), western fence lizard,

1 southern alligator lizard (*Elgaria multicarinata*), western terrestrial garter snake
2 (*Thamnophis elegans*), common garter snake (*Thamnophis sirtalis*), and western
3 rattlesnake.

4 **Blue Oak–Foothill Pine** Blue oak–foothill pine habitat also occurs mainly as
5 small inclusions within other more prevalent habitats in the Shasta Lake and
6 vicinity portion of the primary study area; however, moderate-sized stands also
7 occur. This habitat is found in the Main Body, Squaw Creek Arm, and Pit Arm.
8 Species composition is similar to the blue oak woodland habitat; however, gray
9 pine and a shrub component are more common. Dominant overstory species
10 include blue oak, California black oak (*Quercus kelloggii*), valley oak (*Quercus*
11 *lobata*), interior live oak (*Quercus wislizenii*), and gray pine (*Pinus sabiniana*).
12 Common shrubs observed in this habitat include white leaf manzanita
13 (*Arctostaphylos viscida*), buck brush (*Ceanothus cuneatus*), poison oak
14 (*Toxicodendron diversilobum*), coffee berry (*Frangula californica*), snowdrop
15 bush (*Styrax officinalis*), wild mock orange (*Philadelphus lewisii*), deer brush
16 (*Ceanothus integerrimus*), and California buckeye (*Aesculus californica*).
17 Common grasses and forbs observed in this vegetation habitat include pussy
18 ears (*Calochortus tolmiei*), Pacific hounds tongue (*Cynoglossum grande*),
19 slender wild oat, and soaproot (*Chlorogalum pomeridianum*). Lianas of
20 Dutchman’s pipe (*Aristolochia californica*) and chaparral clematis (*Clematis*
21 *lasiantha*) shroud shrubs and often grow into the tree canopy.

22 The blue oak–foothill pine community provides breeding habitat for a large
23 variety of wildlife species, although no species is completely dependent on it for
24 breeding, feeding, or cover. Many of the species found in blue oak habitat are
25 also found here. Acorns and gray pine seeds are an important resource for many
26 of the species using this habitat, such as the acorn woodpecker, western scrub-
27 jay, and western gray squirrel. The newly emerged leaves of oaks in the spring
28 support an abundance of insects that attract migrating and nesting warblers,
29 vireos, flycatchers, and other insectivorous birds. In addition, the shrubs provide
30 habitat for birds, such as the spotted towhee (*Pipilo maculatus*), California
31 towhee (*Pipilo crissalis*), wrentit (*Chamaea fasciata*), and blue-gray gnatcatcher
32 (*Polioptila caerulea*). Characteristic reptiles and amphibians include western
33 toads (*Bufo boreas*), a wide variety of snakes (common garter snakes, California
34 whipsnakes (*Masticophis lateralis*), gopher snakes, and western rattlesnakes),
35 western skinks, southern alligator lizards, and western fence lizards.

36 **Closed-Cone Pine–Cypress** Closed-cone pine–cypress consists of open to
37 dense knobcone pine (*Pinus contorta*) stands. This habitat is scattered
38 throughout all portions of the Shasta Lake and vicinity portion of the primary
39 study area and often occurs in disturbed areas, including areas subject to
40 wildfires and historic mining activities. Dominant species include knobcone
41 pine, with occasional canyon live oak (*Quercus chrysolepis*), California black
42 oak, ponderosa pine, and gray pine. The shrub layer is moderate to dense and is
43 dominated by white leaf manzanita and poison oak. The ground cover varies
44 and is dominated by various grasses and forbs. Numerous game and nongame

1 species make use of this habitat for feeding and cover. Steller's jays (*Cyanocitta*
2 *stelleri*) and western scrub-jays, downy woodpeckers (*Picoides pubescens*), and
3 western gray squirrels extract seeds from partially opened cones. The great
4 horned owl and red-tailed hawk are among the few species known to use this
5 habitat for breeding.

6 **Douglas-Fir** As a habitat type, Douglas-fir is uncommon in the Shasta Lake
7 and vicinity portion of the primary study area. This habitat type occurs in the
8 upper portion of the McCloud Arm. Douglas-fir is characterized by moderate to
9 dense conifer stands dominated by Douglas-fir (*Pseudotsuga menziesii*), with
10 occasional ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*),
11 incense cedar (*Calocedrus decurrens*), canyon live oak, and California black
12 oak. Associated understory species vary and include Pacific dogwood (*Cornus*
13 *nuttallii*), mock orange (*Philadelphus lewisii*), poison oak, snowdrop bush, and
14 white leaf manzanita. The ground layer ranges from open to moderate and is
15 dominated by various grasses and forbs. The multilayered vegetation in the
16 Douglas-fir community supports a variety of wildlife species. A significant
17 feature of the community is the presence of cavity-bearing trees. Mature,
18 fire-damaged, and wind-damaged forests typically contain snags (dead trees that
19 are still standing), which are a valuable resource for birds and mammals that
20 prefer nest and den sites in cavities, such as the flammulated owl (*Otus*
21 *flammeolus*) and northern pygmy owl (*Glaucidium gnoma*). Snags also support
22 wood-boring insects that provide food for bark-gleaning insectivorous birds,
23 such as the brown creeper (*Certhia americana*). Other birds foraging and/or
24 breeding in this habitat include the sharp-shinned hawk (*Accipiter striatus*),
25 American peregrine falcon, mountain quail, western wood-pewee (*Contopus*
26 *sordidulus*), and western tanager (*Piranga ludoviciana*). Mammals found in this
27 habitat include the long-eared myotis (*Myotis evotis*), western red bat (*Lasiurus*
28 *blossevillii*), northern flying squirrel (*Glaucomys sabrinus*), and bobcat (*Lynx*
29 *rufus*).

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

36 **Mixed Chaparral** Mixed chaparral is a common habitat type and is scattered
37 throughout all portions of the Shasta Lake and vicinity portion of the primary
38 study area. This habitat often occurs on exposed slopes and/or in disturbed
39 areas, including areas subject to wildfires and historic mining activities. Mixed
40 chaparral is typically characterized by dense shrub stands dominated by white
41 leaf manzanita, buck brush, toyon (*Heteromeles arbutifolia*), California
42 buckeye, Brewer's oak (*Quercus garryana* var. *breweri*), California bay
43 (*Umbellularia californica*), interior live oak, Lemmon's ceanothus (*Ceanothus*
44 *lemmonii*), birch-leaf mountain mahogany (*Cercocarpus betuloides*), holly-leaf

1 redberry (*Rhamnus ilicifolia*), yerba santa (*Eriodictyon californicum*), and
2 poison oak. Few herbaceous plants occur in this habitat. Mixed chaparral
3 provides habitat for a wide variety of wildlife species. It provides seeds, fruit,
4 and protection from predators and harsh weather. In addition, it provides
5 singing, roosting, and nesting sites for many species of birds, including the
6 California quail (*Callipepla californica*), wrentit, and Bewick's wren
7 (*Thryomanes bewickii*). Mammals common in this habitat include the black-
8 tailed hare (*Lepus californicus*), gray fox, coyote, and deer mouse. Reptiles that
9 make use of this habitat include the western fence lizard and southern alligator
10 lizard.

11 **Montane Hardwood** Montane hardwood is a common tree habitat type and is
12 scattered throughout all portions of the Shasta Lake and vicinity portion of the
13 primary study area. The montane hardwood stands are typically characterized
14 by moderate to dense stands of California black oak, canyon live oak, and
15 occasional interior live oak. The understory is variable, although often sparse in
16 the evergreen (live oak) stands because of a typically dense overstory canopy.
17 Mast crops provided by montane hardwood forests are an important food
18 resource for many species, including the acorn woodpecker, Steller's jay,
19 mountain quail (*Oreortyx pictus*), western gray squirrel, and black-tailed deer.
20 In addition, cavities in mature trees provide nesting and denning habitat for
21 species such as the northern flicker, western screech owl (*Otus kennicottii*),
22 American kestrel, and Virginia opossum. In moist areas, many amphibians and
23 reptiles are found in the duff layer, including ensatina (salamander) (*Ensatina*
24 *eschscholtzii*) and western skink.

25 **Montane Hardwood–Conifer** Montane hardwood–conifer is a common tree
26 habitat type and is scattered throughout all portions of the Shasta Lake and
27 vicinity portion of the primary study area. Montane hardwood–conifer is a
28 complex forest type generally characterized by a complex of hardwood and
29 conifer tree species. Stand composition varies, depending on numerous physical
30 and geographic factors, and can include California black oak, canyon live oak,
31 interior live oak, Oregon white oak (*Quercus garryana*), gray pine, ponderosa
32 pine, Douglas-fir, sugar pine, and knobcone pine. Understory species are
33 generally moderate to dense and include white leaf manzanita, buck brush,
34 California buckeye, western redbud (*Cercis occidentalis*), California bay,
35 poison oak, birch-leaf mountain mahogany, Brewer's oak, and snowdrop bush.
36 The ground layer varies and is dominated by various grasses and forbs,
37 including pussy ears, soaproot, Pacific hound's tongue, and slender wild oat.

38 The variability of the canopy cover and understory vegetation makes montane
39 hardwood–conifer habitat suitable for numerous species of wildlife. Hollow
40 trees and logs provide denning sites for mammals, such as the coyote and gray
41 fox, and cavities in mature trees are used by cavity-dwelling species, such as the
42 acorn woodpecker, violet-green swallow (*Tachycineta thalassina*), northern
43 flicker, great horned owl, raccoon, and California myotis (*Myotis californicus*).
44 In addition, raptors, such as the red-tailed hawk, construct nests in the upper

1 canopy of mature trees. Moreover, mast crops and conifer seeds are an
2 important food source for many birds and mammals, including the Steller's jay,
3 acorn woodpecker, California quail, black-tailed deer, and western gray
4 squirrel. In moist areas, many amphibians and reptiles, including ensatina and
5 western fence lizards, inhabit the duff layer. Snakes, including the western
6 rattlesnake and sharp-tailed snake (*Contia tenuis*), also are found in this habitat.

7 **Montane Riparian** Montane riparian is the dominant riparian habitat type and
8 is scattered throughout all portions of the Shasta Lake and vicinity portion of
9 the primary study area. Montane riparian habitat occurs as thin stringers and
10 large patches along most stream corridors and is characterized as a sparse
11 overstory of white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus*
12 *fremontii*), or big leaf maple (*Acer macrophyllum*), along with a fairly dense
13 mid-story and herbaceous layer. The mid-story is dominated by red osier
14 dogwood (*Cornus sericea*), arroyo willow (*Salix lasiolepis*), narrow-leaved
15 willow (*S. exigua*), red willow (*S. laevigata*), spicebush (*Calycanthus*
16 *occidentalis*), mock orange, button willow (*Cephalanthus occidentalis*),
17 American dogwood (*Cornus cericea*), California ash (*Fraxinus dipetala*), and
18 mugwort (*Artemisia douglasiana*). Brambles of Himalayan blackberry (*Rubus*
19 *armeniacus*) and California blackberry (*R. ursinus*) often engulf broader,
20 low-gradient riparian areas. Lianas, including California grape and greenbriar
21 (*Smilax californica*), grow into the canopy.

22 Riparian habitats are among the most important wildlife habitats because of
23 their high floristic and structural diversity, high biomass (and therefore high
24 food abundance), and high water availability. In addition to providing breeding,
25 foraging, and roosting habitat for a diverse array of animals, riparian habitats
26 also provide movement corridors for some species, connecting a variety of
27 habitats throughout the region.

28 The leaf litter, fallen tree branches, and logs associated with the riparian
29 community in the study area provide cover for the western toad and Pacific
30 chorus frog. The western fence lizard, western skink, and southern alligator
31 lizard are also expected to occur here. Common species nesting and foraging
32 primarily in the riparian tree canopy include the bushtit (*Psaltriparus minimus*),
33 white-breasted nuthatch (*Sitta carolinensis*), and Nuttall's woodpecker
34 (*Picoides nuttallii*). Other resident species, such as the spotted towhee and song
35 sparrow (*Melospiza melodia*), nest and forage on or very close to the ground,
36 usually in dense vegetation. A variety of mammals also inhabit riparian
37 communities, including the deer mouse, raccoon, Virginia opossum, and several
38 bat species.

39 **Ponderosa Pine** Ponderosa pine is the most common conifer habitat type in
40 the Shasta Lake and vicinity portion of the primary study area and is scattered
41 throughout all portions of the area. This habitat is characterized by open to
42 dense conifer stands dominated by ponderosa pine. Associated species include
43 occasional Douglas-fir, sugar pine, incense cedar, canyon live oak, and

1 California black oak. Associated understory species vary and include redbud,
2 buck brush, mock orange, poison oak, snowdrop bush, and white leaf
3 manzanita. The ground layer ranges from open to moderate and is dominated by
4 various grasses and forbs.

5 Ponderosa pine needles, cones, buds, pollen, twigs, seeds, and associated fungi
6 and insects provide food for many species of birds and mammals, including the
7 mountain quail, western gray squirrel, black-tailed deer, Allen's chipmunk
8 (*Tamias senex*), and black bear (*Ursus americanus*). Mature trees provide
9 nesting habitat for raptors, such as the bald eagle (*Haliaeetus leucocephalus*),
10 osprey (*Pandion haliaetus*), sharp-shinned hawk, and red-tailed hawk, and
11 snags and hollow logs provide shelter for species such as the Virginia opossum,
12 western spotted skunk (*Spilogale gracilis*), and several bat species.

13 **Riverine** Riverine habitat includes the free-flowing portions of the rivers and
14 larger streams tributary to Shasta Lake. The riverine habitat is highly variable
15 and ranges from moderately to well-confined stream reaches with low to steep
16 gradient. Most riverine habitat is dominated by run-and-riffle habitats, with
17 bedrock, boulder, cobble, gravel, and sand substrates. The vegetation in the
18 active stream channel is sparse, with occasional clumps of torrent sedge (*Carex*
19 *nudata*) and Indian rhubarb (*Darmera peltata*).

20 Riverine areas provide habitat for numerous fish, including rainbow trout
21 (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), smallmouth bass
22 (*Micropterus dolomieu*), and riffle sculpin (*Cottus gulosus*). Aquatic wildlife
23 species include the foothill yellow-legged frog (*Rana boylei*), aquatic garter
24 snake (*Thamnophis atratus*), and the aquatic phase of the rough-skinned newt
25 (*Taricha granulosa granulosa*). Birds present include the American dipper
26 (*Cinclus mexicanus*), common merganser (*Mergus merganser*), and belted
27 kingfisher (*Ceryle alcyon*). Many mammals in the surrounding upland habitats
28 use the riverine areas, including raccoon, gray fox, black-tailed deer, and many
29 bat species.

30 **Urban** Urban habitat consists of various human-made features scattered
31 throughout the Shasta Lake and vicinity portion of the primary study area,
32 including resorts and a portion of the visitor center complex at Shasta Dam.
33 These features are typically a combination of buildings, pavement areas with
34 manicured landscaping, and lawns. The wildlife species most often associated
35 with urban areas are those that are most tolerant of periodic human
36 disturbances, including several introduced species, such as European starling
37 (*Sturnus vulgaris*), rock dove (*Columba livia*), and house mouse (*Mus*
38 *musculus*). Native species that are able to use these habitats include the western
39 fence lizard, American robin (*Turdus migratorius*), Brewer's blackbird
40 (*Euphagus cyanocephalus*), northern mockingbird (*Mimus polyglottos*),
41 mourning dove, house finch (*Carpodacus mexicanus*), California ground
42 squirrel, black-tailed hare, and striped skunk (*Mephitis mephitis*). In addition,

1 bats that forage in nearby habitats may make use of small cavities around the
2 eaves of structures.

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

4 Important wildlife habitat is found throughout the upper Sacramento River
5 portion of the primary study area, and large contiguous blocks that contain
6 multiple habitat types have the potential to support the highest wildlife diversity
7 and abundance. Overall, the quantity and variety of wildlife species now
8 inhabiting the area have been reduced since agricultural and residential
9 development permanently removed much of the native and natural habitat. Most
10 affected have been wildlife species associated with riparian habitats, which have
11 declined substantially and been highly altered by land use, water resources
12 development, and land management practices. Wildlife species associated with
13 grassland and oak woodland habitats have also been affected by habitat loss
14 resulting from habitat conversions to residential, commercial, and agricultural
15 uses; cattle grazing; and other compounding factors, such as lack of oak
16 regeneration, spread of Sudden Oak Death Syndrome, and competition from
17 invasive species. The region also supports a variety of nonnative plant and
18 animal species, some of which are detrimental to survival of native species.

19 Habitats present in this portion of the primary study area are riparian woodland,
20 riparian scrub, oak woodland, chaparral, annual grassland, agriculture, and
21 urban. (See the *Wildlife Resources Technical Report* for a description of the
22 plant and wildlife species typical of these habitats.) Riparian habitat has been
23 designated by the California Department of Fish and Wildlife (CDFW) as a
24 sensitive habitat in California because of its limited abundance and high value
25 to wildlife.

26 ***Lower Sacramento River and Delta***

27 The roughly 300 miles of the Sacramento River can be subdivided into distinct
28 reaches. The reaches in the lower Sacramento River and Delta portion of the
29 extended study area are discussed separately below because of differences in
30 morphology, riparian vegetation, and habitat functions.

31 **Sacramento River from Red Bluff Pumping Plant to the Delta** Most habitat
32 types and many of the wildlife species found in the upper Sacramento River
33 portion of the primary study area have the potential to occur in the Central
34 Valley portion of the extended study area, with additional species occurring in
35 upland and foothill areas. The segment of the extended study area between Red
36 Bluff Pumping Plant and the Delta includes a diverse array of wildlife habitats –
37 floodplains, basins, terraces, active and remnant channels, and oxbow sloughs.
38 The variety and availability of habitats along the middle Sacramento River
39 support a wide range of wildlife species: a variety of resident and migratory
40 waterfowl, raptors, and songbirds, plus a variety of mammals, amphibians, and
41 reptiles that inhabit both aquatic and upland habitats.

1 **Sacramento–San Joaquin River Delta** Delta wetlands are considered to be
2 among the most productive wildlife habitats in California. These wetlands
3 consist of permanent saline, brackish, and freshwater marshes; seasonal
4 freshwater wetlands; open water; tidal and nontidal marshes, and emergent
5 wetlands; and seasonally flooded agricultural cropland, such as rice fields
6 (CALFED 2000a). (See the *Wildlife Resources Technical Report* for a
7 discussion of the plant and wildlife species typical of Delta wetlands.)

8 **San Joaquin River Basin to the Delta** Most habitat types and many of the
9 wildlife species described above for the Sacramento River corridor have the
10 potential to occur in the Central Valley portion of the extended study area, with
11 additional species occurring in upland and foothill areas. The current wildlife
12 habitat value of this area is somewhat limited by the predominance of
13 agricultural lands, which support a relatively low diversity of wildlife species.
14 However, the orchards, row and field crops, and fallow fields can be used by a
15 number of common species, and fallow fields and some crops (e.g., wheat and
16 barley) can support a variety of small mammals and provide high-quality
17 foraging habitat for many species of raptors. More importantly, remnant native
18 vegetation patches are likely to support a high diversity of wildlife species.

19 **CVP/SWP Service Areas**

20 The CVP and SWP service areas contain a large diversity of both lowland and
21 upland habitats and species, although agricultural and urban growth has reduced
22 the area and connectivity of important habitats that are critical to sustaining a
23 wide variety of unique plants and animals (CALFED 2000a). The agricultural
24 land and urban development that dominate the CVP and SWP service areas,
25 respectively, can support many wildlife species, most of which are highly
26 adapted to these disturbed environments.

27 **13.1.2 Special-Status Species**

28 Special-status species addressed in this section include animals that are legally
29 protected or are otherwise considered sensitive by Federal, State, or local
30 resource conservation agencies and organizations. Specifically, these include
31 species that are Federally listed and/or State-listed as rare, threatened, or
32 endangered; those considered as candidates or proposed for listing as threatened
33 or endangered; species identified by CDFW as fully protected or species of
34 special concern; species identified by USFS as sensitive, or endemic; species
35 identified by the U.S. Bureau of Land Management (BLM) as sensitive; species
36 designated by the *Northwest Forest Plan* as survey and manage; other animals
37 protected by the California Fish and Game Code; and those designated as Multi-
38 Species Conservation Strategy (MSCS) covered species by the CALFED Bay-
39 Delta Program (CALFED).

40 **Shasta Lake and Vicinity**

41 For the purposes of this evaluation, wildlife species of concern include species
42 that are any of the following:

- 1 • Designated as threatened or endangered by the State or Federal
2 government
- 3 • Proposed or petitioned for Federal listing as threatened or endangered
- 4 • State or Federal candidates for listing as threatened or endangered
- 5 • Identified by CDFW as a species of special concern
- 6 • Considered sensitive or endemic by USFS
- 7 • Considered sensitive by BLM
- 8 • Considered survey and manage species by Northwest Forest Plan
- 9 • Designated as MSCS-covered species by CALFED

10 Special-status wildlife species with the potential to occur in the Shasta Lake and
11 vicinity portion of the primary study area were determined using several
12 database searches; review of USFWS and CDFW special-status species lists for
13 Shasta County; review of the CALFED MSCS list; review of other appropriate
14 literature; discussions with BLM, CDFW, DWR, USFS, and USFWS personnel;
15 and professional experience in the area. All special-status wildlife species
16 potentially occurring in the Shasta Lake and vicinity portion of the primary
17 study area are discussed in Attachment 1 of the *Wildlife Resources Technical*
18 *Report*, which provides a general comparison of habitat requirements for each
19 species and the general habitats in the primary study area above Shasta Dam.
20 For those special-status species for which generally suitable habitat was
21 determined to be present, results from the various vegetation habitat mapping
22 and wildlife surveys conducted in the area by North State Resources, Inc. (NSR)
23 since 2002 were used to determine the likelihood of their presence in the
24 primary study area above Shasta Dam (Table 13-3).

25 The survey and manage species include species listed in the most current survey
26 and manage species list used by the Northwest Forest Plan Survey and Manage
27 Program. This list includes species from the annual review for survey and
28 manage species that was completed in compliance with the 2001 record of
29 decision (ROD) for amendments to the survey and manage, protection buffer,
30 and other mitigation measures standards and guidelines. Compliance with this
31 ROD is conducted by completion of an annual species review and category
32 assignment. The current survey and manage species list is from the December
33 2003 annual status review and includes species included in *Survey and Manage*
34 *Standards and Guidelines and Category Assignment* of the 1994 ROD for the
35 Northwest Forest Plan. For the purposes of this evaluation, survey and manage
36 species of concern include taxa that are designated as Category A and C by the
37 current category assignment. These categories include taxa that require what are
38 known as predisturbance (i.e., preproject) surveys.

1 The CNDDDB was reviewed for records of special-status plant species in or near
2 the Shasta Lake and vicinity portion of the primary study area. The CNDDDB is a
3 database consisting of historical observations of special-status plant species,
4 wildlife species, and natural communities. The CNDDDB is limited to reported
5 sightings and is not a comprehensive list of special-status species that could
6 occur in a particular area.

7 **Table 13-3. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of**
8 **the Primary Study Area**

Common Name	Scientific Name	Status ¹	Potential for Occurrence
Shasta sideband	<i>Monadenia troglodytes troglodytes</i>	FP, USFS S, S&M, MSCS m	Endemic to Shasta County. Potentially occurring in mixed conifer and woodland habitats, especially near limestone. Species occurs in limestone on the McCloud Arm.
Wintu sideband	<i>Monadenia troglodytes wintu</i>	FP, USFS S, S&M	Endemic to Shasta County. Potentially occurring in mixed conifer and woodland habitats, especially near limestone. Known to occur between the Pit and Squaw Creek arms and at Mountain Gate.
Shasta chaparral	<i>Trilobopsis roperi</i>	FP, USFS S, S&M	Endemic to Shasta County. Potentially occurring in mixed conifer and conifer/woodland habitats. Known occurrences in the Shasta Lake and vicinity portion of the study area.
Shasta hesperian	<i>Vespericola shasta</i>	FP, USFS S, S&M	Endemic to the southeastern Klamath Mountains. Potentially occurring in mixed conifer and conifer/woodland habitats (riparian and/or riverine habitats). Known occurrences in the Shasta Lake and vicinity portion of the study area.
Shasta salamander	<i>Hydromantes shastae</i>	CT, USFS S, S&M, MSCS m, BLMS	Only known from the southeastern Klamath Mountains. Potentially occurring in mixed conifer, woodland, and chaparral habitats, especially near limestone. Known occurrences in the Shasta Lake and vicinity portion of the study area.
Tailed frog	<i>Ascaphus truei</i>	CSC	Potentially occurring in stream habitats in the Shasta Lake and vicinity portion of the study area. Known occurrences in the McCloud Arm and the upper Sacramento Arm tributaries outside the study area boundaries (CDFG 2003).
California red-legged frog	<i>Rana draytonii</i>	FT, CSC, MSCS m	Requires aquatic habitat for breeding; also uses a variety of other habitat types, including riparian and upland areas. The Shasta Lake and vicinity portion of the study area is outside the current species range. A USFWS habitat assessment is in preparation to determine habitat suitability.
Foothill yellow-legged frog	<i>Rana boylei</i>	CSC, USFS S, MSCS m, BLMS	Potentially occurring in stream habitats. Known occurrences scattered throughout the Shasta Lake and vicinity portion of the primary study area.

9

1 **Table 13-3. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of**
2 **the Primary Study Area (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Western pond turtle	<i>Actinemys marmorata</i>	CSC, USFS S, MSCS m	Potentially occurring in stream or other wetland habitats. Adjacent upland habitats are potential nesting areas. Known occurrences scattered throughout the Shasta Lake and vicinity portion of the primary study area.
Great blue heron	<i>Ardea herodias</i>	MSCS m	Known to breed in nearshore wooded habitat in the Turntable Bay area of Shasta Lake.
Cooper's hawk	<i>Accipiter cooperi</i>	MSCS m	Potentially occurring in mixed conifer and conifer/woodland habitats.
Northern goshawk	<i>Accipiter gentilis</i>	CSC, USFS S, BLMS	Potentially occurring in mixed conifer habitats. Known to occur in the upper McCloud Arm.
Bald eagle	<i>Haliaeetus leucocephalus</i>	FD, FB, CE, CP, USFS S, MSCS m, BLMS	Occur in riverine and lacustrine habitats. Common at Shasta Lake, and a substantial number of nests occur in the Shasta Lake and vicinity portion of the primary study area and vicinity. Shasta Lake has the highest density of breeding bald eagles in the continental United States.
Osprey	<i>Pandion haliaetus</i>	MSCS m	Occur in riverine and lacustrine habitats. Common at Shasta Lake, and many known nests occur in the Shasta Lake and vicinity portion of the primary study area and vicinity.
American peregrine falcon	<i>Falco peregrinus anatum</i>	FD, CD, CP, MSCS m	Potentially occurring in mixed conifer and conifer/woodland habitats. Nesting sites in the study area unlikely due to lack of suitable eyrie sites; however, potential eyrie sites occur adjacent to the Shasta Lake and vicinity portion of the primary study area. A historical nest site occurs in the cliffs near Shasta Caverns and a "new" nest site is believed to occur in cliffs along the Sacramento Arm of Shasta Lake. Another nest site is located south of Shasta Lake at Gray Rocks, near Mountain Gate.
Long-eared owl	<i>Asio otus</i>	CSC, MSCS m	Potentially occurring in coniferous forest habitats.
Northern spotted owl	<i>Strix occidentalis caurina</i>	FT, MSCS m	Potentially occurring in coniferous forest habitats. The species has been recorded within 0.5 mile of the study area along the Squaw Creek Arm.
Vaux's swift	<i>Chaetura vauxi</i>	CSC	Potentially occurring in coniferous forest and conifer/woodland habitats. Known to occur in the Shasta Lake and vicinity portion of the study area.
Willow flycatcher	<i>Empidonax traillii</i>	CE, USFS S, MSCS r	Uncommon migrant in riparian habitat; unlikely to nest in the Shasta Lake and vicinity portion of the primary study area.

3

1 **Table 13-3. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of**
2 **the Primary Study Area (contd.)**

Common Name	Scientific Name	Status	Potential for Occurrence
Purple martin	<i>Progne subis</i>	CSC	Potentially occurring in conifer, woodland, and riparian habitats. Foraging habitat occurs throughout Shasta Lake and vicinity portion of the primary study area. Nests along the Pit River Arm. Shasta Lake is one of the few known breeding sites in interior northern California.
Yellow warbler	<i>Dendroica petechia brewsteri</i>	CSC, MSCS r	Potentially occurring in riparian habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.
Yellow-breasted chat	<i>Icteria virens</i>	CSC, MSCS m	Potentially occurring in riparian habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.
Pallid bat	<i>Antrozous pallidus</i>	CSC, USFS S, BLMS	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the study area.
Townsend's big-eared bat	<i>Plecotus townsendii</i>	CSC, USFS S	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the study area. Known occurrence from a cave on the Backbone Arm in the Shasta Lake and vicinity portion of the primary study area.
Spotted bat	<i>Euderma maculatum</i>	CSC, BLMS	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the study area. Species has been recorded on Squaw Creek within approximately 6 miles of the Shasta Lake and vicinity portion of the primary study area.
Western red bat	<i>Lasiurus blossevillii</i>	USFS S	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the Shasta Lake and vicinity portion of the primary study area.
Long-eared myotis	<i>Myotis evotis</i>	BLMS	Potentially occurring in a wide variety of forest habitats throughout the study area.
Yuma myotis	<i>Myotis yumanensis</i>	BLMS	Potentially occurring in a wide variety of forest habitats throughout the study area.
Western mastiff bat	<i>Eumops perotis</i>	CSC, MSCS m*, BLMS *californicus subspecies only	Potentially occurring in mixed conifer and conifer/woodland habitat throughout the Shasta Lake and vicinity portion of the primary study area.
Ringtail	<i>Bassariscus astutus</i>	CP, MSCS m	Potentially occurring in mixed conifer and conifer/woodland habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.
American marten	<i>Martes americana</i>	USFS S	Potentially occurring in mixed conifer habitats.
Pacific fisher	<i>Martes pennanti</i>	FC, CSC, USFS S, BLMS	Potentially occurring in mixed conifer and conifer/woodland habitats. Known occurrences in and near the Shasta Lake and vicinity portion of the primary study area.

3

1 **Table 13-3. Wildlife Species of Concern in the Shasta Lake and Vicinity Portion of**
2 **the Primary Study Area (contd.)**

Note:

¹Status Definitions

Key:

BLMS = U.S. Bureau of Land Management sensitive

CD= California delisted

CE = California endangered

CP = California fully protected

CSC = California species of special concern

CT = California (State) listed as threatened

FB = Federal Bald and Golden Eagle Protection Act

FC = Federal candidate for listing

FD = Federally delisted

FP = Federally petitioned for listing

FPD = Proposed for Federal delisting

FT = Federally listed as threatened

m = Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED Bay-Delta Program actions will be fully offset through implementation of actions beneficial to the species.

MSCS = Multi-Species Conservation Strategy covered species

r = Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations in the Multi-Species Conservation Strategy focus area.

USFS M = U.S. Forest Service survey and manage species

USFS S = U.S. Forest Service sensitive

3 The life history of species known or potentially occurring in the Shasta Lake
4 and vicinity portion of the primary study area are described in detail in
5 Attachment 2 of the *Wildlife Resources Technical Report*. Figures 13-3a
6 through 13-3f depict the known locations of special-status wildlife species in
7 the primary study area above Shasta Dam located during various surveys
8 conducted by NSR and recent USFS records. Figures 13-4a through 13-4f
9 depict the known locations of special-status terrestrial mollusks.

10 **Summary of Wildlife Investigations** Because wildlife studies are ongoing,
11 technical memoranda describing methods, results, and conclusions in detail will
12 be provided in the Final EIS.

13 **Terrestrial Mollusk Surveys (Survey and Manage)** Reclamation has
14 conducted three survey efforts for survey and manage terrestrial mollusk species
15 in the Shasta Lake and vicinity portion of the primary study area. These include
16 protocol-level efforts during 2002 to 2003 and 2005 along selected portions of
17 the Shasta Lake shoreline and protocol-level efforts initiated in 2010 at the
18 relocation areas. Additionally, many other terrestrial mollusk locations have
19 been found incidentally during numerous other biological survey tasks
20 throughout the Shasta Lake and vicinity portion of the primary study area. Four
21 survey and manage terrestrial mollusk species have been found to date: Shasta
22 sideband (*Monadenia troglodytes troglodytes*), Wintu sideband (*Monadenia*
23 *troglodytes wintu*), Shasta chaparral (*Trilobopsis roperi*), and Shasta hesperian
24 (*Vespericola shasta*). Collectively, 29, 2, 29, and 74 locations of Shasta
25 sideband, Wintu sideband, Shasta chaparral, and Shasta hesperian, respectively,
26 have been found (Figures 13-4a through 13-4f).

1 **Shasta Salamander Surveys** Reclamation has conducted three survey efforts
2 for Shasta salamander in the Shasta Lake and vicinity portion of the primary
3 study area. These include survey efforts during 2003 and 2006 to 2007 along
4 selected portions of the Shasta Lake shoreline and current efforts initiated in
5 2010 at the relocation areas. Additionally, several other Shasta salamander
6 locations have been found incidentally during other biological survey tasks
7 throughout the Shasta Lake and vicinity portion of the primary study area.
8 Shasta salamanders have been found at 38 locations. These findings and other
9 known locations show that this species occurs in all arms of Shasta Lake in both
10 limestone and nonlimestone habitats (Figures 13-3a through 13-3f).

11 **Bald Eagle/Osprey Surveys** Reclamation mapped all known bald eagle and
12 osprey nests in the Shasta Lake and vicinity portion of the primary study area in
13 2007 and 2010. Additional data, including diameter of nest trees, nest tree
14 height, nest height, proximity to the high-water mark, surrounding vegetation,
15 and shoreline erosion rating, were recorded for the bald eagle nests. Twenty-
16 eight bald eagle nests and 54 osprey nests were located (Figures 13-3a through
17 13-3f). Reclamation is currently working with USFS to update this data set,
18 because several bald eagle nesting pairs are no longer active and/or have moved
19 to new locations.

20 **Neotropical Migrant Bird Surveys** Reclamation conducted a breeding bird
21 survey in the Shasta Lake and vicinity portion of the primary study area in
22 2007. Additionally, focused surveys for purple martins and an analysis of purple
23 martin habitat at Shasta Lake were conducted. These surveys provided
24 information on use of the Shasta Lake and vicinity portion of the primary study
25 area by breeding birds, including breeding neotropical migrant species. Sixty-
26 seven bird species were detected during these surveys, including 38 neotropical
27 migrant species.

28

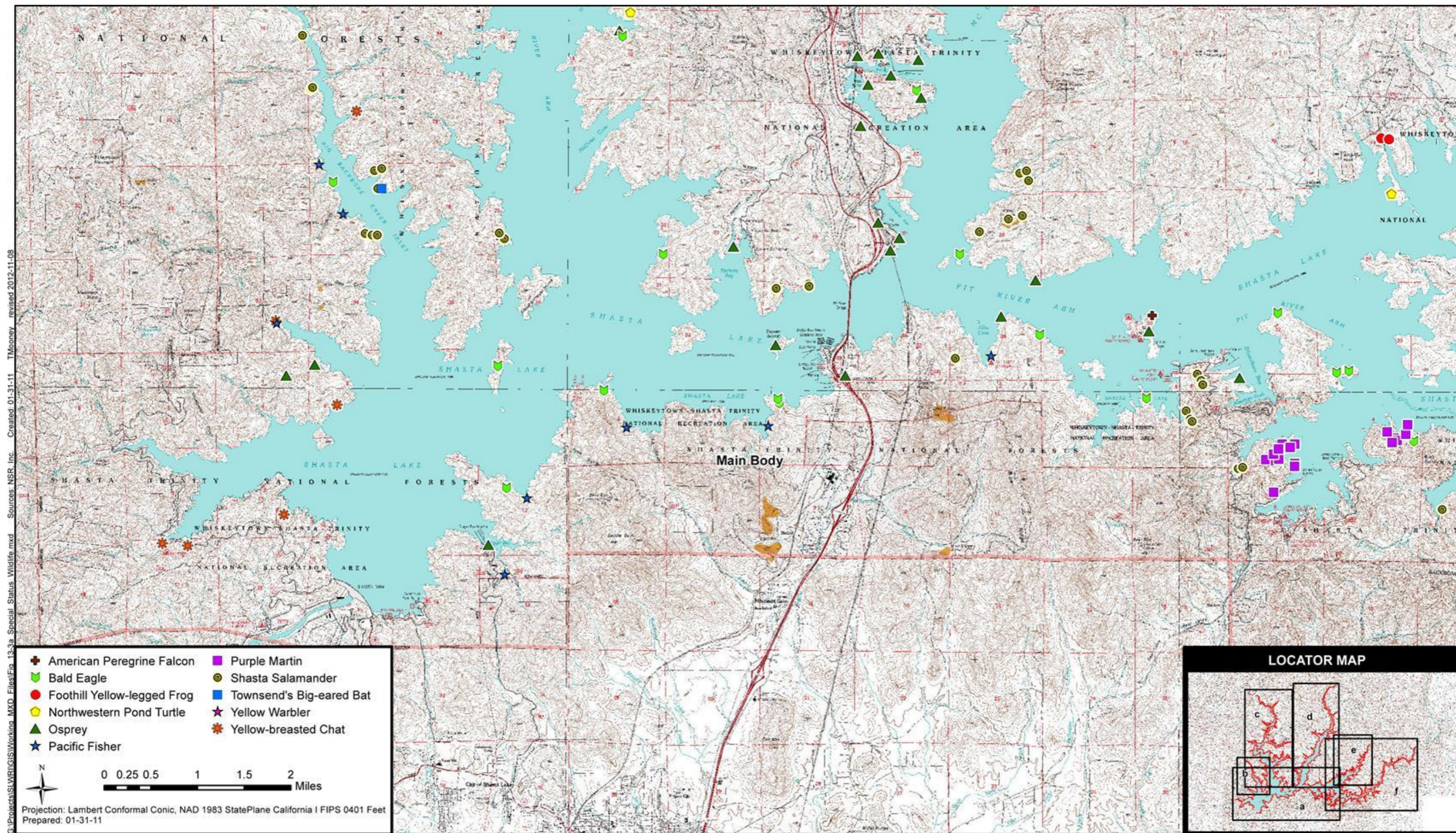


Figure 13-3a. Special-Status Wildlife Occurring in Shasta Lake and Vicinity

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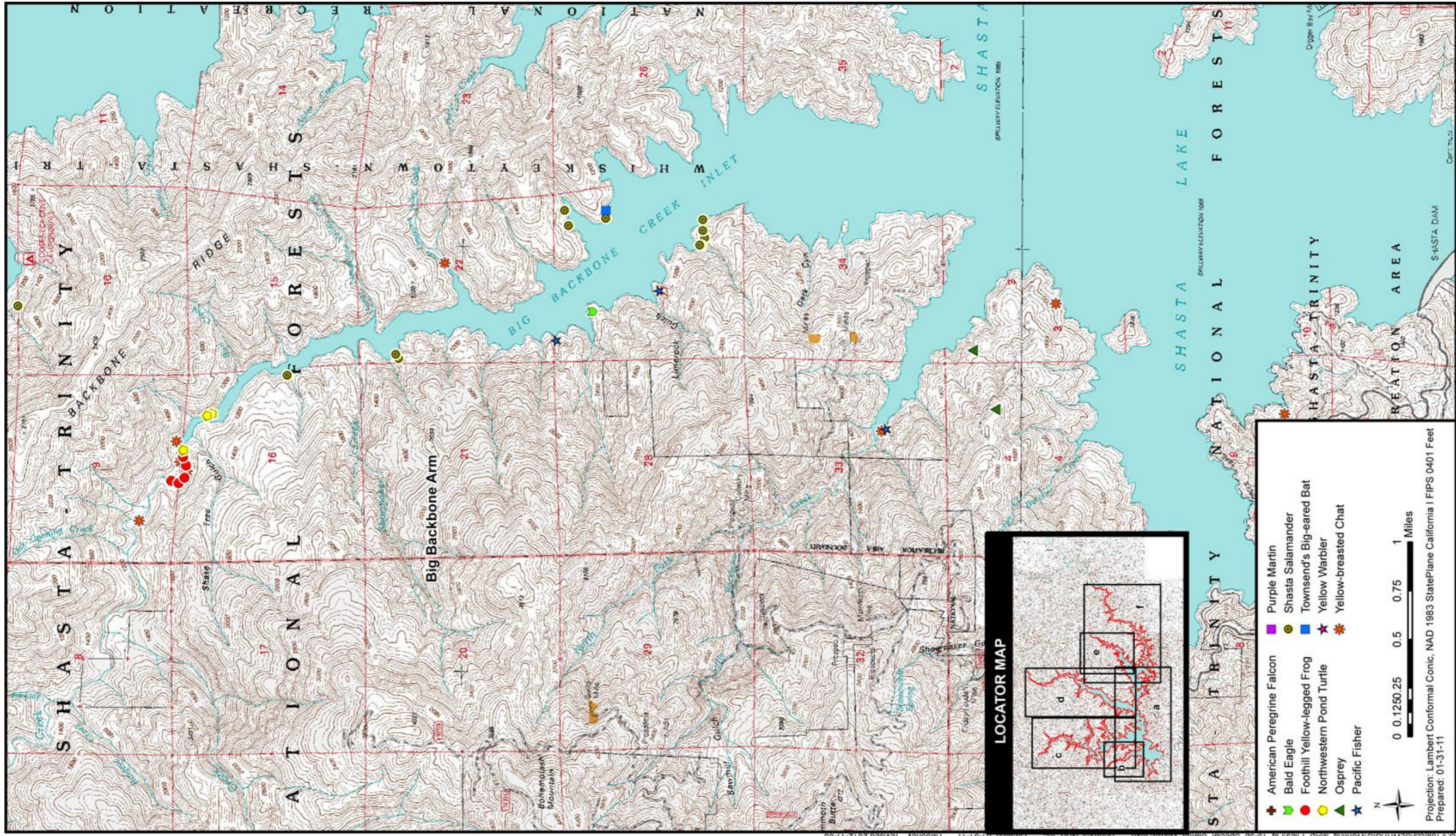


Figure 13-3b. Special-Status Wildlife Occurring in Shasta Lake and Vicinity

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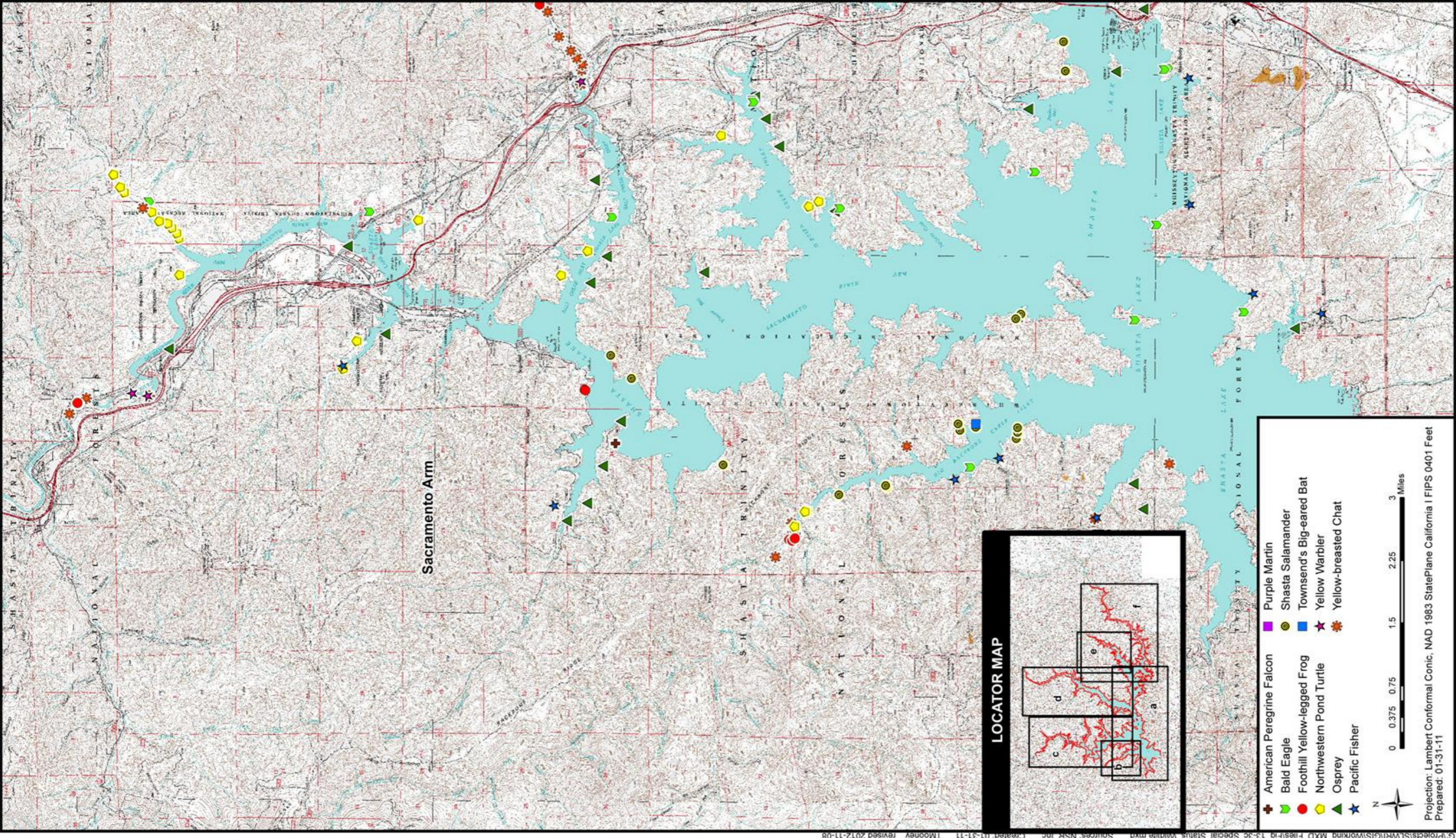


Figure 13-3c. Special-Status Wildlife Occurring in Shasta Lake and Vicinity

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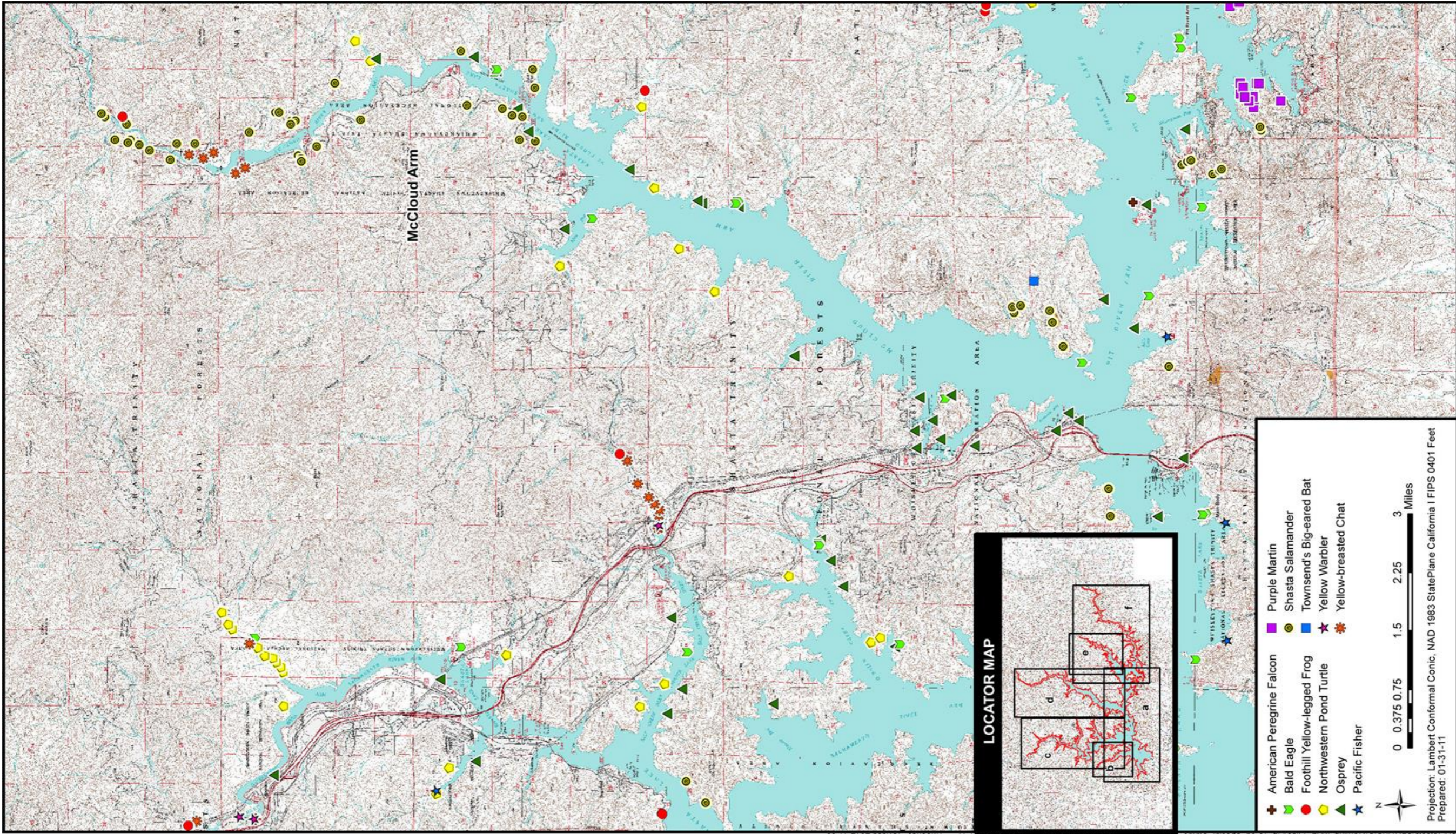


Figure 13-3d. Special-Status Wildlife Occurring in Shasta Lake and Vicinity

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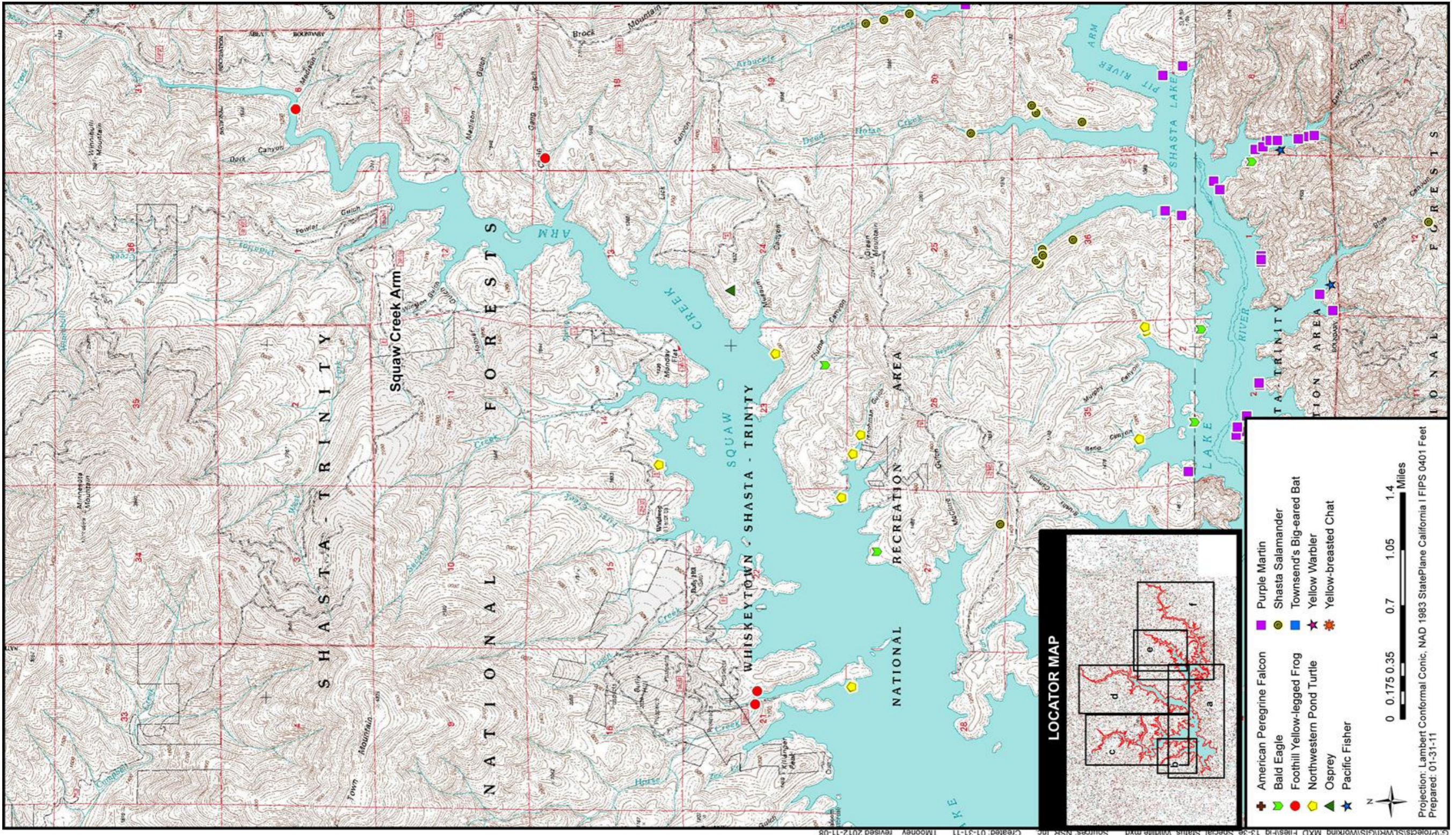


Figure 13-3e. Special-Status Wildlife Occurring in Shasta Lake and Vicinity

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