U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Shasta Reservoir Area Inventory

Shasta Dam and Reservoir, California

February 2003

SHASTA RESERVOIR AREA INVENTORY

SHASTA DAM AND RESERVOIR, CALIFORNIA

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MWH

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INTRODUCTION

Shasta Reservoir is California's largest man-made lake, with a gross pool storage capacity and water surface area at elevation 1,070 msl (vertical datum NAVD 1988) of 4,552,000 acre-feet and 29,600 acres, respectively. Shasta Reservoir has approximately 370 miles of shoreline when full and has a maximum depth of 517 feet. The Shasta Dam and Reservoir project was constructed by the U. S. Bureau of Reclamation (Reclamation) as an integral element of the Central Valley Project (CVP) from 1938 to 1945 for six purposes. They include: irrigation water supply, municipal and industrial (M&I) water supply, flood control, hydropower generation, fish and wildlife conservation, and navigation. The project also supports vigorous water oriented recreation at the reservoir, which is located within the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area.

BACKGROUND

Shasta Dam and Reservoir are located on the upper Sacramento River in northern California about 9 miles northwest of the City of Redding. The entire reservoir is within Shasta County. **Plate 1** shows the location of Shasta Reservoir. The reservoir controls runoff from about 6,420 square miles from four major tributaries including the Sacramento, McCloud, and Pit Rivers, Squaw Creek, and from numerous minor creeks and streams. Historically, essentially all outflow from Shasta Dam travels through northern California to the Sacramento-San Joaquin Delta southwest of Sacramento. The total drainage area of the Sacramento River at the Delta is about 26,300 square miles. The average annual runoff to the Delta from the Sacramento River watershed is about 17.2 million acre-feet. This represents about sixty two percent of the total inflows to the Delta.

Shasta Dam is a curved, gravity-type, concrete structure 533 feet high above the streambed with a total height above the foundation of 602 feet. The seasonal flood control storage space in Shasta is 1.3 million acre-feet. Shasta Dam has a crest width of 41 feet 5 inches and a length of 3,460 feet. The Shasta Powerplant consists of five main generating units with a current capacity of 625 megawatts and two station service units with a current capacity of 5 megawatts. The capacity of the five main generating units when upgrades are completed in 2007 will be 710 megawatts.

PURPOSE AND SCOPE

A primary purpose of this document is to identify the major infrastructure that may be subject to modification or relocation if Shasta Dam were raised up to 30 feet. One use of the data in this inventory will be to help estimate the cost of relocations for various increments of raising the dam up to 1,100 feet msl. This document does not include an inventory of biological and aquatic resources at Shasta Reservoir. Reclamation is conducting a feasibility investigation considering increasing the reliability of water supply and ecosystem restoration opportunities in the upper Sacramento River watershed primarily through enlarging Shasta Dam and Reservoir. The resulting decision document will be an integrated feasibility report and Environmental Impact Statement and Report (EIS/EIR). Fundamental authorization for the Shasta Dam Enlargement Feasibility Investigation is provided under the 1980 Public Law (P.L.) 96-375. Major influencing legislation includes the Central Valley Project Improvement Act (CVPIA) of 1992 (P.L. 102-575).

The primary features included in the inventory consist of, but are not limited to, transportation routes, recreation facilities, community and residential structures, utilities, industrial facilities, and cultural/historic resources. Available data from previous studies were used to the maximum extent possible. The inventoried features are located spatially (geo-referenced) on maps using a Geographic Information System (GIS) and referenced in elevation. The inventory extends from 1,070 feet msl, the existing gross pool elevation (vertical datum NAVD 1988), up to 1,100 feet msl.

DATA GATHERING

Data were collected for major infrastructure adjacent to Shasta Reservoir between the elevations of 1,070 and 1,100 feet msl. **Table 1** gives a representative list of the various types of items included in the inventory.

TABLE 1
ITEMS INCLUDED IN INVENTORY

General Facility Type	Specific Facilities
Transportation Routes	Bridges Roadways Railroads
Recreational Facilities	Resorts Marinas Parking Lots Campgrounds Boat Ramps Day Use Areas RV Parks
Community/Residential Structures	Homes Commercial Buildings Summer Use Cabins Misc. Buildings/Structures
Utilities	Water Intake Pipelines Tanks Power Poles/Power Towers
Industrial Facilities	Mines Dams
Cultural & Historical Resources	Archeological and Ethnographic Sites Historic Sites

The main sources of information for the inventory were obtained from Reclamation and included aerial photos and photogrammetric plan and 2-foot contour data. The digital orthophoto imagery was scanned from 1:7200 aerial photography. A total of seven hundred and sixty seven photos were required for coverage of the entire reservoir area at a scale of 1:1200. The aerial survey was performed in the California State Plane Coordinate System (Zone 1). The horizontal datum used was the North American Datum (NAD) of 1983 and the vertical datum was the North American Vertical Datum (NAVD) of 1988. The aerial photos were high resolution (6-inch pixels). The photogrammetry (contours and plan data in AutoCAD format) was imported into and used in a GIS environment. The contours represented the ground surface elevation along the shoreline of the reservoir and extended up to elevation 1,200 feet msl. The photogrammetric plan data contained groups of points, lines, and polygons representing the features shown in the aerial survey, such as buildings, roads, railroads, and bridges.

Data were also collected from other sources, including local, state, and federal government agencies, and utility companies. The U. S. Department of Agriculture Forest Service (USFS) provided GIS data, 7.5-minute quadrangle maps for the entire reservoir area, and some infrastructure drawings. The Union Pacific Railroad Company provided plan and profile drawings for the railroad from Redding to Lamoine. Reports on cultural resources present in the

Shasta Reservoir area were obtained from the Reclamation Division of Environmental Affairs. Data were also gathered from the Shasta County Assessor-Recorders Office, Shasta County Department of Public Works, the California Department of Transportation (CalTrans), and Pacific Gas and Electric Company (PG&E). **Table 2** shows a summary of the primary data sources.

TABLE 2
SUMMARY OF DATA COLLECTED

Source/Contact	Data Type	Comments
U.S. Bureau of Reclamation, Design and Construction Terri Reaves, Chief of Surveys and Photogrammetry (916) 978-5306	Aerial Photos, Photogrammetric Plan and Contours	767 Photos, 2' Contours, Coverage of Infrastructure
U.S. Bureau of Reclamation, Environmental Affairs Jim West, Archeologist (916) 978-5041	Cultural Resources Reports	4 Reports from 1980s
U.S. Bureau of Reclamation, Environmental Affairs Barbara Simpson, GIS Coordinator (916) 978-5031	GIS Indian Trust Assets	Rancherias, PDAs
U.S. Department of Agriculture Forest Service, Shasta-Trinity National Forests Judy Fessenden, GIS Coordinator (530) 242-2280	USFS GIS Data	Roads, Powerlines, Recreation Areas
U.S. Department of Agriculture Forest Service, Shasta-Trinity National Forests David Tracy, Acting Forest Engineer (530) 242-2304	USFS Bridge Plan and Profile Drawings, Bridge Condition Inspection Reports	McCloud River Bridge, Fender Ferry Bridge, Second Creek Bridge, Didallas Creek Bridge
Union Pacific Railroad Company Engineering Department Ronald McCoy, Program Manager	Railroad Plan and Profile Drawings	Redding to Lamoine, CA
Shasta County Assessor-Recorder's Office Ken McKrola, Assessor-Recorder Program Manager (530) 225-5148	Land/Property	Land Ownership, Parcel Locations
Shasta County Department of Public Works Casey Scott, Supervising Engineer (530) 245-6807	Bridge Plan and Profile Drawings, Water System Drawings	Lakeshore Drive Bridges, Westside Road Bridge, Jones Valley Intake
California Department of Transportation John O'Sullivan, Structure Maintenance & Investigations (916) 227-5206	Bridge Logs	Locations, Conditions
Pacific Gas and Electric Company Dan Kogut, Hydrographer (530) 335-5619	Hydroelectric Dam Drawings	Pit 7 Dam

INVENTORY APPROACH

INVENTORY MAPS AND ITEMIZED TABLES

The reservoir area was divided into forty one areas for presentation on a set of maps. **Plate 2** is an index map showing the relative location of each of the sheets in **Plate 3**. The **Plate 3** sheets have a scale of 1:12000 (1 inch = 1,000 feet). Black and white aerial photos taken by the USGS in 1998 and 1999 (distributed by MSN Terraserver at http://terraserver.homeadvisor.msn.com) were used for presentation on the **Plate 3** sheets. The aerial photos provided by Reclamation were much larger in file size, and thus more difficult to deal with in map production. The Reclamation photos were used in performing the inventory, but are only included in the inserts to the **Plate 3** sheets. The black and white USGS images also provide a visual contrast with the highlighted inventory items and elevation 1,100-foot pool and more complete coverage outside the shoreline.

Each item in the inventory is presented in **Attachments A and B**. Each attachment contains a complete facilities inventory table. **Table A1** in **Attachment A** is sorted by item ID number and **Table B1** in **Attachment B** includes the same inventory items but is sorted by the **Plate 3** sheet number. The facilities inventory tables each consist of four hundred and three items. **Table 3** lists and explains the categories in **Tables A1 and B1**.

TABLE 3
FACILITIES INVENTORY (TABLES A1 & B1) CATEGORIES

Category	Explanation
ID	Each inventory item is given a unique identification number.
Plate 3 Sheet #	This field gives the Plate 3 sheet number that the item can be located on.
Description	This field contains the name of the item or any other identifying data, such as a structure number for a bridge, or a forest road number.
Photo/Drawing	This field contains references to photos and drawings of items included in Attachment C. Plan/profile drawings are included for many of the bridges, and several photos of inventory items are included.
Item Type	This is a general classification of what the item is and corresponds to the photogrammetric plan layers from the aerial survey.
Arm	This field identifies the major river arm of Shasta Reservoir within which the item is located.
Latitude	This field contains the latitude of the centroid of the item.
Longitude	This field contains the longitude of the centroid of the item.
Elevation 1 (ft. msl)	This is the lowest elevation at which an item is impacted. Items of small spatial extent only have one elevation listed.
Elevation 2 (ft. msl)	This is the highest elevation (up to 1,100 ft msl) at which an item is impacted.
Item Comment	This field contains any further information on the item, such as additional information about the elevation data.

DATA PROCESSING/REPORT PREPARATION

The data gathered for the inventory were assembled and characterized in a GIS database. Locations, elevations, and descriptions were identified for the items in the inventory. Fieldwork was also done to verify and check the coverage of infrastructure in the aerial survey.

Photogrammetric Plan and Contour Data

The photogrammetric plan and contour data were originally composed of seventy-three flight line files. These files were imported into GIS and merged into one file for each river arm-Sacramento, McCloud, Squaw, and Pit. Since only features up to 1,100 feet in elevation were inventoried, only the photogrammetry inside of the 1,100-foot contour was used. The aerial survey data were organized into numerous layers. The layers used in the inventory were *area-paved, area-unpaved, bridge, building, dam, miscellaneous object, power tower, railroad, road-paved, road-unpaved, and tank.*

Elevations

Each item included in the inventory has an identified elevation. All of the elevations reported came from the aerial survey information obtained by Reclamation, unless otherwise noted, and are in the vertical datum NAVD 1988.

The aerial survey used in this inventory was done in an updated datum. The aerial photogrammetry was done in horizontal datum North American Datum (NAD) 1983 and in vertical datum North American Vertical Datum (NAVD) 1988. Most of the existing documents referencing elevations of the dam, reservoir, and associated infrastructure used a horizontal datum of NAD 1927 and vertical datum of National Geodetic Vertical Datum (NGVD) 1929. According to the National Geodetic Survey (NGS) Program *VERTCON*, the difference between these vertical datums at the dam is 0.812 meters (2.664 feet). The gross pool elevation of Shasta Reservoir in NGVD 1929 is 1,067 feet msl. Adding the difference between the two datums to the previous elevation, the value for the gross pool elevation at the dam in NAVD 1988 is approximately 1,069.7 feet, rounded up to 1,070 feet msl. The gross pool elevation for the purpose of this report is assumed to be 1,070 feet msl in the entire reservoir, and this is the lowest elevation at which items are included in the inventory.

After the raw photogrammetric plan and contour data were assembled and processed, the inventory items in the aerial survey were identified and characterized. The photogrammetric building data reported the roof elevations, so the lowest ground elevation was estimated for each of the buildings and reported to the nearest foot from the contours. For items of larger spatial extent, like roads, a range of elevations was identified: the lowest point at which the road is impacted, and the highest elevation, up to elevation 1,100 feet msl.

Significant items that would be inundated when the existing reservoir is at gross pool are not included in the inventory. Most of the time the water level at Shasta Reservoir is below the gross pool elevation of 1,070 feet msl, so facilities such as boat ramps extend to very low elevations, even as much as 100 feet below the gross pool elevation. The elevations listed in the inventory for a boat ramp would start at 1,070 feet msl, even if the boat ramp extended down to an elevation of 1,000 feet msl or lower. Also, items that float on the water surface, such as boat

docks and floating marinas are not included in this inventory because they and their moorings would incur only minor relocation expenses with an increase in the maximum water level, or they may not need to be relocated at all.

The elevations listed for bridges represent the top of the bridge decks. This is not necessarily representative of the water level at which any given bridge would need to be relocated or modified. Thus, additional information on the superstructure of the bridge will be used to assess potential impacts of higher water surface elevations. Where available, plan and profile drawings of the bridges were identified and included in **Attachment C**. This information will be utilized in formulating estimates of the water level at which each bridge would need to be relocated or modified.

Description of Items

A description or name was identified and assigned to each of the inventory items, when that information was known. Names of roads were taken from GIS coverages provided by USFS when possible. For bridges inspected by CalTrans, maintenance logs were used as the source for bridge names and numbers. Available plan and profile drawings were used as the source of structure names for USFS and UPRR bridges. Recreation maps and quad maps were also used as a source of names for facilities such as campgrounds, resorts, marinas, and communities.

Field Verification

Major features in the reservoir area were verified through field visits. Access is an issue in the remote areas of Shasta Reservoir, so the fieldwork was done by boat as well as by automobile. Many photographs were taken of the inventoried facilities, and they are included in **Attachment C**. The goals of the field trips were to: 1) verify the results of the aerial survey, 2) gain familiarity with the area and facilities, 3) take photos, 4) classify some of the potentially inundated structures, and 5) study areas with the most significant infrastructure that could be seen as constraining how much the reservoir could be raised, or how costly certain levels of a raise would be.

The field visits provided a better understanding of the potential impacts of raising the reservoir. Many of the structures identified generally as *buildings* in the aerial survey were able to be more accurately classified as homes, cabins, marinas, restrooms, stores, etc.

GPS reference locations and elevations were taken at several locations with significant pieces of infrastructure, such as the Pit River Bridge. The Pit River Bridge is of major concern in the inventory because of its large size, low elevation, and the fact that it carries both Interstate 5 and the Union Pacific railroad. Other areas with very significant infrastructure will be discussed in the next section of this report. GPS field measurements were taken at the following other facilities: the Interstate 5 bridge over the Sacramento River at Antlers, the Lakeshore Drive bridge across Doney Creek (next to railroad bridge), the Lakeshore Drive bridge across Charlie Creek, the McCloud River Bridge, the Union Pacific Railroad between tunnel 1 and tunnel 2, the Bully Hill Mine Tailings piles, the Pit 7 Dam, Bridge Bay Resort and Marina, Lakeview Marina, and Shasta Marina.

In areas with dense tree cover, identification of all of the infrastructure using aerial surveys was not possible. During the field visits, several areas were identified as having infrastructure that was not identified in the photogrammetric plan. The following areas had infrastructure items that were missing from the photogrammetric plan and were subsequently added to the inventory: Campbell Creek Cove summer use cabins, Lakeshore Resort cottages, Bully Hill Mine tailings piles, Tsasdi Resort cottages, Lakeshore Fire Station buildings, Lakeshore East Campground Restrooms, Antlers Boat Ramp Restrooms, Shasta RV Resort Grocery Store, Shasta Marina Office, Sugarloaf Cottages, and Jones Valley Intake Pipelines.

RESULTS OF INVENTORY

INFRASTRUCTURE SUMMARY

A majority of the infrastructure adjacent to Shasta Reservoir is located along the Interstate 5 corridor. The largest potentially impacted residential developments near the reservoir are in the Lakeshore and Sugarloaf areas in the northern part of the Sacramento River Arm. The main facilities in the Pit River Arm are at Bridge Bay Marina and in the Jones Valley and Silverthorn areas. The upper Pit River Arm is very remote, with the only significant infrastructure being the Fender Ferry Bridge and Pit 7 Dam at the upstream end. The main development along the McCloud River Arm includes several USFS campgrounds and a few marinas, the Bollibokka Club, and some summer use cabins. The Squaw Creek Arm has the least infrastructure, with the old Bully Hill Mine and a few cabins. **Table 4** is a summary of the results of the inventory. Power poles were not included in **Plate 3** and **Tables A1 and B1** to provide clarity in labeling the inventory items in sheets with dense infrastructure coverage. A map of powerline locations is included in **Attachment C**. Locations of archeological sites were not included in **Plate 3** and **Tables A1 and B1** due to their sensitivity and in accordance with the Section 106 Regulations of the National Historic Preservation Act.

TABLE 4
SUMMARY OF INVENTORY RESULTS

Facilities	Number	Comments	Included on Plate 3 Sheets and Tables A1, B1
Buildings	197	63- Homes/Cabins 94- Associated with Rec Facilities 15- Community Buildings 11- Miscellaneous 14- Unclassified	Yes
Bridges	22	10- Union Pacific Railroad 2- Interstate 5 1- Union Pacific Railroad/Interstate 5 6- USDA Forest Service 3- Shasta County	Yes
Dams	3	Shasta Dam, Pit 7 Dam, Pit 7 Afterbay Dam	Yes
Paved Road Segments	86	1 Segment- Interstate 5 7 Segments- Lakeshore Drive 2 Segments- Gilman Road	Yes
Unpaved Road Segments	53	Mostly Forest Roads	Yes
Parking Areas	16	Resorts, Marinas, Boat Ramps, etc.	Yes
Railroad Segments (not including Railroad Bridges)	1	Union Pacific Railroad between Tunnel 1 and Tunnel 2	Yes
Power Poles	98	Near Interstate 5 Corridor	No
Power Towers	3	Sacramento River Arm near Antlers	Yes
Miscellaneous Objects	19	Gaging Stations, Tailings Piles, Tanks, etc.	Yes
Archeological Sites	31	From Surveys in 1983 and 1986	No

Bridges

The reservoir area inventory identified twenty-two bridges inside of the elevation 1,100-foot contour adjacent to Shasta Reservoir. Ten of these bridges carry the Union Pacific Railroad; two of the bridges are on Interstate 5; one of the bridges (Pit River Bridge) carries both Interstate 5 and the Union Pacific Railroad; three of the bridges are maintained by Shasta County; and seven of the bridges are maintained by USFS. Relocation or modification requirements for the bridges identified in the inventory will require additional analysis. The bridges identified in the inventory may not all require relocation with a raise in the water surface to 1,100 feet msl. The bridges with the lowest deck elevations are on smaller local roads and include Charlie Creek Bridge, Doney Creek Bridge, McCloud River Bridge, Didallas Creek, Bridge, and Second Creek Bridge (all below 1,100 feet msl). The Pit River Bridge and the Antlers Bridge are the lowest of the large bridges.

Recreation Facilities

The majority of infrastructure along the shore of Shasta Reservoir is related to recreation activities at the reservoir. Shasta Reservoir has numerous campgrounds, boat launch ramps, marinas, and resorts.

Of the almost thirty public campgrounds, half are either shoreline campsites or boat camps with no significant infrastructure. These campgrounds would be affected by a raise in the reservoir, but do not have permanent facilities that would be affected. The developed campgrounds would be impacted by various amounts with a 30-foot raise in the reservoir. The marinas and boat ramps would be significantly affected with an increase in the gross pool elevation because their facilities are generally immediately adjacent to the shoreline at existing gross pool. Most of the resorts are also located very close to the reservoir shoreline. **Table 5** gives a summary of developed recreation facilities at Shasta Reservoir and the level at which their facilities would be impacted with a water level of 1,100 feet msl. No developed recreation facilities exist on the Squaw Creek Arm. General levels of impact in **Table 5** have been qualified as *low* when less than one-fourth of the facility is impacted, *medium* when one-fourth to one-half of the facility is impacted, and *high* when more than one half of the facility is impacted. These impact estimates are broad, and are not meant to replace information included in **Plate 3**, which shows specific facilities impacted at each of the recreation locations. A map of Shasta Reservoir recreation facility locations is included in **Attachment C**.

Buildings

At least one-fourth of the buildings affected are homes or cabins, more than one-third are associated with private resorts or marinas, and an estimated ten percent are associated with USFS sites such as campgrounds, boat ramps, and stations. Some businesses and community buildings would also be affected in the Lakeshore area.

TABLE 5
SHASTA RESERVOIR DEVELOPED RECREATION FACILITIES

Recreation Facility	Level of Impact at 1100 feet msl
Sacramento River Arm	
Antlers Campground	Low- Unaffected except restroom, amphitheater, storage area
Antlers Public Launch Ramp	High- Entire facility affected
Antlers Resort & Marina	Medium- One-third of buildings affected
Centimundi Public Ramp	High- Entire facility affected except overflow parking
Digger Bay Marina	Medium- Half of facility affected
Fisherman's Point Day Use Area	Low- Picnic area partially affected, parking and restroom unaffected
Gregory Creek Campground	High- Road and building facilities affected
Lakeshore East Campground	High- Entire facility affected
Lakeshore Inn & RV Park	High- Entire facility affected
Lakeshore Marina	High- Entire facility affected
Oak Grove Campground	Low- Unaffected except part of access road
Nelson Point Campground	Medium- Half of facility affected
Salt Creek Resort and Marina	Low- Unaffected except boat ramp
Shasta Lake RV Resort	High- Entire facility affected
Shasta Marina Resort	High- Most of facility affected
Sugarloaf Boat Ramp	High- Entire facility affected
Sugarloaf Resort and Marina	High- Most of buildings affected
Tsasdi Resort	Medium- Half of facility affected
McCloud River Arm	
Bailey Cove Campground	High- Most of facility affected
Bailey Cove Day Use Area & Boat Ramp	High- Entire facility afected
Dekkas Rock Campground & Day Use Area	Medium- Half of facility affected
Ellery Creek Campground	High- Almost entire facility affected
Hirz Bay Campgrounds	Low- No infrastructure affected
Hirz Bay Public Ramp	High- Entire facility affected except upper parking lot
Holiday Harbor Marina	High- Main office, parking area, and ramp affected
Kamloop Camp	Medium- Half of facility affected
Lakeview Marina	High- Main office, parking area, and ramp affected
McCloud Bridge Campground	High- Entire facility affected
Moore Creek Campground	Medium- Half of facility affected
Pine Point Campground	Medium- General area partially affected, road almost unaffected
Shasta Caverns Buildings	High- Main buildings affected
Pit River Arm	
Bridge Bay Resort and Marina	High- Most of facility (several buildings) affected except lodging
Jones Valley Campground	High- Lower campground entirely affected
Jones Valley Public Ramp	Medium- Ramp entirely affected, parking area unaffected
Jones Valley Resort	High- Main buildings, parking area, and ramp affected
Packers Bay Marina	Medium- Half of facility affected
Packers Bay Public Ramp	High- Almost entire facility affected
Silverthorn Resort	High- Main office, parking area, and ramp affected

Significant Areas

The most significant infrastructure items that would be affected between 1,070 feet msl and 1,100 feet msl are:

- The Pit River Bridge (Interstate 5 and Union Pacific Railroad),
- The Union Pacific Railroad between Tunnels 1 and 2 (0.6 mi south of the Pit River Bridge),
- The Antlers Bridge and approximately 2,000 feet of Interstate 5 at Lakeshore just north of the bridge,
- Several homes and other buildings in the communities of Lakeshore and Sugarloaf,
- The Bridge Bay Resort and Marina, and
- The Pit 7 Dam (owned by PG&E).

CULTURAL AND HISTORIC RESOURCES

The main inventory data source for cultural resources was a report prepared for Reclamation by Peak and Associates in 1983. Three archeological investigations by USFS (Sundahl 1986, Winfield and Sundahl 1986) were also used as a source of data. The construction of Shasta Dam and Reservoir caused the inundation of over one hundred archeological sites, the mining towns of Kennett, Delamar, and Copper City, and the Baird Hatchery on the lower McCloud River, which was the first in the National Fish Hatchery System. This inventory does not detail those sites below the gross pool elevation. Although cultural and historic resources are located within the inventoried area (1,070 – 1,100 feet msl), these sites are not included on **Plate 3** due to the sensitivity of the sites.

Thirty-one more archeological sites would be inundated or partially inundated at a water level of 1,100 feet, sixteen of which would already be partially covered when the reservoir is at gross pool (1,070 feet msl). Thirty of the sites are prehistoric, and one of the sites is historic. Two of the sites have been classified as having a *high* significance, ten are *probably* significant, thirteen are *possibly* significant, and six sites have *unknown* significance. Peak and Associates ranked the Shasta Reservoir area as having very high archeological sensitivity, high ethnographic significance, and medium historic sensitivity in comparison to other reservoirs in California with the potential for enlargement.

Raising the water level in Shasta Reservoir to 1,100 feet msl would not impact any American Indian Reservations or Public Domain Allotments (PDAs). The American Indian Reservations in the general area are the Roaring Creek Rancheria, the Montgomery Creek Rancheria, and the Big Bend Rancheria, which are east of the Upper Pit River, and the Redding Rancheria, which is south of the City of Redding. Two PDAs exist east of the upper Pit River, and one PDA exists just north of the Salt Creek Inlet. The original construction headquarters site for Shasta Dam is located along Lake Boulevard and the Bureau of Indian Affairs (BIA) now owns the land. Several sites considered sacred by the Winnemem Wintu tribe exist along the banks of the upper McCloud River Arm of Shasta Reservoir. At this time, the number and nature of Winnemem

Wintu cultural sites that could be affected by a Shasta Dam raise is unknown. Further study is needed to assess such impacts. Potential impacts to caves of cultural significance located adjacent to Shasta Reservoir are also presently unknown.

The Shasta Reservoir area is rich in history. Shasta County has twenty-four resources in the National Register of Historic Places. None of these resources are immediately adjacent to Shasta Reservoir. At least one California Historical Landmark is located in the Shasta Reservoir area. This landmark is Bass Hill, Landmark No. 148. Bass Hill was a common hold up spot on the California-Oregon stage road, so a marker has been placed there in memory of W. L. Smith (division stage agent of the California and Oregon Stage Company) and the pioneer stage drivers along the road. The marker is located in the Bridge Bay Resort parking lot.

Peak and Associates listed forty-two historic sites (not including those already inundated) in the Shasta Reservoir area, none of which are listed on the National Register of Historic Places. Some of the sites which would be inundated or partially inundated by raising the water surface by 30 feet are: Lakeshore Townsite, Sugarloaf Townsite, Shasta Marina, Bridge Bay Resort, Bollibokka Club, McCloud Bridge Site, Bully Hill Mine, Fenders Flat, Monday Flat, Rocky Ridge Campground, and Jones Valley Campground. Remains of the old head tower used during the construction of Shasta Dam still exist just north of the dam. In very dry years, the remains pose a hazard to boats. Raising the dam would reduce the frequency of such problems.

ITEMS NOT INCLUDED IN INVENTORY

The inventory maps and tables include major infrastructure items, as they are known to exist. However, some items known to exist in the reservoir shoreline areas (such as retaining walls, fences, guardrails, hiking trails, culverts, picnic tables, fire rings, and tent pads) are not included because it is believed that they would not significantly influence the cost of raising the dam and reservoir levels. Power poles were accounted for, but are not included in the inventory maps and tables (**Plate 3 and Tables A1 and B1**). A map of the main power line locations is included in **Attachment C**. Items that float on the water surface, such as boat docks and floating marinas are not included in this inventory because they and their moorings would incur only minor relocation expenses. Septic systems, drinking water systems, and other underground utility systems may be significant, but are not included in the inventory maps and tables. These types of systems may be considered appurtenances to the facilities that they serve. For example, when a USFS campground restroom is identified in the inventory, it is estimated that the accompanying septic system (if it exists) would need to be relocated along with the restroom. **Table 6** includes a list of developed campgrounds and indicates whether they have drinking water, flush or vault toilets, and septic systems, based on information from USFS.

This inventory includes items potentially affected by a raise in Shasta Dam and Reservoir, but specific facilities and appurtenances of the dam, such as the spillway, gates, outlets, penstocks, and power plant are not included in the inventory. The temperature control device is included because it is on the upstream side of the dam. Further analysis will be required to quantify the effects of raising the water level in Shasta Reservoir on the Shasta Dam facilities.

No active mining currently occurs in the Shasta Reservoir watershed, but many abandoned mines exist within the watershed. The Bully Hill mine site on the north side of the Squaw Creek arm has been identified in the inventory, but other mines and associated tailings piles or smelters may

exist between 1,070 and 1,100 feet msl and have not been included in the inventory. More research is needed in this area to properly characterize mines and their potential impacts to a raise in Shasta Reservoir. Copper was the principal commodity mined in the Shasta Reservoir watershed, and the copper mining activities date back to 1862. The largest copper mines were Mammoth, Balaklala, and Bully Hill. Iron was first mined in 1902 at the Shasta Iron Mine.

TABLE 6
DEVELOPED CAMPGROUND WATER FACILITIES

USFS Developed Campground	Drinking Water	Toilets	Septic System
Antlers	Yes	Flush/Vault	Yes
Bailey Cove	Yes	Flush	Yes
Dekkas Rock (Group)	Yes	Vault	No
Ellery Creek	Yes	Vault	Yes
Gregory Creek	Yes	Flush	Yes
Hirz Bay	Yes	Flush/Vault	Yes
Jones Valley (Lower)	Yes	Vault	Yes
Jones Valley (Upper)	Yes	Vault	Yes
Lakeshore East	Yes	Flush	Yes
McCloud Bridge	Yes	Flush/Vault	Yes
Moore Creek	Yes	Vault	Yes
Nelson Point	No	Vault	No
Pine Point	Yes	Vault	Yes

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Shasta Reservoir Area Inventory

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