

Chapter 20

Transportation and Traffic

20.1 Affected Environment

This section describes the existing transportation network in the primary and extended study areas – specifically those roads, highways, bridges, railroads, ports, transit, navigation, and airports that could be affected by the SLWRI action alternatives.

20.1.1 Roadways

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

The primary study area comprises Shasta Dam, Shasta Lake, and the upper Sacramento River between Shasta Dam and the Red Bluff Pumping Plant in Shasta and Tehama counties. The surface transportation network in the primary study area consists of an interstate freeway, State highways, and smaller connector roads. Traffic in the area is generally moderate to light, except that heavy traffic in the Shasta Lake Unit of the Whiskeytown-Shasta-Trinity National Recreation Area is not unusual during weekends and holidays between May 1 and Labor Day (Reclamation 2004).

Figure 1-1 in Chapter 1, “Introduction,” shows the highways in the primary study area. Interstate 5 (I-5) is the main north-south interstate freeway in the region. Several major arterials run north-south, generally parallel to the Sacramento River. State Route (SR) 99 and SR 70 run north-south; certain sections of both of these routes are expressways. SR 273 runs north-south from Redding, generally paralleling the Sacramento River before it intersects with I-5 several miles north of the Shasta/Tehama county line.

Roadways in the vicinity of Shasta Lake are shown in Figure 20-1a (see Section 20.3.1, Methods and Assumptions). Roadways and bridges in the primary study area that could be affected by the SLWRI include Lakeshore Drive, Silverthorn Road, Gillman Road, and Salt Creek Road. These roads are described in more detail below.

Lakeshore Drive is a two-lane paved road that begins in the Lakeshore Area, immediately west of I-5, and continues south to the Sugarloaf Creek. Some segments of Lakeshore Drive are owned and maintained by Shasta County and some segments are owned and maintained by USFS.

1 Silverthorn Road is a two-lane paved road and provides access to the
 2 Silverthorn Area. Silverthorn Road is owned and maintained by Shasta County.

3 Gillman Road is a two-lane paved road that runs along the west side of the
 4 McCloud River Arm portion of Shasta Lake. Gillman Road is owned and
 5 maintained by Shasta County.

6 Salt Creek Road is an unpaved road, ranging from 10 to 12 feet wide and runs
 7 along the west side of the Squaw Creek Arm portion of Shasta Lake. Salt Creek
 8 Road is owned and operated by USFS.

9 Bridges in the primary study area include Antlers Bridge and Pit River Bridge
 10 (also carries Union Pacific Railroad), which are located along I-5; Doney Creek
 11 Bridge and Charlie Creek Bridge, which are located along Lakeshore Drive;
 12 McCloud River Bridge, which is located along Gillman Road; and Didallas
 13 Creek Bridge, which is located along Salt Creek Road. A new Antlers Bridge is
 14 currently under construction and will accommodate raises of Shasta Dam up to
 15 18.5 feet (Caltrans and Federal Highway Administration 2007).

16 Every 3 years, the California Department of Transportation (Caltrans) collects
 17 traffic at the I-5/Turntable Bay Road and I-5/Bridge Bay Road interchanges for
 18 an 8-day period between April and June. Table 20-1 shows the average daily
 19 traffic counts for these interchanges in 2003, 2006, and 2009. These data
 20 provide a general sense of the amount of traffic accessing the Shasta Lake area
 21 from I-5.

22 **Table 20-1. Average Daily Traffic Volume at the I-5/Turntable Bay Road**
 23 **and I-5/Bridge Bay Road Interchanges**

Location	Average Daily Traffic Volumes		
	2003	2006	2009
Turntable Bay Road northbound off-ramp	170	210	150
Turntable Bay Road northbound on-ramp	150	150	180
Turntable Bay Road southbound off-ramp	35	40	65
Turntable Bay Road southbound on-ramp	65	100	70
Bridge Bay Road northbound off-ramp	310	360	210
Bridge Bay Road northbound on-ramp	60	60	40
Bridge Bay Road southbound off-ramp	85	100	65
Bridge Bay Road southbound on-ramp	350	400	220

Source: Caltrans 2011

Key:
 I-5 = Interstate 5

24
 25 SR 299 is the major east-west route. This route traverses Trinity, Shasta,
 26 Lassen, and Modoc counties north of Shasta Dam. SR 44 is another major east-

1 west route farther south that traverses Shasta County near the city of Redding.
2 SR 36, which also runs generally east-west, intersects with SR 99 and I-5, and
3 this route crosses the Sacramento River near the city of Red Bluff.

4 Between Shasta Dam and Keswick Dam, one vehicular bridge spans the
5 Sacramento River. Between Keswick Dam and Red Bluff Pumping Plant along
6 the Sacramento River, 3 pedestrian bridges, 1 railroad bridge, and 14 vehicular
7 bridges (3 of which are for I-5) span the Sacramento River.

8 There are 317 bridges in Shasta County, 220 of which have bridge spans of 20
9 feet or more, making them eligible for Federal aid. Ninety-four bridges are
10 beyond their design lives, functionally obsolete, or structurally deficient (Shasta
11 County RTPA 2010).

12 ***Lower Sacramento River and Delta***

13 SR 45 follows the Sacramento River north from SR 113 in Knights Landing,
14 north of Sacramento. I-5 parallels SR 45 and the Sacramento River to the west.
15 On the west side of the Sacramento Valley, SR 29 runs north-south through
16 Napa and Lake counties. East-west highways include SR 20 in Lake County, SR
17 162 in Glenn County, and SR 36 in Tehama and Trinity counties. Major east-
18 west routes on the east side of the Sacramento Valley include SRs 70, 49, and
19 88; U.S. Highway 50; and Interstate 80.

20 The Delta region is served by several major freeways. I-5 and SR 99 run north-
21 south and Interstate 80 and U.S. Highway 50 run east-west through Sacramento.
22 Other highways extend from the cities of Sacramento and Stockton to small
23 cities and towns in the region. New roadways have facilitated growth and
24 urbanization along their corridors and within the upper watersheds of major
25 inflowing rivers. Local roads in the Delta are often narrow and winding; during
26 peak travel times, traffic in this area often includes slow, oversized farm
27 equipment.

28 The 2 major north-south freeways in the San Joaquin River area are I-5 and SR
29 99, which pass through the San Joaquin Valley from Sacramento through
30 Stockton and continue on to Bakersfield and its vicinity. SR 41 runs in a north-
31 south direction south of Fresno. Several east-west routes traverse the San
32 Joaquin River basin: SR 152 is an expressway that connects Los Banos and
33 Chowchilla in Madera County, SR 180 terminates in Yosemite National Park,
34 SR 168 is a primary east-west route in Fresno County, and SRs 190 and 198 are
35 primary routes in Tulare County.

36 ***CVP/SWP Service Areas***

37 Numerous freeways and expressways serve portions of the CVP and SWP
38 service areas not discussed above. U.S. Highway 101 extends north and south
39 near the coast from San Luis Obispo south to Los Angeles, and I-5 runs north-
40 south through the Central Valley to Los Angeles and on to San Diego. An
41 extensive, intricate freeway system serves the Los Angeles area. I-10 runs east

1 from Los Angeles to Arizona, while I-8 runs east-west from San Diego to
2 Arizona.

3 **20.1.2 Public Transit**

4 Public transit service in the primary study area is provided by the Redding Area
5 Bus Authority (RABA), which provides fixed-route and demand-responsive
6 (paratransit) service. RABA operates 12 fixed routes within the cities of
7 Redding, Shasta Lake, and Anderson. Shasta County contracts with RABA for a
8 rural commuter bus service. This commuter service offers express transportation
9 into Redding from the outlying community of Burney. The RABA
10 demand/response system provides complimentary transportation to disabled
11 residents of the fixed-route service area. The service area is generally within
12 0.75 mile of the fixed routes, complying with the minimum mandates of the
13 Federal Americans with Disabilities Act.

14 Most urban areas in the extended study area provide public transit. These transit
15 systems generally provide both fixed-route and paratransit service. Transit
16 services in the extended study area are not discussed further because they would
17 not be affected by any of the alternatives.

18 **20.1.3 Railroads**

19 ***Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to*** 20 ***Red Bluff)***

21 The Union Pacific Railroad (UPRR) and Western Pacific Railroad both have
22 rail lines serving the vicinity of Shasta Lake and the upper Sacramento River
23 area. The UPRR main line follows the I-5 alignment. Railroad bridges in the
24 area include the Pit River Bridge (which carries both the railroad and I-5), the
25 Sacramento River Second Crossing Railroad Bridge, and the Doney Creek
26 Railroad Bridge. All three railroad bridges were constructed by Reclamation
27 during the original construction period of Shasta Dam. The Engineering
28 Appendix includes additional information on each of these railroad bridges.

29 The Pit River Bridge would require relocation or major modifications for Shasta
30 Dam raises greater than about 18.5 feet. The Plan Formulation Appendix
31 provides additional information on the limitations that the existing Pit River
32 Bridge places on potential dam enlargements. Lower Sacramento River and
33 Delta

34 UPRR is the main rail line serving the Sacramento River region. The UPRR
35 alignment approximates the alignment of I-5. The Western Pacific rail lines
36 extend farther east through the cities of Marysville and Oroville.

37 Rail lines serving the Delta are the UPRR; the Western Pacific Railroad; and the
38 Atchison, Topeka, and Santa Fe Railway.

39 The UPRR and Atchison, Topeka, and Santa Fe lines provide primary rail
40 service connecting the Delta region to the San Joaquin River basin. The

1 alignments of these rail lines generally follow the I-5 alignment through the San
2 Joaquin Valley.

3 ***CVP/SWP Service Areas***

4 The UPRR line runs north-south near the coast, from the San Francisco Bay
5 Area through Los Angeles, then southeast toward the Arizona/Mexico border.

6 **20.1.4 Water Navigation**

7 ***Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to***
8 ***Red Bluff)***

9 The means of water travel and navigation in the primary study area consist of
10 smaller watercraft such as kayaks and canoes, as well as motorboats for fishing,
11 water-skiing, and boating. Shasta Lake is a popular destination for houseboats.
12 A 65-foot-long catamaran provides ferry service to the Shasta Caverns on the
13 east side of the McCloud Arm of Shasta Lake. Water flows and depths in this
14 segment of the Sacramento River limit river navigation to smaller watercraft.
15 Additional information on recreational boating in the primary study area,
16 especially at Shasta Lake, is included in Chapter 18, “Recreation.”

17 ***Lower Sacramento River and Delta***

18 The Port of Sacramento is located in West Sacramento in the southeastern part
19 of Yolo County. Ship access to the port is provided from San Francisco Bay up
20 the Sacramento River and through the Sacramento Deep Water Ship Channel.
21 San Francisco Bay is approximately 80 nautical miles southwest of the Port of
22 Sacramento. This route provides direct and unrestricted passage to the port (City
23 of Sacramento 2005).

24 Two ports are located along the Sacramento River between Sacramento and
25 Walnut Grove. Another commercial port is located on the Sacramento River at
26 Isleton. A commercial port is located near Terminous and two ports are located
27 adjacent to each other on Old and Middle rivers, northeast of Brentwood
28 (CALFED 2000a). The Port of Stockton is on the San Joaquin River. A deep-
29 water ship channel runs from Cache Slough in the Delta to West Sacramento,
30 where the Port of Sacramento is located.

31 There are no commercial ports or shipping routes on the San Joaquin River
32 upstream from the Port of Stockton.

33 ***CVP/SWP Service Areas***

34 The Los Angeles–Long Beach installation on San Pedro Bay is one of the
35 leading ports of California. The growth of Los Angeles led to the creation of its
36 artificial harbors. Other harbors in this area serving commercial shipping are the
37 San Luis Obispo, Santa Barbara, Carpinteria, Port Hueneme, El Segundo, Los
38 Angeles, Long Beach, and San Diego harbors (CALFED 2000b).

1 **20.1.5 Airports**

2 There are four airports in the primary study area: Redding Municipal Airport,
3 Benton Airpark, Shingletown Airport, and Fall River Mills Airport. Redding
4 Municipal Airport, the closest airport to the project site, is located 20 miles
5 southeast of Shasta Dam in Redding. Seaplanes are also permitted to land at
6 Shasta Lake at the Bridge Bay Resort Seaplane Base. More than 120 other
7 airports exist in the extended study area; these airports are not relevant to the
8 environmental analysis and thus are not discussed further.

9 **20.2 Regulatory Framework**

10 **20.2.1 Federal**

11 Several statutes and regulations include provisions specific to the interstate
12 system in California and transportation projects in general. Title 23 of the U.S.
13 Code and the Code of Federal Regulations govern highways; the laws for
14 transportation are included in U.S. Code Title 23 and Code of Federal
15 Regulations Title 49.

16 The following Federal legislative statutes may also apply to surface
17 transportation and transportation aspects of the project:

- 18 • Federal Clean Air Act
- 19 • Federal Transit Act
- 20 • Americans with Disabilities Act
- 21 • Civil Rights Act
- 22 • Safe, Accountable, Flexible, Efficient Transportation Equity Act: A
23 Legacy for Users

24 The Federal Highway Administration issues directives and policy memoranda
25 in the form of technical advisories, orders, and notices for Federally funded
26 roadway and transit projects in California.

27 **20.2.2 State**

28 Caltrans plans, designs, constructs, and maintains State-owned roadways.
29 Caltrans's standard specifications (Caltrans 2006) establish uniform design and
30 construction procedures for California highways and local roads. The highway
31 design criteria and policies in the standard specifications ensure minimum
32 design, contract, and construction standards for projects.

33 The primary study area is in Caltrans District 2, headquartered in Redding.
34 Caltrans's Division of Transportation Planning, System Planning Branch,
35 conducts long-range transportation plans in cooperation with local agencies to

1 identify future highway improvements; the Division of Transportation
2 Programming sets priorities for various Federal and State transportation funding
3 programs.

4 **20.2.3 Regional and Local**

5 The circulation elements in the general plans of California cities and counties
6 are concerned with the movement of people and goods. Section 65302(b) of the
7 California Government Code requires that circulation elements address the
8 general location and extent of existing and proposed major thoroughfares,
9 transportation routes, terminals, and other local public utilities and facilities
10 (Shasta County 2004).

11 Circulation elements establish goals and policies that pertain to transportation-
12 related activities on city- or county-maintained roads. Most general plans
13 contain circulation goals related to levels of service. “Level of service”
14 describes the efficiency of road segments and intersections in terms of traffic
15 delays. Level of service guidelines address long-term planning objectives rather
16 than temporary conditions related to temporary, short-term traffic delays
17 resulting from construction activities.

18 Counties in California classify county-maintained roads according to their
19 intended function and linkage to land uses. Major roads are generally defined as
20 primary carriers of intercity and intracounty travel. Collector roads are intended
21 to provide subregional access and circulation by linking major roads with
22 residential streets.

23 The Shasta County Regional Transportation Planning Agency is the congestion
24 management agency in Shasta County. In 2010, the agency issued the *Regional*
25 *Transportation Plan for Shasta County* in accordance with California
26 Government Code Section 65080 et seq. and 23 U.S. Code 134–135 et seq. The
27 plan discusses regional transportation issues, problems, and solutions and
28 includes goals and objectives for each transportation mode and area of concern.

29 The Tehama County Transportation Commission is the regional transportation
30 planning agency. It develops policies and allocates transportation funds in
31 Tehama County. The commission published the 2006 *Tehama County Regional*
32 *Transportation Plan* and is responsible for updating the plan.

33 Local agencies administer various transportation-related revenues that are sent
34 directly to the agencies. The funds provide for the planning, design, operation,
35 and maintenance of roadways and bridges. The Federal government provides
36 matching funds under local assistance programs established under the Surface
37 Transportation Improvement Program and Highway Bridge Rehabilitation and
38 Replacement Program.

1 20.3 Environmental Consequences and Mitigation Measures

2 This section evaluates the environmental consequences of each project
 3 alternative related to traffic and transportation. The methods of evaluation are
 4 explained and the assumptions used to conduct the evaluation are listed below,
 5 and the criteria used to determine the significance of impacts are described.
 6 Mitigation measures are recommended to avoid or reduce any potentially
 7 significant impacts to less-than-significant levels.

8 20.3.1 Methods and Assumptions

9 Level of service standards are typically used to evaluate long-term (operational)
 10 traffic impacts resulting from residential, employment-generating, industrial,
 11 and institutional development projects. The SLWRI is not a land use
 12 development project. Long-term operation of the project alternatives would not
 13 generate additional residential, employment-related, industrial, or institutional
 14 vehicular trips (other than an increase in trips from additional recreation use);
 15 therefore, this analysis focuses on construction-related traffic effects. Level of
 16 service standards were not used in this analysis because such standards are
 17 typically used to evaluate long-term traffic congestion resulting from operations
 18 under a proposed action.

19 Figures 20-1a through 20-1g below show the locations of transportation
 20 facilities that would be relocated under the project alternatives. Table 20-2 lists
 21 the named roads and bridges that would require relocation and identifies the
 22 map figure that shows each facility. The facilities that would be relocated under
 23 each alternative are described with greater specificity in the associated impact
 24 evaluation that follows.

25 **Table 20-2. Named Road and Bridge Facilities that Would Require**
 26 **Relocation Under the SLWRI**

Roads and Bridges	Map Figure	CP1	CP2	CP3	CP4	CP5
Lakeshore Drive	20-1f	X	X	X	X	X
Doney Creek Bridge	20-1f	X	X	X	X	X
Charlie Creek Bridge	20-1f	X	X	X	X	X
Silverthorn Road	20-1c	X	X	X	X	X
Gillman Road	20-1g		X	X	X	X
McCloud River Bridge	20-1g		X	X	X	X
Salt Creek Road	20-1d		X	X	X	X
Didallas Creek Bridge	20-1d		X	X	X	X

Key:

CP = Comprehensive Plan

SLWRI = Shasta Lake Water Resources Investigation

1 The following project-related assumptions were used in the analysis of
2 construction-related traffic that would result from needed roadway and bridge
3 relocations and the dam raise:

- 4 • The estimated duration of proposed construction activities related to all
5 major features would be 4.5 years for CP1 and 5 years for CP2–CP5.
6 Construction activities would be phased, when feasible; however, some
7 construction activities would occur concurrently.

- 8 • Import of fill and construction materials (aggregate, cobble, sand, and
9 concrete) and export of construction waste related to construction of all
10 major facilities would result in 95–177 truck trips per day for 4.5 to 5
11 years, with a maximum haul route distance of up to 20 miles. Export of
12 vegetation cleared from the primary study area would result in 52–75
13 round trips per day, with a maximum haul route distance of up to 20
14 miles for up to 3.5 years.

- 15 • The estimated construction labor force for CP1–CP5 would be 300–360
16 workers per year, resulting in 300–360 daily round trips for 4.5 to 5
17 years.

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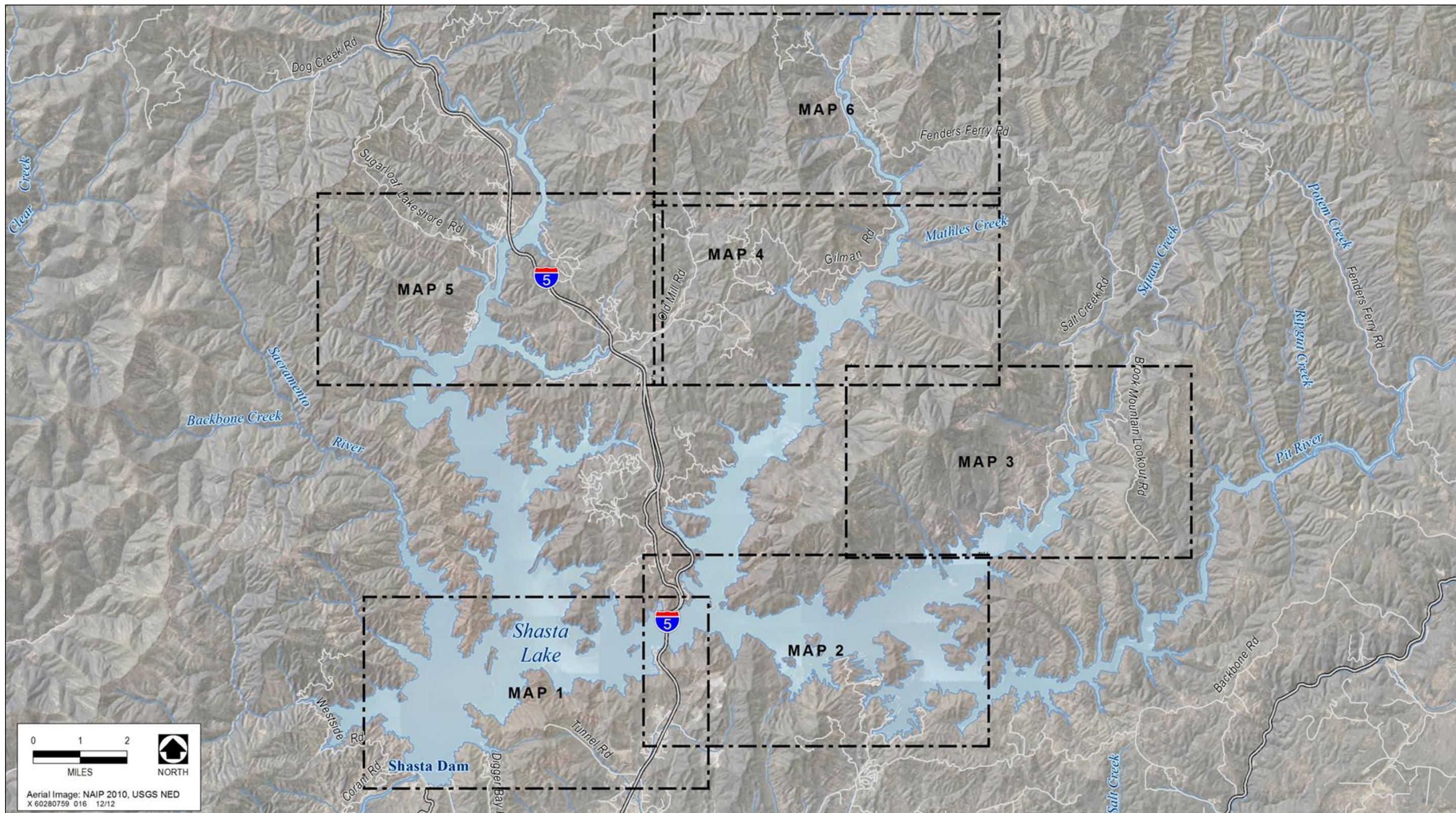


Figure 20-1a. Affected Transportation Facilities – Key to the Sheets

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Figure 20-1b. Affected Transportation Facilities – Map 1

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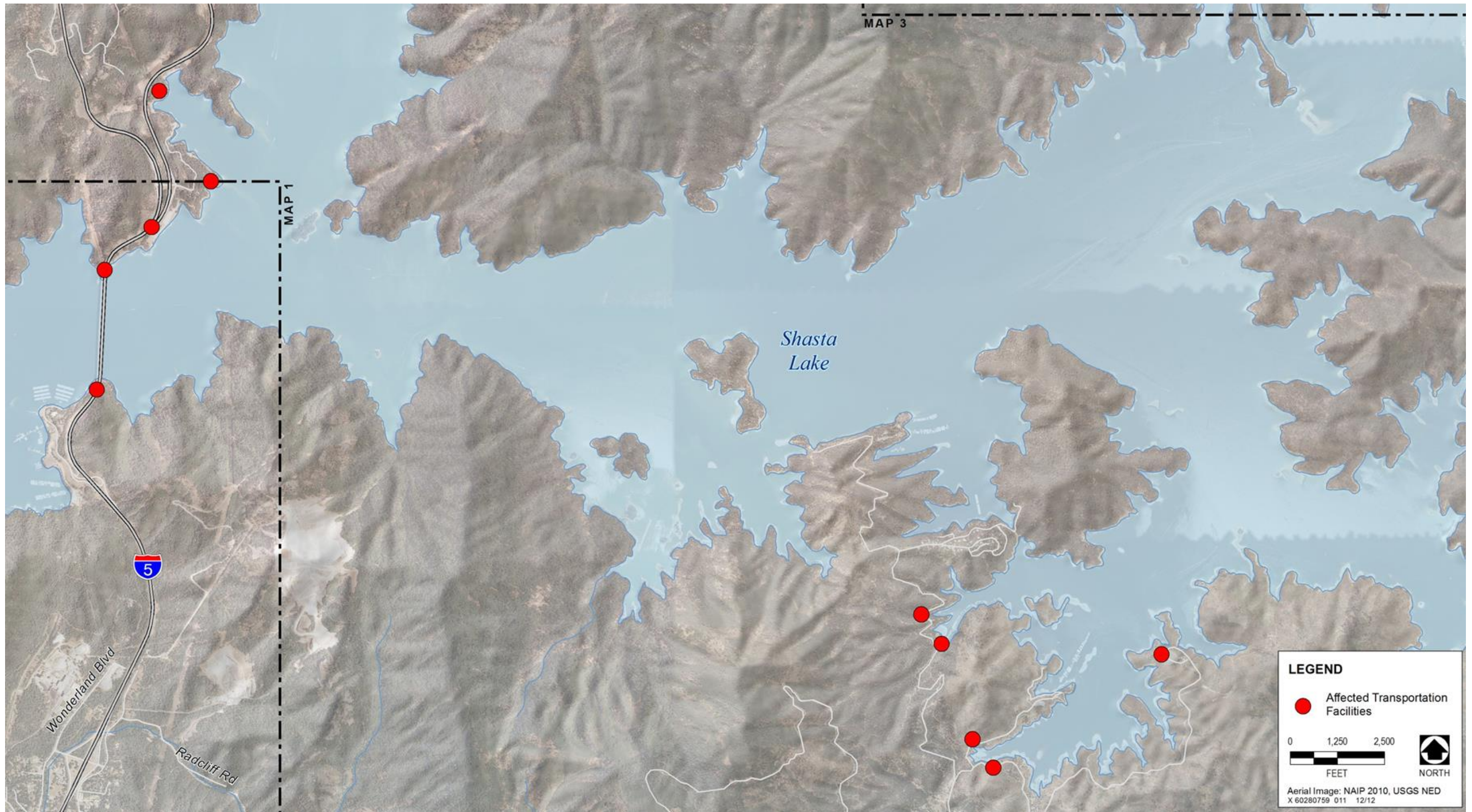


Figure 20-1c. Affected Transportation Facilities – Map 2

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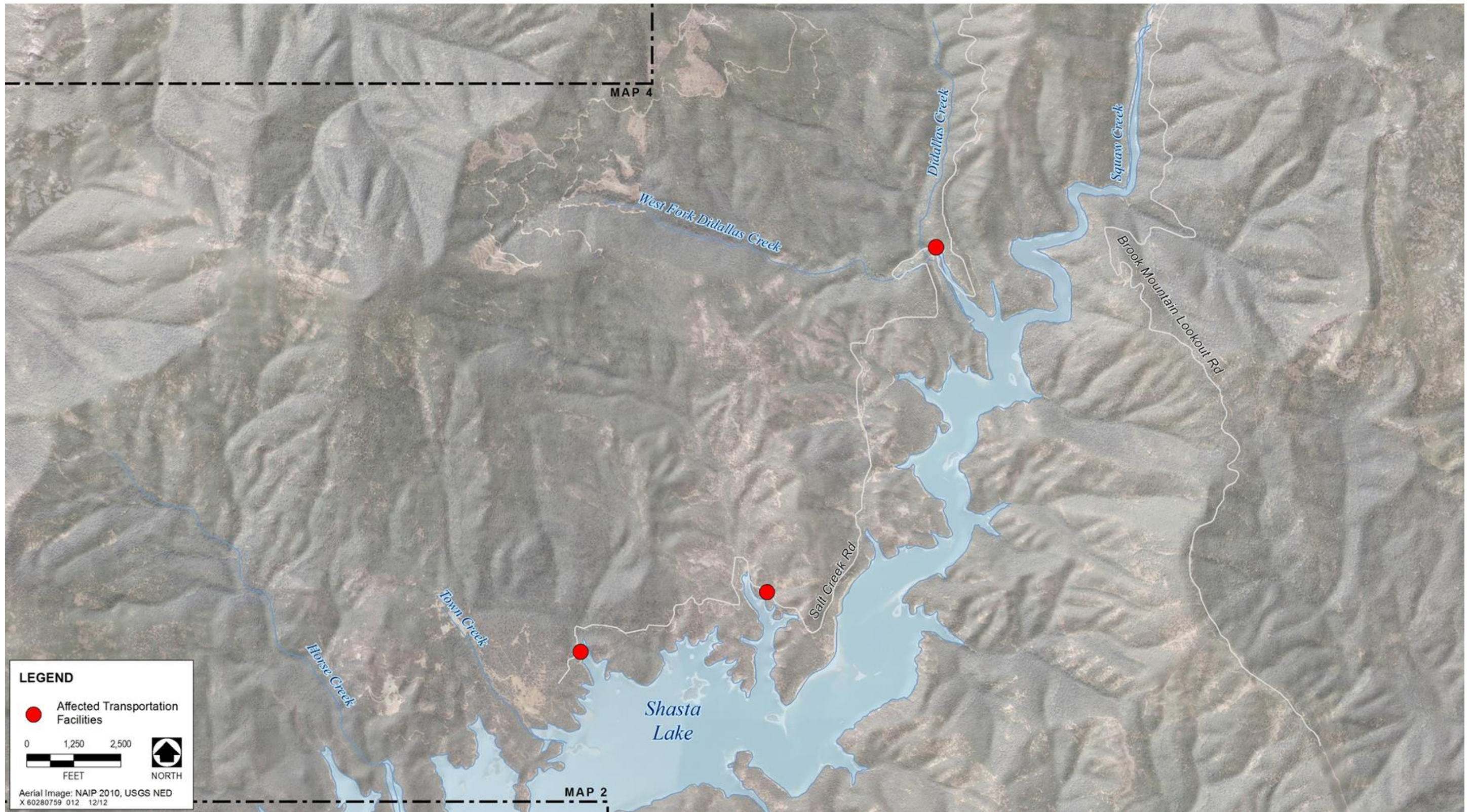


Figure 20-1d. Affected Transportation Facilities – Map 3

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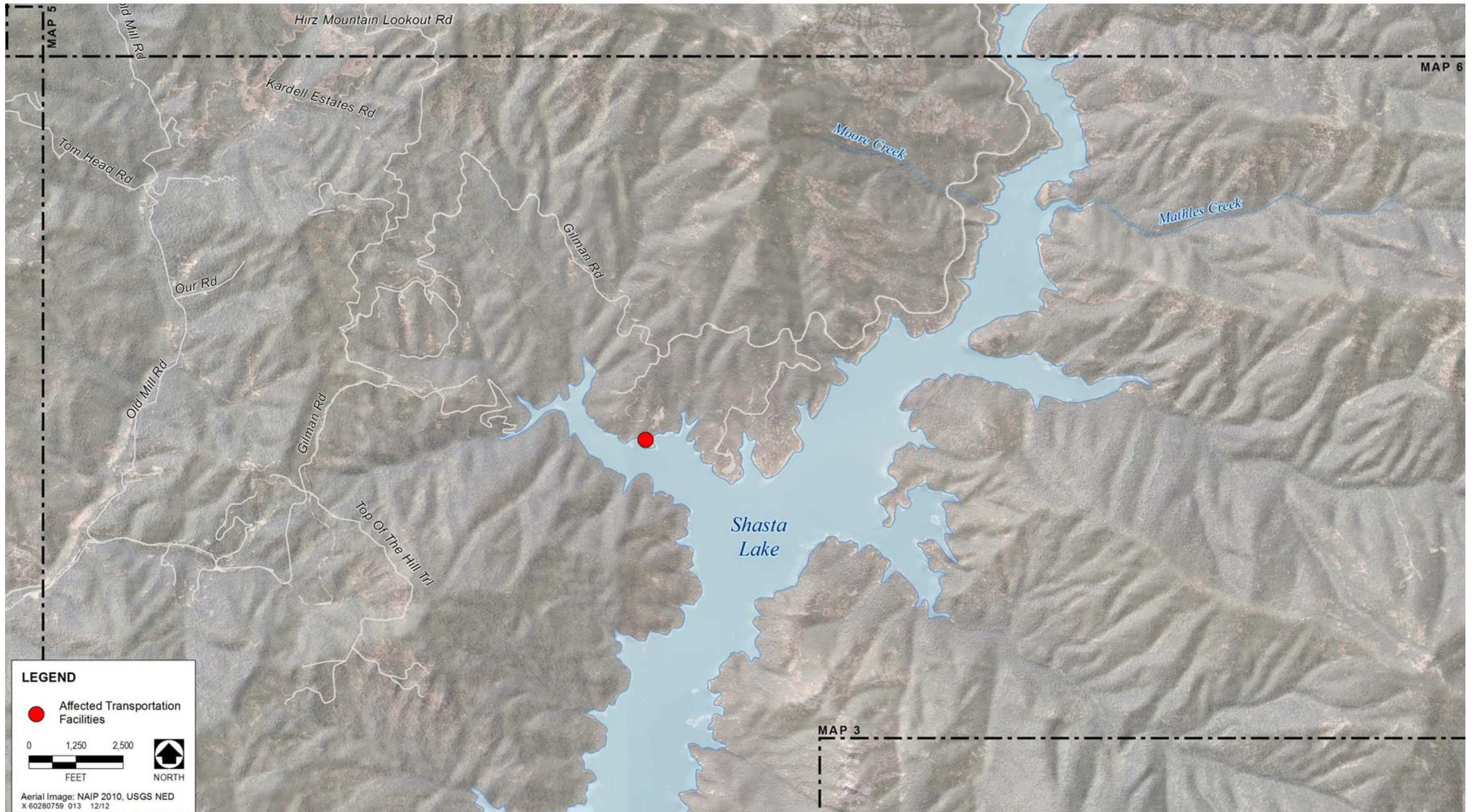


Figure 20-1e. Affected Transportation Facilities – Map 4

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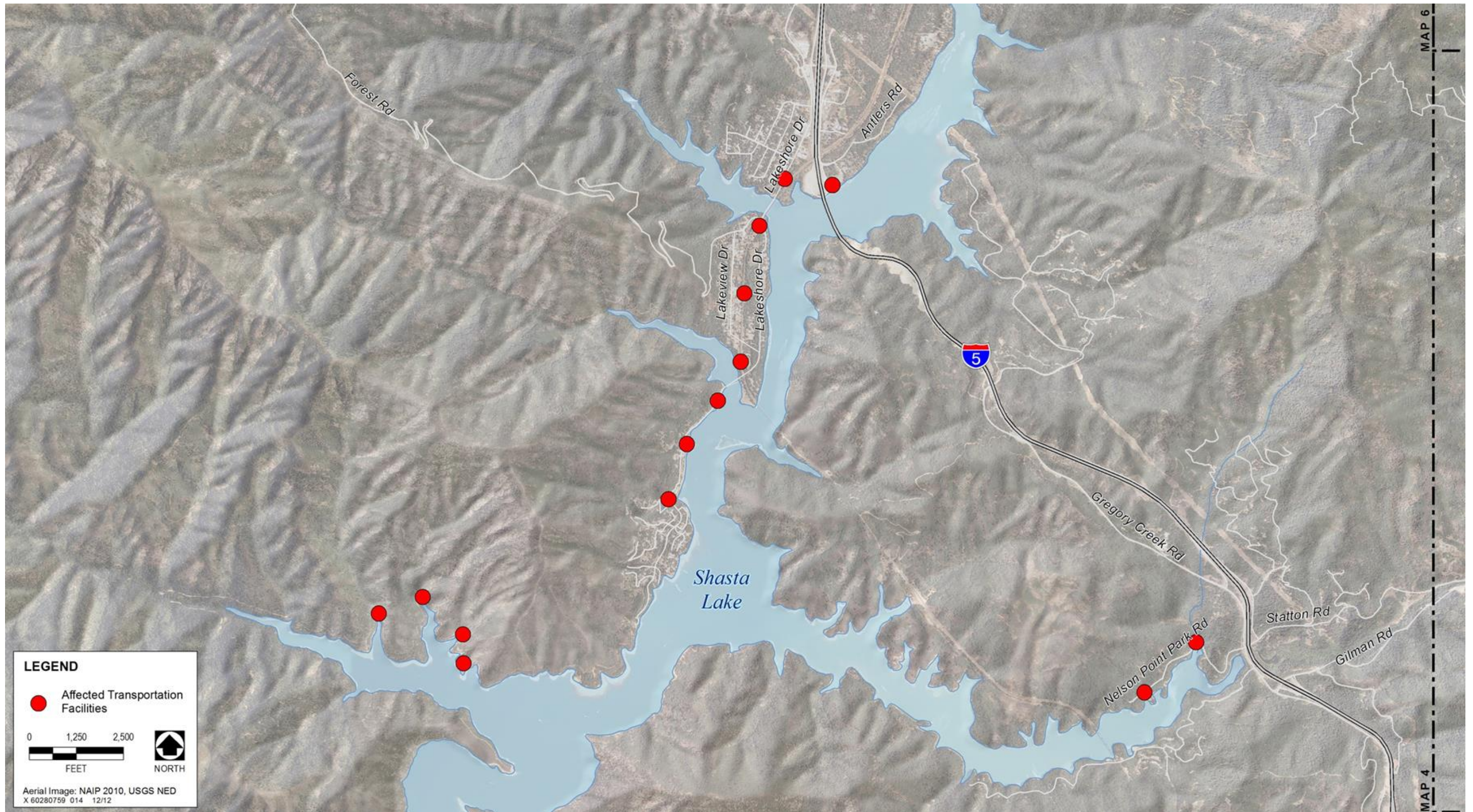


Figure 20-1f. Affected Transportation Facilities – Map 5

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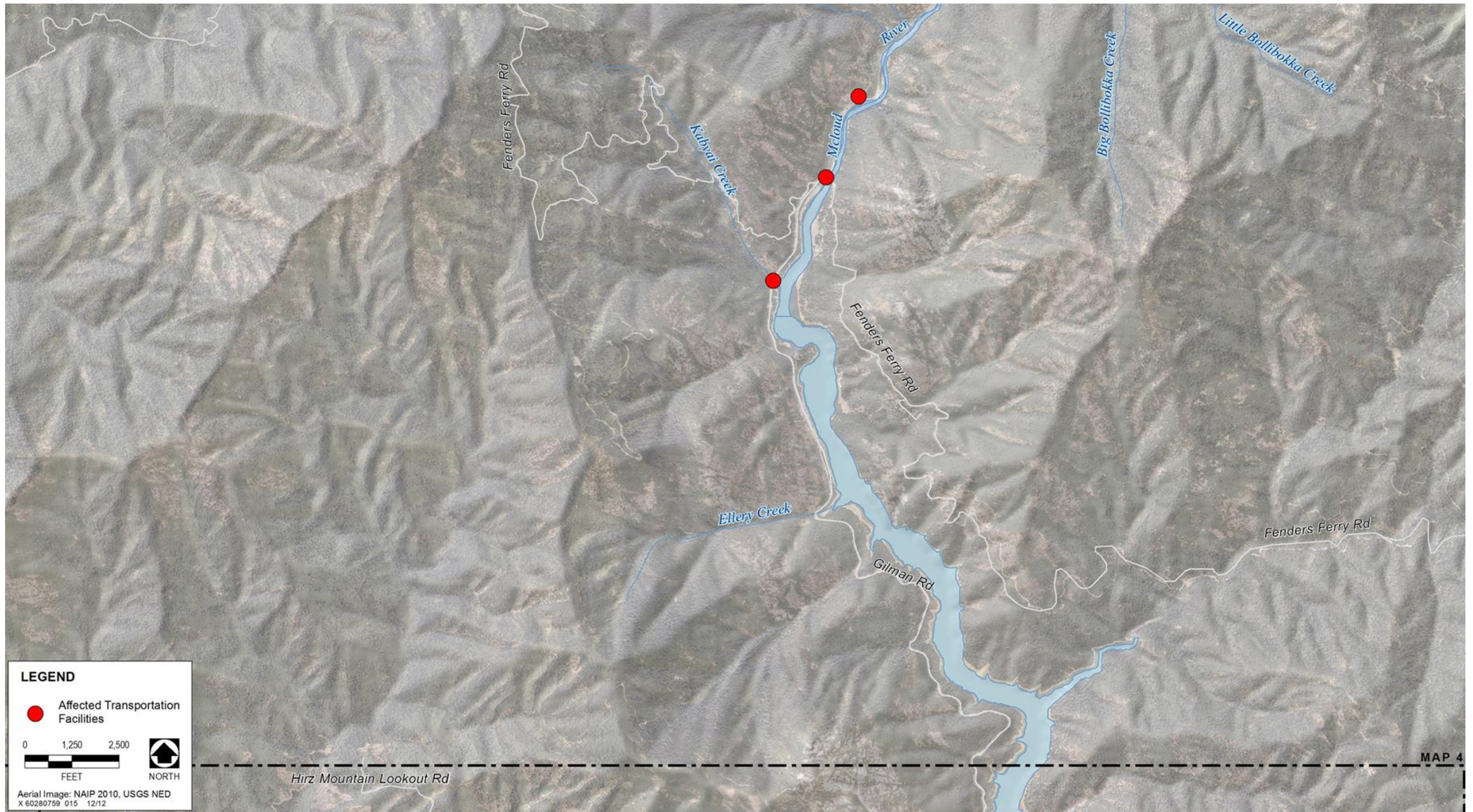


Figure 20-1g. Affected Transportation Facilities – Map 6

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- 1 • Existing access roads would be used to the extent feasible during
2 construction. However, should temporary access roads need to be
3 constructed, temporary fill for access would be completely removed
4 after construction is completed.

- 5 • Construction would typically occur during daylight hours Monday
6 through Friday, but the construction contractor may extend the hours
7 and may schedule construction work on weekend days with the
8 approval of Reclamation. The average workday would be 8 hours.

- 9 • Under CP4 and CP5, 5,000–10,000 tons of gravel on average would be
10 installed per year at up to three sites per year. Gravel would be obtained
11 from local commercial sources in Redding, and would result in up to 18
12 truck trips per day, with a maximum haul route distance of up to 40
13 miles. Under CP4 and CP5, gravel augmentation would continue to
14 occur annually for an additional 5 years, for a total construction period
15 of 10 years.

- 16 • Under CP4 and CP5, restoration at up to 6 restoration sites would result
17 in up to 25 haul trips per day for approximately 1 month.

- 18 • The increase in long-term recreational opportunities and additional
19 visitor days would generate an approximate average of 158 one-way
20 trips per day to Shasta Lake and its tributaries under CP1, 238 one-way
21 trips per day under CP2, 364 one-way trips per day under CP3, 658
22 one-way trips per day under CP4, and 311 one-way trips per day under
23 CP5.

24 **20.3.2 Criteria for Determining Significance of Effects**

25 An environmental document prepared to comply with NEPA must consider the
26 context and intensity of the environmental effects that would be caused by, or
27 result from, the proposed action. Under NEPA, the significance of an effect is
28 used solely to determine whether an EIS must be prepared. An environmental
29 document prepared to comply with CEQA must identify the potentially
30 significant environmental effects of a proposed project. A “[s]ignificant effect
31 on the environment” means a substantial, or potentially substantial, adverse
32 change in any of the physical conditions within the area affected by the project”
33 (State CEQA Guidelines, Section 15382). CEQA also requires that the
34 environmental document propose feasible measures to avoid or substantially
35 reduce significant environmental effects (State CEQA Guidelines, Section
36 15126.4(a)) to less-than-significant levels.

37 Thresholds for determining the significance of transportation and traffic effects
38 were based on the environmental checklist form in Appendix G of the State
39 CEQA Guidelines and Federal, State, and local guidance. These thresholds
40 consider the context and intensity of the environmental effects as required under
41 NEPA.

1 Impacts of an alternative on transportation and traffic would be significant if
2 project implementation would do any of the following:

- 3 • Conflict with an applicable plan, ordinance, or policy establishing
4 measures of effectiveness for the performance of the circulation
5 system, taking into account all modes of transportation, including mass
6 transit and nonmotorized travel and relevant components of the
7 circulation system, including but not limited to intersections, streets,
8 highways and freeways, pedestrian and bicycle paths, and mass transit
- 9 • Conflict with an applicable congestion management program, including
10 but not limited to level of service standards and travel demand
11 measures, or other standards established by the county congestion
12 management agency for designated roads or highways
- 13 • Result in a change in air traffic patterns, including either an increase in
14 traffic levels or a change in location that results in substantial safety
15 risks
- 16 • Substantially increase hazards as a result of a design feature (e.g., sharp
17 curves or dangerous intersections) or incompatible uses (e.g., farm
18 equipment)
- 19 • Result in inadequate emergency access

20 In accordance with NEPA, the methods for determining the significance of
21 effects on traffic and transportation are based on the intensity of the effect
22 within the context of the existing transportation facility.

23 The following screening criterion is recommended by the Institute of
24 Transportation Engineers (ITE) (1989) for assessing the effects of construction
25 projects that create temporary traffic increases. To account for the large
26 percentage of heavy trucks associated with typical construction projects, ITE
27 recommends a threshold level of 50 or more new peak-direction trips.
28 Therefore, an alternative would cause an increase in traffic that is substantial in
29 relation to the existing traffic load and capacity of the street system, and thus
30 would result in a significant effect related to traffic and transportation, if it
31 would result in 50 or more new truck trips during the a.m. peak hours or the
32 p.m. peak hours. The a.m. peak hours are between 7 and 9 a.m. and the p.m.
33 peak hours are between 4 and 6 p.m.

34 **20.3.3 Topics Eliminated from Further Consideration**

35 Several categories of effects would not result from the No-Action Alternative or
36 any of the action alternatives. These categories are described below. An analysis
37 of potential effects in applicable categories for the No-Action Alternative and
38 action alternatives follows this discussion.

1 None of the airports (Redding Municipal, Benton Airpark, Shingletown, and
2 Fall River Mills) in the primary study area are located near the project site;
3 therefore, project construction and operation would not affect air traffic
4 patterns. In addition, the project would not affect the ability of seaplanes to land
5 at Bridge Bay Resort Seaplane Base. For these reasons, air traffic patterns are
6 not discussed further in this analysis.

7 None of the alternatives would interfere with RABA services or affect transit
8 service. Therefore, transit is not discussed further in this analysis.

9 None of the alternatives propose any facility that is in conflict with adopted
10 policies, plans, or programs supporting alternative transportation. Therefore,
11 this issue is not discussed further in this analysis.

12 The alternatives do not propose any changes in land use; however, under the
13 action alternatives there could be minor changes in land uses throughout the
14 study area because of increased water supply reliability. These indirect effects
15 would be extremely minor and spread over a wide geographic area (i.e.,
16 throughout the CVP and SWP service areas). Therefore, none of the action
17 alternatives would increase transportation hazards because of incompatible uses.
18 This issue is not discussed further in this analysis.

19 **20.3.4 Direct and Indirect Effects**

20 ***No-Action Alternative***

21 Under the No-Action Alternative, no improvements to Shasta Dam would be
22 constructed and none of the associated road and bridge relocations would be
23 needed. It is expected that over time, as population and traffic levels increase,
24 roads and bridges would be maintained and improvements would be constructed
25 throughout the study area when needed to ensure safety and meet current
26 engineering-design requirements. Also, growth occurring under the No-Action
27 Alternative would likely be consistent with city and county general plans,
28 resulting in effects on California's transportation network. The effects on and
29 impact conclusions for the primary study area and extended study area are
30 essentially the same.

31 **Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to 32 Red Bluff)**

33 *Impact Trans-1 (No-Action): Short-Term and Long-Term Increases in Traffic in*
34 *the Primary Study Area in Relation to the Existing Traffic Load and Capacity of*
35 *the Street System* Traffic levels would not increase above levels anticipated in
36 local general plans and regional transportation plans. This impact would be less
37 than significant.

38 Under the No-Action Alternative, traffic would be expected to increase
39 compared to existing conditions. Traffic in the primary study area would
40 increase by amounts anticipated in local general plans and regional

1 transportation plans, and no construction-related truck trips would occur.
2 Planned growth under the No-Action Alternative, including development of
3 residential and recreational uses, has the potential to result in temporary, short-
4 term increases in construction traffic. It is reasonable to assume, however, that
5 necessary improvements to roads, bridges, and other transportation facilities
6 would be made in response to increased traffic levels associated with increased
7 population growth over time. Therefore, this impact would be less than
8 significant. Mitigation is not required for the No-Action Alternative.

9 *Impact Trans-2 (No-Action): Adverse Effects on Access to Local Streets or*
10 *Adjacent Uses in the Primary Study Area* Access to local streets and adjacent
11 uses would remain generally unchanged. This impact would be less than
12 significant.

13 Access to local streets and adjacent uses in the primary study area would be
14 maintained under the No-Action Alternative. No adverse construction-related
15 effects on access would occur. Planned growth under the No-Action Alternative
16 has the potential to impede access to local streets and adjacent uses. It is
17 reasonable to assume, however, that road and bridge improvements needed to
18 maintain access would be made in accordance with city and county regulations
19 and policies. For this reason, this impact would be less than significant.
20 Mitigation is not required for the No-Action Alternative.

21 *Impact Trans-3 (No-Action): Hazards in the Primary Study Area Caused by a*
22 *Design Feature* No design hazards or incompatible uses would be introduced.
23 This impact would be less than significant.

24 No design hazards or incompatible uses would be introduced in the primary
25 study area under the No-Action Alternative. No construction-related effects
26 would occur. Planned growth under the No-Action Alternative has the potential
27 to introduce design hazards or incompatible uses. It is reasonable to assume,
28 however, that necessary actions would be taken in accordance with city and
29 county policies and design standards. Therefore, this impact would be less than
30 significant. Mitigation is not required for the No-Action Alternative.

31 *Impact Trans-4 (No-Action): Adverse Effects on Emergency Access in the*
32 *Primary Study Area* Emergency access would remain unchanged. This impact
33 would be less than significant.

34 Emergency access in the primary study area would remain unchanged under the
35 No-Action Alternative. No construction-related effects would occur. Planned
36 residential and recreation growth under the No-Action Alternative has the
37 potential to affect emergency access during construction of roadway
38 improvements to accommodate that growth. It is reasonable to assume,
39 however, that necessary actions would be taken in accordance with city and
40 county standards. Therefore, this impact would be less than significant.
41 Mitigation is not required for the No-Action Alternative.

1 *Impact Trans-5 (No-Action): Accelerated Degradation of Surface*
2 *Transportation Facilities in the Primary Study Area* No increase in road
3 degradation would occur because no trucks would transport materials to and
4 from the project site. This impact would be less than significant.

5 Because construction would not occur under the No-Action Alternative, trucks
6 would not be required to transport construction materials to and from the
7 primary study area. Therefore, road degradation would not increase as a result
8 of construction. Planned growth under the No-Action Alternative has the
9 potential to result in increased truck trips, with the secondary effect of road
10 degradation. It is reasonable to assume, however, that necessary actions would
11 be taken to accommodate planned growth over time. Therefore, this impact
12 would be less than significant. Mitigation is not required for the No-Action
13 Alternative.

14 **Lower Sacramento River and Delta and CVP/SWP Service Areas**

15 *Impact Trans-6 (No-Action): Temporary Increase in Traffic in the Extended*
16 *Study Area in Relation to the Existing Traffic Load and Capacity of the Street*
17 *System* Traffic levels would not increase above levels anticipated in local
18 general plans and regional transportation plans. This impact would be less than
19 significant.

20 This impact is similar to Impact Trans-1 (No-Action) for the primary study area.
21 For the same reasons as described under Impact Trans-1 (No-Action), this
22 impact would be less than significant. Mitigation is not required for the No-
23 Action Alternative.

24 *Impact Trans-7 (No-Action): Adverse Effects on Access to Local Streets or*
25 *Adjacent Uses in the Extended Study Area* Access to local streets and adjacent
26 uses would remain generally unchanged because no construction would occur.
27 This impact would be less than significant.

28 This impact is similar to Impact Trans-2 (No-Action) for the primary study area.
29 For the same reasons as described under Impact Trans-2 (No-Action), this
30 impact would be less than significant. Mitigation is not required for the No-
31 Action Alternative.

32 *Impact Trans-8 (No-Action): Hazards in the Extended Study Area Caused by a*
33 *Design Feature* No design hazards or incompatible uses would be introduced.
34 This impact would be less than significant.

35 This impact is similar to Impact Trans-3 (No-Action) for the primary study area.
36 For the same reasons as described under Impact Trans-3 (No-Action), this
37 impact would be less than significant. Mitigation is not required for the No-
38 Action Alternative.

1 *Impact Trans-9 (No-Action): Adverse Effects on Emergency Access in the*
2 *Extended Study Area* Emergency access would remain unchanged. This impact
3 would be less than significant.

4 This impact is similar to Impact Trans-4 (No-Action) for the primary study area.
5 For the same reasons as described under Impact Trans-4 (No-Action), this
6 impact would be less than significant. Mitigation is not required for the No-
7 Action Alternative.

8 *Impact Trans-10 (No-Action): Accelerated Degradation of Surface*
9 *Transportation Facilities in the Extended Study Area* No increase in road
10 degradation would occur because no trucks would transport materials to and
11 from the project site. This impact would be less than significant.

12 This impact is similar to Impact Trans-5 (No-Action) for the primary study area.
13 For the same reasons as described under Impact Trans-5 (No-Action), this
14 impact would be less than significant. Mitigation is not required for the No-
15 Action Alternative.

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

18 CP1 consists of raising Shasta Dam by 6.5 feet, which would increase the
19 surface water elevation and acreage of the inundation area. Under CP1,
20 transportation facilities in the proposed inundation area would be relocated to
21 sites outside that area. Transportation facilities include road infrastructure and
22 vehicular bridges. Construction would involve installing bank fortification to
23 preserve road segments and dike/abutment protection for bridge structures that
24 do not require relocation. The construction period would be approximately 4.5
25 years. As shown in Table 20-2 and Figures 20-1c and 20-1f, the following
26 transportation facilities would need to be relocated to accommodate
27 construction under CP1:

- 28 • Four segments of Lakeshore Drive beginning in the Lakeshore area
29 west of I-5, extending south to the Sugarloaf Area and along the
30 Sugarloaf Creek Inlet. Shasta County owns and maintains the first
31 segment extending from the Lakeshore area to the Sugarloaf area, the
32 most populated areas around the lake. The Doney Creek and Charlie
33 Creek bridges in this segment would also require relocation. USFS
34 owns and maintains the segments that extend from the Sugarloaf area
35 along Sugarloaf Creek Inlet. A total of 8,100 feet of Lakeshore Drive
36 would require relocation. No segment of Lakeshore Drive would need
37 to be closed during construction.

- 38 • Three road segments in the Turntable Bay area, northeast of the north
39 end of the Pit River Bridge. These road segments are owned and
40 maintained by USFS. The segments provide access to the Shasta Yacht
41 Club. A total of 6,200 feet of roadway would require relocation. Given

1 the terrain along these segments, these roadways would need to be
2 closed during construction.

- 3 • Silverthorn Road and segments of USFS roads in the Jones Valley area,
4 on the south side of the Pit Arm of Shasta Lake. Owned and maintained
5 by Shasta County, Silverthorn Road provides access to a residential
6 area composed of permanent and seasonally occupied dwelling units. A
7 total of 2,000 feet of roadway would be relocated. These roadways
8 would need to be closed during construction.
- 9 • Additional road segments in the primary study area totaling 230 linear
10 feet. None of these road segments would need to be closed during
11 construction.
- 12 • Two railroad bridges with realignment of the railroad tracks between
13 the bridges. Both of the bridges would require modification.
- 14 • Relocation of McCloud River Bridge and Didallas Creek Bridge.
15 Modification of Pit River Bridge and Fenders Ferry Bridge.

16 Potential impacts on access roads to and internal loop roads at campsites and
17 other recreation facilities are evaluated in Chapter 18, “Recreation and Public
18 Access.” Potential impacts from changes in Sacramento River flows due to
19 water operations, that may affect transportation infrastructure (e.g. bridges), are
20 described in Chapter 4, “Geology, Geomorphology, Minerals, and Soils” and
21 Chapter 6, “Hydrology, Hydraulics, and Water Management.”

22 **Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to** 23 **Red Bluff)**

24 *Impact Trans-1 (CPI): Short-Term and Long-Term Increases in Traffic in the*
25 *Primary Study Area in Relation to the Existing Traffic Load and Capacity of the*
26 *Street System* Construction activities would temporarily increase traffic. This
27 short-term, temporary impact would be potentially significant. In the long term,
28 increased recreational opportunities and visitor days would result in additional
29 traffic on area roadways; however, the long-term impact would be less than
30 significant.

31 Existing traffic in the primary study area is generated by residents living and
32 working in the area, living in the area and working elsewhere, and living
33 elsewhere and working in the area; and by tourists who come to visit the dam,
34 picnic, hike, camp, fish, and go boating. Because Shasta Lake is a tourist
35 destination, traffic is seasonally heavier from the middle of spring to the middle
36 of fall (Reclamation 2004).

37 Project construction activities would require numerous truck trips to move
38 materials to and from the project site, as well as trips in personal vehicles by
39 construction crew members commuting to and from the site. Traffic would

1 temporarily increase on roadways in the primary study area including I-5,
2 Shasta Dam Boulevard, Lake Boulevard, Lakeshore Drive, and other roads
3 during the CP1 construction period. Commute trips by construction workers
4 would add vehicles to the road system during the a.m. and p.m. peak periods.
5 Haul truck trips would increase traffic on designated haul routes during peak
6 and off-peak hours.

7 Approximately 95 round-trip haul trips per day are anticipated for trucking
8 materials to the dam site over a 4.5-year construction period. Approximately 75
9 round trips per day are anticipated for trucking materials cleared from the land
10 over the same period. The total number of truck trips, 170 round trips per day,
11 would not exceed the ITE threshold of 50 new truck trips in the a.m. and p.m.
12 peak hours (i.e., 7–9 a.m. and 4–6 p.m.) because the truck trips would be
13 distributed over an 8-hour workday; approximately 21 truck trips would occur
14 during the peak-hour period. This impact would be less than significant.

15 Up to 300 round trips per day by workers are anticipated. Because various
16 construction activities would occur concurrently, these truck trips would be
17 distributed to multiple locations within the primary study area. However, the
18 total number of worker trips may temporarily exceed the existing traffic loads
19 and capacities on the roads where substantial numbers of workers are located at
20 any one time. This impact would be potentially significant.

21 Traffic slowdowns may also result from temporary obstruction of roadway
22 access because of lane closures or heavy equipment entering and exiting the
23 road. Most construction would be phased to maintain access to existing
24 roadways and bridges while constructing the relocated roadways and bridges;
25 however, some construction would require lane closures. There would also
26 likely be temporary traffic controls for transport of large material loads to and
27 from the demolition, modification, and relocation sites. Lane closures and
28 traffic slowdowns could occur on a number of roadways and bridges, and
29 circulation patterns would change if detours were to be required during
30 replacement of transportation facilities. Detours may add traffic that could
31 exceed the capacity of the facility being relocated. This impact would be
32 potentially significant.

33 In the long term, increased recreational opportunities and visitors would
34 increase traffic on area roads by an estimated average of 158 one-way trips per
35 day. These additional trips would be distributed throughout the primary study
36 area to numerous recreational facilities: 6 public boat ramps, 9 commercial
37 marinas, 15 family campgrounds, and various other public and private facilities.
38 These recreational facilities are distributed around Shasta Lake and can be
39 accessed via numerous roadways. Because these trips would be distributed over
40 a large number of roadways throughout a large area, the additional trips are not
41 expected to exceed the existing traffic loads and capacities of the street system.
42 Growth in the primary study area that is generated through implementation of
43 city and county general plans would increase traffic in the area. The regional

1 transportation planning documents identify roadway projects needed to
2 accommodate expected traffic increases. Therefore, the long-term impact of
3 traffic increases on area roads would be less than significant.

4 In summary, in the short term, construction activities under CP1 are expected to
5 result in a potentially significant impact on traffic; but in the long term, the
6 impact of traffic increases resulting from expected growth and additional
7 recreational opportunities would be less than significant. Mitigation for this
8 short-term impact is proposed in Section 20.3.5.

9 *Impact Trans-2 (CP1): Adverse Effects on Access to Local Streets and Adjacent*
10 *Uses in the Primary Study Area* Relocation of transportation facilities would
11 require either road closures and detours or partial road closures, or a
12 combination of both. This temporary direct impact would be potentially
13 significant. Indirect impacts on air quality, noise, and recreation resulting from
14 extended travel lengths, increased traffic near sensitive land uses, and limiting
15 or restricting access to recreational facilities are evaluated in the corresponding
16 chapters of this DEIS.

17 CP1 would raise the elevation and increase the surface acreage of Shasta Lake.
18 Several existing roads and bridges at the lake would require relocation to avoid
19 potential inundation as the elevation of the lake's full pool increases.

20 It is anticipated that most of the new roadway alignments or bridges would be
21 constructed and connected to existing road facilities before demolition of the
22 existing facilities in the proposed inundation area. In some cases, work in the
23 road relocation areas may require a road closure with detours, lane closures, or a
24 combination of both. Road closures would temporarily impede access to local
25 connector roads and recreational land uses, affecting residents, local
26 recreational and nonrecreational businesses, and visitors to Shasta Lake. This
27 impact would be potentially significant. Mitigation for this impact is proposed
28 in Section 20.3.5.

29 Detours and alternate routes resulting from road and bridge relocations could
30 cause longer trip lengths and increase traffic in areas of sensitive land uses. The
31 following potential indirect impacts are evaluated in the corresponding chapters
32 of this DEIS:

- 33 • Effects on air quality caused by extended trip lengths – Chapter 5, “Air
34 Quality and Climate”
- 35 • Effects on sensitive receptors resulting from increased traffic on
36 connector roads caused by detours – Chapter 8, “Noise and Vibration”
- 37 • Effects on recreation caused by restrictions to facility access – Chapter
38 18, “Recreation and Public Access”

1 *Impact Trans-3 (CP1): Hazards in the Primary Study Area Caused by a Design*
2 *Feature* Relocated road segments and vehicular and railroad bridges would be
3 designed to current engineering design standards. This impact would be
4 beneficial.

5 Road segments, vehicular bridges, and railroad bridges must be designed to
6 current engineering and seismic standards. Current engineering standards ensure
7 that hazards are minimized to the extent practicable. Modernizing bridges to
8 current design standards is a beneficial aspect of CP1. Because relocated road
9 segments and vehicular bridges would be designed to current engineering
10 design standards, design features would not increase hazards but would actually
11 decrease the potential for hazards. This impact would be beneficial. Mitigation
12 for this impact is not needed, and thus not proposed.

13 *Impact Trans-4 (CP1): Adverse Effects on Emergency Access in the Primary*
14 *Study Area during Construction* Road closures may result in increased
15 response times for emergency vehicles. This direct impact would be potentially
16 significant. Indirect impacts on air quality resulting from extended driving
17 lengths, increased emergency vehicle response times, and potential noise
18 impacts on sensitive receptors are discussed in the respective chapters of this
19 DEIS.

20 As discussed under Impact Trans-2 (CP1), temporary road closures and lane
21 closures would be needed for construction of the relocated road alignments and
22 bridges. Several schools are located near roadways that would be affected by
23 construction, and it is expected that school bus routes could be affected by
24 temporary road closures. Although no emergency response centers are in the
25 immediate area affected by construction, road and lane closures may restrict
26 emergency vehicle access. This impact would be potentially significant.
27 Mitigation for this impact is proposed in Section 20.3.5.

28 The following potential indirect impacts are evaluated in the corresponding
29 chapters of this DEIS:

- 30 • Effects on air quality caused by extended trip lengths – Chapter 5, “Air
31 Quality and Climate”
- 32 • Effects on sensitive receptors – Chapter 8, “Noise and Vibration”
- 33 • Effects of increased emergency vehicle response times – Chapter 22,
34 “Public Services”

35 *Impact Trans-5 (CP1): Accelerated Degradation of Surface Transportation*
36 *Facilities in the Primary Study Area during Construction* Trucks used to
37 import fill material and export construction waste would accelerate degradation
38 of surface transportation facilities used as haul routes. This impact would be
39 potentially significant.

1 As noted in the discussion of Impact Trans-1 (CP1), CP1 would generate
2 approximately 170 round trips per day for the length of the 4.5-year
3 construction period. Degradation of road surfaces would result in a significant
4 impact if truck trips associated with the project would substantially shorten the
5 life of the facility so that the owner of the right-of-way would need to repair or
6 rehabilitate the road surface before it is scheduled for repair. The significance
7 determination is based on several factors, including the existing condition of
8 road surfaces and the road's normal repair or rehabilitation schedule. Given the
9 total number of anticipated trips and expected weight of the payloads, the
10 impact of CP1 on existing road surfaces in relation to the anticipated utility of
11 the road surfaces would be potentially significant. Mitigation for this impact is
12 proposed in Section 20.3.5.

13 **Lower Sacramento River and Delta and CVP/SWP Service Areas** No
14 effects on traffic or transportation are expected to occur in the lower
15 Sacramento River and Delta or in the CVP/SWP service areas; therefore,
16 potential effects in those geographic regions are not discussed further in this
17 DEIS.

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

20 CP2 consists of raising Shasta Dam by 12.5 feet, which would result in a greater
21 increase in the surface water elevation and acreage of inundation area than
22 under CP1. A larger number of transportation facilities would be relocated
23 under CP2 than under CP1. CP2 would have a 5-year construction period,
24 compared to 4.5 years under CP1. As shown in Table 20-2 and Figures 20-1c,
25 20-1d, 20-1f, and 20-1g, the following transportation facilities would need to be
26 relocated to accommodate construction under CP2:

- 27 • Two segments of Lakeshore Drive in addition to the 4 road segments
28 that would be relocated under CP1, for a total of 6 segment relocations
29 along Lakeshore Drive totaling 13,100 feet. As under CP1, no segment
30 of Lakeshore Drive would need to be completely closed during
31 construction.
- 32 • The same 3 road segments in the Turntable Bay area (with a total
33 roadway length of 6,200 feet) that would require relocation under CP1.
34 As under CP1, these roadways would need to be closed during
35 construction.
- 36 • Three segments of Gillman Road that run along the west side of the
37 McCloud Arm of Shasta Lake, totaling 1,200 feet. Owned and
38 maintained by Shasta County, the road is used primarily by logging
39 trucks. Gillman Road would need to be closed during construction.
- 40 • The same segments of Silverthorn Road and other USFS roads in the
41 Jones Valley area that would require relocation under CP1 (with a total

1 roadway length of 2,000 feet). As under CP1, these roadways would
2 need to be closed during construction.

- 3 • Four segments of Salt Creek Road that run along the west side of the
4 Squaw Creek Arm of Shasta Lake, totaling 4,300 feet. Salt Creek Road
5 is a dirt and gravel road owned and maintained by USFS. Its primary
6 use is for USFS access. Didallas Creek Bridge crosses one of the
7 segments and would also require relocation under CP2. Salt Creek
8 Road would need to be closed during construction.
- 9 • An additional two road segments besides the two other road segments
10 that would be relocated under CP1. The total length of the 4 roadway
11 segments that would be relocated under CP2 is 2,300 feet. As under
12 CP1, none of these road segments would need to be closed during
13 construction.
- 14 • Two railroad bridges with realignment of the railroad tracks between
15 the bridges. Both of the bridges would require modification.
- 16 • Relocation of McCloud River Bridge and Didallas Creek Bridge.
17 Modification of Pit River Bridge and Fenders Ferry Bridge.

18 ***Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to***
19 ***Red Bluff)***

20 *Impact Trans-1 (CP2): Short-Term and Long-Term Increases in Traffic in the*
21 *Primary Study Area in Relation to the Existing Traffic Load and Capacity of the*
22 *Street System* Construction activities would temporarily increase traffic. This
23 short-term, temporary impact would be potentially significant. In the long term,
24 increased recreational opportunities and visitor days would result in additional
25 traffic on area roadways; however, the long-term impact would be less than
26 significant.

27 This impact is similar to Impact Trans-1 (CP1), but the impact would be greater
28 than under CP1, as described below.

29 Approximately 118 round-trip haul trips per day are anticipated for trucking
30 materials to the dam site over a 5-year construction period. Approximately 56
31 round trips per day are anticipated for trucking materials cleared from the land
32 over the same period. The total number of truck trips, 174 round trips per day,
33 would not exceed the ITE threshold of 50 new truck trips because the trips
34 would be distributed over an 8-hour workday; approximately 21 truck trips
35 would occur in the a.m. and p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.). This
36 is the same number of daily truck trips as under CP1, but these trips would be
37 borne on the transportation network for a longer duration than under CP1;
38 therefore, the impact would be greater than under CP1. Because the ITE
39 threshold would not be exceeded, this impact would be less than significant.

1 Up to 300 round trips per day by workers are anticipated over a 5-year period
2 under CP2. Because various construction activities would occur concurrently,
3 these truck trips would be distributed to multiple locations within the primary
4 study area. However, the worker trips would occur over a longer construction
5 period than under CP1; therefore, the impact would be greater than under CP1.
6 This impact would be potentially significant.

7 As under CP1, traffic slowdowns also may result from temporary obstruction of
8 roadway access because of lane closures or heavy equipment entering and
9 exiting the road. Interference would occur over a longer period than under CP1;
10 therefore, the impact would be greater than under CP1. This impact would be
11 potentially significant.

12 In the long term, under CP2, traffic on roads within the primary study area
13 would increase by an estimated average of 238 one-way trips per day, more than
14 under CP1; however, for the same reasons as described in CP1, this impact
15 would be less than significant.

16 In summary, in the short term, construction activities under CP2 are expected to
17 result in a potentially significant impact on traffic that would be greater than
18 under CP1; but in the long term, the impact of traffic increases resulting from
19 expected growth and additional recreational opportunities would be less than
20 significant. Mitigation for this short-term impact is proposed in Section 20.3.5.

21 *Impact Trans-2 (CP2): Adverse Effects on Access to Local Streets and Adjacent*
22 *Uses in the Primary Study Area* Relocation of transportation facilities would
23 require either road closures and detours or partial road closures, or a
24 combination of both. This temporary direct impact would be potentially
25 significant. Indirect impacts on air quality, noise, and recreation resulting from
26 extended travel lengths, increased traffic near sensitive land uses, and limiting
27 or restricting access to recreational facilities are evaluated in the corresponding
28 chapters of this DEIS.

29 This impact would be similar to Impact Trans-2 (CP1); however, because CP2
30 would require that more roads be closed for a longer duration than under CP1,
31 the impact would be greater than under CP1. This impact would be potentially
32 significant. Mitigation for this impact is proposed in Section 20.3.5. Potential
33 indirect effects are evaluated in Chapter 5, "Air Quality and Climate"; Chapter
34 8, "Noise and Vibration"; and Chapter 18, "Recreation and Public Access."

35 *Impact Trans-3 (CP2): Hazards in the Primary Study Area Caused by a Design*
36 *Feature* Relocated road segments and vehicular and railroad bridges would be
37 designed to current engineering design standards. This impact would be
38 beneficial.

39 This impact would be similar to Impact Trans-3 (CP1); however, CP2 would
40 result in a greater beneficial effect than CP1 because more bridges would be

1 replaced and constructed using current design standards under CP2 than under
2 CP1. This impact would be beneficial. Mitigation for this impact is not needed,
3 and thus not proposed.

4 *Impact Trans-4 (CP2): Adverse Effects on Emergency Access in the Primary*
5 *Study Area during Construction* Road closures may result in increased
6 response times for emergency vehicles. This direct impact would be potentially
7 significant. Indirect impacts on air quality resulting from extended driving
8 lengths, increased emergency vehicle response times, and potential noise
9 impacts on sensitive receptors are discussed in the respective chapters of this
10 DEIS.

11 This impact would be similar to Impact Trans-4 (CP1). However, the
12 construction period for CP2 would be 5 years, 6 months longer than the
13 construction period for CP1. Because road closures under CP2 would occur for
14 a longer period than under CP1, the impact would be greater under CP2 than
15 under CP1. This impact would be potentially significant. Mitigation for this
16 impact is proposed in Section 20.3.5. Potential indirect effects are evaluated in
17 Chapter 5, “Air Quality and Climate”; Chapter 8, “Noise and Vibration”; and
18 Chapter 22, “Public Services.”

19 *Impact Trans-5 (CP2): Accelerated Degradation of Surface Transportation*
20 *Facilities in the Primary Study Area* Trucks used to import fill material and
21 export construction waste would accelerate degradation of surface
22 transportation facilities used as haul routes. This impact would be potentially
23 significant.

24 This impact would be similar to Impact Trans-5 (CP1). As noted in the
25 discussion of Impact Trans-1 (CP2), CP2 would generate approximately 174
26 round trips per day for the length of the 5-year construction period. This is
27 similar to the number of round trips per day anticipated under CP1; however,
28 because the construction period for CP2 would be longer than the construction
29 period for CP1, the impact on road surfaces would be greater under CP2 than
30 under CP1. This impact would be potentially significant. Mitigation for this
31 impact is proposed in Section 20.3.5.

32 **Lower Sacramento River and Delta and CVP/SWP Service Areas** No
33 effects on traffic or transportation are expected to occur in the lower
34 Sacramento River and Delta or in the CVP/SWP service areas; therefore,
35 potential effects in those geographic regions are not discussed further in this
36 DEIS.

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

39 CP3 consists of raising Shasta Dam by 18.5 feet, which would result in a greater
40 increase in the surface water elevation and acreage of inundation area than
41 would occur under CP1 or CP2. A larger number of transportation facilities

1 would be relocated under CP3 than under CP1 and CP2. CP3 would have a 5-
2 year construction period, compared to 4.5 years under CP1. As shown in Table
3 20-2 and Figures 20-1c, 20-1d, 20-1f, and 20-1g, the following transportation
4 facilities would need to be relocated to accommodate construction under CP3:

- 5 • Two road segments of Lakeshore Drive in addition to the 6 road
6 segments that would be relocated under CP2, for a total of 8 segment
7 relocations along Lakeshore Drive totaling 13,700 feet. Doney Creek
8 Bridge and Charlie Creek Bridge would be relocated. As under CP1
9 and CP2, no segment of Lakeshore Drive would need to be completely
10 closed during construction.
- 11 • The same 3 segments in the Turntable Bay area (with a total roadway
12 length of 6,200 feet) that would require relocation under CP1 and CP2.
13 As under CP1 and CP2, these roadways would need to be closed during
14 construction.
- 15 • The same three segments of Gillman Road that would require
16 relocation under CP2. As under CP2, Gillman Road would need to be
17 closed during construction.
- 18 • An additional three road segments of Silverthorn Road and/or other
19 USFS roads in the Jones Valley area besides the segments that would
20 require relocation under CP1 and CP2. The total length of roadway that
21 would be relocated under CP3 is 3,600 feet. As under CP1 and CP2,
22 these roadways would need to be closed during construction.
- 23 • An additional road segment of Salt Creek Road that runs along the west
24 side of the Squaw Creek Arm of Shasta Lake, besides the four roadway
25 segments that would be relocated under CP2. The total length of
26 roadways that would be relocated under CP3 is 5,100 feet. As under
27 CP2, Salt Creek Road would need to be closed during construction.
- 28 • Three additional road segments besides the four other road segments
29 that would be relocated under CP1 and CP2. The total length of the 7
30 roadway segments that would be relocated under CP3 is 3,900 feet. As
31 under CP1 and CP2, none of these road segments would need to be
32 closed during construction.
- 33 • Two railroad bridges with realignment of the railroad tracks between
34 the bridges. Both of the bridges would require modification.
- 35 • Relocation of McCloud River Bridge and Didallas Creek Bridge.
36 Modification of Pit River Bridge and Fenders Ferry Bridge.

1 **Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to**
2 **Red Bluff)**

3 *Impact Trans-1 (CP3): Short-Term and Long-Term Increases in Traffic in the*
4 *Primary Study Area in Relation to the Existing Traffic Load and Capacity of the*
5 *Street System* Construction activities would temporarily increase traffic. This
6 short-term, temporary impact would be potentially significant. In the long term,
7 increased recreational opportunities and visitor days would result in additional
8 traffic on area roadways; however, the long-term impact would be less than
9 significant.

10 This impact would be similar to Impacts Trans-1 (CP1) and Trans-1 (CP2), but
11 the impact would be greater than under CP1 or CP2, as described below.

12 Approximately 168 round-trip haul trips per day are anticipated for trucking
13 materials to the dam site over a 5-year construction period. Approximately 52
14 round trips per day are anticipated for trucking materials cleared from the land
15 over the same period. The total number of truck trips, 220 round trips per day,
16 would not exceed the ITE threshold of 50 new truck trips because the trips
17 would be distributed over an 8-hour workday; approximately 28 trips would
18 occur during the a.m. and p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.). This is
19 a greater number of daily truck trips than under CP1 and CP2, and these daily
20 truck trips would occur for a longer duration than under CP1; therefore, the
21 impact would be greater under CP3 than under CP1 or CP2. Because the
22 number of truck trips during the peak hours would not exceed the ITE threshold,
23 this impact would be less than significant.

24 Up to 350 round trips per day by workers are anticipated over a 5-year period.
25 Because various construction activities would occur concurrently, these truck
26 trips would be distributed to multiple locations within the primary study area.
27 However, the total number of worker trips may temporarily exceed the existing
28 traffic loads and capacities on the roads where substantial numbers of workers
29 are located at any one time. The number of worker trips would be greater than
30 under CP1 and CP2 and would occur over a longer construction period than
31 under CP1; therefore, the impact would be greater than under CP1 or CP2. This
32 impact would be potentially significant.

33 As under CP1 and CP2, traffic slowdowns may also result from temporary
34 obstruction of roadway access because of lane closures or heavy equipment
35 entering and exiting the road. Interference would occur over a longer period
36 than under CP1 or CP2; therefore, the impact would be greater than under CP1
37 or CP2. This impact would be potentially significant.

38 In the long term, under CP3, traffic on roads within the primary study area
39 would increase by an estimated average of 364 one-way trips per day, more than
40 under either CP1 or CP2; however, for the same reasons as described in CP1,
41 this impact would be less than significant.

1 In summary, in the short term, construction activities under CP3 are expected to
2 result in a potentially significant direct impact on traffic that would be greater
3 than under CP1 or CP2; however, the impact of traffic increases resulting from
4 expected growth and additional recreational opportunities would be less than
5 significant. Mitigation for this short-term impact is proposed in Section 20.3.5.

6 *Impact Trans-2 (CP3): Adverse Effects on Access to Local Streets and Adjacent*
7 *Uses in the Primary Study Area* Relocation of transportation facilities would
8 require either road closures and detours or partial road closures, or a
9 combination of both. This temporary direct impact would be potentially
10 significant. Indirect impacts on air quality, noise, and recreation resulting from
11 extended travel lengths, increased traffic near sensitive land uses, and limiting
12 or restricting access to recreational facilities are evaluated in the corresponding
13 chapters of this DEIS.

14 This impact would be similar to Impacts Trans-2 (CP1) and Trans-2 (CP2);
15 however, because CP3 would require more roads to be closed for a longer
16 duration than under CP1 and CP2, the impact would be greater than under CP1
17 or CP2. This impact would be potentially significant. Mitigation for this impact
18 is proposed in Section 20.3.5. Potential indirect effects are evaluated in Chapter
19 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter
20 18, "Recreation and Public Access."

21 *Impact Trans-3 (CP3): Hazards in the Primary Study Area Caused by a Design*
22 *Feature* Relocated road segments and vehicular and railroad bridges would be
23 designed to current engineering design standards. This impact would be
24 beneficial.

25 This impact would be similar to Impacts Trans-3 (CP1) and Trans-3 (CP2);
26 however, CP3 would result in a greater beneficial effect than CP1 or CP2
27 because more bridges would be replaced and constructed using current design
28 standards under CP3 than under CP1 or CP2. This impact would be beneficial.
29 Mitigation for this impact is not needed, and thus not proposed.

30 *Impact Trans-4 (CP3): Adverse Effects on Emergency Access in the Primary*
31 *Study Area during Construction* Road closures may result in increased
32 response times for emergency vehicles. This direct impact would be potentially
33 significant. Indirect impacts on air quality resulting from extended driving
34 lengths, increased emergency vehicle response times, and potential noise
35 impacts on sensitive receptors are discussed in the respective chapters of this
36 DEIS.

37 This impact would be the same as Impact Trans-4 (CP2). This impact would be
38 potentially significant. Mitigation for this impact is proposed in Section 20.3.5.
39 Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate;"
40 Chapter 8, "Noise and Vibration;" and Chapter 22, "Public Services."

1 *Impact Trans-5 (CP3): Accelerated Degradation of Surface Transportation*
2 *Facilities in the Primary Study Area* Trucks used to import fill material and
3 export construction waste would accelerate degradation of surface
4 transportation facilities used as haul routes. This impact would be potentially
5 significant.

6 This impact would be similar to Impacts Trans-5 (CP1) and Trans-5 (CP2). As
7 noted in the discussion of Impact Trans-1 (CP3), CP3 would generate
8 approximately 220 round trips per day for the length of the 5-year construction
9 period. This is greater than the number of round trips per day anticipated under
10 CP1 and CP2. In addition, the construction period for CP3 would be longer than
11 the construction period for CP1. Therefore, the impact on road surfaces would
12 be greater under CP3 than under CP1 or CP2. This impact would be potentially
13 significant. Mitigation for this impact is proposed in Section 20.3.5.

14 **Lower Sacramento River and Delta and CVP/SWP Service Areas** No
15 effects on traffic or transportation are expected to occur in the lower
16 Sacramento and Delta area or in the CVP/SWP service areas; therefore,
17 potential effects in those geographic regions are not discussed further in this
18 DEIS.

19 ***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus***

20 CP4 consists of raising Shasta Dam by 18.5 feet. The same transportation
21 facilities would be relocated under this alternative as under CP3. CP4 would
22 also have an approximately 5-year construction period like CP3, compared to
23 4.5 years under CP1.

24 In addition to constructing the dam raise and relocating transportation facilities
25 described for CP3, CP4 involves augmenting locations along the Sacramento
26 River with gravel. As noted previously, gravel augmentation would be
27 conducted at up to 3 of the identified sites annually for a 10-year period,
28 commencing with construction of CP4. The following analysis evaluates, as the
29 maximum-intensity option, gravel augmentation at the three sites located the
30 farthest from Redding where gravel is known to be available from commercial
31 sources. All other combinations of gravel augmentation sites would have lesser
32 impacts than the combination of sites evaluated herein.

33 In addition to the dam construction, relocation of transportation facilities, and
34 gravel augmentation, CP4 includes habitat and recreational resources
35 improvements at up to six restoration sites. (See the description in Chapter 2,
36 “Alternatives.” The proposed improvements are shown in Figure 2-3.)

37 **Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to**
38 **Red Bluff)**

39 *Impact Trans-1 (CP4): Short-Term and Long-Term Increases in Traffic in the*
40 *Primary Study Area in Relation to the Existing Traffic Load and Capacity of the*
41 *Street System* Construction activities would temporarily increase traffic. This

1 short-term, temporary impact would be potentially significant. In the long term,
2 increased recreational opportunities and visitor days would result in additional
3 traffic on area roadways; however, the long-term impact would be less than
4 significant.

5 This impact would be similar to but greater than Impacts Trans-1 (CP1), Trans-
6 1 (CP2), and Trans-1 (CP3) because additional haul trips would be required for
7 construction, gravel augmentation, and habitat restoration. Approximately 175
8 round-trip haul trips per day are anticipated for trucking materials to the dam
9 site over a 5-year construction period. Approximately 53 round trips per day are
10 anticipated for trucking materials cleared from the land over the same period.
11 The total number of truck trips, 228 round trips per day, would not exceed the
12 ITE threshold of 50 new truck trips because the trips would be distributed over
13 an 8-hour workday. Approximately 29 trips would occur during the a.m. and
14 p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.). This is a greater number of daily
15 truck trips than under CP1, CP2, and CP3 and these daily truck trips would
16 occur for a longer duration than under CP1; therefore, the impact would be
17 greater than under CP1, CP2, and CP3. Because the number of truck trips
18 during the peak hours would not exceed the ITE threshold, this impact would be
19 less than significant.

20 Using the Redding Riffle site as the maximum-intensity option in terms of haul
21 truck trips affecting traffic for gravel augmentation, approximately 800 round
22 trips would be made during the September and August construction term under
23 CP4. This is based on placing 19,000 tons of gravel at the site and the capacity
24 of the haul trucks being 25 tons per load. With a total of 44 8-hour workdays (2
25 months excluding weekends), the number of daily haul trips would be 18 haul
26 trips per day. This would not exceed the ITE threshold of 50 new truck trips in
27 the peak-hour period even if all of the truck trips occurred during the peak-hour
28 period. Distributed over an 8-hour workday, two truck trips would occur during
29 the a.m. peak-hour period and two truck trips would occur during the p.m. peak-
30 hour period.

31 In addition to the haul trips for gravel augmentation, there would be haul trips
32 for removing approximately 15,650 cubic yards of fill material from up to 6
33 restoration sites. Haul trucks can carry 14 cubic yards. Therefore, a total of
34 approximately 1,118 haul trips would be required to remove the fill material.
35 With a total of 44 8-hour workdays (2 months excluding weekends), the number
36 of daily haul trips would be 25 haul trips per day. This would add
37 approximately three truck trips in both the a.m. and p.m. peak-hour periods.

38 Combining the 3 truck trips during the peak-hour period resulting from
39 removing the fill material from 1 or more of the restoration sites with gravel
40 augmentation and the 18.5-foot Shasta Dam raise and related activities,
41 approximately 37 peak-hour trips would occur. This is below the ITE threshold
42 of 50 new truck trips during the a.m. and p.m. peak hours.

1 In the long term, under CP4, traffic on area roads would increase by an
2 estimated average of 658 one-way trips per day. This is greater than under CP1,
3 CP2, and CP3; however, for the same reasons as described in CP1, this impact
4 would be less than significant.

5 In the short term, construction activities under CP4 are expected to result in a
6 potentially significant impact on traffic; but in the long term, for the same
7 reasons as described in CP1, the impact of traffic increases resulting from
8 expected growth and additional recreational opportunities would be less than
9 significant. Mitigation for this short-term impact is proposed in Section 20.3.5.

10 *Impact Trans-2 (CP4): Adverse Effects on Access to Local Streets and Adjacent*
11 *Uses in the Primary Study Area* Relocation of transportation facilities would
12 require either road closures and detours or partial road closures, or a
13 combination of both. This temporary direct impact would be potentially
14 significant. Indirect impacts on air quality, noise, and recreation resulting from
15 extended travel lengths, increased traffic near sensitive land uses, and limiting
16 or restricting access to recreational facilities are evaluated in the corresponding
17 chapters of this DEIS.

18 This impact would be the same as Impacts Trans-2 (CP2) and Trans-2 (CP3)
19 and similar to but greater than Impact Trans-2 (CP1) because the duration of
20 project construction under CP4 would be longer than under CP1. This impact
21 would be potentially significant. Mitigation for this impact is proposed in
22 Section 20.3.5. Potential indirect effects are evaluated in Chapter 5, “Air
23 Quality and Climate”; Chapter 8, “Noise and Vibration”; and Chapter 18,
24 “Recreation and Public Access.”

25 *Impact Trans-3 (CP4): Hazards in the Primary Study Area Caused by a Design*
26 *Feature* Relocated road segments and vehicular and railroad bridges would be
27 designed to current engineering design standards. This impact would be
28 beneficial.

29 This impact would be the same as Impact Trans-3 (CP3) and similar to Impacts
30 Trans-3 (CP1) and Trans-3 (CP2); however, like CP3, CP4 would result in a
31 greater beneficial effect than CP1 and CP2 because more bridges would be
32 replaced and constructed using current design standards under CP4 than under
33 CP1 or CP2. This impact would be beneficial. Mitigation for this impact is not
34 needed, and thus not proposed.

35 *Impact Trans-4 (CP4): Adverse Effects on Emergency Access in the Primary*
36 *Study Area during Construction* Road closures may result in increased
37 response times for emergency vehicles. This direct impact would be potentially
38 significant. Indirect impacts on air quality resulting from extended driving
39 lengths, increased emergency vehicle response times, and potential noise
40 impacts on sensitive receptors are discussed in the respective chapters of this
41 DEIS.

1 This impact would be the same as Impacts Trans-4 (CP2) and Trans-4 (CP3)
2 and similar to Impact Trans-4 (CP1). For the same reasons as described under
3 Impacts Trans-4 (CP2) and Trans-4 (CP3), the impact would be greater under
4 CP4 than under CP1, and this impact would be potentially significant.
5 Mitigation for this impact is proposed in Section 20.3.5. Potential indirect
6 effects are evaluated in Chapter 5, “Air Quality and Climate”; Chapter 8, “Noise
7 and Vibration”; and Chapter 22, “Public Services.”

8 *Impact Trans-5 (CP4): Accelerated Degradation of Surface Transportation*
9 *Facilities in the Primary Study Area* Trucks used to import fill material and
10 export construction waste would accelerate degradation of surface
11 transportation facilities used as haul routes. This impact would be potentially
12 significant.

13 This impact would be similar to Impacts Trans-5 (CP1), Trans-5 (CP2), and
14 Trans-5 (CP3), but would be greater because gravel augmentation would affect
15 more roadways for a longer duration. For the same reasons as described under
16 Impact Trans-5 (CP3), the impact would be potentially significant. Mitigation
17 for this impact is proposed in Section 20.3.5.

18 **Lower Sacramento River and Delta and CVP/SWP Service Areas** No
19 effects on traffic or transportation are expected to occur in the lower
20 Sacramento River and Delta or in the CVP/SWP service areas; therefore,
21 potential effects in those geographic regions are not discussed further in this
22 DEIS.

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

24 CP5 consists of raising Shasta Dam by 18.5 feet. The same transportation
25 facilities would be relocated under this alternative as under CP3 and CP4. CP5
26 would have an approximately 5-year construction period like CP2, CP3, and
27 CP4, compared to 4.5 years under CP1.

28 Like CP4, CP5 involves augmenting locations along the Sacramento River with
29 gravel. The assumptions stated for CP4 gravel augmentation are the same for
30 CP5.

31 Also like CP4, in addition to the construction of the dam raise, relocation of
32 transportation facilities, and gravel augmentation, CP5 includes habitat and
33 recreational resources improvements at up to six downstream restoration areas.
34 (See the description in Chapter 2, “Alternatives.” The proposed improvements
35 are shown in Figure 2-3.)

36 **Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to**
37 **Red Bluff)**

38 *Impact Trans-1 (CP5): Short-Term and Long-Term Increases in Traffic in the*
39 *Primary Study Area in Relation to the Existing Traffic Load and Capacity of the*
40 *Street System* Construction activities would temporarily increase traffic. This

1 short-term, temporary impact would be potentially significant. In the long term,
2 increased recreational opportunities and visitor days would result in an
3 additional 311 one-way trips on area roadways, similar to CP3; however, for the
4 same reasons as described in CP1, the long-term impact would be less than
5 significant.

6 This impact would be similar to but greater than Impacts Trans-1 (CP1), Trans-
7 1 (CP2), Trans-1 (CP3), and Trans-1 (CP4) because very limited additional
8 construction-related trips associated with enhancements to shoreline and
9 tributary aquatic habitat and recreational trails would be needed and 10 more
10 workers per year than under CP4. For the same reasons as described under
11 Impact Trans-1 (CP3) and Trans-1 (CP4), the impact would be potentially
12 significant. Mitigation for this impact is proposed in Section 20.3.5.

13 *Impact Trans-2 (CP5): Adverse Effects on Access to Local Streets and Adjacent*
14 *Uses in the Primary Study Area* Relocation of transportation facilities would
15 require either road closures and detours or partial road closures, or a
16 combination of both. This temporary direct impact would be potentially
17 significant. Indirect impacts on air quality, noise, and recreation resulting from
18 extended travel lengths, increased traffic near sensitive land uses, and limiting
19 or restricting access to recreational facilities are evaluated in the corresponding
20 chapters of this DEIS.

21 This impact would be the same as Impacts Trans-2 (CP2), Trans-2 (CP3), and
22 Trans-2 (CP4), but greater than Impact Trans-2 (CP1) because the duration of
23 project construction would be longer. This impact would be potentially
24 significant. Mitigation for this impact is proposed in Section 20.3.5. Potential
25 indirect effects are evaluated in Chapter 5, “Air Quality and Climate”; Chapter
26 8, “Noise and Vibration”; and Chapter 18, “Recreation and Public Access.”

27 *Impact Trans-3 (CP5): Hazards in the Primary Study Area Caused by a Design*
28 *Feature* Relocated road segments and vehicular and railroad bridges would be
29 designed to current engineering design standards. This impact would be
30 beneficial.

31 This impact would be the same as Impacts Trans-3 (CP3) and Trans-3 (CP4)
32 and similar to Impacts Trans-3 (CP1) and Trans-3 (CP2); however, like CP3
33 and CP4, CP5 would result in a greater beneficial effect than CP1 and CP2
34 because more bridges would be replaced and constructed using current design
35 standards under CP5 than under CP1 or CP2. This impact would be beneficial.
36 Mitigation for this impact is not needed, and thus not proposed.

37 *Impact Trans-4 (CP5): Adverse Effects on Emergency Access in the Primary*
38 *Study Area during Construction* Road closures may result in increased
39 response times for emergency vehicles. This direct impact would be potentially
40 significant. Indirect impacts on air quality resulting from extended driving
41 lengths, increased emergency vehicle response times, and potential noise

1 impacts on sensitive receptors are discussed in the respective chapters of this
2 DEIS.

3 This impact would be the same as Impacts Trans-4 (CP2), Trans-4 (CP3), and
4 Trans-4 (CP4) and similar to Impact Trans-4 (CP1). For the same reasons as
5 described under Impact Trans-4 (CP2), the impact would be greater under CP5
6 than under CP1 and would be potentially significant. Mitigation for this impact
7 is proposed in Section 20.3.5.

8 *Impact Trans-5 (CP5): Accelerated Degradation of Surface Transportation*
9 *Facilities in the Primary Study Area* Trucks used to import fill material and
10 export construction waste would accelerate degradation of surface
11 transportation facilities used as haul routes. This impact would be potentially
12 significant.

13 This impact would be similar to Impact Trans-5 (CP4) and greater than Impacts
14 Trans-5 (CP1), Trans-5 (CP2), and Trans-5 (CP3) because gravel augmentation
15 would affect more roadways for a longer duration. For the same reasons as
16 described under Impact Trans-5 (CP4), this impact would be potentially
17 significant. Mitigation for this impact is proposed in Section 20.3.5.

18 **Lower Sacramento River and Delta and CVP/SWP Service Areas** No
19 effects on traffic or transportation are expected to occur in the lower
20 Sacramento River and Delta or the CVP/SWP service areas; therefore, potential
21 effects in those geographic regions are not discussed further in this DEIS.

22 **20.3.5 Mitigation Measures**

23 Table 20-3 presents a summary of mitigation measures for potentially
24 significant and significant effects on transportation and traffic.

25 ***No-Action Alternative***

26 No mitigation measures are required for this alternative.

27 ***CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply*** 28 ***Reliability***

29 No mitigation is required for Impact Trans-3 (CP1). Mitigation is provided
30 below for the remaining impacts of CP1 on traffic and transportation.

Table 20-3. Summary of Mitigation Measures for Transportation and Traffic

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Trans-1: Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System	LOS before Mitigation	LTS	PS (short term), LTS (long term)	PS (short term), LTS (long term)	PS (short term), LTS (long term)	PS (short term), LTS (long term)	PS (short term), LTS (long term)
	Mitigation Measure	None required.	Mitigation Measure Trans-1: Prepare and Implement a Traffic Control and Safety Assurance Plan				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Trans-2: Adverse Effects on Access to Local Streets or Adjacent Uses in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Trans-2: To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1: Prepare and Implement a Traffic Control and Safety Assurance Plan				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Trans-3: Hazards in the Primary Study Area Caused by a Design Feature	LOS before Mitigation	LTS	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed				
	LOS after Mitigation	LTS	B	B	B	B	B
Impact Trans-4: Adverse Effects on Emergency Access in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Trans-4: To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1: Prepare and Implement a Traffic Control and Safety Assurance Plan				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS

Table 20-3. Summary of Mitigation Measures for Transportation and Traffic (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Trans-5: Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Trans-5: Identify and Repair Roadway Segments Damaged by the Project.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Trans-6 (No-Action only): Temporary Increase in Traffic in the Extended Study Area in Relation to the Existing Traffic Load and Capacity of the Street System	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
Impact Trans-7 (No-Action only): Adverse Effects on Access to Local Streets or Adjacent Uses in the Extended Study Area	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
Impact Trans-8 (No-Action only): Hazards in the Extended Study Area Caused by a Design Feature	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
Impact Trans-9 (No-Action only): Adverse Effects on Emergency Access in the Extended Study Area	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A

Table 20-3. Summary of Mitigation Measures for Transportation and Traffic (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Trans-10 (No-Action only): Accelerated Degradation of Surface Transportation Facilities in the Extended Study Area	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A

Key:
 B = beneficial
 LOS = level of significance
 LTS = less than significant
 N/A = not applicable
 PS = potentially significant

Mitigation Measure Trans-1 (CP1): Prepare and Implement a Traffic Control and Safety Assurance Plan

Before construction starts, Reclamation and its primary contractors for engineering and construction will develop a coordinated construction traffic control plan to minimize the simultaneous use of roadways by different construction contractors for worker commute trips, material hauling, and equipment delivery to the extent feasible. The plan will outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways. Reclamation will require that the construction contractors implement and enforce the plans throughout the construction periods. In addition, the plan will include the following elements:

- To the extent feasible, require construction contractors to limit truck trips to less than 50 trips per hour on any affected roadway during the morning and afternoon or evening peak-hour periods.
- To the extent feasible, limit the construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.
- Provide flagger control at construction zones to manage traffic control and flows as necessary.
- Install temporary steel-plate trench crossings, as needed, to maintain reasonable traffic, bicycle, and pedestrian access to homes, businesses, and streets.
- Maintain access for emergency vehicles at all times. Provide advance notification to local law enforcement, fire, and emergency service providers of the timing, location, and duration of construction activities that could affect the movement of emergency vehicles on local roadways.
- Post advance warning of construction activities (for any affected roadways that would be closed or major roadways where lane closures would occur) in the local newspaper(s) and/or coordinate with the local jurisdictions to post such warnings in highly visible locations near the affected roadways.
- Post advance warnings about the potential presence of slow-moving vehicles in construction zones, where needed to reduce potential traffic hazards.
- Place and maintain barriers and install traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Work Zones* and in accordance with the guidance provided by the affected local jurisdictions.

- 1 • Limit the accumulation of project-generated mud or dirt on roadways
2 adjacent to construction areas. The construction contractor will sweep
3 the affected paved roadways (water sweeper with reclaimed water
4 recommended) at the end of each day if substantial volumes of soil
5 material have been carried onto adjacent paved, public roads from
6 construction sites.

- 7 • Train construction personnel in appropriate safety measures as
8 described in the plan.

9 Reclamation will also inform the community at a public hearing about the
10 potential traffic delays and the preparation of the traffic control plan.

11 Implementation of this mitigation measure would reduce Impact Trans-1 (CP1)
12 to a less-than-significant level.

13 **Mitigation Measure Trans-2 (CP1): To Reduce Effects on Local Access,**
14 **Implement Mitigation Measure Trans-1 (CP1)** Reclamation will implement
15 Mitigation Measure Trans-1 (CP1) as described above to reduce adverse effects
16 of road closures and detours or partial road closures on access to local streets
17 and adjacent uses.

18 Implementation of this mitigation measure would reduce Impact Trans-2 (CP1)
19 to a less-than-significant level.

20 **Mitigation Measure Trans-4 (CP1): To Reduce Effects on Emergency**
21 **Access, Implement Mitigation Measure Trans-1 (CP1)** Reclamation will
22 implement Mitigation Measure Trans-1 (CP1) as described above to reduce
23 adverse effects of road closures on access by emergency vehicles.

24 Implementation of this mitigation measure would reduce Impact Trans-4 (CP1)
25 to a less-than-significant level.

26 **Mitigation Measure Trans-5 (CP1): Identify and Repair Roadway**
27 **Segments Damaged by the Project** The performance standard is to return
28 roadway segments damaged by the project to pre-project conditions. The
29 following measures will be implemented to require that Reclamation provides
30 compensation for the repair of roadways that are degraded as a result of hauling:

- 31 • The contractor(s) responsible to Reclamation for delivery of borrow
32 material shall identify all proposed haul routes on a map. The map will
33 identify the owner of the rights-of-way (ROW) that are proposed for
34 use as haul routes.

- 35 • The contractor(s) shall notify the owner of the ROW in writing and
36 request conditional approval to use the ROW as a haul route. The
37 contractor(s) shall submit a copy of the written request to Reclamation
38 for Reclamation's file.

- 1 • The contractor(s) shall implement the conditions of approval for use of
2 the haul route ROW. Conditions may include constructing repairs to
3 damaged lengths of roadway or the payment of fees to compensate for
4 roadway wear resulting from truck trips. Before commencement of
5 hauling activities, the contractor(s) shall submit a copy of the ROW
6 owner's conditional approval to Reclamation for Reclamation's file.

- 7 • Within 90 days after hauling activities are completed (that is the haul
8 route is no longer in use for the project term), the contractor(s) shall
9 submit a project close-out report to Reclamation to document
10 compliance with the conditions of approval. Reclamation will keep the
11 project close-out report on file.

12 Implementation of this mitigation measure would reduce Impact Trans-5 (CP1)
13 to a less-than-significant level.

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

16 No mitigation is required for Impact Trans-3 (CP2). Mitigation is provided
17 below for the remaining impacts of CP2 on traffic and transportation.

18 **Mitigation Measure Trans-1 (CP2): Prepare and Implement a Traffic**
19 **Control and Safety Assurance Plan** This mitigation measure is identical to
20 Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure
21 would reduce Impact Trans-1 (CP2) to a less-than-significant level.

22 **Mitigation Measure Trans-2 (CP2): To Reduce Effects on Local Access,**
23 **Implement Mitigation Measure Trans-1 (CP1)** This mitigation measure is
24 identical to Mitigation Measure Trans-2 (CP1). Implementation of this
25 mitigation measure would reduce Impact Trans-2 (CP2) to a less-than-
26 significant level.

27 **Mitigation Measure Trans-4 (CP2): To Reduce Effects on Emergency**
28 **Access, Implement Mitigation Measure Trans-1 (CP1)** This mitigation
29 measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of
30 this mitigation measure would reduce Impact Trans-4 (CP2) to a less-than-
31 significant level.

32 **Mitigation Measure Trans-5 (CP2): Identify and Repair Roadway**
33 **Segments Damaged by the Project** This mitigation measure is identical to
34 Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure
35 would reduce Impact Trans-5 (CP2) to a less-than-significant level.

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

38 No mitigation is required for Impact Trans-3 (CP3). Mitigation is provided
39 below for the remaining impacts of CP3 on traffic and transportation.

1 **Mitigation Measure Trans-1 (CP3): Prepare and Implement a Traffic**
2 **Control and Safety Assurance Plan** This mitigation measure is identical to
3 Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure
4 would reduce Impact Trans-1 (CP3) to a less-than-significant level.

5 **Mitigation Measure Trans-2 (CP3): To Reduce Effects on Local Access,**
6 **Implement Mitigation Measure Trans-1 (CP1)** This mitigation measure is
7 identical to Mitigation Measure Trans-2 (CP1). Implementation of this
8 mitigation measure would reduce Impact Trans-2 (CP3) to a less-than-
9 significant level.

10 **Mitigation Measure Trans-4 (CP3): To Reduce Effects on Emergency**
11 **Access, Implement Mitigation Measure Trans-1 (CP1)** This mitigation
12 measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of
13 this mitigation measure would reduce Impact Trans-4 (CP3) to a less-than-
14 significant level.

15 **Mitigation Measure Trans-5 (CP3): Identify and Repair Roadway**
16 **Segments Damaged by the Project** This mitigation measure is identical to
17 Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure
18 would reduce Impact Trans-5 (CP3) to a less-than-significant level.

19 ***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus***
20 No mitigation is required for Impact Trans-3 (CP4). Mitigation is provided
21 below for the remaining impacts of CP4 on traffic and transportation.

22 **Mitigation Measure Trans-1 (CP4): Prepare and Implement a Traffic**
23 **Control and Safety Assurance Plan** This mitigation measure is identical to
24 Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure
25 would reduce Impact Trans-1 (CP4) to a less-than-significant level.

26 **Mitigation Measure Trans-2 (CP4): To Reduce Effects on Local Access,**
27 **Implement Mitigation Measure Trans-1 (CP1)** This mitigation measure is
28 identical to Mitigation Measure Trans-2 (CP1). Implementation of this
29 mitigation measure would reduce Impact Trans-2 (CP4) to a less-than-
30 significant level.

31 **Mitigation Measure Trans-4 (CP4): To Reduce Effects on Emergency**
32 **Access, Implement Mitigation Measure Trans-1 (CP1)** This mitigation
33 measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of
34 this mitigation measure would reduce Impact Trans-4 (CP4) to a less-than-
35 significant level.

36 **Mitigation Measure Trans-5 (CP4): Identify and Repair Roadway**
37 **Segments Damaged by the Project** This mitigation measure is identical to
38 Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure
39 would reduce Impact Trans-5 (CP4) to a less-than-significant level.

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

2 No mitigation is required for Impact Trans-3 (CP5). Mitigation is provided
3 below for the remaining impacts of CP5 on traffic and transportation.

4 **Mitigation Measure Trans-1 (CP5): Prepare and Implement a Traffic**
5 **Control and Safety Assurance Plan** This mitigation measure is identical to
6 Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure
7 would reduce Impact Trans-1 (CP5) to a less-than-significant level.

8 **Mitigation Measure Trans-2 (CP5): To Reduce Effects on Local Access,**
9 **Implement Mitigation Measure Trans-1 (CP1)** This mitigation measure is
10 identical to Mitigation Measure Trans-2 (CP1). Implementation of this
11 mitigation measure would reduce Impact Trans-2 (CP5) to a less-than-
12 significant level.

13 **Mitigation Measure Trans-4 (CP5): To Reduce Effects on Emergency**
14 **Access, Implement Mitigation Measure Trans-1 (CP1)** This mitigation
15 measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of
16 this mitigation measure would reduce Impact Trans-4 (CP5) to a less-than-
17 significant level.

18 **Mitigation Measure Trans-5 (CP5): Identify and Repair Roadway**
19 **Segments Damaged by the Project** This mitigation measure is identical to
20 Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure
21 would reduce Impact Trans-5 (CP5) to a less-than-significant level.

22 **20.3.6 Cumulative Effects**

23 The majority of the past, present, and reasonably foreseeable projects are related
24 to the SLWRI through operations of Shasta Dam. The projects in the extended
25 study area are not evaluated further because construction of the SLWRI would
26 not affect transportation facilities in the extended study area. Projects that could
27 influence the local transportation network affected by the SLWRI include
28 implementation of the *Shasta-Trinity National Forest Land and Resource*
29 *Management Plan, Iron Mountain Mine Restoration Plan, and Mendocino*
30 *National Forest Land and Resource Management Plan*; and construction of the
31 Antlers Bridge Replacement. The geographic scope of the management plans is
32 vast while the geographic scope of the Antlers Bridge Replacement is relatively
33 limited. Individually and combined, none of these projects would result in
34 significant haul trips that would occur during the peak-hour period. The ITE
35 threshold of 50 trips during the peak-hour period on any particular route is not
36 expected because the actions would be distributed throughout a substantially
37 large study area compared to the area affected by the SLWRI. Another reason
38 that the ITE threshold would not be exceeded is that the forest and mine
39 management and restoration actions would take place over a long period and the
40 Antlers Bridge Replacement would be completed in 2014. Consequently, no
41 significant cumulative adverse effect on transportation or traffic presently exists
42 or would exist under the No-Action Alternative in the primary study area.

1 Potential impacts of the project alternatives (CP1–CP5) are related to
2 construction activities and increased vehicle trips resulting from increased
3 recreational opportunities at Shasta Lake and its tributaries. Construction
4 impacts would be temporary and short term, and recreational vehicle trips
5 would be permanent and long term.

6 For the following reasons, implementation of any of the project alternatives
7 (CP1–CP5), when combined with construction traffic for present and reasonably
8 foreseeable actions, would not result in a cumulatively considerable incremental
9 contribution to a significant cumulative adverse effect on localized traffic and
10 circulation. Under CP5, the maximum-intensity alternative, approximately 12
11 truck trips would be added to the a.m. and p.m. peak hours. These truck trips
12 would not occur simultaneously on the haul routes. They would be distributed
13 throughout the shoreline region of the lake, gravel augmentation sites (the sites
14 that would change annually), and up to six restoration sites on the Sacramento
15 River. The truck trips for the gravel augmentation and restoration activities
16 would occur during a 2-month period, while the eight peak-hour trips upstream
17 from Shasta Dam would occur over a much longer portion of the construction
18 year. To result in a significant cumulative adverse effect on traffic and
19 circulation, the present reasonably foreseeable future projects would need to
20 generate 38 trips during the a.m. or p.m. peak hour. Because of the large
21 geographic scope and length of time for implementing the present and
22 reasonably foreseeable future projects, it is reasonable that they would not
23 generate peak-hour truck trips that would be 68 percent more than the peak-hour
24 truck trips that would be generated by CP5. Furthermore, the cumulative peak-
25 hour truck trips would not be concentrated at any one road segment or
26 intersection.

27 For the reasons set forth for adverse effects of construction traffic on localized
28 traffic and circulation problems, construction traffic under any of the project
29 alternatives (CP1–CP5) would not result in a cumulatively considerable
30 incremental contribution to a significant cumulative adverse effect on
31 emergency access.

32 For potential accelerated degradation of roadways from construction traffic,
33 none of the construction alternatives (CP1–CP5) would result in cumulatively
34 adverse effects. The reason is that the mitigation measure for these alternatives
35 requires physical repair of damaged roadways to pre-project conditions, thereby
36 eliminating the adverse effects of the alternatives. Implementation of Mitigation
37 Measure Trans-5 (CP1) would ensure that the roadways would be equal to or in
38 better condition than under preproject conditions. In addition, roads and bridges
39 that would be relocated under any of the project alternatives would be
40 modernized using current design standards and would likely be replaced before
41 they were scheduled for replacement by the local transportation agencies.

1 In conclusion, with implementation of any of the project alternatives (CP1–
2 CP5), no significant cumulative adverse effects would occur on traffic and
3 circulation, emergency access, or transportation facilities.

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