# Chapter 22
# Public Services

## 22.1 Affected Environment

This section describes the affected environment related to public services for the dam and reservoir modifications proposed under SLWRI action alternatives. The public services addressed are fire protection, emergency services, law enforcement, and schools. Utilities, sewer services, and water supply are analyzed in Chapter 21, "Utilities and Service Systems," of this DEIS.

Because of the potential influence of the proposed modification of Shasta Dam and water deliveries over a large geographic area, the SLWRI includes both a primary study area and an extended study area. The primary study area has been further divided into the Shasta Lake and vicinity portion and the upper Sacramento River (Shasta Dam to Red Bluff) portion. The extended study area has been further divided into the lower Sacramento River and Delta portion, and the CVP/SWP service areas portion.

The public services setting for Shasta Lake and vicinity consists of the portion of Shasta County above Shasta Dam. Public services needs in this region are influenced by rugged, mountainous terrain, rural lakeside communities, and Shasta Lake. The public services setting for the upper Sacramento River portion of the primary study area consists of Shasta County below Shasta Dam and Tehama County. Public services needs in this area are influenced by topography and population densities. Four incorporated cities—the Cities of Shasta Lake, Redding, Anderson, and Red Bluff—create an urban setting in the otherwise rural upper Sacramento Valley, which is characterized by rolling hills with mountains to the north, east, and west.

The public services setting for the extended study area consists of 24 counties downstream from Red Bluff and encompasses all areas served by the CVP and the SWP.

Table 22-1 lists the public service providers considered in this DEIS.

**Table 22-1. Key Public Service Providers**

| Fire Protection Services |
|---|
| U.S. Forest Service |
| California Department of Forestry and Fire Protection |
| Shasta County Fire Department |
| Tehama County Fire Department |
| Redding Fire Department |
| Shasta Lake Fire Protection District |
| Anderson Fire Protection District |
| Red Bluff Fire Department |
| Corning Volunteer Fire Department |
| **Emergency Services** |
| California Highway Patrol |
| California Office of Emergency Services |
| Shasta County Sheriff's Office |
| Tehama County Sheriff's Department |
| Shasta Area Safety Communications Agency |
| Shasta Regional Medical Center |
| Mercy Medical Center Redding |
| Shasta Community Health Center |
| St. Elizabeth Community Hospital |
| **Law Enforcement** |
| U.S. Forest Service |
| U.S. Bureau of Land Management |
| California Highway Patrol |
| California Department of Fish and Wildlife |
| Shasta County Sheriff's Office |
| Tehama County Sheriff's Department |
| Red Bluff Police Department |
| Corning Police Department |
| **Schools** |
| Gateway Unified School District |

### 22.1.1 Fire Protection Services

Fire protection services consist of fire suppression, emergency dispatching, specialized training, fire prevention, fire safety education, and emergency medical response. Chapter 9 (Hazards and Hazardous Materials and Waste) describes the fire risk and provides historic fire data for the primary and extended study areas.

### *Shasta Lake and Vicinity*

The Shasta County Fire Department (SCFD) and the California Department of Forestry and Fire Protection (Cal Fire) respond to nonwildland fires in the Shasta Lake and vicinity portion of the primary study area. Nonwildland fires consist of structural, chemical, petroleum, electrical, vehicle, and other fires that involve human-made materials. Cal Fire and USFS are responsible primarily for wildland fires, which consist of fires in vegetated areas such as forests, chaparral, and grassland.

Cal Fire and USFS generally respond according to established jurisdictional boundaries. Under an agreement with the U.S. Department of the Interior, Bureau of Land Management (BLM), Cal Fire provides fire protection resources for lands managed by BLM throughout the primary study area. Additionally, a fire protection agreement between Cal Fire and USFS provides for the sharing of fire protection resources to augment the capabilities of each agency (USFS 1995). In practice, SCFD, Cal Fire, and USFS provide mutual assistance when needed.

The National Interagency Fire Center, located in Boise, Idaho, assists with wildland fire suppression nationwide. The center represents a collaboration among seven Federal agencies: the Bureau of Indian Affairs, BLM, USFS, USFWS, the National Park Service, the National Weather Service, and the Office of Aircraft Services. These agencies work together to coordinate and support wildland fire and disaster operations. Cal Fire and the California Emergency Management Agency (Cal EMA) (formerly Governor's Office of Emergency Services (OES)) work closely with these agencies to manage wildland fire operations.

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

Fire protection services in the upper Sacramento River portion of the primary study area are similar to those in the Shasta Lake and vicinity portion. SCFD and the Tehama County Fire Department (TCFD) are responsible primarily for nonwildland fires, and Cal Fire and USFS respond primarily to wildland fires.

In Shasta County, the Redding Fire Department, SCFD, and Cal Fire have mutual aid agreements to ensure adequate fire protection services and to share resources. Under these agreements, the agencies respond to emergencies in Shasta County that are in adjacent jurisdictions.

Fire departments serving the unincorporated areas of Shasta County include 1 SCFD station that is housed in Redding, 12 community fire districts, and 19 volunteer fire companies. Cal Fire operates several fire stations during the off-season winter months, through an agreement with BLM and local fire departments. The community fire districts operate

autonomously; the remaining fire departments, fire stations, and the Shasta County Fire District fall under the jurisdiction of SCFD.

The Cities of Shasta Lake, Redding, and Anderson are incorporated cities in Shasta County. Fire protection in Redding is provided by the Redding Fire Department, which has 8 fully equipped stations and 72 full-time employees. The City of Shasta Lake provides fire protection, supported by 3 fire stations with 27 employees. The Anderson Fire Protection District provides service to Anderson and operates 2 fire stations with 15 employees.

Shasta and Tehama counties share fire protection resources along their shared county line, through a mutual aid agreement. Like SCFD, TCFD has mutual aid agreements with local fire protection agencies that operate in the county. One difference between Shasta and Tehama counties is the level of integration with Cal Fire: TCFD is fully integrated with Cal Fire, which administers fire protection services in all unincorporated areas of the county except for the areas covered by the Gerber and Capay fire protection districts.

TCFD provides fire protection services for the residents of Tehama County through a network of 16 fire stations and 15 volunteer fire companies. Five of the stations, Los Molinos, Corning, Bowman, El Camino, and Antelope, are staffed 24 hours a day, year round. The distribution of stations places most residents of Tehama County within 5 road miles of a responding fire station.

Red Bluff and Corning are incorporated cities in Tehama County; both cities provide fire protection services for their residents. Fire protection in Red Bluff is provided by the Red Bluff Fire Department. The Corning Volunteer Fire Department, which employs full-time staff assisted by volunteers, provides fire protection for the incorporated area of Corning.

Other fire protection services in Tehama County include the Gerber Fire Protection District, Lassen Volcanic National Park, Capay Fire Protection District, and Cottonwood Fire Protection District.

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

Fire protection services in the extended study area are similar to those discussed for the primary study area. However, urban population densities are higher in parts of the extended study area, which influences the types and extent of the fire protection services that are provided. Cities and counties in the extended study area provide fire protection services primarily for nonwildland fires, and Cal Fire and USFS provide fire protection services primarily for wildland fires.

### 22.1.2 Emergency Services

Emergency services consist of emergency preparation, response, and recovery efforts. Emergencies range from calls for medical assistance to individuals, to large-scale disasters, such as evacuations resulting from wildland fires and floods.

#### *Shasta Lake and Vicinity*

The Shasta County Sheriff's Office (SCSO) is responsible for coordinating emergency services on Shasta Lake and in the unincorporated areas of Shasta County upstream from Shasta Dam. Large-scale emergency services are handled by SCSO, in cooperation with the State emergency response network run by Cal EMA. As of 1996, OES (now Cal EMA) had designated emergency service "Operational Areas" for all California counties, cities, and special districts (e.g., school, water, and waste reclamation districts). Shasta Lake and vicinity is located in the Region 3 Operational Area, which consists of 12 Northern California counties. Emergency services providers can be called on to assist with emergencies that occur in their designated region and to assist the Central and South emergency services regions. Cal Fire, USFS, BLM, the Federal Emergency Management Agency, and the American Red Cross also provide assistance in large-scale emergencies.

SCSO provides emergency services, including patrol boats and deputies, at Shasta Lake from a substation at Bridge Bay Marina. Medical aid is provided by Shasta County fire departments and private ambulance companies, including land and air ambulance services, based in the Redding area.

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

Emergency services in the upper Sacramento River area are similar to those described in the previous section. SCSO is responsible for coordinating emergency services in the Shasta County part of the upper Sacramento River area, and the Tehama County Sheriff's Department is responsible for coordinating emergency services in the Tehama County part. Both county agencies coordinate emergency services with Cal EMA and serve as the emergency services headquarters during declared public emergencies.

A number of emergency services agencies in Shasta County have formed a joint-powers agency, called the Shasta Area Safety Communications Agency, to consolidate emergency services related to fire, medical services, and law enforcement. Current participants include the Redding Fire Department, the Redding Police Department, and SCSO. American Medical Response, Redding Medical Center, and Mercy Medical Center in Redding participate in the Shasta Area Safety Communications Agency under a contractual agreement for ambulance

services. Emergency medical response is also provided by St. Elizabeth Community Hospital in Red Bluff.

The Tehama County Sheriff's Department is responsible for emergency services coordination in Tehama County. In addition, TCFD responds to some medical emergencies in Tehama County.

The California Highway Patrol (CHP), Northern Division, provides ground and air support for emergencies along the Interstate 5 (I-5) corridor and State highways throughout the primary study area. CHP maintains two A-star helicopters and two Cessna airplanes that are used to assist other agencies with search and rescue, and fire response. In addition, CHP assists with traffic control during emergencies.

Emergency services in the upper Sacramento River area are also supplemented by Cal Fire, USFS, the Federal Emergency Management Agency, and the American Red Cross.

Several hospitals and other facilities in Shasta and Tehama County provide emergency and urgent care services. Shasta Regional Medical Center, Mercy Medical Center Redding, and Shasta Community Health Center are located in Redding and serve the Shasta Lake and Redding areas. St. Elizabeth Community Hospital is located in Red Bluff and serves Tehama County.

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

Emergency services in the extended study area are similar to those discussed for the primary study area. Cities and counties in the extended study area are primarily responsible for providing emergency services, and they receive assistance from regional, State, and Federal agencies for emergencies that require resources beyond the capability of the local jurisdiction.

### 22.1.3 Law Enforcement

Law enforcement services consist of crime prevention, investigation, and apprehension of lawbreakers and include duties to keep the peace and protect life and property. Law enforcement agencies often enter into cooperative aid agreements with neighboring or overlapping law enforcement jurisdictions to consolidate resources and facilitate communication.

#### *Shasta Lake and Vicinity*

Law enforcement services in the Shasta Lake and vicinity portion of the primary study area are provided by SCSO, CHP, CDFW, BLM, and USFS. In general, the nature of an offense or law enforcement duty establishes jurisdiction. SCSO has primary responsibility for conflicts between people and most violations of State law, CHP handles most

traffic violations, CDFW enforces State fish and game laws, and BLM/USFS handle violations of Federal law.

Agencies responsible for law enforcement on Shasta Lake and the surrounding area carry out their duties from several locations. SCSO operates a substation in the city of Shasta Lake with nine assigned deputies and another substation in Lakehead with two resident deputies. Because of the nature and volume of human activity around Shasta Lake, SCSO also maintains a substation at Bridge Bay Marina, located on the main dock above the store. SCSO's boat dock is located on the main dock near the substation. Services provided by SCSO include search and rescue, safety patrol boats, boating safety education, emergency services, and animal control.

USFS and BLM use Federal law enforcement officers with jurisdiction on Federal lands. USFS and BLM do not assume the Sheriff's responsibilities; instead, they enforce the Federal codes that govern public behavior on lands managed by USFS and BLM. The CDFW Northern District enforcement unit is based in Redding and provides law enforcement related to State fish and game laws in Shasta, Trinity, and Tehama counties.

Traffic law enforcement along I-5, State routes, and State highways is provided primarily by the Northern Division of CHP. CHP operates several offices in the primary study area, including offices in Redding and Red Bluff.

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

Reclamation's Security, Safety and Law Enforcement (SSLE) Office, located in Denver, is responsible for protecting the public, Reclamation employees, and Reclamation facilities through the development and implementation of an integrated security, safety, and law enforcement program. The SSLE Office manages security, safety, and law enforcement for Reclamation programs and projects such as Shasta Dam; develops Reclamation-wide policies and guidelines governing these programs; and provides oversight of program execution in Reclamation field offices.

SCSO provides law enforcement services for the unincorporated areas of Shasta County. County law enforcement operations are based in Redding. Sheriff substations are located in Burney, the city of Shasta Lake, and Shingletown. The incorporated cities of Redding and Anderson provide law enforcement services for their residents. USFS and BLM use Federal law enforcement officers with jurisdiction on Federal lands.

The Tehama County Sheriff's Department office is located in Red Bluff. The sheriff is the chief law enforcement officer of Tehama County, with jurisdiction throughout the unincorporated county, the incorporated cities, and State-owned property. The incorporated cities of Red Bluff and Corning provide law enforcement services for their residents.

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

Law enforcement services in the extended study area are similar to those discussed for the primary study area. Counties maintain sheriff's departments that have jurisdiction within the county boundaries, and incorporated cities maintain police departments that have jurisdiction within the city limits. However, urban population densities are higher in parts of the extended study area, which influences the types and extent of law enforcement services provided. USFS and BLM use Federal law enforcement officers with jurisdiction on Federal lands.

### 22.1.4 Schools

School districts are autonomous entities responsible for providing educational services for elementary, middle school, and high school students. Districts elect their own governing boards and appoint their own superintendents. County offices of education assist the school districts with administrative and curricular support.

***Shasta Lake and Vicinity***

No schools are located in the Shasta Lake and vicinity portion of the primary study area. The Gateway Unified School District serves residents in this area and previously operated Canyon Elementary in Lakehead. This school, however, is currently closed.

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

School districts in the upper Sacramento River area serve students in levels kindergarten through grade 12. Shasta County is served by 25 school districts, and Tehama County is served by 21 school districts. The California Community College system provides continuing education services at locations in Shasta County and Tehama County. Simpson University, located in Redding, also provides college-level educational services.

The Gateway Unified School District operates several schools in Shasta County. Mountain Lakes High School (grades 10 through 12) and Shasta Lake Alternative School (kindergarten through grade 12) are located at the northeast corner of the intersection of Lake Boulevard and Shasta Dam Boulevard.

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

Educational services in the extended study area are similar to those discussed for the primary study area. Cities and counties form school

districts to provide educational services for children between 6 and 18 years of age. Numerous community colleges and 4-year colleges and universities are also located in the extended study area. Urban population densities are higher in parts of the extended study area, which influences the variety of educational services provided.

## 22.2 Regulatory Framework

### 22.2.1 Federal

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

USFS personnel conduct their responsibilities for regulating the use of and protecting national forest lands under Title 36 and sections of Titles 16, 18, and 21 of the Code of Federal Regulations. Public services directives from the Code of Federal Regulations are integrated into the Shasta-Trinity National Forest Land and Resource Management Plan (LRMP), which includes the following topics: fire and fuels management, facilities management, law enforcement, and land management.

The LRMP identifies goals, standards, and guidelines related to public services in Shasta-Trinity National Forest. The following goals, standards, and guidelines related to public services in Shasta-Trinity National Forest have been excerpted from the LRMP (USFS 1995):

**Fire and Fuels Goals (LRMP, p. 4-4)**

- Achieve a balance of fire suppression capability and fuels management investments that are cost effective and able to meet ecosystem objectives and protection responsibilities.

**Fire and Fuels Standards and Guidelines (LRMP, p. 4-17)**

- Wildland fires will receive an appropriate suppression response that may range from confinement to control. Unless a different suppression response is authorized in this plan, or subsequent approved plans, all suppression responses will have an objective of "control."

- All wildland fires, on or threatening private land protected by agreement with the State of California, will receive a "control" suppression response.

- Fire prevention efforts will be designed to minimize human-caused wildfires commensurate with the resource values at risk.

**Facilities Goals (LRMP, p. 4-4)**

- Provide and maintain those administrative facilities that effectively and safely serve the public and USFS workforce.

**Facilities Standards and Guidelines (LRMP, p. 4-17)**

- Manage, construct, and maintain buildings and administrative sites to meet applicable codes and to provide the necessary facilities to support resource management.

- Closure of roads and/or selected areas to assist in management of Forest resources may be made by regulatory and/or physical devices on the road for the following purpose[s]: safety, fire, and general administrative purposes.

**Law Enforcement Goals (LRMP, p. 4-5)**

- Establish priority in law enforcement activities as follows: (a) provide for employee and public safety, (b) protect resources and property, (c) provide for the accomplishment of management objectives, and (d) prevent violation of laws and associated loss and damage.

**Law Enforcement Standards and Guidelines (LRMP, p. 4-21)**

- Protect the public interest by a thorough and aggressive program of violation prevention, violation detection, investigation and apprehension of violators, and prosecution.

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

BLM manages a number of public lands adjacent to the Sacramento River corridor downstream from Shasta Dam. The study area falls under two BLM districts (Northern California and Central California) and the resource management plans of three BLM field offices: Redding, Ukiah, and Mother Lode (BLM 2006a). The purpose of BLM's resource management plans is to provide overall direction for managing and allocating public resources in each planning area. The Resource Management Plan (RMP) for the Redding field office states that any fire occurring on public lands would be suppressed.

### 22.2.2 State

***Standardized Emergency Management Systems***

The Standardized Emergency Management Systems law (Government Code Section 8607) directs Cal EMA (formerly OES) to establish, implement, and maintain a coordinated emergency response system. The California Mutual Aid Agreement defines responsibilities and resource sharing between agencies to ensure that adequate resources, facilities, and other support are provided to jurisdictions when their own resources are insufficient to cope with the needs of a given emergency.

#### *California Education Code*

The California Education Code provides educational goals and requirements for the educational providers in the state (Title 5 of the California Code of Regulations). It governs school district formation and operation, county board of education authorities and responsibilities, and educational criteria for children between 6 and 18 years of age.

#### *California Fire Plan*

The California Fire Plan provides guidance for reducing the risk of wildfire. The following are the basic principles of the fire plan:

- Community involvement
- Community risk assessment
- Development of solutions and implementation of projects

### 22.2.3 Regional and Local

#### *Shasta County General Plan*

The *Shasta County General Plan* (Shasta County 2004) identifies goals, objectives, and policies related to public services in Shasta County. Fire protection and law enforcement services are discussed in the section titled "Fire Safety and Sheriff Protection." Schools are discussed in the section titled "Public Facilities."

#### *Tehama County General Plan Update 2009–2029*

The *Tehama County General Plan Update 2009–2029* (Tehama County 2009) identifies goals, objectives, and policies for public services in Tehama County. The public services element of the general plan addresses concerns associated with growth and development as they relate to public services, including schools. The safety element addresses potential dangers and damages associated with fire, floods, earthquakes, landslides, and other hazards.

## 22.3 Environmental Consequences and Mitigation Measures

### 22.3.1 Methods and Assumptions

This section addresses potential impacts associated with implementation of the project on the following public services: law enforcement, fire protection, emergency services, and schools. The analysis is based on a review of planning documents applicable to the project area, consultation with various agencies, and field reconnaissance.

### 22.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with the NEPA must consider the context and intensity of the environmental effects that

would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with the CEQA must identify the potentially significant environmental effects of a project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria are based on guidance provided by the State CEQA Guidelines and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative on public services would be significant if project implementation would do any of the following:

- Interfere with emergency services
- Degrade the level of service of a public service
- Require relocating public service facilities
- Require substantial improvements to the facilities or level of staffing of a public service to maintain its existing level of service

### 22.3.3 Topics Eliminated from Further Consideration

No topics were eliminated from consideration.

### 22.3.4 Direct and Indirect Effects

#### *No-Action Alternative*

The impact discussion for the No-Action Alternative addresses Shasta Lake and vicinity and the upper Sacramento River together because this alternative would not affect land use in any of the primary study area locations. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because the distance from the project area would result in similar impacts.

**Shasta Lake and Vicinity, Upper Sacramento River (Shasta Dam to Red Bluff), Lower Sacramento River and Delta, and CVP/SWP Service Areas**

*Impact PS-1 (No-Action): Disruption of Public Services* Under the No-Action Alternative, no new facilities would be constructed in the primary or extended study areas, and no changes in Reclamation's

existing facilities or operations would occur that would directly or indirectly result in the disruption of public services in the project area. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

*Impact PS-2 (No-Action): Degraded Level of Public Services* Under the No-Action Alternative, no new facilities or infrastructure would be constructed in the primary or extended study areas and no changes in Reclamation's existing facilities or operations would occur that would directly or indirectly result in degraded levels of public services in the project area. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

*Impact PS-3 (No-Action): Relocation of Public Service Facilities* Under the No-Action Alternative, no new facilities would be constructed in the primary or extended study areas and no changes in Reclamation's existing facilities or operations would occur that would directly or indirectly result in the relocation of public service facilities in the project area. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

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

The impact discussion for CP1 addresses Shasta Lake and vicinity and upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

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

*Impact PS-1 (CP1): Short-Term Disruption of Public Services* Project construction could result in short-term disruption of emergency services response as well as short-term disruption to school bus services throughout the Gateway Unified School District. Short-term traffic delays and access restrictions would require traffic controls and coordination with public services agencies. Although Reclamation would implement measures to lessen short-term disruption of public services, this impact would be potentially significant.

Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency

supplies, including food and shelter for emergency crews and public services staff, could also be affected by project implementation because of temporary increases in the work force.

Direct impacts could include disruption of traffic flows and street operations through temporary lane closures, detours, blockages, and restrictions on curbside parking; these impacts could result in delays for emergency services vehicles and school buses traveling through or around construction zones. In addition, project construction could cause short-term interruptions in power and telecommunications services, which could affect emergency response capabilities in the primary study area.

Construction activities that could disrupt emergency services and school bus service in the primary study area include road and bridge replacement, telecommunications facility replacement, power facility replacement, vegetation clearing for utility relocation, structure removal, marina relocation, and emergency services facility relocation. Reclamation estimates that construction activities for CP1 would take 4.5 years.

Routes proposed for transporting construction materials to the dam consist of I-5 and local roads, particularly Shasta Dam Boulevard and Lake Boulevard. These routes are used primarily by Reclamation personnel to access the Shasta Dam facilities, by visitors and tourists, and by residents of the city of Shasta Lake. At this time, no detours or lane closures are proposed for the portions of Shasta Dam Boulevard and Lake Boulevard that serve the city of Shasta Lake. Road closures would likely be required adjacent to the facilities in the immediate vicinity of Shasta Dam and Reclamation's Northern California Area Office.

The Gateway Unified School District covers Shasta Lake and vicinity and portions of the upper Sacramento River area. Project construction could result in traffic delays and the need to reroute local traffic to ensure public health and safety. School bus routes could be temporarily affected by road closures and detours during project construction in communities around Shasta Lake.

Several roads around Shasta Lake would be affected by infrastructure, utility, and marina relocation activities. These activities could require road closures, detours, or traffic restrictions.

Emergency supplies and resources that could be affected by project implementation include food, shelter for emergency crews and local residents, and public services staff and equipment. Project construction activities are located within commuting distance of Redding, where

ample food and shelter are available in emergencies. The Cal EMA network could supplement local emergency services staffing and equipment levels. However, Cal EMA may not be able to provide assistance when wildfires in the state require Cal EMA resources.

Construction activities at Shasta Dam and various locations surrounding Shasta Lake could affect emergency response capabilities throughout Shasta County (i.e., in a portion of the upper Sacramento River area) because the areas share emergency services resources and responsibilities.

In summary, project construction could result in short-term disruption of school bus services throughout the Gateway Unified School District. Short-term traffic delays and access restrictions would require traffic controls and coordination with public services agencies. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-2 (CP1): Degraded Level of Public Services* Project implementation could temporarily degrade local public resources. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services would not be substantially degraded by construction activities, this impact would be potentially significant.

Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure combined with possible consolidation of recreational facilities (e.g., USFS administrative facilities, campgrounds, boat ramps, marinas) could result in changing demands for public services. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the locations of some public services, which could affect the areas where the public services are currently located.

Project implementation could also result in degraded levels of public services in the upper Sacramento River portion of the primary study area because the Shasta Lake area and parts of the upper Sacramento River area share public services. Project construction activities at Shasta Lake could require the use of public services resources that could be needed simultaneously for public services assistance in the upper Sacramento River area.

Reclamation estimates that CP1 would take 4.5 years to complete. Public services levels that are increased as a result of the project would return to pre-project levels once construction activities were completed. However, project implementation could temporarily degrade local public resources. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-3 (CP1): Relocation of Public Services* The project would require relocation of some public service facilities in the Shasta Lake and vicinity portion of the primary study area. No public services facilities in the upper Sacramento River portion of the primary study area would need to be relocated. This impact would be less than significant.

The Whiskeytown-Shasta-Trinity National Recreation Area is managed by USFS, which has several facilities throughout the reservoir area. Two USFS facilities would be inundated and thus would require relocation or replacement. The work station located in the Lakeshore area would be inundated by raising Shasta Dam and would have to be relocated to an area above the new full pool. The new facility would contain all of the features that exist at the current facility. The inundated facility would be demolished and hauled to waste. At Turntable Bay, another USFS facility would be inundated by the raising of Shasta Dam. Additional space at Turntable Bay would allow for the facility to be relocated on fill in the current location. Also, the SCSO substation and dock at the Bridge Bay Marina could need to be relocated within the marina complex. Reclamation would construct the replacement facilities before abandonment and demolition of the existing facilities, thereby ensuring that levels of public services provided by these facilities would not be adversely affected by the relocation process. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

*Impact PS-4 (CP1): Short-Term Disruption of Public Services* Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. The northern end of the extended study area would be more than 30 miles from the nearest project construction activities. Emergency services providers with mutual aid agreements that could be called on to assist with emergencies resulting from project activities are located in the primary study area. Project construction activities in the primary study area that could disrupt public services would be too far removed from the extended study area to disrupt emergency services or law enforcement serving areas south of Red Bluff. Project implementation would not disrupt school bus service in the extended study area because school districts

located in the extended study area would not operate school bus routes in or near project construction activities. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-5 (CP1): Degraded Levels of Public Services* Construction activities are not expected to affect public service levels in the extended study area. Existing facilities, personnel, and equipment in the extended study area could provide short-term assistance for project-related public services needs without degrading public services levels in the extended study area. This impact would be less than significant.

The northern end of the extended study area would be more than 30 miles from the nearest project construction activities. Public services providers with mutual aid agreements that could be called on to assist with law enforcement, fire suppression, or other emergencies resulting from project activities are located in the primary study area. Project construction activities around Shasta Lake are too far removed from the extended study area to disrupt public services below Red Bluff. Public services providers located in the extended study area could be called on by Cal EMA to assist with large-scale emergencies in the primary study area that resulted from project implementation. However, existing facilities, personnel, and equipment in the extended study area would be adequate to maintain current levels of service while providing assistance to the primary study area.

Indirect impacts on public services in the extended study area could result from traffic accidents associated with the transport of project materials and workers. Some project materials and workers could originate in the extended study area, requiring northbound travel to the primary study area. At this time, Reclamation estimates that the project would employ 350 workers. Project-related travel that would likely occur on I-5, the railway, or via air transport is not anticipated to result in accidents in the extended study area that would require significant response from law enforcement, fire protection, or emergency services providers; however, the fact that traffic accidents resulting from project-related travel could occur in the extended study area means that the possibility of travel-related accidents would exist. Existing facilities, personnel, and equipment in the extended study area are expected be adequate to maintain current levels of service while providing assistance for any such accidents.

Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-6 (CP1): Relocation of Public Services Facilities* Project implementation would not result in the relocation of public services facilities in the extended study area. Therefore, public services in the extended study area would not be affected by relocation of public services facilities. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

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

The impact discussion for CP2 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

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

*Impact PS-1 (CP2): Short-Term Disruption of Public Services* Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant.

Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near the relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity of Shasta Lake, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (e.g., food, shelter for emergency crews, public services staff) could also be affected by project implementation.

Impacts related to short-term disruption of emergency services that would result from implementing the 12.5-foot dam raise (CP2) are similar to those identified for the 6.5-foot dam raise (Impact PS-1 (CP1)). However, the duration of the impacts would be longer for CP2 because construction activities associated with the 12.5-foot dam raise would take more time than under the 6.5-foot dam raise. The 12.5-foot dam raise would require significantly more concrete and is anticipated to take 6 more months to construct than the 6.5-foot dam raise (CP1).

The increased amount of infrastructure demolition and relocation activity associated with CP2 would also require more time than under CP1. More structures would need to be demolished and relocated, and additional power and telecommunication lines would need to be relocated. Additional septic systems and wells would also require demolition and relocation, and 20 additional road segments would need to be realigned for CP2. The increased construction activity in the Shasta Lake and vicinity portion of the primary study area under CP2 would extend the duration of potential disruption to emergency services and school bus service in that area. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-2 (CP2): Degraded Levels of Public Services* Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services would not be substantially degraded, this impact would be potentially significant.

Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure combined with possible consolidation of recreational facilities (e.g., campgrounds, boat ramps, marinas) could result in changing demands for public services. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the locations of some public services, which could affect the areas where the resources are currently located.

This impact would be similar to Impact PS-2 (CP1). However, the impacts would last longer for CP2 than CP1 because more time would be needed to complete project construction under the 12.5-foot dam raise. Reclamation estimates that CP2 would take 5 years to complete. Project implementation could temporarily degrade local public services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-3 (CP2): Relocation of Public Services Facilities* This impact would be similar to Impact PS-3 (CP1). Facility relocation would not degrade levels of public services when the public service agencies relocated to their new facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

*Impact PS-4 (CP2): Short-Term Disruption of Public Services* This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-5 (CP2): Degraded Levels of Public Services* This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-6 (CP2): Relocation of Public Services Facilities* This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public service facilities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

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

The impact discussion for CP3 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

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

*Impact PS-1 (CP3): Short-Term Disruption of Public Services* Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant.

Construction activities associated with enlarging Shasta Dam and the related infrastructure (e.g., road relocations, bridge replacements) near the dam and near the relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the

vicinity, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (food, shelter for emergency crews, public services staff) could also be affected by project implementation.

This impact would be similar to Impact PS-1 (CP1). However, the impact would last longer for CP3 because construction activities associated with the 18.5-foot dam raise would take more time than for the 6.5-foot dam raise. Reclamation estimates that the 18.5-foot dam raise would take 5 years. The 18.5-foot dam raise would require significantly more concrete and is anticipated to take 6 more months to construct than the 6.5-foot dam raise (CP1). The increased amount of infrastructure demolition and relocation activity associated with CP3 would also require more time than for CP1. Almost twice as many structures would need to be demolished and relocated, and additional power and telecommunication lines would require removal and relocation. Additional septic systems and wells would be abandoned and relocated, and 25 more road segments would be realigned. The increased construction activity at Shasta Dam and in the surrounding area would extend the time of potential disruption to emergency services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-2 (CP3): Degraded Levels of Public Services* Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded, this impact would be potentially significant.

Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure, combined with possible consolidation of recreational facilities (e.g., campgrounds, boat ramps, marinas), could result in changing demands for public services. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the locations of some public services, which could affect the areas where the public services are currently located.

This impact would be similar to Impact PS-2 (CP1). However, the impact would last longer for CP3 than for CP1 because more time would be needed to complete project construction for the 18.5-foot dam raise.

This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-3 (CP3): Relocation of Public Services Facilities* This impact would be similar to Impact PS-3 (CP1). Facilities relocation would not degrade levels of public services while the public services agencies are relocating to new facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

*Impact PS-4 (CP3): Short-Term Disruption of Public Services* This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-5 (CP3): Degraded Levels of Public Services* This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-6 (CP3): Relocation of Public Services Facilities* This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public services facilities in extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

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

The impact discussion for CP4 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

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

*Impact PS-1 (CP4): Short-Term Disruption of Public Services* Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus

service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant.

This impact would be similar to Impact PS-1 (CP3). Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near the relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity of Shasta Lake, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (e.g., food, shelter for emergency crews, public services staff) could also be affected by project implementation. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for short-term disruption of public services in the primary study area. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-2 (CP4): Degraded Levels of Public Services* Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded, this impact would be potentially significant.

This impact would be similar to Impact PS-2 (CP3). Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure, combined with possible consolidation of recreational facilities (e.g., campgrounds, boat ramps, marinas), could result in changing demands for public services. Project construction proposed around Shasta Lake could require local, State, and Federal agencies to change the location of some public services, which could affect the areas where the public services are currently located. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for degradation of public services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-3 (CP4): Relocation of Public Services Facilities* This impact would be similar to Impact PS-3 (CP1). Facilities relocation would not degrade levels of public services while the public services agencies are relocating to new facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

*Impact PS-4 (CP4): Short-Term Disruption of Public Services* This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. fore no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-5 (CP4): Degraded Levels of Public Services* This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-6 (CP4): Relocation of Public Services Facilities* This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public services facilities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

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

The impact discussion for CP5 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

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

*Impact PS-1 (CP5): Short-Term Disruption of Public Services* Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public

services were not substantially degraded by construction activities, this impact would be potentially significant.

This impact would be similar to Impact PS-1 (CP3). Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (e.g., food, shelter for emergency crews, public service staff) could also be affected by project implementation. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for short-term disruption of public services in the primary study area. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-2 (CP5): Degraded Levels of Public Services* Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded, this impact would be potentially significant.

This impact would be similar to Impact PS-2 (CP3). Project implementation could result in short-term degradation of levels of public services, including impacts on law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the location of some public services, which could affect the areas where the public services are currently located. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for degradation of public services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

*Impact PS-3 (CP5): Relocation of Public Services Facilities* This impact is similar to Impact PS-3 (CP1). Facilities relocation would not degrade levels of public service while the public service agencies are relocating to new facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Lower Sacramento River and Delta and CVP/SWP Service Areas**
*Impact PS-4 (CP5): Short-Term Disruption of Public Services* This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-5 (CP5): Degraded Levels of Public Services* This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact PS-6 (CP5): Relocation of Public Services Facilities* This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public services facilities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

### 22.3.5 Mitigation Measures

Table 22-2 presents a summary of mitigation measures for public services.

**Table 22-2. Summary of Mitigation Measures for Public Services**

| Impact | | No-Action Alternative | CP1 | CP2 | CP3 | CP4 | CP5 |
|---|---|---|---|---|---|---|---|
| Impact PS-1: Disruption of Public Services (Shasta Lake and Vicinity and Upper Sacramento River) | LOS before Mitigation | NI | PS | PS | PS | PS | PS |
| | Mitigation Measure | None required. | PS-1: Coordinate and Assist Public Services Agencies. | | | | |
| | LOS after Mitigation | NI | LTS | LTS | LTS | LTS | LTS |
| Impact PS-2: Degraded Level of Public Services (Shasta Lake and Vicinity and Upper Sacramento River) | LOS before Mitigation | NI | PS | PS | PS | PS | PS |
| | Mitigation Measure | None required. | PS-2: Provide Support to Public Services Agencies. | | | | |
| | LOS after Mitigation | NI | LTS | LTS | LTS | LTS | LTS |
| Impact PS-3: Relocation of Public Service Facilities (Shasta Lake and Vicinity and Upper Sacramento River) | LOS before Mitigation | NI | LTS | LTS | LTS | LTS | LTS |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | LOS after Mitigation | NI | LTS | LTS | LTS | LTS | LTS |

**Table 22-2. Summary of Mitigation Measures for Public Services (contd.)**

| Impact | | No-Action Alternative | CP1 | CP2 | CP3 | CP4 | CP5 |
|---|---|---|---|---|---|---|---|
| Impact PS-4: Short-Term Disruption of Public Services (Lower Sacramento River, Delta, CVP/SWP Service Areas) | LOS before Mitigation | NI | NI | NI | NI | NI | NI |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | LOS after Mitigation | NI | NI | NI | NI | NI | NI |
| Impact PS-5: Degraded Levels of Public Services (Lower Sacramento River, Delta, CVP/SWP Service Areas) | LOS before Mitigation | NI | LTS | LTS | LTS | LTS | LTS |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | LOS after Mitigation | NI | LTS | LTS | LTS | LTS | LTS |
| Impact PS-6: Relocation of Public Services Facilities (Lower Sacramento River, Delta, CVP/SWP Service Areas) | LOS before Mitigation | NI | NI | NI | NI | NI | NI |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | LOS after Mitigation | NI | NI | NI | NI | NI | NI |

Key:
LOS = level of significance
LTS = less than significant
NI = no impact
PS = potentially significant

### *No-Action Alternative*

No mitigation measures are required for the No-Action Alternative.

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

No mitigation is required for Impacts PS-3 (CP1) through PS-6 (CP1). Mitigation is provided below for impacts of CP1 related to short-term disruption of public services (PS-1) and degraded levels of public services in the primary study area (PS-2).

**Mitigation Measure PS-1 (CP1): Coordinate and Assist Public Services Agencies** Reclamation will coordinate all proposed road closures, detours, and traffic control measures with the Shasta County Sheriff's Office and Tehama County Sheriff's Office, which are the designated Cal EMA (formerly OES) headquarters for the primary study area.

Reclamation will appoint a public liaison to communicate construction schedules, road closures, and project activities to the public. The liaison will organize and conduct public meetings for the purpose of communicating project information. The liaison will meet with all affected public services agencies to coordinate public meetings and information exchanges.

Reclamation will obtain all necessary permits and/or authorizations from public services agencies for matters requiring agency approval and/or cooperation.

Reclamation will meet with public services agencies to determine traffic controls for infrastructure, utility, and structure relocation.

Reclamation will develop and implement a monitoring plan to track the effectiveness of this mitigation measure, and will make adjustments, if necessary.

*Traffic Control and Safety Assurance Plan* Reclamation will implement Mitigation Measure Trans-1 as described in Chapter 20, "Transportation and Traffic," to reduce adverse effects of road closures and detours or partial road closures on access to local streets and adjacent uses.

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

**Mitigation Measure PS-2 (CP1): Provide Support to Public Services Agencies** Reclamation will provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services are not substantially degraded by construction activities. Reclamation will coordinate with affected providers to develop a mutual understanding of the amount and schedule of financial and administrative support required to reduce this impact to a less-than-significant level.

Reclamation will develop and implement a monitoring plan to track the effectiveness of this mitigation measure, and will make adjustments, if necessary.

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

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

No mitigation is required for Impacts PS-3 (CP2) through PS-6 (CP2). Mitigation is provided below for the impacts of CP2 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

**Mitigation Measure PS-1 (CP2): Coordinate and Assist Public Services Agencies** This mitigation measure is identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP2) to a less-than-significant level.

**Mitigation Measure PS-2 (CP2): Provide Support to Public Services Agencies** This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP2) to a less-than-significant level.

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

No mitigation is required for Impacts PS-3 (CP3) through PS-6 (CP3). Mitigation is provided below for the impacts of CP3 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

**Mitigation Measure PS-1 (CP3): Coordinate and Assist Public Services Agencies** This mitigation measure is identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP3) to a less-than-significant level.

**Mitigation Measure PS-2 (CP3): Provide Support to Public Services Agencies** This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP3) to a less-than-significant level.

### *CP4-18.5 Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability*

No mitigation is required for Impacts PS-3 (CP4) through PS-6 (CP4). Mitigation is provided below for the impacts of CP4 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

**Mitigation Measure PS-1 (CP4): Coordinate and Assist Public Services Agencies** This mitigation measure identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP4) to a less-than-significant level.

**Mitigation Measure PS-2 (CP4): Provide Support to Public Services Agencies** This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP4) to a less-than-significant level.

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

No mitigation is required for Impacts PS-3 (CP5) through PS-6 (CP5). Mitigation is provided below for the impacts of CP5 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

**Mitigation Measure PS-1(CP5): Coordinate and Assist Public Services Agencies** This mitigation measure is identical to Mitigation

Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP5) to a less-than-significant level.

**Mitigation Measure PS-2 (CP5): Provide Support to Public Services Agencies** This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP5) to a less-than-significant level.

### 22.3.6 Cumulative Effects

Implementing the proposed SLWRI alternatives would not have a significant cumulative effect on public services in the primary study area. As described above, CP1– CP5 would result in short-term disruption of public services, would degrade the levels of public services provided, and would require the relocation of public services facilities in the primary study area. These effects would be of greater magnitude and duration with the larger dam raises. Thus, effects of CP2 would be similar to but greater than those of CP1, and similar to but less than those of CP3–CP5. Although Mitigation Measures PS-1 and PS-2 would enhance the coordination of public services during project implementation, the adverse effects of CP1–CP5 would not be eliminated, particularly regarding short-term disruption of public services. Only two of the present or reasonably foreseeable future actions, Antlers Bridge Replacement and the Iron Mountain Restoration Plan, are located in the immediate vicinity of Shasta Lake and would have the potential to result in short-term disruption of public services, would degrade the levels of public services provided, or would require the relocation of public services facilities in the primary study area. The Antlers Bridge replacement is currently under construction and is expected to be completed in 2015, before any of the action alternatives would begin. With respect to the Iron Mountain Mine Restoration Plan, this activity would be unlikely to occur simultaneously with the action alternatives. Therefore, construction activities related to implementation of the proposed SLWRI alternatives would not contribute considerably to significant cumulative impacts on public services.

The effects of CP1–CP5 on public services would diminish with distance from project construction sites, and the alternatives would not have cumulatively considerable impacts on public services downstream from Red Bluff (i.e., in the extended study area).

# Chapter 23
# Power and Energy

This chapter describes the environmental and regulatory settings of power and energy, as well as environmental consequences and mitigation measures, as they pertain to the SLWRI action alternatives. The discussion of power and energy existing conditions and the potential impacts of the program alternatives on power and energy encompass the Pit 7 Powerplant upstream from Shasta Reservoir as well as the CVP/SWP water service areas and associated facilities.

## 23.1 Affected Environment

Shasta Lake is an integral part of the CVP, and the proposed changes in storage and releases affect system operations throughout the CVP. This change in CVP operations and the dedication of a portion of the storage in Shasta Lake to operate for the SWP affect the operations of the entire SWP system. Locally, the potential changes in operations could affect the upstream Pit 7 Powerplant.

The CVP is a multipurpose project with 20 storage facilities, 5 pumping plants, 11 hydroelectric powerplants, and 500 miles of major canals, as well as conduits, tunnels, and related facilities. Because the CVP generates more power than it uses, the excess power is marketed through the Western Power Authority (Authority).

The SWP is a multipurpose project with 32 storage facilities. Major SWP facilities include 17 pumping plants, 8 hydroelectric powerplants, and 660-plus miles of aqueducts and pipelines. Because the SWP uses more energy than it generates from its hydroelectric facilities, DWR has exchange agreements with other utility companies and has developed other power resources. DWR sells surplus power, when it is available, to minimize the net cost of pumping energy.

For a more in-depth description of the affected environment, see the *Power and Energy Technical Report*.

### 23.1.1 Shasta Lake and Vicinity

The Shasta Division of the CVP contains Shasta Dam, Lake, and Powerplant, and Keswick Dam, Reservoir, and Powerplant; it captures water from the Sacramento River basin. Shasta Powerplant is located just below Shasta Dam as part of the Shasta Division. Water from the dam is released through five 15-foot penstocks leading to the 5 main generating units and 2 station service units with a maximum generation capacity of 715 megawatts (MW). Shasta Powerplant is a peaking plant and generally runs when demand for electricity is high. Its

power is dedicated first to meeting the requirements of CVP facilities. The remaining energy is marketed to customers in Northern California. The 2007 net annual generation of Shasta Powerplant was 1,914,175 megawatt-hours (MWh).

### 23.1.2 Upper Sacramento River (Shasta Dam to Red Bluff Pumping Plant)

CVP powerplants located downstream from Shasta Reservoir but upstream from the Red Bluff Pumping Plant are Trinity, Lewiston, Judge Francis Carr, and Spring Creek powerplants of the Trinity River Division and Keswick Powerplant of the Shasta Division. The Trinity River Division captures headwaters from the Trinity River basin and diverts surplus water to the Sacramento River.

Trinity Dam stores water from the Trinity River in Trinity Reservoir and makes releases to the Trinity River through Trinity Powerplant. Downstream, Lewiston Dam makes minimum required releases to the Trinity River through Lewiston Powerplant and diverts water into Clear Creek Tunnel and through Judge Francis Carr Powerplant to Whiskeytown Reservoir. Some Whiskeytown Reservoir releases are made through Spring Creek Power Conduit and Powerplant into Keswick Reservoir in the Shasta Division. The remaining releases from Whiskeytown Reservoir are made to Clear Creek. Releases from Keswick Reservoir are made through Keswick Powerplant to the Sacramento River.

Keswick Powerplant belongs to the Shasta Division, is located at Keswick Dam, and has 3 generating units with a total capacity of 105 MW. Keswick Powerplant is a run-of-the-river facility, creating Shasta Powerplant's afterbay and providing uniform flows to the Sacramento River.

### 23.1.3 Lower Sacramento River and Delta

Two CVP powerplants, Folsom and Nimbus, are located between Red Bluff Pumping Plant and the Delta. Both powerplants belong to the Folsom Unit on the American River.

Folsom Powerplant is a peaking powerplant, located at the foot of Folsom Dam on the north side of the American River. Water from the dam is released through three 15-foot-diameter penstocks to 3 generating units with a maximum capacity of 199 MW. Folsom Dam was constructed by USACE and, on completion, was transferred to Reclamation for coordinated operation as an integral part of the CVP.

Nimbus Dam forms Lake Natoma to act as an afterbay for Folsom Powerplant. It allows dam operators to coordinate power generation and flows in the lower American River channel during normal reservoir operations. Nimbus Powerplant, with 2 units and a maximum capacity of 13.5 MW, is a run-of-the-river facility and provides station service backup for Folsom Powerplant.

### 23.1.4 CVP/SWP Service Areas

There are a number of generation facilities and pumping facilities in the greater CVP/SWP service areas, beyond the specific geographies discussed above. These facilities are discussed below.

#### *CVP Generation Facilities*

The CVP powerplants located in the CVP south-of-Delta service area include New Melones Powerplant in the New Melones Unit of the CVP East Side Division, and the William R. Gianelli and O'Neill Pumping-Generating Plants in the San Luis Unit of the CVP West San Joaquin Division. The latter two, with dual functions of generating electricity and pumping water, are jointly owned by Reclamation and DWR.

New Melones Dam was completed in 1979, and inundated the original Melones Dam and created New Melones Reservoir on the Stanislaus River. New Melones Powerplant, located on the north bank immediately downstream from the dam, is a peaking plant. The powerplant contains 2 units and a maximum capacity of 300 MW.

The San Luis Unit, part of both the CVP and SWP, was authorized in 1960. Reclamation and the State of California constructed and operate this unit jointly; 45 percent of the total cost was contributed by the Federal government and the remaining 55 percent by the State of California. The joint-use facilities are O'Neill Dam and Forebay, B.F. Sisk San Luis Dam, San Luis Reservoir, William R. Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, Los Banos and Little Panoche Reservoirs, and San Luis Canal from O'Neill Forebay to Kettleman City, together with the necessary switchyard facilities. The Federal-only portion of the San Luis Unit includes O'Neill Pumping-Generating Plant and Intake Canal, Coalinga Canal, Pleasant Valley Pumping Plant, and San Luis Drain.

San Luis Reservoir serves as the major storage reservoir, and O'Neill Forebay acts as an equalizing basin for the upper stage, dual-purpose pumping-generating plant. O'Neill Pumping-Generating Plant takes water from the Delta-Mendota Canal and discharges it into the O'Neill Forebay, where the California Aqueduct (SWP feature) flows directly. William R. Gianelli Pumping-Generating Plant lifts water from O'Neill Forebay and discharges it into San Luis Reservoir. During releases from the reservoir, these plants generate electric power by reversing flow through the turbines. Water for irrigation is released into the San Luis Canal and flows by gravity to Dos Amigos Pumping Plant, where the water is lifted more than 100 feet to permit gravity flow to the canal terminus at Kettleman City. The SWP canal system continues to southern coastal areas.

O'Neill Pumping-Generating Plant consists of an intake channel, leading off the Delta-Mendota Canal, and six pumping-generating units. Normally, these units operate as pumps to lift water from 45 to 53 feet into O'Neill Forebay; each unit

can discharge 700 cubic feet per second (cfs) and has a rating of 6,000 horsepower (hp). Water is occasionally released from the forebay to the Delta-Mendota Canal, and these units then operate as generators; each unit has a generating capacity of about 4.2 MW.

William R. Gianelli Pumping-Generating Plant, the joint Federal-State facility located at San Luis Dam, lifts water by pump-turbines from O'Neill Forebay into San Luis Reservoir. During the irrigation season, water is released from San Luis Reservoir back through the pump-turbines to the forebay and energy is reclaimed. Each of the eight pumping-generating units has a capacity of 63,000 hp as a motor and 53 MW as a generator. As a pumping plant to fill San Luis Reservoir, each unit lifts 1,375 cfs at a design dynamic head of 290 feet. As a generating plant, each unit passes 2,120 cfs at a design dynamic head of 197 feet.

### *SWP Generation Facilities*

Among the eight SWP hydroelectric powerplants, three powerplants are located in the Lake Oroville vicinity and the remaining in the south-of-Delta area.

Lake Oroville, the SWP's largest reservoir, stores winter and spring runoff from the Feather River watershed and releases water for SWP needs. These releases generate power at three powerplants: Edward Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Powerplant, and Thermalito Pumping-Generating Plant (Oroville Facilities). DWR schedules hourly releases through the Oroville Facilities to maximize the amount of energy produced when power values are highest. Because the downstream water supply does not depend on hourly releases, water released for power in excess of local and downstream requirements is conserved by pump-back operation during off-peak times into Lake Oroville. Energy prices primarily dictate hourly operations for the power generation facilities.

The remaining five SWP powerplants are the jointly owned William R. Gianelli Pumping-Generating Plant, Alamo Powerplant, Mojave Siphon Powerplant, Devil Canyon Powerplant, and Warne Powerplant. They generate about one-sixth of the total energy used by the SWP. Alamo Powerplant uses the 133-foot head between Tehachapi Afterbay and Pool 43 of the California Aqueduct to generate electricity. Mojave Siphon Powerplant generates electricity from water flowing downhill after its 540-foot lift by Pearblossom Pumping Plant. Devil Canyon Powerplant generates electricity with water from Silverwood Lake, with more than 1,300 feet of head, the highest water head[1] in a powerplant in

[1] Potential hydropower generation is a function of the hydraulic net head and rate of fluid flow. The net head is the actual head available for power generation and is used for computing the energy generated. The net head is the gross head minus the head losses due to intake structures, penstocks, and outlet works. The gross or static head is the vertical distance between the tailwater elevation and the forebay water surface elevation (i.e., the height of water in the reservoir relative to its height after discharge). The head losses are generally assumed to be 2 to 10 percent of the gross head, depending on the configuration of the powerhouse structure.

the SWP system. Warne Powerplant uses the 725-foot drop from Peace Valley Pipeline to generate electricity with its Pelton wheel turbines.

### *CVP Pumping Facilities*

CVP pumping plants that move water from the Delta to CVP service areas in the Central Valley include C.W. "Bill" Jones Pumping Plant, O'Neill and William R. Gianelli Pumping-Generating Plants, Dos Amigo Pumping Plant, and SWP Banks Pumping Plant. Reclamation constructed and operates C.W. "Bill" Jones Pumping Plant. Harvey O. Banks Pumping Plant is an SWP facility; however, Reclamation has access to its pumping capacity by use of the Joint Point of Diversion, described in the State Water Resources Control Board's Water Right Decision 1641. The remaining plants, described previously, are joint-use facilities between the two agencies under the San Luis Unit.

C.W. "Bill" Jones Pumping Plant, formerly Tracy Pumping Plant, is a component of the CVP Delta Division. Construction of the plant started in 1947 and was completed in 1951, with an inlet channel, pumping plant, and discharge pipes. Delta water is lifted 197 feet and is carried about 1 mile into the Delta-Mendota Canal. Each of the 6 pumps at C.W. "Bill" Jones Pumping Plant is powered by a 22,500-hp motor and is capable of pumping 767 cfs. The intake canal includes the C.W. "Bill" Jones Fish Screen, which was built to intercept downstream migrant fish to be returned to the main channel, to resume their journey to the ocean.

Dos Amigos Pumping Plant is a joint CVP/SWP facility, located 17 miles south of O'Neill Forebay on the San Luis Canal. It lifts water 113 feet to permit gravity flow to the terminus of San Luis Canal at Kettleman City. The plant contains 6 pumping units, each capable of delivering 2,200 cfs at 125 feet of head.

### *SWP Pumping Facilities*

Among the SWP pumping plants, plants that historically consumed most of the energy are William R. Gianelli Pumping-Generating Plant (SWP share), Harvey O. Banks Pumping Plant, Dos Amigos Pumping Plant (SWP share), Ira J. Chrisman Pumping Plant, and A.D. Edmonston Pumping Plant.

Harvey O. Banks Pumping Plant is located 2.5 miles southwest of Clifton Court Forebay on the California Aqueduct. The plant is the first pumping plant for the California Aqueduct and the South Bay Aqueduct. It provides the necessary head[2] for water in the California Aqueduct to flow for approximately 80 miles south, past O'Neill Forebay and San Luis Reservoir to Dos Amigos Pumping Plant (another jointly owned facility, as previously described). Harvey O. Banks Pumping Plant initially flows into Bethany Reservoir, where the South Bay

[2] In pumping plants, the design head is the gross head plus the head losses due to intake structures.

Aqueduct truly begins. The design head is 236–252 feet and installed capacity is 10,670 cfs with 333,000 hp.

Along the California Aqueduct, Pearblossom, Chrisman, and Edmonston pumping plants historically consumed the highest amount of energy. Pearblossom Pumping Plant lifts water about 540 feet and discharges it 3,479 feet above mean sea level (msl), the highest point along the entire California Aqueduct. Chrisman and Edmonston pumping plants provide 524 and 1,970 feet of lift, respectively, to convey California Aqueduct water across the Tehachapi Mountains.

## 23.2 Regulatory Framework

There are two categories of regulatory framework for hydropower: Federal regulations for CVP hydroelectric operations, and State regulations for the SWP.

### 23.2.1 Federal

Reclamation operates the CVP system for water supply, environmental and hydropower purposes, under various acts authorizing specific projects and with other laws, permits, and enabling legislation (see the *Hydrology, Hydraulics, and Water Management Technical Report* in the Physical Resources Appendix for details).

The power generated by the CVP is marketed through contracts with the Western Area Power Administration (Western). Western, created in 1977 under the U.S. Department of Energy Organization Act, markets and transmits electric power throughout 15 western states. Western's Sierra Nevada Customer Service Region (also known as the Sierra Nevada Region) markets and transmits power generated from the CVP and the Washoe Project in excess of CVP use.

The 2004 Marketing Plan for the Sierra Nevada Region specifies the terms and conditions under which Western markets power from the CVP and the Washoe Project that began on January 1, 2005. This marketing plan resulted in the existing power marketing contract between Western and the CVP that expires on December 31, 2024.

### 23.2.2 State

DWR is currently seeking a new 50-year hydroelectric license from the Federal Energy Regulatory Commission to operate the Oroville Facilities. The DEIS is available for public review and comment. The initial Federal Energy Regulatory Commission license for the Oroville Facilities, issued on February 11, 1957, expired on January 31, 2007. Currently, the Oroville Facilities are operating under a license that was issued by the Federal Energy Regulatory Commission, effective February 1, 2007, and being renewed each year in anticipation of issuance of the new 50-year license.

### 23.2.3 Regional and Local

No known regional or local regulations govern power and energy resources.

## 23.3 Environmental Consequences and Mitigation Measures

The purpose of this section is to provide information about hydropower generation, energy use, and impacts on existing hydropower facilities from the SLWRI study alternatives described in the DEIS. Hydropower modeling for the DEIS was conducted to identify potential impacts from the SLWRI on hydropower generation and consumption at CVP and SWP facilities, which are operated by Reclamation and DWR, respectively. This section describes the analytical methodology used to calculate, for all alternatives, the hydropower generation and pumping energy required at existing CVP and SWP hydropower facilities. This chapter also describes criteria for determining significant impacts associated with the SLWRI alternatives, and lists those impacts.

### 23.3.1 Methods and Assumptions

Council on Environmental Quality regulations and the State CEQA Guidelines address NEPA and CEQA requirements for describing the potential environmental consequences of alternatives in an EIS and EIR, respectively. NEPA and CEQA requirements guide the assessments presented in this section. Appendix F of the State CEQA Guidelines addresses energy conservation, and NEPA directs that energy requirements and conservation potential are to be evaluated. This impact assessment is based on quantitative data regarding changes to hydropower resources that could occur under the program alternatives in geographic locales within the study area.

Several modeling tools were used for the SLWRI hydropower analysis. The CalSim-II model was used to simulate project operations and LongTermGen (LTGen) and State Water Project Power (SWPPower) power tools were used to quantify the hydropower generation and pumping energy associated with each alternative. A spreadsheet postprocessor was used to evaluate impacts to the Pit 7 Powerplant.

#### *Power Modeling Tools*

Energy estimates were made using the Benchmark Study Team (BST) power modeling tools LTGen, Version 1.18, and SWPPower, BST April 2010 Version, for CVP and SWP facilities, respectively. LTGen and SWPPower use operations data from CalSim-II simulations to predict energy generation and consumption throughout the CVP and SWP. Methods applied to evaluate power generation are discussed below.

For each alternative, outputs from CalSim-II simulation were input to LTGen and SWPPower, to simulate power generation and consumption throughout the CVP and SWP systems, respectively. These CalSim-II outputs included reservoir releases, conveyance flow rates, and end-of-month reservoir storage

data. Both LTGen and SWPPower are monthly models. Their simulation periods are from October 31, 1921 to September 30, 2003.

In LTGen and SWPPower, energy generation is a function of turbine configuration, reservoir release, net head, and duration of generation. Net head is the actual head available for power generation; it is reservoir water surface elevation (a function of storage) minus tailrace elevation (a function of release).

Similarly, the calculation of energy required for pumping in both models is a function of pump configuration, pumping rate, pumping head (i.e., net head with hydraulic losses), and duration of pumping. Detailed descriptions of LTGen and SWPPower are included in Chapter 8 of the Modeling Appendix.

***CalSim-II***

CalSim-II is the application of the Water Resources Integrated Modeling System software to the CVP/SWP. This application was jointly developed by Reclamation and DWR for planning studies related to CVP/SWP operations. The primary purpose of CalSim-II is to evaluate the water supply reliability of the CVP and SWP at current and/or future levels of development (e.g., 2005 or 2030), with and without various assumed future facilities, and with different modes of facility operations. Geographically, the model covers the drainage basin of the Delta, and CVP/SWP exports to the San Francisco Bay Area, San Joaquin Valley, Central Coast, and Southern California.

CalSim-II typically simulates system operations for an 82-year period, using a monthly time step. The model assumes that facilities, land use, water supply contracts, and regulatory requirements are constant over this period, representing a fixed level of development (e.g., 2005 or 2030). The historical flow record from October 1921 to September 2003, adjusted for the influences of land use changes and upstream flow regulation, is used to represent the possible range of water supply conditions. Major Central Valley rivers, reservoirs, and CVP/SWP facilities are represented by a network of arcs and nodes. CalSim-II uses a mass balance approach to route water through this network. Simulated flows are mean flows for the month; reservoir storage volumes correspond to end-of-month storage.

Monthly CalSim-II model results are intended to be used for comparative purposes. It is important to differentiate between “absolute” or “predictive” modeling applications and “comparative” applications. In “absolute” applications, the model is run once to predict a future outcome; errors or assumptions in formulation, system representation, data, and operational criteria all contribute to total error or uncertainty in model results. In “comparative” applications, the model is run twice, once to represent a baseline condition (no project) and a second time with a specific change (project) to assess the change in the outcome due to the input change. In this comparative mode (the mode used for this DEIS), the difference between the two simulations is of principal importance. Potential errors or uncertainties that exist in the “no project”

simulation are also present in the "project" simulation, such that their impacts are reduced when assessing the change in outcomes.

***Spreadsheet Postprocessors***

For analysis of impacts from each alternative on generation from the Pit 7 Powerplant, a spreadsheet postprocessor was used in lieu of a model. Since no model was available for Pit 7 Powerplant operations, an evaluation of potential impacts of the SLWRI alternatives, as simulated using CalSim-II on recent historical data, was used instead.

The spreadsheet postprocessor interpolated CalSim-II output for Shasta Reservoir storage to determine the reservoir water surface elevation. The water surface elevations for each alternative were compared to historical Pit 7 Powerplant tailwater elevations, to calculate the change in net head at the Pit 7 Powerplant. Changes in net head at the Pit 7 Powerplant were assumed to be small enough so that turbine/generator efficiencies would be unaffected. For each alternative, the monthly generation was determined by multiplying historical average monthly generation by the ratio of the alternative-reduced net head compared to the historical net head (assumed to be 200 feet, based on historical average) raised to the 1.5 power.

### 23.3.2 Criteria for Determining Significance of Effects

The thresholds of significance for impacts to power and energy are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. An alternative would be considered to have a potentially significant impact on regional hydropower production if the change in the average annual energy generation or consumption (over the 82-year period of simulation) by the CVP/SWP is greater than 5 percent, as shown in Table 23-1.

A threshold of 5 percent was selected as the threshold of significance for hydroelectric generation for several reasons, including seasonal and annual hydrologic variability, short-term operations decisions that may affect water level in storage, and regional power market demands and prices that may dictate hydropower facilities operations. All these factors could contribute to potentially substantial variations in hydropower generation on a monthly or annual basis. As a result, generation variations of less than 5 percent would not be considered significant. Significance statements are relative to both existing conditions (2005) and future conditions (2030), unless stated otherwise.

**Table 23-1. Impact Indicators and Significance Criteria for Energy Generation and Usage**

| Impact Indicator | Significance Criterion |
|---|---|
| Shasta Powerplant Energy Generation | Decrease in average annual Shasta Powerplant hydropower generation of more than 5 percent. |
| CVP System Energy Generation | Decrease in average annual CVP system hydropower generation of more than 5 percent. |
| SWP System Energy Generation | Decrease in average annual SWP system hydropower generation of more than 5 percent. |
| CVP System Pumping Energy Use | Increase in average annual CVP system pumping energy use of more than 5 percent. |
| SWP System Pumping Energy Use | Increase in average annual SWP system pumping energy use of more than 5 percent. |
| Pit 7 Powerplant Energy Generation | Decrease in average annual Pit 7 hydropower generation of more than 5 percent. |

Key:
CVP = Central Valley Project
SWP = State Water Project

***Shasta Powerplant Energy Generation***

Changes in Shasta Powerplant operations due to any of the SLWRI alternatives could directly affect hydropower generation caused by changes in head and flow available for hydropower generation, A significant reduction in energy generation at Shasta Powerplant could require purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

***CVP System Energy Generation***

Changes in CVP operations due to any of the SLWRI alternatives could result in reoperation of other CVP hydropower generation facilities, and could result in a systemwide decrease in CVP hydropower generation. A significant reduction in CVP energy generation could require purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

***SWP System Energy Generation***

Changes in SWP operations due to any of the SLWRI alternatives could result in reoperation of SWP generation facilities, and could result in a systemwide decrease in SWP hydropower generation. A significant reduction in SWP energy generation could require purchase of energy to meet SWP pumping energy demands, or a reduction in power revenue.

***CVP Pumping Energy Use***

Changes in CVP operations due to any of the SLWRI alternatives could result in changes in operations of the CVP pumping plants. A significant increase in CVP system pumping energy use could require purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

***SWP Pumping Energy Use***

Changes in SWP operations due to any of the SLWRI alternatives could result in changes in operations of the SWP pumping plants. A significant increase in

SWP system pumping energy use could require purchase of energy to meet SWP pumping energy demands, or a reduction in power revenue.

#### *Pit 7 Powerplant Energy Generation*

The Pit 7 Powerplant is owned and operated by the Pacific Gas and Electric Company. Increases in Shasta Lake water surface elevations could increase the tailwater elevation below the Pit 7 Powerplant, reducing the net head and decreasing generation.

### 23.3.3 Direct and Indirect Effects

This section describes the environmental consequences of the SLWRI comprehensive plans, and proposed mitigation measures for any impacts determined to be significant or potentially significant. All comprehensive plans are compared to a baseline to allow evaluation of potential impacts. For the existing condition a 2005 level of development) CalSim-II simulation without any Shasta enlargement is used. Similarly, for the future condition a 2030 level of development CalSim-II simulation, the No-Action Alternative, is used as a baseline. Each of the comprehensive plans where simulated using the same levels of development so that any changes from the baseline hydropower generation or consumption can be attributed the alternative. Detailed tables of the monthly energy generation and energy consumption associated with each comprehensive plan are included in Attachment 18 of the Modeling Appendix.

The No-Action Alternative and five SLWRI comprehensive plans are described in the following subsections. Potential effects of the existing condition, No-Action Alternative, and various SLWRI comprehensive plans on energy generation and usage are also described.

#### *No-Action Alternative*

Under the No-Action Alternative, the Federal government would take reasonably foreseeable actions, as discussed in Chapter 2, but would take no additional action toward implementing a specific plan to help increase anadromous fish survival in the upper Sacramento River, nor would help address the growing water reliability issues in California. Shasta Dam would not be modified, and the CVP would continue operating similar to the existing condition. Changes in regulatory conditions and water supply demands would result in differences in flows on the Sacramento River and in the Delta between existing and future conditions. Possible changes include the following:

- Firm Level 2 Federal refuge deliveries
- SWP deliveries based on full Table A amounts
- Full implementation of the Grassland Bypass Project
- Implementation of salinity management actions similar to the Vernalis Adaptive Management Plan

- Implementation of the South Bay Aqueduct Improvement and Enlargement Project
- Increased San Joaquin River diversions for water users in the Stockton Metropolitan Area after completion of the Delta Water Supply Project
- Increased Sacramento River diversions by Freeport Regional Water Project agencies
- San Joaquin River Restoration Program Full Restoration Flows

This alternative is used as a basis of comparison for future condition comparisons. Table 23-2 summarizes the simulated average annual hydropower generation and energy use for the No-Action Alternative.

**Table 23-2. Simulated Average Annual Energy Generation and Use for No-Action Alternative**

| | Existing (GWh) | No Action (GWh) | Change (GWh) | Percent Change |
|---|---|---|---|---|
| Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation | 2,151 | 2,154 | 3 | 0% |
| Impact Hydro-2 – Decrease in CVP System Energy Generation | 4,909 | 4,897 | -12 | 0% |
| Impact Hydro-3 – Decrease in SWP System Energy Generation | 4,427 | 4,513 | 86 | 2% |
| Impact Hydro-4 – Increase in CVP System Pumping Energy Use | 1,445 | 1,447 | 2 | 0% |
| Impact Hydro-5 – Increase in SWP System Pumping Energy Use | 7,600 | 7,933 | 333 | 4% |
| Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation | 529 | 529 | 0 | 0% |

Key:
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

**Impact Hydro-1 (No-Action): Decrease in Shasta Powerplant Energy Generation** Simulated annual average Shasta Powerplant energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual generation of 3 gigawatt-hour (GWh) (0 percent). This impact would be beneficial. Mitigation is not required for the No-Action Alternative.

**Impact Hydro-2 (No-Action): Decrease in CVP System Energy Generation** Simulated average annual CVP system energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be a decrease in simulated average annual energy generation of 12 GWh (0 percent). This impact would be less than significant. Mitigation is not required for the No-Action Alternative.

**Impact Hydro-3 (No-Action): Decrease in SWP System Energy Generation** Simulated average annual CVP system energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual energy generation of 86 GWh (2 percent). This impact would be beneficial. Mitigation is not required for the No-Action Alternative.

**Impact Hydro-4 (No-Action): Increase in CVP System Pumping Energy Use** Simulated average annual CVP pumping energy use for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual pumping energy use of 2 GWh (0 percent). This impact would be less than significant. Mitigation is not required for the No-Action Alternative.

**Impact Hydro-5 (No-Action): Increase in SWP System Pumping Energy Use** Simulated average annual SWP pumping energy use for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual pumping energy use of 333 GWh (4 percent). This impact would be less than significant. Mitigation is not required for the No-Action Alternative.

**Impact Hydro-6 (No-Action): Decrease in Pit 7 Powerplant Energy Generation** Simulated average annual Pit 7 Powerplant energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be no change in simulated average annual energy generation at the Pit 7 Powerplant. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

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

CP1 focuses on increasing water supply reliability and increasing anadromous fish survival. This plan primarily consists of raising Shasta Dam by 6.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 8.5 feet and enlarge the total storage capacity in the reservoir by 256,000 acre-feet. The existing temperature control device (TCD) would also be extended to achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years[3] and critical years, when 70 thousand acre-feet (TAF)

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

and 35 TAF, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP1 would help reduce future water shortages by increasing drought year and average year water supply reliability for agricultural, and municipal and industrial (M&I) deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River. Table 23-3 summarizes the simulated average annual hydropower generation and energy use for CP1.

**Table 23-3. Simulated Average Annual Energy Generation and Use for CP1**

| | Existing (GWh) | CP1 (GWh) | Change | | Future (GWh) | CP1 (GWh) | Change | |
|---|---|---|---|---|---|---|---|---|
| | | | (GWh) | Percent | | | GWh | Percent |
| Impact Hydro-1 – Decrease in Shasta Energy Generation | 2,151 | 2,191 | 40 | 2% | 2,154 | 2,194 | 40 | 2% |
| Impact Hydro-2 – Decrease in CVP System Energy Generation | 4,909 | 4,948 | 39 | 1% | 4,897 | 4,937 | 40 | 1% |
| Impact Hydro-3 – Decrease in SWP System Energy Generation | 4,427 | 4,440 | 13 | 0% | 4,513 | 4,527 | 14 | 0% |
| Impact Hydro-4 – Increase in CVP System Pumping Energy Use | 1,445 | 1,453 | 8 | 1% | 1,447 | 1,458 | 11 | 1% |
| Impact Hydro-5 – Increase in SWP System Pumping Energy Use | 7,600 | 7,642 | 42 | 1% | 7,933 | 7,979 | 46 | 1% |
| Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation | 529 | 525 | -4 | -1% | 529 | 525 | -4 | -1% |

Key:
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

**Impact Hydro-1 (CP1): Decrease in Shasta Powerplant Energy Generation**
Simulated average annual Shasta Powerplant energy generation for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual generation under both existing and future levels of 40 GWh (2 percent). This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-2 (CP1): Decrease in CVP System Energy Generation**
Simulated average annual CVP system generation for CP1 is shown in Table

23-3. Under CP1, there would be an increase in simulated average annual energy generation of 39 GWh (1 percent) and 40 GWh (1 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-3 (CP1): Decrease in SWP System Energy Generation**
Simulated average annual CVP system generation for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual energy generation of 13 GWh (0 percent) and 14 GWh (0 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-4 (CP1): Increase in CVP System Pumping Energy Use**
Simulated average annual CVP pumping energy use for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual pumping energy use of 8 GWh (1 percent) and 11 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-5 (CP1): Increase in SWP System Pumping Energy Use**
Simulated average annual SWP pumping energy use for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual pumping energy use of 42 GWh (1 percent) and 46 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-6 (CP1): Decrease in Pit 7 Powerplant Energy Generation**
Simulated average annual Pit 7 generation for CP1 is shown in Table 23-3. Under CP1, the 6.5-foot Shasta Dam raise option, the operating range of net head would decrease from about 173 to 204 feet to about 168 to 193 feet, an approximately 4 percent decrease in net head. Under CP1, there would be a decrease in simulated average annual generation of about 4 GWh (1 percent) and 4 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

As with CP1, CP2 focuses on increasing water supply reliability and increasing anadromous fish survival. CP2 primarily consists of raising Shasta Dam by 12.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 14.5 feet and enlarge the total storage capacity in the reservoir by 443,000 acre-feet. The existing TCD would also be extended to achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 120 TAF and 60 TAF, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically

focus on increasing M&I deliveries. CP2 would help reduce future water shortages by increasing drought year and average year water supply reliability for agricultural and M&I deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River. Table 23-4 summarizes the simulated average annual hydropower generation and energy use for CP2.

**Table 23-4. Simulated Average Annual Energy Generation and Use for CP2**

| | Existing (GWh) | CP2 (GWh) | Change | | Future (GWh) | CP2 (GWh) | Change | |
|---|---|---|---|---|---|---|---|---|
| | | | GWh | Percent | | | GWh | Percent |
| Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation | 2,151 | 2,221 | 70 | 3% | 2,154 | 2,221 | 67 | 3% |
| Impact Hydro- 2 – Decrease in CVP System Energy Generation | 4,909 | 4,980 | 71 | 1% | 4,897 | 4,966 | 69 | 1% |
| Impact Hydro- 3 – Decrease in SWP System Energy Generation | 4,427 | 4,444 | 17 | 0% | 4,513 | 4,535 | 22 | 0% |
| Impact Hydro- 4 – Increase in CVP System Pumping Energy Use | 1,445 | 1,458 | 13 | 1% | 1,447 | 1,464 | 17 | 1% |
| Impact Hydro-5 – Increase in SWP System Pumping Energy Use | 7,600 | 7,660 | 60 | 1% | 7,933 | 8,005 | 72 | 1% |
| Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation | 529 | 520 | -9 | -2% | 529 | 522 | -7 | -1% |

Key:
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

**Impact Hydro-1 (CP2): Decrease in Shasta Powerplant Energy Generation**
Simulated average annual Shasta Powerplant energy generation for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual generation of 70 GWh (3 percent) and 67 GWh (3 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-2 (CP2): Decrease in CVP System Energy Generation**
Simulated average annual CVP system generation for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual energy generation of 71 GWh (1 percent) and 69 GWh (1 percent) under

existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-3 (CP2): Decrease in SWP System Energy Generation**
Simulated average annual CVP system generation for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual energy generation of 17 GWh (0 percent) and 22 GWh (0 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-4 (CP2): Increase in CVP System Pumping Energy Use**
Simulated average annual CVP pumping energy use for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual pumping energy use of 13 GWh (1 percent) and 17 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-5 (CP2): Increase in SWP System Pumping Energy Use**
Simulated average annual SWP pumping energy use for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual pumping energy use of 60 GWh (1 percent) and 72 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-6 (CP2): Decrease in Pit 7 Powerplant Energy Generation**
Simulated average annual Pit 7 generation for CP2 is shown in Table 23-4. Under CP2 the operating range of net head would decrease from about 173 to 204 feet to about 168 to 193 feet, an approximately 4 percent decrease in net head. Under CP2, there would be a decrease in simulated average annual generation of about 9 GWh (2 percent) and 7 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

CP3 focuses on increasing agricultural water supply reliability while also increasing anadromous fish survival. This plan primarily consists of raising Shasta Dam by 18.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet. The existing TCD would also be extended to achieve efficient use of the expanded cold-water pool. Because CP3 focuses on increasing agricultural water supply reliability, none of the increased storage capacity in Shasta Reservoir would be reserved for increasing M&I deliveries. Operations for water supply, hydropower, and environmental and other regulatory requirements would be similar to existing operations, with the additional storage retained for water supply reliability and to expand the cold-water pool for downstream

anadromous fisheries. Simulations of CP3 did not involve any changes to the modeling logic for deliveries or flow requirements; all rules for water operations were updated to include the new storage but were not otherwise changed. Table 23-5 summarizes the simulated average annual hydropower generation and energy use for CP3.

**Table 23-5. Simulated Average Annual Energy Generation and Use for CP3**

| | Existing (GWh) | CP3 (GWh) | Change | | Future (GWh) | CP3 (GWh) | Change | |
|---|---|---|---|---|---|---|---|---|
| | | | GWh | Percent | | | GWh | Percent |
| Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation | 2,151 | 2,248 | 97 | 5% | 2,154 | 2,249 | 95 | 4% |
| Impact Hydro-2 – Decrease in CVP System Energy Generation | 4,909 | 5,007 | 98 | 2% | 4,897 | 4,992 | 95 | 2% |
| Impact Hydro-3 – Decrease in SWP System Energy Generation | 4,427 | 4,429 | 2 | 0% | 4,513 | 4,508 | -5 | 0% |
| Impact Hydro-4 – Increase in CVP System Pumping Energy Use | 1,445 | 1,468 | 23 | 2% | 1,447 | 1,482 | 35 | 2% |
| Impact Hydro-5 – Increase in SWP System Pumping Energy Use | 7,600 | 7,606 | 6 | 0% | 7,933 | 7,917 | -16 | 0% |
| Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation | 529 | 514 | -15 | -3% | 529 | 514 | -15 | -3% |

Key:
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

**Impact Hydro-1 (CP3): Decrease in Shasta Powerplant Energy Generation**
Simulated average annual Shasta Powerplant energy generation for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual generation of 97 GWh (5 percent) and 95 GWh (4 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-2 (CP3): Decrease in CVP System Energy Generation**
Simulated average annual CVP system generation for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual energy generation of 98 GWh (2 percent) and 95 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-3 (CP3): Decrease in SWP System Energy Generation**
Simulated average annual CVP system generation for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual energy generation of 2 GWh (0 percent) under the existing level and a decrease of 5 GWh (0 percent) under the future level. This impact would be beneficial under the existing level and less than significant under the future level. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-4 (CP3): Increase in CVP System Pumping Energy Use**
Simulated average annual CVP pumping energy use for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual pumping energy use of 23 GWh (2 percent) and 35 GWh (2 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-5 (CP3): Increase in SWP System Pumping Energy Use**
Simulated average annual SWP pumping energy use for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual pumping energy use of 6 GWh (0 percent) under the existing level and a decrease of 16 GWh (0 percent) under the future level. This impact would be less than significant and beneficial under the existing level and less than significant under the future level. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-6 (CP3): Decrease in Pit 7 Powerplant Energy Generation**
Simulated average annual Pit 7 Powerplant generation for CP3 is shown in Table 23-5. Under CP3 the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP3, there would be a decrease in simulated average annual generation of 15 GWh (3 percent) under both the existing and future levels. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

### *CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability*

CP4 focuses on increasing anadromous fish survival while also increasing water supply reliability. By raising Shasta Dam 18.5 feet, in combination with spillway modifications, CP4 would increase the height of the reservoir full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet. The existing TCD would also be extended to achieve efficient use of the expanded cold-water pool. The additional storage created by the 18.5-foot dam raise would be used to improve the ability to meet temperature objectives and habitat requirements for anadromous fish during drought years and increase water supply reliability. Of the increased reservoir storage space, about 378,000 acre-feet would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. Operations for the remaining portion of increased storage (approximately 256,000 acre-feet) would be the same as for CP1, with 70 TAF and 35 TAF reserved to specifically focus on increasing

M&I deliveries during dry and critical years, respectively. CP4 also includes augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River. Table 23-6 summarizes the simulated average annual hydropower generation and energy use for CP4.

**Table 23-6. Simulated Average Annual Energy Generation and Use for CP4**

| | Existing (GWh) | CP4 (GWh) | Change | | Future (GWh) | CP4 (GWh) | Change | |
|---|---|---|---|---|---|---|---|---|
| | | | GWh | Percent | | | GWh | Percent |
| Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation | 2,151 | 2,269 | 118 | 5% | 2,154 | 2,273 | 119 | 6% |
| Impact Hydro-2 – Decrease in CVP System Energy Generation | 4,909 | 5,026 | 117 | 2% | 4,897 | 5,016 | 119 | 2% |
| Impact Hydro-3 – Decrease in SWP System Energy Generation | 4,427 | 4,440 | 13 | 0% | 4,513 | 4,527 | 14 | 0% |
| Impact Hydro-4 – Increase in CVP System Pumping Energy Use | 1,445 | 1,453 | 8 | 1% | 1,447 | 1,458 | 11 | 1% |
| Impact Hydro-5 – Increase in SWP System Pumping Energy Use | 7,600 | 7,642 | 42 | 1% | 7,933 | 7,979 | 46 | 1% |
| Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation | 529 | 519 | -10 | -2% | 529 | 519 | -10 | -2% |

Key:
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

**Impact Hydro-1 (CP4): Decrease in Shasta Powerplant Energy Generation**
Simulated average annual Shasta Powerplant energy generation for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual generation of 118 GWh (5 percent) and 119 GWh (6 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-2 (CP4): Decrease in CVP System Energy Generation**
Simulated average annual CVP system generation for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual energy generation of 117 GWh (2 percent) and 119 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-3 (CP4): Decrease in SWP System Energy Generation**
Simulated average annual CVP system generation for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual energy generation of 13 GWh (0 percent) and 14 GWh (0 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-4 (CP4): Increase in CVP System Pumping Energy Use**
Simulated average annual CVP pumping energy use for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual pumping energy use of 8 GWh (1 percent) and 11 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-5 (CP4): Increase in SWP System Pumping Energy Use**
Simulated average annual SWP pumping energy use for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual pumping energy use of 42 GWh (1 percent) under both the existing and future levels. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-6 (CP4): Decrease in Pit 7 Powerplant Energy Generation**
Simulated average annual Pit 7 Powerplant generation for CP4 is shown in Table 23-6. Under CP4 the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP4, there would be a decrease in simulated average annual generation of 10 GWh (2 percent) under both the existing and future levels. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

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

CP5 primarily focuses on increasing water supply reliability, anadromous fish survival, Shasta Lake area environmental resources, and recreation opportunities. By raising Shasta Dam 18.5 feet, in combination with spillway modifications, CP5 would increase the height of the reservoir full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet. The existing TCD would be extended to achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 150 TAF and 75 TAF, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP5 also includes constructing additional fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries; augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River; and increasing recreation opportunities at Shasta Lake. CP5 would help reduce future water shortages by increasing drought year and average year water supply reliability for agricultural and M&I deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta

Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River. Table 23-7 summarizes the simulated average annual hydropower generation and energy use for CP5.

**Table 23-7. Simulated Average Annual Energy Generation and Use for CP5**

| | Existing (GWh) | CP5 (GWh) | Change | | Future (GWh) | CP5 (GWh) | Change | |
|---|---|---|---|---|---|---|---|---|
| | | | GWh | Percent | | | GWh | Percent |
| Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation | 2,151 | 2,247 | 96 | 4% | 2,154 | 2,247 | 93 | 4% |
| Impact Hydro-2 – Decrease in CVP System Energy Generation | 4,909 | 5,004 | 95 | 2% | 4,897 | 4,990 | 93 | 2% |
| Impact Hydro-3 – Decrease in SWP System Energy Generation | 4,427 | 4,449 | 22 | 0% | 4,513 | 4,537 | 24 | 1% |
| Impact Hydro-4 – Increase in CVP System Pumping Energy Use | 1,445 | 1,463 | 18 | 1% | 1,447 | 1,475 | 28 | 2% |
| Impact Hydro-5 – Increase in SWP System Pumping Energy Use | 7,600 | 7,674 | 74 | 1% | 7,933 | 8,018 | 85 | 1% |
| Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation | 529 | 514 | -15 | -3% | 529 | 514 | -15 | -3% |

Key:
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

**Impact Hydro-1 (CP5): Decrease in Shasta Powerplant Energy Generation**
Simulated average annual Shasta Powerplant energy generation for CP5 is shown in Table 23-7. Under CP5, there would be an increase in simulated average annual generation of 96 GWh (4 percent) and 93 GWh (4 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-2 (CP5): Decrease in CVP System Energy Generation**
Simulated average annual CVP system generation for CP5 is shown in Table 23-7. Under CP5, there would be an increase in simulated average annual energy generation of 95 GWh (2 percent) and 93 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-3 (CP5): Decrease in SWP System Energy Generation**
Simulated average annual CVP system generation for CP5 is shown in Table

23-7. Under CP5, there would be an increase in simulated average annual energy generation of 22 GWh (0 percent) and 24 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-4 (CP5): Increase in CVP System Pumping Energy Use**
Simulated average annual CVP pumping energy use for CP5 is shown in Table 23-7. Under CP5, there would be an increase in simulated average annual pumping energy use of 18 GWh (1 percent) and 28 GWh (2 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-5 (CP5): Increase in SWP System Pumping Energy Use**
Simulated average annual SWP pumping energy use for CP5 is shown in Table 23-7. Under CP5, there would be an increase in simulated average annual pumping energy use of 74 GWh (1 percent) and 85 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

**Impact Hydro-6 (CP5): Decrease in Pit 7 Powerplant Energy Generation**
Simulated average annual Pit 7 Powerplant generation for CP5 is shown in Table 23-7. Under CP5 the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP5, there would be a decrease in simulated average annual generation of 15 GWh (3 percent) under both the existing and future levels. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

### 23.3.4 Mitigation Measures

Table 23-8 presents a summary of impacts and mitigation measures for power and energy. No potentially significant impacts have been identified; therefore, no mitigation is required.

**Table 23-8. Summary of Impacts and Mitigation Measures – Power and Energy**

| Impact | | No-Action Alternative | CP1 | CP2 | CP3 | CP4 | CP5 |
|---|---|---|---|---|---|---|---|
| Impact Hydro-1: Decrease in Shasta Powerplant Energy Generation | LOS before Mitigation | Beneficial | Beneficial | Beneficial | Beneficial | Beneficial | Beneficial |
| | Mitigation Measure | None required | No mitigation needed; thus, none proposed. | | | | |
| | LOS after Mitigation | Beneficial | Beneficial | Beneficial | Beneficial | Beneficial | Beneficial |
| Impact Hydro-2: Decrease in CVP System Energy Generation | LOS before Mitigation | LTS | Beneficial | Beneficial | Beneficial | Beneficial | Beneficial |
| | Mitigation Measure | None required | No mitigation needed; thus, none proposed. | | | | |
| | LOS after Mitigation | LTS | Beneficial | Beneficial | Beneficial | Beneficial | Beneficial |
| Impact Hydro-3: Decrease in SWP System Energy Generation | LOS before Mitigation | Beneficial | LTS | Beneficial | LTS | LTS | LTS |
| | Mitigation Measure | None required | No mitigation needed; thus, none proposed. | | | | |
| | LOS after Mitigation | Beneficial | LTS | Beneficial | LTS | LTS | LTS |
| Impact Hydro-4: Increase in CVP System Pumping Energy Use | LOS before Mitigation | LTS | LTS | LTS | LTS | LTS | LTS |
| | Mitigation Measure | None required | No mitigation needed; thus, none proposed. | | | | |
| | LOS after Mitigation | LTS | LTS | LTS | LTS | LTS | LTS |
| Impact Hydro-5: Increase in SWP System Pumping Energy Use | LOS before Mitigation | LTS | LTS | LTS | LTS | LTS | LTS |
| | Mitigation Measure | None required | No mitigation needed; thus, none proposed. | | | | |
| | LOS after Mitigation | LTS | LTS | LTS | LTS | LTS | LTS |
| Impact Hydro-6: Decrease in Pit 7 Powerplant Energy Generation | LOS before Mitigation | No Impact | LTS | LTS | LTS | LTS | LTS |
| | Mitigation Measure | None required | No mitigation needed; thus, none proposed. | | | | |
| | LOS after Mitigation | No Impact | LTS | LTS | LTS | LTS | LTS |

Key:
LOS = Level of Significance
LTS = Less than Significant
NI = No Impact
PS = Potentially Significant

### 23.3.5 Cumulative Effects

Chapter 3 discusses the overall cumulative impacts of the project alternatives, including the relationship to CALFED Programmatic Cumulative Impacts Analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. This section provides an analysis of overall cumulative impacts of the project alternatives with other past, present, and reasonably foreseeable future projects producing related impacts. The projects listed in the quantitative analysis section of Chapter 3 are included in the 2030 level-of-development alternatives. Accordingly, quantitative effects of the projects combined with the SLWRI alternatives are described in Section 23.3.3. Project alternatives would cause less-than-significant impacts on hydropower generation and consumption. The discussion below focuses on the qualitative effect of the SLWRI alternatives and other past, present, and reasonably foreseeable future projects.

The effects of climate change on operations at Shasta Lake could potentially result in changes to power and energy. As described in the Climate Change Projection Appendix, climate change could result in higher reservoir releases in the winter and early spring due to an increase in runoff during these times. Similarly, climate change could result in lower reservoir inflows and Sacramento tributary flows during the late spring and summer due to a decreased snow pack. This reduction in inflow and tributary flow could result in Shasta Lake storage being reduced due to both a reduced ability to capture flows and an increased need to make releases to meet downstream requirements.

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

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP1. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP1 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP1 having a significant cumulative impact.

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

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP2. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP2 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP2 having a significant cumulative impact.

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

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP3. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP3 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP3 having a significant cumulative impact.

***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability***

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP4. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP4 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP4 having a significant cumulative impact.

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

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP5. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP5 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP5 having a significant cumulative impact.

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# Chapter 24
# Environmental Justice

## 24.1 Affected Environment

### 24.1.1 Minority and Low-Income Populations

The environmental setting of a project area can be viewed from both a geographic perspective and a human perspective. The physical environment provides a geographical context for the populations to be evaluated in this EIS. The human perspective encompasses race, ethnic origin, and economic status of affected groups.

The intent of an environmental justice evaluation under Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* (1994), is to identify communities and groups that meet environmental justice criteria, and suggest strategies to reduce potential adverse impacts of projects on affected groups.

In its guide to environmental justice under NEPA, the Council on Environmental Quality (CEQ) (1997) encourages agencies to consider all of the following groups in the scoping process:

- Religious organizations
- Newspapers, radio, and other media
- Civic associations
- Minority business associations
- Environmental and environmental justice organizations
- Legal aid providers
- Homeowners', tenants', and neighborhood watch groups
- Federal, State, local, and tribal governments
- Rural cooperatives
- Business and trade organizations

- Community and social service organizations
- Universities, colleges, vocational, and other schools
- Labor organizations
- Civil rights organizations
- Local schools and libraries
- Senior citizens' groups
- Public health agencies and clinics

### *Shasta Lake and Vicinity*

This section reviews minority and low-income communities situated near the reservoir, and those that directly depend on it for social, economic, cultural, historic, occupational, recreational, or other needs deemed significant by these communities.

Table 24-1 depicts a historically white population that is slowly diversifying and income levels consistently below the statewide average, resulting in relatively higher poverty rates among all ethnic groups. In 2010, the population of Shasta County was approximately 16.6 percent minority (nonwhite) and approximately 17.7 percent low-income, compared to statewide populations of 42.4 percent minority and 15.5 percent low-income. The slightly higher local poverty rate is not meaningfully greater than the statewide rate.

**Lakehead-Lakeshore Community** The Lakehead-Lakeshore community is located along Shasta Lake's northernmost reach, the Sacramento River Arm. Lakehead, an unincorporated seasonal community of approximately 1,500 residents (U.S. Census Bureau 2010a), is adjacent to Interstate 5 and includes typical services found near a major interstate highway. Lakehead provides a variety of campgrounds, boat ramps, and marinas. The Lakehead community includes low-income and minority residents and workers who could be affected by project construction and changes in outdoor recreation patterns resulting from the project.

**Tourism and Outdoor Recreation Industry** Shasta Lake and its vicinity are recreation destinations that draw visitors from throughout California. Most facilities in the area depend on Shasta Lake to draw visitors and customers. The tourism and outdoor recreation service industries are included in this discussion because this group includes a community of lower-paid service workers that could be affected by project actions related to Shasta Dam. A change in recreation opportunities could affect employment and revenue patterns, as well as social and recreational opportunities for minority or low-income residents. With the exception of Lakehead, the settlement and

recreation-related development along Shasta Lake falls within unincorporated Shasta County. Residents and workers are dispersed throughout Shasta County, and affected minority and low-income communities are reflected in demographic data for Shasta County as shown in Table 24-1.

**Table 24-1. Ethnicity, Income, and Poverty Trends in Shasta and Tehama Counties and California**

| Topic | | Shasta County | Tehama County | State of California |
|---|---|---|---|---|
| Race/Ethnicity | White, 2010 | 153,726 | 51,721 | 21,453,934 |
| | White, 2000–2010 (% change) | 5.4 | 8.8 | 6.4 |
| | Black or African American, 2010 | 1,548 | 406 | 2,299,072 |
| | Black or African American, 2000–2010 (% change) | 26.4 | 27.7 | 1.6 |
| | American Indian, including Alaskan Natives, 2010 | 4,950 | 1,644 | 362,801 |
| | American Indian, including Alaskan Natives, 2000–2010 (% change) | 9.3 | 41.3 | 8.8 |
| | Asian or Pacific Islander, 2010 | 4,662 | 732 | 5,005,393 |
| | Asian or Pacific Islander, 2000–2010 (% change) | 37.0 | 47.9 | 31.2 |
| | Two or more races (total), 2010 | 7,846 | 2,702 | 1,815,384 |
| | Two or more races (total), 2000–2010 (% change) | 38.6 | 42.3 | 12.9 |
| | Hispanic Origin (any race), 2010 | 14,878 | 13,906 | 14,013,719 |
| | Hispanic Origin (any race), 2000–2010 (% change) | 65.3 | 56.8 | 27.8 |
| Income/Poverty | Median Household Income, 2000 | $34,335 | $31,206 | $47,493 |
| | Median Household Income, 2010 | $42,931 | $39,392 | $59,641 |
| | % Change, 2000–2010 | 25.0 | 26.2 | 25.5 |
| | % of Individuals Below Poverty Level, 2000 | 15.4 | 17.3 | 14.2 |
| | % of Individuals Below Poverty Level, 2010 | 17.7 | 19.5 | 15.5 |
| | % Change, 2000–2010 | 2.3 | 2.2 | 1.3 |
| | % of Children (< 18) Below Poverty Level, 2000 | 21.0 | 24.0 | 19.0 |
| | % of Children (< 18) Below Poverty Level, 2010 | 23.4 | 27.9 | 21.6 |
| | % Change, 2000–2010 | 2.4 | 3.9 | 2.6 |

*Sources: U.S. Census Bureau 2002a, 2002b, 2002c, 2009a, 2010b*

**Areas of Native American Concern** As described in Chapter 14, "Cultural Resources," the Sacramento River and its major tributaries, particularly the Pit and McCloud rivers, were the focus of intensive Native American occupation during historic times, with a variety of religious, economic, historic, and other values identified here for Native American groups. Ten groups, including those listed by the Native American Heritage Commission, represent Native American interests in the study area. They include Grindstone Indian Rancheria, Paskenta Band of Nomlaki Indians, Pit River Environmental Council, Pit River Tribe of California, Redding Rancheria, Shasta Nation, United Tribe of Northern California, Inc., Winnemem Wintu Tribe, Wintu Educational and Cultural Council, and the Wintu Tribe of Northern California.

The Winnemem Wintu have identified important localities within the study area, many of which are locations where ceremonies are regularly conducted. Along the McCloud River, these include Children's Rock, Coyote Rock, Dekkas Rock, doctoring pools near Nawtawaket Creek, Eagle Rock and Samwel Cave, Hirz Bay, *Kaibai* village, North Gray Rocks, Puberty Rock, Saddle Rock, and *Watawacket* village and spiritual area. Along the Sacramento River, important localities include the Antlers area, Delta area, Doney Creek, Gregory Creek, LaMoine area, Packers Bay, Pollard's area, middle Salt Creek, and Sims area. The Winnemem Wintu have strong traditional and contemporary connections with the land, and their ongoing use of many archaeological and religious sites is fundamental to the well-being of their culture, particularly the education of their youth.

The Winnemem Wintu have also documented the location of some 155 ancestral villages within the Shasta Lake area. At least 81 village locations are known along the lower McCloud River and lower Pit River. An additional 73 villages are known to have existed on the east side of the Sacramento River. These village locations once contained between one and 30 houses each, some had associated cemeteries and each had a power place. Some of these villages are already under the waters of Shasta Lake, while others are just above the current Shasta Lake water level. The Winnemem Wintu have estimated that 120 of the known villages are still accessible (above the current high-water line).

Members of the Pit River Madesi Band stated that 22 ethnographic villages and associated burial grounds are located within the existing reservoir and proposed reservoir areas. One tribal member also noted that several Traditional Cultural Properties (TCP) exist within the Pit 6 and Pit 7 Dam areas.

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

Many social and public services are provided and a range of resource-dependent cultural activities take place in the cities of Shasta Lake, Redding, Anderson, Cottonwood, and Red Bluff. Each of these communities could be affected during project operation as a result of improved flood protection, enhanced water supply reliability, and increased recreational opportunities and spending related to improved salmonid habitat. Redding and Shasta County may be most

affected because local residents, businesses, public services, and fiscal resources likely would also be affected by construction-related spending and activities.

Groups affected by the project could include minority and low-income populations such as transient and seasonal workers, Native American and Hispanic/Latino populations, and low-income water and electric utility customers. In 2010, the population of Tehama County was approximately 18.0 percent minority (nonwhite) and 19.5 percent low-income, compared to statewide populations of 42.4 percent minority and 15.5 percent low-income (Table 24-1). Poverty levels in Shasta and Tehama counties were exceeding statewide levels in 2010.

These groups often share the need for a reliable income and low costs of living, access to steady jobs, the need to protect the profitability of businesses that affect their personal income, access to high-quality public services, access to affordable and diverse housing, and a desire to enjoy a high quality of life.

Minority and low-income populations in the upper Sacramento River portion of the primary study area, many of which are employed by local agricultural operations, are especially susceptible to changes in employment opportunities. Changes in water and power supply reliability or delivery costs can have a major effect on the cost of living and on the operating costs and financial health of local businesses and employers. Changes in the frequency and duration of flooding along the Sacramento River and in the Delta also could affect agricultural operations and business owners and employees.

#### *Lower Sacramento River and Delta*

As discussed in Chapter 16, "Socioeconomics, Population, and Housing," this portion of the extended study area includes Red Bluff, the largest city in Tehama County with a population of 13,825 in 2010, and nine counties to the south. In 2010, the population of those nine counties totaled 4,226,027 (DOF 2010). The minority population of the nine counties was 42.6 percent overall, which is approximately the same as the statewide populations of 42.4 percent. Glenn County had the lowest proportion of minority populations, while Sacramento and San Joaquin counties had the highest proportion (U.S. Census Bureau 2010c). In 2010, poverty levels in the region ranged from 10 percent to 20 percent, with low-income populations exceeding the 15.5 percent state poverty level in Butte, Glenn, Sacramento, San Joaquin, and Yolo counties (U.S. Census Bureau 2009b).

Regional employment and labor trends are generally consistent with statewide trends. In 2010, approximately 15.6 percent of the labor force in the nine-county area was unemployed, compared to 7.7 percent statewide (U.S. Census Bureau 2009b). Butte, Colusa, Sacramento, San Joaquin, Solano, and Sutter counties registered higher unemployment rates than California as a whole. The counties with the highest unemployment rates in 2010 were characterized by greater dependence on the agricultural industry and less industrial diversity. Five of the

six counties with unemployment rates above the statewide average maintained more than 60 percent of their land mass in agricultural production. Unemployment rates tend to be higher in rural areas than in urban areas because farm work is typically seasonal or temporary.

The lower Sacramento River region becomes increasingly urbanized as the river flows past the city of Sacramento and toward the Delta. Along its course, the river passes through low-density agricultural and suburban metropolitan areas and near high-density centers of commerce and culture such as Sacramento. In the Delta, a complex network of highways and urban infrastructure is integrated with canals, dikes, and levees. Heavily engineered water control and conveyance systems have promoted and sustained a successful agriculture industry and protected the region against damaging floods.

### *CVP/SWP Service Areas*

The CVP and SWP service areas include 36 of California's 58 counties, accounting for 91 percent (38,648,090 residents) of California's population in 2010 (DOF 2010). Minority groups have been steadily increasing and such ethnic diversification is expected to continue. As shown in Table 24-1, the population of individuals in California identifying themselves as Asian–Pacific Islander or multiracial experienced double-digit population growth, while those identifying themselves as Black or African American experienced the least amount of growth between 2000 and 2010 (U.S. Census Bureau 2010b). Hispanics are the most numerous minority group in California, and many members of this ethnic group work on farms that receive some or all of their water from the CVP. In general, rural agricultural counties have smaller minority populations than urban counties.

Poverty levels for both individuals and children increased slightly between 2000 and 2010. The percentage of people below the poverty level is expected to follow national and statewide economic trends. Generally, poverty rates tend to be higher in rural counties than in urban counties. Despite these differences, each of California's major urban areas has pockets of low-income neighborhoods with high poverty (and unemployment) rates. Minority and low-income communities that might be affected by the project include communities adjacent to construction projects, gateway and service communities providing support to construction-related activities, and low-income customers of water and power utilities who might experience higher rates as a result of costs of project-related system improvements.

These residents and workers may be most vulnerable to increases in CVP water and power costs and, conversely, would benefit from improved flood protection and CVP water and power supply reliability. Central Valley farm workers and other workers employed by businesses in the region that supply goods and services to agricultural operations also could benefit.

# 24.2 Regulatory Framework

## 24.2.1 Federal

***Executive Order 12898***

The purpose of Executive Order 12898 (part of which is excerpted in the introduction to this chapter) is to identify and address the disproportionate placement of adverse environmental, economic, social, or health impacts from Federal actions and policies on minority and/or low-income communities. This order requires lead agencies to evaluate impacts on minority or low-income populations during preparation of environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by Federal agencies.

In addition to the direction referenced above, Executive Order 12898 includes the following requirements:

- Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin. *(Section 2-2)*

- Each Federal agency shall work to ensure that public documents, notices, and hearings relating to human health or the environment are concise, understandable, and readily accessible to the public. *(Section 5-5(c))*

In addition, the presidential memorandum accompanying the executive order states that "(e)ach Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA of 1969."

Two documents provide some measure of guidance to agencies required to implement Executive Order 12898. The first is *Environmental Justice Guidance Under the National Environmental Policy Act* (December 1997), published by CEQ. The second document, the *Final Guidance for Incorporating Environmental Justice Concerns* (April 1998) published in the U.S. Environmental Protection Agency's NEPA Compliance Analysis, serves as a guide for incorporating environmental justice goals into preparation of the EIS under NEPA. These documents provide specific guidelines for assessing environmental justice effects associated with a proposed Federal project.

### 24.2.2 State

There are no State plans, policies, regulations, or laws related to environmental justice applicable to the project. However, Senate Bill 115 (Chapter 690, Statutes of 1999), signed into law in 1999, defined environmental justice in statute and established the Governor's Office of Planning and Research as the coordinating agency for State environmental justice programs (California Government Code, Section 65040.12). This law further required the California Environmental Protection Agency to develop a model environmental justice mission statement for boards, departments, and offices within the agency by January 1, 2001 (Public Resources Code, Sections 72000–72001). The purpose of this program is to inform decision-makers by providing guidance on environmental justice issues.

### 24.2.3 Regional and Local

There are no regional or local plans, policies, regulations, or laws related to environmental justice applicable to the project.

## 24.3 Environmental Consequences and Mitigation Measures

This section describes the potential environmental consequences of the project alternatives as they relate to environmental justice. This analysis relies on demographic data provided in the *Socioeconomics, Population, and Housing Technical Report* and incorporates that information as necessary to describe potential effects on minority and low-income communities.

### 24.3.1 Methods and Assumptions

According to CEQ and U.S. Environmental Protection Agency guidelines established to assist Federal and State agencies, a minority population is present in a project area if (1) the minority population of the affected area exceeds 50 percent, or (2) the minority-population percentage of the affected area is meaningfully greater than the minority-population percentage in the general population or other appropriate unit of geographic analysis. By the same rule, a low-income population exists if the project area consists of 50 percent or more people living below the poverty threshold, as defined by the U.S. Census Bureau, or is meaningfully greater than the poverty percentage of the general population or other appropriate unit of geographic analysis.

The CEQ guidance indicates that when agencies determine whether environmental effects are disproportionately high and adverse, they are to consider whether there is or would be an impact on the natural or physical environment (as defined by NEPA) that would adversely affect a minority population or low-income population.

None of the published guidelines define the term "disproportionately high and adverse," but CEQ includes a nonquantitative definition stating that an effect is

disproportionate if it appreciably exceeds the risk or rate to the general population (CEQ 1997).

The following population characteristics are considered in this analysis:

- Race and ethnicity
- Per-capita income as it relates to the poverty level

The relevant demographic data were obtained from the U.S. Census Bureau and the California Department of Finance. Data are presented at the county level to accommodate the geographic size of each portion of the study area.

In this analysis, a county is considered to have a minority population if its nonwhite population is greater than 50 percent or is meaningfully larger than the general (statewide) nonwhite population. Low-income areas are defined as counties in which the percentage of the population below poverty status exceeds 50 percent, or is meaningfully greater than the general population (average statewide poverty level).

### *Native American Outreach*

Public and stakeholder coordination meetings were conducted on behalf of Reclamation with Native American tribal groups whose traditional territories overlap the primary study area. Seven tribal groups were invited to an information meeting held on April 4, 2007, in Redding, California. The purpose of the meeting was to provide general information about the project, initiate Section 106 consultation with groups desiring to participate in the project, and introduce Elena Nilsson as the Native American Tribal Coordination study lead. Invitations were sent to the Grindstone Rancheria, Paskenta Rancheria, Pit River Tribe, Redding Rancheria, Shasta Nation, Winnemem Wintu, and the Wintu Tribe and Toyon-Wintu Center. The meeting was attended by representatives from the Winnemem Wintu and the Madesi Band of the Pit River Tribe.

Between August 2007 and March 2008, nine meetings were held with Native American groups whose traditional territories overlap with the primary study area. These included meetings and/or workshops with groups and individuals representing major tribes and/or extended family groups in the Shasta/Redding area regarding potential effects on cultural resources from a plan to enlarge Shasta Dam. The purposes of the meetings were to solicit, clarify, and document major concerns and issues regarding the project, and to establish a preferred method/approach to maintaining effective communication during the remainder of the project study and in future endeavors. Five groups participated in these meetings: Grindstone Indian Rancheria (one meeting), Paskenta Band of Nomlaki Indians (one meeting), Pit River Tribe (three meetings), Shasta Nation (one meeting), and Winnemem Wintu (three meetings).

### 24.3.2 Criteria for Determining Disproportionately High and Adverse Effects

To make a finding that disproportionately high and adverse effects would likely fall on minority or low-income populations, three conditions must be met simultaneously:

- There must be a minority or low-income population in the impact zone.
- A high and adverse impact must exist.
- The impact must be disproportionately high and adverse on the minority or low-income population.

### 24.3.3 Topics Eliminated from Further Consideration

No topics related to environmental justice that are included in the significance criteria listed above have been eliminated from further consideration. All relevant topics are analyzed below.

Effects on sites considered sacred by local Native American communities in the upper Sacramento River portion of the primary study area and the lower Sacramento River and Delta and CVP and SWP service areas have been eliminated from further discussion. No impacts on these resources are anticipated as a result of changes in Shasta Dam operations (i.e., storage and release scenarios). Furthermore, any construction activities near sites considered sacred by local Native American communities would require mitigation as stated in Chapter 14 “Cultural Resources”, including compliance with Section 106 of the National Historic Preservation Act (NHPA). As a result, no disproportionately high and adverse effects on Native American populations would be expected; therefore, potential effects related to this topic in these geographic regions are not discussed further in this EIS.

### 24.3.4 Direct and Indirect Effects

#### *No-Action Alternative*

**Shasta Lake and Vicinity**

*Impact EJ-1 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake*

Communities at Shasta Lake and in the vicinity would remain below minority and low-income thresholds as they relate to environmental justice. Adverse construction-related impacts would be avoided, and construction-related employment opportunities and gains within local economies would not be realized. Existing adverse effects on minority or low-income populations do not constitute a disproportionately high and adverse impact. No disproportionately high and adverse effects on minority or low-income populations would occur.

Shasta County would maintain its steady population growth under the No-Action Alternative. Between 1990 and 2010, the population increased by 25.3

percent, with total population projected to reach 196,087 by 2020 (DOF 2010, 2012). The minority (nonwhite) population, including the Winnemem Wintu Tribe and other Native Americans, is projected to account for 16.6 percent of the total population in Shasta County in 2020, slightly more than the current 14.3 percent representation, but less than the 62.5 percent minority population projected statewide for 2020.

As described in Table 24-1, the poverty level in Shasta County increased by 2.3 percent during 2000 to 2010, and unemployment rates in Shasta County were mostly steady during 2000 to 2010, fluctuating between 6.0 and 8.1 percent. However, the poverty and unemployment rates are expected to decrease as the economy recovers. Employment opportunities continue to be provided in the region by major employment sectors such as trade, transportation, and utilities; government; educational, and health services; and leisure and hospitality industries (see Chapter 16, "Socioeconomics, Population, and Housing"). Professional and business services and education and health services are projected to be the leading growth industries in Shasta County; these are also the top two anticipated growth industries statewide. No disproportionately high or adverse impacts on minority or low-income communities are anticipated under the No-Action Alternative. Mitigation is not required for the No-Action Alternative.

*Impact EJ-2 (No-Action): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake* Shasta Dam would not be enlarged; no infrastructure would be removed, modified, or relocated; and no changes in Reclamation's Shasta Lake operations would occur. No disproportionately high and adverse effects on Native American populations would occur.

Under the No-Action Alternative, Shasta Dam would not be enlarged; no infrastructure would be removed, modified, or relocated; and no changes in Reclamation's Shasta Lake operations would occur. Therefore, there would be no effect on several locations in the vicinity of Shasta Lake that are considered sacred by local Native American communities. No disproportionately high and adverse effects on Native American populations would occur. Mitigation is not required for the No-Action Alternative.

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

*Impact EJ-3 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area* Communities in the upper Sacramento River portion of the primary study area would remain below minority and low-income thresholds for environmental justice. The No-Action Alternative would not cause long-term operational changes; therefore, communities adjacent to the Sacramento River would not be affected by long-term changes to environmental and recreational conditions. Construction-related gains within this area would not be realized. Existing adverse effects on minority or low-income populations would not be

disproportionately high and adverse. No disproportionately high and adverse effects on minority or low-income populations would occur.

Tehama County would maintain its steady population growth under the No-Action Alternative. Between 1990 and 2010, the population increased by 27.2 percent, with total population projected to reach 68,769 by 2020 (DOF 2010). The minority (nonwhite) population is projected to account for 31 percent of the total population in Tehama County in 2020, an increase of nearly 7 percent from the current 23.9 percent level, but less than the 62.5 percent minority population projected statewide for 2020.

As described in Chapter 16, "Socioeconomics, Population, and Housing," during 2000 to 2010, the poverty level in Tehama County increased by 2.2 percent and unemployment rates in Tehama County fluctuated between 6.4 and 8.8 percent. Tehama County is similar to neighboring Shasta County in employment and income trends, and dominant employment sectors. Projected growth industries differ between the two counties, however; Tehama County is projected to experience economic growth in construction and information services (see Chapter 16, "Socioeconomics, Population, and Housing"). These sectors are the third and fifth largest anticipated growth areas statewide.

Because the No-Action Alternative would not change existing or projected future conditions, it would not have a disproportionately high or adverse effect on minority or low-income communities. Mitigation is not required for the No-Action Alternative.

**Lower Sacramento River and Delta**

*Impact EJ-4 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area* Some communities within the lower Sacramento River and Delta portion of the extended study area contain minority and low-income populations above environmental justice thresholds; however, continuing the existing and projected future conditions under the No-Action Alternative would not affect those populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

The lower Sacramento River and Delta portion of the extended study area includes Butte, Colusa, Contra Costa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties. In 2010, the population of the nine-county region was 4,226,027. This number is expected to grow by 47.5 percent to 6,294,088 by 2020 (DOF 2010, 2012). The minority (nonwhite) population is projected to account for 63.8 percent of the total population in the lower Sacramento River and Delta area by 2020, with minority populations exceeding 50 percent in Colusa, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties. Although the minority population in the lower Sacramento River and Delta area is projected to exceed 50 percent by 2020, the 63.8 percent representation would

not be meaningfully greater than the statewide minority population, which is projected to be 62.5 percent.

In 2010, poverty levels in the nine-county region ranged from 10 percent to 20 percent, with low-income populations exceeding the 15.5 percent statewide poverty level in Butte, Glenn, Sacramento, San Joaquin, and Yolo counties (U.S. Census Bureau 2009b). Employment and labor trends in the lower Sacramento River and Delta portion of the extended study area are generally consistent with statewide trends. In 2010, approximately 15.6 percent of the labor force in the nine-county area was classified as unemployed, compared to a statewide total of 7.7 percent. Butte, Colusa, Sacramento, San Joaquin, Solano, and Sutter counties registered higher unemployment rates than the state as a whole in 2010. Generally, the counties with the highest unemployment rates in 2010 were characterized by greater dependence on the agricultural industry and less industrial diversity. Five of the six counties with unemployment rates above the statewide average maintained more than 60 percent of their land mass in agricultural production. Unemployment rates tend to be higher in rural areas than in urban areas because farm work is typically seasonal or temporary.

The lower Sacramento River and Delta portion of the extended study area has some low-income populations and some counties with a higher unemployment rate than the statewide average. However, the No-Action Alternative would not change the existing or projected future conditions. Therefore, the No-Action Alternative would not have disproportionately high and adverse effects on minority or low-income populations. Mitigation is not required for the No-Action Alternative.

**CVP/SWP Service Areas**

*Impact EJ-5 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas*

Some communities within the CVP and SWP service areas contain minority and low-income populations above environmental justice thresholds; however, adverse effects on CVP and SWP customers within these communities do not constitute a disproportionately high and adverse impact. Continuing the existing and projected future conditions under the No-Action Alternative would not affect these populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

The CVP and SWP service areas are so expansive that they may be considered synonymous with the entire state of California for environmental justice purposes. Together, the CVP and SWP service areas include 36 of California's 58 counties, accounting for 91 percent (39 million residents) of California's population in 2010. The state's population has increased by almost 30 percent since 1990 and is projected to increase by approximately 32 percent to more than 51 million people by 2020 (DOF 2010). Continued ethnic diversification is expected. Minority groups have been steadily increasing their proportion of the state population. The population of individuals in California identifying

themselves as Asian–Pacific Islander or multiracial experienced double-digit population growth, while those identifying themselves as Black or African American experienced the least amount of growth between 2000 and 2010 (U.S. Census Bureau 2010b). Hispanics are the most numerous minority group in California, and many members of this ethnic group work on farms that receive some or all of their water from the CVP. In general, rural agricultural counties have smaller minority populations than urban counties.

Poverty levels for both individuals and children in California increased slightly between 2000 and 2010. The percentage of people below the poverty level in Shasta County is expected to follow national and statewide economic trends. Generally, poverty rates tend to be higher in rural counties than in urban counties. Despite these overall differences, each of the state's major urban areas has pockets of low-income neighborhoods with high poverty rates.

California's total labor force increased just over 2 percent from 2002 to 2005, adding between 100,000 and 200,000 individuals each year. Between 2004 and 2005, the labor force increased by approximately 188,000 individuals. This was the largest annual increase over the 4-year period. California's total labor force exceeded 18.8 million in 2010. The state's unemployment rate was lowest in 2000 (5.0 percent), and has been increasing since 2003. Unemployment in 2010 registered at 7.7 percent, greater than the state's 2001 unemployment rate of 5.4. This observed increase in the unemployment rate at the state level has coincided with similar national employment trends. Like poverty, unemployment rates tend to be lower in urban areas than in rural areas of the state; however, high unemployment rates are often found in low-income neighborhoods of major urban centers.

Although the CVP and SWP service areas have some low-income populations, the No-Action Alternative would not change the existing or projected future conditions. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation is not required for the No-Action Alternative.

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

**Shasta Lake and Vicinity**

*Impact EJ-1 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake*

Communities adjacent to the project construction site may experience temporary or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would disproportionately affect minority or low-income populations in the vicinity of Shasta Lake. Increased employment and income opportunities could also result from project construction activities, and would not be disproportionately distributed among

minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

Under this alternative, the dam would be raised by 6.5 feet over a 54-month construction period. Residents near Shasta Dam, as well as others who may commute or otherwise travel near construction sites, would be exposed to a range of potentially adverse environmental and public health effects over a 54-month construction period (see Engineering Appendix). Temporary and/or short-term adverse noise, visual, and air quality effects could result; in addition, motorists could be delayed, and access to recreation opportunities or local businesses could be temporarily reduced. Negative health effects could also result if hazardous materials were to be accidentally released into the environment during construction.

Nonwhite individuals, including the Winnemem Wintu Tribe and other Native Americans, accounted for 16.6 percent of Shasta County's total population in 2010, well below the 50 percent threshold for a minority population. This percentage is also substantially less than the 2010 statewide nonwhite population of 42.4 percent. Likewise, the poverty rate in Shasta County was 17.7 percent in 2010, well below the 50 percent threshold and slightly greater than the 15.5 percent statewide poverty rate. Therefore, the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, minority and low-income populations would not be disproportionately affected by these adverse effects.

Increased employment and income opportunities may result from construction under CP1, which could benefit minority and low-income populations. Project construction under CP1 could increase the number of jobs available, or could improve business conditions and incomes for workers who are already employed by businesses that would directly or indirectly benefit from project-related construction spending. The project would require a labor force of 300 people drawn directly from the Shasta Lake area. Most (85 percent) of the construction materials and supplies would be purchased in the vicinity; these materials and supplies would constitute 60 percent of total construction costs. As described above, the percentages of minority and low-income individuals in Shasta County populations are well below threshold levels for minority and low-income populations, and employment effects would not be disproportionately distributed among these groups. Selected minority and low-income individuals may be potentially affected. Such economic and job-related impacts would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

*Impact EJ-2 (CP1): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake* The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to

be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP1 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

Two tribes, the Winnemem Wintu and the Pit River Madesi Band, live within the vicinity of Shasta Lake, where they continue to actively practice many aspects of their traditional culture. Both groups have related that a complex cultural landscape of village sites, ceremonial areas, sacred sites, burial sites, and resource areas would be affected directly by CP1.

Two particularly important Winnemem Wintu locations that would be affected by CP1 are Puberty Rock and the doctoring pools near Nawtawaket Creek. CP1 could submerge Puberty Rock for longer periods, restricting the Winnemen Wintu from holding the puberty ceremony at this important location. Relocating the rock to higher ground is not possible; in the Winnemem Wintu's worldview, its location is preordained and connected with the nearby "two sisters" mountain (Bolliboka Mountain). Puberty Rock also marks the location of an extensive village with housepits and burials, situated at Kabyai Creek, west of the McCloud River near the McCloud Campground. CP1 would inundate additional burials at this location, which would require removal and relocation. The Winnemem Wintu have estimated that 120 ancestral villages are still accessible above the current high-water line of Shasta Lake and would be adversely affected by CP1.

Pit River Madesi Band members state that 22 ethnographic villages, associated burial grounds, and several TCPs are located within the existing reservoir and proposed inundation or fluctuation areas.

Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to several locations in the vicinity of Shasta Lake; therefore, the disturbance and loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP1, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

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

*Impact EJ-3 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area*

Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP1 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

In Tehama County, nonwhite individuals accounted for 18.0 percent of the total population in 2010. This is roughly half of the 50 percent threshold for a minority population. This level also is substantially less than the statewide nonwhite population of 42.4 percent. The poverty level in Tehama County was 19.5 percent in 2010, also well below the 50 percent threshold and slightly higher than the 15.5 percent statewide poverty rate. From 2000 to 2010, poverty levels in Tehama County increase at a rate of 2.2 percent, outpacing the statewide poverty rate (1.3 percent) by 0.9 percent over approximately the same time. Based on this trend, and the comparatively consistent poverty rates between Tehama County and the statewide population, poverty levels in Tehama County are not meaningfully greater than poverty levels statewide. Therefore, the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Thus, disproportionately high and adverse effects on minority or low-income populations would not occur.

Communities along the upper Sacramento River portion of the primary study area would not be exposed to direct construction-related impacts associated with CP1.

Raising Shasta Dam would add 256,000 acre-feet of cold-water storage to the overall capacity of the reservoir. This operational change would be beneficial for two reasons. CP1 would reduce the risk of flooding downstream from Shasta Dam and consequently reduce potentially adverse social, economic, and environmental effects because of flooding for property owners, businesses, and workers. In addition, CP1 would improve environmental and recreational conditions by enhancing habitat for fish and wildlife, benefiting anglers, hunters, and wildlife viewers.

These beneficial impacts would not be disproportionately distributed among minority and low-income populations, because representation of these groups in the population of Tehama County is well below threshold levels. Selected minority and low-income individuals may be potentially affected; however, these environmental and recreational effects would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

**Lower Sacramento River and Delta**

*Impact EJ-4 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area* Operational effects of CP1 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-2 (CP1). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high or adverse effects on minority or low-income populations would occur.

Operational effects of CP1 on minority and low-income populations in the lower Sacramento River and Delta portion of the extended study area would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-2 (CP1). However, benefits in the lower Sacramento River and Delta area resulting from the reduced risk of flooding and improved environmental and recreational conditions would be less than described for the upper Sacramento River area because the lower Sacramento River and Delta is located at a greater distance from the project site. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**CVP/SWP Service Areas**

*Impact EJ-5 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas* Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power for businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur.

Utility customers in communities within the CVP and SWP service areas may experience indirect, adverse effects through rate increases as a result of CP1. Project-related water storage and hydroelectric facility improvements may be funded partly through increased rates for water and power services. However, such adverse effects would not disproportionately affect minority or low-income populations.

Operational changes resulting from CP1 may increase employment opportunities and water and power reliability in the CVP and SWP communities, which would be beneficial for individual utility customers and businesses. Selected minority and low-income individuals may be beneficially affected by increased employment opportunities. Such beneficial employment-

related impacts would not disproportionately affect minority and low-income populations. Thus, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

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

**Shasta Lake and Vicinity**

*Impact EJ-1 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake* Communities adjacent to the project construction site may experience temporary and/or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would disproportionately affect minority or low-income populations in the vicinity of Shasta Lake. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur.

Effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 12.5 feet and the construction period likely would extend for up to 6 additional months. The beneficial effects and less-than-significant adverse impacts would be similar to those described under Impact EJ-1 (CP1) because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, disproportionately high and adverse effects on minority or low-income populations would not occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact EJ-2 (CP2): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake* The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP2 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be similar to but slightly greater than Impact EJ-2 (CP1) because the inundation area under CP2 would be slightly greater than under CP1. A disproportionately high and adverse effect on Native American

populations would occur. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP2, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

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

*Impact EJ-3 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area* Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP2 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP2 would provide 187,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Thus, disproportionately high and adverse effects on minority or low-income populations would not occur. Mitigation for this impact is not needed, and thus not proposed.

**Lower Sacramento River and Delta**

*Impact EJ-4 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area* Operational effects of CP2 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-4 (CP2). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP2, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 187,000 acre-feet of reservoir storage would provide

somewhat greater benefits under CP2 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**CVP/SWP Service Areas**

*Impact EJ-5 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas* Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power for businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP2 would be greater than under CP1, because of the increased need for construction materials and an additional 6 months of construction. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those of CP1, and minority or low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

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

**Shasta Lake and Vicinity**

*Impact EJ-1 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake* Communities adjacent to the project construction site may experience temporary and/or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would disproportionately affect minority or low-income populations in the vicinity of Shasta Lake. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-1 (CP1). Under CP3, the effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 18.5 feet and the construction period would extend for at least 6 additional months and require an

additional 50 construction workers. The beneficial impacts and less-than-significant adverse impacts would be similar to those described under CP1 because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, disproportionately high effects on minority or low-income populations would not occur (nor would disproportionately high and beneficial effects). Mitigation for this impact is not needed, and thus not proposed.

*Impact EJ-2 (CP3): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake* The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP3 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be similar to but slightly greater than Impact EJ-2 (CP2) because the inundation area under CP3 would be slightly greater than under CP2. A disproportionately high and adverse effect on Native American populations would occur. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP3, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

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

*Impact EJ-3 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low- Income Populations in the Upper Sacramento River Area* Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP3 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These beneficial operational effects would not be disproportionately distributed among minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP3 would provide 378,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Thus, disproportionately high and adverse effects on minority or low-income populations would not occur. Mitigation for this impact is not needed, and thus not proposed.

**Lower Sacramento River and Delta**

*Impact EJ-4 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area* Operational effects of CP3 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-3 (CP3). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP3, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 378,000 acre-feet of reservoir storage would provide somewhat greater benefits under CP3 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**CVP/SWP Service Areas**

*Impact EJ-5 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas* Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply reliability and power for businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP3 would be greater than under CP1 because of the increased need for construction materials and an additional 6 months of construction. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those of CP1, and minority and low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

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

**Shasta Lake and Vicinity**

*Impact EJ-1 (CP4): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake*

Communities adjacent to the project construction site may experience temporary and/or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would be disproportionately distributed among minority or low-income populations in the vicinity of Shasta Lake. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-1 (CP1). Under CP4, the effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 18.5 feet and the construction period would extend for at least 6 additional months and require an additional 50 construction workers. The beneficial effects and less-than-significant adverse impacts would be similar to those described under CP1 because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, adverse and beneficial effects would not be disproportionately distributed among minority or low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact EJ-2 (CP4): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake* The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP4

would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be similar to Impact EJ-2 (CP3), but the frequency and timing of inundation may vary. Disproportionately high and adverse effects on Native American populations would occur. Mitigation for this impact is not proposed because no feasible mitigation is available. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP4, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

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

*Impact EJ-3 (CP4): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area*

Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP4 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These beneficial operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP4 would provide 378,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**Lower Sacramento River and Delta**

*Impact EJ-4 (CP4): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area* Operational effects of CP4 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-3 (CP4). However, because the beneficial effects (reduction of flooding risk and

improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP4, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 378,000 acre-feet of reservoir storage would provide somewhat greater benefits under CP4 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**CVP/SWP Service Areas**

*Impact EJ-5 (CP4): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas* Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power to businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP4 would be greater than under CP1 because of the increased need for construction materials and an additional 6 months of construction and require an additional 50 construction workers. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those under CP1, and minority and low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

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

**Shasta Lake and Vicinity**

*Impact EJ-1 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake* Communities adjacent to the project construction site may experience

temporary adverse environmental effects because of construction activities and changes in project conditions and operations. However, the construction activity in any specific area would be short-term, and neither construction-related nor operational effects would constitute a high and adverse impact on minority or low-income populations in the vicinity of Shasta Lake. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-1 (CP1). Under CP5, the effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 18.5 feet and the construction period would extend for at least 6 additional months and require an additional 60 construction workers. The beneficial effects and less-than-significant adverse impacts would be similar to those described under CP1 because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

*Impact EJ-2 (CP5): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake* The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP5 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be the same as Impact EJ-2 (CP3). Disproportionately high and adverse effects on Native American populations would occur. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP5, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

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

*Impact EJ-3 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area* Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP5 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP5 would provide 378,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Therefore, minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**Lower Sacramento River and Delta**

*Impact EJ-4 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area* Operational effects of CP5 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-3 (CP5). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP5, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 378,000 acre-feet of reservoir storage would provide somewhat greater benefits under CP5 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

**CVP/SWP Service Areas**

*Impact EJ-5 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas* Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power for businesses and others. Minority and low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP5 would be greater than under CP1 because of increased materials, an additional 6 months of construction, and 60 additional construction workers. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those under CP1, and minority and low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

### 24.3.5 Mitigation Measures

Table 24-2 presents a summary of effects and mitigation measures for environmental justice.

***No-Action Alternative***

No mitigation measures are needed for this alternative.

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

No mitigation measures are needed for Impacts EJ-1 (CP1), EJ-3 (CP1), EJ-4 (CP1), or EJ-5 (CP1). No feasible mitigation is available for Impact EJ-2 (CP1). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

**Table 24-2. Summary of Mitigation Measures for Environmental Justice**

| Impact | | No-Action Alternative | CP1 | CP2 | CP3 | CP4 | CP5 |
|---|---|---|---|---|---|---|---|
| Impact EJ-1: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake | Effect before Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | Effect after Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| Impact EJ- Impact EJ-2: Potential Disproportionate High and Adverse Effect on Native American Populations in the Vicinity of Shasta Lake | Effect before Mitigation | NDHA | DHA | DHA | DHA | DHA | DHA |
| | Mitigation Measure | None required. | No feasible mitigation is available to reduce impact. | | | | |
| | Effect after Mitigation | NDHA | DHA | DHA | DHA | DHA | DHA |
| Impact EJ- Impact EJ-3: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area | Effect before Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | Effect after Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| Impact EJ- Impact EJ-4: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area | Effect before Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | Effect after Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| Impact EJ- Impact EJ-5: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas | Effect before Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |
| | Mitigation Measure | None required. | None needed; thus, none proposed. | | | | |
| | Effect after Mitigation | NDHA | NDHA | NDHA | NDHA | NDHA | NDHA |

Key:
DHA = Disproportionately high and adverse
NDHA = Not disproportionately high and adverse

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

No mitigation measures are needed for Impacts EJ-1 (CP2), EJ-3 (CP2), EJ-4 (CP2), or EJ-5 (CP2). No feasible mitigation is available for Impact EJ-2 (CP2). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

***CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply***

No mitigation measures are needed for Impacts EJ-1 (CP3), EJ-3 (CP3), EJ-4 (CP3), or EJ-5 (CP3). No feasible mitigation is available for Impact EJ-2 (CP3). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

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

No mitigation measures are needed for Impacts EJ-1 (CP4), EJ-3 (CP4), EJ-4 (CP4), or EJ-5 (CP4). No feasible mitigation is available for Impact EJ-2 (CP4). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

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

No mitigation measures are needed for Impacts EJ-1 (CP5), EJ-3 (CP5), EJ-4 (CP5), or EJ-5 (CP5). No feasible mitigation is available for Impact EJ-2 (CP5). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

### 24.3.6 Cumulative Effects

In the primary study area (i.e., Shasta Lake and vicinity and the upper Sacramento River from Shasta Dam to Red Bluff), minority and low-income populations are not disproportionately represented. Identified construction effects would be less than significant, and minority and low-income populations would not be disproportionately affected.

Some communities within the extended study area (i.e., the lower Sacramento River and Delta and the CVP and SWP service areas) exceed minority and low-income thresholds. These communities, along with the general population, would benefit from project effects that would reduce future water shortages by improving water supply reliability for both average and drought years. The greatest benefit would be provided by CP3, CP4, and CP5, which would

provide an additional 634,000 acre-feet of storage capacity. CP1 and CP2 would provide only 256,000 and 443,000 acre-feet of increased storage capacity, respectively, with correspondingly reduced benefits.

Alternatives that would incorporate the greatest increase to dam height would result in the greatest project cost because of higher costs for construction materials and longer construction periods. These increased costs may be reflected in increased utility rates that could be combined with other utility rate increases. Such rate increases would be incremental and would be experienced by the general population, along with minority and low-income communities.

Therefore, the project would not contribute to disproportionate placement of environmental impacts on low-income and minority populations or communities, and no cumulatively considerable impacts would result.

The disturbance or loss of resources associated with locations considered by Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake. Therefore, the project would contribute to disproportionate placement of environmental impacts on Native American populations and would result in a cumulatively considerable incremental contribution to a significant and unavoidable cumulative impact.

# Chapter 25
# Wild and Scenic River Considerations for McCloud River

This chapter describes the effects of the dam and reservoir modifications proposed under SLWRI action alternatives on the wild and scenic river values of the lower McCloud River, one of the major tributaries to Shasta Lake.

This chapter differs from the other chapters in this DEIS in that it concerns only the McCloud River and does not discuss other portions of the primary study area nor the extended study area. The study area for this chapter consists of the lower McCloud River from the McCloud River Bridge to the confluence with Little Bollibokka Creek (Figure 25-1).

The primary focus of this chapter is the wild and scenic river values of the lower McCloud River, particularly the reach that would periodically be newly inundated if Shasta Dam and Shasta Lake were enlarged. The discussion and analysis concentrate on the values for which the McCloud River has been determined eligible for listing under the Federal Wild and Scenic Rivers Act ((Federal WSRA); Public Law 90-542, as amended; 16 U.S. Code 1271-1287) and for which a portion of the river is protected under the California Public Resources Code, Section 5093.542 (State PRC). Section 5093.542 was established through enactment of the California Wild and Scenic Rivers Act, as amended (Sections 5093.50 – 5093.70).

This chapter also differs from the other chapters in that it first provides background information and then discusses the regulatory framework to provide context for the affected environment section.

## 25.1 Background

Segments of the McCloud River have been determined eligible for listing under the Federal WSRA and are protected under the State PRC. The river has not been formally listed as wild and scenic under either the Federal WSRA or State PRC.

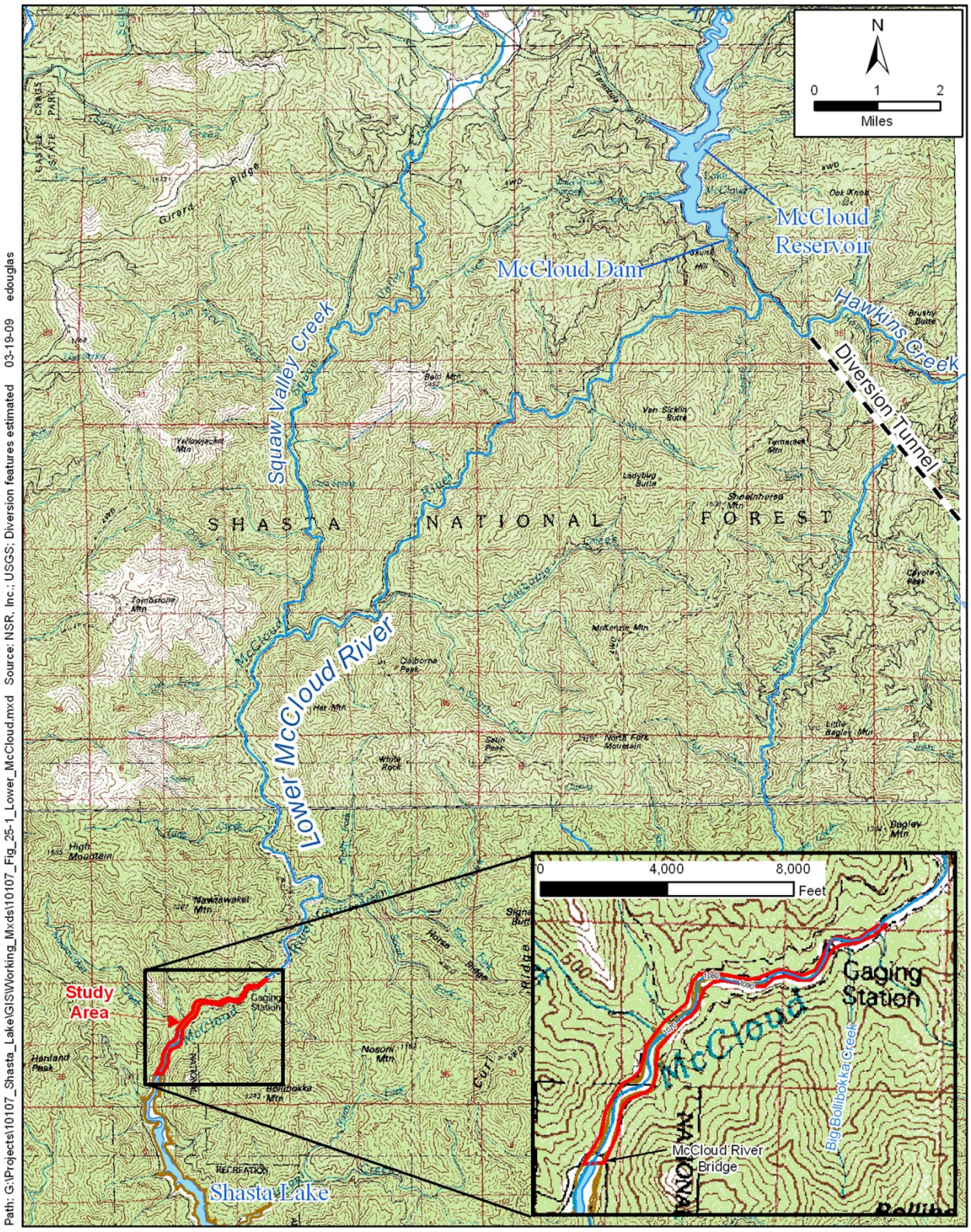


**Figure 25-1. Lower McCloud River Study Area**

The USFS evaluated the eligibility of the McCloud River for listing as wild and scenic under the Federal WSRA during preparation of the Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP) in 1994 (USFS 1994). Although the LRMP found the McCloud River eligible for listing, the LRMP direction was to not formally designate any reach of the river as wild and scenic. Instead, the direction was to manage the lower McCloud River under a Coordinated Resource Management Plan (CRMP; USFS 1995a). The coordinated resource management plan (CRMP) is a coordinated effort between landowners and stakeholders with a vested interest in the river. The CRMP requires its signatories to protect the values that make it eligible for Federal designation as wild and scenic and contains a provision stating that the USFS reserves the right to pursue designation if the CRMP is terminated or fails to protect these values.

The California Resources Agency (Resources Agency) evaluated the McCloud River in the late 1980s (Jones & Stokes Associates 1988) to determine whether it was eligible for listing under the State PRC. The Resources Agency study found it eligible, but the California legislature declined to add the river to the California wild and scenic river system. The legislature instead passed an amendment to the California Wild and Scenic Rivers Act to protect the river's free-flowing condition and the river's fishery below McCloud Dam through the State PRC.

As described in more detail under "Regulatory Framework," the State PRC and Federal WSRA share several similar components: the establishment of a wild and scenic rivers system; the purpose of protecting certain rivers in their "free-flowing" condition; the identification of extraordinary or outstandingly remarkable values (ORV) that make such rivers eligible for protection; a study process and procedure for including rivers in the system; and classifications of "wild," "scenic," and "recreational." Both the Federal WSRA and State PRC prohibit new water impoundments on designated rivers, and both contain directives to government agencies to use their powers to further the policies of the legislation.

The Federal WSRA establishes a larger wild and scenic river corridor—typically at least 0.25 mile on each side of the river—than the State PRC and requires Federal agencies to manage the public lands in the corridor to protect the river's free-flowing character and ORVs. In addition, the Federal agency managing rivers that are Federally designated as wild and scenic is required to develop and implement a management plan that will ensure the river's protection. In contrast, the State PRC provides protection only to the first line of permanent riparian vegetation and does not require a management plan.

The length of the lower McCloud River that was determined to be eligible for wild and scenic river status differs between the Federal and State evaluations. The USFS defined the lower McCloud River more narrowly than the Resources Agency, considering the portion of the river that is currently periodically

inundated by Shasta Lake – referred to in this chapter as the *transition reach* – as part of the lake rather than part of the river. The USFS defined the lower river as extending from McCloud Dam downstream to an elevation of 1,070 feet mean sea level (msl) (approximately 22 total river miles), which corresponds to the current full-pool elevation of Shasta Lake. The Resources Agency's study report included approximately 5,400 feet of the transition reach (down to the McCloud River Bridge) as part of the lower river's segments (approximately 23 total river miles).

In its evaluation, the USFS divided the McCloud River into 10 segments encompassing 46 total river miles: three segments along the upper McCloud River (24 river miles above McCloud Reservoir) and seven segments along the lower McCloud River (22 river miles below McCloud Dam). Numbering of the upper McCloud River segments began at the headwaters and counted downstream, but numbering of the lower McCloud River segments began at the downstream extent and counted upstream. The USFS concluded that all 10 segments of the McCloud River were eligible for listing as a Federal wild and scenic river because they are free flowing, possess good water quality, and exhibit ORVs in the areas of cultural and historical resources, fisheries, geology, and scenic resources. Part of the lowermost segment – Segment 4 – would be periodically inundated if Shasta Lake is expanded. Segment 4 extends from about 5,400 feet upstream from the McCloud River Bridge, beginning at an elevation of 1,070 feet msl, to about Little Bollibokka Creek. The lower extent of this segment corresponds with the current full-pool elevation of Shasta Lake based on Reclamation geographic information system data. Figure 25-2 shows the downstream extent of Segment 4.

The Resources Agency's report also identified 10 segments, but its evaluation encompassed only 43 total river miles and the numbering of segments began at the headwaters and counted downstream along the entire river. The segments included six along the upper river (20 river miles above McCloud Reservoir) and four along the lower river (23 river miles below McCloud Dam). Eight of the 10 segments were determined eligible for State wild and scenic river status. Segment 10 extends from the McCloud River Bridge to the northern border of Section 9, Township 36 North, Range 3 West, which is just upstream from the river's confluence with Tuna Creek. Approximately 5,400 feet of the transition reach is included in Segment 10; the portion of the transition reach downstream from the bridge was determined ineligible. The downstream extent of Segment 10 is shown on Figure 25-2.

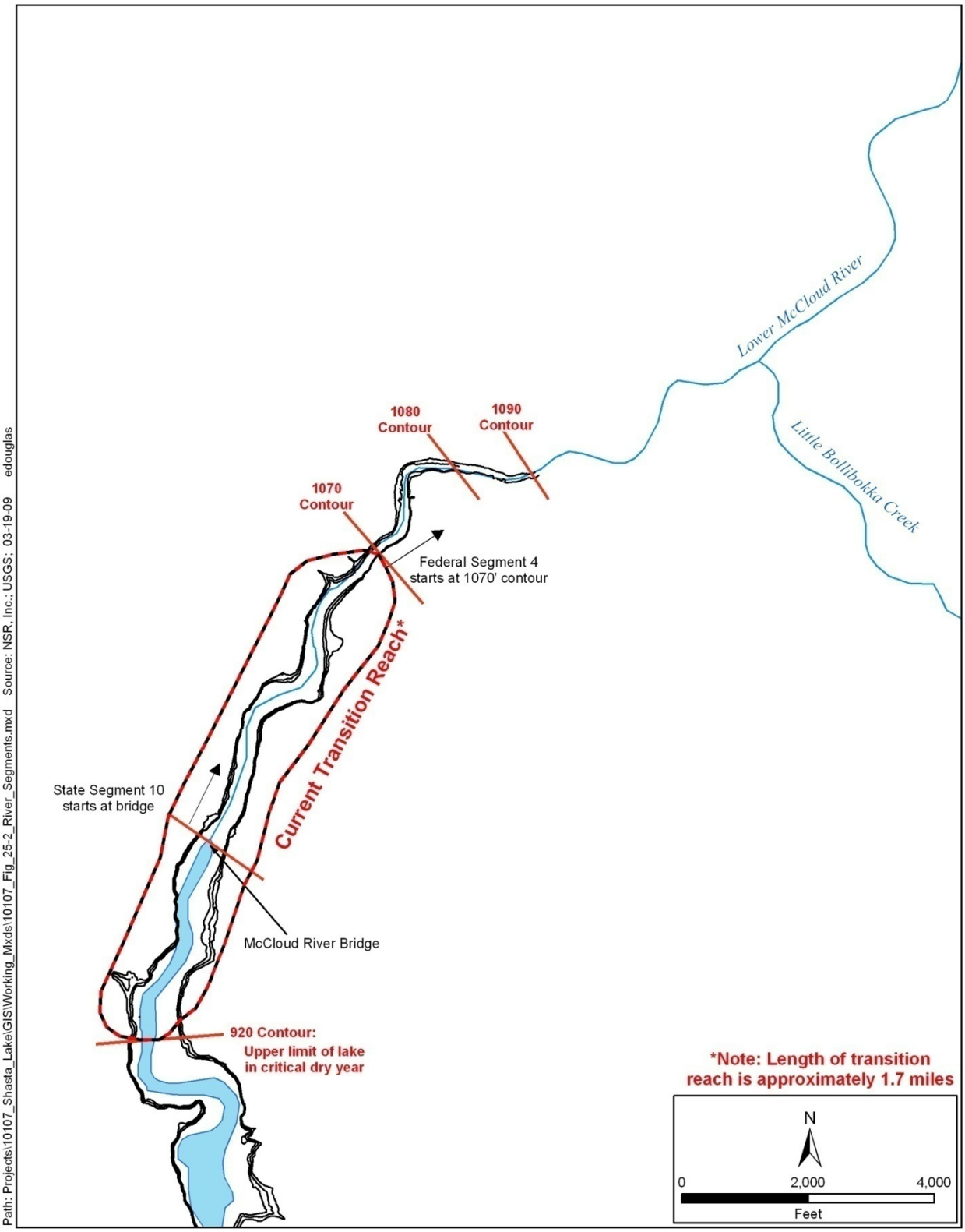


**Figure 25-2. Differences in State and Federal Segments and Transition Reach**

## 25.2 Regulatory Framework

### 25.2.1 Federal

***Federal Wild and Scenic Rivers Act***

The Federal WSRA, enacted in 1968, established the National Wild and Scenic Rivers System "to preserve rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations." To be eligible for inclusion in the system, a river must be free-flowing and exhibit ORVs. Free-flowing means "existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway" (16 United States Code (USC) Section 1286). ORVs are scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (16 USC Section 1271). Depending on the specific conditions of a river, it may be designated as "wild," "scenic," or "recreation." Different segments of a single river can receive different designations; in other words, some segments can be designated wild, some scenic, and some recreation or combinations of these designations.

Through the development and approval of the STNF LRMP, the USFS determined that segments of the McCloud River are eligible for inclusion in the national system; however, the river has not been formally designated and thus is not afforded protections under the Federal WSRA. Instead, the McCloud River CRMP was developed "to protect the [river's] unique and outstandingly remarkable features," thereby maintaining its eligibility.

The USFS evaluation concluded that the lower McCloud River, from McCloud Dam downstream about 22 miles to the river's transition to Shasta Lake at about 1,070 feet msl, provides outstanding cultural, fisheries, and geologic values, and its corridor has been classified as a highly sensitive visual area by the USFS (USFS 1994 and 1995b). The entire river corridor contains prehistoric and historic sites from past use by Indian tribes, late 1800 and early 1900 resorts, and logging activities. The lower river provides habitat for trout species (bull trout/Dolly Varden, which is believed to be extinct, and rainbow trout, which has been transplanted all over the world) and is considered a "blue ribbon trout fishery" (USFS 1994). Outstanding geologic values include rock outcrops, cascades, and pools. Based on the ORVs, the STNF determined that the lower McCloud River meets the eligibility requirements for designation under the Federal WSRA.

***Shasta-Trinity National Forest Land and Resources Management Plan***

The STNF LRMP is a forest-wide land use plan developed to guide resource management within the forest (USFS 1995b). For planning purposes, the STNF is divided into six land allocations for which specific management prescriptions are identified. The land allocations include Congressionally Reserved Areas, Late-Successional Reserves, Administratively Withdrawn Areas, Riparian Reserves and Key Watersheds, Matrix Lands, and Adaptive Management Areas.

Management areas were identified within the STNF to establish management direction in response to the issues and resources of each distinct area. The Management Area defined for the McCloud River provides resource direction for recreational use, specifically fishing and viewing waterfalls, and management of old-growth habitat. Management of the wild and scenic river ORVs of the McCloud River is deferred to the CRMP.

***Coordinated Resource Management Plan***

In 1990, certain public agencies and private parties with interests in the management of lands adjacent to the McCloud River executed a memorandum of understanding to pursue preparation of a CRMP. The memorandum was signed by representatives of the USFS, CDFW, The Nature Conservancy, Pacific Gas and Electric Company (PG&E), the Bollibokka Land Company, Crane Mills, McCloud River Co-Tenants, Sierra Pacific Industries, and the Hearst Corporation. In 1991, the same signatories, along with California Trout Inc., signed another memorandum of understanding to establish the framework for and approve the CRMP. The CRMP was adopted in July 1991. In 2007, the property owned by the Bollibokka Land Company was sold to Westlands Water District, which is not a party to the CRMP.

The CRMP provides a framework for the coordination of management activities among the participants to ensure that the characteristics of the river that make it eligible for Federal wild and scenic river designation are protected. The CRMP provides specific conditions for the USFS' management of the river and states that the USFS "reserves the right to pursue [Federal wild and scenic river] designation" if the CRMP is terminated or significantly impaired or if the CRMP fails to protect the values that make the river suitable for such designation.

### 25.2.2 State

***California Public Resource Code, Sections 5093.50-5093.70***

Sections 5093.50–5093.70 were added to the State PRC in 1972, through enactment of the California Wild and Scenic Rivers Act, to preserve certain rivers that possess extraordinary scenic, recreational, fishery, or wildlife values in their free-flowing state. The State PRC identifies, classifies, and provides protection for specific rivers or river segments, as approved by the legislature. Rivers or river segments that are specifically identified and classified in the State PRC comprise the State Wild and Scenic Rivers System. As described in Section 5093.50, rivers or river segments included in the State system must possess "extraordinary scenic, recreational, fishery, or wildlife values"; the State PRC does not define what constitutes "extraordinary."

Various amendments to the California Wild and Scenic Rivers Act have been passed, adding related legislation to the State PRC. In 1986, Assembly Bill (AB) 3101 (Statutes 1986, Chapter 894) established a study process to help determine eligibility for potential additions to the State system (State PRC

Section 5093.547 and Section 5093.548). Additionally, protection for river segments can be provided without formally identifying them as part of the State system.

In 1989, an amendment to the California Wild and Scenic Rivers Act was passed, adding Section 5093.542 to the State PRC to protect the McCloud River fishery, which it describes as "one of the finest wild trout fisheries in the state." It further declares that "The continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud River" and that "maintaining the McCloud River in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the McCloud River." The amendment provides protection to the McCloud River fishery and its "natural" and "free-flowing" condition from Algoma to the confluence with Huckleberry Creek (upper McCloud River), and 0.25 mile downstream from the McCloud Dam to the McCloud River Bridge (lower McCloud River). Although the Legislature declared that the McCloud River possessed "extraordinary resources" in the context of the State PRC, the Legislature's action stopped short of formally designating the river as wild and scenic.

## 25.3 Affected Environment

This section defines "affected environment" as the wild and scenic characteristics of the lower McCloud River that could be affected by the proposed modifications to Shasta Dam and Shasta Lake. It briefly describes the McCloud River from its headwaters to the McCloud Arm of Shasta Lake. It then describes the wild and scenic values of Segment 4 identified in the USFS evaluation and the values provided protection in the State PRC.

Descriptions of the river and its characteristics were derived primarily from the following sources:

- Wild and Scenic Rivers Evaluation, Appendix E to the EIS for the Shasta-Trinity National Forest Land and Resources Management Plan (USFS 1994)
- Lower McCloud River and McCloud Arm Watershed Analyses (USFS 1998a and 1998b)
- McCloud River Wild and Scenic River Report (Jones & Stokes Associates 1988)
- Lower McCloud River Wild Trout Area Fishery Management Plan, 2004 through 2009 (Rode and Dean 2004)
- Lower McCloud River Habitat Typing Report (USFS 2001)

### 25.3.1 The McCloud River

#### *McCloud River Basin*

The McCloud River basin drains an area of approximately 800 square miles (USFS 1998a) in northern Shasta County and southern Siskiyou County, southeast of Mount Shasta. The river originates in an area of the STNF near Colby Meadows at approximately 4,250 feet above msl (Rode and Dean 2004). From its headwaters to Shasta Lake, the river is approximately 59 miles long. McCloud Reservoir, part of PG&E's McCloud-Pit Hydroelectric Project, separates the upper river from the lower river. The lower McCloud River transitions into the McCloud Arm of Shasta Lake upstream from the McCloud River Bridge (Figure 25-3).

#### *Upper McCloud River*

The upper McCloud River is an approximately 36-mile reach from the river's origins at Colby Meadows downstream to the transition with McCloud Reservoir. The river basin above the reservoir drains an area of approximately 403 square miles. Mean monthly flows in the upper McCloud River range from 766 cubic feet per second (cfs) in October to over 1,000 cfs in March, April, and May (PG&E 2006).

#### *McCloud Reservoir*

The McCloud Reservoir is a major component of PG&E's McCloud-Pit Hydroelectric Project, which was constructed in 1965 and operates under license from the Federal Energy Regulatory Commission (FERC). The McCloud Reservoir is approximately 5 miles long and has a storage capacity of approximately 35,200 acre-feet of water. The McCloud-Pit Hydroelectric Project diverts approximately 75 percent of the upper McCloud River's flow through a pipeline to Iron Canyon Reservoir, then conveys it downslope and discharges it into the Pit River at the Pit 6 powerhouse, upstream from the Pit River Arm of Shasta Lake (PG&E 2006). The remaining 25 percent of flows provide base flow for the lower McCloud River, a considerable reduction from historic flow volumes (Jones & Stokes Associates 1988).

#### *Lower McCloud River*

The lower McCloud River flows southwesterly through a deep canyon with steep slopes approximately 22 miles from McCloud Dam downstream to the transition with Shasta Lake. Vegetation along the lower river is predominately mixed-conifer and Douglas-fir forest. This stretch of river receives runoff from a 404-square-mile area of the lower McCloud River basin and the 95-square-mile Squaw Valley Creek basin. It provides exceptional fishing opportunities and includes two long-established fishing clubs, the Bollibokka Club and the McCloud River Club. The Nature Conservancy's McCloud River Preserve also encompasses a portion of the lower McCloud River.

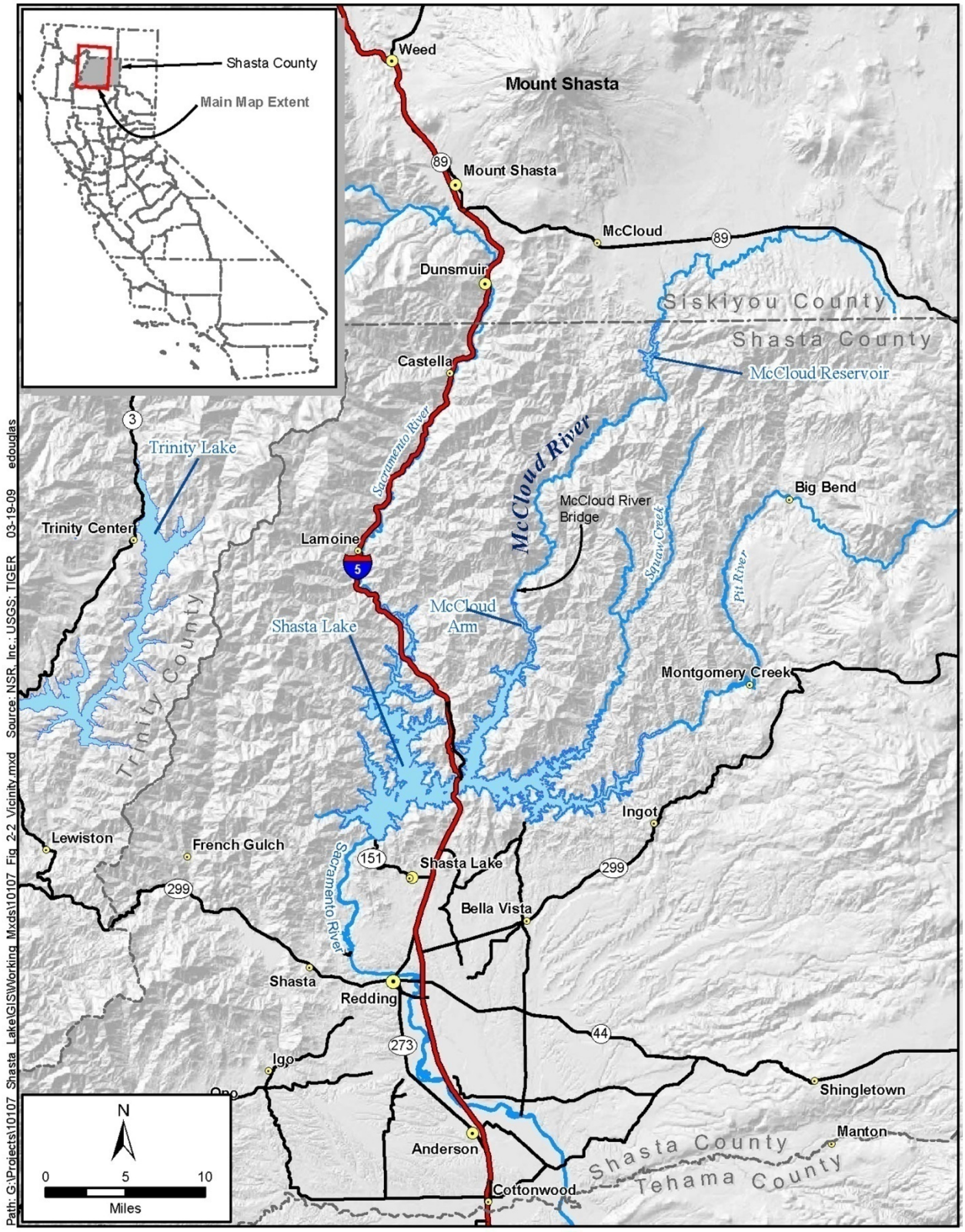


**Figure 25-3. Regional Location**

Flows in the lower McCloud River have been controlled by releases from McCloud Dam since 1965 (PG&E 2006). Under its current FERC license, PG&E's McCloud-Pit Hydroelectric Project maintains a minimum instream flow of 50 cfs from May through November and 40 cfs from December through April through controlled releases. Accordingly, flows in the lower McCloud River are highly regulated, and annual flows in the river below McCloud Dam do not follow a pattern typical of an unimpaired mountain river in northern California. Prior to dam construction, flows in the lower river were considerably higher, estimated to be in the range of 924 to 1,245 cfs (mean monthly flows) from June to October (Jones & Stokes Associates 1988, citing U.S. Geological Survey (USGS) for the period of 1967 to 1985).

### *McCloud Arm of Shasta Lake*

The construction of Shasta Dam between 1938 and 1945 converted part of the lower McCloud River into the McCloud Arm of Shasta Lake. The McCloud Arm is more than 16 miles long, with approximately 70 miles of shoreline. It drains an area of approximately 41,000 acres (USFS 1998b). Water levels in the arm fluctuate with the lake's water levels, and during periods of lower water levels, a water line, known as the "bathtub ring," is evident along the banks. During extended periods of lower water levels, vegetation may become established on the exposed banks.

The upper extent of the lake encompasses the transition reach, which varies between about 920 and 1,070 feet msl. Because of the effects of Shasta Lake on the McCloud Arm, the STNF determined that the transition reach did not meet the eligibility requirements of a wild and scenic river (USFS 1994). The USFS defined the upper limit of the McCloud Arm as an elevation of 1,070 feet, or approximately 5,400 feet above the McCloud River Bridge. This elevation corresponds to the lower limit of Segment 4. A portion of the transition reach – from the McCloud River Bridge to the 1,070-foot elevation – is included in the segments of the river provided protection under the State PRC.

The transition reach provides a corridor for fish migrating between Shasta Lake and the lower McCloud River and contributes to the unique fishery of the river. Common fish in the McCloud Arm include rainbow trout, spotted bass, riffle sculpin, and speckled dace (North State Resources, Inc. 2008).

Water temperatures in the McCloud Arm become warmer as the river transitions to Shasta Lake. The warmer temperatures associated with Shasta Lake support warmwater fish, but the cooler temperatures of the transition reach may prevent some fish from migrating upstream into the lower river. Water temperatures in the transition reach may be suitable for warmwater species.

### 25.3.2 The McCloud River's Wild and Scenic Values

This section focuses on the wild and scenic river characteristics and ORVs of the lower McCloud River identified by the USFS in the wild and scenic river evaluation performed for the STNF LRMP (USFS 1994) and the wild and scenic river characteristics and extraordinary value protected under the State PRC.

The McCloud River's fishery and its free-flowing condition are identified in both the USFS evaluation and the State PRC. These characteristics are discussed first, followed by a discussion of the wild and scenic characteristics and values – water quality, geology, cultural/historical resources, and visual quality/scenery – that are identified only in the USFS evaluation.

Specific information is lacking concerning the river reach that could periodically be inundated if Shasta Dam and Shasta Lake were enlarged because the lands along this part of the river are privately owned and access for biological and other surveys has been limited; therefore, general information concerning the lower McCloud River as a whole is provided for some resource areas. This section also includes a brief description of the current transition reach (see Figure 25-1) because the reach of the river that would be newly inundated would likely take on the characteristics of the existing transition reach.

#### *Fishery*

The fishery of the lower McCloud River is unique; the river is considered a premier trout fishery, despite the ongoing effects of McCloud Dam and Shasta Lake on the river's flows and water quality. To characterize the fishery, this section includes descriptions of the aquatic habitat in USFS Segment 4, the Resources Agency's Segment 10, and the transition reach as well as the fish species that inhabit the study area.

**Aquatic Habitat** The lower McCloud River is characterized as a series of alternating riffles, pools, and cascading pocket water occurring along a broad, boulder-studded river channel within a confined, heavily timbered valley. A narrow band of montane riparian vegetation (typically less than 25 feet wide) dominated by willows, white alders, and Oregon ash occurs along the river banks adjacent to steep hill slopes with mixed conifer-Douglas-fir forest (USFS 2001).

In 2001, the USFS prepared a Habitat Typing Report to characterize aquatic habitats in the lower McCloud River from the McCloud River Bridge to McCloud Dam. The report divided the lower river into four reaches: McCloud Dam to Ladybug Creek, Ladybug Creek to Clairborne Creek, Clairborne Creek to Tuna Creek, and Tuna Creek to McCloud River Bridge. The reach from Tuna Creek to McCloud River Bridge includes all of Segment 4 and nearly all of Segment 10, including the portion of the transition reach that is part of Segment

10. Data are not available for the transition reach below the McCloud River Bridge downstream to Shasta Lake.

The dominant aquatic habitat in the reach of the lower river from Tuna Creek to McCloud River Bridge includes runs (20 percent), mid-channel pools (18 percent), low-gradient riffles (18 percent), lateral scour pools from bedrock (11 percent), and pocket water (10 percent) (USFS 2001). This reach provides most of the corner pool (100 percent), glide (89 percent), and cascade (50 percent) habitats in the lower river.

The portion of the transition reach upstream from McCloud River Bridge is dominated by low-gradient riffles and mid-channel pools, with some pocket water, glides, runs, and lateral scour pools. Glide habitat is the dominant aquatic habitat between the 1,070-foot and 1,080-foot elevations, and pocket water is the dominant aquatic habitat between the 1,080-foot and 1,090-foot elevations. The habitat within the current transition reach represents a fraction of the total available aquatic habitat within the lower McCloud River and provides a small portion of the habitats within the reach from the McCloud River Bridge to Tuna Creek.

The diversity of riffles, flatwater habitat, and pools is influenced by the presence of boulders and cobble substrate and variations in flow conditions. The lower river is dominated by boulders with pockets of gravel present at pool tailouts and in velocity breaks behind large boulders. The riffles are generally higher gradient channel sections with turbulent surface flow and uniform cobble and boulder substrates. While swift pocket water in the lower McCloud River often appears more like a riffle than a run, the habitable eddies, or pockets, created behind the boulders that characterize this habitat type make it functionally more similar to the other flatwater habitats (USFS 2001). Typically, flatwater and pools are the principal habitats used by the trout in the McCloud River for rearing and feeding (Wales 1939, Rode and Dean 2004, USFS 2001).

The USFS (2001) reported that the aquatic habitat within the transition reach has undergone type conversions caused by aggradation and scour of sediments for about 3,700 feet upstream from the McCloud River Bridge. When Shasta Lake is drawn down, large, wide, low-gradient riffles with channel braiding dominate in this reach. When the lake is at full pool and at intermediate levels of drawdown, the transition reach becomes inundated, but a unidirectional current created by the lower McCloud River's inflow is detectable throughout the inundation zone, slowing as it approaches the flat water of Shasta Lake. To varying degrees, this fluctuating backwater effect converts this reach to a deep, wide, slow-moving riverine habitat transitioning to lacustrine habitat near the bottom of the transition reach.

**Fish Species** The current composition and distribution of fish species inhabiting the lower McCloud River and Shasta Lake reflect the historic fishery, the operational effects of Shasta Dam and McCloud Dam, and the introduction of nonnative fish species into the river and Shasta Lake. The completion of Shasta Dam in 1945 eliminated all runs of anadromous fish in the river (Rode and Dean 2004). The historic fishery included Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss irideus*), rainbow trout (*O. mykiss*), and the only known California occurrence of the bull trout (*Salvelinus confluentus*). The bull trout is believed to have been extirpated from the lower McCloud River and is possibly extinct in California. Today, the fishery is dominated by rainbow trout and brown trout (*Salmo trutta*), an introduced species that migrates between Shasta Lake and the lower McCloud River. Other nonnative species also migrate up the lower McCloud River, including spotted bass (*Micropterus punctulatus*), but bass have not been confirmed upstream from Tuna Falls, a high-gradient rapid at the confluence with Tuna Creek. Despite the change in fish species in this 22-mile reach, the lower McCloud River is still considered one of California's premier trout streams.

Fish observed in the river downstream from the Tuna Creek confluence during a survey conducted in summer 2007 included rainbow trout, spotted bass, speckled dace (*Rhinichthys osculus*), sculpin spp. (*Cottus* spp.), Sacramento sucker (*Catostomus occidentalis*), and Sacramento pikeminnow (*Ptychocheilus grandis*) (North State Resources, Inc. 2008). Other fish that occur in this reach include brown trout, brook trout (*Salvelinus fontinalis*), hardhead (*Mylopharodon conocephalus*), and smallmouth bass (*Micropterus dolomieui*). The status of the riverine fish species of the lower McCloud River is identified in Table 25-1.

*Rainbow Trout* Fluvial and adfluvial populations of rainbow trout use the habitat available throughout the lower McCloud River. The McCloud River rainbow trout became known as "the rainbow of the fish culturist" because eggs from that population accounted for transplants of rainbow trout in the 1880s to the eastern states and several other countries.

The rainbow trout that inhabit the McCloud River are a vigorous, active fish that primarily inhabit swifter portions of pool and pocket water habitats. Adults migrate into the lower McCloud River from Shasta Lake in the spring and fall months, presumably to spawn. Suitable spawning habitat in the study area is limited, and the trout likely migrate further upstream to spawn (North State Resources, Inc. 2008).

Although the genetic origin of these fish has not been evaluated, the numerous strains of rainbow trout planted in Shasta Lake over the years have likely resulted in some introgression among migratory rainbow trout in the lower McCloud River. The degree to which this migratory population of rainbow trout contributes to the native trout fishery of the river is not specifically known; however, available data do not indicate that it is substantial.

**Table 25-1. Riverine Fish Species of the Lower McCloud River**

| Species | Current Status | Comments |
|---|---|---|
| Sacramento sucker (*Catostomus occidentalis*) | Common | Native, non-game species, observed during 2007 surveys |
| Riffle sculpin (*Cottus gulosus*) | Common | Native, non-game species, observed during 2007 surveys |
| Smallmouth bass (*Micropterus dolomieui*) | Uncommon | Introduced sport species in Shasta Lake, moves into lower river from lake, warmwater species |
| Spotted bass (*Micropterus punctulatus*) | Uncommon | Introduced sport species in Shasta Lake, moves into lower river from lake, observed during 2007 surveys, warmwater species |
| Hardhead (*Mylopharodon conocephalus*) | Uncommon | Native, non-game species |
| Rainbow trout (*Oncorhynchus mykiss*) | Abundant | Native trout species, subject to special angling regulations, coldwater species, observed during 2007 surveys |
| Sacramento squawfish (=pikeminnow) (*Ptychocheilus grandis*) | Common | Native, non-game species, observed during 2007 surveys |
| Speckled dace (*Rhinichthys osculus*) | Common | Observed during 2007 surveys |
| Brown trout (*Salmo trutta*) | Common | Introduced sport species found throughout the river, migrates from Shasta Lake to spawn in lower river, subject to special angling regulations, coldwater species |
| Bull trout (*Salvelinus confluentus*) | CE; Extinct | Native, believed extirpated from entire river by mid-1970s, a few restoration experiments performed in upper river tributaries, coldwater species |
| Brook trout (*Salvelinus fontinalis*) | Rare | Introduced sport species, stocking in upper river and tributaries discontinued, very rarely observed in lower river, coldwater species |

*Sources: Wales 1939, Tippets and Moyle 1978, Rode and Dean 2004, Moyle 2002, CDFW, unpublished data, North State Resources, Inc. 2008*
Key:
CE = California Endangered
CDFW = California Department of Fish and Wildlife

Rainbow trout typically mature in their second to third year and move upstream to spawn in the lower McCloud River and its tributaries from February to June. The eggs typically hatch in 3 to 4 weeks, depending on water temperature, and fry emerge 2 to 3 weeks later. The fry remain in quiet waters close to shore, among cobbles, or under overhanging vegetation for several weeks. As the fish grow, they move into swifter water habitats.

In the river, this species forms feeding station hierarchies, which they aggressively defend, and prey on aquatic and terrestrial insects drifting in the current. They also eat active bottom invertebrates. It has been reported that McCloud River rainbow trout tend to be more bottom-oriented when feeding than rainbow trout elsewhere.

In reservoirs, rainbow trout form loose schools and feed on both invertebrates and other fish, although fish dominate their diet as they grow larger. Preferred prey in Shasta Lake is the threadfin shad. Trout growth in Shasta Lake is more rapid than for fluvial trout. The optimum temperature range for growth and for completion of most life stages of rainbow trout is between 50 and 70 degree Fahrenheit (°F), though they seem to prefer and thrive at temperatures in the lower two-thirds of this range. Rainbow trout in lakes and streams seldom live for more than 6 years.

*Brown Trout* Like the rainbow trout, fluvial and adfluvial populations of brown trout use habitat throughout the lower McCloud River, but this species migrates more between the lake and river. It is not as abundant as the rainbow trout. CDFW biologists suggest that this species occupies an ecological niche previously occupied by bull trout in the lower McCloud River (Rode and Dean 2004).

Only some of the brown trout migrating from Shasta Lake that passed a lower river counting weir were observed upstream in the Wild Trout Management Area (segments 7, 8, 9, and 10), so the actual extent of the spawning grounds of migratory brown trout is not fully known.

Brown trout mature in their second or third year. Some fish may mature in the river while others may migrate to Shasta Lake to feed, returning to spawn on a recurring basis. The stimulus for upstream migration is often a rise in stream flow or changing lake temperatures. Spawning takes place from November through December when water temperatures fall below 50°F. Eggs typically hatch within 7 to 8 weeks, depending on water temperature. Fry emerge from the gravel 3 to 6 weeks later. The habitats used by juvenile brown trout are similar to those used by rainbow trout; however, as brown trout grow, they tend to select habitats with slower water and more cover. In the riverine environment, brown trout prefer slow, deep pools with abundant boulder and bedrock ledge cover. The timing of emigration of juvenile brown trout to Shasta Lake is not known.

Fluvial brown trout have diets similar to those of rainbow trout, but appear to feed more on the stream bottom for benthic prey than rainbows. As brown trout grow, their diet expands to include larger invertebrate prey and fish. Larger brown trout are voracious predators, especially on fish, including young salmonids. In Shasta Lake, adult brown trout prefer threadfin shad as a staple prey.

Brown trout growth in the lower McCloud River appears to increase after age 3, which has been attributed to their migration to Shasta Lake to exploit the forage fish populations. Brown trout growth is best at temperatures ranging from 45 to 69°F, though they seem to prefer and dominate other trout species near the upper half of this range.

*Spotted Bass and Smallmouth Bass* Black basses and other sunfishes dominate in the littoral zones of Shasta Lake. Spotted bass and smallmouth bass are now the most common black basses in Shasta Lake, with spotted bass having become most frequent over the past 20 years. Both spotted and smallmouth bass occupy shallow, low-gradient habitat offered by Shasta Lake and its tributaries. They can be found throughout Shasta Lake and in the lower ends of the main tributary streams, including the lower McCloud River. However, the extent to which black bass have colonized the lower McCloud River is not currently known.

Smallmouth bass and spotted bass share similar life histories, and these similarities may account for their persistence in Shasta Lake compared to that of largemouth bass, which have declined in numbers. Both smallmouth and spotted bass mature in their second or third year and spawn in the late spring. Smallmouth will spawn at cooler temperatures (55 to 61°F) than spotted bass (greater than or equal to 65°F). Both species seek quiet shallow areas over mud, sand, gravel, and rocky, debris-littered bottoms to spawn in both lakes and streams. This type of spawning habitat is available in the transition reach of the lower McCloud River, especially when lake levels are high.

Juvenile bass feed on small invertebrates until they are large enough to prey on small fish and large invertebrates. Temperature preferences and optimal growth for both species of black basses is attained in the range from 68 to 81°F. Because of the year-round cool temperatures (less than or equal to 68°F) of the lower McCloud River, temperatures preferred by bass only occur during the late summer and early fall months upstream from the transition reach. Therefore, the temperature regime of the lower McCloud River may limit intrusions of bass from the lake. However, spotted bass were observed in the lower river below the confluence of Tuna Creek during summer fish surveys (North State Resources, Inc. 2008).

### *Free-Flowing Condition*

The Federal WSRA defines *free flowing* as “existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway” (16 USC Section 1286). The State PRC defines free-flowing as “existing or flowing without artificial impoundment, diversion, or other modification of the river.” It states, however, that the “presence of low dams, diversion works, and other minor structures does not automatically bar a river’s inclusion in the system.”

Base flows in the lower McCloud River are partially controlled by releases from McCloud Reservoir in accordance with PG&E’s FERC license and include precipitation and inflow from tributaries. The lower McCloud River experiences seasonal fluctuations and large variations in base flows (USFS 1998a). Releases from McCloud Reservoir into the lower river are heavily regulated, with a minimum release requirement of 50 cfs from May through November and 40 cfs from December through April; the releases are typically well above these

minimum requirements and tend to stay above 100 cfs (USFS 1998a). Tributary contributions are the most noticeable flows during storm events, but are substantially reduced during low-flow conditions. Because of the minimum release requirements from McCloud Reservoir, spring and summer flows are considerably more stable than they would be under unregulated conditions.

PG&E monitors lower McCloud River flows in accordance with its FERC license at a gaging station in Segment 4 upstream from Shasta Lake (0.2 mile downstream from Big Bollibokka Creek); the most recent available water data record covers the water year October 2006–September 2007 (USGS 2007). For this period, measured mean monthly flows ranged from 235 cfs in August to a high of 1,185 cfs in February, with maximum flows as high as 5,010 cfs.

Over the course of the year, the transition from lake to river expands and contracts over a distance of about 1.7 miles due to changing water levels in Shasta Lake (Figure 25-2). During April and May of wet years, the transition reach extends about 1 mile (5,400 feet) upstream from the McCloud River Bridge to the full pool elevation of 1,070 feet msl, the downstream boundary of Segment 4. As described in Chapter 6, “Hydrology, Hydraulics, and Water Management” Shasta Lake reaches full-pool elevation about one year in three.

Despite upstream and downstream dams and diversions, the lower McCloud River meets the definition of a free-flowing river under both the Federal WSRA and State PRC.

#### *Water Quality*

The water quality of the lower McCloud River is influenced by natural processes and land use activities, including PG&E’s McCloud-Pit Hydroelectric Project, timber management activities, and roads. Overall, the water quality of the river is rated as good (USFS 1998). Glacial silt gives the river “a beautiful turquoise color typical of rivers draining glacial valleys in British Columbia and Alaska” (Jones & Stokes Associates 1998).

Turbidity and water temperature are two important factors that influence the water quality of the river and affect aquatic habitat. Turbidity is caused by suspended sediment transported from upstream waters and in surface runoff, particularly from disturbed landscapes, such as timber harvest areas or roads. Water temperature is affected by a variety of conditions, such as river flows, solar radiation, and density of vegetation along the river, but is closely tied to the temperature of the flows released from the McCloud Reservoir.

The turbidity of the lower McCloud River is influenced by the water quality and water levels of the McCloud Reservoir and runoff from upland areas throughout the basin. Turbidity levels are generally low during most of the year, ranging from 5–10 nephelometric turbidity units, but can spike to more than 900 units during periods of intense rainfall and flood flows (PG&E 2006).

Sediment becomes trapped at McCloud Dam and is released into the lower river during large storm events, temporarily increasing turbidity levels, especially in the upper segments of the lower river. Testing of the McCloud Dam bypass valve can cause high turbidity for a short period when sediment is discharged from the reservoir into the lower McCloud River. Surface runoff, especially after the first storms of the wet season, can contribute large amounts of turbid runoff from upland areas.

The length of the transition reach depends on the water year type. As the transition reach moves upstream, sediment within the reach is remobilized and turbidity levels respond accordingly. Periodic fluctuations in water levels can result in erosion along the banks and localized increases in turbidity levels in the transition reach and the McCloud Arm.

The year-round cool water temperature regime of the lower McCloud River inhibits the productivity of its fishery, but provides high-quality holding habitat for salmonids, contributing to the river's unique value as a tributary to Shasta Lake. The controlled releases from McCloud Dam appear to have a direct bearing on the water temperatures downstream. Water temperatures tend to be higher in Segment 4 than immediately below McCloud Dam. Data recorded at PG&E's monitoring station on the river just upstream from Shasta Lake (0.2 mile downstream from Big Bollibokka Creek) indicate that water temperature ranges from the high 30s to the upper 60s (°F), with lower temperatures in the winter and higher temperatures in the summer (PG&E 2006).

The infusion of cooler water from the lower McCloud River influences water temperatures in the transition reach throughout the year. The degree of influence depends on the amount of discharge from the river and Shasta Lake levels. The temperatures throughout the lower McCloud River also control to some degree the distribution of the warmwater fishery known to occupy the river below Tuna Falls.

#### *Outstandingly Remarkable Values Identified in USFS Evaluation*

**Cultural/Historical Resources** Cultural resources include archaeological sites, historical structures and sites, and areas of religious or cultural significance to Native Americans. Significant resources that provide important information on the prehistory and history of an area or that are considered sacred to Native Americans can contribute to wild and scenic river values.

The McCloud River basin was part of a major center of occupation by the Wintu people, who occupied the McCloud River area at the time of Euro-American contact in the 1800s. Although much of the Wintu territory was overrun with miners and other opportunistic Euro-Americans, the lower McCloud River was left largely untouched due in part to a lack of easily mined materials and the ruggedness of the terrain (Yoshiyama and Fisher 2001), but also because of the resistance of the Wintu to incursions into their territory. Because of its generally undisturbed nature, the significance of the lower

McCloud River to prehistoric and ethnographic records of this area of California's history is considered to be great (Jones & Stokes Associates 1988).

Within the 0.25-mile corridor deemed eligible by the USFS, three formally recorded sites and other known sites contribute to the lower river's ORVs because they provide important information on the use of the area from before the Late Archaic Period (1300 to 150 before present, calibrated using radiocarbon dating ) to the Historic Era (1840 to present). Three Wintu villages, called Tsekerenwaitsogi, Klolwakut, and Boloibaki, are thought to have been located in the general area of the present-day Bollibokka Club headquarters (Guilford-Kardell 1980), which is part of the former Wintu territory. These villages likely represent the typical lifestyle of the Wintu at the time of Euro-American contact, when they lived in permanent villages near rivers and streams and were semi-sedentary, foraging people (DuBois 1935). As part of the Wintu occupation of this area, prehistoric, historic, and modern Traditional Cultural Properties, sacred locations, and important use areas are located throughout the lower McCloud River basin (outside of the 0.25 mile corridor), including features such as mountains, unique landforms, caves, distinctive rock outcrops, waterfalls, pools, springs, and resource gathering areas.

Point McCloud Bridge (known as McCloud River Bridge in this chapter) is a historical resource that was constructed in 1940 and altered in 1986; the bridge would be subject to relocation in conjunction with SLWRI activities. The Bollibokka Club is a historical resource located on the north bank of the river between the confluence of Big Bollibokka Creek on the east and Wittawaket Creek on the west. Buildings associated with the club were built between the 1860s and 1920s by Austin and Rueben Hills, the founders of Hill's Brothers Coffee, and previous owners (Lucas and Stienstra 2007). A log cabin dates from the 1860s, and other structures date from the ownership of the Hills Family, including the clubhouse built in 1924 and a structure built of river cobble in 1915 (Whitney 2004). Although these resources could be eligible for listing on the National Register of Historic Places, they have not been formally evaluated.

The fishery of the lower McCloud River was also very important to prehistoric and historic uses of the area. The Native Americans in the lower McCloud River basin conducted communal fish drives of salmon or steelhead at night, which brought together many communities and provided opportunities for trade and social networking, including the parsing out of the catch among the people and villages involved (DuBois 1935). Fish, including salmon, steelhead, Sacramento sucker, freshwater shellfish, and lamprey, were an important part of the Native American diet in this area. When the northern mines opened in the 1800s, settlers moved into the area, and the McCloud River and other rivers' fisheries provided important sources of food. In the early years of settlement, fish and game in the area were used for subsistence; however, this changed with the formation of the State of California and increased fishery management and recreational fishing.

**Geology** The lower McCloud River flows through a number of geologic formations, including the McCloud Limestone formation. This formation contains fossilized remains of invertebrate and vertebrate fauna that provide important scientific information on the history of California, and it has a high potential for research. According to the USFS (1998b), the limestone features exposed at a number of locations around Shasta Lake are unique and contribute to worldwide paleontological knowledge. The McCloud Limestone contains 36 species of corals, some of which may form the basis of a new taxonomic group.

Because of its very diverse fossil faunas, the mountainous terrain between the McCloud and Pit arms of Shasta Lake is perhaps California's single most important area for paleontological research (Munthe and Hirschfield 1978, cited in USFS 1998b). The limestone outcrops on the ridge immediately northwest of McCloud River Bridge (several hundred vertical feet above Shasta Lake) have produced several large Mississippian and Pennsylvanian invertebrate faunas. Because this period is poorly represented on the West Coast, this fossiliferous limestone is important to understanding the late Paleozoic evolution in this part of the country (USFS 1998b). Limestone outcrops adjacent to the McCloud Arm also provide habitat for several special-status species, such as Shasta salamander, Shasta eupatorium, Howell's cliff-maids, and Shasta snow-wreath (Reclamation 2003).

Exposed outcrops of the limestone formation are visible from the lower McCloud River in and upslope of the transition reach and contribute to its scenic values.

**Visual Quality/Scenery** The visual setting of the lower McCloud River upstream from Shasta Lake includes views of the river, limestone rock outcrops, adjacent coniferous and oak forests, and infrastructure associated with the Bollibokka and McCloud River clubs. A USGS stream gage has also been in place for a number of years. The pristine nature of the lower river provides for high-quality scenic views. However, the scenic views of the lower McCloud River are enjoyed by only a limited number of viewers, consisting primarily of private landowners, club members, and their guests.

Views of the river include "picturesque cascading whitewater, and deep, long, green- or turquoise-colored pools," with Douglas-fir and black and canyon oaks dominating the steep slopes and hillsides along the river (Jones & Stokes Associates 1988). Several buildings are present at the Bollibokka Club headquarters, but these structures blend in with the visual setting. The transition reach exhibits some evidence of fluctuating surface water elevations associated with changes in water levels of Shasta Lake. Areas that are noticeably affected by the reservoir levels exhibit "a bathtub ring of steep, treeless slopes with occasional deposits of alluvium."

The scenic views make most of the lower McCloud River, including Segment 4, eligible as a scenic river under the Federal WSRA (USFS 1994). To be classified as a scenic river, the river must be free of impoundments, be accessible in places by roads, and have a river basin/shoreline that is largely undeveloped. Segment 4 does not contain any human-made or other impoundments that affect its free-flowing conditions. Roads to the Bollibokka Club provide access to portions of Segment 4 for members of the club and their guests. Currently, public access is limited to pedestrians on USFS lands along the shoreline of Shasta Lake. For these reasons, the USFS has determined that this segment meets the eligibility requirements of a scenic river under the Federal WSRA.

## 25.4 Environmental Consequences and Mitigation Measures

This section identifies how the characteristics of the lower McCloud River that make it eligible for listing under the State PRC and Federal WSRA could be affected by each alternative and whether the alternatives would conflict with the provisions of the STNF LRMP and the CRMP.

### 25.4.1 Methods and Assumptions

This analysis of environmental consequences focuses on the effects of proposed modifications to Shasta Dam and Shasta Lake on the McCloud River's free-flowing conditions, its water quality, and the ORVs (cultural resources, fisheries, geology, and scenery) that make it eligible for listing as a wild and scenic river under the Federal WSRA. In large part, the environmental effects are based on computer modeling of water levels and the anticipated changes in the environment due to fluctuations in water levels and expansion of the transition reach. Physical effects to the free-flowing conditions, water quality, and ORVs are analyzed in terms of their effects on the eligibility of the river for wild and scenic river designation. While aquatic habitat data are used to quantify the relative impact to fishery values, a qualitative analysis is provided for most resources because of a lack of quantitative data and the subjective nature of the values. Information to support the analysis was generated from available literature and planning documents and technical studies prepared as part of the SLWRI as well as other chapters in this DEIS.

#### *CalSim Modeling*

The CalSim-II computer model was used to assist in the evaluation of the potential impacts of the project alternatives on water-related resources. The model used historical data on California hydrology to represent the variety of weather and hydrologic patterns, including wet periods and droughts, under which water storage and conveyance facilities would be operated. Two scenarios (base cases) of demands for, and storage and conveyance of, water were used in model runs: 2005 facilities and demands ("existing conditions") and forecasted 2030 demands and reasonably foreseeable projects and facilities ("future conditions"). A model run was conducted for each of these base cases

combined with each alternative so that the effects of the No-Action Alternative and the action alternatives could be evaluated for both existing and future conditions.

The analysis focuses on the environmental effects in the portion of segment 4 that would periodically be inundated. These effects are discussed in the following section.

### *Gage Data*

PG&E, in coordination with USGS, monitors McCloud River flows in accordance with its FERC license for the McCloud-Pit Hydroelectric Project at a gaging station just upstream from the McCloud River Bridge, approximately 0.2 mile downstream from Big Bollibokka Creek (USGS 11368000 McCloud River above Shasta Lake, California). The station measures mean, minimum, and maximum monthly flows in the lower McCloud River. The most recent available water data record covers the water year of October 2011 to September 2012 (USGS 2012). This data was used to describe flow conditions in the lower McCloud River.

### *Water Quality Monitoring*

Current and historical water quality monitoring data for the McCloud River have been collected by federal and state agencies as well as PG&E and The Nature Conservancy. The California Department of Water Resources maintains water quality information on the McCloud River in the California Data Exchange Center database. The Nature Conservancy monitors water quality at the McCloud River Preserve. Water quality monitoring of the lower McCloud River includes measures of water temperature, dissolved oxygen, pH, specific conductance, and turbidity, as well as correlated data on weather, air temperature, and debris movement. PG&E monitors water quality in compliance with its FERC license. Available information on water quality was used to describe the setting of the lower river and assess changes in water quality that would occur as a result of the Shasta Dam modification alternatives.

### *Habitat Typing*

The USFS stream habitat typing performed in 1999 and 2000 (STNF, December 2001 unpublished data report, as found in USFS 2001) was used to describe aquatic habitat in the lower McCloud River and to assess the changes in aquatic habitat from implementation of the Shasta Dam modification alternatives. The habitat typing data were used in conjunction with the CalSim-II modeling results, digitized orthophotographs, and high-resolution topographic data to provide habitat maps and graphic depictions of the distribution of aquatic habitat in the lower river below Little Bollibokka Creek. A longitudinal profile, using water surface elevations, was generated to illustrate habitats; it does not provide an accurate representation of channel geometry.

A quantitative evaluation of the aquatic habitats was performed using digital images and the USFS habitat typing data in an integrated geographic information systems environment. Longitudinal habitat delineation was determined from the habitat typing data, with minor adjustments to match photo-interpreted habitat, and incorporated into the geographic information systems in conjunction with water surface elevations generated through the CalSim-II modeling results. Estimates of aquatic habitat areas were generated from digitized wetted stream perimeters. These measurements were based on orthophotographs taken April 25, 2001. While the absolute amount of riverine habitat can vary with flow, the relative proportions of different types of habitat remain relatively constant. Therefore, we used the relative proportions of aquatic habitat types to compare impacts to the transition reach with the entire lower river.

### 25.4.2 Criteria for Determining Significance of Effects

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, other Federal and State guidance, and consider the context and intensity of the environmental effects as required under NEPA. (Please see Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences) for an explanation of the distinction between significance under NEPA and significance under CEQA.) Impacts of an alternative on the wild and scenic river values of the lower McCloud River would be significant if project implementation would:

- Affect the eligibility for Federal listing as a wild and scenic river of any portion of the lower McCloud River above the 1,070-foot elevation
- Conflict with the Shasta-Trinity National Forest Land and Resource Management Plan or with management of the McCloud River under the Coordinated Resource Management Plan
- Conflict with the protection provided the lower McCloud River under the State PRC

### 25.4.3 Direct and Indirect Effects

#### *No-Action Alternative*

Under the No-Action Alternative, Reclamation would not pursue an action to enlarge Shasta Dam to help increase anadromous fish survival in the upper Sacramento River and address the growing water supply reliability issues in California. Water levels in Shasta Lake and the transition reach would continue to fluctuate similar to current conditions. USFS Segment 4 and the Resources Agency's Segment 10 would not be affected by this alternative.

**Impact WASR-1 (No-Action): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River** Under the No-Action Alternative, the current maximum elevation of water levels in the transition reach would not be increased, and Segment 4 would not be affected. Fluctuations in water levels would continue to be similar to current conditions, with water levels reaching the maximum elevation of 1,070 feet msl – the downstream boundary of Segment 4 – in the transition reach for a brief period (typically a few days in May) during wet years.

The average monthly water surface of Shasta Lake would continue to fluctuate based on the water year, with a maximum elevation of 1,053 feet msl in April of an average water year and 1,070 feet msl in April and May of a wet year. These fluctuations would not affect the free-flowing conditions and water quality of Segment 4. The ORVs that make the river eligible for designation as a Federal wild and scenic river would continue to be affected only by ongoing natural processes and land use activities, and all of Segment 4 would remain eligible for listing under the Federal WSRA. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

**Impact WASR-2 (No-Action): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan** Under the No-Action Alternative, the STNF LRMP would continue to be implemented as it has in the past, with no changes in the management of the McCloud River's free-flowing condition, water quality, and ORVs. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

**Impact WASR-3 (No-Action): Conflict with the California Public Resources Code, Section 5093.542—McCloud River Fishery** Under the No-Action Alternative, the protections afforded the McCloud River by the State PRC would not be affected. River conditions would not be modified, and the provisions of the State PRC would continue to protect the river. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

**Impact WASR-4 (No-Action): Conflict with the California Public Resources Code, Section 5093.542—Free-Flowing Conditions** Under the No-Action Alternative, the protections afforded the McCloud River by the State PRC would not be affected. River conditions would not be modified, and the provisions of the State PRC would continue to protect the river. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

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

CP1 would involve a 6.5-foot raise of Shasta Dam, which would increase the lake's gross pool by 8.5 feet and enlarge the total storage space in the lake by 256,000 acre-feet. This increase would equate to an increase of about 1,100 acres of surface area occupied by Shasta Lake when the lake is full. CP1 includes measures to increase water supply reliability while contributing to

increased survival of anadromous fish. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 70 thousand acre-feet (TAF) and 35 TAF, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing municipal and industrial (M&I) deliveries.

**Impact WASR-1 (CP1): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River** Under CP1, the increased gross pool of Shasta Lake would expand the current transition reach up to the 1,078-foot elevation, resulting in adverse effects on the characteristics of approximately 1,470 feet of Segment 4. The rest of the McCloud River would remain eligible for designation as a Federal wild and scenic river. This impact would be significant.

Under CP1, approximately 1,470 feet, or 11 percent, of Segment 4 would be periodically inundated. This increase in the transition reach to a maximum elevation of 1,078 feet msl would equate to a 16 percent increase over the current transition reach. The length of time during the year when the transition reach is inundated and the maximum elevation of the inundation area would vary by the type of water year (wet, above normal, below normal, average, dry, or critical).

Within the expanded transition reach, flow conditions and fisheries would periodically be affected, with the timing and duration of the effects similar to those that occur in the current transition reach. Over time, the expansion of the bathtub ring would affect water quality, geology, and visual quality/scenery in the affected portion of Segment 4. Erosion of soils along the river could expose buried cultural resources, and periodic inundation could permanently alter cultural resource values and features in the transition reach important to Native Americans. These effects could reduce the total length of the lower McCloud River that is eligible for wild and scenic river designation by about 1,470 feet (approximately 1.2 percent of the total length of the lower river).

*Free-Flowing Conditions* Under CP1, the currently free-flowing section of the lower McCloud River would be reduced by about 1,470 feet or about 1.2 percent. The flow characteristics of the affected portion of Segment 4 would periodically be modified, resulting in slower moving waters and a wider river channel. When inundated, the affected portion would retain some current, but flow velocities would decrease with distance downstream. This modification would not meet the definition of a free-flowing river under the Federal WSRA.

Because free-flowing conditions are a fundamental requirement for wild and scenic river eligibility, the 1,470-foot reach of Segment 4 that would be affected by CP1 would become ineligible for listing under the Federal WSRA.

*Water Quality* As Shasta Lake's water levels rise, vegetation and soils along the banks of the affected portion of Segment 4 would become inundated. Most

or all of the vegetation that is inundated would eventually die and be washed or fall into the river, bringing with it sediment and other materials that could affect water quality. Soils in the affected portion of Segment 4 would erode as water levels rise and fall, causing an increase in turbidity. These effects would likely be most noticeable during the initial inundation periods, since the river corridor is likely to eventually stabilize as the soil is eroded to bedrock.

Within the approximately 1,470-foot reach of Segment 4 that would be affected under CP1, water temperatures would fluctuate relative to temperatures immediately upstream. Similar to flow, these changes would vary by water year type. Increased turbidity and warmer water temperatures would be most noticeable along the affected portion of Segment 4 because this area has not been previously exposed to periodic inundations.

Adverse effects on water quality would be associated with the periodic fluctuations in the water levels of Shasta Lake. Because water quality is a fundamental requirement for wild and scenic river eligibility, the 1,470-foot reach of Segment 4 that would be affected by CP1 would become ineligible for listing under the Federal WSRA.

*Outstandingly Remarkable Values* As described above under Affected Environment, the ORVs that make Segment 4 of the McCloud River eligible for listing as a wild and scenic river are cultural/historical resources, fisheries, geology, and visual quality/scenery.

*Cultural/Historical Resources* Under CP1, erosion of rock outcrops and expansion of the bathtub ring in an approximately 1,470-foot reach of Segment 4 could expose buried or previously undiscovered prehistoric cultural resources associated with Wintu occupation of the area and historic recreational uses of the area. As this reach becomes inundated, any exposed resources would be susceptible to the effects of water, which could damage or otherwise alter their values, affecting their eligibility for listing on the National Register of Historic Places and reducing their importance for providing information on past use within the corridor. As the water recedes, exposed resources would be susceptible to wind and rain and could be visible, potentially exposing them to theft or vandalism. These adverse effects would be localized along the corridor of the affected portion of Segment 4 and would likely only affect a small portion of the cultural resources that may be associated with the lower McCloud River basin.

The historic structures associated with the Bollibokka Club occur outside of the area that would be affected by the expanded transition reach and would not be affected. However, unrecorded resources associated with the Wintu village locations may occur within the corridor along the river and could be subjected to periodic inundation, deposition, and scour within the upper portions of the expanded transition reach. Portions of three other recorded sites could also be subject to similar impacts within the expanded transition reach, which could

result in damage to resources within the sites. Although these sites may provide information on the area's history or prehistory, none of these sites has been evaluated for listing on the National Register of Historic Places.

Sacred sites important to Native Americans have not been specifically identified, and access to lands adjacent to the reach that would be periodically inundated under CP1 is limited because all of these lands are privately owned.

The cultural resources located along the 1,470-foot reach of Segment 4 that would be affected under CP1 would be subject to the effects of periodic inundation.

*Fisheries* Aquatic habitat in the 1,470-foot expansion of the transition reach would be affected during periodic inundations, resulting in potential adverse effects on the fish that occur in the river. Potential adverse effects on fish could include a reduction in spawning habitat for trout in the expanded transition reach and an increase in the range of warmwater fish in the lower McCloud River. Fishing opportunities would not be affected more than they are now with the periodic fluctuations in river levels.

Under CP1, the transition reach would be extended by about 1,470 feet to the 1,078-foot elevation, resulting in a larger inundation area when Shasta Lake water levels are the highest. Aquatic habitat in the affected portion of Segment 4 consists primarily of flatwater habitat (52 percent glide, 19 percent mid-channel pool, and 13 percent run), with pocket water (11 percent) and a small, low-gradient riffle (5 percent) in the lower portion of the segment. With the periodic inundations, sediment deposition could cause flatwater habitat to convert to riffle habitat, resulting in a reduction in flatwater habitat of less than 3 percent of the total lower McCloud River's flatwater habitat. During the inundation period, riffle and pool habitat (approximately 1.2 percent of the total lower McCloud River) would be converted to flatwater habitat. Also, riparian vegetation along the newly inundated banks of the affected portion of Segment 4 would be expected to die, which could affect water temperatures and reduce cover for fish in this reach. The extent of these effects would depend on the frequency, duration, and surface elevation of the inundation, which would vary depending on the type of water year and water levels of Shasta Lake.

The migration of fish, especially trout, between the lower McCloud River and Shasta Lake is an important attribute of the unique trout fishery. Many of the rainbow and brown trout that occupy the lower McCloud River spend part of their lives rearing in Shasta Lake, feeding on the abundant prey in the lake and attaining large sizes that would not be possible if they reared only in the river. Upon returning to the river to spawn, these lake-reared fish provide the trophy-sized trout, particularly brown trout, for which the lower McCloud River is renowned (Rode and Dean 2004). Based on a survey that extended up to Tuna Falls (North State Resources, Inc. 2008), the reach of Segment 4 that would periodically be inundated does not contain any barriers or impediments to fish

movement or migration, and CP1 would not create any. Consequently, trout migration through the transition reach to upstream spawning areas would not be impaired.

Conversely, warmwater fish movement between the lake and river is not likely to be facilitated by the expanded transition reach. Warmwater fish from Shasta Lake, such as spotted bass, have been observed throughout the lower McCloud River, at least up to the confluence with Tuna Creek (North State Resources, Inc. 2008). Nonnative warmwater species inhabiting Shasta Lake (e.g., smallmouth bass and spotted bass) are known to exploit riverine and transitional habitats and are effective predators of juvenile trout. No barriers have been observed in the transition reach that could prevent warmwater fish from moving upstream, and no barriers would be created by the expansion of the transition reach. Warmwater fish would continue to be able to move between the lake, the transition reach, and lower McCloud River (Segment 4).

Aquatic habitat changes could affect how fluvial resident trout use habitat within the affected portion of Segment 4. General effects may range from temporary displacement of trout to upstream habitats at high water levels to degraded riverine habitat suitability within the transition reach.

Suitable spawning habitat for rainbow and brown trout in the expanded transition reach is limited because of the few pools and riffles available during the spring and fall when these species spawn. Based on the USFS habitat data and more recent reconnaissance surveys, the amount of spawning gravels in the expanded transition reach represents only a small percentage of the suitable spawning habitat in the lower McCloud River. However, any effect on spawning habitat would be considered adverse.

*Geology* During periods of maximum inundation in the 1,470-foot portion of Segment 4 that would be affected under CP1, some rock outcrops may become inundated and could erode, but the overall geologic value of the McCloud Limestone features would not be adversely affected.

*Visual Quality/Scenery* The visual quality of the affected portion of Segment 4 would decrease as the vegetation along the banks becomes inundated and eventually dies, the bathtub ring expands, and evidence of flow is reduced. These conditions would be similar to those in the current transition reach. The affected portion of Segment 4 would no longer have the qualities that contributed to its classification by the USFS as “scenic.”

CP1 would result in making approximately 1,470 feet of the lower McCloud River ineligible for listing as wild and scenic. This impact would be significant. Mitigation for this impact is not currently available. Additional studies will be conducted to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

**Impact WASR-2 (CP1): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan** The inundation of approximately 1,470 feet of Segment 4 would not conflict with the provisions in the STNF Land and Resource Management Plan to protect the ORVs that make the McCloud River eligible for listing under the Federal WSRA. Although raising Shasta Dam would result in inundation of part of Segment 4, the McCloud River and the adjoining lands in this part of the segment are not National Forest System lands and therefore not subject to the LRMP. Management of the river's ORVs under the STNF LRMP and the CRMP would not be affected. No land use changes would occur along the river, and the USFS and signatories to the CRMP would be able to continue implementing provisions of their plans that apply to the river. Because the LRMP does not apply to the private lands in Segment 4, there would be no impact and no mitigation is required.

**Impact WASR-3 (CP1): Conflict with the California Public Resources Code, Section 5093.542—McCloud River Fishery** The State PRC includes provisions that protect the McCloud River fishery with an emphasis on wild trout. Implementation of proposed modifications to Shasta Dam and Shasta Lake could conflict with this element of the State PRC.

The proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 1.2 percent of the lower McCloud River and its associated fishery habitat. Under CP1, the transition reach would be extended by about 1,470 feet, a 16 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The primary impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to that described under Impact WASR-1 and Impact WASR-2 and comparable to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the fishery (populations and habitat) are small in the context of the entire lower McCloud River, the impacts would conflict with the State PRC. This impact would be potentially significant. Mitigation for this impact is not currently available; however, ongoing efforts to develop and implement the Comprehensive Mitigation Strategy described in Chapter 2 are focusing on identifying and developing feasible mitigation measures to reduce this impact. Since mitigation for this impact is currently under development, the significance after mitigation has not yet been determined.

**Impact WASR-4 (CP1): Conflict with the California Public Resources Code, Section 5093.542—Free-Flowing Conditions** The State PRC includes provisions that protect the free-flowing conditions of the McCloud River. Implementation of proposed modifications to Shasta Dam and Shasta Lake could conflict with this element of the State PRC.

The proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded

transition reach, affecting about 1.2 percent of the lower McCloud River. Under CP1, the transition reach would be extended by about 1,470 feet, a 16 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The free-flowing conditions of the river would not be adversely affected beyond the upstream extension of the transition reach. The primary impact of the expansion of the transition reach would be modifications to the free-flowing character in a manner similar to that described under Impact WASR-1 and Impact WASR-2. While the overall impacts to the free-flowing conditions that would occur within this transition reach are small in the context of the lower McCloud River (1.2 percent), the impacts would conflict with the State PRC. This impact would be significant. Mitigation for this impact is not currently available. Additional studies will be conducted to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

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

CP2 would involve a 12.5-foot raise of Shasta Dam, which would increase the lake's gross pool by 14.5 feet and enlarge the total storage space in the lake by 443,000 acre-feet. This increase would equate to an increase of about 1,850 acres of surface area when the lake is full. CP2 also includes measures to increase water supply reliability while contributing to increased survival of anadromous fish. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 120 TAF and 60 TAF, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP2 would help reduce future water shortages through increasing drought year and average year water supply reliability for agricultural and M&I deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River.

**Impact WASR-1 (CP2): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River** Impact WASR-1 (CP2) would be similar to Impact WASR-1 but would affect 1270 feet more of Segment 4 than CP1. Implementation of CP2 would reduce the total length of the McCloud River that is eligible for wild and scenic river designation by about 2,740 feet (approximately 2.3 percent of the total length of the lower river). The rest of the lower McCloud River would remain eligible for listing.

Under CP2, approximately 2,740 feet, or 21 percent, of Segment 4 would be periodically inundated. The transition reach would increase to a maximum elevation of 1,084 feet msl, which would extend it by about 2,740 feet (a 30 percent increase over the current transition reach), inundating a larger portion of the lower McCloud River within the study area and Segment 4. The inundated area would increase to approximately 51 total acres (an increase of 18 acres

over existing conditions and 9 acres more than CP1 conditions), with a maximum width of approximately 530 feet (an increase of 60 feet over existing conditions) and a total length of approximately 11,740 linear feet (2.22 miles). The extension of the transition reach by approximately 2,740 feet would affect approximately 21 percent of Segment 4. Additional impacts under CP2 compared with CP1 would be minimal and would be limited to the additional 440-foot extension of the transition reach and about 15 additional feet on both sides of the river.

During a wet year, the maximum average water surface elevation of Shasta Lake would be 1,080 feet msl, with a peak elevation of 1,084 feet msl during May. This is an increase of 15 feet above the existing maximum average. During an average water year, the maximum average water surface elevation would increase to 1,051 feet msl, an increase of 11 feet above existing conditions. During dry and critical water years, the change would be on the order of 5 to 9 feet in elevation.

The increased gross pool of Shasta Lake would expand the current transition reach up to the 1,084-foot elevation, a 30 percent increase. Flow conditions and fisheries in the 2,740-foot reach of Segment 4 would periodically be affected, with the timing and duration of the effects similar to those in the current transition reach. Over time, the expansion of the bathtub ring would adversely affect water quality, geology, and visual quality/scenery. Erosion of soils along the river could expose buried cultural resources, and periodic inundation could permanently alter cultural resource values and features in the transition reach important to Native Americans.

*Free-Flowing Conditions* As discussed under Impact WASR-1 (CP1), the flow characteristics of the extended transition reach under CP2 would be periodically modified, resulting in slower moving waters and a wider river channel. This modification would not meet the definition of a free-flowing river under the Federal WSRA. The width of the transition reach would be increased by approximately 30 feet on both sides of the river. Flow conditions and the river's free-flowing nature upstream from the expanded transition reach would remain similar to current conditions.

Because free-flowing conditions are a fundamental requirement for wild and scenic river eligibility, the 2,740-foot reach of Segment 4 that would be affected by CP2 would become ineligible for listing under the Federal WSRA.

*Water Quality* Under CP2, increased turbidity and warmer water temperatures would be most noticeable along the expanded 2,740 feet of the transition reach and in the 30-foot corridor on either side of the transition reach because these areas have not been previously exposed to periodic inundations. As discussed under Impact WASR-1 (CP1), effects on water quality would be associated with the periodic increases in water levels of Shasta Lake.

Because water quality is a fundamental requirement for wild and scenic river eligibility, the 2,740-foot reach of Segment 4 that would be affected by CP2 would become ineligible for listing under the Federal WSRA.

*Outstandingly Remarkable Values* As described above under Affected Environment, the ORVs that make Segment 4 of the McCloud River eligible for listing as a wild and scenic river are cultural/historical resources, fisheries, geology, and visual quality/scenery.

*Cultural/Historical Resources* Impacts would be the same as discussed under Impact WASR-1 (CP1); however, a slightly larger portion of the three recorded sites and possible resources associated with the known Wintu villages would be inundated.

The cultural resources located along the 2,740-foot reach of Segment 4 that would be affected under CP2 would be subject to the effects of periodic inundation.

*Fisheries* Aquatic habitat in the affected 2,740-foot segment consists of pocket water and a lateral scour pool. The potential conversion of flatwater habitat to riffle habitat in the 2,740-foot segment would be similar to but greater than under WASR-1 (CP1), and overall impacts to aquatic habitat and fish would be similar to those discussed under Impact WASR-1 (CP1).

*Geology* Impacts would be the same as discussed under Impact WASR-1 (CP1); the geologic values of the lower McCloud River would not be adversely affected.

*Visual Quality/Scenery* Impacts would be the same as discussed under Impact WASR-1 (CP1). The affected portion of Segment 4 would no longer have the qualities that contributed to its classification by the USFS as "scenic."

CP2 would result in making approximately 2,740 feet of the lower McCloud River ineligible for listing as wild and scenic. This impact would be significant. Mitigation for this impact is not currently available. Additional studies will be conducted to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

**Impact WASR-2 (CP2): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan** The inundation of approximately 2,740 feet of Segment 4 would not conflict with the provisions in the STNF Land and Resource Management Plan to protect the ORVs that make the McCloud River eligible for listing under the Federal WSRA. There would be no impact, and no mitigation is required.

**Impact WASR-3 (CP2): Conflict with the California Public Resources Code, Section 5093.542 —McCloud River Fishery** The impact would be

similar to WASR-3 (CP1) but the magnitude of the impact would be greater under CP2 because of the longer transition reach. Under CP2, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 2.3 percent of the lower McCloud River. Under CP2, the reach affected by Shasta Lake water levels would be extended by about 2,740 feet, a 30 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The primary impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the fishery (populations and habitat) are small in the context of the entire lower McCloud River, the impacts would conflict with the State PRC. This impact would be potentially significant. Mitigation for this impact is not currently available; however, ongoing efforts to develop and implement the Comprehensive Mitigation Strategy described in Chapter 2 are focusing on identifying and developing feasible mitigation measures to reduce this impact. Since mitigation for this impact is currently under development, the significance after mitigation has not yet been determined.

**Impact WASR-4 (CP2): Conflict with the California Public Resources Code, Section 5093.542—Free-Flowing Conditions** The impact would be similar to WASR-4 (CP1) but the magnitude of the impact would be greater under CP2 because of the longer transition reach. Under CP2, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 2.3 percent of the lower McCloud River. Under CP2, the reach affected by Shasta Lake water levels would be extended by about 2,740 feet, a 30 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The free-flowing conditions of the river would not be adversely affected beyond the upstream extension of the transition reach. While the overall impacts to the free-flowing conditions that would occur within this transition reach are small in the context of the lower McCloud River (2.3 percent), the impacts would conflict with the State PRC. This impact would be significant. Mitigation for this impact is not currently available. Additional studies will be conducted to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

***CP3, 4, 5 – 18.5-Foot Dam Raise, with Variations***

CP3, CP4, and CP5 would involve an 18.5-foot raise of Shasta Dam, which would increase the lake's gross pool by 20.5 feet and enlarge the total storage space in the lake by 634,000 acre-feet. This increase would equate to an increase of about 2,500 acres of surface area when the lake is full. CP3, CP4, and CP5 include variations in measures to increase water supply reliability while contributing to increased survival of anadromous fish.

CP3 involves measures to increase agricultural water supply reliability and survival of anadromous fish. Because CP3 focuses on increasing agricultural water supply reliability, none of the increased storage capacity in Shasta Reservoir would be reserved for increasing M&I deliveries. Operations for water supply, hydropower, and environmental and other regulatory requirements would be similar to existing operations, with the additional storage retained for water supply reliability and to expand the cold-water pool for downstream anadromous fisheries.

CP4 would be used to improve the ability to meet temperature objectives and habitat requirements for anadromous fish during drought years and increase water supply reliability. Of the increased reservoir storage space under CP4, about 378,000 acre-feet would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. For CP4, operations for the remaining portion of increased storage (approximately 256,000 acre-feet) would be the same as in CP1, with 70 TAF and 35 TAF reserved to specifically focus on increasing M&I deliveries during dry and critical years, respectively. CP4 includes augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River.

CP5 would help reduce future water shortages through increasing drought year and average year water supply reliability for agricultural and M&I deliveries. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 150 TAF and 75 TAF, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP5 also includes constructing additional fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries; augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River; and increasing recreation opportunities at Shasta Lake.

Impacts associated with CP3, CP4, and CP5 would be very similar to those described for CP1 and CP2, but the increased water levels of Shasta Lake would affect a longer reach of the lower McCloud River. Because of their similarities, and in an effort to reduce redundancy, only the differences between the plans are described below.

**Impact WASR-1 (CP3, 4, 5): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River** Implementation of CP3, CP4, and CP5 would reduce the total length of the McCloud River that is eligible for wild and scenic river designation by about 3,550 feet (less than 3 percent of the total length of the lower river). The rest of the lower McCloud River would remain eligible for listing.

Under CP3, 4, and 5, the extent of the transition reach would increase to a maximum elevation of 1,090 feet msl, which would extend the current transition reach by about 3,550 feet (a 39 percent increase over the current transition

reach), inundating a larger portion of the lower McCloud River within the study area and Segment 4. The inundated area would increase to approximately 60 total acres (an increase of 27 acres over existing conditions, and 9 acres more than CP2 conditions), with a maximum width of approximately 610 feet (an increase of 140 feet over existing conditions) and a total length of approximately 12,550 linear feet (2.38 miles). The extension of the transition reach by approximately 3,550 feet would affect approximately 26 percent of Segment 4. Additional impacts under CP3, 4, and 5 compared with CP1 and CP2 would be minimal and would be limited to the additional 810-foot extension of the transition reach and about 20 additional feet on either side of the river.

During a wet year, the maximum average water surface elevation of Shasta Lake would be 1,086 feet msl, with a peak elevation of 1,090 feet msl during May. This is an increase of 21 feet above the existing maximum average. During an average water year, the maximum average water surface elevation would increase to 1,054 feet msl, an increase of 14 feet above existing conditions. During dry and critical water years, the change would be on the order of 6 to 13 feet in elevation.

The increased gross pool of Shasta Lake would expand the current transition reach by approximately 3,550 feet (810 feet beyond CP2's effects) up to the 1,090-foot elevation, resulting in a 39 percent increase in the transition reach. Within the expanded transition reach, flow conditions and fisheries would periodically be affected, with the timing and duration of the effects similar to those in the current transition reach. Over time, the expansion of the bathtub ring would affect water quality, geology, and visual quality/scenery. Erosion of soils along the river could expose buried cultural resources, and periodic inundation could permanently alter cultural resource values and features in the transition reach important to Native Americans.

*Free-Flowing Conditions* As discussed under Impact WASR-1 (CP1), the flow characteristics of the extended transition reach under CP3, CP4, and CP5 would be temporarily modified, resulting in slower moving waters and a wider river channel. This modification would not meet the definition of a free-flowing river under the Federal WSRA. The width of the transition reach would be increased by approximately 70 feet on either side of the river. Flow conditions and the river's free-flowing nature upstream from the expanded transition reach would remain similar to current conditions.

Because free-flowing conditions are a fundamental requirement for wild and scenic river eligibility, the 3,550-foot reach of Segment 4 that would be affected by CP1 would become ineligible for listing under the Federal WSRA.

*Water Quality* Under CP3, 4, and 5, increased turbidity and warmer water temperatures would be most noticeable along the expanded 3,550-foot reach of the transition reach and in the 70-foot corridor on either side of the transition

reach because these areas have not been previously exposed to periodic inundations. Under these plans, the wider affected river corridor could result in greater temporary effects on water quality because more vegetation would be temporarily inundated and more soils would be exposed. As discussed under Impact WASR-1 (CP1), effects on water quality would be associated with the periodic increases in water levels of Shasta Lake.

Because water quality is a fundamental requirement for wild and scenic river eligibility, the 3,550-foot reach of Segment 4 that would be affected by CP3, CP4, and CP5 would become ineligible for listing under the Federal WSRA.

*Outstandingly Remarkable Values* As described above under Affected Environment, the ORVs that make Segment 4 of the McCloud River eligible for listing as a wild and scenic river are cultural/historical resources, fisheries, geology, and visual quality/scenery.

*Cultural/Historical Resources* Impacts would be similar to those discussed under Impact WASR-1 (CP1). Under CP3, CP4, and CP5, the wider affected river corridor could result in greater effects on cultural resources because of the wider inundated area and increased erosion. Larger portions of the three recorded sites and known Wintu villages would become inundated.

The cultural resources located along the 3,550-foot reach of Segment 4 that would be affected under CP3, CP4, and CP5 would be subject to the effects of periodic inundation.

*Fisheries* Aquatic habitat in the additional 810-foot segment under CP3, CP4, and CP5 consists of a mid-channel pool and a lateral scour pool. The potential conversion of flatwater habitat to riffle habitat in the 3,550-foot reach of Segment 4 that would be affected under these plans be similar to but greater than under WASR-1 (CP1), and overall impacts to aquatic habitat and fish would be similar to those discussed under Impact WASR-1 (CP1).

*Geology* Impacts would be the same as discussed under Impact WASR-1 (CP1), except additional rock outcrops could become inundated because of the wider affected corridor.

*Visual Quality/Scenery* Impacts would be similar to those discussed under Impact WASR-1 (CP1). Under these plans, the wider affected river corridor could result in greater effects on the visual setting because of the wider inundated area and increased impacts on vegetation. The water line would also be visible at a higher elevation and could be more noticeable. The affected portion of Segment 4 would no longer have the qualities that contributed to its classification by the USFS as “scenic.”

CP3, 4, and 5 would result in making approximately 3,550 feet of the lower McCloud River ineligible for listing as wild and scenic. This impact would be significant. Mitigation for this impact is not currently available. Additional

studies will be conducted to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

**Impact WASR-2 (CP3, 4, 5): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan** The inundation of approximately 3,550 feet of Segment 4 would not conflict with the provisions in the STNF Land and Resource Management Plan to protect the ORVs that make the McCloud River eligible for listing under the Federal WSRA. There would be no impact, and no mitigation is required.

**Impact WASR-3 (CP3, 4, 5): Conflict with the California Public Resources Code, Section 5093.542—McCloud River Fishery** The impact would be similar to WASR-3 (CP1), but the magnitude of the impact would be greater under CP3, CP4, and CP5 because of the longer transition reach. Under CP3, CP4, and CP5, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 3 percent of the lower McCloud River. Under CP3, CP4, and CP5, the reach affected by Shasta Lake water levels would be extended by about 3,550 feet, a 39 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The primary impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the fishery (populations and habitat) are small in the context of the entire lower McCloud River, the impacts would conflict with the State PRC. This impact would be potentially significant. Mitigation for this impact is not currently available; however, ongoing efforts to develop and implement the Comprehensive Mitigation Strategy described in Chapter 2 are focusing on identifying and developing feasible mitigation measures to reduce this impact. Since mitigation for this impact is currently under development, the significance after mitigation has not yet been determined.

**Impact WASR-4 (CP3, 4, 5): Conflict with the California Public Resources Code, Section 5093.542—Free-Flowing Conditions** The impact would be similar to WASR-4 (CP1), but the magnitude of the impact would be greater under CP3, CP4, and CP5 because of the longer transition reach. Under CP3, CP4, and CP5, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 3 percent of the lower McCloud River. Under CP3, CP4, and CP5, the reach affected by Shasta Lake water levels would be extended by about 3,550 feet, a 39 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The free-flowing conditions of the river would not be adversely affected beyond the upstream extension of the transition reach. The primary impact of the expansion of the transition reach would be

conversion of aquatic habitat in a manner similar to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the free flowing conditions that would occur within this transition reach are small in the context of the lower McCloud River (3 percent), the impacts would conflict with the State PRC. This impact would be significant. Mitigation for this impact is not currently available. Additional studies will be conducted to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

### 25.4.4 Mitigation Measures

Table 25-2 presents a summary of mitigation measures for wild and scenic rivers.

No specific mitigation measures are proposed at this point in the planning process. Ongoing efforts to develop and implement the Comprehensive Mitigation Strategy described in Chapter 2 will focus on identifying and determining if feasible mitigation measures could be developed and implemented to reduce the impacts described under WASR-1, WASR-3 and WASR-4 to less-than-significant levels.

**Table 25-2. Summary of Mitigation Measures for Wild and Scenic Rivers**

| Impact | | No-Action Alternative | CP1 | CP2 | CP3 | CP4 | CP5 |
|---|---|---|---|---|---|---|---|
| Impact WASR-1: McCloud River's Eligibility for Listing as a Federal Wild and Scenic River | LOS before Mitigation | NI | S | S | S | S | S |
| | Mitigation Measure | None required. | No feasible mitigation available to reduce impact. | | | | |
| | LOS after Mitigation | NI | SU | SU | SU | SU | SU |
| Impact WASR-2: Conflict with Shasta-Trinity National Forest, Land and Resource Management Plan | LOS before Mitigation | NI | NI | NI | NI | NI | NI |
| | Mitigation Measure | None required. | None required. . | | | | |
| | LOS after Mitigation | NI | NI | NI | NI | NI | NI |
| Impact WASR-3: Conflict with California Public Resources Code, Section 5093.542 - McCloud River Fishery | LOS before Mitigation | NI | PS | PS | PS | PS | PS |
| | Mitigation Measure | None required. | Mitigation for this impact is under development. | | | | |
| | LOS after Mitigation | NI | [TBD] | [TBD] | [TBD] | [TBD] | [TBD] |
| Impact WASR-4: Conflict with California Public Resources Code, Section 5093.542 - Free-Flowing Conditions | LOS before Mitigation | NI | S | S | S | S | S |
| | Mitigation Measure | None required. | No feasible mitigation available to reduce impact. | | | | |
| | LOS after Mitigation | NI | SU | SU | SU | SU | SU |

Key:
CP = Comprehensive Plan
LOS = level of significance
NI = no impact
PS = potentially significant
S = significant
SU = significant and unavoidable

## 25.4.5 Topics Eliminated from Further Consideration

No topics related to the eligibility of the McCloud River for listing under the Federal WSRA, the compatibility of the alternatives with the STNF LRMP or the CRMP, or their compatibility with the State PRC providing protection to the McCloud River were eliminated from further consideration.

## 25.4.6 Cumulative Effects

Significant effects were identified related to the compatibility of the project with the State PRC, Section 5093.542. The potential effects would be of greater magnitude and duration with the larger dam raises (i.e., CP3 through CP5 would have greater potential effects than CP1 and CP2). These impacts may also be associated with two reasonably foreseeable future actions that could affect the McCloud River: the relicensing of PG&E's McCloud-Pit Project and the pilot project to reintroduce anadromous salmonid populations upstream of Shasta Dam. FERC has issued the Final EIS for the relicensing of the McCloud-Pit

Project. However, the relicensing process for the McCloud-Pit Project is ongoing, and the conditions that may be required under a new FERC license are uncertain. The potential effects of the relicensing on the lower McCloud River are therefore unknown. The 2009 NMFS Biological Opinion described in Chapter 3 requires Reclamation to implement a pilot project that would provide passage for anadromous salmonids upstream of Shasta Dam. This project could reintroduce anadromous salmonids to the lower McCloud River. At this point in the planning process, the details of this project are ill-defined and the potential for success is uncertain. Therefore, the potential effects of this future action on the lower McCloud River are unknown. Given the information available on these future actions, the potential for project-related impacts to be cumulatively considerable would be less than significant and could, in fact, result in benefits to some of the values and resources of the lower McCloud River.

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# Chapter 26
# Other Required Disclosures

## 26.1 Significant Adverse Effects that Cannot be Avoided If a Project is Implemented

Section 21100(b)(2)(A) of CEQA requires an EIR to include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Chapters 4 through 25 of this DEIS analyze in detail all of the project's potentially significant environmental impacts, including cumulative impacts; list feasible mitigation measures that could avoid, minimize, rectify, reduce or eliminate, or compensate for the project's significant impacts; and specify whether these mitigation measures would reduce the impacts to a less-than-significant level. If no feasible mitigation measure is available to reduce a significant impact to a less-than-significant level, then the impact would be a significant and unavoidable impact.

After consideration of actions, operations, and features to avoid, mitigate, and/or compensate for adverse effects, the action alternatives would likely result in the following significant and unavoidable direct and indirect impacts:

- **Geology, Geomorphology, Minerals, and Soils** – Loss or diminished availability of known mineral resources that would be of future value to the region; lost or diminished soil biomass productivity; and substantial soil erosion or loss of topsoil due to shoreline processes (all action alternatives).

- **Air Quality and Climate** – Short-term emissions of criteria air pollutants and precursors at Shasta Lake and vicinity during project construction (all action alternatives).

- **Botanical Resource** – Loss of Multi-Species Conservation Strategy (MSCS) covered species; loss of USFS sensitive, U.S. Department of the Interior, Bureau of Land Management (BLM) sensitive, or California Rare Plant Rank (CRPR) species; loss of jurisdictional waters; and loss of general vegetation habitats (all action alternatives).

- **Wildlife Resources** – Take and loss of habitats for the Shasta salamander, bald eagle, northern spotted owl, and Pacific fisher; impact on the foothill yellow-legged frog, tailed frog, northwestern pond turtle, purple martin, special-status bats, American marten, ringtail, terrestrial

mollusks, and their habitat; impact on willow flycatcher, Vaux's swift, yellow warbler, yellow-breasted chat, long-eared owl, northern goshawk, Cooper's hawk, great blue heron, and osprey, and their foraging and nesting habitat; permanent loss of general wildlife habitat; take and loss of foraging and nesting habitat for other birds of prey and migratory bird species; and loss of critical deer winter and fawning range (all action alternatives).

- **Agriculture and Important Farmlands** – Direct and indirect conversion of forest land to nonforest uses in the vicinity of Shasta Lake (all action alternatives).

- **Land Use and Planning** – Conflicts with existing land use goals and policies of affected jurisdictions (Shasta Lake and vicinity and upper Sacramento River), and disruption of existing land uses (Shasta Lake and vicinity and upper Sacramento River) (all action alternatives).

- **Cultural Resources** – Inundation of Traditional Cultural Properties (all action alternatives).

- **Aesthetics and Visual Resources** – Degradation and/or obstruction of a scenic view from key observation points, and generation of increased daytime glare and/or nighttime lighting (all action alternatives).

- **Wild and Scenic River Considerations for McCloud River** – Effect on McCloud River's eligibility for listing as a Federal Wild and Scenic River and conflicts with the California Public Resources Code, Section 5093.542 (all action alternatives).

The action alternatives could also result in the following significant and unavoidable cumulative impacts (i.e., an impact would make a considerable contribution to a significant cumulative effect):

- **Geology, Geomorphology, Minerals, and Soils** – Cumulative effects from use of soil and mineral resources, leading to diminished regional availability of cement, concrete sand, and aggregate and loss of soil productivity (all action alternatives).

- **Air Quality and Climate** – Cumulative effects from emissions of nitrogen oxide during project construction (all action alternatives).

- **Hydrology, Hydraulics, and Water Management** – Cumulative effects on south Delta water levels, X2 position, and Delta outflow (all action alternatives).

- **Botanical Resources and Wetlands** – Cumulative effects from increased water delivery in the service areas and growth-related loss of

sensitive plant communities and special-status plant species (all action alternatives).

- **Wildlife Resources** – Cumulative effects from inundation at Shasta Lake, leading to take and loss of habitat for numerous special-status species at Shasta Lake and vicinity (all action alternatives).

- **Cultural Resources** – Inundation of places of Native American cultural significance (all action alternatives).

- **Aesthetics and Visual Resources** – Changes to aesthetic values and resources at Shasta Lake (all action alternatives).

- **Environmental Justice** – Cumulative effects from disproportionate placement of environmental impacts on Native American populations, leading to disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance in the vicinity of Shasta Lake (all action alternatives).

Feasible mitigation will be implemented to reduce these impacts but would not be sufficient to reduce these impacts to a less-than-significant level.

## 26.2 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 Code of Federal Regulations 1502.16). This involves using all practicable means and measures, including financial and technical assistance, in a manner calculated to: foster and promote the general welfare; to create and maintain conditions under which man and nature can exist in productive harmony; and fulfill the social, economic, and other requirements of present and future generations of Americans.

All action alternatives analyzed in this DEIS would involve new construction, such as raising Shasta Dam, replacing bridges, and relocating/reconstructing recreational facilities and access roads adversely affected by higher reservoir levels. Specific activities would modify the Pit River Bridge, modify/replace six other bridges, relocate various recreation facilities, utilities and related infrastructure, and inundate numerous small segments of existing paved and unpaved roads. All of the action alternatives would result in indirect and induced employment, which may support hiring in businesses that would provide materials to the construction effort; in service-related industries that would provide food, beverages, and other goods to construction workers; or in more technical industries, such as consulting firms and other businesses (see

Chapter 16, "Socioeconomics, Population, and Housing"). Sales and profits for businesses that support the construction industry in the primary study area would increase over the 4.5- to 5-year construction period.

Potential habitat- and recreation-related losses caused by enlarging the dam and reservoir would irreversibly affect habitats and developments near the dam inundation area. Impacts on habitat areas within the dam inundation area would be mitigated by preservation of similar habitats elsewhere. Construction activities would include short-term uses of capital, labor, fuels, and construction materials; habitats; and recreation areas. General commitments of construction materials are largely irreversible because most construction materials are unsalvageable.

Potential benefits of the action alternatives include an increase in water supply reliability and a reduction in the probability of experiencing a potential flood-related loss of resources, property, and human life. Environmental uses and habitat for a variety of aquatic and terrestrial species along the Sacramento River and waterways within the primary and extended study areas would be maintained and potentially enhanced with the proposed mitigation. No adverse effects would pose a long-term risk to health and safety.

## 26.3 Irreversible and Irretrievable Commitments of Resources

The State CEQA Guidelines require a discussion of the significant irreversible environmental changes that would be caused by implementation of the proposed project. In addition, an EIS prepared under NEPA must analyze irreversible and irretrievable commitments of resources, such as soils, wetlands, waterfowl habitat, and cultural resources (40 Code of Federal Regulations, Section 1502.16).

The irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled, or those that are consumed or reduced to unrecoverable forms. The action alternatives would result in the irreversible and irretrievable commitment of the following energy and material resources during project construction and maintenance:

- Construction materials, including such resources as soil and rocks
- Land area committed to new/expanded project facilities and water inundation areas
- Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction, operations, and maintenance

Nonrenewable resources are expected to account for a minimal portion of the region's resources; the project's use of nonrenewable resources would not affect the availability of these resources for other needs within the region. Construction activities would not result in inefficient use of energy or natural resources. The selected construction contractors would use best available engineering techniques, construction and design practices, and equipment-operating procedures. Furthermore, mitigation would be provided to offset any loss of habitat areas and other land uses within the proposed dam inundation areas. Long-term project operation would not result in substantial long-term consumption of energy and natural resources, and increased energy production would result from the additional storage capacity at Shasta Lake.

## 26.4 Growth-Inducing Impacts

CEQA requires that an EIR discuss how a project may induce growth. NEPA requires that an EIS consider indirect effects of a project, which are often the result of growth inducement. A project is considered potentially growth inducing if it is reasonably foreseeable that the project may foster economic or population growth or may result in the construction of additional housing (California Code of Regulations, Section 15126.2(d)). The increase in water supply reliability that would result from the construction of any of the proposed action alternatives would be potentially growth inducing because it would foster economic growth and potentially remove an obstacle to development.

The purpose of this section is to disclose how the action alternatives that are analyzed in this DEIS could be growth inducing and to describe how the potential resulting environmental effects would be addressed. In *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001) 91 Cal.App.4th 342, 367–371 [110 Cal.Rptr.2d 579], the California Court of Appeal, Fourth District, provided clear direction on the standards for disclosure of growth-inducing effects in an EIR that also is relevant to an EIS. The lead agency also may consider mitigation measures for the anticipated effects. Growth-inducing impacts are evaluated for the project alternatives in accordance with the California Court of Appeal finding in *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001):

> *Neither CEQA itself, nor the cases that have interpreted it, require an EIR to anticipate and mitigate the effects of a particular project on growth on other areas. In circumstances such as these, it is sufficient that the final EIR (FEIR) warns interested persons and governing bodies of the probability that additional housing will be needed so that they can take steps to prepare for or address that probability. The FEIR need not forecast the impact that the housing will have on as yet unidentified areas and propose measures to mitigate that*

*impact. That process is best reserved until such time as a particular housing project is proposed.*

The increase in water supply reliability resulting from the action alternatives would make additional water resources available for municipal, industrial, and agricultural uses in the CVP and SWP service areas. The additional water resources could be used for actions that sustain and support growth.

Growth-inducing effects resulting from the increase in water supply reliability that were caused by the action alternatives would be indirect. However, Reclamation's ability to forecast the extent and location of these effects throughout its extensive service area is extremely limited. More than likely, the effects would be spread throughout the CVP and SWP service areas, would change annually, and would depend on how the additional water supply stored in Shasta Lake is ultimately used. Because the potential indirect, growth-inducing effects are speculative, amorphous, and not site specific, no feasible mitigation measures are available or proposed. No mitigation measure could be feasibly applied across the entire CVP and SWP service areas. Direct impacts on traffic and air quality and changes to the jobs/housing balance would be evaluated and mitigated by the local land use agency during general plan updates and project-specific application review. The following potential effects of an increase in water supply reliability are discussed:

- Existing fallow agricultural land and rangeland may be converted to irrigated row crops or irrigated orchard. This land use change could increase effects of local economic growth on farmers and could result in more local employment opportunities.

- If water supply is an obstacle to expansion of industrial facilities, this obstacle may be removed. Increased industrial capacity could result in economic growth and provide more local employment opportunities.

- If water supply is an obstacle to residential development, this obstacle may be removed, and local land use authorities may be encouraged to approve residential development projects on currently zoned agricultural land:

  - Residential development would result in the construction of houses.

  - Residential development may cause economic growth through the collection of development fees.

The project analysis covers the primary study area and an extended study area. The primary study area encompasses Shasta Dam and Shasta Lake; inflowing rivers and streams including the Sacramento River, McCloud River, Pit River, and Squaw Creek; and the Sacramento River downstream to about Red Bluff

Pumping Plant. Because of the potential influence of Shasta Dam modification on natural resources along the Sacramento River as well as on other programs and projects in the Central Valley, the project also evaluates an extended study area that includes the Sacramento River basin downstream from Red Bluff Pumping Plant, the American River basin, the Delta, the San Joaquin River basin, and the CVP and SWP service areas.

The extended study area includes CVP and SWP reservoirs and the portions of tributaries that are downstream from these reservoirs and affect the Sacramento River, San Joaquin River, Trinity River, and Delta flows. These reservoirs and tributaries include Lake Oroville, Folsom Lake, Millerton Lake, San Luis Reservoir, New Melones Reservoir, and Trinity Lake, and portions of the Trinity, Feather, American, and Stanislaus rivers. The CVP and SWP service areas include much of the Sacramento and San Joaquin valleys, and substantial portions of the Bay Area and Southern California.

The following sections describe mechanisms that could be growth inducing and analyze potential growth-inducing effects of the action alternatives.

### 26.4.1 Increased Construction Work

The action alternatives would create new construction jobs in the primary study area, but this temporary effect would not be growth inducing. Concrete workers, workers with large-scale construction experience, general laborers, and others would be drawn from the local construction industry. These jobs would represent a relatively small increase (i.e., less than 0.5 percent) in the total labor force in the two counties of the primary study area (Shasta and Tehama counties), but also would represent a substantial increase in employment for many of the cities surrounding the project, where employment has consistently been below the state average (EDD 2010, 2011). Therefore, jobs created by the action alternatives would be serviced by the local workforce and would not be growth inducing (see Chapter 16, “Socioeconomics, Population, and Housing”).

### 26.4.2 Increased Flood Risk Reduction

The action alternatives also are anticipated to provide some flood risk reduction benefits, but these benefits would not be growth inducing. The added reservoir capacity at Shasta Lake would give Reclamation greater flexibility in using the reservoir for flood management purposes, thereby increasing the threshold at which seasonal heavy-rain events produce flood conditions downstream from Shasta Dam. The benefits of this increase in reservoir capacity and related flood management options would be most evident along the upper Sacramento River in the primary study area, and would decrease downstream where other major tributaries, such as the Feather and American Rivers, join the Sacramento River. Structures in and inhabitants of this floodplain experience the most direct effects from storage releases during flood events. The action alternatives would reduce the frequency, magnitude, and duration of some potential future flood events, like those that have affected structures and residents in this part of the primary study area in the past.

As a result of the added reservoir capacity, the overall risk of flooding and its related consequences below Shasta Dam is expected to be reduced. Although heavy-rain events would continue to occur in the region, and potentially increase as a result of global climate change, enlarging the dam is intended to provide greater flexibility in flood management in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures in or near the lower Sacramento River and Delta floodplains would be expected over time although the probability of certain flood events of a substantial size would not be decreased from the increased reservoir capacity at Shasta Lake. Most importantly, the flood risk reduction benefits of the dam enlargement would not change the existing floodplain or Federal Emergency Management Agency flood zone designations, so the action alternatives would not remove an obstacle to development or even reduce any obstacles to development. Flood risk reduction benefits from any of the action alternatives, therefore, are not growth inducing.

### 26.4.3 Increased Water Supply Reliability

Implementing any of the action alternatives would improve water supply reliability in the primary and extended study areas. This improved water supply reliability would better accommodate existing water contracts by increasing the available water supply in some years. The environmental consequences of these contracts have been (and in the future will be) evaluated in separate environmental review processes. The improvement in water supply reliability would not change long-term contract amounts or deliveries within their existing historical ranges.

A variety of factors indirectly influence business, residential, and population growth in the region. Among these are city and county general plans and policies, and the availability of utility services, public schools, and transportation services. Water is one of the primary public services needed to support urban development, including businesses, industry (including agriculture), and housing; a deficiency in water service capacity could constrain future development.

Implementing any of the action alternatives also would increase water yield, which would have the potential to be growth inducing. The expected increase in water yield relative to the CVP and SWP service areas would be small (i.e., less than 1 percent), and this new yield likely would be provided to a number of geographic areas within the CVP and SWP service areas. Also, a substantial portion of this water would substitute for groundwater pumping, would allow for changes in agricultural irrigation practices, or would return idle cropland to production. For this reason, implementing any of the action alternatives would result in beneficial effects on agricultural resources, which would intrinsically benefit the economies in the affected localities. An increase in the reliability of water provided to agricultural areas would not necessarily lead to a direct increase in population because the water primarily would service existing agricultural lands and would not be expected to foster expansion into

undeveloped natural communities. Substantial acreages of existing agricultural lands are idle because of reduced water reliability, and some of these existing acreages would receive water and be put back into agricultural production. However, the cumulative effect of a more reliable water source would be to increase agricultural effectiveness, a key economic sector in the region, which could indirectly result in growth-inducing impacts by bringing more money into the local economies.

The proposed action alternatives would increase water supply reliability for agricultural and/or municipal and industrial (M&I) uses. Agriculture is the most important segment of the economy below Shasta Dam and throughout California's Central Valley. Anticipated increases in agricultural water supply reliability are based on simulated CVP and SWP irrigation deliveries. The average annual increase in CVP and SWP irrigation deliveries under action alternatives would be up to 62,200 acre-feet per year. Anticipated increases in M&I water supply reliability are estimated based on simulated increases in CVP and SWP M&I deliveries. The average annual increase in CVP and SWP M&I deliveries under action alternatives would be up to 25,000 acre-feet per year.

Anticipated increases in total water supply reliability are based on the sum of simulated increases in agricultural and M&I water supply reliability. Average annual increases in total water supply reliability under action alternatives would be up to 75,900 acre-feet per year. Therefore, the action alternatives would result in increases in agricultural and/or M&I water supply reliability, which potentially would be a growth-inducing effect.

If residential development is constrained by water supply, then increased water supply reliability may remove an obstacle to residential development. Therefore, any of the action alternatives potentially would be growth inducing. Local land use authorities are required to demonstrate sufficient water supply reliability, pursuant to Senate Bill 610 (Chapter 643, Statutes of 2001), in addition to completion of a water supply evaluation required by CEQA. Water supply reliability may be demonstrated with surface water, water contracts, groundwater, and combinations thereof. Impacts on the physical environment would be evaluated and mitigated at a project level. The locations of potential residential development on existing agricultural or rangeland cannot be predicted, and because of the speculative and amorphous nature of potential growth-inducing impacts, no feasible mitigation for impacts of the action alternatives is available at this time.

Increased reliability of the water supply could reduce a limitation on growth throughout the primary and extended study areas; however, any project that could affect natural resources or otherwise accommodate growth in the study areas would have to comply with existing planning documents and would be subject to project-specific public environmental analysis and review. The effects of subsequent growth would be analyzed in general plan EIRs and in project-level CEQA compliance documents for the local jurisdictions in which the

growth would occur. Mitigation of these potential effects would be the responsibility of these local jurisdictions, not Reclamation.

In summary, the expected increase in water yield relative to the entire CVP service area would be extremely small and could be provided to any number of geographic areas within the CVP service area (and in part would substitute for ongoing groundwater pumping). Water provided to agriculture would be used primarily if not exclusively to return idle cropland to production. Furthermore, it would be speculative to identify specific areas where growth could occur or the indirect effects on specific community service facilities in a particular service area. For these and other reasons specified above, the growth-inducing effects from the action alternatives are limited, minimal, and can be effectively mitigated through local jurisdictions as needed.

## 26.5 Identification of Environmental Preferences for Action Alternatives

CEQ Regulations require identification of an environmentally preferable alternative, and the CEQA Guidelines require identification of an environmentally superior alternative. However, the CEQ Guidelines and CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. The Final EIS will identify a preferred alternative. The selection of the preferred alternative is independent of the identification of the environmentally preferable/superior alternative, although the identification of both will be based on the information presented in this EIS.

Section 1505.2(b) of the CEQ Regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a Record of Decision. The CEQ Regulations define the environmentally preferable alternative as "…the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources". Similar to the environmentally preferable alternative under NEPA, the CEQA Guidelines, Sections 15120 and 15126.6(e)(2), require identification of an environmentally superior alternative. If the environmentally superior alternative is the "no project" alternative, the CEQA Guidelines, Section 15126.6(e)(2), require identification of 1 an environmentally superior alternative among the action alternatives.

Each action alternative generally has similar characteristics as all alternatives vary based on combinations of dam raise height, water management, and environmental restoration, and gravel augmentation. The primary distinguishing factors between action alternatives are related to dam raise height, water supply reliability, anadromous fish survival, and other project objectives. CP1, CP2,

and CP3 primarily address water supply reliability and anadromous fish survival; however, each of these plans also would contribute to other project objectives. Furthermore, the likelihood that each of these three plans would meet its intended objectives is very high because the plans generally would not rely on any other actions. However, CP4 would emphasize anadromous fish survival through an increase in the Shasta Lake storage dedicated to cold-water supply each year, Sacramento River environmental restoration, and gravel augmentation, and CP5 specifically addresses reservoir area environmental restoration and gravel augmentation. For Sacramento River and reservoir area environmental restoration, success would depend on the continued effectiveness of the environmental restoration facilities/features proposed as part of the SLWRI – enhanced lake area spawning and rearing habitat, increased native vegetation, and new riparian rehabilitation areas – well past completion of construction.

Impacts associated with each alternative are summarized at the end of each resource chapter and in Table S-1 in the Summary.

### 26.5.1 Least Environmentally Damaging Practicable Alternative

The SLWRI would require discharge of dredged or fill material into waters of the United States. Section 404 of the Clean Water Act (CWA) authorizes USACE to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands (33 U.S. Code [USC] 1344). Guidelines promulgated by the U.S. Environmental Protection Agency and commonly known as the Section 404(b)(1) Guidelines (40 CFR 230 et seq.), regulatory guidelines of USACE (33 CFR 320 et seq.), and NEPA guidelines (40 CFR 1500 et seq.) are substantive environmental criteria used to evaluate permit applications submitted to USACE. An analysis of practicable alternatives is the primary screening mechanism used by USACE to determine the appropriateness of permitting a discharge. A key element of this approval is the requirement that USACE approve only the Least Environmentally Damaging Practicable Alternative (LEDPA), in accordance with guidance provided by Section 404(b)(1) of the CWA.

An alternative is considered practicable if it is available and capable of being implemented after considering cost, existing technology, and logistics in light of overall project purposes (40 CFR 230.3[q]). Practicable alternatives may include placing a project in an area not owned by the applicant that could be reasonably obtained by the project applicant to achieve the overall purpose of the project (40 CFR 230.10[a][2]).

The LEDPA would be determined on the basis of the entire environmental review and identified in the Record of Decision, consistent with Section 404(b)(1) of the Federal CWA, which requires that only the Least Environmentally Damaging Practicable Alternative may be approved and implemented by a Federal agency. This EIS provides a substantive portion of

the environmental information necessary for USACE to determine the LEDPA consistent with Section 404(b)(1) guidelines.

### 26.5.2 Environmentally Preferable Alternative/Environmentally Superior Alternative

CEQ Regulations require identification of an environmentally preferable alternative, and the CEQA Guidelines require identification of an environmentally superior alternative as discussed above.

Construction-related impacts would be similar for all of the action alternatives, and the significance determinations for each of the action alternatives generally are the same. Varying magnitudes of impacts generally would be related to the height of the dam raise because additional construction resources would be required for the larger raise and more land would be affected within the larger inundation area. All of the action alternatives would provide additional opportunities for flood risk reduction and increased anadromous fish survival; they also would provide greater water supply reliability during extremely dry years, which would benefit all water users. CP1 and CP2 would have less of an impact on land uses within the reservoir area than the other action alternatives because they would raise the dam by 6.5 feet and 12.5 feet, respectively, compared to the 18.5-foot increase proposed under CP3, CP4, and CP5. However, water supply reliability and anadromous fish survival would be maximized with the larger raise.

This EIS provides a substantive portion of the environmental information necessary for Reclamation to determine the Environmentally Preferable Alternative. However, the public and other agencies reviewing a Draft EIS can assist the lead agency to develop and determine environmentally preferable alternatives by providing their views in comments on the Draft EIS. Accordingly, and consistent with NEPA requirements, the environmentally preferable alternative will be identified in the in the Final EIS and Record of Decision.

## 26.6 Compliance with Applicable Laws, Policies, and Plans

For more detailed descriptions of the laws, policies, and plans listed below, see Section 3.4, “Regulatory Framework.”

### 26.6.1 Federal Requirements

#### *National Environmental Policy Act*

NEPA requires that an appropriate document be prepared to ensure that Federal agencies accomplish the Act’s purposes. The Council on Environmental Quality has adopted regulations and other guidance that provide detailed procedures for Federal agencies to follow in implementing NEPA. Once finalized, Reclamation

would use the Final EIS to comply with Council on Environmental Quality regulations and document NEPA compliance.

### *Clean Water Act*

**Section 404** A Section 404(b)(1) alternatives information package will be prepared for the action alternatives and submitted to USACE and the U.S. Environmental Protection Agency. In addition, Reclamation will obtain a Section 404 permit before filling any waters of the United States. USACE will issue a Record of Decision that addresses pertinent consideration and implementation requirements. Section 404 also requires that the Least Environmentally Damaging Practicable Alternative be identified and implemented by an authorized Federal agency.

**Section 401** Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. The Federal government delegates water pollution control authority under Section 401 of the CWA to the states. Refer to the Porter-Cologne Water Quality Control Act discussion below.

### *Rivers and Harbors Act*

In USACE's Sacramento District, navigable waters of the United States in the project area that are subject to the requirements of the Rivers and Harbors Act include the Sacramento River and all waterways in the Sacramento–San Joaquin drainage basin affected by tidal action. Sections of the River and Harbors Act applicable to the action alternatives are described below.

**Section 9** All of the action alternatives include construction of dikes. A Section 9 approval would be required before construction of any dikes. Reclamation would obtain approval from the Chief of Engineers and the Secretary of the Army before construction of any dikes in navigable waters of the United States.

**Section 10** A Section 10 permit would be required before any activity that would alter waters of the United States. To comply with the Rivers and Harbors Act, Reclamation would apply for a permit from USACE's Sacramento District before construction, and that application would be processed simultaneously with the CWA Section 404 permit application. This DEIS evaluates the environmental effects that the action alternatives would have on waters of the United States, including navigable waters.

**Section 13** The Central Valley Regional Water Quality Control Board has jurisdiction within the primary study area. The Federal government delegates water pollution control authority to states under Section 402 of the CWA. Refer to the Porter-Cologne Water Quality Control Act discussion below.

### *Federal Endangered Species Act*

Reclamation has coordinated with USFWS and NMFS regarding potential project effects on Federally listed species. The potential effects of the SLWRI on endangered and threatened species are described in Chapter 11, "Fisheries and Aquatic Ecosystems"; Chapter 12, "Botanical Resources and Wetlands"; and Chapter 13, "Wildlife Resources." Reclamation will prepare the appropriate biological assessments to address potential impacts on Federally listed species and will consult with USFWS and NMFS regarding impacts of the proposed action.

### *Magnuson-Stevens Fishery Conservation and Management Act*

Chapter 11, "Fisheries and Aquatic Ecosystems," discusses impacts on fisheries and fisheries habitat. Reclamation will coordinate with NMFS to ensure that recommended measures be put into the Preferred Plan that would minimize adverse modifications to Essential Fish Habitat. The specific implementation plan will analyze the significance of modifications to Essential Fish Habitat and will support the habitat assessments included for restoration-specific actions during Endangered Species Act, Section 7 consultations.

### *Fish and Wildlife Coordination Act*

Compliance with the Fish and Wildlife Coordination Act (FWCA) involves assessing the impacts of the proposed action on preservation, conservation, and enhancement of fish and wildlife habitat and preparation of a FWCA Report. Reclamation will be required to include recommendations for preserving affected habitats, mitigating their loss, and enhancing such habitats, in its documentation of compliance. Documentation of compliance with the FWCA is a separate analysis of habitats of concern to USFWS, NMFS, and CDFW, and does not replace the analysis required by Section 7 of the Federal Endangered Species Act.

### *Migratory Bird Treaty Act*

Chapter 13, "Wildlife Resources," evaluates potential impacts on migratory bird species and identifies mitigation measures to reduce impacts on birds, nests, and eggs. In addition, Reclamation will implement all feasible measures included in the FWCA Report discussed above. Reclamation will comply with the Migratory Bird Treaty Act by implementing mitigation measures described in the DEIS and in the FWCA Report, before and during implementation of the proposed action.

### *Bald and Golden Eagle Protection Act*

USFWS has proposed new permit regulations to authorize the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally when the take to be authorized is associated with otherwise lawful activities (72 Federal Register 31141–31155, June 5, 2007). With delisting of the bald eagle in 2007, the Bald and Golden Eagle Protection Act is the primary law that protects bald eagles as well as golden eagles. As discussed in Chapter 13, "Wildlife Resources," suitable habitat is not present for golden eagle in the

primary study area; however, each of the action alternatives would have a significant and unavoidable impact on the bald eagle. Therefore, Reclamation will consult with USFWS to implement the reasonable and prudent alternative and conservation measures to reduce impacts on the bald eagle.

### *Safe Drinking Water Act*

Water used for domestic purposes must be treated in accordance with Federal and State standards by the local or regional water supply. Reclamation will be in compliance with the Safe Drinking Water Act because the action alternatives would not change existing license requirements or impede enforcement of primary drinking water standards.

### *Farmland Protection Policy Act*

As a Federal agency preparing environmental compliance documents, Reclamation has included in its analysis a farmland assessment designed to minimize adverse impacts on Prime and Unique Farmlands and provide for mitigation as appropriate. Chapter 10, "Agriculture and Important Farmland," evaluates potential effects of the action alternatives on Important Farmland.

### *National Forest Management Act*

As discussed in Chapter 1, "Introduction," USFS is a cooperating agency in this DEIS. Under the National Forest Management Act, any decision emanating from a NEPA process must comply with the Land and Resource Management Plan (LRMP) to authorize an action on lands managed by Shasta-Trinity National Forest (STNF). Significant impacts on lands and resources managed by STNF are discussed in Chapter 4, "Geology, Geomorphology, Minerals, and Soils"; Chapter 12, "Botanical Resources and Wetlands"; Chapter 13, "Wildlife Resources"; Chapter 17, "Land Use and Planning"; Chapter 18, "Recreation and Public Access"; and Chapter 19, "Aesthetics and Visual Resources." These impacts may require nonsignificant, project-specific amendments to the LRMP.

The National Forest Management Act also requires that USFS maintain viable populations of existing native and desired nonnative species in the planning area. Reclamation will meet this requirement by preparing a biological evaluation and associated management indicator species assessment. Those documents will be used by USFS to make a finding that the actions disclosed in the record of decision, issued by Reclamation, will be consistent with the LRMP.

### *Federal Land Policy and Management Act*

As described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," the Federal Land Policy Management Act directs USFS and BLM to manage public lands under the principles of multiple use and sustained yield. Under the Federal Land Policy and Management Act, the use and occupancy of public lands requires authorization by a land management agency, typically under the auspices of a special-use permit. As the principal land management agency for the Shasta Unit of the

Whiskeytown-Shasta-Trinity National Recreation Area, USFS and, to a lesser degree, BLM, will need to use the Final EIS to support issuance of authorizations to various parties, pursuant to the Federal Land Policy and Management Act.

### *Wild and Scenic Rivers Act*

Section 7 of the Federal Wild and Scenic Rivers Act requires STNF to manage the outstandingly remarkable values of the McCloud River, consistent with the objectives, standards, and guidelines of its LRMP. The evaluation in the LRMP concluded that the lower McCloud River, from McCloud Dam downstream about 22 miles to the river's transition to Shasta Lake at about 1,070 feet mean sea level, provides outstanding cultural, fisheries, and geologic values, and its corridor has been classified as a highly sensitive visual area by USFS (USFS 1995). Based on the outstandingly remarkable values, STNF determined that the lower McCloud River meets the eligibility requirements for designation under the Federal Wild and Scenic Rivers Act. Chapter 25, "Wild and Scenic River Considerations for McCloud River," evaluates potential effects of the SLWRI on the McCloud River.

### *Federal Water Project Recreation Act*

Compliance with the Federal Water Project Recreation Act is achieved by documenting the consideration of recreation opportunities in USACE reports and NEPA documents. Within this DEIS, Reclamation has taken into consideration and addressed outdoor recreation and fish and wildlife enhancement in the primary and extended study areas.

### *National Historic Preservation Act*

Under Section 106 of the National Historic Preservation Act, Federal agencies must consider effects to eligible resources ("historic properties") from the proposed undertaking, in consultation with the California State Historic Preservation Officer (SHPO) and other parties. This includes affording the Advisory Council a reasonable opportunity to comment on such undertakings. For this project, consultation between Reclamation, USFS, any other applicable Federal agencies, SHPO, and other consulting parties would include consideration of possible options for avoiding, minimizing, or mitigating adverse effects. If SHPO, Reclamation, USFS, other applicable Federal agencies, and the Council (if participating) agree to measures to resolve adverse effects to historic properties, these are formalized in a Memorandum of Agreement (MOA). Other consulting parties may be invited to sign the MOA. The Section 106 process (36 CFR Part 800.14) is completed once the terms of the MOA have been met. Alternatively, the Federal agencies may elect to enter into a programmatic agreement that would be developed as an alternative procedure to implement the Section 106 process (36 CFR Part 800.14). In rare cases, if consultation fails to result in agreement on resolving adverse effects, consultation may be terminated pursuant to the process detailed in 36 CFR Part 800.7.

### *Indian Trust Assets*

When adverse impacts on Indian Trust Assets (ITA) cannot be avoided, appropriate mitigation or compensation will be provided. ITAs consist of lands that have been deeded to tribes or on which tribes have a historical legal claim. However, no such lands are within the primary study area. Thus, the SLWRI would have no impact on ITAs. Because ITAs have been evaluated and the SLWRI would have no impact on these resources, the SLWRI would comply with ITAs.

### *Executive Order 11988 (Flood Hazard Policy)*

As discussed in Chapter 6, "Hydrology, Hydraulics, and Water Management," all of the action alternatives would have an effect on floodplains in the primary study area. However, none of the action alternatives would increase flood flows, and feasible mitigation would be implemented to compensate for the impact of altered flow on riparian and wetland communities.

### *Executive Order 11990 (Protection of Wetlands)*

As discussed in Chapter 12, "Botanical Resources and Wetlands," a wetland delineation will be prepared for the Preferred Plan and a USACE Section 404 permit will be obtained before construction. Reclamation will identify the location of sensitive habitats by conducting a wetland delineation, avoid and minimize impacts to the extent feasible, and compensate for any losses. However, implementation of any of the action alternatives would result in significant and unavoidable impacts on wetlands.

### *Executive Order 12898 (Environmental Justice Policy)*

As discussed in Chapter 24, "Environmental Justice," the disturbance or loss of resources associated with locations considered by Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake. Therefore, the project would contribute to disproportionate placement of environmental impacts on Native American populations and would result in a cumulatively considerable incremental contribution to a significant and unavoidable cumulative impact. No feasible mitigation is available to reduce this high and adverse effect. Compliance with Executive Order 12898 occurs through the identification of this effect and acknowledgement of the lack of feasible mitigation measures available to reduce it.

### *Americans with Disabilities Act*

The Americans with Disabilities Act of 1990 is a comprehensive law prohibiting discrimination against people with disabilities in employment practices, use of public transportation, use of telecommunication facilities, and use of public accommodations. Title II of the ADA applies to government facilities and requires that reasonable modifications must be made to services and programs so that they are readily accessible to and usable by people with disabilities. If any alternative proposed under the SLWRI is approved and

authorized, Reclamation would make every reasonable effort to make any new construction or improvement fully compliant with ADA requirements. If it is found to be infeasible to make a new construction or improvement element fully ADA compliant, Reclamation would obtain any required waivers or modifications to the ADA standards.

***Executive Order 13007 (Indian Sacred Sites) and Memorandum of April 29, 1994***

EO 13007 defines a sacred site as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

Potential impacts of the action alternatives on Native American sacred sites are addressed in Chapter 14, "Cultural Resources." Reclamation will continue to coordinate with federally recognized tribes to address potential impacts on sacred sites.

***Executive Order 13112 (National Invasive Species Management Plan)***

A weed management plan is within the scope of the action alternatives and would include methods for managing the spread of invasive plant species. Because the details of the weed management plan have not been finalized at the time of this writing, this DEIS identifies preparation and implementation of a weed management plan as a mitigation measure. Developing and implementing the weed management plan as a mitigation measure demonstrates compliance with Executive Order 13112. Reclamation will demonstrate continued compliance with this executive order by implementing the methods described in the weed management plan.

***Federal Clean Air Act***

As discussed in Chapter 5, "Air Quality and Climate," the SLWRI would not result in long-term effects on air quality. Because the effects of the action alternatives on air quality have been evaluated and mitigated to the extent possible, any of the action alternatives would comply with the Federal Clean Air Act.

***Federal Transit Administration***

This DEIS evaluates potential groundborne-vibration impacts on sensitive receptors, including the maximum sensitivity of 65 vibration decibels for hospitals, high-technology manufacturing, and laboratory facilities. Some construction activities associated with the action alternatives could result in groundborne vibrations exceeding 65 vibration decibels. However, sensitive receptors would need to be within 250 feet of the activities to be affected, and no sensitive receptors would be within this distance. Reclamation has

demonstrated consistency with this policy by evaluating the construction activities that would generate the maximum possible groundborne vibration at the highest sensitive uses.

***Federal Energy Regulatory Commission***

Changes to hydroelectric facilities on the Pit River, including instream flow releases or modifications to downstream structures, may necessitate a license amendment from the Federal Energy Regulatory Commission. Reclamation will support Pacific Gas and Electric Company in any application to the Federal Energy Regulatory Commission for necessary license amendments before implementing any action alternatives that would affect Pit River flows.

***U.S. Coast Guard***

The SLWRI has the potential to affect several bridges over inflows to Shasta Lake. Reclamation will coordinate with the U.S. Coast Guard in respect to these potential impacts.

### 26.6.2 State Requirements

***California Environmental Quality Act***

This document has been prepared in accordance with CEQA and may be used by State lead, responsible, and trustee agencies that would be involved in project review and approval of certain aspects of the proposed project under their jurisdiction.

***California Endangered Species Act***

Evaluations have been conducted for State-listed endangered and threatened species, and have determined that the proposed action would affect several State-listed species. Effects on those species are discussed in Chapter 11, "Fisheries and Aquatic Ecosystems"; Chapter 12, "Botanical Resources and Wetlands"; and Chapter 13, "Wildlife Resources." Reclamation will prepare appropriate biological assessments to address potential impacts on Federally listed species, and will consult with CDFW regarding impacts of the proposed action on State-listed species.

***California Fish and Game Code—Fully Protected Species***

This DEIS identifies potential actions that could result in take of fully protected species, and Reclamation will work closely with CDFW to evaluate methods to avoid impacts on fully protected species.

***California Fish and Game Code Section 1602—Streambed Alteration***

A CDFW streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake. This DEIS identifies potential actions within the proposed action that would require the alteration of stream features, subject to Section 1602 of the California Fish and Game Code. This document requires Reclamation to secure an approved streambed alteration agreement before performing any actions subject to Section 1602.

### *California Fish and Game Code Sections 5900–5904, 5930–5948, 7261, and 7370—Fish Passage*

This DEIS identifies actions that could affect fish passage, and Reclamation will work closely with CDFW to evaluate methods to avoid impacts on sturgeon, fish passage, and designated "Heritage Trout Waters." Potential impacts on fisheries are described in Chapter 11, "Fisheries and Aquatic Ecosystems."

### *California Native Plant Protection Act*

All action alternatives are evaluated in this DEIS for consistency with this Act. Mitigation measures are provided, as necessary, to minimize potential take of listed and special-status plants under the California Native Plant Protection Act.

### *California Native Plant Society Species Designations*

This DEIS identifies plants of concern on California Native Plant Society lists that may be affected by the action alternatives, using these lists as a method of identifying species of concern. Mitigation and minimization measures will be implemented, as necessary, to reduce the significance of potential impacts on these species of concern.

### *Central Valley Flood Control Act of 2008*

Reclamation has developed the action alternatives in a manner that is consistent with the Central Valley Flood Control Act, and the action alternatives would not inhibit development and implementation of the *Central Valley Flood Protection Plan*.

### *Central Valley Flood Protection Board Encroachment Permit*

Certain action alternatives would require work along the Sacramento River in areas that may be subject to Title 23; the river is managed for flood control, and thus it contains features subject to Central Valley Flood Protection Board jurisdiction. Reclamation will secure encroachment permits, as needed, to satisfy Title 23 before performing any work along relevant reaches of the Sacramento River that contain flood control features subject to Central Valley Flood Protection Board jurisdiction.

### *Water Rights*

The action alternatives do not include any actions that would require acquisition, use, or modification of water rights. Therefore, the action alternatives would comply with all existing water rights in the primary and extended study areas.

### *California Public Resources Code*

The Legislature has declared that the McCloud River, which is within the primary study area, possesses "extraordinary resources" in the context of Section 5093.542 of the California Public Resources Code, established through enactment of the Wild and Scenic Rivers Act, as amended (Sections 5093.50through 5093.70). However, the Legislature's action stopped short of formally designating the river as wild and scenic. Chapter 25, "Wild and Scenic

River Considerations for McCloud River," evaluates potential effects of the action alternatives on the McCloud River. New legislation may be required for State support and/or participation in any of the action alternatives.

The California Public Resources Code also contains several other sections relevant to the project. Compliance with provisions of the California Public Resources Code is achieved in this DEIS by analyzing the impact of the action alternatives on recreation opportunities. Chapter 18, "Recreation and Public Access," discusses effects on Shasta Lake and the surrounding recreation areas under the action alternatives.

#### *California Harbors and Navigation Code*

Significant modifications to facilities on Shasta Lake may necessitate coordination with the California Department of Boating and Waterways and/or the U.S. Coast Guard. Reclamation will coordinate with them as necessary.

#### *Porter-Cologne Water Quality Control Act*

Action alternatives that have the potential to adversely affect water quality are identified in this DEIS. Measures necessary for compliance with the Act would need to achieve consistency with implementation programs under the water quality control plan for the Sacramento River basin, and with the Central Valley Regional Water Quality Control Board's waste discharge requirements. Other necessary actions likely would include application for and finalization of National Pollutant Discharge Elimination System permits and Section 401 water quality certifications.

#### *California Land Conservation Act of 1965 (Williamson Act)*

Approximately 51 percent of Shasta County's farmland is under Williamson Act contracts (Shasta County 2004). Williamson Act lands affected by the action alternatives are discussed in Chapter 10, "Agriculture and Important Farmland."

#### *California Clean Air Act*

This DEIS evaluates the contribution of the action alternatives to any violation of air quality standards and identifies mitigation measures to help achieve consistency with the State implementation plan's attainment goal before implementation of any of the alternative actions.

#### *California Scenic Highway Program*

On the south side of Shasta Lake, portions of State Route 151 are an officially designated State Scenic Highway. County Road A18 is an officially designated County Scenic Highway, and it also is located on the southern side of Shasta Lake. Portions of Interstate 5, as it approaches Shasta Lake and crosses the Pit River Bridge, are considered eligible for designation as a State Scenic Highway. Impacts on scenic highways are discussed in Chapter 19, "Aesthetics and Visual Resources."

#### *State Lands Commission Land Use Lease*

In the primary study area, the lands under the jurisdiction of the California State Lands Commission include areas along the Sacramento River, north of Red Bluff. Work on the Sacramento River would require a lease from the California State Lands Commission. Reclamation will coordinate with the California State Lands Commission and obtain a State Lands Commission Land Use Lease before starting work in areas under the Commission's jurisdiction.

#### *California Surface Mining and Reclamation Act*

In general, the Surface Mining and Reclamation Act of 1975 (SMARA) requires that the lead agency approve a permit and a reclamation plan, and that an approved financial assurance be posted for the reclamation of the mined land. If borrow is required from borrow site(s), not previously permitted under SMARA, Reclamation will either obtain a SMARA permit or an exemption from SMARA for all borrow sites before beginning borrow activities.

#### *State of California General Plan Guidelines*

Chapter 8, "Noise and Vibration," evaluates long-term effects on noise levels in the primary and extended study areas. Long-term changes in noise levels associated with any of the alternative actions would be less than significant. All alternative actions would comply with the appropriate noise guidelines based on Reclamation's evaluation of long-term compatibility of the actions with noise levels.

#### *California Department of Transportation*

Highway improvements or modifications that may be necessary as part of this project may require an encroachment permit, issued through the California Department of Transportation (Caltrans). The project may involve modifications to roadways that Caltrans considers "complex," and Reclamation would need extensive communication with the Caltrans Department of Engineering Services and/or structure-specific encroachment permits. The requirements are detailed in the *Caltrans Encroachment Permits Manual*, which is available at the Caltrans Web site.

### 26.6.3 Local Plans and Policies

#### *Shasta County Air Quality Management District's Authority to Construct and Permit to Operate*

Reclamation would obtain an Authority to Construct permit before building or installing any new emissions unit or modifying any existing emissions unit that requires a permit, if necessary. Reclamation also would obtain a Permit to Operate after all construction is completed and the emission unit is ready for operation, if needed.

#### *Other Local Permits and Requirements*

Several other local permits and requirements may apply to the action alternatives. Shasta and Tehama counties and their public works departments

will require compliance with local plans and ordinances, such as the county general plan, zoning ordinances, grading plan, and various use permits. Utility easements and various encroachments also may be required.

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# Chapter 27
# Public Involvement, Consultation, and Coordination

This chapter summarizes completed, ongoing, and anticipated public outreach and agency involvement efforts related to development of the SLWRI, including activities that satisfy NEPA requirements for public scoping and agency consultation and coordination. Efforts to engage the public, stakeholders, Federally recognized tribes, Native American tribal groups, and public agencies are an important role in the SLWRI. These efforts are guided by the *Strategic Agency and Public Involvement Plan* (Reclamation 2003a), and include a broad range of activities designed to accomplish official and supplementary outreach goals. Chapter 29, "DEIS Distribution List," lists the entities receiving a copy of the DEIS. Reclamation encourages review of this DEIS and will continue to solicit public and agency input on the proposed action.

The *Strategic Agency and Public Involvement Plan* features four main objectives:

- **Stakeholder Identification** – Identifying and involving individuals, groups, and other entities that have an expressed or implied interest in the SLWRI.

- **Project Transparency** – Informing stakeholders and the public of study results in a timely, unbiased fashion through a variety of methods, including stakeholder and/or public meetings, Web postings, and mailings.

- **Issues and Concerns Resolution** – Gaining awareness of the issues and concerns of stakeholders and the public early in the process, and responding to these issues in an effective and timely manner.

- **Project Implementation** – Assisting policy-makers in understanding project purposes and benefits, and demonstrating that the project has met all necessary requirements to be implemented.

# 27.1 Public Involvement Through Project Scoping

Public scoping activities are conducted as part of compliance with both NEPA and CEQA, but are more formalized under NEPA. Scoping allows agencies, stakeholders, organizations, and other interested parties to identify resources to be evaluated, issues that may require environmental review, reasonable alternatives to consider, and potential mitigation if significant adverse effects are identified. The scoping process helps with early identification of problems to be studied, and also helps to eliminate from detailed study issues that are not critical to the decision at hand. Scoping also provides decision makers with insight on the issues and concerns that the public believes should be considered as part of the feasibility study. Public scoping activities performed for the SLWRI environmental documentation process are described below.

## 27.1.1 Notice of Intent to Propose an Environmental Impact Statement

Reclamation initiated the scoping process by publishing a notice of intent to prepare an EIS and a notice of public scoping meetings pursuant to NEPA on October 7, 2005, in the *Federal Register* (Volume 70, pages 58744–58746). The opportunity for submitting written comments on the notice of intent extended through December 6, 2005.

On the same day that the notice of intent and notice of meetings were published in the *Federal Register*, Reclamation announced the scoping meetings to be held in a news release posted on the project Web site and distributed via e-mail to media in the extended study area. The release was also distributed to agencies, stakeholders, organizations, and other interested parties. A second news release on October 20, 2005, announced an additional scoping meeting to be held in Red Bluff, and was published in display advertisements that Reclamation purchased in newspapers within the immediate study area in Redding, Red Bluff, and Dunsmuir.

## 27.1.2 Public Scoping Meetings

In 2005, seven public scoping meetings were conducted in an “open house” format throughout California to update the public on the status of the proposed action and to solicit and receive input on alternatives, project related concerns, and issues to be addressed in the environmental review process. Project team members from Reclamation and its consultants staffed informational workstations and interacted with meeting participants to provide information and answer questions. Attendance ranged from very light for meetings held in Concord, Fresno, and Los Angeles at 2, 2 and 4 people, respectively. Attendance was comparatively stronger in Dunsmuir, Redding, Red Bluff and Sacramento at 11, 39, 20 and 10 people, respectively. The proximity to the projects, and advertisements in three local newspapers, likely contributed to a stronger attendance in the northern cities.

The meetings were attended by private citizens, Federal and State agency personnel, local government representatives, political representatives, members

of the media, Native American tribes, Native American groups, and business owners, and representatives of private industry, utilities, environmental interest groups, and nongovernmental organizations.

Displays of information were presented at each meeting on large-scale panels at a series of four workstations. Information included on these panels is summarized as follows.

***Background***

This workstation described Shasta Dam and Shasta Lake, authorization of the Federal feasibility study and other pertinent guidance, the CALFED Bay-Delta Program Record of Decision (ROD) relating to enlarging Shasta Dam and Shasta Lake, and the primary and extended study areas.

***Environmental Overview***

This workstation summarized the major resource areas to be evaluated, defined the biological, socioeconomic, physical, and cultural environments, and identified potential impacts on those environments. The workstation also included information on the Federal environmental review process and Federal and State regulatory requirements and processes.

***Study Process***

This workstation presented information on water resources problems and needs being addressed in the SLWRI environmental documents. The primary and secondary study objectives were identified along with the overall study mission. The workstation also included information about the Federal plan formulation process, including the development of the SLWRI initial alternatives and the formulation of comprehensive alternatives.

***Initial Alternatives***

This workstation described the initial alternatives formulated, potential major features associated with potential enlargement of Shasta Dam and Shasta Lake that are likely to be considered in future studies, and potential environmental restoration features to be included in the alternatives.

The *Environmental Scoping Report* (Reclamation 2006) describes the scoping process, comments received during scoping, and how these comments would be addressed as part of the SLWRI and in support documentation (e.g. Feasibility Report and EIS).

## 27.2 PDEIS Outreach

In advance of this DEIS, Reclamation released the Preliminary Draft Environmental Impact Statement and the Draft Feasibility Report. This February 2012 release was followed by an October 2012 Reclamation news release requesting additional public comment on the Draft Feasibility Report for

input on potential cost, benefits and impacts of enlarging Shasta Dam and Reservoir. In December 2012, Reclamation extended the comment period for review of the document from December 28, to January 28, 2013, to allow time for additional public comments on the Draft Feasibility Report.

## 27.3 Other Public Outreach

In addition to scoping activities, other public outreach activities have included the following:

- Release of major previous Reclamation studies and reports investigating potential enlargement of Shasta Dam and Reservoir included: *Enlarged Shasta Lake Investigation Preliminary Findings Report* (1983), *Shasta Dam and Reservoir Enlargement, Appraisal Assessment of the Potential for Enlarging Shasta Dam and Reservoir* (1999), *SLWRI Strategic Agency and Public Involvement Plan* (2003b), *SLWRI Mission Statement Milestone Report* (2003a), *SLWRI Initial Alternatives Information Report* (2004a), *SLWRI Environmental Scoping Report* (2006), and *SLWRI Plan Formulation Report* (2007). As described above, Reclamation also completed the Preliminary DEIS (2011a), Draft Feasibility Report (2011b), and supporting technical appendices for the SLWRI in November 2011. These documents were released to the public in February 2012, to share study findings and provide additional opportunities for public and stakeholder input.

- Release of two project information papers associated with milestone reports- the *Mission Statement Milestone Report* (Reclamation 2003b) and the *Initial Alternatives Information Report* (Reclamation 2004a) – in support of public outreach.

- Stakeholder workshops during development of the SLWRI (multiple years)

- Project briefings to Federal, state and local elected officials, water and hydropower interest groups, and environmental interest groups in 2003.

- Project update meetings with property owners and/or business interests in the Shasta Lake area (multiple years)

- Presentations to the California Water Commission, Bay-Delta Public Advisory Committee, and related agency presentations (multiple years)

- Briefings to resource management groups and stakeholders (multiple years)

- Project Web site for the SLWRI (www.usbr.gov/mp/slwri/index.html)

Future meetings will focus primarily on public outreach related to the release of this DEIS.

## 27.4 Consultation and Coordination

Reclamation has consulted various public agencies and organizations during the public outreach process and throughout development of the SLWRI DEIS to obtain feedback on the investigation. Consultations have assisted Reclamation in determining the scope of the DEIS, developing project components and objectives, identifying the range of alternatives, and defining potential environmental impacts, impact significance, and mitigation measures.

### 27.4.1 Consultation and Coordination with Agencies

Reclamation conducts ongoing consultation and coordination efforts with agencies. The SLWRI study management structure includes the active participation of numerous cooperating agencies and other stakeholders on a Project Coordination Team (PCT) and Study Management Team and in Technical Working Groups. Cooperating agencies for the SLWRI, pursuant to NEPA, include USFS, Colusa Indian Community Council of the Cachil Dehe Band of Wintun Indians, USACE, and U.S. Department of the Interior, Bureau of Indian Affairs. Other participants in the PCT include USFWS, NMFS, U.S. Department of the Interior, Bureau of Land Management, DWR, CDFW, and other Federal and State agencies. These groups were active contributors to the ongoing development and/or review of the alternative plans that are addressed herein and in supporting documentation.

The PCT is among the most effective means of communication between agencies, continuing to provide for regular participation by numerous cooperating agencies. Regularly scheduled bimonthly meetings have been held and continue to be held, for the purpose of project coordination and decision making, with invitations extended to all cooperating agencies and other CALFED Bay-Delta Program agencies and the Central Valley Regional Water Quality Control Board.

Key elements of these coordination activities are the *Planning Aid Memorandum* and *Coordination Act Report*, documents issued by USFWS. A draft *Planning Aid Memorandum* outlining areas of potential concern was circulated among the resource agencies in the first quarter of 2007. Development of the *Coordination Act Report* began in summer 2007, with circulation of a draft in 2008.

### 27.4.2 Consultation and Coordination with Tribal Governments

Consistent with a memorandum from the President on April 29, 1994, Reclamation and the cooperating agencies will continue to actively engage Federally recognized tribal governments in planning and developing the investigation, and will consult with each tribe on a government-to-government

basis before taking actions that could affect such tribal governments. Under Federal Trust responsibility, Reclamation will provide full disclosure (benefits and negative impacts) of the project, allow time for tribal review/consultation, and receive comments and/or suggestions for alternatives.

The PCT held several coordination meetings with Federally recognized tribes during 2007 and 2008. Tribes were invited to an informal meeting held on April 4, 2007, in Redding, California, to provide general information about the SLWRI and determine tribal participation interests. Additionally, from August 2007 to November 2008, members of the PCT held six separate meetings with four Federally recognized tribes whose traditional territories overlap with the SLWRI project area. The purposes of the meetings were to solicit, clarify, and document major concerns and issues regarding the SLWRI, and to establish a preferred method or approach for maintaining effective communication with each tribe during the remainder of the feasibility study and in future endeavors.

### 27.4.3 Coordination with Native American Tribal Groups

In accordance with Executive Order 12898, Native Americans – including Federally-recognized and non-Federally recognized tribes – are considered minority populations, and are encouraged as stakeholder groups to participate in the ongoing investigation. Several groups, such as the Winnemem Wintu and Shasta Nation, have expressed significant interest in the SLWRI. In response, the PCT conducted 10 meetings and dialogues in 2007 and 2008 with Native American groups whose traditional homelands overlap with the SLWRI study area; four of these meetings engaged non-Federally recognized Native American groups. Groups were invited to an April 4, 2007, informal meeting to receive general information about the SLWRI and to identify their interests for project participation. As with Federally recognized tribes, meetings were held with Native American groups to solicit, clarify, and document major concerns and issues regarding the SLWRI, and to establish each group's preferred method or approach for receiving communications about the SLWRI during the remainder of the study.

## 27.5 Major Topics of Interest

The focus of interest varied among the outreach activities, but a common theme centered on potential impacts on the Shasta Lake area that could result from enlargement of the reservoir.

The public, stakeholders, and other Federal agencies, and State and local agencies identified several areas of concern during SLWRI meetings and workshops. Key topics included potential adverse effects on cultural resources in the Shasta Lake area; recreation and recreation providers in the Whiskeytown-Shasta-Trinity National Recreation Area; terrestrial special-status species around Shasta Lake, including State-designated fully protected species, aquatic special-status species in the Sacramento River and Sacramento-San

Joaquin Delta (including delta smelt); the lower McCloud River and its special designation under California Public Resources Code 5093.542(c); Delta water quality; south Delta water levels; Central Valley hydrology below CVP and SWP facilities and resulting effects on water supplies for water contractors and other water users; and consistency with the CALFED Bay-Delta Program ROD. These topics are described in more detail in Section 1.6, "Areas of Controversy/Issues to Be Resolved."

## 27.6 Next Steps in the Environmental Review Process

This DEIS will be circulated for public and agency review and comment for 90 days following the date when the U.S. Environmental Protection Agency publishes the notice of availability of weekly receipt of environmental impact statements in the *Federal Register*. During this public comment period, Reclamation intends to hold public meetings/hearings in Los Banos, Redding and Sacramento to solicit and receive public input on the DEIS. These meetings will be formatted similar to public scoping with an open house preceding a formal public hearing. The open house will include project information stations staffed by project team member available to respond to attendee's questions. The open house will conclude with a presentation. At the conclusion of the open house, a public hearing will be initiated consistent with NEPA guidelines. Comments provided during the public hearing will be addressed in the Final EIS. In addition, written comments from the public, reviewing agencies, and stakeholders will be accepted during the public comment period.

A Final EIS will be prepared and circulated in accordance with NEPA requirements and will include responses to all comments. When the Final EIS is complete, Reclamation will publish the document, and the notice of availability will be printed in the *Federal Register*, which will mark the start of a minimum 30-day waiting period before Reclamation issues its ROD on the investigation. The date of the release of the Final EIS has not been determined. In the ROD, which is the final step in the NEPA process, Reclamation will document its decision on which actions, if any, to take to address the primary objectives. It will also describe other risk reduction plans it considered, identify any mitigation plans, and describe factors and comments taken into consideration when making its decision.

To date, CEQA scoping has not been initiated. This process will commence after a State lead agency is identified.

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# Chapter 28
# DEIS Distribution List

This chapter provides locations where this DEIS is available for review and provides an overview the governmental entities, organizations, and interested parties that received copies of this DEIS. This list includes agencies and organizations that were involved in the scoping process for the proposed action, requested a copy of the DEIS, or that may use the DEIS for discretionary or informational purposes.

## 28.1 Document Availability

The public distribution of this DEIS emphasizes the use of electronic media to ensure cost-effective, broad availability to the public and interested parties. This DEIS is available on the Internet at Reclamation's Web site, <http://www.usbr.gov/mp/slwri/documents.html>. The DEIS is also available for review at the following locations:

U.S. Department of the Interior, Bureau of Reclamation Library
2800 Cottage Way
Sacramento, CA 95825

Bureau of Reclamation, Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, CA 96019

U.S. Department of the Interior, Natural Resources Library
1849 C Street NW, Main Interior Building
Washington, D.C., 20240

Dunsmuir Branch Library
5714 Dunsmuir Avenue
Dunsmuir, CA 96025

Shasta County Public Library,
Redding Library
1100 Parkview Avenue
Redding, CA 96001

Kern County Library,
Holloway-Gonzales Branch

506 East Brundage Lane
Bakersfield, CA 93307

Concord Library
2900 Salvio Street
Concord, CA 94519

Los Banos Public Library
1312 South 7th Street
Los Banos, CA 93635

Napa City-County Library
580 Coombs St.
Napa, California 94559

## 28.2 Agencies and Organizations Receiving Copies of the DEIS

All persons, agencies, and organizations listed in this chapter have been informed of the availability of and locations to obtain the DEIS. Parties listed below have received an electronic or hard copy of the main body of this DEIS or the entire DEIS, including appendices.

### 28.2.1 Federal Agencies

- U.S. Army Corps of Engineers
- U.S. Department of Interior, Fish and Wildlife Service
- U.S. Department of Interior, Bureau of Indian Affairs
- U.S. Department of Interior, Bureau of Land Management
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Environmental Protection Agency

### 28.2.2 State Agencies

- California Water Commission
- California Department of Boating and Waterways
- California Department of Conservation
- California Department of Education
- California Department of Fish and Wildlife

- California Department of Public Health
- California Department of Parks and Recreation
- California Department of Toxic Substances Control
- California Department of Transportation
- California Department of Water Resources
- California Department of Food and Agriculture
- California Department of Forestry and Fire Protection
- California Environmental Protection Agency
- California Highway Patrol
- California Air Resources Board
- California Central Valley Flood Protection Board
- Central Valley Regional Water Quality Control Board
- California Governor's Office of Planning and Research
- State Water Resources Control Board
- California Energy Commission
- Delta Protection Commission
- Delta Stewardship Council
- Native American Heritage Commission
- State Lands Commission
- Office of Historic Preservation

### 28.2.3 Regional and Local Entities

- Shasta County
- Tehama County
- Siskiyou County
- Trinity County

- Shasta County Air Quality Management District
- Tehama County Air Quality Management District
- City of Anderson
- City of Corning
- City of Dunsmuir
- City of Mount Shasta
- City of Redding
- City of Red Bluff
- City of Shasta Lake

### 28.2.4 Tribal Interests

- Grindstone Indian Rancheria
- Paskenta Band of Nomlaki Indians
- Pit River Environmental Council
- Pit River Tribe of California
- Redding Rancheria
- Shasta Nation
- United Tribe of Northern California, Inc.
- Winnemem Wintu Tribe
- Wintu Educational and Cultural Council
- Wintu Tribe of Northern California
- Lone Pine Paiute-Shoshone Tribe
- Cortina Indian Rancheria
- Wintu Tribe of Northern California
- Cantara Indian Rancheria
- Montgomery Creek (Pit River)

- Roaring Creek Tribe
- The United Tribe of Northern California, Inc.
- Robinson Rancheria, Band of Pomo Indians

### 28.2.5 Other Interested Parties

- Over 250 non-governmental organizations representing environmental, agricultural, business and related interests
- Over 50 water districts, irrigation districts, other water purveyors, and related utilities
- Over 50 media outlets
- Over 180 private business interests
- Over 1,000 individuals, including reservoir area property owners

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# Chapter 29
# List of EIS Preparers

Following is a list of persons who contributed to preparation of this DEIS.

This list is consistent with the requirements set forth in NEPA and CEQA (40 CFR 1502.17 and Section 15129 of the State CEQA Guidelines).

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| Reclamation (NEPA Lead Agency) | |
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| Jared Vauk | Geology |
| Greg Mangano | Geology |
| Russ Yaworsky | Water Operations |
| Tom Fitzhugh | Water Operations |
| Steve Lloyd | Engineering |
| Tom Hepler | Engineering |
| Bill Taylor | Engineering |
| Bob Gee | Planning |
| Craig Stroh | Economics |
| Julie Bowen | Real Estate |
| Chuck Johnson | Recreation |
| Scott Springer | Recreation |
| John Hannon | Fisheries Biologist |
| Patricia Rivera | Indian Trust Assets |
| Anastasia Leigh | Cultural Resources |
| Laureen Perry | Cultural Resources |
| Louis Moore | Public Affairs |
| Michael Tansey | Climate Change |
| David Hansen | GIS |

# 29.2 Non-Federal

## 29.2.1 Consultants

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| Name | Qualifications | Participation |
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| Name | Qualifications | Participation |
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| Bob Sennett | B.S., Civil and Structural Engineering; M.S., Civil and Structural Engineering; 20 years of experience. | Engineering |

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# References

## Summary

AEP. *See* Association of Environmental Professionals.

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DWR. *See* California Department of Water Resources.

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WRC. *See* U.S. Water Resources Council.

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CDFG. *See* California Department of Fish and Game.

CEQ. *See* Council on Environmental Quality.

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DOF. *See* California Department of Finance.

DWR. *See* California Department of Water Resources.

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NMFS. *See* National Marine Fisheries Service.

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