

**Placer County Water Agency  
Middle Fork American River Hydroelectric Project**

**(FERC No. 2079)**

**2005 – 2006  
Cultural Resources Inventory  
Study Plan**



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## **Glossary and Acronyms**

**APE** – Area of Potential Effects. Defined in Title 36 of the Code of Federal Regulations, Section 800.16(d) as the “geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking.” Section 106 of the National Historic Preservation Act requires that the APE be defined and documented in consultation with the State Historic Preservation Office.

**ARPA** - Archaeological Resources Protection Act

**CFR** – Code of Federal Regulations

**DPR** - State Department of Parks and Recreation

**Expanded Study Area** – For the purposes of this Study, the Expanded Study Area is defined as the Study Area plus the area within one mile of the FERC Project boundary.

**FERC** – Federal Energy Regulatory Commission, which issued an operating license for the Middle Fork American River Hydroelectric Project.

**FERC Project Boundary** – The boundary surrounding the MFP facilities as delineated in the MFP license issued by the FERC in 1963.

**GPS** – Global Positioning System

**ILP** - Integrated Licensing Process. – A new FERC process for conducting a relicensing program and the FERC’s default licensing process effective July 23, 2005.. The ILP provides for increased public participation during pre-filing consultation, development of FERC-approved Study Plans, better coordination between the FERC and other agency processes, and encourages informal resolution of study disagreements. PCWA has chosen the ILP mainly because it emphasizes early collaboration with the stakeholders, a feature PCWA believes is important.

**MFP or Project** – Middle Fork American River Hydroelectric Project, FERC Project No. 2079.

**NHPA** – National Historic Preservation Act

**NOI** – Notice of Intent

**PAD** – Pre-Application Document. A document that is required as part of the ILP, which PCWA will file with the FERC and distribute to the resource agencies and other stakeholders in September 2007. As required in the FERC regulations, the PAD will include: 1) a description of the existing and proposed (if any) Project facilities and operations; 2) information on the existing environment; 3) existing data or studies relevant to the existing environment, and; any known and potential impacts of the proposed project on the specified resources. PCWA also plans to include agency and stakeholder-approved technical study plans in the PAD.

**PCWA – Placer County Water Agency**

**Preliminary Activities** – Activities to be performed by PCWA, in consultation with the resource agencies, prior to filing the NOI and PAD.

**Resource Agencies** – State and federal governmental agencies with a mandatory or discretionary interest in the relicensing of the MFP, including among others, the United States Forest Service.

**Study** – For the purposes of this document, the Proposed Cultural Resources Inventory Studies to be conducted in 2005 and 2006. The Study will be carried out prior to the collaborative development of the comprehensive Technical Study Plans, which will occur in 2006 and 2007.

**Study Area** – For the purposes of this Study, the area within the FERC Project boundary and a 200 foot area surrounding any Project related feature that may lie outside the FERC Project boundary, for example, radio towers, recreation facilities, sediment storage areas, and roads that were specifically developed to access Project facilities. The Study Area does not include the land areas that overlie subsurface features such as tunnels.

**Technical Studies** – Comprehensive technical studies that will be designed and developed as part of a multi-stakeholder collaborative effort in 2006 and 2007 and implemented in 2008 and 2009.

**Tribes** – Native American Tribes that may have a cultural affiliation with the Project, including: United Auburn Indian Community, Shingle Springs Rancheria, Washoe Tribe, Todd Valley Miwok-Maidu Cultural Foundation, Colfax-Todd Valley Consolidated Tribe, and Miwok Tribe of the El Dorado Rancheria.

**USFS** – United States Forest Service

**USGS** – United States Geological Survey

## 1.0 INTRODUCTION

The Placer County Water Agency (PCWA) owns the Middle Fork American River Hydroelectric Project (MFP or Project), located on the Middle Fork American River, the Rubicon River, and several tributaries in Placer and El Dorado Counties, California. A preliminary description of the MFP is included in Appendix A. PCWA is currently preparing a more comprehensive Project description for use by the resource agencies and stakeholders during the formal relicensing proceedings.

PCWA operates the MFP under the terms of a Federal Energy Regulatory Commission (FERC) License No. 2079. The current license will expire on February 28, 2013, and PCWA will apply for a new license for the MFP pursuant to the FERC's Integrated Licensing Process (ILP) regulations. PCWA plans to file a Notice of Intent (NOI) to relicense the MFP with the FERC in September 2007. A Pre-Application Document (PAD) will accompany the NOI per FERC regulations.

## 2.0 CULTURAL RESOURCES INVENTORY STUDY

As a part of the Prelicensing Activities, PCWA proposes to implement a Cultural Resources Inventory Study (Study) to inventory the cultural resources associated with the MFP. The studies described in this plan will be carried out in 2005 and 2006, and limited to the following areas:

**Study Area** – All of the area that lies within the FERC Project boundary and a 200-foot area surrounding any Project related facility or feature that may lie outside the FERC Project boundary. These include, for example, recreation facilities, radio towers, spoil piles, adit entrances, sediment storage areas, the sediment transport study pile between Ralston Reservoir and Oxbow Powerhouse, and roads that were specifically developed to access Project facilities. The Study Area does not include the land areas that overlie subsurface features such as tunnels.

**Expanded Study Area** – The Expanded Study Area is defined as the Study Area described above plus the area within one mile of the FERC Project boundary.

The cultural resources inventory will be developed using existing information contained in databases, published and unpublished reports, government archives and through consultation with Native American Tribes (Tribes), organizations and other individuals. In addition, field surveys will be conducted to verify the location and conditions of known cultural resources and to identify previously unidentified and/or unreported sites. All field surveys will be limited to the Study Area, as defined above and shown on Figure 1.

## **2.1 STUDY PURPOSE**

The information developed as part of this Study will serve the following purposes: form a basis for future technical studies conducted as part of the formal relicensing process; support discussions with the resource agencies and the tribes regarding the Area of Potential Effects (APE); support permit applications required from the U.S. Forest Service (USFS); help ensure timely completion of other regulatory processes, for example Section 106 of the National Historic Preservation Act (NHPA); help facilitate early consultation efforts with the Tribes.

## **3.0 RESOURCE AGENCY CONCURRENCE**

PCWA is seeking resource agency concurrence on this Study. PCWA recognizes that additional information regarding cultural resources will need to be collected during the relicensing of the MFP. PCWA understands that resource agency involvement at this time will not inhibit their decision-making discretion in the development of future studies.

## **4.0 STUDY OBJECTIVES**

The primary objective of the Study is to compile a comprehensive inventory of cultural resources that are more than 50 years old within the Study Area. These data are essential to making determinations that will allow the FERC to meet its responsibilities under Section 106 of the NHPA and to design future studies necessary for the relicensing process. More specifically, the study objectives are:

- Obtain information regarding known cultural resources in the Study Area and the Expanded Study Area.
- Determine the extent and adequacy of previous archaeological field surveys in the Study Area.
- Verify the presence/absence and nature of cultural resources previously known to exist in the Study Area, and immediate vicinity.
- Identify any previously unknown cultural resources within the Study Area.
- Identify prospective stakeholders in the relicensing process, including Tribes, non-governmental organizations, and resource agencies.
- Determine if there are any known cultural resource management issues within the Study Area.

### Placeholder for Figure 1

Figure 1. Cultural Resources Inventory Study Area and  
Expanded Study Area

### **Non-Internet Public Information**

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## **5.0 TWO PHASED APPROACH**

The Study will be performed in two phases, the first focusing on data acquisition and review, the second focusing on field surveys. Phase 1 data acquisition activities will occur in 2005, pursuant to an Organic Act Permit (Temporary Special Use Permit ID: GTN104, dated 1/28/2005) that was issued by the USFS. Phase 2 activities involving fieldwork will be implemented in 2006 and will consist of the following two components: (1) verification of the location and nature of previous known and reported cultural resources within the Study Area; and (2) completion of an intensive field survey to locate previously unknown and therefore unreported cultural resources within the Study Area. Phase 2 fieldwork will require a USFS Special Use Permit issued pursuant to the Archaeological Resources Protection Act (ARPA). Phase 1 and Phase 2 study efforts will involve consultation with the resource agencies, including the California Office of Historic Preservation, USFS, the Tribes, and other interested parties.

## **6.0 NATIVE AMERICAN CONSULTATION AND NOTIFICATION**

PCWA considers consultation with Tribes having a cultural affiliation with the Study Area an important part of the studies involving cultural resources. Furthermore, early consultation with the Tribes is required by FERC and is necessary to comply with Section 106 of NHPA. Consultation will be coordinated among the Tribes, PCWA, FERC, and the USFS to ensure that the consultation effort is efficient and does not burden the tribes and agencies with multiple, redundant consultations. In addition to their tribal consultation responsibilities under Section 106 of NHPA, the FERC and the USFS also have legal responsibility for conducting government-to-government consultation with the federally-recognized Tribes. It is PCWA's intention to facilitate consultation with the Tribes and resources agencies associated with this Study throughout the relicensing process.

As part of the Phase 1 studies, federally recognized and unrecognized Tribes will be contacted to determine how or if they wish to participate in the relicensing process. PCWA will seek to ascertain how Tribes want to receive information about the relicensing process, how they wish to be approached for information, and who in the Tribe may represent the Tribe in the consultation process. Consultation with Tribes for the Phase 1 studies will assist PCWA in understanding how the Tribes wish to contribute to and/or participate in the Phase 2 studies.

PCWA will coordinate with the USFS regarding notification to Tribes as required by ARPA regulations. Tribes will be notified by the USFS at least 30 days before an ARPA permit is issued for cultural resources survey fieldwork. Ground disturbing activities will not be undertaken as part of this Study. However, the Tribes will be notified at least 30 days in advance of any excavations should ground disturbing activities occur in association with future field work.



Consultation with the Tribes and the resource agencies will be documented for inclusion in the FERC required consultation record. Consultation documentation may include telephone conversation records, copies of e-mails, and written correspondence.

## **7.0 CONFIDENTIALITY**

Data collected from the Tahoe or Eldorado National Forests will be subject to a Confidentiality Agreement between the USFS and PCWA. Data regarding archaeological sites and other historic properties may be subject to the confidentiality requirements of Section 304 of the NHPA. Similarly, any information received from Tribes or others under the stipulation that it is confidential and not for public release will be provided for relicensing planning on a strict need-to-know basis and will not be included in reports available to the general public.

## **8.0 PERMITS**

PCWA has obtained an Organic Act Permit from the USFS to collect information from the Eldorado and Tahoe National Forests. The Archaeological Resources Protection Act requires PCWA to obtain a permit from the USFS prior to conducting fieldwork involving cultural resources. PCWA will apply for this permit no less than 90 days prior to beginning the Phase 2 studies.

## **9.0 STUDY METHODOLOGY - PHASE 1**

Phase 1 of the Study will be carried out in 2005 and involves assembling existing information regarding cultural resources within the Expanded Study Area. Focus will be placed on cultural resources that are more than 50 years old.

Existing information regarding the cultural resources in the Expanded Study Area will be collected, compiled and reviewed. Cultural resources include those pertaining to prehistoric Native Americans, historic Native Americans, and historic Euroamericans. The following is a preliminary list of agencies, tribes and organizations that will be contacted for existing cultural resources information.

- USFS, Eldorado National Forest
- USFS, Tahoe National Forest
- California Historical Resources Information System
- United Auburn Indian Community
- Shingle Springs Rancheria
- Washoe Tribe
- Todd Valley Miwok-Maidu Cultural Foundation
- Colfax-Todd Valley Consolidated Tribe
- Placer County Historical Society
- El Dorado County Historical Museum
- California State Library
- California Native American Heritage Commission

- The Bancroft Library, University of California at Berkeley
- California Historical Society Library
- Miwok Tribe of the Eldorado Rancheria

Specific data sources to be reviewed will include, for example: historic General Land Office, USGS, USFS, and county assessors maps; land and tax records; archaeological site records; published and unpublished local histories; unpublished and published academic theses, dissertations, and journal articles; historic aerial photographs; and oral histories. PCWA will arrange a field trip with the Tribes in the fall of 2005 for a general orientation of the Project and to help facilitate information-gathering.

## 9.1 PHASE 1 REPORT

Phase 1 study efforts will be summarized in a report, which will be provided to the resource agencies and Federally recognized Tribes for review and comment. Information in the report will be shared with federally non-recognized Tribes according to a procedure to be developed in concert with the USFS. The Phase 1 Report will describe the Study goals and objectives, methods, and results; discuss previous cultural resource identification efforts in the Study Area and assess their adequacy and reliability for this Study; and, summarize the known inventory of cultural resources more than 50 years old that lie within the Expanded Study Area. The report will provide an overview of regional and local archaeology (prehistory), ethnography, and history as a context for the inventory of cultural resources. Each known cultural resource will be described.

Information about the cultural resources will be provided as text, maps, photographs, and DPR 523 forms if the resource has been entered into the California Historic Resource Information System inventory. Confidential information will be compiled as separate appendices. All sources of information will be identified except those persons that provide confidential information. The report will be consistent in format and content with guidance provided by the California Office of Historic Preservation, US Secretary of the Interior, and the USFS.

The information contained in the Phase 1 Report will be used to refine the Phase 2 study components. Specifically, the data will be used to characterize the cultural resources in the Expanded Study Area and to predict what types of resources could be expected to occur within the Study Area in anticipation of conducting comprehensive inventory fieldwork.

The Phase 1 report will provide the basis for the ARPA Permit Application for the Phase 2 Study. It will provide a detailed plan of work for the Phase 2 field survey, including the listing of known and recorded cultural sites, discussion of prior survey coverage and adequacy for the study area, proposed survey areas with acreages identified, and survey strategies identified that would be appropriate for those areas. Known sites, prior survey coverage, and proposed survey coverage will be shown on topographic maps.

## **10.0 STUDY METHODOLOGY - PHASE 2**

Phase 2 will be completed in 2006 and will involve fieldwork designed to locate and describe cultural resources that are more than 50 years old that exist within the Study Area. Access to private and public lands will be in accordance with procedures established by PCWA with appropriate land owners and administrators.

Phase 2 will consist of two components. The first component will involve verifying the location and nature of previously known and reported cultural resources found during the Phase 1 study. Cultural resource specialists (e.g., archaeologists, historians, architectural historians) will visit each reported resource to verify the existence of the resource at the reported location, to document the physical characteristics of the resource, and to compare the material documentation with the historical record. Resources not previously recorded on DPR 523 forms (or equivalent) will be recorded using them. Existing documentation that does not meet current standards established by the California Historic Resources Information System will be up-graded. Any previously unknown cultural resources encountered will be noted on USGS maps.

The second component involves completing an intensive field survey to locate previously unknown and therefore unreported cultural resources. Archaeologists and other trained professionals will conduct a complete/ intensive level examination of all accessible areas within the Study Area to locate, identify, and document previously unknown cultural resources that are more than 50 years old. This effort will include identifying and inventorying all prehistoric and historic Native American and historic Euroamerican resources.

All Phase 2 field studies will be completed by pedestrian survey. Archaeologists and other trained professionals will walk across the landscape looking for evidence of archaeological sites, historic buildings and structures, and seek to determine the locations of places of interest to Native Americans. Identified historic resources will be documented using California Department of Parks and Recreation Form 523 and consistent with the USFS Manual. The location of identified cultural resources will be mapped using GPS, USGS topographic maps, and available air photos. No ground disturbing activities will be conducted for the resource identification effort.

### **10.1 PHASE 2 REPORT**

The Phase 2 Study efforts will be summarized in a report which will be provided to resource agencies and the Federally recognized Tribes for review and comment. This report will be important in defining the APE and for identifying Native American resources of interest to the Tribes.

The Phase 2 Report will summarize the documented inventory of cultural resources more than 50 years old within the Study Area. The Phase 2 Report will reference the Phase 1 Report regarding the overview of ethnography, history and prehistory and will supplement that overview as necessary given the information collected in the field.

Field methods employed will be described and all appropriate resources will be described briefly using text, photographs, and maps. DRP 523 forms will be provided in a confidential appendix.

The report will initially define the period of significance and historic context for cultural resources in the Study Area based on the information gathered. The report will assess the potential for unrecognized cultural resources (e.g., buried archaeological sites) that may exist within the Study Area and immediate vicinity, and describe the potential for cultural resources to occur in inaccessible areas (e.g., in inundated reservoir basins). The report will be consistent in format and content with guidance provided by the California Office of Historic Preservation, US Secretary of the Interior, and the USFS.

#### **11.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES**

All appropriate PCWA team members (staff) participating in the Study will meet the appropriate qualifications standards of the Secretary of the Interior (36 CFR 61). Staff will be provided with specific training regarding the types of necessary information to be found in historical and archival reference sources. Staff will be supervised by senior historians, architectural historians, ethnographers, and archaeologists who will review the information gathering process and products on a regular basis. Data compiled for reports will be cross-checked to ensure that the inventory of cultural resources is properly documented and that inconsistencies in data are resolved. Additional quality assurance/control will result by checking inventory results with agencies and knowledgeable persons to verify that the information staff provided is accurately restated in reports.

## 12.0 SUMMARY OF SCHEDULE/ REPORTING MILESTONES

A summary of the key Cultural Resource Inventory Study schedule/reporting milestones is shown below.

### Key Phase 1 Study Milestones

Date	Milestone
May 2005	Resource agencies concurrence to proceed with Phase 1 Study
June - Sept 2005	Collect and review existing data regarding cultural resources
Sept - Oct 2005	Report preparation
Nov 2005 – Jan 2006	Distribute draft Phase 1 Report to resource agencies and Tribes for review/comment. Incorporate comments and distribute final Phase 1 Report.

### Key Phase 2 Study Milestones

Date	Milestone
Feb - May 2006	ARPA permit application preparation and submittal to USFS
Apr 2006	Resource agencies concurrence to proceed with Phase 2 Study
Jun - Oct. 2006	Phase 2 field studies conducted
Nov - Dec 2006	Report preparation
Jan 2007	Distribute draft Phase 2 Report to resource agencies and Tribes for review and comment

## **APPENDIX A**

### **Preliminary Project Description Placer County Water Agency Middle Fork American River Hydroelectric Project (FERC Project No. 2079)**

**Preliminary Project Description  
Placer County Water Agency  
Middle Fork American River Hydroelectric Project  
(FERC Project No. 2079)**

The Middle Fork American River Project (MFP or Project) is a multi-purpose water supply and hydro-generation Project designed to conserve and control waters of the Middle Fork American River, the Rubicon River and certain tributaries. It was constructed by PCWA and brought into operation in 1967.

The Project consists of a series of seven diversions and five powerhouses with a nameplate generating capacity of 224 megawatts (MW). Water from the diversions is controlled and conveyed through five tunnels. At the end of the system, Project water is released to the Middle Fork American River approximately 29 miles upstream of Folsom Reservoir.

The Project includes two principal water storage reservoirs, French Meadows and Hell Hole, two limited storage afterbays, Interbay and Ralston and three small diversions, Duncan Creek Diversion, North Fork Long Canyon Diversion and South Fork Long Canyon Diversion. These Project features are shown geographically on Figure 1- "Project Facilities", and schematically on Figure 2 - "Project Schematic Diagram".

Duncan Creek Diversion is a 32 foot high concrete gravity dam that routes flows from Duncan Creek into French Meadows Reservoir via the 1.5 mile-long, Duncan Creek Diversion Tunnel. The headwaters of the Middle Fork American River and its tributaries drain to the French Meadows Reservoir, impounded by French Meadows Dam (also referred to as LL Anderson Dam), a 231 foot-high earth and rock fill structure. Water stored in French Meadows Reservoir travels to the Hell Hole Reservoir via the 2.6 mile-long, French Meadows-Hell Hole Tunnel. Hell Hole Dam, a 410 foot rockfill structure, also impounds water flowing from the upper reaches of the Rubicon River drainage into Hell Hole Reservoir.

Water flowing from French Meadows to Hell Hole Reservoir passes through a 691 foot-long penstock and the French Meadows Powerhouse, located on the north shore of Hell Hole Reservoir approximately 1.5 miles east of the Hell Hole Dam. French Meadows Powerhouse has a nameplate generating capacity of 15.3 MW from a single generation unit at a maximum flow rate of about 400 cfs. The Hell Hole Powerhouse, located at the base of the Hell Hole Dam, generates electricity from stream maintenance flow releases into the Rubicon River, and has a nameplate generating capacity of 0.7 MW from a single generator using required stream flow releases.

Water stored in Hell Hole Reservoir is released through the 10.4 mile-long Hell Hole - Middle Fork Tunnel to a 3,653 foot-long penstock into the Middle Fork Powerhouse. Middle Fork Powerhouse has a nameplate generating capacity of 122.4 MW from two generating units at a design flow rate of about 990 cfs. Middle Fork Powerhouse

releases water to Middle Fork Interbay Reservoir, impounded by Interbay Dam, a 70 foot high concrete gravity dam on the Middle Fork American River. Interbay Reservoir acts as an afterbay for the Middle Fork Powerhouse and as a forebay for the inlet to the Middle Fork-Ralston Tunnel.

Water flowing through the Hell Hole - Middle Fork Tunnel is augmented by diversions from the North and South Forks of Long Canyon Creeks. Water diverted by a 10 foot concrete gravity dam from North Fork Long Canyon Creek and a 27 foot concrete gravity dam from South Fork Long Canyon Creek flows through buried metal pipes into 6 foot diameter vertical shafts that join the Hell Hole - Middle Fork Tunnel.

The 6.7 mile-long, Middle Fork-Ralston Tunnel terminates in a 1,670 foot-long penstock that supplies water to drive a single generating unit at the Ralston Powerhouse. The powerhouse has a nameplate electrical generating capacity of 79.2 MW from a single generating unit at a maximum flow rate of about 924 cfs, and discharges to the Ralston Afterbay. The Ralston Afterbay Dam is a 89 foot concrete gravity dam located on the Middle Fork American River just down stream of the Rubicon River's confluence with the Middle Fork American River.

The Ralston Afterbay supplies water to the 0.1 mile-long Oxbow Tunnel. Oxbow Powerhouse at the downstream end of the tunnel has a nameplate electrical generating capacity of 6.1 MW from a single generator at a maximum flow rate of about 1075 cfs.

Water from the Oxbow Powerhouse is discharged back to the Middle Fork American River approximately 29 miles upstream of Folsom Reservoir.

### ***Operation of the Middle Fork Project***

The Project is operated to meet three objectives: maintenance of water flows to protect environmental resources, water supply for PCWA customers, and generation of electrical energy. In addition to the FERC license, operation of the Project is also governed by water rights permits, water supply contracts, and a power purchase contract with PG&E. Water flows to protect and maintain environmental resources are defined in the FERC License and in agreements with the State of California. These flows occur from the Duncan Creek Diversion (Duncan Creek); French Meadows, Interbay and Ralston Afterbay Dams (Middle Fork American River), North and South Long Canyon Diversions (Long Canyon Creek) and Hell Hole Dam (Rubicon River).

The water rights permits, water supply contracts and FERC License conditions constrain how PCWA plans for water use and how PG&E optimizes electrical generation. Management of flows is also constrained by annual and seasonal water availability. In late fall and early winter the water levels in French Meadows and Hell Hole reservoirs are reduced to provide adequate storage to manage spring runoff. The fall/winter drawdown must balance the objectives of providing sufficient storage space to minimizing the potential for spilling the reservoirs if the following spring is wet, but must also retain sufficient water in storage to ensure an adequate water supply to meet environmental and consumptive demands if the following spring is dry. During spring



runoff operating flows are adjusted to store as much runoff as possible without spilling the reservoirs. After the reservoirs have reached their maximum capacity in late spring or summer, flows are regulated to first meet environmental flow requirements, then to meet consumptive water supply requirements, and then to optimize power generation. Operation of the system varies from year to year based on the winter snow pack and amount of precipitation (wet year vs. dry).

Under typical operating conditions the Project generates approximately 1 million-megawatt hours annually. Operations patterns for the Project may include full load operations (typically during when runoff is high), "peaking" operations (when the Project is operated 15 to 18 hours a day to conserve water but help meet peak electrical demand), to low flow operations to conserve water for consumptive use or during Project maintenance periods.

While not within the FERC Project Boundaries, PCWA's consumptive water rights permits identify two points of diversion for water for consumptive purposes downstream of the Project facilities. The Auburn Pumping Station diversion point is approximately 28 miles downstream of the Project's FERC boundary. The second point of consumptive diversion is via facilities near Folsom Dam, at the downstream end of Folsom Reservoir, approximately 48 miles downstream of the Project's FERC boundary.

## Placeholder for Figure A-1

Figure A-1. Project Facilities

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## Placeholder for Figure A-2

Figure A-2. Project Schematic Diagram

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