

Environmental Impact Report

Comments and Responses Volume 6

San Francisco Public Utilities Commission CALAVERAS DAM REPLACEMENT PROJECT



San Francisco Planning Department File No. 2005.0161E
State Clearinghouse No. 2005102102

Draft EIR Publication Date: October 6, 2009

Draft EIR Public Hearing Date:
November 10, 2009 in Fremont, CA
November 12, 2009 in San Francisco, CA
December 14, 2009 in Sunol, CA

Draft EIR Public Comment Period: October 6, 2009 through December 21, 2009

Comments and Responses Publication Date: January 5, 2011

Final EIR Certification Date: January 27, 2011

City and County of San Francisco
San Francisco Planning Department

Environmental Impact Report

Comments and Responses Volume 6

San Francisco Public Utilities Commission CALAVERAS DAM REPLACEMENT PROJECT

San Francisco Planning Department File No. 2005.0161E
State Clearinghouse No. 2005102102

Draft EIR Publication Date: October 6, 2009

Draft EIR Public Hearing Date:
November 10, 2009 in Fremont, CA
November 12, 2009 in San Francisco, CA
December 14, 2009 in Sunol, CA

Draft EIR Public Comment Period: October 6, 2009 through December 21, 2009
Comments and Responses Publication Date: January 5, 2011
Final EIR Certification Date: January 27, 2011

City and County of San Francisco
San Francisco Planning Department

CALAVERAS DAM REPLACEMENT PROJECT ENVIRONMENTAL IMPACT REPORT – COMMENTS AND RESPONSES

TABLE OF CONTENTS

VOLUMES 4 AND 5

8.	INTRODUCTION TO COMMENTS AND RESPONSES	8-1
8.1	Purpose of the Comments and Responses Document	8-1
8.2	Environmental Review Process	8-2
8.3	Document Organization	8-3
8.4	Organization of Comments and List of Commenters	8-5
9.	PROJECT VARIANT	9-1
9.1	Introduction to CDRP Variant	9-1
9.2	Description of CDRP Variant	9-3
9.3	Environmental Effects of CDRP Variant	9-40
9.4	Mitigation Measures Applicable to the CDRP Variant	9-161
9.5	Cumulative Impacts of the CDRP Variant	9-162
9.6	CDRP Variant and Consideration of Alternatives	9-179
9.7	Summary of Impacts of the Variant Compared to the Draft EIR Project	9-181
9.8	References	9-198
10.	MASTER RESPONSES	10-1
10.1	Potential Future Enlargement of Calaveras Reservoir	10-1
10.2	Baseline Used in the Environmental Analysis	10-9
10.3	Hydrology	10-21
10.4	Fisheries	10-63
10.5	Greenhouse Gas Emissions	10-111
11.	COMMENTS AND RESPONSES	11-1
11.1	Federal, State, Regional, and Local Agencies	11.1-1
11.2	Organizations	11.2-1
11.3	Individuals	11.3-1
12.	DRAFT EIR REVISIONS	12-1
12.1	Changes in Response to Comments	12-1
12.2	Staff-Initiated Text Changes	12-65

VOLUME 6

APPENDICES

- L. Comment Letters
- M. Transcripts of Draft EIR Public Hearings
- N. Proposed Instream Flow Schedules and Adaptive Management Implementation Plan
- O. Variant Air Quality Modeling
- P. Hydrology Modeling for the Variant

LIST OF FIGURES

Figure 9.1:	Location of CDRP Variant Project Elements Differing from the Draft EIR Project	9-13
Figure 9.2:	Proposed Fish Screen at Alameda Creek Diversion Tunnel – CDRP Variant.....	9-15
Figure 9.3:	Proposed Fish Ladder at the Alameda Creek Diversion Dam – CDRP Variant.....	9-18
Figure 9.4:	Proposed Intake Tower Modifications – CDRP Variant.....	9-20
Figure 9.5:	PG&E Power Line Upgrade Alignment – CDRP Variant.....	9-23
Figure 9.6:	Work Areas for Proposed Fisheries Improvements at Alameda Creek Diversion Dam – CDRP Variant.....	9-28
Figure 9.7a:	Modeled Calaveras Reservoir Storage and Releases to Calaveras Creek, 1920-2002 – CDRP Variant	9-90
Figure 9.7b:	Modeled Calaveras Reservoir Storage and Releases to Calaveras Creek, 1920-2002 – CDRP Variant	9-91
Figure 9.8:	Modeled Storage in Calaveras Reservoir, Annual Average and Range in Storage Volume.....	9-92
Figure 9.9a:	Modeled Flow in Alameda Creek Downstream of the ACDD, 1920-2002 – CDRP Variant	9-96
Figure 9.9b:	Modeled Flow in Alameda Creek Downstream of the ACDD, 1920-2002 – CDRP Variant	9-97
Figure 9.10a:	Analysis of 15-Minute USGS Gage Data from Alameda Creek above the ACDD and Flow Past the Dam (March 1996, December 1996, and February 1999) – CDRP Variant.....	9-98
Figure 9.10b:	Analysis of 15-Minute USGS Gage Data from Alameda Creek above the ACDD and Flow Past the Dam (February 2000, December 2002, and March 2006) – CDRP Variant.....	9-99
Figure 9.11a:	Modeled Flow in Alameda Creek Downstream of the Calaveras Creek Confluence, 1920-2002 – CDRP Variant.....	9-104
Figure 9.11b:	Modeled Flow in Alameda Creek Downstream of the Calaveras Creek Confluence, 1920-2002 – CDRP Variant.....	9-105
Figure 10.1.1:	Dam Cross-Section.....	10-7
Figure 10.4.1a:	Proposed CDRP Variant Flow Schedules in Alameda Creek Below ACDD.....	10-71
Figure 10.4.1b:	Proposed CDRP Variant Flow Schedules Below Calaveras Dam	10-72
Figure 10.4.2a:	Relationship of Spawning Habitat to Flow for Rainbow Trout and Steelhead in Alameda Creek Upstream of the Calaveras Creek Confluence	10-76
Figure 10.4.2b:	Relationship of Spawning Habitat to Flow for Rainbow Trout and Steelhead in Alameda Creek Downstream of the Calaveras Creek Confluence	10-77
Figure 10.4.3a:	Map Depicting Rearing Habitat Functions Associated with Proposed Final Flow Schedules	10-78
Figure 10.4.3b:	Map Depicting Spawning Habitat Functions Associated with Proposed Final Flow Schedules	10-79
Figure 11.1.1:	CDRP Temporary Impacts to California Tiger Salamander Habitat.....	11.1.3-28
Figure 1:	Calaveras Dam Replacement Project and Mitigation Areas Locator Map (New)	11.1.15-28
Figure 2:	Mitigation Areas and Regional Land Cover (New)	11.1.15-29

Attachment A:	Photographs of the Calaveras Dam Replacement Dam Project Mitigation Areas: South Calaveras, San Antonio, Sage Canyon, and Goat Rock ...	11.1.15-30
Figure 11.3.1:	Average Daily Flow in Alameda Creek above the SFPUC's Alameda Creek Diversion Dam, 2009-2010.....	11.3.14-2
Figure 2.2:	SFPUC Water Service Area – San Francisco and SFPUC Wholesale Customers (Revised)	12-135
Figure 4.6.17:	Depth of Floodwaters from Modeled Breach of Calaveras Dam (Revised).	12-148
Figure 4.8.1b:	Regional Geology and Paleontological Resource Potential	12-153
Figure 4.10.1:	Cultural Resources Study Area and Work Limit Area (Revised)	12-156
Figure 6.1:	Location of Cumulative Projects in the Sunol Valley Region (Revised)	12-186

LIST OF TABLES

Table 8.1:	Governmental Agencies Commenting on the Draft EIR for the CDRP	8-6
Table 8.2:	Organizations Commenting on the Draft EIR for the CDRP	8-8
Table 8.3:	Individuals Commenting on the Draft EIR for the CDRP	8-11
Table 9.1:	Comparison of the Draft EIR Project and CDRP Variant	9-4
Table 9.2:	Summary of CDRP Variant Elements that Differ from the Draft EIR Project.....	9-6
Table 9.3:	Construction Scenario Difference Between the CDRP Variant and the Draft EIR Project.....	9-25
Table 9.4:	Summary of the Proposed Instream Flow Schedules Below Calaveras Dam	9-34
Table 9.5:	Ramping of Proposed Instream Flows Below Calaveras Dam	9-35
Table 9.6:	Proposed Instream Flow Schedule in Alameda Creek Below the ACDD.....	9-36
Table 9.7:	Summary of San Mateo Creek Minimum Water Release Schedule below Lower Crystal Springs Dam	9-43
Table 9.8:	Water Deliveries in SFPUC Service Area.....	9-46
Table 9.9:	Regional and Local Land Use Plans and Policies Relevant to CDRP and Variant.....	9-49
Table 9.10:	Summary of Land Use, Agricultural Resources, and Recreation Impacts	9-51
Table 9.11:	Summary of Vegetation and Wildlife Impacts	9-56
Table 9.12:	Summary of Fishery Resources Impacts	9-78
Table 9.13:	Summary of Impacts on Hydrology in Alameda Creek Watershed	9-87
Table 9.14:	Modeled Average Monthly Releases from Calaveras Reservoir to Calaveras Creek (cubic feet per second)	9-93
Table 9.15:	Existing and Estimated with-Proposed Project (CDRP Variant) Average Annual Flow in Calaveras Creek Downstream of Calaveras Dam	9-94
Table 9.16:	Estimated Average Monthly Flow in Alameda Creek Downstream of the ACDD (cubic feet per second)	9-100
Table 9.17:	Existing and Estimated with-Proposed Project (CDRP Variant) Average Annual Flow in Alameda Creek Downstream of the ACDD	9-101
Table 9.18:	Estimated Average Monthly Flow in Alameda Creek Downstream of Calaveras Creek Confluence (cubic feet per second).....	9-106
Table 9.19:	Existing and Estimated with-Proposed Project (CDRP Variant) Average Annual Flow in Alameda Creek Downstream of its Confluence with Calaveras Creek.....	9-107
Table 9.20:	Summary of Water Quality Impacts.....	9-111
Table 9.21:	Summary of Geology, Soils, and Seismicity Impacts	9-119
Table 9.22:	Summary of Hazards and Hazardous Materials Impacts.....	9-124
Table 9.23:	Summary of Cultural Resources Impacts	9-130

Table 9.24:	Summary of Visual Resources Impacts.....	9-134
Table 9.25:	Summary of Transportation and Circulation Impacts	9-139
Table 9.26:	Summary of Air Quality Impacts	9-144
Table 9.27	Comparison of Draft EIR Project and CDRP Variant Construction- Related Air Quality Impacts	9-145
Table 9.28:	Summary of Noise and Vibration Impacts	9-150
Table 9.29:	Summary of Utilities, Service Systems, and Public Services Impacts	9-156
Table 9.30:	Summary of Mineral and Energy Resources Impacts	9-159
Table 9.31:	Comparison of Compensation Acreages for the Draft EIR Project and the Variant.....	9-162
Table 9.32:	Summary of Impacts and Mitigation Measures for the Draft EIR Project and the CDRP Variant.....	9-181
Table 10.4.1	Proposed CDRP Variant Instream Flow Schedule in Alameda Creek Below the ACDD	10-70
Table 10.4.2	Summary of the Proposed CDRP Variant Instream Flow Schedules Below Calaveras Dam.....	10-70
Table 10.4.3	Ramping of Proposed Instream Flows Below Calaveras Dam	10-74
Table 11.1.15-1	East Bay Regional Park District Regional Preserves, Parks, and Recreational Areas in the Vicinity of Sunol Regional Wilderness	11.1.15-72
Table 11.2.4-1:	Locations of Responses to Comment O-ACA&CBD1-130a through f ...	11.2.4-85
Table 11.2.4-2:	Locations of Responses to Comment O-ACA&CBD1-131	11.2.4-86
Table 11.2.4-3:	Locations of Responses to Comment O-ACA&CBD1-132a through e ...	11.2.4-87
Table 11.2.4-4	Locations of Responses to Comment O-ACA&CBD1-133a through b ...	11.2.4-88
Table S.3:	Summary of Impacts and Mitigation Measures for the Draft EIR Project and the CDRP Variant (New).....	12-83
Table S.4	Summary of Mitigation Measures for the CDRP Variant (New).....	12-96
Table 4.8.1:	Summary of Geologic Units Near Calaveras Dam and Reservoir (Revised)	12-151
Table 4.13.5:	Summary of Modeled Worst-Case Construction-Related Criteria Air Pollutant, Ozone Precursor, and Greenhouse Gas Emissions (Revised).....	12-167
Table 4.13.6:	Summary of Potential Health Risk from Project Construction with Mitigation (Revised).....	12-170
Table 5.1:	Sensitive Biological Resources That Could Be Affected by Mitigation Activities (Revised).....	12-176

Appendix L

Comment Letters

Comment Letters – Agencies



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-4731

December 17, 2009

In response refer to:
T/SWR/2005/07436

Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, California 94103

Dear Mr. Wycko:

Thank you for the opportunity to comment on the October 6, 2009, Public Draft Environmental Impact Report (EIR) for the San Francisco Public Utilities Commission's (SFPUC) Calaveras Dam Replacement Project (CDRP). SFPUC has proposed construction of a new 210-foot high earth and rock dam immediately downstream of the existing Calaveras Dam on Calaveras Creek in the upper Alameda Creek watershed. The new dam will replace the old dam due to seismic safety issues and will be of equivalent height and storage capacity. In addition, the proposed CDRP includes physical modifications to SFPUC's Alameda Creek Diversion Dam (ACDD). The CDRP description included in the EIR proposes operational scenarios for both the new Calaveras Dam and ACDD. NOAA's National Marine Fisheries Service (NMFS) has identified several important measures and facilities for anadromous salmonids that should be incorporated into the CDRP and these items are outlined below.

Since 2005, NMFS staff has been working directly with SFPUC on the CDRP and other Water System Improvement Program projects. In response to SFPUC's Notice of Preparation of an EIR for the CDRP, NMFS provided comments to SFPUC by letter dated November, 30, 2005. To assist the U.S. Army Corps of Engineers (Corps) and SFPUC with planning the CDRP and its associated environmental reviews, NMFS offers the following recommendations to be incorporated into the CDRP at Calaveras Dam and ACDD:

Calaveras Dam: Construction of a new dam provides an opportunity to incorporate facilities and measures for anadromous and resident fish downstream of the dam, within the reservoir, and upstream of the dam. NMFS recommends the following for the new Calaveras Dam and Reservoir to be included in the CDRP:

- (1) **Fish Passage** - Establish a SFPUC, NMFS, and California Department of Fish and Game (CDFG) fish passage taskforce to evaluate the following:
 - i. Engineering evaluation and feasibility study for fish passage through the Calaveras Dam/ACDD tunnel to provide movement of adult and/or juvenile *O. mykiss* between Calaveras Reservoir and Upper Alameda Creek;



- ii. Engineering evaluation of volitional downstream migration facilities for juvenile and adults;
- iii. Engineering evaluation of non-volitional dam/reservoir fish collection facilities (upstream and downstream), adults, and juveniles;
- iv. Conduct a biological investigation of the current migration behavior and habitat use of *O. mykiss* in Arroyo Hondo and Calaveras Reservoir; and
- v. Conduct a biological investigation of potential predation impacts to *O. mykiss* by bass in Calaveras Reservoir.
- (2) **Operations of the New Calaveras Dam** - Until site-specific flow studies are completed follow the 1997 Memorandum of Understanding (MOU) between SFPUC and CDFG with one specific revision: **move the compliance point to the outlet works of Calaveras Dam.** The flows established by the MOU include:
- i. November 1 to January 14 – release 5-cubic-feet-per-second (cfs);
- ii. January 15 to March 15 – release 20 cfs; and
- iii. March 16 to October 31 – release 7 cfs.
- (3) **Recovery of Steelhead Viability** - Establish a SFPUC, NMFS, NMFS Southwest Fisheries Science Center, and CDFG steelhead translocation/reintroduction taskforce to evaluate the following:
- i. No later than June 30, 2013, complete an evaluation of the genetic viability of the wild *O. mykiss* population in Calaveras Reservoir/ Arroyo Hondo to determine its current status (we should include San Antonio); and
- ii. No later than June 30, 2013, complete an evaluation of the current status of *O. mykiss* and the suitability of habitat for translocation/reintroduction efforts in anadromous waters of Alameda Creek.
- Alameda Creek Diversion Dam: The diversion dam and tunnel at the ACDD were completed in 1931, and the facility was operated for 70+ years without bypass flows to protect downstream aquatic life in Alameda Creek. NMFS recommends the following measures and facilities to bring ACDD up to current fish protection standards:
- (1) Installation of a fish ladder/passage over ACDD that will provide upstream and downstream passage for adult and juvenile salmonids.
- (2) Installation of a fish screen at the intake of the diversion tunnel that meets CDFG/NMFS fish screen guidelines.¹
- (3) Until additional site-specific flow studies are completed, the CDFG/NMFS' June 17, 2002, water diversion guidelines² and the Physical Habitat Simulation Model (PHABSIM) of the Instream Flow Incremental Methodology conducted by Hagar Environmental Science and Thomas R. Payne & Associates (2008) provide the most

¹ <http://swr.nmfs.noaa.gov/hcd/fishscrn.pdf>

² http://swr.nmfs.noaa.gov/hcd/policies/water_diversion_guidelines.pdf

current and useful information in assessing the downstream bypass flow requirements for salmonids. Based on that information, NMFS recommends the following to be included in the CDRP:

- i. Seasonal limited on water diversions should be limited to the period between December 15 to March 31. This time period includes the highest winter flows and the time when water diversions will be least likely to adversely affect fish and aquatic habitat downstream;
- ii. Provide a minimum bypass flow of 60 cfs (Hagar 2008) for steelhead spawning habitat suitability; and
- iii. Limit the maximum rate of diversion to no greater than 100 cfs (or 10% of the 1.5 or 2 years recurrence interval) to maintain habitat forming flows and to allow for intermediate and high flow events to provide passage flows for steelhead to ascend through Little Yosemite.

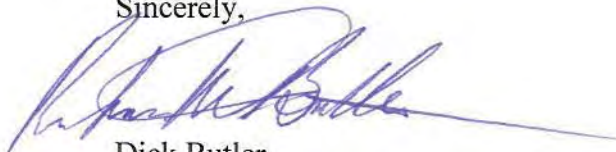
04 cont.

The operations and facilities included in the CDRP will significantly affect efforts to restore steelhead to the Alameda Creek watershed. Releases and bypass flows from the new Calaveras Dam and ACDD will be integral for the successful restoration of steelhead in the watershed because it will provide the habitat necessary for them to complete their life history. Additionally, sufficient bypass flows at ACDD for steelhead passage through Little Yosemite and a fish passage facility at ACDD will provide access to historical steelhead habitat that will significantly contribute to the spatial habitat diversity essential for the viability of the species.

05

My staff is available to assist with the development of information and environmental analyses regarding anadromous and resident salmonids for the CDRP's environmental documents. We will also continue to work with SFPUC on this project through the section 7 consultation process with the Corps. Please contact Josh Fuller of my staff at 707-575-6096 if you have questions concerning these comments.

Sincerely,



Dick Butler
Santa Rosa Area Office Supervisor
Protected Resources Division

cc: Chris Yates, NMFS, Long Beach, California
Greg Martinelli, CDFG, Yountville, California
Wesley Stokes, CDFG, Yountville, California
Xavier Fernandez, RWQCB, Oakland, California
Tim Rameriz, San Francisco Public Utilities Commission
Jill Blanchard, San Francisco Public Utilities Commission
Copy to file ARN# 151422SWR2005SR00796

Literature Cited

EDAW and SFPUC 2008. Assessment of relationship between stream flow and spawning habitat for rainbow trout and steelhead in Alameda Creek. Prepared by Hagar Environmental Science and Thomas R. Payne & Associates for EDAW & Turnstone Joint Venture and SFPUC. August 2008. Appendix A of Calaveras Dam Replacement Project Fisheries Technical Report 2008.

ARNOLD SCHWARZENEGGER
GOVERNOR

MATTHEW R. BETTENHAUSEN
SECRETARY



November 24, 2009

RECEIVED

NOV 25 2009

CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M E A

Mr. Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Ste 400
San Francisco, CA 94103

Re: Calaveras Dam Replacement Project

Dear Mr. Wycko,

The California Emergency Management Agency (Cal EMA) received Notice of the Calaveras Dam replacement. Pursuant §2576 of the Dam Inundation Mapping Regulations, Cal EMA is giving Notice that a dam failure inundation map prepared in accordance with the regulations will be required to be prepared and submitted to this office 60 days prior to the filling of the replacement dam.

01

Any questions or comments may be directed to Robert M. Mead, Senior Emergency Services Coordinator, at (916) 845-8174

Sincerely,

KEN WORMAN
State Hazard Mitigation Officer



State of California - The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Bay Delta Region
Post Office Box 47
Yountville, California 94599
(707) 944-5500
www.dfg.ca.gov

ARNOLD SCHWARZENEGGER, Governor
JOHN MCCAMMAN, Acting Director



December 21, 2009

Mr. Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1660 Mission Street, Suite 500
San Francisco, CA 94103-2414

Dear Mr. Wycko:

Subject: Calaveras Dam Replacement Project, SCH #2005102102, Draft Environmental Impact Report, Alameda County

Department of Fish and Game (DFG) staff has reviewed the draft Environmental Impact Report (DEIR) for the Calaveras Dam Replacement Project (CDRP; Project), proposed by the San Francisco Public Utilities Commission (SFPUC). The SFPUC proposes to construct a new dam to replace the existing Calaveras Dam. The replacement dam would be located immediately downstream at the foot of the existing dam, and would improve seismic safety in response to the Division of Safety of Dams (DSOD) restrictions. The main elements of the proposed Project include construction of a new dam to replace the existing Calaveras Dam; removal of the existing spillway and replacement with a new spillway and stilling basin; removal of the existing intake tower, and construction of a new intake tower and shaft; extension of the outlet pipe connecting to a relocated, fixed cone valve; new low-flow discharge valves; instrumentation; stabilization of the right abutment landslide; and construction of a bypass tunnel through the Alameda Creek Diversion Dam (ACDD). The Project includes numerous staging, borrow, and disposal areas, access roads, and changes in the operations of Calaveras Reservoir.

DFG, a Trustee Agency under the California Environmental Quality Act (CEQA), is responsible for the conservation, protection, and management of the State's biological resources. Pursuant to Fish and Game Code Section 1801, it is the policy of the State to encourage preservation, conservation, and maintenance of wildlife resources, including perpetuation of all species of wildlife for their intrinsic and ecological values. In addition, pursuant to Fish and Game Code Section 1802, DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. The purpose of DFG's comments is to provide guidance to SFPUC to ensure that, if the Project under the Water System Improvement Program (WSIP) is implemented, biological resources are protected.

Mr. Bill Wycko
 December 21, 2009
 Page 2

Potential environmental impacts from the proposed Project would result generally from three primary aspects of the Project: construction activity; restoration of the reservoir water level to pre-DSOD restriction levels, and future reservoir operations, in particular as they affect flows within Alameda Creek downstream of the Alameda Creek Diversion Dam, and Calaveras Creek below Calaveras Dam. We recognize the importance of the Project for contributing to a reliable source of clean water to the Bay Area, and support improving the seismic safety of the Calaveras Dam to protect humans as well as wildlife in the event of a catastrophic event. We also support the creation of jobs this Project will provide. However, we are concerned with many of the determinations and conclusions of the EIR and have the following comments to offer.

Trout in Alameda Creek

The area surrounding the Calaveras Dam is known to provide habitat for land-locked steelhead trout (*Oncorhynchus mykiss*). Steelhead is a species listed as "Threatened" under the Federal Endangered Species Act (FESA) and included as part of the California Central Coast Evolutionarily Significant Unit (CCC ESU) for steelhead. The land-locked trout population was not listed as threatened under FESA, but genetic and behavioral studies (Nielson 2003) have determined that the population of trout within Calaveras Reservoir watershed to be "land-locked steelhead." Currently, efforts are underway to improve fish access between the San Francisco Bay at a number of passage barriers including the BART weir, ACWD rubber dams and PG&E structure. We commend and thank the SFPUC for their contributions to these efforts, including the removal of the Niles and Sunol dams. The barriers to the Bay may become passable for land-locked steelhead in Alameda and Calaveras creeks within the next few years, even as soon as 2010, returning the anadromous run of steelhead back to these creeks.

Alternative 5, New Downstream Dam Without Provision For Potential Future Enlargement Alternative

The DEIR highlights substantial reductions in Project impacts from Alternative 5, which would benefit special-status and listed species. Impacts to fisheries and aquatic resources associated with sediment discharge and erosion would be reduced compared to the preferred alternative. Impacts to air quality, transportation and noise would be reduced. In addition, Alternative 5 would feasibly attain all Project objectives except future dam enlargement and appears to be the environmentally superior alternative. The DEIR declares building the dam with a larger core to accommodate future enlargement is a primary Project objective. Since it is considered a primary Project objective, a complete analysis on the impacts to biological resources should be included in the document from the impacts associated with projected enlargement. A discussion on the size of the future enlargement that is capable from the larger core design should be disclosed. A discussion on the level of water diversion from Alameda Creek, Calaveras Creek and the Arroyo Hondo that is needed to fill the larger design should also be included.

DFG is concerned that "future increases of the dam's surface water elevation could potentially extirpate the adfluvial population of steelhead trout as well as that of the Foothill yellow-legged frog. Raising the surface water elevation will likely also have serious impacts to the California red-legged frog, California tiger salamander, foothill yellow-legged frog,

western pond turtle, Alameda whipsnake, Callippe silverspot butterfly, and a number of other special-status plants and animals (DFG 2005, response to CDRP NOP).” We are also concerned raising the water level in the future will cause additional unforeseen impacts to the Alameda Creek watershed. From the information provided in the CDRP DEIR and because the SFPUC appears to have been able to meet water demands even with DSOD restrictions, we believe the watershed is already too impaired to consider such a proposal.

01 cont.

Environmental Settings and Impacts

Table 4.1.1 provides an overview of impacts from water supply impacts and mitigation measures in the WSIP PEIR. The table includes the Tuolumne River System, Peninsula Watersheds, and the Westside Groundwater Basin. While we may have comments on the adequacy of the mitigation measures for these topics, the following comments will be limited to the scope of the CDRP Project.

Previous DFG Recommendations

In our November 22, 2005 response to the Calaveras Dam Replacement Project Notice of Preparation (NOP) letter, DFG requested, as part of the environmental review process for the Project, that both interim and long-term operations of Calaveras Dam be addressed through the following:

1. A habitat-based stream assessment for Calaveras, Arroyo Hondo, and Alameda creeks, done at a seasonally appropriate time period that incorporates habitat and life history criteria of species which may be impacted by the Project. DFG made a specific recommendation that California red-legged frog (*Rana aurora draytonii*), a species Federally listed as “Threatened”; California tiger salamander (CTS) (*Ambystoma californiense*), a species Federally listed as “Threatened;” foothill yellow-legged frog (*Rana boylei*), a State and Federal Species of Special Concern; and western pond turtle (*Clemmys marmorata*) be included in the assessment.
2. A hydrologic study is conducted to determine the amount of water that is needed to support steelhead trout through critical reaches under various water year conditions within the reaches affected by the Project, specifically the reach of Alameda Creek from Alameda Creek Diversion Dam downstream to Alameda Creek’s confluence with Arroyo de la Laguna.
3. A specific proposal to provide minimum bypass flows for both Calaveras Dam and the Alameda Creek Diversion Dam for maintenance of habitat for fish and other aquatic species, taking into account current and projected water operation scenarios of the SFPUC’s regional water system. This proposal should also consider utilizing the SFPUC’s related water storage facilities within the Alameda Creek watershed (i.e., San Antonio Reservoir) to meet the needed minimum bypass flows in the affected reach of Alameda Creek and in particular passage flows needed through Sunol Valley.
4. An assessment of the impacts of Calaveras Dam and the Alameda Creek Diversion Dam on channel forming flows with a specific proposal to provide periodic channel maintenance and flushing flows that are representative of the natural hydrograph that existed before the original construction of Calaveras Dam.

02

5. An analysis of current and projected operational scenarios for Calaveras Reservoir and their impacts to the existing population of land-locked steelhead trout that utilize Calaveras Reservoir and Arroyo Hondo throughout various stage of the steelhead trout's life cycle. This study should include a plan to preserve the existing population of steelhead trout during interim operations (preconstruction) and post construction operations of Calaveras Dam. The concerns to be addressed included the following:
- a) Maintain fish passage between the reservoir and Arroyo Hondo by keeping reservoir water elevations as high as possible during the period when adult trout migrate upstream from the reservoir through the end of the downstream (adult and juvenile trout) migration season.
 - b) Maintain channel integrity (maintain active channel/minimize delta/maximize hydrological connectivity) of Arroyo Hondo.
 - c) Maintain physical carrying capacity for trout in Calaveras Reservoir during the summer and fall period by keeping water elevations as high as possible.
 - d) Maintain adequate water temperatures and dissolved oxygen for trout in the reservoir throughout the summer and fall periods. The concentration of dissolved oxygen in reservoirs is often the limiting factor for trout survival in San Francisco Bay Area reservoirs. DFG recommends targeting a specific dissolved oxygen concentration of 7 mg/L so as to minimize impacts to land-locked steelhead especially during times of lowered surface water elevation (current operations as per DSOD requirements).
 - e) Provide flow releases to the stream channel below Calaveras Reservoir dam to encourage riparian vegetation growth, invertebrate productivity, adequate dissolved oxygen, low water temperatures, and provide some rearing habitat for juvenile steelhead trout and spawning adult steelhead trout. The SFPUC, under the aforementioned 1997 MOU with DFG, agreed to specific flow releases to provide habitat for resident rainbow trout and other native fish species downstream of Calaveras Reservoir based on the knowledge of fish migration barriers being present in the lower downstream reaches of Alameda Creek. At this time, however, there is active fish passage remediation at these barriers. The SFPUC will need to assess adequate flows for anadromous steelhead trout and will need to renegotiate with DFG such that adequate flows are released to comply with Fish and Game Code 5937.
 - f) Eliminate or minimize the loss of adult and juvenile trout from Alameda Creek through the Alameda Creek Diversion Dam.
 - g) Determine how operation and interim operation of Calaveras Reservoir could alter the operation of San Antonio Reservoir and result in adverse conditions for the adfluvial trout population in San Antonio Reservoir. DFG recommends that impacts to fisheries upstream and downstream of San Antonio Reservoir be avoided as much as possible. If avoidance is not possible, impacts should be minimized and mitigated.
6. A mitigation plan that assesses the potential impacts of the SFPUC's proposal to rebuild Calaveras Dam with a wider core that would accommodate enlargement of the dam in the

02 cont.

future. The NOP states that although the "SFPUC does not reasonably foresee the need for a larger dam beyond one that restores the reservoir's historic capacity; the dam would be designed to allow potential future reuse of dam components without requiring otherwise more extensive dam removal and rebuilding if an enlargement were ever undertaken in the future." DFG recommends that the Calaveras Reservoir dam not be built to accommodate future size increases based on DFG's concern that future increases of the dam's surface water elevation could potentially extirpate the adfluvial population of steelhead trout as well as that of the foothill yellow-legged frogs. Raising the surface water elevation will likely also have serious impacts to the California red-legged frog, CTS, foothill yellow-legged frog, western pond turtle, Alameda whipsnake, Callippe silverspot butterfly, and a number of other special-status plants and animals.

7. A specific plan to screen as per DFG screening criteria at the new intake tower/adit(s) at Calaveras Reservoir and at the intake of the diversion at the Alameda Creek Diversion Dam so as to be in compliance with Fish and Game Code Section 6100.
8. A specific plan to provide fish passage at the new Calaveras Reservoir dam and the Alameda Creek Diversion Dam so as to be in compliance with Fish and Game Code Sections 5901.

The CDRP DEIR does not address the items above sufficiently for both interim and long-term operations of Calaveras Dam. An adequate habitat based biological and hydrologic assessment that incorporates the life history and habitat needs of the species that may be affected by the Project is not provided in the CDRP DEIR. The analysis provided in the DEIR does not sufficiently address the level of watershed impairment from baseline and proposed Project conditions.

Although SFPUC signed a Memorandum of Understanding (MOU) with DFG in 1997, as of today's date, SFPUC has not released flows from Calaveras Dam in compliance with the 1997 MOU. While the CDRP repeatedly references the 1997 MOU as an improvement from baseline conditions, improvements from CEQA baseline conditions do not necessitate compliance with Fish and Game Code 5937. The 1997 MOU should not be referred to for a number of reasons. Since the 1997 MOU has not been implemented, the adequacy of the flow schedule for providing water to biological resources is unconfirmed. Since the 1997 MOU does not include steelhead, it does not completely address the potential impacts to biological resources. A recapture facility proposal is included in the 1997 MOU but is only briefly addressed as a potential cumulative impact in the CDRP DEIR. The compliance point in the 1997 MOU is a location below the confluence of Alameda and Calaveras creeks. Minimum bypass flow requirements of one creek cannot be substituted for another and should not be accepted as the least environmental damaging practicable alternative. Minimum bypass flows at each structure must be assessed independently to comply with Fish and Game Code 5937.

To meet minimum bypass flow requirements, DFG requires a site-specific study be completed prior to issuing a Lake and Streambed Alteration Agreement consistent with our comments outlined in our November 22, 2005 letter. In addition to the issues discussed

02 cont.

03

04

Mr. Bill Wycko
December 21, 2009
Page 6

above, the study should identify a plan to monitor compliance, the effectiveness of the stipulated flows, and procedures for making subsequent modifications, if necessary.

04 cont.

Project Description

3.6.6 Steelhead Flow Releases

We have addressed steelhead in greater detail in our comments below, but in summary: (1) The proposed steelhead flow release schedule shown in Table 3.7, is not supported by sufficient hydrologic or biologic data to confirm the adequacy of the proposal; (2) The proposal addresses spawning and rearing habitat but does not address all life history needs of steelhead, including adult and juvenile migration; (3) It relies on a determination by the National Marine Fisheries Service (NMFS) that steelhead have returned to the watershed from the ocean before implementation, which may prevent the recovery of the species.

05

Fisheries and Aquatic Habitat

Impact 4.5.2: Construction-related Permanent Loss of Fish Habitat in Calaveras Creek Downstream of the Existing Dam

Since the specific section of Calaveras Creek within the replacement dam footprint "was not surveyed to determine fish species present, (pg 4.5-56 DEIR)," it is speculative to make the determination that trout are not present. Historically, trout and steelhead in this reach of Calaveras Creek were present (Leidy et al. 2005). Since "under existing conditions, no flow is released from Calaveras Dam to Calaveras Creek except during infrequent cone valve releases, which have generally occurred during brief periods in the winter and spring (pg 4.5-72 DEIR)," sufficient water is not allowed to pass the dam to keep fish in good condition. Provided sufficient water is released from Calaveras Reservoir, DFG would likely consider this reach of Calaveras Creek high quality aquatic habitat for fish and other wildlife.

06

Impact 4.5.3: Effect of Project on Creating Barriers to Fish Movement/Migration Upstream in Calaveras and Alameda Creek

At Calaveras Dam, fish will have 945 linear feet less aquatic habitat available; therefore, we consider this a significant impact to fish movement/migration. With regard to the ACDD, since DSOD-restrictions were put in place, reduced diversions at the ACDD have resulted in more flow being passed over the ACDD. This additional flow could be sufficient to provide land-locked steelhead access past the natural barrier commonly referred to as Little Yosemite.

07

Without including provisions for fish passage at the ACDD and Calaveras Dam, the proposed Project will continue to be out of compliance with Fish and Game Code 5901. Section 5901 states that, "Except as otherwise provided in this code, it is unlawful to construct or maintain in any stream in Districts 1, 1-1/2, 2, 2-1/2, 2-3/4, 3, 4, 4-1/2, 23, and 25, any device or contrivance which prevents, impedes, or tends to prevent or impede, the passing of fish up and down stream." Section 5901 covers Alameda and Santa Clara counties, District 3. Without including fish passage at these structures, the least environmentally damaging alternative is not included in the CEQA document.

08

09

Mr. Bill Wycko
December 21, 2009
Page 7

According to the Feasibility of Fish Passage at Alameda Creek Diversion Dam Technical Report (June 2009), prepared for SFPUC, a fish ladder combined with installation of screens at the diversion tunnel is a technologically feasible option for providing passage for steelhead at ACDD. A trap and haul option is presented as feasible provided the natural feature known as Little Yosemite is demonstrated to be a fish passage barrier. We do not support a trap and haul option since it does not provide voluntary movement of fish and is subject to ongoing institutional commitment. Considering the information provided in the DEIR that a large amount of suitable steelhead habitat is available above Little Yosemite, we are interested in the concept of improving fish access past Little Yosemite through higher flows, a land modification, and/or structural modification so the potential for passage is increased.

09 cont.

Effects on Native Fish in Alameda Creek from the ACDD Downstream to the Confluence with Calaveras Creek

Channel-Forming Flows; Sediment Sluicing; Redd Scour and Erosion; Fish Entrainment at the Diversion Tunnel

We are pleased SFPUC has made a commitment to responsible natural resources management that maintains the integrity of the natural resources, restores habitat for native species, and enhances ecosystem function. However, the CDRP proposed operations is not consistent with SFPUC's Watershed Enterprise Environmental Stewardship Policy. In particular, the proposed operations of the water system is not in a manner that mimics the variation of the seasonal hydrology of corresponding watersheds in order to sustain the aquatic and riparian ecosystems upon which native fish and wildlife species depend. The proposed operations will not restore habitat, especially for listed native species, and will not enhance ecosystem function, especially to sensitive habitat types.

10

From the DEIR: Modeling of future operations indicates that diversions at the ACDD would primarily occur during the October through April rainy season, and the greatest diverted/reduced streamflow quantities would occur from December through March in normal and above-normal years and January of wet years (pg 4.5-61 DEIR). DFG recommends that the diversion season of both the ACDD and Calaveras Dam be limited to the period of December 15 to March 31 and that all natural flow outside of this diversion season shall be bypassed.

Impact 4.6.10: *Effects on Channel Formation and Sediment Transport Along Alameda Creek Downstream of the ACDD to the Calaveras Creek Confluence*

Impact 4.6.11: *Effects on Channel Formation and Sediment Transport Along Alameda Creek Downstream of the Calaveras Confluence*

The ACDD sluice gate is proposed to be operated as under existing conditions. Approximately 900 cubic yards of bed material is released during the sluicing operation. By altering the timing, frequency and magnitude of flows in Alameda Creek below the ACDD, coupled with sluicing approximately 900 cubic yards of bed material, without conducting a complete biological and hydrologic study, it is optimistic and speculative to make a prediction that fish habitat will be improved. We are concerned that fish habitat will not be improved but will be degraded by the proposed Project and that steelhead and other fish

numbers will decline due to an increased alteration of the natural hydrology as referenced above (CDRP DEIR, EJTV 2008; Sak, pers. com., 2008). We are also concerned the sluicing operations at the ACDD will cause mortality to fish and other wildlife by smothering redds and degrading water quality.

Section 4.5 and/or Section 4.6 do not sufficiently evaluate effects of channel forming flows on biological resources. Important considerations should include channel shape/form (cross sections, widths, depths, slopes, planform), aggradation/degradation, bank stability, lateral/horizontal stability, erosion, and sediment load with special attention to biotic and abiotic factors of aquatic/riparian ecology. Stream geomorphology, including the shape, profile, plan view, and structural elements, strongly influences the hydraulic characteristics of streams (Rosgen 1994, Ziemer and Lisle 1998, Fukushima 2001), which determines the distribution, abundance and habitat for fish (Beschta and Platts 1986, Bisson et al. 1987, Sullivan et al. 1987, Naiman 1998). The particle sizes and distributions of bed material influence channel characteristics, bedload transport, food supplies for fish, spawning conditions, cover, and rearing habitat. Riparian vegetation helps stabilize channel banks and contributes in various ways to fish productivity (Beschta and Platts 1986). We are particularly concerned with the current and historic practice of sluicing at the ACDD. While we support the concept of maintaining material transport, the process of sluicing 900 cubic yards of sediment during one event needs to be examined further. One of the largest capacity dump trucks on the market today is the Super 18 (Desert Trucking), which has a capacity of 20-22 cubic yards or around 25.5 tons. Thus, the current operation of ACDD is similar to 45 extra large dump trucks unloading consecutively in Alameda Creek. The impacts to listed species from such operations have a very high potential to be significant. The DEIR should include information addressing the flows used in the past to sluice at ACDD and the amount of time it took to move 900 cubic yards of bed material as supporting evidence for impact conclusions. The DEIR should also discuss the size and composition of the material sluiced at ACDD.

The DEIR uses different CEQA baseline time intervals for channel forming flows in sections 4.5 and 4.6. In Section 4.5, Fisheries and Aquatic Habitat, under impact 4.5.5, a brief discussion on channel forming flows is provided. The discussion asserts that the baseline period of DSOD-regulated operations and associated variable operation of full diversions with no bypasses is likely too short and too variable to have had a changed effect on channel form. The following statements are from the Streamflow and Alameda Creek Geomorphology Section in the DEIR: High flows have the ability to transport immense amounts of sediment, large-sized material in the bed load, and large woody debris. The effect on channel form in such events (episodic) can be dramatic, including rapid bank and bed erosion in some areas and sedimentation elsewhere. These episodic storm events play an important role in shaping the channel morphology of Alameda Creek, notably in the steeper watershed (pg 4.6-44 DEIR). According to Figure 4.6.5, the ACDD is in a steeper part of the watershed.

The information provided in the DEIR contradicts the effect determination that a substantial change to sediment transport and channel-forming flows are not expected since flows will be reduced in above-normal and normal water years, and peak flows substantially reduced

10 cont.

in drier years. The proposed Project will substantially alter streamflows in Alameda Creek downstream of the ACDD such that they will be outside the range of pre-Project conditions and have the potential to result in substantial hydrologic changes. This is particularly relevant when comparing periodic operations at the ACDD during the DSOD-restricted baseline period.

10 cont.

Mitigation Measures 5.5.5a and 5.5.5b

The SFPUC fishery biologists (CDRP DEIR, EJTV 2008; Sak, pers. com., 2008) have indicated trout numbers are already low, so monitoring will do nothing to mitigate effects to biological resources from increased diversions at the ACDD. We have reason to believe anadromous steelhead will be present in the watershed well before the ten-year monitoring period is complete. Since the mitigation measure does not include steelhead, it does not sufficiently address conditions in the reasonably foreseeable future. We believe the impact is avoidable by implementing suitable bypass flows and fish passage in compliance with Fish and Game Code sections 5937 and 5901.

Diversions and Bypass Flows

In our November 22, 2005 response to the Calaveras Dam Replacement Project Notice of Preparation (NOP) letter, we provided comments requesting the CDRP DEIR include an assessment of the bypass flow requirements for steelhead in Alameda and Calaveras creeks. The ETJV 2008 study referenced in the CDRP DEIR addresses the spawning phase of resident rainbow trout, but a complete assessment including the entire life history of resident trout and anadromous steelhead, is needed to address the relationship between streamflow and impacts to biological resources from water diversions. Immigration and emigration of adult and juvenile trout/steelhead must be included in the assessment to encompass life history criteria. Critical riffles, as well as suitable attraction flows to initiate migration, need to be addressed.

11

While it is important to consider diversions in the winter months, the analysis is inadequate without including other times of the year, especially spring and early summer months. Diversions during spring and early summer months have a high potential to significantly impact trout/steelhead and other biological resources. Specific concerns during this time of the year include significant impacts to trout/steelhead adult and juvenile out-migration and impairment to fish access to required aquatic habitat necessary for survival.

Effects of Entrainment on Fish Populations Downstream and Upstream of the ACDD:

According to the DEIR, under existing conditions, resident rainbow trout are most abundant in Alameda Creek upstream of the ACDD. An unknown number of these trout are washed over the ACDD and/or entrained in the diversion tunnel to Calaveras Reservoir. Once entrained, fish are conveyed through the approximate 1.5-mile tunnel and drop approximately 35 feet over the concrete tunnel spillway outlet structures (pg 4.5-66, 4.5-67 DEIR). Thus, survival probability of entrained fish is estimated to be low (pg 4.5-68 DEIR). A fish screen is necessary to prevent fish and amphibians from entering the tunnel and being impacted by the drop onto the outlet structure. It will also prevent future steelhead from being entrained behind the Calaveras Dam as they are transported through the tunnel.

12

Since electrical or sound fish barriers, as proposed, are unproven in preventing fish or amphibians from entering the ACDD at higher flows, DFG recommends a physical barrier, such as a screen, designed to comply with the NMFS/DFG guidelines.

The DEIR states limited rearing habitat has likely kept the trout population extremely low in reaches downstream of the ACDD. Thus, under existing conditions, the trout population upstream of the ACDD has limited value as a "source population." A habitat-based stream assessment should include an assessment of the amount of available rearing habitat downstream of the ACDD under various conditions to help determine the value of trout upstream of the ACDD as a "source population." It is likely that rearing habitat has been limited due to reduced flows by diversion through the ACDD facility. Thus, with adequate bypass flows, the land-locked steelhead would have very high value as a "source population" once aquatic habitat below ACDD and Calaveras Reservoir improve with the increased flows.

No supporting data is provided to substantiate the statement that the ACDD is not having a substantial adverse impact on fish populations. We also anticipate that a return to pre-DSOD operations compared to baseline operations would have a significant effect to individual fish and the "source population" above ACDD.

Effects on Native Fish in Calaveras Creek Below Calaveras Dam and in Alameda Creek Downstream of the Confluence with Calaveras Creek in the Primary Study Area

The DEIR refers to the results of recent surveys conducted by SFPUC in Calaveras and Alameda creeks (Table 4.5.3, ETJV 2008). The assessment is interpreted such that existing hydrologic conditions "appear" to sustain aquatic habitat in a manner that supports a native fish community, which includes resident rainbow trout, in good condition. From Table 4.5.3, only 0.1% of fish sampled in reach A-2 were trout, and 0% in reach C-1 were trout. A total of 0.1% relative abundance is not an indication of good health for trout.

Upon further examination of Table 4.5.3, it becomes apparent that over 75% of the fish sampled were roach. California roach (*Lavinia symmetricus*) prefer relatively warm water temperatures and the disproportionately high numbers of this species is an indication of low fish diversity. The DEIR does not provide sufficient supporting evidence that the existing hydrologic conditions are sufficient to support a native fish community.

Impacts During Construction Period Operations

There would be two shutdowns of the outlet works during construction (mid-April to mid-November in 2011 and 2012 or 2012 and 2013) to allow excavation of the dam foundation and extension of the outlet conduit, and to connect the new intake shaft to the outlet conduit. Minimum bypass flows would need to be maintained below the dam to ensure additional impacts are not occurring due to low or no flow.

Impacts During Filling and Normal Restored Storage Operations

Modeled flow data in Alameda Creek is presented in terms of monthly average flow within year type (wet, above-normal, dry) and a statement is made that the net flow in Alameda Creek would not change appreciably on an average annual basis (pg 4.4-82 DEIR). The

12 cont.

13

14

15

Mr. Bill Wycko
December 21, 2009
Page 11

hydrologic conditions in Alameda and Calaveras creeks are “flashy” and are known for their sudden changes in flow. Fish and other wildlife have adapted to these conditions. Thus, monthly average and average annual flow data are not adequate for identifying suitable minimum bypass flows that mimic the natural hydrology of the watershed or for making effects determinations for biological resources. Trout/steelhead migrate and spawn when conditions are suitable even if only available during a brief window of opportunity. Thus, flows should be evaluated using at minimum a daily time scale to have more biologically meaningful data. Trout/steelhead need sufficient streamflow during a large enough window of time to pass the obstacles which block them from completing their life cycle (see Sullivan et al. 1987). Therefore, sufficient flows to pass adults and juveniles over critical riffles should be provided.

15 cont.

The DEIR includes a brief discussion of cone valve operations with respect to native fish and amphibians. Topics include a brief discussion of rapid or sudden increases/decreases in flow releases, potential stranding of rainbow trout juvenile during rearing periods, scour, dewatering and/or washout of redds, exposure to predators and water quality. We request this section include a more complete analysis that examines all life history phases of trout and steelhead, foothill yellow-legged frog (FYLF) and California red-legged frog (CRLF). Also, at this time, we are not confident the two new low-flow valves capable of releasing 0.5 to 35 cfs will be able to provide the minimum bypass flows needed to mimic the natural hydrograph and to support fish in “good health,” based on the analysis provided.

16

In summary, the proposed operations of ACDD and Calaveras Dam do not mimic the natural hydrology of Calaveras or Alameda Creek. Sufficient scientific biological and hydrological analyses were not conducted to address the impacts to biological resources and adequate analysis and disclosure was not provided for impacts due to cone valve operations. The impacts to selected fish species were briefly assessed but steelhead were not included and amphibians were not addressed sufficiently.

17

Effects of Project Operations on Fish Habitat in Calaveras Reservoir and in Streams Upstream of the Replacement Dam

The DEIR indicates there are no data that confirm the lack of hydraulic connectivity has affected or would significantly affect trout or other fish populations in either the reservoir or Arroyo Hondo. This statement is particularly concerning since there is data to confirm a lack of hydraulic connectivity between Calaveras Reservoir and the Arroyo Hondo that does significantly affect trout/steelhead. We are aware SFPUC staff has such data. In a letter dated November 22, 2005, DFG provided the following comments to the Calaveras Dam Replacement Project NOP:

18

DFG's concerns about the potential fish passage problems associated with the lowering of the surface water elevation were corroborated during a field site visit made by SFPUC, the National Marine Fisheries Service (NOAA Fisheries), and DFG staff on August 17, 2004. During the creek assessment, DFG staff observed that lowering of the surface water elevation had resulted in a significant lack of hydrological connection (approximately 1.5-mile dry zone) between Arroyo Hondo and Calaveras Reservoir and that there were numerous adult-sized steelhead trout residing in the upstream perennial pools.

Mr. Bill Wycko
December 21, 2009
Page 12

Another letter was sent to Mr. Josh Milstein concerning fish passage for the adfluvial trout population due to lowering of the surface water elevation at Calaveras Reservoir dated October 14, 2004 concerning the August 17, 2004 observations:

During the creek assessment, DFG staff observed that lowering of the surface water elevation had resulted in a significant lack of hydrological connection between Arroyo Hondo and Calaveras Reservoir...DFG is concerned that the lack of hydrological connection and lack of a low flow channel in Arroyo Hondo is likely significantly impacting the steelhead trout population by limiting access to and from the reservoir from Arroyo Hondo.

In a letter dated January 11, 2008, DFG provided comments to the Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead Trout (December 2007), Alameda County:

In July 2007, DFG staff worked with SFPUC staff to relocate adult steelhead that were trapped and dying in pools of Arroyo Hondo, unable to migrate back to Calaveras Reservoir (DFG letter dated July 6, 2007).

In a letter dated July 18, 2008, DFG provided a Letter of Permission (LOP) to Mr. Brian Sak, Supervising SFPUC Fishery Biologist, to conduct adult steelhead rescues at Arroyo Hondo due to a lack of hydrologic connectivity. In an email communication between DFG and SFPUC (October 30, 2009), it was confirmed that on July 28, 2008, nine fish were relocated by SFPUC fishery biologists. Of those nine fish, there was one mortality upon release into the reservoir. Snorkel observations indicated approximately ten fish were left behind and not successfully captured.

Due to the overall evidence that fish populations may be impacted by this lack of hydrologic connection, we recommend the impacts be disclosed and avoidance, minimization, and mitigation measures be reevaluated.

Effects of Project Operations on Native Fish in Alameda Creek in the Extended Study Area

Structures including the BART weir, PG&E gas pipeline drop structure, and a series of inflatable dams are mentioned. The features are described as preventing fish migration and impairing other habitat functions and would be expected to continue to do so for an undefined time. The statement that fish migration will be prevented for an undefined time is misleading. According to a letter dated July 15, 2009 from the Alameda Creek Alliance, comments on the Draft Biological Assessment for the Calaveras Dam Replacement Project are:

On July 31, 2007, the Alameda County Flood Control and Water Conservation District and the Alameda County Water District signed a Memorandum of Understanding (MOU) for an agreement to develop a preliminary design of a fish passage facility in the Alameda Creek flood control channel. The MOU states the goal of these agencies to "have the Fish Passage Facility constructed by the end of calendar year 2010," before construction of Calaveras Dam begins. This facility will provide fish passage for anadromous fish past the

18 cont.

19

BART weir and the middle ACWD rubber dam, the primary barriers to steelhead migration up lower Alameda Creek. The lower ACWD rubber dam is being removed this summer. The ACWD operates the upper ACWD rubber dam to have the dam deflated during winter storm events, which will allow some anadromous fish to bypass the dam and migrate into Niles Canyon during some winter flows once the BART weir is laddered. The next significant fish passage barriers on Alameda Creek are the USGS gaging station weir in lower Niles Canyon, owned by the SFPUC and likely not a barrier to fish migration at higher flows, and a PG&E gas pipeline crossing in the Sunol Valley. The DPEIR for the SFPUC's WSIP (Table 5.7-13) states that the PG&E gas pipeline crossing fish passage project is scheduled for completion by 2009.

19 cont.

Therefore, a time has been identified for fish passage remediation at the BART weir, PG&E gas pipeline, and series of inflatable dams. A discussion of this information should be incorporated in the CDRP EIR. Although anadromous steelhead were not in Alameda Creek in 2005, land-locked steelhead were, and it appears the anadromous form of the species will be present before the CDRP is implemented. As such, the DEIR should include anadromous steelhead in the impact analysis.

Hydrology

Construction of the Replacement Dam Would Temporarily Change Flow Rates in Calaveras and Alameda Creeks Downstream of Calaveras Dam

The Impact Conclusion in the DEIR should quantitatively identify what is defined as within the range of past operations. A historic baseline should not be applied to the impact assessment for changes in flow rates in Calaveras and Alameda creeks downstream of Calaveras Dam without including the same level of analysis for Impact 4.5.6: Effects on native fish in Calaveras Creek below Calaveras Dam and in Alameda Creek downstream of the confluence with Calaveras Creek in the primary study area, since the two sections address the same action.

20

Hetch Hetchy/Local Simulation Model and 15-Minute Interval Model

According to the DEIR, the Hetch Hetchy/Local Simulation Model (HH/LSM) includes actual, measured historical information about the hydrology that occurred in each month over the 82-year record. We request clarification about the source of information used. According to the DEIR (pg 4.6-60), the HH/LSM simulates system operations over the course of an 82-year sequential hydrologic period but does not necessarily precisely depict the past, historical operations of the system. We request clarification for the assumptions used in the model.

21

From Appendix D4, a model was used with 15-minute interval data to create hydrographs for operations of the ACDD. The model that was developed routed inflows to either the stream or through the diversions tunnel based on assumptions from operations and capacity constraints. We request clarification for the assumptions for used in this model.

Effect of CDRP on Wetlands and Other Aquatic Habitats

Impacts of Construction

Mitigation Measure 5.4.2, Habitat Restoration Measures, requires SFPUC to restore temporarily impacted wetland, stream, pond, and riparian habitats located above the 756-foot inundation elevation within 3 years of completion of construction. The document should disclose the need to wait 3 years to restore temporary impacts and any additional long-term impacts this may cause.

22

Impacts of Operation

The DEIR indicates the change in flows would have no expected net effect on the riparian woodland communities. Changes to streamflows are known to have effects on riparian woodland communities (Gillies 1998). The concept that a reduction in flows during winter and spring in relation to stand regeneration for willow and alder riparian forest would be offset by increased summer flows, that conversion of existing riparian habitats (such as sycamore alluvial woodland and valley oak woodland, to alder- and willow-dominated) would be minimal, and the claim that channel incision is not expected to be an important factor because of the large cobble content of the substrate is speculative with insufficient supporting evidence. Since channel incision is often the result of impaired material transport and Calaveras Reservoir impairs material transport, channel incision is expected to be an important factor, especially when coupled with grazing impacts.

23

Impact Conclusions

Impacts from inundation of the Arroyo Hondo is proposed to be offset by improvements to the functions and services of more than 16,000 feet of Alameda Creek downstream of the ACDD as a result of implementing minimum bypass flows proposed by the CDRP. The bypass flows are part of the Project and will be a requirement to be in compliance of Fish and Game Code Section 5937. Therefore, they are not appropriate as mitigation to offset the impacts to Arroyo Hondo.

24

Calaveras Creek Downstream of the Dam

Sufficient evidence is not provided to support the speculative statement that flow released at Calaveras Dam would have less benefit for CRLF than flows bypassed from the ACDD (pg 4.4-87 DEIR), and Figure 4.4.6 provides contradicting evidence. Impacts to CRLF from cone valve releases are briefly discussed but are not sufficiently assessed in the DEIR. DFG is aware of ongoing monitoring of FYLF and CRLF in the Alameda Creek watershed by East Bay Regional Parks District (Bobzein and Didonato 2007) and other researchers (Kupferberg et al. 2006), (also see: Kupferberg 1996 and 1997). These monitoring programs are studying FYLF, a species known to be very sensitive to ambient stream conditions, as well as the responses to temperature and flow regimes in Alameda Creek. Stream temperature is known to affect the timing of egg deposition by the adults as well as the duration of egg and tadpole development. Flow regimes and ramping rates are therefore critical in providing suitable habitat for egg placement and ensuring that eggs are less likely to be washed away (i.e., in storm events or from high bypass flow ramping rates) or left to desiccate during receding streamflows. DFG recommends the DEIR include data

25

collection/analysis and review of existing literature. We further recommend that this document more completely address temperature, flow, and ramping rates and their potential impacts on these important and significant amphibian populations.

25 cont.

Alameda Creek Downstream of ACDD to Calaveras Creek Confluence

The DEIR does not include sufficient evidence to support the statement: "Flow release schedules specified in the MOU are intended to support resident rainbow trout, but the resulting flows would also support California red-legged frog and other amphibians," pg 4.4-89. The life history and specific habitat requirements for these species are different. Since "minimum flows would provide less water than under baseline years without diversion," we are concerned sufficient flow would not be available to sustain breeding or rearing habitat. We are also concerned that without screens, the ACDD tunnel will cause entrainment to CRLF and FYLF.

26

27

Effect of CDRP on California Tiger Salamander

Table 4.4.4 identifies areas within 0.7 miles from suitable habitat as considered potentially suitable for California tiger salamander (CTS). "According to interim guidance provided by CDFG and USFWS, habitat assessments and field surveys for the California tiger salamander should consider upland and aquatic habitats within 1.24 miles (2km) of potentially suitable breeding habitat (USFWS and CDFG,2003)," (SFPUC San Joaquin Pipeline System Project EIR Comments and Responses, SCH No. 2007032138, May 21, 2009). Therefore, the upland estivation habitat should be calculated using 1.24 miles from accessible breeding ponds and the appropriate mitigation shall be based on those calculations.

28

Table 4.4.12 indicates temporary construction would affect CTS habitat for year 1 to year 4. The DEIR should indicate how much and the locations of CTS habitat to be affected for more than one year or one breeding cycle. Although impacts to CTS habitat may be temporary, any take of CTS requires a California Endangered Species Act (CESA) permit and full mitigation.

Effect of CDRP on Alameda Whipsnake

Table 4.4.13 indicates temporary construction would affect Alameda whipsnake (AWS) for year 1 to year 4. The DEIR should indicate how much and the locations of AWS habitat to be affected. Although impacts to AWS habitat may be temporary, any take of AWS requires a CESA permit and full mitigation.

29

Vegetation and Wildlife

5.4.3a Compensation Goals and Objectives

Compensation for impacts to all habitat types and species should be in place prior to the beginning of construction to minimize temporal impacts. We request clarification if the proposed goals and objectives provide flexibility to wait up to five or ten years to begin compensation efforts, or if that is the amount of time expected to meet success criteria. If the proposal is to wait up to five or ten years before beginning compensation efforts, (depending on the habitat type) the measures should be revised.

30

5.4.3b-I

Compensation for impacts from the CDRP must include a DFG-approved conservation easement protecting the site in perpetuity; a DFG-approved management plan; and an endowment which provides for management of the site in perpetuity.

31

Cumulative Impacts

6.2.3.3 *Fisheries and Aquatic Habitat*

Construction Impacts

A means to provide water to Calaveras and Alameda creeks during construction should be included in the DEIR. One way water could be provided to Calaveras Creek below the dam is by running a large screened hose or pipe from the reservoir into the creek and creating a siphon.

32

Minimum bypass flows at the ACDD can be met prior to the construction of the proposed ACDD bypass facility. The diversions at the ACDD can be reduced or not conducted such that the minimum bypass flow requirement is met. Therefore, it would be feasible to provide sufficient steelhead flow releases before construction is complete.

33

Operational Impacts

The DEIR outlines a number of uncertainties regarding suitable flow releases for steelhead. A hydrologic study can be conducted to determine the amount of water that is needed to support steelhead trout through critical reaches under various water year conditions within the reaches affected by the Project, specifically the reach of Alameda Creek from Alameda Creek Diversion Dam downstream to Alameda Creek's confluence with Arroyo de la Laguna. Results of such a study should be included in the CDRP EIR to determine the appropriate bypass flows.

34

Water Quality

The DEIR indicates that between 1987 and 2005, SFPUC dosed Calaveras Reservoir with 174,050 pounds (approximately 87 tons) of copper sulfate to control algae. According to the DEIR, SFPUC may continue to use copper-based herbicides to control algal blooms in the future. We recommend SFPUC continue pursuing less toxic alternative measures to control algal blooms and avoid using copper-based herbicides. Since aqueous copper is known to be highly toxic to aquatic organisms (Eisler 1998; Baldwin et al. 2003), we are concerned the use of copper-sulfate in Calaveras Reservoir will have unintended impacts to special-status and listed species below the dam. At a minimum, if copper-based herbicides are proposed to be continued, an analysis should be included in the DEIR on the potential impacts to listed species and sensitive habitat types. Careful consideration should be given to application timing with regards to species life history and habitat needs.

35

For any activity that will divert or obstruct the natural flow of, or change or use any material from the bed, channel, or bank (which may include associated riparian resources) of any river, stream, or lake, DFG may require a Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. The CEQA document should fully identify the potential impacts to the stream or riparian

36



Mr. Bill Wycko
December 21, 2009
Page 17

resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. A Notification Package for Lake and Streambed Alteration Agreements and Section 1600 et seq. of the Fish and Game Code can be obtained at <http://www.dfg.ca.gov/habcon/1600/> or by contacting the Regional Office at (707) 944-5520.

36 cont.

We appreciate your consideration of our comments and look forward to working with you to address the issues. If you have any questions, please contact Mr. Wes Stokes, Environmental Scientist, at (707) 944-5571 or wstokes@dfg.ca.gov; or Mr. Greg Martinelli, Water Conservation Supervisor, at (707) 944-5570.

Sincerely,



Charles Armor
Regional Manager
Bay Delta Region

cc: State Clearinghouse

Mr. Tim Ramirez – tramirez@sfgwater.org
Ms. Jill Blanchard – jblanchard@sfgwater.org
Mr. Greg Lyman – GLyman@sfgwater.org
Ms. Cheryl Davis – CLDavis@sfgwater.org
San Francisco Public Utilities Commission

Mr. Gary Stern – gary.stern@noaa.gov
Mr. Josh Fuller – Joshua.Fuller@noaa.gov
NOAA Fisheries

Mr. Robert Smith – robert.f.smith@usace.army.mil
U.S. Army Corps of Engineers

Mr. Ryan Olah – ryan_olah@fws.gov
Ms. Angela Picco – Angela_Picco@fws.gov
U.S. Fish and Wildlife Service

Mr. Xavier Fernandez – xafernandez@waterboards.ca.gov
San Francisco Regional Water Quality Control Board

Ms. Melissa Scianni – Scianni.Melissa@epamail.epa.gov
U.S. Environmental Protection Agency

LITERATURE CITED

- Bobzien, S. and Didonato, J. 2007. The Status of the California Tiger Salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), foothill yellow-legged frog (*Rana boylei*), and other aquatic herpetofauna in the East Bay Regional Park District, California. East Bay Regional Parks District 2007.
- Kupferberg, S., Lind, A., Mount, J., and Yarnell, S. 2006. Pulsed flow effects on the Foothill Yellow-Legged Frog (*Rana boylei*): Integration of empirical, experimental and hydrodynamic modeling approaches. First Year Interim Report. California Energy Commission, PIER. Publication number TBD.
- Baldwin, D.H., J.F. Sandahl, J.S. Labenia, and N.L. Scholz. 2003. Sublethal Effects of Copper on Coho Salmon: Impacts on Nonoverlapping Receptor Pathways in the Peripheral Olfactory Nervous System. Environmental Toxicology and Chemistry, Vol. 22:10.
- Beschta, R.L. and W.S. Platts. 1986. Morphological features of small streams: significance and function. Water Resources Bulletin. 22(3):369-379.
- Bisson, P.A., R.E. Bilby, M.D. Bryant, C.A. Dolloff, G.B. Grett, R.A. House, M.L. Murphy, K.V. Koski and J.R. Sedell. 1987. Large woody debris in forested streams in the Pacific Northwest: past, present and future. Pages 143-190 In: E.O. Salo and T.W. Cundy (eds.). Streamside management: forestry and fishery interactions. Contribution No. 57. College of Forest Resources. University of Washington. Seattle.
- Desert Trucking, P.O. Box 32683 Tucson, AZ 857561;
<http://www.deserttrucking.com/rental.html>, accessed December 9, 2009.
- Eisler, R. 1998. Copper Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR*1997-0002, Contaminant Hazards Reviews Report No. 33.
- Gillies, E.L. 1998. Effects of Regulated Streamflows on the Sycamore Alluvial Woodland Riparian Community. A thesis presented to the faculty of the Department of Environmental Studies San Jose State University.
- Fukushima, M. 2001. Salmonid Habitat-Geomorphology Relationships in Low Gradient Streams. Ecology, 82(5), 2001, pp 1238-1246.
- Kupferberg, S.J. 1996. Hydrologic and geomorphologic factors affecting conservation of a river-breeding frog (*Rana boylei*). Ecological Applications 6:1322-1344.

Mr. Bill Wycko
December 21, 2009
Page 19

- Kupferberg, S.J. 1996b. The ecology of native tadpoles (*Rana boylei* and *Hyla regilla*) and the impacts of invading bullfrogs (*Rana catesbeiana*) in a northern California river. Dissertation. University of California, Berkeley, CA, USA.
- Kupferberg, S.J. 1997 Bullfrog invasion of a California river: the role of larval competition. *Ecology* 78(6):1736-1751.
- Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (*Oncorhynchus mykiss*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.
- Naiman, R.J. 1998. Biotic stream classification. Pages 97-119 in R.J. Naiman and R.E. Bilby (Editors). *River Ecology and Management: Lessons from the Pacific Coastal Ecoregion*. Springer-Verlag, New York.
- Nielsen, J. 2003. *Population Genetic Structure of Alameda Creek Rainbow/Steelhead Trout – 2002*. U. S. Geological Survey, Alaska Science Center, Anchorage, Alaska.
- Rosgen, D.L. 1994. A Geomorphological Approach to Restoration of Incised Rivers. David L. Rosgen, Director, Wildland Hydrology, 1481 Stevens Lake Road, Pagosa Springs David, CO 81147.
- Siemering, G.S., J.D. Hayworth, and B.K. Greenfield. 2008. Assessment of Potential Aquatic Herbicide Impacts to California Aquatic Ecosystems. *Archives of Environmental Contamination and Toxicology*, Vol. 55:3.
- Sullivan, K., T.E. Lisle, C.A. Dolloff, G.E. Grant and L.M. Reid. 1987. Stream channels: the link between forests and fishes. Pp. 39-97. In E.O. Salo and T.W. Cundy (Editors). *Streamside Management: Forestry and Fishery Interactions*. Contribution No. 57. College of Forest Resources, University of Washington, Institute of Forest Resources, Seattle, WA.
- Alameda Creek Alliance,
<http://www.alamedacreek.org/Historical%20photos/recent%20fish%20documentation/Alameda%20Creek%20salmonid%20documentation%2012-13-06.pdf>, accessed December 9, 2009.
- Ziemer, Robert R., and Thomas E. Lisle. 1998. Chapter 3. Hydrology. Pages 43-68, in: Naiman, Robert J., and Robert E. Bilby, eds. *River Ecology and Management: Lessons from the Pacific Coastal Ecoregion*. Springer-Verlag, N.Y.

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

RECEIVED

NOV 18 2009

NOV 24 2009

Mr. Chris Kern
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, California 94103-2479

CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M.E.A.

SCH #2005102102, Calaveras Dam Replacement Project, Draft Environmental Impact Report, October 2009
San Francisco County

Dear Mr. Kern:

We have reviewed the subject Notice for this project, which includes the replacement of Calaveras Dam.

Calaveras Dam, No. 10, is currently under the jurisdiction of the Division of Safety of Dams. On February 1, 2007 the owner, San Francisco Public Utilities Commission (SFPUC), submitted a construction application for our review and approval. We are currently working with SFPUC to resolve all dam safety related issues prior to approval of this application.

01

If you have any questions or need additional information, you may contact Area Engineer Mike Sutliff at (916) 227-4601 or Regional Engineer Y-Nhi Enzler at (916) 227-4604.

Sincerely,

Michael Wagner For

David A. Gutierrez, Chief
Division of Safety of Dams

cc: Ms. Nadell Gayou
Resources Agency Project Coordinator
Environmental Review Section, DPLA
901 P Street
Sacramento, California 95814

Governor's Office of Planning
and Research
State Clearinghouse
Post Office Box 3044
Sacramento, California 95812-3044



Linda S. Adams
Secretary for
Environmental
Protection

California Regional Water Quality Control Board

San Francisco Bay Region

1515 Clay Street, Suite 1400, Oakland, California 94612
Phone (510) 622-2300 • FAX (510) 622-2460
<http://www.waterboards.ca.gov/sanfranciscobay/>



Arnold Schwarzenegger
Governor

November 5, 2009
Site No. 02-01-C1060 (XF)
CIWQS Place No. 743933

Sent via electronic mail: No hard copy to follow

San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103
Attn.: Mr. Bill Wycko, Environmental Review Officer

Subject: Comments on Draft Environmental Impact Report for the Calaveras Dam Replacement Project, SCH No. 2005102102

Dear Mr. Wycko:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the Draft Environmental Impact Report for the Calaveras Dam Replacement Project. The project consists of two components: replacement of the existing dam at Calaveras Reservoir to meet seismic safety and delivery/drought reliability requirements, and operation of Calaveras Reservoir to release up to 6,300 acre-feet per year of water to Calaveras and Alameda Creeks for enhancement of fisheries and the other natural resources of the creeks.

Calaveras Reservoir is located on the boundary of Alameda and Santa Clara Counties, about 10 miles southeast of Fremont, California. Calaveras Dam is located at the northern end of the reservoir, about one mile upstream from the confluence of Calaveras and Alameda Creeks.

Calaveras Reservoir is the largest of San Francisco Public Utilities Commission's (SFPUC's) reservoirs in the San Francisco Bay Area. However, Calaveras Reservoir is currently operating at about 40 percent of full capacity because the California Department of Water Resources, Division of Safety of Dams (DSOD) placed operational restrictions on the reservoir in 2001. The DSOD placed operational restrictions on the reservoir because the dam is located near a seismically active fault zone and was determined to be vulnerable to strong earthquake ground motion.

The proposed project includes construction of a replacement dam immediately downstream of the existing dam to restore the reservoir's historical capacity. The replacement dam would be an earthen dam built to withstand the Maximum Credible Earthquake originating on the Calaveras Fault Zone and to withstand the Probable Maximum Flood event. The design of the new dam

could accommodate enlargement of the dam in the future although the SFPUC does not reasonably foresee the need for a larger dam on the future.

The main elements of the proposed project are:

- Construct a new earth and rockfill dam and modification of the existing dam to accommodate the construction and operation of the new replacement dam;
- Remove the existing spillway and construct an ungated spillway with a concrete-lined channel and a new stilling basin;
- Remove the existing intake tower, plug the shaft, and construct a new intake tower and shaft connecting to an existing drain and three water inlet adits;
- Extend the outlet pipe connecting to a relocated, fixed cone valve, and install new low-flow discharge valves for fishery releases;
- Install instrumentation, such as piezometers, inclinometers, settlement monuments, seepage weirs, and accelerometers to measure strong ground motions during earthquakes;
- Stabilize the right abutment landslide;
- Construct a bypass tunnel through the Alameda Creek Diversion Dam to improve habitat conditions in Alameda Creek downstream of the diversion; and
- Implement flow releases to support native fishes in Calaveras and Alameda Creeks downstream of Calaveras Dam and the Alameda Creek Diversion Dam.

Based on the information provided in the DEIR, we offer the following comments.

Comment on Designing the Dam to Accommodate Future Enlargement

We do not support designing the dam to accommodate enlargement of the dam in the future because enlargement of the dam will exacerbate existing impacts to beneficial uses and cause additional unforeseen impacts to the Alameda Creek Watershed. Moreover, if the SFPUC does not reasonably foresee the need for a larger dam in the future, there is no reason to design the new dam to accommodate potential future enlargement.

01

Comment on Waters of the State versus Waters of the United States

The text on page 4.4-65 of the DEIR needs to be revised to indicate that under the Porter-Cologne Water Quality Act (Porter-Cologne), all waters of the United States that are within the borders of California are waters of the state. Currently, the text incorrectly indicates that waters of the United States are often waters of the state. For additional clarification, please see Item III of the January 25, 2001, Memorandum from the Office of Chief Counsel on the Effect of SWANCC v. United States on the 401 Certification Program (available on-line at http://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/stateregulation_memorandum.pdf).

02

Comment on California Wetlands Conservation Policy

To be consistent with Executive Order W-59-93 (i.e., California Wetlands Conservation Policy), the description of mitigation requirements on page 4.4-65 of the DEIR should be revised as follows: “Impacts on waters of the state typically require mitigation requiring no net loss of wetlands functions, acreage and values of waters of the state.”

03

Comment on Regulatory Framework for Fisheries and Aquatic Habitat

The discussion of State Regulations protecting fisheries and aquatic habitat on pages 4.5-49 and 4.5-50 fails to mention the Porter-Cologne and the San Francisco Water Quality Control Plan (Basin Plan). Porter-Cologne and the Basin Plan (developed under Porter-Cologne) protect water quality requirements for the following fisheries and aquatic habitat beneficial uses:

- **Cold Freshwater Habitat:** Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- **Fish Migration:** Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.
- **Preservation of Rare and Endangered Species:** Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.
- **Fish Spawning:** Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
- **Warm Freshwater Habitat:** Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- **Wildlife Habitat:** Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

04

As a result, a discussion of Porter-Cologne and the Basin Plan should be added to State Regulations protecting fisheries and aquatic habitat.

Comment on Memorandum of Understanding with California Department of Fish and Game

The 1997 Memorandum of Understanding (MOU) between the SFPUC and the California Department of Fish and Game established flow schedules to support native rainbow trout with the best available science at the time. Subsequent to the 1997 MOU, there have been additional studies of flow requirements for steelhead in Alameda Creek that would also benefit other

05

species and enhance geomorphic and hydrologic functions in the watershed. These new studies should be used to update the flow schedule established in the 1997 MOU with the best available science in 2009. In addition, we support future studies to further refine the flow requirements needed to enhance the beneficial uses of Alameda Creek. For instance, a future flow study may evaluate using cone valve releases during naturally high flow periods to better mimic the flashy nature of the watershed.

05 cont.

We also support removing the recapture facility from the MOU because eliminating the recapture facility would avoid additional impacts to Alameda Creek from constructing an infiltration gallery (i.e., perforated pipes) directly beneath the streambed of Alameda Creek. In addition, the recapture facility could reduce seasonally important flows in Alameda Creek below the confluence of Arroyo de Laguna (i.e., Lower Alameda Creek). For instance, the Upper Alameda Creek Watershed contributes up to 59 percent of the flow in Lower Alameda Creek during the month of May (EDAW and Turnstone Consulting Joint Venture 2009).

06

Reference

EDAW and Turnstone Consulting Joint Venture. 2009. *Biological Assessment/Essential Fish Habitat Assessment for Calaveras Dam Replacement Project*. September.

Comment on Fish Screens at the Alameda Creek Diversion Dam

The DEIR fails to evaluate fish screens at the Alameda Creek Diversion Dam although on November 22, 2005, the California Department of Fish and Game provided the Planning Department and SFPUC with comments on the Notice of Preparation of an EIR that indicated that fish screens would be required at the Alameda Creek Diversion Dam per Fish and Game Code Section 6100. Instead, the DEIR indicates that there are ongoing impacts associated with fish entrainment in diversions from Alameda Creek. The lack of fish screens at the Alameda Creek Diversion Dam causes ongoing impacts to beneficial uses, and support installation of fish screens designed to minimize impacts from entrainment and impingement at the Alameda Creek Diversion Dam. Therefore, we recommend revising the DEIR to include an evaluation of the impacts and benefits of adding fish screens to the Alameda Creek Diversion Dam.

07

Comment on Sluicing Operations at the Alameda Creek Diversion Dam

The text on pages 4.6-33 and 4.6-46 indicates that the SFPUC discharges about 900 cubic yards per year of sediment accumulated behind the Alameda Creek Diversion Dam. While keeping the sediments in Alameda Creek helps minimize geomorphic impacts of operating the Alameda Creek Diversion Dam, releasing this sediment through sluice gates once per year has the potential to impact the water quality and beneficial uses downstream of this discharge. In addition, the SFPUC could be violating the Basin Plan if these discharges cause the following Water Quality Objectives (WQOs) to be exceeded:

08

- **TDS in the Alameda Creek Watershed above Niles:**

- o 250 milligrams per liter (mg/l) (90 day-arithmetic mean)
- o 360 mg/l (90 day-90th percentile)
- o 500 mg/l (daily maximum)
- **Sediment:** The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
- **Settleable Material:** Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.
- **Suspended Material:** Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
- **Turbidity:** Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.

08 cont.

Adverse effects on beneficial uses could include, but are not limited to, covering spawning beds and benthic macroinvertebrate habitat with excessive sediment, irritating fish gills with increased suspended sediment, and reducing foraging opportunities for fish and wildlife by decreasing water clarity.

As a result, the SFPUC should evaluate whether current sluicing operations are impacting beneficial uses by causing WQOs to be exceeded. If beneficial uses are being impacted, the SFPUC should modify their sluicing operations to prevent further impacts. Operational modifications that may be necessary include increasing the frequency in which sediment is sluiced from behind the dam, changing the frequency and duration of water diversions, or revising the method for managing sediment behind the Alameda Creek Diversion Dam.

Comment on the Hydrology Impact Evaluation in the Primary Project Area

The hydrology impact evaluation focuses primarily on peak flows (10+ year storm events), and as a result, under values the importance of intermediate flows. According to Luna Leopold's effective work concept, particularly as modified by GeoSyntech's recent work on creeks in the South San Francisco Bay Watersheds (GeoSyntech 2002), relatively frequent moderate stream flows cumulatively transport a larger proportion of total sediment load than large peak flows, and control channel stability, or instability. In addition, peak flows are less likely to be impacted because they typically occur in extremely wet years when fewer diversions from Alameda Creek would be needed to fill Calaveras Reservoir. As a result, the DEIR should be revised to include an evaluation of impacts resulting from modification or elimination of intermediate flows below the Alameda Creek Diversion Dam (i.e., flows between 50 cfs and 700 cfs).

09

Reference

GeoSyntec Consultants. 2002. Hydromodification Management Plan Literature Review, Santa Clara Valley Urban Runoff Pollution Prevention Program.

Comment on the Hydrology Impact Evaluation for Alameda Creek below the Confluence with Arroyo de la Laguna

The hydrology impact evaluation for Alameda Creek below the confluence of Arroyo de la Laguna is oversimplified, and as a result, undervalues the importance of seasonal flows from the Upper Alameda Creek Watershed.

First, the text indicates the flow model used in the evaluation includes flow reductions as a result of the recapture facility although the recapture facility is not part of the Calaveras Dam Replacement Project. The rationale for this was that the effect of the recapture facility could not be separated from the model. It is unclear to us why a single parameter in the model could not be removed to provide a clear understanding of impacts from the Calaveras Dam Replacement Project, especially when the text on page 4.6-61 and 4.6-62 indicate that not only can parameters in the model be revised or added but the parameters in the model were in fact revised for the analysis of impacts associated with the Calaveras Dam Replacement Project as well as to refine the model based on new information. We recommend removing parameters that confound interpretation of the models output, and revising the hydrology impact evaluation in the DEIR based on interpretation of model results that do not include the recapture facility.

Second, the text indicates that the Calaveras Dam Replacement Project will only affect about one-third of stream flow in Alameda Creek at the Niles gage. While this is true based on average annual flow estimate, it is not true when you consider seasonal variations in contributions to flow in the reach below the confluence of Arroyo de la Laguna and Alameda Creek. For instance, the flow contributions from Upper Alameda Creek Watershed to Lower Alameda Creek is 40 percent in January, 44 percent in March, 45 percent in April, 59 percent in May, and 39 percent in June (EDAW and Turnstone Consulting Joint Venture 2009). As a result, the DEIR should be revised to evaluate hydrologic impacts to Lower Alameda Creek based on seasonal variations on flow contribution from the Upper Alameda Creek Watershed.

Reference

EDAW and Turnstone Consulting Joint Venture. 2009. *Biological Assessment/Essential Fish Habitat Assessment for Calaveras Dam Replacement Project*. September.

Comment on Water Quality Objective for Asbestos

The text on pages 4.7-48 and 4.7-58 of the DEIR incorrectly states that the Basin Plan does not have a water quality objective for asbestos. [Section 3.3.22](#) and [Table 3.5](#) of the Basin Plan incorporates the maximum contaminant levels (MCLs) and secondary MCLs specified in Title 22, Section 64431 of the California Code of Regulations as water quality objectives for Municipal Supply. The text will, therefore, need to be revised to indicate that the water quality

objective for asbestos in the Basin Plan is based on the MCL for asbestos and is currently 7 million fibers per liter.

11 cont.

Comments on Copper Applications in Calaveras Reservoir

The text on page 4.7-6 of the DEIR indicates that from 1987 through 2005, the SFPUC applied 174,050 pounds (or 87 tons) of copper sulfate to Calaveras Reservoir to control algal blooms. However, copper has not been needed to control algae since implementation of alternative control measures (e.g., the hypolimnetic oxygenation system) in 2005. Aqueous copper is known to be highly toxic causing mortality, avoidance behavior, condensed growth, decreased sensory perception, and altered metabolism in to aquatic organisms, including juvenile salmonids (Eisler 1998; Baldwin and others 2003). In addition, most of the copper in herbicide applications is deposited in sediments in the reservoir, where it has the potential to degrade benthic communities (Siemering and others 2008). Despite the recent success of alternative methods to control copper in Calaveras Reservoir and the potential to discharge copper in flow releases meant to support fish downstream of the reservoir, the text indicates that the SFPUC may continue to use copper-based herbicides to control algal blooms in the future. We acknowledge and appreciate that the SFPUC plans to continue use of the hypolimnetic oxygenation system to reduce nutrient levels and prevent algal blooms, thereby reducing the use of copper-based herbicides. However, we encourage the SFPUC to seek other less toxic algae control alternatives that compliment the hypolimnetic oxygenation system, so copper-based herbicide applications can be avoided in the future.

12

The text in the DEIR also indicates that dredging for the barge option may impact water quality by increasing turbidity in the reservoir, but fails to evaluate potential impacts associated with remobilizing copper from sediment into the water column as a result of dredging. The EIR should include an evaluation of potential impacts associated with disturbance of reservoir sediments containing potentially toxic copper concentrations. If significant impacts are identified, the EIR should then identify mitigation measures to reduce impacts to less-than-significant, such as screening and to determine whether sediments need to be disposed of off-site.

References

- Baldwin, D.H., J.F. Sandahl, J.S. Labenia, and N.L. Scholz. 2003. Sublethal Effects of Copper on Coho Salmon: Impacts on Nonoverlapping Receptor Pathways in the Peripheral Olfactory Nervous System. *Environmental Toxicology and Chemistry*, Vol. 22:10.
- Eisler, R. 1998. *Copper Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review*. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR—1997-0002, Contaminant Hazards Reviews Report No. 33.
- Siemering, G.S., J.D. Hayworth, and B.K. Greenfield. 2008. Assessment of Potential Aquatic Herbicide Impacts to California Aquatic Ecosystems. *Archives of Environmental Contamination and Toxicology*, Vol. 55:3.

Comments on Vegetation and Wildlife Mitigation Measures

We acknowledge and appreciate mitigation measures specified in Section 5.4 of the DEIR and would like to emphasize that these measures need to be implemented throughout the project to protect water quality.

Comment on Pre-Construction Workers Education Program

The text on page 5-2 indicates that workers will be educated on the importance of avoiding harm to special-status species and sensitive natural communities. Topics of discussion will include the importance of maintaining speed limits and respecting exclusion zones. We recommend adding a discussion of the importance of proper waste management to the education program, especially during construction of temporary stream crossings and removal of vegetation. This will help ensure that trees, shrubs, debris, soils, or construction materials will not be inadvertently placed below the ordinary high-water mark of any streams, drainages, ponds, wetlands, riparian areas, and Calaveras Reservoir (i.e., any waterway).

13

Comment on Construction Measures for Streams and Drainages

We also recommend that the text describing bank stabilization measures on page 5-8 be revised to indicate that all erosion control materials shall be free of plastic monofilament and nylon wire because erosion control blankets and mats backed with plastic and nylon netting are known to entrap and injure amphibians and snakes (Barton and Kinkead 2005).

14

References

Barton, C., and K. Kinkead. 2005. Do Erosion Control and Snakes Mesh?. *Journal of Soil and Water Conservation*, Vol. 60:2.

Comment on Construction Measures for Vegetation Removal

The text on page 5-8 indicates that trees, shrubs, debris, soils, or construction materials inadvertently deposited below the ordinary high-water mark of any streams, drainages, ponds, wetlands, riparian areas, and Calaveras Reservoir shall be removed and placed at least 10 feet back from any waterway. Placing cleared vegetation matter, debris, soils, or construction materials 10 feet from waterways is unacceptable because this material will likely wash into the waterway during storm events. Therefore, the text should be revised as follows:

15

Vegetation Removal. During construction, implement measures to catch any trees, shrubs, debris, soils, or construction materials created by or used in vegetation removal before they can enter any waterway. Immediately remove trees, shrubs, debris, soils, or construction materials that are inadvertently deposited below the ordinary high-water mark of any streams, drainages, ponds, wetlands, riparian areas, and Calaveras Reservoir in a manner that minimizes disturbance of the drainage bed and bank (e.g., manually). Such materials will be set back at least 10 feet from Calaveras Reservoir and from streams, drainages, ponds, wetlands, and riparian areas

that are not otherwise directly disturbed by construction placed either in soil stock piles or an appropriately managed waste collection container until the materials can be properly disposed of.

15 cont.

Please also note that it may be possible to beneficially reuse tree and shrub materials for erosion control by using them to create wood mulch or brush layering.

Comment on Habitat Restoration Measures

The text on page 5-9 of the DEIR indicates that wetlands, creeks, and riparian areas that are temporarily impacted will be restored within three years of project completion. Restoring riparian areas dominated by slow growing tree species, such as oaks, will require more than three years. Therefore, oak riparian woodlands and other riparian sites dominated by slow growing species will have greater temporal losses in function and require greater compensatory mitigation than wetlands and riparian sites dominated by fast growing species, such as willows. Lastly, replanting and grading activities to restore temporarily impacted wetlands, creeks, and riparian areas should be completed within one year of project completion to avoid even greater temporal losses in function.

16

Comment on Compensatory Mitigation Areas and Measures

The text on pages 4.4-73 and 4.4-74 of the DEIR provide brief descriptions of the proposed mitigation areas, and the text on page 5-10 indicates that these areas will be used to compensate for the temporal, long-term, and permanent losses of wetlands, streams, and riparian areas, functions, and services. Although the compensatory mitigation areas include streams and riparian areas, they do not include perennial streams or riparian areas adjacent to perennial streams. Therefore, impacts to the acres, linear feet, functions, and services of perennial streams will be compensated with restoring and enhancing streams and riparian areas associated with streams that are intermittent and ephemeral. This will result in out-of-kind mitigation because the functions and services of intermittent and ephemeral streams are different from the functions and services provided by perennial streams. Please note that this will increase the amount of mitigation required by the Water Board.

17

Comment on Impacts of Implementing the Proposed Mitigation

The text on page 5-12 of the DEIR indicates that plans to control invasive plant and animal species will be prepared and included in the mitigation work plan. Based on review of past mitigation and monitoring plans, invasive plant and animal control will include use of herbicides and pesticides. However, potential adverse effects associated with the use of herbicides and pesticides are not identified as impacts resulting from implementing the proposed mitigation. The DEIR should be revised to evaluate the potential impacts from herbicides and pesticides used to control invasive plants and animals. Any significant impacts from herbicides and pesticides should then be mitigated for by requiring that integrated pest management techniques

18

Mr. Wycko
San Francisco Planning Department

- 10 -

Calaveras Dam Replacement Project

that incorporate alternative control strategies, such as grazing management, to minimize herbicide and pesticide use to the maximum extent practicable.

18 cont.

Comment on Water Quality Mitigation

We appreciate inclusion of an off-site erosion control project within the Alameda Creek Watershed as a mitigation measure to offset potential impacts to water quality from a 10-year storm event causing the combined volume of stormwater and dewatered groundwater to exceed the capacity of the detention and treatment system. We also acknowledge the space limitations that preclude construction of a detention and treatment system with a larger capacity. However, the text should make it clear that all the other mitigation measures to protect water quality from stormwater impacts must be implemented before the Water Board will consider off-site mitigation.

19

In addition, the off-site mitigation should be identified prior the impacts occurring even though the probability of this storm event occurring is low (10 percent in any given year). The off-site mitigation project needs to be identified prior to impacts, so it can be implemented as quickly as possible after the impact occurs. The text should be revised to include identification of an off-site mitigation project for storm water impacts contingent upon a 10-year storm event resulting in the release of untreated water from runoff and dewatering activities.

Closing

Please contact Xavier Fernandez at 510-622-5685 or xafernandez@waterboards.ca.gov with any questions or comments.

Sincerely,



William B. Hurley
Senior Engineer

cc: State Clearinghouse, state.clearinghouse@opr.ca.gov
State Water Board, Division of Water Rights
Kathy Mrowka, kmrowka@waterboards.ca.gov
SF Planning Department, Major Environmental Analysis Division:
Chris Kern, chris.kern@sfgov.org
SFPUC, Bureau of Environmental Management:
Jillian Blanchard, JBlanchard@sfgwater.org
Craig Freeman, CFreeman@sfgwater.org

Mr. Wycko
San Francisco Planning Department

- 11 -

Calaveras Dam Replacement Project

Kelley Capone, KCapone@sfgwater.org
CDFG, Bay Delta Region:
Greg Martinelli, gmartinelli@dfg.ca.gov
Wesley Stokes, wstokes@dfg.ca.gov
USACE, SF Regulatory Branch:
Robert Smith, Robert.F.Smith@usace.army.mil
U.S. EPA, Region IX, WTR-8:
Melissa Scianni, scianni.melissa@epamail.epa.gov
U.S. FWS, Coast Bay Delta Branch:
Angela Picco, Angela_Picco@fws.gov
Ryan Olah, Ryan_Olah@fws.gov
NMFS, Southwest Region:
Gary Stern, Gary.Stern@noaa.gov
Josh Fuller, Joshua.Fuller@noaa.gov



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7
100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551-9486 • PHONE (925) 454-5000

December 21, 2009

Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Subject: Calaveras Dam Draft Environmental Impact Report - Comments

Dear Mr. Wycko,

Thank you for the opportunity to comment on the Calaveras Dam Replacement Project Draft Environmental Impact Report (DEIR).

Our comments are in the context of the Zone 7 Water Agency's mission to provide drinking water, non-potable water for agriculture/ irrigated turf, flood protection, and groundwater and stream management within the Livermore-Amador Valley. Our service area covers the Valley and includes the cities of Pleasanton, Dublin, Livermore, and unincorporated Alameda County (see figure).

The mission of Zone 7 Water Agency's flood control section is to "provide for the control of flood and storm waters and for the protection of life and property from damage or destruction of such waters."

Comments:

On page 4.6-11 of the Calaveras Dam Replacement Project DEIR it states, "The northern Alameda Creek watershed drained by the Arroyo de la Laguna and Arroyo Mocho is not discussed further here because the project would have no impact in that area."



However, *Figure 4.6.17: Depth of Floodwaters from Modeled Breach of Calaveras Dam*, illustrates that in the event of a catastrophic failure of the dam floodwaters would not only flow from Alameda Creek westerly through Niles Canyon and out the Bay, but would push northerly upstream into Arroyo de la Laguna.

01 cont.

Your assessment does not address the potential for impacts of such a catastrophic event on the upstream areas – the community of Sunol, to Highways 680 and 84 in this area, and to Zone 7 flood control facilities on Arroyo de la Laguna.

Further, the DEIR neglects to fully state the actual impacts that would occur as a result of a catastrophic failure of the new dam; it rather sidesteps this impact by stating that “the seismic and flood design considerations incorporated into the project would reduce the risk of dam failure when compared with the existing structure.” While such an event is unlikely, the impacts would be devastating to local communities and infrastructure and thus should be more fully evaluated.

02

If you have any questions or comments, please feel free to contact me at (925) 454-5000.

Sincerely,



for G.F. Duerig
General Manager, Zone 7 Water Agency

cc: Kurt Arends, Joe Seto, Elke Rank – Zone 7 Water Agency



**COUNTY OF ALAMEDA
PUBLIC WORKS AGENCY**

399 Elmhurst Street • Hayward, CA 94544-1307
(510) 670-5480

December 18, 2009

Mr. Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Fax: 415.558.64029

Dear Mr. Wycko:

Subject: Comments on Draft Environmental Impact Report (dEIR) for the Calaveras Dam Replacement Project

The proposed tiered-project is located in the Sunol Valley of Alameda County and is a specific project under the San Francisco Public Utilities Commission's (SFPUC) Programmatic Environmental Impact for the Water System Improvement Program (WSIP) (SCH#200509026) certified in 2008) is located in the Sunol Valley of Alameda County. The project will construct a new dam to replace the existing Calaveras Dam. The replacement dam would respond to California Department of Water Resources, Division of Safety of Dams (DSOD) requirements to improve seismic safety. Replacement of the dam would not only restore the reservoir to its pre-DSOD safety requirement volume of about 96,850 acre-feet (AF) but provide significant additional storage capacity. The reconstructed dam would restore the previously existing yield and reliability of the SFPUC local system and provide water supply during droughts. The new dam would also lay the foundation for significant future expansion.

The County have received and reviewed the draft Environmental Impact Report for the Calaveras Dam Replacement Project. The County asserts that impacts and potential impacts identified in the EIR have not been adequately addressed or mitigated. The County's concerns are identified in the following comments:

GENERAL COMMENTS

1. The SFPUC should preserve on-site, in perpetuity by grant of conservation easement in a form acceptable to the County of Alameda, at least: 4.61 acres of wetlands and open water, and 4,682 linear feet of stream habitat, 7.9 acres of riparian habitat, 24.0 acres of oak woodland and savannah habitat located within acceptable Mitigation Areas in the County; the referenced habitat acreage should be equivalent in ecological function and quality to the habitat on the project site. 01
2. The Project EIR should quantify the amount of carbon dioxide-equivalent emissions sequestered by existing vegetation (i.e., upland woodland, riparian forest, scrub, grassland, etc.), representing a potential GHG impact. The SFPUC should consider quantification methods adopted by the California Air Resources Board, Climate Action Reserve Forest Project Protocol. The protocols provide quantification methods that ensure that reductions are real, additional, permanent, and verifiable as required by the Global Warming Solutions Act of 2006 (AB 32). 02
3. The referenced compensation plan should be peer reviewed to ensure that planned measures and methodologies will appropriately compensate for unavoidable impacts. 03
4. The Project dEIR should quantify the amount of carbon dioxide-equivalent emissions sequestered by existing biological resources (i.e., upland woodland, riparian forest, scrub, grassland, etc.), and any net losses which may represent a potential GHG impact. The SFPUC should consider quantification methods adopted by the California Air Resources Board, Climate Action Reserve Forest Project Protocol. The protocols provide quantification methods that ensure that reductions are real, additional, permanent, and verifiable as required by the Global Warming Solutions Act of 2006 (AB 32). 04
5. In September 2009, the Bay Area Air Quality Management District released draft CEQA Guidelines for Air Quality, including recommended thresholds of significance and mitigations measures for GHG emissions. The Project dEIR should consider GHG impacts resulting from the net loss of woodland, riparian, scrub, and other biological habitat. Such issues and acknowledgements should also be considered in the draft EIR and proposed compensation plan. 05
6. The SFPUC should preserve on-site, in perpetuity by grant of conservation easement in a form acceptable to the County of Alameda, at least: 4.61 acres of wetlands and open water, 4,682 linear feet of stream habitat, 7.9 acres of riparian habitat, 24.0 acres of oak woodland and savannah habitat located within acceptable Mitigation Areas in the County; the referenced habitat acreage should be equivalent in ecological function and quality to the habitat on the project site. 06
7. The SFPUC should explore opportunities to visually improve the view from Sunol Wilderness lands to help offset the overall net loss of the visual quality around the CDRP Project Area, particularly to Observation Hill, Hill 1000, the new replacement dam, borrow areas, haul roads, etc. 07

8. The Project EIR should include consequential photo-simulations, from a variety of significant vantage points, of the proposed grading solution including: the stabilization of the east abutment wall with the tie-back wall, Observation Hill, Hill 1000, Borrow/Staging Areas, access areas/haul roads, and the new replacement dam. Furthermore, photo-simulations should be presented that represent the resulting reservoir inundation to the new prescribed elevation levels (at 96,850 acre-feet). 08
9. The SFPUC should work with the County to explore recreational opportunities that may be pursued on watershed lands that would not conflict with watershed protection objectives. 09
10. The SFPUC should work with the East Bay Regional Park District and the County to explore opportunities to improve recreational facilities in the surrounding recreational and resource management lands. 10
11. The County is concerned about closure of Calaveras Road for approximately 20 months. 11
12. The SFPUC should pursue a more pro-active approach to water conservation in line with San Francisco's progressive reputation, to address the purported need to divert flows from Alameda Creek. To this end, the County supports the complete removal of the ACDD. Please step-up mitigation to meet with 21-century standards. 12
13. The impacts to sensitive species at the base of the existing dam have not been adequately addressed. The County requests the SFPUC to take a watershed approach when considering mitigation areas. 13
14
14. The proposed stream flow releases from Calaveras Dam and its downstream recapture via the Sunol Filter Gallery, meant for rainbow trout is not adequate for steelhead. These stream flows releases are not sufficient to get salmonids from its outlet at San Francisco Bay to the base of Calaveras Creek Dam. 15
15. When re-opening Calaveras Road, the County requests the SFPUC to thoroughly remove all debris from roadway surface and insure that any temporary asphalt fixes are completed to a standard that in no way can interfere with the safe use of the roadway to bicyclists. 16
16. The County is not fully aware of the proposal to close the Sunol Regional Wilderness. Can the SFPUC elaborate on this proposal? 17
17. Although the draft EIR inadequately mentions the impacts of the project on steelhead, it does not mention two other migratory fish that frequent the watershed: Chinook Salmon and Pacific Lamprey. SFPUC should provide justification for this omission. 18
18. The draft EIR failed to address the flow diversions from the watershed. According to Alameda County Water District, using data generated from USGF gages, significant flows have been diverted to Calaveras Reservoir from upstream watershed areas. During these water years (beginning 2001 through 2008) the following acre-feet of water have been diverted each year into Calaveras reservoir: 22600, 17200, 33100, 25700, 36600, 26900, 19

8400 and 24500. These flow diversion volumes average 82% of the available flows. The EIR now proposes to divert additional flows to the expanded Calaveras Dam from tributary creeks to Alameda Creek. The additional proposed diversions would result in significant and irreversible impacts to any recovery effort to restore these secondary reaches to support steelhead and other endangered species.

19 cont.

19. The County proposes that any diversions of flow to Calaveras Reservoir be monitored via a USGS gage. Specifically, the flows presently diverted from Alameda Creek to Calaveras Reservoir need to be accounted for with a USGS gage and data available online and accessible to the public. The County suggests the SFPUC work closely with Alameda Creek Fishery Workgroup Flows Subgroup (of which SFPUC is participating member) to provide the necessary flow releases from Calaveras Reservoir to determine the appropriate level of flows necessary for salmonid migration from San Francisco Bay upstream to spawning areas. The required flow releases are necessary to catalog habitat types location necessary to support ESA in the watershed under varying flow regimes. Such flow releases by SFPUC would significantly expedite the data gathering and not have to depend on the uncertainties of rainfall events as has been the case these past two years. As a participating member of the Study group, it is unclear why SFPUC has refused to provide adequate flow release when the information generated from these studies can assist SFPUC in the watershed management effort. The County requests the SFPUC to provide these necessary flows to support these studies on timely manner.

20

20. All described flow releases from Calaveras reservoir need to address the hydrological requirements of Steelhead, Chinook Salmon, and Pacific Lamprey from throughout the watershed from the headwaters to San Francisco Bay.

21

21. The County does not consider the analysis of the effects of asbestos on sensitive receptors to be sufficient. The County requests the SFPUC to implement a rigorous monitoring program that will unequivocally absolve the SFPUC from any associated adverse health effects associated with its dealings with asbestos-tainted soils. The County is concerned with unforeseen health effects on the residents of the County that may come into unknown contact with asbestos. What is the nature of the imported materials from across the County line (from Santa Clara County) into Alameda County? Have these potentially asbestos-laden fill materials been tested in accordance to EPA standards?

22

22. The County Flood Control District has determined that near total diversion of stream flows into reservoirs has resulted in lack of adequate sediment transport flows in the Alameda Creek flood control channel. Periodic flushing flows from Calaveras Reservoir are essential for the flood control channel to reach efficient sediment transportation flows. To support development of sediment management plan for the flood control channel SFPUC will need to provide sediment transport flows that would support a reconfigured channel's cross section to provide a more efficient sediment transport. These sediment transport flows would also improve the channel for fish and provide sediment-starved San Francisco Bay with local supply. The flood control channel built by the Army Corps of Engineers requires regular costly maintenance. The sediment deposition in the flood control channel (due to lack of flows) results in substantial financial and environmental costs. This significant

23

impact of flow diversions have neither been adequately analyzed, discussed, nor mitigated in the draft EIR. Please revise the EIR accordingly.

23 cont.

23. The proposed further diversion of natural spring flows in the watershed would render the entire lower reach of Alameda Creek waterless. Such total take of flows with disregard to downstream properties is inconsistent with water right laws including Riparian Rights.

24

SPECIFIC COMMENTS

Statement

Page 1-5, paragraph 4: The SFPUC must maintain water deliveries to all its customers for the protection of public health and safety. Therefore, under the WSIP, the SFPUC will work with its customers to develop financial incentives to limit water sales to an average annual amount of 265 mgd from the watersheds through 2018. With the projected 20 mgd of conservation, recycled water, and groundwater projects, the system would meet average daily demand of 285 mgd in 2018.

25

County Comment

The Calaveras dam project described as a seismic upgrade is more than that. It is a capacity increase project to accommodate significantly higher flow diversions from the watershed. While these diversions are to assure delivery of water to the San Francisco Bay Area, it does not address the associated impacts on anadromous fish species that depend on flows to survive. Narrowly defining the project impacts limits to the immediate vicinity of the Dam is misleading and inconsistent with CEQA Sections 15122 to 15131.

Statement

The WSIP would result in changes in reservoir levels and associated changes in downstream flows in rivers and creeks in the three affected watersheds, potentially resulting in adverse effects on groundwater, water quality, fisheries, and terrestrial biological resources.

26

County Comment

It is shocking that the EIR acknowledges these impacts to resources and yet provides no substantial remedy to address them. Deferring the measures to address these effects to some unknown period in the future is inconsistent with CEQA Section 15125 (e) (d) and Section 15126(2).

Statement

Page 1-9: In 2006, the SFPUC installed a temporary 12-inch low-flow release valve for studies of fisheries and other aquatic resources. The low-flow valve allows flow releases from the reservoir that better approach the natural hydrology of Calaveras Creek downstream of Calaveras Dam and Alameda Creek downstream of the confluence with Calaveras Creek.

27

County Comment

It is presumed that this discharge pipe is still in place? Why not use this device to provide flows to reach Alameda Creek's tidal estuary. Intercepting the flows downstream of the dam at the proposed Sunol recharge gallery significantly precludes Steelhead trout and other anadromous fish from ever getting into the historic spawning grounds.

27 cont.

28

Statement

Page 1-13, Bullet 1: Construct a new earth and rockfill dam with a robust design (wide centrally located clay core, wide filter, and internal drainage) that could accommodate potential enlargement by future generations and modification (regrading) of the existing dam to accommodate the construction and operation of the new replacement dam;

County Comment

Once again, the EIR has not addressed the full range of the project's impacts including the impacts associated with known and anticipated additional expansions in the future. Addressing the consequences of the current and anticipated future expansions as required by CEQA Section 15126 (2) is warranted. Future generations would appreciate having a watershed that is diverse and supports variety of habitat and species that are no longer at risk. Paramount to this envisioned habitat is adequate flows that are not subject to diversions into reservoirs.

29

Statement and County Comment

Page 1-14: This project is not consistent with SFPUC applicable land-use policies adopted to avoid environmental impacts. The diversion of stream flows into dams and subsequently release and recapture is also inconsistent with the ESA.

30

Statement and County Comment

Page 1.38, Section 5.4a: Pre-Construction Measures

• Wetland Buffers: Except for those areas specifically identified in Table 4.4.9: Impacts of Construction on Wetlands and Other Waters of the State and United States, where impacts cannot be practicably avoided, a minimum 100-foot buffer surrounding all wetlands, ponds, streams, drainages, and other aquatic habitats located on or within 100 feet of the project site shall be clearly designated on the final project construction plans and marked on the site with orange construction fencing or silt fence. If the area is on a slope, silt fencing or other comparable management measures will be installed to prevent polluted runoff, as well as equipment, from entering the buffer area. Signs shall be installed every 100 feet on or adjacent to the buffer fence that read, "Environmentally Sensitive Area – Keep Out." Fencing and management measures shall be installed and inspected prior to initial project construction and maintained through the construction period. No equipment mobilization, grading, clearing, storage of equipment or machinery, vehicle or equipment washing, or similar activity, may occur until a representative of the SFPUC has inspected and approved the fencing and/or management measures installed around these features.

31

• Temporary Stream Crossings: The final project construction plans shall be designed to minimize the number of temporary stream crossings necessary for project site access and construction. Stream crossings shall be located to the maximum extent practicable in previously disturbed areas lacking riparian vegetation, pools, side ponds, or other sensitive habitat features. Post construction impacts are not addressed in the EIR. Please address Post-Construction Impacts to wetlands at crossings of perennial streams. Many California streams are perennial. Absence of surface flows does not mean it is devoid of water. These streams exhibit dry creek bed at certain times of the year when flows are below the surface.

Statement

Page 1-39: A preconstruction survey will be conducted at each work site where there would be ground-disturbing activities to identify suitable California tiger salamander burrow aestivation areas. Aestivation habitat will be defined as the presence of two or more small mammal burrows greater than 1 inch in diameter within a 10-foot-diameter area and within 10 feet of proposed construction sites (i.e., the presence of a single isolated gopher hole would not be considered habitat). As feasible within the context of the work area, aestivation areas will be temporarily fenced and avoided.

31 cont.

County Comment

A single gopher hole with extensive subterranean chamber could serve as refugia for California Tiger Salamander (CTS). Dismissing this outright without further studies would result in take of CTS. Surveys should consider these apparent single holes as potential refugia warranting investigation in accordance with DFG protocol prior to destruction. Also the protective radius (around potential aestivation sites) should be expanded beyond those narrowly defined in the EIR.

Statement

Page 1-40 –41: Bald eagle preconstruction survey....

County Comment

Period identify for survey may not provide adequate information on breeding of this species. Besides, exceptionally dry winter may result in early breeding. Wet and extensive winter or spring rainfall may delay breeding start well into the summer

Statement

Page 1-43: Loggerhead shrike....

County Comment

Removal of vegetation during non-breeding season is recommended.

Statement

Executive Summary 1.4.3.1, Sources of Material for Construction: The new Calaveras Dam would require approximately 2.77 million cubic yards of material. Much of the material needed to construct the dam would be obtained from excavation of the new spillway and from two borrow areas within the vicinity of the reservoir. Borrow Area B would be located in the hills on the west side of Calaveras Creek, downstream of the existing dam, and would be used for rockfill; and Borrow Area E would be located at the south end of the reservoir and would be used for clay fill. Sand and gravel for filters and drains would be imported from commercial sources to be determined by the contractor.

34

County Comment

It appears SFPUC is proposing to transport millions of cubic yards of soil (fill material) from Santa Clara into Alameda County. Please clarify how this is to be done without preapproval from the County.

Statement

Page 1-47, Section 4.42, Effects on CRLF: Restore temporary impacts on annual grasslands within the limit of work located above the 756-foot inundation elevation within 3 years of completion of construction.

County Comment

The proposed measure as presented is unclear. Does SFPUC mean the vegetation would be fully restored at the end of the third year? Or does this mean that SFPUC would be planting during a 3-year window? Why not plant immediately after construction?

Statement

Page 1-48-49, Wetlands and Other Waters: Fully compensate for impacts on 4.61 acres of wetlands and open water and 4,682 linear feet of stream habitat by restoring wetlands and streams and establishing wetland habitats at the South Calaveras and San Antonio Mitigation Areas within 5 years of completion of construction.

35

County Comment

Again, the mitigation measure is unclear. Wetlands will be restored within 5 years? Why not sooner? If restoration being in the fifth year of the 5-year window, establishment may not be accomplished until 10 or more years after project completion. Please clarify.

Statement

Page 1-49. Fully compensate for impacts on 7.9 acres of riparian habitat by restoring and establishing riparian habitat at the South Calaveras and San Antonio Mitigation Areas within 10 years of completion of construction.

County Comment

Please clarify what is meant by “within 10 years.” Why not sooner?

Statement

Page 1-49, CTS: Fully compensate for impacts on 0.11 acre of California tiger salamander aquatic habitat by improving aquatic habitat through predator control in impaired water bodies in the SCMA within 5 years of completion of construction; fully compensate for permanent impacts on 971.6 acres.

35 cont.

County Comment

This statement is unclear how this is to be done within 5 years on 971 acre Sage Canyon Mitigation Area (SCMA). Why not sooner? It is preferable to begin the mitigation prior to project construction start. Please clarify.

Statement

Page 1-50, 5.4.3b, Site Selection: The final compensation plan(s) shall include a description of the factors considered during the final mitigation site selection process, including consideration of watershed needs, on-site alternatives, and the practicability of accomplishing ecologically self-sustaining habitats at the mitigation sites.

36

County Comment

Site Selection “including consideration of watershed needs”: Since these measures are for compensation for impacts to resources, what is meant by watershed needs that would render use by California tiger salamander and for that matter any native wildlife inappropriate? Please clarify the statement.

Statement and County Comment

Page 1-53, Section 4.53, 4.54, 4.53: All of these are “significant” impacts and not “less than significant”. Additionally, the lengthy period to identify mitigation success is inadequate.

37

Statement and County Comment

Page 1-54, Section 4.52: Construction-related permanent loss of fish habitat in Calaveras Creek downstream of the existing dam. The additional diversion of flows would permanently prevent ESA fish from the corridor.

38

The EIR failed to identify impacts on downstream corridor of Alameda Creek below the diversion structure that currently suffers from lack of flows rendering the corridor a barrier to migration. Furthermore limiting the project impact to a narrowly defined perimeter around the dam (for construction and operational only) is woefully flawed and misleading. The Dam depends on flows from the Alameda Creek watershed. These same flows sustain diverse habitats

39

along Alameda Creek's entire corridor to San Francisco Bay. The existing lack of flows in the downstream segment would be significantly exacerbated with the proposed additional diversions into storage inherent in the "seismic retrofit". Recapturing released flows downstream and returning it back to the reservoir would certainly guarantee the demise and extinction of anadromous species. To assert no impact because of barriers downstream is misleading at best. Erroneously confining the project impacts to only the dam (for a project that depends entirely on flows that are linear in nature) is flawed and misleading. This proposed work goes beyond seismic upgrade. It would result in even larger diversion of flows beyond the existing conditions.

39 cont.

Statement and County Comment

Page 1.54, Section 4.53: Please change "No" impact to "Significant" impact and provide mitigation.

Statement and County Comment

Page 1-55, Section 4.54: The framing of the statement is questionable. Water flows downstream and if flows are unavailable because of dam diversion, it stands to reason that the downstream reaches will be adversely impacted.

Statement and County Comment

Page 1-56, Sections 4.56, 4.57, 4.58., 4.59: Please change "less than significant" impact to "significant" and provide mitigation.

Statement and County Comment

Page 1-57, Section 4.65 – 4.6.11.: Please change "less than significant" impact to "significant" and provide mitigation.

Statement and County Comment

Page 1.58, Section 4.6.12: Please change "less than significant" impact to "significant" and provide mitigation.

Statement

Page 2.6: A performance objective of the sustainability goal is "Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat."

County Comment

This performance objective should include protection of fish and wildlife habitat within the Alameda Creek Flood Control Channel from Mission Boulevard to San Francisco Bay.

Statement

Figure 3.3, Adit #1 does not include fish screens.

County Comment

Can you explain the lack of fish screens on Adit #1?

45 cont.

County Comment on Section 3.5.4

The proposed project would result in emission of greenhouse gases (GHG) that may contribute to global climate change. The SFPUC is committed to following GHG reduction actions as part of the proposed project. The SFPUC will include the first two measures in all contractor specifications and implement the third measure during project planning and design, which would help reduce GHG emissions and provide other environmental benefits:

- a. The SFPUC will require that all contractors maintain tire inflation to the manufacturer's inflation specifications.
- b. The SFPUC will implement a construction worker education program.
- c. The SFPUC will incorporate all applicable energy efficiency measures into the project design. For project buildings, the SFPUC will attempt to maximize energy efficiency by exceeding Title 24 minimum requirements by at least 20 percent. The SFPUC will attempt to meet or exceed LEED Silver certification as required by the City's Green Building Ordinance.

46

LOCAL AND REGIONAL REGULATIONS

As of the date of this Draft EIR, the BAAQMD has not adopted quantitative thresholds of significance for construction-related emissions. However, the BAAQMD is developing quantitative CEQA significance thresholds for construction-related emissions of criteria pollutants, precursors, TACs, and GHGs (BAAQMD 2009). The BAAQMD expects to adopt these new thresholds of significance later this year.

County Comment on Section 4.11.1:

Construction activities in the vicinity of the proposed dam construction site would be visible from some areas within Sunol Wilderness, as discussed below. Such activities include the following:

- The dam foundation would be excavated (about 2.32 million cubic yards of material).
- The landslides at the east abutment (left side when facing the dam looking south), downstream from the existing dam, would be stabilized with a tie-back wall.

47

- The eastern face of Observation Hill, including its peak, and portions of Hill 1000 would be removed to excavate the spillway (about 1.87 million cubic yards of material). The excavated area would be graded into a series of benches.
- Borrow Area B, just north of the peak of Hill 1000 (site of the old quarry used to obtain materials for the existing dam), would be excavated (about 1.30 million cubic yards of material, covering about 8 acres) as a source of construction materials.
- Staging areas on Observation Hill and Hill 1000 (Staging Areas 5, 7, 8, and 10) would be cleared of their existing cover of oak woodland and graded to store materials and equipment during construction.
- Access areas on Observation Hill and Hill 1000 (covering about 23.1 acres) would be cleared of their existing cover of oak woodland and graded for use by vehicles and equipment to access the construction site, Borrow Area B, and staging areas.
- New haul roads would be constructed, and existing roads would be widened on Observation Hill and Hill 1000 for use by vehicles and equipment to serve the construction areas, Borrow Area B, and staging areas.
- The replacement dam would be constructed approximately 1,000 feet downstream (north) of the existing dam. The existing dam would function as a cofferdam during construction of the replacement dam. At the end of construction, an approach channel would be excavated through the west side of the cofferdam. The remaining portion of the cofferdam would be left in place.

47 cont.

County Comment on Section 4.11.2

As described above, project construction activities would have a temporary impact on visual quality for the duration of construction when viewed from various areas and trails in the Sunol Wilderness. Site disturbance resulting from these construction activities would remain after completion of construction and would have a long-term impact on scenic vistas, scenic resources, and visual character when viewed from the same areas and trails of the Sunol Wilderness. Excavation of the peak of Observation Hill and portions of Hill 1000 (for the spillway) and excavation of Borrow Area B (for construction materials) would permanently alter the profiles of these features when viewed from the Sunol Wilderness.

Grading the excavated area of Observation Hill and Hill 1000 into regularly spaced, horizontal benches and the landslide stabilization work would increase the visual discontinuity of the dam complex with the irregular and sloped natural landforms in the vicinity. These components of the proposed project, along with proposed staging areas, access areas, and haul roads on the north face of Observation Hill opposite the park, would require removal of a large area of existing oak woodland cover. As discussed above under "Local Setting," a general pattern of oak woodland cover on north- and east-facing slopes is a defining visual feature of the landscape. Removal of this vegetation would create visual discontinuity with the existing pattern of oak woodland cover in the immediate vicinity of the dam on north-facing slopes. Areas of

disturbance would be particularly prominent when viewed from upland trails in the Sunol Wilderness (see Figure 4.11.10).

Impact Conclusions

Site disturbance caused by the excavation and grading of Observation Hill and Hill 1000 and the excavation of Borrow Area B would have a significant impact on scenic vistas from the park and on scenic resources and the visual character of the dam site and its surroundings for decades after construction is complete. Implementation of policies of the *Alameda Watershed Management Plan*, calling for site and vegetation restoration (i.e., Action des 5A: contour to mimic surrounding landforms; and Action Veg 4: revegetate graded areas) would occur as part of the proposed project. These efforts would lessen the impact on scenic views from Sunol Wilderness as would implementation of Vegetation and Wildlife Mitigation Measure 5.4.2, Habitat Restoration Measures (see Chapter 5). However, full restoration would not be feasible within the spillway excavation on Observation Hill and Hill 1000. The slopes of these areas would be excavated to bedrock and benched to stabilize them. The benched slopes on exposed bedrock would not lend themselves to replanting with oak woodland and would not retain the same visual character that exists now. This impact would, therefore, be considered significant and unavoidable.

47 cont.

Statement and County Comments

Section 4.12.6: Please change “less than significant” impact to “significant” and provide mitigation.

48

Statement and County Comments

Section 4.13.1, Air Emission: Please change “less than significant” impact to “significant” impact and provide mitigation.

49

Statement and County Comments

Section 4.14.1, Significant Noise: The County considers the noise controls measures inadequate.

50

Statement

Page 4.18: The EIR states that there are “beneficial impacts” on effects on the fishery resources in Calaveras Reservoir, on fishery resources along Calaveras Creek below Calaveras Dam and along Alameda Creek below confluence with Calaveras Creek, and beneficial impacts on effects on fishery resources in San Antonio Reservoir.

51

County Comment

Can SFPUC elaborate on the “beneficial impacts” the CDRP will have on fisheries resources within the watershed, and, more specifically, within the Alameda Creek Flood Control Channel.

Statement

Page 4.18: Under Impact 5.4.5-3: Effects on fishery resources along Alameda Creek downstream of Alameda Creek Diversion Dam. As a mitigation measure the SFPUC will release a minimum flow of approximately 10 cubic feet per second from the diversion dam and monitor the effects of the release on resident trout spawning and egg incubation. If monitoring results for Measure 5.4.5-3a indicate the measure is unsuccessful, the SFPUC will implement Measure 5.4.5-3b. In addition, if after 10 years the minimum release does not sustain the resident trout population, the SFPUC will either increase releases from the diversion dam or install a fish passage barrier on the diversion tunnel.

52

County Comment

Can the SFPUC elaborate on the extent of the proposed monitoring? The County requests that any monitoring be expanded to include the entire length of Alameda Creek from the base of Calaveras Reservoir Dam to its confluence with San Francisco Bay. The County advocates for the complete removal of the Alameda Creek Diversion Dam (ACDD) and channel re-grading to allow future runs of salmonids to return to the upper reaches of Alameda Creek. At a minimum, the County requests that a fish screen be installed on the diversion tunnel and a fish ladder be installed on the ACDD. The issue regarding fish and flows necessary to support a viable population in the watershed has been studied for at least 15 years. This deliberately staged approach outlined above is simply an effort to avoid and delay addressing the flows releases necessary to allow for the establishment of viable salmonid populations within the Alameda Creek Watershed.

County Comment on Section 4.5

Project impacts on fisheries and aquatic habitat are consistently referenced to the temporary DSOD-restricted conditions. It would seem that impact analysis should be made in relation to the general conditions during the 70-year period since the initial construction of both Calaveras and Alameda Creek Diversion dams. In addition, since the project entails significant modifications to the dams and reservoir, it would seem appropriate that the impacts should also be referenced to the pre-dam conditions of the watershed and adequately addressed in the EIR.

53

Consideration should be given to reducing the diversion of flow from Alameda Creek via the ACDD to Calaveras Reservoir.

54

The discussion in the DEIR on the impaired condition of the Alameda Creek steelhead fishery and aquatic habitat is misleading and may lack full presentation of the facts. It is the County's understanding that when the USACE designed and constructed the Alameda Creek Federal Project, it had been determined that there was no longer a significant viable steelhead fishery within the watershed. Therefore, the design of the flood control channel (including the BART weir) did not give full consideration to the steelhead fishery. However, the start of the decline of the fisheries (within the study area and extended study area) may actually be largely attributable to the earlier dams constructed by the SF Water Department and others that hindered fish

55

migration. The County believes that the lack of flows was the primary basis for the decline of the fisheries within the watershed more than any other factor.

55 cont.

Statement

Page 4.6: In the Alameda Creek and Peninsula watersheds, the WSIP, which includes restoring the historical storage capacities of Calaveras and Lower Crystal Springs Reservoirs, could affect reservoir levels, downstream flows, fisheries, and terrestrial biological resources.

56

County Comment

Can the SFPUC elaborate on the affects that the CDRP could have on fisheries resources within the watershed, specifically in Alameda Creek downstream to San Francisco Bay.

Statement

The finding of "Less than Significant" effect on fisheries resources along San Antonio Creek below San Antonio Reservoir.

57

County Comment

Can the SFPUC elaborate on how a "less than significant" effect was determined?

Statement

The finding of a "Less than Significant" effects on fishery resources along Alameda Creek below confluence with San Antonio Creek.

58

County Comment

Can the SFPUC elaborate on how a "less than significant" effect was determined? Also provide the data, if any, upon which the determination was based?

Statement

Page 4.2-8: The SFPUC will operate the SFPUC water system in a manner that protects and restores native fish and wildlife downstream of SFPUC dams and water diversions, within SFPUC reservoirs, and on SFPUC watershed lands. Releases from SFPUC reservoirs will mimic the variation of the seasonal hydrology (e.g., magnitude, timing, duration, and frequency) of their corresponding watersheds in order to sustain the aquatic and riparian ecosystems upon which these native fish and wildlife species depend.

59

County Comment

Recent findings from historical ecology studies of Alameda Creek Watershed by SFEI (jointly funded by the County and SFPUC) have indicated that the lower reaches of Alameda Creek were intermittent but contained deep pools with stretches where water resurfaced. Will flow releases from SFPUC reservoirs mimic historic flows to allow for pool formation in lower Alameda Creek? To what extent will SFPUC use the information from the historical ecology study to

re-create a historic flow regime that will benefit the entire length of Alameda Creek to its outlet at San Francisco Bay? Could SFPUC clarify what is meant by “*SFPUC will operate the SFPUC water system in a manner that protects and restores native fish and wildlife downstream of SFPUC dams and water diversions, within SFPUC reservoirs, and on SFPUC watershed lands*”?

59 cont.

Statement

Page 4.3-22, Environmental Settings and Impacts – Recreation 4.3.6: The EIR identifies that the proposed roadway closures will impact access along the roadway for cycling including the Amgen cycling event; the closure periods have been identified as 2 months in the summer 2011 and 18 months in 2012-2013.

Comment

The EIR has failed to address the substantial impacts on the project on the Amgen event, other cycling events that routinely utilize Calaveras Road and would be potentially affected during the proposed closure periods. The condition of the pavement surface due to the extensive hauling activities may also impact cycling and cycling events requiring localized repairs and additional roadway sweeping for cyclist safety. In addition, access to regional recreation facilities would be substantially affected during the closure periods. These are significant impacts that need to be mitigated.

60

Statement

Page 4.4-14: The reservoir provides both warm-water and cold-water habitat. Bass, sunfish, and catfish constitute the primary warm-water fisheries in Calaveras Reservoir. The reservoir’s cold-water species include rainbow trout (*Oncorhynchus mykiss*).

61

County Comment

The SFPUC should adopt and implement a general policy to eradicate all non-native fish from their facilities. Under higher flow scenarios, non-native fish may make it over the spillway and find themselves in Alameda Creek.

Statement

Page 4.4-34: Calaveras Creek downstream of the dam to confluence with Alameda Creek is impaired by non-native predatory fish and bullfrogs in large pools immediately downstream of the dam and at the confluence with Alameda Creek.

62

County Comment

This statement confirms the County's concerns with predatory non-native fish having a negative impact on native wildlife, specifically with California red-legged frogs and native rainbow trout. The SFPUC should implement a non-native species eradication policy on its properties within the Alameda Creek Watershed.

Statement

Page 4.4-34: Alameda Creek impaired by presence of non-native predatory fish and bullfrogs downstream of Little Yosemite. Breeding habitat quality varies in Alameda Creek; fewer egg masses are found in the Sunol reach compared to the reach at Camp Ohlone.

County Comment

This statement confirms the County's concerns with predatory non-native fish having a negative impact on native wildlife within the watershed, specifically with California red-legged frogs and native rainbow trout. The SFPUC should implement a non-native species eradication policy on its properties within the Alameda Creek Watershed.

Statement

Page 4.4-35: Specific threats to California red-legged frog in the east San Francisco Bay region include livestock grazing, non-native predators, urbanization, water management, diversions, and reservoirs. Regional, county, and city park districts and regional water and municipal utility districts are recognized in the 2002 recovery plan as contributing to California red-legged frog habitat management in the region. Specific management actions being taken by these agencies include preparing Habitat Conservation Plans (HCPs), maintaining water levels in ponds, removing predatory fish, reducing grazing impacts, minimizing human disturbances, planting wetland and riparian vegetation, offering public education programs, and developing guidelines for fire management practices to decrease incidental impacts on California red-legged frogs.

County Comment

The SFPUC should follow these guidelines to the maximum extent possible on its properties within the Alameda Creek Watershed.

Statement

A 1997 MOU between the SFPUC and CDFG specifies releases from Calaveras Reservoir to improve habitat conditions for native rainbow trout and native warm-water fish species. Flow releases have been designed to provide water at temperatures that are cold enough for rainbow trout in a defined upper study reach, yet with sufficient warming to satisfy the temperature requirements of native, warm-water fishes in a defined lower reach (CDFG 1997).

County Comment

The defined lower reach should be expanded to include the extended study area defined on Figure 4.5.1 of the CDRP (i.e., the entire length of Alameda Creek to San Francisco Bay). The County recommends the SFPUC re-assess its MOU with CDFG.

Statement

An element of the 1997 MOU with CDFG includes construction of downstream facilities to recapture the water released for the proposed fishery and aquatic habitat beneficial uses.

64 cont.

County Comment

This element of the MOU should be discarded as it predates the listing of Steelhead as a federally threatened species. The water released from Calaveras Reservoir should not be recaptured in Sunol, but rather freely released down to San Francisco Bay.

Statement

On Page 4.5-13: The ACFCWCD channelization project is listed as a barrier/obstacle to fish migration.

County Comment

The statement is misleading. The County does not have a channelization project. The 12 mile earthen flood control channel (presumed being reference) was constructed by the Army Corps of Engineers many years after the Calaveras dam and diversion barrier construction had already resulted in a precipitous decline of the Steelhead population. Diversion of flows is the principal reason for migration difficulties in this corridor. None- the-less, the scheduled installation of fish ladder in 2011 (fully known to SFPUC) would still require substantial flow releases from the upper watershed to make the ladder operable. Please elaborate on the rationale in listing the flood control channel proper as a barrier.

65

Statement

It is unlikely that any of the warmwater species have the swimming ability necessary to ascend through the Little Yosemite area into the upper portion of Alameda Creek, and their exclusion may favor rainbow trout through lack of competition and predation.

66

County Comment

Can you qualify this response in relation to the swimming capability of adult Sacramento suckers (*Catostomus occidentalis*).

Statement

Page 4.6-42: Coarse streambed sediments are preferred by some fish species, such as trout and steelhead, for spawning, particularly, gravels and pebbles which can be moved by the fish for spawning beds (called "redds").

67

County Comment

This coarse sediment is being trapped behind Calaveras Reservoir and partially diverted to Calaveras Reservoir from the Alameda Diversion Dam and Tunnel. The SFPUC should commission a study to determine the quantity of coarse sediment being trapped in the Calaveras

Reservoir and provide measures to mitigate for this loss downstream from the base of the Dam and Alameda Diversion Dam downstream to San Francisco Bay.

67 cont.

Statement

Page 4.6-69: Under existing conditions, no water is released from the reservoir to support fish in Calaveras and Alameda Creeks downstream of the dam. Under the proposed operations, water would be released from the reservoir through the proposed low-flow valves to support native fish, as discussed in Sections 3.6.5 and 3.6.6. Additional reservoir releases would be provided in accordance with the 1997 MOU flow schedule during any time of the year when sufficient flow is not present in Alameda Creek upstream of the ACDD to meet the MOU flow requirements and in summer when cold water from the reservoir would be released to meet temperature criteria. These fisheries releases are intended to improve habitat conditions for native fish and would increase flows in Calaveras Creek downstream of the dam during times of the year when there is little or no flow in the creek under existing conditions. As previously explained, additional releases to address future steelhead fisheries are not assumed in this hydrology analysis but would occur in the future under the conditions explained in Section 3.6.6, Steelhead Flow Releases, and Section 6.2.3, Cumulative Effects by Environmental Topic.

68

County Comment

Releases of flows from Calaveras Reservoir should not be "re-captured" within the watershed. These flows should be available all the way to San Francisco Bay. The DFG MOU requires modification post listing of steelhead.

Statement

Page 4.6-7: As specified in Sections 3.6.5 and 3.6.6, when water is present in upper Alameda Creek, a portion of the flow would be allowed to bypass the ACDD to support native fish in the creek downstream of the diversion dam.

69

County Comment

Flow releases allowed to bypass the ACDD should be sufficient to support native fish downstream to San Francisco Bay.

Statement

Page 4.6-106: The diversions at the ACDD and storage in the reservoir under the proposed project would reduce some peak and moderate flows in Alameda Creek between the ACDD and San Francisco Bay.

70

County Comment

Although the County commends the SFPUC for referencing the effects of the CDRP downstream to San Francisco Bay, effects have not been adequately addressed in the draft EIR. We encourage all analysis of the effects of CDRP to incorporate effects downstream to San Francisco Bay.

County Comments on Section 4.7

Schedule construction activities during the non-rainy season to minimize the potential for pollutant discharge to Calaveras and Alameda Creeks.

70

What design storm will be used for the preparation of the stormwater pollution prevention plans? Is there a plan of action for responding to catastrophic failure of the proposed erosion control and water quality treatment features and facilities?

Statement

Page 4.7-29, first and second paragraphs: It is stated that, "The impacts on beneficial uses related to water supply (groundwater recharge and freshwater replenishment) could also be potentially significant downstream in Alameda Creek. The impacts may be similar to those associated with the existing natural range in sediment discharges in Alameda Creek and its related turbidity (e.g., during large storm flows). However, if construction-related discharges are added to high natural sediment loads and turbidity during and after large storm events, the combined effects could increase substantially."

72

County Comment

In addition to the impacts noted in the DEIR, sediment discharge into Alameda Creek due to project activities may also cause deposition of sediments in the Alameda Creek Federal Project downstream of Niles Canyon. SFPUC should be responsible for removal of project related sediments and other contaminants from the Federal Project.

Statement

Page 4.7-10: Aquatic resources in Alameda Creek have been monitored since 1998 as part of the 1997 MOU with CDFG. Water temperature, turbidity, pH, and DO concentrations have been measured annually in each of the electro-fishing habitat units.

County Comment

Aquatic resources monitoring in the lower Alameda Creek is yet to be conducted by SFPUC. In order to understand the real SFPUC projects impacts to aquatic resources, a baseline survey of the resources needs to be conducted. This has not been done. The County requests the SFPUC to conduct detailed surveys to the same degree that have been conducted in other stream reaches within the watershed consistent with the flow diversion (into reservoirs) impacts to the lower reaches of Alameda Creek.

73

Statement

Page 4.7-29: Construction related sediment discharges would constitute a significant impact on Alameda Creek water quality.

74

County Comment

The SFPUC correctly notes the significant negative impacts on water quality within Alameda Creek via the proposed construction project. The County requests a rigorous sediment and water quality monitoring program at County-reviewed monitoring locations from just below the base of the dam to San Francisco Bay. The County requests that all methodologies for monitoring be reviewed and mutually approved.

74 cont.

Statement

Mitigation Measures 5.12.4b Approval for Road Closure: The SFPUC shall seek approval from Alameda County for closure of Calaveras Road between Geary Road and the dam site, to through traffic, Monday to Friday, except for emergency vehicles, during two periods when hauling on Calaveras Road from Geary Road to the dam site would create substantial conflicts with other vehicles. These two periods are estimated to occur for **2 months in summer 2011 and 18 months beginning in winter 2012.**

75

County Comment

As the DEIR acknowledged, these substantial conflicts are also present along the portion of the haul route that extends beyond the closure limits. These conflicts have not been adequately mitigated in the Draft EIR. Mitigations for roadway safety for motorist and cyclists are needed on this segment of the road. Mitigations to address these conflicts should include but not limited to providing adequate lane widths and shoulder area in conformance with public road standards and providing turnout areas for trucks along haul routes.

Statement

Page 5-3: The qualified biologist will remove and/or destroy any individuals of non-native species, such as bullfrogs, crayfish, and centrarchid fish from within the dewatered habitat, to the maximum extent possible.

76

County Comment

The County supports the SFPUC recommendation to eradicate all non-native species encountered during the de-watering process necessary for project implementation. The County recommends that the SFPUC make this a general policy to be implemented during all biological surveys held within the Alameda Creek Watershed.

County Comment on Section 5.4.3

The SFPUC shall compensate for unavoidable impacts on special-status species and sensitive habitats in accordance with a detailed compensation plan or plans. The compensation plan(s) shall be prepared by a qualified restoration ecologist and shall be consistent with all required permits. The final compensation plan(s) shall fully compensate for direct and indirect impacts on special-status species and for the temporal, long-term, and permanent losses of habitat areas, functions, and services and shall include a description of the resource types and amounts that will be provided; the methods of compensation (i.e., restoration, rehabilitation, reestablishment, establishment, enhancement, and/or preservation); and the manner in which the resource

77

functions and services of the compensation project will address the related project impacts. The final compensation plan(s) shall provide, at minimum:

5.4.3a Compensation Goals and Objectives

- **Wetlands and Other Waters:** Fully compensate for impacts on 4.61 acres of wetlands and open water and 4,682 linear feet of stream habitat by restoring wetlands and streams and establishing wetland habitats at the South Calaveras and San Antonio Mitigation Areas within 5 years of completion of construction.
- **Riparian Habitat:** Fully compensate for impacts on 7.9 acres of riparian habitat by restoring and establishing riparian habitat at the South Calaveras and San Antonio Mitigation Areas within 10 years of completion of construction.
- **Oak Woodlands and Savannah:** Fully compensate for impacts on 24.0 acres of oak woodland and savannah habitat by restoring and establishing oak woodland and savannah habitat at the San Antonio Mitigation Area within 10 years of completion of construction. Impacts on oak woodlands and savannah may also be compensated for in whole or in part through a contribution to the Oak Woodlands Conservation Fund as established under subdivision (a) of Section 1363 of the Fish and Game Code.

77 cont.

Statement

Page 5-24, Inspection and Maintenance: Inspect all disturbed sites in the first week of October and no later than October 15 to document that all erosion and sediment control BMPs have been installed properly according to the BMP requirements.

78

County Comment

In general conformance with the Alameda County Grading Ordinance, all disturbed sites should be inspected no later than mid-September and all erosion and sediment control BMPs should be installed by October 1st. According to the Alameda County Grading Ordinance, the rainy season runs from October 1 to April 15.

Statement

Mitigation Measures, 5.7.1 Storm Water Pollution Prevention Plan, Page 5-25, Monitoring and Reporting: Notify the RWQCB, Alameda County Water District, Alameda County Environmental Health Services Department, and East Bay Regional Park District in the event of elevated turbidity or a spill or release of contaminants, NOA, or metals to any waterways in the Alameda Creek system.

79

County Comment:

Include the Alameda County Flood Control and Water Conservation District in the notifications of such events. Enough of the deleterious materials are likely to be deposited in the Alameda Creek Federal Project downstream of Niles Canyon to be a concern of the District. SFPUC should be responsible for removal of such materials from the Federal Project.

Statement

Mitigation Measures, 5.9.5 Hazardous Materials in Structures to be Demolished: Any electrical equipment containing polychlorinated biphenyls (PCBs), fluorescent lights containing mercury vapors or fluorescent light ballasts containing PCBs or Bis (2-ethylhexyl) phthalate (DEHP) in any of the structures to be demolished shall be removed and disposed of properly.

80

County Comment

Will this material be disposed of at one of the disposal areas on-site? The County and the public should be provided opportunity to comment on the Material Handling Plan.

Statement

Page 6-14, Proposed SFPUC Upper Alameda Creek Filter Gallery Project: This project would recover water released from the Calaveras Dam or bypassed at the Alameda Creek Diversion Dam (ACDD) under the requirements of the Memorandum of Understanding (MOU) between the SFPUC and California Department of Fish and Game. The SFPUC would recover the water downstream via an infiltration gallery (perforated pipes) to be constructed directly beneath the streambed of Alameda Creek just upstream of the confluence of Alameda and San Antonio Creeks.

81

County Comment

The County requests that the SFPUC abandon the Upper Alameda Creek Filter Gallery Project completely and to revise the MOU with DFG to provide flows downstream of Calaveras Reservoir through Alameda Creek to its estuary at San Francisco Bay. The concept of recapturing water within Alameda Creek prior to its release at San Francisco Bay is outdated and inconsistent with Riparian rights under Water Right laws. The County will support the SFPUC in amending its MOU with DFG to this end.

The following relevant County policies are affected by the Calaveras Dam Project (i.e., *Diversion of flows renders certain corridors of Alameda Creek and tributary creeks barren, thereby affecting the quality of the corridor*). These impacts were not adequately addressed in the draft EIR.

82

EAST COUNTY AREA PLAN POLICIES

ECAP Policy 101: The County shall encourage public water management agencies to explore recreational opportunities on watershed lands, particularly reclaimed quarries, where recreational use would not conflict with watershed protection objectives.

Policy 102: The County shall encourage the San Francisco Water Department to provide limited public access on trail corridors through the watershed lands surrounding San Antonio and Calaveras Reservoirs, Sunol Watershed, and the Arroyo de la Laguna. The County shall work with the East Bay Regional Park District to incorporate these watershed corridors into the regional trail system, where recreational use would not conflict with watershed protection objectives.

Policy 103: The County shall designate an area outside of the San Francisco Water Department lands that extends to the limit of the watershed boundary as "Resource Management". Within this area, the County shall encourage land use activities to adhere to management guidelines developed for the protection of watershed lands and shall ensure that subdivisions of lands or quarry operations and reclamation plans within this designation are approved only where such subdivisions or quarry operations would not adversely affect the watershed protection objectives of the San Francisco Water Department.

Policy 104: The County shall preserve the area located between the Sunol/Ohlone Wilderness and San Francisco's San Antonio and Calaveras Reservoir watershed lands for uses compatible with watershed and recreational lands.

82 cont.

ECAP Policy 110: The County shall require that developments are sited to avoid or, if avoidance is infeasible, to minimize disturbance of large stands of mature, healthy trees and individually healthy trees of notable size and age. Where healthy trees are removed, the County shall require a tree replacement program which includes a range of tree sizes, including specimen-sized trees, to achieve immediate visual effect while optimizing the long-term success of the replanting effort.

ECAP Policy 113: The County shall review development proposed adjacent to or near public parklands to ensure that views from parks and trails are maintained.

ECAP Policy 114: The County shall require the use of landscaping in both rural and urban areas to enhance the scenic quality of the area and to screen undesirable views. Choice of plants should be based on compatibility with surrounding vegetation, drought-tolerance, and suitability to site conditions; and in rural areas, habitat value and fire retardance.

ECAP Policy 115: In all cases, appropriate building materials, landscaping, and screening shall be required to minimize the visual impact of development. Development shall blend with and be subordinate to the environment and character of the area where located, so as to be as unobtrusive as possible and not detract from the natural, open space or visual qualities of the area. To the maximum extent practicable, all exterior lighting must be located, designed, and shielded so as to confine direct rays to the parcel where the lighting is located.

ECAP Policy 116: To the maximum extent possible, development shall be located and designed to conform with rather than change natural landforms. The alteration of natural topography,

vegetation, and other characteristics by grading, excavating, filling, or other development activity shall be minimized. To the extent feasible, access roads shall be consolidated and located where they are least visible from public view points.

FCAP Policy 117: The County shall require that where grading is necessary, the off-site visibility of cut and fill slopes and drainage improvements is minimized. Graded slopes shall be designed to simulate natural contours and support vegetation to blend with surrounding undisturbed slopes.

ECAP Policy 118: The County shall require that grading avoid areas containing large stands of mature, healthy vegetation, scenic natural formations, or natural watercourses.

ECAP Policy 119: The County shall require that access roads be sited and designed to minimize grading.

ECAP Policy 120: The County shall require that utility lines be placed underground whenever feasible. When located above ground, utility lines and supporting structures shall be sited to minimize their visual impact.

82 cont.

ECAP Policy 121: The County shall secure open space lands, through acquisition of easements or fee title, specifically for the preservation and protection of indigenous vegetation and wildlife.

ECAP Policy 122: The County shall encourage that wetland mitigation be consolidated in areas that are relatively large and adjacent to or otherwise connected to open space. To the extent possible, these areas should be included in, adjacent to, or linked through open space corridors with lands designated as "Resource Management" that are managed specifically for the preservation and enhancement of biological resources.

ECAP Policy 123: Where site-specific impacts on biological resources resulting from a proposed land use outside the Urban Growth Boundary are identified, the County shall encourage that mitigation is complementary to the goals and objectives of the ECAP. To that end, the County shall recommend that mitigation efforts occur in areas designated as "Resource Management" or on lands adjacent to or otherwise contiguous with these lands in order to establish a continuous open space system in East County and to provide for long term protection of biological resources.

ECAP Policy 124: The County shall encourage the maintenance of biological diversity in East County by including a variety of plant communities and animal habitats in areas designated for open space.

ECAP Policy 125: The County shall encourage preservation of areas known to support special status species.

ECAP Policy 126: The County shall encourage no net loss of riparian and seasonal wetlands.

ECAP Policy 127: The County shall encourage the preservation of East County's oak woodland plant communities.

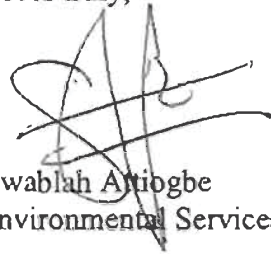
ECAP Policy 129: The County shall protect existing riparian woodland habitat present along the Arroyo Mocho, Arroyo Del Valle, Arroyo Las Positas, Arroyo de la Laguna and Alamo, Tassajara, and Alameda Creeks.

82 cont.

Thank you for the opportunity to comment on this draft EIR. The dEIR requires revision and re-circulation in accordance with Section 150703.5 of CEQA. The County would appreciate a written response to the comments. I can be reached at Kwablah@acpwa.org or by phone at (510) 670-5772 if you have further questions.

83

Yours truly,



Kwablah Attiogbe
Environmental Services Manager,

KA/ED/rbr

C: County Counsel: Audrey Beaman audrey.beaman@acgov.org

Army Corps of Engineers: Robert.F.Smith@usace.army.mil

RWQCB: dbowyer@waterboards.ca.gov

DFG: Scott Wilson: swilson@dfg.ca.gov

NMFS: Gary Stern: Gary.Stern@NOAA.gov

USFWS: Jim Browning j_browning@fws.gov

December 17, 2009

Mr. Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103-2414

Dear Mr. Wycko:

Subject: SFPUC Calaveras Dam Replacement Project: Draft Environmental Impact Report

The Alameda County Water District (ACWD) appreciates this opportunity to comment on the Draft Environmental Impact Report for the SFPUC's Calaveras Dam Replacement Project (DEIR). The following narrative addresses ACWD's reliance on water supplies from the Alameda Creek Watershed (downstream of the Calaveras Dam Replacement Project), ACWD's support for improving the Regional Water System (including the Calaveras Dam Replacement Project) and the need for the DEIR to adequately address downstream water supply, water quality and fishery impacts in the Alameda Creek Watershed.

ACWD Background

ACWD supplies water to a population of over 330,000 in the cities of Fremont, Newark and Union City and relies on purchases from the San Francisco Regional Water system for approximately 20% of its supplies. ACWD also relies on local runoff from the Alameda Creek Watershed to replenish the Niles Cone Groundwater Basin (underlying the ACWD service area). This local source provides approximately 40% of ACWD's supplies. The local runoff from the Alameda Creek Watershed is percolated into the Niles Cone Groundwater Basin through recharge in the Alameda Creek Flood Control Channel and through recharge ponds within and adjacent to the Quarry Lakes Regional Recreational Area. The water is subsequently recovered through groundwater production wells and provided as a potable supply to ACWD's customers. Given that the Niles Cone Groundwater Basin is hydraulically connected to San Francisco Bay, recharge of the groundwater basin with runoff from Alameda Creek also serves as a barrier to protect the groundwater basin from saltwater intrusion. ACWD's other supplies include imported water from the State Water Project (SWP), which is treated at the District's water treatment facilities prior to distribution. A relatively small portion of ACWD's SWP supplies are released into Alameda Creek for groundwater recharge.

Mr. Bill Wycko, Environmental Review Officer
 Page 2 of 15
 December 17, 2009

ACWD Support for Implementation of the SFPUC's Water Supply Improvement Program

As one of the SFPUC's larger wholesale customers, ACWD has a profound interest in seeing the SFPUC successfully execute its multi-billion dollar Water Supply Improvement Program (WSIP), including the Calaveras Dam Replacement Project. We share with the residents of San Francisco the same desire for a high quality water supply and a reliable storage and conveyance system that will serve the present and future needs of the San Francisco Bay Area at a reasonable cost. The Calaveras Dam Replacement Project (CDRP), with the implementation of appropriate mitigation measures (as discussed below), can help to improve the dry year water supply reliability and local emergency water supply reserves for the Bay Area.

Need to Address Alameda Creek Watershed Impacts

At almost 700 square miles, the Alameda Creek Watershed is the largest local watershed tributary to San Francisco Bay. This watershed is an important local resource in the Bay Area with much of the watershed headwaters remaining in a pristine, natural condition. Alameda Creek is crucial in providing beneficial uses which include aquatic and riparian habitat for a wide variety of species, as well as serving as a vital source of water supply to the communities in ACWD (Fremont, Newark and Union City).

For that reason, ACWD's comments on the DEIR focus on ensuring that potential downstream impacts in the Alameda Creek Watershed, including the fishery resources and water supply to the Niles Cone Groundwater Basin, are adequately evaluated, and that full mitigation is provided for any adverse impacts. As the comments below illustrate, the DEIR does not adequately address downstream impacts to ACWD's water supplies from Alameda Creek and the Niles Cone Groundwater Basin, and potential impacts to steelhead trout, a federally-protected species.

1. The technical analysis of downstream hydrologic impacts of the CDRP is fundamentally flawed.

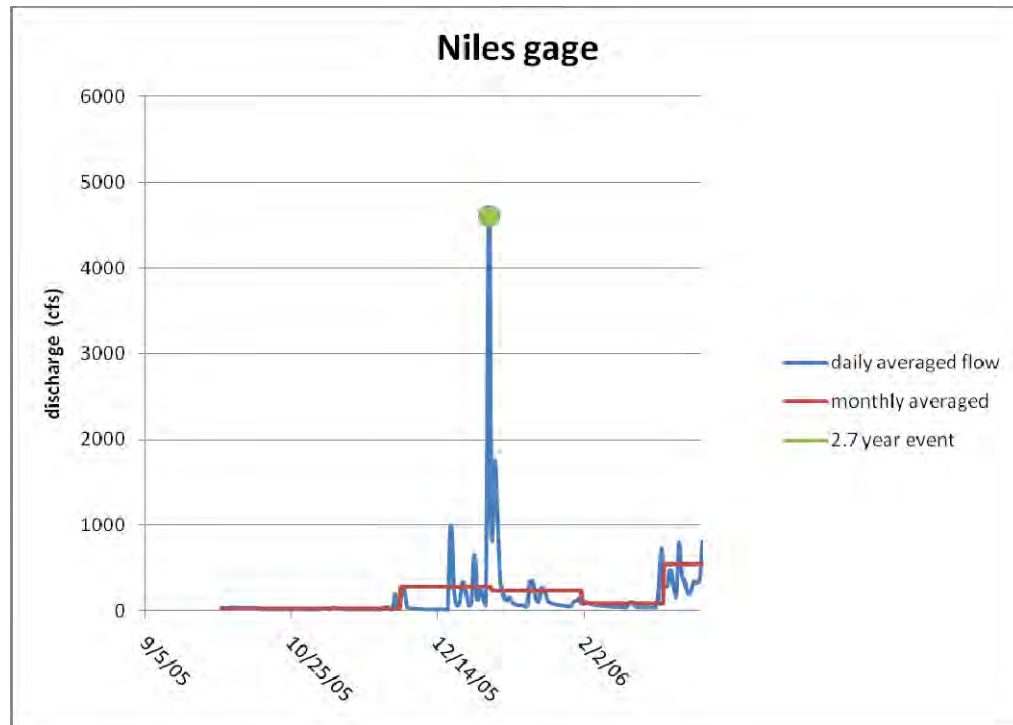
As documented in the DEIR, projected changes to downstream flows attributed to implementation of the CDRP are evaluated through the use of the Hetch-Hetchy/Local Simulation Model (HH/LSM). All modeling of impacts to Alameda Creek flows was conducted on a monthly time step. These results are presented as average monthly flows.

The monthly model time step is not sufficient to capture day-to-day flow impacts that may be significant. Winter and spring flows in Alameda Creek and its tributaries are highly variable, and are primarily a function of the daily rainfall conditions. It is common for daily flows within a month to vary widely, with peak flows occurring during and directly after a rainfall event. Flows quickly recede after these brief periods of rainfall. Because of these wide variations in daily flows, the use of a monthly time step to evaluate downstream flow impacts is not adequate for CEQA purposes. For instance, implementation of the CDRP may significantly reduce stream flows for a portion of a month (with significant impacts to fisheries and downstream water supplies) while keeping water in the creek for the remainder

Mr. Bill Wycko, Environmental Review Officer
 Page 3 of 15
 December 17, 2009

of the month. However, with the use of average monthly flows in the HH/LSM, the impacts of significantly reducing flows during a portion of the month would be obscured, or entirely overlooked in the DEIR impact analysis. Figure 1 demonstrates the typical annual variability that may be encountered in any given year, along with monthly averaged flow rates used for the HH/LSM analysis.

Figure 1. Demonstration of hydrologic variability at the USGS gage 11179000 (Niles Canyon)



Instead, the DEIR analyses of downstream flow impacts should be conducted utilizing a hydrologic model with a daily time-step developed for the Alameda Creek Watershed. Given the highly variable flow conditions in the watershed, a daily time step is necessary to analyze and properly assess impacts to both fisheries and water supply. As an example, ACWD uses a daily operational model, with over 70 years of daily hydrology on Alameda Creek. This ACWD model is used for the operational planning of ACWD water supply facilities in the Alameda Creek Flood Control Channel. In order to facilitate the implementation of a similar daily hydrologic model of the SFPUC's Alameda Creek watershed operations, in August 2009, ACWD and SFPUC entered into a letter of understanding (LOU) to develop a hydrologic model of the watershed which simulates flow downstream of Calaveras Dam and Alameda Creek Diversion Dam on a daily basis. This hydrologic model has been recently completed, and the results reviewed with both the California Department of Fish and Game (DFG) and NOAA Fisheries. Prior to finalizing the DEIR, the downstream hydrologic impacts of the CDRP should be re-evaluated with this daily model to adequately address the highly variable flow conditions in the watershed. As described in the comments below, the

01 cont.

Mr. Bill Wycko, Environmental Review Officer
 Page 4 of 15
 December 17, 2009

daily hydrologic model should be used to assess impacts to both downstream water supplies and flows needed for a restored steelhead fishery.

01 cont.

2. The Upper Alameda Creek Filter Gallery Project is an integral component of the Calaveras Dam Replacement Project and should be included as part of the EIR's Project Description

The DEIR includes the analyses of the proposed Upper Alameda Creek Filter Gallery Project under the "Cumulative Impacts" section of the DEIR (Section 6). The Upper Alameda Filter Gallery Project ("Filter Gallery Project") was previously called the "Alameda Creek Fishery Enhancement Project" when it was evaluated on a programmatic basis in the 2007 Program EIR for the SFPUC's Water System Improvement Program (Table 3.10, page 3-50). At that time, the Project Description in the Program EIR stated that, "This project would recapture the water released as part of the Calaveras Dam project (SV-2) and return it back to the regional system for use". The Program EIR goes on to describe the potential means to recover the water as, "A number of structural and non-structural recovery alternatives..." including, "a water recapture facility downstream of the Sunol Valley WTP, conjunctive groundwater use, horizontal collector wells, or other groundwater systems yet to be defined".

02

It is apparent that the SFPUC has recently completed a significant amount of planning and design on this project, as the description of this project under the CDRP DEIR is much more specific. As described in Table 6.1 of the DEIR, the Filter Gallery Project would, "recover water released from the Calaveras Dam or bypassed at the Alameda Creek Diversion Dam (ACDD) under the requirements of the Memorandum of Understanding (MOU) between the SFPUC and California Department of Fish and Game." The project description goes on to state that the, "SFPUC would recover the water downstream via an infiltration gallery (perforated pipes) to be constructed directly beneath the streambed of Alameda Creek just upstream of the confluence of Alameda and San Antonio Creeks. The primary project components include the infiltration gallery (pipes beneath Alameda Creek), a new pipe from the infiltration gallery to the existing Sunol Pipeline, and a sump and small pump station at the end of the infiltration gallery which would allow the SFPUC to pump the recovered water through the Sunol Pipeline to the San Antonio Pipeline where water would be transported to the San Antonio Reservoir. The infiltration gallery and new pipe would be installed via open-cut construction method."

The DEIR takes the approach of analyzing the Filter Gallery Project as a separate project from the CDRP by evaluating the Filter Gallery Project as a "reasonably foreseeable" project under the Cumulative Impacts section of the DEIR. The SFPUC has also stated that the Filter Gallery Project will go through a separate environmental review and permitting process. However, as described below, the Filter Gallery Project and CDRP are so closely linked that this approach to separate environmental review of these two projects is inappropriate:

- First, as described in the DEIR, the schedules of these two projects call for construction of both projects to be completed concurrently (in 2015).

Mr. Bill Wycko, Environmental Review Officer
 Page 5 of 15
 December 17, 2009

- Second, as described in the DEIR Project Description, a key element of the CDRP will be the implementation of the 1997 MOU fishery flow releases from Calaveras Dam and ACDD. However, as also described in the DEIR, the implementation of the 1997 MOU fishery flow releases is directly dependent on the implementation of the downstream recapture facility (i.e. Filter Gallery Project). Specifically, on Page 4.5-6 of the DEIR it states that, among other factors, the reason the 1997 MOU flow releases have not been implemented to date is “due to delays in constructing a water recapture facility”.
- Third, as described under the Project Description, a Primary Objective of the CDRP is to “re-establish water delivery reliability” to the pre-DSOD conditions (page 3-7). As described above, a key element of the Project Description also includes the implementation of the fishery flow releases under the 1997 MOU. However, since the 1997 MOU will require flow releases of up to 6,300 AF/Yr, and given that these releases were never implemented under pre-DSOD conditions, it is clear that the CDRP’s Primary Objective of re-establishing water delivery reliability may not be achieved without implementation of the Filter Gallery Project.
- Lastly, all hydrologic modeling of downstream flow impacts of the CDRP conducted for the DEIR assume that the Filter Gallery Project is in place and would recapture flows released under the 1997 MOU. In fact, the DEIR does not consider downstream impacts of the CDRP without the Filter Gallery Project in place. If the Filter Gallery Project is a future, separate project from the CDRP, under CEQA Guidelines, it is clearly inappropriate to assume that the Filter Gallery Project is in place when evaluating the environmental impacts of the CDRP.

02 cont.

Because the planning and design of the Filter Gallery Project is well underway and because meeting the Primary Objectives of the CDRP is dependent on implementation of the Filter Gallery Project, the DEIR should consider the Filter Gallery Project as part of the overall Calaveras Dam Replacement Project, and include it in the DEIR’s Project Description of the CDRP. Without including the Filter Gallery as part of the CDRP Project Description, the Primary Objective of water supply reliability may not be met, and the SFPUC would be “piecemealing” the environmental analyses of these two projects, in violation of CEQA requirements.

If the SFPUC insists on keeping the Filter Gallery Project is kept as a separate project from the CDRP in the DEIR, then the downstream impact analyses of the CDRP should assume that the Filter Gallery is not in place. In addition, the water supply reliability benefits of the CDRP should also be evaluated without the Filter Gallery in place.

3. **The DEIR does not provide an adequate analysis of downstream impacts to ACWD’s water supplies and incorrectly characterizes the potential impacts as “less than significant.”**

03

Mr. Bill Wycko, Environmental Review Officer
 Page 6 of 15
 December 17, 2009

The DEIR incorrectly states that the proposed CDRP would not impact ACWD's water supplies drawn from the Niles Cone Groundwater Basin. As described above, the Niles Cone Groundwater Basin underlies the ACWD service area and provides approximately 40% of the water supply to the communities of Fremont, Newark and Union City. The primary source of recharge for the Niles Cone Groundwater Basin comes from runoff from the Alameda Creek Watershed, with most recharge occurring in the winter and early spring months. The DEIR acknowledges that, as a result of implementation of the CDRP, "Reductions of up to 17% in average monthly flow could occur in years similar to Water Years 2000 – 2007" in Alameda Creek at Niles Canyon. Given ACWD's reliance on these winter and spring flows to replenish the Niles Cone Groundwater Basin (and to protect the Basin from seawater intrusion from San Francisco Bay), the Niles Cone Groundwater Basin and ACWD's water supplies, would, in fact, be significantly affected by the proposed CDRP. However, the DEIR fails to quantify the potential water supply impacts to ACWD that would occur as a result of these flow reductions.

In order to quantify the potential water supply impacts to the Niles Cone Groundwater Basin, ACWD has further evaluated the results of the HH/LSM modeling, as presented in Appendix D of the DEIR. The results from this preliminary analysis, summarized in Table 1 below, indicate that ACWD monthly water supply losses could exceed 2,800 AF/month, and the annual water supply losses could exceed 4,400 AF/Yr. Based on total water deliveries in the ACWD service area of 50,800 AF in FY08/09, this represents a 9% loss of ACWD's available water supplies.

03 cont.

Table 1. Preliminary Analyses of Water Supply Impacts to ACWD as a result of CDRP Implementation (negative value represents loss of water supply, in acre-feet)

Water Year	Dec	Jan	Feb	Mar	Apr	May	June	Dec-Mar Total	Annual Total
2002	0	0	-111	61	119	0	0	-50	69
2003	-1660	-676	-167	-61	60	123	-1660	-2565	-2382
2004	0	-615	-805	-123	60	0	0	-1543	-1484
2005	-615	-2828	-1611	-2337	3273	-307	-615	-7390	-4425
2006	-615	-2214	-444	-1168	6664	-1783	-615	-4441	440
2007	0	0	0	0	0	0	0	0	0

Despite this significant loss in water supply, the DEIR incorrectly concludes that impacts to ACWD's water supplies of the Niles Cone Groundwater Basin would be "less than significant." The DEIR comes to this conclusion based on: 1) an analysis which relies solely on an overly-simplified modeling of average monthly flows of lower Alameda Creek over a limited time frame; 2) an inappropriate comparison of hydrologic conditions that occurred prior to the DEIR's baseline; and 3) an inadequate review of the modeling results. For

Mr. Bill Wycko, Environmental Review Officer
 Page 7 of 15
 December 17, 2009

instance, the DEIR's use of "pre-baseline" conditions (i.e., prior to the 2001 DSOD restrictions on Calaveras Reservoir) to provide a basis for determining the level of impacts to downstream supplies is inconsistent with the Final WSIP DEIR (page 14.4-14). That section states that, "Consistent with CEQA Guidelines, the Draft DEIR uses the conditions present in 2005 as the baseline condition for the analysis of impacts of WSIP water supply and operations on Alameda Creek." The DEIR is incorrect when it concludes that, based on the modeling results and historical flows in the creek (pre-baseline conditions), downstream water supply impacts to ACWD would be "less than significant".

Prior to finalizing the EIR, an analysis of potential impacts to the Niles Cone Groundwater Basin and ACWD's water supplies from the Niles Cone Groundwater Basin should be conducted and the results included in the EIR. This impact analysis should consider potential impacts due to changes in timing and magnitude of flows in the Alameda Creek Flood Control Channel on a daily basis. The impact analyses should use the Baseline Conditions as described in Section 1.3.1 of the DEIR (post-DSOD requirements for Calaveras operations), and should consider ACWD's facilities and operations utilized for groundwater recharge in the Flood Control Channel and adjacent percolation ponds. The DEIR should also include mitigation for resulting impacts to ACWD's water supply in the Niles Cone. This mitigation could consist of a commitment from the SFPUC to either: 1) release sufficient water from Calaveras Dam downstream to ACWD's recharge such that the water supply impacts are fully mitigated; or 2) provide another source of supply to ACWD (of equivalent or better water quality) to fully offset the water supply impacts.

03 cont.

4. The DEIR does not provide an adequate analysis of the impacts of the Project on downstream fisheries, and the flows needed for a restored steelhead fishery.

The following ACWD comments focus on the potential impacts the Calaveras Dam Replacement Project may have once fish passage is restored further downstream and steelhead have access to spawning and rearing habitat below the rebuilt Calaveras Dam and Alameda Creek Diversion Dam (ACDD). Specifically, ACWD is concerned that the DEIR does not address the impacts that the CDRP will have on flows in the "secondary study area." Correspondingly, the DEIR should include a meaningful analysis of how steelhead migration into and out of the primary study area (Sunol Valley Reach), the Niles Canyon Reach, as well as the Alameda Creek Flood Control Channel will be impacted by implementation of the Calaveras Dam Replacement Project. The following is a summary of ACWD's comments regarding fishery impacts; each of these comments is discussed in greater detail below.

- A. The description of the progress made by ACWD and Alameda County Flood Control and Water Conservation District in addressing downstream fish passage in the Alameda Creek Flood Control Channel should be updated.
- B. The DEIR does not recognize the significant impacts that the historic and projected future CDRP operations have on the downstream flow regime.

Mr. Bill Wycko, Environmental Review Officer
 Page 8 of 15
 December 17, 2009

- C. The DEIR does not account for the direct hydrologic connection between the CDRP and the downstream reaches in Niles Canyon and the Alameda Creek Flood Control Channel to San Francisco Bay.
- D. The DEIR should address the need for flow releases to provide for migration of steelhead into and out of Sunol Valley (and the spawning/rearing habitat directly downstream of the CDRP), and through Niles Canyon downstream to San Francisco Bay.

Each of these comments is discussed in greater detail below.

- A. The description of the progress made by ACWD and Alameda County Flood Control and Water Conservation District (ACFCWCD) in addressing downstream fish passage in the Alameda Creek Flood Control Channel should be updated: The DEIR does not take into account the recent progress being made to address passage in the flood control channel, and should be updated. The following is a more current and accurate summary of the progress made to date:

“ACWD’s lower, middle and upper rubber dams are located approximately 16.6, 16.4 and 15.4 miles downstream of Calaveras Dam. The rubber dams, in conjunction with a series of gated pipelines, are used to divert water from Alameda Creek into adjacent ponds, which provide groundwater recharge into the Niles Cone Groundwater Basin. This water is a critically important source of water supply for the cities of Fremont, Newark and Union City. These rubber dams typically remain inflated during the summer and fall months. During the winter through spring, the dams are typically raised and lowered in response to rainfall, watershed runoff, and water levels in the adjacent recharge ponds. The rubber dams, when inflated, have been identified as impediments to fish passage.

Accordingly, ACWD decided to decommission the lower rubber dam to improve fish passage. Environmental review for decommissioning the lower rubber dam was completed in 2006. The construction contract for the work was awarded in April 2009 and all project construction was completed in November 2009. The project included removing the existing rubber dam bladder and notching the existing foundation to install a fish ladder that provides passage over a range of low flows.

Design of fish passage facilities over the middle and upper rubber dams is in progress. As part of an agreement made in 2007 between ACWD and ACFCWCD, the ladder over the middle dam will also extend over the adjacent BART weir (further information provided below), and the project is being undertaken jointly by the two agencies. Completion of this fish ladder is scheduled for 2011. Design of the upper rubber dam fish ladder is also underway, with project completion scheduled for 2012. Development of CEQA documents for both fish passage projects is also underway with completion of the environmental review process anticipated for spring 2010. ACWD and ACFCWCD will serve as joint lead agencies. Development of a biological assessment for the fish passage projects is also underway, with a draft biological assessment scheduled to be completed by spring 2010.

Mr. Bill Wycko, Environmental Review Officer
 Page 9 of 15
 December 17, 2009

The BART weir is located approximately 16.5 miles downstream of Calaveras Dam and immediately downstream of ACWD's middle rubber dam. The facility was constructed in 1972 to protect the foundation elements of the UPRR and BART bridges crossing Alameda Creek. The facility consists of a 12-foot high, bank-to-bank, sloping cement grade control structure. Steelhead have been seen at the base of the structure unsuccessfully attempting to swim upstream. It is an acknowledged barrier to fish passage, under all flow conditions. Design of fish passage facilities over the BART weir is being performed jointly between ACWD and ACFCWCD, as described above."

04 cont.

- B. The DEIR does not recognize the significant impacts that the historical and projected future Calaveras Dam operations have on the downstream flows that are needed for a restored steelhead fishery. Data from USGS gages indicate that the Calaveras Reservoir has accounted for significant flow diversions from the watershed. Table 2 presents results from an analysis of published daily average flow data from USGS gages, and demonstrates that in 2001 (the year prior to DSOD restrictions), 92% of all gaged inflows to Calaveras Reservoir were diverted from the watershed. Even during periods of DSOD restrictions (2002 through 2008) roughly 80% of all gaged flows were diverted. These percentages were calculated by applying a mass balance analysis of gaged inflows and outflows of Calaveras Reservoir from Oct 1 to May 31 for water years 2001 – 2008. Table 2 clearly demonstrates the degree of impact the CDRP has on flows downstream of the proposed site in the Sunol Valley, as well as downstream in the Niles Canyon Reach, to the San Francisco Bay. The results of this analysis understate the estimate of total flow removed from the watershed because a primary tributary to Calaveras Reservoir (Calaveras Creek) does not have a USGS gaging station. ACWD would be happy to share with the SFPUC the specific calculations used to develop Table 2 below.

05

Table 2. Results from mass balance of gaged inflow to Calaveras Reservoir

Water Year	Ac-Ft diverted by SFPUC	Average % of available flow diverted by SFPUC
2001	22,600	92%
2002	17,200	81%
2003	33,100	79%
2004	25,700	83%
2005	36,600	85%
2006	26,900	76%
2007	8,400	74%
2008	24,500	84%

- C. The DEIR does not account for the direct hydrologic connection between the Calaveras Dam and the downstream reaches in Niles Canyon and the Alameda Creek Flood Control Channel to San Francisco Bay. Flow data from the USGS gaging stations have confirmed that under low to moderate flow conditions, releases from Calaveras Reservoir can provide the flows needed for steelhead to migrate from the lower reaches of the watershed (i.e. Flood Control Channel and Niles Canyon) to the spawning and rearing

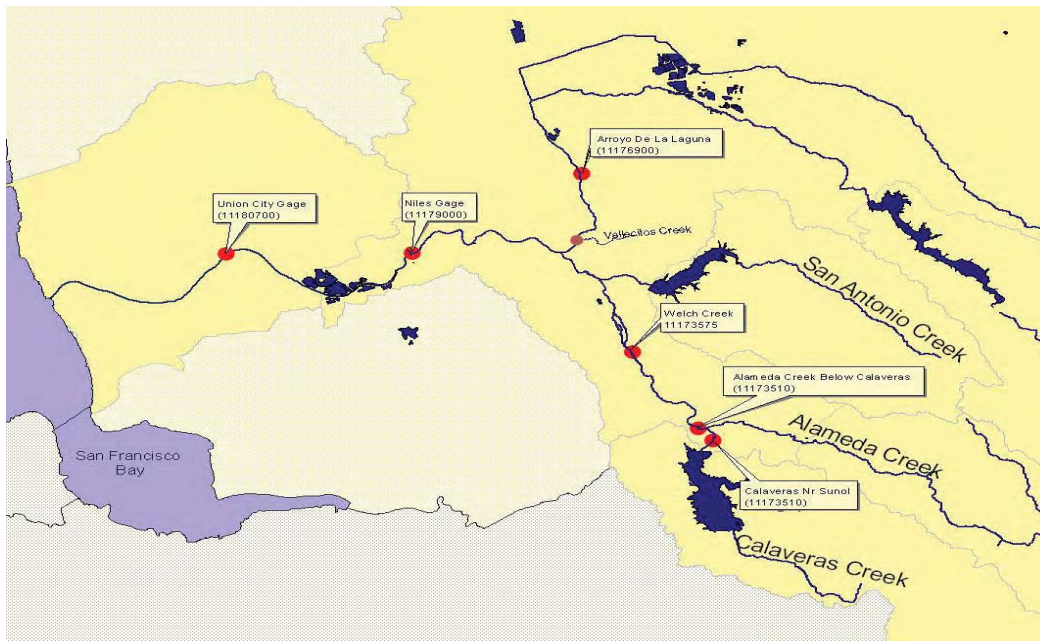
06

Mr. Bill Wycko, Environmental Review Officer
 Page 10 of 15
 December 17, 2009

habitat directly downstream of the CDRP. A Calaveras Dam flow release performed by SFPUC in late spring/early summer of 2008, USGS data from stations 11173500, 11173575, and 1117900, shown on the map in Figure 2, indicate that flows originating at the outlet of Calaveras Reservoir clearly have the potential to travel through the Sunol Valley and are able to be conveyed to the Niles Canyon gage and through the Alameda Creek Flood Control Channel. This data is presented below in Figure 3. As shown in Figure 3, the controlled releases from Calaveras Reservoir ranged from approximately 5 cfs to 30 cfs over a period of several days. Once the Calaveras releases began on April 17, 2008, an increase in downstream flows at the Niles gage (located directly upstream of the Flood Control Channel) was observed. The flows at the Niles gage continued to track relatively closely with the Calaveras releases (with some losses between the Calaveras and Niles gages). This controlled release from Calaveras Reservoir has clearly demonstrated that releases and/or bypasses from SFPUC's diversion facilities in the upper watershed travel down to the lower reaches where adequate flows will be needed for steelhead migration to access the habitat below the CDRP. As a result, the DEIR should account for the direct hydrologic connection between the CDRP and the downstream reaches, and address how flows that are diverted to the Calaveras Reservoir affect steelhead migration, as discussed in more detail below.

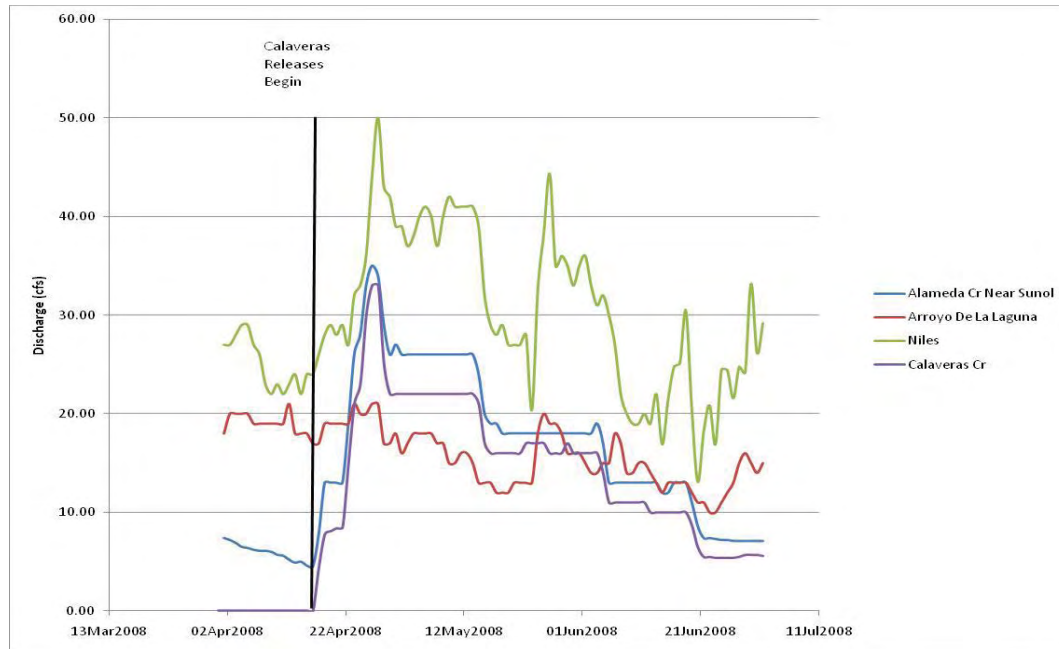
06 cont.

Figure 2. Location of USGS Gaging Stations in the Alameda Creek Watershed



Mr. Bill Wycko, Environmental Review Officer
 Page 11 of 15
 December 17, 2009

Figure 3 USGS Gage data for April-May 2008 Calaveras Dam low flow releases



- D. The DEIR should address the need for sufficient flow releases to provide for migration of steelhead into and out of Sunol Valley (and the spawning/rearing habitat directly downstream of the CDRP), and through Niles Canyon downstream to San Francisco Bay. As described in the comments above, significant progress is being made on providing steelhead passage through the Alameda Creek Flood Control Channel, with plans in place to provide complete fish passage through this lower reach in the next several years. In addition, data from the USGS gaging stations clearly demonstrate that: 1) the CDRP will have a significant impact on downstream flows, and 2) these flows would otherwise have had the potential to travel downstream through the Sunol Valley, Niles Canyon and the Flood Control Channel and ultimately to the Bay.

The DEIR includes a proposed flow schedule for steelhead, which is to be implemented once steelhead passage is provided in the Alameda Creek Flood Control Channel. However, the proposed flow schedule, while potentially suitable for steelhead spawning and rearing, does not provide the migration flows needed to provide steelhead access to the spawning and rearing habitat below the CDRP. That is, in order for steelhead restoration efforts in the Alameda Creek Watershed to be successful, adequate flows must be provided from the spawning/rearing habitat (primary study area) to downstream reaches in Sunol Valley, Niles Canyon and the Flood Control Channel (secondary study area). These flows will be required in order for in-migrating adult steelhead from San Francisco Bay to successfully access the habitat below the CDRP in the upper watershed.

06 cont.

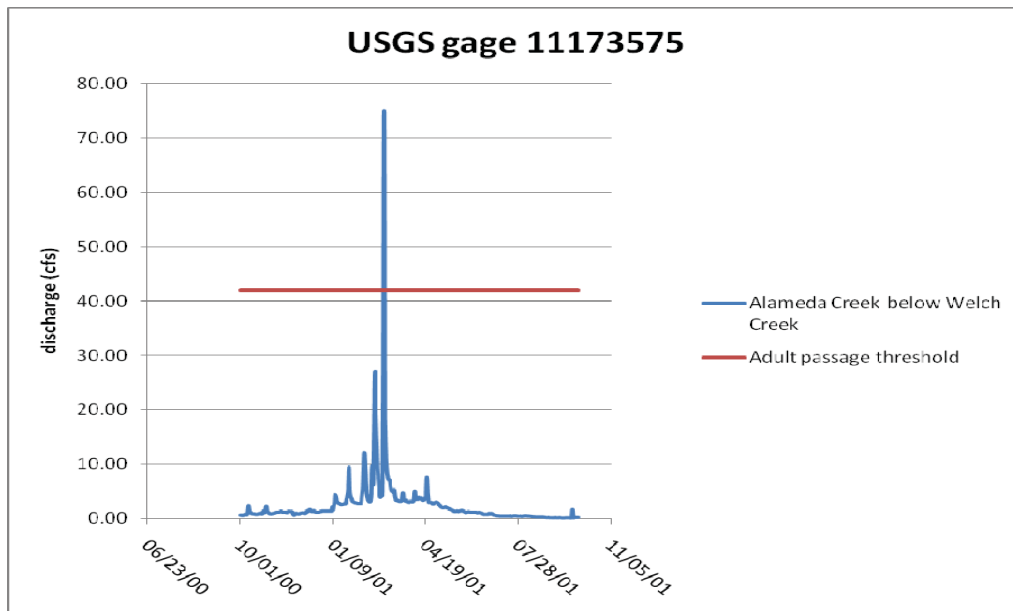
Mr. Bill Wycko, Environmental Review Officer
 Page 12 of 15
 December 17, 2009

For example, under dry and normal year types (comprising 80% of the years), the DEIR's proposed steelhead flow schedule is no different than the 1997 MOU flow schedule (during the steelhead in-migration months of December through March). The SFPUC has already indicated that these flows will be "recaptured" at the downstream Filter Gallery Project. Therefore, the proposed steelhead flow schedule would provide no benefits for steelhead migration for eight out of ten years. In "wet" years (20% of the time), the SFPUC proposes to meet a flow schedule of 42 cfs between January 12 and March 31. It is not clear if these flows would also be recaptured. In any event, they are not sufficient to allow for upstream steelhead migration (the DEIR states that up to 46 cfs is required to provide adequate adult steelhead in-migration from Niles Canyon through Sunol Valley to the spawning/rearing habitat below Calaveras Dam).

Rather than providing the needed flows for steelhead migration, the DEIR states that there will be sufficient opportunities for in-migration during high flow events, without providing additional releases to support the steelhead in-migration. However, as shown in Figure 4 below, an analyses of flow data at the USGS gaging station on Alameda Creek at Welch Creek, indicates that under pre-DSOD restrictions (Water Years 1999-2001) on average, adequate flows for steelhead in-migration occurred approximately 17% of the time during the in-migration season of December through March. In WY 2000 adequate flows were provided only 0.8% of the time, and WY 2001 provided adequate flows 32% of the time. Given that the DEIR acknowledges that the flow conditions under the CDRP would be similar to those which occurred under pre-DSOD conditions, it is clear that the DEIR fails to provide adequate commitments for the flows needed for steelhead in-migration. Similarly, adequate flows from the rearing habitat in the upper watershed downstream through Sunol Valley, Niles Canyon and Flood Control Channel must be provided such that smolts can out-migrate from the rearing habitat in the upper watershed to San Francisco Bay.

06 cont.

Figure 4. Water year 2001 hydrograph, and needed discharge for adult fish passage



Mr. Bill Wycko, Environmental Review Officer
 Page 13 of 15
 December 17, 2009

Without a commitment by the SFPUC to provide adequate flows from the CDRP for steelhead in-migration and out-migration (such that steelhead can complete their life cycle), other steelhead management actions taken by the SFPUC as part of the CDRP will have limited value for a restored steelhead population in the watershed.

In order to adequately address the project impacts on steelhead fisheries, the Final EIR should include the following:

- A daily hydrologic model (see comment No. 1 above) should be utilized and applied to the steelhead flow release schedule to determine the number of days that adequate flows will be available for steelhead migration into and out of the spawning and rearing habitat downstream of Calaveras Dam.
- As mitigation, the Final EIR should include a commitment to provide sufficient downstream flows for steelhead migration to support a restored steelhead fishery. Prior to finalizing the EIR, the SFPUC should coordinate with NOAA Fisheries and California Department of Fish and Game to develop a flow schedule that provides for: 1) adequate flows for migration through Sunol Valley, and 2) a contribution to flows needed for steelhead migration through Niles Canyon and the Alameda Creek Flood Control Channel to San Francisco Bay.
- The flows released by the SFPUC to support steelhead in-migration and out-migration should not be “re-captured” at a downstream infiltration gallery or similar facility. These flows should be dedicated to providing the opportunity for adult steelhead to access the upper watershed for spawning and rearing (from San Francisco Bay) and for smolts to out-migrate from the spawning and rearing habitat to San Francisco Bay to complete their life cycle.

06 cont.

5. The DEIR must further characterize and address the water quality impacts to ACWD’s drinking water supply.

Protecting water quality in Alameda Creek is critical to ACWD’s mission to provide a reliable supply of high quality water to its customers. The DEIR does not address the possible water quality impacts to ACWD and the importance of this supply as a drinking water source. The DEIR should be revised to acknowledge: 1) the critical need for ACWD’s groundwater recharge program to prevent salt water intrusion into the Niles Cone Groundwater Basin from San Francisco Bay; 2) the importance of Drinking Water Source Protection in the Alameda Creek watershed given the downstream use as a potable supply; and 3) the importance of state and federal Maximum Contaminant Levels in analyzing water quality impacts given the downstream use as a potable supply. Further, the significance criteria used by SFPUC to assess possible water quality impacts of the CDRP are far too simplistic to be protective of downstream water quality and supply at a level that is significant to ACWD, and are therefore inadequate for CEQA analysis. The significance criteria must be appropriately revised to provide an adequate impact analysis.

07

Mr. Bill Wycko, Environmental Review Officer
Page 14 of 15
December 17, 2009

The CDRP has the potential to significantly impact water quality in Alameda Creek and ACWD's downstream water supply. Specific impacts to ACWD that were not addressed in the DEIR include: 1) turbidity impacts of the project that would impair ACWD's ability to divert water from Alameda Creek, as well as subsequent impacts to groundwater recharge rates from additional sedimentation; 2) impacts and risks of additional contaminant loading to Alameda Creek from project construction and operation that are unacceptable for a drinking water source; and 3) impacts of known contaminant loading to Alameda Creek above background levels from discharges of the construction site dewatering and treatment system, which may include asbestos, arsenic, chromium, nickel, copper and cobalt in treated water or in overflows. Dilution identified in the DEIR as a justification for a "less than significant impact" finding is not an appropriate mitigation under CEQA or under standard Drinking Water Source Protection practices.

07 cont.

Water quality and supply impacts to ACWD must be addressed and fully mitigated prior to finalization of the DEIR. Given SFPUC's strong commitment to source water protection in its own source watersheds, and its use of watershed management as an alternative to expensive treatment processes in the case of the Hetch Hetchy supply, meeting that same commitment for protection of downstream drinking water supplies through appropriate impact analyses and mitigation should be the standard of mitigating the impacts of this proposed project.

6. The DEIR does not provide mitigation measures for water quality at a level appropriate for a project of this size, duration and complexity.

Coverage under the General NPDES permit for construction and implementation of standard Best Management Practices (BMPs) through a Stormwater Pollution Prevention Plan (SWPPP), as proposed in the DEIR, is not sufficient mitigation for a project of this scale and location. Complex dewatering and treatment operations and subsequent discharge to Alameda Creek should be covered by a dedicated NPDES permit and should not be allowed to increase background levels of contaminants in Alameda Creek, which could impact ACWD. Further, off-site mitigation "after-the-fact" to make up for overflows of the dewatering and treatment system in a 10-year storm event is not appropriate. SFPUC should commit to mitigation that will be protective of water quality at all times, in areas that are not already under the control and protection of SFPUC. Given the complexity and size of the project, SFPUC should provide assurances that BMP and SWPPP implementation and on-site work practices will ensure constant water quality protection during construction. In order to ensure that any water quality or hazardous materials incidents are immediately reported and responded to, SFPUC should further commit to installing real-time water quality monitoring downstream of the construction operations, including automated alerts to key agencies and staff.

08

Mr. Bill Wycko, Environmental Review Officer
Page 15 of 15
December 17, 2009

The DEIR should also address plans for dealing with sanitary and grey water waste, although these may be significant issues requiring mitigation given the size and duration of the work effort. The Final EIR should address these issues and their possible impacts on Alameda Creek, and should provide appropriate mitigation.

09

7. The DEIR should commit to a coordinated operations notification plan and alert system between SFPUC and ACWD for Alameda Creek watershed operations.

As written, the DEIR does not commit to a coordinated operations notification plan between SFPUC and ACWD outside of the basic water quality discharge notifications that are part of the SWPPP. SFPUC's upstream operations have a significant potential to affect ACWD's downstream real-time water supply and fish ladder. SFPUC should commit to regular coordination with ACWD on watershed operations and implementation of a real-time notification and communication procedure, including an alert system using the best available technology that will give advance notification to all entities located downstream of Calaveras Reservoir and the ACDD of the time, rate, and quality of flow of all water releases into Alameda Creek. The potential for hazardous materials releases during construction further warrants implementation of such a plan and alert system.

10

Thank you again for the opportunity to review and provide comments on the Draft EIR for the Calaveras Dam Replacement Project. ACWD's comments, as described above, have been provided to assist the SFPUC in ensuring the Draft EIR meets all CEQA requirements for environmental impact analyses and mitigation, with the goal of ultimately ensuring the success of this important project. Should you have any questions about these comments, please feel free to contact Eric Cartwright, Water Resources Planning Manager, at (510) 668-4206 or Laura Hidas, Water Supply Supervisor, at (510) 66-6516.

Sincerely,



Walter L. Wadlow
General Manager

ASSOCIATION OF BAY AREA GOVERNMENTS

Representing City and County Governments of the San Francisco Bay Area

**RECEIVED**

November 12, 2009

NOV 17 2009

Bill Wycko
 Environmental Review Officer
 San Francisco, Planning Department
 1650 Mission Street, Suite 400
 San Francisco, CA 94103

CITY & COUNTY OF S.F.
 PLANNING DEPARTMENT
 M E A

Dear Mr. Wycko:

I am writing to express the support of the Association of Bay Area Governments (ABAG) for the Calaveras Dam Replacement Project and the Draft Environmental Impact Report.

Our organization's mission is to enhance the quality of life in the San Francisco Bay Area through regional advocacy, collaboration and excellence in planning and research. It is often extremely difficult to look beyond the rhetoric and emotions to take a long-term view on issues that are complicated.

Here is what we know to be true. The Calaveras Dam Replacement Project is extremely important for the region's water supply. Calaveras Reservoir, when full, represents over half of the SFPUC's water storage in the local Bay Area. More than 60% of the drinking water generated locally comes from that reservoir. Communities in the East Bay and South Bay depend heavily upon this water when Hetch Hetchy supplies are not available.

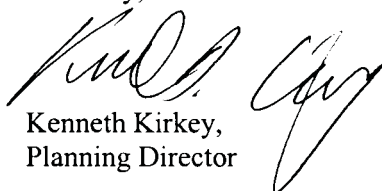
If Sierra supplies are cut off because of a major earthquake, it is important that there be sufficient water for fire fighting, for public health, to keep our governments, businesses, and hospitals open. We cannot do this without a reliable supply of water that is nearby.

We write to ask that the Draft Environmental Review process move forward. Discussions about the operation of the proposed new dam are ongoing with the appropriate permitting agencies. That process, too, needs to be allowed to move forward.

The cost of not moving forward through delays in the CEQA process are too high to consider.

I urge you to move forward with this important project.

Sincerely,



Kenneth Kirkey,
 Planning Director

01



Statement from Arthur Jensen, CEO
Bay Area Water Supply and Conservation Agency about
San Francisco's Draft Environmental Impact Report
For the Calaveras Dam Replacement Project

November 10, 2009

San Francisco's draft Environmental Impact Report (draft EIR) for the Calaveras Dam Replacement Project has been reviewed by the Bay Area Water Supply and Conservation Agency on behalf of 26 agencies that purchase water from the San Francisco Regional Water system for 1.7 million residents, businesses, and institutions in San Francisco's neighboring communities.

Calaveras Reservoir is San Francisco's largest local reservoir. It provides about 40% of the SFPUC's local water storage and 66% of local water yield. As such, Calaveras provides critical water supply reliability for the Bay Area customers that rely upon the San Francisco Regional Water System. Additionally, as a local storage facility, Calaveras provides a majority of the water supply that would be available in the event of a disruption of water supply from San Francisco's Hetch Hetchy system.

Since 2001, the water level in Calaveras has been lowered 66% in response to seismic stability concerns with the existing dam. The Calaveras Dam Replacement Project proposes to construct a new, seismically resistant dam immediately downstream of the existing dam that would re-establish the water delivery reliability of this critical component of the San Francisco Regional Water System.

BAWSCA supports the proposed project. Replacement of Calaveras Dam is essential to ensuring the continued delivery of a reliable supply of high quality water to all the residents and businesses that rely on the San Francisco Regional Water System, including those in the City of San Francisco itself. In replacing the dam, the proposed project takes the prudent approach of building the base of the replacement project in such a manner that it can be expanded in the future to meet additional needs if necessary.

We believe the draft environmental impact report does a good job of addressing the potential environmental impacts and we urge the Planning Commission to continue its progress in preparing a final environmental impact report for this critically important project as soon as possible.

BAWSCA

Bay Area Water Supply & Conservation Agency

December 18, 2009

Mr. Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Subject: Case No. 2005.0161E – Draft Environmental Impact Report for the Calaveras Dam Replacement Project

Dear Mr. Wycko,

Thank you for the opportunity to provide the following comments from the Bay Area Water Supply & Conservation Agency (BAWSCA). BAWSCA represents the interests of 24 cities and water districts, an investor-owned utility, and a university, that purchase water wholesale from the San Francisco Regional Water System. These agencies, in turn, provide water to 1.7 million people, businesses and community organizations in Alameda, Santa Clara and San Mateo counties. These comments are in response to the Draft Environmental Impact Report (EIR) published October 6, 2009 for the Calaveras Dam Replacement project.

Overall Comment

It is critical that all alternatives examined as part of this environmental review provide an equivalent water supply yield and reliability of the San Francisco Regional Water System. The draft EIR appropriately presents an environmental analysis of the proposed project and six alternatives. One of the variables being considered as part of this review is possible additional water flows to benefit the fishery resources below the dam. It is essential that all alternatives evaluated as part of this environmental review, including any new alternatives that are evaluated prior to the Final EIR, provide an equivalent water supply yield in order to meet the known projected water supply needs of San Francisco and its wholesale customers, with specific documentation of any potential impact on water supply reliability (e.g. average water deliveries, frequency and level of expected droughts, frequency of rationing, estimated regional economic impact). To the extent that a new alternative is examined which would reduce the water supply yield from the Calaveras Reservoir due to increased fishery flows, it is critical that new additional water supply be included within the alternative to ensure equivalency between alternatives and to ensure that related environmental impacts are identified, examined and reported. The modeling results

01

(HHSIM/LSM) for all alternatives evaluated should be provided prior to the Final EIR consistent with the modeling information provided for the Proposed Project and the No Project Alternative.

01 cont.

Specific Comments

1. Section 1.2.1.1 Program Description (p. 1-5)

In this section and in various places in the draft EIR, when describing the "adopted WSIP", the text cites the October 30, 2008 action by the SFPUC. This information should be updated to reflect the recently adopted June 2009 WSIP which incorporates a revised program description, schedule, and budget. The text states, "Dry year transfer from Modesto and/or Turlock Irrigation Districts of about 2 mgd coupled with the Westside Groundwater Basin conjunctive use project to meet the drought year goal..." To avoid confusion, it should be noted that the currently adopted WSIP refers to the conjunctive use project as the Regional Groundwater Storage and Recovery project.

02

2. Section 1.3.1 Project Objectives (p. 1-8)

Explanatory text should note that the project supplies water during a seismic/emergency event since this source of supply contributes up to 160 mgd of capacity to the regional water system during emergencies. The text should also state the project is needed for supply during maintenance of the San Joaquin Pipeline System.

03

3. Section 1.4.2 Design and Composition of the Replacement Dam (p.1-17)

Text describing the outlet pipe and stream discharge valves should state that a seismically activated valve will be placed in the outlet line to prevent uncontrolled discharge during a seismic event on the Calaveras Fault.

04

4. Table S.2 Summary of Impacts and Mitigation Measures (p.1-85, p.1-88)

To avoid confusion, the designation of both LSM and SU in items 4.13.1 and 4.13.7 (page 1-85 and 1-88) should be explicit as to the two significance thresholds evaluated that they represent.

05

5. Section 3.2.2 Project Objectives (p. 3-6)

Footnote #3 quantifies the reduction in reservoir storage capacity due to siltation from the nominal 96,850 AF to 92,000 AF. Does this net capacity support the required yield for the 7 mgd design drought supply objective and the normal year reservoir yield requirements?

06

6. Section 3.2.2.4 Robust Design for Potential Future Enlargement (p.3-9)

The text should state additional reasons for this configuration, such as that the dam can be raised to accommodate a larger conservation pool with less cost and environmental impacts than a complete reconstruction.

07

7.	Section 3.3.1.1 Spillway (p.3-11) The text should state the design PMF quantity here to avoid confusion. The section implies that this is 48,440 cfs based on 12 percent of the 5,813 cfs historical maximum spill. Section 3.4.1 gives the design criteria for the spillway as a routed PMF outflow of 39,700 cfs.	08
8.	Section 3.3.1.3 Control Valves (p.3-13) The text should include a discussion of the seismically activated control valve on the reservoir outlet.	09
9.	Section 3.3.4.6 On-Site Water Treatment (p.3-23) The text states that potassium permanganate is used to oxidize taste and odors. It also discusses operation of the HOS. Other sections of the report state that the potassium permanganate facility will be removed. Please clarify here that the planned upgrades to the Sunol Valley WTP will negate the need for potassium permanganate addition here in the future.	10
10.	Section 3.4.2.3 Outlet Pipe and Stream Discharge Valves (p.3-31) The text should state the facilities will include a seismically activated valve on the outlet line to prevent uncontrolled discharge during a seismic event on the Calaveras Fault.	11
11.	Section 3.6.2 Calaveras Reservoir Operations (p.3-64) Please discuss planned modifications, if any, to normal operations for drought periods beyond the stated reservoir drawdown procedures.	12
12.	Section 7.7.3 Impacts of the Alternative (Alternative 5, New Downstream Dam Without Provision For Potential Future Enlargement Alternative) (p. 7-59) The analysis of Alternative 5 currently fails to address the impacts that would result from the building of a new dam, desalination plant, or other water supply project(s) that would need to be constructed if this dam would not be expanded in the future to meet the known, projected water supply needs of San Francisco and its wholesale customers. Please include this analysis in the Final EIR in order for the correct level of impacts to be more fully understood as part of the decision making process. The analysis should not assume that conservation, wastewater recycling or other actions that have been already been identified to accommodate future water needs are available for this purpose; to do so would be a form of double-accounting.	13

Calaveras Reservoir is San Francisco's largest local reservoir. It provides about 40% of the SFPUC's local water storage and 66% of local watershed yield. This reservoir provides reserve and emergency supply during periods when the supply from Hetch

Hetchy is unavailable due to maintenance, damage or other outages. As such, Calaveras provides critical water supply reliability for the Bay Area water customers that rely upon the San Francisco Regional Water System.

BAWSCA supports the proposed project. Replacement of Calaveras Dam is essential to ensuring the continued delivery of a reliable supply of high quality water to all the residents and businesses that rely on the San Francisco Regional Water System, including those in the City of San Francisco itself. In replacing the dam, the proposed project takes the prudent approach of building the base of the replacement project in such a manner that it can be expanded in the future to meet additional needs if determined to be necessary and appropriate by the City and County of San Francisco.

14

Thank you for the opportunity to provide these comments on the Draft EIR for the Calaveras Dam Replacement Project dated October 6, 2009. If you have any questions, please contact me at (650) 349-3000.

Sincerely,



Nicole M. Sandkulla, P.E.
Senior Water Resources Engineer

cc: E. Harrington, SFPUC
A. Jensen, BAWSCA
File



CITY OF MILPITAS

455 EAST CALAVERAS BOULEVARD, MILPITAS, CALIFORNIA 95035-5479 • www.ci.milpitas.ca.gov

November 24, 2009

Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission St., Ste. 400
San Francisco, CA 94103

Subject: SFPUC's Calaveras Dam Replacement Project DEIR

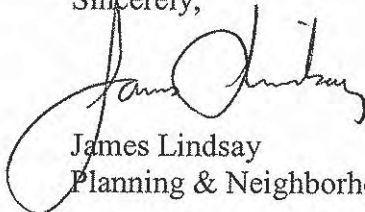
Dear Mr. Wycko:

The City of Milpitas supports the SFPUC's Calaveras Dam Replacement Project (CDRP), and we appreciate the opportunity to review and provide comments on the draft environmental impact report (DEIR). The CDRP is urgently needed to rehabilitate the aging SFPUC water storage system. It provides necessary seismic upgrades to help the system withstand the major earthquakes that will inevitably strike this region. We have identified the following items that need to be corrected or clarified in the EIR.

1. Calaveras Road west of Ed Levin County Park is owned and maintained by the City of Milpitas. The Traffic and Circulation impacts and mitigation measures should be modified to include the City of Milpitas with Santa Clara County when referring to Calaveras Road south of the dam. 01
2. Mitigation measure 5.12.4a "Traffic Control Plan" shall include the requirement that a Milpitas Truck Haul permit is required for construction vehicles traveling on Calaveras Road within the City since it not an approved truck route. It shall also include the City of Milpitas in the list of agencies that SFPUC will enter into agreement with for implementing a post construction roadway repair/rehabilitation program.
3. Note that there are several residential homes at the southeast corner of Calaveras and Piedmont Roads. Noise from haul or delivery trucks will impact these residents and nighttime operations should be prohibited. 02

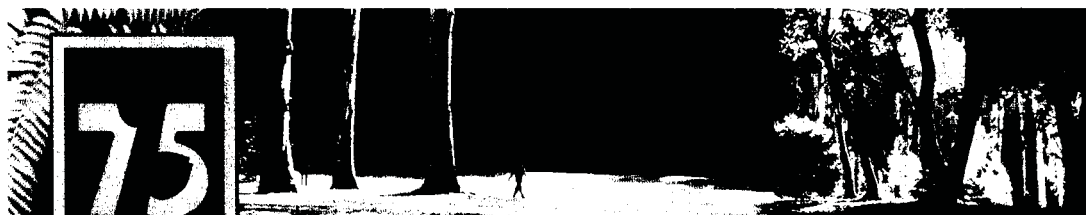
If you have questions, please contact the City's Principal Land Development Engineer, Fernando Bravo at (408) 586-3328 or fbravo@ci.milpitas.ca.gov.

Sincerely,



James Lindsay
Planning & Neighborhood Services Director

cc: BAWSCA General Manager
Public Works Director/City Engineer



2950 PERALTA OAKS COURT PO BOX 5381 OAKLAND, CALIFORNIA 94605-0381
 TEL 888 EBPAKSF TEL 510 549 3439 TDD 510 611 0440 WWW.EBPARKS.ORG

December 11, 2009

RECEIVED

Bill Wycko, Environmental Review Officer
 San Francisco Planning Department
 1650 Mission Street, Suite 400
 San Francisco, CA 94103

DEC 14 2009

CITY & COUNTY OF S.F.
 PLANNING DEPARTMENT
 M E A

Subject: Comments on the DEIR for the Calaveras Dam Replacement Project

Dear Mr. Wycko,

Thank you for providing the East Bay Regional Park District ("District") with a copy of the Draft Environmental Impact Report (DEIR) for the Proposed Calaveras Dam Replacement Project ("Project"). The proposed Project is adjacent the District's Sunol, Ohlone and Mission Peak Regional Preserves. Attached please find the District's comments on the DEIR.

The proposed Project will result in a number of significant adverse impacts to recreation, maintenance and operation of our parks and trails in the area. These include impacts to vegetation and wildlife, fisheries, hydrology, human health, visual resources, transportation, air quality, noise, land use, public safety, and park operations. Some of these impacts, such as traffic, will be short-term, while others, such as human health, will be long-term. There will also be significant cumulative impacts resulting from other San Francisco Public Utility Commission (SFPUC) projects to be constructed in the Alameda Creek Watershed.

We believe that the DEIR is seriously flawed because it overlooks or inadequately considers significant effects and that it fails to fully mitigate these impacts to District facilities. Perhaps of greatest significance are the health effects from grading 4,000,000 cubic yards of asbestos-containing rock and soil, and the traffic and safety impacts from an estimated 16,000 truck trips on Calaveras Road, the sole point of vehicular access to Sunol Regional Wilderness. In order to protect the health and safety of District employees and the public the District may need to consider closing portions or all of Sunol Regional Wilderness during the Project construction period. This is an unprecedented decision of great concern to the District.

Please call me at (510) 544-2600 should you wish to discuss our letter.

Sincerely,

Nancy Werninger
 for Robert E. Doyle,
 Assistant General Manager

01

02

03

04

05

East Bay Regional Park District

Comments on the Draft Environmental Impact Report for the Proposed Calaveras Dam Replacement Project

December 11, 2009

The East Bay Regional Park District ("District") is submitting the following written comments on the Draft Environmental Impact Report (DEIR) for the proposed Calaveras Dam Replacement Project ("Project"). The proposed Project is located in close proximity to the District's Sunol and Ohlone Regional Wilderness Preserves, Camp Ohlone, Mission Peak Regional Preserve and the Ohlone Wilderness Regional Trail.

The proposed Project will result in a number of significant adverse impacts to public recreation and operation of our parks and trails in the greater Project area. These include impacts to vegetation and wildlife, fisheries and aquatic habitats, hydrology, human health, visual resources, transportation, air quality, noise, land use, public safety, and park operations. Some of these impacts will be short-term during the anticipated four-year Project construction period and others will be long-term effects of the Project. There will also be significant cumulative impacts to District facilities resulting from other San Francisco Public Utility Commission (SFPUC) projects to be constructed in the Alameda Creek Watershed.

Mitigation for the above described significant effects to the District should include measures for 1.) reimbursement of lost revenues and increased operating costs; 2.) relocation of Park facilities and programs; 3.) construction of new recreational facilities; 5.) replacement of the trestle bridge over Alameda Creek; and 5.) acquisition and dedication of new parklands. Information describing these mitigation measures are contained in this letter.

06

The District has no objection to the proposed replacement of the existing Dam in order to protect public safety and to provide for a reliable drinking water supply for the SFPUC's customers. However, we believe that the DEIR is seriously flawed because it overlooks or inadequately considers significant effects and it fails to fully mitigate these effects. We recommend that the DEIR be withdrawn and revised to correct its deficiencies and that the DEIR be recirculated for public review and comment.

07

The following are the District's comments on the DEIR. They follow the general subject order contained in the Project DEIR.

A. Vegetation and Wildlife

Vegetation: The DEIR states on page 4.4-20 that wetlands, riparian, oak woodlands and serpentine bunchgrass grasslands are considered sensitive habitats. We believe that rock outcrops should also be added to this list. Outcrops in the greater project area contain both metamorphic and volcanic rocks and minerals. Rock outcrops are worthy of protection due to

08

their scenic qualities, cultural values, and unique assemblages of plant and animal habitats. This includes several special-status plants, and habitat for ground and cavity nesting birds.

The DEIR on page 4.4-47 acknowledges the importance of rock outcrops as being “essential for the conservation of the Alameda whipsnake.” Impacts to these areas should be considered significant and appropriate mitigation measures should be adopted. This could include in fee acquisition and protection of similar habitats on adjacent properties.

Page 4.4-21 describes a number of sources that were consulted to determine what special-status plant and animal species should be considered for evaluation in the DEIR. The most comprehensive assessment of special-status plants in the greater Project area is a report prepared by Dianne Lake in 2001¹. Her publication is considered the authoritative work on special-status plants in the East Bay. This document was not listed on page 4.4-21 nor is it included in the references section of the Vegetation and Wildlife chapter of the DEIR. This document contains a number of special-status plant occurrences in and adjacent to the project area that were not considered in the Project DEIR. Some of these plants were also identified in the District’s November 9, 2005, scoping letter to Paul Maltzer at San Francisco Planning. This letter is incorporated by reference into our comments on the Project DEIR.

There are at least 25 special-status plant species for which there was no or inadequate consideration in the DEIR and in Appendix C-I. This should not be considered a comprehensive list. For a complete list please consult Dianne Lake’s publication. We have included the following examples to illustrate the deficiency of this impact analysis.

1. *Acanthomintha lanceolata* – Extant at several East Bay locations, including Sunol Regional Wilderness, Arroyo Mocho and Cedar Mountain. This plant is usually found on rock outcrops and tallus slopes.
2. *Allium sharsmithae* - Extant at several East Bay locations, including Arroyo Mocho and Cedar Mountain. This plant is usually found on rock outcrops and tallus slopes.
3. *Androsace elongata* ssp. *acuta* – Extant on volcanic rock outcrops at several East Bay locations, including Ranchos Los Mochos, Arroyo Mocho, Tarraville Creek and Cedar Mountain. This plant is also found on rocky ridge tops with thin soils.
4. *Arabis Breweri* - Extant on volcanic rock outcrops at Sunol and Ohlone. This plant is usually found on rock outcrops.
5. *Aspidotus Carlotta-halliae* – Extant at Cedar Mountain. This plant is usually found on rock outcrops and tallus slopes.
6. *Campanula exigua* – Appendix C states that this plant has not been observed since 1973. Extant populations are known from Rancho Los Mochos and Cedar Mountain.

¹ Diane Lake, *Unusual and Significant Plants of Alameda and Contra Costa Counties*, California Native Plant Society, East Bay Chapter, sixth edition, 2001.

7. *Delphinium californicum* ssp. *interius* – Appendix C-I states that this plant has not been observed since 1928. Extant populations are known from the Arroyo Mocho watershed and in Del Puerto Canyon.
8. *Streptanthus albidus* ssp. *peramoenus* – The DEIR states on page 4.4-22 that there were eleven small populations identified in the study area during 2006 botanical surveys. This annual or biannual plant occurs sporadically in known populations throughout its range. There are likely considerably more plants or clusters of plants that may be identified at different locations in subsequent years. A one year survey is insufficient to capture the distribution of this species. This plant is often found at the toe of rock outcrops and tallus slopes.

9 cont.

Impacts from invasive non-native plants due to disturbance from Project construction, clearing and vehicles entering the watershed need to be analyzed and addressed in the DEIR.

10

Wildlife: The DEIR notes at several locations that livestock grazing has adverse affects to special-status wildlife species. Many of the sources of information cited to support these conclusions are now considered outdated or erroneous. More recent research conducted by the District has demonstrated that potential impacts from livestock grazing may have neutral or even beneficial effects to several special-status species.

Calippe silverspot butterflies are known to be dependent on violets (*Viola pedunculata*) as their sole larval-stage food plant (see DEIR page 4.4-25). In general, this species of violet is found in areas subject to regular cattle grazing. Cattle tend to graze on grasses and taller growing forbs. Plants, such as violets, that grow nearly flush with the ground usually are ungrazed by cattle. The cattle grazing results in a significant reduction in taller plants that otherwise out-compete violets for sunlight, moisture and nutrients. By removing these competing plants, properly managed cattle grazing may benefit Callippe silverspot butterflies.

11

Project construction poses significant risks to Callippe silverspot by loss of habitat from grading at borrow and disposal sites, and from introduction of non-native plants that out-compete violets and from project-related changes in the watershed, such as elimination of grazing.

Red-legged frog benefit from cattle grazing because cattle will graze into ponds, keeping the water column open and improving habitat conditions. The District has been conducting studies on grazing effects for several years and has provided significant information that has advanced the science and understanding of this species since the publication of the red-legged frog recovery plan in 2002. These studies are cited in the DEIR on page 4.4-28. They clearly refute the conclusions reached in the 2002 recovery plan regarding cattle grazing and are now cited as one of the authoritative works on the subject. The DEIR has not fully or adequately considered this information in reaching its conclusions about cattle grazing effects to red-legged frog.

In contrast to cattle grazing, red-legged frogs and other amphibians are considerably more likely to be adversely affected by construction and operation of the proposed Project, including effects to water quality and temperature, and from unseasonal fluctuations in water flow

regimes in Alameda Creek that impact existing breeding conditions. *These potential effects are discussed further in comments on the "Fisheries and Aquatic Habitats" section of this letter.*

11 cont.

Mitigation: On page 4.4-72 there is a statement that the "SFPUC has identified four proposed mitigation areas which, when combined, contain adequate and feasible opportunities to fully compensate for impacts described in this section." This includes the 641-acre "South Calaveras Mitigation Area", 254-acre "San Antonio Mitigation Area", 584-acre "Sage Canyon Mitigation Area", and 35-acre "Goat Rock Mitigation Area." All of these mitigation areas are located on already-protected SFPUC watershed lands. These same lands should not be counted twice as mitigation for the proposed Project. We believe that additional lands should be acquired in fee where natural resource impact mitigation can occur.

Acquisition of mitigation land should occur adjacent to or nearby the impacted areas. This will assure that impacted species will have suitable replacement habitat in areas that are accessible to wildlife through linkages and migration corridors. There should also be provisions to conserve mitigation lands in perpetuity through conservation easements or deed restrictions. Non-wasting endowments should be established for perpetual management and monitoring.

12

The 2005 Notice of Preparation for the Habitat Reserve Programs states on page five that "habitat preservation would involve fencing, periodic weed control and managed grazing". Such measures would seem to be good property management that SFPUC has already implemented and not necessarily impact mitigation. It's unclear what is the added value of "preserving" watershed lands that have already been acquired and managed by SFPUC to protect water quality and natural resources. This approach will lead to a net loss of natural resources.

Preserve lands that are acquired for mitigation need monitoring and management prescriptions set forth in a Long-term Management Plan (LTMP) that provides contingencies and dedicated funding for property management. The following are some example management and monitoring provisions that should be analyzed in the DEIR and included in the LTMP:

13

1. *Non-native plants:* Yellow starthistle is rapidly invading grasslands in California and displacing other native plants and animals. Prescribed fire, herbicides and properly timed livestock grazing can be very effective in controlling this species. However, this requires a long-term commitment for successful control. Grazing alone is typically insufficient to control this weed. Prescribed fire and/or herbicides may be necessary to make the control effective. Fire and herbicides are considerably more expensive than grazing and will require substantial funding to implement in the mitigation areas.
2. *Non-native animals:* Feral pigs root within wetlands, riparian woodland and restoration areas. Extensive "hog" fencing and/or trapping may be required to control pigs and assure the long-term viability of mitigation lands, especially areas where restoration has occurred. Similar control measures will also need to be implemented for control of bullfrogs, bass, red fox, etc. Without management of such species, there is considerable doubt that mitigation would be successful in the long-term.
3. *Pond management:* Existing and constructed stock ponds and other potential breeding areas for special-status amphibians, such a red-legged frog, will require long-term

14

15

16

management. For example, drainage of ponds may be required periodically to remove non-native animal species, such as bullfrogs and fish. Rehabilitation and maintenance of pond berms, spillways and drainage devices will be required to prevent pond failure and significant shoreline erosion during storm events or from wave fetch.

16 cont.

4. *Property management:* Maintenance of site security, police and fire services, replacement of fences and gates, etc. should all be included in the LTMP. There should be funding provided for these purposes.

17

5. *Public access:* The LTMP should provide for public access in areas where the public can enjoy passive recreational activities, such as hiking, equestrian access, wildlife and plant study, interpretive programs, views of scenic open space, etc.

18

6. *Habitat monitoring:* While many mitigation lands may have relatively undisturbed habitats at the time of acquisition, many natural and human-induced factors may degrade habitat values over the long-term. These include spread of non-native species, changes in watershed hydrology and sedimentation, grazing management changes, etc. Monitoring should be conducted to determine the effects of these changes on the biological resources for which the property was initially conserved.

19

The proposed Goat Rock Mitigation Area is located on SFPUC lands that are leased to the District and managed as part of Sunol Regional Wilderness. The DEIR does not contain an exhibit showing the location of the proposed mitigation area. Appendix C-2 references a "Figure 2", but this figure was not included in the appendix.

We received an October 21, 2009, Public Notice (#29979S) from the US Army Corps of Engineers regarding the subject Project. The notice appears to contain the missing Figure 2 from Appendix C-2 of the DEIR. Figure 2 shows only the general location for the mitigation area. Through a separate request we obtained a "Figure 3-6 Goat Rock Mitigation Area" from Robert Smith at the US Army Corps of Engineers. This figure provides considerably more detail on Goat Rock; however, this figure was not contained in the DEIR, Appendix C-2 or in the referenced Corps Public Notice. See *attached Figures 2 and 3-6*.

20

The proposed Goat Rock mitigation area depicted on Figure 3-6 is considerably larger than the 35-acres stated in the DEIR. The proposed fenced area, including the mitigation site and serpentine grassland reference area are about 200 to 250 acres in size. The mitigation area contains a 1.94 mile segment of the Ohlone Wilderness Trail and a 0.70 mile segment of the Homestead Trail. See *the attached annotated Figure 3-6 for more information*.

Figure 3-6 shows that proposed new fencing would create barriers to the use of the two park trails. Gates have not been identified on the figure that would allow for their continued use. The DEIR has no discussion about how this area might be affected by management changes and/or restrictions resulting from its use as parkland. This significant effect was not identified in the DEIR. These potential effects should also be identified on page 5-14 of the DEIR.

Table 4.4.17 on page 4.4-115 of the DEIR lists 29 oak trees with a diameter at breast height (DBH) greater than 8 inches that would be impacted by the proposed Project. Some of these are particularly large specimens (e.g. blue oak of 61 inches DBH and valley oak of 60 inches

21

DBH) worthy of preservation due to their significant age and habitat value for wildlife, and the number of decades that would be required to grow a replacement tree of similar stature. Recent construction projects in the East Bay have demonstrated that large, mature oak trees can be successfully transplanted. This was conducted at the Wilder Project in Orinda's Gateway Valley and the Stonebrae Project on Walpert Ridge in Hayward. This type of mitigation measure should be considered for suitable mature trees.

21 cont.

The Project will disperse animals that are a nuisance or hazard to humans such as skunks, raccoons, rattlesnakes, opossum and rodents that could be harmful to Park visitors, and Park workers and residents. The DEIR needs to assess the magnitude of this impact and develop mitigation measures to control these problematic species.

22

B. Fisheries and Aquatic Habitats

Flow releases into Alameda Creek downstream of Calaveras Reservoir have not been in compliance with the 1997 MOU between the Department of Fish and Game and SFPUC. The DEIR describes a number of circumstances about why there has not been compliance. In addition, the SFPUC recapture facility designed to recapture flows for diversion to the filtration plant is problematic due to increased water temperature, as well as other factors contributing to the survival of non-native predatory species in this facility. These species include: bullfrog, largemouth bass, bluegill and green sunfish. Several native species have been adversely affected by this situation, including steelhead, rainbow trout, and California red-legged frog. The DEIR does not adequately address or mitigate these impacts to Alameda Creek fisheries.

23

Water releases designed primarily to accommodate native fish reproduction and rearing must consider amphibian (red-legged frog and foothill yellow-legged frog) reproduction and rearing requirements. Flows should mimic baseline conditions in watershed streams unaffected by dam operations and be ramped appropriately when conditions change.

24

The DEIR contains no provisions for migratory fish (Steelhead, Rainbow trout, Pacific lamprey) passage around the new Calaveras Dam. This is significant oversight of the Project description and an important mitigation measure for this Project. There also needs to be adequate flows to facilitate upstream migration for adults or downstream migration for juveniles.

25

On page 4.5–24 the DEIR states that the lowest Calaveras Reservoir intake (located at 664 ft.) is not screened. While juvenile fish are not likely to occur at this water depth, adult fish, especially rainbow trout, are likely to be at deeper reservoir depths under the current hypolimnetic oxygenation scenario. Fish pulled into the intake could be injured, killed or otherwise transported out of the reservoir under the current unscreened condition. This impact should be mitigated as part of the proposed Project.

26

Sinbad Creek is not a tributary to the section of Alameda Creek described on page 4.5-25 of the DEIR; Sinbad Creek is a tributary to Arroyo de la Laguna. No steelhead or rainbow trout have been observed in Sinbad Creek over at least the past 18 years. A population of Sacramento suckers (*Catostomus occidentalis*) does exist in Sinbad creek.

27

Please note on page 4.5-43 that rainbow trout are present in Indian Joe Creek. The DEIR correctly notes on page 4.5-46 of the DEIR that Sacramento Perch are present in the upper Alameda Creek watershed, in at least one stock pond adjacent to the Alameda Creek Diversion Dam (ACDD); however, this pond does not overflow into Alameda Creek.

28

29

The DEIR does not have provisions for fish passage at the ACDD. Under moderate to low flow conditions the diversion dam can divert all of the Alameda Creek flow into Calaveras Reservoir. The area of diversion contains a number of native fish and amphibian species including Rainbow Trout, California Roach, and Prickly Sculpin as well as California red-legged frog and Foothill yellow-legged frog. The facility also interferes with the downstream transport of bedload materials (gravels) as well as large boulders and woody debris needed to create optimum salmonid spawning and rearing habitat. Loss of fish, amphibians and other aquatic organisms to entrainment in the Alameda Creek diversion tunnel is not adequately addressed. This loss may significantly affect the number of organisms in the area. These impacts should be mitigated by other improvements in the watershed that benefit native fisheries.

30

C. Hydrology

Increased spring flows in the Park will adversely affect interpretive programs, public recreation and park operations. Interpretive programs involving Alameda Creek would have to be curtailed in the spring months when higher flows are underway. The current ford crossings within the park will become unusable by Park operations and emergency vehicles during high-flow periods. This impact is especially significant to park and tenant vehicles that exceed the weight limit on the trestle bridge. This impact can be mitigated by construction of a replacement bridge over Alameda Creek with adequate load bearing capacity for maintenance and emergency vehicles. It may also be necessary to relocate the bridge to a better location for vehicular access and to reduce potential conflicts with changes in Alameda Creek hydrology.

31

D. Human Health

The proposed project will construct a new dam of approximately 2.4 million cubic yards of material. In addition, about 3.8 million cubic yards of unsuited materials (old dam, overburden, etc) will be disposed in the project area. It is unclear in the DEIR on page 1-21 if the total amount of material to be moved is 6.2 million cubic yards or some other figure. Please clarify and explain the above figures.

On page 3-43 the DEIR states that 2.4 million cubic yards of Franciscan complex rock and soil would be disposed of within the Project area. The DEIR states on page 4.9-23 that about 4.0 million cubic yards of Franciscan materials will be excavated or handled in the Project area. We could find no explanation of how these figures were derived or where these materials were generated. We were able to determine that approximately 50,000 cubic yards of Franciscan mélange would be excavated to repair landslides at the dam site (DEIR page 3-36) and that 630,000 cubic yards of Blue Schist/Graywake (Franciscan Rocks) from Borrow Area B would be used for dam construction (page 3-40, Table 3.3). Please clarify and explain the above figures.

32

The DEIR on page 4.3-4 states that the Park Security Residence is closest to Borrow Area “D”. We could not find a Borrow Area D on the referenced Figure 4.14.1 or on Figure 3.10. Perhaps this is a mistake and this should be a reference to Borrow Area B? If correct, Borrow Area B would be the closest excavation area to the Park². It is located 1.2 miles from the Park Security Residence (DEIR page 4.3-4). Does this mistake affect any of the potential impact conclusions in the DEIR regarding noise, traffic or air quality?

33

Franciscan rock will be excavated to depths ranging from 15 and 70 feet below ground surface for the dam foundation (See *DEIR page 3-35*), and up to an additional 100 feet below the core dam foundation for the grout curtain (See *DEIR page 3-36*). If we understand these figures correctly then excavation into the Franciscan Formation at the dam site could extend from 115 to 170 below ground surface; please clarify.

35

The Franciscan Formation contains greywacke, serpentinite, silicious schist, greenstone and blueschist (See *DEIR page 3-35, footnote #10*). Table 4.9.1 on page 4.9-4 of the DEIR states that serpentinite, greenstone and blueschist are known to contain naturally occurring asbestos (NOA). In addition, some of the top soil, fill, colluvium and alluvium in the Project area are known to contain asbestos (see *Table 4.9.1*).

Inhalation or ingestion of asbestos discharged from the proposed Project could result in significant health risks to Park workers and the public. Asbestos is known to cause lung cancer, and cancer to the stomach and heart linings, as well as non-cancerous lung diseases (American Cancer Society Website 2009; Harte et. al. 1991³). “Any exposure to asbestos increases risk of cancer and the risk increases with both the level and duration of exposure” (Harte 1991).

Of particular concern is Mesothelioma, a rare and usually incurable disease almost exclusively caused by exposure to asbestos. The American Cancer Society website (2009) contains the following information on Mesothelioma health effects:

36

“The risk of getting mesothelioma depends on how much asbestos a person was exposed to and for how long. Mesotheliomas take a long time to develop. The time between the first exposure and finding the disease is often between 20 and 50 years. Once you have been exposed to asbestos, the risk of mesothelioma appears to be life long and it does not go down over time.”

Asbestos fibers have aerodynamic features that allow them to be suspended and resuspended easily in the air and to travel long distances (Harte et. al. 1991). People can be exposed at the time of release and long after the release and far from the source (Harte et. al. 1991).

There are two types of asbestos in the Project area. These are Chrysotile and Amphibole asbestos (See *DEIR page 4.9-2*). Chrysotile fibers are curly, tend to clump together and are easily rejected by the human body (Harte et. al. 1991). Amphibole fibers are smooth, needle-like fibers that are readily taken into the lungs (Harte et. al. 1991). In general, Amphibole

² We understand that there may be bed rock mortars in or near Borrow Area B. This should be investigated.

³ Toxics A to Z, John Harte et. al., 1991.

34

asbestos fibers may pose a greater health risk (than Chrysotiles) to humans due to their small size, low dissolution rates, and ability to remain suspended in the air for longer periods. Amphiboles are considered amongst the “most dangerous mineral particles” (Van Oss, C.J. et. al. 1999⁴). Accordingly, discharged Amphibole asbestos has a greater potential to cause adverse human health effects.

While there are mitigation measures that will be implemented to control asbestos, there is no certainty that asbestos will not be discharged from the Project area into the Park. The potential release of asbestos from the Project area may expose Park workers and the public to asbestos at levels greater than existing background levels. This potential health risk is of significant concern to the District.

Park workers and residents, and frequent visitors to the Park may be exposed to elevated levels of asbestos (and heavy metals) discharged from the Project during the proposed four-year construction period. This potential exposure may result in asbestos related diseases. Some of these may be short-term and others may be long-term that result in health problems several years after exposure.

The DEIR appears to be internally inconsistent on where asbestos-containing materials may be transported. Page 4.9-23 states that 4.0 million cubic yards of Franciscan rock will be “excavated or handled” in the Project area. On page 4.9-15 the DEIR states that no asbestos-containing materials would be transported outside the Project limits or “on public roadways” (emphasis added). Page 5-28 contains a mitigation measure for “off-site transport” of asbestos containing materials. Does “off-site transport” mean trucking of asbestos-containing materials on Calaveras Road (or other public roads)? If this is correct, when would this occur, what volume of material would be moved, where would such material be transported and what mitigation measures would be implemented to protect human health? Please explain these statements.

Another scenario of potential exposure is from periodic events, such as discharge of asbestos and/or metals from the project area by blasting or strong southerly wind gusts that result in fugitive dust (containing asbestos and/or metals) being blown into the Park. The DEIR states on page 4.3-21 that this “could pose a potential hazard to recreational hikers and bicyclists despite the required dust control measures.” We believe that such a scenario could result in asbestos exposure to Park workers, residents and visitors.

Mitigation: Page 4.9-24 and Mitigation Measure 5.9.2a starting on page 5-27 of the DEIR requires coordination with the Park District to determine “corrective actions”, including potential Park and/or road closures. These measures will not effectively mitigate impacts because it requires that action be taken **after** the potential discharge of asbestos and/or metals. Furthermore, road and trail closures will not mitigate the potential effects of an asbestos discharge to Park workers and residents that have to stay in the Park. It is not feasible to close a Park quickly enough under the above scenario to prevent human exposure to asbestos.

⁴ “Impact of Different Asbestos Species and Other Mineral Particles on Pulmonary Pathogenesis”, In Clays and Clay Minerals, Vol. 47, No. 6, 697-707, 1999.

Other mitigation measures will need to be identified and evaluated to determine what will mitigate this significant effect. This could include suspension of weekday naturalist programs, camping and picnicking, relocation of Park Staff to other parks, and potential closure of the Park in order to monitor air quality to determine if asbestos is being discharged by the Project into the Park. *More information on these potential mitigation measures is provided in the "Transportation and Circulation" and "Park Operations and Recreation" sections of this letter.*

36 cont.

E. Visual Resources

The DEIR does not adequately describe long-term or temporary visual impacts. It concludes that some construction areas will be obscured from view while others will be prominently visible from Sunol and Ohlone Regional Wilderness Preserves. It does not provide any substantial evidence of how these conclusions were made. The Project description states that borrow areas and disposal sites will be contoured to blend into the existing topography but no information is provided to show how this might appear from selected view study points, including Park trails with views of the new dam. The DEIR analysis needs to show how the benched/terraced engineered cut slopes will appear from view points 4.11.8, 4.11.9, 4.11.10 and 4.11.11. The viewshed analysis in the DEIR should evaluate the surrounding topography and provide engineering design standards that will blend finished grades into the surrounding area in a way that minimizes the unnatural appearance of the area around the dam. This is especially important because areas around the dam cannot be replanted with oak woodlands and will have a permanent visually degraded character due to the unnatural-appearing graded benches and engineered slopes.

37

Note: The exposure and print quality of existing view photos must be improved to understand the existing view point perspectives selected. Specifically, photos of view points 4.11.8 and 4.11.9 are poor quality. This makes it difficult to assess existing conditions and is an inadequate basis from which to make visual impact conclusions.

38

F. Transportation and Circulation

Public Roads and Hazards: Importation of approximately 319,100 cubic yards of bulk materials from off-site quarries (See DEIR page 3-60) would most likely be conducted on Calaveras Road (weekdays between 7:00 AM and 5:00 PM) from the Sunol quarries that are seven miles north of the dam site (See DEIR page 3-42). Bulk material importation would be conducted over a two month period in summer 2011 and 18 month period beginning in winter 2012 (See DEIR page 1-23).

39

The DEIR does not provide information on the volume of material that would be carried per truck load or the weight of a loaded truck or an estimate of the number of round trips on Calaveras Road that would be required to transport 319,000 cubic yard of bulk material from Sunol to the Project Area. For purposes of understanding the potential magnitude of this impact we made the assumption that a typical truck and trailer would carry an average load of 20 cubic yards of material. Twenty cubic yards of gravel would weigh approximately 40,000 pounds. An empty truck may weigh approximately 30,000 pounds. This would add to a total

weight of approximately 70,000 pounds per loaded truck. Transporting 319,000 cubic yards of bulk material would require about 15,955 round trips from the Sunol quarry site to the Project area. The DEIR should provide specific information that can be used to fully understand the magnitude of this significant transportation impact on wildlife, fisheries, water quality, traffic circulation and safety, air quality, noise, land use, recreation, public safety and Park operations.

39 cont.

The Project DEIR concludes that Calaveras Road can accommodate heavy trucks but provides insufficient information or analysis to substantiate this conclusion and does not examine the impact of a significant increase of truck traffic on publicly maintained roads (See DEIR page 4.12-6). Significant portions of Calaveras Road south of the Alameda Water Treatment Plant were not constructed to withstand the proposed level and intensity of use by heavy trucks. Truck damage to road surfaces could include cracking, crumbling, settlement and pot holes. This would create road conditions especially hazardous to bicycles that may lose control and crash on damaged roads. Motor vehicles would experience increased wear of tires and damage to suspension systems, including strut and axle failures. In addition, motorists and bicyclists may be swerving to avoid damaged road sections and be subject to greater risk of collision with on-coming vehicles or trees and embankments along Calaveras Road.

The DEIR proposes that Calaveras Road be swept before opening closed portions to weekend traffic. While sweeping may reduce the amount of coarse dust on the road, it does not mitigate the impact of truck damage to the road surface. The DEIR states on page 3-50 that "Calaveras Road between Interstate 680 and the dam access road would be repaved as needed to restore the road to its pre-construction condition."

40

Additional mitigation measures are necessary to conduct regular repair of damaged road segments before they are reopened to bicyclists and motorists. Proposed mitigation measure 5.12.4a does not adequately address roadway hazards as it leaves repair and restoration of Calaveras Road to occur upon project completion and it prescribes vague and ambiguous requirements to "address" maintenance of "adequate" driving and bicycling conditions (DEIR, P. 5-38). How will maintenance be "addressed" during the construction period and what measureable standards will be set forth to maintain "adequate" driving conditions? These mitigation measures need to be defined with measureable criteria, established performance measures and regular inspections.

If road repair measures are not feasible during Project construction then it may be necessary to close damaged road segments for longer time periods. This may be of particular relevance during winter months when cold and wet weather conditions are not conducive to placing new pavement on damaged road sections. One adverse effect of longer road closures is that it will increase the recreational impacts of the Project. Additional mitigation will be required for this impact. This could include construction of alternative means of access to the Park or potential closure of the Park.

Table 3.6 on page 3-50 of the DEIR states that Calaveras Road may also need to be closed weekend days "when air quality monitoring indicates unacceptable levels of dust" on the road. While this may be necessary to protect human health and the environment, such measures would result in unscheduled Park closures. This would be a significant impact because it would

41

require cancellation of naturalist programs, camping and picnic reservations, special events, regional trail access, bicycle access and other day use activities. Unscheduled closures would result in economic and recreational impacts that are not mitigated by the proposed Project.

41 cont.

During project construction it is likely that most construction workers will be commuting south on Calaveras Road from Interstate 680. Most of these workers will likely be driving in single-passenger vehicles during three commute periods. This will place between 80 and 190 vehicles per day on Calaveras Road. This narrow road has poor sight distances and sharp curves. This increased use will greatly increase the risk of collisions with or between construction workers. Speed limits and safe material hauling practices should be strictly enforced during project construction, including those periods when the road is closed to regular traffic.

42

DEIR Page 5-39 sets forth a speed limit on unpaved roads of 15 miles per hour but does not address the possibility of similar speed controls for paved roads. Reduction of vehicle speeds on Calaveras Road may be required due to dust generated by excessive truck traffic. This may unduly impair access to Sunol and Ohlone Wilderness Preserves. Consideration should be given to keeping the road safe and in such condition that it allows for normal road speeds when not otherwise in use by large trucks for hauling materials.

43

Environmental Setting: The Project DEIR does not use the best available information from the WSIP programmatically planned scenario to describe the environment under which the project will take place. Omitting analysis of how the project will function given known and foreseeable overlapping WSIP construction projects scheduled to use Calaveras Road mischaracterizes and understates project impacts.

Due to overlapping construction projects scheduled to occur in the Sunol Valley region within the next 5 years and proposed road and lane closures coupled with an extraordinary increase in truck traffic and material transport associated with the Project, safe and reliable automobile and bicycle access to Sunol Regional Wilderness from Calaveras Road remains a serious concern for the District. We raised this concern with SFPUC in multiple comment letters including the WSIP DEIR and NOP Scoping Comments for the subject Project. We request that the environmental setting be updated to reflect this unusual circumstance and that appropriate mitigation measures be developed to lessen cumulative traffic delays and hazards.

44

The DEIR understates the environmental setting and physical environment under which the Project would be implemented. Brief references in the DEIR to the WSIP PEIR and limited cumulative project impact analysis (peak hour trips) of projects with overlapping schedules in the area do not explain how traffic delay and hazard impacts will impact Park operations. The DEIR should explain how the Project will be implemented given the constraints of other WSIP projects that involve lane reconfigurations, new traffic signal(s), new access driveways, detours, prolonged lane closures and approximate doubling of daily vehicle trips on Calaveras Road.

The four year duration and overlapping nature of these projects is not the normal circumstance for construction projects in this area. The DEIR's reliance on the WSIP PEIR to address these impacts is inappropriate given the programmatic nature of the WSIP PEIR (see WSIP PEIR

Response 14.4.2, “Intent of Programmatic Impact Analysis”). Essential issues for the DEIR to address should include:

1. Identify the location (planned or existing) of known or foreseeable traffic controls (flaggers, signals, detours, lane closures) associated with WSIP projects using Calaveras Road. This should be based on the most current information on WSIP projects that have undergone project-specific analysis.
 - a. Analyze how Project traffic and material hauling will function with known or foreseeable Calaveras Road traffic controls and identify and mitigate for any new hazards to bicyclists and motorists.
2. Identify the location and description of known or foreseeable roadway modifications (i.e. adjusted alignments, construction driveway locations, lane closures) associated with Project and WSIP projects using Calaveras Road. This should be based on the most current information on WSIP projects that have undergone project specific analysis.
 - a. Analyze how Project traffic and material hauling will function with known or foreseeable roadway modifications and mitigate for any new hazards to bicyclists and motorists.
3. Provide analysis of the build/design of Calaveras Road and measure of accelerated wear and tear that Project truck/vehicle trips will have in addition to truck/vehicle trips from other WSIP projects using the road.
4. Quantify the project’s contribution to traffic control delays affecting bicyclists and motorists on Calaveras Road. Recognizing the variability in how WSIP construction trips may overlap, describe the foreseeable range of delay the Project may cause. Develop mitigation measures that will avoid or minimize this impact.
5. The Project DEIR cumulative impact analysis and the “Mitigation Measure Consistency with WSIP Program EIR” analysis (See *DEIR Appendix I*) states that WSIP PEIR Mitigation Measure 4.8-1b (Coordination of Individual Traffic Control Plans) will be implemented by Project Mitigation Measure 5.12.4a; however, the text of Mitigation Measure 5.12.4a does not include such a requirement. The DEIR should identify the WSIP projects that need to be coordinated and use the most current WSIP project information to develop Project-specific measures for coordinating WSIP construction traffic in the region.

44 cont.

Recreational Use: Weekday closure of Calaveras Road from Geary Road to Felter Road will create a 25-mile detour for Park visitors coming from Santa Clara County. This is a significant inconvenience for Park visitors and will have the effect of discouraging Park visitation. Recent studies conducted by the District show that many of our facilities have as much weekday usage as weekends. For example, at Sunol school group visits are a significant weekday activity.

45

The Project DEIR makes no attempt to quantify expected traffic delays due to construction and provides no basis for developing measures to avoid or minimize impacts or determine impact significance. The DEIR does not adequately describe what the detour delay might be from weekday closure of Calaveras Road from Geary Road to Felter Road. This Project could cause a significant adverse impact where Calaveras Road will be impassible at random times thereby

46

making it impossible for the District to continue with our interpretive programs (planned three or more months in advance), camping reservations (up to three months in advance) or other planned special events (i.e. Wildflower festival in March/April, Cowboy Extravaganza in October) that have strong and growing public attendance. Proposed mitigation for installing signs and providing information to the District is ambiguous and provides little detail about the actual impact. This is a loss of recreational use that must be avoided or mitigated by providing alternative recreational opportunities. *More information on these potential mitigation measures is provided in the "Park Operations and Recreation" section of this letter.*

46 cont.

The DEIR on page 5-30 states that roads and trails will be closed should measures fail to control airborne asbestos or metals. Road and trail closures could cut off our only point of access to Sunol and Ohlone Regional Wilderness Preserves. The DEIR must analyze access impacts to the Park and provide an alternate access route or avoidance measures.

47

Unsafe Driving: Unsafe transport of material by trucks is a reasonably foreseeable traffic and circulation impact that is not addressed in the DEIR. This is a potentially significant impact on motorists, trail users (at trail crossings), joggers and bicyclists. This impact could result in serious traffic accidents due to speeding and improper loading of materials. This is especially amplified because of overlapping truck traffic from other construction projects, tight scheduling requirements and truck operator's desire to maximize the number of truck runs per hour. It is inappropriate to assume that truck operators will comply with mitigation measures or other regulations without defined consequences in place to assure compliance. The DEIR should analyze this potential impact and develop mitigation measures to avoid or minimize impacts.

48

Emergency Vehicle Access: Emergency access to the area is critical for control of wildland fires in the region. The DEIR concludes that impaired emergency service provider access is less than significant because Level of Service (LOS) standards will not be exceeded and the residence near the dam would be vacated (See *DEIR*, p 4.12-14). This conclusion is flawed in that there is no consideration given to the environmental setting under which the Project will take place (see *environmental setting above*) and the increase wildfire risk the region will be subject to during Project construction. It is inappropriate to rely solely on LOS standards to address potential emergency service access impacts as LOS analysis overlooks delays caused by detours, lane closures and other traffic controls. The full extent of potential emergency service access impacts needs to be addressed in the DEIR. Appropriate measures for avoiding and minimizing this impact should also be identified.

49

Mitigation Measures: Several mitigation measures that should be considered for lessening transportation related impacts include:

1. Using the most current information on Project and WSIP projects, analyze how the Project will specifically coordinate overlapping construction schedules and activities, truck arrivals and departures, lane closures and detours and the adequacy of on-street staging requirements.
2. Include performance standards that will minimize traffic control delays. A predictable performance measure such as requiring traffic control points to not delay vehicles for

50

51

more than one minute would help with scheduling Park activities and keep Park visitation viable for the public.

51 cont.

3. Restrict truck access to essential trips (only) from the north via Calaveras Road. Divert other truck trips to access the Project area from the south via Interstate 680. This alternate route will provide shorter travel time to the Project site due to higher travel speeds on Interstate 680 (See DEIR pages 4.12 - 4.13) and minimize traffic delays and hazards to bicyclists and motorists on Calaveras Road.

52

4. Require mandatory suspension of truck operators that do not comply with established standards for accessing the project area and material transport. For example, truck drivers found speeding, driving recklessly or improperly securing hauled material would not be allowed to continue to transport materials for the Project. This policy should be included in all relevant construction contract documents.

53

5. Develop a process for reporting dangerous truck operators and for reporting hazardous roadway conditions (road debris or surface degradation). The program should identify protocols for responding to reports and concerns from the public.

6. Require a street maintenance and a cleaning program. This program would include ongoing roadway inspections and public reporting to ensure roadway surfaces are safe for bicyclists and motorists. A regular street sweeping schedule would be a key component of this program.

54

G. Air Quality

Note: Comments in this section refer to potential air quality impacts during construction, except for those relating to airborne asbestos. Potential impacts from asbestos are discussed in the "Human Health" section of this letter.

Calaveras Road will be subject to regular heavy use by motor vehicles and trucks during the anticipated four year construction period. This will include multiple periodic closures as described in the EIR. Significant impacts to air quality will result from hauling more than 319,000 cubic yards of sand and gravel on Calaveras Road between Sunol and the Project area. This includes particulates and vehicle exhaust. While the DEIR describes these as temporary impacts, there will be cumulative impacts to human health. This includes inhalation of fine particles during the four year construction period. Periodic sweeping and watering of public roads will reduce the amount of larger dust particles; however, smaller particles will remain airborne considerably longer and are not effectively removed by just sweeping and water application.

55

The public will be unable to distinguish between dust particulates that may contain asbestos and those that do not. This may cause unnecessary alarm and further deter use of Calaveras Road and reduce Park visitation. The DEIR does not adequately mitigate these potentially significant effects. The SFPUC should provide mitigation for degraded air quality conditions that may deter park/trail users or impact the health of Park workers and visitors.

56

The Project DEIR identifies that air quality impacts from Project construction will exceed Bay Area Air Quality Management District thresholds for significance. Project specific CEQA findings for this impact will need to be adopted. The WSIP PEIR identifies cumulative air quality impacts (ozone and particulate matter) as significant and unavoidable. Best Management Practices for dust and exhaust control are identified as mitigation measures for all WSIP projects. The subject Project should also adopt these specific mitigation measures.

57

H. Noise

According to the DEIR noise impacts will occur twenty hours per day, six days per week (See DEIR page 4.14-13) and “temporary” construction-related noise will result in a significant unavoidable impact. The DEIR states on page 4.14-6 that Park users “can be characterized as noise sensitive” but does not analyze noise impacts to Park users. Park visitors and workers, especially campers, interpretive program students and Park workers should be recognized as stationary sensitive receptors and appropriate mitigation measure should be developed to avoid or minimize noise impacts to them. The four year construction schedule and long hours of construction are well beyond the duration of most construction projects. Not analyzing noise impacts to this group leaves this potential impact unknown and does not provide a basis to develop mitigation measures to avoid and minimize the impact.

58

The DEIR on page 4.14-18 concludes that noise impacts to hikers will be insignificant because hikers can avoid noisy areas. Assuming that Park visitors will alter their planned activities for the Project is not an acceptable approach for minimizing noise impacts. Mitigation of Project impacts should be the responsibility of the Project sponsor and not the impacted public.

59

I. Land Use

The DEIR on page 4.3-15 describes the greater Sunol area as having a “rural setting that has low volumes on truck traffic”. As described on page 3-60 the DEIR the proposed Project would haul more than 319,000 cubic yards of filter and drain materials from the Sunol quarries for dam construction. This trucking would take place over the four year project construction period. Approximately 15,955 trucks would drive on Calaveras Road for seven miles through an area previously described in the DEIR as having a “low volume of truck traffic”. Clearly this volume of truck traffic is inconsistent with the rural setting of the area and would result in significant and unmitigated impacts.

60

On page 4.3-16 the DEIR states that “increased construction traffic, would be similar to ongoing activities that occur in the vicinity; all existing land uses would continue to operate uninterrupted throughout the construction period.” This statement is incorrect for two reasons; 1.) There are no similar ongoing activities on Calaveras Road that would generate anywhere near the number of truck trips as the proposed Project; and 2.) Existing land uses would be interrupted during the construction period due to the planned weekday closures of Calaveras Road for two- and 18-month intervals (plus periodic week day and week end closures as needed). These are substantial closure periods that will result in significant impacts to private property owners and to the Park. This will be a significant impact to access and

operation of Sunol Regional Wilderness. Regardless of whether these impacts are temporary or permanent they are still significant and require mitigation.

60 cont.

The DEIR should provide specific information requirements of Alameda and Santa Clara Counties that are necessary to obtain permission to close portions of Calaveras Road. What type of public information and noticing will be required by these counties as part of their approvals for potential road closures?

61

J. Public Safety

There are a number of concerns regarding the affects of the proposed Project on public safety. These include the health effects of asbestos from Project³⁷ and the effects to drivers and residents that may inhale small particulate matter generated by substantially increased truck traffic on Calaveras Road. Respectively, these have been addressed in the “Human Health”, “Air Quality” and “Transportation” sections of this letter.

Other safety effects include increased demand for police and fire services during Project construction. The DEIR makes the incorrect assumption that public safety services will be provided by others with no impact to those agencies. The District provides police and fire services to its regional parks and trails, and to adjacent areas through agreements with other agencies, including SFPUC. Road closures, potential park and trail closures, Project-caused wildfire, increased trespass and vandalism of District facilities, and increased vehicle accidents on Calaveras Road may all place new or increased demands on District public safety services. There is a finite amount of District public safety staff and financial resources that can be devoted to this area over the proposed four-year construction period. The DEIR does not propose adequate mitigation measures for these significant impacts. Mitigation should include financial compensation for the District’s increased public safety costs. Coordination alone will not be sufficient to mitigate this impact.

62

K. Park Operations and Recreation

Sunol Regional Wilderness is 6,858 acres; of this figure, 3,812 acres are leased from the SFPUC. The DEIR incorrectly states the Park District leases 3,800 acres from the SFPUC. The remaining 3,146 acres are owned in fee by the District. There are recreational facilities located within the Park on both SFPUC and District lands. These facilities are operated by the District. Public use within the parks adjacent to the proposed Project area (Sunol, Ohlone, Camp Ohlone, Del Valle and Mission Peak) is between 750,000 and 1,000,000 people per year.

63

Del Valle Regional Park is 4,395 acres; the DEIR on page 4.3-10 states that Del Valle is “approximately 4,000 acres”. Current information about regional parks and trails, and Ordinance 38 can be found on the Park District’s website at www.ebarks.org.

The Sunol and Ohlone Regional Wilderness Preserves are one of the District’s premier camping facilities and are ranked as one of America’s top 100 campgrounds by Reserve America (<http://www.thecampingclub.com/zztop100/top100list.html>).

Page 4.3-9 of the DEIR states that “swimming is not prohibited within the Sunol Wilderness”. This statement is incorrect; swimming is prohibited in all parks, except those areas that have been designated as swim facilities by the District’s Board of Directors (see *Park District Ordinance 38 Section 401.1*). There are no designated swim facilities at Sunol or Ohlone Regional Wildernesses.

64

As previously identified in our comments on the “Human Health”, “Transportation” and “Air Quality” sections of this letter the proposed Project will impact a number of recreation facilities due to periodic and unscheduled closure of roads, traffic congestion, construction noise and dust, trail closures, concerns about potential exposure to asbestos, etc. Many reservation-based activities, such as naturalist programs, group picnic and camping areas, and special events may be cancelled due to these concerns. The net result will be a significant reduction in Park visitors and a degraded Park experience during the four-year construction period. The District will also experience a significant reduction in revenues due to decreased Park visits and cancellations. Potentially significant effects include the following examples.

1. *Visitor Center* – This facility includes a museum and class room that is regularly used for public programs. Many school groups make regular visits to the Park for Naturalist programs and tours. These activities are scheduled several months in advance. The District has no comparable visitor’s center in the area.
2. *Security Residence* – The District has a six-year residential lease to a District employee. This lease provides revenue to the District and an extra measure of Park security. There is no nearby replacement residence should this residence be closed during construction.
3. *Picnic Areas* – There are several picnic areas scattered throughout the valley on the west side of Alameda Creek. Some of these are paid group picnic areas often reserved several months in advance. The closest replacement facilities are at Shadow Cliffs Regional Recreation Area, approximately twelve miles northeast of Sunol.
4. *Camping Areas* – As with group picnic facilities, camp sites are reserved several months in advance. The closest replacement facilities are at Del Valle Regional Park, approximately twenty miles east of Sunol.
5. *Special Events* – Sunol hosts a number of annual and periodic special events that are conducted at various locations in the Park. Alternative locations for these events may not be available.
6. *Trails* – The DEIR proposes to redirect trail usage away from the Project area. This will reduce the trail usage in the Park. The Ohlone Wilderness Trail runs for about 27-miles from Mission Peak, through Sunol and Ohlone, and ends at Del Valle. Periodic closure of Calaveras Road will preclude the use of this important regional trail through the Park. There are regular events on this trail, including runs and equestrian rides that could not be conducted. There are also backpack camps that may become inaccessible or under utilized due to trail closures.
7. *Gate Revenues* – Decreases in public visits to Sunol during Project construction will result in a reduction in entrance gate-revenues. These revenues off-set District

65

maintenance and operating costs for the Park. This includes funding for equipment, supplies, services, utilities and salaries. These fixed baseline costs will remain constant even as revenues and Park visits decline.

8. *Operating Costs* – Park operating costs will increase due to a number of effects from construction of the proposed Project. These include increased need for ranger patrols to enforce closures, inspection for trespass and vandalism, collection of debris, posting informative signs and public education regarding the proposed Project and its effects on the Park and Park visitors.

Mitigation Measures: The DEIR does not identify Project-related impacts to the above described Park operations and recreation, nor does it propose suitable mitigation measures for these significant effects. Potential mitigation measures could include the following:

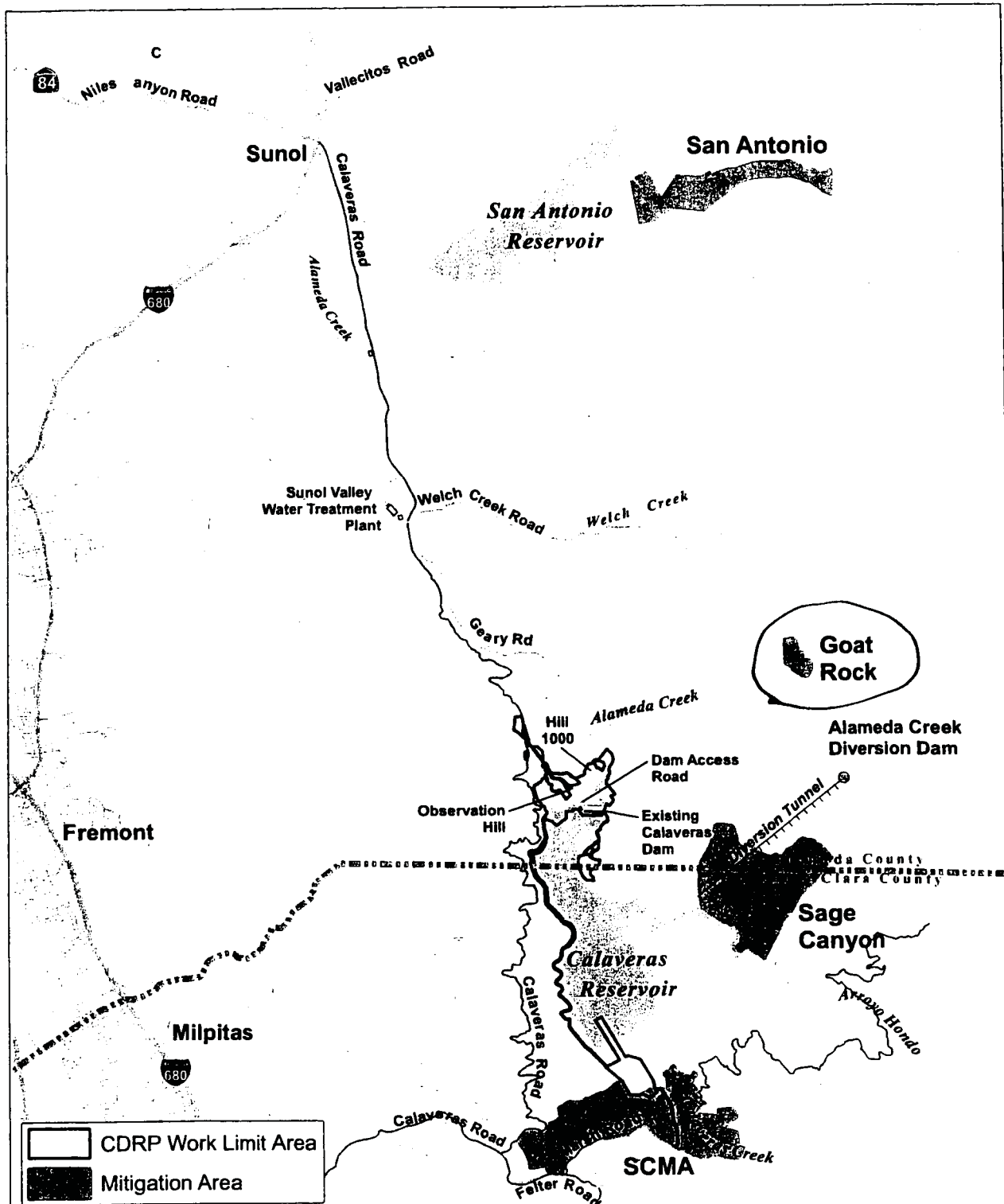
1. *Reimbursement of lost revenues and increased operating costs* – This would include lost revenues from entrance gates, security residence rent, camping and picnic reservations, special events, naturalist programs, and increased costs for ranger, police and fire services.
2. *Relocation of park facilities and programs* – Should it be necessary to close the Sunol visitor's center and related naturalist programs during Project construction this facility and its associated staff would need to be relocated to another park where replacement facilities could be provided. There would be substantial costs for such an undertaking.
3. *Construction of new facilities* - Given the number of impacts that may result from the Project new facilities should be constructed to replace lost recreational opportunities during the Project construction period. This could include park offices, maintenance facilities, staging areas, restrooms, drinking water, trails, picnic areas, campgrounds and road improvements.
4. *Construction of new bridges* - One particularly important mitigation measure would be the replacement of the trestle bridge over Alameda Creek. This would mitigate a number of significant impacts to recreation, park operations and public safety resulting from increased flows in Alameda Creek.
5. *Acquisition and dedication of new parklands* – As previously described in this letter in the "Vegetation and Wildlife" section, we believe that on-site mitigation using existing watershed land is inappropriate because these lands were already protected as part of the original reservoir project. Instead, the SFPUC should acquire in fee new properties that can serve as mitigation for the proposed Project. Acquisitions should focus on unprotected lands within the Alameda Creek Watershed that provide opportunities for protection, enhancement and restoration of plant and animal habitats. Some of these areas may also be suitable as mitigation lands dedicated to the District to mitigate impacts to the District's parks during Project construction.

65 cont.

66

This Figure missing from
DEIR and Appendix C-2

20 cont.



SOURCE: EDAW & Turnstone JV

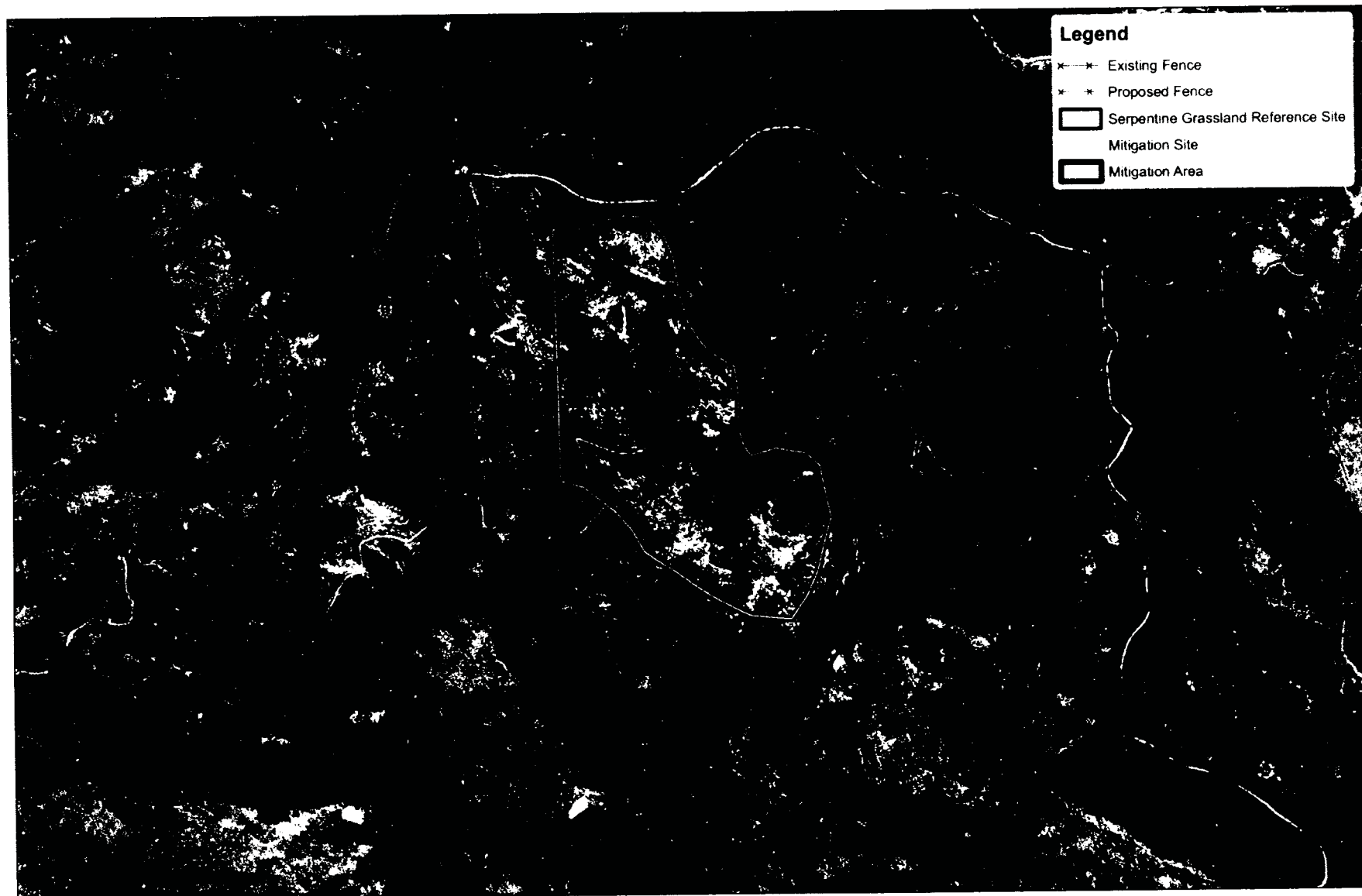
PURPOSE: The basic purpose of the project is to replace the existing Calaveras Dam so that it meets current DSOD requirements for seismic stability and to reinstate the previous capacity of Calaveras Reservoir to provide necessary local water supply in the event of interruption of service at Hetch Hetchy or in the event of a drought.

LOCATION: Alameda and Santa Clara Counties, CA

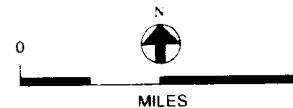
APPLICANT: San Francisco Public Utilities Commission, 1155 Market Street, 6th Floor, San Francisco, CA 94103. Contact: Dan Wade

CALAVERAS DAM REPLACEMENT PROJECT - USACE File #29979S

FIGURE 2: CALAVERAS DAM VICINITY



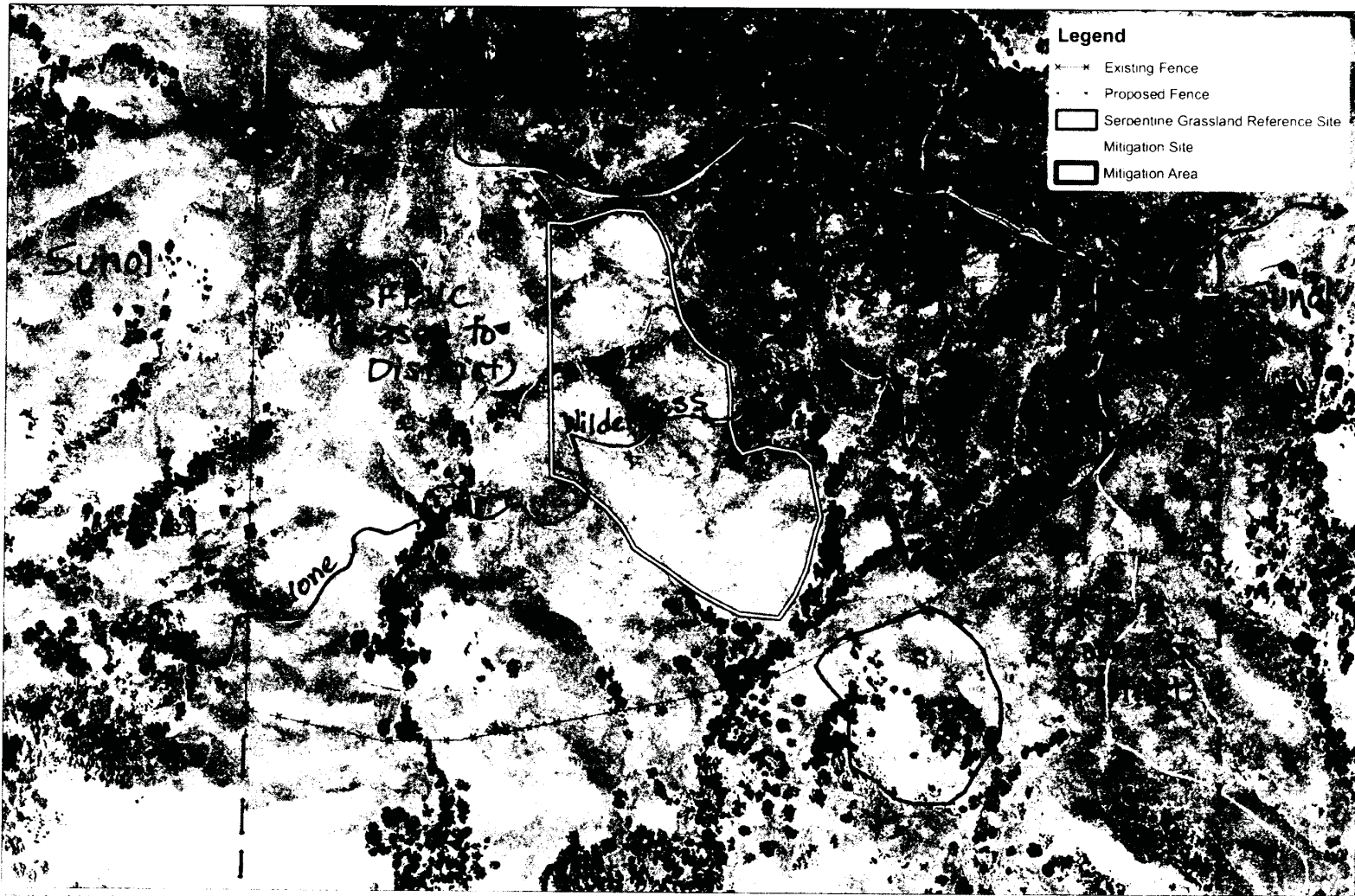
SOURCE: EDAW & Turnstone JV



CALAVERAS DAM REPLACEMENT PROJECT

2005.0161E

FIGURE 3-6: GOAT ROCK MITIGATION AREA



SOURCE: EDAW & Turstone, Inc.

CALAVERAS DAM REPLACEMENT PROJECT

2005 0161E

FIGURE 3-6: GOAT ROCK MITIGATION AREA

This figure missing from DEIR and Appendix C-2

20 cont.

EAST BAY REGIONAL PARK DISTRICT



City & County of S.F.
Dept. of City Planning

November 9, 2005

DEC 02 2005

Mr. Paul Maltzer
San Francisco Planning Department
30 Van Ness Suite 4150
San Francisco, CA 94103

OFFICE OF
ENVIRONMENTAL REVIEW

Subject: Scoping Comments for SFPUC Calaveras Dam Replacement
Sunol/Ohlone Regional Wilderness

Dear Mr. Maltzer,

Thank you for providing the East Bay Regional Park District ("District") with a copy of the Notice of Preparation (NOP) for a Draft Environmental Impact Report (DEIR) for SFPUC's Calaveras Dam Replacement Project. On October 12, 2005, the District provided scoping comments on SFPUC's Water System Improvement Program. Those comments dealt with more general programmatic comments on the proposed Program. The following comments focus more specifically on the proposal to replace the Calaveras Dam in southern Alameda County. One item that is not clear in the NOP is whether a joint EIR/EIS will be prepared, or whether the CPUC and Corps of Engineers will be preparing separate environmental documents. Our comments are being provided for consideration under both the California Environmental Quality Act and the National Environmental Policy Act.

The District leases 3812 acres of land from SFPUC as part of Sunol and Ohlone Regional Wilderness parks. The proposed project has the potential for significant adverse effects to Sunol Regional Wilderness, Ohlone Regional Wilderness, Mission Peak Regional Preserve and Camp Ohlone. The EIR and EIS should evaluate potential effects to all of these regional parks and provide appropriate mitigation for such effects. These effects could include:

1. **Fisheries:** The NOP notes that there may be downstream effects to fisheries from the proposed project. This could include impacts to native fisheries in Alameda Creek at Sunol Regional Wilderness. In cooperation with the SFPUC, the District has imposed a number of restrictions to protect water quality and fisheries in the creek, including restricting livestock, public access and dogs from entering the creek. Such potential impacts, however, do not compare to the potential impacts to fisheries resulting from replacement of the Calaveras Dam. This could include increased sedimentation or erosion, increased turbidity, changes in water chemistry, reduced dissolved oxygen, increased or fluctuating water temperature and creation of new barriers to fish passage.

The EIR and EIS should identify downstream impacts to Alameda Creek and implement measures to mitigate the individual and cumulative effect of successive water diversion

BOARD OF DIRECTORS

Beverly Lund
President
Ward 6

Carol Severin
Vice President
Ward 5

John Sutter
Treasurer
Ward 2

Ayni Wadsworth
Secretary
Ward 1

Ted Runko
Ward 7

Doug Smith
Ward 4

Joan Gill
Ward 3

Pat O'Brien
General Manager

67

68



2550 Parisha Oaks Court P.O. Box 5381 Oakland, CA 94605-0381
T. 510 535-0138 FAX 510 569-4318 TDD 510 633-0480 www.ebrpd.org

and storage projects on this creek. Such measures could include acquisition and protection of additional watershed areas, restoration of degraded riparian vegetation, removal of obsolete water diversion structures and removal of barriers to fish passage. Development of such mitigation measures should be done with the involvement of adjacent property owners and land managers who will be affected by the proposed project.

68 cont.

2. **Plants and Wildlife:** The NOP does not appear to provide any information of the loss or plant and animal habitats in the project area. This would include the footprint of the new dam, stockpile, spoilage, borrow areas and new roads. Figures 3 and 4 depict a large area of impact, potentially including several hundred acres of grassland, scrub, chaparral, oak woodland, coniferous forest, riparian woodland and freshwater wetlands. Many of these habitats are rapidly declining in California and impacts to such communities would be considered significant under CEQA. In addition, the project footprint will create islands of remaining habitat which will have a large edge interface with disturbed areas. Such isolated pockets of habitat will cease to have value for many species that require large contiguous blocks of habitat for foraging, reproduction and migration. As a result, these pockets of habitat should also be considered as impacted by the proposed project. The EIR and EIS must identify and fully mitigate such significant effects.

69

3. **Special-Status Species:** There is a long list of potentially affected special-status species included in the NOP that may be affected by the proposed project. Of particular interest to the District are native fisheries, such as (anadromous and land-locked) salmonids and squawfish in Alameda Creek, and amphibians and reptiles in the surrounding watershed areas, including California red-legged frog, foothill yellow-legged frog, California tiger salamander, Western pond turtle, horned lizard and Alameda whipsnake.

70

71

The upper Alameda Creek Watershed contains large populations of special-status fisheries, amphibians and reptiles that will be impacted by the proposed project. The EIR and EIS should identify impacts to these species and implement measures to mitigate the individual and cumulative effect of successive water diversion and storage projects in this watershed. Such measures could include acquisition and protection of additional watershed areas, restoration of degraded habitats and removal of non-native pigs, foxes, bullfrogs and fish.

72

Another area of concern is impacts to raptors. There are number of nesting locations for golden eagle, peregrine falcon, prairie falcon and others that may be directly affected by removal of nest locations or indirectly affected by construction disturbance during nesting periods. Other raptors, such as bald eagle forage in Calaveras Reservoir and other nearby reservoirs. Changes in reservoir operations resulting in degradation of reservoir fisheries may impact bald eagle foraging.

73

The NOP did not identify a number of special-status plants that have been documented in the upper Alameda Creek Watershed that may be impacted by the proposed project. These include *Lessingia hololeuca* (documented at Calaveras Dam), *L. tenuis* (at Arroyo Mocho), *Hallanthella castanea* (at various locations), *Acanthomintha lutescens* (at

74

Sunol), *Campanula exigua* (at Sunol), *Eriophyllum jepsonii* (at Del Valle and Sunol), *Linanthus ambiguus* (at Sunol) and *Monardella villosa* ssp. *globosa* (at Sunol).

74 cont.

4. **Water Quality:** As described above under the fisheries section, the proposed project may result in similar significant impacts to water quality in downstream areas of Alameda Creek in Sunol Regional Wilderness. The EIR and EIS should identify downstream impacts to Alameda Creek and implement measures to mitigate the impacts to water quality.
5. **Air Quality:** Construction of the new dam will impact air quality in the greater project area. Specifically, excavation and transportation of fill materials to the dam site, stock pile, spoilage and borrow sites will result in significant increases in particulates and exhaust from construction equipment and trucks. In addition, project traffic on Calaveras Road, Welch Creek Road (if Apperson Quarry is used) and on unpaved roads in the watershed will generate significant amounts of air pollutants (and water pollutants where particulates would be deposited in drainages). Areas within the air basin which are downwind (or downstream) of construction areas will be impacted by such pollutants, potentially including Sunol Regional Wilderness, Camp Ohlone and other parklands.
6. **Noise:** Similar to air quality impacts, the proposed project will generate significant amounts of noise during the construction of the new dam, excavation or disposal of fill materials and transportation of materials on public roadways and unpaved roads in the watershed. Potential blasting at the dam site or borrow sites may also disrupt wildlife and the recreating public. Such activities should be prohibited on weekends and during high use periods at Sunol Regional Wilderness.
7. **Esthetics:** It appears from the proposed project description that none of the existing material within the existing Calaveras Dam will be utilized for the construction of the new dam. Instead, the proposed project calls for the importation of 2.4 million cubic yards of material to construct the new dam. At least three of the proposed borrow sites are located north of the existing dam, in very close proximity to Sunol Regional Wilderness. One borrow site calls for removing the top of a 1000 foot ridge that is visually prominent from the Wilderness Park. Such impacts are not consistent with the wilderness character of the park and would result in significant and potentially unmitigatable visual impacts to park users. The EIR and EIS should perform a visual impact analysis including visual simulations of before and after project conditions, as seen from public roads, trails and parklands. The EIR and EIS should also consider a range of potential sources for the imported fill materials, including alternative sites that will not result in impacts to Sunol Regional Wilderness.
8. **Recreation:** A number of existing recreational activities take place within the watershed area that may be affected by the proposed project. These include hiking, equestrian, bicycling, picnicking, camping, backpacking, fishing, photography, interpretive programs, nature study and quiet enjoyment in a wilderness area. Some of these activities would be particularly vulnerable to impacts from the proposed project. For

75

76

77

78

79

example, night time construction, blasting or truck noise would impact campers and backpackers at Sunol and Camp Ohlone. Closure of roads and trails would impact hikers, equestrians and bicyclists (where permitted).

79 cont.

9. **Traffic and Circulation:** The proposed closure of Calaveras Road between Geary Road and Felter Road would cut off public access to Sunol Regional Wilderness from Santa Clara County and could disrupt public access to the Ohlone Wilderness Regional Trail at its Geary Road crossing of Calaveras Road. Closure of portions of Calaveras road will increase traffic on the northern portions of the road, creating congestion and potentially substantial delays in accessing Sunol Regional Wilderness. The EIR and EIS must identify and fully mitigate such significant effects.

80

The NOP is silent on the issue of whether materials from the Apperson Quarry may be necessary for construction of the new Calaveras Dam. Opening of this quarry site would result in a number of new impacts to Sunol Regional Wilderness. One of our primary areas of concern with use of the Apperson Quarry would be the traffic and circulation impacts to Sunol from trucking aggregate materials on Calaveras Road, Welch Creek Road, or potentially even through Sunol to reach the new dam location. The EIR and EIS must identify and fully mitigate such significant effects.

10. **Public Safety.** While the NOP states that Calaveras Road would be open to emergency vehicles, its closure to the public would decrease the safety of private vehicles by placing more cars on Calaveras Road north of the closure. More cars on a narrow road increase the chances of collision or vehicles running off the road. Furthermore, large construction vehicles accessing the construction area from Calaveras Road would greatly increase the risk of collision between construction vehicles and private vehicles. The EIR and EIS must identify and fully mitigate such significant effects.

81

Please call me if you have any questions regarding our scoping letter. I can be reached at (510) 544-2622. Please include my name on any future mailings regarding this project.

Sincerely,



Brad Olson
Environmental Programs Manager

cc. Robert Smith, US Army Corps of Engineers
Tim Ramirez, SFPUC

County of Santa Clara

Parks and Recreation Department

298 Garden Hill Drive
Los Gatos, California 95032-7669
(408) 355-2200 FAX 355-2290
Reservations (408) 355-2201
www.parkhere.org



December 19, 2009

Bill Wycko, Environmental Review Officer
San Francisco Public Utilities Commission (SFPUC)
1650 Mission Street, Suite 400
San Francisco, CA 94103

Subject: Draft Environmental Impact Report for the Calaveras Dam Replacement Project

Planning Department Case Number: 2005.0161E
State Clearing House Number: 2005102102

Dear Mr. Wycko,

The Santa Clara County Parks Department (County Parks Department) has received a copy of the Draft Environmental Impact Report (DEIR) for the proposed Calaveras Dam Replacement Project (CDRP) located on Calaveras Creek in the Diablo Mountain Range in Alameda County. The project-level DEIR describes this project as filling Calaveras reservoir to its former volume and includes construction of a new dam, modifications to existing dam facilities, and long-term operation and maintenance of the facilities with construction scheduled to begin in 2011 and completed in approximately four years. While it is understood that the project will predominantly occur in Alameda County, some project activities will occur in Santa Clara County.

The County Parks Department has reviewed the DEIR for the project's potential impacts and submits the following comments. The County Parks Department's comments are primarily focused on potential impacts related to land use policies, regional parks, public access, recreation, and trails including countywide trail routes relative to the Santa Clara County Countywide Trails Master Plan Update. In addition, since the project site is located within the vicinity of Ed Levin County Park, the County Parks Department will provide focused comments related to potential impacts to the park, its trails and uses.



Board of Supervisors: Donald F. Gage, George Shirakawa, Dave Cortese, Ken Yeager, Liz Kniss
County Executive: Jeffrey V. Smith

Existing Recreational Land Uses

Section 4.3.1.5 of the DEIR acknowledges Ed R. Levin County Park; however, the DEIR should more accurately reflect the recreational uses in the park. Please consider inclusion of the recommended information in the DEIR.

Ed R. Levin County Park lies approximately two miles west of Calaveras Reservoir. The park offers many recreational facilities and activities including over 19 miles of regional and internal park trails, a group camping area, an off-leash dog park, equestrian staging area, picnicking, fishing, hang gliding, and golfing. Spring Valley Golf Course, a leased facility, and Airpoint School, a private in-holding property, are located within the park.

Calaveras Road, east of Interstate 680 and 880, bisects the southern portion of the park and provides the main vehicular entry into the park. Calaveras Road provides access to park and leased facilities including trails, a youth group camp area, equestrian facilities and provides the only roadway access to the golf course, school site, and the park's equestrian staging area. In addition, three public roads and one private road that are within the park boundary originate or are accessed from Calaveras Road. These roadways include:

- Downing Road which provides access to recreation facilities in the northern portions of the park and the park entry on Old Calaveras Road;
- an unnamed road providing access to the park's maintenance facility, private residences and an equestrian stables facility;
- Spring Valley Road which provides access to the equestrian facilities and numerous trails; and
- Vista Ridge Drive, a private road providing access to a residential community.

Calaveras Road south of the dam from I-680 or I-880 eastward is used by commuters, residents, and visitors to Ed Levin County Park. and is a popular route for bicyclists.

Internal Park Trails and Regional Trails

The southern portion of Ed Levin County Park contains numerous park trails designated as hiking and/or equestrian use, four of which parallel Calaveras Road. These trails are very popular and provide access to the park trails system. In addition, there are approximately six trail access/crossing points along Calaveras Road.

Santa Clara Countywide Trails Master Plan Update

The EIR should acknowledge the policies and guidelines of the *Santa Clara County Countywide Trails Master Plan Update* ("Countywide Trails Master Plan"), which the County Board of Supervisors approved in November 1995 as part of the Parks and Recreation Element of the County of Santa Clara General Plan (1995-2010). The County Parks Department, in partnership with other public agencies, is charged with furthering the implementation of the *Santa Clara Countywide Trails Master Plan Update*. As such, we have identified the following Countywide Trails Master Plan routes as routes that may potentially be directly impacted as a result of the proposed project.

- ***Bay Area Ridge Trail: Diablo Range*** (R5-B) – designated as a trail route within other public lands and trail route within private property for hiking, off-road cycling and equestrian use. The DEIR acknowledges that the park includes a segment of the Bay



Area Ridge Trail; however, the DEIR should also note that this segment of the Ridge Trail crosses Calaveras Road. Therefore, any short-term construction activities related to the use of Calaveras Road should discuss potential impacts to the Bay Area Ridge Trail.

02 cont.

- **Calaveras Connector Trail (C7)** – designated as an on-street bicycle route within the road right of way. This trail route is located within the road right of way of Calaveras Road from Warm Spring Boulevard and is a popular bicycle route.

Impacts to Recreational Uses, Regional and Park trails

Section 4.3.2.5 – Recreation (pages 4.3-20 – 4.3-23), acknowledges that the proposed project could result in temporary indirect affects and construction-related visual, noise, dust and traffic impacts that could potentially impact existing recreational resources at Ed Levin County Park. However, the DEIR only evaluated impacts to recreational use of facilities in the Sunol and Ohlone Wilderness areas and the bicycle uses of the section of Calaveras Road north of Felter Road during the closure of that section of road. The DEIR (page 4.3-22) limits its discussion of potential impacts to Ed Levin County Park to those impacts which would result from the closure of Calaveras Road stating that the recreational facilities in Ed Levin County Park would not be affected by the proposed project because of the distance from the proposed construction activities. Potential impacts to recreational uses in Ed Levin County Park, particularly to the trail routes, trail access/crossing points, and park and leased facilities in close proximity to Calaveras Road should be assessed in the DEIR. The DEIR should also include mitigation measures to address the potential impacts to recreational uses, and park and leased facilities and to ensure the safety of park visitors.

03

Transportation and Circulation

Calaveras Road provides the primary access to the project area from both the north and south and bisects Ed Levin County Park south of the project area. Section 4.12.2.3 discusses project impacts related to transportation and circulation and states (impact 4.12.4) that there would be an increased potential for traffic safety hazards for vehicles and bicyclists on public roadways during construction. The evaluation of potential impacts (page 4.12-15), however, is limited to impacts on roadways north of the reservoir and those which would result from the closure of the section of Calaveras Road north of Felter Road. While the closure of Calaveras Road from Felter Road northwards is not expected to limit recreational use of Ed Levin County Park, construction-related traffic along Calaveras Road could impact vehicular access to park facilities and increase potential for traffic hazards to recreational uses. Therefore, the DEIR should evaluate the potential short-term construction-related impacts to park facilities and recreational uses, along the segment of Calaveras Road that goes through Ed Levin County Park.

04

The County Parks Department requests that the DEIR address how construction related traffic along Calaveras Road could impact access to and use of park and leased facilities particularly the trails, trail access/crossing points and facilities in close proximity to Calaveras Road.

The DEIR should include additional mitigation measures to address impacts to recreational uses, and park and leased facilities in Ed Levin County Park. Impacts and/or damages to park and leased facilities including but not limited to roads, trails, accesses, driveways and turnouts as a result of the project or related construction activities should be repaired and/or replaced to the



pre-project conditions that would meet the standards of the County Roads and Airports Department. With regards to mitigation measure 5.12.4a – Traffic Control Plan, the preparation and implementation of the plan should include coordination with County Parks and County Roads and Airports Department staff and should include advanced notification of road closures, and of the timing, location and duration of construction activities which would occur on Calaveras Road.

04 cont.

Thank you for the opportunity to comment on the DEIR for the Calaveras Dam Replacement Project. We request that a copy of the Final EIR be sent to our office when completed. If you have any questions regarding these comments, please feel free to contact me at (408) 355-2235 or by email at Antoinette.Romeo@prk.sccgov.org.

Sincerely,

Antoinette Romeo
Park Planner

Signature copy sent by U.S. mail

Cc: ___Julie Mark, Deputy Director, County Parks Department
 ___Jane Mark, Senior Planner, County Parks Department
 Rob Eastwood, Senior Planner, County Planning Office
 Felix Lopez, Assistant Civil Engineer, County Roads & Airports Department
 Bern Smith, South Bay Director Bay Area Ridge Trail Council



County of Santa Clara

Roads and Airports Department

101 Skyport Drive
San Jose, California 95110-1302
(408) 573-2400



November 10, 2009

Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Subject: Draft Environmental Impact Report for Calaveras Dam Replacement Project

Dear Mr. Wycko:

We have received and reviewed your Draft Environmental Impact Report for the subject above. The following are our comments:

1. Section 5.12.4a, 6th bulleted item, page 5-38 of the Mitigation Measures mentioned repair or restore public rights-of-way to their pre-construction conditions upon completion of construction. Current Pavement Condition Index (PCI) for Calaveras Rd is 88; the road shall be repaired/reconstructed to the same or higher PCI. Repairs shall be made based on a survey of the roadway upon completion of the dam construction and all equipment removed from site. Pavement repairs methods shall be made based on PCI and standard practice (i.e. PCI over 80 – slurry; PCI from 70 to 79 – AC overlay; PCI from 60 to 69 – dig outs and overlay; PCI less than 59 – total reconstruction). PCI to be surveyed by Santa Clara County staff, contractor may conduct its own PCI survey but repairs shall be based on County's PCI survey. 01
2. Section 3.5.1.7 – Access and Roads, last sentence on page 3-50 shall be revised to: "Following construction, Calaveras Road between Interstate 680 and the dam access road ~~would shall~~ be repaved ~~as needed to restore~~ to its pre-construction condition ~~or better~~." 02
3. An issue that was not discussed in the mitigation is the damage to the roadway during construction. There will be close to 300,000 CY of sand and gravel to be hauled into the site to be used as filters, drains, and concrete for the dam. Associated structures failed/damaged due to damaged roadways or due to the construction of this project shall also be repaired/replaced at no cost to the County. Damaged roadways shall be immediately repaired during construction to the satisfaction of the County, to County's standards, and under County's inspection. Damaged structures may be repaired upon completion of the project if it is not of an immediate threat to safety, health, and well-being of the community. 03
4. All repairs within County ROW may be made upon completion of the project at no expense to the County, to County's standards & satisfaction, under County's inspection, unless noted in #3. 04
5. Weight limit on Calaveras Rd (through Milpitas, from Evans Road to Ed Levin County Park) is 3 Tons. Steep slopes creek side and limited slope support is probably reason for weight limit. 05

6. RWQCB recently adopted a new General Permit, October 14, 2009. SWPPPs and BMPs for the project should be revised to meet new conditions/requirements.

06

7. As stated on page 5-37 and 5-38, SFPUC shall obtain approval from County of Santa Clara for Traffic Control Options.

8. The dam construction will require huge earthmoving equipment to be moved on-site and potential construction deliveries over the 4-year construction period. SFPUC or the contractor shall be required to post bond when they apply for an encroachment permit to assure repair of damaged County facilities due to the Calaveras Dam construction.

07

Thank you for the opportunity to review and comment on this project. If you have any questions, please contact me at (408) 573-2462.

Sincerely,


Felix Lopez
Project Engineer

cc: MA, MLG, GR, KV, WRL, RN, file

克里斯·戴利
CHRIS DALY

Board of Supervisors
District 6



COMMITTEES

Rules Committee, Chair
City Operations & Neighborhood Services

MEMBER

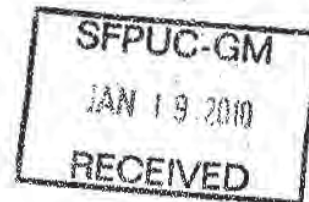
Bay Area Air Quality Management District
Joint Powers Committee
Metropolitan Transportation Commission
SF County Transportation Authority
Transbay Joint Powers Authority
Treasure Island Development Authority, Ex Officio

January 12, 2010

San Francisco Public Utilities Commission
City Hall, Room 400
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Ed Harrington
General Manager
San Francisco Public Utilities Commission
1155 Market Street, 11th Floor
San Francisco, CA 94103

Ron Miguel
Commission President
San Francisco Planning Commission
600 DeHaro Street
San Francisco, CA 94107



Subject: Calaveras Dam Replacement Project

The Calaveras Dam Replacement Project is a critical project for San Francisco's water supply reliability. Although the Draft Environmental Impact Report for the project appears to thoroughly address the issues of seismic safety, restored water storage capacity, and water supply reliability during drought, there is considerable public interest and scrutiny of the project regarding operation of the water system once the dam is rebuilt. There has been controversy and continuing public concern about the adequacy of the proposed stream flows for native fish in Alameda Creek. 01

I am interested in ensuring that the final EIR and future SFPUC water system operating plans are consistent with federal and state environmental laws and the SFPUC's watershed stewardship policy, and that operation of the rebuilt dam allows for the restoration of steelhead trout to Alameda Creek. 02

Future SFPUC water system operations in the Alameda Creek watershed may adversely affect water flow, habitat suitability, and fish passage downstream of SFPUC dams. As part of the water system improvements, San Francisco should take the lead in watershed stewardship and operating the city's water system in a more sustainable manner. It is in the interests of all stakeholders to adequately address fisheries issues as part of the project EIR so the Calaveras Dam project can be completed quickly. 03

I am interested in seeing a final EIR that includes mitigation measures that will allow the project to move forward quickly and without conflict, such as minimum stream flows downstream of SFPUC dams that are consistent with those proposed by the federal regulatory agency, the National Marine Fisheries Service, that are adequate for upstream passage and out-migration of steelhead trout and chinook salmon, and that mimic the natural hydrograph of the stream. The project should fully mitigate for the impacts of the operation of Calaveras and Alameda Diversion dams in blocking spawning and rearing habitat for steelhead, impairing flows in Alameda Creek, and changing downstream habitat. The project should thoroughly evaluate and consider as mitigation some form of migratory fish passage at the Alameda Diversion Dam and at Calaveras Dam. I would encourage meaningful mitigations for construction impacts and greenhouse gas emissions due to the project.

04

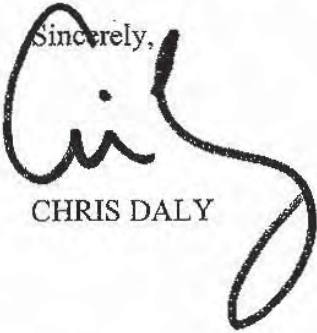
05

06

With major fish passage projects in Alameda Creek moving forward, San Francisco can and should play a major role in restoration of this important local watershed as part of the Calaveras Dam project. I look forward to working with the SFPUC and the Planning Department to address public concerns and improve this project.

07

Sincerely,



CHRIS DALY

c: Irina Torrey
Tim Ramirez

Comment Letters – Organizations

December 18, 2009

Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103
Fax: (415) 558-6409

Robert Smith
Regulatory Division
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103

Comments on Calaveras Dam Replacement Project

Please accept these comments from the Alameda Creek Alliance and the Center for Biological Diversity on the Draft Environmental Impact Report (DEIR) and on the U.S. Army Corps of Engineers Project Notice for the San Francisco Public Utilities Commission (SFPUC) Calaveras Dam Replacement Project (CDRP) in the Alameda Creek watershed. We will be submitting additional comments regarding the adequacy of the analysis and disclosure of the potential environmental impacts of the CDRP under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

Our comments are organized as follows: an introduction; a summary of the flaws in the fisheries and aquatic habitat and hydrology sections of the DEIR; comments on the approach to analysis; more detailed discussions of some of the fisheries, hydrology, and greenhouse gas issues; and the inadequacy of proposed mitigation measures. Detailed comments on specific sections of the DEIR follow.

We incorporate by reference previous scoping and CEQA comments on the CDRP by the Alameda Creek Alliance (ACA), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and Alameda County Water District (ACWD), including scoping and CEQA comments on the Programmatic EIR for the Water System Improvement Program, scoping comments on the CDRP, and comments submitted on the Biological Assessment for the CDRP.¹

Sincerely,

¹ For the WSIP Programmatic EIR, ACA submitted comments on 10/12/05, 11/10/05, 10/1/07, and 10/28/08; ACWD submitted comments 9/26/07; and CDFG submitted comments 10/1/07. For the CDRP, ACA submitted comments 11/8/05, 11/23/05, and 12/20/05; NMFS submitted comments 11/30/05, 4/4/08, 10/21/08 and 2/23/09; and CDFG submitted comments 11/22/05. For the Biological Assessment, ACA submitted comments 7/15/09; NMFS submitted comments 6/23/09; and ACWD submitted comments 7/8/09.

See
Comments
128-144

Jeff Miller, Director
Alameda Creek Alliance
P.O. Box 2626
Niles, CA 94536
Phone: (510) 499-9185

Peter Galvin, Conservation Director
Center for Biological Diversity
351 California Street, Suite 600
San Francisco, CA 94104
Phone: (707) 986-2600

Introduction

The Alameda Creek Alliance (ACA) is a community watershed group dedicated to the protection and restoration of the natural ecosystems of the Alameda Creek watershed, and has more than 1,700 members that live in or near the watershed. The Alliance has been working to restore steelhead trout and salmon to Alameda Creek and to protect endangered species in the watershed since 1997. The Center for Biological Diversity is a national nonprofit conservation organization with more than 240,000 members and online activists dedicated to the protection of endangered species and wild places. The Center has worked since 1997 to secure protections under the Endangered Species Act for imperiled west coast salmon and steelhead trout populations and to promote recovery of steelhead trout in the Central California Coast.

Alameda Creek is a regional asset with significance for restoration of steelhead trout in the greater San Francisco Bay Area and contributing to the recovery of the listed central California coast population of steelhead. Numerous fish passage projects downstream of SFPUC dams have been completed since 2001 and several major fish ladder and dam removal projects will be completed by the time Calaveras Dam is rebuilt, allowing anadromous fish to access approximately 20 miles of suitable spawning and rearing habitat in upper Alameda Creek.

Our organizations support the SFPUC rebuilding Calaveras Dam to benefit public safety, ensure a reliable water supply, and potentially enhance fish habitat. However, we have serious concerns about how the SFPUC is proposing to operate its water system once the dam is rebuilt, and whether these operations will allow for the restoration of steelhead trout and salmon below the dam. San Francisco's water system can and should be operated in a sustainable manner that provides adequate stream flow for native fish and wildlife. Our organizations believe that numerous conservation, recycling, and groundwater projects can be implemented that will make up the water needed for healthy fisheries in Alameda Creek, as well as the Tuolumne River and the Peninsula watersheds managed by the SFPUC.

We are disappointed with the approach to fisheries issues in the DEIR given the extensive communication and input the ACA has given the SFPUC regarding the CDRP and the Programmatic EIR for the Water System Improvement Program, and the involvement of the SFPUC in the Alameda Creek Fisheries Restoration Workgroup, which has been coordinating restoration efforts over the past decade. Over 70 Bay Area conservation groups have called on the SFPUC to improve its stewardship of the Alameda Creek watershed and restore stream flows in Alameda Creek sufficient to sustain steelhead trout. The Alliance submitted formal scoping comments on the Calaveras Dam project in 2005 and has met continuously with SFPUC staff since 2003 regarding providing adequate stream flows for steelhead trout as part of the project.

Summary Statement

The fundamental flaw of the DEIR and the CDRP in general is the failure to include native fish restoration as one of the project purposes and goals. The ACA requested that fisheries restoration be included as part of the project purpose in our formal scoping comments on the CDRP. Having consistency with steelhead restoration efforts be a co-equal goal of the project would avoid many of the conflicts over the adequacy of the proposed mitigations for fisheries and hydrology impacts. We suggest that the final EIR include consistency with steelhead restoration as a co-equal purpose of the project, with a goal of restoring a self-sustaining steelhead run below the SFPUC's major dams.

01

A first major flaw of the DEIR is the selection of the baseline condition for analysis of the project impacts. By choosing the period during which the Division of Safety of Dams (DSOD) restrictions were in place and the water system was under somewhat constrained operation, the DEIR attempts to avoid complete analysis of the impacts of the normal operation of the SFPUC water system on hydrology and fisheries in Alameda Creek. The EIR should analyze and compare the impairment of stream flows under the proposed project operations with a baseline of unimpaired flows and pre-DSOD operations for full disclosure of the impacts of the project.

02

A second major flaw is the reliance on flows agreed to in the 1997 memorandum of Understanding (MOU) with the California Department of Fish and Game (CDFG) as the basis of mitigations for fisheries and hydrology impacts of the CDRP. The 1997 MOU flows are a pre-existing legal obligation that has nothing to do with the CDRP, and it is inappropriate to use them as mitigation for project impacts. The fact that the SFPUC has failed to abide by this agreement for over 12 years does not allow for promised future compliance to be packaged as mitigation for project impacts. Furthermore, the 1997 MOU flows were designed for the habitat needs of resident rainbow trout in a limited stream reach, and do not address the migratory flows needed for steelhead trout or chinook salmon in the watershed. The DEIR also fails to characterize what percentage of compliance flows under the 1997 MOU will be provided by natural runoff in different water year types, and what portion will be actually released or bypassed past SFPUC facilities to benefit fisheries. The actual mitigation measures that will be provided under the project must be disclosed under the guidelines and statutes that govern adequate environmental review.

03

A third major flaw is the proposed operation of the Alameda Creek Diversion Dam (ACDD), in conflict with state Fish and Game Codes, the federal Endangered Species Act, and the SFPUC's Watershed Stewardship Policy. The DEIR does not analyze the implications of operating the ACDD in a manner that contravenes state and federal laws. The DEIR does not fully analyze the impacts of the proposed operation of the ACDD on fish passage downstream and at ACDD, or on fisheries habitat quality and quantity, nor does it provide adequate mitigations for these potentially significant impacts.

04

A fourth major flaw is the approach to mitigations for direct and cumulative project impacts in the DEIR, which seems to be avoidance of mitigation or reliance on

05

ineffective and insufficient mitigation measures. Some of the proposed “mitigations” for direct construction impacts on habitat for sensitive species, greenhouse gas emissions, and fisheries and hydrology impacts are particularly disingenuous and hollow.

05 cont.

The fisheries and aquatic habitat and hydrology sections of the DEIR for the CDRP do not reflect a full analysis of the effects of SFPUC water supply operations via Calaveras Dam and Reservoir and the ACDD on the affected environment. Since the CDRP will allow the SFPUC to resume diversions of upper Alameda Creek flows, the impact of these diversions on the environment must be evaluated in the EIR, preferably in the direct impacts section of the report or, at a minimum, through the cumulative impacts analysis. The approach taken in the DEIR instead examines the impact of changes between DSOD-restricted conditions and future conditions after the restrictions are removed (*i.e.*, to pre-DSOD conditions), with inadequate consideration of cumulative impacts. For a variety of reasons, this approach is unsatisfactory logically, procedurally, and legally.

06

With regard to the impacts on fisheries and aquatic habitat in particular, the DEIR incorporates flawed assumptions in the method by which it presumes to measure changes between “current conditions” and post-project conditions, resulting in inadequate analysis. First, the DEIR assumes that “current” conditions, including fish populations and habitat distribution and quality, are based on DSOD-restricted conditions. In fact, current habitat conditions have resulted from water management practices in place since the construction of SFPUC diversion and storage facilities, and not since DSOD restricted their operation.

The DEIR fails to adequately characterize the effects of re-diverting flows currently bypassed downstream to Alameda Creek under the DSOD restrictions. Where there should be a direct (*i.e.*, non-cumulative) impact assessment based on changes to flow after the CDRP is implemented, the DEIR conspicuously avoids a clear comparison of before and after conditions in terms of stream flow, and distribution and quality of fish habitat. The EIR needs to include an evaluation of stream flow and suitable fish habitat compared to the baseline, which the SFPUC has chosen to be during the DSOD-restricted conditions. Even with the short period of record since 2001, the analysis must attempt to characterize the hydrologic regime on a reasonable time-step in the study area with the DSOD restrictions (and corresponding increased unregulated instream flows) in place, and speculate about resulting habitat implications such as available spawning, rearing, and migration opportunities. The impact analysis should then evaluate conditions with such flows withdrawn from the various affected reaches, as is proposed in the project.

07

The EIR must consider the full operational effects of the ACDD and Calaveras Dam in the cumulative impacts analysis. A cumulative impact is an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. As SFPUC water supply operations cause fishery and aquatic habitat impacts, these are cumulative impacts of the CDRP. The DEIR does not adequately analyze the cumulative effects of the proposed SFPUC operations which will divert upwards of 85 percent of the stream flow from upper Alameda Creek.

08

Understanding the cumulative impacts of the CDRP and related projects will require comparing conditions without water supply operations with conditions resulting from CDRP implementation. While information concerning fish populations and habitat resources prior to the existence of Calaveras Dam and ACDD may be minimal, basic analytical tools such as regional curves or other standard hydrologic methods allow for, and should be used in, developing “unimpaired” flow models and evaluating the effects of cumulative water diversions on the watershed and fish habitat.

08 cont.

Further, reasonable standards of flow impairment are available with which to correlate diversion rates and impacts to fisheries and aquatic habitat, for example from restoration efforts on the Owens River (Mono Lake), Trinity River, and San Joaquin River. The EIR needs to define how much water must be left instream in the watershed and the timing of suitable flows to allow fisheries to function and characterize an “acceptable” level of flow impairment, and identify what percentage of unimpaired flows will be allowed to flow down the creek to provide suitable steelhead and salmon habitat.

09

The DEIR disregards cumulative impacts related to reducing the range of steelhead due to water diversions and passage barriers, which should involve a mandatory finding of significance. The project as proposed does not include adequate migration flows for steelhead, and the DEIR does not acknowledge migration impacts or include associated mitigation. In general, meaningful mitigation must be provided to reduce the unavoidable cumulative adverse impacts of altering the unimpaired flow regime (~42,000 acre-feet per annum) to the proposed levels (~6,300 AFA minus the planned future diversions of up to 20 cfs at the proposed SFPUC Upper Alameda Creek Filter Gallery Project).

10

As previously noted, the DEIR also errs in assuming that flow provisions agreed to under the 1997 MOU are not part of the environmental baseline. This agreement was made before the DSOD restriction and is outside of the project scope. Ascribing the CDRP with beneficial impacts because the SFPUC proposes to comply with a legal agreement that the SFPUC has not complied with for over 12 years is inappropriate and disingenuous, and detracts from the quality of the environmental analysis. Since the SFPUC has not complied with this MOU for 12 years there is no reasonable expectation that alleged future compliance can be offered as a feasible “mitigation.”

11

While it is reasonable to consider post-project conditions with fish flows in place, and discuss the new low-flow discharge valves and an ACDD bypass that will facilitate providing fish flows, there is no project alternative that proposes water supply operations without fishery flows. Therefore the baseline for impacts analysis should not be considered to be “water supply operations without fishery flows.” The three flow regimes affecting the CDRP environmental analysis (*i.e.*, unimpaired flows, pre-project flows, and post-project flows) must be clearly defined and flows should not be used in a “shell game” either to hide adverse impacts or try to show beneficial ones at the whim of the project proponent.

12

Another major flaw of the DEIR analysis is that potential construction impacts on the resident trout population in Calaveras Reservoir and its tributaries are inadequately

13

assessed and mitigated. This invaluable and genetically unique trout population must be protected for its inherent value as well as for possible incorporation in a future steelhead supplementation program. The extensive activities associated with barging materials on Calaveras Reservoir are dismissed in the DEIR as mitigated by incorporating standard Best Management Practices (BMPs). The effects of building docks, running large barges, loading and unloading vast quantities of cut and fill materials, and other related actions are well beyond the scope of standard construction practices that runoff management BMPs are designed to mitigate. The section of the report addressing construction impacts on the reservoir and upstream trout populations should be revisited.

↑
13 cont.

The DEIR fails to discuss the potential for listed steelhead trout to migrate into the project area during construction of the dam, due to the proposed schedule for downstream fish passage projects. The EIR should analyze the potential impacts of operating Calaveras Dam during the four years of construction without bypass flows from the dam. Appropriate mitigation would be an interim operation plan for providing sufficient water downstream of SFPUC dams, if needed during the construction period to keep fish downstream in good condition.

↑
14

The EIR requires a more thorough analysis of the cumulative impacts of the proposed Upper Alameda Creek Filter Gallery Project, a reasonably foreseeable future project that is intimately related to the CDRP and should be considered a “related project” under CEQA. This project will recapture bypass and release flows purported to benefit anadromous steelhead, reducing the benefits of promised mitigations in the CDRP, and has the potential to impact stream flow, fish passage, and habitat quality downstream.

↑
15

In summary, the CDRP represents an opportunity to progress on several of the last remaining obstacles to steelhead restoration in the Alameda Creek watershed. Most importantly, the project and its associated EIR should propose and evaluate flow regimes that reflect natural seasonal streamflow patterns and account for all life stages of the ocean-run form of the primary target species for restoration – steelhead trout - in all portions of the watershed affected by SFPUC operations. Consistency with the SFPUC’s adopted watershed stewardship policy requires that flow release schedules should incorporate the input received through collaborations with other stakeholders in the watershed. As currently presented, however, the project description and the impact assessment methodology demonstrate a retrograde parochialism that is contrary to the long-standing cooperative relationships established through the Alameda Creek Fisheries Restoration Workgroup.

↑
16

We sincerely hope the SFPUC chooses to reassess its approach rather than embark on a potentially long-term, adversarial process to implementing this important water supply project. To this end, the final EIR should include a revised project purpose that has steelhead restoration as a co-equal goal, should be supplemented with more thorough analysis of fisheries and hydrology impacts and attendant meaningful mitigations, and should make proposed water system operations consistent with anadromous steelhead habitat needs.

↑

Approach to Analysis

Baseline Conditions

Under the DEIR, only relative effects of two SFPUC operating conditions are described, and habitat conditions with proposed provision of instream flows are considered almost universally to be better than baseline conditions (with only incidental flows going to the creek). Readers are not provided with the information or analytical approach to understand the absolute effects of SFPUC operations and the CDRP.

CDRP permitting and environmental review processes are appropriate avenues in which, for the first time since the inception of water supply activities in the watershed, to characterize the effects of SFPUC operations and to ensure that future operating plans are consistent with steelhead recovery. The environmental baseline should assess the impacts of Calaveras and ACDD regarding blockage of spawning and rearing habitat for steelhead, impairment of flows in Alameda Creek, and changes to downstream channel morphology and habitat. The EIR must fully quantify the project effects on streamflow, fish passage, water temperature, and fish habitat. After modification of downstream passage barriers, operations at ACDD and Calaveras Dam (*i.e.*, the project being assessed) will comprise the greatest single influence on habitat conditions and recovery. The EIR must: provide information concerning conditions prior to, or without, the project; analyze the effects of operations; and provide mitigation measures adequate to address these effects.

In particular, a logical and acceptable assessment framework would examine proposed flow regimes in a context of flows existing under unimpaired conditions. The EIR should present side-by-side the unimpaired and impaired flow conditions in reaches affected by diversions at ACDD and Calaveras Dam. Data regarding Calaveras Reservoir inflow and disposition of these flows are conspicuously lacking from the EIR and must be presented to aid in understanding the biological effects of the project.

Primary Study Area

The DEIR defines a “primary study area” and an “extended study area.” The primary study area terminates at the confluence of Alameda Creek and Arroyo de la Laguna. According to the DEIR, this is “because the proposed Calaveras Dam operations would have limited influence on flows downstream of the confluence (the extended study area). In addition, the effects of Alameda Creek flows could not be distinguished from runoff flowing out of Livermore Valley and Delta water imported by the Alameda County Water District and discharged into the Arroyo de la Laguna from the South Bay Aqueduct Vallecitos turnout.” These assumptions are unsupported in the DEIR. The primary study area should extend all the way to San Francisco Bay, since future CDRP operations have the potential to affect stream flows all the way to the Bay. Also, the quantity, proportion, temperature, water quality, and habitat value of Alameda Creek flows can easily be distinguished from Arroyo de la Laguna flows.

17

18

Regulatory Requirements

The DEIR has an incomplete discussion of regulatory requirements. Despite comments by the ACA, NMFS, and CDFG on the Programmatic EIR (PEIR) for the Water System Improvement Program, scoping comments on the CDRP, and comments on the Biological Assessment for the CDRP raising these issues, the DEIR has an incomplete discussion of compliance with state Fish and Game Code and Endangered Species Act requirements to protect native fish and wildlife.

19

State Fish and Game Codes

California Fish and Game Code §5937 requires that the owner of a dam allow sufficient water to pass through a fishway or dam, to keep in “good condition” any fish that may be planted or exist below the dam. The law applies to any dam regardless of when it was built.

CDFG submitted comments on the PEIR on November 22, 2005, stating that “at this time, both the Alameda Creek Diversion Dam and Calaveras Reservoir are out of compliance with Fish and Game Code 5937 which requires dam owners to release enough water to keep downstream fish populations in good condition,” and that the SFPUC “will need to assess adequate flows for anadromous steelhead trout and will need to renegotiate with DFG such that adequate flows are released to comply with Fish and Game Code 5937.” The EIR should discuss exactly how the proposed operations of the ACDD and Calaveras Dam will come into compliance with §5937.

20

CDFG also commented that the PEIR should “consider utilizing the SFPUC’s related water storage facilities within the Alameda Creek watershed (i.e., San Antonio Reservoir) to meet the needed minimum bypass flows in the affected reach of Alameda Creek and in particular passage flows needed through Sunol Valley.” The CDRP does not include consideration of any minimum flows from San Antonio Reservoir.

21

Under the CDRP, the SFPUC proposes to operate the ACDD in a manner that appears to violate §5937, diverting almost the entirety of late fall through spring flows from upper Alameda Creek. The EIR should discuss how this operation is compatible with keeping fish populations downstream of the diversion dam in good condition. The SFPUC also has not demonstrated that the proposed operation of Calaveras and San Antonio Reservoirs under the WSIP will keep fish populations downstream of these dams in good condition. The SFPUC must show that the minimum flows proposed for Calaveras Reservoir will maintain healthy fish and wildlife populations downstream.

22

The proposed operation of the ACDD without fish passage also violates California Fish and Game Code §5901, which makes it illegal to maintain any device which prevents or impedes the passing of fish up and down stream. The ACDD blocks the upstream and downstream movements of both resident and transient fishes, including resident rainbow trout. Once fish passage projects in lower Alameda Creek are completed, the ACDD could block upstream and downstream migration of steelhead trout. Operation of the

23

ACDD will not only affect fish migration past ACDD, but also potential fish passage through Little Yosemite, by diverting the majority of the annual flow of upper Alameda Creek. As acknowledged in SFPUC studies for the CDRP (EDAW and Hagar 2008), reducing the frequency of high flow periods downstream of ACDD will reduce fish passage opportunities through Little Yosemite. The proposed operation of Calaveras Dam without fish passage provisions also violates California Fish and Game Code §5901.

↑
23 cont.

Endangered Species Act

The federal Endangered Species Act (ESA) prohibits unauthorized take of listed species. The DEIR does not ensure that the CDRP will be in compliance with the ESA, specifically with regards to adequate stream flows for steelhead trout in Alameda Creek. In a NMFS letter of June 23, 2009 to the SPUC regarding the CDRP, the federal agency noted that “Our preliminary review of the project and its future operation suggests the project will adversely affect CCC steelhead and their habitat in the Alameda Creek watershed.” The Biological Assessment for the CDRP prepared by the SFPUC and submitted to the Corps in September 2009 concluded that the CDRP could result in adverse construction-related effects to CCC steelhead trout and that operations have the potential to adversely affect CCC steelhead trout.²

↑
24

NMFS issued protective rules under section 4(d) of the ESA governing take for listed Central California Coast steelhead trout in 2000 (65 FR 42422; July 10, 2000), which were amended in 2005 (70 FR 37160; June 28, 2005). The 4(d) rules identify those activities that would constitute a violation of Section 9 of the ESA, such as: maintaining barriers that eliminate or impede a listed species’ access to habitat or ability to migrate; removing water or otherwise altering streamflow when it significantly impairs spawning, migration, feeding or other essential behavioral patterns; or constructing or operating dams or water diversion structures with inadequate fish screens or fish passage facilities in a listed species’ habitat. Many of the operations and activities contemplated under the CDRP could result in unauthorized take of listed CCC steelhead.

↑
25

The CDRP will directly impact 12.2 acres of designated critical habitat for the Alameda whipsnake and proposed critical habitat for the California red-legged frog. The red-legged frog critical habitat will be finalized (under court order) before the CDRP begins. Critical habitat is areas identified as essential for the survival and recovery of listed species. Destruction or adverse modification of critical habitat cannot be authorized by federal agencies, and direct impacts to critical habitat should be avoided as part of the CDRP.

↑
26

The EIR should also discuss published recovery plans for listed species potentially affected by the CDRP and ensure that proposed CDRP operations are consistent with these recovery plans.

↑
27

² EDAW and Turnstone Consulting, 2009. Biological Assessment/Essential Fish Habitat Assessment for Calaveras Dam Replacement Project. September 30, 2009.

The SFPUC completed a fish passage report for the EIR (EDAW and Hagar 2008)³ that analyzes the potential habitat benefits to steelhead by providing fish passage at the ACDD and Calaveras Dam. The conclusions reached from this analysis do not remove the obligation of the CDRP and SFPUC operations to comply with §5901 and the Endangered Species Act.

28

The SFPUC has prepared Biological Assessments for the U.S Army Corps of Engineers that will form the basis of formal consultation under the ESA with NMFS for listed steelhead trout and the U.S. Fish and Wildlife Service (USFWS) for listed terrestrial species. The final EIR should incorporate the requirements and conditions of the Biological Opinions issued by USFWS and NMFS on the project so that the document reflects exactly what protection the agencies agree is necessary and gives the public an opportunity to determine if the federal regulatory agencies have properly carried out their responsibilities under the ESA.

29

California Endangered Species Act

Under state law, the CDRP must fully mitigate for impacts to species listed under the California Endangered Species Act (CESA). CESA listed species potentially impacted by the CDRP include the Alameda whipsnake (threatened), bald eagle (endangered), and peregrine falcon (endangered). In addition, the California tiger salamander was made a state candidate species under CESA in 2009, giving it the legal protections of a CESA protected species. No “take” is allowed under CESA for those species designated as “fully protected.” Fully protected species potentially impacted by the CDRP include the bald eagle, golden eagle, white-tailed kite, and peregrine falcon. The DEIR acknowledges that the project has the potential to cause “take” through harassment of bald eagles.

30

Compliance with SFPUC Policies

The SFPUC Water Enterprise Environmental Stewardship Policy, adopted by the SFPUC in 2006, reads in part:

The SFPUC will proactively manage the watersheds under its responsibility in a manner that maintains the integrity of the natural resources, restores habitats for native species, and enhances ecosystem function... To the maximum extent practicable, the SFPUC will ensure that all operations of the SFPUC water system (including water diversion, storage and transport), construction and maintenance of infrastructure, land management policies and practices, purchase and sale of watershed lands, and lease agreements for watershed lands protect and restore native species and the ecosystems that support them... It is the policy of the SFPUC to operate the SFPUC water system in a manner that protects and restores native fish and wildlife downstream of SFPUC dams and water diversions, within SFPUC reservoirs, and on SFPUC watershed lands.

31

³ EDAW and Hagar. 2008. Calaveras Dam Replacement Project Fisheries Technical Report. Prepared for EDAW Turnstone Joint Venture and SFPUC by Hagar Environmental Science.

Releases from SFPUC reservoirs will (consistent with the SFPUC mission described above, existing agreements, and applicable state and federal laws), mimic the variation of the seasonal hydrology (e.g., magnitude, timing, duration, and frequency) of their corresponding watersheds in order to sustain the aquatic and riparian ecosystems upon which these native fish and wildlife species depend.

The implementation strategy in the policy includes the following: “Ensure that the policy guides development of project descriptions, alternatives and mitigation for all SFPUC projects during the environmental review process under CEQA and/or NEPA.”

As discussed throughout this document, the DEIR for the CDRP suggests water system operations that do not protect and restore native species and the ecosystems that support them to the maximum extent practicable, and releases from the reservoirs may not be consistent with applicable state and federal laws.

Operations Description

For the purposes of the EIR, the CDRP’s most important element is its capacity to divert the majority of upper Alameda Creek flows, and an adequate assessment of the project’s effects must evaluate these operations in detail, with particular respect to how the project would alter the timing and quantity of instream flows. The DEIR is incomplete on this issue, particularly concerning Calaveras Dam operations and the resulting changes to stream flows.

To characterize effects of the CDRP, the EIR must compare timing and quantity of Calaveras inflow with the timing and quantity of reservoir releases to Calaveras Creek. Also, the overall effect of the project would be clarified by comparing the total average inflow by water year type during the entire period of record with total average Calaveras Creek releases. Our review of the information presented in the DEIR suggests that the proposed instream flow “releases” would comprise at most, approximately 9,600 AF/annum (AFA) in a normal year, for an average impairment of a minimum of about 77 percent of local flows (42,000 AFA), without development of the proposed recapture facility. This CDRP effect must be stated and addressed.

The process of developing appropriate conservation measures and analyzing their benefits also must be informed by an understanding of system impairment at biologically meaningful time scales (e.g., daily, hourly, and in relation to storm events). The CDRP permitting process should provide the basis from which to revise the “maximize conservation of runoff on a long-term basis” operational objective for consistency with the steelhead ESA listing status.

Proposed Flows Assessment Criteria

The DEIR states that the proposed flow schedules were developed to provide habitat functions necessary to meet the primary constituent elements (PCEs) for Central

↑
31 cont.
32
33
34
↓

California Coast steelhead as defined by NMFS (70 FR 52488) and that consideration was given to mimicking the variability of unimpaired flows downstream of SFPUC facilities. However, the proposed flow schedules do not account for several of the PCEs, nor are they consistent with mimicking the natural hydrograph.

In particular, the proposed flow schedules neglect to address: a) adequate stream flows for adult attraction and upstream passage following storms; b) periodic high flow events that maintain channel form, geometry, and other geomorphic functions; or c) adequate stream flows during and following storms for smolt out-migration. The DEIR provides virtually no analysis of the effects of the proposed flow schedules in regard to meeting these particular PCEs. The effects of the CDRP on in-migration and out-migration conditions in the Sunol Valley and downstream should be presented for without-project (*i.e.*, unimpaired) and with-project conditions, and effects determined from this basis.

The proposed flow schedules do not appear to address, nor does the DEIR evaluate, the accepted definition of natural hydrograph mimicry, which consists of variability on hydrologically important time scales (*e.g.*, daily, hourly, and in relation to storm events) that would be reflected in such management approaches as pulse flows for channel shaping or flushing, or migration flows.

The flow schedules should: mimic natural runoff conditions; provide bypass flows which represent an acceptable level of flow impairment for ecological integrity; adequately meet the PCEs for Central California Coast steelhead; and ensure restored stream habitat function to the greatest degree possible. The flow schedule should include periodic high flow events for channel formation and salmonid habitat development processes. There should trigger points that allow the water year type determination to be changed and the flows to be adjusted upwards if there is increased late precipitation in any given year.

The EIR should present hydrographs of Alameda Creek and Calaveras Creek and depict the percent impairment under the CDRP project. The effects of the proposed flow schedule on other anadromous fish expected to be present in the project area, such as chinook salmon and Pacific lamprey, should be discussed in the EIR. We note that the flow targets in the EIR do not represent flows that are required to be released by the SFPUC from Calaveras Reservoir or bypassed at the ACDD, but rather represent stream flows which may be met by natural runoff. It appears that in wet and normal year types, the instream flows for much of the year (excluding summer and fall) may already be met by natural runoff conditions and under the proposed flow targets the SFPUC would release or bypass very little water.

The DEIR calculates flow effects in Alameda Creek only using flow data from water years since 2000, even though over 100 years of stream flow records are available. The DEIR model uses monthly average stream flows rather than daily stream flows, a method which is not adequate for evaluating fishery impacts of flows.

34 cont.

35

36

Water Rights Issues

As noted by the State Water Resources Control Board in a scoping comment letter to the SFPUC on the PEIR for the Water System Improvement Program dated October 3, 2005, “an appropriative water right issued by the State Water Board is also required for any increased diversion from Alameda Creek.” The CDRP proposes increased diversions from Alameda Creek. As noted by the SWRCB, “the DEIR should include sufficient information for the State Water Board to use the document for water right permitting purposes. Therefore, the document should evaluate the availability of unappropriated water after taking into consideration prior rights and the water required to maintain public trust resources. Division staff recommends that any evaluation utilize a cumulative flow impairment methodology, such as the assessment method described in the *Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams (Draft)* prepared by NOAA Fisheries Service and the Department of Fish and Game and dated June 17, 2002.”

37

The impact evaluation in the DEIR does not employ a cumulative flow impairment methodology and falls short of answering the question of whether there is sufficient water available to maintain public trust resources. The EIR should mention that in 2001 the SWRCB estimated that the entire Alameda Creek watershed is 72% “impaired,” impairment representing the ratio of water appropriation under existing water rights to estimated stream flow, and that in 2002 the state Department of Water Resources concluded that the Alameda Creek watershed is “fully appropriated” and no further water diversions will be considered.

38

Fisheries and Hydrology Issues

1997 MOU Flows and Steelhead Flows

The proposed base stream flows (in cubic feet per second, cfs) in the DEIR, starting in winter of 2015 are:

39

Jan 15-Mar 15	20 cfs
April 5-Oct 31	7 cfs
Nov 1-Jan 14	5 cfs

These are the flow schedules that the SFPUC committed to in the 1997 MOU but has not yet implemented.

The SFPUC will release 2 cfs from Calaveras Dam year-round. An additional 10 cfs will be bypassed past the Alameda Diversion Dam from December 1 to April 30 when sufficient stream flow is generated by precipitation events. These flows would be bypassed by the ACDD when possible to provide water in a greater stream reach – and from Calaveras Reservoir in the summer and fall to provide cold water.

40

It is important to keep in mind that except for the potential 10 cfs Dec1 – April 30 and the guaranteed 2 cfs from Calaveras year-round, the base flows are not flow releases or

bypasses, they are flows required to be in the creek at the junction of Alameda and Calaveras creeks. They are instream flows that may be met by natural runoff most of the year in most water year types. The SFPUC would have to actually release very minimal amounts of water below the dams in the summer of most years and a small amount in the winter and spring during dry years. Natural runoff will provide most of the base winter and spring flows in Alameda Creek in normal and wet years, but in these years the SFPUC would not be required to contribute meaningful flows from the largest sub-watershed, Calaveras Creek, which they completely impound.

40 cont.

The proposed stream flows when steelhead return to the upper watershed are:

Dry years

Nov–Jan 11	5 cfs
Jan 12–Mar 31	20 cfs
April–Oct	7 cfs

Normal years

Nov–Jan 11	5cfs
Jan 12–Mar 31	20cfs
April–Sept 30	15 cfs
Oct	7 cfs

Wet years

Nov–Jan 11	5cfs
Jan 12–Mar 31	42cfs
April	32-18 cfs
May 1–Sept 30	15 cfs
Oct	7 cfs

41

The 2 cfs will be released from Calaveras Dam year-round and potentially 10 additional cfs will be bypassed at the ACDD from December 1 to April 30, when available.

In dry years the steelhead flows would be the same as the trout flows. In normal water years the steelhead flows would be essentially the same as the trout flows plus 8 cfs from April to September. In wet years the steelhead flows would be essentially the same as the trout flows plus 22 cfs mid-January through March, ramped down to an additional 8 cfs from April to September. Since the flows under 1997 MOU are not a mitigation, but should be considered as a baseline condition, the dedicated mitigation in the CDRP for steelhead trout is the “steelhead” flows minus the currently required 1997 MOU flows: no flow releases in dry years; 8 cfs from April to September in normal years; and 22 cfs mid-January through March, ramped down to 8 cfs from April to September in wet years.

The proposed steelhead flows are based on the 1997 MOU, an agreement designed to create a tail-water resident rainbow trout fishery in a limited stream reach below the dam, not for migratory steelhead. The DEIR acknowledges that the identified ranges of flows are intended to provide habitat for resident rainbow trout spawning, not for steelhead migration (EJTV 2008). The proposed flow schedules neglect to address: a) adequate

42

stream flows for adult steelhead attraction and upstream passage following storms; b) periodic high flow events that maintain channel form, geometry, and other geomorphic functions; or c) adequate stream flows during and following storms for smolt outmigration in Alameda Creek. The flows do not provide for adequate steelhead migration, with only 7-15 cfs flow proposed for large portions of presumed steelhead smolt outmigration periods (April-May), flow that also may be entirely recaptured downstream at the recapture facility, frustrating smolt outmigration. Proposed flows during adult steelhead in-migration periods are only 20-42 cfs at the confluence with Calaveras Creek. The flows do not address potential chinook salmon migration or spawning. The flows do not mimic the natural hydrograph of the stream.

42 cont.

The proposed resident rainbow trout monitoring mitigation measure provides that the SFPUC will monitor the effects of operation of the CDRP on resident trout in Alameda Creek downstream of the ACDD. If monitoring demonstrates that the MOU flow bypasses are not adequate to sustain the resident trout fishery downstream of the ACDD, the SFPUC will implement a proposed adaptive management mitigation measure that could either modify the flow release schedule, implement seasonal restrictions on Alameda Creek diversions during the spawning period, or install a fish screen at the diversion tunnel. These mitigation measures defer mitigation for up to 10 years, while continuing potential impacts, and do not specify how the flow release schedule would be modified, or what criteria would be used to determine that “flow bypasses are not adequate to sustain the resident trout fishery downstream of the ACDD.”

43

The DEIR provides no analysis of how much flow will actually be released from Calaveras Reservoir or bypassed past ACDD in a typical wet, normal or dry year. The EIR should provide analysis of how much of the compliance flow will be met by natural runoff in typical wet, dry, and normal years and calculate the SFPUC release obligations (and characterize them as a percentage of the available SFPUC water supply in the watershed), so the public can understand both the mitigation that is being provided and the potential impacts on water supply.

44

CDFG stated in their November 22, 2005 scoping comments on the PEIR for the Water System Improvement Program that the SFPUC must:

“provide flow releases to the stream channel below Calaveras Reservoir dam to encourage riparian vegetation growth, invertebrate productivity, adequate dissolved oxygen, low water temperatures, and provide some rearing habitat for juvenile steelhead trout and spawning adult steelhead trout. The SFPUC, under the aforementioned 1997 MOU with DFG, agreed to specific flow releases to provide habitat for resident rainbow trout and other native fish species downstream of Calaveras Reservoir based on the knowledge of fish migration barriers being present in the lower downstream reaches of Alameda Creek. At this time, however, there is active fish passage remediation at these barriers. The SFPUC will need to assess adequate flows for anadromous steelhead trout and will need to

45

renegotiate with DFG such that adequate flows are released to comply with Fish and Game Code 5937.”

↑
45 cont.

ACDD Operation and Fish Passage

The CDRP proposes to operate the ACDD to divert almost all of the late fall, winter and spring stream flows from upper Alameda Creek. Aside from the questionable legality of this plan, the DEIR acknowledges that this would nearly eliminate low and moderate (1 to 650 cfs) flows in Alameda Creek downstream of the diversion dam that currently occur when the diversion gates are closed, and substantially reduce many higher (greater than 650 cfs) flows. The DEIR categorizes this as a significant and unavoidable impact. We concur that the impact would be significant but the impact is clearly avoidable if the SFPUC removes the diversion dam or operates it in a lawful manner that protects fish and wildlife downstream of the dam.

↑
46

The proposed operation of the diversion dam would be to divert all but 1 cfs of flow when the gates are open up to a flow of 650 cfs. Diverting the entire stream flow (except 1 cfs) and cutting the frequency of peak flows during December through May will clearly affect downstream fish passage, fish rearing, amphibian populations, and stream temperatures. The SFPUC has bypassed most flows past the diversion dam since 2002, and trout and aquatic resources below the diversion dam are dependent upon these natural stream flows.

↑
47

The DEIR acknowledges that the CDRP would continue to exclude steelhead from Alameda Creek upstream from ACDD, but does not list corresponding conservation measures. The assessment similarly acknowledges operational effects (substantially reduced or no flow conditions downstream) on Alameda Creek between the Calaveras Creek confluence and ACDD but fails to provide conservation measures.

↑
48

The DEIR acknowledges that the proposed operation of the ACDD would result in significant change in hydrologic conditions in Alameda Creek downstream of the diversion dam when compared to existing conditions. “Diversion of most or all flows during the late winter and spring months could adversely affect the ability of resident rainbow trout to spawn and for eggs to successfully incubate in this reach.”

The DEIR acknowledges that the proposed operation would increase diversion and reduce winter stream flow up to 18% in the Alameda Creek flood control channel and up to 45% in the Sunol quarry reach and upstream during wet and normal years. These flow reductions will have potentially significant effects on fish passage and spawning for steelhead.

↑
48

The DEIR proposes the following mitigations for operation of the Alameda Creek Diversion Dam:

↑
49
↓

“The SFPUC will establish and implement written operational criteria for the Alameda Creek Diversion Dam that directs that the diversion dam and

tunnel shall be operated to pass flows down Alameda Creek when diversion of those flows is not required to maintain desired levels in Calaveras Reservoir in order to provide the maximum possible days of winter and spring flows in Alameda Creek below the diversion dam. This measure reinforces the way the SFPUC generally operates the diversion tunnel now: that diversion gates are closed in the spring once desired Calaveras Reservoir storage have been reached. However, at times additional flows have been diverted from Alameda Creek after reservoir storage levels have been achieved such that the “excess” water has subsequently been released from the reservoir to maintain the appropriate water level. This measure would formalize Alameda Creek diversion procedures to maintain flows in Alameda Creek to the extent they are not needed to achieve required reservoir storage. This measure would reduce the flow reduction impact but not to a level that is less than significant.”

49 cont.

This is a ridiculous mitigation measure, essentially promising to not divert the remainder of stream flows that are not diverted. Bypassing stream flows based solely on whether or not they are needed for water supply, without regard for the instream flow needs of downstream fish and wildlife is not an adequate mitigation measure.

The proposed mitigation measures also include the potential for diversion restrictions or fish screens:

“If, after 10 years of monitoring results for Measure 5.4.5-3a, Minimum Flows for Resident Trout in Alameda Creek, indicate that the measure does not sustain the resident trout population in Alameda Creek below the diversion dam, then the SFPUC shall also implement additional measures as follows: either implement seasonal restrictions on Alameda Creek diversions to Calaveras Reservoir to protect the downstream resident trout fishery during the critical spawning period (December 1 through April 30) or install and operate a fish passage barrier to “screen” the diversion facility (screening could consist of a behavioral barrier, such as electrical or sound barrier that deters fish, or a physical barrier – such as a screen facility).”

50

This mitigation measure is also inadequate, since it promises to continue to illegally divert Alameda Creek stream flow for another decade, without necessarily bypassing flows sufficient to keep fish and wildlife downstream in good condition during that decade. Similarly, if the diversion tunnel is currently injuring or harming fish, it legally needs to be screened now, not in 10 years. The DEIR acknowledges that Fish and Game Code Section 5980 contains requirements for an intake screen or other suitable method for avoiding and minimizing fish entrainment at the ACDD. The DEIR also acknowledges that the ACDD could block migration to any migrating steelhead that travel upstream of the Little Yosemite area. This would be a significant impact that is not mitigated in the CDRP. If and when steelhead trout migrate upstream to the Little

Yosemite and the diversion dam, the SFPUC has an obligation to ensure adequate stream flow, and a fish ladder or dam removal for fish passage at that time.

50 cont.

California Fish and Game Code §5901 requires fish passage at ACDD if it prevents or impedes the passing of fish up and down stream. Fish passage at the ACDD will be required by the Endangered Species Act if the ACDD blocks migration of listed CCC steelhead. *Oncorhynchus mykiss* upstream from ACDD should be provided passage downstream to the extent feasible, and the CDRP should include design elements to prevent entrainment of fish into the diversion tunnel and to allow for migration via bypass flows. The ACDD is required to be screened to NMFS and CDFG screening criteria. The EIR should note that *O. mykiss* in this reach presently cannot migrate downstream (except possibly under extreme high flows) and propose conservation measures to address this operational effect. The EIR should fully discuss the impacts of proposed ACDD operations on fish passage at Little Yosemite and other locations downstream of the ACDD.

51

The ACA scoping comments of November 8, 2005 proposed options for providing fish passage at the ACDD, including complete removal of the dam, building a fish ladder at the dam, installing a fish screen at the diversion, and providing bypass flows for fish migration. The EIR should evaluate the potential implications of removal of the ACDD.

52

The NMFS comment letter of April 4, 2008 on the CDRP stated that “Additional project features that should be considered include alternatives that include a fish ladder for adult steelhead to access areas upstream of Calaveras Dam and areas upstream of the Alameda Creek Diversion Dam. These structural features of the project should be evaluated prior to the Corps’ issuance of a permit to ensure the CDRP does not limit or preclude future actions to restore steelhead in Alameda Creek.”

Migration Flows

The DEIR demonstrates confusion regarding adequate flows for steelhead in-migration and out-migration. It must be recognized generally in the EIR and in SFPUC flow schedule development that minimum passage flows over critical riffles do not equate to “suitable migration conditions.” Alameda Creek spawning steelhead are known to move on flows in the vicinity of 400 cfs (FarWest 2005) and out-migrants typically move on spring freshets. It is inappropriate to measure the adequacy of overall migration conditions based on criteria developed for passing individual riffles (or, more accurately, culverts).

53

The DEIR claims less than significant or no impact on fisheries and hydrology based on unsubstantiated claims such as “proposed CDRP flows would constitute an improvement over existing conditions.” The DEIR also uses specious metrics, such as “annual average flow” to ascribe beneficial impacts. For example, “the net result of these changes would be a slight increase in the average annual amount of water flowing in Alameda Creek and no appreciable change in the average annual flow in Calaveras Creek.” Despite the fact that the claim of increased annual flow is likely false, annual flow change is not an

acceptable metric for measuring impacts to hydrology and fisheries. The CDRPP will have significant negative impacts on winter and spring flows, critical periods for fish migration.

53 cont.

Fisheries Protections Plans Requested by CDFG

The EIR should include the fisheries protections plans requested by CDFG in their comments on the PEIR for the water System Improvement Program. CDFG requested a plan to preserve the existing reservoir population of steelhead trout during interim operations (preconstruction) and post construction operations of Calaveras Dam; a plan to screen (per DFG screening criteria) the new reservoir intake tower/adit(s) at Calaveras Reservoir and at the intake of the diversion at the Alameda Creek Diversion Dam so as to be in compliance with Fish and Game Code Section 6100; a plan to provide fish passage at the new Calaveras Dam and ACDD so as to be in compliance with Fish and Game Code Section 5901; and consideration of minimum flows from San Antonio Reservoir.

54

Recapture Facility

The DEIR cites a future flows recapture facility downstream from the Sunol Valley Water Treatment Plant, whose construction is not dependent on the CDRP. Nevertheless, proposed instream flows being analyzed through CDRP permitting are proposed to be re-diverted through this project. We suggest that it is impossible to assess CDRP effects without considering recapture facility operations.

According to the DEIR, the 1997 flows MOU was not implemented pending implementation of the project to recapture these releases further downstream, implying implementation of proposed flow schedules continues to be tied to recapture facility development. At a minimum, SFPUC policy and EIR analysis must decouple the start of releases with recapture facility development to allow for a reasonable understanding of CDRP effects and mitigation.

55

Although recapture of summer rearing flows released from Calaveras may be achievable in a manner consistent with steelhead recovery, by definition, a recapture facility that “recaptured” natural flow or recaptured spring and winter releases for steelhead in- and out-migration flows would undermine potential benefits of these flows to anadromous species, and have a potentially significant impact on steelhead. The recapture project would create additional impacts to passage and downstream habitat that must be addressed in the EIR.

Greenhouse Gas Issues

According to the DEIR, construction of the CDRP could produce up to an estimated 24,012 metric tons of CO₂ equivalent greenhouse gasses during the 4-year construction period (or approximately 6,003 metric tons per year, or 21 metric tons per day). The DEIR concludes that since these emissions are minimal relative to state-wide emissions the proposed project would not conflict with state greenhouse gas reduction goals or

56

result in substantial contribution to global climate change. The DEIR asserts that there is no methodology or threshold that can be applied to the significance of an individual project regarding greenhouse gas emissions. However, the DEIR's greenhouse gas analysis is based on the flawed assumption that seemingly small contributions of greenhouse gases do not have a cumulative impact on global warming.

56 cont.

The DEIR incorrectly reasons that because the CDRP's construction and operational emissions represent a small percentage of California's total emissions, its cumulative impact is less than significant. Under CEQA, "[t]he determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible *on scientific and factual data.*" CEQA Guidelines § 15064(b) (emphasis added). Accordingly, a significance threshold for greenhouse gases must reflect the grave threats posed by the cumulative impact of additional new sources of emissions into an environment where deep reductions from existing emission levels are necessary to avert the worst consequences of global warming. See *Communities for Better Env't v. California Resources Agency*, 103 Cal. App. 4th 98, 120 (2002) ("the greater the existing environmental problems are, the lower the threshold for treating a project's contribution to cumulative impacts as significant."); see also *Center for Biological Diversity v. National Highway Traffic Safety Administration*, 508 F.3d 508, 550 (9th Cir. 2007) ("we cannot afford to ignore even modest contributions to global warming."). The more new emissions are added to the atmosphere, the more difficult it will be to attain the emission reduction targets required to minimize the risk of dangerous climate change. Given the deep emission cuts necessary to stabilize the climate, a net zero threshold is the most scientifically supportable threshold for greenhouse gas emissions.

57

Based on the severe impacts already observed as well as future impacts and risks posed by additional warming to which we are committed due to inertia in the climate system, climatologists are increasingly concluded that current climate conditions already constitute "dangerous" climate change and that greenhouse gas emissions ultimately must be drawn down to net negative levels through the rapid phase-out of coal and improved forest and agricultural management.⁴ Atmospheric concentrations of CO₂ have risen from a pre-industrial concentration of 280 ppm to 383 ppm in 2007.⁵ Annual mean global temperature has increased by 0.76°C relative to pre-industrial times and is increasing at a rate of 0.17°C/decade.⁶ Impacts from this anthropogenic interference with the climate has already resulted in tens of thousands of climate-related deaths, species extinction, ocean acidification and loss of coral reefs, and the significant retreat of glaciers and sea ice. In addition to the impacts already observed, additional warming "in the pipeline" due to

58

⁴ James Hansen et al., *Target Atmospheric CO₂: Where Should Humanity Aim?* 2 OPEN ATMOSPHERIC SCIENCE J. 217, 226-27 (2008); see also Matthews H.D. & Caldeira, K., *Stabilizing the Climate Requires Near-Zero Emissions*, 35 GEOPHYSICAL RESEARCH LETTERS L04705 (2008) ("future anthropogenic emissions would need to be eliminated in order to stabilize global-mean temperature.").

⁵ Global Carbon Project, *Carbon Budget and Trends 2007* (2008), available at: <http://www.globalcarbonproject.org/carbontrends/index.htm>.

⁶ Kevin E. Trenberth et al., 2007: *Observations: Surface and Atmospheric Climate Change in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE* 252 (Susan Solomon et al. eds., Cambridge Univ. Press 2007).

inertia in the climate system and their feedback loops will result in further increases in temperature posing significant risks of severe and irreversible impacts.⁷ The climate is locked into anywhere from 0.3 to 0.7°C additional warming relative to late 20th century levels due to the eventual impacts of past historical emissions.⁸ On account of additional warming to which we are committed, Ramanathan and Feng (2008) found that there is a “high probability that the [dangerous anthropogenic interference] threshold is already in our rearview mirror.”⁹ Similarly, on the basis of paleoclimate evidence and ongoing climate change, James Hansen and other leading climate scientists concluded the present CO₂ levels of 385 ppm are “already in the dangerous zone” and that “[i]f humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that.”¹⁰ In looking at dangerous climate change through the lens of risk tolerance, Harvey concluded that, at a 10% risk tolerance, atmospheric CO₂ concentrations close to present levels “violates the UNFCCC” for a range of assumptions of climate sensitivity.¹¹ Accordingly, as the climate change to which we are committed is already dangerous, there is little scientific basis to conclude that any new source of emissions is innocuous.

58 cont.

Based on the abundant scientific evidence that *any* increase in greenhouse gas emissions has a cumulatively significant impact on the environment, there is a “fair argument that can be made about the possible significant environmental effects of a project, irrespective of whether an established threshold of significance has been met with respect to any given effect.” *Protect the Historic Amador Waterways v. Amador Water Agency*, 116 Cal. App. 4th 1099, 1109 (2004). Accordingly, the EIR should properly recognize that the CDRP greenhouse gas impacts are cumulatively significant and adopt all feasible mitigation and alternatives to reduce project emissions.

The DEIR mentions San Francisco’s Climate Action Plan and the City’s greenhouse gas reduction goal of 20% by 2012. The SFPUC, as a San Francisco City agency, should be leading the way in greenhouse gas reduction measures and mitigation for greenhouse gas impacts for each and every one of the SFPUC’s projects.

The DEIR states that “no state, local, or regional air quality agency has adopted a methodology or quantitative threshold that can be applied to a specific development or construction project to evaluate the significance of an individual project’s contribution,” but then goes on to discuss current development of just those quantitative thresholds. The DEIR discusses BAAQMD efforts to define quantitative CEQA thresholds of

⁷ V. Ramanathan & Y. Feng, *On Avoiding Dangerous Anthropogenic Interference With the Climate System: Formidable Challenges Ahead*, 105 PNAS 14245, 14249 (Sept. 23, 2008); James Hansen et al., *Target Atmospheric CO₂: Where Should Humanity Aim?* 2 OPEN ATMOSPHERIC SCIENCE J. 217, 226 (2008).

⁸ Michael E. Mann, *Defining Dangerous Anthropogenic Interference*, 106 PNAS 4065, 4066 (Mar. 17, 2009).

⁹ V. Ramanathan & Y. Feng, *On Avoiding Dangerous Anthropogenic Interference With the Climate System: Formidable Challenges Ahead*, 105 PNAS 14245, 14249 (Sept. 23, 2008).

¹⁰ James Hansen et al., *Target Atmospheric CO₂: Where Should Humanity Aim?* 2 OPEN ATMOSPHERIC SCIENCE J. 217, 217-18 (2008).

¹¹ Danny Harvey, *Dangerous Anthropogenic Interference, Dangerous Climatic Change, and Harmful Climatic Change: Non-Trivial Distinctions With Significant Policy Implications*, 82 CLIMATE CHANGE 1, 20 (2007).

significance for construction-related air quality impacts, and consideration of two significance thresholds: one based on total construction-related CO₂ equivalent emissions over the duration of project construction exceeding 35,250 metric tons; and a second based on daily construction emissions exceeding 10 metric tons. However, in April 2009 the BAAQMD also discussed a recommended greenhouse gas threshold of 3,750 metric tons of CO₂ equivalent construction-related emissions annually. The DEIR acknowledges that greenhouse gas emissions under the CDRP would likely exceed the proposed daily threshold of significance of 10 metric tons per day, characterized as potentially significant and unavoidable impacts on climate change in accordance with the proposed Option 2 BAAQMD threshold of significance. The CDRP would likely exceed the recommended annual threshold as well.

60 cont.

The DEIR contains token greenhouse gas reduction measures such as maintaining tire inflation pressure on construction vehicles and a worker education program and erroneously concludes that “No other feasible mitigation exists that would reduce construction-related emissions of GHG to below the BAAQMD draft daily threshold of significance.” The DEIR should include full mitigation for all the CO₂ equivalent greenhouse gasses produced during the construction period and project operation to reduce the level of impact to less than significant, such as through purchase of offsets for 100% of the emissions from a fund or project certified by the California Climate Action Registry.

61

Inadequacy of Mitigation Measures

Construction Impacts

The DEIR acknowledges significant direct impacts from construction on 343 acres of habitat, much of it habitat for numerous listed species, such as the Callippe silverspot butterfly, California tiger salamander, California red-legged frog, and Alameda whipsnake. Mitigation for these direct biological impacts of the CDRP is through four proposed “compensation” sites, which are located on protected, public SFPUC land. This mitigation is highly inappropriate. There is a fundamental problem with proposing mitigation for impacts with enhancements on public land that is already owned by the SFPUC. These lands are under no threat of development, are already owned by the public, and presumably are being managed in accordance with the SFPUC’s Environmental Stewardship Policy as protected watershed lands. If they are not being managed in this manner, using these lands as mitigation banks rewards the SFPUC for bad management policies and contributes no net benefit to special-status species. Management of SFPUC properties in accordance with the Environmental Stewardship Policy should not be considered mitigation for project impacts.

62

Presumably the SFPUC mitigation lands are disturbed areas that could benefit from habitat restoration, invasive plant removal, management changes, and/or species reintroduction. These projects should be done under the auspices of the SFPUC Watershed and Environmental Improvement Program (WEIP), approved in 2006 and with committed funding of \$50 million over 10 years. The stated purpose of the WEIP is

63

for the SFPUC to more proactively manage, protect and restore environmental resources critical to or affected by SFPUC operations, such as the land in the proposed “reserves.” These projects to improve management should be done under the WEIP, which was set up to do just this, and not used as mitigation for construction impacts of SFPUC projects.

63 cont.

The DEIR does not specify compensation ratios for the direct impacts of loss of habitat for special-status species from dam construction, but rather defers quantification of mitigation to a nebulous decision-making process based on undefined success criteria. The compensation ratios for destruction of endangered and threatened species habitat should be clearly spelled out in the EIR.

To provide meaningful mitigation, compensation should consist of protecting privately owned lands under threat of development with habitat value for special status-species, at a minimum of a 1:1 ratio. If already protected areas are used as mitigation banks for SFPUC project impacts, the mitigation ratios should be much, much higher than 1:1 to provide real conservation and ecosystem benefits. These lands are mitigating for permanent loss of areas known to harbor special-status species. If degraded public lands are enhanced as compensation for permanent impacts from the SVWTP project, the mitigation ratio should be 5:1 or 6:1. In this case the EIR would also need to describe how the SFPUC would ensure mitigation lands will be managed for special-status species habitat and ecosystem values in perpetuity and describe the dedicated funding and monitoring program and who will be responsible for ensuring this outcome.

64

Deferred Avoidance and Minimization Measures

The DEIR reflects an apparent SFPUC policy of deferring conservation measures until such a time as NFMS notifies the SFPUC of the presence of steelhead in the upper watershed. However, recovering Alameda Creek steelhead depends on implementing such measures, and the SFPUC has a responsibility to account for steelhead restoration in conjunction with its ongoing water supply operations. The DEIR uses circular logic in proposing flows purported to support steelhead will be provided only if steelhead occur in the absence of such flows. As provisions are in place to allow spawning steelhead to move into areas affected by SFPUC operations associated with ACDD and Calaveras Dam, and life history forms of the species currently occur in Alameda Creek and tributaries downstream from these facilities, conservation measures should be implemented concurrently with the CDRP.

65

Relationship to Habitat Conservation Plan

The DEIR notes that the SFPUC will develop a Habitat Conservation Plan (HCP) that will be the primary plan for coordinating operations and steelhead restoration in the watershed. Since ACDD and Calaveras Dam operations constitute the single most important factor affecting the species in the watershed, planning cannot be forestalled until development of an HCP.¹² The mitigation measures and habitat benefits in this

66

¹² The HCP may be an appropriate venue for addressing Alameda Creek watershed impacts of SFPUC activities including grazing, gravel mining, and agricultural leases, although the ACA urges the SFPUC to

proposed HCP are completely speculative and cannot be relied upon to reduce significant impacts. The SFPUC began this HCP in 2004 (and abandoned the effort in 2005, reviving it in 2006). There is no guarantee this HCP will be completed in a timely fashion. It is also not certain that regulatory agencies will agree to give the SFPUC a permit to “take” steelhead under this HCP, or that the mitigation measures will be adequate to sustain steelhead trout in the watershed. The SFPUC has thus far failed to incorporate most of the comment letters and extensive information submitted by the ACA on the HCP. The EIR must address operational effects of the CDRP and provide conservation measures consistent with steelhead restoration to ensure proper implementation of the project, not rely on a speculative HCP.

66 cont.

Comments on Specific Sections

p 1-8, *Primary Objectives*. The project involves adding facilities for fisheries flows, but does not include providing fish habitat as an objective. Add as an objective, “Achieve maximum consistency with on-going efforts to restore steelhead in the Alameda Creek watershed.”

67

p 1-13, *Project Description*. Operating the project involves an unscreened diversion (the ACDD) that must be screened according to California Fish and Game Code. Add as a main element of the project, “Install a fish screen at the ACDD intake structure that complies with CDFG and NMFS screening criteria.”

68

p 1-17, *Outlet Pipe*. The DEIR cites “the 1997 MOU” without reference to its provisions or implementation status. Explain the relevance of the MOU to the proposed project.

69

p 1-24, *Changes in Reservoir Operations*. The DEIR notes a decrease in diversions from the ACDD and an increase in releases from Calaveras Reservoir for fish flows pursuant to the 1997 MOU. These flows should be part of the environmental baseline as they were stipulated (and should have been implemented) in a process unrelated to the CDRP.

70

p 1-24, *Fishery Releases*. The DEIR states, “Because of the DSOD restrictions on the reservoir, the MOU flow requirements could not be met...” As the MOU is dated 1997 and the DSOD restriction happened in 2001, and no fishery flows were released between 1997 and 2001, the asserted cause-effect is false and should be omitted. The EIR and the PEIR for the Water System Improvement Program claim that the MOU flows “not been fully implemented because of the current limitations on storage.” However, this is a misrepresentation of the limitations the DSOD drawdown has placed on the SFPUC’s ability to release flows from the reservoir. Although current water storage in Calaveras Reservoir is at 60% less than the maximum before the DSOD drawdown, the SFPUC’s yield (available treated water supply) from Calaveras has not been proportionally affected by the DSOD operating restrictions. According to the Notice of Preparation for the Water System Improvement Program PEIR published by the SFPUC in 2005, Calaveras yield for the previous year was 219 mgd, fully 98% of the normal system yield of 223 mgd.

71

pursue appropriate mitigation for previously-identified limiting factors to habitat as soon as possible, and not to wait for adoption of an HCP.

This meant that water was available for flow releases to Calaveras Creek and Alameda Creek, but that the SFPUC chose to divert this water to its water treatment plant instead.

↑
71 cont.

p 1-25, *Fishery Releases*. The DEIR uses the word “high” to describe winter flow under the MOU. As the MOU flow is 20 cfs and all flow from upper Alameda Creek between 20 and 650 cfs will be diverted, the use of this term is inappropriate.

72

Similarly, the flow schedule is characterized as coinciding with the seasonal habitat requirements for steelhead trout, when in fact there is no provision for adequate steelhead migration flows or channel shaping flows, both of which must be considered in seasonal habitat requirements for steelhead.

73

The SFPUC proposes to implement flows to support steelhead when steelhead have regained access to the upper watershed. As a program is in place to move in-migrant steelhead upstream from the BART weir, flows to support the anadromous form of the species should not be deferred. With provision of flows, the areas downstream of ACDD and Calaveras Dam offer the best habitat in the Alameda Creek watershed and should be available to steelhead.

74

p 1-30, *Fisheries and Aquatic Habitat*. Flows associated with the 1997 MOU cannot reasonably be evaluated as part of this project, nor can the impact analysis claim beneficial effects of the CDRP merely because the SFPUC has not yet implemented the flows agreement and claims it will implement it in the future.

75

Here and throughout the DEIR, the use of the qualities “stable” and “reliable” regarding flows should not be incorporated as criteria to measure suitability for fish. A flow may be both stable and reliable and be entirely inappropriate for fish habitat purposes.

76

The claim that high magnitude channel maintenance flows would continue similar to existing conditions is inaccurate – high flows will not be similar under the proposed project. The project proposes to re-divert flows now bypassed at ACDD due to the DSOD restriction. The DEIR here and throughout the report switches “existing conditions” at its convenience for the sake of minimizing impacts.

77

p 1-31, *Cumulative Impacts*. A cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. As SFPUC water supply operations cause significant steelhead habitat impacts, these are cumulative impacts of the CDRP (regardless of baseline). As the CDRP would not mitigate these to less than significant levels and would involve increasing the impacts from the baseline (DSOD restricted operations), it has significant cumulative impacts that are not identified in the DEIR.

78

p 1-55, *Impact 4.5-5*. The DEIR notes that the project could have a significant impact on fish in Alameda Creek downstream from ACDD, but that the significance level is reduced by monitoring and adaptive management. To maintain logical consistency, the impact needs to be identified as less than significant (and stay less than significant with

79
↓

implementation of monitoring and adaptive management), or it needs to be identified as significant, and be mitigated by flow releases.

↑
79 cont.

p 1-56, *Mitigation Measure 5.5.5b*. Use of the term “fish passage barrier” is inappropriate in this context. The report should say “fish screen” or use the generic term “entrainment prevention method.”

80

p 1-56, *Impact 4.5.6*. The impact level assigned implies that re-operating diversions at ACDD and Calaveras Reservoir will not restrict the range of steelhead. We strongly disagree, especially as there are not steelhead migration flows proposed as part of the project. This impact involves a mandatory finding of significance.

81

p 1-56, *Impact 4.5.8*. See previous comment regarding Impact 4.5.6.

p 3-6, *Project Objectives*. Add consistency with steelhead restoration as a primary project objective.

82

p 3-62, *Section 3.5.6*. To avoid possible impacts to the reservoir trout population, the project should state clearly that surface elevation of the reservoir will not be lowered to less than 690 feet.

83

p 3-64, *Section 3.6.2*. The statement that there will be a decrease in annual diversions at ACDD from DSOD restricted conditions to future conditions is inaccurate. The CDRP propose just that – to increase annual diversions at ACDD from the baseline conditions. Specific discharge values should be assigned to pre- and post-project conditions for the sake of adequate environmental analysis.

84

p 3-67, *Section 3.6.5*. The 1997 MOU was meant to address inadequacies in water supply operations in relation to maintaining a resident rainbow trout fishery in a limited stream area. A sophisticated, multi-stakeholder process is in place through the Fisheries Restoration Workgroup to define appropriate flows to support a restored viable steelhead run in the upper Alameda Creek watershed. Seventeen public agencies and nonprofit organizations, including the Alameda Creek Alliance and the SFPUC, began flow studies in 2006 to determine how much water might be needed at critical times to support a viable steelhead population in Alameda Creek - while also considering other native fish and wildlife and minimizing potential impacts to drinking water supplies. These studies are ongoing. The project should commit to supplying instream flows as dictated by the needs of steelhead trout as expressed through this stakeholder process. The DEIR must incorporate mitigation (including appropriate flows) for the reasonably expected impacts of CDRP implementation on steelhead habitat.

85

The DEIR refers to potential future modification of the proposed flow regime via a Habitat Conservation Plan (HCP) process. Such a process is not sufficiently developed as to provide adequate mitigation for project impacts, and reliance on unspecified future actions must be viewed as deferring mitigation. The mitigation measures and habitat benefits in this proposed plan are completely speculative and cannot be relied upon to

86
↓

reduce significant impacts. The SFPUC began this HCP in 2004, abandoned the effort in 2005, and revived it in 2006. After 5 years, a draft HCP is not completed and there is no guarantee this HCP will be completed in a timely fashion. It is also not certain that regulatory agencies will agree to give the SFPUC a permit to “take” steelhead under this HCP, or that the mitigation measures will in any way be adequate.

86 cont.

p 3-69, *Section 3.6.6*. Flow releases associated with the project should address the full range of steelhead habitat requirements. The project proposes only spawning and rearing flows, and does not address other important habitat considerations including migration and channel shaping and flushing flows essential to accommodate the needs of steelhead. Further, flow regimes should be structured to mimic storm hydrographs as much as possible. The proposed regime does not account for the natural variation of flow conditions on which steelhead depend.

87

The DEIR notes that flows may be modified through the federal permitting process. Please refer to the comments on Section 3.6.5 regarding deferring mitigation.

88

p. 4.4-84, *Effect of CDRP on California red-legged frog*. The DEIR states that “Compared to the baseline, minimum flows would provide more water during the California red-legged frog breeding and rearing season. This is not true, in fact the opposite is proposed – reducing flows in Alameda Creek during winter and spring frog breeding and rearing season under the CDRP. The DEIR notes that minimum flows under the CDRP would provide less water than under baseline years without diversion, “however, they would maintain habitat availability for California red-legged frog in Alameda Creek downstream of the ACDD by providing sufficient flow to sustain breeding habitat.” This claim is unsubstantiated.

89

p 4-16, *Table 4.1.2*. Impact 5.4.1-2 in the WSIP EIR correctly identifies a significant unavoidable impact on Alameda Creek downstream of ACDD from water supply operations. The corresponding analysis states, “On a storm-by-storm basis, even when stream flows exceed 650 cfs, WSIP diversions would substantially reduce the flows and alter the hydrograph, leaving only brief periods of high flows in major storm events... (WSIP p. 5.4.1-27).” The DEIR for the CDRP states that this impact has been re-evaluated as a project-specific impact when in fact this has not occurred. The analytical sleight-of-hand represented here must be addressed or the EIR must be found deficient in this regard.

90

p 4.2-17, *Water Enterprise Environmental Stewardship Policy*. Compliance with the 1997 MOU is unrelated to the proposed project. Providing flows agreed to through the MOU does not constitute CDRP compliance with stewardship policies or mitigation for CDRP impacts. The CDRP fails to release water consistent with the needs of steelhead, indicating that the project would in fact conflict with the stewardship policy.

91

p 4.5-2, *Extended Study Area*. The statement, “While operation of Calaveras Reservoir and the ACDD influences flow conditions in the extended study area, it is difficult to distinguish this influence from the effect of these other water projects” is inaccurate and

92

should be deleted. Not only is it perfectly possible to characterize how operations of SFPUC water supply facilities reduce flow into Alameda Creek downstream from the Alameda Creek/Arroyo de la Laguna confluence, it is at the heart of the project's impact.

92 cont.

p 4.5-4, *Fisheries, Existing Conditions*. As the SFPUC is well aware, the Alameda Creek watershed historically supported coho and possibly salmon as well as steelhead and trout (ACA 2009).¹³

93

p 4.5-6, *Alameda Creek Fisheries Restoration Workgroup*. The EIR should discuss the context of extensive fish passage projects being pursued by the Workgroup downstream of the SFPUC facilities and their schedule for completion.

94

p 4.5-10, *Water Enterprise Environmental Stewardship Policy*. The DEIR notes that the stewardship policy obligates the SFPUC to release flows in such a way as to mimic the variation of the seasonal hydrology. This is not accomplished by the proposed flow schedule, which has different flow schedules for different water year types, but does not account for variation within any given year-type. Proposed flows are inconsistent with this element of the stewardship policy.

95

p 4.5-17, *Table 4.5.1*. It would be appropriate in this EIR section to quantify the baseline flows (under "existing conditions"). What is the diversion rate of unimpaired flows averaged over this period? In particular, assessing the flow regime of water years 2004-5, 2005-6, and 2006-7 would allow for understanding of the impact of the project on habitat and hydrology.

96

p 4.5-39, *Steelhead/Rainbow Trout Regulatory Status*. The DEIR states that "the resident rainbow trout that occur in the watershed upstream of the BART weir are not designated as a listed species nor proposed for listing." However, NMFS has proposed listing these fish as part of the CCC steelhead population once adult steelhead have access to Alameda Creek above the BART weir, under the similarity of appearance provision (71 FR 834; January 5, 2006). In addition, adult steelhead that are moved annually upstream of the BART weir under a relocation and monitoring program permitted by NMFS and CDFG are listed CCC steelhead trout.

97

p 4.5-52, *Section 4.5.2.1 Significance Criteria*. Steelhead restoration in the Alameda Creek watershed occurs primarily through the auspices of the Alameda Creek Fisheries Restoration Workgroup. Revise the significance criteria to reflect consistency with the efforts and plans of this group.

98

p 4.5-55, *Impact 4.5.2*. While the impact of destroying 945 lineal feet of stream may (or may not) be less than significant, it nevertheless should be mitigated. No mitigation is offered for this impact. Restoring the portion of Arroyo Hondo affected by recent landslide activity would be appropriate mitigation.

99

¹³ ACA documentation at:

<http://www.alamedacreek.org/Historical%20photos/recent%20fish%20documentation/Alameda%20Creek%20salmonid%20documentation%2012-13-06.pdf>

p 4.5-56, Calaveras Replacement Dam. The DEIR states that “No facilities or provisions for fish passage are proposed; therefore, the proposed replacement dam would not change the extent to which fish passage or migration is impeded by the existing dam.” Claiming that there is no effect because the existing condition

100

p 4.5-56, *Impact 4.5-3*. The project would involve re-operation of ACDD at full capacity, which clearly has the potential to affect the movement of sensitive species (*i.e.*, upper Alameda Creek rainbow trout). This effect has a mandatory finding of significance that may be mitigated only through installation of a fish screen at ACDD.

101

Further, the EIR must examine the effects of ACDD and Calaveras Dam re-operation on movement and migration opportunities downstream of these facilities (including in the Extended Study Area). The proposed diversion rate of approximately 86 percent of unimpaired flow has the potential to create an impact with a mandatory finding of significance. The EIR does not address the effect of diversions on downstream passage conditions; the “no impact” designation therefore is inadequate, as is the lack of mitigation for this significant unavoidable impact.

102

An adequate evaluation of the impacts of the CDRP on downstream movement and migration of steelhead must also consider the effects of proposed new diversion points in the Sunol Valley, such as is proposed by the SFPUC under the related Upper Alameda Creek Filter Gallery Project. As new facilities to “recapture” instream flow releases will adversely impact passage conditions downstream, they will be subject to a mandatory finding of significance and will conflict with the stewardship policy. Recapture is proposed as part of implementing the 1997 MOU and must be included in the context of the current environmental review. The DEIR does not set forth releases or bypass flows associated with the recapture facility or attempt to evaluate the cumulative effects of the CDRP and recapture facility operations on steelhead migration.

103

p 4.5-57, *Impact 4.5.4*. This section vastly underestimates the potential impacts of Haul Route Option 2, which involves using barges to cross the reservoir. This option would require that a rock-fill jetty up to 1,000 feet long be constructed along with either a floating dock or two jetties up to 500 feet long. Further, timber or sheet piles would be driven along the jetties, and dredging for access lanes could occur, including materials disposal at sites that would be inundated by reservoir refilling. Finally, six round trips of two boats hauling three 560-ton barges are envisioned. The impacts of these collective activities are dismissed with the analysis that “these effects would be localized and temporary, and the reservoir would provide substantial area for escape.”

104

The reservoir trout population is of unique importance to restoring steelhead to the Alameda Creek watershed, due to its genetic legacy as descended from the original steelhead trout run in the watershed. Potential harm to a population already stressed by reduced reservoir volume must be reduced through more elaborate mitigation than reliance on standard construction BMPs. A plan should be developed in consultation with CDFG to protect the trout population of the reservoir during construction. Appropriate

105

further mitigation could include improving access to suitable stream habitat for this trout population in the portion of Arroyo Hondo affected by recent landslide activity.

105 cont.

p 4.5-60, *Operational Impacts*. Bypass of flows envisioned under the 1997 MOU at the ACDD should not be analyzed as part of this EIR. Rather, since these flows were proposed under a 1997 MOU, the baseline condition includes these bypass flows, regardless of where they are released, and the bypass structure proposed at ACDD is impact-neutral. Proposed operations at ACDD having a continuing impact on entrainment, movement, and habitat for fish should be mitigated by installation of a fish screen and fish ladder at the ACDD, coupled with a new, robust, steelhead-based flow schedule. Facilities and a monitoring program for flow measurement at the ACDD diversion also should be incorporated into the project.

106

The DEIR claims that “The proposed bypass flows would ensure that the flows in Alameda Creek downstream of the ACDD would either be increased or remain unchanged for purposes of supplying adequate fish spawning habitat for resident rainbow trout.” In fact, the CDRP proposes to dramatically decrease the flows in Alameda Creek downstream of the ACDD, compared to baseline conditions.

107

p 4.5-62, *Impact 4.5.5*. The impact discussion relies on a standard of “more predictable and stable” flows to ascribe beneficial impacts to the project. “Stable flows are not necessarily a benefit to fish, particularly if the stable flows are lower post-project than under the baseline. It is universally recognized, including in the SFPUC stewardship policy, that flows that mimic the natural hydrograph are desirable for native fish. The “more predictable and stable” criterion should be discarded unless it can be justified.

108

The DEIR claims that “Over all years, flows would increase on an average annual basis.” In fact, the CDRP proposes to dramatically decrease flows on an average annual basis, compared to baseline conditions.

109

p 4.5-64, *Diversions and Bypass Flows*. This section states that “The bypass flows would occur whenever streamflow is naturally present and therefore would provide more stable and reliable habitat compared to the existing condition, which includes variable periods of flow with no bypasses.” This statement, the crux of the analysis, is inconsistent with a defensible EIR impact approach and should be deleted. For purposes of the EIR, the existing condition is increased bypasses at ACDD because of the DSOD restriction as compared to a proposed future decrease in instream flows without the DSOD restriction. The impacts resulting from re-operation of ACDD should be based on analysis of these flow reductions. Further, bypass flows must legally be provided with or without CDRP implementation, and compliance with existing laws cannot be used to mitigate CDRP project impacts.

110

p 4.5-65, *Channel-Forming Flows*. This section shifts the baseline for analysis to the “longer period of pre-DSOD operation,” seemingly for the sake of attempting to minimize the perceived effects of the project. Also, the statement that the DSOD-restricted period is “too short and too variable to have had a changed effect on channel

111

form” is unsupported and should be deleted. Channel forming occurs on high-flow events. The project proposes to change the high flow event regime. The EIR should quantify the change, evaluate the impacts, and propose suitable mitigations, such as allowing periodic channel-shaping flows. The adopted approach and conclusions are disturbingly unscientific and self-serving.

↑
111 cont.

p 4.5-66, *Redd Scour and Erosion*. This section again implies beneficial impacts from re-operating ACDD that simply don’t occur. The “redd scour hypothesis” as somehow limiting to the trout population of upper Alameda Creek is unsubstantiated, and its use in this context is inappropriate and self-serving. The analysis implies that nature needs help creating habitat in the form of radical alteration of the natural hydrograph. This reasoning is unsupported, and this section of the EIR should be deleted.

112

The DEIR claim that “the more regular diversions and consistent bypass flows whenever flows are naturally present would be expected to contribute to improved reproductive success of those fish spawning within the reach,” is completely false and unsupported. The CDRP proposes reducing flows for spawning as compared to the baseline – to claim that this is a beneficial impact for fish is deceptive and disingenuous.

113

p 4.5-66, *Fish Entrainment at the Diversion Tunnel*. The EIR must discuss the fact that mortality of fish entrained in the diversion tunnel may be significant, and that some of these fish may be *O. mykiss* smolts, that could become steelhead. The DEIR does not discuss the relationship of stream fish to anadromous steelhead populations and the conservation significance of resident rainbow trout.

114

p 4.5-67, *Summary*. This long, tortured “evaluation” of entrainment essentially finds that since the trout population upstream from ACDD is “small and isolated,” it is somehow not subject to protections guaranteed by environmental review processes or the state Fish and Game Code. This section of the report should be deleted, and the project should adopt installing a fish screen at the ACDD that is required for diversions of this size and as mitigation for an impact with a mandatory finding of significance.

115

p 4.5-71, Impact 4.5.6. The DEIR claims that the ETJV report “indicated that the existing hydrologic conditions appear to sustain aquatic habitat in a manner that supports a native fish community, which includes resident rainbow trout, in good condition,” implying that conditions for cold water fish are good under current conditions. In fact, the conclusion of ETJV (2008) was that the warm water native fish community “appears relatively healthy in the reach of Alameda Creek below the Calaveras Creek confluence,” not the rainbow trout or coldwater fish.

116

The rainbow trout population in this reach is decidedly not in good condition. Populations of native resident rainbow trout below the dams, in Alameda Creek and its tributaries in the upper Sunol Valley, are very small, with few to no trout found in most reaches in dry

117
↓

years.¹⁴ These populations are severely constrained by lack of rearing habitat and high summer temperatures,¹⁵ due to lack of minimum flow releases from Calaveras Reservoir. 2007 monitoring of trout (the latest year of published information) found only 4 trout redds and 13 rainbow trout (no more than 3 at one time) in this reach during spawning surveys; and an additional trout during snorkeling surveys. The SFPUC population estimate for rainbow trout in this reach is only 25 fish.¹⁶

117 cont.

p 4.5-73, *Impacts During Filling and Normal Restored Storage Operations*. Again, the CDRP cannot use implementation of the 1997 MOU as a project element for the purposes of evaluating impacts. The EIR also must not shift the baseline from pre-DSOD restriction to DSOD restriction as it does throughout this section. Flows (even with the minimal proposed bypass flows) would be substantially reduced by the project and the impacts of this reduction must be recognized, evaluated, and mitigated. Further, “reliable and stable” are not standards of significance for flow regimes and this specious metric should be purged from the EIR.

118

p 4.5-75, *Cone Valve section*. The hypothetical trout-death-by-cone-valve scenario culminating with “juveniles...would inevitably die,” while decidedly dramatic, is inappropriate for an environmental review document. If there is a point in this section beyond “ramping will be part of the project,” please state it in the Final EIR.

119

p 4.5-76, *Impact Conclusion*. The claim that reducing instream flows (post-CDRP) is better for fish habitat than leaving them higher (current conditions) is not supported. This impact needs to be thoroughly revisited in a focused EIR section that addresses the inadequacies of the current one. In particular, the project’s impacts on steelhead migration in Little Yosemite, the Sunol Valley and downstream areas, on nursery (rearing) habitat, and on channel-shaping and flushing flows must be adequately characterized and mitigated.

120

p 4.5-76, *Impact 4.5.7*. Please see the comment regarding Impact 4.5.4. Protecting the Calaveras Reservoir trout population is of the utmost importance, and a plan should be developed in cooperation with CDFG that avoids unforeseen construction-period impacts.

121

p 4.5-80, *Impact Conclusion (Impact 4.5.8)*. The EIR inappropriately relies on flows from other portions of the watershed to minimize the magnitude of CDRP effects on hydrology and fish habitat suitability in lower Alameda Creek. As structured, the project proposes zero dedicated outflow as measured at the Arroyo de la Laguna confluence. This flow regime must be compared to the baseline of bypassed ACDD and Calaveras flows which

122

¹⁴ San Francisco Public Utilities Commission. 2000, 2001, 2002, and 2004. Alameda Creek aquatic resource monitoring reports: summer and fall 1998; summer and fall 1999; 2000; 2001; and 2002. Prepared by SFPUC Water Quality Bureau, Sunol, CA.

¹⁵ San Francisco Public Utilities Commission. 2000, 2001, 2002, and 2004. Alameda Creek aquatic resource monitoring reports: summer and fall 1998; summer and fall 1999; 2000; 2001; and 2002. Prepared by SFPUC Water Quality Bureau, Sunol, CA.

Hanson Environmental, Inc. 2002. Air and water temperature monitoring within Alameda Creek. Draft report submitted to the San Francisco Public Utilities Commission. March 30, 2002.

¹⁶ SFPUC. 2009. Alameda Creek Aquatic Resource Monitoring Report 2007.

provide flow at the confluence, a mandatory finding of significance made regarding migration (and potentially nursery) habitat, and meaningful mitigation developed.

↑
122 cont.

p 4.5-80, *Impact 4.5.9*. The EIR must acknowledge the inconsistency of the project and its environmental review as represented in this EIR with the efforts and plans of the Alameda Creek Fisheries Restoration Workgroup. The Workgroup has been the forum for coordinating restoration of steelhead to the watershed, and the CDRP and its EIR conflict with ongoing and planned restoration plans of the non-SFPUC members of the Workgroup.

123

p 4.6-86, *Hydrology Impact Conclusion*. Here and elsewhere the DEIR concludes that “the proposed project would not substantially alter streamflows in Alameda Creek downstream of the ACDD such that they would be outside the range of pre-project conditions and result in substantial hydrologic changes.” On the contrary, the CDRP proposes substantially changing the hydrology of Alameda Creek downstream of the ACDD by resuming ACDD diversions.

124

p 6-28, *Operational Impacts*. This section of the EIR must recognize the cumulative impacts on steelhead related to water supply operations in the upper watershed and propose meaningful mitigation. Rather, the analysis relies on the current inaccessibility of the habitat and associated information limitations to avoid commitment to necessary flow regimes. An appropriate analysis of cumulative fisheries impacts would compare unimpaired and post-project flow regimes, applying relevant (and available) standards of impairment, and proposing post-project flows that account for the habitat needs of all life stages of steelhead.

125

While MOU-related flow releases will begin to provide spawning and rearing opportunities in relatively small portions of the SFPUC-operations-affected areas, as proposed they will not mitigate the cumulative effects of the CDRP and other related SFPUC water supply projects such as the Upper Alameda Creek Filter Gallery Project to less than significant levels. The Final EIR must acknowledge these significant unavoidable impacts or, preferably, reduce the impact level through new flow provisions.

126

Availability of Reference Documents

On November 4, 2009 the ACA sent a representative to the address listed in the DEIR to review the supporting documents and reports referenced in the DEIR, but not posted on the Planning Department web site or included as appendices in the DEIR. The documents that the Planning Department confirmed as constituting the entirety of the references for the DEIR appeared to be missing the following references:

127

Chapter 4.4

#15 Condor Country Consulting. 2008. CTS Survey Report.

#18 EBRPD. Unpublished data. GIS records.

#25 EDAW & Turnstone Joint Ventures. 2007. Unpublished data. CRLF, CTS, and FYLF data from Arroyo Hondo.

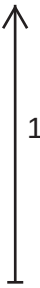
↓

#xx Hanson Environmental Inc. 2002. Air and water temperature monitoring within Alameda Creek.

#xx SFPUC. Unpublished data. Incidental wildlife sightings.

#xx EDAW. Unpublished data. CRLF and CTS habitat assessment for the Calaveras Dam Replacement.

#xx EDAW. Unpublished data. Spring 2006 and 2007 breeding bird surveys for the Calaveras Dam replacement.



127 cont.

cc: Ron Miguel
Commission President
San Francisco Planning Commission
600 DeHaro Street
San Francisco, CA 94107

Ed Harrington
General Manager
San Francisco Public Utilities Commission
1155 Market Street, 11th Floor
San Francisco, CA 94103

San Francisco Public Utilities Commission
City Hall, Room 400
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

San Francisco Board of Supervisors
1 Dr. Carlton B. Goodlett Place, Room 224
San Francisco, CA 94102

Keith Lichten
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Lippe Gaffney Wagner LLP www.lgwlawyers.com

SAN FRANCISCO • 329 Bryant St., Ste. 3D, San Francisco, CA 94107 • T 415.777.5600 • F 415.777.9809
SACRAMENTO • 9333 Sparks Way, Sacramento, CA 95827 • T 916.361.3887 • F 916.361.3897

O-ACA&CBD2

Thomas N. Lippe
Brian Gaffney
Keith G. Wagner
Jennifer L. Naegele
John H. Curran
Celeste C. Langille
Kelly A. Franger

December 21, 2009

Sent via e-mail and facsimile

San Francisco Planning Department
Attn: Mr. Bill Wycko
1650 Mission Street, Suite 400
San Francisco, CA 94103
415 558 6409 FAX

US Army Corps of Engineers
San Francisco District, Regulatory Division
Attn: Mr. Bob Smith
1455 Market Street
San Francisco, CA 94103-1398

Dear Mr. Wycko and Mr. Smith,

This office represents the Alameda Creek Alliance and the Center for Biological Diversity in regards to the Calaveras Dam Replacement Project Draft Environmental Impact Report ("DEIR").

For the reasons below, this DEIR is inadequate under CEQA, and thus prevents informed public participation and decision making. Because of these inadequacies it would not be proper for the Army Corps to rely on the DEIR in preparing its draft Environmental Impact Statement until and unless these inadequacies have been corrected.

Please continue to include both this office, the Alameda Creek Alliance (P.O. Box 2626, Niles, CA 94536) and the Center for Biological Diversity (351 California Street, Suite 600, San Francisco, CA 94104-2404) in any further communications to the public on the proposed Calaveras Dam Replacement Project ("project"). In particular, please provide us with a copy of the Final Environmental Impact Report for this project. Thank you for your careful consideration of these comments.

Sincerely yours,

Brian Gaffney

cc: Jeff Miller

I. THE DRAFT EIR VIOLATES CEQA**A. California Environmental Quality Act (CEQA) Requirements**

“The foremost principle under CEQA is that the Legislature intended the act “to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language. It is, of course, too late to argue for a grudging, miserly reading of CEQA. The Legislature has emphasized that ‘It is the intent of the Legislature that all agencies of the state government which regulate activities . . . which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage. . . . The Legislature has made clear that an EIR is an informational document and that the purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project. . . . Before approving the project, the agency must also find either that the project’s significant environmental effects identified in the EIR have been avoided or mitigated, or that unmitigated effects are outweighed by the project’s benefits.” (*Laurel Heights Improvement Association v. University of California* (1988) 47 Cal.3d 376, 390 - 391 [citations and internal quotes omitted].)

An EIR is an environmental alarm bell whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return. The EIR is also intended to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action. Because the EIR must be certified or rejected by public officials, it is a document of accountability. If CEQA is scrupulously followed, the public will know the basis on which its responsible officials either approve or reject environmentally significant action, and the public, being duly informed, can respond accordingly to action with which it disagrees. The EIR process protects not only the environment but also informed self-government. (*Id.* at 392.)

These principles must guide the EIR in order for it to be legally valid. Specifically, the EIR must analyze (a) significant environmental effects of the proposed project, (b) significant environmental effects which cannot be avoided if the proposed project is implemented, (c) significant irreversible environmental changes which would be involved in the proposed project should it be implemented, (d) growth-inducing impact of the proposed project, (e) the mitigation measures proposed to minimize the significant effects, (f) alternatives to the proposed project. See Appendix A attached hereto.

B. The DEIR Fails to Include an Adequate Project Description.

An EIR must include “a general description of the project’s technical, economic and environmental characteristics, considering the principal engineering proposals if any and supporting

public service facilities.” (CEQA Guideline 15124(c).)¹ An EIR must include an “accurate” project description of the project’s technical and environmental characteristics. (*County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193; CEQA Guideline 15124.) The “project” is the “the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.” (Pub. Res. Code § 21065; CEQA Guideline 15378(a).) All phases of a project must be considered when evaluating its impact on the environment: planning, acquisition, development, and operation.

The Draft EIR’s project description does not specify if the Calaveras Reservoir will be drained during the construction phase.

01

The Draft EIR’s project description contains no disclosure of the volume and timing of operation-phase water diversions that will be split between the Sunol Valley Water Treatment Plant, the San Antonio Reservoir, or released into Calaveras Creek, or on what criterion the SFPUC will make such decisions. Therefore, the DEIR does not analyze how impacts will change based on where water is sent.

02

The DEIR’s project description states (DEIR p. 3-65) that there would be a decrease in average annual diversions from Alameda Creek compared to diversions under current DSOD-restricted operations, but does not disclose the volume of the diversions.

03

The DEIR project description vaguely claims (DEIR p. 3-65) that additional releases from Calaveras Reservoir will support native fishes pursuant to the 1997 MOU, but this is a conclusion that is not supported by DEIR analysis. Nor does the project description provide the dates when such releases would commence, nor what are the “periods when colder water is needed in Alameda Creek,” nor “when flows are not available at the ACDD.”

04

The DEIR should define how much of the flow releases will come from the ACDD bypass tunnel and how much will come from the Calaveras Dam to meet flow and temperature requirements, particularly in summer. The DEIR vaguely offers that the flow releases will be consistent with the MOU, but doesn’t state exactly what the flow releases will be.

05

The DEIR does not disclose the location of the new roads that will be created for the DEIR construction phase. Haul roads that would be used for two-way traffic will be 30 to 40 feet wide (DEIR p. 3-54), and yet the DEIR fails to disclose where these roads will be. Without this information the DEIR can not fully analyze project impacts to terrestrial plant and animal species. For example, the location of the west haul road is disclosed and that road may impact nesting bald eagles. In addition, disclosure of the location of the new roads is necessary to analyze the water quality impacts of proposed submergence of roads when the reservoir is filled. (DEIR p. 1-22.) The absence of such project description is startling given that the Army Corps’ Notice No. 29997S claims that the SFPUC has worked closely with the Corps of Engineers, the U.S. Fish and Wildlife

06

¹ The CEQA Guidelines are located in Title 14, California Code of Regulations. Great weight must be afforded the CEQA Guidelines. (*Laurel Heights Improvement Assn v. Regents of University of California* (1988) 47 Cal.3d 376, 391, fn.2.)

Service, the California Department of Fish and Game, and the San Francisco Bay Regional Water Quality Control Board to locate and design roads to avoid or minimize potential impacts to wetlands and other waters.

The Army Corps' Public Notice No. 29997S describes three gradient control structures being included as part of the proposed project, apparently in conjunction with the discharge channel. The DEIR does not include "gradient control structures" as part of the project description, and thus there is no analysis of the impacts of such structures on fish and fish migration.

07

C. The Baseline for Analysis of Environmental Impacts is Too Limited

An EIR must present an accurate, complete description of the environmental setting in the vicinity of the project as it existed before commencement of the project. (*San Joaquin Raptor/Wildlife Resource Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 722.) A complete description of the "pre-existing environment" (*id.* at 723) is critical to establish a baseline for analyzing whether the project's impacts are significant. (*County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 952; CEQA Guidelines 15125 & 15126.2(a).) The environment consists of the "physical conditions which exist within an area which will be affected" by a project. (Pub. Res. Code §21060.5.) As the *County of Amador* court reasoned, "the question is whether the EIR contains a sufficient description of the baseline environment to make further analysis possible." (*Id.* at 954.)

The DEIR claims that "the existing *interim* lowered water level is the baseline (existing condition) for impact assessment." (DEIR p. 1-8, emphasis added.) However, the DEIR does not *consistently* use the existing interim lowered water level as the environmental setting. For example, the DEIR changes the baseline to pre-DSOD conditions in analyzing impacts of channel-forming flows (DEIR p. 4.5-65), sediment sluicing (DEIR p. 4.5-66), effects below Calaveras Dam (DEIR p. 4.5-71), and spill events (DEIR p. 4.5-75). The DEIR also uses "the approximate 70-year period prior to DSOD restrictions" in analyzing the ACDD's 1) diversion rate, 2) injury/mortality, 3) summary, and 4) impact conclusion. (DEIR pp. 4.5-67 through 4.5-70.)² Notably, in abandoning the DSOD restricted baseline (2002 to present) the DEIR reasons that this period is "likely too short and too variable." (DEIR p. 4.5-65.)

08

Because the DSOD restricted baseline is "likely too short and too variable," the proper environmental setting for analyzing impacts to fisheries and to water quality should also include pre-DSOD conditions and pre-dam conditions. Such comparisons would give the public, responsible agencies and decision makers the proper bases for comparison of project impacts, particularly in regards to the impacts on native resident fish of 1) various flow regimes, 2) barriers to movement,

² Likewise, when explaining the project purpose, the DEIR states that it is to "to replace the existing dam with a new dam to accommodate a public water supply reservoir of the same size as the original plans (96,850 AF). However, the existing dam has a capacity of 38,100 AF; it has not had a capacity of 96,850 AF for over 80 years. (DEIR p. 3-6.) Even before the DSOD restrictions, the existing dam capacity was 92,000 AF.

and 3) water quality changes.³ Only in this way can the DEIR fulfill its function of demonstrating “that the significant environmental impacts of the proposed project were adequately investigated and discussed” and “permit the significant effects of the project to be considered in the full environmental context.” (CEQA Guideline 15125(c).)

08 cont.
[+see fn
below]

D. The DEIR Fails to Adequately Analyze Impacts.

The DEIR must discuss “*all* significant effects on the environment.” (Pub. Res. Code §21100(b)(1), emphasis added.) Both direct and *indirect* effects “shall be clearly identified and described, giving due consideration to both the short-term and long-term effects . . . including relevant specifics of the area, the resources involved, physical changes, and alterations to ecological systems.” (CEQA Guideline 15126.2(a); 15064 (d).)

The DEIR sets a criteria (p 4.5-52) that the project would have a significant effect if it would have a substantial adverse effect on any sensitive, or special-status species. The native rainbow trout are such sensitive species. Yet, as discussed below, the DEIR fails to properly analyze the construction impacts within the Calaveras Reservoir on these species.

09

The DEIR sets a significance criteria (p 4.5-52) that the project would have a significant effect if it conflicts with any local policies or ordinances protecting fisheries or aquatic resources. Under CEQA, the DEIR should also discuss all inconsistencies between the proposed project and applicable general plans and regional plans, including water quality control plans. (CEQA Guideline 15125(d).)

10

- The DEIR fails to analyze whether and how the project conflicts with Fish & Game Code section 5901.
- The DEIR fails to analyze whether and how the project conflicts with Fish & Game Code section 5937, summarily concluding that “[f]lows established in a 1997 agreement between CDFG and the SFPUC, and as implemented through the proposed project, are intended to comply with this requirement.”
- The DEIR fails to analyze whether and how the project conflicts with protective rules under section 4(d) of the Endangered Species Act governing take for listed Central California Coast steelhead trout. (65 FR 42422; and 70 FR 37160.)
- The DEIR fails to analyze whether and how the project conflicts with the SFPUC Watershed Stewardship Policy.
- The DEIR fails to analyze whether and how the project conflicts with Water Code sections 6500, 5933, and 6020 through 6028.
- The DEIR doesn’t analyze if the construction shutdowns of the Reservoir outlet works violate the 1991 MOU minimum cold water pool requirement of 30,000 AF in the reservoir

11

12

13

14

³ Using an environmental baseline before DSOD restrictions were put into place in 2002 would not be technically difficult. The SFPUC has all the relevant data. For example, Figure 4.6.15a presents flow in Alameda Creek downstream of the Calaveras Creek confluence from 1920 through 1959. Figure 4.6.11b presents Calaveras Reservoir Storage and Releases to Calaveras Creek from 1960 through 2002. Figure 4.6.16 details the predicted changes in flow in Alameda Creek at the Niles gage over an 8-year period extending back to 2000. (DEIR p. 4.5-78.)

08 cont.

↑
14 cont.

from July through late October.

The DEIR sets a criteria (DEIR p. 4.5-52) that the project would have a significant effect if it interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. The DEIR fails to analyze how the proposed project interferes with movement of native rainbow trout. This is important as the project will need California Department of Water Resources, Division of Safety of Dams construction approval, including referral to the Fish and Game Commission per Water Code Section 6500 regarding the need for fish ladders or screens in accordance with Fish & Game Code sections 5933, 6020 – 6028. The DEIR also fails to analyze how the proposed project interferes with use of native wildlife nursery sites.

15

The DEIR fails to properly analyze the extent of project impacts to fish. The DEIR states that its analysis of impacts on fisheries and aquatic habitat focuses on the primary study area. (DEIR p. 4.5-52.) The primary study area in the Alameda Creek corridor terminates downstream at the Arroyo de la Laguna confluence. The extended study area includes the segment of the Alameda Creek main stem from the Arroyo de la Laguna confluence downstream to San Francisco Bay. However, the DEIR provides no rationale for limiting analysis to the primary study area, and downplaying impacts in the extended study area. The DEIR states (DEIR p. 4.5-57) that all fish species present in waterways downstream of construction activities could be adversely affected by construction-related impacts on water quality, but doesn't disclose how far downstream this impact will reach. Defining the extent of the impact is particularly important as the impact of increased temperature and reduced DO (dissolved oxygen) concentrations related to turbidity in the warm low-flow season would be particularly stressful for over-summering fish, including resident rainbow trout.

16

The DEIR also does not analyze impacts to fish as a result of the fact that the construction phase will last 4 years, plus one to several year period to refill the Reservoir. Analysis of potential impacts that takes into account the duration of the construction phase will guide formulation of mitigations and evaluation of mitigation feasibility.

17

The DEIR discloses that construction of barge-related facilities in the reservoir (e.g., possible piles, mooring structures) associated with Haul Route Option 2 would "harass and displace" (DEIR p. 4.5.-58) fish present during construction, but the DEIR doesn't disclose if this will be a significant impact, thus avoiding use of the EIR's own significance threshold. Instead, the DEIR impermissibly avoids this analysis by stating that impacts will be temporary and mitigated. Without analysis of the extent of the impacts, the public and decision makers can not evaluate proposed relevant mitigations.

18

The DEIR concludes that water quality impacts to fish from excavation and placement of material for construction of the new dam "is not likely to be significant for individuals nor result in a significant adverse impact on fish populations." (DEIR p. 4.5-60.) However, the DEIR does not explain how it reached this conclusion given its statements that 1) "excavation and placement of material for construction of the new dam, including soil from borrow areas, would result in contamination of fish habitat if the material contains any contaminants or elevated substances that could be toxic to fish," 2) contaminants or hazardous naturally occurring asbestos (NOA) in

19
↓

sufficient concentrations “could be harmful to sensitive fish and aquatic species,” and 3) “exposure of fish to natural asbestos fibers in the water related to project construction could potentially have adverse effects on [fish] health.” (DEIR p. 4.5-59.)

19 cont.

The DEIR (DEIR p. 1-18) states that operation of the ACDD bypass would be the primary means of providing flow releases for fish, when sufficient flows are present in Alameda Creek. The DEIR must define what constitutes sufficient flow and also analyze impacts when sufficient flows are not present.

20

In discussing construction impacts to fish downstream of the Calaveras Reservoir in the extended study area, the DEIR concludes that “impacts in the extended study area are anticipated to be less than significant.” (DEIR p. 4.5-60.) However, there is no analysis to support this conclusion. The DEIR avoids any analysis of construction impacts to fish in the extended area. DEIR section 4.5.8 is limited to the effects of project *operations* on native fish in Alameda Creek in the extended study area, not construction impacts. Moreover, there is no analysis to support the DEIR’s assertion that construction impacts over a 5-plus year construction phase will be “relatively localized” or why localized impacts will not have adverse potentially significant impacts in the extended study area. In addition, the DEIR treats the extended study area as solely occurring 9.3 miles miles downstream from the construction area, when this is only the terminus of the extended study area.

21

In discussing DEIR flow as compared to existing conditions, the DEIR is vague as to whether claimed “greater” or “increased” refers to flow volume or flow frequency, thus impairing understanding impacts of the proposed DEIR.⁴

22

The DEIR concludes that the “project is expected to have a less than-significant impact on water quality within Alameda Creek with respect to all water quality parameters,” but does not disclose how this conclusion was reached. (DEIR p. 4.5-64.) Elsewhere, the DEIR acknowledges that the project would affect water quality parameters in Calaveras Reservoir, including temperature, DO, and nutrient levels. (DEIR p. 4.7-61.) Likewise, regarding settleable materials, suspended materials, and turbidity, the DEIR notes that operations would result in slightly higher sediment loads in Alameda Creek during dry years, and from March to June of all other years, because of bypass flows from the ACDD. (DEIR p. 4.5-64.) The DEIR does not explain why it claims that project “releases are expected to contribute only minimally to overall suspended sediment load and turbidity,” given that “[d]uring dry and critical years as well as from March through June of all year

23

⁴ Compare DEIR p. 4.5-61 (The post-2002 flows in Alameda Creek downstream of the ACDD, while extremely variable depending on whether or not diversions were being made, have generally been *greater* than they were prior to the DSOD restrictions (2002)) with DEIR p. 4.5-62 (Diversions from Alameda Creek to Calaveras Reservoir during the baseline period, at times, eliminated the low and moderate (1 to 650 cfs) flows in Alameda Creek downstream of the ACDD and did not include any predictable bypass flows for fish species) and DEIR p. 4.5-62 (The proposed bypass flows would ensure that the flows in Alameda Creek downstream of the ACDD would either be increased or remain unchanged for purposes of supplying adequate fish spawning habitat for resident rainbow trout.)

22

types, more water would be bypassed through the ACDD to Alameda Creek, which could result in short-term increases in settleable materials, suspended materials, and turbidity. (*Ibid.*; DEIR p. 4.7-67.) The absence of an explanation violates CEQA as the DEIR sets a criteria that water quality impacts will be significant, *inter alia*, if water quality 1) violates any water quality standards or waste discharge requirements, or 2) otherwise substantially degrades water quality.

23 cont.

In concluding that DEIR operations would have a less-than significant effect on channel-forming flows in the reach of Alameda Creek between the ACDD and the Calaveras Creek confluence, the DEIR fails to compare the project to the stated environmental baseline. Instead, the DEIR abandons the environmental baseline period of DSOD-regulated operations claiming, perhaps legitimately, that this period is “likely too short and too variable.” (DEIR p. 4.5-65.) Moreover, the DEIR does not explain how it reached this conclusion of insignificance given its statement that “[p]roject-related diversions and bypasses at the ACDD would also alter the frequency and magnitude of channel-forming flows that support geomorphic processes within the creek.” Most importantly, the DEIR fails to analyze what the impact on fish will be from the DEIR’s change in channel forming flow.

24

In discussing effects of sediment sluicing, the DEIR acknowledges that the DEIR “would result in increased diversion of sediments (entrained in the water) to Calaveras Reservoir” and that “the proposed diversion of flows from the ACDD would maintain the potential to transport large volumes of sediment in large storm events.” (DEIR p. 4.5-65 to -66.) However, the DEIR omits any analysis of these DEIR changes to fish, including but not limited to native rainbow trout in the Calaveras Reservoir.

25

The DEIR fails to analyze the impacts to native fish *in the Reservoir* during the two shutdowns planned to occur over seven month periods in two consecutive years (approximately mid-April to mid-November in either 2011 and 2012 or 2012 and 2013). This is particularly important as the rainbow trout juvenile rearing periods are from March through November/December each year. Stranded fish, particularly juveniles, would be exposed to predators and increasing water temperatures, poor water quality, or the drying out of these areas. They would inevitably die from lack of water.

26

Effects on native fish *below Calaveras Dam*, also suffers from a lack of analysis. The DEIR states that during construction the flow release schedule would not change substantially, *except* “as diminished by water quality” and “two planned shutdown periods.” (DEIR p. 4.5-72.) However, there is no analysis of impacts to native fish or geomorphic processes during these shutdown periods or “as diminished by water quality.” Nor is there any analysis of impacts in the extended study area during these shutdown periods.

27

The DEIR states that during periods when there would be no releases, “all flow in Calaveras Creek downstream of the dam would come from Calaveras Dam seepage” and that such seepage alone “would provide hydrologic conditions that sustain the fish community” and thus there would be no significant impact. This conclusion may well be correct, but there is insufficient explanation of how the DEIR reached this bald conclusion. The DEIR does not disclose what is the CFS from such seepage during various times of the year, whether these seepages will last through the 4-plus year construction period, and what mitigations are available if the seepage does not sustain the fish

community.

The DEIR states that operation period cone valve testing “events would occur at a similar or slightly increased frequency, duration, and magnitude” (DEIR p. 4.5-75), but doesn’t disclose the frequency, duration, and magnitude of such events, thus impairing its analysis of fish impacts and the public’s understanding of the proposed DEIR.

 28

While the DEIR states (DEIR p. 4.5-79) that specifics regarding the frequency, magnitude, and duration of future ACWD diversions are unknown, the DEIR has a duty to include information regarding future ACWD diversions that is reasonably available and to provide reasonable estimates if possible.

 29

The DEIR states that during construction, the “water quality conditions in the reservoir created by the low water levels are not ideal for some fish species” (DEIR p. 4.5-76), but fails to disclose if such impacts will be adverse or significant, or which fish species will be affected.

 30

The DEIR states that “[d]uring project construction, no change from the existing condition would occur (i.e., project related operation reservoir surface elevations would not change the extent to which the drawdown condition creates fish passage limitations)” (DEIR p. 4.5-77), but does not include the two 7-month shutdown periods as part of its analysis.

 31

The DEIR states that diversions by ACWD would further affect flows in the portion of Alameda Creek within the extended study area (i.e., at the mouth of Niles Canyon and lower Alameda Creek), but doesn’t disclose if these affected flows will be adverse or significant. (DEIR p. 4.5-80.) Likewise, the DEIR states that these predicted changes in the flow regime could result in associated small changes in habitat, but doesn’t disclose if these changes are adverse or significant. Instead, the DEIR reasons that these changes would be diminished by operations of other water entities, but doesn’t discuss what these other operations are or by whom. (DEIR p. 4.5-80.)

 32

The DEIR discloses that “Borrow Area E, Disposal Site 5, access roads, and biological mitigation areas would be located on SFPUC lands in Santa Clara County on lands designated as “Other, Public Lands” under the *Santa Clara County General Plan*.” (DEIR p. 4.5-80.) However, the DEIR does not discuss whether the DEIR conflicts with the *Santa Clara County General Plan*, including Policy R-RC 19 protection of areas of functioning, intact natural ecosystems as well as areas known to support special-status species. For example, there is no discussion of DEIR impact on “functioning, intact natural ecosystems.” Likewise, the DEIR does not analyze potential conflict with the proposed HCP for incidental take of listed species that may result from SFPUC operations in the watershed. These omissions violate CEQA as the DEIR has set a criteria that the project would have a significant effect if it conflicts with any local policies or ordinances protecting fisheries or aquatic resources.

 33

The DEIR’s discussion of conflicts with local policies and ordinances concludes that with implementation of mitigations, the potential impacts on fisheries and aquatic habitat would be less than significant (DEIR p. 4.5-82), but this approach is wrong. Under CEQA the DEIR must first determine if the impacts are significant and why, and then formulate appropriate mitigations.

The DEIR (p. 1-18) states that groundwater encountered during the excavation of the foundation would be treated as necessary, then discharged to Calaveras Creek. The DEIR also states that “[d]ewatering is expected to be necessary at Borrow Area E/Disposal Site 5, Disposal Site 3, and Disposal Site 7. Water produced during construction dewatering could contain sediments and contaminants that could degrade water quality if the water were discharged directly to surface water or if it infiltrated to groundwater.” (DEIR p. 4.7-37.) However, the DEIR must include analysis of these impacts; it is improper to defer the analysis – particularly where the EIR has adopted water quality significance criteria where the project 1) violates any water quality standards or waste discharge requirements, or 2) otherwise substantially degrades water quality.

34

The DEIR fails to analyze the indirect impacts of importing sand and gravel for construction from off-site areas. (DEIR p. 1-27.) Importing off-site materials (sand and gravel) for dam construction would start in winter 2012 and would last about 18 months. (DEIR p. 3-61.)

35

The DEIR fails to analyze project impacts from algae blooms and reduced DO (dissolved oxygen), despite the DEIR’s water quality significance criteria of 1) violations of any water quality standards or waste discharge requirements, and 2) otherwise substantially degrade water quality. This despite the DEIR acknowledging (p. 4.5-57) that reduced DO concentrations can be expected from the construction phase. This analysis is particularly important as a project objective is to “limit algal growth in the reservoir.” (DEIR p. 1-8.) Sediment plumes would add nutrients to the lowered reservoir pool and could thereby increase algal growth. (DEIR p. 4.7-28.) Low dissolved oxygen also is deleterious to fish. Under the right conditions, algae caused by dam conditions can create microcystin toxins from toxic cyanobacteria (blue-green algae) *Microcystis aeruginosa* (“MSAE”). Such toxins can represent a substantial threat to human and animal health, including potential impacts to nervous systems and/or liver damage. In the presence of adequate nutrients, this change from a riverine to a lake environment provides ideal growing conditions for toxigenic blooms of the bluegreen alga *Microcystis aeruginosa* (MSAE).

36

E. Inadequate Analysis of Cumulative Impacts.

An EIR must adequately analyze and discuss significant cumulative impacts of the project. (*Laurel Heights I, supra*, 47 Cal.3d at 394; CEQA Guideline 15130.) A mandatory finding of significance is required if the possible effects of a project are individually limited but “the incremental effects of an individual project are considerable when viewed *in connection with* the effects of past projects, the effects of other current projects, and the effects of probable future projects.” (Pub. Res. Code § 21083(b); CEQA Guideline 15065(c), emphasis added.)

The DEIR’s analysis of cumulative fish impacts appears to examine water quality, but not water volume nor fish passage.

37

In regards to consideration of past projects, the cumulative impacts analysis must at a minimum (1) “consider the proposed project in the context of a realistic historical account of relevant prior activities,” (2) actually discuss the combined effects of the project in combination with past, present and future projects and (3) not merely “catalogue current conditions.” (*Environmental Protection and Information Center v. California Department of Forest and Fire Protection* (2008) 44 Cal.4th 459.) One relevant activity that the DEIR conspicuously avoids considering is the

38

Calaveras Dam's non-compliance with the 1997 MOU. That non-compliance has resulted in 6,300 AF of water per year that has not released for the past twelve years (since 1997).

38 cont.

If "streamflows and the related fisheries habitat conditions in the extended study area are strongly influenced by operation of other water projects in the watershed including Del Valle Reservoir and water deliveries to the Alameda County Water District (ACWD) from the South Bay Aqueduct via Vallecitos Creek," as the DEIR claims (DEIR p. 4.5-2) then these related projects must be included in the cumulative impact analysis as present projects.

39

The DEIR must also analyze all reasonably foreseeable projects as part of its cumulative impact analysis including, but not limited to, the following:

40

- The proposed recapture facility, which is another project being considered downstream. The cumulative impact discussion should include impacts on Steelhead including whether the proposed recapture facility will adversely effect steelhead migration, breeding, feeding, and sheltering.
- Future increased water supply demands on flow rates must be included as part of this EIR's cumulative impact analysis, including the impact on species including but not limited to salmonids, steelhead and native rainbow trout. This is important given that the DEIR (p. 1-4 to 1-5) states that under the WSIP, the 2018 water supply is only an "interim mid-term planning horizon for its water supply strategy" and that the SFPUC will consider a decision regarding long-term water supply after 2018 and through 2030. Even if "the size and design" of the WSIP facility improvement projects would not change as a result of increased water supply demands, such reasonably foreseeable future expansion may impact flow releases and thus fish, water quality and geomorphic processes.
- Similarly, the cumulative impacts analysis must include impacts that may result from increases in deliveries from the SFPUC watersheds over the total average annual of 265 mgd in the event that conservation, recycled water, and groundwater projects are not completed prior to the increase in customers' demand. (DEIR p. I-5.)
- The cumulative impact analysis must also include that enlargement of the dam is a reasonably foreseeable project given that the DEIR' stated project objectives include constructing a new dam "that could accommodate potential enlargement by future generations." (DEIR p. 1-8, 1-13.)

41

42

F. The DEIR Fails to Adequately Analyze Mitigations

In addition to assessing a project's significant and cumulative impacts, an EIR is also required to set forth and analyze mitigation measures to eliminate or minimize each significant impact. (§§ 21002, 21002.1(a) & (b); CEQA Guidelines §§ 15126(e), 15126.4.) Mitigations must be designed to minimize, reduce, rectify or compensate for the project's impacts. (CEQA Guideline § 15370.) Analyzing "the manner in which [the] significant effects can be mitigated or avoided" is one of the main functions of an EIR. (§ 21002.1(a).) As with all aspects of an EIR, the discussion of mitigation measures must be "prepared with a sufficient degree of analysis to provide

decisionmakers with information which enables them to intelligently take account of environmental consequences. . . . The courts have looked. . . for adequacy, completeness and a good faith effort at full disclosure.” (CEQA Guideline § 15151.)

The DEIR fails to analyze the feasibility of Mitigation Measure 5.5.1, nor is there a performance standard to evaluate success. Further, the DEIR does not analysis impacts to native fish from the proposed mitigation’s capture, transport and relocation of fish.

43

The DEIR fails to define the standard that will trigger implementation of Measure 5.5.5b (Resident Rainbow Trout Adaptive Management). The DEIR only vaguely states that “[i]f monitoring indicates that this measure does not sustain the resident trout fishery in this reach, then the SFPUC shall implement” Measure 5.5.5b.

44

Measure 5.5.5b does not specify the quantities of water by which it will “modify the flow release schedules,” or what will be the “seasonal restrictions on Alameda Creek diversions” in order to protect the downstream resident trout fishery during the spawning period (December 1 through April 30).” The DEIR impermissibly defers this analysis.

The DEIR does not explain how or why Mitigation Measure 5.7.1 will 1) reduce construction turbidity impacts, and 2) mitigate displacement and harassment impacts, and 3) mitigate construction contaminant and NOA impacts on resident rainbow trout and the larger fish community to less than significant.

45

The DEIR fails to analyze the water quality impacts of applying water to roads for dust control.

46

The DEIR fails to properly mitigate construction phase water quality,⁴⁷ hydrology⁴⁸ and fish impacts.

49

APPENDIX A

OVERVIEW OF NATIONAL ENVIRONMENTAL POLICY ACT AND CALIFORNIA ENVIRONMENTAL QUALITY ACT REQUIREMENTS FOR A LEGALLY SUFFICIENT EIS/EIR

I. PURPOSE OF NEPA AND CEQA.

The fundamental purpose of both NEPA and CEQA is to foster informed public participation and informed decisionmaking. To that end, NEPA regulations state that:

NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA. . . . NEPA's purpose is not to generate paperwork . . . but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental policy. (40 C.F.R. § 1500.1(b) (emphasis added).)

Further, federal agencies must “use all practicable means . . . to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions on the quality of the human environment.” (40 C.F.R. § 1500.2(f).)

Similarly, a fundamental CEQA policy is to ensure that “public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would avoid or substantially lessen the significant environmental effects of such projects.” (Cal. Pub. Res. Code § 21002.) CEQA also is designed to “ensure that fish and wildlife populations do not drop below self-perpetuating levels,” as well as to protect a host of other environmental values. (Cal. Pub. Res. Code § 21001(c).) To this end, CEQA procedures are designed to “assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.” (Cal. Pub. Res. Code § 21002; see also 14 Cal. Code Regs. § 15002(a).) The CEQA process is also designed to “demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.” (14 Cal. Code Regs. § 15003(d).) Importantly, CEQA must be interpreted in a manner which affords “the fullest possible protection to the environment within the reasonable scope of the statutory language.” (14 Cal. Code Regs. § 15003(f).)

II. GENERAL REQUIREMENTS FOR AN EIS/EIR.

The primary purpose of an EIS “is to serve as an action-forcing device” to insure that the policies and goals of NEPA “are infused into the ongoing programs and actions of the Federal Government.” (40 C.F.R. § 1502.1.) NEPA regulations also require an EIS to be supported “by evidence that the agencies have made the necessary environmental analysis.” (40 C.F.R. § 1500.2(b).) Similarly, the primary purposes of an EIR is to protect the environment, to demonstrate to the public that it is being protected, and to inform other governmental agencies and the public of the environmental impact of a proposed project. (14 Cal. Code Regs. § 15003.)

A. The EIS/EIR Must Include a Complete and Accurate Project Description.

NEPA requires an EIS to specify the “purpose and need” to which the agency is responding in proposing the federal action and alternatives to that action. (40 C.F.R. § 1502.12.) NEPA also requires an EIS to analyze actions that are connected to the proposed project. The regulations define “connected actions” as those that: (1) will automatically trigger other actions which may require an EIS; (2) cannot or will not proceed unless other actions are taken previously or simultaneously; or (3) are interdependent parts of a larger action and depend on the larger action for their justification. (40 C.F.R. § 1508.25(a)(1).)

Likewise, CEQA requires an EIR to include a complete and accurate project description. The project description must include: (1) the precise location and boundaries of the proposed project depicted on a detailed map; (2) a statement of the project’s objectives; (3) a general description of the project’s technical, economic, and environmental characteristics; and (4) a statement regarding the intended uses of the EIR. (14 Cal. Code Regs. § 15124.) An inaccurate, misleading, or curtailed project description prevents the public and the decisionmaking agency from adequately evaluating this project’s environmental effects. (See *County of Inyo v. City of Los Angeles*, 71 Cal. App. 3d 185, 192-193 (1977) (an “accurate, stable and finite project description is the sine qua non of an informative and legally sufficient” environmental analysis).)

Like NEPA, CEQA prohibits lead agencies from improperly “segmenting” the project into its component parts and subsequently distorting or underestimating the project’s effects. (See *City of Santee v. County of San Diego*, 214 Cal. App. 3d 1438, 1452 (1989) (CEQA requires the project description to include all phases of a proposed action and precludes segmentation); *Laurel Heights Improvement Assn. v. Regents of University of California*, 47 Cal. 3d 376, 393-399 (1988).) In *Laurel Heights*, 47 Cal. 3d at 396, the California Supreme Court stated that:

[w]e hold that an EIR must include an analysis of the environmental effects of future expansion or other action if: (1) it is a reasonably foreseeable consequence of the initial project; and (2) the future expansion or action will be significant in that it will likely change the scope or nature of the initial project or its environmental effects.

B. The EIS/EIR Must Accurately Describe the Environmental Setting.

NEPA requires an EIS to “describe the environment of the area(s) to be affected or created by the alternatives under consideration.” The depth of the discussion must be commensurate with the importance of the impacts of the alternatives on various aspects of the environment. (40 C.F.R. § 1502.15.) “Environment” is interpreted comprehensively to include both the natural and physical environment as well as the relationship of humans to the environment. (40 C.F.R. § 1508.14.)

CEQA requires an EIR to describe the environmental setting or baseline of the project from both a local and regional perspective, with special emphasis being placed on resources that are rare or unique to the region. “Environment” is defined as the physical conditions which exist in the area that will be affected by the project, including land, air, water, minerals, flora, fauna, noise, and objects of aesthetic or historical significance. (Cal. Pub. Res. Code § 21060.5; 14 Cal. Code Regs. § 15360.) The description of environmental setting must also include a discussion of any

inconsistencies between the project and local or regional plans. (14 Cal. Code Regs. § 15125.) The environmental setting must be described in sufficient detail to allow the reader to understand how the project will affect the environment. (*San Joaquin Raptor/Wildlife Rescue Assn. v. County of Stanislaus*, 27 Cal. App. 4th 713 (1994).)

C. Requirements for Alternatives Analysis In An EIS/EIR.

NEPA regulations require an EIS to “rigorously explore and objectively evaluate all reasonable alternatives,” and to explain why alternatives not analyzed were eliminated from detailed consideration. (40 C.F.R. § 1502.14(a).) Consideration of alternatives is the “heart” of an EIS. (40 C.F.R. § 1502.14.) An EIS must evaluate a “reasonable range” of alternatives. The range is dictated by “nature and scope of the proposed action,” and must be sufficient to permit the agency to make a “reasoned choice.” (*Alaska Wilderness Recreation and Tourism v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995).)

The EIS must “devote substantial treatment to each alternative considered in detail so that reviewers may evaluate their comparative merits.” (40 C.F.R. § 1502.14(b).) It also must explain how each alternative will or will not achieve the policies of NEPA and other relevant environmental laws and policies. (40 C.F.R. § 1502.2(d).) The analysis must include the alternative of no action, as well as alternatives not within the federal lead agency’s jurisdiction. (40 C.F.R. § 1502.14(c), (d).) Finally, the analysis must identify the agency’s preferred alternative and include appropriate mitigation measures for each alternative analyzed in detail. (40 C.F.R. § 1502.14(e), (f).)

Similar to NEPA, CEQA requires EIRs to evaluate the “comparative merits” of a range of reasonable alternatives to the proposed project and/or to the location of the project. (14 Cal. Code Regs. § 15126(d).) The alternatives selected for analysis must focus only on those that would avoid or substantially reduce the project’s significant environmental effects, even if these alternatives would impede to some degree the attainment of project objectives or would be more costly. (14 Cal. Code Regs. § 15126(d)(1) and (5), emphasis added.) The range of alternatives selected must “foster meaningful public participation and informed decisionmaking.” (14 Cal. Code Regs. § 15126(d)(5).) As under NEPA, one of the alternatives analyzed must include the “no project” alternative. (14 Cal. Code Regs. § 15126(d)(4).)

The EIR must describe the rationale for selecting the alternatives to be discussed, and identify any alternatives that were rejected as infeasible during the scoping process and why. (14 Cal. Code Regs. § 15126(d)(2).) The EIR’s alternatives analysis must include “sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the proposed project.” (14 Cal. Code Regs. § 15126(d)(3) (emphasis added).) If an alternative would cause one or more significant effects in addition to the proposed project, the EIR must evaluate these impacts but in less detail than those of the proposed project. Finally, the analysis must select an “environmentally superior” alternative. (14 Cal. Code Regs. § 15126(d)(4).)

D. Requirements for Impact Analysis In An EIS/EIR.

1. Cumulative impacts.

An EIS must analyze “cumulative actions, which when viewed together have cumulatively significant impacts.” (40 C.F.R. § 1508.25(a)(2).) Thus, “[w]here several foreseeable similar projects in a geographical region have a cumulative impact, they should be evaluated in a single EIS.” (*Resources Ltd. v. Robertson*, 35 F.3d 1300, 1306 (9th Cir. 1993); see also 40 C.F.R. § 1508.25(a)(3).) “Cumulative impact” is defined in the NEPA regulations as the impact on the environment that results from “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.” (40 C.F.R. § 1508.7.) A federal agency cannot ignore significant impacts by considering the environmental effects of individual projects in isolation from past and reasonably foreseeable future projects. (*Inland Empire Public Lands Council v. Schultz*, 992 F.2d 977, 981 (9th Cir. 1993).)

CEQA similarly requires EIRs to analyze the cumulative impacts of the project under consideration when added to other closely related past, present and reasonably foreseeable future projects producing related or cumulative impacts. (14 Cal. Code Regs. § 15130.) “Cumulative impact” is defined as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” (14 Cal. Code Regs. § 15355.) Cumulative impacts may result from “individually minor but collectively significant actions taking place over a period of time.” (*Id.*) Thus, the fact that a project or an aspect of a project may, in and of itself, have a relatively minor impact does not mean that the project will not have significant cumulative impacts. (See *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 722 (1991).) Such a conclusion was expressly repudiated by the court in *EPIC v. Johnson*, 170 Cal. App. 3d 604, 624-625 (1985):

An adequate cumulative impact analysis under NEPA and CEQA must include several basic components. First, it must list all past, present and reasonably foreseeable future projects (including projects outside of the agency’s control). (40 C.F.R. § 1508.7; 14 Cal. Code Regs. § 15130(b).) The projects discussed must include not only approved projects (whether or not under construction) but projects currently undergoing environmental review. The California Supreme Court held in *Environmental Protection and Information Center v. California Department of Forest and Fire Protection (EPIC)* (2008) 44 Cal.4th 459 that the cumulative impacts analysis must at a minimum (1) “consider the proposed project in the context of a realistic historical account of relevant prior activities,” (2) actually discuss the combined effects of the project in combination with past, present and future projects and (3) not merely “catalogue current conditions.”

Second, CEQA requires the EIR must summarize the expected environmental effects (14 Cal. Code Regs. § 15130(b).) Third, the EIS/EIR must contain a “reasonable analysis” of the anticipated environmental effects of the relevant (Id.) Fourth, CEQA also requires that cumulative impact analyses include “specific reference[s] to additional information” and state where that information is available. (14 Cal. Code Regs. § 15130(b)(2); see also *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 729 (1990) (holding that cumulative impact analysis must be supported by at least some hard data).) Finally, an EIS/EIR must examine “reasonable options” for avoiding or mitigating to insignificance any significant cumulative effects identified in the document. (40 C.F.R. § 1508.25; 14 Cal. Code Regs. § 15130.)

2. Discussion of impacts in general.

NEPA regulations require an EIS to “provide a full and fair discussion of significant environmental impacts” of the proposed action, as well as each alternative. (40 C.F.R. §§ 1502.1, 1502.14, 1502.16(d).) In addition to cumulative impacts, this discussion must address the direct and indirect impacts of the project. (40 C.F.R. § 1502.16(a), (b).) “Direct effects” are those which are immediately caused by the action; indirect effects are those which will be caused by the action at a later time, but which are nevertheless reasonably foreseeable. (40 C.F.R. § 1508.8.) The discussion must also include an analysis of possible conflict between the proposed action and federal, state, regional and local land use plans and policies. (40 C.F.R. § 1502.16(c).)

The discussion of environmental impacts must satisfy a “rule of reason” which requires a “reasonably thorough” discussion of impacts and mitigation measures. (*Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352 (1989).)

CEQA similarly requires an EIR to clearly identify and describe the cumulative, direct and indirect environmental effects of the project, considering both short term and long term effects. The discussion must include: the relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution [and] concentration, human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resources base such as water, scenic quality, and public services. (14 Cal. Code Regs. § 15126(a).)

CEQA requires a lead agency to make a mandatory finding of significance whenever a project has the potential to reduce the number or restrict the range of a rare or endangered species, regardless of whether or not that species is formally listed under the federal and/or state Endangered Species Acts. (14 Cal. Code Regs. §§ 15065, 15380.)

Finally, CEQA requires information and studies regarding project impacts to be provided prior to project approval. (*Sundstrom v. County of Mendocino*, 202 Cal. App. 3d 296, 311 (1988).) In fact, the California Supreme Court has specifically held that, where an environmental review document contains no site-specific data regarding the presence of species, it is an abuse of discretion for an agency to approve the project in the absence of such data. (*Sierra Club v. Board of Forestry*, 7 Cal. 4th at 1236.)

E. Mitigation Measures.

NEPA and CEQA require EIS/EIRs to include measures to avoid or minimize each significant impact identified, including the impacts of alternatives. (40 C.F.R. § 1502.16(h), 1502.14(f); 14 Cal. Code Regs. § 15126(c).) This discussion must distinguish between measures proposed by the project proponent to be included in the project and others that are not included but could reduce adverse impacts if included as conditions of project approval. If several measures are identified to mitigate an impact, the EIS/EIR must discuss the basis for selecting a particular measure, if that is done. Finally, if a mitigation measure itself would cause one or more significant effects in addition to those caused by the proposed project, these effects must also be discussed but in less detail than for the proposed project. (14 Cal. Code Regs. § 15126(c).) In addition, CEQA requires a mitigation monitoring program to be included in the environmental documentation for the project. (Pub. Res. Code § 21081.6)

F. Other NEPA and CEQA Requirements.

1. Growth inducing impacts.

CEQA requires EIRs to “[d]iscuss the ways in which the proposed project could foster economic or population growth, or the construction of additional [development], either directly or indirectly, in the surrounding environment.” (14 Cal. Code Regs. § 15126(g).) NEPA requires a discussion of such growth-inducing impacts as part of its analysis of indirect environmental effects of the proposed action. (40 C.F.R. § 1508.8(b).) A project may have a growth-inducing impact if it may directly remove an obstacle to growth, or if it may encourage other activities that would significantly affect the environment, individually or cumulatively. The EIR must not assume that growth is necessarily beneficial, detrimental or of little significance to the environment. (14 Cal. Code Regs. § 15126(g).)

2. Unavoidable significant effects.

NEPA and CEQA require EIS/EIRs to include a discussion of significant adverse effects which cannot be avoided if the proposal is implemented. (40 C.F.R. § 1502.16.) CEQA further requires the discussion to identify both those effects which cannot be mitigated and those which can be mitigated, but not to a level of insignificance. (14 Cal. Code Regs. § 15126(b).) In addition, if certain significant impacts cannot be alleviated without requiring an alternative project design, the EIR must discuss the implications of the impacts and the reasons why the project is being proposed despite them. (Id.)

3. Effects found to be insignificant.

CEQA requires an EIR must discuss environmental effects that were found to be insignificant and why. (14 Cal. Code Regs. § 15128; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus*, 27 Cal. App. 4th 713 (1994).)

4. Irreversible and irretrievable commitments of resources.

Both NEPA and CEQA require an EIS/EIR to discuss any irreversible or irretrievable commitments of resources which would be involved if the proposal is implemented. (40 C.F.R. § 1502.16; 14 Cal. Code Regs. § 15126(f).)

December 14, 2009

Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Robert Smith
Regulatory Division
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103

Ron Miguel
Commission President
San Francisco Planning Commission
600 DeHaro Street
San Francisco, CA 94107

Ed Harrington
General Manager
San Francisco Public Utilities Commission
1155 Market Street, 11th Floor
San Francisco, CA 94103

San Francisco Public Utilities Commission
City Hall, Room 400
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

San Francisco Board of Supervisors
1 Dr. Carlton B. Goodlett Place, Room 224
San Francisco, CA 94102

Comments on Calaveras Dam Replacement Project

The undersigned 46 Bay Area conservation organizations submit these comments on the Draft Environmental Impact Report (DEIR) for the San Francisco Public Utilities Commission (SFPUC) Calaveras Dam Replacement Project in the Alameda Creek watershed.

Alameda Creek is a regional asset with significance for restoration of steelhead trout in the greater San Francisco Bay Area. Due to ongoing restoration efforts over the past decade, Alameda Creek is becoming a stream restoration success story. Numerous fish passage projects downstream of SFPUC dams have been completed since 2001 and several major fish ladder and dam removal projects will be completed by the time Calaveras Dam is rebuilt. The completion of these projects will allow anadromous fish to

access approximately 20 miles of suitable spawning and rearing habitat in upper Alameda Creek for the first time in almost half a century.

Our organizations support the SFPUC rebuilding Calaveras Dam as quickly as possible to benefit public safety, ensure a reliable water supply, and enhance fish habitat. However, before we can support the project, the major issue that needs to be resolved is how the SFPUC will operate the water system once the dam is rebuilt, and whether operations will allow for the restoration of steelhead trout and salmon below the dam. San Francisco's water system can and should be operated in a sustainable manner that provides adequate stream flow for native fish and wildlife.

01

02

Our organizations believe that numerous conservation, recycling, and groundwater projects can be implemented that will make up the water needed for healthy fisheries in Alameda Creek, the Tuolumne River, and the Peninsula watersheds managed by the SFPUC.

03

The SFPUC diverts 86 percent of the stream flow of upper Alameda Creek. Future SFPUC dam operations will impact water flow, habitat suitability, and fish passage far downstream. The operation of Calaveras Dam should adhere to the SFPUC's watershed stewardship policy, and state Fish and Game Codes require the SFPUC to provide bypass flows to keep native fish downstream of its dams in good condition. The Endangered Species Act also requires the SFPUC to provide sufficient water for federally protected steelhead trout. Providing adequate flows for native fish and wildlife are part of doing business for any water agency with major dams.

04

We have the following concerns about the DEIR for the Calaveras Dam Replacement Project:

- It concludes that many significant impacts on steelhead trout and other listed species are "not significant" or mitigated to a "less than significant" level based on inadequate analysis and mitigations;
- It downplays and misstates the impacts of SFPUC dam operations on water flow, habitat suitability, and fish passage further downstream;
- It wrongly asserts that diverting all winter and spring flows from upper Alameda Creek at the Alameda Diversion Dam under 650 cfs flow will benefit fish because it will provide a "a more predictable and stable flow";
- Flows for steelhead will be provided only if steelhead occur in the upper watershed in the absence of such flows;
- The environmental baseline covers years during which conditions for fish were poor and partially during a drought, leading the EIR to conclude that modest improvements in flow conditions are adequate to determine "no impact," "less than significant," or "beneficial" impacts;

05

06

07

08

- It does not analyze the impacts of Calaveras and Alameda Diversion dams with regards to blocking spawning and rearing habitat for steelhead or impairing flows in Alameda Creek,⁹ nor does it fully assess changes to downstream channel morphology and habitat;¹⁰
- The proposed stream flow releases are designed for resident rainbow trout, not migratory fish, and do not address the habitat needs of chinook salmon;¹¹
- The proposed mitigations for what will be significant construction impacts on habitat for numerous endangered species are meager and inappropriate; and¹²
- There are no meaningful mitigations for greenhouse gas emissions from the project.¹³

We propose the following changes be made to the EIR and the project, in order to move the rebuild project forward quickly and without conflict:

- Minimum stream flows downstream of SFPUC dams should be consistent with those proposed by the federal regulatory agency, the National Marine Fisheries Service;¹⁴
- Winter and spring flows should be adequate to provide for adult attraction and upstream passage and for smolt out-migration, and fall flows should address the habitat needs of chinook salmon;¹⁵
- Downstream flows should mimic the natural hydrograph of the stream;¹⁶
- The project should mitigate for the impacts of the Calaveras and Alameda Diversion dams in blocking spawning and rearing habitat for steelhead, impairing flows in Alameda Creek, and changing downstream habitat;¹⁷
- The project should provide for some form of migratory fish passage at the Alameda Diversion Dam and Calaveras Dam;
- Mitigations for construction impacts should be on private land, not on land already protected by the SFPUC; and¹⁸
- Greenhouse gas emissions from construction should be fully mitigated, such as by purchasing approved carbon offsets.¹⁹

San Francisco should be taking the lead in restoring steelhead trout to Alameda Creek as part of this project. We look forward to working with the SFPUC to ensure the final EIR and future operating plans are consistent with steelhead recovery, and federal and state environmental laws.

Sincerely,

Acterra

Michael Closson, Executive Director
3921 East Bayshore Road
Palo Alto, CA 94303

Alameda Creek Alliance

Jeff Miller, Director
P.O. Box 2626
Niles, CA 94536

American Rivers

Steve Rothert, Director
California Regional Office
432 Broad Street
Nevada City, CA 95959

Beyond Searsville Dam

Matt Stoecker, Director
3130 Alpine Road Suite #288-411
Portola Valley, CA 94028

California Oak Foundation

Janet Cobb, President
428 - 13th Street, Suite 10-A
Oakland, CA 94612

California Sportfishing Protection Alliance

Chris Shutes, FERC Projects Director
1608 Francisco Street
Berkeley, CA 94703

California Trout

George Shillinger, Executive Director
870 Market Street, #528
San Francisco, CA 94102

Center for Biological Diversity

Peter Galvin, Conservation Director
351 California Street, Suite 600
San Francisco, CA 94104

Citizens Committee to Complete the Refuge

Florence LaRiviere, Chairperson
453 Tennessee Lane
Palo Alto, CA 94306

Clean Water Action

Jennifer Clary, Policy Analyst

111 New Montgomery Street, Suite 600
San Francisco, CA 94105

Close to Home: Exploring Nature in the East Bay

Cindy Spring
3758 Grand Ave. #38
Oakland, CA 94610

Crab Boat Owners Association

Larry Collins, President
2907 Jones Street
San Francisco, CA 94133

Diablo Valley Fly Fishermen

Ted Shapas, Conservation Chair
P.O. Box 4988
Walnut Creek, CA 94596

Flycasters of San Jose

Mike Brinkley, Conservation Chair
P.O. Box 821
Campbell CA 95009

Food and Water Watch

Mark Schlosberg, Director
25 Stillman Street, Suite 200
San Francisco, CA 94107

Friends of Creeks in Urban Settings

Beverly Ortiz, President
1778 Sunnyvale Avenue
Walnut Creek, CA 94597

Friends of the Creeks

Lesley Hunt, President
236 Warwick Drive
Walnut Creek, CA 94598

Friends of Orinda Creeks

Jim Luini, President
52 Charles Hill Road
Orinda, CA 94563

Friends of the River

Steven Evans, Conservation Director
1418 20th Street, Suite 100
Sacramento, CA 95814

Golden Gate Audubon Society

Mark Welther, Executive Director

2530 San Pablo Avenue, Suite G
Berkeley, CA 94702

Golden West Women Flyfishers

Cindy Charles, President
790 27th Avenue
San Francisco, CA 94121

Guadalupe-Coyote Resource Conservation District

Nancy Bernardi
888 North First Street, Room 204
San Jose, CA 95008

Hayward Area Planning Association

Sherman Lewis, Chair
2675 Hillcrest Avenue
Hayward CA 94542

Institute for Fisheries Resources

Sara Randall
P.O. Box 29196
San Francisco, CA 94129

International Rivers

2150 Allston Way, Suite 300
Berkeley, CA 94704

Lake Merritt Institute

Richard Bailey, Executive Director
568 Bellevue Avenue
Oakland, CA 94610

Mission Peak Fly Anglers

Larry Dennis, Conservation Chairman
P.O. Box 7263
Fremont, CA 94537

Northern California Council of Federation of Fly Fishers

Dougald Scott, Steelhead Committee Chair
728 Gull Avenue
Foster City, CA 94404

Ohlone Audubon Society

Evelyn Cormier, President
1922 Hillsdale Street
Hayward, CA 94541

Pacific Coast Federation of Fishermen's Associations

Zeke Grader, Executive Director
P.O. Box 29370

San Francisco, CA 94129

Peninsula Fly Fishers

Bobbie Armor, Conservation Director
39159 Paseo Padre Parkway, Suite 116
Fremont, CA 94538

Regional Parks Association

Amelia Wilson, President
P.O. Box 9127
Berkeley, CA 94709

Restore Hetch Hetchy

Mike Marshall, Executive Director
P.O. Box 565
San Francisco, CA 94104

Salmon Protection and Watershed Network

Paola Bouley, Conservation Program Director
P. O. Box 400
Forest Knolls, CA 94933

Santa Cruz Fly Fishermen

Jim Tolonen, Conservation Committee Chair
P.O. Box 2008
Santa Cruz, CA 96063

Sierra Club, Mount Diablo Group

Jim Blickenstaff, Chairman
2410 Talavera Drive
San Ramon, CA 94583

Sierra Club, S.F. Bay Chapter

Norman La Force, Chair
2530 San Pablo Avenue, Suite I
Berkeley, CA 94702

Small Boat Commercial Salmon Fishermen's Association

Mike Hudson, President
1204 Cedar Street
Berkeley, CA 94702

Strawberry Creek Watershed Council

Carole Schemmerling
1250 Addison Street, Suite 204
Berkeley, CA 94702

The Bay Institute

Christina Swanson, Executive Director
695 DeLong Avenue, Suite 100

Novato, CA 94945

Tracy Fly Fishers

Corey Cate, Conservation Chair
P.O. Box 1916
Tracy, CA 95378

Tri-City Ecology Center

Donna Olsen
P. O. Box 674
Fremont, CA 94537

Tri-Valley Fly Fishers

Corey Cate, Conservation Chair
P.O. Box 231.
Livermore, CA 94551

Tuolumne River Trust

Eric Wesselman, Executive Director
111 New Montgomery Street, Suite 205
San Francisco, CA 94105

Visions of the Future Environment

John Powers, Director
2370 Market Street, #204
San Francisco, CA 94114

Water4Fish

Dick Pool, Director
5700A Imhoff Drive
Concord, CA 94520



AMERICAN FISHERIES SOCIETY

California-Nevada Chapter

<http://www.afs-calneva.org/Home.htm>

O-AFS

December 18, 2009



Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Dear Mr. Wycko,

Comments on Calaveras Dam Replacement Project

I am writing on behalf of the California-Nevada Chapter of the American Fisheries Society (AFS). The American Fisheries Society, founded in 1870, is the oldest and largest professional fishery organization in North America. Our membership includes biologists, aquaculturists, academics, consultants, and others committed to science-based fisheries management and conservation. The Chapter consists of 425 members from California, Nevada and other states. AFS has an international reputation as the premier science-based organization dealing with fisheries, and collectively we speak for this resource at every level of government. Because the AFS relies on peer-reviewed science, the public at large knows that when AFS makes a presentation on any particular issue there is no hidden political agenda; our focus is on *what is best for the resource*. An important aspect of our mission is to promote progress toward sustainable aquatic ecosystems and thus, fisheries. We support protecting fishery resources and their habitat for future generations to enjoy.

Alameda Creek is a regional asset with statewide significance for potential restoration of steelhead trout populations in the greater San Francisco Bay Area. Due to ongoing restoration efforts over the past decade, Alameda Creek is becoming a stream restoration success story. Numerous fish passage projects downstream of SFPUC dams have been completed since 2001, and several major fish ladder and dam removal projects will be completed by the time Calaveras Dam is rebuilt. The completion of these projects will allow anadromous fish to access approximately 20 miles of suitable spawning and rearing habitat in upper Alameda Creek for the first time in almost half a century.

The California-Nevada Chapter conditionally supports the SFPUC rebuilding Calaveras Dam as quickly as possible to benefit public safety, ensure a reliable water supply, and enhance fish habitat. However, before we can fully support the project, the major issue that needs to be resolved is how the SFPUC will operate the water system once the dam is rebuilt, and whether operations will allow for the restoration of anadromous steelhead trout below the dam.

San Francisco's water system can and should be operated in a manner that provides adequate stream flow for native anadromous salmonids. In addition, State Fish and Game Code Section 5937 requires "the owner of any dam to allow sufficient water at all times through a fishway, or in the absence of a fishway, allow sufficient water to pass

01
02
03

over, around or through a dam, to keep in good condition any fish that may be planted or exist below the dam.”

03 cont.

The Federal Endangered Species Act also requires the SFPUC to provide sufficient water for federally protected steelhead trout. Providing adequate flows below a dam to benefit native fish are part of the environmental responsibilities of any water agency with major dams.

After all of the barriers to upstream adult steelhead migration in the lower watershed are removed, we recommend that flows for steelhead be provided by SFPUC to enable steelhead to reach the upper watershed. The proposed streamflow releases in the EIR are designed for resident rainbow trout, not migratory anadromous steelhead trout, and should address the habitat needs of steelhead trout. Minimum stream flows downstream of SFPUC dams should be consistent with those determined by State and federal regulatory agencies, namely, the National Marine Fisheries Service, California State Dept. of Fish and Game, and State Water Resources Control Board.

04

The project should also mitigate for the impacts of the Calaveras Dam and Alameda Diversion dam by providing for migratory fish passage at the Alameda Diversion Dam and Calaveras Dam.

05

Because of Alameda Creek’s statewide significance to the anadromous fisheries of this State, we strongly recommend that the restoration and enhancement of steelhead runs in Alameda Creek below Calaveras Dam be included as a primary goal; if not, at least a secondary goal of the proposed project.

06

We look forward to working with the SFPUC to ensure that the final EIR and future operating plans are consistent with steelhead recovery needs, and Federal and state environmental laws.

Sincerely,



Michelle Workman, President
California-Nevada Chapter, American Fisheries Society

cc: Robert Smith
Regulatory Division
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103



Ohlone Audubon Society, Inc.

*A chapter of the National Audubon Society
Serving Southern Alameda County, CA*

RECEIVED

DEC 09 2009

CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M E A

Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

December 5, 2009

Subject: Calaveras Dam

Dear Mr. Wycko,

Ohlone Audubon society takes its responsibility for protecting all wildlife seriously. Thus when we reviewed the elements regarding the treatment of the water in Alameda Creek and pondered its impact on the steelhead trout and the salmon who need the appropriate amount of water at appropriate times of the year we were dismayed to see that the needs of the fish had not been adequately addressed.

01

The SFPUC should adhere to their own watershed stewardship policy and comply with state and federal laws. This means there should be enough water in the creek so that native fish can survive year round.

02

It is hoped that as this project moves forward the inadequacy of the water in Alameda Creek will be properly addressed.

Yours truly,

Evelyn M. Cormier
President, Ohlone Audubon Society
31020 Carroll Avenue
Hayward, CA 94544



SAN FRANCISCO PLANNING DEPARTMENT
 Draft Environmental Impact Report Public Hearing
 Calaveras Dam Replacement Project

Fremont Main Library
 2400 Stevenson Blvd
 Fremont, CA 94538

Tuesday, November 10, 2009

COMMENT CARD

Thank you for participating in tonight's public hearing on the Calaveras Dam Replacement Project DEIR. Your comments are encouraged.

Name (Please print): Rich Cimino
 Affiliation (If applicable): Ohlone Audubon
 Phone: _____ Email: _____
 Address: 1281 Ridgewood Rd
 City, State, Zip: Pleasanton, Ca 94566

COMMENTS

There appears to be a lack of accurate ^{information} of the evolution of baseline stream flow to support anadromous fishery. By using the 2002 flows a baseline is misleading to the reader. SF needs to supply computer modeling of the streamflow by year from 2002 to date. Audubon believes that revealing the annual high flows. The public needs to have reasonable accurate data available if the SF-PLC expects full public support.

- over -

For more information about the proposed project, please contact:

Betsy Rhodes, San Francisco Public Utilities Commission
 1155 Market Street, 11th Floor, San Francisco, CA 94103
 Phone: (415) 554-3240
 BLauppe@sfgwater.org

For more information about the EIR process, please contact:

Chris Kern, EIR Coordinator, San Francisco Planning Department
 1650 Mission Street, Suite 400, San Francisco, CA 94103
 Phone: (415) 575-9037
 Chris.Kern@sfgov.org

COMMENTS (Continued)

The Calaveras - Alameda Diversion Dam appears to possibly block spawning and rearing habitat for steelhead.

It is Audubon's opinion that the SF-PUC needs to go to the next step of stream flow recovery.

Streamflow as proposed are not satisfactory. The SF-PUC HCP ~~should~~ needs to address summer flows. Currently your flow will not support migratory fishery.

I know that SF PUC has spent time in reaching your EIR - put SF PUC needs to think out of the box by doing what's best long term for the fishery - There is plenty of water to share your storage will be 9688 acre feet - (additional flow will be captured down stream) catching water from 100 square miles!

Conservation by usage if SF-PUC addresses the issue can/could/should/will offset additional water flows. Support of cold water steelhead population as the watershed needs to be taken seriously.

Why have King Salmon not been addressed in the SF-PUC EIR? SF-PUC needs to prepare for additional species naturally wanting to establish themselves into the Alameda Creek Watershed.

STEWART WEINBERG
 DAVID A. ROSENFELD
 WILLIAM A. SOKOL
 VINCENT A. HARRINGTON, JR.
 W. DANIEL BOONE
 BLYTHE MICKELSON
 BARRY E. HINKLE
 JAMES RUTKOWSKI •
 SANDRA RAE BENSON
 CHRISTIAN L. RAISNER
 JAMES J. WESSER
 THEODORE FRANKLIN
 ANTONIO RUIZ
 MATTHEW J. GAUGER
 ASHLEY K. IKEDA ••
 LINDA BALDWIN JONES
 PATRICIA A. DAVIS
 ALAN G. CROWLEY
 KRISTINA L. HILLMAN •••
 ANDREA LAIACONA
 EMILY P. RICH
 BRUCE A. HARLAND

WEINBERG, ROGER & ROSENFELD

A PROFESSIONAL CORPORATION

1001 Marina Village Parkway, Suite 200
 Alameda, CA 94501-1091
 TELEPHONE 510.337.1001
 FAX 510.337.1023

LORI K. AQUINO ••
 ANNE I. YEN
 NICOLE M. PHILLIPS
 CONCEPCIÓN E. LOZANO-BATISTA
 CAREN P. SENCER
 MANJARI CHAWLA
 KRISTINA M. ZINNEN
 JANNAH V. MANANSALA
 MANUEL A. BOIGUES ••••
 KERIANNE R. STEELE •••
 ANA M. GALLEGOS
 GARY P. PROVENCHER

PATRICIA M. GATES, Of Counsel
 ROBERTA D. PERKINS, Of Counsel
 RICHARD T. DRURY, Of Counsel

• Also admitted in Arizona
 •• Admitted in Hawaii
 ••• Also admitted in Nevada
 •••• Also admitted in Illinois

BY EMAIL AND US MAIL

December 21, 2009

Bill Wycko, Environmental Review Officer
 San Francisco Planning Department
 1650 Mission Street, Suite 400
 San Francisco, CA 94103
 Fax: 415-558-6409

Re: Calaveras Dam Replacement Project DEIR

Dear Mr. Wycko:

I am writing on behalf of the Carpenters Union Local 713 (“Local 713”) to provide comments on the draft Environmental Impact Report (“DEIR”) prepared under the California Environmental Quality Act (“CEQA”), Public Resources Code section 21000, et seq., for the Calaveras Dam Replacement Project (“Project”) (SCH Number: 2005102102) proposed by the San Francisco Public Utilities Commission (“SFPUC”).

I. INTRODUCTION

After reviewing the DEIR it is clear that the proposed Project has many valuable assets, including:

- Enhancing earthquake safety;
- Improving water supply reliability, quantity and quality;
- Providing employment opportunities for highly trained workers;
- Improving habitat for resident rainbow trout upstream of Calaveras Reservoir by better connecting reservoir habitat to upstream habitat;
- Improving habitat downstream of the dams by improving SFPUC’s ability to provide flow releases specified and even above the levels in the 1997 Memorandum of

Understanding between the Department of Fish and Game and the SFPUC (“1997 DFG/SFPUC MOU”); and,

- Increasing the availability of coldwater fisheries (i.e., trout) habitat.

While the Project presents many important benefits, Local 713 requests that the SFPUC consider additional mitigation measures in the final EIR, including:

- Continue to address flow issues through the Alameda Creek Fisheries Restoration Workgroup to ensure adequate flow for downstream fish, and adopting mitigation measures to ensure adequate flow is maintained;
- Designing a fish relocation plan in consultation with the National Marine Fisheries Service (“NMFS”) that incorporates measures to minimize stress on the fish to be relocated;
- Incorporating a design for future fish ladders to ensure that the dams are designed to more readily accommodate fish ladders if and when downstream impediments are removed and steelhead actually make it up to the two dams.

We encourage the SFPUC to consider these additional mitigation measures in the final EIR for the Project.

II. BACKGROUND

The SFPUC is proposing a project to replace the existing Calaveras Dam. Calaveras Dam and Reservoir are part of the regional water system owned and operated by the City and County of San Francisco, through the SFPUC. Calaveras Dam is located on Calaveras Creek in the Diablo Mountain Range in Alameda County, California, approximately 12 miles south of the City of Pleasanton and 7.5 miles east of the City of Fremont.

Calaveras Dam forms Calaveras Reservoir, which is situated on the border between Alameda and Santa Clara Counties. In response to safety concerns about the seismic stability of the dam, the SFPUC lowered water levels in the reservoir, beginning in the winter of 2001. A mandate from the California Department of Water Resources, Division of Safety of Dams (DSOD) directed the SFPUC to undertake necessary seismic improvements to the dam and lower the reservoir water level until these improvements are completed. The elevation of the lowered water level corresponds to about 38,100 acre-feet (AF) of storage, which is approximately 60 percent less than the pre-DSOD restricted total water storage volume.

The SFPUC proposes to construct a new dam to replace the existing Calaveras Dam. The replacement dam, to be located immediately downstream at the foot of the existing dam, would respond to DSOD requirements to improve seismic safety. Replacement of the dam would allow the reservoir to be filled to its former volume of about 96,850 AF. This would restore the

previously existing yield and reliability of the SFPUC local system and provide water supply during droughts.

The main elements of the proposed project are as follows:

- Construct a new earth and rockfill dam with a robust design that could accommodate potential enlargement by future generations, and modification of the existing dam to accommodate the construction and operation of the new replacement dam;
- Remove the existing spillway and construct an ungated spillway with a concrete-lined channel and a new stilling basin;
- Remove the existing intake tower, plug the shaft, and construct a new intake tower and shaft connecting to an existing drain and three water inlets;
- Extend the outlet pipe connecting to a relocated, fixed cone valve, and install new low-flow discharge valves for fishery releases;
- Install instrumentation such as piezometers, inclinometers, settlement monuments, seepage weirs, and accelerometers to measure strong ground motions during earthquakes;
- Stabilize the right abutment landslide;
- Construct a bypass tunnel through the Alameda Creek Diversion Dam to improve habitat conditions in Alameda Creek downstream of the diversion; and
- Implement flow releases to support native fishes in Calaveras and Alameda creeks downstream of Calaveras Dam and the Alameda Creek Diversion Dam.

Construction would begin in spring 2011 and would be completed in approximately 4 years.

III. STANDING

Many of Local 713's members live, work and recreate in the immediate vicinity of the Project site. Many of these members fish, recreate and otherwise enjoy the environment of the Calaveras Reservoir and the upper Alameda Creek watershed. These same members face earthquake risks and water supply shortages that will be reduced by the Project. Therefore, Local 713 and its members have a direct interest in ensuring that the Project provides the maximum benefits to the public while also minimizing any adverse environmental impacts.

IV. LEGAL STANDARDS

CEQA requires that an agency analyze the potential environmental impacts of its proposed actions in an environmental impact report (“EIR”) (except in certain limited circumstances). (See, e.g., Pub. Res. Code § 21100.) The EIR is the very heart of CEQA. (*Dunn-Edwards v. BAAQMD* (1992) 9 Cal.App.4th 644, 652.) “The ‘foremost principle’ in interpreting CEQA is that the Legislature intended the act to be read so as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.” (*Communities for a Better Environment v. Calif. Resources Agency* (2002) 103 Cal. App. 4th 98, 109.)

CEQA has two primary purposes. First, CEQA is designed to inform decision makers and the public about the potential, significant environmental effects of a project. (14 Cal. Code Regs. (“CEQA Guidelines”) § 15002(a)(1).) “Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR ‘protects not only the environment but also informed self-government.’” (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal. 3d 553, 564.) The EIR has been described as “an environmental ‘alarm bell’ whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return.” (*Berkeley Keep Jets Over the Bay v. Bd. of Port Comm’rs.* (2001) 91 Cal. App. 4th 1344, 1354 (“Berkeley Jets”); *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810.)

Second, CEQA requires public agencies to avoid or reduce environmental damage when “feasible” by requiring “environmentally superior” alternatives and all feasible mitigation measures. (CEQA Guidelines § 15002(a)(2) and (3); See also, *Berkeley Jets*, 91 Cal. App. 4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.) The EIR serves to provide agencies and the public with information about the environmental impacts of a proposed project and to “identify ways that environmental damage can be avoided or significantly reduced.” (Guidelines §15002(a)(2).) If the project will have a significant effect on the environment, the agency may approve the project only if it finds that it has “eliminated or substantially lessened all significant effects on the environment where feasible” and that any unavoidable significant effects on the environment are “acceptable due to overriding concerns.” (Pub.Res.Code § 21081; 14 Cal.Code Regs. § 15092(b)(2)(A) & (B).)

While the courts review an EIR using an “abuse of discretion” standard, “the reviewing court is not to ‘uncritically rely on every study or analysis presented by a project proponent in support of its position. A ‘clearly inadequate or unsupported study is entitled to no judicial deference.’” (*Berkeley Jets*, 91 Cal. App. 4th 1344, 1355 (emphasis added), quoting, *Laurel Heights Improvement Assn. v. Regents of University of California*, 47 Cal. 3d 376, 391 409, fn. 12 (1988).) As the court stated in *Berkeley Jets*, 91 Cal. App. 4th at 1355:

A prejudicial abuse of discretion occurs “if the failure to include relevant information precludes informed decisionmaking and informed public participation, thereby thwarting the statutory goals of the EIR process.” (*San Joaquin Raptor/Wildlife Rescue Center v.*

County of Stanislaus (1994) 27 Cal. App. 4th 713, 722]; *Galante Vineyards v. Monterey Peninsula Water Management Dist.* (1997) 60 Cal. App. 4th 1109, 1117; *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal. App. 4th 931, 946.)

We have prepared these comments with the assistance of fisheries expert, Dr. Alice Rich, Ph.D. Her “*Technical Comments On Fishery Resources Issues*” (“Rich Comments”) are attached hereto as Exhibits A, and are incorporated herein in their entirety.

V. THE PROJECT PROVIDES SIGNIFICANT BENEFITS

The DEIR concludes that the Project will have significant, unmitigated environmental impacts. As a result, a statement of overriding considerations will be required. Under CEQA, when an agency approves a project with significant environmental impacts that will not be fully mitigated, it must adopt a “statement of overriding considerations” finding that, because of the project’s overriding benefits, it is approving the project despite its environmental harm. (14 Cal.Code Regs. §15043; Pub. Res. Code §21081(B); *Sierra Club v. Contra Costa County* (1992) 10 Cal.App.4th 1212, 1222) A statement of overriding considerations expresses the “larger, more general reasons for approving the project, such as the need to create new jobs, provide housing, generate taxes and the like.” (*Concerned Citizens of South Central LA v. Los Angeles Unif. Sch. Dist.* (1994) 24 Cal.App.4th 826, 847)

A statement of overriding considerations must be supported by substantial evidence in the record. (14 Cal.Code Regs. §15093(b); *Sierra Club v. Contra Costa Co.* (1992) 10 Cal.App.4th 1212, 1223)) The agency must make “a fully informed and publicly disclosed” decision that “specifically identified expected benefits from the project outweigh the policy of reducing or avoiding significant environmental impacts of the project.” (15 Cal.Code Regs. §15043(b)) As with all findings, the agency must present an explanation to supply the logical steps between the ultimate finding and the facts in the record. (*Topanga Assn. for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, 515)

The Project provides very significant environmental benefits, including:

- Enhancing earthquake safety;
- Improving water supply reliability, quantity and quality;
- Providing employment opportunities for highly trained workers;
- Improving habitat for resident rainbow trout upstream of Calaveras Reservoir by better connecting reservoir habitat to upstream habitat;
- Improving habitat downstream of the dams by improving SFPUC’s ability to provide flow releases specified and even above the levels in the 1997 Memorandum of

Understanding between the Department of Fish and Game and the SFPUC (“1997 DFG/SFPUC MOU”); and,

- Increasing the availability of coldwater fisheries (i.e., trout) habitat.

The Project also provides important economic benefits, which are critical to any statement of overriding consideration. CEQA requires that the lead agency *must* make a finding that:

“Specific economic, legal, social, technological, or other considerations, including ***the provision of employment opportunities for highly trained workers***, make infeasible the mitigation measures or alternatives identified in the environmental impact report... [and that those] benefits of the project outweigh the significant effects on the environment.”

(Pub. Res. Code §21081(a)(3), (b).)

This Project will pay prevailing wages for construction workers which will ensure the use of “highly trained workers” and which will maximize economic benefits to the community. If additional mitigation measures are incorporated into the Project, this will help to ensure that the “economic . . . benefits of the project outweigh any significant environmental impacts.”

VI. THE SFPUC SHOULD CONSIDER ADDITIONAL MITIGATION MEASURES IN THE FINAL EIR TO FURTHER PROTECT RAINBOW TROUT AND FACILITATE STEELHEAD RECOVERY

CEQA requires the lead agency to consider all feasible mitigation measures. (CEQA Guidelines § 15002(a)(2) and (3)) We urge the SFPUC to consider the feasibility of the following additional mitigation measures in the final EIR for the Project.

A. Although the DEIR Contains Mitigation Measures to Address Impacts to Steelhead and Rainbow Trout, Additional Feasible Flow Measures Should be Considered in the Final EIR to More Fully Mitigate The Project’s Impacts.

The DEIR proposes to implement the 1997 Memorandum of Understanding (“MOU”) between the SFPUC and the California Department of Fish & Game providing for certain minimum flows in Alameda Creek below the confluence with Calaveras Creek to benefit a range of resident fish species. The MOU calls for 5-day running average flows at that location of 5 cubic feet per second (“cfs”) and a minimum of 4.5 cfs from November through mid-January, a ramping up of flows to a 5-day running average of 20 cfs and minimum of 18 cfs from January 15 through March 15, and then back down to the 5-day running average of 7 cfs from March 16 through October 31. The MOU flows also require that the existing base flow of 0.5 cfs immediately below the Calaveras Dam be maintained and that the Calaveras Reservoir not fall below a minimum pool of 30,000 acre-feet in order to assure the availability of cooler waters for release downstream.

The DEIR proposes to increase flows above levels set under the MOU to address steelhead impacts, including increasing flows immediately below the Calaveras Dam from 0.5 cfs to 2 cfs. The schedule also proposes a slight expansion of the period of time requiring an average flow of 20 cfs requiring the higher flows begin on January 12 (rather than January 15) and extend through March 31 (rather than March 15). The schedule also calls for doubling the MOU flows from March 31 through September 30 for normal rain years and doubling flows from January 12 through April 30 during wet years. This schedule change would only go into place once the most prominent downstream obstruction to steelhead migrating up Alameda Creek is removed (the BART weir) and National Marine Fisheries Service ("NMFS") confirms that steelhead have reached the SFPUC dams. These mitigation measures will have significant environmental benefits over the current baseline situation.

In addition, Dr. Rich proposes that the SFPUC consider in the Final EIR additional mitigation measures that would further benefit the environment. Dr. Rich has reviewed relevant sections of the DEIR and technical studies supporting the DEIR's discussion of rainbow trout and steelhead. Based on her review, Dr. Rich has identified several additional flow and thermal studies that the PUC should undertake prior to operation of the project. Dr. Rich is concerned that the operation of the reconstructed Calaveras Dam and the ACDD could potentially influence stream flows and water temperatures in Alameda Creek during the rearing period for rainbow trout and during steelhead rearing and smoltification if and when the BART weir currently obstructing steelhead migration is removed. Dr. Rich notes the apparent absence of studies specifically addressing flow needs or thermal requirements for: (1) rearing steelhead or rainbow trout in Alameda Creek downstream of Calaveras Dam or the ACDD; (2) steelhead during the parr-smolt transformation (smoltification) in the Alameda Creek Watershed; or, (3) rearing rainbow trout upstream of Calaveras Dam or the ACDD. Until these studies are completed, Dr. Rich does not believe it is possible to determine the impacts of the proposed instream flow schedules discussed in the DEIR on steelhead or rainbow trout.

The SFPUC should expedite its proposed adaptive management scheme to fill in these research gaps in order to evaluate (along with NMFS and DFG) any changes to the proposed flow schedule prior to completion of construction of the project in order to assure maximum feasible net benefits to rainbow trout and steelhead. These studies could occur either in the Final EIR or prior to operation of the Project in 2015, but not necessarily prior to construction, so long as SFPUC commits to implement feasible mitigation recommended by the studies prior to operation of the Project. (*Sacramento Old City Association v. City Council of Sacramento* (1991) 229 Cal.App.3d 1011, 1028-29)

Dr. Rich also points out that thermal requirements for salmonids are site-specific and can vary considerably, depending upon food availability primarily and, that, thus far, the DEIR relies on studies in which the emphasis was on water temperatures that were lethal to rainbow trout and steelhead in laboratory studies, rather than on the more important sublethal temperatures that often result in delayed mortality of a population. Dr. Rich explains that "thermal bioenergetics



04 cont.

05

physiology studies are the best method for determining thermal requirements of fishes, including salmonids, and impacts of changing water temperatures on salmonids.”

05 cont.

In the FEIR, the PUC should refine the proposed rainbow trout monitoring to address these information gaps prior to operation of the project. Dr. Rich recommends (1) A description of the types of cause-and-effect studies that would answer the crucial question posed in the DEIR (Section 5.5.5b): *Do the bypass flows at the ACDD and flow releases at Calaveras Dam sustain resident rainbow trout populations in Alameda Creek downstream of the ACDD?* (2) Design of thermal bioenergetics physiology studies by a fish physiologist that would determine both the optimal temperatures for rearing and smoltification and the impacts of the proposed flow schedules on rearing (rainbow trout and steelhead) and smoltification (steelhead); and, (3) Design of flow studies that determine the impacts of the proposed flow schedules on rearing and smoltification. Again, these studies could occur either in the Final EIR or prior to operation of the Project in 2015, but not necessarily prior to construction, so long as SFPUC commits to implement feasible mitigation recommended by the studies prior to operation of the Project. (*Sacramento Old City Association v. City Council of Sacramento* (1991) 229 Cal.App.3d 1011, 1028-29)

06

B. In Order to Avoid Impacts Associated With Relocating Fish at the Construction Site, the PUC Should Provide a More Detailed Discussion and a Written Plan.

The DEIR’s provision for relocating resident rainbow trout from the construction area below the Calaveras Dam is appropriate. However, based on her years of experience relocating salmonids, Dr. Rich recommends that the Final EIR include the following under *Native Fish Capture and Relocation*: (1) prior to collection and relocation of fishes, a Fish Relocation Plan, that will be reviewed by NMFS, will be designed that includes measures to minimize stress on collected and relocated fish; and, (2) one or more fisheries biologists will collect and relocate fishes within the construction area.

07

C. The DEIR Should Anticipate the Restoration of Steelhead Runs to the Upper Alameda Creek Watershed by Designing Elements of the Calaveras Dam and Alameda Creek Diversion Dam to Better Accommodate the Future Installation of Fish Ladders.

For purposes of its cumulative impact analysis, the DEIR properly assumes that the various barriers to steelhead migration located downstream in Alameda Creek will be removed. However, the DEIR does not address the feasibility and likely benefits of designing the Project to incorporate fish ladders at both dams once steelhead reach the dams.

08

Fish ladders are not currently warranted since steelhead are not yet able to reach the dam due to obstructions – particularly the BART weir. However, plans are in place to remove these obstructions and to allow fish to migrate up Alameda Creek to the dams. It is important to design the dams in a manner that will facilitate future installation of fish ladders. A design that does not consider fish ladders could make later installation of fish ladders unnecessarily

December 21, 2009
Calaveras Dam CEQA Comments of Carpenters Local 713
Page 9

expensive or impossible. Designing fish ladders into the Project at this time may save time and resources in the long term, while enhancing the environment and restoring fish habitat.

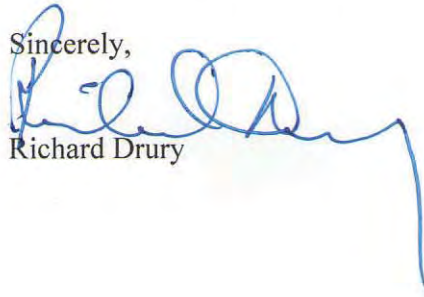
CEQA requires the analysis of "the incremental impact of the project when added to other closely related past, present, and *reasonably foreseeable probable future projects*. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (*Communities for a Better Environment v. Cal. Resources Agency* (2002) 103 Cal.App.4th 98, 117 (emphasis added).) Removal of the BART weir and other obstructions to steelhead migration are "reasonably foreseeable future projects." At that point the Calaveras and Alameda Creek Diversion Dams will be the major obstructions to steelhead migration unless fish ladders are designed into the Project to be constructed either with the project or in the future.

As recommended by Dr. Rich and the National Marine Fisheries Service, the Final EIR should analyze the impact of the Project in light of these foreseeable future projects and design feasible mitigation such as accommodations for fish ladders. Similarly, the SFPUC should include a discussion of potential future impacts to steelhead from the project above the two dams, once access above the dams is restored.

CONCLUSION

We hope that the above comments will assist the SFPUC in ensuring that the EIR for the Calaveras Dam Replacement Project will be as complete as possible and assure the timely approval of this important project. Please call me should you have any questions. Thank you for your attention to this matter.

Sincerely,


Richard Drury

Cc: Robert Klein
Scott Littlehale
Ted Franklin

08 cont.

09

A.A. RICH AND ASSOCIATES

Alice A. Rich, Ph.D.
Principal



150 Woodside Drive
San Anselmo, CA 94960
Tel: (415) 485-2937
Fax: (415) 485-9221
Email: aarfish@earthlink.net

**SAN FRANCISCO PUBLIC UTILITIES COMMISSION
CALAVERAS DAM REPLACEMENT PROJECT
PUBLIC DRAFT EIR**

***TECHNICAL COMMENTS ON
FISHERY RESOURCES ISSUES***

Prepared for:

**Weinberg, Roger & Rosenfeld
1001 Marina Village Parkway, Suite 200
Alameda, California 94501**

Prepared by:

**Alice A. Rich, Ph.D.
A. A. Rich and Associates
Fisheries and Ecological Consultants
150 Woodside Drive
San Anselmo, CA 94960**

December 21, 2009

A.A. RICH AND ASSOCIATES



I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

The law firm of Weinberg, Roger & Rosenfeld retained A.A.Rich and Associates to evaluate and provide comments on fishery resources issues in the San Francisco Public Utility District's (SFPUC) Public Draft Environmental Impact Report (DEIR) for the Calaveras Dam Replacement Project ("Project") (SCH Number: 2005102102). Lozeau | Drury requested that I provide specific technical comments on the fishery resources issues in the DEIR. The objectives of my review were to determine:

- (1) Whether potential impacts of the project on the Federally-listed as threatened Central California Coast (CCC) anadromous steelhead (*Oncorhynchus mykiss*) and its resident counterpart, the rainbow trout, had been discussed fully; and,
- (2) Whether there were any additional feasible mitigation measures the PUC should consider that would benefit the steelhead and rainbow trout.

To that end, I reviewed relevant sections (and Appendices) of the DEIR, as well as a number of other relevant technical studies and documents (Hagar Environmental Science, 2009, 2008 a,b; Hagar Environmental Science and Thomas R. Payne & Associates, 2009a,b; Gunther et al., 2000; DFG, 2008; NOAA Fisheries, 2008; DFG and SFPUC, 1997, 1991; MOU, 2007). Following are my comments on the potential impacts of the project on rainbow trout and steelhead, and mitigation measures proposed for the project.

B. BACKGROUND

As discussed in the DEIR (*Section 4.5 Fisheries and Aquatic Habitat*), numerous studies and documents have focused on the fishery resources of the Alameda Creek Watershed, specifically with regard to fish habitat conditions (including water temperatures) and fish populations, and MOU's that focused on fish screens, flows, water temperatures, and potential for restoration of steelhead upstream of the migration barriers. In summary, researchers determined that, for the Alameda Creek Watershed:

- (1) Suitable habitat existed within the watershed to support spawning and rearing steelhead;
- (2) Genetic testing indicated that a native, locally-adapted steelhead stock survived in the watershed;
- (3) Sightings of steelhead have been reported downstream of the BART weir¹;

¹ BART (Bay Area Rapid Transit) Weir crossing over the Alameda Creek Flood Control Channel (known as the BART Weir).

A.A. RICH AND ASSOCIATES



- (4) Steelhead were currently prevented from completing their life-history cycle within the Alameda Creek, due to the presence of an impassable migration barrier near the bottom of the watershed, and were severely limited by several other impassable or partial migration barriers; and,
- (5) Migration of juvenile steelhead to the ocean could be limited by existing water project operations.

Hence, given the threatened status of the CCC steelhead, implementing measures that protect, enhance, and/or restore habitat for the anadromous steelhead and its resident counterpart, the rainbow trout, is very important to the National Marine Fisheries Service (NMFS) (2008) and the California Department of Fish and Game (DFG) (DFG and SFPUC, 1997, 1991). A 1991 MOU between DFG and the SFPUC addressed the design and operation of fish screens at the Calaveras Reservoir intake for the Sunol Valley Water Treatment Plant. A 1997 MOU between DFG and the SFPUC specified flow releases from Calaveras Reservoir that would maintain cooler water temperatures in the upper reach for native cold water fish such as rainbow trout, with the water gradually warming as it enters the lower reach, improving conditions for native non-game fish species.

Although the DEIR discusses a number of benefits for rainbow trout and steelhead (if they are restored to the watershed), there are some impacts on the salmonids that need further analysis, and there are additional mitigation measures that would reduce impacts on the salmonids. The proposed project provides a number of benefits for rainbow trout and steelhead, including:

- (1) Improving SFPUC's ability to provide flow releases specified in the 1997 DFG/SFPUC MOU;
- (2) Increasing the availability of coldwater fisheries (i.e., trout) habitat; and,
- (3) Increasing rainbow trout habitat upstream of Calaveras Reservoir.

However, the impacts of flow alterations after the dams are constructed, on rainbow trout and steelhead are not fully known and, hence, require further analysis.

II. IMPACTS



A. STREAM REACHES THAT PROPOSED PROJECT COULD IMPACT

The DEIR identifies the following two discrete habitat areas for steelhead and rainbow trout that could be directly or indirectly affected by the construction and operation of the proposed dam and associated facilities:

- (1) Primary Study Area: stream reaches downstream of Calaveras Dam and the Alameda Creek Diversion Dam (ACDD); and,
- (2) Extended Study Area: stream reaches of the Alameda Creek mainstem from the Arroyo de la Laguna confluence downstream to San Francisco Bay.

The stream reaches in the Primary Study Area include Calaveras Creek from the existing dam downstream to the confluence with Alameda Creek and Alameda Creek downstream from the existing ACDD to Arroyo de la Laguna. These stream reaches could be most affected by operation of the proposed project.

B. THE NEED FOR ADDITIONAL INFORMATION ON THE IMPACTS OF FLOWS ON STEELHEAD AND RAINBOW TROUT

The impacts of stream flow alterations caused by the proposed project are not known for a number of life stages of steelhead and rainbow trout in the Alameda Creek Watershed. If anadromous steelhead become re-established in Alameda Creek, due to the construction of a fish ladder at the Bay Area Rapid Transit crossing over the Alameda Creek Flood Control Channel (known as the BART weir) (NMFS, 2008), operation of the Calaveras Reservoir and ACDD could potentially influence stream flows and water temperatures in Alameda Creek during steelhead rearing and smoltification. And, regardless of whether or not a fish ladder is installed at the BART weir, operation of the Calaveras Reservoir and ACDD could influence stream flows and water temperatures in Alameda Creek during the rearing period for rainbow trout. No studies have been conducted that specifically address flow needs or thermal requirements for: (1) Rearing steelhead or rainbow trout in Alameda Creek downstream of Calaveras Dam or the ACDD; (2) Steelhead during the parr-smolt transformation (smoltification) in the Alameda Creek Watershed; or, (3) Rearing rainbow trout upstream of Calaveras Dam or the ACDD. Furthermore, the steelhead flow schedules discussed in the DEIR (*Section 3.3.3 Steelhead Flow Releases*) are subject to approval by NMFS in accordance with the Federal Endangered Species

12



Act and may, therefore, be modified through the Federal permitting process. Thus, it is not possible to determine the impacts of the proposed instream flow schedules discussed in the DEIR on steelhead or rainbow trout without additional flow and thermal studies during rearing (rainbow trout and steelhead) and smoltification (steelhead).

12 cont.

III. ADDITIONAL MITIGATION MEASURES RECOMMENDED

Although the mitigation measures discussed in the DEIR will certainly benefit steelhead and rainbow trout compared to existing conditions, a number of the mitigation measures can be improved upon. The DEIR identifies fish-related mitigation measures under the following three subject headings: (1) Native Fish Capture and Relocation; (2) Resident Rainbow Trout Monitoring; and, (3) Resident Rainbow Trout Adaptive Management (5.5.1, 5.5.5a, and 5.5.5b, pages 5-16 and 5-17 of the DEIR). Each of the mitigation areas discussed in the DEIR would benefit from additional mitigation measures. To that end, in the discussion that follows I have first summarized each fish-related mitigation measure discussed in the DEIR and then provided additional comments and mitigation measures.

1. Native Fish Capture and Relocation

In *Section 5.5.1, Native Fish Capture and Relocation*, the DEIR states that, “Prior to commencement of construction downstream of the existing dam, a qualified biologist shall capture and relocate native fish within the dam construction impact area and downstream approximately 100 feet.” As rainbow trout may be present in the construction area (*Section 4.5.1 of the DEIR*), it is important that stress be minimized during pre-project collection and relocation of fishes. Salmonids are particularly susceptible to handling and transportation stress and can die if precautionary measures are not implemented during the process (Rich, 1991, 1979; Kerstetter, 1988; Mazeaud et al., 1977). For over 25 years, my firm, *A. A. Rich and Associates*, has performed dozens of fish collections and relocations of salmonids. For all of these projects, prior to any collection and relocation of fishes, a Fish Relocation Plan that included measures to minimize stress on the fishes during the collection and relocation process, had to be submitted to, and approved by, NMFS. And, in all of these projects, more than one fisheries biologist was needed.

I recommend that the Final EIR (FEIR) include the following under *Native Fish Capture and Relocation*: (1) prior to collection and relocation of fishes, a Fish Relocation Plan, that will be



reviewed by NMFS, will be designed that includes measures to minimize stress on collected and relocated fish; and, (2) one or more fisheries biologists will collect and relocate fishes within the construction area.

13 cont.

2. Resident Rainbow Trout Monitoring

In Section 5.5.5a, *Resident Rainbow Trout Monitoring*, the DEIR states that, “The SFPUC shall develop and implement a Resident Rainbow Trout Monitoring Plan in consultation with CDFG and NMFS.” More information needs to be provided on what would be included in the Resident Rainbow Trout Monitoring Plan. There are still many information gaps about the potential impacts of this project on rainbow trout and steelhead. Thus, it is important that these information gaps be filled, or at least, studies be proposed that will fill the gaps in knowledge, prior to operation of the project.

Although a previous study (Hagar Environmental Science and Thomas R. Payne & Associates, 2008a) assessed the relationship between stream flow and spawning habitat for rainbow trout and steelhead in Alameda Creek, no studies have been conducted that determined the impacts of flows on steelhead or rainbow trout rearing habitat or populations. And, although water temperature monitoring was conducted in Arroyo Hondo Creek and Alameda Creek (Hagar Environmental Science and Thomas R. Payne & Associates, 2008b), it does not appear from the DEIR, or accompanying reports, that any studies have been conducted that determined optimal temperatures for rainbow trout or steelhead in the Alameda Creek Watershed during any of their life stages. Rainbow trout and steelhead rearing, and steelhead smoltification would be the life stages most affected by changing water temperatures in response to the instream flow schedules discussed in the DEIR (*Section 3.6.6 Steelhead Flow Releases*). Without knowing the thermal requirements for these life stages in the Alameda Creek Watershed, it is not possible to determine the thermal impacts on these rainbow trout or steelhead.

14

One of the tasks that should be added to the rainbow trout monitoring is a study to determine the thermal requirements of juvenile rainbow trout and, in the future, steelhead, in the Alameda Creek Watershed. Thermal requirements for salmonids are site-specific and can vary considerably, depending, primarily, upon food availability. Knowledge of optimal water temperatures on juvenile rainbow trout and steelhead are far from adequate to define safe thermal limits for this species in the Alameda Creek Watershed. Without knowing the thermal requirements, it is not possible to determine the impacts on rainbow trout and steelhead of



changing water temperatures as a result of the instream flow schedules discussed in the DEIR. In the DEIR, and in the studies that the DEIR used to identify water temperature requirements for rainbow trout and steelhead, the emphasis was on water temperatures that were lethal to rainbow trout and steelhead in laboratory studies, rather than on the more important sublethal temperatures that often result in delayed mortality of a population (Brett, 1956).² Thermal bioenergetics physiology studies are the best method for determining both thermal requirements of fishes, including salmonids, and impacts of changing water temperatures on salmonids (Hanson et al., 1997). An example of the appropriate use of a bioenergetics physiology model to evaluate thermal responses in a fish (by Petersen and Paukert, 2005) is attached.

14 cont.

Rather than waiting for possibly adverse effects on the existing rainbow/steelhead in the Alameda Creek Watershed by experimenting with altering stream flows downstream of Calaveras Dam, per the flow schedules discussed in the DEIR, it is recommended that the FEIR include more detail on what the Resident Rainbow Trout Monitoring would entail. Included should be: (1) A description of the types of cause-and-effect studies that would answer the crucial question posed in the DEIR (*Section 5.5.5b*): *Do the bypass flows at the ACDD and flow releases at Calaveras Dam sustain resident rainbow trout populations in Alameda Creek downstream of the ACDD?* (2) Design of thermal bioenergetics physiology studies by a fish physiologist that would determine both the optimal temperatures for rearing and smoltification and the impacts of the proposed flow schedules on rearing (rainbow trout and steelhead) and smoltification (steelhead); and, (3) Design of flow studies that determine the impacts of the proposed flow schedules on rearing and smoltification.

15

///

///

///

² "Within a population, the inability to maintain near optimum growth at less than optimum temperatures is as decisive to continued survival as more extreme temperatures are to immediate life." (Brett, 1956)



3. Resident Rainbow Trout Adaptive Management

a. Need for Additional Flow Studies to Assure Mitigation of the Project's Impacts on Rainbow Trout and Steelhead.

The DEIR provides a discussion (*Section 3.6.6. Steelhead Flow Releases*) of proposed flows that appear to be based, in part, on the 1997 MOU between DFG and the SFPUC and a study that assessed the relationship between streamflow and spawning habitat for rainbow trout and steelhead in Alameda Creek (Hagar Environmental Science and Thomas R. Payne & Associates, 2008a). The DEIR proposes some flow increases, compared to the flows under the 1997 MOU, including increasing flows immediately below Calaveras Dam from 0.5 cfs to 2 cfs. The flow schedule also proposes a slight expansion of the time period, requiring an average flow of 20 cfs to begin on January 12 (instead of January 15), and extend through March 31 (instead of March 15). The schedule also calls for doubling the 1997 MOU flows from March 31 through September for normal rain years, and doubling flows from January 12 through April 30 during wet years. However, this schedule would only be implemented once the most prominent downstream obstruction (the BART weir) to steelhead migration in Alameda Creek is removed and NOAA Fisheries confirms that steelhead have reached the SFPUC dams.

The flow schedules in the DEIR do not appear to be based on flow requirements for any other life stage but spawning for rainbow trout and steelhead. Hence, to determine the flow requirements for the other life stages of rainbow trout and steelhead, further studies are needed.

In addition, the 2008 spawning flow study is based on the Physical Habitat Simulation (PHABSIM) Model of the Instream Flow Incremental Methodology (Bovee et al., 1998). The use of the PHABSIM model has been widely questioned by researchers over the years (Lamb and Burkardt, 2008; Parasiewicz and Walker, 2007; Railsback et al., 2003; Scott and Shirvell, 1987). Common criticism of the PHABSIM model is that some of the assumptions made are not validated for the life stage of the fish in question. For example, the model assumes that the life stage of the fish species in question responds positively to the availability of habitat. The model also assumes that the habitat available is directly proportional to estimates of fish production. And, the model assumes that habitat with high fish densities (highly selected habitat) is high quality habitat, and low densities indicate low quality habitat. These assumptions have been increasingly questioned, but are very difficult to test (Railsback et al., 2003). In addition, the preferred method of determining habitat suitability criteria is to make numerous site-specific



observations of the target species, followed by the use of existing habitat suitability criteria from similar streams. However, no site-specific observations of rainbow trout were made and no steelhead are present. Hence, the FEIR should discuss these uncertainties when determining flow requirements for spawning steelhead and rainbow trout. And, given the uncertain nature of the model, at a minimum, the results of the PHABSIM model should be validated for spawning rainbow trout and steelhead in the Alameda Creek watershed prior to being relied upon by the SFPUC for its post-construction long-term management decisions related to protecting rainbow trout and steelhead.

17 cont.

b. Need for Fish Ladders on Calaveras Reservoir and the Alameda Creek Diversion Dam

The DEIR should anticipate the restoration of steelhead upstream of Calaveras Reservoir and the ACDD by designing the Calaveras dam spillway and elements of the ACDD to better accommodate the future installation of fish ladders. The new Calaveras Dam would be a barrier to fish migration, similar in magnitude to the existing dam. Because of its size, the replacement dam, like the existing dam, would be a permanent impassible barrier to fish migration in Calaveras Creek. And, the presence of the existing ACDD would continue to be an impassible barrier to fish migration. The DEIR states (*Impact 4.5.3*) that there are no facilities or provisions for fish passage proposed and that the proposed replacement dam would not change the extent to which fish passage or migration is impeded by the existing dam. Hence, the DEIR states that there is no change (i.e., “No Impact”) created by the proposed project as compared to the existing condition in regard to fish passage. However, as there are plans to install a fish ladder at the BART weir, there should also be plans to construct fish ladders at the Calaveras Dam and the ACDD.

18

In a letter to the U.S. Corps of Engineers, NMFS stated that (NMFS, 2008, page 2),

“Since its construction in the 1970’s, the grade control structure at the Bay Area Rapid transit crossing over the Alameda Creek flood Control Channel known as the BART Weir) has blocked anadromous fish from accessing the upper Alameda Creek watershed..... Although the BART Weir is currently a complete barrier to upstream passage..., efforts are actively underway to construct a fish ladder at this site. Conceptual plans for a fish ladder have been developed and funding has been provided for the project’s pre-design, final design, environmental documentation, and permitting.” The current schedule anticipates that



the Alameda County Water District, and the Alameda County Flood Control and Water Conservation District will construct this fish ladder in 2010.”

Thus, when the fish ladder is constructed, steelhead passage would be possible to the Alameda Creek Diversion Dam and Calaveras Dam sites. NMFS stated that “Additional project features that should be considered include alternatives that include a fish ladder for adult steelhead to access areas upstream of Calaveras Dam and areas upstream of the ACDD (NMFS, 2008, page 2). I agree with NMFS’ suggestion. I recommend that the FEIR should include a design that would facilitate the future installation of a fish ladder if and when steelhead are able to reach the dams.

18 cont.

c. The Proposed Project Should Include the Eventual Presence of Steelhead

NMFS stated that “Additional project features that should be considered include alternatives that include a fish ladder for adult steelhead to access areas upstream of Calaveras Dam and areas upstream of the ACDD (NMFS, 2008, page 2). In addition, installation of a fish ladder at the BART weir is planned. Therefore, the proposed project should take into consideration the likely eventual presence of steelhead, not only downstream of Calaveras Dam, but upstream of Calaveras Dam and the ACDD, as well.

19

d. Need for an Interdisciplinary Approach for Aquatic Restoration Mitigation

Although I realize that it is customary for an EIR to divide up the mitigation section into disciplines, I believe there should be more emphasis on the use of an interdisciplinary approach when discussing mitigation measures that involve aquatic habitat restoration. Such projects usually involve not only ecologists, but for this project, some of the projects would need to

20

///

///

A.A. RICH AND ASSOCIATES



incorporate fishery resources elements, as well. Hence, there would be a need for fisheries biologists to work with hydrologists and, perhaps, ecologists.

↑
20 cont.

December 21, 2009

A handwritten signature in dark ink, appearing to read "Alice A. Rich, Ph.D.", written over a horizontal line.

Alice A. Rich, Ph.D.



IV. LITERATURE CITED

- Bovee, K. D., B. L. Lamb, J. M. Bartholow, C. B. Stalnaker, J. Taylor, and J. Henriksen. 1998. Stream habitat analysis using the instream flow incremental methodology. U.S. Geological Survey, Biological Resources Division Information and Technology Report. USGS/BRD-1998-0004. 131 pp.
- Brett, R. J. 1956. Some principals in the thermal requirements of fishes. *Quarterly Review of Biology* 31: 75-87.
- DFG (Department of Fish and Game). 2008. Technical Comments on the Report, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead Trout (December 2007), Alameda County* (Prepared by A. Gunther, W. Trush, and S. McBain) January 28, 2008. 8 pp.
- DFG (Department of Fish and Game) and SFPUC (San Francisco Public Utilities Commission) 1997. Memorandum of Understanding (MOU) regarding water releases and recapture facilities for purposes of improving native fisheries in Alameda Creek. July 30, 1997. 15 pp + Attachments.
- DFG (Department of Fish and Game) and SFPUC (San Francisco Public Utilities Commission) 1991. Memorandum of Understanding (MOU) regarding intake screen design/operating procedures. October 11, 1991. 3 pp.
- Gunther, A. J., J. Hagar, and P. Salop. 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000. 10 pp.
- Hagar Environmental Science. 2009. Final Calaveras Dam Replacement Project Fisheries Technical Report. Prepared for EDAW Turnstone Join Venture and SFPUC. December 2, 2009. 78 pp.

A.A. RICH AND ASSOCIATES



Hagar Environmental Science and Thomas R. Payne & Associates. 2009. Survey of Aquatic Habitat Conditions: Calaveras Creek Upstream of Calaveras Reservoir, Arroyo Hondo Upstream of the Large Slide, and Alameda Creek Upstream of Camp Ohlone. Prepared for EDAW Turnstone Joint Venture and SFPUC. December 2, 2009.

Hagar Environmental Science and Thomas R. Payne & Associates. 2008a. Assessment of Relationship Between Stream Flow and Spawning Habitat for Rainbow Trout and Steelhead in Alameda Creek. Prepared for EDAW Turnstone Joint Venture and SFPUC. October 29, 2008.

Hagar Environmental Science and Thomas R. Payne & Associates. 2008b. Supplemental Water Temperature Monitoring in Arroyo Hondo and Alameda Creek. Prepared for EDAW Turnstone Joint Venture and SFPUC. October 29, 2008.

Hanson, P., T. Johnson, J. Kitchell and D. E. Schindler. 1997. Fish Bioenergetics 3.0. University of Wisconsin Sea Grant Institute, Report WISCU-T-97-001, Madison, Wisconsin.

Kerstetter, T. H. 1988. Delayed mortality related to capture and handling in salmonids -- annual report, 1987/88. Humboldt State University, Dept. of Biological Sciences.

Mazeau, M. M., F. F. Mazeau, and E. H. Donaldson. 1977. Stress resulting from handling in fish: primary and secondary effects. *Transactions of the American Fisheries Society*. 106: 210-212.

MOU (Memorandum of Understanding). 2007. MOU Regarding the Alameda Creek Restoration Workgroup and Collaborative Flow Studies Focused on Steelhead Restoration. June 7, 2007. 8 pp.

NMFS. 2008. Letter, dated April 2008, to Lt. Colonel Craig W. Kiley, District Engineer, U.S. Department of the Army. San Francisco, California, regarding the SFPUC proposal to replace Calaveras Dam on Calaveras Creek in Alameda and Santa Clara counties. 3 pp.

Parasiewicz, P. and J. D. walker. 2007. Arena comparison of MESOHABSIM with two microhabitat models (PHABSIM and HARPHA). River Research and Applications 2007.

A.A. RICH AND ASSOCIATES



Railsback, S. F., B. Stauffer, and B. C. Harvey. 2003. What can habitat preference models tell us? Tests using a virtual trout population. *Ecological Applications* 13(6): 1580-1594.

Rich, A. A. 1991. Mortality and stress on salmonids as a result of fishery resources management actions, the stressful effects of catch-and-release fishing on salmonids. Prepared for Bangor Hydro-Electric Company, Bangor, Maine. May 31, 1991. 57 pp.

Rich, A. A. 1979. The use of stress to quantitate the survival potential of three strains of trout. M. S. Thesis, University of Washington, Seattle. 65 pp.

Scott, D. and C. S. Shirvell. 1987. A critique of IFIM and observations on flow determination in New Zealand. In *Regulated Streams, Advanced in Ecology*. J. F. Craig and J. B. Kemper (eds). Plenum Publishing: New York, NY: 27-43.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

Dr. Rich, who founded *AAR* in 1983, has had over 30 years of technical and administrative project management experience in a wide range of fisheries-related projects. Dr. Rich's professional experience encompasses work as a fisheries consultant, fisheries biologist, fish physiologist/toxicologist, analytical chemist, and university lecturer. For over 30 years, Dr. Rich has worked on projects involving federal, state, and local agencies, environmental non-profit organization, private firms, landowners, and law firms. Dr. Rich has designed and supervised projects involving the effects of various types of land use (e.g., road construction, bridges, dredging, water diversions, hydropower, dredging, urban development, vineyards, mining, timber harvesting) on sensitive fish species. Projects have included instream flow studies, water quality and water temperature studies, fish habitat and population studies, fish physiology and toxicology, salvage and relocation of fishes, fish rehabilitation, and, fish aging studies. In addition, Dr. Rich is an expert in fish physiology and toxicology and has been called upon as an expert witness on the stressful impacts of water diversions, water temperature, sediment, pollutants, hydroelectric projects, migration barriers, timber harvest, catch-and-release fishing, and transportation and handling on fishes.

REPRESENTATIVE EXPERIENCE

- Designed multi-year studies to determine the relationship between instream flows from water diversions on Chinook salmon, steelhead, and American shad.
- Testified before the State Water Resources Control Board in projects involving the effects of instream flows and water temperatures on Chinook salmon, steelhead, rainbow trout, American shad, and other fish species.
- Determined the impacts of diverting water on threatened and endangered fish species.
- Designed and implemented multi-year studies focusing on the impacts of water quality and water temperature on salmonids from various land uses.
- Designed and supervised over 50 projects involving dewatering of channels, fish salvage and relocation of threatened, endangered, and candidate fish species.
- Designed and implemented multi-year studies fishery resources studies involving various land uses, including water diversions and dams, housing developments, grazing, hydroelectric, mining, logging, road construction, levee construction, boat docks, marinas, and boat activities.
- Designed and supervised fish habitat and population (electrofishing, beach seining, snorkeling, fyke nets) studies on the impacts of agriculture and urban development on salmon and trout and other Federal- and state-listed fish species.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

REPRESENTATIVE EXPERIENCE (cont.)

- Expert witness on the impacts of water temperature, sediment/siltation and other water quality factors on Federal- and state-listed fish species in connection with housing developments, mining, dredging, pile driving, logging, water diversions, hydroelectric projects, and streamflows..
- Fish toxicology and risk assessment studies.
- Supervised fish age studies (scales, otoliths, fin rays) in numerous freshwater and marine fishes.
- Written Fishery Resources Technical Reports (including existing conditions, potential impacts, mitigation measures and long-term monitoring) for hundreds of EIR's and EIS's.
- Assisted with Endangered Species Act Section 7 Consultations and written Biological Assessments for over 100 projects.
- Designed numerous Adaptive Management Plans.
- Designed watershed-based fish rehabilitation projects for over 25 years.
- Trained in Instream Flow Incremental Methodology (IFIM) and Habitat Evaluation Procedures (HEP).
- Prepared over 100 technical papers and presentations on fishery resources issues.

EXPERT WITNESS TESTIMONY

- Impacts of Reduced Flows on the Fishery Resource Habitat of the Lower American River (*County of Sacramento, California*)
- Thermal Impacts of Altered Stream Flows on the Fishery Resources of the Lower American River (*County of Sacramento, California*)
- Thermal Impacts of Delta Wetlands Project on Chinook Salmon and other Fishes of the Sacramento-San Joaquin River System (*Central Delta Water District, Stockton, California*)

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

EXPERT WITNESS TESTIMONY (cont.)

- Fisheries issues within Marine Protected Areas in the Channel Islands National Marine Sanctuary, Santa Barbara, California (*Ilson W. New, Attorney, San Francisco, California*)
- Impacts of Spot Prawn fishing along the California coast (*Ilson W. New, Attorney, San Francisco, California*)
- Thermal Impacts of Yuba County Water Agency's Proposal to Reduce Flows in the Lower Yuba River on Chinook Salmon and Steelhead Trout in the Yuba River (*California Department of Fish and Game, Sacramento, California*)
- Thermal Impacts of Delta Wetlands Project on Chinook Salmon and other Fishes of the Sacramento-San Joaquin River System (*California Department of Fish and Game, Sacramento, California*)
- Impacts of Streamflow Alterations on Emigrating Salmonids (*North Marin County Water District, Novato, California*).
- Impacts of Streamflow Alterations on Emigrating and Resident Salmonids (*Casa de Fruta, Hollister, California*).
- Impacts of Proposed Board of Forestry's Amendment to the Board of Forestry Rules on Salmon and Trout (*California Forestry Association, Sacramento, California*)
- Impacts of Sediment Associated with Timber Harvesting on Salmonids (*California Forestry Association, Sacramento, California*)
- Impacts of Sediment Associated with Vineyard Development on Salmonids (*Morrison and Foerster, Attorneys, San Francisco, California*)
- Impacts of Summer Dams on Aquatic Species (*North Marin Water District, Novato, California*).
- Impacts of Handling and Transportation on Fresh Salmon (*Alaska Airlines, Seattle, Washington*).
- Stressful Impacts of Handling and Transportation on Salmonids (*Bangor Hydro-Electric Company, Bangor, Maine*).
- Impacts of Timber Harvest Practices on Salmonids (*East Bay Municipal Water District, Oakland, California*).
- Impacts of Timber Harvest Practices on Salmonids (*Barnum Timber Company, Eureka, California*).

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

EXPERT WITNESS TESTIMONY (cont.)

- Impacts of Roads, Bridge, and Vineyard on Salmonids (*Friends of West Union Creek, Woodside, California*).
- Impacts of Construction of an Oil Rig Platform on the Fishery Resources (primarily herring) of Northern Puget Sound (*Kiewit Construction Company, Bellingham, Washington*).

EDUCATION

- Ph.D., 1983. Fisheries, University of Washington, Seattle
- M.S., 1979. Fisheries, University of Washington, Seattle
- B.S., 1973. Zoology, University of California, Davis

PROFESSIONAL HISTORY

- A. A. Rich and Associates/Principal (1983-present)
- University of Washington, School of Fisheries/Lecturer (1982-1983)
- University of Washington, School of Fisheries/Teaching Assistant (1976-1983)
- University of Washington, School of Fisheries, Laboratory of Radiation Ecology/Analytical Chemist (1977-1980)
- U.S. Forest Service, Seattle/Fisheries Consultant (1980)
- U.S. Bureau of Reclamation, Sacramento, California/Fisheries Biologist (1975)
- California Department of Fish and Game, Sacramento/Fisheries Biologist (1973-1975)

CERTIFICATIONS

- IFG 200-Designing and Conducting Studies Using IFIM. Instream Flow Group, U. S. Fish and Wildlife Service, West Virginia.
- IFG 205-Field Techniques for Instream Analysis. U. S. Fish and Wildlife Service, West Virginia.
- IFG-210-PHABSIM-Using the Computer-Based Physical Habitat Simulation System. U. S. Fish and Wildlife Service, Colorado.
- Habitat Evaluation Procedures (HEP), Colorado.
- Fish Bioenergetics Growth Models, Toronto, Canada.
- SCUBA, N.A.U.I.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PROFESSIONAL AFFILIATIONS

- American Association for the Advancement of Science
- American Fisheries Society
- American Association of University Women
- Western Dredging Association

PUBLICATIONS AND PAPERS PRESENTED

Dr. Rich has published and presented papers on a number of fishery resources topics including those on: the water quality and thermal impacts of flow alterations on salmonids; impacts of gravel, gold, and phosphate mining on salmonids; water quality requirements for fishes; dredging impacts on fishes; impacts of catch-and-release fishing on salmonids; smoltification of salmonids; enhancement strategies for salmonids in urban and rural areas; impacts of logging on salmon and trout habitat and populations; impacts of rotenone on lake fishery resources; domestication of salmonids; preferred herring spawning substrates; and, exercise physiology of trout. Following is a list of representative publications and papers presented.

Rich, A. A. 2009. River Islands at Lathrop Project - Fishery Resources Technical Report. Prepared for Califia, Inc., Lathrop, California. November 11, 2009. 71 pp.

Rich, A. A. 2009. River Islands at Lathrop Project - Potential Impacts of Water Temperature on Federal- and State- Listed Fish Species. Prepared for Califia, Inc., Lathrop, California. November 11, 2009. 15 pp.

Rich, A. A. 2009. River Islands at Lathrop Project - Potential Impacts of Stormwater Runoff and Gold course Discharge on Federal- and State-Listed Fish Species. Prepared for Califia, Inc., Lathrop, California. November 11, 2009. 46 pp.

Rich, A. A. 2009. Effects of Re-Suspended Sediments Due to Dredging and Dredged Material Placement on Sensitive Fish Species in San Francisco Bay-Literature Review and Identification of Data Gaps. Prepared for the U.S. Army Corps of Engineers, San Francisco. January 2009. 122 pp + Appendices.

Rich, A. A. 2008. Tools for Assessing and Monitoring Fish Behavior in Relation to Dredging Activities. Prepared for the U.S. Army Corps of Engineers, San Francisco. November 2008. 140 pp + Appendices.

Rich, A. A. 2008. Fishery Resources Conditions of the Alhambra Creek Watershed, Contra Costa County. Prepared for the Urban Creeks Council, Berkeley, California. July 25, 2008. 53 pp.

Rich, A. A. 2008. A Salmonid Monitoring Plan for Codornices Creek. Prepared for the Urban Creeks Council, Berkeley, California. May 23, 2008. 71 pages.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (cont.)

- Rich, A. A. 2008. A Trout and Salmon Guide to the Urban Creeks and Rivers that Flow into San Francisco Bay. Prepared for the Urban Creeks Council, Berkeley, California. April 20, 2008. 47 pp.
- Rich, A. A. 2008. Codornices Creek Restoration Project at Albina Avenue, Berkeley, California-Pre-Construction Relocation of Fishes. Prepared for the U. S. Fish and Wildlife Service, Santa Rosa, California. February 5, 2008. 12 pp.
- Rich, A. A. 2008. Biological Resources Assessment for the Draper Project, 560 Inverness Road, Inverness, California. Prepared for the Draper Family, Inverness, California. February 4, 2008. 14 pp + Appendices.
- Rich, A. A. 2007. Impacts of Water Temperature on Fall-Run Chinook Salmon (*Oncorhynchus tshawytscha*) and Steelhead (*O. mykiss*) in the San Joaquin River System. Prepared for the California Department of Fish and Game, Fresno, California. September 24, 2007. 44 pp.
- Rich, A. A. 2007. PG&E's DeSabra-Centerville Hydropower Project - Comments on the Thermal Effects of PG&E's DeSabra-Centerville Project on Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*). Prepared for the California Sportfishing Protection Alliance, Berkeley, California. August 23, 2007. 25 pp plus Appendices.
- Rich, A. A. 2007. Napa Creek Flood Wall Construction-Pre-Project Relocation of Fishes. Prepared for the U. S. Fish and Wildlife Service, Sacramento, California. August 7, 2007. 6 ppages + Appendices.
- Rich, A. A. 2007. Fishery Resources Technical Report for Napa County General Plan. Prepared for Napa County, Napa, California. January 2007. 110 pp + Appendices.
- Rich, A. A. 2006. Fishery Resources Assessment for the Town of Fairfax. Prepared for the Town of Fairfax, Department of Public Works. December 18, 2006. 77 pp + Appendices.
- Rich, A. A. 2006. The 505 Miller Avenue Project, Mill Valley. Biological Assessment. Prepared for Skyline/Miller/House, LLC. October 27, 2006. 33 pp + Appendices.
- Rich, A. A. 2006. Biological Assessment for the Bank Failure Project at 323/325 Bolinas Road, Fairfax. Prepared for the Wasserman Family. September 19, 2006. 31 pp.
- Rich, A. A. 2006. Biological Assessment for Bank Failure Project at 39 Cascade Drive, Fairfax. Prepared for the Katz Family. September 10, 2006. 26 pp.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (cont.)

- Rich, A. A. 2006. Biological Assessment for Bank Failure Project at 91 Mt. Tallac Court, San Rafael. Prepared for the Moreno Family. September 7, 2006. 35 pp.
- Rich, A. A. 2006. Critique of NOAA Fisheries Report Entitled *Monitoring Sediment Delivery to Streams Following Vineyard Development from Forested Lands and the Effects on Steelhead Trout*. Submitted to the California Board of Forestry. Prepared for Morrison & Foerster, Attorneys, San Francisco. August 7, 2006. 33 pp.
- Rich, A. A. 2006. Redwood Lodge, Mill Valley-Assessment of Fishery Resources Habitat Conditions in Arroyo Corte Madera del Presidio Creek. Prepared for Clearwater Hydrology, Berkeley. May 30, 2006. 19 pp.
- Rich, A. A. 2006. Construction of 18-Unit Residential Building at 5-19 La Goma Avenue, Mill Valley. Biological Assessment. Prepared for CirclePoint, San Francisco. May 17, 2006. 31 pp + Appendices
- Rich, A. A. 2005. Fish Relocation Summary of Results for Town of Ross (Marin County) Annual Dredging. Prepared for NOAA Fisheries, November 8, 2005. 10 pp.
- Rich, A. A. 2005. SFPP Pipeline Inspection and Repairs-Summary Results of Collection and Relocation of Fishes in Donner Creek, Nevada County, California. Prepared for U.S. Fish and Wildlife Service and California Department of Fish and Game. November 2, 2005. 10 pp.
- Rich, A. A. 2005. Carmel River Lagoon Mechanical Breaching- Steelhead Issues. Prepared for the Carmel Point and Lagoon Preservation Association. August 7, 2005. 37 pp.
- Rich, A. A. 2005. River Islands Project - Fishery Resources Technical Report. Prepared for River Islands at Lathrop, Lathrop, California. April 21, 2005. 85 pp + Appendices.
- Rich, A. A. 2005. Replacement of Deck at #14 and #16 Creek Lane, Mill Valley. Biological Assessment. Prepared for Cascade Properties, Boulder, Colorado. February 2005. 34 pp + Appendices.
- Rich, A. A. 2004. Bank Stabilization at 1 Sylvan Lane, Marin County, Relocation of Fishes. Prepared for the U.S. Army Corps of Engineers, San Francisco, CA. March 29, 2004. 8 pp + Appendices.
- Rich, A. A. 2004. Fishery Resources Conditions at Emmerson, Blue Lake, Johnson, and Graham Bars. Prepared for Granite Construction Company, Ukiah, California. March 8, 2004. 36 pp + Appendices.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (cont.)

- Rich, A. A. 2003. Fishery Resources Conditions of Suscol Creek, Napa County, California. Prepared for Friends of the Napa River. April 21, 2003. 68 pp + Appendices.
- Rich, A. A. 2003. Long-term Water Quality and Temperature Monitoring for Boat Dock Construction at the Brookside Estates in Stockton, California. Summary of Results of 2002 Data. Prepared for Brookside Development Associates, Stockton. April 4, 2003. 25 pp + Appendices.
- Rich, A. A. 2002. Results of Presence/Absence Fishery Resources Electrofishing Survey within the North Branch of the South Fork Littlejohns Creek, San Joaquin County. Prepared for Forward Inc., Manteca, California. June 25, 2002. 9 pp + Appendices.
- Rich, A. A. 2002. On-Site Biological Monitoring for Boat Dock Installation and Construction at Brookside Estates in Stockton, California. Prepared for Brookside Development Associates, Stockton, April 19, 2002. 22 pp + Appendices.
- Rich, A. A. 2002. Bahia Dredging and Lock Project Environmental Assessment for Fishery Resources. Prepared for Bahia Homeowners' Association, Novato, California. February 22, 2002. 62 pp + Appendices.
- Rich, A. A. 2002. Environmental Assessment for the Chaplinsky Boat Ramp to Pier Conversion at 93 Shoreline Circle, Incline Village, Lake Tahoe, Nevada. Prepared for the Chaplinsky Family, Incline Village, Lake Tahoe, Nevada. January 18, 2002. 36 pp + Appendices.
- Rich, A. A. 2001. Noyo River Fish Monitoring 2000 Summary Report. Prepared for the City of Fort Bragg, Fort Bragg, California. April 25, 2001. 25 pp + Appendices.
- Rich, A. A. 2001. Response to the California Department of Fish and Game's February 2, 2001 Testimony presented to the California Fish and Game Commission with regard to listing coho salmon (*Oncorhynchus kisutch*) as an endangered species. Testimony submitted to the California Fish and Game Commission. April 3, 2001. 26 pp.
- Rich, A. A. 2001. Response to the Salmon and Steelhead Recovery Coalition Petition submitted to the California Fish and Game Commission to list coho salmon (*Oncorhynchus kisutch*) as an endangered species. Testimony submitted to the California Fish and Game Commission. January 31, 2001.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (cont.)

- Rich, A. A. 2000. Fishery Resources Conditions of the Corte Madera Creek Watershed, Marin County, California. Prepared for Friends of Corte Madera Creek Watershed, Larkspur, California. November 10, 2000. 120 pp. + Appendices.
- Rich, A. A. 2000. Aguas Frias Road Bridges-Impacts on Fishery Resources, Chico, Butte County, California. Prepared for Eco-Analysts, Chico, California. October 25, 2000. 29 pp.
- Rich, A. A. 2000. Oral Testimony of Alice A. Rich Presented to the California State Water Resources Control Board in the Matter of the Delta Wetlands Project Regarding Water Rights Applications 29062, 29066, 30268, and 30270 and Petitions to Change these Applications. September 15, 2000.
- Rich, A. A. 2000. Brookside Dock Expansion Environmental Assessment for Fishery Resources-Addendum. Prepared for Brookside Development Associates, Stockton. September 4, 2000. 67 pp. + Appendices.
- Rich, A. A. 2000. Brookside Dock Expansion Environmental Assessment for Fishery Resources. Prepared for Brookside Development Associates, Stockton, July 10, 2000. 6 pp. + Appendices.
- Rich, A. A. 2000. Potential impacts of the proposed Congregation Beth El Synagogue and School on the fishery resources of the Codornices Creek Watershed, Alameda County, California. Prepared for the City of Berkeley. June 26, 2000. 50 pp. + Appendix.
- Rich, A. A. 2000. Testimony of Alice A. Rich, Ph.D. Submitted to the State Water Resources Control Board by the California Department of Fish and Game Regarding the Yuba River Hearings. May 1, 2000.
- Rich, A. A. 2000. The potential impacts of the emergency work performed at the Kendall Ranch on the fishery resources of the Garcia River, Mendocino County. Prepared for Rawles, Hinkle, Carter, Behnke & Oglesby, Attorneys, Ukiah. February 9, 2000.
- Scientific Review Panel. 1999. Report of the Scientific Review Panel on California Forest Practice Rules and Salmonid Habitat. Prepared for The Resources Agency of California and the National Marine Fisheries Service, Sacramento, California, June, 1999. 92 pp + Appendices.
- Rich, A. A. 1999. FMC Phosphate Mine Expansion, Fishery Resources Technical Report. Prepared for FMC Corporation, Soda Springs, Idaho. February 5, 1999. 100 pages + Appendices.
- Rich, A. A. 1999. Fishery Resources Conditions in Pine and Mill Creek Watersheds, Rovana, Inyo County, California. Prepared for Inyo County. January 11, 1999. 48 pp + Appendices.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1999. Ventura River Fish Survey and Fish Relocation Results. Submitted to the National Marine Fisheries Service as part of Section 7 Consultation. January 4, 1999.
- Rich, A. A. 1999. Leeville Gold Mine Expansion Project, Carlin, Nevada. Fishery Resources Technical Report. Prepared for Newmont Gold Company, Carlin, Nevada. January, 1999.
- Rich, A. A. 1998. Fishery Resources Conditions of Adobe Creek, Petaluma, Sonoma County, California. Prepared for the City of Petaluma. December 8, 1998. 46 pp.
- Rich, A. A. 1998. Assessment Plan for the Talache Mine Mill Tailings Site, Atlanta, Idaho. Prepared for Monarch Greenback, Boise, Idaho, April 14, 1998. 36 pp + Appendix.
- Rich, A. A. 1998. Talache Mine Tailings Project, Preliminary Review of Existing Information on Fishery Resources Conditions. Prepared for Monarch Greenback, Boise, Idaho. April 24, 1998. 71 pp + Appendices.
- Rich, A. A. 1997. Noyo River Fish Monitoring 1997 Summary Report. Prepared for the City of Fort Bragg, Fort Bragg, Mendocino, California. December 30, 1997. 36 pp + Appendix.
- Rich, A. A. 1997. Ord Ferry Road Bridge Seismic Retrofit Project, Impacts on Fishery Resources, Butte County, California. Prepared for Butte County. November 25, 1997. 27 pp + Appendix.
- Rich, A. A. 1997. Testimony of Alice A. Rich, Ph.D., Submitted to the State Water Resources Control Board, Regarding Water Rights Applications for the Delta Wetlands Project. July 1997, on behalf of the California Department of Fish and Game, Exhibit 7, 88 pp + Appendix.
- Rich, A. A. 1997. Novato Creek Flood Control Project, Marin County. Fishery Resources Conditions. Prepared for the County of Marin, California. June 19, 1997. 23 pp + Appendices.
- Rich, A. A. 1997. Stibnite Mine Expansion Payette National Forest Draft Fishery Resources Technical Report. Prepared for U.S. Forest Service, Payette National Forest, McCall, Idaho. April 25, 1997. 172 pp + Appendices.
- Rich, A. A. 1997. Aggregate Resources Management Plan for the Upper Russian River-Status of Fishery Resources. Prepared for Philip Williams & Associates, San Francisco. February, 1997. 98 pp + Appendices.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. and S. Li. 1997. Fishery Resources Assessment for a Project to Assign 15,000 Acre-Feet Per Year of Sacramento Municipal Utility District's (SMUD) American River Water Entitlement to Sacramento County. Prepared for Sacramento Municipal Utility District, Sacramento. 1997.
- Rich, A. A. 1996. Novato Creek Flood Control Project, Marin County. Fishery Resources Conditions from Diablo Avenue to Grant Avenue-Reconnaissance-Level Survey. Prepared for the County of Marin. May 31, 1996. 19 pp.
- Rich, A. A. 1995. Results of age analysis of fishes (English sole) from the Yukon and British Columbia. Prepared for Norecol Dames & Moore, British Columbia, Canada. December 19, 1995. 30 pp.
- Rich, A. A. 1995. The potential impacts of the Serra Estrellada Project on the Fishery resources of the Redwood Creek Drainage, Alameda County. Prepared for Alameda County, Hayward, California. October 2, 1995. 34 pp.
- Rich, A. A. 1995. Mitigation measures and habitat analysis for fishery resources of San Joaquin County-Habitat Conservation Plan. Prepared for Toyon Environmental Consultants, Kentfield, California. September 15, 1995. 12 pp.
- Rich, A. A. 1995. The potential impacts of the Pearson Project on the fishery resources of West Union Creek, San Mateo County. Prepared for Friends of West Union Creek, Woodside, California. September 5, 1995. 43 pp + Appendix.
- Rich, A. A. 1995. Potential impacts of the Klyce Project on the fishery resources of Slide Gulch Creek in Mill Valley, Marin County. Prepared for the Babcock Family, Mill Valley, California. August 14, 1995. 23 pp + Appendix.
- Rich, A. A. 1995. Feasibility study to rehabilitate the fishery resources of the Arroyo Corte Madera del Presidio Watershed, Mill Valley, California. A. A. Rich and Associates. May 31, 1995. 74 pp + Appendices.
- Rich, A. A. 1994. West Lathrop Specific Plan Fishery Resources Assessment. Prepared for Sycamore Environmental Consultants, Sacramento, California. September 30, 1994. 61 pp.
- Rich, A. A. 1994. Central Valley Project Improvement Act Programmatic EIS: Anadromous Fish Restoration Projects. Prepared for Jones & Stokes Associates, Sacramento, California, August 31, 1994. 96 pp + Appendices.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1994. A reconnaissance-level study of the fishery resources of the Pilarcitos Creek Watershed. Prepared for the San Francisco Water Department, Millbrae, California. May 20, 1994. 49 pp + Appendices.
- Rich, A. A. 1994. The potential impacts of the Fort Bragg Water Resources Development Project on the Fishery Resources of the Noyo River, Mendocino County. Prepared for the City of Fort Bragg. May 4, 1994. 54 pp + Appendices.
- Rich, A. A. 1993. State of California Wildlife Conservation Board Boat Ramp Renovation Project-Fishery Resources. Prepared for Harland Bartholomew & Associates, Sacramento, California, December 3, 1993.
- Rich, A. A. 1993. Vallejo fishing pier replacement fishery resources assessment. Prepared for Greiner, San Ramon. November 26, 1993. 10 pp.
- Rich, A. A. 1993. A Reconnaissance-Level Survey of Existing Fishery Resources Habitat Conditions on the Lemelson Property, Incline Village, Nevada. Prepared for Jerome Lemelson, Incline Village, Nevada. September 29, 1993. 28 pp + Appendices
- Rich, A. A. 1993. Alameda Watershed Fishery Resources Evaluation of Existing Data. Prepared for the City and County of San Francisco. August 1993.
- Rich, A. A. 1993. Peninsula Watershed Fishery Resources Evaluation of Existing Data. Prepared for the City and County of San Francisco. August 1993.
- Rich, A. A. 1993. Fishery resources of Auburn Ravine and Pleasant Grove Creeks, Roseville, California. Prepared for ESA, San Francisco. February 16, 1993. 14 pp.
- Rich, A. A. 1993. Weber Creek Fishery Resources Evaluation of Existing Data. Prepared for ESA, Sacramento, February 5, 1993. 27 pp.
- Rich, A. A. 1993. Technical Memorandum on the Impacts of the Implementation of the Reclamation Reform Act on Aquatic Resources in the Central Valley. Prepared for the U.S. Bureau of Reclamation, Denver, Colorado, January, 1993. 71 pp + Appendix.
- Rich, A. A. 1992. Biological Assessment for Proposed Sewer pipeline, City of Sutter Creek, Amador, California. Prepared for Baracco and Associates, Sutter Creek. October 31, 1992. 26 pp + Appendix.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

REPRESENTATIVE PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1992. Feasibility study to rehabilitate the fishery resources of Easkoot Creek, Marin County. Prepared for the Environmental Action Committee of West Marin, Point Reyes Station. May 1992. 47 pp. + Appendices.
- Rich, A. A. 1992. Fishery Resources of Dry Creek and Pleasant Grove Creek, Roseville, California. Prepared for James M. Montgomery Consulting Engineers, Walnut Creek. January 6, 1992. 35 pp.
- Rich, A. A. 1991. Salmonid habitat conditions and population estimates in Forest Creek and the Middle Fork of the Mokelumne River, California. Prepared for East Bay Municipal Utility District. November 14, 1991. 55 pp. + Appendices.
- Rich, A. A. 1991. Pieta Creek Basin Stream Assessment: 1989-1991. Prepared for the Mendocino County Resource Conservation District, Ukiah, California. October 4, 1991. 52 pp + Appendices.
- Rich, A. A. 1991. Mortality and Stress on Salmonids as a Result of Fishery Resources Management Actions. Part 1: The Stressful Effects of Catch-and-Release Fishing on Salmonids. Prepared for Bangor Hydro-Electric Company, Bangor, Maine. May 31, 1991. 57 pp.
- Rich, A. A. 1991. The Impacts of Stress on Salmonids as a Result of Fishery Resources Management Actions. Part 2: The Stressful Effects of Handling, Transportation and Tagging on Salmonids. Prepared for Bangor Hydro-Electric Company, Bangor, Maine. August, 1991. 67 pp.
- Rich, A. A. and W. E. Loudermilk. 1991. Preliminary Evaluation of Chinook Salmon Smolt Quality in the San Joaquin Drainage. Prepared for the Calif. Dept. Fish and Game, Region 4, Fresno, California. February 18, 1991. 76 pp.
- Rich, A. A. 1991. The impacts of timber harvest practices on the fishery resources of the Navarro River Watershed, Mendocino County, California. Phase III: Fishery resources baseline surveys. Annual Report. Prep. for Louisiana-Pacific Corporation, Samoa, California. July 7, 1991. 109 pp. + Appendices.
- Rich, A. A. 1991. Potential impacts of the Casa de Fruta expansion on the fishery resources in Pacheco Creek, Santa Clara County, California. Prep. for David Powers & Associates, San Jose. February 15, 1991. 14 pp + Appendix.
- Rich, A. A. 1990. Pieta Creek Basin Stream Assessment: 1989-1990. Prep. for the Mendocino County Resource Conservation District, Ukiah, California. October 1, 1990. 52 pp. + Appendices.
- Rich, A. A. 1990. Restoration of coho salmon and steelhead trout stocks in the Walker Creek Watershed, Marin County, California. Prep. for the California Coastal Conservancy. October, 1990.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

REPRESENTATIVE PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1990. The use of smolt and stress indicators as management tools in the San Joaquin Drainage, California. American Fisheries Society. Symposium Proceedings, September 18-22, 1990, Humboldt State University, Arcata, California.
- Rich, A. A. 1990. Salmonid habitat conditions in Sproul Creek, Humboldt County, California. Prepared for Barnum Timber Company, Eureka, California. August 31, 1990. 19 pp + Appendices.
- Rich, A. A. 1990. Route 85-Coyote Creek mitigation site conceptual revegetation plan: fishery resources conditions. Prepared for H. T. Harvey and Associates, Alviso, California. August 8, 1990. 26 pp + Appendix
- Rich, A. A. 1990. Salmonid habitat conditions in Baker Creek, Humboldt County, California. Prepared for Barnum Timber Company, Eureka, California. July 17, 1990. 41 pp + Appendices.
- Rich, A. A. 1990. Environmental assessment for the extension of an existing pier at the Croom Family residence, Crystal Bay, Lake Tahoe, Nevada. Prepared for Brisco Enterprises. May 2, 1990. 17 pp + Appendices.
- Rich, A. A. 1990. Environmental assessment for the extension of an existing pier at the McClean Family residence, Meeks Bay, Lake Tahoe, California. Prepared for Brisco Enterprises. May 2, 1990. 16 pp + Appendices.
- Rich, A. A. 1990. Codornices Creek fishery resources habitat survey and enhancement feasibility study. Prepared for the Department of Water Resources, Sacramento, California. February 28, 1990
- Rich, A. A. 1989. How does one assess the impacts of water temperatures on salmonids? Fifteenth Annual Conference of the Humboldt Chapter of the American Fisheries Society, April 22, 1989, Scotia, California.
- Rich, A. A. 1989. The cumulative impacts of timber harvest practices on the fishery resources of the Navarro River Watershed, Mendocino County, California. Phase I: Development of a methodology to be used to determine the existing fishery resource conditions in the Navarro River Watershed. Prepared for Louisiana-Pacific Corporation. February 15, 1989. 72 pp + Appendices.
- Rich, A. A. 1988. The Giacomini Summer Dam Environmental Assessment. Prepared for the Giacomini Family, Point Reyes Station, California. November 6, 1988. 24 pp + Appendix.
- Rich, A. A. 1988. A qualitative assessment of the salmonid habitat in Pilarcitos Creek from Main Street to the mouth of the creek, Half Moon Bay, California. Prep. for Bay Farms, San Ramon, California. July 20, 1988. 7 pp.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1988. A qualitative assessment of the proposed Stone Pine Center on the fishery resources of Pilarcitos Creek, Half Moon Bay, California. Prepare for Inwood Corporation, Woodside, California. July 18, 1988.
- Rich, A. A. 1988. A qualitative fisheries survey of Pacheco Creek, Novato, California. Prepare for EIP Associates, San Francisco, California. April 10, 1988. 9 pp.
- Rich, A. A. 1988. Results of a fisheries survey in the tidal embayment adjacent to Coyote Creek, Alameda County, California. Prep. for Zentner and Zentner, San Francisco, California, March 15, 1988. 13 pp.
- Rich, A. A. 1988. Assessment of water availability and potential conflicts of streamflow withdrawals on rainbow and brown trout in Canyon Creek, El Dorado County, California. Prepared for Eagle Hydro Partners, Millbrae, California,. February 29, 1988. 14 pp + Appendix.
- Rich, A. A. 1988. Growth and food conversion efficiency of American River juvenile salmon at different temperatures. Twenty-Third Annual Cal-Neva American Fisheries Conference, February 5-6, 1988, Ventura, California.
- Rich, A. A. 1988. Qualitative fisheries survey in Richardson Bay, California. Prepared for Martin Jarvis, Attorney, San Francisco, California. February 2, 1988. 8 pp.
- Rich, A. A. 1987. The status of knowledge of the steelhead trout, coho salmon, the white sturgeon, the tidewater goby and the opossum shrimp in Lagunitas Creek and its estuary. Prepare for North Marin Water District, Novato, California. , November 25, 1987. 62 pp + Appendices.
- Rich, A. A. 1987. Report on studies conducted by Sacramento County to determine the temperatures which optimize growth and survival in juvenile chinook salmon (*Oncorhynchus tshawytscha*). Prepared for the County of Sacramento, California. April, 1987. 52 pp + Appendices.
- Rich, A. A. 1986. Fishery resource habitat assessment in the watersheds of Salmon Creek, Willow Creek, the Estero Americano, and Cheney Gulch in Sonoma County, California. Prepared for Circuit Rider Productions, Windsor, California. November 17, 1986.
- Rich, A. A. 1986. The potential impact of rubber tires on the fishery resources of Phoenix Lake, Marin County, California. Prep. for Marin Municipal Water District, Corte Madera, California. October 24, 1986. 16 pp.
- Rich, A. A. 1986. The potential role of the lunar cycle and photoperiod in the stranding of juvenile chinook salmon (*Oncorhynchus tshawytscha*) in the Skagit River, Washington. Prepared for R. W. Beck and Associates, Seattle, Washington. July 8, 1986. 20 pp.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

REPRESENTATIVE PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1986. Fishery issues associated with water diversions: the American River versus the Sacramento-San Joaquin Delta. Prepared for the County of Sacramento, California. February, 1986. 26 pp.
- Rich, A. A. 1985. Supplemental temperatures analysis. Prepared for the County of Sacramento, California. May 17, 1985. 24 pp + Appendices.
- Rich, A. A. 1985. Re-evaluation of fall chinook salmon spawning escapement estimates in the lower American River. Prepared for the County of Sacramento, California. March 31, 1985. 17 pp.
- Rich, A. A. 1985. Finfishery resources off Grays Harbor, Washington. Prepared for Shapiro and Associates, Seattle, Washington. December 3, 1985. 43 pp.
- Rich, A. A. 1985. Fishery resources off Willapa Bay, Washington. Prepared for Shapiro and Associates, Seattle, Washington. July 15, 1985. 29 pp.
- Rich, A. A. 1985. Existing finfishery resources in the water adjacent to Eagle Harbor, Cypress Island, Washington. Prep. for Shapiro and Associates, Seattle. February 21, 1985. 22 pp.
- Rich, A. A. 1984. Big Soos Creek fishery resource inventory, analysis, and enhancement plan. Prepared for Richard Carothers Associates, Landscape Architects, Seattle, Washington. September, 1984. 35 pp.
- Rich, A. A. 1984. Herring spawn adjacent to the proposed Kiewit Marine Facility, Whatcom County, Washington. Prep. for Kiewit Construction Company, Bellingham, Washington. February, 1984. 59 pp.
- Rich, A. A. 1984. Evaluation of existing water quality conditions in Whatcom Creek and recommendations for the design of a water treatment facility at the Maritime Heritage Center in Bellingham, Washington. Prepared for Callen Construction Company, Custer, Washington. July, 1984. 59 pp.
- Rich, A. A. 1984. Herring spawn adjacent to the proposed Kiewit Marine Facility, Whatcom County, Washington. Prep. for Kiewit Construction Company, Bellingham, Washington. February, 1984. 59 pp.
- Rich, A. A. 1983. Smolting: circulating catecholamine and thyroxine levels in coho salmon (*Oncorhynchus kisutch*). Ph.D. Dissertation, University of Washington, Seattle. 97 pp.
- Plisetskaya, E., A. A. Rich, W. W. Dickhoff, and A. Gorbman. 1982. A study of triiodothyronine-catecholamine interactions: their effect on plasma fatty acids in Pacific hagfish, *Eptatretus stouti*. Comparative Biochemistry and Physiology. 1982.

A.A. RICH AND ASSOCIATES



ALICE A. RICH, PH.D., PRINCIPAL

RÉSUMÉ

REPRESENTATIVE PUBLICATIONS AND PAPERS PRESENTED (Cont.)

- Rich, A. A. 1980. The effects of domestication upon the levels of noradrenaline, glucose and lactate dehydrogenase in resting and exercised rainbow trout. *American Zoology*. 20(4): 800.
- Rich, A. A. 1980. Feasibility of managing resident trout in Williamson Creek, Washington. Prep. for the U. S. D. A., Forest Service. September 18, 1980. 44 pp + Appendices.
- Rich, A. A. 1979. The use of stress to quantitate the survival potential of three strains of trout. M. S. Thesis, University of Washington, Seattle. 65 pp.

Development of a Bioenergetics Model for Humpback Chub and Evaluation of Water Temperature Changes in the Grand Canyon, Colorado River

JAMES H. PETERSEN*

U.S. Geological Survey, Western Fisheries Research Center, Columbia River Research Laboratory, 5501 Cook-Underwood Road, Cook, Washington 98605, USA

CRAIG P. PAUKERT¹

U.S. Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center, 2255 North Gemini Drive, Flagstaff, Arizona 86001, USA

Abstract.—The construction of Glen Canyon Dam above the Grand Canyon (Arizona) has reduced the water temperature in the Colorado River and altered the growth rate and feeding patterns of the federally endangered humpback chub *Gila cypha*. A bioenergetics model for humpback chub was developed and used to examine how warmer water temperatures in the lower Colorado River (achieved through a temperature control device [TCD] at Glen Canyon Dam) might influence their growth rate and food requirements. Parameter values for humpback chub were developed by Monte Carlo filtering and fitting to laboratory growth. Parameter bounds were established from the literature for *Gila* species, random parameter sets were selected within these bounds, and the growth of modeled humpback chub was compared with criteria from a laboratory growth experiment at 24°C. This method of parameter estimation could be applied to other imperiled fishes where physiological studies are impractical. Final parameter values were corroborated by comparison with the growth rates of humpback chub from independent field and laboratory studies. Simulations indicated that increasing water temperatures from approximately 9°C to 16°C during summer and fall, the change expected from the TCD, may have a minimal effect on humpback chub growth rate unless food availability also increases with temperature. To evaluate the effects of increased temperatures on humpback chub in the lower Colorado River, it will be essential to monitor their growth rate, the invertebrate community, and the predators of humpback chub, which are also influenced by temperature changes. Bioenergetics models for humpback chub and their predators should be helpful tools for identifying potential scenarios and evaluating the complex interactions resulting from a TCD.

The native fish community in the southwestern United States has changed dramatically over the last 100 years because of watercourse changes, introduction of nonnative species, destruction of spawning habitat, and degraded water quality (Minckley and Deacon 1991; Mueller and Marsh 2002). Humpback chub *Gila cypha* is native in the Colorado River Basin and has been listed as a federally endangered species since 1967 (USFWS 2002). Humpback chub is a large cyprinid that reaches a maximum size of about 480 mm and 1.2 kg. One of the largest populations of humpback chub occurs in the Colorado River in Grand Can-

yon below Glen Canyon Dam (USFWS 2002). Smaller populations occur above Glen Canyon Dam in the upper Colorado River, in Green River, and in Yampa River (USFWS 1990; Douglas and Marsh 1996; USFWS 2002).

Plans to facilitate the recovery of humpback chub populations have been developed and were recently revised by the U.S. Fish and Wildlife Service (USFWS 2002). These plans include specific alternatives for “downlisting” and “delisting” the species, assuming there are improvements in adult numbers, better recruitment of age-3 fish, at least three viable populations, and removal or minimization of specific threats (USFWS 2002). The most serious threats to the recovery of the Grand Canyon population include streamflow and temperature modifications caused by Glen Canyon Dam, parasitism, competition with nonnative fishes, and predation by nonnative species, especially rainbow trout *Oncorhynchus mykiss* and brown trout *Salmo trutta* (USFWS 1990, 2002).

* Corresponding author: jim.petersen@usgs.gov

¹ Present address: U.S. Geological Survey, Kansas Cooperative Fish and Wildlife Research Unit, Division of Biology, Kansas State University, 205 Leasure Hall, Manhattan, Kansas 66506, USA.

Received May 28, 2004; accepted March 14, 2005

Published online June 22, 2005

Alternatives to minimize or remove threats to humpback chub recovery have been discussed and planned for over a decade (USFWS 1990). Removal of potential predators, competitors, or both is a management action that is currently underway. Rainbow trout prey on juvenile and subadult humpback chub (Valdez and Ryel 1995) and may be an important source of mortality. In 2003, over 6,000 rainbow trout were removed from the Colorado River in the reaches above and below the confluence of the Little Colorado River, a major spawning site and nursery habitat for this population of humpback chub. This removal program reduced the local trout population by about 90% (Grand Canyon Monitoring and Research Center, U.S. Geological Survey [GCMRC], unpublished).

Installation of a temperature control device (TCD) at Glen Canyon Dam is another management action being discussed. Hypolimnetic water from Glen Canyon Dam is released into the lower Colorado River causing temperatures to be 9–12°C year-round; the historic temperature range is about 2–26°C (Kaeding and Zimmerman 1983; Stevens et al. 1997). Modifications to Glen Canyon Dam being considered would enable water managers to release warmer surface water into the lower Colorado River during part of the year (USDI 1999). Warmwater releases would partially simulate the historic temperature patterns and would presumably improve the growth rates of humpback chub. Warmer water would also minimize temperature shock for juvenile humpback chub entering the Colorado River from warmwater tributaries, thus increasing their rate of survival. However, there has also been speculation that warmer water could increase competition, predation mortality, or both for humpback chub by altering the feeding patterns or increasing the growth rates of rainbow or brown trout (USDI 1999; Robinson and Childs 2001).

Predictive tools are needed to assist managers and researchers in evaluating the potential outcomes of actions such as predator removal and temperature modifications in large river systems. Models that integrate physical factors such as temperature and biological processes such as feeding rates should be especially useful, allowing managers to run divergent scenarios and eliminate actions with little chance of success. We developed a bioenergetics model for humpback chub and applied the model to simulate how water temperature changes may influence the growth rate and food requirements of humpback chub. Results are discussed in the context of management options,

needs for specific data to improve the model, and data needed to test hypotheses in the field.

Methods

Humpback chub model development and parameter estimation.—The general bioenergetics model is

$$G = C - (R + \text{SDA} + F + E),$$

where G is growth, C is consumption, R is respiration, SDA is specific dynamic action, F is excretion, and E is egestion (Jobling 1994; Hanson et al. 1997). Consumption was modeled as

$$C = C_{\max} \cdot p \cdot f(T),$$

where $C_{\max}$ is the maximum rate of food intake for an individual of a given size, p is a proportionality constant that scales consumption according to food availability, and $f(T)$ is a temperature dependence function. The maximum rate of food intake, $C_{\max}$, is an allometric function of fish mass W (g), namely,

$$C_{\max} = CA \cdot W^{\text{CB}},$$

where CA and CB are fit parameters. Respiration is modeled as

$$R = (RA \cdot W^{\text{RB}}) \cdot f(T) \cdot \text{ACT},$$

where ACT is a multiplier for fish activity and RA and RB are allometrically fit parameters. We used the warmwater form for the temperature (T) dependence of C and R (Kitchell et al. 1977; equation (2) in Hanson et al. 1997), which allows specification of optimal (CTO , RTO) and maximal (CTM , RTM) temperatures and includes a measure similar to Q_{10} , the factor by which a physiological rate increases with a 10°C increase, that approximates the rate at which the function increases over relatively low water temperatures (CQ , RQ). For C , the temperature function is

$$f(T) = V^X \cdot e^{[X \cdot (1-V)]},$$

where

$$V = (\text{CTM} - T)/(\text{CTM} - \text{CTO});$$

$$X = \{Z^2 \cdot [1 + (1 + 40/Y)^{0.5}]^2\}/400,$$

$$Z = \log_e(\text{CQ}) \cdot (\text{CTM} - \text{CTO}), \text{ and}$$

$$Y = \log_e(\text{CQ}) \cdot (\text{CTM} - \text{CTO} + 2).$$

The respiration temperature function has the same form, but CTM , CTO , and CQ are replaced by RTM , RTO , and RQ , respectively. These temperature-dependence equations have been used to

TABLE 1.—Bioenergetic parameters derived from the peer-reviewed literature for cyprinids. Mass and temperature are the ranges studied or modeled. Abbreviations are as follows: CTO = optimal temperature for consumption; RTO = optimal temperature for respiration; CTM = maximum temperature for consumption; RTM = maximum temperature for respiration; CQ and RQ = the rates at which the temperature function increases at relatively low water temperatures for consumption and respiration, respectively; CA and CB = the intercept and slope of the function for the maximum rate of consumption; and NA = not available from publication. See Text for more details.

Species	Mass (g)	Temperature (°C)	CTO, RTO (°C)	CTM, RTM (°C)
Bream <i>Abramis brama</i>	71–345	9–26	25.8 ^b , –	27.8 ^b , –
Bleak <i>Alburnus alburnus</i>	<1	20	–, –	–, –
Silver bream <i>Blicca bjoerkna</i> ^c	111–211	9–26	25.8 ^b , –	27.8 ^b , –
Gibel <i>Carassius auratus gibelio</i>	857–1,144	9–26	25.8 ^b , –	27.8 ^b , –
Common carp <i>Cyprinus carpio</i>	473–1,331	9–26	25.8 ^b , –	27.8 ^b , –
	800–1,200	6–15	–, –	–, –
Utah chub <i>Gila atraria</i>	<1–41	6–22	–, 22	–, 24 ^b
Mohave tui chub <i>Gila bicolor mohavensis</i>	NA	18–30	–, 32 ^d	–, 35
Northern redbelly dace <i>Phoxinus eos</i>	1–3	5–24	26, 29	29, 32
Eurasian minnow <i>Phoxinus phoxinus</i>	<3.0	5–15	15 ^b , 15 ^b	17 ^b , 17 ^b
Fathead minnow <i>Pimephales promelas</i>	<1–6	20–25	24.0, 28.0	30.0, 33.0
Northern pikeminnow <i>Ptychocheilus oregonensis</i>	500–2,000	5–21	29.9, 21 ^b	27.0, 23 ^b
Colorado pikeminnow <i>Ptychocheilus lucius</i>	1–3	15–30	25, –	30, –
Speckled dace <i>Rhinichthys osculus</i>	<1–7	6–22	–, 18	–, 20 ^b
Roach <i>Rutilus rutilus</i>	20–239	9–26	25.8 ^b , –	27.8 ^b , –
	20–70	10–21	27, 30	30, 33

^a 1, Black and Bulkley (1985); 2, Cech et al. (1994); 3, Cui and Wootton (1988a; 1988b; 1989a; 1989b); 4, Duffy (1998); 5, He (1986); 6, Hofer et al. (1982; 1985); 7, Horppila and Peltonen (1997); 8, Keckeis and Schiemer (1990; 1992); 9, McClanahan et al. (1986); 10, Petersen and Ward (1999); 11, Rajagopal and Kramer (1974); 12, Specziar (2002); 13, Stecyk and Farrell (2002); 14, Vigg and Burley (1991).

^b No observed maximum in study; optimum was the highest tested or observed temperature; maximum was optimum plus 2°C.

^c Also known as *Abramis bjoerkna*.

^d Estimate.

^e Active oxygen consumption.

model warm- and cool-water species such as yellow perch *Perca flavescens*, fathead minnow *Pimephales promelas*, dace *Phoxinus* spp., largemouth bass *Micropterus salmoides*, and smallmouth bass *M. dolomieu* (Kitchell et al. 1977; Rice et al. 1983; Duffy 1998). Specific dynamic action (SDA) was assumed to be 0.15 (He 1986; Shuter and Post 1990). We assumed that egestion, *F*, and excretion, *E*, were constant proportions (0.1) of consumption (Hanson et al. 1997; Duffy 1998).

Since species-specific parameters were not available for humpback chub, a Monte Carlo filtering method was used to develop and test model parameters (Rose et al. 1991; Petersen and Gadomski 1994). Monte Carlo filtering is a procedure for randomly sampling within a range of parameter values in a model, running the simulation model with these parameter values to produce some output, and statistically comparing the output to a test criterion, which may be from field or laboratory studies (Rose et al. 1991). If model output is not different from the test criterion, then the particular parameter value or set of parameter values are assumed to be acceptable. Numerous iterations of the simulation model can be conducted, each with

a different random set of parameter values, eventually generating many sets of parameter values. To decide on the final parameter values among the acceptable sets, central tendency, ranking, or other techniques can be applied.

We first assumed that taxonomic relationships, especially fish in the same genus as humpback chub, could be used to set the upper and lower bounds on parameters for consumption and respiration in a bioenergetics model. Peer-reviewed literature was surveyed for energetic studies on cyprinids, particularly those studies that contained allometric and temperature-dependent functions or data. From this literature, we collated as many of the specific parameters as possible, along with the size range of fish studied and the temperature over which experiments were conducted (Table 1). For some studies we were able to use data in tables or figures to calculate specific parameters. Tabulated parameter values for *Gila* spp. were used to establish upper and lower bounds for Monte Carlo filtering. Because we did not have bounds on all parameters for *Gila* spp. (Table 1), we used fathead minnow as the next most “similar” species, knowing that fathead minnow is successful in the lower

TABLE 1.—Extended.

Species	CQ, RQ	CA, CB	RA, RB	Source ^a
Bream <i>Abramis brama</i>	1.07, –	–, –	–, –	12
Bleak <i>Alburnus alburnus</i>	–, –	0.522, –0.22	0.069, –0.31	8
Silver bream <i>Blicca bjoerkna^c</i>	2.06, –	–, –	–, –	12
Gibel <i>Carassius auratus gibelio</i>	1.04, –	–, –	–, –	12
Common carp <i>Cyprinus carpio</i>	2.23, –	–, –	–, –	12
	–, 2.6	–, –	–, –	13
Utah chub <i>Gila atraria</i>	–, 2.2	–, –	0.03, –0.032 (22 °C)	11
Mohave tui chub <i>Gila bicolor mohavensis</i>	–, –	–, –	0.00045, –0.118	9
Northern redbelly dace <i>Phoxinus eos</i>	2.3, 2.1	0.36, –0.31	0.0148, –0.2	5
Eurasian minnow <i>Phoxinus phoxinus</i>	–, 2.83	0.110, –0.194	0.00017, –0.45	3
Fathead minnow <i>Pimephales promelas</i>	2.4, 2.6	0.149, –0.242	0.0096, –0.041	4
Northern pikeminnow <i>Ptychocheilus oregonensis</i>	2.04, 2.96	0.278, –0.197	0.00165, –0.285	2, 10, 14
Colorado pikeminnow <i>Ptychocheilus lucius</i>	–, –	–, –	–, –	1
Speckled dace <i>Rhinichthys osculus</i>	–, 1.22	–, –	0.047 ^e , –	11
Roach <i>Rutilus rutilus</i>	1.61, –	0.595, –0.27	0.065, –0.22	6, 12
	3.0, 3.1	0.3, –0.15	0.0188, –0.28	7

Colorado River, occupies a similar ecological niche in the Grand Canyon (Kaeding and Zimmerman 1983), and probably has a similar diet and physiology as small humpback chub.

For developing the *Gila* spp.–humpback chub model, the parameter bounds for optimum consumption and respiration were set from 22°C to 32°C (Tables 1, 2). We increased the upper bound of temperature for the maximum consumption or respiration parameter to 35°C (range 22–35°C), assuming that humpback chub and most *Gila* spp. had evolved in a seasonal environment that might

be warmer than parameters representing many of the cyprinids tabulated in Table 1. We had no explicit estimates of CA or CB for *Gila* spp. (Table 1), so we used an arbitrary range around values measured for fathead minnow (Duffy 1998). For the Q_{10} parameters, 2.1 was the low bound, slightly less than the 2.2 for respiration Q_{10} observed for Utah chub (Table 1), and 2.7 was the high bound, slightly higher than the respiration Q_{10} for fathead minnow. The test range for the allometric respiration parameters was slightly higher and lower than the range observed for Utah chub and Mohave

TABLE 2.—Range of parameter values used in Monte Carlo filtering for a humpback chub bioenergetics model. Parameters not included were fixed and were not determined by filtering (see Table 5). The consumption and respiration Q_{10} approximates the rate at which the function increases.

Parameter abbreviation	Description	Range
Consumption		
CA	Intercept	0.11 to 0.2
CB	Slope	–0.3 to –0.2
CQ	Consumption Q_{10}	2.1 to 2.7
CTO	Optimum temperature	22 to 32
CTM	Maximum temperature	22 to 35
p	Proportion of maximum consumption	0.0 to 1.0
Respiration		
RA	Intercept	0.0004 to 0.01
RB	Slope	–0.15 to –0.02
RQ	Respiration Q_{10}	2.1 to 2.7
RTO	Optimum temperature	22 to 32
RTM	Maximum temperature	22 to 35
ACT	Activity	0.5 to 2.0

tui chub (Table 1). Activity had bounds of 0.5–2.0, and p was allowed to range from 0.0 to 1.0 (Table 2).

A laboratory growth experiment conducted at 24°C by Gorman and VanHoosen (2000) was used to establish the test criteria for Monte Carlo filtering. Gorman and VanHoosen (2000) conducted growth experiments at three temperatures (12, 18, and 24°C) with four native fishes of the Colorado River, including humpback chub. Their experiments were conducted from January through September, starting with fish that were approximately 4 g. We used results from experiments at the highest temperature, 24°C, assuming this would give the best estimates of optimum growth for these warmwater fish. Fish were fed flaked krill, commercial pelletized feed (Silvercup #2), and thawed frozen brine shrimp three times daily (morning, midday, and early evening). Fish were offered 12% of their body weight daily, and tanks were siphoned daily to remove excess food; however, the amount of food that was uneaten was not reported. In Gorman and VanHoosen's experiment, humpback chub started at 3.9 g and grew to 21.7 g over a 238-d period (Figure 1A).

A bioenergetics model was constructed to grow simulated fish, and Monte Carlo methods were used to sample parameters within reasonable bounds (Table 2). Simulated fish started at 3.9 g and were grown for 238 d at 24.2°C, the measured temperature (Gorman and VanHoosen 2000). To test the adequacy of a randomly drawn parameter set, the size of the modeled fish was compared to the observed size halfway through the growth period (120 d; 12.3 g) and at the end of the growth period (238 d; 21.7 g). To be acceptable and included for further analysis, a parameter set had to produce growth of modeled fish that was within one standard error of the mean observed size at the halfway point and the end of the experiment. Preliminary parameter filtering indicated that testing only the final size of fish was insufficient because certain parameter sets met the end criteria, but size trajectories were largely outside the general pattern of growth (Figure 1B).

Monte Carlo sampling of temperature-related parameters for consumption and respiration required special attention. In the formulations that we used for temperature functions, optimum and maximum temperature parameters were required and were thus sampled in the Monte Carlo program. The optimum temperature was assumed to be no greater than the temperature of the laboratory growth experiment used to fit parameters

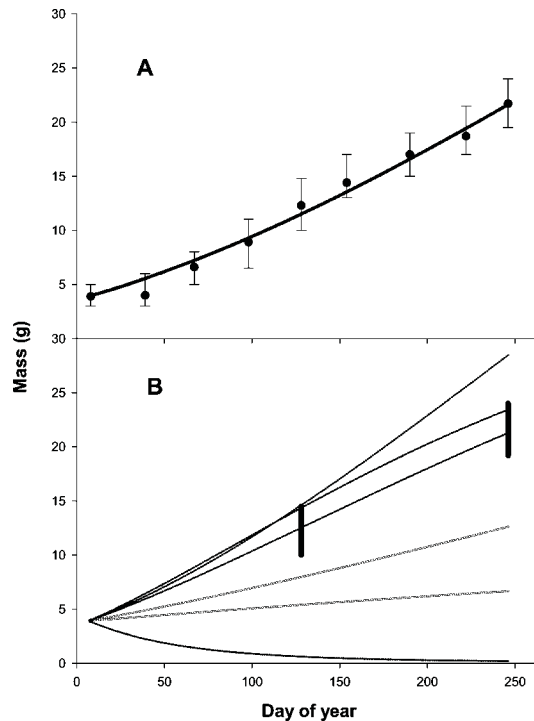


FIGURE 1.—Fit of a bioenergetics model to humpback chub growth. In panel (A) average parameter values from Monte Carlo filtering were used to simulate the growth of a subadult humpback chub (solid line), which was compared with the observed laboratory growth at 24°C (means [circles] $\pm$ SEs). In panel (B) examples of growth trajectories are shown, each with a different set of randomly chosen parameter values. In this example, two of the six trajectories met the growth criteria (vertical heavy bars), which were based on laboratory size on days 128 and 246 (see panel A). Laboratory data are from Gorman and VanHoosen (2000).

(24°C), and the optimum temperature was less than the maximum temperature, that is,

$$\begin{aligned} & \text{temperature of experiment} \\ & \leq \text{optimum temperature} \\ & < \text{maximum temperature.} \end{aligned}$$

This rule was applied to both the consumption (CTO, CTM) and the respiration (RTO, RTM) parameters. Although the optimum temperature might have been less than the temperature used in the growth experiment (24°C), Gorman and VanHoosen (2000) as well as other information suggest that optimum temperature for humpback chub is likely quite high and is above 24°C because they evolved in environments where temperatures were often above this value (Stevens et al. 1997).

Without inclusion of such a rule, it would be possible to get nonsensical parameter sets from Monte Carlo sampling, such as optimum is greater than maximum temperature because other random parameter combinations might “compensate” for temperature parameters, allowing growth to fit the test criteria.

Many parameter sets produced low or high growth rates that did not fit test criteria, whereas other parameter sets grew model fish that fit the test criteria at either the intermediate or the final time but not at both test times (Figure 1B). Some combinations of selected parameter values produced growth of humpback chub that matched size in the 24°C laboratory growth experiment (Figure 1B). Using the average parameter values from all acceptable sets, modeled growth closely matched laboratory growth (Figure 1A). Specific values of model parameters are discussed in the Results section.

Final parameter selection, model corroboration, and sensitivity.—Fitting parameters with the Monte Carlo model could be accomplished by assuming that fish in the feeding experiment have fed at either their maximum rate or some rate below the maximum rate. Although humpback chub were offered a 12% ration in the growth experiment (Gorman and VanHoosen 2000), fish might have fed below their maximum consumption rate if temperature was not optimum, there was interference competition, or the food sources were not ideal. For corroboration and final selection of parameter values, we conducted Monte Carlo sampling of parameters to fit the 24°C growth experiment under two assumptions: (1) satiation, i.e., food availability was maximum and humpback chub were feeding at their maximum consumption rate ($p = 1.0$), and (2) below satiation, i.e., humpback chub in growth experiments were feeding at some level below maximum consumption, so p was allowed to vary during parameter fitting between 0.0 and 1.0. For this second assumption, the p value was sampled as a random variable on each iteration of the Monte Carlo model, similar to other parameters.

To corroborate the humpback chub model and select final parameter values, we used independent growth rates of juvenile and subadult humpback chub from various field and laboratory sources; ran the model with appropriate diet, temperature, and fish size; and evaluated the range and average p values necessary to model observed growth. Growth under a variety of conditions that produced reasonable p values would corroborate that the

model was capable of producing a variety of growth patterns under different temperatures and conditions. An acceptable range of p values was approximately 0.2–0.8 (J. Kitchell, University of Wisconsin–Madison, personal communication). Data were not available on specific consumption rates and temperature, which might be used in a different type of corroboration of the model (e.g., Petersen and Ward 1999).

Growth rates of humpback chub in the field were from several sources. Robinson and Childs (2001) fit a von Bertalanffy growth model to juvenile humpback chub captured during 1991–1994 in the Little Colorado River (LCR), a spawning and rearing tributary of the Colorado River. We used this model to estimate size at monthly intervals and estimated p values assuming growth during the month and average LCR temperatures (taken from their Figure 1). Valdez and Ryel (1995) reported the average back-calculated size of humpback chub aged 1–4 years collected from the main-stem Colorado River, Grand Canyon, in 1992–1993. We used these sizes and average water temperature in the COR to estimate p values. Valdez and Ryel (1995) examined scales for transition checks to determine those fish that might have moved from the warm LCR ($>20^{\circ}\text{C}$) to the cold COR ($\sim 10^{\circ}\text{C}$) and concluded that there was “little or no survival of smaller fish descending from the LCR”; hence we assumed that fish used in this analysis likely grew under only the COR temperature regime. A von Bertalanffy growth model fit to recaptured humpback chub in the LCR (L. Coggins, GCMRC, unpublished analyses) was used to predict start and end size for three subadult size intervals (ages 1–4). Average water temperature in the LCR was used to model these fish. Where necessary, fork lengths (mm) were converted to mass (g) using the following regressions, which were derived from field collections of humpback chub (GCMRC, unpublished analyses). The first equation applies to main-stem Colorado River fish exceeding 150 mm in length, the second equation to main-stem Colorado River fish 30–150 mm in length, and the third equation to LCR fish 30–150 mm in length.

$$\log_{10}\text{weight} = -5.597 + 3.194(\log_{10}\text{length}),$$

$$r^2 = 0.93;$$

$$\log_{10}\text{weight} = -4.838 + 2.873(\log_{10}\text{length}),$$

$$r^2 = 0.93; \text{ and}$$

$$\log_{10}\text{weight} = -4.975 + 2.904(\log_{10}\text{length}),$$

$$r^2 = 0.90.$$

Results from laboratory growth experiments were also used in the corroboration process. Gorman and VanHoosen's (2000) experiments at temperatures different from 24°C were used in corroboration tests. Summer warming during their experiment caused the lower temperature treatment (12°C) to warm by about 2–3°C midway through the experiment. Gorman and VanHoosen (2000) concluded that there was no significant growth during the early period (~12°C; January to mid-June), but there was positive growth during the later period (14–15°C; mid-June to mid-September). Based on these results, we also separated the low-temperature treatment into two groups, a 13°C period and a 15°C period, for corroboration. Actual average temperatures for these two periods, 13.0°C and 14.8°C, were used in corroboration testing. Clarkson and Childs (2000) grew humpback chub for 90 d at 10, 14, and 20°C in the laboratory, and these results were also used in corroboration analyses.

Model sensitivity was explored in several ways. We inspected the coefficient of variation ($CV = 100 \times SD/mean$) of parameter values that met test criteria and examined the correlation coefficients of those accepted parameter sets. Sensitivity of the growth rate of juvenile and subadult humpback chub was examined by simulating growth at various temperature and food availability values. Juvenile (4.0 g) and subadult (115 g) humpback chub growth was modeled for 30 d at a given temperature (range 5–32°C) and p value (range 0.1–1.0). Daily growth rates were averaged during this period and results were presented in a response surface plot.

Bioenergetic simulations of potential temperature control device scenarios.—To demonstrate an application of the bioenergetic model for humpback chub in the lower Colorado River, we compared the growth rates and total consumption for juvenile and subadult humpback chub grown under three temperature scenarios (Figure 2): (1) pre-dam temperature conditions, (2) post-dam temperature conditions, and (3) increased temperature in May through October (TCD scenario). The TCD scenario corresponded to a potential management action that might be implemented to increase water temperature in the lower Colorado River (Figure 2). Pre- and post-dam simulations were conducted with the p equal to 0.65 (see Table 3). The TCD scenario was evaluated assuming no increase in food availability ($p = 0.65$) and with an increase in food availability due to temperature change ($p = 0.75$). Diet was constant in all simulations and growth was evaluated over a 1-year period. Diet

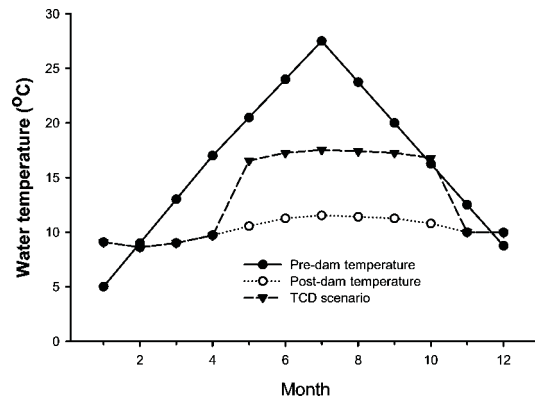


FIGURE 2.—Average monthly water temperatures in the Grand Canyon (lower Colorado River) before and after the construction of Glen Canyon Dam and for a potential temperature management scenario using a temperature control device (TCD). Temperature data are from U.S. Geological Survey at river mile 61 near the confluence with the Little Colorado River.

of humpback chub was taken from Valdez and Ryel (1995; Table 4). Energy densities of prey were from Cummins and Wuycheck (1971).

Results

Final Parameter Selection, Model Corroboration, and Sensitivity

Monte Carlo simulations with 10,000 iterations produced 273 acceptable data sets assuming satiation ($p = 1.0$) and 316 data sets assuming feeding in the growth experiment was below satiation ($0.0 < p < 1.0$). Assuming feeding was below satiation, the average value of p was 0.62 ($N = 316$).

When the two model parameter sets for humpback chub (i.e., those based on the satiation and below-satiation assumptions) were fit to field and laboratory growth, the satiation parameter values produced consistently higher food availability estimates (p) than the below-satiation parameter values (Table 3). Assuming satiation in the growth experiment, values of p in the corroboration tests ranged from 0.61 to 1.27 with an average of 1.02 (Table 3). Assuming fish were eating below satiation, p ranged from 0.34 to 0.81 and averaged 0.66 (Table 3). Values of p derived from laboratory experiments were somewhat lower than p values from field data (Table 3). Specific growth rates ranged from 0.0 to 3.0% per day; higher growth rates occurred with smaller fish and higher temperatures (Table 3). Based on the lower and more reasonable p values in this analysis, simulations in the remainder of this study used parameter val-

TABLE 3.—Corroboration results for the humpback chub bioenergetics model. The model was fit to laboratory and field growth rates and p -values (proportionality constants that scale consumption according to food availability) were determined. Two parameter sets were compared, one with satiation feeding ($p = 1.0$) and one with less than satiation feeding ($p < 1.0$).

Life stage	Period	Starting size (g)	Ending size (g)	Temperature (°C)	Specific growth rates (%/d)	Estimated <i>p</i> -value		Source ^a
						Parameters fit with <i>p</i> = 1.0	Parameters fit with <i>p</i> < 1.0	
Juvenile				Laboratory				
	90 d	0.07	0.14	10	0.3	0.61	0.41	2
	90 d	0.07	0.32	14	0.7	0.82	0.60	2
	90 d	0.07	1.02	20	1.3	0.98	0.73	2
	146 d	3.7	3.6	12	0.0	0.66	0.34	3
	92 d	3.6	5.3	15	0.2	0.92	0.57	3
	238 d	3.5	10.1	18	0.2	0.93	0.57	3
Subadult				Little Colorado River				
	May–Jun	0.01	0.06	20	3.0	1.03	0.71	4
	Jun–Jul	0.06	0.23	21	2.1	1.06	0.77	4
	Jul–Aug	0.23	0.63	21	1.4	1.04	0.81	4
	May–Jun	4.2	5.5	20	0.4	1.03	0.67	4
	Jun–Jul	5.5	7.2	21	0.4	1.06	0.69	4
	Jul–Aug	7.2	9.7	21	0.4	1.15	0.77	4
	Age 1–2	4.7	26.6	5.0–26.5	0.2	1.10	0.68	5
	Age 2–3	26.6	61.2	5.0–26.5	0.1	1.19	0.69	5
	Age 3–4	61.2	97.3	5.0–26.5	0.1	1.24	0.69	5
				Main-stem Colorado River				
	Age 1–2	5.4	19.8	9.1–11.5	0.2	1.18	0.75	1
Age 2–3	19.8	44.9	9.1–11.5	0.1	1.27	0.77	1	
Average						1.02	0.66	
Minimum						0.61	0.34	
Maximum						1.27	0.81	

^a 1, Valdez and Ryel (1995); 2, Clarkson and Childs (2000); 3, Gorman and VanHoosen (2000); 4, Robinson and Childs (2001); and 5, U.S. Geological Survey, Grand Canyon Monitoring and Research Center, unpublished.

ues that were derived by assuming feeding was below satiation in the laboratory growth experiment. Parameter values for the bioenergetic model for *Gila* spp.–humpback chub are provided in Table 5.

As expected, optimum and maximum temperatures for respiration and consumption were posi-

tively correlated (Pearson's product-moment correlation coefficient), as we included a rule that optimum temperatures could not be greater than maximum temperature. The correlation coefficient between RTO and RTM was 0.49 ($P < 0.0001$) and between CTO and CTM was 0.48 ($P < 0.0001$). The respiration intercept (RA) was strongly correlated with p (correlation coefficient 0.65; $P < 0.001$) and weakly correlated with RTO, RTM, and CA (correlation coefficient < 0.2 ; $P < 0.05$). Other correlation coefficients were not significant ($P > 0.05$).

Using the bioenergetics model, the growth rate of juvenile and subadult humpback chub was predicted to respond in a complex manner to changes in water temperature and food availability (Figure 3). When food availability was high, the maximum potential growth rate for juvenile (4 g) and subadult (115 g) humpback chub was at 27–28°C (Figure 3). At high food availability, the potential growth rate declined steadily when water temperature was below 25°C, but growth rate dropped rapidly when temperature was greater than 29°C

TABLE 4.—Energy density of prey (wet mass basis) and average contribution to diet for subadult humpback chub in the Grand Canyon. Diet is the average (ranges in parentheses) for spring, summer, and fall estimates (Valdez and Ryel 1995). Energy density is from Cummins and Wuycheck (1971).

Prey taxon or category	Diet contribution	
	Energy density (J/g)	Average composition of diet (%)
Simuliids	2,565	32 (20–39)
<i>Gammarus</i> spp.	3,389	32 (25–37)
Chironomids	2,744	7 (4–11)
<i>Cladophora</i> spp.	1,122	16 (16–17)
Other aquatic invertebrates	3,176	1 (1–1)
Terrestrial invertebrates	3,050	12 (4–19)

TABLE 5.—Final parameter values used in the bioenergetics model of juvenile and subadult humpback chub. Except for SDA, the consumption and respiration parameters, were based on Monte Carlo filtering of humpback chub growth at 24°C. The parameters for SDA, FA, and UA are from other species, so no variance was associated with these values.

Parameter abbreviation	Description	Mean (SD)	Coefficient of variation (%)
Consumption			
CA	Intercept	0.154 (0.027)	17
CB	Slope	−0.251 (0.028)	11
CQ	Consumption Q_{10}	2.39 (0.19)	8
CTO	Optimum temperature	28.1 (2.3)	8
CTM	Maximum temperature	31.5 (2.5)	8
Respiration			
RA	Intercept	0.0049 (0.0026)	53
RB	Slope	−0.084 (0.039)	47
RQ	Respiration Q_{10}	2.42 (0.17)	7
RTO	Optimum temperature	28.2 (2.3)	8
RTM	Maximum temperature	31.6 (2.4)	8
ACT	Activity	1.16 (0.41)	36
SDA	Specific dynamic action	0.15	
Excretion and egestion			
UA	Proportion of excretion	0.1	
FA	Proportion of egestion	0.1	

(Figure 3). Regardless of food availability, predicted growth rates for juvenile and subadult humpback chub were zero or negative at temperatures above approximately 31°C.

For juvenile humpback chub, the predicted growth rate was fairly constant across a broad range of temperatures (~5–25°C) when food availability was in the range of 0.4–0.6 (Figure 3A). For example, with a food availability of 0.5, growth rate varied little from 5 to 27°C. When food availability was relatively low ($p < 0.3$) growth rate was negative for all temperatures. For subadult humpback chub, growth rates were negative or zero when food availability was low ($p < 0.5$) for all temperatures examined (Figure 3B). The specific growth rates predicted across a fairly broad range of food availability and temperature is consistent with observed growth rates from laboratory and field studies (compare Figure 3 and Table 3), suggesting the model is operating within the expected range.

Bioenergetic Simulations of a Potential Temperature Control Device Scenario

Before the completion of Glen Canyon Dam in 1963, average monthly water temperature through the Grand Canyon ranged from about 5°C to 27°C (Figure 2). Since the dam was constructed, water temperature has varied across a narrow range (9–12°C; Figure 2). Bioenergetic model simulations suggest that before the dam was built, juvenile humpback chub may have grown from 4 to 22 g

during 1 year; since the dam, 4-g juveniles grow to only 12 g (Table 6). Over twice as much food was required to achieve the high rate of growth under high temperatures prior to dam construction (Table 6). When we assumed an increased summer–fall temperature from a TCD and average ($p = 0.65$) food availability, juvenile size at the end of 1 year increased 33% compared with the size predicted with post-dam temperatures (12 g versus 16 g; Table 6). Juvenile humpback chub would have to eat about 76 g of food (+58% relative to post-dam average conditions) to achieve this increase in size. With a slight increase in prey availability ($p = 0.75$), juvenile humpback chub grew to 24 g (+100%), requiring 106 g of prey (+121%; Table 6). Predicted growth of subadult humpback chub differed little between pre-dam, post-dam, and increased temperature scenarios. The food required to maintain this constant size varied from 378 g for post-dam conditions to 516 g (+37%) and 709 g (+88%) in the increased temperature and pre-dam conditions, respectively, due to the higher temperatures in these simulations. If prey availability increased ($p = 0.75$) during a TCD application, subadult humpback chub grew to 158 g (+28% relative to post-dam average conditions), requiring 657 g of prey (+74%; Table 6).

Discussion

Bioenergetics Model Development

Estimating bioenergetic parameters using the Monte Carlo sampling procedure was relatively

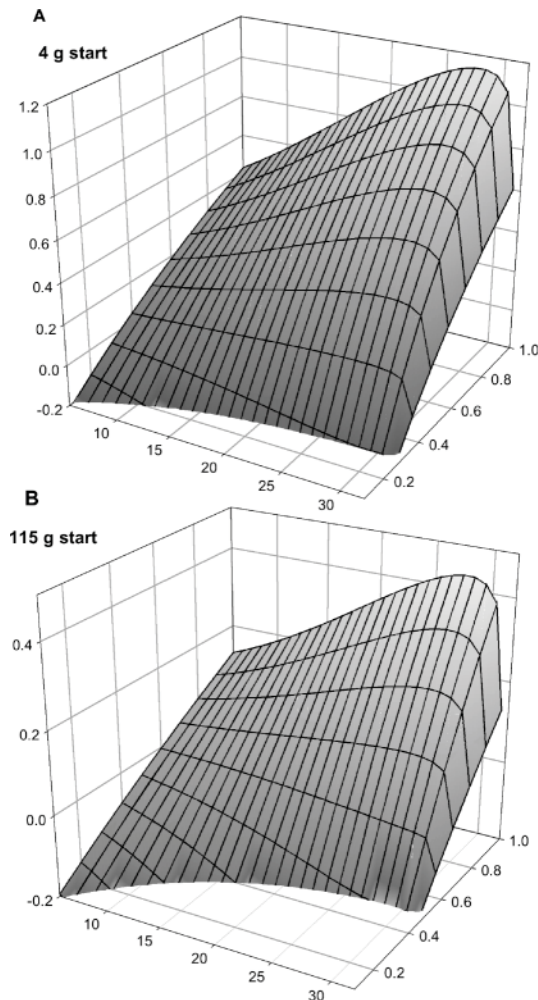


FIGURE 3.—Effect of varying food availability (p ; range, 0.1–1.0) and temperature (range, 5–32°C) on the growth of a (A) juvenile (starting size, 4 g) and (B) subadult (starting size, 115 g) humpback chub based on a bioenergetics model. Growth simulations were run over 365 d. Growth rates are hypothetical.

simple, and this methodology may have applications for other rare species. For many rare or imperiled species, researchers face problems obtaining collecting permits, obtaining a sufficient sample size because of limits on the total number of individuals that can be collected, and sampling an appropriate size range of fish from field populations. Laboratory work with endangered species may also be subject to strict regulations on the types of experiments that are allowed and the mortality rate for experimental groups. Rare, endangered, or imperiled species are, however, often of great concern to conservation and management

agencies, and thus bioenergetic models and analyses would be useful in decision making. The approach that we used relied upon fitting the model parameters to temperature-dependent growth, so we did not completely avoid some of the issues mentioned above. Growth experiments at different temperatures are, however, relatively easy to conduct, and mortality of test animals is usually low. The model we developed was further corroborated using values of p derived from observed growth rates of humpback chub in independent laboratory and field studies. Using the existing literature to obtain ranges in parameter values (such as those listed in Table 1 for cyprinids) for bioenergetics modeling provides a useful supplement to field and laboratory experiments.

Using growth experiments and Monte Carlo filtering to fit model parameters provided an alternative to simple “borrowing” of parameters from related species. Based on the coefficients of variation in humpback chub parameters fit with Monte Carlo sampling (Table 5), laboratory experiments on respiration rates (RA and RB), activity (ACT), and perhaps maximum consumption (CA and CB), could improve or corroborate this parameter set. The intercept and slope for respiration had high coefficients of variation (>45%; Table 5), suggesting a wide range of these parameter values were acceptable. Except for the ACT multiplier, the coefficients of variation for other parameters were much lower (<20%; Table 5), suggesting narrower ranges and variability for acceptable parameter values. Many other bioenergetic models have been shown to be highly sensitive to respiration and consumption parameters (e.g., Bartell et al. 1986; Duffy 1998; Petersen and Ward 1999). Laboratory or field experiments that provide specific estimates for these parameters could improve the humpback chub bioenergetics model.

The high correlation between RA and food availability is probably a result of the very broad range for RA that we allowed during Monte Carlo sampling. The bounds for RA allowed this parameter to vary by several orders of magnitude whereas other parameters were much more restricted (Table 2). When high values of RA were randomly selected, only parameter sets with quite high values of p would fit the test criteria of the growth experiment, thus the strong positive correlation between these parameters. The narrower range for other parameters did not allow for such a broad range of p values, causing lower correlation coefficients.

Corroboration of this model was indirect, using

TABLE 6.—Predicted growth and consumption for juvenile and subadult humpback chub in the Colorado River below Glen Canyon Dam based on a bioenergetics model and four temperature and food scenarios. Model fish were grown for 1 year. The start size for juvenile fish was 4 g; for Subadult was 115 g. Food availability (p) was 0.65 except for one simulation in which it was assumed to have increased to 0.75.

Predicted response (g)	Temperature and food scenario			
	Pre dam temperatures, $p = 0.65$	Post dam temperatures, $p = 0.65$	Increased temperature (May–Oct), $p = 0.65$	Increased temperature (May–Oct), $p = 0.75$
Juvenile				
Final size	22	12	16	24
Consumption	123	48	76	106
Subadult				
Final size	124	123	124	158
Consumption	709	378	516	657

p values and the potential response of growth rates to various conditions. Stronger corroboration testing might be done by comparing feeding rates from the field with model-predicted feeding rates; however, such data are difficult to obtain, are often highly variable, and depend themselves on various assumptions about times of feeding, temperature, prey size, and other factors (Adams and Breck 1990). We were able to simulate observed growth rates with reasonable p values at a broad range of temperatures and in two habitats where humpback chub occur (the Colorado and Little Colorado rivers), so the model and parameter estimates should be a useful tool for scientists and managers.

Temperature Control Device Implications

Water temperature has been identified as a possible cause of declines of native fishes in the Grand Canyon (Minckley 1991), and warmer water temperatures have been shown to improve the condition and swimming ability and to increase the growth rate of native fishes (Clarkson and Childs 2000; Meretsky et al. 2000; Ward et al. 2002). The implementation of a TCD on Glen Canyon Dam that will increase water temperatures 5–10°C in the Colorado River may also increase the growth rate of humpback chub if food availability increases simultaneously. Our simulations suggested that humpback chub growth rates were relatively constant at water temperatures between 5 and 25°C if food availability was constant at moderate levels. Higher growth rates were predicted at increased water temperature coupled with increased food availability. Water temperature can strongly influence consumption by fish, and individuals cannot feed at the same rate at low temperatures as they can at higher temperatures. Consumption typically peaks at an optimum temperature but declines

drastically above this optimum temperature (Jobling 1994). Therefore, a ration that produces positive growth at low temperatures is not likely to produce similar growth at high temperatures, and growth rate can decline with increased temperature and no concomitant change in ration. An evaluation of any management action for humpback chub that alters temperature must take into account prey availability and consumption across the range of expected temperatures.

Temperature changes following implementation of a TCD will likely cause complex changes at several trophic levels in the lower Colorado River, and these changes should be closely monitored (Poff et al. 1997). In particular, the abundance and species composition of invertebrates, the primary food base for fishes in the Grand Canyon (Valdez and Ryel 1995), should be monitored if a TCD is implemented. In other river systems, the response of invertebrate populations to increased temperatures has been mixed. An increase in water temperature of 2.3°C caused a decrease in the densities of invertebrates in a Canadian stream experiment, although growth rate of the invertebrates increased (Hogg and Williams 1996). At Flaming Gorge Dam in Utah, an increase of summer water temperature from 6 to 12°C did not change the taxa richness of invertebrates (Vinson 2001). Compared with other unregulated rivers in the region, the Colorado River in Grand Canyon has had a relatively depauperate invertebrate community following closure of Glen Canyon Dam (Stevens et al. 1997), suggesting the cool, stenothermal regime may have decreased species diversity and abundance. Although water temperature may be the most important variable in determining local invertebrate community dynamics in streams (Vannote and Sweeney 1980), other factors such

as turbidity and periphyton abundance may also be influential (Gore 1977; Vannote and Sweeney 1980). Temperature effects on nutrient cycling and production rates of invertebrates within the lower Colorado River will likely have a strong impact on humpback chub food sources.

Temperature is only one of the many hypothesized causes of native fish declines in the Colorado River, with flow regimes and nonnative fish introductions also influencing native fish populations. Abundant nonnative fishes such as fathead minnow, channel catfish *Ictalurus punctatus*, common carp, rainbow trout, and brown trout may be the most important factor in native fish declines (Minckley 1991). Warmer temperatures in the river may cause increased growth rates and possibly increased main-stem spawning by nonnative species that currently co-occur with humpback chub (Clarkson and Childs 2000; Robinson and Childs 2001). Warmer main-stem water temperatures may also increase the probability that fish such as striped bass *Morone saxatilis* will migrate up the Colorado River from downstream reservoirs, possibly increasing predation on humpback chub and other native fishes (Valdez and Leibfried 1999). The most proximate threat to humpback chub from nonnative predation is brown trout whose current mode of distribution is near Bright Angel Creek. Large brown trout have been observed feeding on adult humpback chub (L. Coggins, GCMRC, personal communication). Brown trout are also more tolerant than are rainbow trout to increased temperatures and are adapted to forage under low light conditions (Robinson and Tash 1979; Young 1999), commonly observed in the lower Colorado River.

The impacts of a TCD would directly influence the growth rates of predators such as rainbow trout and brown trout along with the rate of growth of small humpback chub that are prey to these predators. The size of prey that predators such as rainbow trout consume is often limited to a specific size range (Ware 1972; Vogel and Beauchamp 1999), so faster growth of prey can limit the duration of time that they are vulnerable to the predator. With increasing temperatures or variations in food availability in the lower Colorado River, this "window of vulnerability" would presumably shorten if the growth rate of juvenile humpback chub increased. The window of prey vulnerability depends upon growth rates of both the predators and their prey, which may differ with an altered temperature regime. Valdez and Ryel (1995) made some estimates of the maximum size of humpback

chub that could be consumed by brown trout, rainbow trout, and channel catfish of varying sizes, but they did not estimate the period of vulnerability during the year. Bioenergetic or other growth models could be used to evaluate further specific temperature and food scenarios and the potential importance of prey-to-predator size ratios (Cowan et al. 1996). If a TCD is installed and operated, predator and prey sizes should be monitored so specific predation hypotheses can be tested.

The model that we fit and applied is largely driven by water temperature and the diet of humpback chub and thus does not take into account some conditions that are believed to be important for the growth and survival of humpback chub in the lower Colorado River. Turbidity, for example, increases substantially below the Little Colorado River during certain periods and may reduce primary productivity (and therefore food availability, consumption, or both) through increased light attenuation (SWCA 1998). Asian tapeworms *Bothriocephalus acheilognathi* have also been observed in up to 78% of humpback chub and may represent a new threat in Grand Canyon, perhaps reducing the growth rate of native fishes (Clarkson et al. 1997; Brouder 1999). Turbidity and parasitic effects cannot be directly simulated with the bioenergetics model that we employed, although the model could be modified to incorporate these types of variables. Individual-based models, in particular, have been used to examine how turbidity or light influences foraging rate in fishes (Petersen and Gadomski 1994; Vogel and Beauchamp 1999). Beyers et al. (1999) have shown how stress or parasites might be modeled using a bioenergetics framework. As the specific objectives evolve for humpback chub recovery in the lower Colorado River, models and analyses that account for such factors as turbidity and stress may be necessary.

The bioenergetic modeling approach was applied to explore a few of the potential interactions and produced some nonintuitive results that can be used to develop testable hypotheses. Bioenergetic or modified models that consider turbidity and predator-prey size ratios could also be used with nonnative fishes such as rainbow trout and brown trout that have well-developed energetic parameter sets.

Acknowledgments

We appreciate the financial assistance and encouragement of Denny Fenn, Steve Gloss, Jeff Lovich, Jim Seelye, and Lyman Thorsteinson. Lew Coggins and the staff at the GCMRC offered help-

ful comments on parts of this work. Jim Kitchell provided numerous helpful suggestions, reviews, and encouragement, which we greatly appreciate. Dave Beauchamp, Dena Gadomski, Dave Ward, and two anonymous reviewers provided comments on various drafts of the manuscript.

References

- Adams, S. M., and J. E. Breck. 1990. Bioenergetics. Pages 389–415 in C. B. Schreck and P. B. Moyle, editors. *Methods for fish biology*. American Fisheries Society, Bethesda, Maryland.
- Bartell, S. M., J. E. Breck, R. H. Gardner, and A. L. Brenkert. 1986. Individual parameter perturbation and error analysis of fish bioenergetics models. *Canadian Journal of Fisheries and Aquatic Sciences* 43:160–168.
- Black, T., and R. V. Bulkley. 1985. Growth rates of yearling Colorado squawfish at different water temperatures. *Southwestern Naturalist* 30:253–257.
- Brouder, M. J. 1999. Relationship between length of roundtail chub and infection intensity of Asian fish tapeworm *Bothriocephalus acheilognathi*. *Journal of Aquatic Animal Health* 11:302–304.
- Beyers, D. W., J. A. Rice, W. H. Clements, and C. J. Henry. 1999. Estimating physiological costs of chemical exposure: integrating energetics and stress to quantify toxic effects in fish. *Canadian Journal of Fisheries and Aquatic Sciences* 56:814–822.
- Cech, J. J., Jr., D. T. Castelberry, T. E. Hopkins, and J. H. Petersen. 1994. Northern squawfish *Ptychocheilus oregonensis* O₂ consumption rate and respiration model: effects of temperature and body size. *Canadian Journal of Fisheries and Aquatic Sciences* 51:8–12.
- Clarkson, R. W., and M. L. Childs. 2000. Temperature effects of hypolimnial-release dams on early life stages of Colorado River basin big-river fishes. *Copeia* 2000:402–412.
- Clarkson, R. W., A. T. Robinson, and T. L. Hoffnagle. 1997. Asian tapeworm (*Bothriocephalus acheilognathi*) in native fishes from the Little Colorado River, Grand Canyon, Arizona. *Great Basin Naturalist* 57:66–69.
- Cowan, J. H., Jr., E. D. Houde, and K. A. Rose. 1996. Size-dependent vulnerability of marine fish larvae to predation: an individual-based numerical experiment. *ICES Journal of Marine Science* 1:23–27.
- Cui, Y., and R. J. Wootton. 1988a. Bioenergetics of growth of a cyprinid, *Phoxinus phoxinus*: the effect of ration, temperature, and body size on food consumption, faecal production, and nitrogenous excretion. *Journal of Fish Biology* 33:431–443.
- Cui, Y., and R. J. Wootton. 1988b. The metabolic rate of the minnow, *Phoxinus phoxinus* (L.) (Pisces: Cyprinidae), in relation to ration, body size, and temperature. *Functional Ecology* 2:157–161.
- Cui, Y., and R. J. Wootton. 1989a. Grouping fails to affect the growth and energy budget of a cyprinid, *Phoxinus phoxinus* (L.). *Journal of Fish Biology* 35:795–798.
- Cui, Y., and R. J. Wootton. 1989b. Bioenergetics of growth of a cyprinid, *Phoxinus phoxinus* (L.): development and testing of a growth model. *Journal of Fish Biology* 34:47–64.
- Cummins, K. W., and J. C. Wuycheck. 1971. Caloric equivalents for investigations of ecological energetics. *International Association of Theoretical and Applied Limnology Special Communication* 18:1–158.
- Douglas, M. E., and P. C. Marsh. 1996. Population estimates/population movements of *Gila cypha*, an endangered cyprinid fish in the Grand Canyon regions, Arizona. *Copeia* 1996:15–28.
- Duffy, W. G. 1998. Population dynamics, production, and prey consumption of fathead minnows (*Pimephales promelas*) in prairie wetlands: a bioenergetics approach. *Canadian Journal of Fisheries and Aquatic Sciences* 54:15–27.
- Gore, J. A. 1977. Reservoir manipulations and benthic macroinvertebrates in a prairie river. *Hydrobiologia* 55:113–124.
- Gorman, O. T., and R. R. VanHoosen. 2000. Experimental growth of four native Colorado River fishes at temperatures of 12, 18, and 24°C. U.S. Geological Survey, Grand Canyon Monitoring and Research Center report. Available: www.gcmrc.gov/library/reports/biological/Fish_studies/USFWS/Gorman2000D.pdf. (February 2005).
- Hanson, P. C., T. B. Johnson, D. E. Schindler, and J. F. Kitchell. 1997. Bioenergetics model 3.0 for Windows. University of Wisconsin, Sea Grant Institute, Technical Report WISCU-T-97-001, Madison.
- He, X. 1986. Population dynamics of northern redbelly dace (*Phoxinus eos*), finescale dace (*Phoxinus neogaeus*), and central mudminnow (*Umbra limi*) in two manipulated lakes. Master's thesis. University of Wisconsin, Madison.
- Hofer, R., H. Forstner, and R. Rettenwander. 1982. Duration of gut passage and its dependence on temperature and food consumption in roach, *Rutilus rutilus* L.: laboratory and field experiments. *Journal of Fish Biology* 20:289–299.
- Hofer, R., G. Krewedl, and F. Koch. 1985. An energy budget for an omnivorous cyprinid *Rutilus rutilus* (L.). *Hydrobiologia* 122:53–59.
- Hogg, I. D., and D. D. Williams. 1996. Response of stream invertebrates to a global warming thermal regime: an ecosystem-level manipulation. *Ecology* 77:395–407.
- Horppila, J., and H. Peltonen. 1997. A bioenergetic approach to food consumption of roach (*Rutilus rutilus* [L.]) in a eutrophic lake. *Archiv für Hydrobiologie* 139:207–222.
- Jobling, M. 1994. *Fish bioenergetics*. Chapman and Hall, London.
- Kaeding, L. R., and M. A. Zimmerman. 1983. Life history and ecology of the humpback chub in the Little Colorado and Colorado rivers of the Grand Canyon. *Transactions of the American Fisheries Society* 112:577–594.
- Keckeis, H., and F. Schiemer. 1990. Consumption, growth, and respiration of bleak, *Alburnus alburnus*

- (L.), and roach, *Rutilus rutilus* (L.), during early ontogeny. *Journal of Fish Biology* 36:841–851.
- Keckeis, H., and F. Schiemer. 1992. Food consumption and growth of larvae and juveniles of three cyprinid species at different food levels. *Environmental Biology of Fishes* 33:33–45.
- Kitchell, J. F., D. J. Stewart, and D. Weininger. 1977. Applications of bioenergetics model to yellow perch (*Perca flavescens*) and walleye (*Stizostedion vitreum vitreum*). *Journal of the Fisheries Research Board of Canada* 34:1922–1935.
- McClanahan, L. L., C. R. Feldmeth, J. Jones, and D. L. Soltz. 1986. Energetics, salinity, and temperature tolerance in the Mohave tui chub, *Gila bicolor mohavensis*. *Copeia* 1:45–52.
- Meretsky, V. J., R. A. Valdez, M. E. Douglas, M. J. Brouder, O. T. Gorman, and P. C. Marsh. 2000. Spatiotemporal variation in length–weight relationships of endangered humpback chub: implications for conservation and management. *Transactions of the American Fisheries Society* 129:419–428.
- Minckley, W. L. 1991. Native fishes of the Grand Canyon region: an obituary? Pages 124–177 in *Colorado River ecology and dam management*. National Academy of Sciences, Santa Fe, New Mexico.
- Minckley, W. L., and J. E. Deacon, editors. 1991. *Battle against extinction: native fish management in the American West*. University of Arizona Press, Tucson.
- Mueller, G. A., and P. C. Marsh. 2002. Lost, a desert river and its native fishes: a historical perspective of the lower Colorado River. U.S. Geological Survey, Information and Technology Report USGS/BRD/ITR-2002-0010, Reston, Virginia. Available: <http://www.fort.usgs.gov/products/publications/10026/10026.asp>. (February 2005).
- Petersen, J. H., and D. Gadomski. 1994. Light-mediated predation by northern squawfish on juvenile Chinook salmon. *Journal of Fish Biology* 45A:227–242.
- Petersen, J. H., and D. L. Ward. 1999. Development and corroboration of a bioenergetics model for northern pikeminnow feeding on juvenile salmonids in the Columbia River. *Transactions of the American Fisheries Society* 128:784–801.
- Poff, N. L., J. D. Allan, M. B. Bain, J. R. Karr, K. L. Prestegard, B. D. Richter, R. E. Sparks, and J. C. Stromberg. 1997. The natural flow regime: a paradigm for river conservation and restoration. *Bioscience* 47:769–784.
- Rajagopal, P. K., and R. H. Kramer. 1974. Respiratory metabolism of Utah chub, *Gila atraria* (Girard) and speckled dace, *Rhinichthys osculus* (Girard). *Journal of Fish Biology* 6:215–222.
- Rice, J. A., J. E. Breck, S. M. Bartell, and J. F. Kitchell. 1983. Evaluating the constraints of temperature, activity, and consumption on growth of largemouth bass. *Environmental Biology of Fishes* 9:263–275.
- Robinson, A. T., and M. R. Childs. 2001. Juvenile growth of native fishes in the Little Colorado River and in a thermally modified portion of the Colorado River. *North American Journal of Fisheries Management* 21:809–815.
- Robinson, F. W., and J. C. Tash. 1979. Feeding by Arizona trout (*Salmo apache*) and brown trout (*Salmo trutta*) at different light intensities. *Environmental Biology of Fishes* 4:363–368.
- Rose, K. A., E. P. Smith, R. H. Gardner, A. L. Brenkert, and S. M. Bartell. 1991. Parameter sensitivity, Monte Carlo filtering, and model forecasting under uncertainty. *Journal of Forecasting* 10:117–133.
- Shuter, B. J., and J. R. Post. 1990. Climate, population viability, and the zoogeography of temperate fishes. *Transactions of the American Fisheries Society* 119:314–336.
- Specziar, A. 2002. An in situ estimate of food consumption of five cyprinid species in Lake Blaton. *Journal of Fish Biology* 60:1237–1251.
- Stecyk, J. A. W., and A. P. Farrell. 2002. Cardiorespiratory responses of the common carp (*Cyprinus carpio*) to severe hypoxia at three acclimation temperatures. *Journal of Experimental Biology* 205:759–768.
- Stevens, L. E., J. P. Shannon, and D. W. Blinn. 1997. Colorado River benthic ecology in Grand Canyon, Arizona: dam, tributary, and geomorphological influences. *Regulated Rivers: Research and Management* 13:129–149.
- SWCA (SWCA Environmental Consultants). 1998. The aquatic ecosystem of the Colorado River in Grand Canyon: Grand Canyon data integration project synthesis report. Final report to the U.S. Bureau of Reclamation, Salt Lake City, Utah.
- USDI (U.S. Department of the Interior). 1999. Glen Canyon Dam modifications to control downstream temperatures: plan and draft environmental assessment. USDI, Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah.
- USFWS (U.S. Fish and Wildlife Service). 1990. Humpback chub recovery plan, 2nd revision. Report of the Colorado River Fishes Recovery Team to the U.S. Fish and Wildlife Service, Region 6, Denver.
- USFWS (U.S. Fish and Wildlife Service). 2002. Humpback chub (*Gila cypha*) recovery goals: supplement and supplement to the humpback chub recovery plan. U.S. Fish and Wildlife Service, Region 6, Denver.
- Valdez, R. A., and W. C. Leibfri. 1999. Captures of striped bass in the Colorado River in Grand Canyon, Arizona. *Southwestern Naturalist* 44:388–392.
- Valdez, R. A., and R. J. Ryel. 1995. Life history and ecology of the humpback chub (*Gila cypha*) in the Colorado River Grand Canyon, Arizona. Final Report to the U.S. Bureau of Reclamation, Contract 0-CS-40-09110, Salt Lake City, Utah.
- Vannote, R. L., and B. W. Sweeney. 1980. Geographic analysis of thermal equilibria: a conceptual model for evaluating the effect of natural and modified thermal regimes in aquatic insect communities. *American Naturalist* 115:667–693.
- Vigg, S., and C. C. Burley. 1991. Temperature-dependent maximum daily consumption of juvenile salmonids by northern squawfish (*Ptychocheilus oregonensis*)

- from the Columbia River. *Canadian Journal of Fisheries and Aquatic Sciences* 48:2491–2498.
- Vinson, M. R. 2001. Long-term dynamics of an invertebrate assemblage downstream of a large dam. *Ecological Applications* 11:711–731.
- Vogel, J. L., and D. A. Beauchamp. 1999. Effects of light, prey size, and turbidity on reaction distances of lake trout (*Salvelinus namaycush*) to salmonid prey. *Canadian Journal of Fisheries and Aquatic Sciences* 56:1293–1297.
- Ward, D. L., O. E. Maughan, S. A. Bonar, and W. J. Matter. 2002. Effects of temperature, fish length, and exercise on swimming performance of age-0 flannelmouth sucker. *Transactions of the American Fisheries Society* 131:492–497.
- Ware, D. M. 1972. Predation by rainbow trout (*Salmo gairdneri*): the influence of hunger, prey density, and prey size. *Journal of the Fisheries Research Board of Canada* 29:1193–1201.
- Young, M. K. 1999. Summer diel activity and movement of adult brown trout in high-elevation streams in Wyoming, U.S.A. *Journal of Fish Biology* 54:181–189.

Subject: Calaveras Dam Replacement Project Draft EIR - comment

Chris Kern
 December 21, 2009
 San Francisco Planning Department
 City and County of San Francisco

RE: San Francisco Planning Department File No. 2005.0161E
 State Clearinghouse No. 2005102102
 Calaveras Dam Replacement Project, San Francisco Public Utilities
 Commission Draft EIR

Dear Chris Kern,

We wish to thank you for the opportunity to respond to the Public
 Draft
 Environmental Impact Report for the San Francisco Public
 Utilities
 Commission Calaveras Dam Replacement.

We concur with PUC that dam renovation is needed as a public
 utilities upgrade to insure water supplies for the City of San
 Francisco and Peninsula communities, however there are aspects of
 the proposed project that are of considerable concern. These are:

~ the borrow pits and filling of wetlands in watershed
 immediately surrounding Calaveras Reservoir is more destructive
 of natural habitat and landscape than is necessary, what
 alternatives can be considered?

~ excavation of adjacent hillsides should be last option
 but if unavoidable the top foot and a half of soil be saved for
 redressing site with natural grasses and seeds, (ie.
 consideration in terracing of Observation Hill);

~ removal of vegetation in wetlands and tributary streams
 around reservoir is counter to beneficial uses that are the
 intrinsic value of wetlands for maintaining water quality, so
 please explain this proposed practice

01

02

03

04

~ raw hillsides should receive mitigation plantings before first winter and rainy season, (please reference US Geological Survey Water Resources Investigations Report 89-4130 for assessment of thousands of tons of sediment per square mile that can be generated under heavy storm conditions);

05

~ in general, we find that mitigation ratios to compensate for vegetation and wetlands losses are unclear and a 5 to 10 year timeframe for implementation is too extended;

06

~ in the spirit of NEPA law and guidelines give priority to all possible methods of 'avoidance' of impacts;

07

~ if habitat restoration cannot be accomplished on project site that has been impacted, then we would want mitigations or conservation easements to occur on lands that are not already protected by being owned and managed by SF PUC, otherwise it could not be assessed as no net loss of wetlands or species habitat;

08

~ in general we would request that the natural integrity of the Calaveras Reservoir site be respected for its value to wildlife and for the biodiversity of the plant species that represent early California landscape.

09

In at least two of your public hearings our Santa Clara Valley Chapter of the California Native Plant Society has requested a small team of our volunteer biologists be allowed to collect seeds in the affected watershed around Calaveras Reservoir for propagation in our nurseries and for returning to the site. We have worked with Santa Clara County Parks in this manner and to the benefit of conserving resources of Santa Clara County.

10

In an attachment we would like to cite individual areas of this EIR in which the aforementioned concerns are evident. Due to the extended review of these three volumes, probably not all references will be found that are relative but at least representative ones will be noted.

11

Thank you for consideration of these comments.

Kevin Bryant, Santa Clara Valley Chapter, California Native Plant Society

California Native Plant Society

East Bay and Santa Clara Valley Chapters



December 21, 2009

Bill Wycko and Chris Kern
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

RE: Calaveras Dam Replacement Project

Dear Mr. Wycko and Mr. Kern,

The East Bay and Santa Clara Valley chapters of the California Native Plant Society (CNPS) appreciate the opportunity to comment upon the Draft Environmental Impact Report (DEIR) for the Calaveras Dam Replacement Project. The California Native Plant Society is a non-profit organization of more than 10,000 laypersons and professional botanists in 32 chapters across the state. Our mission is to increase the understanding and appreciation of California's native plants and to preserve them in their natural habitat through scientific activities, education, and conservation.

The Mount Hamilton area represents one of the most significant "last wild areas" of the Bay Area. CNPS has been studying and helping conserve this area for generations, starting with the Mt. Hamilton Flora which was first published by Helen Sharsmith in *American Midland Naturalist* in 1945. CNPS hopes that the SFPUC will be a force in preserving habitats of the Mount Hamilton area since preservation fits within the mission of the agency.

However, CNPS fails to understand how the SFPUC has met mitigation requirements for the proposed project by "protecting" land already owned and protected by the SFPUC. We believe that this DEIR is inadequate given the lack of specific mitigations and of details associated with how mitigations will be fulfilled.

01

General Considerations

CNPS has a long history of cooperative efforts with the SFPUC. Various chapters have reviewed projects associated with the Water System Improvement Project (WSIP). We understand that this Calaveras project will create some of the most significant impacts of any of the WSIP projects. Although we are encouraged with certain WSIP project goals, CNPS believes that the Habitat Reserve Program (HRP) planning efforts must be

02

completed, specific mitigation strategies identified, and an Environmental Impact Report completed before the Calaveras Dam project can utilize these “planned” mitigations.

02 cont.

Compliance with Alquist-Priolo Earthquake Fault Zoning Act

CNPS understands that this structure will be built on and/or near an existing and active set of geologic faults (the Calaveras Fault, an extension of the Hayward Fault). The Alquist-Priolo Earthquake Fault Zoning Act provides guidelines for “prohibit[ing] the location of developments and structures of human occupancy across the trace of active faults” (Section 2621.5(a)). The DEIR does not make clear how the project meets guidelines for exemption from the promulgated standards. We ask for further clarification in understanding concurrence with this Act.

03

Geology

The DEIR’s treatment of impacts to serpentine habitats is extremely difficult to understand, in part because it does not contain a suitable geologic map that depicts the various substrates located on site. We looked specifically in the Section 4.8 *Geology, Soils, and Seismicity* and found only diagrams of faults for the area. Additionally, this section of the document fails to indicate where serpentine soils exist and what portion of the project will affect serpentine soils. For example, does this project impact a “singular island of serpentine,” with no other nearby sediment, or does the project impact the edge of a contact zone with Franciscan? Is the serpentine located at “Disposal Area 7?” If so, it seems that the SFPUC could minimize and avoid impacts by simply moving the *Disposal Area* to a non-serpentine habitat.

04

Two diagrams seem to provide confusing information. The Calaveras Fault zone is represented on different sides of the northern end of the reservoir in Figures 4.8.1 and 4.8.2. Which side is the accurate location? If 4.8.2 is accurate, then the fault passes underneath the face of the dam. How is this addressed with respect to the Alquist-Priolo Act as well as wise risk management and planning in a seismically active area?

05

06

Avoidance Measures

In a number of cases in this project, CNPS challenges the project proponent to review components of the proposed project and assess whether SFPUC has utilized avoidance measures as the first line of mitigation for impacts. Some examples of where we believe avoidance measures are not fully incorporated are: impacts to wetlands, impacts to serpentine habitat, impacts to riparian woodland, and others listed in the text below.

07

Specific Considerations

Soil and Groundwater Contamination

Figure 4.9.1 shows the toxic propellant plume of trichloroethene, tetrachloroethene, perchlorate, etc. CNPS believes this source of pollution is a critical constraint to returning reservoir to the 756-foot elevation level. It appears that the plume can only be migrating underground and downhill, especially as it appears to be in the Calaveras Creek channel or floodway. We understand that Santa Clara Valley Water District engineers have experience with this problem from an extensive perchlorate plume in Coyote Valley. How are risks from this plume addressed in the DEIR?

08

Water Quality and Serpentine-derived Leachate

The project indicates that serpentine soils will be impacted. Based on the presence of most-beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*), a serpentine endemic, CNPS believes that the serpentine soils are located at or near “Disposal Area 7”. Will this *Disposal Area* be graded or altered to allow for more fill? If so, CNPS believes that soil disturbance could release some of the microelements that constitute the serpentine geology. Of notable interest and toxicity are two heavy metals, chromium and nickel. Nickel is also known to have physiological effects on plant growth. CNPS believes that the disruption of these soils could mobilize some of these elements and potentially impact the reservoir and downstream water quality, especially during the first rains of the season. CNPS was unable to locate any analysis of this impact in the DEIR.

09

Excavation Impacts

On page 1-34, the DEIR states that excavation of the peak of Observation Hill and Hill 1000 will permanently “alter ground profiles... and color of the hillsides visible from hiking trails.” The document neglects to establish how much of these hills will be removed. Will there be loss of grasslands here that would have Johnny-jump-up habitat for the Callippe Silverspot Butterfly? Will instability or erosion levels of these hillsides be exacerbated in storm events? Will flight paths of migratory birds be affected by this alteration of historic terrain? There is mention that the Migratory Bird Treaty Act would be a consideration in reviewing this project, but the document fails to provide data as to which migratory species might be affected, i.e. eagles, waterfowl or butterflies? What is the level of impact to all these habitats and could it be avoided? What alternatives are there to excavation of these peaks?

10

11

12

13

Habitat Types: Acres and Impacts

CNPS finds that the proposed project has significant and unmitigated impacts to the vegetation and special status plants found within the survey envelope. CNPS has reproduced Table 4.4.1 *Habitat Types and Extent in the Study Area* in order to clearly communicate the potential loss of significant habitats in this invaluable watershed. Since Appendix C-2 utilizes a different vegetation classification system, it is difficult to clearly

14

understand what percentage of the existing habitat will be impacted. For instance, Table 4.4.1 reports exactly 1.0 acres of freshwater marsh. It is unclear whether all of the freshwater marsh habitat would be destroyed on-site in the 4.61 acre number that is presented in Appendix C-2. Other questions pertain to riparian habitats.

14 cont.

Figure 4.4.2 (Regional Land Cover) illustrates that this project may impact nearly all (~95%) of the Riparian Forest habitat downstream of the Sunol Valley Water Treatment Plant. CNPS believes this could be construed as equivalent to destroying the entire stream and its habitat. Yet, this impact was not clearly called out. CNPS believes partial impacts to streams may be possible to mitigate on site in a reasonable manner, but we are not convinced that the impacts from inundation of this area are being taken seriously by the SFPUC. CNPS requests that the project and its impact areas be overlaid onto Figure 4.4.2 in order to provide a new figure to show impact location with relation to the entire study area.

15

An important principle of the science of landscape ecology is that the geographic distribution of habitats (the pattern of distribution) may be just as important as the size and quality of habitat. Accordingly, CNPS believes that the riparian habitats and wetland complexes that will be inundated or filled should be mitigated aggressively. Since the water resources of an entire watershed are being completely altered, CNPS asks that the mitigations reflect the gravity of these impacts. This concept is further analyzed in the next section.

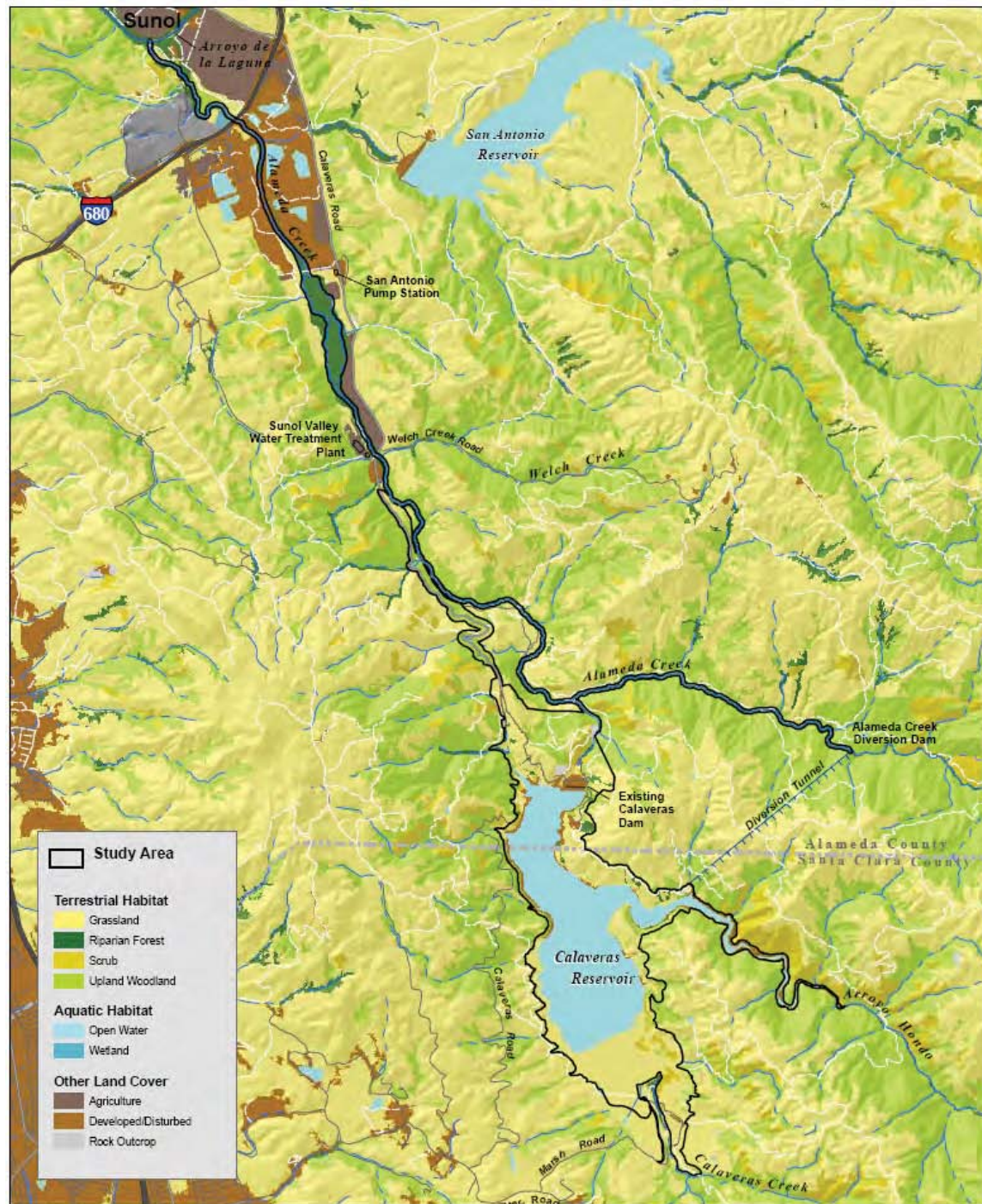
16

Table 4.4.1: Habitat Types and Extent in the Study Area

General Habitat Type	Vegetation Community or Creek Name	Acres or Channel Length ¹	General Habitat Type Acres or Channel Length ¹
Terrestrial Habitats			
Grassland	Non-Native Grassland	788 acres	863 acres
	Valley Needlegrass Grassland	2 acres	
	Serpentine Bunchgrass Grassland	73 acres	
Upland Woodland	Blue Oak Woodland	17 acres	327 acres
	Valley Oak Woodland ²	17 acres	
	Oak Savannah	3 acres	
	Mixed Evergreen Forest/Oak Woodland	287 acres	
	Serpentine Foothill Pine - Chaparral Woodland	3 acres	
Scrub	Coyote Brush Scrub ³	29 acres	79 acres
	Diablan Sage Scrub	50 acres	
Riparian Forest	Central Coast Live Oak Riparian Forest	8 acres	38 acres
	Coast Live Oak Riparian Forest	22 acres	
	Sycamore Alluvial Woodland	5 acres	
	Willow Riparian Forest	3 acres	
Aquatic Habitats			
Calaveras Reservoir	Open water	1,012 acres	1,012 acres
Riverine	Alameda Creek	61,550 feet (11.7 miles)	75,018 feet (14.3 miles)
	Calaveras Creek	4,047 feet (0.8 mile)	
	Arroyo Hondo	9,421 feet (1.8 miles)	
Wetland	Freshwater Marsh Wetland	1 acres	34 acres
	Seep Wetland	3 acres	
	Seasonal wetland	30 acres	
Other Land Cover			
Disturbed ⁴	Unvegetated	94 acres	94 acres
Developed ⁵	Unvegetated or Landscaped	35 acres	35 acres
Rock Outcrop	Unvegetated	15 acres	15 acres
Notes:			
¹ Acreages of terrestrial habitats are based on the results of surveys conducted in the study area by May and Associates (ETJV 2006a, 2006b), which used the draft <i>Alameda Watershed Habitat Conservation Plan</i> (Jones & Stokes 2006) land cover classification system. Channel lengths are presented for the entire study area. Acreage values are rounded to the nearest whole number.			
² Valley Oak Woodland is frequently considered a riparian plant community; however, within the study area the majority of this community is found in uplands and does not function as riparian habitat.			
³ Coyote Brush Scrub was not described in the draft <i>Alameda Watershed Habitat Conservation Plan</i> (Jones & Stokes 2006) but is used here to distinguish between two distinct scrub vegetation types in the study area.			
⁴ Disturbed is not described as a land cover in the draft <i>Alameda Watershed Habitat Conservation Plan</i> (Jones & Stokes 2006); however, it is used here to describe some portions of the area around Calaveras Reservoir that were inundated from 1925 to 2001 but are exposed at the current reservoir water level.			
⁵ Includes developed non-native grassland on the dam face.			

Source: ETJV 2006a, pp. 25–34

14 cont.



SOURCE: ETJV 2006b; CDF 2005; Jones and Stokes 2008.

CALAVERAS DAM REPLACEMENT PROJECT

FIGURE 4.4.2: REGIONAL LAND COVER

15 cont.

Impacts to Wetland Habitat

From Figures 4.4.6 and 4.4.7 (Critical habitat for California Red-Legged Frog and California Tiger Salamander), it would appear that a tributary to reservoir and downstream seep wetlands and ponds flows into Calaveras at this northwestern arm. Yet, this extensive wetland complex is slated for a spoils disposal area (pp 70-71, Vol. 3). This proposal does not appear to adhere to best management practices or to CEQA or NEPA guidelines. Have California Department of Fish and Game and US Corps of Engineers reviewed this loss of wetlands? Where will an equivalent caliber of wetlands be found and what mitigation ratio will be used, 3 to 1 or higher?

17

Figure 4.4.12 illustrates that a significant acreage of seasonal wetlands will be lost if the reservoir returns to an elevation of 756'. Where can mitigation areas be found for this type of wetlands? Inundation of the Calaveras Creek riparian corridor should be mitigated in linear feet of wetlands and hopefully in an area where the continuity of the wildlife corridor is a benefit. This is a concern both here at the south end of Calaveras Reservoir, in proximity to the toxic plume, as well as at the north end of the reservoir.

18

Proper Project Surveys

In Appendix C.1, (Special Status Plant and Animal Species Evaluated in Calaveras Dam Replacement Project) the biological survey language is not very explicit. Of 38 species surveyed, 12 were 'expected not to occur,' 24 possibly 'could occur,' and only Diablo helianthella and Most beautiful jewelflower were 'known to occur.' We would request that the more comprehensive past plant surveys of Calaveras Reservoir be noted here. Were surveys limited to only one year?

19

Mitigation Measures

CNPS is concerned about the restitution that the SFPUC has proposed in order to mitigate significant impacts to vegetation. Clearly, the impacts to vegetation are significant, including impacts to approximately 50 acres of vegetation types that are considered sensitive and important by the California Department of Fish and Game (serpentine, riparian, oak woodlands and savanna).

Appendix C-2 (Evaluation of Proposed Mitigation Areas for the Calaveras Dam Replacement Project) offers the following "Results and Findings:"

20

The selected mitigation areas are located entirely on SFPUC-owned land and are not open to the public. Photos of the four mitigation areas are provided as an attachment to this memo. Field survey findings are described below by mitigation area.

Given that the mitigation areas are already owned by the SFPUC, the areas are already subject to SFPUC land management goals and standards, **and** the lands are not open to the public, CNPS believes these lands are low priority mitigation targets. According to CEQA principles of "rough proportionality," CNPS is convinced that the current

mitigations fail to meet appropriate State standards (CEQA Guidelines Section 15041(b)).

20 cont.
↓

CNPS requests a detailed history of how each mitigation site was acquired and what funding was used for acquisition. The funding source and impetus should be made clear when describing each of the four mitigation sites. CNPS would like to understand how and when these properties were acquired and how they may or may not meet mitigation guidelines.

21

Please also note, Appendix C-2 states that photographs of the four “mitigation” sites are included, but they were not located in the DEIR Appendices.

22

On page 1-45, under 'mitigation measure' the document states "Vegetation Removal...during construction... remove trees, shrubs, soils that are inadvertently deposited below the ordinary high-water mark of any streams, drainages, ponds, wetlands, riparian areas and Calaveras Reservoir in a manner that minimizes disturbance of the drainage bed and bank (e.g. manually)...such materials will be set back at least 10 feet from Calaveras Reservoir and from streams, drainages, ponds, wetlands and riparian areas that are not otherwise directly disturbed by construction." Please explain the mitigation or conservation rationale of such a measure. What is this mitigating for and how will the resultant loss of shaded riparian corridor and wetlands be mitigated?

23

As stated earlier, we would appreciate an opportunity to collect seeds or salvage special status species wherever possible in areas that are doomed by construction activities. By the same token preventive measures should be taken to provide alternative habitat for all the listed species of Silverspot Butterfly, Red and Yellow-legged Frogs, Tiger Salamanders, and Western Pond Turtles before construction so they can be moved to these safe-haven locations as construction progresses. The US Navy Northern Channel clean-up at Moffett Field salvaged ten times as many Western Pond Turtles as originally noted by reserving refugia ponds.

24
25

Conclusions

CNPS has often been encouraged by the past work of the SFPUC, but this DEIR fails to present the information required by CEQA for the Calaveras project. Notably, some important background information on soils is missing. Impacts on vegetation are difficult to understand given the layout of the document and the various vegetation classification methods. Additionally, mitigations are not specific enough to determine if they are adequate to compensate for impacts. CNPS encourages the SFPUC to consider presenting information on alternative strategies and on alternative mitigation sites that are not currently owned by the SFPUC.

26

Please do not hesitate to contact Lech Naumovich or Libby Lucas with questions about our comments.

Sincerely,

Lech Naumovich & Libby Lucas, CNPS

Lech Naumovich
East Bay CNPS
PO Box 5597
Berkeley, CA 94705

Libby Lucas
Santa Clara Valley CNPS
174 Yerba Santa Ave.
Los Altos, CA 94022



Fremont Freewheelers Bicycle Club

Primavera 2010

Supporting safe cycling...

December 11, 2009

Bill Wycko
Environmental Review Officer
San Francisco, Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

FFBC President:

Gary Smith
President
510-797-7809

Primavera 2010 Committee:

Jan Green
510-651-1557
jan_green@comcast.net

Ron Mitchell
510-792-7219
Ron_m_ffwbc@sbcglobal.net

Becky Denevan
510-651-4243
beckydenevan@gmail.com

**The Fremont Freewheelers
Is an unincorporated
non-profit
organization
founded in 1971**

www.ffbc.org

Dear Bill Wycko,

This letter is to express our concerns regarding the Calaveras Dam project as it relates to safe cycling. It has been brought to our attention that a couple of months in 2010 and 18 months in 2011-12 will have work being done.

01

We understand that the Amgen Tour of California is being accommodated and we ask that our FFBC Primavera Bicycling Tour on April 11, 2010 be accommodated as well should this date coincide with the work being done. We would ask that particular attention to the condition of the road be a priority before weekend openings. This would include asphalt patches being properly done to eliminate safety hazards for cyclists, as well as ensuring that it is swept well.

02

We would also ask that the Primavera be accommodated in April of 2011 and 2012.

For any questions or further communications, please contact Jan Green 510-651-1557.

Sincerely,

The Primavera Organizing Committee

*Our mission is to promote bicycling for recreation, health, pleasure, a means of transportation;
to sponsor bicycle events and racing; and to encourage bicyclist education and safety.*



GOLDEN WEST WOMEN FLYFISHERS

790 27th AVENUE, SUITE 400, SAN FRANCISCO, CALIFORNIA 94114

November 11, 2009

Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

RECEIVED

NOV 13 2009

CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M E A

Dear Mr. Wycko-

I am writing on behalf of the Golden West Women Flyfishers to express our concerns with the recently released draft Environmental Impact Report for the Calaveras Dam project. The Golden West has a long history in conservation and restoration efforts for the Alameda Creek Watershed:

- In 1998, we partnered with the East Bay Regional Park District and DFG to save steelhead eggs which would have perished at the BART weir, incorporating them into our Tanks in the Class program and released juveniles back into the river.
- Participated in several steelhead rescues for migrating fish trapped below the BART weir.
- Participated in fish surveys and cleanup efforts on Alameda Creek
- Are involved with the Northern California Council Federation of Fly Fishers in advocating the removal of the USGS gauging station fish passage barrier on Alameda which the SFPUC owns.

While we support San Francisco's goal of upgrading its aging water-supply infrastructure, we firmly believe that San Francisco's water supply system should be managed in accordance with the SFPUC watershed stewardship policy, and the Calaveras Dam rebuild project must be compatible with restoration of native fish and wildlife downstream of dam.

01

Specifically, the proposed stream flow releases for migratory fish below the reservoir are clearly inadequate and the proposed mitigations for what will be significant construction impacts on habitat for many endangered species are limited and weak.

GWFF is also very concerned that no fish passage will be provided at the Alameda Diversion Dam or Calaveras Dam. After all the years and hard work that has gone into removing barriers for steelhead, it is a huge oversight of the EIR not to address passage issues on these dams.

02

As a water resource user of the Alameda Creek Watershed, San Francisco needs to fulfill its responsibility of good stewardship to the endangered steelhead by incorporating meaningful actions to protect and restore these fish in its plans and projects.

Sincerely,

Cindy Charles
President & Conservation Chair
Golden West Women Flyfishers.



League of Women Voters of the Bay Area
Inter-League Organization of the San Francisco Bay Area



November 18, 2009

RECEIVED

Bill Wycko, Environmental Officer
San Francisco, Planning Department,
1650 Mission Street, Suite 400
San Francisco,, CA 94103

NOV 19 2009

CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M E A

Re: Calaveras Dam Replacement

The League of Women Voters of the Bay Area (LWVBA) and the League of Women Voters of San Francisco (LWVSF) have long advocated a stewardship policy in the Water System Improvement Program that emphasizes goals for lessening the impact on all water bodies within the system and for achieving environmental restoration wherever possible. We have asked for increased conservation and reclamation as a means of addressing future water supply needs without taking more water from the Tuolumne River or other tributaries to the system.

01

We support a new Calaveras Dam as a major improvement to public safety, built to survive a 7.2 magnitude quake on the Calaveras Fault. It also provides an opportunity to restore the endangered steelhead trout.

02

Restoration of steelhead trout is in accordance with your Water Enterprise Environmental Stewardship Policy's commitment to responsible natural resources management that protects and restores viable populations of native species and maintains the integrity of the ecosystems that support them for current and future generations.

03

To take advantage of this opportunity, we ask that you release flows sufficient to save endangered species according to recommendations from the National Marine Fisheries Service and principles of adaptive management.

A lot of progress has been made in fish restoration. Don't miss this chance to take another major step.

Sincerely,

Marion Taylor

Marion Taylor
Vice President, Program and Advocacy
League of Women Voters of the Bay Area



SAN FRANCISCO PLANNING DEPARTMENT

Draft Environmental Impact Report Public Hearing

O-NCCFFF2

Calaveras Dam Replacement Project

Sunol Glen Elementary School

11601 Main Street

Sunol, CA 94586

Monday, December 14, 2009

COMMENT CARD

Thank you for participating in tonight's public hearing on the Calaveras Dam Replacement Project DEIR. Your comments are encouraged.

Name (Please print): BOBBIE ARMOR
Affiliation (If applicable): NCCFFF DIRECTOR ; CONSERVATION PENINSULA
Phone: 510-793-1947 Email: FLY FISHERS
Address: 2010 PALMER DR
City, State, Zip: PLEASANTON CA

COMMENTS

WE SUPPORT THE DAM. | 01
PLEASE MAKE SURE THE FLOWS ARE ADEQUATE | 02
FOR FISH PASSAGE

For more information about the proposed project, please contact:

Betsy Rhodes, San Francisco Public Utilities Commission
1155 Market Street, 11th Floor, San Francisco, CA 94103
Phone: (415) 554-3240
BLauppe@sfgwater.org

For more information about the EIR process, please contact:

Chris Kern, EIR Coordinator, San Francisco Planning Department
1650 Mission Street, Suite 400, San Francisco, CA 94103
Phone: (415) 575-9037
Chris.Kern@sfgov.org



RECEIVED

NOV 16 2009

CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M E A

November 12, 2009

Ron Miguel
President
San Francisco Planning Commission
1660 Mission Street
San Francisco, CA 94103

Dear President Miguel:

I am submitting this statement on behalf of the members of the San Francisco Building Owners and Managers Association (BOMA San Francisco), an organization that represents over 70,000,000 square feet of commercial office and retail space in the City. BOMA supports the Calaveras Dam Replacement Project and the Draft Environmental Impact Report.

We are asking the Planning Commission to let the process proceed. Here's why:

- The Calaveras Dam Replacement Project is extremely important to San Francisco and the Bay Area's water supply.
- Calaveras Reservoir, when full, represents over half of the San Francisco Public Utility Commission's water storage capacity in the Bay Area and more than 60% of our drinking water.
- Communities in the East Bay and South Bay depend even more heavily upon this water source when Hetch Hetchy supplies are not available.
- If Hetch Hetchy supplies were cut off because of a major earthquake, it is critical that we have sufficient water in reserve available for fire fighting, public health, and to keep our city functioning as much as possible.
- Finally, we need this nearby improved water supply project moving forward today, not tomorrow, and cannot support further CEQA review delays. Discussions about the operation of the proposed new dam are ongoing with the appropriate permitting agencies, and will be appropriately dealt with.
- Therefore, on behalf of BOMA San Francisco, I ask this commission to support moving this Draft Environmental Review report forward.

Thank you.

Ken Cleaveland

Ken Cleaveland, Director, Govt. and Public Affairs
BOMA San Francisco

Cc: Bill Wycko, Environmental Review Officer, Planning Department



SAN FRANCISCO
CHAMBER OF COMMERCE *Where smart business starts.*

RECEIVED AT OPC HEARING 11-12-09
2009.01612
Calaveras Dam
(C. KERN)

November 12, 2009

Bill Wycko
Environmental Review Officer
San Francisco, Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Dear Mr. Wycko:

I am writing on behalf of the 2,000 members of the San Francisco Chamber of Commerce to express our support for the Calaveras Dam Replacement Project and the Draft Environmental Impact Report.

The Chamber has been working hard to ensure that San Francisco and the region's water supply is safe and secure, leading the effort to retrofit our aging water system. The Calaveras Dam Replacement Project is extremely important for the region's water supply. Calaveras Reservoir, when full, represents over half of the SFPUC's water storage in the local Bay Area. More than 60% of the drinking water generated locally comes from the reservoir.

If Sierra supplies are cut off because of a major earthquake, it is important that there be sufficient water for fire fighting, for public health, to keep our governments, businesses, and hospitals open. We cannot do this without a reliable supply of water that is nearby.

We write to ask that the Draft Environmental Review process move forward. Discussions about the operation of the proposed new dam are ongoing with the appropriate permitting agencies. That process, too, needs to be allowed to move forward.

The cost of not moving forward in a timely manner are highlighted by what we are seeing on the Bay Bridge. Due to years of bureaucratic delays, the replacement of the earthquake damaged Bay Bridge is now costing the region hundreds of millions of dollars in lost productivity and creates a great risk of the loss of life. Don't let this happen to the Calaveras Dam Replacement Project.

I urge you to move forward with this important project.

Sincerely,

Rob Black
Vice President / Public Policy
San Francisco Chamber of Commerce

01



SAN FRANCISCO PLANNING DEPARTMENT
 Draft Environmental Impact Report Public Hearing
 Calaveras Dam Replacement Project

Sunol Glen Elementary School
 11601 Main Street
 Sunol, CA 94586

Monday, December 14, 2009

COMMENT CARD

Thank you for participating in tonight's public hearing on the Calaveras Dam Replacement Project DEIR. Your comments are encouraged.

Name (Please print): Janis Turner
 Affiliation (If applicable): Sierra Club - San Francisco Bay Chapter
 Phone: 925-443-4372 Email: _____
 Address: 749 Hazel St
 City, State, Zip: Livermore Ca 94550

COMMENTS

Bay chapter Sierra Club supports
 a timely rebuilding of Calaveras Dam
 We request SFPUC comply with state
 & federal environmental laws & leave
 enough water in ~~the~~ ^{the Alameda} creek so that
 native fish, i.e. steelhead & salmon
 can survive. Downflow stream
 flows on Alameda Creek should mimic
 the natural hydrology of the stream in
 order to support native fish & wildlife.

For more information about the proposed project, please contact:

Betsy Rhodes, San Francisco Public Utilities Commission
 1155 Market Street, 11th Floor, San Francisco, CA 94103
 Phone: (415) 554-3240
 BLauppe@sfgwater.org

For more information about the EIR process, please contact:

Chris Kern, EIR Coordinator, San Francisco Planning Department
 1650 Mission Street, Suite 400, San Francisco, CA 94103
 Phone: (415) 575-9037
 Chris.Kern@sfgov.org

Comment Letters – Individuals

To: Chris Kern

From: Walter Epp

Date: 12/21/2009 02:27

Subject: Calaveras Dam DEIR comments

Anadromous fish are pivotal to ecosystem health in the long run, closing a great loop by bringing nutrients from the sea, without which the land's vitality may steadily decline as rains wash nutrients downstream. Measurements by Dr. Tom Reimchen of the University of Victoria demonstrate that as much as half the nitrogen in riparian trees came from the sea via anadromous fish.

"Pacific Salmon and Wildlife," a report by a collaboration coordinated by the Washington state Department of Fish and Wildlife and Department of Natural Resources, builds on 500 scientific studies and decades of research to document the vital role anadromous fish play in the overall health of ecosystems, including the more than 137 species of wildlife that depend for their survival on anadromous fish.

Thus to maintain the health of the watershed in the long term, not merely decades, the needs of anadromous fish must be given high priority.

Consider what it takes for survival of the physical body. If your timeframe is a minute, then the only things you have to worry about are extreme factors like gunshots or falling airplanes - ordinary every-day things aren't going to make a difference, and even air is not important, since you can make it through a minute without breathing at all. If your timeframe is a day, then air is critical, but food and water are not so important, since you'll make it through the day without them. If your timeframe is a year, then food is critical but vitamins are not so important, since it'll probably take more than a year for deficiencies to cause serious problems. If your timeframe is 50 years, then vitamins are just as important as air or food, since you won't make it without them any more than you'll make it without food or air.

Likewise, for an ecosystem, what may be enough to make it for decades is not necessarily enough to make it for millenia. Thus we need to provide a large margin of precautionary safety beyond what science currently thinks is necessary, to compensate for its profound ignorance about the ecological vitamins needed for long-term ecosystem health in general, and anadromous health in particular.

Only 1% of California Coho Salmon now survive. Steelhead are in danger of a similar collapse. Translated to human beings, this 99% loss would mean the death of 6 billion people, a thousand times the number of Jews killed in Nazi concentration camps. Translated to the U.S., a 99% drop would leave us with the population of Albania, after a death toll 10,000 times the annual toll from murder and nearly 100,000 times the death toll of the World Trade Center attack of September 11.

Murder is a far more serious crime than robbing, since money is easily replaced, while murder is irrevocable. Genocide of a nation is a far more serious crime than murder, since a life can be replaced in one generation, while extermination is irrevocable. Extinction of a species is a far more serious crime than extermination of a nation, since a nation can be replaced in centuries, while extinction is irrevocable.

01

In other words, the subject at hand is not one of political tradeoffs, but crimes against Creation of high degree.

Anadromous fish have been here thousands of times longer than any of these have been here: United States, SF PUC, "takings" doctrines, "cost-benefit" theories, private property. Their right to life takes precedence over all of these. No "property right" gives a license to murder; even less does it give a license to expunge an entire species.

700 generations from now, there may be no one who remembers what the United States was, and no one will know or care what Hitler did, but life would still be diminished if we screw up and lose Salmon, which have sustained hundreds of generations of inhabitants.

The fundamental implication of all these points for this project is that the criteria for flow regimes and all other impacts now and in the future must be contingent on the current and future health of the watershed in general, and its at-risk and keystone species in particular. No fixed volumes of water can possibly be acceptable. Nor can any fixed algorithm for calculating volumes of water be acceptable. Actions must be contingent on what actually happens in reality, not just on the imperfect understanding of what's sufficient as of 2009, which will become more and more obsolete as we move through time. If fish or other critical species decline in health (not just numbers), whether due to drought or habitat degradation elsewhere or due to reasons completely unknown, then flow regimes and other impacts must be adjusted. If science in the future learns more about how to predict impacts on future health of critical species, then that must be incorporated into dam and other watershed management even if there is not yet a detectable problem at that point in time. There should be a process in place for people to petition for such adjustments at any time the need arises. Only opening the door at decade intervals could mean action only happens after it's too late.

It's important that we have people tending to all the details of this project. But please don't lose sight of the bigger picture. Yes we need to listen to NMFS, DFG, FERC, EIR laws, and all the rest, but the supreme authority to guide our actions is what Nature and Salmonids tell us of what they need. That may mean going beyond the minimum of what all of those agencies require. If we don't blow it, then generations hence people, fish, and the land will be thriving after all of those man-made authorities have passed into footnotes of history.

Walter Epp
281 Jayne #133, Oakland CA 94610

01 cont.

02

03

From: [Bill LaCommare](#)
To: bill.wycko@sfgov.org; chris.kern@sfgov.org
Subject: Alameda Creek Minimum Flows
Date: 11/02/2009 12:01 PM

Dear Bill & Chris,

Since the big rains in October, I've been on two hikes along Alameda Creek up past the confluence with Calaveras creek. I expected to see a vibrant river with some decent flows, but instead there was virtually no flow at all. I was able to hike right down the middle of the creek avoiding a few pools here and there.

Needless to say, this is incomprehensible especially given the recent efforts and significant financial investment to restore Steelhead and Salmon to their historic spawning habitats in the Alameda Creek watershed. This would be a great story of recovery and great publicity for San Francisco. I know water supply is a big issue for San Francisco, but you simply must set some minimum flow standards for Alameda Creek... the status quo is unacceptable!

01

Bill

Bill LaCommare, President
MediaWorks Software
2843 Hopyard Rd., #159
Pleasanton, CA 94588
(925) 485-0702

"Steve Lawrence"

10/05/2009 09:27 AM To

<chris.kern@sfgov.org>

cc

bcc

Subject

Calaveras Dam's environmental impact and decision

History:

This message has been forwarded.

Chris:

When the City decides whether to proceed with Calaveras Dam despite its environmental impacts, please consider and perhaps expand upon the following statements made concerning the need for the project:

"San Francisco will continue to have water supply, water quality, and reliability issues [until Calaveras Dam is fixed]." Final Design Report, URS, 7-9-09.

"The SFPUC water supply experiences deficiencies in dry years and cannot meet the full water demands of its system customers. The Water Supply Master Plan recommended the SFPUC increase its available water supply by 71 million gallons per day through water transfers or 800,000 acre feet additional storage to meet the future needs of its service area." Capital Improvement Program, February 2002. Note that the schedule showed completion of the new dam, then an enlarged dam, in 2009.

Since 2002 the impact of global warming on water supply has made it clearer that in our Sierra watershed snow levels will rise, that is, storage of water as snow will diminish. Instead, with snow levels higher, in our watershed more precipitation will fall as rain, and that falling as snow will melt faster and more suddenly, flooding more and earlier. All this suggests that storage at lower elevation is even more important. Yet since 2002 storage has been cut. Today's Calaveras Dam is much smaller than what was planned in 2002. The Sunol Quarry reservoir was eliminated. Storage at Sunol was reduced. These reductions seem inconsistent with the increased recognition of the effects that global warming. The question is: will our water system be reliable, and does it have sufficient storage to meet future demands, especially during crises (earthquake, flood, terror, epidemic)? Since 1906, we in the Bay Area know that it is not normal times

01

file:///C:/Documents%20and%20Settings/ckern/Desktop/Lawrence_100509_2.txt

but extraordinary times that must be planned for, especially regarding water.

So please fully understand and study the importance of adequate storage before making a decision about this project.

Steve Lawrence

↑
01 cont.
↓

To: Chris Kern

From: Libby Lucas

Date: 12/22/2009 09:29

Subject: Calaveras Dam Replacement Project Draft EIR - comment

Chris Kern,

This was my submittal to you in regards the Calaveras Dam Improvement Project that got encompassed into the CNPS East Bay Chapter letter on the subject yesterday. My computer froze in afternoon.

Would like to submit it to you now separately to make sure all my concerns are responded to. From what I was told by our Santa Clara Valley Audubon Chapter, they did not have time to review the DEIR to comment.

Personally fear that the removal of the top of Observation Hill and Hill 1000 might impact migratory waterfowl, and critical habitat of migratory or resident butterflies and resident bald eagles. Will DEIR assess this?

01

Also have major concerns on level of fill slated to cover wetlands of north western arm of Calaveras Reservoir. This seems to be entirely unnecessary degradation of prime wetlands habitat on site and downstream.

02

Thank you for all and any consideration that you can give to implementation of this project.

Libby Lucas

To: Chris Kern

From: Libby Lucas

Date: 12/22/2009 09:29

Subject: SFPUC Calaveras Dam Replacement Project – DEIR comments cont.

Chris Kern,

And this was part two of my comment letter in regards more detailed Aspects of DEIR.

Before digging in to vegetation references in DEIR need to mention that believe in Figure 4.9.1 the toxic propellant plume of trichloroethene, tetrachloroethene, perchlorate, etc. is a critical constraint to returning reservoir to 756 elevation level as that plume can only be migrating underground and downhill, especially as it appears to be in the Calaveras Creek channel or floodway. Santa Clara Valley Water District engineers have experience with this problem from an extensive perchlorate plume in Coyote Valley.

01

Calaveras Fault zone is represented in different sides of northern end of reservoir in Figure 4.8.1 and 4.8.2. Which side is accurate location? If 4.8.2 is accurate then fault passes underneath face of dam?

02

From Figures 4.4.6 and 4.4.7, critical habitat for California Red-Legged Frog and California Tiger Salamander it would appear that a tributary to reservoir and downstream seep wetlands and ponds flows into Calaveras at this north-western arm (underlain by Calaveras Fault?) and yet this extensive wetlands is slated for a spoils disposal area (pp 70-71, Vol. 3). This does not appear to adhere to best management practices, or CEQA or NEPA guidelines. Have California Department of Fish and Game and US Corps of Engineers reviewed this loss of wetlands? Where will equivalent calibre of wetlands be found and at mitigation ratio, 2 to 1 or 3 to 1?

03

In Appendix C.1 Special Status Plant and Animal Species Evaluated in Calaveras Dam Replacement Project the biological survey language is not very explicit. Of 38 species surveyed, 12 were 'expected not to occur', 24 possibly 'could occur', and only Diablo helianthella and Most beautiful jewel-flower were 'known to occur'. We would request that the more comprehensive past plant surveys of Calaveras Reservoir be noted here.

04

On page1-45, under 'mitigation measure' it states "Vegetation Removal...during construction..remove trees, shrubs,.soils..that are inadvertantly deposited below the ordinary high-water mark of any streams, drainages, ponds, wetlands, riparian areas and Calaveras Reservoir in a manner that minimizes disturbance of the drainage bed and bank (e.g. manually)...such materials will be set back at least 10 feet from Calaveras Reservoir and from streams, drainages, ponds, wetlands and riparian areas that are not otherwise directly disturbed by construction." Please explain the mitigation or conservation rationale of such a measure. What is this mitigating for and how will the resultant loss of shaded riparian corridor and wetlands be mitigated for?

05

On page 1-34 the DEIR states that excavation of the peak of Observation Hill and Hill 1000 will permanently "alter ground profiles....and color of the hillsides visble from hiking trails". It neglects to establish how much of these hills will be removed? Will there be loss of grasslands here that would have Johnny-jump-up habitat for the callippe silverspon butterfly?

06

Will stability or erosion levels of these hillsides be accerbated in storm events?

07

Will flight paths of migratory birds be affected by this alteration of historic terrain? There is mention that the Migratory Bird Treaty Act would be a consideration in reviewing this project but then there is no data as to which migratory species might be affected, eagles, waterfowl or butterflies? What is level of impact to all these habitats and could it be avoided?

08

What alternatives are there to excavation of these peaks?

09

As stated earlier, we would appreciate an opportunity of collecting seeds or salvaging status species wherever possible in areas that are doomed by construction activities. By the same token preventative measures should be taken to provide alternative habitat for all the listed species of Silverspot Butterfly, Red and Yellow-legged Frogs, Tiger Salamanders, and Western Pond Turtles before construction so they can be moved to these safe-haven locations as construction progresses. The US Navy Northern Channel clean-up at Moffett Field salvaged ten times as many Western Pond Turtles as originally noted by reserving refugia pond.

10

11

In Figure 4.4.12 there are noted significant acreage of seasonal wetlands that will be lost if the reservoir returns to an elevation of 756'. Where can mitigation areas be found for this type of wetlands? Inundation of the Calaveras Creek riparian corridor should be mitigated for in linear feet of wetlands and hopefully in an area where continuity of wildlife corridor is a benefit. This is a concern both here at the south end of Calaveras Reservoir, in proximity to the toxic plume, as well as at the north end of the reservoir.

12

Time does not permit noting other areas of concern but perhaps you will accept late postscripts.

Sincerely,

Libby Lucas, Conservation

From: [Robert Salkow](#)
To: chris.kern@sfgov.org
Subject: Tell San Francisco to Restore Salmon and Trout With Dam Rebuild
Date: 11/03/2009 11:57 PM

Your help is needed to secure a future for salmon and steelhead trout in the Bay Area. San Francisco — voted the second greenest city in the nation — will soon be rebuilding the seismically challenged Calaveras Dam on Alameda Creek, the largest local tributary to San Francisco Bay. You'd think the eco-City by the Bay would operate the dam in an ecologically responsible fashion to help restore historic salmon and steelhead trout populations below the dam, but sadly this is not the case.

After decades of restoration efforts, Alameda Creek is on its way to becoming an urban-stream success story. Half a dozen fish passage projects, including removal of dams and construction of fish ladders and fish screens, are being constructed downstream of San Francisco's three dams in the watershed. For the first time in nearly 50 years, these projects will soon make up to 20 miles of the stream available for steelhead trout and salmon spawning and rearing. Alameda Creek is an "anchor watershed," considered regionally significant for restoration of steelhead to the entire Bay Area.

But the creek is at risk. The San Francisco Public Utilities Commission this month released a flawed draft environmental impact report for the Calaveras Dam replacement that will not restore a sustainable run of steelhead below the dam. Migratory fish below the reservoir will not receive adequate stream flow, and the proposal fails to mitigate construction-related damage to endangered species habitat.

Help give trout a chance to recover and bring San Francisco's water agency into the 21st century in terms of compliance with modern environmental protections. Your message will be sent to decision makers with San Francisco's water agency, planning department, and board of supervisors.

Visit http://salsa.democracyinaction.org/o/2167/t/5243/p/dia/action/public/?action_KEY=1645 to take action now.

December 21, 2009

Bill Wycko, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103
Fax: (415) 558-6409

Robert Smith
Regulatory Division
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103

Comments on the Calaveras Dam Replacement Project

The following comments are submitted in support of and in addition to those made on December 18 and 21, 2009 by the Alameda Creek Alliance (ACA) and the Center for Biological Diversity (CBD) on the Draft Environmental Impact Report (DEIR) and on the U.S. Army Corps of Engineers Project Notice for the San Francisco Public Utilities Commission (SFPUC) Calaveras Dam Replacement Project (CDRP) in the Alameda Creek watershed. My expert comments are based on my education, certifications, and 25 years of experience as a professional fisheries biologist, as well as my personal local experience with the Alameda Creek Watershed in the past, acquired as the Inland Fisheries Supervisor for Alameda County in prior service with the California Department of Fish and Game's Central Coast Region from 2001 through 2006. In the latter role I participated in the Alameda Creek Fisheries Restoration Workgroup (ACFRWG), and also participated in multiple watershed tours that included all of the water resources facilities and most of the watersheds discussed in the DEIR. I wish to formally state my concurrence with all of the technical criticisms submitted by the ACA/CBD on Chapters 4.5 - Fisheries and Aquatic Habitat, and 4.6- Hydrology of the DEIR, as well as make the following additional points.

01

The DEIR incorrectly states in Chapter 4.5, Section 4.5.2.3, pages 66 - 70 that the operation of the Alameda Creek Diversion Dam (ACDD) is not currently, has not in the past, and will not in the future have any effect on the abundance of the resident rainbow trout populations above or below the ACDD. The only evidence stated to substantiate this illogical conclusion is a personal communication with one ichthyologist, which does not fully elucidate the logic behind that expert's opinion, nor is the expert's opinion supported by any hydraulic modeling or technical analysis of evidentiary data collected on site. In fact the DEIR should state that the ACCD is likely having a significant effect on the resident trout population until such a time as a properly designed study can

02

-1-

conclusively prove that it is not. The DEIR states that the two 40 square foot intakes to

the ACDD's diversion tunnel are capable of diverting 100% of upper Alameda creeks outflow until flows exceed 650 cubic-feet-per-second (CFS). Figure 4.5.3 and other analogous ones elsewhere in the DEIR and supporting technical reports show that this diversion capacity exceeds the natural outflow of Upper Alameda Creek above ACDD the vast majority of each year, and that no other bypass flows are ever released, except during one annual sediment sluicing event.

Clearly as a result of the operation of ACDD, a significant fraction, up to 100%, of any juvenile rainbow trout dispersing downstream will be entrained into the diversion tunnel to Calaveras Reservoir and permanently lost to the sub-population of rainbow trout existing below ACDD, thus depressing the abundance of that sub-population. In any year that the production of juvenile rainbow trout above ACDD exceeds the intrinsic carrying capacity of that habitat, some fraction of the juvenile production will attempt to disburse downstream to avoid intra-specific competition. In doing so they will come under the influence of the unscreened diversion at ACDD that diverts 100% of the creek's flow for most of the year, and be lost from their natal stream system. While juvenile trout will also attempt to move upstream to avoid competition, the DEIR describes stream slope and geomorphologic conditions which will impair juvenile upstream migration in some areas of Upper Alameda creek above the ACDD, thus most juvenile redistribution to avoid competition in years of abundant/surplus juvenile production will likely occur in a downstream direction.

Additionally, if the population above ACDD that the DEIR assumes to be solely resident rainbow trout is in fact landlocked anadromous rainbow trout, a.k.a. steelhead¹, then the operation of the unscreened diversion at ACDD is also depressing the abundance of the landlocked steelhead population above ACDD, and likely preventing its achieving the optimal population level that could be sustained by the available habitat. Since ACDD diverts 100% of Upper Alameda Creeks outflow most of the time, any juvenile pre-smolts/smolts currently produced by the landlocked population in the upper watershed that are attempting to disburse downstream towards the ocean will instead be permanently lost to diversion into Calaveras Reservoir. Even after flows reaching ACDD exceed 650 CFS a small fraction of the year, allowing some spill, there will continue to be proportional loss of out-migrant juvenile steelhead to the diversion at ACDD. Once all of the other remaining partial or near complete barriers to adult steelhead immigration below ACDD are addressed, and even if passage is provided at ACDD, the diversion at ACDD is likely to cause the loss of the majority of the smolt production above ACDD, due to the unscreened diversion of the majority of the creek's outflow into Calaveras Reservoir.

If the SFPUC wishes to make a substantive argument that the unscreened diversion at

-2-

ACDD has only a partial or minimal effect on out-migrant juvenile trout or steelhead smolts under some flow conditions, then the DEIR will have to add an evaluation and discussion of the proportion of diverted flows in each water year type that occur at

¹ this is likely the case based upon Nielsen 2003, as well as observations by SFPUC staff, consultants, and others of adfluvial rainbow trout migrating into streams above Calaveras and San Antonio Reservoirs.

velocities well below the documented swimming abilities of juvenile trout and steelhead smolts. Clearly diversions of 100% of stream flow at between 400-650 CFS being entrained into an 80 square-foot intake will produce velocities of 5.0 - 8.13 feet-per second that will unavoidably entrain juvenile rainbow trout or steelhead. Since the ACDD is a passive gravity fed diversion, regulated by the size of the openings to the two, 40 square foot sluice gates, even as little as a 100 CFS diversion through a potential opening of only approximately 13 square feet (crudely estimated as a linear interpolation of 100 cfs/650 cfs capacity x 80 square feet of sluice gate), may still result in entrainment velocities of 7.69 feet per second. Thus it is likely, until conclusively proven otherwise, that the operation of the ACDD diverting 100% of upper Alameda Creeks's stream flow at almost any absolute diversion rate below 650 CFS is entraining the vast majority, if not 100% of the downstream migrant, juvenile rainbow trout or emigrant steelhead smolts/pre-smolts that reach the vicinity of the intake to the diversion tunnel.

02 cont.

The DEIR and its supporting technical reports need to better evaluate the flows needed for immigration passage and spawning by adult steelhead, and rearing by juvenile steelhead in the watershed between the BART Weir and ACDD, Calaveras, and San Antonio Reservoirs. The Instream Flow Incremental Methodology evaluations conducted by Hagar and Paine appear to cease at Welch Creek², thus there is inadequate information provided to determine whether all life stages of steelhead will have adequate flows for upstream passage, spawning, and rearing in the 'Extended Study Area', once instream barriers to passage are corrected in the near future. CEQA requires the DEIR to evaluate and account for the project's interaction with foreseeable events. Fish passage improvements below the project area are foreseeable, with a high probability of completion, so their consequences to the bypass flows required of the project in the near future should be included in the DEIR.

03

The DEIR fails to evaluate the ongoing and cumulative impacts of ACDD, Calaveras Reservoir/Dam and San Antonio Reservoir/Turner Dam degrading the habitat below each facility due to a) their impeding the natural sediment and bed-load transport necessary to maintain adequate quantity and quality of spawning gravels for rainbow trout or steelhead; and b) large woody debris necessary to form complex instream habitat and channel scouring structures forming natural pools. These cumulative negative impacts contribute to the consultants' ratings of the relative value of the habitat below the three dams, and thus those ratings do not fully represent the real unimpaired natural conditions and carrying capacity of a properly functioning watercourse. The impairment of downstream habitat by the cumulative impacts of ongoing SFPUC operations should be properly acknowledged and evaluated in the DEIR.

04

-3-

The DEIR should fully elucidate in Chapter 4.6 - Hydrology the proportion of unimpaired flows that would have been historically generated in lower Alameda Creek, a.k.a. the 'Extended Study Area', from both the middle and upper Alameda Creek Watershed containing SFPUC's reservoirs and the specific Project Area, vs. the Arroyo de la Laguna/Arroyo Mocho watershed to the north, in order to define the proportional

05

² Welch Creek is a tributary to Alameda Creek below Calaveras Creek but upstream of San Antonio Creek.

responsibility of the SFPUC for bypass flow releases to sustain the aquatic habitat below the confluence with the Arroyo de la Laguna. The DEIR avoids these evaluations on the flawed assumption that Arroyo de la Laguna/Arroyo Mocho Watershed contributes an unspecified, yet large enough fraction of flows to lower Alameda Creek to negate in any way the responsibility of the SFPUC for sustaining minimum flows in this area. In fact the opposite may be true. The SFPUC is responsible for maintaining flows below the Arroyo de la Laguna in proportion to the natural/unimpaired flows that would have accrued from the proportion of the Alameda Creek Watershed affected by SFPUC operations. In my experience³ the portion of the Alameda Creek Watershed containing the SFPUC's facilities would contribute most of the natural unimpaired flow, except during the high flow season, and does contribute much of the existing flow in Alameda Creek below the Arroyo de la Laguna, as although it is a smaller watershed in square miles, it is a wetter one producing a greater proportion of the natural unimpaired outflow. The DEIR would have to include such discussions of the proportional contribution of the middle and upper Alameda Creek Watershed to flows in the lower watershed, versus the contributions of Arroyo de la Laguna/Arroyo Mocho Watershed, in order for the DEIR to validly quantify the responsibilities of the SFPUC for maintaining base flows in the lower Alameda Creek drainage. This is necessary to comply with Fish & Game Code 5937, to protect public trust values, and to comply with State water rights law and precedent.

05 cont.

Since Chapter 4.6 is a technical analysis of hydrology being presented in a legal public proceeding, according to the State Business and Professions Code either it or its substantiating technical reports must be prepared by Certified Hydrogeologist, and his/her registration number and name(s) must appear as part of any report(s). Please provide that information in the FEIR.

06

Sincerely,

Kevan Urquhart, M.A.
 Certified Fisheries Professional - American Fisheries Society
 Member of the American Institute of Fishery Research Biologists
 P.O. Box 2612
 Carmel-by-the-Sea, CA 93921-2612

³ based on visits to the watershed and briefings from SFPUC staff or their consultants made to the ACFRW.



SAN FRANCISCO PLANNING DEPARTMENT
 Draft Environmental Impact Report Public Hearing
 Calaveras Dam Replacement Project

Sunol Glen Elementary School
 11601 Main Street
 Sunol, CA 94586

Monday, December 14, 2009

COMMENT CARD

Thank you for participating in tonight's public hearing on the Calaveras Dam Replacement Project DEIR. Your comments are encouraged.

Name (Please print): Karla + Curtis Werning
 Affiliation (If applicable): Alameda Creek Alliance
 Phone: 510-538-1490 Email: -
 Address: 5601 Lynwood Ct
 City, State, Zip: Castro Valley, CA 94552

COMMENTS

Save the fish

Restoration of fish habitat and adequate
flows for steelhead survival are crucial.
Barriers to migration must be removed.
We are concerned about the effect of the diversion dam and
tunnel on fish populations.
We are willing to have less water for our home in
order to restore the steelhead's home.

01

For more information about the proposed project, please contact:

Betsy Rhodes, San Francisco Public Utilities Commission
 1155 Market Street, 11th Floor, San Francisco, CA 94103
 Phone: (415) 554-3240
 BLauppe@sfgwater.org

For more information about the EIR process, please contact:

Chris Kern, EIR Coordinator, San Francisco Planning Department
 1650 Mission Street, Suite 400, San Francisco, CA 94103
 Phone: (415) 575-9037
 Chris.Kern@sfgov.org

Appendix M

Transcripts of Draft EIR Public Hearings

**Public Hearing Transcript –
Fremont, November 10, 2009**

SAN FRANCISCO PLANNING DEPARTMENT
MAJOR ENVIRONMENTAL ANALYSIS DIVISION

CALAVERAS DAM REPLACEMENT PROJECT
DRAFT ENVIRONMENTAL IMPACT REPORT
PUBLIC HEARING

Fremont Main Library

2400 Stevenson Blvd

Fremont, CA 94538

Tuesday, November 10, 2009

6:30 p.m.

REPORTER'S TRANSCRIPT OF PROCEEDINGS
BY: JUDITH LARRABEE, SHORTHAND REPORTER

CLARK REPORTING AND VIDEOCONFERENCING

2140 SHATTUCK AVENUE, SUITE 405

BERKELEY, CALIFORNIA 94704

(510) 486-0700

2

3 Chris Kern, San Francisco Planning Department

4 Dan Wade, San Francisco Public Utilities Commission

5

6 MEMBERS OF THE PUBLIC

7 (in order of appearance)

8

9 Ken Edgecombe

10 Nicole Sandkulla

11 Glenn Kirby

12 Tim Starbird

13 Dave Gargas

14 John Cant

15 Jeff Miller

16 Jessie Raeder

17 Robert Raburn

18 Roger Castillo

19 ---000---

20

21

22

23

24

25

1 PROCEEDINGS

2 MR. KERN: We're going to get started now. Good
3 evening. Welcome to tonight's public hearing on the Draft
4 Environmental Impact Report or EIR for the San Francisco
5 Public Utility Commission's Calaveras Dam Replacement
6 Project. My name is Chris Kern, and I'm with the San
7 Francisco Planning Department, Major Environmental Analysis
8 Division. And I will be moderating this hearing tonight.
9 In a few minutes, Dan Wade, with the San Francisco Public
10 Utilities Commission, will give a presentation about the
11 project.

12 This is the first of three public hearings on the
13 Draft EIR that the Planning Department will be holding. We
14 are also holding a hearing before the City Planning
15 Commission this Thursday starting at 1:30 and we are holding
16 a third hearing in Sunol at the Sunol Glen Elementary
17 School on December 14th at the same time, 6:30 p.m.

18 So this is tonight's agenda. If you haven't already
19 done so, please sign in and write your name and address
20 legibly so that we can stay in touch with you throughout
21 the environmental review process for this project.

22 As I said, Dan Wade is going to give us an overview of
23 the project, and then we're going to open up the hearing to
24 hear your comments. And then I'll close the hearing and
25 make a few closing remarks.

1 If you haven't also -- in addition to signing in --
2 taken the handouts for tonight, we've to got a comment
3 sheet where you can provide written comments. It has our
4 contact information on it. We have speaker cards. If you
5 do want to speak tonight, I'm going to ask you to fill out
6 one of these speaker cards and there will be a few folks
7 that will collect them and bring them up. I'll be calling
8 people up based on the cards that I receive when we get to
9 the public comment portion of the hearing.

10 Just a few reminders. The restrooms are back out
11 towards the main entry there to your right. Please turn
12 the ringers off of your cell phones and step outside the
13 room if you do have to take a call during the hearing.

14 Also I want to let you know that there's a court
15 reporter tonight who will be transcribing all of the
16 comments. The Planning Department will respond to all of
17 the comments that we receive at this hearing tonight, as
18 well as the other two hearings, and all comments that we
19 receive in writing in a written Comments and Responses
20 document. We will not be responding to comments this
21 evening.

22 Now I'd like to introduce Dan Wade.

23 MR. WADE: Thank you, Chris. Again, I'm Dan Wade.
24 I am the senior project manager for the Sunol Valley
25 Project, the Water System Improvement Program for the San

1 Francisco Public Utilities Commission, and I'm also the
2 project manager of the Calaveras Dam Replacement.

3 This schematic shows an overview of the San Francisco
4 Public Utilities Commission's water system. And there's
5 essentially two primary portions of our system. There's
6 the regional water system which is the system that
7 surrounds the Bay Area. It's the oldest part of the
8 system.

9 Then there's the Hetch Hetchy part of the system, which
10 of course includes Hetch Hetchy Reservoir which is inside
11 Yosemite National Park. There is 200 miles of conveyance
12 lines that take the water across the San Joaquin Valley.
13 And it's in the Sunol Valley where the first portions of
14 our regional system connect up with the Hetch Hetchy
15 system. And Calaveras Reservoir is located here. And we
16 can actually take local water that's collected in Calaveras
17 Reservoir and put it into the Hetch Hetchy pipelines to
18 take water around the South Bay or across the Bay and up
19 the peninsula to San Francisco, of course making lots of
20 deliveries along the way here in the East Bay area.

21 Calaveras Reservoir is a key component of our local
22 water system. The size is 96,000 acre-feet which is the
23 largest local reservoir in our system.

24 This is zooming in a little bit on the Bay Area.

25 Again, the reservoir is located here in the southeast Bay

1 Area. It's located about 7 miles south of the town of
2 Sunol, 12 miles south of the city of Pleasanton and about
3 seven miles east of the city of Milpitas. It's located in
4 a remote area of both Alameda and Santa Clara counties.
5 The drainage area of the reservoir is about 100 square
6 miles of which the city of San Francisco owns about 35,000
7 acres of watershed lands which are restricted to public
8 access.

9 So the project background, again, the Calaveras
10 Reservoir is the SFPUC's largest local reservoir allowing
11 for a storage of 96,850 acre-feet. It provides 40 percent
12 of the local water storage and 66 percent of the local
13 water yield. That means 66 percent of the water from the
14 local storage reservoirs in the Bay Area are from
15 Calaveras.

16 The original dam was completed in 1925 and it was
17 modified in 1974 to increase seismic stability. Now, in
18 2001, the SFPUC lowered the water levels in the reservoir
19 due to seismic safety concerns and a mandate from the
20 California Division of Safety of Dams which is the
21 regulatory agency that regulates all dams over 25 feet high
22 in the state of California. This was due to increase in
23 seismic concerns as a result of our increased understanding
24 over the years of how much larger earthquakes are than when
25 the dam was built in 1925. The reservoir is currently

1 operating at approximately 40 percent of the historic
2 capacity due to this reservoir restriction.

3 Now, this shows a view of the reservoir and dam from
4 about 2,000 feet above the Sunol Regional Wilderness which
5 is just north of the dam. So the existing dam is located
6 here. It's about 210 feet high. It's about three and a
7 half million yards of earth and rock-fill materials. At
8 the time of construction, it was the largest earth-filled
9 dam in the world. Of course, the reservoir is here, and
10 the reservoir in this picture is at the reduced level. You
11 can see essentially the bathtub ring around the reservoir.
12 If the reservoir were at the historic high capacity, the
13 reservoir would go up in this area like this. And so that
14 upper 50 feet of the reservoir represents approximately
15 60 percent of the storage.

16 So what's the project purpose? The purpose of the
17 proposed project is to replace the existing dam with a dam
18 that meets current seismic standards. And upon completion,
19 then the Division of Safety of Dams, or DSOD, would lift
20 the restriction that was placed on the reservoir so that
21 the historic capacity of the reservoir could be restored.

22 The project would help meet the level of service
23 objectives for the SFPUC's water system improvement program
24 which are to maintain reliable water system during major
25 earthquakes, to maintain delivery, reliability of water to

1 the customers, to maintain high water quality and to
2 provide a supply to meet the customer demand through the
3 year 2018 as was documented in our Programmatic
4 Environmental Impact Assessment.

5 So the project objectives are to reestablish water
6 delivery reliability; to restore the water supply and
7 reservoir capacity to the pre-2001 level of 96,850
8 acre-feet, essentially the historic reservoir capacity; to
9 improve seismic reliability and to construct a replacement
10 dam with a robust design that would accommodate a potential
11 future enlargement -- the potential future enlargement is
12 not part of the environmental review of this project, but
13 the dam would be designed in order to accommodate such a
14 potential enlargement -- to continue the reservoir
15 operation during construction, and, of course, to maintain
16 high water quality.

17 So the project features would be a replacement earth
18 and rock-fill dam, which would mean that we would need to
19 stabilize an existing landslide in the right abutment of
20 the new dam. When I say right, I mean looking downstream.
21 Of course, we would need to build a new spillway and
22 stilling basin. We would modify some of the piping and
23 valves which we refer to as outlet works. We would
24 incorporate some fishery release valves so that we could
25 put water in the stream downstream of the dam. We would

1 open up what we call borrow areas which are essentially
2 sources of earth and rock material that are used in the
3 construction of the dam. And then we would also need to
4 have disposal sets for excess soil and rock material
5 because in order to get the material for the construction
6 of the dam, we generate extra material that needs to have a
7 home at the end of construction. Of course, we would need
8 to construct haul routes and staging areas, and lastly we
9 would do some modifications at the Alameda Creek DIversion
10 Dam, and I'll talk about that in a few minutes.

11 So this is the project footprint of the proposed
12 components of the new project. And essentially what that
13 means is that these hatched and colored areas are the areas
14 where the new project would exist. And so the new dam
15 would be constructed immediately downstream of the existing
16 dam, and the existing dam would be used as a coffer dam, or
17 a dam to hold back the water during construction of a
18 replacement dam.

19 The different colors on this map represent the various
20 components that I just mentioned, including borrow areas
21 which are here, which we call Borrow Area B, to obtain hard
22 rock material for the upstream shell of the dam, and Bar
23 Area E at the south end of the reservoir to obtain clay
24 material which essentially forms the impermeable barrier of
25 the core of the dam. We would construct a haul road from

1 Borrow Area E along the west rim of the reservoir up to the
2 dam site. The purpose of constructing that haul road is so
3 that we don't have to haul on Calaveras Road which is
4 immediately west of that area. And so this road would be
5 constructed especially for the project, and we would haul
6 on that project. At the end of construction, it would be
7 under water.

8 We also have the hatched areas, which are the disposal
9 sites that I mentioned, which would accommodate up to
10 4 million cubic yards of excess soil and rock material at
11 the end of construction. And then, of course, these yellow
12 areas are staging areas that are needed in order to stage
13 construction materials and equipment on the site during
14 construction.

15 I mentioned the West Haul Road. As an option to the
16 West Haul Road, we also have an option to barge materials
17 across the reservoir from Bar Area E up to the dam site.
18 The purpose of having that option is that there are a known
19 nesting pair of bald eagles that are currently nesting in a
20 PG&E tower in approximately this area. There was a nest in
21 2006 where they were found to be nesting very near where
22 the West Haul Road would be constructed. And so we wanted
23 to have an option to be able to barge materials across the
24 reservoir in case those eagles decided to go back to their
25 2006 nest or somewhere near the West Haul Road so that the

1 project could continue.

2 This is just kind of a summary of the major
3 construction activities. And essentially, it's a large
4 earth and rock-fill dam construction project. So there
5 will be lots of excavation of soil and weathered rock using
6 conventional methods. There will also be some controlled
7 blasting to excavate hard rock; drilling and grouting of
8 foundation rock to improve the foundation before building
9 the dam. There will be 40,000 yards of concrete for the
10 new spillway construction. I mentioned the outlet works
11 modifications and extension which is essentially the piping
12 and the valves beneath the dam; haul road construction that
13 I mentioned; of course, transporting materials, and then
14 finally building the embankment dam itself.

15 And so this slide shows the existing dam on the left
16 which was modified in 1974 with some of these buttresses to
17 improve seismic stability. So this is looking at the
18 downstream face of the dam. The reservoir is on the upper
19 portion of the slide.

20 And this is what the new replacement dam would look
21 like at completion of construction. This peninsula is
22 essentially -- well, looking at the slide, the left portion
23 of the coffer dam after the reservoir has been raised back
24 to the historic level. We would dredge this portion of the
25 coffer dam so the water could come to the new spillway at

1 the existing dam.

2 This is a cross section or a slice through the middle
3 of the new dam. The new dam would be constructed
4 essentially immediately downstream of the existing dam.
5 And I mentioned the clay core materials, the upstream
6 rock-fill material that would be borrowed from Borrow Area
7 B. And then earth-fill material that would come from this
8 hillside as a result of excavating for the dam. In
9 addition, these yellow areas in the dam consist of gravels
10 and sands that would need to be imported from off site.
11 That's the only portion of the dam that will actually be
12 imported from off site. I'll talk about that more in a
13 moment.

14 Now during the entirety of design, we made every effort
15 to avoid and minimize impacts. This is the case with all
16 SFPUC projects. In the Calaveras, before and after the
17 project design, we conducted surveys for sensitive
18 resources and worked to avoid impacts where impacts were
19 unavoidable. We worked with our environmental staff,
20 engineers, expert consultants and resource agency staff to
21 study and minimize anticipated effects of the proposed
22 project.

23 Similarly, in support of minimizing construction
24 vehicle traffic on Calaveras Road, the project is carefully
25 designed to secure the majority of construction materials

1 on SFPUC land at the site of the proposed project. For
2 example, as I mentioned, the clay core will be constructed
3 from clays located on SFPUC lands, and the clay is
4 transported on our lands rather than on Calaveras Road.

5 Now, in addition to building the dam in this area, we
6 also propose to make some modifications of Alameda Creek
7 Diversion Dam which is located on Alameda Creek in a
8 subwatershed to the Alameda Creek Watershed that feeds
9 Calaveras Reservoir. This is a small 31-foot high concrete
10 dam on Alameda Creek. The purpose of the dam is to divert
11 flows off of Alameda Creek up to 650 CFS when water is
12 available at that level and divert the flows from the creek
13 into a 1.8-mile long tunnel that feeds the flow into
14 storage of Calaveras Reservoir. This is Alameda Creek
15 upstream to downstream, and this is the 31-foot high
16 Alameda Creek Diversion Dam.

17 Now, the modifications that we're proposing to make at
18 the diversion dam are to install a bypass tunnel. So this
19 is the flow coming down Alameda Creek; the blue is the
20 water. This is the dam itself across the creek. This is a
21 temporary work area that we plan to have during
22 construction. What we would do is essentially build a
23 bypass flow tunnel through the dam so that we can provide
24 flows past the Alameda Creek Diversion Dam to provide for
25 fishery habitat enhancement downstream of the dam.

1 Now, the proposed schedule for the project is that in
2 August 2010 we would propose to have the project considered
3 for approval. And if the project is approved in
4 September 2010, we would advertise for construction bids,
5 and then in spring of 2011 begin construction. And the
6 construction is anticipated to be about four years, so we
7 would complete in the winter of 2014, 2015.

8 Now, I mentioned that we are minimizing the use of
9 Calaveras Road as much as possible. There is actually two
10 windows of time where we do need to use Calaveras Road to
11 import those sands and gravels materials that I mentioned
12 for the filters and drains of the dam. So we would use
13 Calaveras Road as a hauling route for those materials, and
14 SFPUC would request permission from both Alameda and Santa
15 Clara Counties to close the road from Geary Road on the
16 north to Felter Road on the south during two months in the
17 summer of 2011, and then again 18 months beginning in the
18 winter of 2012. The road would be open on weekends, and we
19 would, in fact, sweep the road prior to opening it on
20 weekends. And then the road would be restored to the
21 pre-construction condition at the end of construction. And
22 so this yellow shows the portion of Calaveras Road that we
23 would request to be closed.

24 Now, in the post-construction operations, we would
25 essentially refill the reservoir upon completion of the dam

1 beginning in 2014/2015 upon approval from the Division of
2 Safety Dams. Water releases would be made for resident
3 rainbow trout at the proposed Alameda Creek Diversion Dam
4 Bypass Tunnel when water is present in Alameda Creek. And
5 then additional releases would be made from Calaveras
6 Reservoir pursuant to the Memorandum of Understanding or
7 MOU that was negotiated with the California Department of
8 Fish and Game in 1997. And the proposed flow schedules for
9 anadromous steelhead would be implemented once steelhead
10 have regained access to the Alameda Creek watershed below
11 the dam, and that would happen after the fish ladder that's
12 planned on the BART weir is constructed in Fremont. And
13 this last slide shows what the restored reservoir would
14 look like with a new dam. Chris.

15 MR. KERN: Thanks, Dan. Now we're going to get
16 started with the public hearing portion of tonight's
17 meeting. Again, I just want to remind you that tonight's
18 hearing is not a hearing on whether or not the project
19 should be approved. That hearing will be held later before
20 the San Francisco Public Utilities Commission once the
21 environmental review process has concluded. Our hearing
22 tonight is to hear your comments on the adequacy and
23 accuracy of the Draft Environmental Impact Report the
24 Planning Department has published on the project.

25 All the comments that we receive tonight, as I

1 mentioned, will be recorded and transcribed by our court
2 reporter, and those comments, along with all other comments
3 received at the other hearings and written comments that we
4 receive during the public comment period will be responded
5 to in a written Comments and Responses document before the
6 certification of the final Environmental Impact Report.

7 The comment period on this Draft EIR has been extended
8 until December 18th, so you have until then to submit
9 written comments to the Planning Department. Here's our
10 contact information. That information is also available
11 both on our Web site and in the handouts for tonight.

12 The Draft Environmental Impact Report is available on
13 the Planning Department's Web site. There are also copies
14 at this library, at the San Francisco Main Library and at
15 the San Jose Main Library, and there are hard copies that
16 you can view at the Planning Department's offices as well.

17 I already mentioned the comment period has been
18 extended. We will, as I mentioned, be preparing a Comments
19 and Responses document. That is scheduled to be released
20 for public review later in the spring or early summer of
21 next year. And then shortly following the release of that
22 document for review, the Environmental Impact Report will
23 go to the Planning Commission for certification.

24 So now we want to hear your comments on the accuracy
25 and adequacy of the Draft Environment Impact Report. If

1 you wish to speak and you haven't already done so, please
2 do fill out one of these speaker cards, and that will be
3 brought up to me. I'm going to be calling people up from
4 these cards shortly.

5 When your name is called, please come up. We're going
6 to just shift the podium around here so you can use the
7 podium and the microphone. We'd like you to speak your
8 name clearly so we get that in the record. And we would
9 ask people to limit their comments to three minutes.

10 Please also try to speak clearly and slowly so that we can
11 get your comments transcribed accurately.

12 Here is, again, my contact information at the Planning
13 Department and the PUC's public information contact for
14 questions about the project itself.

15 So at this point I have about a dozen speaker cards.
16 So we will ask you to try to keep to the three-minute time
17 limit. The first speaker is Ken Edgecombe. We're going to
18 just get this podium turned around. **O-OpEng1**

19 MR. EDGECOMBE: My name is Ken Edgecombe. I'm the
20 business representative for Operating Engineers Local 3.
21 We have about 1300 people out of work right now, and at
22 this point, we're ready to go to work as soon as possible,
23 as soon as the job is funded and ready to go. The project
24 is fully funded and is shovel-ready. So we're ready to go
25 at any time.

O-OpEng1-01

1 The issues between the Alameda Creek Alliance and this
2 can be mediated over the next four years during the
3 construction phase of the dam. The project has been
4 delayed over 18 months now, and we would urge no more
5 delays and let the project start so we can get the water
6 that we need and put the people back to work and help the
7 economy.

O-OpEng1-02

8 MR. KERN: Thank you. Next is Nicole Sandkulla
9 followed by Glenn Kirby.

A-BAWSCA1

10 MS. SANDKULLA: San Francisco's Draft Environmental
11 Impact Report for the Calaveras Dam Replacement Project has
12 been reviewed by BOSCA on behalf of the 26 agencies that
13 purchase water for the San Francisco Regional Water System,
14 for the 1.7 million residents, businesses and institutions
15 in San Francisco's neighboring communities.

16 Calaveras Reservoir is San Francisco's largest local
17 reservoir. It provides about 40 percent of the PUC's local
18 storage and 66 percent of the local water bureau. As such,
19 it provides critical water supply reliability for the Bay
20 Area customers that rely upon the San Francisco Regional
21 Water System. Additionally, as the local storage facility,
22 Calaveras provides a majority of the water supply that
23 would be available in the event of a disruption of water
24 supply from San Francisco's Hetch Hetchy system.

25 Since 2001, the water levels at Calaveras have been

1 lowered 66 percent in response to seismic stability
 2 concerns. The Calaveras Dam Replacement Project now
 3 proposes to construct a new seismically-resistant dam
 4 immediately downstream of the existing dam and would
 5 reestablish the water delivery reliability of this critical
 6 component of the San Francisco system.

7 BOSCA supports the proposed project. The replacement
 8 of Calaveras Dam is essential to ensuring the continued
 9 delivery of a reliable supply of high-quality water to all
 10 residences and businesses that rely on the San Francisco
 11 Regional Water System, including those in the city of San
 12 Francisco itself. In replacing the dam, the proposed
 13 project takes the prudent approach of building the base of
 14 the replacement project in such a manner that it can be
 15 expanded in the future to meet additional needs if
 16 necessary.

A-BAWSCA1-01

17 We believe the Draft Environmental Impact Report does a
 18 good job of addressing the potential environmental impacts.
 19 We urge the Planning Commission to continue its progress in
 20 preparing the final Environmental Impact Report for this
 21 critically important project as soon as possible. Thank
 22 you.

A-BAWSCA1-02

I-Kirby

23 MR. KERN: Glenn Kirby followed by Tim Starbird.

24 MR. KIRBY: Thank you. My name is Glenn Kirby. I
 25 live in Hayward, which is served by the Hetch Hetchy

1 system. I'm also a member of the Alameda County Planning
2 Commission, although I am speaking as an individual.

3 The other day, the Planning Commission held a hearing
4 on this must-needed project and was able to make a
5 determination that it met with our General Plan. So a
6 compliance hearing was held. A couple of questions came up
7 for me during the course of that. That's why I am here
8 tonight.

9 I am understanding that the dam impacts are a mixture
10 of the actual construction as well as the management of the
11 construction and then management into the future. I
12 understand that the capacity at completion will be
13 essentially the same capacity as the previous dam, and that
14 the discharge pipe will be about the same size.

15 I know that there have been problems in the past with
16 adequate flows on the creek. So I will just say simply
17 that I'm in support of Alameda Creek Alliance's efforts to
18 ensure adequate flows both for fish and for Alameda Creek's
19 needs. Alameda Creek and its watershed are very important
20 assets to Alameda County, and I just want to make sure that
21 they're adequately protected.

I-Kirby-01

22 On a smaller but nonetheless for myself still an
23 important point, I'm an active cyclist, and I am a member
24 of the Fremont Freewheelers Bicycle Club. And I have some
25 concerns about the closures. I know that several years ago

I-Kirby-02



1 when there was a storage tank constructed by Crystal
 2 Springs, there were impacts on Cañada Road that the
 3 contractor didn't always do a good enough job on Friday of
 4 ensuring that the surface of that road was in good
 5 condition for the weekend opening for the cyclist and for
 6 the traffic, and there were some injuries. I witnessed a
 7 couple of injuries where the temporary asphalt patches were
 8 not adequately done. So I would like to ensure that the
 9 contractor's instructed to make sure that in addition to
 10 sweeping, that any patches or repairs that are needed to be
 11 made are done to a minimum standard to ensure safety of
 12 traffic, and in particular the cyclist on weekends.

I-Kirby-02
cont.

13 And then one additional request. I know that I heard
 14 the Amgen California tour will be accommodated. When that
 15 takes place, I'd also like to ask that in the spring of
 16 2012 that the Fremont Freewheelers Prima Vera of the
 17 Century Ride be accommodated as well. Thank you.

I-Kirby-03

18 MR. KERN: Tim Starbird followed by Dave Gargas.

I-Starbird

19 MR. STARBIRD: I'm Tim Starbird. I live on
 20 Calaveras Road. I have the last house out of Milpitas.
 21 It's a half mile east of Felter Road. My concern about the
 22 Draft Environmental Impact Report is that it doesn't
 23 address the closure of the Santa Clara County side.

I-Starbird-01

24 One map shown to me by the water company indicates that
 25 the closure may occur right behind my house. Behind my

1 house is a hairpin turn. It's rather tight. The map
2 identifies as that being the closure and not at Felter Road
3 as you mentioned earlier.

4 That's not a logical place, and also it's very
5 concerning for us because we can imagine that they're going
6 to be people parking there at night and during the day that
7 have easy access to the back of my house. I can't see that
8 location from the house very well.

9 There are other more logical road locations not very
10 far away. I think I mentioned to the water company or to
11 the Planning Department at one time, which is that there is
12 a large sweeping turn just a half mile beyond that hairpin
13 turn referred to by us who live in the mountain as Santa's
14 Hay Field. It's a flat piece and it certainly could be
15 used to turn around trucks. There are trucks in there that
16 get stuck there on a regular basis. That would be a more
17 logical place and certainly one preferable to us.

18 There are lots of guns on Calaveras Road at night, and
19 my wife and I estimate that it's twice a week we hear
20 gunfire that's within a mile or two of our house, including
21 a guy with a assault weapon. And we can just imagine that
22 if you close the road right behind my house, that they're
23 going to be parking there, and either walking up to my
24 house with their guns or at least walking down the road and
25 then shooting their guns near my house.

I-Starbird-01
cont.

1 So my request is that you address the location of the
2 closure on the Santa Clara side and make a decision in that
3 regard so we have it up for discussion anyway. Thank you.

I-Starbird-01
cont.

4 MR. KERN: Dave Gargas followed by John Cant.

I-Gargas

5 MR. GARGAS: Hi. Dave Gargas. I live in Union
6 City. I'm a member of the Alameda Creek Alliance. We want
7 to make sure that the adequacy of water flows are
8 established so that the steelhead can survive throughout
9 the year and restore the population.

I-Gargas-01

10 We've worked hard to remove the barriers along that
11 creek after the steelhead get a stepladder, and this flow
12 from you guys would be the final step for them to populate
13 the stream like they used to. So I'd like to ask you guys
14 to make sure that you establish some adequate flows before
15 you build this dam. Thank you.

16 MR. KERN: John Cant followed by Jeff Miller.

I-Cant

17 MR. CANT: Yes. Good evening. My name is John
18 Cant. I'm a resident of Fremont. I live on Canyon Heights
19 Drive, about five minute's walk from Alameda Creek. And I
20 should mention that I'm fully cognizant of the fact that
21 Fremont, including myself, gets a considerable portion of
22 its water from the SFPUC.

23 First, I do understand the need for upgrading the water
24 supply system. But second, I'd like to talk a little about
25 the context of the project and of the EIR because this

I-Cant-01

1 context is very important. What I'm referring to is the
2 broader issue beyond the dam of the diversion of increased
3 amounts of water from rivers and streams in California to
4 supply human populations.

5 Now, this might be necessary. It's not a completely
6 irrational hypothesis. But so far I have not seen a
7 reasoned argument for doing so. Such an argument would
8 have to compete with an environmentally enlightened plan
9 for actually reducing the need for natural water. This
10 kind of plan would focus especially on conservation of
11 water and recycling.

12 We in the Bay Area get away with murder. When I water
13 my plants, I am in effect forced to use the same water that
14 comes out of the tap which is suitable for drinking. I
15 think that is absurd and it's irresponsible. And
16 unfortunately, a major source of this irresponsibility is
17 the failure over the years of the Commission -- yes, the
18 PUC -- to focus more on conservation and recycling. If it
19 did so, I believe it would be found that one could extract
20 considerably less water from the natural landscape and that
21 this reduced exploitation would benefit biological
22 communities, including endangered species such as steelhead
23 trout in Alameda Creek.

24 The third issue here is that careful analyses by the
25 Alameda Creek Alliance, which have been referred to, also

I-Cant-01
cont.

I-Cant-02

1 the internationally recognized Center for Biological
 2 Diversity and other environmentally concerned
 3 organizations, show that the Calaveras Dam Project, as set
 4 forth in the Commission's Draft EIR, is deeply flawed.

I-Cant-02
cont.

5 Three issues: Proposed stream flows are insufficient
 6 for migratory fish; there is no plan to provide fish
 7 passage at the Alameda Diversion Dam or at Calaveras Dam,
 8 and proposed mitigations for impacts of construction are
 9 inadequate.

I-Cant-03

I-Cant-04

10 The list goes on, and I cannot address these in detail
 11 at this point. But thank you for the opportunity to talk.

12 MR. KERN: Thank you. Jeff Miller followed by
 13 Jessie Raeder.

O-ACA1

14 MR. MILLER: Jeff Miller. I'm with the Alameda
 15 Creek Alliance. I do a lot of bashing of the PUC, so I'll
 16 start out with what's right with the project and go from
 17 there.

18 I want to thank the Planning Department for extending
 19 the comment period. This is a very complex project and a
 20 very big EIR and a lot of issues to be resolved still, and
 21 I want to thank you for the additional meeting in Sunol. I
 22 know a lot of Sunol folks are going to have a lot of
 23 questions.

24 The things that are right, an improvement from the
 25 programmatic EIR, in that flows for steelhead trout are

O-ACA1-01

1 being addressed, although we think the flows are
2 inadequate. The proposed summer flows that are the basis
3 for rearing conditions for cold water fish seem to be good,
4 and the preconstruction surveys, exclusion measures,
5 avoidance measures during construction seem to be pretty
6 good.

O-ACA1-01
cont.

7 Another thing that seems to be very thorough is the
8 engineering, the thinking about where dirt is going to be
9 moved, construction, et cetera. The parts that seem to be
10 lacking are post construction, how the dam is going to be
11 operated, and that's what we're really concerned with is
12 what's going to happen below the dam after construction.

O-ACA1-02

13 The approach by the PUC seems to be to propose the
14 minimum that could possibly fly with regulatory agencies,
15 and that just doesn't seem to be an approach that's going
16 to get this project completed quickly. I know there's a
17 lot of interest in terms of jobs. We have an interest in
18 seeing the dam rebuilt in terms of it's going to be better
19 conditions for fish and pool of cold water for fish
20 releases downstream. But the fisheries issues need to be
21 addressed adequately as this project is approved.

O-ACA1-03

22 I'll just highlight four of the main issues with the
23 EIR that we see as pretty big flaws rights now. The
24 proposed stream flow releases really are tailored -- that
25 are based on this 1997 agreement -- are tailored for

O-ACA1-04

1 resident rainbow trout. They do not adequately address
2 flows for migratory fish.

O-ACA1-04
cont.

3 One of the things we've asked for repeatedly, which I
4 don't know can happen at this point, was to put an element
5 in the project that included -- part of the purpose being
6 restoring steelhead and native fish and wildlife
7 downstream. That way it would be given equal footing with
8 engineering and water supply considerations. That hasn't
9 been done and it shows in the project.

O-ACA1-05

10 Two other things that jump out. The proposed
11 mitigation. There's undeniably going to be very huge
12 impacts from construction. We've got a lot of sensitive
13 species and habitat around the dam there. There are some
14 mitigation areas identified that are already on public
15 land. They are already owned by the public. They are
16 already protected by the San Francisco PUC. They're not at
17 risk of development. They're supposedly being managed
18 according to the PUC's watershed management plan and
19 stewardship policy. Calling these mitigation areas doesn't
20 provide any benefit for the species, and the very real
21 impacts from construction should be offset by protecting
22 at-risk habitat on private lands.

O-ACA1-06

23 Two more quick things. The mitigations for greenhouse
24 gas emissions. The approach has been our contribution to
25 greenhouse gas emissions is insignificant in terms of

O-ACA1-07

1 statewide emissions; therefore, we're not going to
2 mitigate. That's just not an adequate approach.

3 And then the last thing is, like I said, we support
4 bringing San Francisco's water supply into the 21st
5 century. Let's also bring the environmental aspects of
6 this project into the 21st century also. Thank you.

7 MR. KERN: Thank you. Jessie Raeder followed by
8 Robert Raburn. Robert is the last speaker card I have. If
9 you wish to speak and you haven't filled out a card, please
10 do.

O-TRT1

11 MR. RAEDER: Hi. My name is Jessie Raeder. I
12 represent the Tuolumne River Trust, and I am also here on
13 behalf of a coalition called the Bay Area Water Stewards.

14 Tuolumne River Trust has coordinated the Bay Area Water
15 Stewards, a group of environmental folks and organizations
16 that have been meeting with and working with the PUC for
17 the last five years regarding the Water System Improvement
18 Program.

19 About a year ago, our coalition agreed not to challenge
20 the EIR for the Water System Improvement Program, the
21 Program EIR, even though we felt that the EIR was very
22 inadequate, especially as it dealt with fisheries issues.
23 And we agreed not to challenge it because the PUC picked a
24 program that was a compromise agreement that we could all
25 live with, and everybody wants the seismic upgrades to go

1 forward. So we agreed not to challenge that. But we made
2 it clear before the Planning Commission then that we were
3 very concerned that future EIRs would tier off of this
4 flawed EIR and that we wouldn't necessarily let every
5 project go by.

6 Now since then, we've let twelve or more projects go
7 by. Everybody knows that this was going to be the
8 controversial one. I just wanted you to know that our
9 coalition is very concerned. We do find this EIR is
10 inadequate as it deals with steelhead trout and migratory
11 fish.

12 As Jeff mentioned, the flows were created for rainbow
13 trout, not for steelhead. We're concerned about the fact
14 that flows that are proposed for steelhead, which even
15 those seem inadequate, wouldn't go into effect until
16 steelhead get up into the reaches below the dam. I think
17 flows are part of what will enable that to happen.

18 I want to say again that we all support the seismic
19 upgrades going forward. We want the dam to be built. But
20 we do recognize that this is the most delayed project. And
21 I do want to point out that that is not because of us.

22 That's not because of the environmental community at this
23 point. However, we are just monitoring this closely, and
24 we're very concerned that the flows be fixed before we can
25 let this EIR go.

O-TRT1-01

O-TRT1-02

O-TRT1-03

1 I want to say again that Alameda Creek is becoming a
2 real success story, and we really think that this is an
3 opportunity for the PUC to move into the 21st century in
4 terms of how it's dealing with migratory fish and to come
5 into compliance with all of the modern environmental laws.
6 Obviously, this is a big opportunity to upgrade all of that
7 with the rebuilding with the Environmental Impact Report.

O-TRT1-03
cont.

8 Finally, I just want to say that I think our coalition
9 feels it's very important that we all stick together, that
10 we not play one watershed off another. I know that San
11 Francisco has agreed to do a lot of water conservation to
12 offset water that would be coming from the Tuolumme River,
13 that they had originally proposed to take from the
14 Tuolumme, and we think that the amount of water that we're
15 talking about could easily be made up for with those same
16 conservation programs and all of the recycled water and
17 everything that's everybody is working so hard to implement
18 now. So there's no reason not to release that water for
19 the steelhead. Thank you very much.

O-TRT1-04

20 MR. KERN: Thank you. Robert Raburn followed by
21 Roger Castillo.

O-EBBC

22 MR. RABURN: Good evening. My name is Robert
23 Raburn. I'm the executive director of the East Bay Bicycle
24 Coalition.

25 Before I make preliminary comments on the Draft EIR,

1 I'd like to reiterate the comments that Glenn Kirby has
2 made to you, that we did experience inadequate preparation
3 for the weekend travel on Cañada Road Project. We would
4 expect that bicyclists would have not encountered
5 debris-laden surfaces. O-EBBC-01

6 We would also ask for consideration for preparation for
7 the Amgen Tour, a statewide tour in the spring of 2012
8 along with the Prima Vera ride conducted by the Fremont
9 Freewheelers. O-EBBC-02

10 We've been watching this project 18 months, plus
11 another two months of road closure. It's an awful long
12 period of time to go without access on a road, whether
13 you're a commuter or a recreational bicyclist. / As well we
14 understand that Sunol Regional Wilderness would be closed
15 for probably about two years. O-EBBC-03
O-EBBC-04

16 We feel that the mitigations that are included in the
17 Draft Environmental Impact Report are inadequate to address
18 these closures, and we would like to propose that full
19 consideration be given to increasing public access in the
20 area of the project. O-EBBC-05

21 One suggestion that fits within the East Bay Regional
22 Park District's plans as well as countywide plans for bike
23 pedestrian access would be to bridge Alameda Creek near
24 Interstate 680. Currently along 680, what is formally
25 known as Mission Pass Road, there is no access for the O-EBBC-06

1 public -- unless you're in a motor vehicle -- to Andrade,
2 to Sheridan or Vargas Plateau. These are roads that
3 provide access to the back side of Mission Peak Regional
4 Park along with the Vargas Regional Park.

O-EBBC-06
cont.

5 Thank you for your attention.

6 MR. KERN: Thank you. Roger Castillo.

7 MR. CASTILLO: My name is Roger Castillo. I'm a
8 surveyor. I represent the Guadalupe/Coyote Resource
9 Conservation District out of San Jose.

A-GCRCD

10 Being that the project and this reservoir headwaters
11 emanate from the Santa Clara County in our district, we are
12 in deep concern of the EIR leaving out a lot of factors on
13 the flows that will be inadequate for migratory species.
14 And we're deeply concerned because we're looking at the
15 aspect of the recovery effort for the South Bay south of
16 San Francisco for the fisheries.

A-GCRCD-01

17 The main concern is the steelhead which are doing
18 fairly okay in our watershed. But the other thing that is
19 being left out of the EIR is imminence of the King salmon
20 also showing up in your watershed, and that is not being
21 addressed on the EIR. Matter of fact, it's quite left out.

22 We would like to see the EIR address this factor of the
23 King salmon also in the EIR. And the reason that is is
24 because you need to prepare for not just the one species,
25 but for all the other species that are going to try and use

A-GCRCD-02

1 your watershed.

2 You cannot keep the canary from eating the tree when
3 you plant that fruit. You need to prepare. You need to
4 say, "We got to prepare for -- what if these fish start to
5 show up in bigger numbers?"

6 In our river system, which is a lot smaller river
7 system, we have a thousand salmon that sometime show up in
8 the Guadalupe River right there in front of the arena, the
9 shark's tank. From early 1990s all the way to 2000, 2001,
10 2002 -- 300, 400, 500. You need to prepare because when
11 they do show up at your doorstep and this EIR is
12 underwritten, then there's going to be even more
13 headbutting. And then it's kind of like the closed door
14 because you've only set this guideline for the water that
15 is already going to be designated for just this one species
16 for the spring, basically.

A-GCRCD-02
cont.

17 So basically I think the EIR needs to be definitely
18 addressed, the flows for the fall, for the spring and for
19 the winter, for the runs of other species that will be at
20 the doorstep of this reservoir and downstream of the
21 reservoir to the headwaters of the Bay.

A-GCRCD-03

22 Thank you for your time.

23 MR. KERN: Thank you. That was our last speaker.

24 I just want to thank everybody who came tonight and who
25 spoke. If you do have comments that you want to provide to

1 us in writing, we'll get our contact information back up or
2 it's on the handouts and on our Web site. There we go.
3 And if you have questions about the project itself, you can
4 contact the SFPUC, Betsy Lauppe-Rhodes. Again, the
5 information is there as well.

6 Again, thank you very much.

7 (Whereupon, the hearing concluded at
8 7:25 p.m.)

9 ---oOo---

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 REPORTER'S CERTIFICATE

2
3 I, JUDITH L. LARRABEE, a Hearing Shorthand Reporter in
4 the State of California duly authorized to administer
5 oaths, hereby certify:
6

7 That the proceedings therein were taken down in
8 shorthand by me, a disinterested person, at the time and
9 place therein stated, that the proceedings were thereafter
10 reduced to typewriting, by computer, under my direction and
11 supervision, and that the foregoing is a full, true and
12 correct transcript of the proceedings therein to the best
13 of my ability.
14

15 IN WITNESS WHEREOF, I have hereunto set my hand on this
16 27th day of November, 2009.
17

18 _____
19 Judith Larrabee, Shorthand Reporter
20
21
22
23
24
25

**Public Hearing Transcript –
San Francisco, November 12, 2009**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Regular Meeting

Thursday, November 12, 2009

Agenda Item 12, 2005.0161.E

Calaveras Dam Replacement Project

Public Hearing on the Final Environmental Impact Report

City Hall, Room 400

Dr. Carlton B. Goodlett Place

San Francisco, CA 94102

CLARK REPORTING & VIDEOCONFERENCING

2140 Shattuck Avenue, Suite 405

Berkeley, CA 94704

(510) 486-0700

Reported by: Freddie Reppond

CLARK REPORTING & VIDEOCONFERENCING

(510) 486-0700

1 A P P E A R A N C E S

2 FOR THE PLANNING COMMISSION:

3 Board President Ron Miguel

4 Commissioner Michael J. Antonini

5 Commissioner Gwyneth Borden

6 Commissioner William L. Lee

7 Commissioner Kathrin Moore

8 Commissioner Christina R. Olague

9 Commissioner Hisashi Sugaya

10 Linda D. Avery, Commission Secretary

11 FOR THE SAN FRANCISCO PUBLIC UTILITIES COMMISSION:

12 Ed Harrington, General Manager

13 Dan Wade, Project Manager

14 FOR THE SAN FRANCISCO PLANNING DEPARTMENT:

15 Chris Kern

16 FROM THE PUBLIC:

17 Jessie Raeder

18 Sara Meghrouni

19 Charlie Lavery

20 Art Jensen

21 Ken Cleaveland

22 Michael Theriault

23 Richard Hansen

24 Anthony Dimas

25 George Groder

1 Tim Colon
2 Jamie Workman
3 Matt Richardson
4 Jeff Miller
5 Rebecca Atkinson
6 Jeff Miller
7 Manny Florez
8 Jennifer Clary

--o0o--

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 [The item was called at 6:02 p.m.]

2 THE CLERK: Commissioners, you are now on Item
3 No. 12, I believe.

4 PRESIDENT MIGUEL: And if I may mention,
5 from -- so that everyone understands, we are starting
6 Item No. 12. Item No. 13 has been continued, but Items
7 14, 15, and 16 will be heard prior to 17, which is the
8 Northeast Embarcadero study. So if anyone is in the
9 room for that last item, you may want to take a little
10 time.

11 THE CLERK: Okay. Thank you, Mr. President.
12 Item 12, Case No. 2005.0161E, Calaveras Dam
13 replacement project. This is a public hearing on the
14 draft environmental impact report.

15 CHRIS KERN: Good evening, President Miguel
16 and Members of the Commission. My name is Chris Kern;
17 and I am with the major environmental analysis division
18 of the Planning Department. This is a hearing to
19 receive comments on the draft environmental impact
20 report for Case No. 2005.161E, which is the Calaveras
21 Dam replacement project.

22 Staff is not here to respond to comments
23 today. Comments received this evening as well as at the
24 two other public hearings that we're holding on this
25 draft EIR and all written comments received before the

1 end of the public comment period will be responded to in
2 a comments-and-responses document. That document will
3 be released for review shortly before the certification
4 of the EIR.

5 The comments today should be directed to the
6 adequacy and accuracy of the information contained in
7 the draft EIR. Commenters should speak slowly and
8 clearly so that the court reporter can produce an
9 accurate transcript. And, also, commenters should state
10 their name and address so they can be properly
11 identified and so they can be sent a copy of the
12 comments-and-responses document. After comment from the
13 general public, we will also take any comments on the
14 draft EIR by the Planning Commission.

15 The public comment period for this project
16 began on October 6th and has been extended at the
17 request of the project sponsor, the San Francisco Public
18 Utilities Commission, until December 21st. In addition
19 to today's hearing, as I mentioned, we held a meeting
20 this Tuesday in Fremont; and we will be holding a third
21 hearing scheduled for December 14th in Sunol on this
22 draft EIR.

23 This concludes the staff's presentation. But
24 before opening the hearing for public comment, the
25 SFPUC's executive director, Ed Harrington, and the

1 project manager, Dan Wade, would like to make a brief
2 presentation about the project.

3 Thank you.

4 ED HARRINGTON: Good evening, Commissioners.
5 Good to see you. I wanted to first of all to thank
6 you -- I'm Ed Harrington, general manager of the PUC. I
7 wanted to first of all thank you for all the work that
8 you and your staff have put in on our projects,
9 especially in the last year but over the last number of
10 years. I don't think when you got on this Commission,
11 you probably planned on becoming experts on the water
12 system for San Francisco. But I thank you and our two
13 and a half million customers thank you for all the time
14 and effort you and your staff have put into it.

15 Tonight's comments are related to the
16 Calaveras Dam EIR. And we realize that building a dam
17 is an important thing and it's a daunting thing at
18 times. And so you might say, Gee, couldn't you just
19 skip it? Wouldn't it be a lot easier if we didn't have
20 to talk about building a dam? So I want to just spend a
21 minute reminding you of why this dam is so important.

22 If you'll recall, in the program EIR we talked
23 about trying to make sure that our two and a half
24 million customers were protected if there was an
25 earthquake or another major emergency. And it really

1 comes down to geography. If I could put this up on the
2 screen and have it come up.

3 The Hetchy system, as you all know at this
4 point, starts up in Yosemite National Park, 150 miles
5 from the Bay Area. 125 miles of that system are on the
6 other side of the mountains, so to speak. And so what
7 that means is that, as you're coming down from the
8 Hetchy dam up on the top, you go through the canyon
9 tunnel, you go through the mountain tunnel, you go
10 through a variety of penstocks, you go through the
11 foothill tunnel, you go in pipelines through the Central
12 Valley. And you go through the Coast Range tunnel
13 before you get to where Calaveras Dam is. And what that
14 means is, that if any of those things should break down,
15 we will be dependent on local storage in the Bay Area.
16 And that's why this is an important project.

17 The Calaveras Dam has 97,000-acre feet in it
18 when it is fully -- when it is full. That's more water
19 than any of the water you see driving down Highway 280.
20 It's more than Upper and Lower Crystal Springs and San
21 Andreas and Pilarcitos put together. And so right now
22 that dam is at one-third of the capacity. The
23 difference between one-third of the capacity and full
24 capacity of that dam is twenty-five percent of our
25 entire local water storage in the Bay Area. And that's

1 why this is an important project for us.

2 If anything happens to the rest of our system,
3 we and our two and a half million customers will be
4 dependent on water storage this side of the hills to
5 make sure that our project continues to provide water to
6 the people and the economy of the Bay Area, which
7 represents about seven percent of the population of
8 California, all being served by our water system. So
9 that's why I want to make sure that we do this project.

10 We believe we've made progress on the issues
11 that have been raised on the ability to do this project.
12 We believe we'll make continual progress. You'll hear
13 some comments tonight on things we're still working on.
14 At the end of the day we expect to bring you a project
15 we can all be proud of and you can all be very
16 supportive of. And that's what we're working on.

17 So, again, thank you very much for the time
18 again.

19 I'd like to introduce Dan Wade, who is the
20 project manager, to give you a bit of perspective on the
21 project.

22 DAN WADE: Good evening, Commissioners. Dan
23 Wade, project manager of the Calaveras Dam replacement
24 project for the PUC.

25 As General Manager Harrington described, the

1 Calaveras Dam and Reservoir is located in the regional
2 portion of our system in the southeast Bay Area -- in
3 this location. And it's in the Sunol Valley off of
4 Interstate 680, where the local water from Calaveras
5 Reservoir is merged with the Hetch Hetchy system water
6 before entering the new Irvington tunnel on its way to
7 Fremont to users in the East Bay Area as well as going
8 into the Bay Division pipelines across the Bay and over
9 to the Peninsula and San Francisco city.

10 This is a remote area of Alameda and Santa
11 Clara Counties on watershed lands owned and operated by
12 the City of San Francisco. The area that drains to the
13 reservoir is approximately 132 square miles, of which
14 approximately 35,000 acres are owned by the SFPUC and
15 not accessible to the general public. However, the East
16 Bay Regional Parks District owns lands to the north,
17 which is the Sunol Regional Wilderness; and Calaveras
18 Road passes by the reservoir, providing public access in
19 the vicinity. The dam is located in close proximity to
20 the Calaveras earthquake fault, which is capable of
21 producing a maximum credible earthquake of 7.25 on the
22 Richter scale.

23 Now, the backbone of the project is, as Ed
24 mentioned, Calaveras reservoir is the SFPUC's largest
25 local reservoir, allowing for storage of approximately

1 97,000-acre feet. It provides 40 percent of the local
2 water storage and 66 percent of the local water yield
3 each year.

4 In 2001, the SFPUC lowered water levels in the
5 reservoir due to seismic safety concerns and a mandate
6 from the California Division of Safety of Dams.
7 Therefore, the reservoir is currently operating at
8 approximately 40 percent of the historic capacity. This
9 slide shows a perspective from approximately 2000 feet
10 above the Sunol Regional Wilderness north of the
11 reservoir. The existing earth and rock-fill dam located
12 here was completed in 1925 and was modified in 1974 to
13 increase the seismic stability to the standards known to
14 be safe at that time. Of course, as seismic safety
15 science has progressed over the years, the dam has since
16 been determined not to be safe.

17 The current dam is 210 feet high and has a
18 volume of three and a half million cubic yards. Now,
19 one can see the bathtub ring around the rim of the
20 reservoir, which is due to the 2001 reservoir
21 restriction imposed by the Division of Safety of Dams.
22 The upper portion of the reservoir holds 60 percent of
23 the capacity, which is approximately 50 feet in vertical
24 height, to give you some sense of scale in that photo.
25 The proposed project, I'd like to emphasize, would

1 restore the water level to the original reservoir
2 capacity.

3 So the purpose of the project is to replace
4 the existing dam with a dam that meets current seismic
5 safety standards. And the new dam would actually be
6 constructed immediately downstream adjacent to the
7 existing dam. Upon completion, the Division of Safety
8 of Dams restriction would be lifted and then the
9 reservoir capacity could be restored. The project would
10 help meet the level of service objectives for the
11 SFPUC's water system improvement program, which are to
12 maintain a reliable water system during large earthquake
13 events, to maintain delivery reliability, to maintain
14 high water quality, and to provide supply to meet
15 customer demand through the year 2018.

16 And so the project objectives are to
17 reestablish the water delivery reliability, to restore
18 the water supply and reservoir capacity to the pre-2001
19 level of approximately 97,000-acre feet, to improve the
20 seismic reliability, to construct a replacement dam with
21 a robust design that could accommodate potential future
22 enlargement, to continue reservoir operation during
23 construction, and to maintain high water quality.

24 So the main project features are to construct
25 the replacement earth and rock-fill dam, which would

1 consist of stabilizing a landslide that's existing
2 immediately downstream of the existing dam. We would
3 need to construct other pertinent facilities in
4 conjunction with the dam, including a new spillway and
5 stowing basin; outlet works, which include an intake
6 tower and shaft, pipelines and valves; fishery water
7 release valves in order to release water for resident
8 rainbow trout and for future restoration of steelhead
9 downstream of the existing dam and the future proposed
10 replacement dam; borrow areas, which are essentially
11 places where we obtain the construction materials to
12 build the dam, the clay for the impermeable core of the
13 dam and the rock fill and soil for the shells of the
14 earth-filled dam; haul routes and staging areas for the
15 equipment, and materials used to construct the dam; and
16 lastly, the project would include modifications of the
17 existing Alameda creek diversion dam, which is a
18 31-foot-high concrete dam on Alameda Creek in a
19 sub-watershed to the Calaveras Reservoir. And I'll
20 speak about that more in just a moment.

21 This is map, which I know you can't see very
22 well, looking at the projector, essentially depicts the
23 footprint of the proposed project. This white area is
24 the existing reservoir and the various colors and hatch
25 marks that you see on the slide represent essentially

1 the footprint of the proposed project. The new
2 replacement dam would be located in this area north of
3 the existing dam. And the hatched areas would represent
4 disposal areas for excess soil and rock materials that
5 will be generated as part of the project. The green
6 areas represent staging. The orange areas retrospect
7 the borrow areas for the rock material as well as the
8 clay.

9 Now, this is a very large earth and rock-fill
10 dam construction project. And, as such, the major
11 construction activities include conventional excavation;
12 some controlled blasting of hard rock; drilling and
13 grouting of foundation rock; of course, concrete
14 spillway construction; and other activities that are
15 pertinent to the construction of the dam.

16 I also want to mention that there's a haul
17 road being constructed along the west side of the
18 reservoir that would be used to haul the clay from the
19 borrow area at the south end of the reservoir,
20 approximately three and a half miles away, to the north
21 end of the reservoir. That haul road is being
22 constructed so that we can transport the approximately
23 million yards of material that need to be hauled to the
24 north end without using a public road.

25 As is the case with all of the SFPUC projects,

1 avoidance and minimization of impacts is an essential
2 part of the work. And, accordingly, the project
3 components were subjected to careful evaluation and
4 design to avoid and minimize impacts to environmental
5 and cultural resources while also maintaining the
6 requirements for dam stability.

7 This slide on the left shows the existing dam.
8 That's the downstream face of the dam. Again, it was
9 completed in 1925, modified to include some of these
10 berms to increase the seismic stability in 1974. On the
11 right portion of the slide is a view of the proposed new
12 dam. It would essentially be the same height of the
13 existing dam, approximately 210 feet, and would be
14 approximately the same volume of material. The
15 peninsula that you see behind the dam is the portion of
16 the existing dam that would be left in place after the
17 new dam is constructed. The existing dam would be used
18 as a coffer dam during construction, which essentially
19 retains the water in the reservoir so that the new dam
20 can be constructed in the dry. The cross-section, or
21 slice through the replacement dam, shown on the bottom
22 of the slide represents the various zones of the new
23 earth and rock-fill dam and the various types of
24 materials that will be used to construct the dam.

25 I want to reemphasize that all of the

1 materials used to construct the dam will be obtained
2 from the reservoir area. So with the exception of just
3 the yellow zones on either side of the core, which are
4 sand and gravel materials that need to be imported from
5 off site in order to form the intern drains and filters
6 of the new dam.

7 Now, I mentioned the Alameda Creek diversion
8 dam and tunnel a moment ago. And this is Alameda Creek,
9 which runs from southeast to the northwest through the
10 Sunol Valley. And we have an existing 31-foot-high
11 concrete dam on that creek which diverts water off of
12 that creek through a 1.8 mile-long tunnel to the
13 existing Calaveras Reservoir. The purpose of this
14 facility is to enable 34 square miles of the total 132
15 miles of watershed lands to provide water to storage in
16 the reservoir and delivery to the customers.

17 Now, as part of the project, we're proposing
18 to construct a bypass tunnel at the Alameda Creek
19 diversion dam. So this slide shows a plan view of that
20 facility. This is the existing dam which goes across
21 Alameda Creek. These are some trash rack structures
22 that essentially keep large debris from going into the
23 tunnel on its way to Calaveras Reservoir in that
24 direction. The flow of the creek is from the left side
25 of the page to the right. The proposal is to construct

1 a bypass tunnel through the left abutment of that dam so
2 that we can enable bypass flows to release to the
3 portion of the creek downstream of the dam to enhance
4 the flow regime and habitat for resident rainbow trout
5 in Alameda Creek.

6 Now, if the project is approved when it comes
7 up for consideration next summer in 2010, the project
8 will be constructed beginning in the spring of 2011 and
9 will last about four years, with completion anticipated
10 in the winter of 2014 and 2015. Now, for a limited
11 period during the four-year construction period,
12 Calaveras Road will be a hauling route for the import of
13 a limited volume of the materials used to construct the
14 dam. As I mentioned, the sand and gravel material to
15 filters and drains will need to be imported from off
16 site. During two periods, the SFPUC will request
17 permission from both Alameda and Santa Clara Counties to
18 close the road from Geary Road on the north, which
19 intersects Calaveras Road here at the top -- the
20 highlighted portion on the slide -- to approximately
21 Felter Road on the south, which is in Santa Clara
22 County. These two closure periods will be for two
23 months of duration during the summer of 2011 and for
24 eighteen months starting in the winter of 2012 to allow
25 that hauling to take place safely on Calaveras Road.

1 Now, we are planning to have the road open on
2 weekends and we would sweep the road prior to opening it
3 on weekends to be sure that it's safe for cyclists as
4 well as the public to use. And then at the end of
5 construction it's proposed to restore the
6 preconstruction condition of the road.

7 Now, once the dam is complete, the refilling
8 of the reservoir would begin in the winter of 2014 and
9 the 2015 upon approval from the Division of Safety of
10 Dams. And we would then begin water releases for
11 resident rainbow trout at the proposed Alameda Creek
12 diversion dam bypass tunnel when water is present in
13 Alameda Creek. The additional releases will be made
14 from Calaveras with reservoir pursuant to the memorandum
15 of understanding, or MOU, that was negotiated with
16 California Department of Fish and Game in 1997.

17 The proposed flow schedules for anadromous
18 steelhead trout would be implemented when steelhead have
19 regained access to the Alameda Creek watershed upstream
20 of what's known as the BART weir, which is further
21 downstream in Alameda Creek in Fremont. So once
22 steelhead have regained access to the watershed past the
23 BART weir, we would also implement those proposed
24 releases.

25 This final slide is a rendering of what the

1 proposed replacement dam and restored reservoir would
 2 look like upon completion of the project. And I want
 3 you to leave you with that slide. Thank you.

4 PRESIDENT MIGUEL: Thank you. Let's start
 5 with public comment. Jessie Raeder, Sara Meghrouni,
 6 Charlie Lavery.

O-TRT2

7 JESSIE RAEDER: Thank you. Sorry. I was
 8 outside the room. My name is Jessie Raeder,
 9 R-a-e-d-e-r. And I work for the Tuolumne River Trust;
 10 and I'm here representing the Tuolumne River Trust. And
 11 we also coordinate a coalition of environmental
 12 organizations called the Bay Area Water Stewards. And
 13 I'm also here as a board member for the Salmon Aid
 14 Foundation. So I'm representing commercial and
 15 sport-fishing organizations, environmental groups who
 16 are member organizations.

17 Alameda Creek is really becoming a real urban
 18 creek success story. We're really making a lot of
 19 progress here. Seventeen agencies and organizations
 20 have been working together for over a decade to remove
 21 all of the barriers or to modify the barriers for
 22 migratory fish, for fish that come to the -- you know --
 23 are born in creeks and go out to the ocean and come
 24 back. And pretty much all of those barriers are going
 25 to be removed or modified by the time the Calaveras Dam

O-TRT2-01



1 is rebuilt. So now after 50 years we can actually have
2 salmon and steelhead back -- coming back to this creek
3 like they were doing for eons.

4 And the last piece of this restoration puzzle
5 is really the water that we need to do that. The flows
6 in this EIR were designed for rainbow trout, not for
7 migratory fish. And migratory fish need something very
8 different. They need to be able to have a lot of water
9 in the spring to flush juveniles out to sea. They need
10 to have water so that the adults can come back.

11 So what we are asking for is that the EIR
12 provide flows that are designed for migratory fish.
13 Those flows should probably be based on recommendations
14 from the federal regulatory agencies, like the National
15 Marine Fisheries Service.

16 I want to say that our coalition, the Bay Area
17 Water Stewards, has been meeting with the PUC for the
18 last five years over the water system improvement
19 program. And we all support the rebuilding of this dam.
20 We want to see it built quickly. And the way to do that
21 is really to address these fishery issues before it
22 becomes a problem.

23 What's at issue is not the building of the dam
24 but how the dam is going to be operated for the next
25 fifty, seventy-five, a hundred years. And we want to

O-TRT2-01
cont.

O-TRT2-02

O-TRT2-03

1 make sure it's operated in a way that's consistent with
2 our modern environmental laws, with the Endangered
3 Species Act for steelhead trout; with the State Fish and
4 Game Code that requires that fish below dams be kept in
5 good condition.

O-TRT2-03
cont.

6 And I also personally, as a salmon advocate,
7 I'm concerned that the EIR is proposing to provide flows
8 for steelhead once steelhead make it past the barriers
9 or make it up into the upper watershed. Well, the
10 problem is you're not going to make it up into the upper
11 watershed unless there's the water there that will help
12 the fish get back. It's a different thing if you have a
13 dry waterfall and you can't get up that in the same way.
14 So we're really -- that's -- again, our request is that
15 the flows be designed for migratory fish and the EIR be
16 updated to reflect that. Thank you.

O-TRT2-04

17 PRESIDENT MIGUEL: Thank you. **I-Meghrouni**

18 SARA MEGHROUNI: Good evening. My name is
19 Sara Meghrouni. My name is spelled S-a-r-a; last name,
20 M-e-g-h-r-o-u-n-i. I'm representing myself as a 25-year
21 resident of San Francisco, city and county.

22 And I am just here to voice my concern about
23 the fact that this project -- the list of project
24 objectives that were listed by the gentleman who
25 presented before me included nothing about the fish,

I-Meghrouni-01

1 included nothing about the native fish and wildlife.
2 And I would just ask you to press the PUC to ensure that
3 this project is compatible with the restoration of
4 native fish and wildlife. The water belongs to everyone
5 not just the people who drink it.

I-Meghrouni-01
cont.

6 PRESIDENT MIGUEL: Thank you. **O-OpEng2**

7 CHARLIE LAVERY: Good evening, Commissioners.
8 My name is Charlie Lavery, L-a-v-e-r-y. I'm a business
9 representative for the Operating Engineers Union. And
10 I've stood in front of you many times in support of
11 projects that put our local members to work.

12 Today I'm speaking on behalf of more than a
13 thousand men and women who are on the out-of-work list
14 in the counties surrounding this project. Many of them
15 have not worked in over a year. These operating
16 engineers are fathers and mothers, caregivers and
17 providers. The East Bay in particular has been hit a
18 lot harder than San Francisco. Many of these operators
19 were dependent on the development of housing
20 subdivisions and that work's totally dried up. And,
21 hopefully, when they get back to work, it will ease some
22 of the job pressures here in the city and get our local
23 residents to work anyway.

24 As a father of young children that enjoy
25 camping and nature, I'm all in favor of the mitigation

O-OpEng2-01

1 that the environmental impact on these infrastructure
2 projects. The PUC have demonstrated a responsible
3 approach to environmental impacts on all of their
4 projects so far. You've got the opportunity today and
5 on this project to help our economic recovery and to
6 meet the environmental responsibilities that we all
7 share. You can seize that opportunity by moving this
8 environmental review process forward and allowing the
9 permitting process to proceed. I believe it is a
10 responsible use of our economic resources to secure the
11 supply of our most precious resource; and that's water.
12 Thank you.

O-OpEng2-01
cont.

13 PRESIDENT MIGUEL: Thank you. **A-BAWSCA3**

14 Art Jensen, Ken Cleaveland, Michael Theriault.

15 ART JENSEN: Thank you, President Miguel and
16 Members of the Commission. My name is Art Jensen,
17 J-e-n-s-e-n; and I'm with the with Bay Area Water Supply
18 and Conservation Agency, representing 1.7 million
19 residents and businesses and institutions in the
20 neighboring communities that buy their water from the
21 San Francisco system.

22 My background -- academic background -- was
23 many years ago, but it was in environmental engineering
24 science. Many people would think that environmental
25 engineering was an oxymoron, like military intelligence

1 or something like that. But I think it does give us an
2 appreciation -- as a water agency manager, I used to
3 work for the San Francisco Water Department -- a
4 sensitivity to the environmental issues.

5 I'm pleased that Jessie Raeder wants to see
6 the dam built. Thank you, Jessie.

7 And I like the fish in the river, not on my
8 dinner table. So we support the proposed project,
9 obviously. The replacement of the dam is essential to
10 ensuring the reliability and the continuing function of
11 our communities, including San Francisco. In replacing
12 the dam, the PUC has proposed a project that takes an
13 additional prudent step, which is to make sure that the
14 dam is constructed in such a way that in the future, if
15 the decision were that it needed to be expanded, that it
16 could be expanded. That decision, obviously, would be a
17 decision by City and County of San Francisco. And the
18 environmental analysis associated with that decision
19 would be something brought before this body, if it's
20 needed in the future. But we support that approach of
21 the project as well.

22 We believe that the draft environmental impact
23 report does a good job of addressing the potential
24 environmental issues, but that is your decision to make.
25 We would encourage you to continue the progress to

A-BAWSCA3-01



1 finalize that document so the project can proceed.

2 Thank you very much.

O-SFBOMA2

3 KEN CLEVELAND: Thank you. Good evening,
4 President Miguel and Commissioners. First off, I'd like
5 to commend you on the many hours that you spend at these
6 Commission meetings; and I just hope the seats that
7 you're sitting in are very comfortable.

8 I'm here representing both organizations --
9 two organizations -- tonight, the Chamber of Commerce --
10 oh, I'm sorry. Ken Cleaveland with the Building Owners
11 and Managers Association. That's C-l-e-a-v-e-l-a-n-d.
12 I'm the director of government and public affairs.

13 But I'm here to bring two letters, both our
14 letter from our association that represents 275 office
15 buildings that represent about 75 million square feet of
16 office space and roughly a million and a half people
17 working every day in San Francisco; and the Chamber of
18 Commerce, which is the organization representing 2,000
19 businesses that comprise our tenants in the office
20 buildings in San Francisco.

21 And I think we're here obviously to support
22 pushing this EIR forward -- this draft EIR forward --
23 because I think we all have to keep our eye on the ball,
24 and the ball is the safety of our water supply. So we
25 need to keep this project on course and we'd like to see

O-SFBOMA2-01

1 you pass this EIR out tonight.

2 So I think all of these environmental issues
3 are going to be sanely, humanely dealt with by the SFPUC
4 as we move forward. I think the EIR has addressed those
5 issues and I think it will all work out just fine. So I
6 hope that you will unanimously push this project forward
7 tonight. Thank you.

8 PRESIDENT MIGUEL: Thank you.

O-SFBCTC

9 MICHAEL THERIAULT: Commissioners, Michael
10 Theriault, San Francisco Building and Construction
11 Trades Council.

12 I have this beautiful dream and that is that
13 Islais Creek be daylighted all the way from its origins
14 at the south end of Cayuga in the park there to the Bay;
15 that its tributaries along Geneva running up toward City
16 College and running up into Glen Park also be daylighted
17 and allowed to flow free again; that we see runs of
18 steelhead up into the city; we see Sacramento sucker in
19 the creek; we see possibly even coho. But that is not
20 going to happen; nor should it.

21 And there are both similarities to that
22 situation in the case of Calaveras Dam and Alameda
23 Creek, but a very major difference as well. The
24 similarity is that, like Islais Creek,, Calaveras Dam
25 has been a part of the infrastructure of San Francisco.

O-SFBOMA2-01
cont.

O-SFBCTC-01

1 Like the undergrounding of Islais Creek, Calaveras Dam
2 has been a part of the infrastructure of San Francisco
3 for nigh on a century now, since the construction of
4 Calaveras Dam began in 1913. And the city has been
5 built -- based on the existence of that dam and the
6 water it provides; and we need it still for a safe water
7 supply to San Francisco. So the dam -- I'm pleased to
8 hear we have support across the board for the dam's
9 rebuilding.

O-SFBCTC-01
cont.

10 The question of diversion of water from it,
11 though, a dam that cannot hold enough water to fulfill
12 the city's needs is a useless dam. And if the amount of
13 water that we can judiciously allow to be released from
14 that dam is enough to support rainbow trout, well and
15 good. If we can also, in the course of operation,
16 release enough to support steelhead, all the better.
17 But the primary concern must be that the dam must be
18 able to hold enough water to fulfill the city's needs in
19 the event of an emergency.

O-SFBCTC-02

20 And there will be fish. The question of which
21 fish can thrive there is a question that must, I'm
22 afraid, be subservient to the city's needs. Thank you.

23 PRESIDENT MIGUEL: Thank you.

24 Richard Hansen, Anthony Dimas, and George
25 Groder.

1 RICHARD HANSEN: Hi. Again, I want to applaud
2 the folks on the Planning Commission for spending such
3 an incredible amount of time here. I saw Ron Miguel
4 before noon today and he'd already put in four hours of
5 work; and from his briefcase I think he'd been working
6 on it the night before. But this is incredible. I want
7 to thank you for being here. I want to thank you for
8 opportunity to speak. **I-Hansen**

9 My name is Richard Hansen, H-a-n-s-e-n. And
10 the message I want to convey is that I personally,
11 strongly encourage you folks to approve the movement of
12 this environmental review and let the construction of
13 the dam continue. And it has to be done as
14 expeditiously as possible.

I-Hansen-01

15 As background, I need to mention that perhaps
16 one of the reasons I have a lot of gray hair is I was a
17 civilian engineer at the Army Presidio base in 1989, 20
18 years ago. And I learned in a few hours an awful lot
19 about earthquakes. And I was given the job of being
20 chief of operations and maintenance, which meant that I
21 was responsible for the electricity and the water and
22 the gas and all the accouterments there pertaining. And
23 I was the one who had the buck and it had to rest with
24 me and I had to get that resolved.

25 Well, it's shocking to think that the city of

I-Hansen-02

1 San Francisco and the million and a half people or
2 two million people down in Silicon Valley are relying
3 upon the essential nature of a dam that was designed, as
4 the previous speaker said, prior to 1913. It was
5 completed in 1925; it was started in 1913. Much of the
6 physics and engineering was probably done during
7 Theodore Roosevelt's first term. Well, the amount that
8 the scientists and engineers know about strength and
9 materials and proper construction techniques in an
10 earthquake condition is testified by the ongoing
11 difficulty with the Bay Bridge. That's a relatively new
12 structure; and the modifications that are going on right
13 now are even newer. But this dam is based upon a design
14 just after 1900; and it is obviously obsolete and it is
15 so critical to San Francisco that I think it needs to be
16 moved forward as quick as you can. Thank you.

I-Hansen-02
cont.

17 PRESIDENT MIGUEL: Thank you. **O-NCDCL**

18 ANTHONY DIMAS: Good evening, Commissioners.

19 My name is Anthony Dimas, D-i-m-a-s, with the Northern
20 California District Council of Laborers. And I come
21 before you tonight to ask you that support the DEIR and
22 move forward with it.

O-NCDCL-01

23 This job presents a lot of opportunities for
24 my members, not only for mine but for all the different
25 crafts that will be involved in this project. Currently

1 in Northern California, the district council has 15
2 affiliates -- locals that represent about 35,000
3 members. And with all those locals, there's about 20-
4 to 30-percent unemployment rate right now. This job
5 would truly help the membership in Northern California
6 by providing jobs for hundreds of our members here and
7 in the surrounding areas. Also, it gives them
8 opportunity to get back to their benefits and to support
9 their families.

10 And also, too, I've been working with the PUC
11 to help the community-based organizations to get their
12 people out on these projects, such as the Pulgas Tunnel,
13 also on the Harry Tracer water treatment plant, and been
14 very active in getting the disadvantaged people of the
15 neighborhood onto these projects. And I will continue
16 to work with the PUC in getting the disadvantaged
17 neighborhoods to work on these projects.

18 So I ask that you support the project and move
19 forward with it. Thank you for your time.

20 PRESIDENT MIGUEL: Thank you. **O-BAC**

21 GEORGE BRODER: Good evening, Commissioners.
22 George Broder, B-r-o-d-e-r, resident of the City and
23 County of San Francisco, representing two organizations
24 tonight -- two regional entities -- the Bay Area
25 Council; and I'll be submitting a letter on behalf of

I O-NCDCL-02

1 the Association of Bay Area Governments.

2 The Bay Area Council is not as old as the dam
3 of which we're speaking tonight, but it has been around
4 since 1945. Fully 275 member companies through this
5 nonprofit public policy advocacy organization represent
6 the largest employers of the Bay Area. Fully, they
7 represent some more than 4.4 million employees of
8 companies that work around the Bay Area with worldwide
9 net revenues of in excess of \$1.9 trillion. These
10 millions of employees depend on the water of the Hetch
11 Hetchy system either where they live or where they work
12 or both.

13 We certainly are here tonight urging you to do
14 your part in this process to keep the draft EIR moving
15 forward so that the PUC can continue to do their job
16 diligently, fairly, with environmental sensitivity to
17 take care of the environmental responsibilities for all
18 the regulatory requirements for those fish that aren't
19 able to be here to testify. But first and foremost we
20 do have to take care of those people that come and speak
21 on their behalf or speak for those people that wanted to
22 keep drinking that water. So please do your part. You
23 have a hard job. And as Mr. Harrington said, you've
24 become experts in water also. But thank you. Please do
25 your part to keep the process moving forward. Thanks.

O-BAC-01

1 PRESIDENT MIGUEL: Thank you.

2 Tim Colon, Jamie Workman, Bill Maher.

3 GEORGE BRODER: And the letter I'm supposed to
4 please submit on behalf of ABAG, Association of Bay Area
5 Governments, also echo this recommendation.

6 TIM COLON: Good evening, Commissioners. I'm
7 Tim Colon. **I-Colon**

8 And as far as I know, this item has nothing to
9 do with housing. But my interest in this was the years
10 I put into the Lake Merced Task Force and my deep
11 involvement with the CIP bond initiative back when. And
12 the idea that getting the City to help PUC make better
13 use of its resources, keep them up to shape, and keep
14 them safe and sound. They have done a lot of work in
15 the EIR, obviously.

16 And what it comes down to me is San Francisco
17 is in a curious arrangement of having what is likely the
18 finest water system in the western hemisphere, in which
19 two-thirds of the users are outside of San Francisco and
20 which San Francisco has sole management of it. It's
21 imperative that San Francisco wisely, prudently,
22 efficiently manage its water resources. And I don't see
23 any possible public policy reason to slow this down. I
24 urge you to pass this as quickly as possible, move it
25 along. Thank you.

I-Colon-01

1 PRESIDENT MIGUEL: Thank you.

2 SPEAKER: Jamie Workman or Bill Maher. All
3 right. Matt Richardson, Jeff Miller, Rebecca Atkinson.

4 JAMIE WORKMAN: Good evening. Jamie Workman,
5 lifelong Bay Area resident -- Menlo Park and San
6 Francisco. W-o-r-k-m-a-n. Author of Heart of Dryness,
7 a book about water scarcity. **I-Workman**

8 And I want to say how -- I don't think there's
9 anyone in this room that disagrees that we should
10 restore water security and water storage. I don't think
11 there's anyone that disagrees that we should restore the
12 dam. But I want to speak a little bit on behalf -- it
13 seems like your job is to figure out can we also restore
14 something that hasn't been here in a long, long time.
15 That's restoring this magic, this extraordinary animal
16 that a lot of us never come in contact with outside of
17 the frozen food section, that we only see on bagels or
18 something like that.

19 And when you do come in contact, as I have
20 with my daughter, with a wild salmon, an indigenous
21 salmon, in an area where you live, it becomes something
22 magical. It becomes a transrational creature and a
23 reflection of everything that goes on and the quality
24 and quantity of that watershed.

25 Beyond the romance of salmon restoration and

I-Workman-01

1 steelhead restoration, I worked for several years with
2 the federal government restoring flows in areas where
3 they said this can't be done. We need jobs at stake.
4 We have economic issues at stake. And what they found
5 later on through restoration was that jobs and the
6 economy increased. Property values went up where there
7 was salmon restored, where there was wildlife coming
8 back, where people had jobs diversified because of the
9 attraction of something indigenous and special about
10 that place. And for me, again, the dam will be
11 restored. The storage will be restored. But I also
12 hope you can figure out a way creatively to find enough
13 water -- more water -- less water than evaporates off
14 the dam to restore this salmon. Thank you.

I-Workman-01
cont.

15 PRESIDENT MIGUEL: Thank you. **I-Richardson**

16 MATT RICHARDSON: Hi there. My name is Matt
17 Richardson, R-i-c-h-a-r-d-s-o-n. I want to thank you
18 for the opportunity to speak. I really appreciate it.
19 I'm a Bay Area native. I've been living in San
20 Francisco for the last ten years. I should also say
21 that I really like the water that comes out of my tap.
22 It tastes really good, but I'm also a wise user. I use
23 it sparingly. I think we can also -- all of us could
24 deal with a lot less of it.

I-Richardson-01

25 I really grew up in the East Bay; and my

I-Richardson-02

1 brother and I were lucky enough to have a creek in our
2 backyard and we played in it for years. But for decades
3 creeks and rivers in the Bay Area and, also, in all of
4 the state of California have been damaged by dams. And
5 one of the things that I think is really important to me
6 is when we have opportunities to mitigate the losses and
7 problems that we've created. I'm sure you're quite
8 aware that this year there's been some big announcements
9 about maybe how to manage the dam in the Klamath River
10 differently; and also the first time in many years we
11 have had appropriate flows on the San Joaquin River.

12 And I think it's important that the Calaveras
13 Dam DEIR provide, one, access to migratory fish as well
14 as provide adequate flows. I think those are most
15 imperative; and especially with regards to the
16 recommendations set forth by the National Marine
17 Fisheries Service.

18 I also think it's important that the SFPUC be
19 mindful of the Endangered Species Act -- I think it's
20 important to residents of California -- and the State
21 Department of Fish and Game. And appropriate
22 modifications, I think, will ensure the quickest process
23 for dam rebuilding. I do believe that we can set
24 minimum flows without affecting meaningful water usage
25 for San Francisco water users.

I-Richardson-02
cont.

1 As I said before, I like the water that we
2 have here in San Francisco. I think we can deal with a
3 lot less of the water that we use and that we share.
4 I'm in favor of rebuilding the dam, but I think this is
5 an excellent opportunity to build it the right way.
6 Thank you.

I-Richardson-03

7 PRESIDENT MIGUEL: Thank you.

8 REBECCA ATKINSON: Good evening, **I-Atkinson**
9 Commissioners. My name is Rebecca Atkinson,
10 A-t-k-i-n-s-o-n. And I'm a resident of the Bay Area.
11 I've moving back and forth between San Francisco and the
12 East Bay -- back and forth, as many people do.

13 I wanted to come today to share with you how
14 much I care about Alameda Creek and its ecological
15 integrity and of the whole watershed. I'm very excited
16 about the ongoing collaborative efforts that have been
17 going on to restore the creek and its watershed. And I
18 am speaking today because you're considering the
19 environmental document that discusses the proposed
20 operation of Calaveras Dam. I believe the Calaveras Dam
21 could contribute positively to the downstream
22 restoration efforts through the release of increased
23 instream flows, or flows greater than what's proposed in
24 the environmental document right now.

I-Atkinson-01

25 I would be satisfied with the EIR if they had

I-Atkinson-02

1 a discussion of all species of concern in combination
2 with the necessary flows for each stage of their life
3 cycle and that it included better mitigations to ensure
4 that the flows that these species need are provided.

5 Furthermore, in order to avoid project delays,
6 it's important that these increased flows are provided
7 in order to ensure compliance with the Endangered
8 Species Act and secure further agency approvals. I
9 think it's really important to not just read an
10 environmental document and take a determination of "less
11 than significant" at face value. This determination
12 needs to be explained and substantiated by using
13 appropriate analysis methodology. The latest scientific
14 data and satisfy the latest regulatory directions
15 including in regards to the Endangered Species Act in
16 our ever-evolving direction from the state about how to
17 address climate change analysis.

18 I also just want to say that I don't believe
19 that the use of better maintenance practices on San
20 Francisco-owned land is an effective mitigation measure
21 for any future operation of Calaveras Dam impacts.

22 Lastly, I want to say that when you review
23 this draft environmental impact report, I just want you
24 to -- I request that you really question and scrutinize
25 the analysis and project.

I-Atkinson-02
cont.

I-Atkinson-03

I-Atkinson-04

1 And I want to just say that I believe that
2 implementing this proposed project with increased flows
3 and better mitigations for fisheries and other species
4 in the watershed as well as better mitigations for
5 addressing climate change, I just think that this
6 project would be a real opportunity to reduce the
7 environmental footprint of past water delivery system
8 decisions and demonstrate some of San Francisco's San
9 Francisco leadership and sustainability. Thank you so
10 much.

I-Atkinson-04
cont.

11 PRESIDENT MIGUEL: Thank you.

O-ACA2

12 JEFF MILLER: Good evening, Commissioners.

13 Thanks for the opportunity to speak tonight.

14 Jeff Miller, M-i-l-l-e-r. I'm the director of
15 the Alameda Creek Alliance. We're a community watershed
16 group that's been working since 1997, since steelhead
17 trout were first designated as a threatened species on
18 the Central Coast here, to try to bring these amazing
19 fish back to our watershed.

20 And I have to say I bristled a little at first
21 when I heard us compared to Islais Creek. Not to knock
22 Islais Creek, but Alameda Creek is a regional gem.

23 If you've ever been up to Sunol Wilderness,
24 it's an impressive watershed. We know it's an important
25 part of the water system, but it's also -- you know,

O-ACA2-01

1 it's really being looked at as an anchor watershed for
2 restoring steelhead trout in the entire Bay Area and the
3 Central Coast. We have got an unprecedented consortium
4 of 17 local, state, and federal governments that have
5 put millions of dollars into dam removals and fish
6 passage projects downstream. We had our first pair -- a
7 single pair -- of spawning steelhead in 45 years in the
8 creek two winters ago -- a pretty amazing event, but a
9 sign of things to come. We are about to open up about
10 20 miles of the stream to migratory fish. And the last
11 piece of the puzzle really is the flows and how these
12 dams are operated.

13 San Francisco controls the lion's share of the
14 water. They divert 86 percent of the flows in the upper
15 creek. And we absolutely support rebuilding this dam.
16 Conditions for fish under the restricted dam are abysmal
17 and will only get better with a bigger pool of water.
18 The issue really is how is the water system going to be
19 operated after the dam is rebuilt. And a lot of eyes in
20 the East Bay are going to be catching San Francisco and
21 the stewardship on this project.

22 I won't go into detail about some of the
23 problems we have with the project. We'll be submitting
24 pretty detailed comments on the EIR. I will suggest --
25 the only reason I'm here tonight -- I wouldn't want to

O-ACA2-01
cont.

1 waste my time or your time if I didn't think this
2 project would be improved before the final. And we
3 definitely have an interest in not holding up this
4 project. We'd like to see it move forward. The things
5 that can be done -- the flows -- you've heard it from a
6 number of people. We think the federal agencies and the
7 state agency that have to give out the federal and state
8 permits are going to tell the SFPUC the very same thing.
9 These flows are really designed for resident fish. They
10 need adequate flows for fish migration and definitely
11 implications with the Endangered Species Act and State
12 Fish and Game Codes and regulatory agencies are going to
13 ask for higher flows.

O-ACA2-02

14 The approach for -- there's going to be some
15 very significant impacts from construction from this
16 dam; and we have a problem with the approach for
17 mitigation. Mitigation should be replacing lost habitat
18 with either conservation easements or acquiring private
19 land that's at risk of development, not changing
20 management on land that's already protected.

O-ACA2-03

21 The last issue is the greenhouse gas
22 emissions. The current approaches are contribution to
23 the statewide emissions is insignificant; therefore
24 we're not going to mitigate. There should be some
25 offsets for the greenhouse gas emissions.

O-ACA2-04

1 So I look forward to working with you guys to
2 improve this project. Thank you.

3 PRESIDENT MIGUEL: Thank you.

4 Manny Florez, Joel Couple.

5 MANNY FLOREZ: Good evening, Commissioners.

6 Manny Florez, Carpenters' Local 22. **O-CL22**

7 I think I speak on behalf of my brothers and
8 sisters here in the Bay Area on a wonderful project.
9 But what's important -- I think I'd like to piggyback
10 with what Commissioner Ed Harrington said. It's a scary
11 thought that the emergency water supply when a major
12 earthquake -- wow, that's something to think about.
13 It's like enough said with that. It's, like, again,
14 something to think about. But we look for your support
15 on the EIR and a wonderful project. Thank you very
16 much.

O-CL22-01

17 PRESIDENT MIGUEL: Thank you.

18 Any additional public comments on this item?

19 JENNIFER CLARY: Am I really that much shorter
20 than everyone here? **O-CWA**

21 Hi, I'm Jennifer Clary, speaking on behalf of
22 Clean Water Action. And I'm a member of the Bay Area
23 Water Stewards.

24 Since 2003 we've been tracking the water
25 system improvement program. And I don't know how many

1 environmental impact reports, how many planning efforts,
2 how many budgets. I know there's been three general
3 managers. But one thing that has always been a priority
4 for the environmental groups involved with BAWS is that
5 we understand that there's a seismic need for this
6 project and that it needs to move forward. And that's
7 why we've been working with the PUC for six and a half
8 years and why we're standing here at the draft stage
9 saying we know that we can improve this.

10 Now, a little over a year ago we finalized the
11 programmatic environmental impact report for the water
12 system improvement program and we felt that that report
13 was not adequate. And for the same reason we have
14 problems with this environmental impact report. And
15 that is, what do you do in case of uncertainty? And the
16 uncertainty with the programmatic document was flows on
17 the Tuolumne River. We didn't understand what the flow
18 needs were on the Tuolumne because adequate studies
19 hadn't been done and the mitigation requirements in the
20 EIR were not adequate to ensure those flows. And we
21 feel that the same problem is occurring in this draft;
22 and we hope that you'll fix it before the final. And
23 we'll present you with many comments explaining how to
24 do that. Thank you.

25 PRESIDENT MIGUEL: Thank you.

O-CWA-01

1 Are there additional public comments on this
2 item? If not, public comment is closed.

3 Mr. Harrington?

4 ED HARRINGTON: Yes.

5 PRESIDENT MIGUEL: If you could make some
6 comment regarding the statements we have heard as to
7 resident and migratory fish, what you presume -- I know
8 you've been in touch with both the state and federal
9 regulatory agencies -- what you presume you'll be
10 hearing from them within the next month or so,
11 undoubtedly, and how that will work its way into the
12 project.

13 ED HARRINGTON: I will certainly give it a
14 try, Commissioner.

15 The issue with Alameda Creek is that there
16 were a number of structures downstream of our dam that
17 have blocked access to that. As we've worked through
18 this project and as it's been delayed, frankly, we --
19 some of those downstream structures will be going away.
20 And so that's one reason we've had to change much of our
21 work to make sure that when and if -- and I think it's a
22 when and not an if -- when those fish have access to the
23 creek, we'll be ready for them. So we are not thinking
24 of waiting and letting it stay dry until they can eke
25 their way up. We are planning on trying to make sure

1 that there are adequate flows for that.

2 I think the real discussion is what's adequate
3 and is it the pulsing that I think you've been hearing
4 people recommending in terms of spring and other times
5 of the year. And we have been very, very involved in
6 trying to figure out what the right way of releasing how
7 much water at what times of year. We'll be working a
8 lot with the National Marine Fisheries and other people.
9 And I'm sure we'll all be hearing a lot in the next
10 month.

11 We've been going through a biological
12 assessment. We've been very open with folks you've
13 heard from today and the state and federal government
14 agencies to make sure that we're trying to take their
15 concerns into consideration; and we're trying to make a
16 program that will satisfy all those. But I think that
17 is the crux of -- if there is an issue -- when all is
18 said and done, that will be the issue is how much water
19 can we release and still retain enough to make the dam a
20 viable structure. I'm confident we can get there, but
21 that's really the crux of the discussion.

22 PRESIDENT MIGUEL: Thank you.

23 Commissioner Antonini.

24 COMMISSIONER ANTONINI: Thank you. I had a
25 question for either Mr. Wade or Mr. Harrington.

1 And my question is, although this isn't part
2 of our study now, how's the dam at the San Antonio
3 Reservoir? Obviously, is that okay? Does that need any
4 reinforcement?

5 DAN WADE: Yeah. There's no known seismic
6 problem with that dam. It's a much newer dam. It was
7 built in the 1960s and it was a traditional rock-fill
8 dam construction. The science of dam building and the
9 engineering practices were much more advanced in the
10 1960s than they were in the 1910s and '20s. **A-SFPC1**

11 COMMISSIONER ANTONINI: Okay. And then I
12 guess my second question is the earthen dam the
13 preferred way to go with the Calaveras as it was before,
14 as opposed to --

15 DAN WADE: Yes, absolutely. We looked at a
16 number of options for dams -- for the type of dam to
17 build at Calaveras. And the type of dam that's been
18 selected is really the best type of dam for this
19 particular site. We need a dam that has some give, if
20 you will, being next to an earthquake fault. A concrete
21 dam, for example, is not appropriate for this site.

22 COMMISSIONER ANTONINI: Makes sense to me.

23 The other thing, I guess, is as you know part
24 of the water for the Alameda Creek is contributed from
25 Arroyo del Valle, which since, I believe, 1972, when

A-SFPC1-01

A-SFPC1-02

1 they build the Arroyo del Valle reservoir, has a
2 year-round flow, because prior to that it was an arroyo.
3 And it almost flooded Pleasanton in 1955, took out a
4 couple of railroad bridges, and -- you know -- so one
5 would assume that, as you calculate the amount of flow
6 that comes through the Alameda Creek, you kind of have
7 to figure out how much of it is contributed from the
8 Arroyo del Valle and how much of it is from the Alameda
9 Creek itself, which prior to 1970 there was no
10 contribution at all from the arroyo because it only
11 flowed in the winter months when there were storms.

A-SFPC1-02
cont.

12 DAN WADE: There are certainly a number of
13 tributaries that join Alameda Creek on its way to the
14 Bay; that's correct.

15 COMMISSIONER ANTONINI: As we've analyzed the
16 whole fish issue, because I'm supportive of having the
17 flow obviously to allow for restoration, but we go back
18 to a time that was a long time ago to figure out how
19 much flow there was before there were any dams at all.
20 And but, hopefully, we can restore something that might
21 even be better than what there was before 1900 or
22 whenever the first dams were built in Niles Canyon.
23 Thank you.

24 PRESIDENT MIGUEL: Commissioner Borden.

25 COMMISSIONER BORDEN: Yeah. I mean,

1 obviously, this is very -- a document with a lot of
2 great information in it. I did want to just make sure
3 that -- we've heard a lot of testimony about the issue
4 of flows. And I just to want to make sure this document
5 explores the range of flows, particularly because it
6 sounds like the flow, as calculated, may not respond to
7 the migratory fish. And I just think that we always
8 with our EIRs evaluate from the most restrictive
9 alternative to the most permissive alternative. And I
10 just want to make sure that this document includes that
11 so that we have that data in this document before we
12 finalize it.

A-SFPC2-01

13 The other thing was the issue of mitigation of
14 construction impacts. And I just wanted to -- I know
15 there was a mention that there's going to be restoration
16 of some public land, but I don't know if there's going
17 to be a net new mitigation that wasn't already
18 mentioned. But just -- I think that we want to make
19 sure that all the mitigations and significance -- that
20 we bring it down to a level of less significant and that
21 we make sure that even with construction impact we've
22 had a lot of information about various other aspects --
23 geology, et cetera. But I didn't see as much about the
24 fisheries; and I just want to make sure that we have
25 that in there because I think that's important.

A-SFPC2-02

1 And then also, the issue was also brought up
2 about greenhouse emissions. And I know that's more of
3 an issue, I think, during the construction period than
4 the post period. But, again, I want to make sure this
5 document is as conclusive as possible; because, contrary
6 to what people think, we're not certifying the EIR
7 today. We are just commenting on the EIR. And it's
8 important that all the major issues that need to be
9 addressed are thoroughly analyzed in this document so we
10 can pass the EIR in its final form and have a range of
11 options. Just because things are analyzed doesn't mean
12 it has to be the way the project goes. But by having
13 the most broad of a range gives the greatest
14 flexibility.

15 PRESIDENT MIGUEL: Commissioner Olague.

16 COMMISSIONER OLAGUE: I just want to thank the
17 PUC for educating us and for really helping to really
18 improve the process here at the Planning Commission with
19 all the education you've been providing to us. And I
20 just wanted to thank you for that -- respecting us and
21 our desire to be knowledgeable about something that
22 we're required to certify. So I want to thank you for
23 that.

A-SFPC3

24 And I would like to just basically agree with
25 what we're heard tonight from most people, which is that

A-SFPC2-03

A-SFPC3-01

1 we support this water overhaul and we'd love to see this
2 project move along. And I think that the best place --
3 the best way of getting there really is to -- I respect
4 and just -- I don't want to have to repeat what
5 Mr. Miller and Jessie Raeder -- what they requested of
6 the additional analysis they requested.

7 And I know that you've been engaged in very
8 productive conversations with the ecologists. And I
9 want to thank you for that, too. And I just want to see
10 that they're -- what they requested is also met through
11 the final EIR, the comments and responses, which I guess
12 we'll be seeing here in the next couple of months, I
13 assume.

14 So I just kind of wanted, without having to
15 repeat or read the letter and go point by point, just
16 play back the tape and, you know, address the needs and
17 concerns that they raised. I'm sure that you planned on
18 doing that anyway so we can see this project, you know,
19 move forward positively, as I think we'll move in a real
20 positive direction.

21 That's it, really, and I just want to thank,
22 you know, again all the education I've received from the
23 ecologists, from you folks, and everybody. It's been
24 really positive for me. Thanks.

25 PRESIDENT MIGUEL: Commissioner Lee.

1 COMMISSIONER LEE: I just had a question for
2 the staff here.

A-SFPC4

3 People talk about the water flow, but that's
4 just to me part of the issue. The other issue really is
5 the BOD, because when you look at the trout and the
6 salmon, they're high oxygen users. And when we see
7 polluted waters, you don't get trout, you don't get
8 salmon. So the question is -- someone brought up the
9 question about eons ago or years ago, we have a certain
10 amount of fish that were going upstream to spawn. But
11 the question is how will we ever get that data regarding
12 BOD demand at that time and the number of fish that
13 actually spawned and made it up to -- up back to Hetch
14 Hetchy, wherever the end point is?

15 And I guess the second part here is I don't
16 know what the BOD would be to justify the number of fish
17 that someone would say that needs to go back that we
18 anticipate -- that we thought we had a hundred years
19 ago.

A-SFPC4-01

20 CHRIS KERN: I'm not sure I can fully respond
21 to your question. And, in fact, our responses will, of
22 course, be in writing in our comments-and-responses
23 document. But what I will say is that the draft EIR
24 does evaluate water quality conditions as it relates to
25 fisheries and effects of the project, or the proposed

1 project on water quality as related to impacts on fish.

2 COMMISSIONER LEE: But so you don't have that
3 data a hundred years ago, because no one did the testing
4 that I'm aware of. So the question would be is, a
5 hundred years ago we had X number of fish and this is
6 what it looked like based on historic evidence, but we
7 don't know what the number -- frankly, they're only
8 estimates. So when it ties to the EIR, the EIR is a
9 legal document and generally what it is is we look at
10 different alternatives. So my question is, if your
11 assumptions aren't totally correct, how can you look at
12 a mitigation measure? Or should you look at a
13 mitigation measure when you don't have the correct data
14 from before?

A-SFPC4-02

15 CHRIS KERN: The best I can say right now is
16 that we will take your comment and your question into
17 consideration when we consult with our expert, a
18 fisheries biologist, in preparation for the
19 comments-and-responses document and do our best to
20 respond to that concern.

21 COMMISSIONER LEE: Right. Thank you.

22 PRESIDENT MIGUEL: Commissioner Olague.

23 COMMISSIONER OLAGUE: Just quickly, did we
24 extend the date for the comment period? Okay.

25 PRESIDENT MIGUEL: Commissioner Moore.

1 COMMISSIONER MOORE: The document is one of
2 many. It shows a consistent strength in reporting,
3 consistent strength in depth of investigation. And
4 while I'm not an expert, I clearly see that it comes
5 from a very solid base and I urge that the questions
6 raised by the public are answered in some form or
7 another. They should not detract or question what you
8 do but further elevate what a large number of people are
9 concerned about. Generally, I'm in support and very
10 much appreciate all the various thoughtful
11 presentations. Thank you.

A-SFPC5-01

12 PRESIDENT MIGUEL: The public hearing is over.
13 Written comments will be accepted at the Planning
14 Department until Friday, December 18th.

15 [The item was concluded at 7:07
16 p.m.]

17
18
19
20
21
22
23
24
25

1 STATE OF CALIFORNIA)
 COUNTY OF SAN FRANCISCO)

2

3

CERTIFICATE OF REPORTER

4

5 I, FREDDIE REPPOND, a duly authorized Shorthand
6 Reporter and licensed Notary Public, do hereby certify
7 that on the date indicated herein that the above
8 proceedings were taken down by me in stenotype and
9 thereafter transcribed into typewriting and that this
10 transcript is a true record of the said proceedings.

11 IN WITNESS WHEREOF I have hereunto set my hand on
12 this 17th day of November, 2009.

13

14 _____

15 FREDDIE REPPOND

16

17

18

19

20

21

22

23

24

25

**Public Hearing Transcript –
Sunol, December 14, 2009**

SAN FRANCISCO PLANNING DEPARTMENT

CALAVERAS DAM REPLACEMENT PROJECT
DRAFT ENVIRONMENTAL IMPACT REPORT
PUBLIC HEARING

Sunol Glen Elementary School
11601 Main Street
Sunol, CA 94586
Monday, December 14, 2009
6:30 p.m.

REPORTER'S TRANSCRIPT OF PROCEEDINGS
BY: JUDITH LARRABEE, SHORTHAND REPORTER

CLARK REPORTING AND VIDEOCONFERENCING

2140 SHATTUCK AVENUE, SUITE 405
BERKELEY, CALIFORNIA 94704
(510) 486-0700

1 APPEARANCES

2 Robert Smith, U.S. Army Corp of Engineers

3 Chris Kern, San Francisco Planning Department

4 Dan Wade, San Francisco Public Utilities Commission

5 ---oOo---

6

7 MEMBERS OF THE PUBLIC

8 (in order of appearance)

9 John Carrolll
Mary Jean Robertson

10 Cindy Charles
Derrell Bridgman

11 Corey Cate
Jim Blickenstaff

12 Douglas Graber
Mike Croll

13 Jessie Raeder
Anne-Marie Bakker

14 Gary Smith
Jan Green

15 Jeff Roy
Jim Schrrer

16 Ken Edgecombe
Jeff Miller

17 Don Reazer
Mark Lynn

18 Richard Sanderell
Robert Means

19 Gary Sargent

20 ---oOo---

21

22

23

24

25

1 PROCEEDINGS

2 MR. KERN: Good evening. Welcome to the third and
3 final public meeting on the Draft Environmental Impact
4 Report for the Calaveras Dam Replacement Project. My name
5 is Chris Kern, and I'm with the San Francisco Planning
6 Department, Major Environmental Analysis Division.

7 The Planning Department is the lead agency under the
8 California Environmental Quality Act for the Draft
9 Environment Impact Report. We also have Bob Smith here who
10 is representing the U.S. Army Corp of Engineers, which is
11 the federal lead agency for the project. And Dan Wade,
12 with the San Francisco Public Utilities Commission,
13 representing the project's sponsor.

14 So here's our agenda for this evening. If you haven't
15 already done so, we'd ask you to sign in for tonight's
16 meeting if you would like to be sure to be on the
17 notification list for future hearings related to this item
18 -- that would be the final certification hearing. When you
19 do that, please try to write legibly so we can figure it
20 out.

21 In a moment, after I do a few meeting logistics, Dan
22 is going to give a brief overview of the proposed project,
23 and then we're going to open up the meeting for the main
24 event tonight, which is to hear your comments on the Draft
25 EIR. And we'll close the meeting with a few closing

1 remarks.

2 So just a few quick logistics. I already mentioned
3 signing in at the registration table. We have a number of
4 handouts including cards for submitting written comments.
5 And we also -- if you wish to provide verbal comments
6 tonight, we need you to fill out one of these speaker
7 slips. I'll be calling up people from these slips later
8 on.

9 You can leave written comments for us this evening in
10 the comment box up there. You can also e-mail, fax or mail
11 comment letters to us at the Planning Department until the
12 close of the public comment period which is a week from
13 today, 5:00 p.m. on Monday the 21st.

14 Actually, before I hand it over to Dan, just a few
15 more things. If you need to take a cell phone call, please
16 take it outside the room tonight. And there are signs for
17 the rest rooms. It looks like most of you are familiar
18 with this venue, but if not, you can go out either door and
19 there are signs pointing to three different restrooms.
20 Okay then.

21 MR. WADE: Good evening. I'm Dan Wade. I'm the
22 project manager for the San Francisco Public Utilities
23 Commission. Appreciate everybody coming out tonight. We
24 appreciate your interest in the project and we look forward
25 to hearing your comments.

1 So what I'd like to do is just give you a brief
2 overview of the project description. I'm not going to take
3 up a lot of time because again, our main purpose is to hear
4 your comments tonight. But I did want to give, especially
5 for folks that don't know a lot about this, a description
6 of the project itself, an overview.

7 This slide shows an overview of the regional system
8 that the San Francisco Public Utilities Commission
9 operates. Of course, we have the South Bay. This line
10 coming across the valley and through the coast range and
11 then into the Bay represents the Hetch Hetchy Aqueduct that
12 takes water from the mountains, across the San Joaquin
13 valley and into the Coast Range mountains.

14 The water here is a 25-mile long tunnel where it comes
15 into the Sunol Valley and then goes into the Bay Division
16 pipelines in Fremont on the downstream into the Irvington
17 Tunnel where two of the pipelines cross the Bay and two of
18 the pipelines go around the south end of the Bay, where it
19 takes water up to the peninsula and then to the San
20 Francisco city proper.

21 Now, the SFPUC serves 2.5 million customers in the San
22 Francisco Bay Area, of approximately which one million are
23 city residents within the city proper and the other million
24 and a half or so are folks that we sell water to, to our
25 wholesale customers in the East Bay as well as along the

1 peninsula and the South Bay. Approximately 85 percent of
2 the water comes from the Hetch Hetchy water system, and the
3 other 15 percent comes from local reservoirs, which
4 includes Calaveras Reservoir, located here, the San Antonio
5 Reservoir, and several reservoirs over on the peninsula.

6 Now, Calaveras Dam and Reservoir are key components of
7 the San Francisco Public Utilities Commission's regional
8 water system. The water that is stored in Calaveras is
9 merged with the water from the Hetch Hetchy Valley for
10 delivery to the customers in East Bay, in the Peninsula,
11 and in San Francisco.

12 The existing dam is located in the Coastal Range here.
13 It's approximately 12 miles south from the city of
14 Pleasanton, 7 miles south of the town of Sunol and 7 miles
15 east of the city of Milpitas. It's a remote area of
16 Alameda and Santa Clara County, on watershed lands owned by
17 the City and County of San Francisco.

18 The area that drains to the reservoir is approximately
19 132 square miles, of which approximately 35,000 acres are
20 owned by the SF Public Utilities Commission and are not
21 accessible to the general public. However, East Bay
22 Regional Parks District owns lands to the north of the
23 reservoir, immediately to the north, which is the Sunol
24 Regional Wilderness, and Calaveras Road bypasses the
25 reservoir, providing public access in the vicinity of the

1 reservoir itself.

2 Now, the dam is located in close proximity to the
3 Calaveras Earthquake Fault which is capable of producing
4 what we call a maximum credible earthquake, which is the
5 maximum earthquake that one could receive for design of a
6 dam of approximately seven and a quarter on the Richter
7 scale.

8 Calaveras Reservoir is the SFPUC's largest local
9 reservoir, and it allows for the storage of approximately
10 97,000 acre-feet. It provides 40 percent of the local
11 water storage and 66 percent of the local water yield, or
12 the amount of water that is provided to the customers each
13 year.

14 Now, in 2001, the San Francisco Public Utility
15 Commission lowered the water levels in the reservoir due to
16 seismic safety concerns and a mandate from the California
17 Division of Safety of Dams. And so now the reservoir is
18 actually currently operating at approximately 40 percent of
19 historic capacity.

20 Now, this picture shows the reservoir from a viewpoint
21 approximately 2000 feet above the Sunol Regional
22 wilderness, so this is taken from the air. And the
23 existing dam is located here. It's 210 feet high. And
24 this photograph was taken after the reservoir was lowered
25 in 2001 due to the seismic safety concerns. You can

1 actually see the bathtub ring around the rim of the
2 reservoir. That ring represents about 50 feet of vertical
3 height. And it's that 50 feet of vertical height that
4 actually holds about 60 percent of the reservoir's
5 capacity.

6 Now, the existing earth and rock-fill dam was
7 completed in 1925 and was modified in 1974 to increase the
8 seismic stability. The dam is 210 feet high, and has a
9 volume of about three and a half million cubic yards of
10 earth and rock-fill. The proposed project that we're
11 talking about tonight would restore the historic capacity
12 of the reservoir back up to the top of that bathtub ring.
13 It wouldn't go higher than that. It would just be
14 restored.

15 So the project purpose is to replace the existing dam
16 with a dam that meets the current seismic safety standards.
17 The new dam would be constructed immediately downstream of
18 the existing dam and would be the same height as the
19 existing dam. But upon completion, the Division of Safety
20 of Dams or DSOD restriction would be lifted, and the
21 reservoir capacity would be restored.

22 The project would help to meet the level of service
23 objectives for the SFPUC's Water System Improvement
24 Program, to maintain a reliable water system during
25 earthquakes, to maintain what we call delivery reliability

1 to our customers, to maintain high water quality, which is
2 very important for our customers, especially throughout the
3 Bay Area high tech industry, and to provide supply to meet
4 customer demand through the year 2018.

5 Now, the project objectives then are to reestablish
6 the water delivery reliability, to restore the water supply
7 and reservoir capacity to the pre-2001 level of
8 approximately 97,000 acre-feet, to improve seismic
9 reliability, to construct a replacement dam with a robust
10 design that could accommodate potential future enlargement,
11 to continue reservoir operation during construction, and to
12 maintain high water quality.

13 So the major project features are to construct the
14 replacement earth and rock-fill dam -- it's 210 feet high,
15 same height as the existing dam; to stabilize a landslide
16 that's in a right abutment, and the right abutment is
17 looking downstream to the right if you're standing on the
18 dam looking to the right where the landslide needs to be
19 stabilized; to construct a new spillway and stilling basin;
20 to construct an outlet works, which include a tower and a
21 shaft, pipelines and valves; to install fishery water
22 release valves providing fish releases downstream of the
23 dam; to develop borrow areas which are essentially places
24 where we obtain the earth and rock-fill to construct a new
25 dam, and disposal sites, to dispose of the materials that's

1 excess to the dam construction; to construct haul routes
2 and staging areas for the dam construction, and to make
3 some modifications at what we call the Alameda Creek
4 Diversion Dam. And we'll talk about that a little bit
5 later in the presentation.

6 Now this slide shows a plan view of the reservoir.
7 It's about three and a half miles from the existing dam,
8 located at the north end of the reservoir to the south end
9 of the reservoir. The various colors on this map represent
10 what we call the project footprint, which are the features
11 of the new project including the new dam itself, the access
12 roads, the staging areas, the borrow areas, the disposal
13 sites.

14 So quickly, I will just show you the various
15 components of the project. We have the new replacement
16 dam, which would be located here, immediately downstream of
17 the existing dam. These hatched areas are disposal sites
18 where we would actually place excess soil and rock that's
19 excavated that can't be used in the new replacement dam.

20 We have borrow areas, one located here at the south
21 end of the reservoir, and another located here north of the
22 reservoir. This one we would use to obtain the hard rock
23 fill that we use for the upstream shell of the new dam.
24 This one would be used to obtain clay for the core, what we
25 call the impermeable core of the new dam.

1 In order to get that clay up to the north end of the
2 reservoir, we would build an access road along the west
3 side of the reservoir within that bathtub ring. That
4 access road would essentially be inundated once the new
5 reservoir is restored to the historic level.

6 Now, this is, as I mentioned, a large earth and
7 rock-fill dam construction project, about 3 and a half
8 million cubic yards. And so as such, the nature of
9 construction activities are conventional excavation of soil
10 and weathered rock, what we call controlled blasting of the
11 hard rock; drilling and driving of foundation rock;
12 concrete spillway construction; outlet works modifications
13 and extension to the existing outlet works; haul route
14 construction; transport of construction materials and
15 spoils, and earth and rock-fill dam embankment
16 construction.

17 Now, as is the case with all of the SFPUC's projects,
18 avoidance and minimization of impacts is an essential part
19 of our work. Accordingly, the project components were
20 subjected to careful evaluation and designed to avoid and
21 minimize impacts to the environmental and cultural
22 resources while also maintaining requirements for dam
23 safety and constructibility. For example, in order to
24 minimize the construction and vehicle traffic on Calaveras
25 Road, the project is carefully designed to secure the

1 majority of the dam's construction materials on SFPUC lands
2 at the site of the proposal project.

3 As I mentioned, the clay of the dam is being
4 constructed from clays located at the southern end of the
5 reservoir. And the clay would be transported on a haul
6 route that we're building especially for this project. I
7 also want to point out the location of the Alameda Creek
8 Diversion Dam located here on Alameda Creek, and we'll come
9 back to that in a few minutes.

10 Now the picture here on the left is the existing dam.
11 The existing reservoir is back here. So this is what we
12 call the downstream face of the existing dam. The new dam
13 is shown in this photo on the right. The new dam would be
14 constructed essentially immediately downstream of the
15 existing dam of this area here. This peninsula that you
16 see on the left side of the slide there is actually the
17 remnant of the existing dam that would remain after
18 construction is completed.

19 The existing dam will be used to form a coffer dam for
20 construction of the new dam. What that means is that the
21 existing dam would be used to hold back the reservoir water
22 so that we can construct the new dam immediately
23 downstream. So when the new dam is complete, we will
24 dredge a slot here on the right side of the existing dam so
25 the water can make its way to the new dam.

1 Now, I mentioned most of the materials for
2 construction are coming from on site. Those materials are
3 shown here. This is what we call a cross section of the
4 new dam which is, if you were to take a slice right down
5 the center and roll it out, this is what it would look
6 like. The red here in the middle is the clay core of the
7 new dam; the green on the upstream side is the hard rock
8 fill that would be obtained north of the site, and the tan
9 is the earthfill that would be obtained from a large
10 excavation on this hillside.

11 Now, all of those materials would be obtained from on
12 site, and therefore we wouldn't transport any of those
13 materials from on site. The only materials that would need
14 to be transported from off site are the yellow, and those
15 are essentially sands and gravels that form filters and
16 granites which are safety features for an earth and
17 rock-fill dam. And those materials are not available on
18 site, and so we do have to import those from off site. And
19 the most likely place that they would come from are from
20 the quarries that currently operate in the Sunol Valley.
21 That makes up about 10 percent of the total construction
22 materials for the project, or about 300,000 cubic yards.

23 Now, we come back to the Alameda Creek Diversion Dam
24 and Tunnel. The SFPUC owns and operates a 31-foot high
25 concrete Diversion Dam that's located on Alameda Creek.

1 The purpose of that dam is to divert flows off of Alameda
2 Creek through a 1.8-mile long tunnel that takes the water
3 to Calaveras Reservoir. The capacity of the tunnel is
4 approximately 650 cubic feet per second, and so when the
5 flows are available in Alameda Creek, we do divert water
6 from the creek to the reservoir. This facility enables 34
7 square miles of the total 132 square miles of watershed
8 lands to provide additional water for storage in the
9 reservoir.

10 So if I zoom in on the Alameda Creek Diversion Dam --
11 this is a schematic of what it looks like. Just to orient
12 you to the slide, Alameda Creek flows from left to right,
13 across the page. The Alameda Creek Diversion Dam is a
14 concrete structure. It is 31 feet high and it's located
15 here. So this is a plan view looking down on the top of
16 the gap.

17 The beginning of the Alameda Creek Diversion Tunnel is
18 here. So the tunnel would go up the page, and the
19 Calaveras Reservoir is off the slide.

20 Here we have trash racks. So water that is diverted
21 by this dam goes through these trash racks, and then
22 there's a gate here on the tunnel. And when the gate is
23 open, they actually divert water through that tunnel to the
24 reservoir.

25 Now, what we're planning to do is to propose

1 modifications at the Alameda Creek Diversion Dam which
2 would be to drill a bypass tunnel and install a valve on
3 the left abutment of the existing dam. So this bypass
4 tunnel would be through this side of the dam. That would
5 enable us to release water in the portion of the creek
6 downstream of the dam to enhance the flow and habitat for
7 resident rainbow trout downstream from this facility.

8 I mentioned that most of the materials are coming from
9 on site. But we do have 300,000 cubic yards of materials
10 that need to come from off site; and therefore, we're
11 requesting closure from both Alameda County and Santa Clara
12 counties of Calaveras Road for a portion of the
13 construction period.

14 So if the project is approved next summer, 2010, the
15 construction would begin in the spring of 2011. The total
16 duration of construction would be about four years, the
17 completion in the winter of 2014 or 2015. So for a limited
18 period during this four-year construction period, Calaveras
19 Road would be a hauling route for the import of a limited
20 volume of materials for the dam construction, namely sands
21 and gravels, as well as some other construction materials,
22 concrete for the spillway and some other items.

23 So the SFPUC would request permission from both
24 Alameda and Santa Clara County to close the road from Geary
25 Road on the north, which is located here. So this is

1 Calaveras Road. So it would be closed from Geary Road on
2 the north to approximately Felter Road on the south, which
3 is north of the intersection of Felter. So it's the
4 highlighted portion of the road. And these closures would
5 be requested for two months in the summer of 2011 and for
6 18 months beginning in the winter of 2012.

7 Now, during this closure period, it's proposed the
8 road be open on the weekends, so it would be weekday and
9 weeknight closures only. The Calaveras Road would be
10 restored to its preexisting condition after completion of
11 the project.

12 Now, once the project is complete, the refilling of
13 the reservoir would begin the winter of 2014 or 2015 upon
14 approval from the Division of Safety of Dams. The water
15 releases would be made for resident rainbow trout at the
16 proposed Alameda Creek Diversion Dam bypass tunnel when
17 water is present at Alameda Creek. Additional releases
18 will be made from Calaveras Reservoir pursuant to the
19 Memorandum of Understanding, or MOU, that the SFPUC has
20 with the California Department of Fish and Game that was
21 signed in 1997. Now, the proposed flow schedules for
22 steelhead trout would be implemented when steelhead have
23 regained access to the Alameda Creek Watershed upstream of
24 the BART weir which is located in Fremont.

25 This slide shows the replacement dam with the restored

1 reservoir. You can no longer see the bathtub ring. And
2 again, the total restored capacity of the reservoir would
3 be approximately 97,000 cubic feet. I mentioned earlier
4 the peninsula on the left is the existing dam which was
5 used as the coffer dam during construction.

6 Thank you again for your interest in the project and
7 we'll look forward to hearing your comments.

8 MR. KERN: Okay. So now we're going to get ready
9 to open up the hearing for your comments. And I want to
10 just remind everybody that the purpose of tonight's meeting
11 is not to -- this isn't a hearing on approval of the
12 project. This is an opportunity for you to provide
13 comments on the adequacy and the accuracy of the
14 information obtained in the Draft Environmental Impact
15 Report. It's just part of the process towards project
16 approval.

17 We have a court reporter here tonight who will be
18 transcribing all the comments received. And you can also
19 submit comments to us, as I mentioned, in writing, by
20 e-mail, by letter or by fax.

21 The Planning Department will be preparing what's
22 called a Comments and Responses Document. In that
23 document, we will be responding to all the comments that we
24 receive tonight and at the other hearings that we've
25 already held on the project, as well as all the comments

1 that we received in writing.

2 The Draft Environmental Impact Report is available on
3 the Planning Department's Web site, and it's also available
4 in hard copy at the Fremont Public Library, at the San Jose
5 Main Library and at San Francisco Main Library.

6 We have extended the public comment period, as I
7 mentioned earlier, through a week from today 'till
8 December 21st. So we need to receive your written comments
9 and you need to submit them by that date.

10 The Comments and Responses Document will take us a few
11 months to prepare. It will be a comprehensive document.
12 We anticipate that to come out sometime in the spring or
13 summer of next year, and then shortly after the Comments
14 and Responses Document is out, we will hold a final hearing
15 on certification of the EIR before the San Francisco
16 Planning Commission.

17 So again, just a reminder. We're here to hear tonight
18 your comments -- not on the merits of the project or its
19 approval, but on the Draft Environmental Impact Report. If
20 you wish to speak again and haven't already done so, please
21 fill out one of these speaker cards and we'll get it to one
22 of our staff so that I can call you when your turn has
23 come.

24 Wait until your name is called. I'll probably call up
25 a couple of names at a time so you can be ready. We have a

1 lot of people here tonight. I'm sure everybody wants to get
2 home before too late. Please be sure to speak clearly into
3 the microphone and begin by stating your name and any
4 organization that you represent. We are limiting comments
5 to three minutes tonight. There will be a timer up there
6 on the screen so you can see how much time you've got.
7 Again, we do have a court reporter who's transcribing your
8 comments. We want to make sure that we get them all right
9 so that our comments and responses are accurate. So please
10 speak slowly and clearly.

11 Again, that's our contact information. I'm going to
12 now open up the hearing beginning with John Carroll and
13 followed by Mary Jean Robertson.

I-Carroll

14 MR. CARROLL: My name is John Carroll. I actually
15 am a member of the Alameda Creek Alliance. I have been
16 reading their materials on the Web site.

17 The creek restoration is very important. I really
18 hope that San Francisco will make a commitment to bring an
19 effort to restore the fish population there and to bring
20 the water level up to a sustainable level so that the fish
21 actually have an opportunity to survive.

I-Carroll-01

22 As a child who used to fish with my father on the
23 Russian River all the time, and I know that that particular
24 area has been devastated with various construction and
25 overdevelopment and so forth. So just as a fisherman that

1 would love to see restoration of habitat, I really feel
2 that San Francisco should step up and hopefully make a
3 commitment to get steelhead back and establish that
4 ecosystem.

I-Carroll-01
cont.

5 I guess the only other thing that caught my eye in
6 terms of the material that I've been reading was that in
7 some cases the EIR apparently were using a couple of
8 different baselines. I'm not real familiar with the two
9 different baselines that they're referencing, but
10 apparently one baseline was used for one particular data
11 set, and then they were using another baseline for a
12 subsequent study that used slightly different numbers that
13 were more favorable to the picture that you want to paint.
14 So I hope everybody can come to agreement as to which
15 baseline information can be used and make sure that that
16 study actually comes up with some numbers that provide a
17 stream flow that will support the steelhead. Thank you
18 very much.

I-Carroll-02

19 MR. KERN: Thank you. Mary Jean Robertson,
20 followed by Cindy Charles.

I-Robertson

21 MS. ROBERTSON: Hi. My name is Mary Jean
22 Robertson. I'm part of the Ohlone Profiles Project in San
23 Francisco. One of the things that I wanted to say was that
24 the Ohlone people were the original inhabitants of San
25 Francisco and this area. One of the most important things

1 to native people all over the country is that --
2 particularly salmon were the ancestral memory of our
3 people. And so when they are dealing with the pollution of
4 the water, like the mercury poisoning and everything else,
5 they have a tendency to lose their memory of where to spawn
6 and where to go back to home. So what we're trying to
7 really talk about is to make sure that the brothers and
8 sisters, the salmon, the fish, are in a place where they
9 can survive, just as we pray and hope the original
10 habitants of San Francisco can be able to return to San
11 Francisco and teach us their original ways and remind us of
12 the meaning of the salmon to them.

I-Robertson-01

13 I just wanted to say that it's very important to
14 participate in all the public meetings to remind people
15 that there were people that were living here for 5,000
16 years, and not only did their habitat survive for that
17 long, but it was enhanced by their activities. So that's
18 what I wanted to say. Thank you.

I-Robertson-02

19 MR. KERN: Cindy Charles followed by Derrell
20 Bridgman.

I-GWWF2

21 MS. CHARLES: Hi. I'm Cindy Charles, and I'm the
22 conservation chair for the Golden West Women Fly Fishers.
23 I'm also on the Steelhead Committee of the Northern
24 California Council of the Federation of Fly Fishers.

25 I'd like to say that the Golden West is a fly fishing

1 club with about 125 members. We have had a long history in
2 restoration efforts on the Alameda Creek watershed. We
3 helped rescue steelhead eggs and put them in the Tanks in
4 the Classroom program with DOT permission many years ago.
5 So we were a leader in that, and we have been actively
6 involved in the Alameda Creek fish rescues. I personally
7 helped move or capture those two male and female steelhead
8 a couple of years ago, and it was just amazing to see what
9 strong and beautiful fish were making their way back. And
10 I hope to see many more.

11 Our concerns with the current project. We fully
12 support the rebuilding of the dam. We can understand the
13 need for that. Our concerns are that there are inadequate
14 flow proposals for the anadromous fish, for migratory
15 return of the steelhead. It's essential that the flows are
16 there. So much work has been done thus far over many
17 years, and many people in this community have made such
18 great strides in helping to bring these fish back. And
19 it's not going to happen unless there's enough water in
20 there year-round. It's just a fact that the fish need the
21 water.

22 I'd like to also add that my club has been working
23 with San Francisco PUC on identifying its ownership of a
24 barrier, the weir at the U.S. Staging Station. We've been
25 cooperating with you in possibly removing that for fish

I-GWWF2-01

I-GWWF2-02

I-GWWF2-03



1 passage. So we have a huge interest in seeing the fish
2 return and hope that you will do all you can to ensure that
3 there is adequate flows. Thanks a lot.

I-Bridgman

4 MR. KERN: Derrell Bridgman followed by Corey Cate.

5 MR. BRIDGMAN: Thank you. My name is Derrell
6 Bridgman. I am also with the Northern California Council
7 of Federation of Fly Fishers. I am also on the Steelhead
8 Committee like Cindy Charles, and have been involved in
9 steelhead rescues on the creek down at the BART weir. And
10 I have a definite passion for seeing the steelhead runs
11 returned to Alameda Creek. I know they need water.

12 My point tonight is I'd just like to emphasize that I
13 think San Francisco PUC should be a good neighbor to the
14 people in the Alameda Creek watershed. We're willing to
15 share surplus water with you. We don't want to give it all
16 to you, and we don't want you to try to take all of it.
17 We're willing to be a good neighbor and share water. We
18 think you should be a good neighbor and not take more than
19 you have to have. Learn to conserve water and leave some
20 for our watershed, our fish and the wildlife in the creek.

21 That's short and sweet, but that's my point.

22 MR. KERN: Thank you. Corey Cate followed by Jim
23 Blickenstaff.

I-Cate

24 MR. CATE: My name is Corey Cate. I'm affiliated
25 with several organizations, California Sport Fishing

I-GWWF2-03
cont.

I-Bridgman-01

1 Protection Alliance, Tracy Fly Fishers, Tri Valley Fly
2 Fishers, and the NCCFFF, which is Northern California
3 Council Federation of Fly Fishers.

4 I live in Livermore. In 1985, I came to the state for
5 the third time from New Mexico and was reminded of the
6 beauty of Niles Canyon as I drove down it, and was reminded
7 that people did fish in Niles Canyon in Alameda Creek.

8 That fishing doesn't appear to be very important
9 anymore, regrettably, for a lot of different reasons. I
10 think you've heard from other people, including Derrell,
11 how important the steelhead are. And what steelhead
12 represent is the real resident rainbow trout.

13 The resident rainbow trout that people fish for
14 through the winter in Niles Canyon were put in tank fish.
15 They were not what I would consider native species.
16 They're California native, but they're not native to the
17 Alameda Creek per se.

18 The steelhead is an absolutely imperiled species. It
19 requires clean water. It requires enough water. It
20 requires temperatures that other fish don't require, and it
21 especially requires large winter flow.

22 I would personally like it if you would take it upon
23 yourself as the paid advocates for the fish -- I'm a
24 volunteer advocate for the fish -- as paid advocates,
25 rather than for the FSSFPUC, take it upon yourself to take

I-Cate-01



1 an ethical point of view in favor of fish restoration.

2 I know that SFPUC pays your salary. I know that
3 you're getting paid to be here tonight. But I see a room
4 full of people. There's perhaps 70 of us here that
5 represent nonpaid representation.

6 We -- perhaps the majority of us -- would like to see
7 the steelhead restored as an endangered species. I believe
8 this Environmental Impact Report ignores the importance of
9 the steelhead in favor of what I would consider to be an
10 insignificant piece called the resident rainbow trout. And
11 perhaps JFJ will disagree with me there, but it's my
12 considered opinion that rainbow trout are less important
13 and steelhead are more important.

I-Cate-02

14 I thank you very much for your work on this complex
15 and absolutely critical issue. I know that you're doing
16 good things, and I wish for that to continue. Thank you
17 very much.

18 MR. KERN: Thank you. Jim Blickenstaff followed by
19 Douglas Graber. **I-Blickenstaff**

20 MR. BLICKENSTAFF: Good evening, gentlemen. Jim
21 Blickenstaff of Mount Diablo Sierra Club. I just have a
22 couple of brief comments to focus on some things that I
23 think need to be appreciated.

24 In the past and in looking at environmental studies, I
25 found that you don't really appreciate the cumulative

I-Blickenstaff-01

1 effects of what happens when you do something that looks
2 like it's going to be controlled in terms of its damage.
3 But ultimately, the cumulative effect is what breaks the
4 camel's back.

I-Blickenstaff-01
cont.

5 Here, for example, I think you need to fully
6 understand the history of the habitat, rather than what you
7 see now and how maybe you maintain it; at best-case
8 scenarios perhaps we'll maintain it, perhaps we won't.

9 The history of the habitat tell us about the heritage
10 of the country, indigenous species and people, and that's
11 your starting point for restoration. That's your starting
12 point for mitigation. And you don't have that yet.

13 For example, a bypass valve on a diversion dam, that's
14 life or death. The bypass valve tells you life or death
15 for the habitat of fish, steelhead and others. And to
16 fully understand how you utilize, maintain, and control and
17 have authority over something like a bypass valve, you have
18 to understand the heritage of that property and that
19 drainage. I get back to the information of understanding
20 fully what the history is here for the steelhead and
21 indigenous trout. And right now, I don't see that.

I-Blickenstaff-02

22 And so you have a risk of adding to the accumulative
23 effects of degrading the fishery. We've seen it throughout
24 California. Salmon species are crashing in Sacramento and
25 other river systems. People seem surprised by it. "Wow.

1 We didn't see that coming." But you should have seen it
2 coming. And I think especially San Francisco, in terms of
3 national perception as being a more progressive,
4 sophisticated, thoughtful kind of area, to look at issues,
5 especially environment, it would be such an embarrassment,
6 such a contradiction for this area, in terms of what San
7 Francisco epitomizes nationally, to fall down on the job
8 and not appreciate this kind of progressive, thoughtful
9 heritage in San Francisco in terms of analyzing things like
10 the environment, critical aspect of the way San Francisco
11 should be looking at the world. It starts with Hetch
12 Hetchy and comes down to the smaller portion of that
13 drainage.

I-Blickenstaff-02
cont.

14 So I'd ask you to reevaluate the way you look at
15 mitigation. It's not just some kind of afterthought to the
16 old system of making more water for people. You should
17 think outside the box a little bit. So looking at this as
18 a restoration and storage project. Therefore, you have
19 equal bearing on protecting the heritage and the habitat
20 and serving your public interest.

I-Blickenstaff-03

21 MR. KERN: Thank you. Douglas Graber followed by
22 Mike Croll.

I-Graber

23 MR. GRABER: Good evening. My name is Douglas
24 Graver. I'm a resident of San Ramon, California.

25 Ten years ago, my daughter and I came down to the

I-Graber-01

1 outflow of Alameda Creek and demonstrated our interest in
2 restoring the salmon and steelhead to this creek. We were
3 hoping that we would be seeing migratory fish coming back
4 to San Ramon sooner than later.

5 It seems like this project doesn't have enough
6 interest in restoring the fish that were here before the
7 dams, before San Francisco starting messing up the creek,
8 and before everyone else put in their dams. It would be
9 really nice if more of this project was focused on
10 restoring the habitat and bringing back the migratory fish
11 that the creek used to support.

I-Graber-01
cont.

12 As far as I'm concerned, I think the fish are great
13 for education and are a great indicator of the quality of
14 the habitat, and the sooner we can get them back in the
15 creek the better. In my opinion, the EIR doesn't address
16 improving flows to help upstream migration or downstream
17 migration enough. I believe it should also have more
18 obstruction removal, not impedance for the fish. Thank
19 you.

I-Graber-02

20 MR. KERN: Thank you. Mike Croll followed by
21 Jessie Raeder.

I-OpEng3

22 MR. CROLL: I'm Mike Croll. I'm Business
23 Representative Operating Engineers Local 3.

24 This project has been on hold for 18 to 24 months.
25 For what reason? The project is fully funded. We have

I-OpEng3-01

1 about 25 percent unemployment in this area. Will all the
2 operating engineers please stand, please? All these people
3 could go to work tomorrow if this project would start
4 today, okay? This job could put hundreds of people to
5 work. That could help jump start the economy.

I-OpEng3-01
cont.

6 Stop holding labor hostage. Let us build this project
7 and build it now. You've got two years to four years to
8 decide what kind of water flow or fish ladders to build.

I-OpEng3-02

9 Let us build it and stop the potential disaster. We've all
10 read the papers. The dam was built a long time ago and
11 needs to be rebuilt and rebuilt fast.

I-OpEng3-03

12 If you give all the other agencies what they want,
13 they still won't be happy because the project will go
14 ahead. Remember the old saying, if you build it, the fish
15 will come.

16 MR. KERN: Jessie Raeder followed by Anne-Marie
17 Bakker.

I-TRT3

18 MS. RAEDER: Hi. My name is Jessie Raeder. I'm
19 here tonight representing several organizations. I work
20 for the Tuolumne River Trust. We're a member of the Bay
21 Area Water Stewards, a coalition of environmental groups
22 that have been meeting with the PUC about the water system
23 improvement program for several years. And I'm
24 representing the Salmon Egg Coalition, which is a group of
25 commercial fishermen, sports fishermen and fishwomen,

1 environmental groups and First Nations Tribes. As
2 residents of the Bay Area, most of us are all very
3 concerned that this project move forward as quickly as
4 possible.

I-TRT3-01

5 Speaking for BAWS, again, we've been meeting with the
6 PUC for years. We expressed a lot of concern over the
7 Environmental Impact Report for the entire project, but our
8 desire to have the project move quickly led us not to
9 challenge it, because we're happy enough with the project.

10 So we didn't challenge the EIR, even though we were very
11 concerned about the fisheries issues in the EIR. We're
12 very concerned again that future EIRs not be based on that
13 first one; that that was something that our environmental
14 groups were able to let pass because of the project. But
15 that's not necessarily always going to be the case.

16 I want to applaud that the PUC has agreed that they
17 need to provide flows for steelhead trout and not just
18 rainbow trout, and I'd like to urge you to back that up in
19 a meaningful way. The flow should be designed for
20 steelhead. What we have now are rainbow trout flows with
21 just a tiny bit added, but not designed around the life
22 cycle of steelhead. And that's really what we need to see.

I-TRT3-02

23 More water is going to be lost from the Calaveras
24 Reservoir due to evaporation than will be released by the
25 PUC for fish, so it's a fairly insignificant amount of

I-TRT3-03

1 water that we're talking about in terms of San Francisco's
2 water supply. My organization, the Tuolumne River Trust
3 and the Bay Area Water Stewards have been monitoring the
4 progress that the PUC has been making on ramping up their
5 water conservation and recycling programs. We're very
6 impressed with that, and we're convinced that the Bay Area
7 can meet its water supply needs and also comply with our
8 modern environmental laws.

I-TRT3-03
cont.

9 Finally, speaking on behalf of this Salmon Egg
10 Coalition, I'd like to ask that the EIR study the
11 possibility of putting a fish ladder in at Calaveras Dam
12 which would provide even more work for our union friends
13 here. And along the same lines, I'd like to ask that the
14 EIR study the possible removal of the Alameda Diversion Dam
15 or the building of a fish ladder at that dam as well,
16 which, again, could provide a lot more work and provide
17 significant serious mitigations for steelhead trout.

I-TRT3-04

I-TRT3-05

18 Finally, I'll just say that San Francisco's water
19 system can and should be operated in a sustainable manner,
20 and if the EIR is corrected and approved and the fisheries
21 issues really come up to snuff, then that can be the way
22 that this can be able to happen as soon as possible to meet
23 everyone's needs.

I-TRT3-06

24 So I hope that that can happen. Thank you for your
25 time.

1 MR. KERN: Thank you. Anne-Marie Bakker, followed
2 by Jan Green and Gary Smith. **I-NCCFFF1**

3 MS. BAKKER: I'm Anne-Marie Bakker, and I'm the
4 president of the Northern California Council of Federation
5 of Fly Fishers, and I'm also a member of Golden West
6 Women's Fly Fishers.

7 Cindy and Derrell and Corey have already talked a lot
8 about what we're done on Alameda Creek and some of the
9 projects that we've been working on. And we've been doing
10 this for many, many years. And so I just want to also add
11 my voice to the fact that we need to make sure that there's
12 adequate flows for the anadromous fish. We want to make
13 sure that it's a natural hydrograph as well to assure that
14 outflow for smelt as well as adequate waters for adult fish
15 and spawning.

I-NCCFFF1-01

16 I think a lot of the points that I made have already
17 been made, so I'll keep this really short. Thank you.

18 MR. KERN: Thank you. We appreciate that. Jan
19 Green and Gary Smith followed by Jeff Roy.

20 MR. SMITH: My name is Gary Smith.

21 MS. GREEN: Jan Green. **I-FFBC2**

22 MR. SMITH: We represent Fremont Freewheelers
23 Bicycle Club. We want to thank you for keeping Calaveras
24 Road open to cyclists on weekends during the project and
25 for keeping the cycling community informed of the plans.

I-FFBC2-01

1 We do have some concerns about the project as it
2 relates to safe cycling. We would ask that particular
3 attention be paid to the condition of the road before
4 weekend openings. This included making sure pot holes are
5 repaired and that the road is well-swept so that we can
6 eliminate any safety hazards for cyclists.

I-FFBC2-01
cont.

7 Also our club hosts an annual cycle touring event on a
8 Sunday in each April that usually attracts roughly 700
9 riders. So we'd ask that particular -- we're especially
10 concerned that the road be in good condition and clean for
11 when that happens.

I-FFBC3-02

12 Do you have anything to add?

I-FFBC3

13 MS. GREEN: I just want to say also that cyclists
14 fall because of many reasons, one of them also being gravel
15 and sand. So those are, coming downhill, is a cyclist's
16 worst enemy. So really just stressing again that it be
17 thought out and be safe because if there are large trucks
18 carrying those materials, we want to make sure the roads
19 are clean and safe. Our Primavera hosts about 700 riders
20 in the spring usually in April. We want to make sure that
21 they're are all safe as well.

I-FFBC3-01

22 So that's it. Thank you.

I-Roy

23 MR. KERN: Jeff Roy followed by Jeff Schrrer.

24 MR. ROY: Jeff Roy, a Pleasanton resident. I've
25 been distracted by some of the comments here I find

I-Roy-01

1 intriguing. I guess maybe I should do a little more
2 homework, but aren't the water flows federally mandated?
3 It's sort of a question I'd like to ask.

I-Roy-01
cont.

4 Also, I have a friend on the County Planning
5 Commission. You commented how the reservoir is 40 percent
6 full. I think that's pretty smart on your part. He claims
7 that if you lived in Sunol or Fremont you'd be highly
8 concerned about the Sunol Valley turning into a lake and
9 causing some harm.

I-Roy-02

10 I took a hike at Sunol Regional Park today with my dog
11 and I couldn't understand why my dog was going so
12 bazonkers. After a fresh rain she's just full of herself.
13 Finally come to the conclusion that whatever was within
14 10 feet of her nose was what she was going to focus on.

15 And what's within 10 feet of my nose right here is
16 there's 3,200 of my fellow union members out of work. And
17 I'm one of them. I've worked about four months this year.
18 I've been at the training center. There's a lot of highly
19 skilled people out of work which sometimes makes me feel
20 better; I'm not the only one.

I-Roy-03

21 I was hoping -- I guess my point is if you're close to
22 an agreement towards getting this project started, please
23 find a way to fast track your differences and get this ball
24 rolling. Thank you.

25 MR. KERN: Jim Schrrer followed by Ken Edgecombe.

I-GPFF

1 MR. SCHRRER: My name is Jim Schrrer, and I am the
2 conservation chair of the Grizzly Peak Fly Fishers. Our
3 club has about 75 members. We go all the way from San
4 Leandro to Marin, as far as our membership. I'm here
5 tonight to really express our club's desire to have our
6 wishes known about support of the Alameda Creek Alliance
7 and all the work they've done to restore the fish migration
8 at Alameda Creek.

9 I think an awful lot of the work has been done by
10 Alameda Creek Alliance to really restore what is perhaps
11 one of the best creeks in the Bay Area as far as getting
12 salmon and steelhead running up those creeks again. So on
13 behalf of our club, we'd like to urge the Commission to do
14 all they can to accommodate those fish passages and to
15 proceed. Again, we're all in favor of the efforts to
16 rebuild the dam, but we'd like to see more attention paid
17 to salmon and steelhead migrations. Thank you.

I-Edgecombe

18 MR. KERN: Thank you. Ken Edgecombe followed by
19 Jeff Miller.

20 MR. EDGECOMBE: Good evening. First thing I'd like
21 to talk about is the conception that construction workers
22 want to build at any cost. That's not the case, especially
23 in this case here. Obviously we know there's a large
24 unemployment rate, but the real necessity here is water
25 storage, and that's what everybody seems to be forgetting

I-GPFF-01

I-Edgecombe-01

1 about.

2 We built a lot of homes in the Bay Area over the last
3 couple of years, and we've got no new reservoirs to speak
4 of. Unless everybody else forgot about it, we just had an
5 earthquake on that fault just a couple of months ago. It's
6 a good thing it wasn't larger than it was because I think
7 it would have really got people's attention and maybe got
8 this thing going faster than we all think it can.

I-Edgecombe-01
cont.

9 I'm a fisherman so I have some sympathy of what these
10 guys are talking about. But I'm also a realist. I fished
11 the Russian River, for example, and there's two hatcheries
12 on that river, and there's still not a real sustainable
13 fishery in that river.

I-Edgecombe-02

14 We think that there's some middle ground that
15 everybody can reach, and hopefully we can get this project
16 going. We do think this is an environmentally responsible
17 Environmental Impact Report, and we hope we can get this
18 project going as soon as possible. Thank you.

I-Edgecombe-03

19 MR. KERN: Jeff Miller followed by Dan Reazer.

I-ACA3

20 MR. MILLER: Good evening. Jeff Miller. I'm
21 director of the Alameda Creek Alliance. We have over 1700
22 members in the Bay Area. As you can see tonight, Alameda
23 Creek is considered a regional asset by people not just in
24 the watershed but around the Bay Area. A lot of interest
25 in this creek. We have a very unique opportunity here to

1 restore a little bit of what was here before we screwed up
2 all the streams in the Bay Area.

3 Alameda Creek is quickly becoming a success story.
4 We've got many agencies downstream that have been working
5 for over a decade on fish passage projects. We're very
6 likely to have steelhead have access on their own to the
7 watershed by the time this dam is rebuilt.

I-ACA3-01

8 I first want to start off thanking the Planning
9 Department and the PUC for having this extra hearing.

10 Obviously the people in Sunol are very interested in this
11 creek. I also want to just address, make it very clear
12 that we do support rebuilding this dam. It's probably
13 going to improve conditions for not just fishing the
14 reservoir but fish downstream in terms of water
15 temperature, in terms of amount of water, in terms of
16 oxygen, water quality, et cetera. So rebuilding this dam
17 is important.

I-ACA3-02

18 The issue here really, and where we're getting hung
19 up, is this project also includes how the water system is
20 going to be operated after the dam is rebuilt. And there's
21 two dams that are going to be operated, the Diversion Dam
22 and the Calaveras Dam.

I-ACA3-03

23 What we have now is an improvement over what was
24 proposed in the Programmatic EIR. But if you start with a
25 low baseline, it's pretty easy to improve. The flow

1 schedule we have now really is aimed at resident rainbow
2 trout. The flow schedules are not, we don't think,
3 compatible with a self-sustaining steelhead run.

I-ACA3-03
cont.

4 We actually asked the PUC to include steelhead
5 restoration as one of the goals of the project. We started
6 making these comments back in 2005 during scoping. That
7 would have avoided a lot of the conflicts we are getting
8 into if steelhead was actually one of the goals and had
9 equal footing with the water reliability.

I-ACA3-04

10 We sent in a letter today that came from 46 Bay Area
11 conservation and fly fishing groups outlining some of the
12 issues we have with the EIR. We'll be submitting more
13 detailed comments this week.

14 Suffice it to say that we've been working a long time
15 with the PUC on this project. Like I said, things have
16 improved, but we still got a ways to go. We'd like to see
17 this project move forward quickly, so please meet with us
18 and please try to address some of these issues before the
19 Final EIR is certified. Thanks.

20 MR. KERN: Thank you. Dan Reazer followed by Mark
21 Lynn.

I-Reazer

22 MR. REAZER: Hello. My name is Dan Reazer. I'm a
23 resident of Sunol town, a citizen of the Mt. Diablo Mt.
24 Hamilton watershed, which includes your lands. I worked
25 with the East Bay Regional Park for several decades, right

1 next door to you, managing trail leases and so forth. So
2 I'm fairly familiar with your ground and so forth. I
3 compliment you on a lot of your work. It's well done.

4 Most of the EIRs I've seen, and this one is included,
5 seem more like they're designed to confuse than clarify
6 issues. I think it's amazing to see how much progress has
7 been made in the western United States to restore fish
8 habitats. One of the things that really amazes me is that
9 no one here in this room so far is wanting to remove your
10 dam. That's happening all over the Klamath River and the
11 Columbia River.

I-Reazer-01

12 I don't want you to remove your dam. I drink your
13 water. I like it, and I want you to do well with your
14 system. I know you're facing difficult climate issues with
15 water supply in the Sierra and so forth, and you've got big
16 problems to face in terms of supply, but having read a
17 considerable amount of history in the Bay Area prior to and
18 during and currently, there were historically runs of
19 several different salmon species, steelhead, possibly even
20 sturgeon, in Alameda Creek. And your EIR does not look at
21 history at all as important as far as I'm concerned.

I-Reazer-02

22 You have a moral obligation, in my opinion, to look at
23 that history and realize that you need to work to restore
24 steelhead at least and salmon to Alameda Creek and the
25 other creeks in the region as well. I think Arroyo Hondo

1 above Calaveras Reservoir where your current steelhead
2 population are trapped in Calaveras Reservoir and spawned
3 today -- I think we should open that up.

I-Reazer-02
cont.

4 You have federal and state and local requirements that
5 I don't think you're addressing very well in terms of water
6 flow. I know that water flow is going to be a big issue in
7 the future with population changes and weather changes. I
8 wonder if you couldn't establish a recreational fishing
9 system that might help recoup some of the revenue lost from
10 possible water flow increases.

I-Reazer-03

11 I would like to see you put passage facilities on the
12 new Calaveras Dam. I see you've got them drawn in on your
13 proposal picture there. You have a fish ladder going up
14 the backside of the dam. (Turning to audience.) These guys
15 would be good at building, I know. Give them some work.

I-Reazer-04

16 Take the lead on restoring anadromous fish to the
17 area. You brought this property back at the turn of the
18 century for a song, getting our treasure, the water, as
19 part of the deal. There's nothing illegal about that or
20 immoral. But you have, I believe, an obligation to restore
21 those fish that were here when you got here.

I-Reazer-05

22 I appreciate being able to speak. Thank you.

23 MR. KERN: Thank you. Mark Lynn followed by
24 Richard Sanderell.

I-Lynn

25 MR. LYNN: Hi. Mark Lynn. I live in Sacramento.

1 I actually grew up in this area, in the early 70s. A
2 friend of mine and I, we'd go out and hang around Alameda
3 Creek and enjoy the rock quarries before all the fences and
4 No Trespassing signs came in.

5 I saw my first steelhead trout when I was seven years
6 old in 1972. It was sitting there suffocating in a
7 stagnant pool of water because a big buffer dam wasn't
8 allowing enough water for it to swim and breathe. So we
9 took it out of one pond and put it in a larger one.

10 Time went on. I went to Humboldt State University.
11 Got a degree in natural resources. Worked for the
12 Department of Fish and Game and the US Forest Service, the
13 National Park Service, Metropolitan Water District under
14 the mitigation project, in which they went way above and
15 beyond and set aside 12,000 acres instead of the required
16 8,000 as a mitigation for the building of what would be
17 Diamond Valley Lake. Later I came home to my parent's
18 house and saw EBMUD talking about restoration of steelhead
19 on the Alameda County Creek and I thought, "Wow, what a
20 great thing." I e-mailed Jeff Miller and found out about
21 the Alameda Creek Restoration Alliance.

22 If people knew, they would care and they would be
23 here. Unfortunately, there's not a lot of folks whose
24 lives are centered around steelhead trout. But it's good
25 to see that there is a lot of support here for this.

I-Lynn-01

1 In what I've read, it doesn't seem that your
2 Environmental Impact Report substantially addresses the
3 concerns and needs for anadromous fish. They're not the
4 same as rainbow trout. So hopefully you will act in good
5 faith and make a concerted effort to restore the steelhead
6 and salmon to the creek. It's a part of our heritage that
7 I don't want to see gone. It would be nice to be able to
8 have future generations go to places like Thornton Avenue
9 and Niles Canyon and actually see these fish thriving as
10 they once did. Thanks a lot.

I-Lynn-01
cont.

11 MR. KERN: Thank you. Richard Sanderell followed
12 by Robert Means. **I-Sanderell**

13 MR. SANDERELL: Yes. My name is Richard Sanderell,
14 and I work with Visions of the Future Environment. I want
15 to say I agree pretty much with everything I've heard
16 tonight, so I'm not going to repeat that. But I do want to
17 say one thing. We do live on Ohlone land, and it would be
18 awfully nice to see the Ohlone people here tonight speaking
19 for this issue.

20 I know that Indian people have always said that before
21 the white man came and when the white man came here, that
22 they could walk across the rivers on the backs of salmon.
23 That's how plentiful the fish were.

I-Sanderell-01

24 It seems me that something has gone terribly wrong.
25 Now we hardly have any fish in our streams. There's been a

1 lot of things given away and given and given. I think at
2 this point there's not much more to give, and what we have
3 to do is give back, and to give back is to make sure
4 there's enough water flow so that the fish can come back.

I-Sanderell-01
cont.

5 Up in Shasta, the Shasta Dam has blocked three rivers,
6 Upper Sacramento, the McCloud and the Pit River. Those
7 rivers now are essentially dead. There's no fish. This is
8 not something I want to see happen here. We want to bring
9 fish back up there as well.

10 As I said, there's a reason why this is happening.
11 It's because we have not paid attention to nature. We have
12 not paid attention to the native people because the native
13 people were the ones who could teach us how to bring the
14 fish back. But we're too arrogant. We think our way is
15 the only way when in fact it is not. We must start paying
16 attention, not just to one group. We need to hear all the
17 groups and to bring that fish back is very important.

I-Sanderell-02

18 As I said, we can keep building, and we can keep
19 building. I know there are a lot of people who need work.
20 But I think as a society we can come together and start
21 figuring this out, seriously, about how we can help each
22 other. I don't want just to see the salmon come back and
23 see people starve.

24 Fish that we grow in hatcheries are some of the worst
25 fish we can be eating. It grows in its own feces. We use

1 antibiotics and pesticides on them. We feed them things
2 that they do not eat in the environment. They lack the
3 Omega 3 because of that. And I think restoring the
4 waterways to our fish is a better way to go. It's
5 healthier for us as human beings to eat, and we should be
6 able to figure this thing out and keep things in balance
7 because right now we're just out of balance.

8 So I hope that you take these words and all the words
9 of the people here tonight seriously. Thank you.

10 MR. KERN: Thank you. Robert Means followed by
11 Gary Sargent. **I-Means**

12 MR. MEANS: Robert Means, 1421 Yellowstone,
13 Milpitas, California. I'm down here because -- well,
14 basically I'm here to help the fishies as my wife put it.

15 As a number of speakers have said here, there's some
16 history. We as humans have disrupted the natural balance
17 here. And it's become a moral issue. Just like dealing
18 with climate change or with climate collapse, it's a moral
19 issue. And we really need to bring our society back into
20 balance with the natural society around us.

21 I'm here on behalf of the fishies so that you guys
22 provide enough water so that we really can restore -- which
23 is the fourth R of reduce, recycle and reuse. The fourth
24 one is restoration. This plan seems to be weak in that
25 area. Please make it stronger.

I-Sanderell-02
cont.

I-Means-01

1 MR. KERN: Our final speaker card is Gary Sargent.
2 I-Sargent

3 MR. SARGENT: Good evening. Let's see. A lot of
4 people here grew up in the area. I didn't. I grew up in
5 Maine on the other side. We have a very similar situation
6 there. I grew up on one of the last remaining three
7 Atlantic salmon rivers in the United States where there
8 hasn't been any fishing since about the time that I left in
9 '66.

10 Now, in the San Francisco Bay -- San Francisco having
11 been my second home where I lived for 35 years, so I kind
12 of have a stake in this issue, and not a salmon steak.
13 Right around the time of the Gold Rush, the salmon fishing
14 industry became one of several biggest industries out of
15 San Francisco Bay. It was a huge industry here for a long
16 time. It continued to be a very thriving industry.
17 Billions of dollars and probably upwards of hundreds of
18 thousands of people working in it until about 10 or 15
19 years ago.

20 All the canneries are gone, of course. That's a long
21 time ago. In the last two years, there has not been any --
22 as you are aware -- there has been no salmon fishing on the
23 United States West Coast south of Alaska other than some
24 tribal fishery. It's a rough situation, a rough economic
25 situation, and it reflects an ecological situation.

I have a very strong feeling for the salmon as I have

I-Sargent-01

1 been connected with them on both coasts. I worked in the
2 forest restoration field here and realized the close
3 connection between the forest and the salmon, and now I'm
4 at Humboldt State finishing up a degree -- I mean, I was at
5 Humboldt State. Now I'm at Cal State East Bay working on
6 the steelhead and other salmon fisheries in the Bay Area on
7 restoration in particular and watershed issues and salmon
8 streams.

9 It's clear that Alameda Creek is the best candidate
10 for restoration of the salmon runs in the San Francisco Bay
11 proper. And I realize that San Francisco, my second home
12 in the city, has been talking and working to promote the
13 continued existence of steelhead in the creek for ten years
14 now. I hope you guys don't ruin that by proceeding with
15 this rather flawed Environmental Impact study.

I-Sargent-02

16 Go back. Take a look at it. Find a way to provide
17 some decent flows for the fish because steelhead have to
18 come back, and they have to come back in Alameda Creek, and
19 the only way they can do it is if you provide more water
20 for them.

21 Yes, we need the dam. I'm glad you're doing it. I
22 just hope you do it right. Get it right the first time.
23 There are laws involved. State and federal.

I-Sargent-03

24 MR. KERN: Thank you. Thank you for everybody who
25 attended the meeting tonight and for your comments. Have a

1 a good evening.

2 (Whereupon, the hearing adjourned at
3 7:55 p.m.)

4 ---o0o---

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

REPORTER'S CERTIFICATE

I, JUDITH L. LARRABEE, a Hearing Shorthand Reporter in the State of California duly authorized to administer oaths, hereby certify:

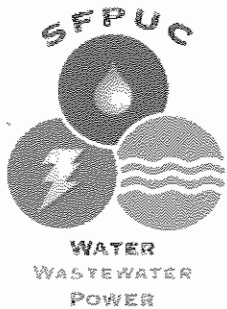
That the proceedings therein were taken down in shorthand by me, a disinterested person, at the time and place therein stated, that the proceedings were thereafter reduced to typewriting, by computer, under my direction and supervision, and that the foregoing is a full, true and correct transcript of the proceedings therein to the best of my ability.

IN WITNESS WHEREOF, I have hereunto set my hand on this 22nd day of December, 2009.

Judith Larrabee, Shorthand Reporter

Appendix N

Proposed Instream Flow Schedules and Adaptive Management Implementation Plan



SAN FRANCISCO PUBLIC UTILITIES COMMISSION

OFFICE OF THE ASSISTANT GENERAL MANAGER, WATER
1155 Market Street, 11th Floor, San Francisco, CA 94103 • Tel. (415) 934-5736



July 16, 2010

Ms. Jane Hicks
Regulatory Branch Chief
U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398

Subject: Calaveras Dam Replacement Project, Project Updates, Alameda and Santa Clara Counties, California; Corps File No. 29979S

Dear Ms. Hicks:

The San Francisco Public Utilities Commission (SFPUC) is pleased to provide you with the enclosed documents for the Calaveras Dam Replacement Project (CDRP): Final Proposed Instream Flow Schedules to be included in the Calaveras Dam Replacement Project Biological Assessments, and the Adaptive Management and Implementation Plan (AMIP). Note that this material supersedes the description of the minimum release schedule and monitoring plans in the Biological Assessment (September 30, 2009).

Over the past several months, staff from SFPUC, National Marine Fisheries Service (NMFS), and California Department of Fish and Game (CDFG) have been working in close coordination regarding the Section 7 review process for CDRP. This coordination has resulted in refinements to the proposed action and to the proposed operation of the facilities after construction is completed. This letter summarizes the most recent Section 7 coordination, updates to the proposed action based on this coordination, and documents the agreement reached by the SFPUC, NMFS, and CDFG on the minimum flow schedules from Calaveras Dam and the Alameda Creek Diversion Dam.

The SFPUC proposed a revised instream flow schedule in March 2009 to address habitat needs for steelhead and other native aquatic species in Alameda Creek. Working meetings were held in November 2009 and in February and March 2010 to address the proposed instream flows required to meet steelhead life stage requirements. To address the inherent uncertainties associated with these actions, the SFPUC prepared and submitted a draft Adaptive Management Implementation Plan (AMIP) in March 2010. The AMIP was updated with significant project modifications, revisions to the instream flow releases, and monitoring plans based on additional working meetings in April, May and June 2010 and agency comments on the AMIP. The proposed revisions focus on the habitat needed to support efforts to restore steelhead in the southern Alameda Creek watershed.

GAVIN NEWSOM
MAYOR

F.X. CROWLEY
PRESIDENT

FRANCESCA VIOTOR
VICE PRESIDENT

ANN MOLLER CAEN
COMMISSIONER

JULIET ELLIS
COMMISSIONER

ANSON B. MORAN
COMMISSIONER

ED HARRINGTON
GENERAL MANAGER

Several important updates have been made to CDRP as summarized here and detailed in the attached AMIP:

- SFPUC commits to construct a fish ladder at the existing Alameda Creek Diversion Dam.
- SFPUC commits to construct and maintain fish screens at the intake facilities at Calaveras Reservoir and at the ACDD.
- SFPUC commits to a maximum diversion rate of 370 cubic feet per second (cfs) at ACDD, reduced from the 1931 design capacity of 650 cfs.
- SFPUC commits to a flow schedule(s) that would improve flows for steelhead migration, spawning, and rearing. Specific changes include bypass flows from ACDD, a reduced period of diversion from ACDD, and more consistent releases from Calaveras Dam during the spawning and rearing periods. Flow compliance would be monitored immediately below Calaveras Dam and below ACDD rather than at the downstream confluence of Calaveras and Alameda creeks (as previously proposed).
- SFPUC commits to fund further assessment, design, and implementation of the future modification of waterfalls in the Little Yosemite reach to improve passage conditions for adults moving upstream.

The Biological Assessment submitted to the USACE on September 30, 2009 is updated as follows:

- Section 3.3.1 (Existing Dam) is updated by the addition of proposed fish screens on adits 1 and 2 as proposed in the AMIP.
- Section 3.5.2 (Alameda Creek Diversion Dam Bypass) now includes installation of screens and ladders as described in the AMIP.
- Sections 3.6.1-2 (Changes in Reservoir Operations and Fisheries Releases) is updated by the July 16, 2010 memo, which supersedes the March 2009 memo, regarding instream flow schedules to be included in the CDRP Biological Assessments.
- Section 3.7.1 (Fisheries Conservation Measures) is updated to include the additional conservation measures and monitoring included in the AMIP.

A supplement to the USACE individual permit application for the CDRP will be submitted separately.

Ms. Jane Hicks
Calaveras Dam Replacement Project, Project Updates, Alameda and
Santa Clara Counties, California; Corps File No. 29979S
July 16, 2010
Page 3 of 3

As we discussed with NMFS over the last few months, these commitments will allow the Section 7 consultation to be completed quickly, and NMFS has agreed to provide a Biological Opinion no later than August 20, 2010.

The SFPUC appreciates your participation and ongoing assistance with CDRP. If you have any questions about the technical memorandum, please contact Tim Ramirez at (415) 554-3265.

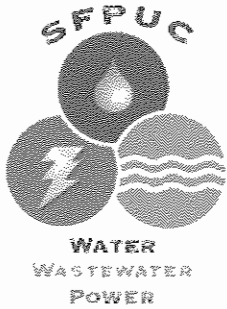
Sincerely,



Steven R. Ritchie
Assistant General Manager
Water Enterprise

Enclosures: 1. CDRP Adaptive Management and Implementation Plan
2. Final Instream Flow Schedules to be included in the Calaveras Dam
Replacement Project Biological Assessments

cc: Bob Smith, USACE
Dick Butler, NMFS
Gary Stern, NMFS
Josh Fuller, NMFS
Chuck Armor, CDFG
Greg Martinelli, CDFG
Wes Stokes, CDFG
Tim Ramirez, SFPUC
Craig Freeman, SFPUC
Daniel Wade, SFPUC
Steve Leach, URS



SAN FRANCISCO PUBLIC UTILITIES COMMISSION

OFFICE OF THE ASSISTANT GENERAL MANAGER, WATER
1155 Market Street, 11th Floor, San Francisco, CA 94103 • Tel. (415) 934-5736



July 16, 2010

To: Harlan Kelly, Assistant General Manager, Infrastructure Division
Julie Labonte, Water System Improvement Program Director

Thru: Michael Carlin, Deputy General Manager

From: Steven R. Ritchie, Assistant General Manager for Water

Re: Final Instream Flow Schedules to be included in the Calaveras Dam
Replacement Project Biological Assessment

GAVIN NEWSOM
MAYOR

F.X. CROWLEY
PRESIDENT

FRANCESCA VIOTOR
VICE PRESIDENT

ANN MOLLER CAEN
COMMISSIONER

JULIET ELLIS
COMMISSIONER

ANSON B. MORAN
COMMISSIONER

ED HARRINGTON
GENERAL MANAGER

The Water Enterprise proposes the following instream flow schedules for Calaveras Dam and the Alameda Creek Diversion Dam (ACDD). These revised schedules supersede the previous instream flow release proposal described in the March 13, 2009 memo. The instream flow schedules described below have been agreed to by the National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG), and will be considered in the environmental review of the Calaveras Dam Replacement Project (CDRP).

Instream Flow Objectives and Background

The revised instream flow schedules were developed based on input from the National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG). The objectives of the proposed instream flow schedules is to maintain and enhance fish habitats downstream of the ACDD and Calaveras Dam for resident trout and other native species, including Central California Coast steelhead when they are restored to the watershed. The instream flow schedules described here supersede the flows previously described in the 1997 MOU with CDFG and those described in the September 2009 Biological Assessment (based on the March 13, 2009 memo).

Final Instream Flow Schedules

The proposed instream flows would be maintained at two compliance points:

- The existing USGS gage below the replacement Calaveras Dam, and
- A new stream flow gage below ACDD.

Flows below the replacement Calaveras Dam would be released from the proposed low-flow valves that would be installed for this purpose.¹ Currently, there are no

¹ Additional detail regarding the outlet works and the new low flow valves is provided in the August 2009 Outlet Works Technical Memorandum prepared by SFPUC.

regularly scheduled releases to Calaveras Creek with the exception of periodic testing of the cone valve. There is some seepage through the dam and through the geologic formations under and around the dam. Releases occur when it is necessary to lower the reservoir level to accommodate inflow during the winter and spring rainy seasons, and for occasional maintenance. Under these operating conditions, the year-round flow in Calaveras Creek immediately below Calaveras Reservoir is about 0.5 cfs (1 AF per day).

After completion of the CDRP, the SFPUC would provide releases from Calaveras Dam to meet flow objectives described below. In order to develop instream flow schedules that partially reflect watershed hydrologic conditions, a water-year classification was developed based upon monthly cumulative flows over 26 years of record at the USGS gage on the Arroyo Hondo (USGS 11173200), an unregulated tributary upstream of Calaveras Reservoir.

Cumulative monthly stream flows at the Arroyo Hondo gage were ranked as exceedance probabilities, and then divided into two water-year types:

- “normal/wet” (0-60% exceedance probability), and
- “dry” (>60% exceedance probability)

Each water year begins October 1st and ends September 30th. The use of monthly cumulative flow in the water-year type classification allows the instream flows to change from one water-year type to another within a hydrologic year depending on cumulative monthly runoff totals, as determined on December 29 and April 30 from the Arroyo Hondo gage. The cumulative runoff totals from October 1 to December 29 determine the instream flow schedule for January 1 to April 30. Similarly, cumulative runoff totals from October 1 to April 30 determine the instream flow schedule from May 1 to September 30. Using this classification, it is expected that any month would be classified as a dry month 4 times out of every 10 years and normal/wet six times during the same 10 year period.

Table 1 summarizes the schedule for flow releases from Calaveras Dam after the low flow valves are operational.

Table 1. Summary of the proposed instream flow schedules below Calaveras Dam.

Flow Schedule Decision Date	Flow Schedule Application period	Dry (Schedule B)		Normal/Wet (Schedule A)	
		Cumulative Arroyo Hondo flows for water year classification (MG) ¹	Flow release (cfs)	Cumulative Arroyo Hondo flows for water year classification (MG)	Flow release (cfs)
N/A	October	N/A	7	N/A	7 ²
N/A	Nov.01 – Dec. 31	N/A	5	N/A	5
Dec. 29	Jan. 01 – Apr.30	≤ 360	10 ²	> 360	12 ²
April 30	May 01 – Sept. 30	≤ 7,246	7	> 7,246	12
<i>Notes:</i> ¹ MG = million gallons ² Flows would be ramped as shown in the daily schedule in Table 2.					

The SFPUC will construct a bypass tunnel, fish ladder and fish screens at ACDD to provide downstream flows for fishes and fisheries-related habitat, prevent the entrainment of fishes at the diversion tunnel, and afford volitional upstream and downstream passage for fishes at ACDD. The ACDD bypass tunnel would be the primary means of providing flows directly below the ACDD; however, flows would also be bypassed at ACDD via the proposed fish ladder.

The SFPUC proposes to reduce the maximum diversions at the ACDD from 650 cfs to 370 cfs. In addition, the following schedule for minimum bypasses and diversions would be implemented upon completion of construction:

- No diversion from April 1 to November 30 (unimpaired)
- Diversion of up to 370 cfs from December 1 to March 31
- Minimum flow of 30 cfs immediately below ACDD during the diversion period from December 1 to March 31 when water is present in Alameda Creek above the diversion dam. Water would be bypassed using the new bypass tunnel, the fish ladder and/or across the dam crest.

The proposed releases/bypasses listed above are consistent with, and exceed the SFPUC WSIP Final Programmatic EIR mitigation measure 5.4.5-3a, which provides a bypass of up to 10 cfs downstream of the ACDD from December 1 to April 30 when sufficient stream flow is generated by precipitation events. All flows in upper Alameda Creek are natural, that is, there is no storage facility above the

ACDD and the ACDD itself provides no storage of note. Thus, the proposed bypass flows would only be provided when water is available in upper Alameda Creek. Implementation of the proposed bypass flows at ACDD will improve spawning habitat for resident trout and future steelhead and provide a more natural baseflow hydrology on approximately 16,000 linear feet of habitat on Alameda Creek above the confluence with Calaveras Creek.

Natural flows in Alameda Creek downstream of its confluence with Calaveras Creek are relatively low during summer and early fall, with reaches often drying up entirely and the available water often not cold enough to meet salmonid minimum temperature requirements. In order to improve these conditions, summer flows will be provided by releases from Calaveras Dam. Water releases from Calaveras Dam during this period would be approximately 15 degrees Celsius (°C) or less. The objective of the low temperature releases would be to maintain rearing habitat in Alameda Creek below the confluence as described in the Adaptive Management Implementation Plan.

Figure 1 illustrates the proposed flow release schedules as described above.

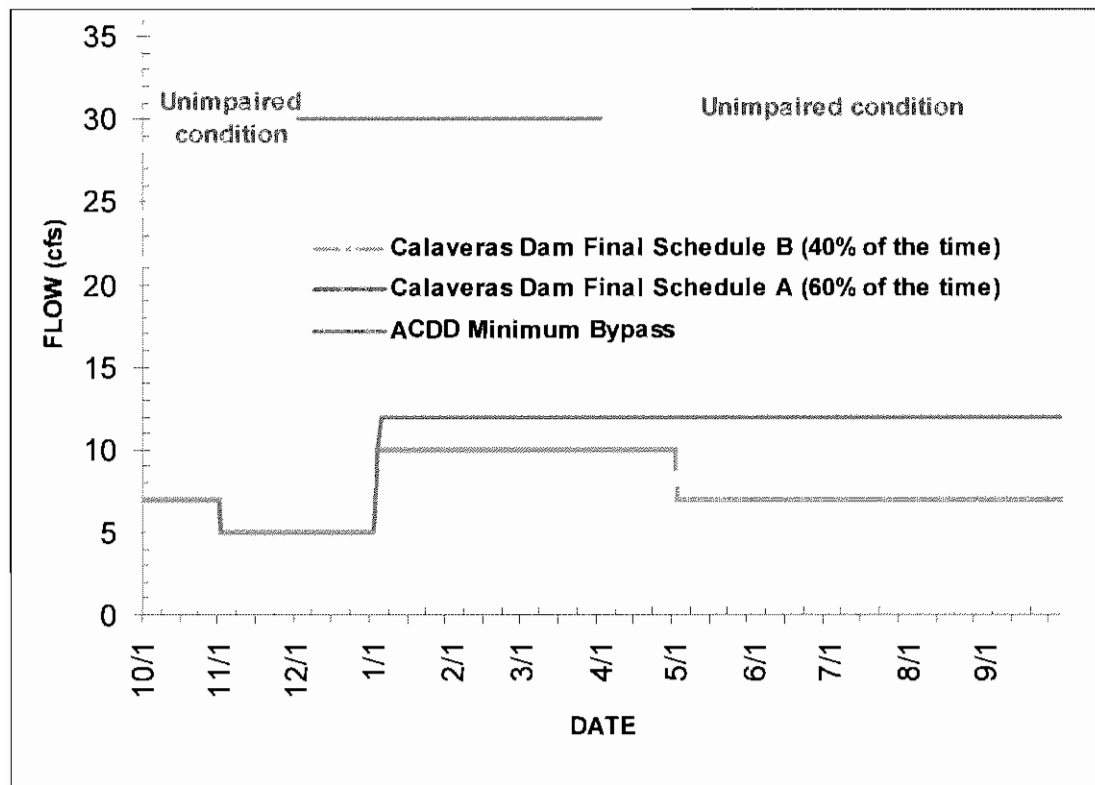


Figure 1. Hydrographs illustrating the minimum instream flow release schedules for Calaveras Dam and bypasses at ACDD.

Table 2. Ramping of proposed instream flows below Calaveras Dam.

Dates	Dry¹ (Schedule B)	Normal/Wet² (Schedule A)
10/1-10/2	7	9 (ramping down)
10/3 to 10/31	7	7
11/1 to 12/29	5	5
12/30	5	7 (ramping up)
12/31	7 (ramping up)	10 (ramping up)
1/1 to 3/31	10	12
4/1 to 4/30	10	12
5/1 to 9/30	7	12

Notes:
¹ The threshold value for dry (Schedule B) and normal/wet years (Schedule A) is 60 percent exceedance probability. 60 percent of the time, cumulative flows in Arroyo Hondo would be higher than the dry year thresholds identified in Table 1. The “dry” schedule would apply to 40 percent of all months.
² Normal/wet schedule would apply to 60 percent of all months.

Please contact Tim Ramirez at (415) 554-3265 or at tramirez@sfgwater.org if you have any questions or comments regarding the proposed flow release schedule described above.

cc: Ellen Levin, SFPUC
 Tim Ramirez, SFPUC
 David Briggs, SFPUC
 Brian Sak, SFPUC
 Dan Wade, SFPUC
 Craig Freeman, SFPUC
 Kelley Capone, SFPUC

CALAVERAS DAM REPLACEMENT PROJECT ADAPTIVE MANAGEMENT IMPLEMENTATION PLAN FOR CENTRAL CALIFORNIA COAST STEELHEAD

1 INTRODUCTION

This chapter provides a discussion on the project background, the purpose of the adaptive management implementation plan (AMIP), the approach for the AMIP process, and key uncertainties to be resolved.

1.1 PROJECT BACKGROUND

The San Francisco Public Utilities Commission (SFPUC) is undertaking the Calaveras Dam Replacement Project (CDRP or proposed action) to comply with California Department of Water Resources, Division of Safety of Dams (DSOD) requirements related to seismic stability, and to restore reservoir storage operations to provide water supply to its customers. Calaveras Reservoir has been held below its historic storage since 2001 under restrictions specified by the DSOD because of the vulnerability of the dam to failure in a large potential earthquake. The CDRP would replace the existing Calaveras Dam on Calaveras Creek and restore maximum pool elevations to those existing prior to 2001, when DSOD restrictions were implemented. The proposed action includes restoring Calaveras Reservoir to historic pool elevations (normal elevation of 756 feet), resuming routine flow diversions at the Alameda Creek Diversion Dam (ACDD), and implementing minimum flow releases and/or bypasses for environmental purposes. Additional measures, including a fish screen and ladder at the Alameda Creek Diversion Dam, fish screens on the lower two adits at Calaveras Dam, water quality best management practices, and enhancements to provide suitable habitat conditions for fish communities in the portions of the southern Alameda Creek Watershed potentially affected by the proposed project, are also proposed by the SFPUC.

The SFPUC is requesting authorization from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act for the discharge of dredged or fill materials into waters of the United States that could result from implementation of the CDRP. In April 2008, the SFPUC requested that the USACE consider initiating formal consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) for Central California Coastal steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) to ensure that the project would not preclude the future recovery of steelhead to the Alameda Creek Watershed. A biological assessment (BA) was prepared in accordance with Section 7 of the Endangered Species Act (ESA), (16 USC 1536[c]) as amended, to evaluate whether the proposed project could affect federally listed threatened or endangered anadromous fish species and their designated critical habitat under the jurisdiction of the NMFS (SFPUC 2009). The BA also evaluates the effects of the proposed action on Essential Fish Habitat (EFH) for Pacific salmon, consistent with the

requirements of the Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 U.S.C. 1801 et seq.).

The species addressed in the BA and EFH assessment are:

- < Central California Coast (CCC) steelhead DPS (federally listed as threatened); and
- < Central Valley fall- and late fall-run Chinook salmon evolutionary significant unit (ESU) (*O. tshawytscha*) (federal and state species of concern, Pacific salmon covered under EFH).

Central California Coast coho salmon (*Oncorhynchus kisutch*) ESU (federally and state listed as endangered) do not occur in the action area and therefore are not addressed in the BA. Chinook salmon are occasionally observed below the Bay Area Rapid Transit (BART) weir but are not able to pass it. Designated EFH for Pacific salmon occurs in Alameda Creek only downstream of the BART weir, a complete and long-standing barrier to upstream fish migration in lower Alameda Creek. Critical habitat for CCC steelhead does not occur in the action area.

Evaluation of potential effects on a future CCC steelhead DPS population unit which could result from the proposed action are made by considering the potential project-related effects on a functioning condition of habitat primary constituent elements (PCEs) for steelhead in the action area (i.e., freshwater PCEs) (70 FR 52488; September 2, 2005).

The PCE approach allows for evaluation of a future steelhead population unit given that one does not currently exist. Furthermore, while the Alameda Creek Watershed is not currently designated as critical habitat for CCC steelhead DPS, this approach to the analysis in the BA allows for an evaluation of project effects on critical habitat in the primary and extended study areas, assuming that these areas are likely to be designated as critical habitat once downstream passage barriers have been remedied.

The BA determines that direct effects to CCC steelhead are currently unlikely because the species can only access habitat below the BART weir in Alameda Creek, approximately 16.5 miles downstream of the project construction site, and because of avoidance and minimization measures included in the proposed action. However, steelhead access to upper Alameda Creek will be restored in the future; therefore, potential effects of the proposed action to CCC steelhead are discussed in this BA associated with a future condition when steelhead are present in the upper watershed. Accordingly, the BA addresses the following scenarios:

1. The potential effects of the proposed action to CCC steelhead under the current baseline condition (i.e., fish passage barriers exist downstream and no steelhead presence in the watershed); and

2. The potential effects of the proposed action to CCC steelhead with potential future projects that would require federal approval (i.e., fish passage is restored and steelhead have potential to occur in the watershed).

Table 1.1 summarizes the potential effects of the proposed action to CCC steelhead for both scenarios identified in the BA.

Table 1.1: Summary of Potential Effects of the Proposed Action

Effects / Locations	Species Status	Effect Conclusion	Mechanism
Effects of the Proposed Action under the Baseline Condition			
Construction-Related Effects (Primary Study Area)	CCC steelhead are not present in Primary Study Area	No Effect	Not present
Construction-Related Effects (Extended Study Area)	CCC steelhead are present downstream of BART weir	Not Likely to Adversely Affect	Avoidance and minimization measures, distance downstream from construction activities
Operations-Related Effects (Primary Study Area)	CCC steelhead are not present in Primary Study Area	No Effect	Not present
Operations-Related Effects (Extended Study Area)	CCC steelhead are present downstream of BART weir	Not Likely to Adversely Affect	Proposed action will have indiscernible effect on highly modified and degraded habitat conditions below BART weir
Effects of the Proposed Action with Potential Future Projects that would require Federal Approval			
Construction-Related Effects (Primary Study Area)	CCC steelhead are present in Primary Study Area	Could result in Adverse Effect Incidental take permit would be required	Bypass of flows at ACDD may contribute flow to extended study area during winter months; flow releases with suitable cold water may not be feasible during two summer rearing periods when CDRP construction is being implemented
Construction-Related Effects (Extended Study Area)	CCC steelhead are present throughout Extended Study Area	Not Likely to Adversely Affect	Bypass of flows at ACDD may contribute flow to extended study area during winter months; summer rearing habitat functions would remain limited
Operations-Related Effects (Primary Study Area)	CCC steelhead are present in Primary Study Area	Potential to Adversely Affect	Habitat conditions would generally be improved compared to the baseline with implementation of project flow releases and avoidance and minimization measures. Further, the project is expected to provide functioning habitat primary constituent elements (PCEs) for steelhead in the action area (i.e., freshwater PCEs) (70 FR 52488; September 2, 2005), which include migration (immigration and emigration), spawning (including egg incubation), and rearing. The provision of functioning habitat PCEs would, in turn, be expected to contribute to recovery of steelhead in the Alameda Creek Watershed. However, due to uncertainties associated with the current absence of a steelhead population in the watershed and the future habitat conditions with potential future projects, it is possible that the proposed conservation measures would not be fully sufficient to avoid potential adverse affects to ESA-listed steelhead, when they gain access to the watershed. Because of these uncertainties, the SFPUC is requesting incidental take coverage for potential operations-related effects to steelhead.
Operations-Related Effects (Extended Study Area)	CCC steelhead are present in Extended Study Area	Not Likely to Adversely Affect	Project-related changes to flow conditions in extended study area would be relatively small; changes to habitat functions would be indiscernible

1.2 PURPOSE OF THE ADAPTIVE MANAGEMENT IMPLEMENTATION PLAN

This AMIP commits the SFPUC to a management strategy that will support steelhead in the southern Alameda Creek Watershed. Actions taken under this management strategy will include minimum water releases from Calaveras Dam, restricted diversions and minimum bypasses at the Alameda Creek Diversion Dam (ACDD) to support aquatic ecosystems and native species, installation of fish protection screens and low flow release valves at Calaveras Dam, installation of fish protection screens and a flow bypass facility at the ACDD, and the construction of a fish ladder around the ACDD. The purpose of the management strategy is to achieve specific AMIP goals that act to support broader species level goals within the entire watershed. These AMIP and broader goals are described below.

The SFPUC and NMFS (and USFWS and CDFG) are also working together to develop, approve, and implement the SFPUC Alameda Watershed Habitat Conservation Plan (HCP). While the actions described in the CDRP BA and this AMIP are not dependent on the HCP being implemented, both the SFPUC and NMFS recognize the value of the long-term framework provided by the HCP, and intend to incorporate and update as appropriate the measures described in the CDRP BA and AMIP into the HCP, which is currently scheduled to be adopted in 2012.

AMIP GOALS

Short Term:

- < Improve habitat conditions in the southern Alameda Creek Watershed for steelhead. Habitat conditions will be improved by providing flows downstream of the Alameda Creek Diversion Dam and Calaveras Dam for: (1) the upstream and downstream migration of adults; (2) spawning during the winter; (3) outmigration for smolts; (4) rearing and foraging habitat; and (5) natural channel maintenance and riparian health associated with winter precipitation events.
- < Improvements will also include passage upstream to additional spawning and rearing habitat above the Alameda Creek Diversion Dam.
- < Implement a research and monitoring program that informs long-term management of steelhead and steelhead habitat in the southern Alameda Creek Watershed as well as in the entire Alameda Creek Watershed.¹

Long Term:

- < Establish sufficient habitat conditions so that the southern Alameda Creek Watershed supports a significant and productive component of a self-sustaining steelhead population in the entire Alameda Creek Watershed.

¹ References to the “entire Alameda Creek watershed” assume that others also have a responsibility to improve conditions and conduct monitoring, in addition to the SFPUC.

The SFPUC recognizes that achieving these project goals is an important element to achieving steelhead restoration and recovery goals on larger scales, which are described as follows:

ALAMEDA CREEK STEELHEAD RESTORATION GOALS

- < Establish a viable self-sustaining steelhead run in Alameda Creek and its tributaries with a high probability of long term (more than 100 years) persistence.
- < Protect unique genetic or adaptive characteristics of the adfluvial Alameda Creek steelhead population.

SFPUC WATER ENTERPRISE GOALS

- < Provide San Francisco and SFPUC Bay Area customers with reliable, high quality, and affordable water, consistent with the Levels of Service goals described in the Water System Improvement Program.
- < Protect and restore viable populations of all native species (including warm-water fishes, amphibians, and riparian plants) and protect the integrity of the native ecosystems that support these species for current and future generations, consistent with the SFPUC Water Enterprise Environmental Stewardship Policy.

1.3 SUMMARY OF THE ADAPTIVE MANAGEMENT APPROACH

Adaptive management is an approach and process that incorporates monitoring, research and evaluation to allow projects and activities, including projects designed to produce environmental benefits to go forward in the face of some uncertainty regarding consequences. It is an iterative process of evaluating and refining management based on the results of management activities and the status of the managed resource. Consequently, the integral components of adaptive management are designed to narrow and/or resolve uncertainties, increase scientific understanding, and evaluate unproven restoration techniques, all of which will inform ongoing and future actions. The approach to the AMIP includes the following key components:

- < A conceptual model that identifies relevant hydrology, habitat and biological performance measures.
- < A research and monitoring program to evaluate performance and narrow and/or resolve uncertainties.
- < A transparent process for reporting and incorporating new scientific knowledge into management activities, which, if necessary, result in the implementation of appropriate changes in operations to benefit steelhead, other native aquatic species, and their habitat within the southern Alameda Creek Watershed.

The adaptive management provisions incorporated into this AMIP are an outgrowth of ongoing work that has been conducted in coordination with NMFS and CDFG, and other interests in the watershed. In addition to the BA

prepared for the proposed action, numerous other studies have been completed by SFPUC to address comments received by NMFS and CDFG. The information contained in these studies help formulate future measures that will be taken to minimize effects of the proposed action to fish and their habitat. These studies provide support and direction for this AMIP and include, but are not limited to, the following:

- < *Alameda Creek Streamflow Study* (ENTRIX, Inc. 2006).
- < *Geologic Evaluation of Potential Barriers to Upstream Fish Migration in the Upper Alameda Creek Sub-Watershed* (URS 2009).
- < *Feasibility of Fish Passage at Calaveras Dam* (URS HDR 2009a).
- < *Feasibility of Fish Passage at Alameda Creek Diversion Dam* (URS HDR 2009b).
- < *Assessment of Fish Upstream Migration at Natural Barriers in the Upper Alameda Creek Sub-Watershed* (URS HDR 2010a).
- < *Assessment of Fish Migration at Riffles in Sunol Valley Quarry Reach of Alameda Creek* (URS HDR 2010b).
- < *Outlet Works Technical Memorandum, Calaveras Dam Replacement Project, Project NO. CUW 37401* (SFPUC 2009).

1.4 KEY UNCERTAINTIES TO BE RESOLVED

Because a steelhead population does not currently exist in the watershed, the time required to understand and address different uncertainties will vary. The general categories of uncertainties can be divided into short-term and long-term and are described below.

SHORT-TERM (1 TO 10 YEARS, 2 TO 3 GENERATIONS)

- (1) The appropriateness of the proposed flow schedules in relation to the ability of adult and juvenile steelhead to migrate through the primary study area with future improvements proposed in the Sunol Valley (e.g., installation of slurry cutoff walls isolating quarry pits, riparian habitat restoration, recommendations from the Sunol Valley Restoration Plan) and Little Yosemite areas (e.g., development and implementation of performance criteria and physical modifications).
- (2) The response of steelhead, in terms of migratory timing, spawning success and rearing tactics, to the proposed flow schedules.

- (3) The current and appropriate future relationship between the *O. mykiss* populations above and below migration barriers like Calaveras Dam and the risks and benefits of moving *O. mykiss* within the watershed above and/or below currently impassable barriers.
- (4) The response of other native species (vertebrates, invertebrates, and riparian vegetation) to the proposed flow schedules.

LONG-TERM (10 TO 20 YEARS, MANY GENERATIONS)

- (5) The extent and quality of habitat in the southern Alameda Creek Watershed that would be required in order to contribute to a sustainable steelhead population within the entire Alameda Creek Watershed that would ultimately contribute to the survival and recovery of the CCC steelhead DPS.
- (6) The long term response of channel morphology and hydrology in the southern Alameda Creek Watershed, particularly the reaches below ACDD and Calaveras Dam, to the proposed flow schedules and feedbacks on steelhead habitat quantity and quality.
- (7) The long term response of the aquatic biological community to the proposed flow schedules and other AMIP management actions.

1.5 BIOLOGICAL GOALS

As described above, the overarching biological goal for the proposed management strategy is to provide suitable habitat conditions within the southern Alameda Creek Watershed to support a self-sustaining population of steelhead in the entire watershed. Similar to the approach to evaluation used in the BA, AMIP biological goals for a future CCC steelhead DPS population unit are largely based on a functioning condition of habitat PCEs for steelhead in the action area (i.e., freshwater PCEs) (70 FR 52488; September 2, 2005). As a result, biological goals for the AMIP are generally as follows:

< Freshwater Adult Upstream Migration Corridors and Spawning Habitat

- Sufficient base flow for holding adults.
- Sufficient base flow for spawning.
- Adequate stream flows during and following storms for adult attraction and upstream passage.
- Periodic high flow events that maintain channel form, geometry, and other geomorphic functions.

< Freshwater Smolt Outmigration Corridors

- Sufficient base flow for downstream movement of juveniles.
- Adequate stream flows during and following storms (for smolt outmigration).

< Freshwater Juvenile Rearing Habitat

- Sufficient flow for rearing and foraging.
- Sufficient flow for maintaining riffles and associated benthic invertebrate productivity.
- Suitable water temperatures (typically 18 degrees Celsius or less in central California).
- Adequate flows for upstream and downstream movement of rearing juveniles.

2 ADDITIONAL CONSERVATION MEASURES AND MONITORING PROGRAM

This chapter describes additional conservation measures, performance criteria, and monitoring activities that will be implemented as part of the AMIP. Contingency actions are proposed if the proposed conservation measures do not meet the specified performance criteria.

2.1 ADDITIONAL CONSERVATION MEASURES

The AMIP includes a list of additional conservation measures that will be implemented in addition to the conservation measures described in the Biological Assessment. These additional conservation measures are directly related to the goals and uncertainties described above. Implementation of these additional conservation measures will further address the migration, spawning, and rearing conditions necessary to support steelhead in the southern Alameda Creek Watershed to meet the goals of the AMIP. Two categories of additional conservation measures are proposed: (1) actions to protect and enhance migrating steelhead and resident rainbow trout (modification of existing facilities); and (2) data collection, studies, and analyses to inform future decisions (supplemental studies).

2.1.1 ACTIONS TO PROTECT AND ENHANCE STEELHEAD AND RESIDENT TROUT POPULATIONS

The SFPUC commits to implementing the following supplemental actions to protect steelhead and resident trout:

Installing screens at the Alameda Creek Diversion Dam Tunnel by 2015. Although the SFPUC believes that many of the fish diverted to Calaveras Reservoir via the Diversion Tunnel survive (particularly with a restored maximum pool elevation), the SFPUC also recognizes the potential contribution these *O. mykiss* may provide to the

genetic diversity of the southern watershed and entire watershed populations. The screens at the Diversion Tunnel will meet NMFS and CDFG criteria, and will be designed in consultation with both agencies². The screens will be designed and constructed as part of the proposed project based on the description in the “Feasibility of Fish Passage at Alameda Creek Diversion Dam” report.

Constructing a fish ladder at the Alameda Creek Diversion Dam to provide passage to additional upstream spawning and rearing habitat above the Alameda Creek Diversion Dam by 2015. The SFPUC commits to installing a fishway (ladder) around ACDD by 2015. SFPUC will complete ladder design in coordination with NMFS and CDFG³.

Installing screens on the two lower most adits on the Calaveras Reservoir Intake Tower by 2015 to protect the existing resident population of *O. mykiss* from entrainment. These proposed screens will meet NMFS and CDFG criteria for adult trout⁴ and will be designed in consultation with both agencies. Note that the upper most adit is already screened and meets NMFS and CDFG criteria.

Modification of natural barriers in the Alameda Creek Watershed. Additional information is necessary to assess the need and required actions for improving adult steelhead passage conditions through the Little Yosemite reach of upper Alameda Creek below the Alameda Creek Diversion Dam (ACDD). The proposed ACDD minimum bypass flow rate (30 cfs) was selected with the intention of improving *O. mykiss* spawning conditions below ACDD, and is not anticipated to provide for passage of upstream moving adult steelhead at Little Yosemite under existing conditions. The high flow events that typically overtop ACDD during wet periods (within or outside of the 12/1-3/31 diversion period), however, are expected to provide the best opportunity for upstream adult passage through the Little Yosemite reach. The SFPUC has provided a Natural Barrier Fish Passage Report (2010) that includes an assessment of existing passage conditions and potential modifications that would improve existing conditions if and when made. Building from this foundation, the SFPUC will:

- 1) Develop adult steelhead performance criteria which can be used to assess current and future passage conditions within Little Yosemite and prepare conceptual physical modification design plans for locations identified as not meeting those criteria under the proposed operation of ACDD. The performance criteria will be submitted to NMFS and CDFG for review and approval no later than January 31, 2011.
- 2) Prepare draft design plans to physically modify Features 9 and 10 (similar to the description in the Natural Barrier Fish Passage Report) and/or other identified passage impediments. Plans will modify Little Yosemite

² As requested by NMFS and CDFG, SFPUC will submit the 60 percent design of the fish screen to NMFS and CDFG for review and approval.

³ The SFPUC will submit 60 percent design details of the fishway to NMFS and CDFG for review and approval.

⁴ As confirmed by NMFS via e-mail on June 3, 2010, the screens would not need to comply with the criteria for steelhead fry because fry are not expected to be present in the reservoir.

to the extent that adult steelhead passage is facilitated at flows as low as 30 cfs (if possible) at natural channel features by modifying portions of the identified impediments. The extent of modification is limited in scope to multiple rock weirs set at different elevations, increasing staging/takeoff/launching pool depth, and/or decreasing vertical height and horizontal range (as described in the Natural Barrier Fish Passage Report, section 5.1, p. 5-4). Draft plans will be submitted by the SFPUC to NMFS and CDFG for review and approval no later than January 31, 2012.

- 3) Prepare final design plans incorporating comments received from NMFS and CDFG , by December 31, 2012. Implementation and construction of the modifications will be completed by October 31, 2014.
- 4) Identify the lead agency and funding for implementation and construction of the physical modifications.
- 5) Monitor all physically modified features within Little Yosemite, following the completion of the modifications, to verify adult steelhead passage success based on the approved performance criteria.

Additional information is also necessary to assess the need and required actions for improving adult steelhead passage conditions through the Sunol Valley. The “Assessment of Fish Migration at Riffles in Sunol Valley Quarry Reach of Alameda Creek” (February 2010) describes the current conditions in this reach, and estimates the minimum flows to support steelhead migration at key locations within this reach (see Table 4-1 and Figure 4-1). Upon further review and assessment, any location estimated to limit adult passage at flows substantially greater than 40 cfs will be physically modified to provide passage at approximately 20 cfs. These modifications may be incorporated into projects implementing the Sunol Valley Restoration Plan, including the Upper Alameda Creek Filter Gallery Project.

SFPUC will monitor fish migration at instream features as detailed in Section 2.1.2.

2.1.2 DATA COLLECTION, STUDIES, AND ANALYSES TO INFORM FUTURE DECISIONS

In addition to the additional conservation measures (modification of existing facilities) described above, the SFPUC commits to the following supplemental studies. These efforts will evaluate the efficacy of all the conservation measures included in the BA and the AMIP, and provide information necessary to inform and evaluate the need for additional actions to support the goals of the AMIP.

Southern Alameda Creek Sub-Watershed Conceptual Model and Analysis: The SFPUC commits to evaluate conditions in the southern watershed with the goal of identifying limiting factors for steelhead within this sub-watershed. As results become available from the viability analysis for the entire Alameda Creek Watershed, the southern watershed analysis would be modified and updated as appropriate. The specific issues to be examined include: extent and quality of spawning and rearing habitat; connectivity (upstream/adult migration, downstream/smolt migration, low flow and high flow passage constraints, etc); and genetic population structure. Until specific targets for performance criteria are developed, the existing framework for evaluating relative cost/benefit to management actions that address these issues will be applied.

- < Complete sub-watershed conceptual model by 2012.
- < Complete sub-watershed viability analysis by 2016.

Alameda Creek Watershed Conceptual Model and Analysis: The SFPUC commits to participating in and supporting the development of a conceptual model and viability analysis for steelhead in the entire Alameda Creek Watershed (and/or larger geographic scale, if appropriate). This will be done in partnership with NMFS (and others, as appropriate) and will require further study and data collection within the watershed. The goal is to determine population-level viability criteria for the Alameda Creek Watershed steelhead population (productivity, abundance, spatial structure, diversity, persistence) and to develop attributes or indicators to be used for monitoring these criteria at the population level. The conceptual model will also need to consider influences outside of the watershed (marine, climate, etc), stochastic demographic effects, and any other sources of uncertainty and variability.

- < Complete watershed conceptual model by 2014.
- < Complete watershed viability analysis by 2018.

Evaluate Steelhead Spawning, Rearing, and Migration in the Southern Alameda Creek Watershed: While the conceptual models and viability analyses are being completed, the SFPUC commits to the following studies. These studies will be reevaluated within in the context of the conceptual models and viability analyses, Southern Alameda Creek and entire Alameda Creek Watersheds, by 2014 and 2018, respectively.

1. Spawning and rearing habitat: The SFPUC will evaluate the effectiveness of the proposed flow schedule on spawning and rearing habitat quantity, quality, and the timing of these flows as described in the monitoring program above. Note that under existing conditions, rearing habitat may be a primary limiting factor for the resident *O. Mykiss* population – this may or may not be the case under the proposed future condition.

In addition to monitoring the effectiveness of the proposed flow schedule, the SFPUC commits to evaluating the spawning and rearing habitat upstream of the Alameda Creek Diversion Dam, and upstream of Calaveras Reservoir. This evaluation will be completed by the end of 2016 (note that much of the area described above is on private property, and access to these areas may limit this evaluation).

2. Fish migration past instream features such as riffles and waterfalls: The SFPUC will evaluate the effectiveness of the proposed flow schedule to support fish migration at existing instream features, including the riffles in Sunol Valley and the exposed bedrock and large boulder reach of Little Yosemite (URS HDR 2010a). Each location will be reevaluated after any proposed physical modifications are assessed and implemented to improve passage conditions.

3. Fish passage at the Alameda Creek Diversion Dam: In conjunction with the SFPUC conservation measure to construct a fish ladder at ACDD, providing upstream adult steelhead passage to spawning and rearing habitat at this location by 2016 (Section 2.1.1), the SFPUC will develop a monitoring program to assess the use and efficacy of the fish ladder.

Population Management Study Plan: The SFPUC commits to supporting genetic and demographic studies related to *O. mykiss* within the Alameda Creek Watershed to evaluate management alternatives for *O. mykiss* on SFPUC property. Planned removals of fish passage barriers in lower Alameda Creek will allow the re-establishment of anadromy to portions of Alameda Creek, and providing passage at the Alameda Creek Diversion Dam will further increase the anadromous range of *O. mykiss* in the watershed. However, without human intervention, the anadromous *O. mykiss* will remain mostly separated from resident *O. mykiss* above Turner and Calaveras Dams. Alternative options for managing the resident and anadromous forms will be evaluated in the context of the restoration goals described in Section 1.2. Some of the questions to be answered include the following:

- < Are resident fish above Calaveras and Turner dams important for the establishment of a steelhead run, the avoidance of inbreeding depression, and/or the enhancement of adaptive and evolutionary potential of the new steelhead population? If so, then how many fish of each life history stage would need to be moved, and at what intervals? What monitoring should be done to evaluate the outcome?
- < If *O. mykiss* from SFPUC reservoirs were used to “supplement” the anadromous population, would there be risks to either the anadromous or resident forms? How likely is it that this management action would cause significant demographic or genetic loss to the above-reservoir population, outbreeding depression in the anadromous population, stress to *O. mykiss* below the reservoirs resulting from competition or disease, and/or loss of existing sustainable *O. mykiss* populations through reduced recruitment? Are there ways to minimize risks through careful design of a supplementation program?
- < If steelhead below SFPUC reservoirs were given access (such as by capture and relocation) to stream reaches above SFPUC facilities, how much benefit to the steelhead population might be expected to result from the increased access to the upper watershed and increased spawning and rearing habitat? Would there be risks of outbreeding depression for steelhead or resident trout, unintentional movement of invasive species or disease over existing barriers, and/or stress to reservoir populations through competition or predation? Are there ways to minimize risks and maximize benefits (in the context of the goals in Section 1.2)?
- < What degree of uncertainty is associated with answers to the above questions? What scientific information would be needed to answer the questions more completely? Are there questions that are not being considered that should

be? Are there clear low-risk management options that would help achieve the restoration goals outlined in Section 1.2?

SFPUC staff, with assistance from NMFS and CDFG staff, will develop a study plan and identify appropriate experts to address these questions. Two research elements are identified as important initial studies to be included in this population management analysis.

Arroyo Hondo and Calaveras Reservoir Study – To determine current conditions above Calaveras Dam, the *O. mykiss* above Calaveras Dam will be studied in terms of migration and habitat use in Arroyo Hondo and Calaveras Reservoir, and secondly predation impacts to *O. mykiss* by largemouth bass in Calaveras Reservoir. Report to be finalized by December, 2012.

Southern Alameda Creek Sub-Watershed Genetics Study – Biological samples taken from throughout the southern Alameda Creek Watershed will be used to do a genetics study that will identify small scale phylogeographic population patterns and genetic diversity above and below reservoirs. Report to be finalized by December, 2012.

2.2 MONITORING PROGRAM

Monitoring programs should be developed to adequately support decision-making. Although monitoring programs can be adaptively adjusted if they prove inadequate, changes to data collection methodologies can compromise the ability to evaluate long-term trends and compare performance measures over time. As such, the monitoring program should be designed at the outset with clear goals and lists of measurable indicators (i.e., performance criteria) that allow for the evaluation of whether or not progress has been made towards the goals.

In addition to the routine monitoring program outlined here, other research and data collection programs have been described above in Section 2.1.2, Data Collection, Studies, and Analyses to Inform Future Decisions. Both the routine monitoring program and the supplemental studies (see Section 2.1.2) are expected to help reduce uncertainties and inform the adaptive management process.

The objectives of the monitoring program are to measure operational implementation performance, short- and long-term biological responses, and trends in habitat conditions. Specific components outlined in the program include streamflow monitoring, temperature monitoring, steelhead migration monitoring, steelhead/rainbow trout spawning monitoring, aquatic population and community characteristics monitoring, in-stream conditions monitoring, and riparian conditions monitoring (Table 2.1). All of these components are described in detail below under the categories of implementation, biological response, and habitat monitoring. Each monitoring component includes specific information on:

- < Measurement Points (locations where measurement would be taken);
- < Measurement Parameters (metrics used to make measurements);
- < Measurement Intervals (frequency/intervals in time when measurements would be taken);
- < Performance Criteria (performance standard used to evaluate if intended outcomes/goals are being achieved); and
- < Contingency Action(s) (potential actions that would be implemented to correct potential deficiencies identified during monitoring and analysis).

It is important to note that information developed through the implementation of supplemental studies (see Section 2.1.2 above) would be used in combination with monitoring results to inform the implementation of any potential contingency actions.

Table 2.1: Monitoring Program Components by CCC Steelhead DPS Primary Constituent Element

Monitoring Component	Migration	Spawning	Rearing
Streamflow*	■	■	■
Temperature		■	■
Steelhead Migration	■		
Steelhead/Rainbow Trout Spawning		■	
Aquatic Population and Community Characteristics			■
In-Stream Conditions		■	■
Riparian Conditions			■
* Streamflow data to be used in conjunction with other monitoring data to inform the evaluation of habitat suitability for steelhead migration, spawning, and rearing.			

2.2.1 IMPLEMENTATION MONITORING

The goal of implementation monitoring is to document that minimum water releases are being employed as proposed and to calibrate and evaluate modeled water temperatures downstream of Calaveras Dam and the Alameda Creek Diversion Dam. These data are expected to allow operational managers to fine-tune water releases to provide suitable habitat conditions. The information is also expected to aid in more accurate interpretations of observed biological responses.

- < **Streamflow:** Streamflow will be monitored to establish compliance below both the ACDD and Calaveras Dam. This information, together with other information on fish populations and communities and habitat conditions (see additional monitoring parameters below), is expected to provide a basis for evaluating performance for and

adjustment of the conservation measures if necessary to achieve performance criteria for steelhead migration, spawning, and rearing.

Measurement Points:	USGS Gage 11172945: Alameda Creek above ACDD Gage to be installed: Immediately below the ACDD in Alameda Creek USGS Gage 11173500: Calaveras Creek below Calaveras Dam USGS Gage 11173510: Alameda Creek below Calaveras Creek USGS Gage 11173575: Alameda Creek below Welch Creek

Measurement Parameter: Streamflow in cubic feet per second (cfs).

Measurement Interval:	Continuous, averaged on a daily basis.

Performance Criteria:	Maintain minimum flows below Calaveras Dam and minimum bypasses below ACDD as described in the proposed minimum flow schedule. In addition to existing flow gages, add additional flow measurement devices as necessary to inform performance monitoring related to steelhead/rainbow trout migration, spawning, and rearing. Regarding migration, the network of flow gages will be sufficient to relate flows to the physical conditions (e.g., depths, velocities, etc) to evaluate passage of steelhead adults and juveniles at key locations, including Little Yosemite and the Sunol Valley, in the primary study area reaches.

Contingency Action(s):	Adjust bypass and/or release rates to achieve streamflow compliance consistent with the minimum flow schedules.

Streamflow measurement and documentation at compliance points and in all reaches in the primary study area, including Alameda Creek below ACDD and in the Sunol Valley, could be accomplished through the temporary installation of devices (flow meter, pressure transducer, or other device) to establish a network that would allow correlations with the existing USGS gages on Alameda Creek (upstream of the ACDD and downstream of the confluence with Calaveras Creek) and Calaveras Creek (downstream of the dam) to be developed.

- < **Temperature:** Water temperature will be monitored to establish accuracy of modeling below Calaveras Dam. This information, along with temperature monitoring at other key locations (see measurement points below), is also expected to provide a basis for evaluating performance for and adjustment of the conservation measures if necessary to achieve performance criteria for steelhead spawning and rearing.

Measurement Points:	Water temperature monitoring will be conducted using remote sensors installed at several locations in the primary study area consistent with those

points already being monitoring by the SFPUC and at existing USGS gages.

Measurement Parameter: Temperature in degrees Celsius (°C).

Measurement Intervals: In real-time at the Calaveras Dam outlet works and continuous at ½-hour intervals at all other locations.

Performance Criteria: Calibrate and evaluate modeled temperatures and the suitability of steelhead/rainbow trout spawning and rearing, below Calaveras Dam and the Alameda Creek Diversion Dam. Achieve maximum temperature of 20°C at the Sunol Regional Park/SFPUC property boundary (flow schedule C) or at a yet to be identified point further downstream (flow schedules A and B).

Contingency Action(s): Adjust operation of Calaveras Dam outlet works to manage cold water releases to meet downstream temperature targets.

2.2.2 BIOLOGICAL RESPONSE MONITORING

The purpose of monitoring biological response is to directly evaluate performance in terms of both short- and long-term goals. The proposed flow schedules are expected to result in immediate improvements in connectivity, spawning and rearing habitat for steelhead/rainbow trout in the primary study area. This monitoring element is expected to provide short-term feedback to the AMIP, but should be continued as stream morphology, hydrology and riparian vegetation could have long-term responses which have the potential to change related primary biological responses.

< **Steelhead Migration:** Monitoring will be conducted to determine migration success into, out of, and within the primary study area and to estimate the relative success of in and out migration of adult and juvenile steelhead.

Measurement Points: Several locations in the primary study area below Calaveras Dam and the Alameda Creek Diversion Dam, including the Sunol Valley and Little Yosemite, to document and evaluate passage conditions associated with the proposed minimum flow schedules and natural flow accretions. Also evaluate the operation of the ladder and screen at the Alameda Creek Diversion Dam.

Measurement Parameters: Monitoring the timing and movement of adult immigration shall be coordinated with the resource agencies and other entities in the watershed

(e.g., Alameda County Water District and operation of the ladders in the Alameda Creek Flood Control Channel). The SFPUC shall provide radio tags or other devices and coordinate monitoring to detect the movement of adults within the portions of the watershed under its jurisdiction. Although outside SFPUC jurisdiction, SFPUC recommends that radio tags or other devices be applied to adult fish captured/trapped at the future BART weir ladder(s). The movements of tagged fish shall be monitored, at either fixed detection sites or manual tracking, as they move through the watershed.

To evaluate movement patterns of juvenile steelhead within Alameda Creek, timing of migration and relative abundance by size class shall be monitored using downstream migrant traps (e.g. rotary screw traps – locations TBD after consultation with NMFS and CDFG). Pit tags will be employed to assess migrational success and survival rates.

Measurement Interval:

During February, March, April and May; continuing through June only if significant numbers of fish are being collected in late May.

Performance Criteria:

Suitable migration conditions for adult steelhead without substantial flow-related interference that causes biologically relevant delay. Natural features such as Little Yosemite will be further evaluated to also consider physical conditions (e.g., vertical jump height) that may create interference regardless of flow conditions (see Section 2.1.2 above). Evidence of downstream moving juvenile steelhead undergoing the process of smoltification. Fish monitoring data will be used in conjunction with physical (e.g. streamflow) data.

Contingency Action(s):

In the short term, if fish stranding is documented, implement fish relocation activities. In the long term and as detailed in Section 2.1.1, contingency actions include SFPUC provision of specific funding amounts in support of NMFS and CDFG modification of physical features in the stream channel (e.g., modification of bedrock and boulder features the Little Yosemite reach) as described above in Section 2.1.1..

- < **Steelhead/Rainbow Trout Spawning:** Monitoring will be conducted to determine the distribution of spawning activity within the project area and to estimate the relative size of spawning populations over time and provide an indication of adult upstream migration success.

Measurement Points:	Portions of stream reaches between the ACDD and confluence of Calaveras and Alameda Creeks and downstream to Welch Creek. Portions of Calaveras Creek between Calaveras Dam and its confluence with Alameda Creek, Alameda Creek between Welch Creek and Arroyo de la Laguna, and upstream of ACDD (may be limited due to access agreements with private landowners).
Measurement Parameters:	Number of spawning steelhead/rainbow trout and number of steelhead/rainbow trout redds by location and survey date.
Measurement Interval:	Twice per month, with not less than two weeks between surveys, in January, February, March and April. Surveys to be conducted only when conditions allow for viewing spawning adults and/or redds.
Performance Criteria:	Suitable spawning sites used by steelhead/rainbow trout: spawning population of steelhead post-project at comparable levels to rainbow trout under existing conditions at reference sites and increased levels in the primary study area.
Contingency Action(s):	Potential contingency actions include adjusting flow schedules to achieve desired flow velocity and depth conditions and/or restoring and enhancing spawning habitat (e.g., gravel augmentation, channel improvements).

- < **Aquatic Population and Community Characteristics:** Monitoring will be conducted annually during the pre-project and post-project periods to document changes in aquatic species composition, relative abundances, and distributions in response to water releases and other operational and management activities. Standard quantitative methods for fish, amphibian and invertebrate sampling will be used (e.g. Dolloff, Hankin & Reeves, “Basinwide Estimation of Habitat and Fish Populations in Streams”, Gen. Tech. Report SE-83, USDA, 1993; National Marine Fisheries Service, “Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act”, June 2000; U.S. Fish and Wildlife Service, “Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog”, August 2005; State Water Resources Control Board, “Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California”, February 2007).

Measurement Points:	Representative habitats throughout the primary study area consistent with those points already being sampled and more recently expanded by the SFPUC.
Measurement Parameters:	Relative abundances and densities (e.g. individuals /mile) by size class for vertebrate species (steelhead, other native and introduced fishes and amphibians) and goal-specific metrics for invertebrates (e.g. diversity) at sample sites, including length, weight, and age characteristics for steelhead/rainbow trout.
Measurement Interval:	Snorkel survey once during summer and electrofishing survey once during fall for fishes. One annual comprehensive protocol survey for frogs. Targeted-riffle composite and/or multi-habitat reach-wide benthos composite survey once during spring for invertebrates.
Performance Criteria:	Increased abundance of steelhead/rainbow trout in the primary study area; includes a self-reproducing population of steelhead/rainbow trout with some individuals greater than six inches in total length. The steelhead/rainbow trout population shall contain a minimum of three viable age classes documenting an acceptable level of recruitment for size and type of stream (i.e., upper Alameda Creek).
Contingency Action(s):	Potential contingency actions include adjusting flow schedules to achieve desired habitat conditions and/or restoring/enhancing spawning and rearing habitat.

2.2.3 HABITAT MONITORING

The goals of habitat monitoring are to collect data useful for understanding observed biological responses, and to help predict future biological responses where time lags are expected.

- < **In-Stream Conditions:** Monitoring will be conducted to evaluate habitat/flow relationships by assessing in-stream morphology, hydrology, and a variety of other steelhead/rainbow trout habitat attributes.

Measurement Points:	Alameda Creek in the primary study area at locations consistent with those locations being surveyed as part of ongoing monitoring efforts and more recently expanded by the SFPUC (Brian – same questions).

Measurement Parameters:	Areal extent, width and depth, water velocity and cover characteristics of different stream habitat types (i.e. pool, riffle, etc.) as measured by an established habitat mapping protocol (e.g. Flosi and Reynolds, “California Salmonid Stream Habitat Restoration Manual”, CDFG Inland Fisheries Division, 1994).
Measurement Interval:	Pre-project: once during each of three successive flow regimes: 0-10 cfs, 11-20 cfs, 21-30 cfs and 31-40 cfs. Post-project: once within three years during each of three successive flow regimes: 0-10 cfs, 11-20 cfs, 21-30 cfs, and 31-40 cfs. Subsequent monitoring within selected flow ranges will occur once every ten years to evaluate habitat/flow relationship, stream morphology and hydrology responses to flow alterations, changes in riparian cover, and habitat restoration activities.
Performance Criteria:	A post-project increase in the quality and quantity of steelhead/rainbow trout spawning and rearing habitat based on parameters described above.
Contingency Action(s):	Potential contingency actions include adjusting flow schedules to achieve desired habitat conditions and/or restoring/enhancing spawning and rearing habitat.

- < **Riparian Conditions:** Monitoring will be conducted to evaluate vegetative cover by assessing plant community composition and condition. If changes are significant, there may be feedbacks on the quality of steelhead/rainbow trout habitat conditions including water temperature, benthic macroinvertebrate productivity, and channel morphology.

Measurement Points:	Alameda Creek from ACDD to its confluence with Arroyo de la Laguna and Calaveras Creek from Calaveras Dam to its confluence with Alameda Creek.
Measurement Parameters:	The community composition and extent of vegetative cover will be mapped using aerial photographs and field mapping methods established by the “California Native Plant Society Manual of California Vegetation Protocols.” Condition and stand age of target species (including sycamores) will be evaluated. Non-native invasive plant species will also be noted, but not mapped in detail.

Measurement Interval:	Once every five years.
Performance Criteria:	A post-project increase in the quality and quantity of steelhead/rainbow trout spawning and rearing habitat based on parameters described above.
Contingency Action(s):	Potential contingency actions include adjusting flow schedules to achieve desired habitat conditions and/or restoring/enhancing spawning and rearing habitat.

3 REPORTING, SCIENTIFIC REVIEW, AND DECISION MAKING PROCESS

Each summer (by September 1st) the SFPUC shall prepare and submit annual monitoring reports to NMFS and CDFG detailing the monitoring activities and any significant deviations from normal operations. The annual monitoring reports will include the status and/or results from the implementation of the monitoring program described in the AMIP, implementation of supplemental actions, including the studies and analyses, and any recommendations for adaptive management (e.g., implementation of contingency or other actions that could arise from review of monitoring results or supplemental studies).

NMFS, CDFG, and SFPUC will meet to review these annual monitoring reports and assess progress towards meeting the goals of the AMIP. At the request of NMFS, CDFG, or the SFPUC, an independent review of the annual monitoring report (or its components) may be recommended. In these situations, NMFS, CDFG, and SFPUC must agree on the selection of the convener for this independent review. Based on discussions with NMFS, CDFG, and SFPUC, the convener will be responsible for establishing the scope of the review, and selecting a panel of experts to conduct the review. The findings of the independent review panel will then be provided to NMFS, CDFG, and SFPUC for their consideration. Note that at least a portion of the independent review deliberations will be conducted in a public forum.

NMFS, CDFG, and the SFPUC will continue to coordinate on individual issues and collaborate on decisions to assure that future contingency actions are coordinated across the watershed. Where there are disputes, issues will be elevated and resolved at the appropriate level. Decisions about the need (or trigger) to implement a contingency action are ultimately the responsibility of NMFS and CDFG, while decisions regarding the implementation of contingency actions are the responsibility of the SFPUC.

SFPUC, NMFS, and CDFG will commit the resources necessary to implement this AMIP. However, if funding issues or other circumstances arise (e.g., regional coordination or scientific review delays) that either change the assumptions under which the AMIP was created or new scientific data indicates different goals are more appropriate, changes in the AMIP will be the product of a transparent “change management” process. An entity that desires a change will provide the rationale and supporting documentation for the proposed modification in advance to making the change. Once coordinated through this process, which may be elevated, changes will be reported in the annual progress report.

4 REFERENCES

- Dibblee, T. W., Jr., 1980. *Preliminary geologic map of the La Costa Valley quadrangle, Alameda County, California*: U.S. Geological Survey Open-File Report 80-533-A, scale 1: 24,000.
- ENTRIX, Inc. 2006. *Alameda Creek Streamflow Study*. Prepared for Kennedy/Jenks Consultants, San Francisco, CA.
- Flosi and Reynolds. 1998. *California Salmonid Stream Habitat Restoration Manual*. CDFG Inland Fisheries Division, 1994.
- Holling, C.S. 1978. *Adaptive environmental assessment and management*. Sponsored by the United Nations Environmental Program: International Institute for Applied Systems Analysis, Chichester, New York.
- McBain and Trush. 2008. *Alameda Creek Instream Flow, Habitat Assessment, and Alternative Development Phase 1: Study Plan*. Prepared for the Alameda Creek Fisheries Restoration Workgroup.
- Nielsen, J. 2003. *Population Genetic Structure of Alameda Creek Rainbow/Steelhead – 2002*. U.S. Geological Survey Alaska Science Center, Anchorage, Alaska. Report prepared for the Alameda Creek Fisheries Restoration Workgroup.
- Nilsen, T. H., 1975. *Preliminary photointerpretation map of landslide and other surficial deposits, La Costa Valley 7½-minute quadrangle, Alameda County, California*: U.S. Geological Survey Open-File Report 75-277-23, scale 1: 24,000.
- Powers, P.D. and J.F. Orsborn. 1985. *Analysis of Barriers to Upstream Migration: An Investigation of the Physical and Biological Conditions Affecting Fish Passage Success at Culverts and Waterfalls*. BPA Report No. DOE/BP-36523-1. Available at: <http://www.efw.bpa.gov/cgi-bin/efw/FW/publications.cgi>.
- SFPUC. 2009. *Outlet Works Technical Memorandum, Calaveras Dam Replacement Project, Project NO. CUW 37401*. Prepared by URS Corporation.

- URS (URS Corporation), 2009. *Geologic Evaluation of Potential Barriers to Upstream Fish Migration in the Upper Alameda Creek Sub-Watershed*. File memo from Senior Engineering Geologist David Simpson to Senior Project Biologist Steve Leach. May.
- URS HDR. 2009a *Feasibility of Fish Passage at Calaveras Dam*. Prepared for San Francisco Public Utilities Commission, San Francisco, CA.
- URS HDR. 2009b. *Feasibility of Fish Passage at Alameda Creek Diversion Dam*. Prepared for San Francisco Public Utilities Commission, San Francisco, CA.
- URS HDR. 2010a. *Assessment of Fish Upstream Migration Barriers at Natural Barriers in the Upper Alameda Creek Sub-Watershed*. Prepared for San Francisco Public Utilities Commission, San Francisco, CA.
- URS HDR. 2010b. *Assessment of Fish Migration at Riffles in Sunol Valley Quarry Reach of Alameda Creek*. Prepared for San Francisco Public Utilities Commission, San Francisco, CA.
- Walters, C. 1986. *Adaptive Management of Renewable Resources*. New York: Macmillan Press.

Appendix O

Variant Air Quality Modeling

The following air emissions calculations show the incremental emissions increase for the portions of the CDRP Variant that differ from the Draft EIR project as a whole (e.g., installation of a fish ladder, expansion of the right dam abutment). The incremental increase in operational emissions for the CDRP Variant is also provided for activities such as fish screen maintenance. Emissions calculations for the overall Draft EIR project are provided in Appendix G. Overall emissions, as shown in Appendix G, would have to be considered concurrently with the incremental increase in emissions from the CDRP Variant (provided here) to evaluate the total emissions from implementation of the CDRP Variant.

Calaveras Dam Worst-Case Unmitigated Short-term Construction-Related Emissions VARIANT

Exhaust Emissions of ROG, NOX, CO, PM10, PM2.5, CO2

Emissions are calculated for the 2011 construction season

Worker Commute Emissions

		Values					
Miles/ one-way trip		20.00	Default Model Setting				
One-way trips/day		2.00	Default Model Setting				
No. of employees		5.00	Worst-case number of daily employees from project description.				
		ROG	NOx	CO	PM10	PM2.5	CO2
Pounds per day*		0.149	0.263	2.686	0.034	0.019	426.620
Tons per const. Period		0.00	0.00	0.03	0.00	0.00	4.69

*Based on EMFAC emission factors.

1.00 10-hour shifts per day
22.00 days per month
1.00 months

Off-Site, On-Road Material Transport Emissions

User Input		Material Transport				
Miles/round trip	30.00	Default Model Setting				
Round trips/day	0.00					
Vehicle miles traveled/day (calculated)	0.00					
	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	1.02	13.03	6.99	0.42	0.41	1861.89
Pounds per day	0.00	0.00	0.00	0.00	0.00	0.00
Tons per construction period	0.00	0.00	0.00	0.00	0.00	0.00

*Based on EMFAC emission factors.

22.00 days per month
1.00 months

On-Site, Off-Road Heavy-Duty Equipment Emissions - Right Dam Abutment Excavation

Number of Vehicles	Type	ROG pounds/day	CO pounds/day	NOX pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
1	Compactor	0.02	0.11	0.14	0.01	0.01	18.53
1	Dozer	2.12	10.20	18.83	0.80	0.74	1557.24
1	Excavator	0.90	4.09	6.81	0.41	0.37	684.20
1	Loaders, Rubber Tired	0.80	3.41	6.22	0.36	0.33	573.58
1	Off-Highway Trucks	1.78	5.39	16.61	0.62	0.57	1949.58
0	Other Construction Equip.	0.0	0.0	0.0	0.0	0.0	0.0
0	Scraper	0.0	0.0	0.0	0.0	0.0	0.0
	Pounds per day*	5.62	23.20	48.60	2.20	2.02	4783.13
	Tons per const. Period	0.06	0.26	0.53	0.02	0.02	52.61

*Based on Off-Road emission factors

10.00 hours per day
22.00 days per month
1.00 months

On-Site, Off-Road Heavy-Duty Equipment Emissions - PG&E Line

Number of Vehicles	Type	ROG pounds/day	CO pounds/day	NOX pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
0	Compactor	0.0	0.0	0.0	0.0	0.0	0.0
0	Dozer	0.0	0.0	0.0	0.0	0.0	0.0
1	Excavator	0.90	4.09	6.81	0.41	0.37	684.20
0	Loaders, Rubber Tired	0.0	0.0	0.0	0.0	0.0	0.0
2	Light Duty Trucks	0.03	0.04	0.47	0.01	0.00	78.59
0	Other Construction Equip.	0.0	0.0	0.0	0.0	0.0	0.0
0	Scraper	0.0	0.0	0.0	0.0	0.0	0.0
	Pounds per day*	0.93	4.12	7.27	0.41	0.38	762.79
	Tons per const. Period	0.03	0.14	0.24	0.01	0.01	25.17

*Based on Off-Road emission factors

10.00 hours per day
22.00 days per month
3.00 months

Fugitive Emissions of PM10 and PM2.5

Acre		PM10 pounds/day	PM2.5 pounds/day	22.00 days per month 3.00 months
Disturbance Area	10.00	95.5	87.9	
*Based on an emission factor of 38.2 lb/acre/day (ARB 2002).		tons/year	tons/year	
		3.15	2.90	
Miles Traveled		pounds/day	pounds/day	22.00 days per month 3.00 months
Haul Truck Travel	0.00	0.0	0.0	
*Based on an emission factor of 2.27 lb PM10/VMT (ARB 2002).		tons/year	tons/year	
Assumes 25% of haul trips will be on unpaved roads		0.00	0.00	

*Assumes a 75% reduction in fugitive PM10 dust emissions from implementation of best management practices in the project description.

	ROG	NOx	CO	PM10 Exhaust	PM10 Fugitive Dust	PM10	PM2.5 Exhaust	PM2.5 Fugitive Dust	PM2.5	CO2
Total 2011 (Unmitigated)	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
	6.70	56.14	30.01	2.65	95.50	98.15	2.42	87.86	90.28	
	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	metric tons/year
	0.09	0.78	0.42	0.04	3.15	3.19	0.03	2.90	2.93	82.48
Total 2011 (Mitigated)	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
	6.36	44.91	28.51	2.12	23.88	25.99	1.93	21.97	23.90	
	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	metric tons/year
	0.09	0.62	0.40	0.03	0.79	0.82	0.03	0.72	0.75	-

Calaveras Dam Worst-Case Unmitigated Short-term Construction-Related Emissions VARIANT

Exhaust Emissions of ROG, NOX, CO, PM10, PM2.5, CO2

Emissions are calculated for the 2014 construction season

Worker Commute Emissions

		Values					
Miles/ one-way trip		20.00	Default Model Setting				
One-way trips/day		2.00	Default Model Setting				
No. of employees		22.00	Worst-case number of daily employees from project description.				
		ROG	NOx	CO	PM10	PM2.5	CO2
Pounds per day per employee*		0.015	0.019	0.235	0.004	0.002	39.294
Pounds per day		0.335	0.422	5.159	0.091	0.037	864.474
Tons per const. Period		0.02	0.03	0.34	0.01	0.00	57.06

*Based on EMFAC emission factors.

1.00 10-hour shifts per day
22.00 days per month
6.00 months

Off-Site, On-Road Material Transport Emissions

		Material Transport					
User Input							
Miles/round trip		30.00	Default Model Setting				
Round trips/day		3.00					
Vehicle miles traveled/day (calculated)		90.00					
		ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)		0.84	10.25	5.45	0.40	0.32	1880.47
Pounds per day		0.17	2.03	1.08	0.08	0.06	373.12
Tons per construction period		0.01	0.13	0.07	0.01	0.00	24.63

*Based on EMFAC emission factors.

22.00 days per month
6.00 months

On-Site, Off-Road Heavy-Duty Equipment Emissions - ACDD

		ROG	CO	NOX	PM10	PM2.5	CO2
Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
0	Compactor	0.00	0.00	0.00	0.00	0.00	0.00
1	Crane	0.75	2.54	6.67	0.24	0.22	924.55
1	Pumps	0.48	2.31	3.34	0.26	0.24	366.76
1	Loaders, Rubber Tired	0.63	3.38	4.82	0.26	0.24	573.58
1	Off-Highway Trucks	1.48	4.39	11.43	0.41	0.37	1949.58
0	Other Construction Equip.	0.00	0.00	0.00	0.00	0.00	0.00
1	Generator Sets	1.88	7.60	24.30	0.69	0.63	3767.98
	Pounds per day*	5.22	20.21	50.55	1.86	1.71	7582.45
	Tons per const. Period	0.34	1.33	3.34	0.12	0.11	500.44

*Based on Off-Road emission factors

10.00 hours per day
22.00 days per month
6.00 months

Fugitive Emissions of PM10 and PM2.5

Acre		PM10 pounds/day	PM2.5 pounds/day	22.00 days per month 6.00 months
Disturbance Area	0.95	9.1 tons/year	8.3 tons/year	
*Based on an emission factor of 38.2 lb/acre/day (ARB 2002).		0.60	0.55	
Miles Traveled		pounds/day	pounds/day	22.00 days per month 6.00 months
Haul Truck Travel	90.00	204.3 tons/year	188.0 tons/year	
*Based on an emission factor of 2.27 lb PM10/VMT (ARB 2002). Assumes 25% of haul trips will be on unpaved roads		13.48	12.41	

*Assumes a 75% reduction in fugitive PM10 dust emissions from implementation of best management practices in the project description.

4	Total 2014 (Unmitigated)	ROG pounds/day	NOx pounds/day	CO pounds/day	PM10 Exhaust pounds/day	PM10 Fugitive Dust pounds/day	PM10 pounds/day	PM2.5 Exhaust pounds/day	PM2.5 Fugitive Dust pounds/day	PM2.5 pounds/day	CO2 metric tons/year
		5.72	53.01	26.45	2.03	213.37	215.40	1.81	196.30	198.11	
		tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	
		0.38	3.50	1.75	0.13	14.08	14.22	0.12	12.96	13.08	557.50
Total 2014 (Mitigated)											
		5.44	42.41	25.13	1.62	53.34	54.97	1.45	49.08	50.52	
		tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	metric tons/year
		0.36	2.80	1.66	0.11	3.52	3.63	0.10	3.24	3.33	-

Calaveras Dam Operational-Related Greenhouse Gas Emissions

Exhaust Emissions of CO₂

Emissions are calculated for the year 2015

Worker Commute Emissions

	Values	
Miles/ one-way trip	20.00	Default Model Setting
One-way trips/day	0.43	Default Model Setting (156 annual trips / 365 days)
No. of employees	2.00	Worst-case number of daily employees from project description.

CO₂

Pounds per day per employee	16.889
Pounds per day*	33.779
Tons per Year	6.165

*Based on EMFAC emission factors.

On-Site, Off-Road Heavy-Duty Equipment Emissions

		CO ₂	
Number of Vehicles	Type	pounds/day	
1	Generator	103.23	100.00 hours per year
	Pounds per day*	103.23	
	Tons per Year	18.84	

*Based on Off-Road emission factors

CO₂

Total 2015 (Unmitigated)

metric tons/year

22.68

Appendix P

Hydrology Modeling for the CDRP Variant

Memorandum

Subject: Analysis of Refined 2018 WSIP Operation on Alameda Watershed Stream Flows

From: Daniel B. Steiner

Date: August 2, 2010

1. Introduction

This memorandum summarizes an expanded evaluation of the potential effects of the Refined 2018 WSIP (refined WSIP) on the hydrology of certain stream segments in the Alameda Creek watershed and the operations of SFPUC Regional Water System facilities.¹ The evaluation is based on a contrast of HH/LSM results for the simulation of the refined WSIP against the simulation of operations under existing conditions. The focused subjects of this expanded evaluation are the noted stream reaches of the watershed shown in Figure 1, referred to as (1) Alameda Creek below Alameda Creek Diversion Dam (ACDD), (2) Calaveras Creek below Calaveras Dam, and 3) Alameda Creek below Confluence. These stream reaches are affected by the operation of the SFPUC's Alameda Creek Diversion Dam and Calaveras Reservoir.

The operation of the Alameda Creek Diversion Dam and Calaveras Reservoir has been evaluated previously within the context of the San Francisco Public Utilities Commission's Water System Improvement Program (WSIP) studies undertaken in the Program Environmental Impact Report (PEIR). Those evaluations included modeled operations of the dam and reservoir under an "existing" setting that assumed the existing Regional Water System (system) configuration. The operation of Calaveras Reservoir assumed a maximum operating storage of 12.4 BG consistent with objectives established with the Department of Safety of Dams. In the existing setting, no mandated stream releases from Alameda Creek Diversion Dam or Calaveras Reservoir occur.

The modeling studies prepared prior to the adoption of the Phased WSIP Variant ("2018 WSIP") assumed WSIP improvements to the system that included restoring Calaveras Reservoir to full operating capacity (31.5 BG). The studies also assumed implementation of the California Department of Fish and Game Memorandum of Understanding (MOU) stream flow objectives, with the flow at the Alameda Creek/Calaveras Creek confluence (confluence) supplemented from releases from Calaveras Reservoir and recaptured for treatment at Sunol Valley Water Treatment Plant (SVWTP). Since the completion of the PEIR modeling studies, a component of the 2018 WSIP configuration concerning the implementation of the MOU flows was refined. The stream flow objective for Alameda Creek (with compliance measured at the confluence) remained consistent with the MOU. However, in the refined configuration, the primary source of water for compliance at the confluence would be the Alameda Creek Diversion Dam (ACDD), when available, instead of Calaveras reservoir. Releases would be made from Calaveras Reservoir, if necessary, to supplement water released at ACDD. Recapture of MOU flows was also assumed. That configuration was the subject of the results presented in the Draft Environmental Impact Report (DEIR) for the Calaveras Dam Replacement Project. Subsequent to the release of the DEIR, discussions between the SFPUC and the resources agencies have developed additional refinements to the project which would (1) incorporate fish screening facilities at the entrance of the Alameda Creek Diversion Tunnel with an estimated 370 cfs diversion capacity, (2) provide fish passage flow and facilities at Alameda Creek Diversion Dam including a bypass of inflow up to 30 cfs during the period December through March, (3) provide closure of the diversion tunnel between April and November, and (4) provide a minimum fishery flow release schedule below Calaveras Dam (Table 1). Recapture of MOU flows was also assumed. The combination of these configuration refinements leads to the refined 2018 WSIP setting evaluated in this analysis.

¹ This memorandum supplements an earlier document 2018 WSIP Model Run with Crystal Springs Restricted and Alameda Creek Diversion Dam as the Primary Source of In-Stream Releases, April 29, 2009 by David Cameron and Daniel Steiner.

Figure 1
Calaveras Dam Vicinity and Stream Reaches

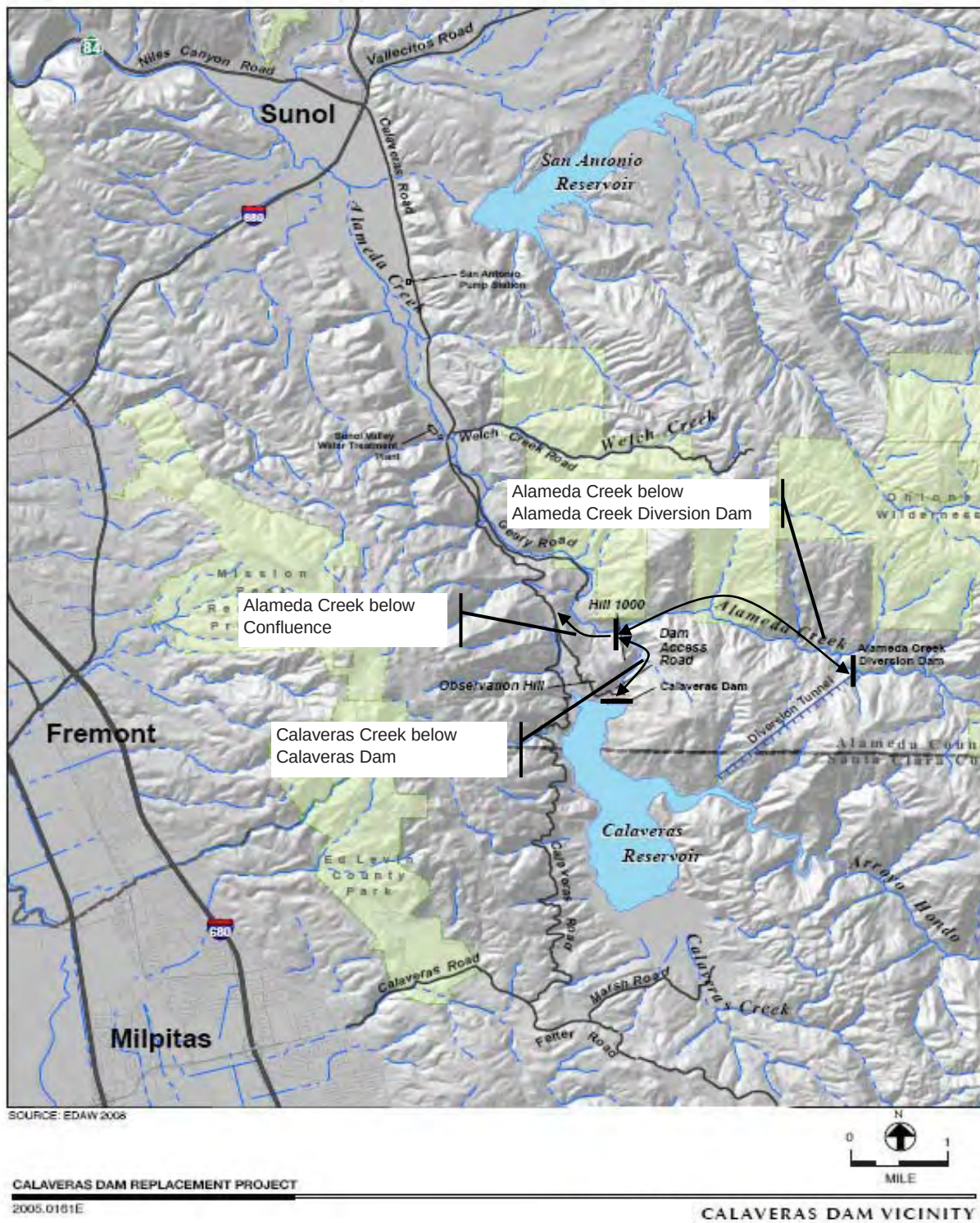


Figure adapted from EDAW 2009

The results of the refined 2018 WSIP Setting described in this memorandum focus upon the operation of ACDD and Calaveras Reservoir, and the resulting stream flow hydrology below these facilities. The operation of ACDD and Calaveras Reservoir are simulated by the use of the Hetch Hetchy/Local Simulation Model (HH/LSM), which is a system-wide monthly time-step operations planning tool used by the SFPUC. HH/LSM uses a scenario-specific system configuration and system water demand over an 82-year historic hydrology (1921-2002) to project operations that might result if that 82-year hydrology recurs. The utility of model simulations is the comparison of results between different scenarios of system configuration, water demand and system operation. This memorandum demonstrates the comparison between the refined 2018 WSIP setting and the existing condition setting.

Table 1
Proposed Flow Schedule below Calaveras Dam

Flow Schedule Decision Date	Flow Schedule Application period	Dry (Schedule B)		Normal/Wet (Schedule A)	
		Cumulative Arroyo Hondo flows for water year (MG)	Flow requirement (cfs)	Cumulative Arroyo Hondo flows for water year (MG)	Flow requirement (cfs)
N/A	October	N/A	7	N/A	7*
N/A	Nov.01 – Dec. 31	N/A	5	N/A	5
Dec. 29	Jan. 01 – Apr.30	<= 360	10*	> 360	12*
April 30	May 01 – Sept. 30	<= 7246	7	> 7246	12

2. Description of Operation

The SFPUC operates the Alameda Creek watershed reservoir system to manage water captured from local watershed runoff and water conveyed from the Hetch Hetchy system. A primary objective of the local reservoir system is to conserve local watershed runoff for delivery. The local reservoir system's operation is seasonally driven. During the winter season, when rainfall and local watershed runoff occurs, the local reservoirs are managed to maintain sufficient available storage in the reservoirs in order to minimize spills from the reservoirs. In anticipation of or subsequent to storm events, runoff is conveyed to the Sunol Valley WTP to maintain reservoir storage at winter storage objective levels. Towards the end of the winter as the likelihood of rain decreases, the reservoirs are operated to capture local watershed runoff with a goal of maximizing storage carried into the late-spring and summer seasons.

During the summer, water drawn from the local reservoirs is minimized in order to preserve stored water so it is available in the event of a disruption of flow from the Hetch Hetchy system (San Joaquin Pipelines) or unplanned outages within the system. As the system demand increases past the capacity of flow from the Hetch Hetchy system, water is drawn from the local reservoirs to serve demands. At the beginning of fall, if the demand on local reservoir supplies has not drawn each reservoir down to its winter-time storage objective level, conveyance between the reservoirs, Hetch Hetchy system flow rates, and treatment plant flow rates are adjusted to reach winter storage objective levels. However, if storage levels are below objectives, additional water may be conveyed from the Hetch Hetchy system to replenish or retain stored water.

Calaveras Reservoir's inflow is supplemented by diversions from Alameda Creek through the Alameda Creek Diversion Dam and Tunnel. The typical operation of the diversion is to divert flow from Alameda Creek when it is available up to the capacity of the tunnel. Flow at the diversion site that exceeds the diversion capacity will flow over the diversion dam and contribute to flows in Alameda Creek downstream of the dam. Other than debris-flushing operations normally at the beginning or end of the rainy-season, the diversion tunnel will remain open. The exception to this operation is when Calaveras Reservoir is at or nearing its maximum level. During these periods, the gates to the diversion tunnel are closed and all Alameda Creek flow passes the diversion dam. The closed-gate operation is more prevalent under the current DSOD restricted-operation condition of Calaveras Reservoir.

Deliveries from Calaveras Reservoir to Sunol Valley WTP are utilized to maintain preferred storage levels in the reservoir and to meet system water deliveries. The amount of water that can be drafted to Sunol

Valley WTP can at times be constrained by system water deliveries and the need to draft water from the Peninsula reservoirs. During those constrained instances, flows to the Peninsula will be rejected. In instances when Calaveras Reservoir exceeds its preferred storage level and Sunol Valley WTP is constrained, the SFPUC can transfer Calaveras Reservoir water to San Antonio Reservoir if reservoir space is available (currently a rarity at the time of opportunity) in the reservoir. Spills (releases) to Calaveras Creek will occur from the reservoir when inflow exceeds reservoir storage availability and draft to Sunol Valley WTP.

Calaveras Reservoir operations also affect the operation of Alameda Creek diversions at the Alameda Creek Diversion Dam. Diversion of flow at the diversion dam to Calaveras Reservoir occurs whenever Calaveras Reservoir is below its maximum storage level. Water not diverted to Calaveras Reservoir continues past the diversion dam and contributes to flow that reaches the Alameda Creek and Calaveras Creek confluence.

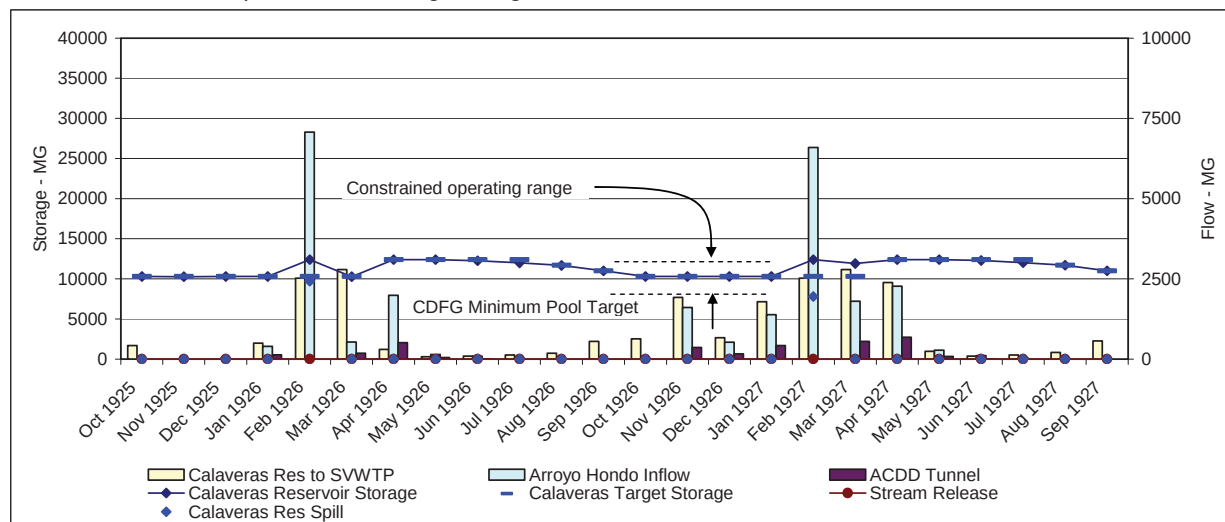
The refined proposed operation supercedes the flow objective of the MOU at the Calaveras Creek and the Alameda Creek confluence. Instead, there would be release requirements and facility operation constraints at both the ACDD and Calaveras Dam. System modeling assumes that supplemental releases up to the amount originally contemplated under the MOU are recaptured by a downstream facility and transferred into the water supply system at Sunol Valley WTP.

2.1 Example of Calaveras Reservoir Operation – Current Constrained Operation

Numerous hydrologic and system operation factors influence the operation of Calaveras Reservoir and the facilities and streams that are affected by its operation. An example of a 2-year sequence of operation (as modeled by HH/LSM) is illustrative of these factors. This particular sequence has been selected to illustrate an example of changes in anticipated system operation resulting from the refined 2018 WSIP, and to illustrate that changes in operational outcomes differ from year to year.

Figure 2.1-1 illustrates a simulated operation of Calaveras Reservoir for a sequence of 24-months, with system operation consistent with the current existing setting including a constrained reservoir elevation at the reservoir.

Figure 2.1-1
Calaveras Reservoir Operation – Existing Setting



Several components of system operation are illustrated. In the background of the Calaveras Reservoir operation is an objective to maintain the storage no greater than the DSOD maximum pool elevation objective of 705 feet (approximately 12,400 MG), and to not draw storage below the CDFG minimum pool target of 690 feet (approximately 8,400 MG). Combined these objectives become the modeled constrained operating range. To operate within this range and continue to effectively utilize some of the

watershed's runoff for water supply, target storage levels are identified that provide guidance for reservoir management. This guidance suggests drawing reservoir storage down during the fall and winter below the DSOD maximum pool elevation objective in order to provide a buffer to absorb storm runoff events. When inflow encroaches into this buffer zone water is released to SVWTP in order to reestablish the buffer zone. During the spring as the likelihood of storm events diminish, the target storage level increases up to the DSOD maximum pool elevation objective, which provides for the capture of late season runoff into storage for system demands during the summer.

Due to the very constrained operating range caused by the DSOD objective and the CDFG minimum pool target, only a limited amount of storage is used to regulate within-year storm events or provide seasonal management of runoff. However, the general rules of system operation still apply to this constrained operation: maintaining water in storage at Calaveras Reservoir is still a priority. Water is primarily released to SVWTP only when passage of inflow or evacuation of storage is suggested to operate near the target storage levels. The exception of this rule is when system deliveries exceed Tuolumne River imports during the summer and local system storage releases are needed to meet deliveries. During these times the call for water from any particular local reservoir is dependent on several considerations, and in the constrained circumstance of Calaveras Reservoir its production has been lessened.

Shown in Figure 2.1-1 are the components of Calaveras Reservoir inflow and releases. The components of inflow from Arroyo Hondo and the Alameda Creek Diversion Dam Tunnel, and releases to SVWTP are illustrated (as vertical bars). Under the existing setting that does not include fish passage facilities and flows and the seasonal closure of the ACDD Tunnel, the occurrence of inflow from Alameda Creek is dependent upon two conditions: 1) inflow to Alameda Creek Diversion Dam, and 2) the ability of Calaveras Reservoir to store the diversion or to pass the diversion to SVWTP. It is assumed that the diversion is available (i.e., tunnel gates open) except when storage in Calaveras Reservoir is projected (for a month) to be greater than the maximum allowed storage. In the existing setting the maximum allowed storage is assumed to be the DSOD objective (view the results shown for February 1926 and February 1927).² During these instances there is typically a spill modeled at Calaveras Reservoir.³ Concurrently, water available from Alameda Creek through the diversion tunnel will be rejected and left to spill past the ACDD. Other than these periods of rejection, water would be diverted from inflow to ACDD, if present, to Calaveras Reservoir including times when the reservoir is operating at its target level.

Reservoir storage is shown to only fluctuate slightly during the year, a result of the constrained operating range. A reservoir's storage is used during a year to modulate inflows with releases. In this constrained setting, releases from the reservoir generally correspond to inflows.

2.2 Example of Calaveras Reservoir Operation – Refined 2018 WSIP Operation

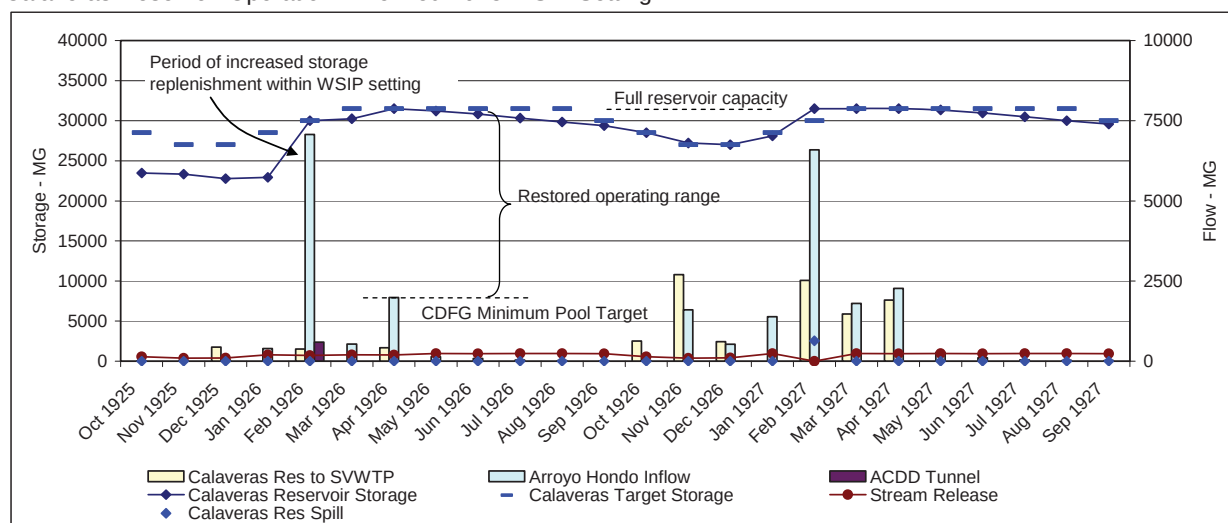
Under a refined 2018 WSIP operation several components of system configuration and constraint change. The implementation of the fish passage facilities and fishery flows adds underlying operating objectives to the system, requiring releases to the streams to be made from facilities where in the past the requirement did not exist nor does a seasonal preclusion of diversions to the ACDD Tunnel occur. The restoration of storage capacity at Calaveras Reservoir will also affect the management of flows within the watershed.

Figure 2.2-1 is an illustration of Calaveras Reservoir operations under a refined 2018 WSIP operation. The illustration is for the same period of study shown above for the existing, constrained setting.

² Actual historical operations have illustrated that storage has been allowed to exceed the DSOD reservoir level objective during the runoff season, with such storage evacuated by the end of spring.

³ "Spill" does not necessarily mean the passage of water through the spillway. The event could be the release of water through valving.

Figure 2.2-1
Calaveras Reservoir Operation – Refined 2018 WSIP Setting



Besides the changes in operation due to implementation of flow objectives being met with releases from ACDD and Calaveras Reservoir, the changes in operation and resulting stream flows are also attributable to the affect of a restored operating range for the reservoir. Evident between the two operations is a greater cycling of reservoir storage. While in the constrained setting reservoir storage could not provide a large amount of regulation between inflows and releases, after restoration of the operating range a greater amount of regulation can occur. This larger operating range, within a year and between years can lead to a greater storage of Arroyo Hondo runoff and a different frequency of diversion from Alameda Creek. The modeled month of February 1926 is illustrative of this change.

In the constrained existing setting, during January Calaveras Reservoir is operated at its target storage level with inflow from Arroyo Hondo and ACDD being passed to SVWTP. During February, inflow from Arroyo Hondo is so great that the release to SVWTP (constrained by system water demands being met from other sources) was not sufficient to maintain Calaveras Reservoir storage at either the target storage level or within the DSOD objective. In this circumstance water available at ACDD is rejected (i.e., tunnel closed) and there is a spill to Calaveras Creek from Calaveras Reservoir.

Within the refined 2018 WSIP operation, the state of Calaveras Reservoir when entering February is different. At the end of January, Calaveras Reservoir storage is well below the target storage as a result of using stored water from Calaveras Reservoir for system deliveries during the previous year. This large storage draw down was not possible in the constrained setting due to the reservoir's limited operating range. With this available storage space, along with the target storage level increasing during February, a large amount of inflow is captured to storage during February. In this example, all of the Arroyo Hondo inflow is regulated (without spill) and a portion of the flow available at the ACDD is diverted to Calaveras Reservoir.

In this month of example, the diversion to Calaveras Reservoir from ACDD is greater within the refined 2018 WSIP operation, decreasing the amount of water that flows past ACDD to Alameda Creek. The amount of water released (spilled) from Calaveras Reservoir to Calaveras Creek also decreases. This circumstance of reduced stream releases is not always the case for each stream reach each month. For the other previously described month of discussion, February 1927, circumstances are different which lead to the same rejection of all ACDD diversions to Calaveras Reservoir, and only a reduction of some of the spill from Calaveras Reservoir to Calaveras Creek. Flow will always occur below Calaveras Dam due to proposed minimum stream flow requirements shown in Table 1.

2.3 Example of ACDD Operation

The operation of ACDD under the two operation settings described above is illustrated in Figure 2.3-1.

Figure 2.3-1
Disposition of ACDD Inflow under Existing and Refined 2018 WSIP Operations

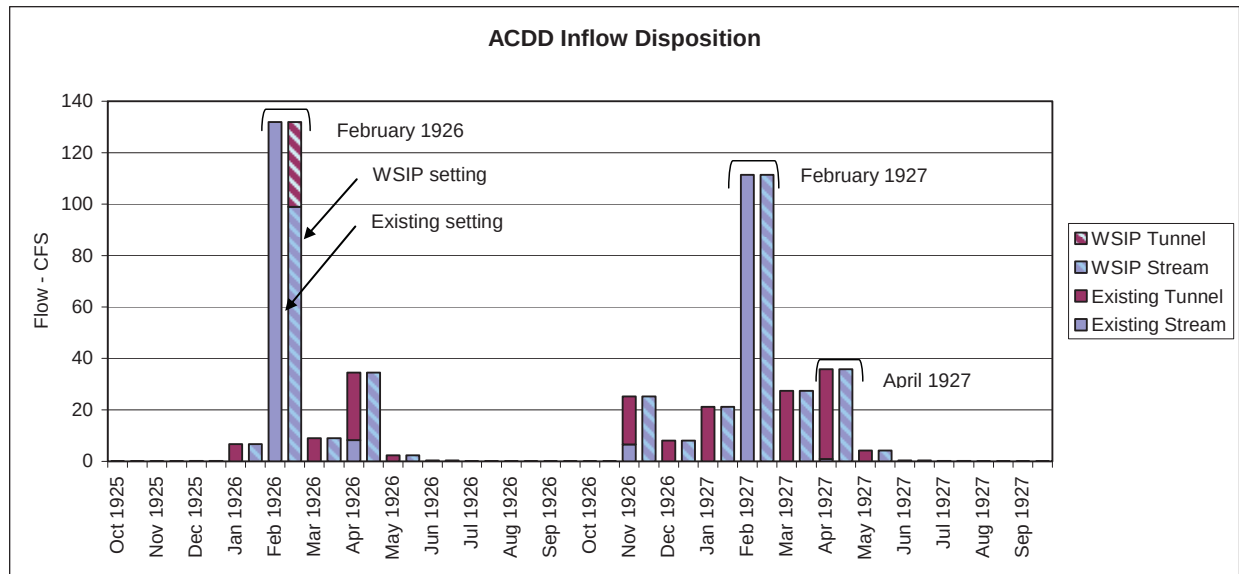


Figure 2.3-1 illustrates the disposition of inflow to ACDD for each month of the 24-month sequence. As an example, in the simulated operation for February 1926, the first bar associated with the month illustrates the disposition of inflow under the existing setting. In this instance, diversion of ACDD inflow to Calaveras Reservoir was rejected due to the constrained operation of Calaveras Reservoir leading to spills to Alameda Creek. The second bar illustrates the disposition of ACDD inflow under refined 2018 WSIP operations. In this instance, as described previously, a portion of ACDD inflow is diverted to Calaveras Reservoir to be stored for coincident or later release. The remaining portion of inflow continues to be passed to Alameda Creek and in this particular example more than is needed to comply with bypass flow objective. The February 1927 results illustrate the same amount of flow past ACDD for the existing and refined 2018 WSIP operation, all of the inflow is passed under either operation.

The April 1927 results illustrate the circumstance of the existing operation diverting the entire flow at ACDD, when under the refined 2018 WSIP operation the entire inflow will be passed because of the proposed operational constraint that closes the gates to the ACDD Tunnel between April and November. In other months of the illustrative period, e.g., January 1926, the entire inflow to ACDD would be passed under refined 2018 WSIP due to the bypass requirement when under existing operations the entire inflow would have been diverted to Calaveras Reservoir.

3. Long-term HH/LSM Results

As illustrated above, the changes to stream flows between the existing and refined 2018 WSIP settings are dependent upon the changes to the operations of Calaveras Reservoir and ACDD. These operation changes are dependent upon several Calaveras Reservoir-related factors, the releases to Alameda Creek and Calaveras Creek, and system wide factors. Shown earlier are the simulated monthly operations for two years, which result in two different outcomes for the affected streams.

HH/LSM is used to provide insight to the frequency of change to stream flow anticipated for the refined 2018 WSIP operation. HH/LSM is the SFPUC's operation planning model that simulates system operation over an 82-year span of differing hydrology, capturing the affects of within-year inflow regulation and year to year water supply objectives. The model simulates system operations on a monthly time step.

Figure 3-1 illustrates the sequential monthly operation of Calaveras Reservoir storage and the resultant flow past ACDD for both the existing and refined 2018 WSIP settings. The flow past ACDD is the result of the proposed fishery flow requirements, Calaveras Reservoir using the diversion from ACDD for reservoir replenishment or supply for SVWTP, and Calaveras Reservoir rejecting diversions from ACDD due to the state of reservoir storage (i.e., being full). Shown in the illustration is the 24-month period of example previously discussed and the entire 82-years of simulation that assumed the recurrence of historical hydrology.

Concerning flows below ACDD, periods of reduction and increases are anticipated to occur. As described previously, reductions will occur when under the refined 2018 WSIP operation greater storage replenishment is needed. This circumstance can occur subsequent to multi-year drought or can occur within any year depending on several factors including system delivery needs from local reservoir storage (creating the need for replenishment) and the amount of runoff that occurs from Arroyo Hondo (negating the need for the ACDD diversion). Increases in flow below ACDD will occur due to the commitment to provide bypassed inflow during December through March. Additional flow will also occur below ACDD during the rest of the year when the gates to the ACDD Tunnel will be closed. These actions will decrease the amount of flow that would otherwise be diverted to Calaveras Reservoir.

Table 3-1 provides an additional illustration of the frequency of the difference in flow that is anticipated with the refined 2018 WSIP operation. Table 3-1a shows the monthly-average flow past ACDD under the refined 2018 WSIP operation. Highlighted with shading are the months when flow is explicitly bypassed towards compliance to the 30 cfs flow objective (December through March). Also highlighted are the months of April through November when the gates to the ACDD Tunnel will be closed. Periods that do not have shading indicate compliance of the flow objective would be met by incidental spills from ACDD or by no reduction to flow available for diversion to Calaveras Reservoir. The underlying values shown in the table are the average monthly flows that would occur past ACDD. Circled values indicate months when the flow past ACDD is anticipated to be reduced due to the change in operations at Calaveras Reservoir.

Table 3-1a illustrates that with a refined 2018 WSIP configuration that includes the winter time bypass requirement and the seasonal tunnel gate closure, flow will explicitly be passed (if inflow occurs to ACDD) that would otherwise may not have been passed under existing operations. The indication that flow would occur during the summer should not be overstated due to the fact that inflow to ACDD can disappear entirely during the summer. However, the intended operation of the gate closure or bypass flow under a refined 2018 WSIP operation would provide passage of inflow if it did occur. Table 3-1b provides additional information regarding the frequency and magnitude of average monthly flow change below ACDD due to the refined 2018 WSIP operation.

Review of these two tables provides the following insights concerning the comparison of the refined 2018 WSIP operation to the existing operation:

- In every year, the implementation of the bypass requirement during the winter and the gate closure the rest of the year will result in more months having flow below ACDD.
- During 30 years out of the 82-years (37 percent of the years) of simulation at least one month of changed operation at Calaveras Reservoir will lead to a reduction in flow past ACDD.
- Within these 30 years of at least one month of reduction, during 13 years (e.g., 1937) there was at least one preceding or following month within the year during which no change occurred and significant flow passed ACDD unaffected by ACDD diversions to Calaveras Reservoir.

Additional information is developed by review of Table 3-1c, that illustrates the same data as Table 3-1b in a ranked order of descending annual inflow to Calaveras Reservoir (i.e., wettest year to driest year). This display of results shows that it is during normal and wetter years that a change in the ACDD diversion operation (that is going from a rejection operation to a diversion operation) is most likely to occur. Caution is advised developing generalized conclusions concerning the “type” of year that changes in flow occur. As discussed earlier several factors affect the changed operation of Calaveras Reservoir, some of which are not directly related to wetness of the basin in any one single year. The information in Table 3-1c is mostly an indication that there is a coincidence of available inflow from ACDD at times when Calaveras Reservoir needs greater replenishment in the refined 2018 WSIP operation. Also, the absence of a “negative” flow value in the table (shown year-round during drier years) does not mean that

Figure 3-1
Calaveras Reservoir Storage and Flow Past ACDD

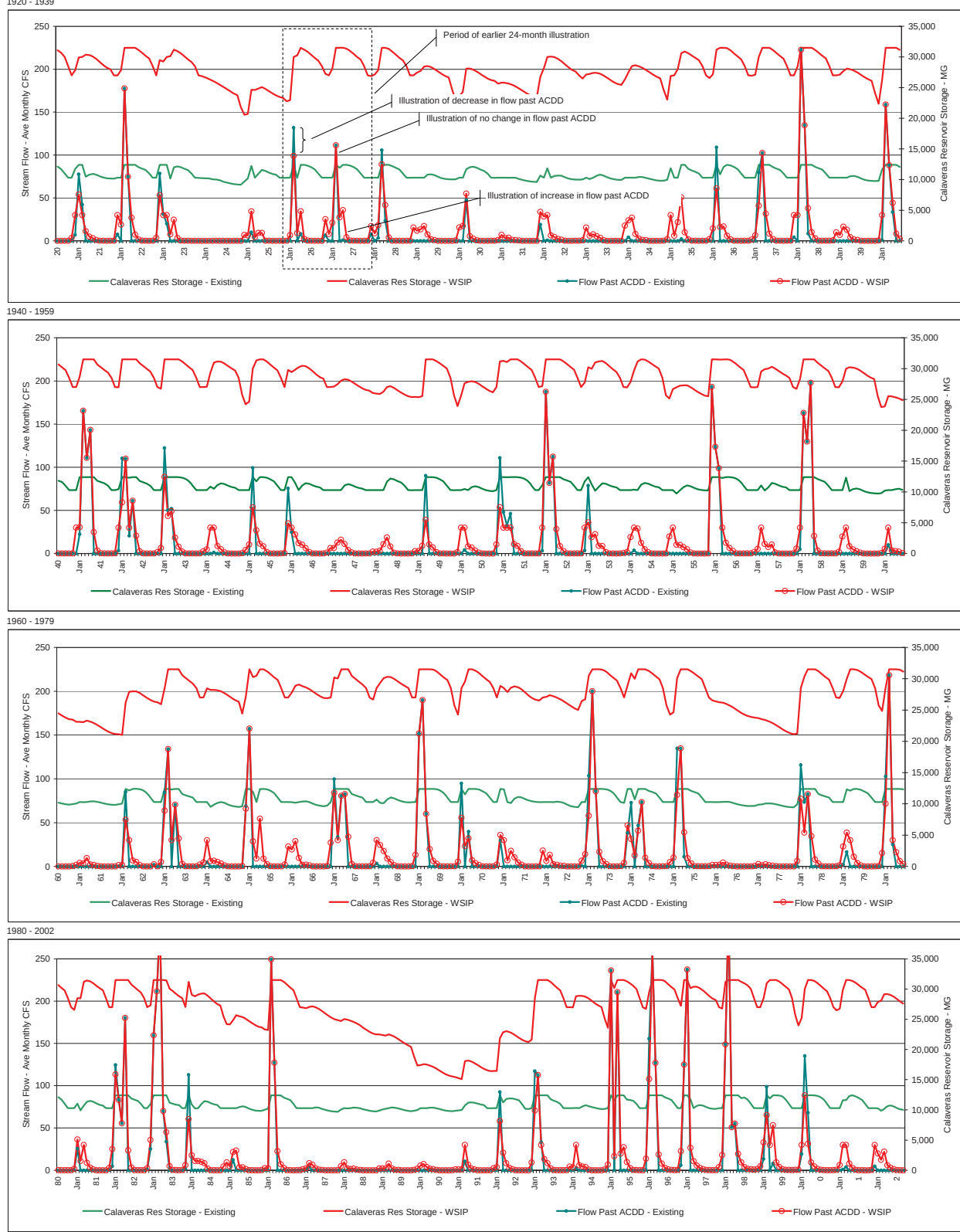


Table 3-1a

Flow Past ACDD under Refined 2018 WSIP Operation – Average Monthly CFS

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1921	0	3	30	54	30	11	5	3	1	0	0	0
1922	0	0	30	19	177	75	27	7	2	0	0	0
1923	0	4	53	30	30	8	25	3	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	7	6	34	4	9	0	0	0	0	0
1926	0	0	0	7	99	9	35	2	0	0	0	0
1927	0	25	8	21	111	27	36	4	0	0	0	0
1928	0	0	17	9	18	89	42	4	0	0	0	0
1929	0	0	16	12	13	17	8	2	1	0	0	0
1930	0	0	1	16	17	55	5	2	1	0	0	0
1931	0	0	1	7	3	4	1	1	1	0	0	0
1932	0	0	34	28	30	6	5	2	1	0	0	0
1933	0	0	1	15	6	8	5	3	1	0	0	0
1934	0	0	18	24	27	8	2	1	1	0	0	0
1935	0	0	2	30	6	22	51	10	2	0	0	0
1936	0	0	2	15	61	16	17	6	2	0	0	0
1937	0	0	1	7	41	102	32	8	2	0	0	0
1938	0	0	30	30	223	135	38	10	3	0	0	0
1939	0	1	10	7	16	13	4	2	1	0	0	0
1940	0	0	1	30	159	88	44	8	2	0	0	0
1941	0	0	30	31	165	111	143	25	3	0	0	0
1942	0	0	30	58	110	30	61	21	3	0	0	0
1943	0	2	6	89	44	49	18	8	2	0	0	0
1944	0	0	3	5	30	30	9	5	1	0	0	0
1945	0	0	4	10	54	27	11	8	2	0	0	0
1946	0	1	35	30	22	12	10	6	2	0	0	0
1947	0	1	6	6	13	16	11	4	1	0	0	0
1948	0	0	2	2	3	11	19	8	1	0	0	0
1949	0	0	3	3	9	39	11	7	2	0	0	0
1950	0	0	2	30	30	8	7	3	1	0	0	0
1951	0	11	54	30	30	30	11	9	3	0	0	0
1952	0	0	30	187	82	112	28	9	3	0	0	0
1953	0	0	30	36	19	22	9	9	2	0	0	0
1954	0	1	2	19	30	29	12	5	2	0	0	0
1955	0	0	20	30	10	10	7	5	1	0	0	0
1956	0	0	193	124	99	30	13	7	3	0	0	0
1957	0	0	2	5	30	11	8	10	1	0	0	0
1958	0	0	6	30	163	130	198	20	4	0	0	0
1959	0	0	2	20	30	9	5	3	1	0	0	0
1960	0	0	1	6	30	4	3	2	1	0	0	0
1961	0	0	2	4	3	10	2	2	1	0	0	0
1962	0	0	1	2	53	30	7	5	1	0	0	0
1963	2	0	5	64	134	30	71	32	3	0	0	0
1964	0	2	5	30	6	6	5	3	1	0	0	0
1965	0	1	66	157	29	9	55	9	3	0	0	0
1966	0	2	23	19	29	10	2	2	1	0	0	0
1967	0	0	27	84	30	81	83	34	3	0	0	0
1968	0	0	4	30	24	18	9	5	1	0	0	0
1969	0	0	13	152	190	60	20	6	3	0	0	0
1970	0	0	5	56	23	32	7	4	2	0	0	0
1971	0	2	36	30	7	18	10	5	2	0	0	0
1972	0	0	18	6	13	3	2	1	1	0	0	0
1973	0	7	14	58	200	86	17	6	3	0	0	0
1974	0	4	47	31	13	41	73	10	4	0	0	0
1975	0	0	5	10	82	135	39	9	3	0	0	0
1976	0	0	2	2	2	4	2	1	0	0	0	0
1977	0	0	1	3	1	2	1	1	0	0	0	0
1978	0	0	6	77	39	83	35	8	3	0	0	0
1979	0	0	1	23	39	30	11	4	1	0	0	0
1980	0	0	15	72	218	30	16	6	3	0	0	0
1981	0	0	2	36	11	30	9	3	1	0	0	0
1982	0	3	25	113	83	56	180	24	3	0	0	0
1983	0	3	36	160	212	294	70	45	5	0	0	0
1984	0	6	61	18	11	11	10	8	2	0	0	0
1985	0	4	9	5	22	23	4	3	2	0	0	0
1986	0	0	2	2	249	127	23	7	3	0	0	0
1987	0	0	1	2	8	7	2	1	1	0	0	0
1988	0	0	5	9	2	2	2	1	0	0	0	0
1989	0	0	2	2	2	8	2	1	0	0	0	0
1990	0	1	2	6	7	4	2	1	1	0	0	0
1991	0	0	1	1	1	30	7	2	1	0	0	0
1992	0	0	3	4	58	21	8	3	1	0	0	0
1993	0	0	9	71	113	30	13	8	2	0	0	0
1994	0	0	4	3	30	6	4	4	1	0	0	0
1995	0	1	7	236	17	211	20	27	10	3	1	0
1996	0	0	14	108	259	127	19	8	3	1	0	0
1997	0	23	125	237	27	11	6	3	1	1	0	0
1998	0	4	18	149	306	51	55	19	9	4	2	1
1999	1	1	5	33	65	30	53	10	4	1	1	0
2000	0	1	1	30	88	31	9	5	2	1	0	0
2001	0	0	1	6	30	30	8	3	1	0	0	0
2002	0	1	30	20	12	22	6	3	1	0	0	0

Key

Periods when explicit bypass release is being made

Periods of less flow past ACDD compared to existing setting

Periods of seasonal ACDD gate closure

Table 3-1b

Difference in Flow below ACDD, Comparison of Refined 2018 WSIP and Existing Operation – Average Monthly CFS

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1921	0	3	23	-24	-12	11	5	3	1	0	0	0
1922	0	0	22	19	0	0	27	7	2	0	0	0
1923	0	4	-25	-1	10	8	25	3	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	7	6	24	4	9	0	0	0	0	0
1926	0	0	0	7	-33	9	26	2	0	0	0	0
1927	0	19	8	21	0	27	35	4	0	0	0	0
1928	0	0	10	9	15	-17	18	4	0	0	0	0
1929	0	0	16	12	13	17	8	2	1	0	0	0
1930	0	0	1	16	17	7	5	2	1	0	0	0
1931	0	0	1	7	3	4	1	1	1	0	0	0
1932	0	0	15	28	29	6	5	2	1	0	0	0
1933	0	0	1	15	6	8	5	3	1	0	0	0
1934	0	0	18	20	27	8	2	1	1	0	0	0
1935	0	0	2	30	6	22	49	10	2	0	0	0
1936	0	0	2	15	-48	16	17	6	2	0	0	0
1937	0	0	1	7	-39	0	32	8	2	0	0	0
1938	0	0	26	30	0	0	29	10	3	0	0	0
1939	0	1	10	7	16	13	4	2	1	0	0	0
1940	0	0	1	29	0	0	11	8	2	0	0	0
1941	0	0	30	8	0	0	0	25	3	0	0	0
1942	0	0	27	-51	0	9	0	21	3	0	0	0
1943	0	2	6	-33	-7	-3	18	8	2	0	0	0
1944	0	0	3	5	30	29	9	5	1	0	0	0
1945	0	0	4	10	-46	27	11	8	2	0	0	0
1946	0	1	-41	5	22	12	10	6	2	0	0	0
1947	0	1	6	6	13	16	11	4	1	0	0	0
1948	0	0	2	2	3	11	19	8	1	0	0	0
1949	0	0	3	3	9	-51	11	7	2	0	0	0
1950	0	0	2	30	26	8	7	3	1	0	0	0
1951	0	11	-57	-18	-3	-16	11	9	3	0	0	0
1952	0	0	27	0	0	0	28	9	3	0	0	0
1953	0	0	27	-43	19	22	9	9	2	0	0	0
1954	0	1	2	19	26	29	12	5	2	0	0	0
1955	0	0	20	30	10	10	7	5	1	0	0	0
1956	0	0	0	0	0	30	13	7	3	0	0	0
1957	0	0	2	5	30	11	8	10	1	0	0	0
1958	0	0	6	25	0	0	0	20	4	0	0	0
1959	0	0	2	20	30	9	5	3	1	0	0	0
1960	0	0	1	6	20	4	3	2	1	0	0	0
1961	0	0	2	4	3	10	2	2	1	0	0	0
1962	0	0	1	2	-32	30	7	5	1	0	0	0
1963	0	0	5	-21	0	30	0	32	3	0	0	0
1964	0	2	5	25	6	6	5	3	1	0	0	0
1965	0	1	-3	0	29	9	55	9	3	0	0	0
1966	0	2	23	19	29	10	2	2	1	0	0	0
1967	0	0	27	-16	-4	0	0	34	3	0	0	0
1968	0	0	4	27	24	18	9	5	1	0	0	0
1969	0	0	13	0	0	0	20	6	3	0	0	0
1970	0	0	5	-39	23	-8	7	4	2	0	0	0
1971	0	2	6	30	7	18	10	5	2	0	0	0
1972	0	0	18	6	13	3	2	1	1	0	0	0
1973	0	6	14	-46	0	0	17	6	3	0	0	0
1974	0	4	9	-41	13	-6	0	10	4	0	0	0
1975	0	0	5	10	-53	0	28	9	3	0	0	0
1976	0	0	2	2	2	4	2	1	0	0	0	0
1977	0	0	1	3	1	2	1	1	0	0	0	0
1978	0	0	6	-38	-35	0	35	8	3	0	0	0
1979	0	0	1	21	22	30	11	4	1	0	0	0
1980	0	0	15	-31	0	5	16	6	3	0	0	0
1981	0	0	2	11	11	30	9	3	1	0	0	0
1982	0	3	20	-11	0	0	0	24	3	0	0	0
1983	0	2	11	0	0	0	0	11	5	0	0	0
1984	0	4	-52	18	11	11	10	8	2	0	0	0
1985	0	4	9	5	9	23	4	3	2	0	0	0
1986	0	0	2	2	0	0	23	7	3	0	0	0
1987	0	0	1	2	5	7	2	1	1	0	0	0
1988	0	0	5	9	2	2	2	1	0	0	0	0
1989	0	0	2	2	2	8	2	1	0	0	0	0
1990	0	1	2	6	7	4	2	1	1	0	0	0
1991	0	0	1	1	1	19	7	2	1	0	0	0
1992	0	0	3	4	-34	21	8	3	1	0	0	0
1993	0	0	9	-46	0	-3	13	8	2	0	0	0
1994	0	0	4	3	28	6	4	4	1	0	0	0
1995	0	1	7	0	17	0	20	27	10	3	1	0
1996	0	0	14	-48	0	0	19	8	3	1	0	0
1997	0	17	0	0	27	11	6	3	1	1	0	0
1998	0	4	18	0	0	0	0	19	9	4	2	1
1999	1	1	5	20	-34	30	45	10	4	1	1	0
2000	0	1	1	11	-47	-37	9	4	2	1	0	0
2001	0	0	1	6	29	26	8	3	1	0	0	0
2002	0	1	25	20	12	22	6	3	1	0	0	0

Key

Reduction in flow

Table 3-1c

Difference in Flow below ACDD, Comparison of Refined 2018 WSIP and Existing Operation – Average Monthly CFS
Rank-ordered by Descending Annual Inflow to Calaveras Reservoir

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1983	0	2	11	0	0	0	0	11	5	0	0	0
1998	0	4	18	0	0	0	0	19	9	4	2	1
1958	0	0	6	25	0	0	0	20	4	0	0	0
1941	0	0	30	8	0	0	0	25	3	0	0	0
1982	0	3	20	-11	0	0	0	24	3	0	0	0
1995	0	1	7	0	17	0	20	27	10	3	1	0
1956	0	0	0	0	0	30	13	7	3	0	0	0
1952	0	0	27	0	0	0	28	9	3	0	0	0
1938	0	0	26	30	0	0	29	10	3	0	0	0
1997	0	17	0	0	27	11	6	3	1	1	0	0
1969	0	0	13	0	0	0	20	6	3	0	0	0
1973	0	6	14	-46	0	0	17	6	3	0	0	0
1986	0	0	2	2	0	0	23	7	3	0	0	0
1980	0	0	15	-31	0	5	16	6	3	0	0	0
1942	0	0	27	-51	0	9	0	21	3	0	0	0
1967	0	0	27	-16	-4	0	0	34	3	0	0	0
1963	0	0	5	-21	0	30	0	32	3	0	0	0
1940	0	0	1	29	0	0	11	8	2	0	0	0
1965	0	1	-3	0	29	9	55	9	3	0	0	0
1996	0	0	14	-48	0	0	19	8	3	1	0	0
1922	0	0	22	19	0	0	27	7	2	0	0	0
1975	0	0	5	10	-53	0	28	9	3	0	0	0
1974	0	4	9	-41	13	-6	0	10	4	0	0	0
1978	0	0	6	-38	-35	0	35	8	3	0	0	0
1993	0	0	9	-46	0	-3	13	8	2	0	0	0
1951	0	11	-57	-18	-3	-16	11	9	3	0	0	0
1943	0	2	6	-33	-7	-3	18	8	2	0	0	0
1927	0	19	8	21	0	27	35	4	0	0	0	0
1937	0	0	1	7	-39	0	32	8	2	0	0	0
2000	0	1	1	11	-47	-37	9	4	2	1	0	0
1921	0	3	23	-24	-12	11	5	3	1	0	0	0
1999	1	1	5	20	-34	30	45	10	4	1	1	0
1923	0	4	-25	-1	10	8	25	3	0	0	0	0
1953	0	0	27	-43	19	22	9	9	2	0	0	0
1928	0	0	10	9	15	-17	18	4	0	0	0	0
1970	0	0	5	-39	23	-8	7	4	2	0	0	0
1984	0	4	-52	18	11	11	10	8	2	0	0	0
1946	0	1	-41	5	22	12	10	6	2	0	0	0
1926	0	0	0	7	-33	9	26	2	0	0	0	0
1936	0	0	2	15	-48	16	17	6	2	0	0	0
1945	0	0	4	10	-46	27	11	8	2	0	0	0
1971	0	2	6	30	7	18	10	5	2	0	0	0
1935	0	0	2	30	6	22	49	10	2	0	0	0
1932	0	0	15	28	29	6	5	2	1	0	0	0
1979	0	0	1	21	22	30	11	4	1	0	0	0
1962	0	0	1	2	-32	30	7	5	1	0	0	0
1949	0	0	3	3	9	-51	11	7	2	0	0	0
1992	0	0	3	4	-34	21	8	3	1	0	0	0
1981	0	0	2	11	11	30	9	3	1	0	0	0
2001	0	0	1	6	29	26	8	3	1	0	0	0
1930	0	0	1	16	17	7	5	2	1	0	0	0
1954	0	1	2	19	26	29	12	5	2	0	0	0
1968	0	0	4	27	24	18	9	5	1	0	0	0
1959	0	0	2	20	30	9	5	3	1	0	0	0
1925	0	0	7	6	24	4	9	9	0	0	0	0
1944	0	0	3	5	30	29	9	5	1	0	0	0
2002	0	1	25	20	12	22	6	3	1	0	0	0
1950	0	0	2	30	26	8	7	3	1	0	0	0
1966	0	2	23	19	29	10	2	2	1	0	0	0
1955	0	0	20	30	10	10	7	5	1	0	0	0
1957	0	0	2	5	30	11	8	10	1	0	0	0
1934	0	0	18	20	27	8	2	1	1	0	0	0
1985	0	4	9	5	9	23	4	3	2	0	0	0
1991	0	0	1	1	1	19	7	2	1	0	0	0
1929	0	0	16	12	13	17	8	2	1	0	0	0
1964	0	2	5	25	6	6	5	3	1	0	0	0
1947	0	1	6	6	13	16	11	4	1	0	0	0
1994	0	0	4	3	28	6	4	4	1	0	0	0
1939	0	1	10	7	16	13	4	2	1	0	0	0
1948	0	0	2	2	3	11	19	8	1	0	0	0
1960	0	0	1	6	20	4	3	2	1	0	0	0
1972	0	0	18	6	13	3	2	1	1	0	0	0
1933	0	0	1	15	6	8	5	3	1	0	0	0
1961	0	0	2	4	3	10	2	2	1	0	0	0
1990	0	1	2	6	7	4	2	1	1	0	0	0
1987	0	0	1	2	5	7	2	1	1	0	0	0
1988	0	0	5	9	2	2	2	1	0	0	0	0
1989	0	0	2	2	2	8	2	1	0	0	0	0
1931	0	0	1	7	3	4	1	1	1	0	0	0
1976	0	0	2	2	2	4	2	1	0	0	0	0
1977	0	0	1	3	1	2	1	1	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0

Key

Reduction in Flow

diversions to Calaveras Reservoir are not occurring. There will be times when there will be greater flow past ACDD than in the existing operation and still be diversions to Calaveras Reservoir – the circumstance is less water will be diverted to Calaveras Reservoir.

Conclusions can be developed from annual average and monthly average by year type summaries of the results. Table 3-2 (Table 3-2a presents units of average monthly cfs, and Table 3-2b presents units of monthly acre-feet) illustrates the average monthly by year-type results for flow passed at ACDD. The results vary by month and year type, with an overall average annual increase in release of about 2,500 acre-feet per year.

Table 3-2a
ACDD Release to Alameda Creek

Flow Passing Alameda Creek Diversion Dam (Average within Year Type - Grouped by 5 Local Reservoir Runoff)												WSIP Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	0	3	38	108	148	97	61	17	4	1	0	0
Above Norr	0	3	20	51	85	53	33	9	2	0	0	0
Normal	0	1	15	21	33	26	16	5	1	0	0	0
Below Norr	0	1	8	16	22	19	7	4	1	0	0	0
Dry	0	0	4	5	9	6	4	2	1	0	0	0
All Years	0	1	17	40	59	40	24	7	2	0	0	0

Flow Passing Alameda Creek Diversion Dam (Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Existing Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	0	0	22	113	146	94	50	2	0	0	0	0
Above Norr	0	0	18	60	95	50	12	0	0	0	0	0
Normal	0	0	16	14	34	15	2	0	0	0	0	0
Below Norr	0	0	0	1	2	4	0	0	0	0	0	0
Dry	0	0	0	0	1	0	0	0	0	0	0	0
All Years	0	0	11	37	55	32	13	0	0	0	0	0

Difference in Flow Passing Alameda Creek Diversion Dam (Average within Year Type - Grouped by 5 Local Reservoir Runoff)												WSIP minus Existing Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	0	2	15	-6	2	3	11	15	4	1	0	0
Above Norr	0	3	2	-9	-10	3	22	9	2	0	0	0
Normal	0	1	-1	7	-1	11	14	5	1	0	0	0
Below Norr	0	1	8	16	20	15	7	4	1	0	0	0
Dry	0	0	4	5	8	6	4	2	1	0	0	0
All Years	0	1	6	3	4	8	11	7	2	0	0	0

Table 3-2b
ACDD Release to Alameda Creek

Flow Passing Alameda Creek Diversion Dam (Average within Year Type - Grouped by 5 Local Reservoir Runoff)													WSIP Acre-feet
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	7	156	2,313	6,626	8,236	5,968	3,608	1,035	227	42	18	12	28,249
Above Norr	18	183	1,234	3,115	4,714	3,278	1,976	542	139	23	11	7	15,240
Normal	7	41	909	1,292	1,807	1,592	939	332	87	8	5	3	7,022
Below Norr	7	42	517	1,008	1,232	1,159	395	246	64	6	4	3	4,684
Dry	7	16	222	314	493	382	238	124	38	3	3	2	1,843
All Years	9	88	1,035	2,461	3,289	2,470	1,425	454	111	17	8	5	11,372

Flow Passing Alameda Creek Diversion Dam (Average within Year Type - Grouped by 5 Local Reservoir Runoff)													Existing Acre-feet
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	0	28	1,379	6,967	8,099	5,757	2,972	130	0	0	0	0	25,331
Above Norr	7	23	1,126	3,672	5,294	3,096	692	0	0	0	0	0	13,911
Normal	0	6	954	868	1,870	906	126	0	0	0	0	0	4,731
Below Norr	0	0	18	45	102	229	0	0	0	0	0	0	394
Dry	0	0	0	0	57	0	0	0	0	0	0	0	58
All Years	1	12	692	2,299	3,075	1,989	748	26	0	0	0	0	8,843

Difference in Flow Passing Alameda Creek Diversion Dam (Average within Year Type - Grouped by 5 Local Reservoir Runoff)													WSIP minus Existing Acre-feet
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	7	128	934	-341	137	211	637	904	227	42	18	12	2,917
Above Norr	11	159	109	-557	-579	181	1,284	542	139	23	11	7	1,329
Normal	7	35	-46	424	-63	687	813	332	87	8	5	3	2,292
Below Norr	7	42	500	962	1,130	930	395	246	64	6	4	3	4,290
Dry	7	16	222	314	435	382	238	124	38	3	3	2	1,785
All Years	8	77	343	161	214	480	677	429	111	17	8	5	2,530

Results are also derived from HH/LSM simulations to illustrate flow immediately below Calaveras Dam. The interdependence of the Calaveras Reservoir operating range and releases from Calaveras Reservoir to Calaveras Creek (spill) is similar to the affect of the operating range upon rejection of diversions from ACDD to Calaveras Reservoir. If there is no, or limited available storage space in Calaveras Reservoir to regulate inflows with releases to SVWTP, diversions from ACDD will be rejected and excess inflow from Arroyo Hondo will be passed through Calaveras Reservoir to Calaveras Creek. The fishery flow requirement below Calaveras Dam will provide flow below the dam every month while in the existing setting flow would only occur when Calaveras Dam is spilling.

Figure 3-2 illustrates the sequential monthly operation of Calaveras Reservoir storage and the resultant flow to Calaveras Creek for both the existing and refined 2018 WSIP settings. The noticeable difference in releases to the stream from Calaveras Dam is the release of flow for the flow requirement and the reduction in passage of occasional storm inflows. Shown in the illustration are the 24-month period of example previously discussed and the entire 82-years of simulation that assumed the recurrence of historical hydrology.

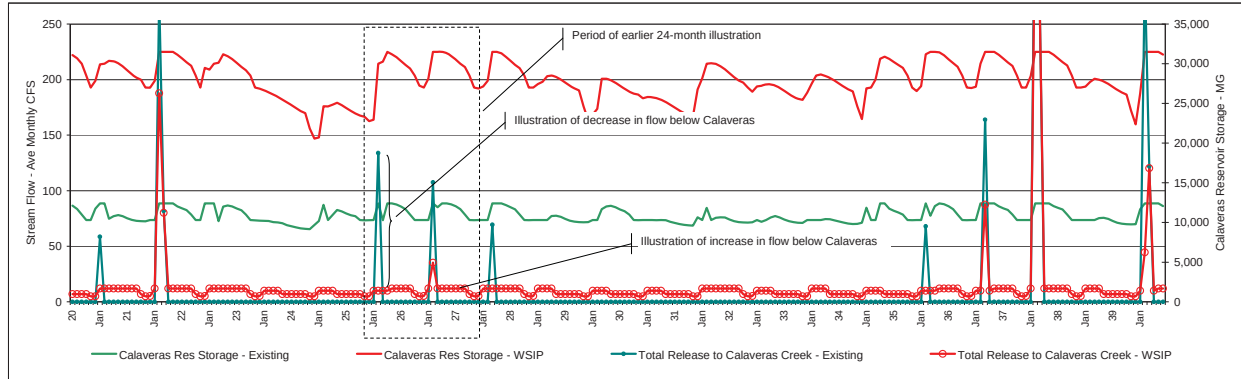
As described earlier, the restoration of the operating range at Calaveras Reservoir will develop a greater within-year or year to year need for reservoir replenishment. For the February 1926 example, the replenishment need of Calaveras Reservoir during this month absorbed the total amount inflow from Arroyo Hondo, which in the existing operation needed to be partially released to Calaveras Creek in order to not exceed the DSOD storage level objective. Table 3-3a illustrates the frequency and magnitude of releases from Calaveras Dam to Calaveras Creek under the refined 2018 WSIP operation.

The results show that during all months of all years flow will occur below Calaveras Dam, unlike under existing operations when flow only occurs during spill conditions. Circled values in Table 3-3a indicate months in which the release from Calaveras Reservoir to Calaveras Creek will be diminished under the refined 2018 WSIP operation. The diminishment of flow occurs during periods when under the existing operation limited storage space in Calaveras Reservoir required the passage of Arroyo Hondo inflow (spills). Un-shaded periods indicate when it is anticipated that Calaveras Reservoir will be spilling. Table 3-3b provides additional information regarding the change in flows below Calaveras Dam, both reductions in flow due to reservoir replenishment and increases in flow due to required fishery flow releases.

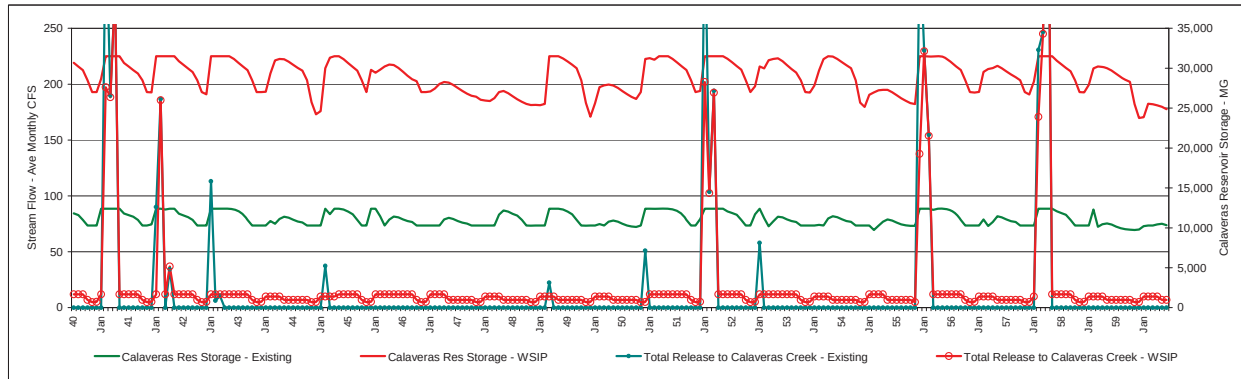
With the ability to make valve releases from Calaveras Reservoir prior to maximum storage pool, in either operation the releases to Calaveras Creek would be generally “constant” without significant fluctuation for days or weeks in duration.

Table 3-4a and Table 3-4b provide annual average and monthly average by year type summaries of the results. Table 3-4a presents units of average monthly cfs, and Table 3-4b presents units of acre-feet illustrating the average monthly by year-type results for flow released from Calaveras Dam. The results vary by month and year type, with a trend to reduce flows during winter months of wetter years for reservoir replenishment and an increase in flows in all other months due to the required fishery flow requirement. The overall change in average annual release for the 82-year simulation period is an average annual increase of over 2,400 acre-feet.

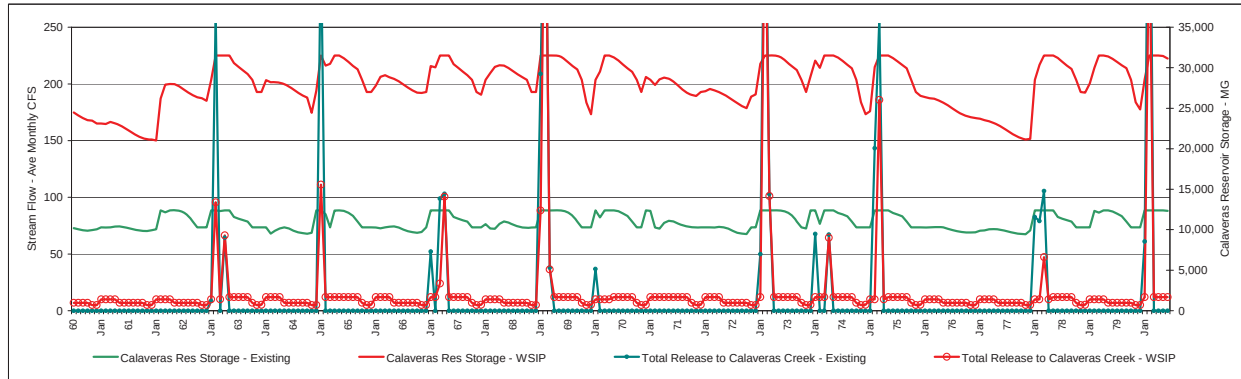
Figure 3-2
Calaveras Reservoir Storage and Release to Calaveras Creek
1920 - 1939



1940 - 1959



1960 - 1979



1980 - 2002

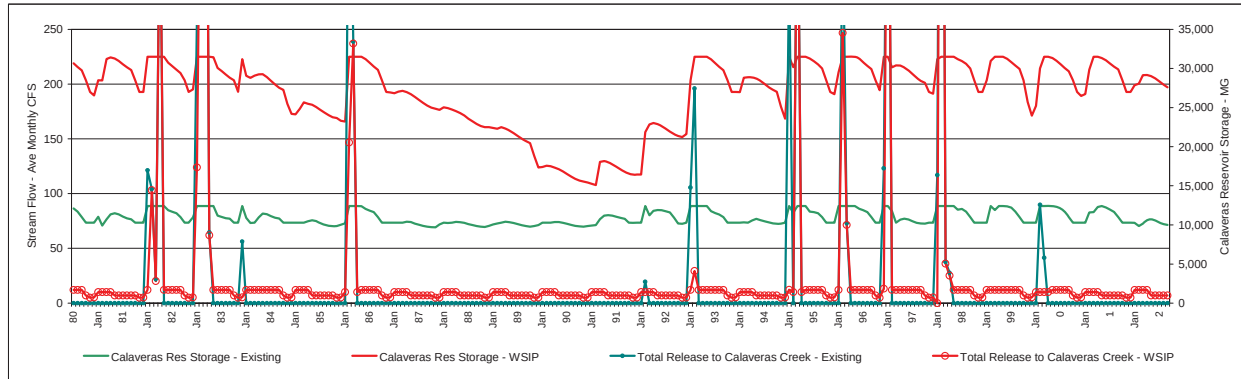


Table 3-3a

Calaveras Dam Releases to Calaveras Creek – Refined 2018 WSIP Operation

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1921	7	5	5	12	12	12	12	12	12	12	12	12
1922	7	5	5	12	188	80	12	12	12	12	12	12
1923	7	5	5	12	12	12	12	12	12	12	12	12
1924	7	5	5	10	10	10	10	7	7	7	7	7
1925	7	5	5	10	10	10	10	7	7	7	7	7
1926	7	5	5	10	10	10	10	12	12	12	12	12
1927	7	5	5	12	35	12	12	12	12	12	12	12
1928	7	5	5	12	12	12	12	12	12	12	12	12
1929	7	5	5	12	12	12	12	7	7	7	7	7
1930	7	5	5	10	10	10	10	7	7	7	7	7
1931	7	5	5	10	10	10	10	7	7	7	7	7
1932	7	5	5	12	12	12	12	12	12	12	12	12
1933	7	5	5	10	10	10	10	7	7	7	7	7
1934	7	5	5	12	12	12	12	7	7	7	7	7
1935	7	5	5	10	10	10	10	7	7	7	7	7
1936	7	5	5	10	10	10	10	12	12	12	12	12
1937	7	5	5	10	10	87	10	12	12	12	12	12
1938	7	5	5	12	355	260	12	12	12	12	12	12
1939	7	5	5	12	12	12	12	7	7	7	7	7
1940	7	5	5	10	45	120	10	12	12	12	12	12
1941	7	5	5	12	197	186	283	12	12	12	12	12
1942	7	5	5	12	186	12	37	12	12	12	12	12
1943	7	5	5	12	12	12	12	12	12	12	12	12
1944	7	5	5	10	10	10	10	7	7	7	7	7
1945	7	5	5	10	10	10	10	12	12	12	12	12
1946	7	5	5	12	12	12	12	12	12	12	12	12
1947	7	5	5	12	12	12	12	7	7	7	7	7
1948	7	5	5	10	10	10	10	7	7	7	7	7
1949	7	5	5	10	10	10	10	7	7	7	7	7
1950	7	5	5	10	10	10	10	7	7	7	7	7
1951	7	5	5	12	12	12	12	12	12	12	12	12
1952	7	5	5	202	103	192	12	12	12	12	12	12
1953	7	5	5	12	12	12	12	12	12	12	12	12
1954	7	5	5	10	10	10	10	7	7	7	7	7
1955	7	5	5	12	12	12	12	7	7	7	7	7
1956	7	5	138	229	154	12	12	12	12	12	12	12
1957	7	5	5	10	10	10	10	7	7	7	7	7
1958	7	5	5	10	171	245	446	12	12	12	12	12
1959	7	5	5	10	10	10	10	7	7	7	7	7
1960	7	5	5	10	10	10	10	7	7	7	7	7
1961	7	5	5	10	10	10	10	7	7	7	7	7
1962	7	5	5	10	10	10	10	7	7	7	7	7
1963	7	5	5	10	96	12	66	12	12	12	12	12
1964	7	5	5	12	12	12	12	7	7	7	7	7
1965	7	5	5	111	12	12	12	12	12	12	12	12
1966	7	5	5	12	12	12	12	7	7	7	7	7
1967	7	5	5	12	12	24	101	12	12	12	12	12
1968	7	5	5	10	10	10	10	7	7	7	7	7
1969	7	5	5	88	426	36	12	12	12	12	12	12
1970	7	5	5	10	10	10	10	12	12	12	12	12
1971	7	5	5	12	12	12	12	12	12	12	12	12
1972	7	5	5	12	12	12	12	7	7	7	7	7
1973	7	5	5	12	371	101	12	12	12	12	12	12
1974	7	5	5	12	12	12	64	12	12	12	12	12
1975	7	5	5	10	10	186	10	12	12	12	12	12
1976	7	5	5	10	10	10	10	7	7	7	7	7
1977	7	5	5	10	10	10	10	7	7	7	7	7
1978	7	5	5	10	10	47	10	12	12	12	12	12
1979	7	5	5	10	10	10	10	7	7	7	7	7
1980	7	5	5	12	346	12	12	12	12	12	12	12
1981	7	5	5	10	10	10	10	7	7	7	7	7
1982	7	5	5	12	103	20	384	12	12	12	12	12
1983	7	5	5	124	486	728	62	12	12	12	12	12
1984	7	5	5	5	12	12	12	12	12	12	12	12
1985	7	5	5	12	12	12	12	7	7	7	7	7
1986	7	5	5	10	147	237	10	12	12	12	12	12
1987	7	5	5	10	10	10	10	7	7	7	7	7
1988	7	5	5	10	10	10	10	7	7	7	7	7
1989	7	5	5	10	10	10	10	7	7	7	7	7
1990	7	5	5	10	10	10	10	7	7	7	7	7
1991	7	5	5	10	10	10	10	7	7	7	7	7
1992	7	5	5	10	10	10	10	7	7	7	7	7
1993	7	5	5	12	29	12	12	12	12	12	12	12
1994	7	5	5	10	10	10	10	7	7	7	7	7
1995	7	5	5	12	12	407	10	12	12	12	12	12
1996	7	5	5	12	247	71	12	12	12	12	12	12
1997	7	5	13	561	12	12	12	12	12	12	12	12
1998	7	5	5	0	889	36	25	12	12	12	12	12
1999	7	5	5	12	12	12	12	12	12	12	12	12
2000	7	5	5	10	10	10	10	12	12	12	12	12
2001	7	5	5	10	10	10	10	7	7	7	7	7
2002	7	5	5	12	12	12	12	7	7	7	7	7

Key

Periods when compliance release is being made

Periods of less flow to Creek compared to existing setting

Table 3-3b

Difference in Flow below Calaveras Dam, Comparison of Refined 2018 WSIP and Existing Operation – Average Monthly CFS

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1921	7	5	5	-47	12	12	12	12	12	12	12	12
1922	7	5	5	12	-87	-2	12	12	12	12	12	12
1923	7	5	5	12	12	12	12	12	12	12	12	12
1924	7	5	5	10	10	10	10	7	7	7	7	7
1925	7	5	5	10	10	10	10	7	7	7	7	7
1926	7	5	5	10	-124	10	10	12	12	12	12	12
1927	7	5	5	12	-72	12	12	12	12	12	12	12
1928	7	5	5	12	12	-57	12	12	12	12	12	12
1929	7	5	5	12	12	12	12	7	7	7	7	7
1930	7	5	5	10	10	10	10	7	7	7	7	7
1931	7	5	5	10	10	10	10	7	7	7	7	7
1932	7	5	5	12	12	12	12	12	12	12	12	12
1933	7	5	5	10	10	10	10	7	7	7	7	7
1934	7	5	5	12	12	12	12	7	7	7	7	7
1935	7	5	5	10	10	10	10	7	7	7	7	7
1936	7	5	5	10	-58	10	10	12	12	12	12	12
1937	7	5	5	10	10	-76	10	12	12	12	12	12
1938	7	5	5	12	-54	-2	12	12	12	12	12	12
1939	7	5	5	12	12	12	12	7	7	7	7	7
1940	7	5	5	10	-250	-2	10	12	12	12	12	12
1941	7	5	5	12	-157	-2	-3	12	12	12	12	12
1942	7	5	5	-78	-1	12	2	12	12	12	12	12
1943	7	5	5	-101	6	1	12	12	12	12	12	12
1944	7	5	5	10	10	10	10	7	7	7	7	7
1945	7	5	5	10	-27	10	10	12	12	12	12	12
1946	7	5	5	12	12	12	12	12	12	12	12	12
1947	7	5	5	12	12	12	12	7	7	7	7	7
1948	7	5	5	10	10	10	10	7	7	7	7	7
1949	7	5	5	10	10	-12	10	7	7	7	7	7
1950	7	5	5	10	10	10	10	7	7	7	7	7
1951	7	5	-46	12	12	12	12	12	12	12	12	12
1952	7	5	5	-153	-1	-2	12	12	12	12	12	12
1953	7	5	5	-46	12	12	12	12	12	12	12	12
1954	7	5	5	10	10	10	10	7	7	7	7	7
1955	7	5	5	12	12	12	12	7	7	7	7	7
1956	7	5	-192	-1	-1	12	12	12	12	12	12	12
1957	7	5	5	10	10	10	10	7	7	7	7	7
1958	7	5	5	10	-60	-2	-3	12	12	12	12	12
1959	7	5	5	10	10	10	10	7	7	7	7	7
1960	7	5	5	10	10	10	10	7	7	7	7	7
1961	7	5	5	10	10	10	10	7	7	7	7	7
1962	7	5	5	10	10	10	10	7	7	7	7	7
1963	7	5	5	1	-167	10	2	12	12	12	12	12
1964	7	5	5	12	12	12	12	7	7	7	7	7
1965	7	5	5	-217	12	12	12	12	12	12	12	12
1966	7	5	5	12	12	12	12	7	7	7	7	7
1967	7	5	5	-40	12	-75	-3	12	12	12	12	12
1968	7	5	5	10	10	10	10	7	7	7	7	7
1969	7	5	5	-120	-1	-2	12	12	12	12	12	12
1970	7	5	5	-27	10	10	10	12	12	12	12	12
1971	7	5	5	12	12	12	12	12	12	12	12	12
1972	7	5	5	12	12	12	12	7	7	7	7	7
1973	7	5	5	-38	-58	-2	12	12	12	12	12	12
1974	7	5	5	-56	12	12	-3	12	12	12	12	12
1975	7	5	5	10	-133	-72	10	12	12	12	12	12
1976	7	5	5	10	10	10	10	7	7	7	7	7
1977	7	5	5	10	10	10	10	7	7	7	7	7
1978	7	5	5	-73	-69	-58	10	12	12	12	12	12
1979	7	5	5	10	10	10	10	7	7	7	7	7
1980	7	5	5	-49	-164	12	12	12	12	12	12	12
1981	7	5	5	10	10	10	10	7	7	7	7	7
1982	7	5	5	-109	-1	-2	-3	12	12	12	12	12
1983	7	5	5	-137	-1	-2	-3	12	12	12	12	12
1984	7	5	-51	12	12	12	12	12	12	12	12	12
1985	7	5	5	12	12	12	12	7	7	7	7	7
1986	7	5	5	10	-337	-2	10	12	12	12	12	12
1987	7	5	5	10	10	10	10	7	7	7	7	7
1988	7	5	5	10	10	10	10	7	7	7	7	7
1989	7	5	5	10	10	10	10	7	7	7	7	7
1990	7	5	5	10	10	10	10	7	7	7	7	7
1991	7	5	5	10	10	10	10	7	7	7	7	7
1992	7	5	5	10	-10	10	10	7	7	7	7	7
1993	7	5	5	-94	-167	12	12	12	12	12	12	12
1994	7	5	5	10	10	10	10	7	7	7	7	7
1995	7	5	5	-291	10	-27	10	12	12	12	12	12
1996	7	5	5	12	-111	-2	12	12	12	12	12	12
1997	7	5	-110	-1	12	12	12	12	12	12	12	12
1998	7	5	5	-117	-18	-2	-3	12	12	12	12	12
1999	7	5	5	12	12	12	12	12	12	12	12	12
2000	7	5	5	10	-80	-31	10	12	12	12	12	12
2001	7	5	5	10	10	10	10	7	7	7	7	7
2002	7	5	5	12	12	12	12	7	7	7	7	7

Key

Reduction in flow

Table 3-4a
Calaveras Reservoir Release to Calaveras Creek

Total Stream Release from Calaveras Reservoir												WSIP
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	7	5	14	83	248	158	90	12	12	12	12	12
Above Norr	7	5	5	17	45	42	18	12	12	12	12	12
Normal	7	5	5	11	11	11	11	10	10	10	10	10
Below Norr	7	5	5	11	11	11	11	7	7	7	7	7
Dry	7	5	5	10	10	10	10	7	7	7	7	7
All Years	7	5	7	26	64	46	28	10	10	10	10	10
Total Stream Release from Calaveras Reservoir												Existing
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	0	0	28	151	299	162	84	0	0	0	0	0
Above Norr	0	0	3	45	107	50	8	0	0	0	0	0
Normal	0	0	4	6	16	6	0	0	0	0	0	0
Below Norr	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0
All Years	0	0	7	40	84	43	18	0	0	0	0	0
Difference in Total Stream Release from Calaveras Reservoir												WSIP minus Existing
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	7	5	-14	-68	-51	-4	6	12	12	12	12	12
Above Norr	7	5	2	-28	-62	-8	10	12	12	12	12	12
Normal	7	5	2	5	-5	5	11	10	10	10	10	10
Below Norr	7	5	5	11	11	11	11	7	7	7	7	7
Dry	7	5	5	10	10	10	10	7	7	7	7	7
All Years	7	5	0	-14	-20	3	10	10	10	10	10	10

Table 3-4b
Calaveras Reservoir Release to Calaveras Creek

Total Stream Release from Calaveras Reservoir												WSIP	
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Acre-feet	
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	430	298	856	5,075	13,773	9,699	5,362	738	714	738	738	714	39,135
Above Norr	430	298	317	1,053	2,494	2,605	1,053	738	714	738	738	714	11,892
Normal	430	298	316	661	597	661	640	623	602	623	623	602	6,676
Below Norr	430	298	317	666	601	666	644	430	417	430	430	417	5,746
Dry	430	298	316	638	576	638	617	430	417	430	430	417	5,638
All Years	430	298	422	1,600	3,558	2,824	1,643	592	573	592	592	573	13,695
Total Stream Release from Calaveras Reservoir												Existing	
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Acre-feet	
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	0	0	1,741	9,267	16,622	9,968	5,024	0	0	0	0	0	42,623
Above Norr	0	0	184	2,766	5,917	3,096	459	0	0	0	0	0	12,423
Normal	0	0	216	364	898	353	0	0	0	0	0	0	1,831
Below Norr	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0	0
All Years	0	0	420	2,453	4,645	2,656	1,076	0	0	0	0	0	11,249
Difference in Total Stream Release from Calaveras Reservoir												WSIP minus Existing	
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Acre-feet	
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	430	298	-885	-4,192	-2,849	-269	338	738	714	738	738	714	-3,488
Above Norr	430	298	133	-1,712	-3,424	-491	594	738	714	738	738	714	-530
Normal	430	298	100	297	-301	308	640	623	602	623	623	602	4,845
Below Norr	430	298	317	666	601	666	644	430	417	430	430	417	5,746
Dry	430	298	316	638	576	638	617	430	417	430	430	417	5,638
All Years	430	298	2	-852	-1,087	168	568	592	573	592	592	573	2,446

Flow at the confluence will change between the two settings, both in monthly distribution and in annual occurrence. The flow at the confluence is affected by the SFPUC's operations at ACDD and Calaveras Dam as described previously, and the occurrence of unregulated runoff from the watersheds below the dam structures.

Shown in the following table for information, the unregulated watershed below the dam structures is estimated to produce an average annual 1,900 acre-feet of flow, varying greatly between years dependent upon rainfall events. Although modeled as a monthly average quantity, the hydrograph of the runoff has typical rising and falling limbs varying instantaneously throughout a day depending on the magnitude and temporal distribution of rainfall.

Unregulated Flow between ACDD and Calaveras Confluence - Average Monthly CFS (Average within Year Type - Grouped by 5 Local Reservoir Runoff)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	0	1	6	16	21	16	10	3	1	0	0	0
Above Norr	0	1	4	10	14	9	5	2	0	0	0	0
Normal	0	0	4	4	7	5	3	1	0	0	0	0
Below Norr	0	0	1	2	4	4	1	1	0	0	0	0
Dry	0	0	0	1	1	1	1	0	0	0	0	0
All Years	0	0	3	7	10	7	4	1	0	0	0	0

Unregulated Flow between ACDD and Calaveras Confluence - Acre-feet (Average within Year Type - Grouped by 5 Local Reservoir Runoff)													
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	1	52	344	1,009	1,188	986	602	177	31	12	5	2	4,409
Above Norr	5	45	244	598	776	561	311	103	21	6	2	1	2,673
Normal	1	22	226	269	386	327	158	60	10	2	0	0	1,461
Below Norr	1	22	61	141	235	221	72	41	7	0	0	0	801
Dry	1	6	26	35	67	70	43	23	2	0	0	0	272
All Years	2	30	179	409	530	432	236	80	14	4	1	1	1,919

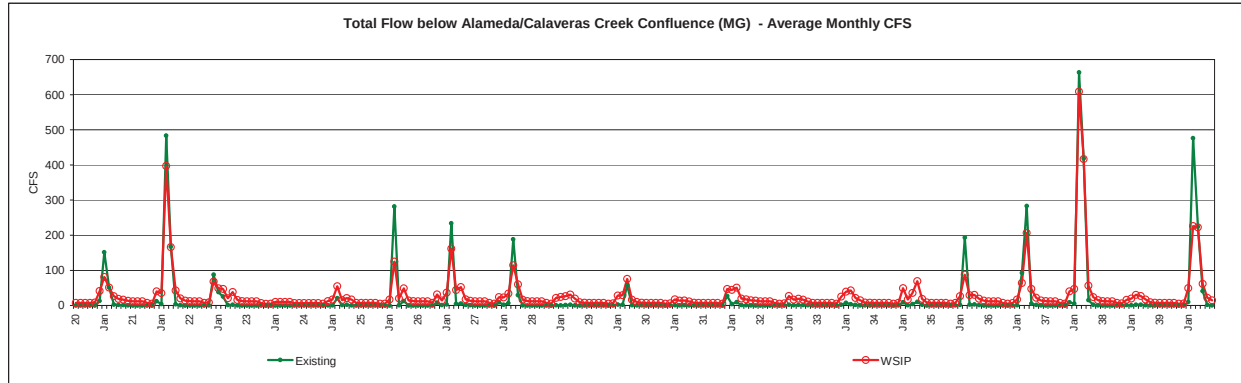
This unregulated runoff begins to add flow to the stream reaches immediately below the dam structures, the amount added at any point in the stream reach is about in proportion to the watershed area added to the stream at that point.

Figure 3-3 illustrates the simulated flow at the confluence under the existing and refined 2018 WSIP operations, and Table 3-5a illustrates the frequency and magnitude of flow at the confluence under the refined 2018 WSIP operation. Complementing that illustration is Table 3-5b that provides additional information regarding the change in flows at the confluence, the combined reductions in flow due to reservoir replenishment and the increases in flow due to ACDD and Calaveras Dam releases.

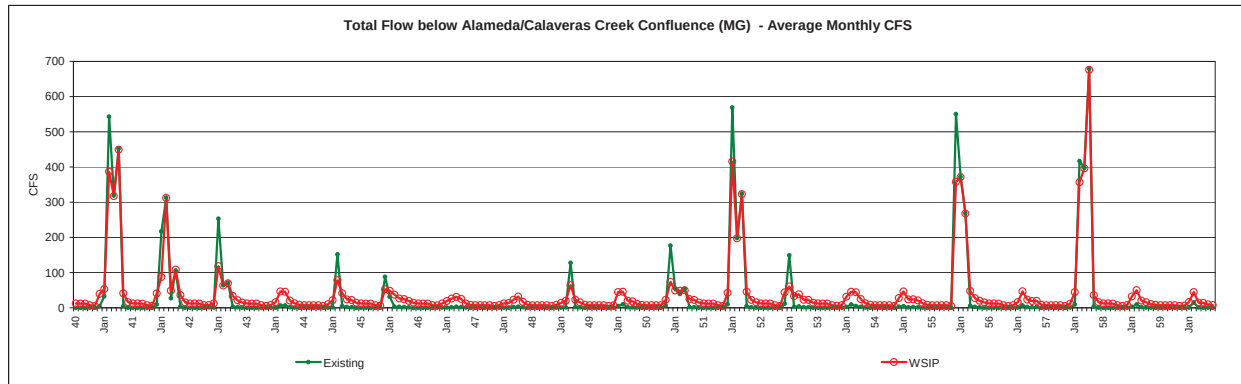
There are 984 months of this simulation (82 years, 12 months a year). There are 90 months (9 percent of the months) in which a reduction in average monthly flow occurs. These reductions can be the result of solely the reduced spills from Calaveras, solely the reduced spill from ACDD, or the combination of both. There are 894 months (91 percent) when flow volume increases. Table 3-6a and Table 3-6b provide annual average and monthly average by year type summaries of the results. Table 3-6a presents units of average monthly cfs, and Table 3-6b presents units of acre-feet illustrating the average monthly by year-type results for flow at the confluence. The results vary by month and year type, with a trend to reduce flows during winter months of wetter years for reservoir replenishment and an increase in flows in all other months. The overall change in average annual release for the 82-year simulation period is an average annual increase in flow of about 5,000 acre-feet per year.

Downstream of the confluence, additional unregulated watershed runoff (including flow from Welch Creek and other creeks) will increase flows in Alameda Creek. The hydrograph of the unregulated runoff has typical rising and falling limbs varying instantaneously throughout a day depending on the magnitude and temporal distribution of rainfall. This unregulated runoff begins to add flow to the stream immediately below the confluence, with the amount of flow added at any point in the stream reach dependent upon the watershed area added to the stream at that point.

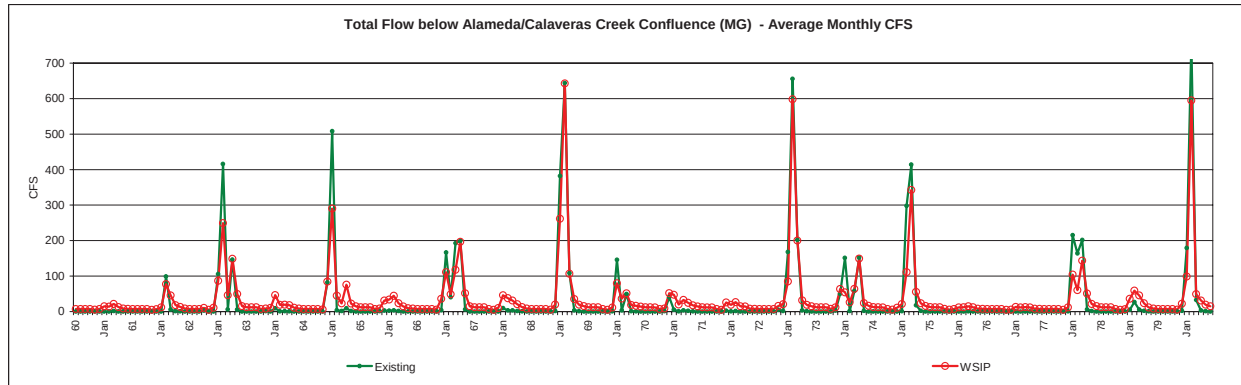
Figure 3-3
Flow at Confluence – Existing and Refined 2018 WSIP Operations
1920 - 1939



1940 - 1959



1960 - 1979



1980 - 2002

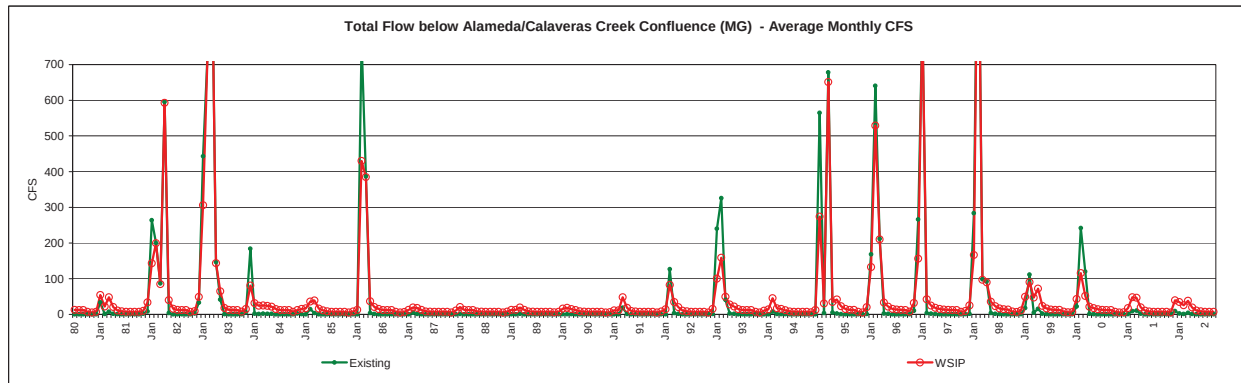


Table 3-5a

Flow at Confluence under Refined 2018 WSIP Operation – Average Monthly CFS

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1921	7	8	▲ 41	81	51	26	19	16	13	12	12	12
1922	7	5	▲ 40	35	397	166	43	20	14	12	12	12
1923	7	9	68	49	47	21	38	16	12	12	12	12
1924	7	5	5	10	10	10	10	7	7	7	7	7
1925	7	5	▲ 12	17	55	15	21	17	7	7	7	7
1926	7	5	▲ 5	17	128	20	49	14	12	12	12	12
1927	7	32	▲ 15	36	162	44	52	18	13	12	12	12
1928	7	5	▲ 24	23	34	115	60	16	12	12	12	12
1929	7	5	▲ 21	25	27	31	20	9	8	7	7	7
1930	7	5	▲ 6	28	29	75	16	10	8	7	7	7
1931	7	5	▲ 6	18	14	14	11	8	8	7	7	7
1932	7	5	47	44	51	20	18	15	13	12	12	12
1933	7	5	▲ 6	27	17	19	16	11	8	7	7	7
1934	7	5	25	39	43	22	15	8	8	7	7	7
1935	7	5	▲ 7	49	17	36	69	19	9	7	7	7
1936	7	5	▲ 7	26	87	29	30	19	14	12	12	12
1937	7	5	▲ 7	17	64	206	47	22	14	12	12	12
1938	7	5	40	47	609	417	56	24	15	12	12	12
1939	7	6	▲ 16	20	30	27	17	9	8	7	7	7
1940	7	5	▲ 6	49	226	223	62	22	15	12	12	12
1941	7	5	40	53	386	317	449	41	16	13	12	12
1942	7	6	41	88	312	49	108	36	15	12	12	12
1943	7	8	12	118	63	70	34	21	15	12	12	12
1944	7	5	▲ 8	16	46	45	21	13	9	7	7	7
1945	7	6	▲ 10	22	79	42	24	22	14	12	12	12
1946	7	6	53	48	37	26	24	19	14	12	12	12
1947	7	7	12	19	26	31	25	12	9	7	7	7
1948	7	5	▲ 8	12	14	23	32	17	8	7	7	7
1949	7	5	▲ 8	14	20	64	23	16	9	7	7	7
1950	7	5	▲ 7	45	46	20	18	11	8	7	7	7
1951	7	22	74	49	48	50	25	22	15	12	12	12
1952	7	5	42	415	197	323	45	22	15	12	12	12
1953	7	5	43	60	33	38	23	22	14	12	12	12
1954	7	6	▲ 7	32	45	44	25	13	9	7	7	7
1955	7	5	27	46	23	24	21	13	8	7	7	7
1956	7	5	358	371	268	48	27	20	15	12	12	12
1957	7	5	7	16	47	23	19	19	8	7	7	7
1958	7	5	12	44	357	396	676	36	16	13	12	12
1959	7	5	▲ 7	32	50	20	16	10	8	7	7	7
1960	7	5	6	16	45	14	13	10	8	7	7	7
1961	7	6	7	15	14	21	13	9	8	7	7	7
1962	7	5	7	12	77	46	18	13	9	7	7	7
1963	10	5	11	87	249	46	149	49	15	12	12	12
1964	7	9	10	46	19	20	18	11	8	7	7	7
1965	7	6	84	291	45	23	76	22	15	12	12	12
1966	7	9	31	34	45	23	14	9	8	7	7	7
1967	7	6	36	111	49	118	197	52	15	12	12	12
1968	7	5	10	46	38	31	21	13	8	7	7	7
1969	7	5	20	262	643	106	35	20	15	12	12	12
1970	7	5	11	80	36	51	19	16	14	12	12	12
1971	7	9	52	47	20	33	24	17	14	12	12	12
1972	7	5	26	19	27	15	14	8	8	7	7	7
1973	7	16	21	85	598	200	32	19	15	12	12	12
1974	7	12	64	54	26	64	149	24	16	13	12	12
1975	7	6	11	21	111	342	56	23	16	13	12	12
1976	7	5	7	12	12	15	12	8	7	7	7	7
1977	7	5	6	13	11	13	12	8	7	7	7	7
1978	7	5	12	104	60	143	51	21	16	12	12	12
1979	7	5	7	36	59	46	23	12	8	7	7	7
1980	7	6	22	99	595	49	31	19	15	12	12	12
1981	7	5	7	54	22	48	21	11	8	7	7	7
1982	7	10	33	143	199	85	593	40	16	12	12	12
1983	7	9	49	306	726	1,068	144	65	18	13	12	12
1984	8	15	81	32	24	25	24	22	14	12	12	12
1985	7	12	16	17	36	39	16	11	9	7	7	7
1986	7	5	8	13	430	385	37	21	15	12	12	12
1987	7	5	7	13	19	18	13	8	8	7	7	7
1988	7	5	11	21	13	12	12	8	7	7	7	7
1989	7	5	7	13	13	19	13	8	7	7	7	7
1990	7	6	7	16	18	14	12	9	8	7	7	7
1991	7	5	6	11	11	48	18	10	8	7	7	7
1992	7	5	8	14	82	35	20	10	9	7	7	7
1993	7	5	15	100	159	49	28	22	15	12	12	12
1994	7	5	10	14	45	17	15	12	8	7	7	7
1995	7	6	12	274	30	651	35	42	23	15	13	12
1996	7	5	20	132	529	210	33	22	15	13	13	12
1997	7	32	156	830	42	25	19	15	13	13	12	12
1998	7	9	25	166	1,242	97	90	35	23	16	14	13
1999	8	7	11	49	90	47	72	24	17	13	13	12
2000	7	6	6	43	116	52	21	17	14	13	12	12
2001	7	5	6	17	48	47	20	10	8	7	7	7
2002	7	6	39	34	26	38	19	11	8	7	7	7

Key

Periods of Calveras required release

Periods of less flow compared to existing setting

▲ Periods of explicit Alameda compliance release

ACDD Tunnel gates closed during April through November

Table 3-5b

Changes in Flow at Confluence, Comparison of Refined 2018 WSIP and Existing Operation – Average Monthly CFS

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1921	7	8	28	-70	0	23	17	15	13	12	12	12
1922	7	5	28	31	-87	-2	39	19	14	12	12	12
1923	7	9	-20	11	22	20	37	15	12	12	12	12
1924	7	5	5	10	10	10	10	7	7	7	7	7
1925	7	5	12	16	34	14	19	16	7	7	7	7
1926	7	5	5	17	-157	19	36	14	12	12	12	12
1927	7	24	13	33	-72	39	47	16	12	12	12	12
1928	7	5	15	21	27	-74	30	16	12	12	12	12
1929	7	5	21	24	25	29	20	9	8	7	7	7
1930	7	5	6	26	27	17	15	9	8	7	7	7
1931	7	5	6	17	13	14	11	8	8	7	7	7
1932	7	5	20	40	41	18	17	14	13	12	12	12
1933	7	5	6	25	16	18	15	10	8	7	7	7
1934	7	5	23	32	39	20	14	8	8	7	7	7
1935	7	5	7	40	16	32	59	17	9	7	7	7
1936	7	5	7	25	-106	26	27	18	14	12	12	12
1937	7	5	7	17	-29	-76	42	20	14	12	12	12
1938	7	5	31	42	-54	-2	41	22	15	12	12	12
1939	7	6	15	19	28	25	16	9	8	7	7	7
1940	7	5	6	39	-250	-2	21	20	14	12	12	12
1941	7	5	35	20	-157	-2	37	15	12	12	12	12
1942	7	5	32	-129	-1	21	2	33	15	12	12	12
1943	7	7	12	-134	-1	-2	30	20	14	12	12	12
1944	7	5	8	15	40	39	19	12	8	7	7	7
1945	7	5	9	20	-73	37	21	20	14	12	12	12
1946	7	6	-35	17	34	24	22	18	14	12	12	12
1947	7	6	12	18	25	28	23	11	8	7	7	7
1948	7	5	7	12	13	21	29	15	8	7	7	7
1949	7	5	8	13	19	-64	21	14	9	7	7	7
1950	7	5	7	40	36	18	17	10	8	7	7	7
1951	7	16	-103	-6	9	-4	23	21	15	12	12	12
1952	7	5	32	-153	-1	-2	40	21	15	12	12	12
1953	7	5	32	-89	31	34	21	21	14	12	12	12
1954	7	6	7	29	36	39	22	12	9	7	7	7
1955	7	5	25	42	22	22	19	12	8	7	7	7
1956	7	5	-192	-1	-1	42	25	19	15	12	12	12
1957	7	5	7	15	40	21	18	17	8	7	7	7
1958	7	5	11	35	-60	-2	32	16	12	12	12	12
1959	7	5	7	30	40	19	15	10	8	7	7	7
1960	7	5	6	16	30	14	13	9	8	7	7	7
1961	7	5	7	14	13	20	12	9	8	7	7	7
1962	7	5	7	12	-22	40	17	12	8	7	7	7
1963	7	5	10	-19	-167	40	2	44	15	12	12	12
1964	7	7	10	37	18	18	17	10	8	7	7	7
1965	7	6	2	-217	41	21	67	21	15	12	12	12
1966	7	7	28	31	41	22	14	9	8	7	7	7
1967	7	5	32	-56	8	-75	-3	46	15	12	12	12
1968	7	5	9	37	34	28	19	12	8	7	7	7
1969	7	5	18	-120	-1	-2	32	18	15	12	12	12
1970	7	5	11	-66	33	2	17	16	14	12	12	12
1971	7	7	12	42	19	30	22	17	14	12	12	12
1972	7	5	23	18	25	15	14	8	8	7	7	7
1973	7	11	19	-84	-58	-2	29	18	15	12	12	12
1974	7	9	14	-97	25	6	-3	22	16	12	12	12
1975	7	5	10	20	-187	-72	38	21	15	12	12	12
1976	7	5	7	12	12	14	12	8	7	7	7	7
1977	7	5	6	13	11	12	11	8	7	7	7	7
1978	7	5	11	-111	-104	-58	45	20	15	12	12	12
1979	7	5	7	31	32	40	21	11	8	7	7	7
1980	7	5	20	-80	-164	17	28	18	15	12	12	12
1981	7	5	7	21	21	40	19	10	8	7	7	7
1982	7	8	25	-120	-1	-2	-3	36	15	12	12	12
1983	7	7	16	-137	-1	-2	-3	23	17	12	12	12
1984	7	9	-103	30	23	23	22	20	14	12	12	12
1985	7	9	15	17	21	35	16	10	9	7	7	7
1986	7	5	8	12	-337	-2	33	19	15	12	12	12
1987	7	5	7	12	15	17	12	8	8	7	7	7
1988	7	5	10	19	12	12	12	8	7	7	7	7
1989	7	5	7	12	12	18	12	8	7	7	7	7
1990	7	6	7	16	17	14	12	8	8	7	7	7
1991	7	5	6	11	11	29	17	9	8	7	7	7
1992	7	5	8	14	-44	31	18	10	8	7	7	7
1993	7	5	14	-140	-167	9	25	20	14	12	12	12
1994	7	5	13	38	16	14	11	11	8	7	7	7
1995	7	6	12	-291	27	-27	30	39	22	15	13	12
1996	7	5	19	-36	-111	-2	31	20	15	13	12	12
1997	7	22	-110	-1	39	23	18	15	13	13	12	12
1998	7	9	23	-117	-18	-2	-3	31	21	16	14	13
1999	8	6	10	32	-22	42	57	22	16	13	13	12
2000	7	6	6	21	-127	-68	19	16	14	13	12	12
2001	7	5	6	16	39	36	18	10	8	7	7	7
2002	7	6	30	32	24	34	18	10	8	7	7	7

Key

Reduction in flow

Table 3-6a
Flow at Confluence

Total Flow below Alameda/Calaveras Creek Confluence												WSIP
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	7	8	57	207	418	271	161	32	16	13	12	12
Above Norr	7	9	29	78	144	105	56	22	15	12	12	12
Normal	7	6	24	36	50	42	29	16	12	10	10	10
Below Norr	7	6	15	30	37	33	19	12	8	7	7	7
Dry	7	5	9	16	20	18	15	9	8	7	7	7
All Years	7	7	27	73	133	93	56	18	12	10	10	10

Total Flow below Alameda/Calaveras Creek Confluence												Existing
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	0	1	56	280	467	272	144	5	1	0	0	0
Above Norr	0	1	25	114	216	110	25	2	0	0	0	0
Normal	0	0	23	24	57	26	5	1	0	0	0	0
Below Norr	0	0	1	3	6	7	1	1	0	0	0	0
Dry	0	0	0	1	2	1	1	0	0	0	0	0
All Years	0	1	21	84	149	83	35	2	0	0	0	0

Difference in Total Flow below Alameda/Calaveras Creek Confluence												WSIP minus Existing
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)												Average Monthly CFS
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	7	7	1	-74	-49	-1	16	27	16	13	12	12
Above Norr	7	8	4	-37	-72	-5	32	21	14	12	12	12
Normal	7	6	1	12	-7	16	24	16	12	10	10	10
Below Norr	7	6	13	26	31	26	17	11	8	7	7	7
Dry	7	5	9	15	18	17	14	9	8	7	7	7
All Years	7	6	6	-11	-16	11	21	17	11	10	10	10

Table 3-6b
Flow at Confluence

Total Flow below Alameda/Calaveras Creek Confluence													WSIP
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)													Acre-feet
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	438	506	3,514	12,710	23,197	16,653	9,572	1,949	972	792	760	727	71,790
Above Norr	453	525	1,795	4,766	7,984	6,444	3,340	1,383	875	767	751	722	29,806
Normal	438	361	1,451	2,222	2,790	2,580	1,737	1,015	699	632	627	606	15,158
Below Norr	438	361	895	1,814	2,069	2,046	1,111	718	487	437	434	419	11,230
Dry	438	319	565	987	1,136	1,090	898	578	456	434	433	419	7,752
All Years	441	415	1,637	4,470	7,376	5,726	3,305	1,126	697	612	601	578	26,985

Total Flow below Alameda/Calaveras Creek Confluence													Existing
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)													Acre-feet
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	1	80	3,465	17,243	25,909	16,711	8,598	307	30	12	4	2	72,361
Above Norr	12	68	1,554	7,035	11,987	6,754	1,462	103	22	6	2	1	29,007
Normal	1	29	1,397	1,501	3,154	1,586	284	60	9	2	0	0	8,022
Below Norr	1	22	78	186	338	450	72	41	7	0	0	0	1,195
Dry	1	6	26	35	124	69	43	23	1	0	0	0	328
All Years	3	41	1,292	5,161	8,250	5,077	2,060	106	14	4	1	1	22,010

Difference in Total Flow below Alameda/Calaveras Creek Confluence													WSIP minus Existing
(Average within Year Type - Grouped by 5 Local Reservoir Runoff)													Acre-feet
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total
Wet	437	426	49	-4,533	-2,712	-58	975	1,642	941	780	756	726	-570
Above Norr	441	457	242	-2,270	-4,003	-309	1,878	1,280	853	761	749	721	799
Normal	437	332	55	721	-364	995	1,453	955	689	630	627	606	7,136
Below Norr	437	340	817	1,628	1,731	1,596	1,039	677	481	437	434	419	10,036
Dry	437	313	539	952	1,012	1,020	855	555	455	434	433	419	7,423
All Years	438	374	345	-691	-874	649	1,245	1,021	683	608	600	578	4,976

4. Disaggregation of Monthly Analysis

The results described previously use the monthly time-step HH/LSM model to provide conclusions regarding long-term, systematic changes to system operations and affected stream flows. Certain data sets within HH/LSM have been developed to recognize the occurrence of daily hydrology; however, some decision processes and elements of hydrology that have been implemented in the model on a monthly basis lead to a less than full depiction of anticipated operations. For Alameda Creek operations an additional level of analysis has been prepared to provide additional insight into the comparison of stream flows between existing and refined 2018 WSIP operations.

The topic of investigation for this additional analysis is the disposition and occurrence of flow at ACDD as it is affected by diversions to Calaveras Reservoir. HH/LSM is a monthly time-step model that uses data that has been processed into monthly volumes and average monthly flow rates. The data used by the model for inflow to ACDD is a combination of synthesized and measured flow records, representing the volume of flow that has occurred during history within a particular month. Without the addition of other data or protocols to address the data differently, the model would treat the data as if it occurs on an evenly distributed pattern during a month. With a facility such as the ACDD diversion structure such treatment could lead to unrepresentative results for the reasons set forth below.

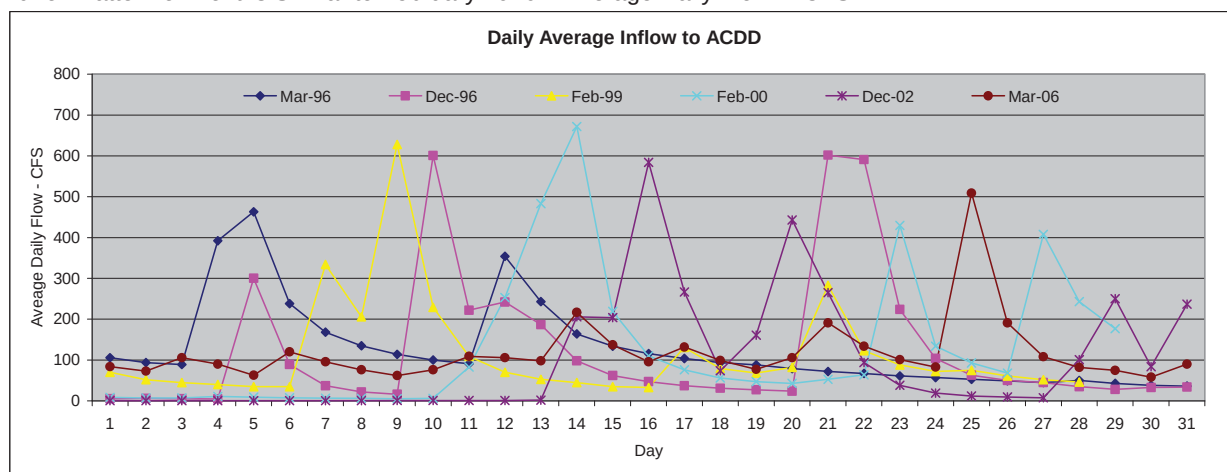
The tunnel diversion structure has an estimated capacity of about 650 cfs, which for a month of constant operation would be capable of diverting about 38,000 acre-feet, a volume exceeding the maximum recorded runoff for any month in history. The large design capacity of the structure is intended to capture instantaneous flows associated with the “flashy” nature of runoff from the watershed. Within a day of runoff, peak instantaneous flows can far exceed 650 cfs and thus, even with diversions occurring, not all of the flow would be diverted and the remainder would spill past the ACDD to the stream. Using only the model's knowledge of monthly runoff to ACDD, the conversion of that volume to an average flow rate during a month would falsely lead the model to a result that diverts to Calaveras Reservoir the entire flow available at ACDD. This result is not reflective or consistent with reality; therefore, additional information is provided to the model to better mimic hydrology that occurs on a more frequent time-step.

The information and protocol developed involved analyzing daily average flow and operation data for Calaveras Reservoir and ACDD facilities. The analysis produced a relationship between average daily flow and “divertible” flow at ACDD. A data set representing the divertible flow is incorporated into the model along with a companion data set representing total inflow to ACDD. Diversions to Calaveras Reservoir are limited by the volumes of water identified as divertible. Working with both of these sets of data the model provides a reasonable depiction of flow diverted to Calaveras Reservoir or left in the stream below ACDD. The use of daily average data within the analysis just described is known to have its limitations of accuracy, which are associated with the daily time-step employed and the records available. However, for planning level water supply studies the results are acceptable.

With the accessibility of even more finite flow records, (e.g., 15-minute interval measurements), data assumptions for the model can be refined. But for the immediate topic of analysis the finite flow records can be used to provide an additional level of illustration of the flow changes that are anticipated for changed operations between the existing and refined 2018 WSIP settings.

For the purpose of illustration, a month of operation (February 1926) within the previously discussed 24-month example period was selected to demonstrate an anticipated change in system operations at ACDD. In that selected month it is anticipated that the existing operation will go from a “diversion rejection” mode to a refined 2018 WSIP “divert water from ACDD for replenishment” mode. Reported (USGS) 15-minute ACDD inflow data provides the underlying hydrology for this analysis. For comparison, six different months in recent history provide illustrations of differing runoff patterns that have occurred for relatively the same amount of monthly runoff assumed for February 1926 (about 7,300 acre-feet). The patterns of daily average runoff of the “similar” months are illustrated in Figure 4-1. These sample months illustrate a monthly runoff that ranges from about 6,100 acre-feet to 7,800 acre-feet. It is evident from this illustration that daily runoff can vary greatly both temporally and in magnitude, which cause is associated with the timing and magnitude of rainfall within the watershed.

Figure 4-1
Runoff Pattern of Months Similar to February 1926 – Average Daily Flow in CFS



The 15-minute interval data of these sample months was used to provide the shape of six different hydrographs for ACDD inflow. The volume of ACDD inflow for February 1926 was then shaped to these hydrographs (7,300 acre-feet). A mathematical model was developed that routed inflows to either the stream or through the diversion tunnel, based on assumptions for operations and capacity constraints. On a 15-minute time-step, model logic bypassed water at ACDD for bypass compliance, diverted water to Calaveras Reservoir up to a capacity of 370 cfs, and spilled back (rejection) to the stream any water not diverted. In addition to this logic, a diversion rejection mechanism was added to simulate Calaveras Reservoir reaching a full storage condition during the month (after about 1,800 acre-feet of diversion from ACDD, consistent with the monthly results from HH/LSM).

Figures 4-2 through 4-7 illustrate the 15-minute interval results of this analysis. This month of illustration is within one of the 30 years when at least one month of flow volume below ACDD is anticipated to be reduced due to changed operations under the refined 2018 WSIP operation. It also represents a month not within one of the 15 years when another month within the year when flow past ACDD is substantial and unaffected by the changed operation (the remaining 15 years of affected operation). The sample hydrographs provide a range of differing results. During this month, under each of the sample shapes of hydrograph it can be seen that at some point in the month Calaveras Reservoir will begin rejecting diversions from ACDD due to a “full reservoir” and Alameda Creek below the dam will receive the full fluctuating inflow that occurs after that time. Also, In 5 out of the 6 hydrographs, tunnel diversion capacity constrains the amount of flow that can be diverted to the tunnel and a varying amount of the flow will spill past the dam in the shape of the peak of the hydrograph. The illustration shows that during certain months of affected operation flow could occur below ACDD with a diversion to Calaveras Reservoir, and during some circumstances the peak instantaneous flow within a month could be the same as occurred in the existing operation.

Figure 4-2
Disposition of Flow at ACDD – Sample Operation of February 1926

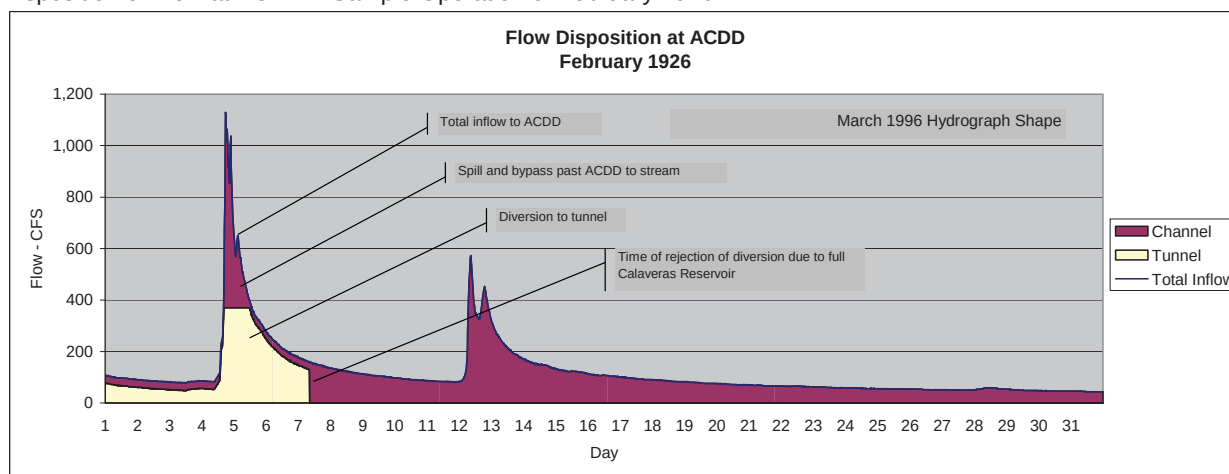


Figure 4-3
Disposition of Flow at ACDD – Sample Operation of February 1926

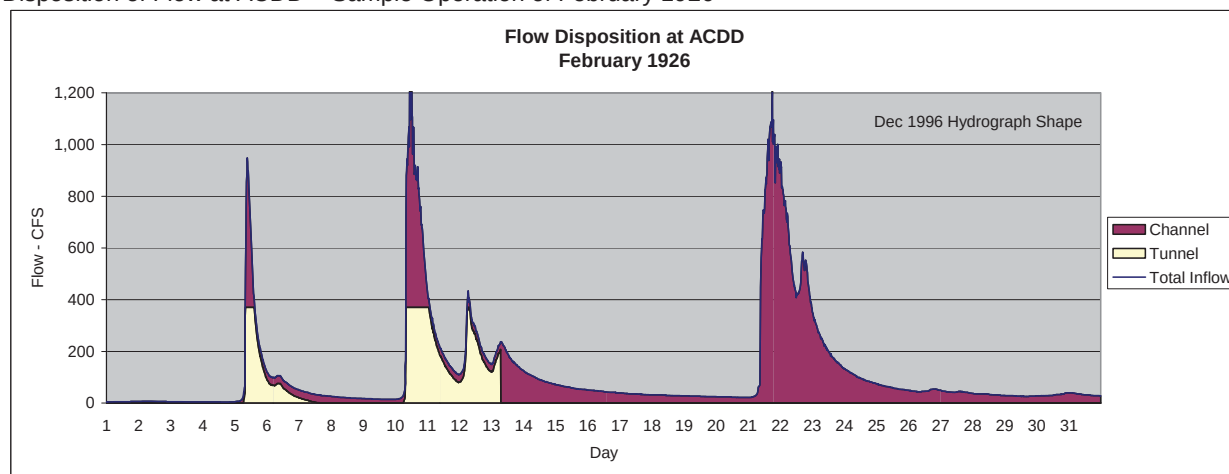


Figure 4-4
Disposition of Flow at ACDD – Sample Operation of February 1926

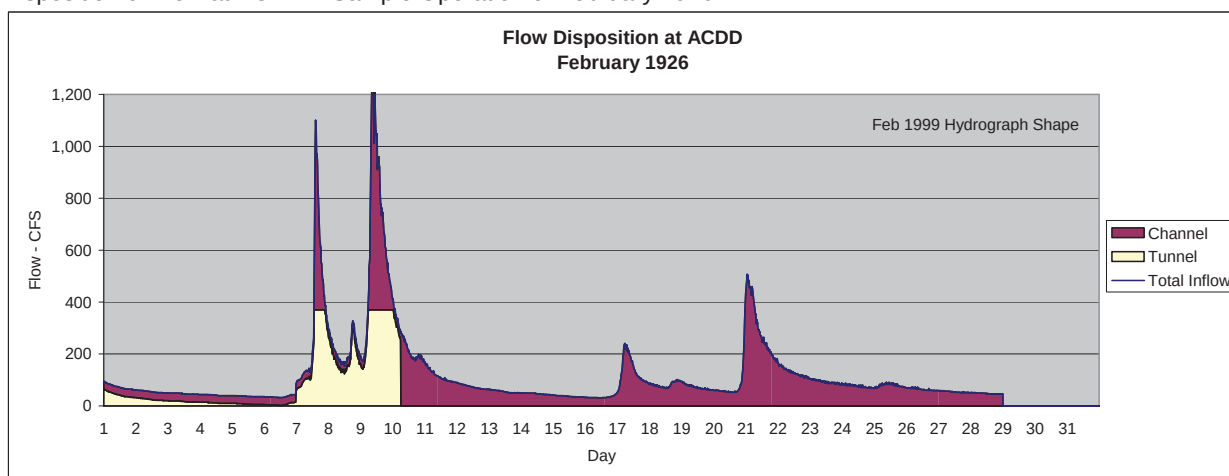


Figure 4-5
Disposition of Flow at ACDD – Sample Operation of February 1926

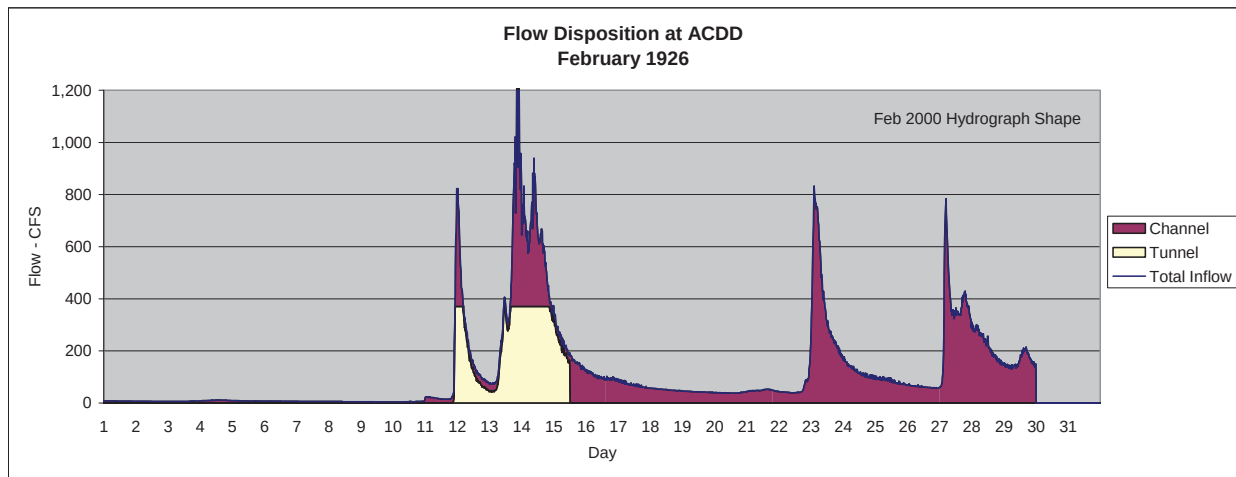


Figure 4-6
Disposition of Flow at ACDD – Sample Operation of February 1926

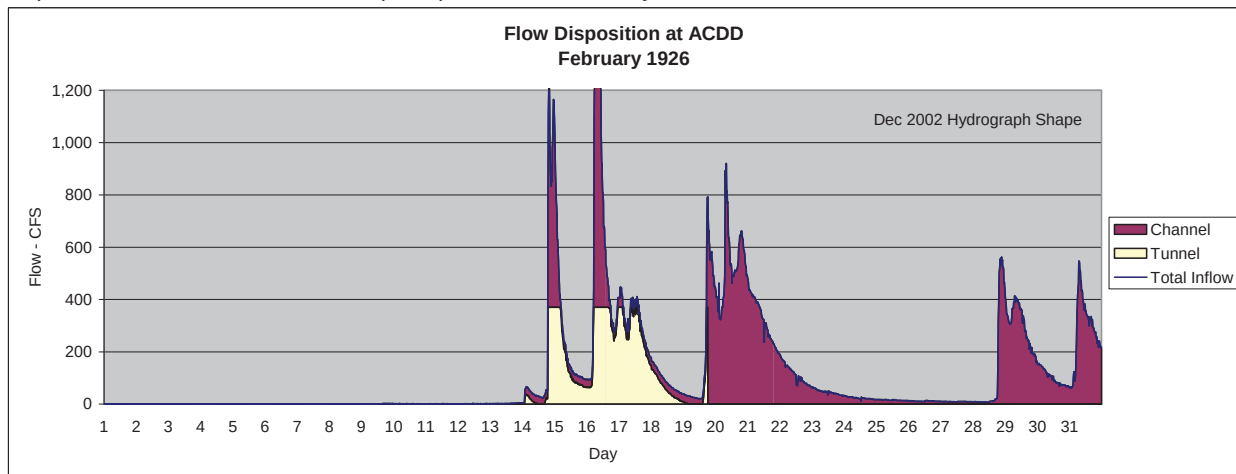
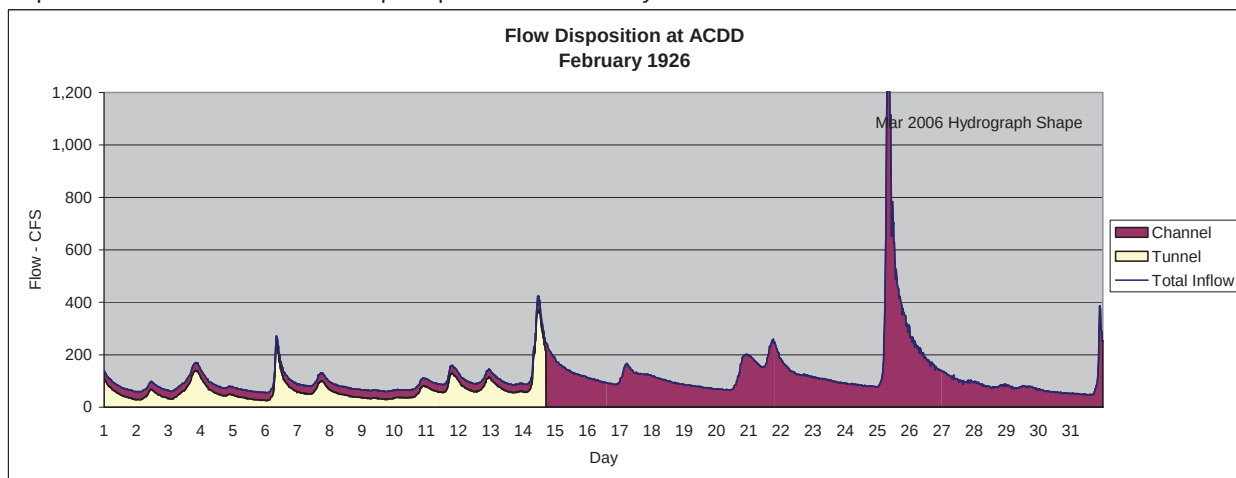


Figure 4-7
Disposition of Flow at ACDD – Sample Operation of February 1926



		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE						G								N		CF		CH				
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence (MG)	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	20	1	0	0	1	0	0	0	0	12117	17	1	0	127	0	0	0	174	0	0	0	0	1	0
RH 8	20	1	0	0	1	0	0	0	0	11700	11	1	0	266	0	0	0	163	0	0	0	0	1	0
RH 9	20	1	0	0	1	0	0	0	0	11000	9	1	0	575	0	0	0	135	0	0	0	0	1	0
RH 10	20	1	0	0	1	0	0	0	0	10300	13	1	0	627	0	0	0	87	0	0	0	0	1	0
RH 11	20	65	0	0	65	0	0	0	0	10300	195	65	0	218	0	0	0	42	0	0	0	0	14	0
RH 12	20	1098	140	0	958	0	125	0	0	11731	3288	958	0	2790	0	0	0	25	0	140	125	265	230	0
RH 1	21	1555	1555	0	834	0	311	0	0	12400	4655	0	0	2790	0	0	1174	22	1174	1555	311	3040	326	995
RH 2	21	829	762	0	829	0	169	0	0	12400	2482	67	0	2520	0	0	0	29	0	762	169	931	174	638
RH 3	21	228	0	0	228	0	59	0	0	10472	684	228	0	2790	0	0	0	50	0	0	59	59	48	0
RH 4	21	98	0	0	98	0	33	0	0	10793	293	98	0	0	0	0	0	70	0	0	33	33	21	0
RH 5	21	63	0	0	63	0	26	0	0	10935	188	63	0	0	0	0	0	108	0	0	26	26	13	0
RH 6	21	19	0	0	19	0	7	0	0	10784	56	19	0	92	0	0	0	135	0	0	7	7	4	0
RH 7	21	3	0	0	3	0	0	0	0	10533	36	3	0	127	0	0	0	163	0	0	0	0	3	0
RH 8	21	2	0	0	2	0	0	0	0	10327	20	2	0	76	0	0	0	152	0	0	0	0	1	0
RH 9	21	1	0	0	1	0	0	0	0	10217	15	1	0	0	0	0	0	126	0	0	0	0	1	0
RH 10	21	2	0	0	2	0	0	0	0	10157	21	2	0	0	0	0	0	83	0	0	0	0	1	0
RH 11	21	2	0	0	2	0	0	0	0	10139	22	2	0	0	0	0	0	42	0	0	0	0	2	0
RH 12	21	625	153	0	472	0	97	0	0	10300	1870	472	0	2157	0	0	0	24	0	153	97	250	131	0
RH 1	22	382	0	0	382	0	80	0	0	10300	1143	382	0	1504	0	0	0	21	0	0	80	80	80	0
RH 2	22	3212	3212	0	1121	0	576	0	0	12400	9611	0	0	2520	0	0	4965	26	4965	3212	576	8752	673	1594
RH 3	22	1496	1496	0	1444	0	230	0	0	12400	4478	0	0	2790	0	0	1638	50	1638	1496	230	3364	313	659
RH 4	22	524	0	0	524	0	72	0	0	12400	1567	524	0	2014	0	0	0	77	0	0	72	72	110	0
RH 5	22	145	0	0	145	0	15	0	0	12395	435	145	0	469	0	0	0	116	0	0	15	15	30	0
RH 6	22	34	0	0	34	0	3	0	0	12015	100	34	0	371	0	0	0	143	0	0	3	3	7	0
RH 7	22	4	0	0	4	0	0	0	0	11774	54	4	0	127	0	0	0	172	0	0	0	0	4	0
RH 8	22	2	0	0	2	0	0	0	0	11569	29	2	0	76	0	0	0	160	0	0	0	0	2	0
RH 9	22	1	0	0	1	0	0	0	0	11000	20	1	0	456	0	0	0	134	0	0	0	0	1	0
RH 10	22	2	0	0	2	0	0	0	0	10300	32	2	0	647	0	0	0	87	0	0	0	0	2	0
RH 11	22	69	0	0	69	0	6	0	0	10300	205	69	0	232	0	0	0	42	0	0	6	6	14	0
RH 12	22	1633	1571	0	992	0	188	0	0	12400	4853	62	0	2790	0	0	0	25	0	1571	188	1759	340	0
RH 1	23	865	624	0	791	0	141	0	0	12400	2572	241	0	2790	0	0	0	23	0	624	141	765	180	409
RH 2	23	733	363	0	697	0	94	0	0	12400	2179	370	0	2520	0	0	0	29	0	363	94	457	153	342
RH 3	23	152	0	0	152	0	23	0	0	10164	452	152	0	2790	0	0	0	50	0	0	23	23	32	0
RH 4	23	477	0	0	477	0	36	0	0	11991	1419	477	0	0	0	0	0	69	0	0	36	36	99	0
RH 5	23	68	0	0	68	0	5	0	0	12146	201	68	0	0	0	0	0	114	0	0	5	5	14	0
RH 6	23	7	0	0	7	0	0	0	0	12015	96	7	0	92	0	0	0	142	0	0	0	0	7	0
RH 7	23	3	0	0	3	0	0	0	0	11756	36	3	0	127	0	0	0	172	0	0	0	0	3	0
RH 8	23	2	0	0	2	0	0	0	0	11541	20	2	0	76	0	0	0	160	0	0	0	0	1	0
RH 9	23	1	0	0	1	0	0	0	0	11000	15	1	0	424	0	0	0	134	0	0	0	0	1	0
RH 10	23	0	0	0	0	0	0	0	0	10300	8	2	0	623	0	0	0	87	0	0	0	0	1	0
RH 11	23	0	0	0	0	0	0	0	0	10258	0	0	0	0	0	0	0	42	0	0	0	0	0	0
RH 12	23	0	0	0	0	0	0	0	0	10233	0	0	0	0	0	0	0	24	0	0	0	0	0	0
RH 1	24	0	0	0	0	0	0	0	0	10212	0	0	0	0	0	0	0	21	0	0	0	0	0	0
RH 2	24	0	0	0	0	0	0	0	0	10186	0	0	0	0	0	0	0	26	0	0	0	0	0	0
RH 3	24	1	0	0	1	0	0	0	0	10060	1	1	0	84	0	0	0	45	0	0	0	0	0	0
RH 4	24	3	0	0	3	0	0	0	0	9998	4	3	0	0	0	0	0	69	0	0	0	0	0	0
RH 5	24	0	0	0	0	0	0	0	0	9895	0	0	0	0	0	0	0	103	0	0	0	0	0	0
RH 6	24	0	0	0	0	0	0	0	0	9676	0	0	0	92	0	0	0	127	0	0	0	0	0	0
RH 7	24	0	0	0	0	0	0	0	0	9525	0	0	0	0	0	0	0	152	0	0	0	0	0	0
RH 8	24	0	0	0	0	0	0	0	0	9383	0	0	0	0	0	0	0	142	0	0	0	0	0	0
RH 9	24	0	0	0	0	0	0	0	0	9265	0	0	0	0	0	0	0	118	0	0	0	0	0	0
RH 10	24	0	0	0	0	0	0	0	0	9193	6	0	0	0	0	0	0	78	0	0	0	0	0	0
RH 11	24	1	0	0	1	0	0	0	0	9170	15	1	0	0	0	0	0	39	0	0	0	0	1	0
RH 12	24	137	0	0	137	0	12	0	0	9690	406	137	0	0	0	0	0	23	0	0	12	12	28	0
RH 1	25	129	0	0	129	0	10	0	0	10182	383	129	0	0	0	0	0	20	0	0	10	10	27	0
RH 2	25	1204	183	0	1021	0	190	0	0	12223	3566	1021	0	2520	0	0	0	26	0	183	190	373	250	0
RH 3	25	83	0	0	83	0	25	0	0	10300	246	83	0	2202	0	0	0	50	0	0	25	25	17	0
RH 4	25	180	0	0	180	0	38	0	0	10942	532	180	0	0	0	0	0	70	0	0	38	38	37	0
RH 5	25	186	0	0	186	0	11	0	0	11570	551	186	0	0	0	0	0	109	0	0	11	11	39	0
RH 6	25	5	0	0	5	0	2	0	0	11405	60	5	0	92	0	0	0	138	0	0	2	2	4	0

		C		GA		P		K		L		M		N		O		P		Q		R		S		FN		FZ		GA		GB		GC		FO	
		CE						G																N		CF		CH									
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence (MG)	Accretion btwn Calaveras Confluence and San Antonio Reservoir (MG)	Total Stream Release from San Antonio Reservoir													
RH 7	25	2	0	0	2	0	0	0	0	11133	20	2	0	127	0	0	0	167	0	0	0	0	1	0													
RH 8	25	1	0	0	1	0	0	0	0	10914	12	1	0	76	0	0	0	156	0	0	0	0	1	0													
RH 9	25	1	0	0	1	0	0	0	0	10795	10	1	0	0	0	0	0	130	0	0	0	0	1	0													
RH 10	25	1	0	0	1	0	0	0	0	10300	14	1	0	424	0	0	0	86	0	0	0	0	1	0													
RH 11	25	1	0	0	1	0	0	0	0	10274	15	1	0	0	0	0	0	42	0	0	0	0	1	0													
RH 12	25	3	0	0	3	0	0	0	0	10285	33	3	0	0	0	0	0	24	0	0	0	0	2	0													
RH 1	26	134	0	0	134	0	1	0	0	10300	396	134	0	494	0	0	0	21	0	0	1	1	28	0													
RH 2	26	2387	2387	0	1046	0	285	0	0	12400	7070	0	0	2520	0	0	2424	26	2424	2387	285	5096	495	364													
RH 3	26	180	0	0	180	0	18	0	0	10275	533	180	0	2789	0	0	0	50	0	0	18	18	37	0													
RH 4	26	670	160	0	510	0	85	0	0	12400	1986	510	0	301	0	0	0	70	0	160	85	245	139	0													
RH 5	26	47	0	0	47	0	2	0	0	12400	140	47	0	71	0	0	0	116	0	0	2	2	10	0													
RH 6	26	7	0	0	7	0	0	0	0	12260	88	7	0	92	0	0	0	143	0	0	0	0	6	0													
RH 7	26	2	0	0	2	0	0	0	0	11992	31	2	0	127	0	0	0	173	0	0	0	0	2	0													
RH 8	26	1	0	0	1	0	0	0	0	11670	18	1	0	179	0	0	0	162	0	0	0	0	1	0													
RH 9	26	1	0	0	1	0	0	0	0	11000	13	1	0	550	0	0	0	134	0	0	0	0	1	0													
RH 10	26	1	0	0	1	0	0	0	0	10300	20	1	0	634	0	0	0	87	0	0	0	0	1	0													
RH 11	26	490	129	0	361	0	25	0	0	10300	1603	361	0	1922	0	0	0	42	0	129	25	154	112	0													
RH 12	26	161	0	0	161	0	27	0	0	10300	526	161	0	662	0	0	0	25	0	0	27	27	37	0													
RH 1	27	424	0	0	424	0	65	0	0	10300	1387	424	0	1790	0	0	0	21	0	0	65	65	97	0													
RH 2	27	2015	2015	0	1473	0	273	0	0	12400	6593	0	0	2520	0	0	1947	26	1947	2015	273	4235	462	451													
RH 3	27	550	0	0	550	0	89	0	0	11909	1799	550	0	2790	0	0	0	50	0	0	89	89	126	172													
RH 4	27	694	17	0	677	0	91	0	0	12400	2272	677	0	2383	0	0	0	75	0	17	91	108	159	0													
RH 5	27	84	0	0	84	0	29	0	0	12400	274	84	0	242	0	0	0	116	0	0	29	29	19	0													
RH 6	27	8	0	0	8	0	12	0	0	12283	110	8	0	92	0	0	0	143	0	0	12	12	8	0													
RH 7	27	3	0	0	3	0	0	0	0	12027	42	3	0	127	0	0	0	174	0	0	0	0	3	0													
RH 8	27	2	0	0	2	0	0	0	0	11683	24	2	0	208	0	0	0	162	0	0	0	0	2	0													
RH 9	27	1	0	0	1	0	0	0	0	11000	17	1	0	567	0	0	0	135	0	0	0	0	1	0													
RH 10	27	2	0	0	2	0	0	0	0	10300	25	2	0	640	0	0	0	87	0	0	0	0	2	0													
RH 11	27	2	0	0	2	0	0	0	0	10287	27	2	0	0	0	0	0	42	0	0	0	0	2	0													
RH 12	27	346	155	0	191	0	31	0	0	10300	1032	191	0	1185	0	0	0	24	0	155	31	186	72	0													
RH 1	28	176	0	0	176	0	43	0	0	10300	526	176	0	681	0	0	0	21	0	0	43	43	37	0													
RH 2	28	331	62	0	269	0	64	0	0	10300	989	269	0	1232	0	0	0	26	0	62	64	126	69	0													
RH 3	28	2118	2118	0	587	0	270	0	0	12400	6326	0	0	2790	0	0	1391	45	1391	2118	270	3779	443	231													
RH 4	28	811	457	0	631	0	117	0	0	12400	2423	354	0	2700	0	0	0	77	0	457	117	575	170	339													
RH 5	28	81	0	0	81	0	7	0	0	12400	243	81	0	208	0	0	0	116	0	0	7	7	17	0													
RH 6	28	3	0	0	3	0	2	0	0	12177	9	3	0	92	0	0	0	143	0	0	2	2	1	0													
RH 7	28	3	0	0	3	0	1	0	0	11915	35	3	0	127	0	0	0	173	0	0	1	1	2	0													
RH 8	28	2	0	0	2	0	0	0	0	11647	20	2	0	128	0	0	0	161	0	0	0	0	1	0													
RH 9	28	1	0	0	1	0	0	0	0	11000	14	1	0	528	0	0	0	134	0	0	0	0	1	0													
RH 10	28	2	0	0	2	0	0	0	0	10300	21	2	0	636	0	0	0	87	0	0	0	0	1	0													
RH 11	28	2	0	0	2	0	2	0	0	10283	23	2	0	0	0	0	0	42	0	0	2	2	2	0													
RH 12	28	312	0	0	312	0	13	0	0	10300	924	312	0	1194	0	0	0	24	0	0	13	13	65	0													
RH 1	29	239	0	0	239	0	12	0	0	10300	708	239	0	926	0	0	0	21	0	0	12	12	50	0													
RH 2	29	242	0	0	242	0	22	0	0	10300	717	242	0	933	0	0	0	26	0	0	22	22	50	0													
RH 3	29	346	0	0	346	0	38	0	0	10300	1027	346	0	1328	0	0	0	45	0	0	38	38	72	0													
RH 4	29	146	0	0	146	0	5	0	0	10809	433	146	0	0	0	0	0	70	0	0	5	5	30	0													
RH 5	29	41	0	0	41	0	1	0	0	10863	121	41	0	0	0	0	0	108	0	0	1	1	8	0													
RH 6	29	19	0	0	19	0	0	0	0	10712	56	19	0	92	0	0	0	134	0	0	0	0	4	0													
RH 7	29	1	0	0	1	0	0	0	0	10440	16	1	0	127	0	0	0	162	0	0	0	0	1	0													
RH 8	29	1	0	0	1	0	0	0	0	10224	10	1	0	76	0	0	0	151	0	0	0	0	1	0													
RH 9	29	1	0	0	1	0	0	0	0	10108	8	1	0	0	0	0	0	125	0	0	0	0	1	0													
RH 10	29	1	0	0	1	0	0	0	0	10038	12	1	0	0	0	0	0	83	0	0	0	0	1	0													
RH 11	29	1	0	0	1	0	0	0	0	10012	15	1	0	0	0	0	0	42	0	0	0	0	1	0													
RH 12	29	11	0	0	11	0	6	0	0	10032	33	11	0	0	0	0	0	24	0	0	6	6	2	0													
RH 1	30	314	0	0	314	0	56	0	0	10300	936	314	0	962	0	0	0	20	0	0	56	56	66	0													
RH 2	30	314	0	0	314	0	35	0	0	10300	936	314	0	1224	0	0	0	26	0	0	35	35	66	0													
RH 3	30	1297	955	0	342	0	209	0	0	11677	3870	342	0	2790	0	0	0	45	0	955	209	1164	271	0													
RH 4	30	106	0	0	106	0	19	0	0	12023	315	106	0	0	0	0	0	74	0	0	19	19	22	0													
RH 5	30	49	0	0	49	0	12	0	0	12104	146	49	0	0	0	0	0	114	0	0	12	12	10	0													
RH 6	30	11	0	0	11	0	8	0	0	11913	32	11	0	92	0	0	0	142	0	0	8	8	2	0													

		VBA_BASERH 2009																							
		C	GA				P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE						G										N	CF		CH				
		Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recapture of MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence (MG)	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir	
Month	Year																								
RH 7	30	2	0	0	2	0	0	0	0	11640	22	2	0	127	0	0	0	171	0	0	0	0	2	0	
RH 8	30	1	0	0	1	0	0	0	0	11418	13	1	0	76	0	0	0	160	0	0	0	0	1	0	
RH 9	30	1	0	0	1	0	0	0	0	11000	10	1	0	296	0	0	0	133	0	0	0	0	1	0	
RH 10	30	2	0	0	2	0	0	0	0	10300	23	2	0	638	0	0	0	87	0	0	0	0	2	0	
RH 11	30	2	0	0	2	0	0	0	0	10284	24	2	0	0	0	0	0	42	0	0	0	0	2	0	
RH 12	30	20	0	0	20	0	2	0	0	10300	57	20	0	36	0	0	0	24	0	0	2	2	4	0	
RH 1	31	140	0	0	140	0	15	0	0	10300	396	140	0	515	0	0	0	21	0	0	15	15	28	0	
RH 2	31	60	0	0	60	0	7	0	0	10300	169	60	0	203	0	0	0	26	0	0	7	7	12	0	
RH 3	31	72	0	0	72	0	13	0	0	10288	204	72	0	243	0	0	0	45	0	0	13	13	14	0	
RH 4	31	24	0	0	24	0	4	0	0	10310	68	24	0	0	0	0	0	70	0	0	4	4	5	0	
RH 5	31	18	0	0	18	0	3	0	0	10274	51	18	0	0	0	0	0	105	0	0	3	3	4	0	
RH 6	31	10	0	0	10	0	0	0	0	10089	27	10	0	92	0	0	0	130	0	0	0	0	2	0	
RH 7	31	1	0	0	1	0	0	0	0	9947	13	1	0	0	0	0	0	156	0	0	0	0	1	0	
RH 8	31	1	0	0	1	0	0	0	0	9812	10	1	0	0	0	0	0	146	0	0	0	0	1	0	
RH 9	31	1	0	0	1	0	0	0	0	9700	9	1	0	0	0	0	0	122	0	0	0	0	1	0	
RH 10	31	1	0	0	1	0	0	0	0	9629	8	1	0	0	0	0	0	80	0	0	0	0	1	0	
RH 11	31	1	0	0	1	0	0	0	0	9604	15	1	0	0	0	0	0	41	0	0	0	0	1	0	
RH 12	31	1064	382	0	682	0	164	0	0	10654	3181	682	0	2790	0	0	0	23	0	382	164	546	223	0	
RH 1	32	569	0	0	569	0	82	0	0	10300	1702	569	0	2604	0	0	0	21	0	0	82	82	119	301	
RH 2	32	1026	13	0	1013	0	158	0	0	11836	3069	1013	0	2520	0	0	0	26	0	13	158	171	215	596	
RH 3	32	127	0	0	127	0	25	0	0	10300	381	127	0	1995	0	0	0	49	0	0	25	25	27	48	
RH 4	32	90	0	0	90	0	17	0	0	10589	269	90	0	0	0	0	0	70	0	0	17	17	19	0	
RH 5	32	44	0	0	44	0	9	0	0	10659	133	44	0	0	0	0	0	107	0	0	9	9	9	0	
RH 6	32	26	0	0	26	0	3	0	0	10630	78	26	0	0	0	0	0	133	0	0	3	3	5	0	
RH 7	32	2	0	0	2	0	0	0	0	10371	27	2	0	127	0	0	0	162	0	0	0	0	2	0	
RH 8	32	1	0	0	1	0	0	0	0	10161	16	1	0	76	0	0	0	150	0	0	0	0	1	0	
RH 9	32	1	0	0	1	0	0	0	0	10050	12	1	0	0	0	0	0	125	0	0	0	0	1	0	
RH 10	32	2	0	0	2	0	0	0	0	9995	26	2	0	0	0	0	0	82	0	0	0	0	2	0	
RH 11	32	2	0	0	2	0	0	0	0	9983	27	2	0	0	0	0	0	42	0	0	0	0	2	0	
RH 12	32	16	0	0	16	0	2	0	0	10023	48	16	0	0	0	0	0	24	0	0	2	2	3	0	
RH 1	33	310	0	0	310	0	37	0	0	10300	904	310	0	916	0	0	0	20	0	0	37	37	63	0	
RH 2	33	106	0	0	106	0	12	0	0	10092	309	106	0	597	0	0	0	26	0	0	12	12	22	0	
RH 3	33	153	0	0	153	0	29	0	0	10300	445	153	0	345	0	0	0	45	0	0	29	29	31	0	
RH 4	33	104	0	0	104	0	19	0	0	10639	305	104	0	0	0	0	0	70	0	0	19	19	21	0	
RH 5	33	70	0	0	70	0	13	0	0	10806	204	70	0	0	0	0	0	107	0	0	13	13	14	0	
RH 6	33	14	0	0	14	0	1	0	0	10636	42	14	0	92	0	0	0	134	0	0	1	1	3	0	
RH 7	33	1	0	0	1	0	0	0	0	10365	17	1	0	127	0	0	0	162	0	0	0	0	1	0	
RH 8	33	1	0	0	1	0	0	0	0	10152	12	1	0	76	0	0	0	150	0	0	0	0	1	0	
RH 9	33	1	0	0	1	0	0	0	0	10039	10	1	0	0	0	0	0	125	0	0	0	0	1	0	
RH 10	33	1	0	0	1	0	0	0	0	9968	11	1	0	0	0	0	0	82	0	0	0	0	1	0	
RH 11	33	1	0	0	1	0	0	0	0	9944	16	1	0	0	0	0	0	42	0	0	0	0	1	0	
RH 12	33	355	0	0	355	0	46	0	0	10300	1058	355	0	1033	0	0	0	24	0	0	46	46	74	0	
RH 1	34	479	86	0	393	0	66	0	0	10300	1428	393	0	1800	0	0	0	21	0	86	66	152	100	0	
RH 2	34	488	0	0	488	0	68	0	0	10300	1455	488	0	1917	0	0	0	26	0	0	68	68	102	0	
RH 3	34	160	0	0	160	0	31	0	0	10300	477	160	0	592	0	0	0	45	0	0	31	31	33	0	
RH 4	34	48	0	0	48	0	9	0	0	10422	144	48	0	0	0	0	0	70	0	0	9	9	10	0	
RH 5	34	23	0	0	23	0	5	0	0	10409	70	23	0	0	0	0	0	106	0	0	5	5	5	0	
RH 6	34	18	0	0	18	0	1	0	0	10257	53	18	0	92	0	0	0	131	0	0	1	1	4	0	
RH 7	34	1	0	0	1	0	0	0	0	10118	18	1	0	0	0	0	0	158	0	0	0	0	1	0	
RH 8	34	1	0	0	1	0	0	0	0	9984	12	1	0	0	0	0	0	148	0	0	0	0	1	0	
RH 9	34	1	0	0	1	0	0	0	0	9871	9	1	0	0	0	0	0	123	0	0	0	0	1	0	
RH 10	34	1	0	0	1	0	0	0	0	9806	16	1	0	0	0	0	0	81	0	0	0	0	1	0	
RH 11	34	5	0	0	5	0	2	0	0	9830	60	5	0	0	0	0	0	41	0	0	2	2	4	0	
RH 12	34	41	0	0	41	0	5	0	0	9968	121	41	0	0	0	0	0	24	0	0	5	5	8	0	
RH 1	35	1182	0	0	1182	0	183	0	0	11855	3515	1182	0	2790	0	0	0	20	0	0	183	183	246	0	
RH 2	35	109	0	0	109	0	12	0	0	10300	324	109	0	1960	0	0	0	28	0	0	12	12	23	0	
RH 3	35	435	0	0	435	0	77	0	0	10300	1292	435	0	1682	0	0	0	45	0	0	77	77	90	0	
RH 4	35	982	41	0	941	0	164	0	0	12400	2918	941	0	1689	0	0	0	70	0	41	164	205	204	0	
RH 5	35	200	0	0	200	0	38	0	0	12400	595	200	0	679	0	0	0	116	0	0	38	38	42	0	
RH 6	35	34	0	0	34	0	4	0	0	11741	100	34	0	650	0	0	0	143	0	0	4	4	7	0	

		VBA_BASERH 2009																						
		C	GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO			
		CE				G										N	CF		CH					
		Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence of ACDD/Cal Dam - MG	Flow below Alameda/Creek Confluence	Accretion between Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
Month	Year																							
RH 7	35	3	0	0	3	0	1	0	0	11482	35	3	0	127	0	0	0	170	0	0	1	1	2	0
RH 8	35	2	0	0	2	0	0	0	0	11270	20	2	0	76	0	0	0	158	0	0	0	0	1	0
RH 9	35	1	0	0	1	0	0	0	0	11000	15	1	0	154	0	0	0	132	0	0	0	0	1	0
RH 10	35	2	0	0	2	0	0	0	0	10300	22	2	0	637	0	0	0	87	0	0	0	0	2	0
RH 11	35	2	0	0	2	0	0	0	0	10289	29	2	0	0	0	0	0	42	0	0	0	0	2	0
RH 12	35	42	0	0	42	0	5	0	0	10300	126	42	0	132	0	0	0	24	0	0	5	5	9	0
RH 1	36	292	0	0	292	0	35	0	0	10300	871	292	0	1142	0	0	0	21	0	0	35	35	61	0
RH 2	36	1972	1972	0	1519	0	295	0	0	12400	5876	0	0	2520	0	0	1230	26	1230	1972	295	3496	411	0
RH 3	36	323	0	0	323	0	60	0	0	10846	963	323	0	2790	0	0	0	50	0	0	60	60	67	0
RH 4	36	326	0	0	326	0	61	0	0	12071	971	326	0	0	0	0	0	72	0	0	61	61	68	0
RH 5	36	120	0	0	120	0	23	0	0	12400	359	120	0	36	0	0	0	114	0	0	23	23	25	0
RH 6	36	34	0	0	34	0	4	0	0	12299	100	34	0	92	0	0	0	143	0	0	4	4	7	0
RH 7	36	3	0	0	3	0	1	0	0	12036	35	3	0	127	0	0	0	174	0	0	1	1	2	0
RH 8	36	2	0	0	2	0	0	0	0	11685	20	2	0	211	0	0	0	162	0	0	0	0	1	0
RH 9	36	1	0	0	1	0	0	0	0	11000	15	1	0	566	0	0	0	135	0	0	0	0	1	0
RH 10	36	2	0	0	2	0	0	0	0	10300	22	2	0	637	0	0	0	87	0	0	0	0	2	0
RH 11	36	2	0	0	2	0	0	0	0	10283	23	2	0	0	0	0	0	42	0	0	0	0	2	0
RH 12	36	30	0	0	30	0	4	0	0	10300	90	30	0	78	0	0	0	24	0	0	4	4	6	0
RH 1	37	131	0	0	131	0	15	0	0	10300	391	131	0	501	0	0	0	21	0	0	15	15	27	0
RH 2	37	1527	1441	0	1378	0	239	0	0	12400	4560	86	0	2520	0	0	0	26	0	1441	239	1679	319	0
RH 3	37	2050	2050	0	1570	0	333	0	0	12400	6123	0	0	2790	0	0	3283	50	3283	2050	333	5666	429	934
RH 4	37	615	0	0	615	0	106	0	0	12400	1838	615	0	2376	0	0	0	77	0	0	106	106	129	0
RH 5	37	168	0	0	168	0	32	0	0	12400	502	168	0	554	0	0	0	116	0	0	32	32	35	0
RH 6	37	41	0	0	41	0	5	0	0	12035	122	41	0	385	0	0	0	143	0	0	5	5	9	0
RH 7	37	4	0	0	4	0	1	0	0	11787	47	4	0	127	0	0	0	172	0	0	1	1	3	0
RH 8	37	2	0	0	2	0	0	0	0	11579	26	2	0	76	0	0	0	161	0	0	0	0	2	0
RH 9	37	1	0	0	1	0	0	0	0	11000	19	1	0	465	0	0	0	134	0	0	0	0	1	0
RH 10	37	2	0	0	2	0	0	0	0	10300	22	2	0	637	0	0	0	87	0	0	0	0	2	0
RH 11	37	3	0	0	3	0	1	0	0	10300	42	3	0	3	0	0	0	42	0	0	1	1	3	0
RH 12	37	657	84	0	573	0	96	0	0	10300	1966	573	0	2514	0	0	0	25	0	84	96	180	138	0
RH 1	38	705	0	0	705	0	105	0	0	10305	2111	705	0	2790	0	0	0	21	0	0	105	105	148	0
RH 2	38	4028	4028	0	2014	0	557	0	0	12400	12055	0	0	2520	0	0	7414	26	7414	4028	557	11999	844	1635
RH 3	38	2701	2701	0	2154	0	437	0	0	12400	8084	0	0	2790	0	0	5244	50	5244	2701	437	8382	566	1678
RH 4	38	737	165	0	737	0	126	0	0	12400	2205	572	0	2700	0	0	0	77	0	165	126	291	154	0
RH 5	38	204	0	0	204	0	39	0	0	12400	609	204	0	697	0	0	0	116	0	0	39	39	43	0
RH 6	38	58	0	0	58	0	8	0	0	12056	173	58	0	432	0	0	0	143	0	0	8	8	12	0
RH 7	38	6	0	0	6	0	3	0	0	11838	75	6	0	127	0	0	0	172	0	0	3	3	5	0
RH 8	38	3	0	0	3	0	1	0	0	11630	40	3	0	90	0	0	0	161	0	0	1	1	3	0
RH 9	38	2	0	0	2	0	0	0	0	11000	27	2	0	525	0	0	0	134	0	0	0	0	2	0
RH 10	38	6	0	0	6	0	1	0	0	10300	71	6	0	690	0	0	0	87	0	0	1	1	5	0
RH 11	38	11	0	0	11	0	6	0	0	10300	134	11	0	103	0	0	0	42	0	0	6	6	9	0
RH 12	38	197	0	0	197	0	22	0	0	10300	555	197	0	727	0	0	0	25	0	0	22	22	39	0
RH 1	39	138	0	0	138	0	15	0	0	10300	391	138	0	508	0	0	0	21	0	0	15	15	27	0
RH 2	39	298	0	0	298	0	34	0	0	10300	842	298	0	1114	0	0	0	26	0	0	34	34	59	0
RH 3	39	259	0	0	259	0	47	0	0	10300	730	259	0	944	0	0	0	45	0	0	47	47	51	0
RH 4	39	83	0	0	83	0	15	0	0	10547	234	83	0	0	0	0	0	70	0	0	15	15	16	0
RH 5	39	35	0	0	35	0	6	0	0	10575	100	35	0	0	0	0	0	107	0	0	6	6	7	0
RH 6	39	21	0	0	21	0	2	0	0	10432	60	21	0	92	0	0	0	133	0	0	2	2	4	0
RH 7	39	2	0	0	2	0	0	0	0	10169	22	2	0	127	0	0	0	160	0	0	0	0	2	0
RH 8	39	1	0	0	1	0	0	0	0	9961	15	1	0	76	0	0	0	148	0	0	0	0	1	0
RH 9	39	1	0	0	1	0	0	0	0	9851	12	1	0	0	0	0	0	123	0	0	0	0	1	0
RH 10	39	1	0	0	1	0	0	0	0	9782	11	1	0	0	0	0	0	81	0	0	0	0	1	0
RH 11	39	1	0	0	1	0	0	0	0	9757	15	1	0	0	0	0	0	41	0	0	0	0	1	0
RH 12	39	11	0	0	11	0	1	0	0	9777	33	11	0	0	0	0	0	24	0	0	1	1	2	0
RH 1	40	1182	16	0	1166	0	184	0	0	11674	3541	1166	0	2790	0	0	0	20	0	16	184	200	248	0
RH 2	40	2874	2874	0	1038	0	411	0	0	12400	8607	0	0	2520	0	0	5333	28	5333	2874	411	8618	602	161
RH 3	40	1764	1764	0	1096	0	289	0	0	12400	5282	0	0	2790	0	0	2442	50	2442	1764	289	4495	370	1092
RH 4	40	858	650	0	858	0	145	0	0	12400	2569	208	0	2700	0	0	0	77	0	650	145	795	180	0
RH 5	40	168	0	0	168	0	32	0	0	12400	502	168	0	554	0	0	0	116	0	0	32	32	35	0
RH 6	40	48	0	0	48	0	6	0	0	12044	144	48	0	405	0	0	0	143	0	0	6	6	10	0

		C		GA		P		K		L		M		N		O		P		Q		R		S		FN		FZ		GA		GB		GC		FO	
		CE						G																N		CF				CH							
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir													
RH 7	40	5	0	0	5	0	2	0	0	11810	60	5	0	127	0	0	0	172	0	0	2	2	4	0													
RH 8	40	2	0	0	2	0	1	0	0	11608	32	2	0	76	0	0	0	161	0	0	1	1	2	0													
RH 9	40	2	0	0	2	0	0	0	0	11000	22	2	0	498	0	0	0	134	0	0	0	0	2	0													
RH 10	40	2	0	0	2	0	0	0	0	10300	32	2	0	647	0	0	0	87	0	0	0	0	2	0													
RH 11	40	4	0	0	4	0	1	0	0	10300	51	4	0	13	0	0	0	42	0	0	1	1	4	0													
RH 12	40	614	0	0	614	0	89	0	0	10300	1836	614	0	2425	0	0	0	25	0	0	89	89	129	0													
RH 1	41	1342	448	0	1284	0	211	0	0	12400	4017	894	0	2790	0	0	0	21	0	448	211	659	281	0													
RH 2	41	2994	2994	0	2510	0	426	0	0	12400	8958	0	0	2520	0	0	6409	29	6409	2994	426	9829	627	1653													
RH 3	41	2221	2221	0	1929	0	361	0	0	12400	6645	0	0	2790	0	0	3805	50	3805	2221	361	6387	465	1377													
RH 4	41	2778	2778	0	2225	0	449	0	0	12400	8311	0	0	2700	0	0	5534	77	5534	2778	449	8762	582	1700													
RH 5	41	498	0	0	498	0	88	0	0	12400	1491	498	0	1873	0	0	0	116	0	0	88	88	104	0													
RH 6	41	67	0	0	67	0	9	0	0	11788	199	67	0	735	0	0	0	143	0	0	9	9	14	0													
RH 7	41	7	0	0	7	0	4	0	0	11587	89	7	0	127	0	0	0	170	0	0	4	4	6	0													
RH 8	41	4	0	0	4	0	1	0	0	11402	46	4	0	76	0	0	0	159	0	0	1	1	3	0													
RH 9	41	2	0	0	2	0	1	0	0	11000	31	2	0	302	0	0	0	133	0	0	1	1	2	0													
RH 10	41	4	0	0	4	0	1	0	0	10300	50	4	0	667	0	0	0	87	0	0	1	1	4	0													
RH 11	41	8	0	0	8	0	4	0	0	10300	110	8	0	76	0	0	0	42	0	0	4	4	8	0													
RH 12	41	758	70	0	688	0	113	0	0	10432	2259	688	0	2790	0	0	0	25	0	70	113	183	158	0													
RH 1	42	2209	2209	0	1832	0	325	0	0	12400	6583	0	0	2790	0	0	1804	21	1804	2209	325	4338	461	234													
RH 2	42	1989	1989	0	909	0	297	0	0	12400	5928	0	0	2520	0	0	3379	29	3379	1989	297	5665	415	1145													
RH 3	42	792	412	0	380	0	134	0	0	12301	2361	380	0	2790	0	0	0	50	0	412	134	546	165	35													
RH 4	42	1188	1188	0	1188	0	197	0	0	12400	3542	0	0	2700	0	0	667	76	667	1188	197	2051	248	0													
RH 5	42	415	0	0	415	0	74	0	0	12400	1238	415	0	1537	0	0	0	116	0	0	74	74	87	0													
RH 6	42	52	0	0	52	0	7	0	0	11770	156	52	0	695	0	0	0	143	0	0	7	7	11	0													
RH 7	42	5	0	0	5	0	2	0	0	11544	66	5	0	127	0	0	0	170	0	0	2	2	5	0													
RH 8	42	3	0	0	3	0	1	0	0	11347	35	3	0	76	0	0	0	159	0	0	1	1	2	0													
RH 9	42	2	0	0	2	0	0	0	0	11000	24	2	0	241	0	0	0	133	0	0	0	0	2	0													
RH 10	42	3	0	0	3	0	1	0	0	10300	42	3	0	658	0	0	0	87	0	0	1	1	3	0													
RH 11	42	31	0	0	31	0	20	0	0	10300	403	31	0	392	0	0	0	42	0	0	20	20	28	0													
RH 12	42	129	0	0	129	0	15	0	0	10300	378	129	0	482	0	0	0	25	0	0	15	15	26	0													
RH 1	43	2450	2450	0	1898	0	350	0	0	12400	7176	0	0	2790	0	0	2265	21	2265	2450	350	5065	502	84													
RH 2	43	910	910	0	910	0	135	0	0	12400	2664	0	0	2520	0	0	115	29	115	910	135	1160	186	507													
RH 3	43	1043	1043	0	1043	0	171	0	0	12400	3053	0	0	2790	0	0	213	50	213	1043	171	1427	214	260													
RH 4	43	357	0	0	357	0	64	0	0	12400	1046	357	0	1326	0	0	0	77	0	0	64	64	73	0													
RH 5	43	160	0	0	160	0	30	0	0	12400	469	160	0	513	0	0	0	116	0	0	30	30	33	0													
RH 6	43	45	0	0	45	0	5	0	0	12318	131	45	0	115	0	0	0	143	0	0	5	5	9	0													
RH 7	43	4	0	0	4	0	2	0	0	12072	51	4	0	127	0	0	0	174	0	0	2	2	4	0													
RH 8	43	2	0	0	2	0	0	0	0	11698	28	2	0	241	0	0	0	163	0	0	0	0	2	0													
RH 9	43	2	0	0	2	0	0	0	0	11000	20	2	0	586	0	0	0	135	0	0	0	0	1	0													
RH 10	43	3	0	0	3	0	0	0	0	10300	35	3	0	651	0	0	0	87	0	0	0	0	2	0													
RH 11	43	6	0	0	6	0	3	0	0	10300	79	6	0	43	0	0	0	42	0	0	3	3	6	0													
RH 12	43	53	0	0	53	0	6	0	0	10300	155	53	0	183	0	0	0	25	0	0	6	6	11	0													
RH 1	44	100	0	0	100	0	11	0	0	10300	294	100	0	373	0	0	0	21	0	0	11	11	21	0													
RH 2	44	787	0	0	787	0	116	0	0	10855	2314	787	0	2520	0	0	0	26	0	0	116	116	162	0													
RH 3	44	639	25	0	614	0	109	0	0	10511	1879	614	0	2790	0	0	0	47	0	25	109	134	132	0													
RH 4	44	172	0	0	172	0	32	0	0	11117	505	172	0	0	0	0	0	71	0	0	32	32	35	0													
RH 5	44	100	0	0	100	0	19	0	0	11401	293	100	0	0	0	0	0	110	0	0	19	19	21	0													
RH 6	44	27	0	0	27	0	3	0	0	11277	79	27	0	92	0	0	0	137	0	0	3	3	6	0													
RH 7	44	2	0	0	2	0	0	0	0	11013	27	2	0	127	0	0	0	166	0	0	0	0	2	0													
RH 8	44	1	0	0	1	0	0	0	0	10800	17	1	0	76	0	0	0	155	0	0	0	0	1	0													
RH 9	44	1	0	0	1	0	0	0	0	10684	13	1	0	0	0	0	0	129	0	0	0	0	1	0													
RH 10	44	1	0	0	1	0	0	0	0	10300	18	1	0	317	0	0	0	86	0	0	0	0	1	0													
RH 11	44	9	0	0	9	0	4	0	0	10300	112	9	0	79	0	0	0	42	0	0	4	4	8	0													
RH 12	44	86	0	0	86	0	10	0	0	10300	256	86	0	317	0	0	0	25	0	0	10	10	18	0													
RH 1	45	210	0	0	210	0	24	0	0	10300	622	210	0	811	0	0	0	21	0	0	24	24	44	0													
RH 2	45	1798	1798	0	1457	0	271	0	0	12400	5322	0	0	2520	0	0	676	26	676	1798	271	2745	373	0													
RH 3	45	541	0	0	541	0	94	0	0	11702	1601	541	0	2790	0	0	0	50	0	0	94	94	112	113													
RH 4	45	221	0	0	221	0	42	0	0	12400	655	221	0	104	0	0	0	75	0	0	42	42	46	0													
RH 5	45	169	0	0	169	0	32	0	0	12400	500	169	0	553	0	0	0	116	0	0	32	32	35	0													
RH 6	45	35	0																																		

		C	GA										P	K	L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO													
		CE												G										N										CF							
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir																	
RH 7	45	3	0	0	3	0	1	0	0	12041	36	3	0	127	0	0	0	174	0	0	0	1	1	3	0																
RH 8	45	2	0	0	2	0	0	0	0	11687	21	2	0	215	0	0	0	162	0	0	0	0	0	1	0																
RH 9	45	1	0	0	1	0	0	0	0	11000	15	1	0	568	0	0	0	135	0	0	0	0	0	1	0																
RH 10	45	2	0	0	2	0	0	0	0	10300	21	2	0	636	0	0	0	87	0	0	0	0	0	1	0																
RH 11	45	11	0	0	11	0	6	0	0	10300	146	11	0	115	0	0	0	42	0	0	6	6	10	0	0																
RH 12	45	1625	1515	0	1625	0	249	0	0	12400	4805	110	0	2790	0	0	0	25	0	1515	249	1765	336	0	0																
RH 1	46	836	496	0	836	0	125	0	0	12400	2473	340	0	2790	0	0	0	23	0	496	125	621	173	471	0																
RH 2	46	401	0	0	401	0	53	0	0	11438	1186	401	0	2520	0	0	0	29	0	0	53	53	83	181	0																
RH 3	46	243	0	0	243	0	46	0	0	10300	719	243	0	2052	0	0	0	48	0	0	46	46	50	16	0																
RH 4	46	199	0	0	199	0	38	0	0	11019	590	199	0	0	0	0	0	70	0	0	38	38	41	0	0																
RH 5	46	125	0	0	125	0	24	0	0	11404	369	125	0	0	0	0	0	109	0	0	24	24	26	0	0																
RH 6	46	34	0	0	34	0	4	0	0	11310	101	34	0	92	0	0	0	137	0	0	4	4	7	0	0																
RH 7	46	3	0	0	3	0	1	0	0	11055	36	3	0	127	0	0	0	167	0	0	1	1	3	0	0																
RH 8	46	2	0	0	2	0	0	0	0	10847	21	2	0	76	0	0	0	156	0	0	0	0	1	0	0																
RH 9	46	1	0	0	1	0	0	0	0	10733	15	1	0	0	0	0	0	130	0	0	0	0	1	0	0																
RH 10	46	3	0	0	3	0	1	0	0	10300	38	3	0	388	0	0	0	86	0	0	1	1	3	0	0																
RH 11	46	21	0	0	21	0	12	0	0	10300	255	21	0	234	0	0	0	42	0	0	12	12	18	0	0																
RH 12	46	127	0	0	127	0	14	0	0	10300	352	127	0	454	0	0	0	25	0	0	14	14	25	0	0																
RH 1	47	130	0	0	130	0	14	0	0	10300	360	130	0	469	0	0	0	21	0	0	14	14	25	0	0																
RH 2	47	230	0	0	230	0	25	0	0	10300	639	230	0	843	0	0	0	26	0	0	25	25	45	0	0																
RH 3	47	321	0	0	321	0	56	0	0	10300	890	321	0	1166	0	0	0	45	0	0	56	56	62	0	0																
RH 4	47	215	0	0	215	0	38	0	0	11043	598	215	0	0	0	0	0	70	0	0	38	38	42	0	0																
RH 5	47	83	0	0	83	0	15	0	0	11247	230	83	0	0	0	0	0	109	0	0	15	15	16	0	0																
RH 6	47	27	0	0	27	0	2	0	0	11120	75	27	0	92	0	0	0	137	0	0	2	2	5	0	0																
RH 7	47	2	0	0	2	0	0	0	0	10857	27	2	0	127	0	0	0	165	0	0	0	0	2	0	0																
RH 8	47	2	0	0	2	0	0	0	0	10647	18	2	0	76	0	0	0	154	0	0	0	0	1	0	0																
RH 9	47	1	0	0	1	0	0	0	0	10535	15	1	0	0	0	0	0	129	0	0	0	0	1	0	0																
RH 10	47	2	0	0	2	0	0	0	0	10300	20	2	0	172	0	0	0	85	0	0	0	0	1	0	0																
RH 11	47	3	0	0	3	0	1	0	0	10300	43	3	0	4	0	0	0	42	0	0	1	1	3	0	0																
RH 12	47	45	0	0	45	0	5	0	0	10300	130	45	0	150	0	0	0	25	0	0	5	5	9	0	0																
RH 1	48	43	0	0	43	0	5	0	0	10300	125	43	0	147	0	0	0	21	0	0	5	5	9	0	0																
RH 2	48	60	0	0	60	0	7	0	0	10300	175	60	0	209	0	0	0	26	0	0	7	7	12	0	0																
RH 3	48	218	0	0	218	0	41	0	0	10300	635	218	0	808	0	0	0	45	0	0	41	41	44	0	0																
RH 4	48	363	0	0	363	0	65	0	0	11652	1059	363	0	0	0	0	0	70	0	0	65	65	74	0	0																
RH 5	48	165	0	0	165	0	31	0	0	12186	481	165	0	0	0	0	0	112	0	0	31	31	34	0	0																
RH 6	48	20	0	0	20	0	2	0	0	12031	59	20	0	92	0	0	0	142	0	0	2	2	4	0	0																
RH 7	48	2	0	0	2	0	0	0	0	11756	22	2	0	127	0	0	0	172	0	0	0	0	2	0	0																
RH 8	48	1	0	0	1	0	0	0	0	11536	15	1	0	76	0	0	0	160	0	0	0	0	1	0	0																
RH 9	48	1	0	0	1	0	0	0	0	11000	13	1	0	416	0	0	0	134	0	0	0	0	1	0	0																
RH 10	48	1	0	0	1	0	0	0	0	10300	15	1	0	629	0	0	0	87	0	0	0	0	1	0	0																
RH 11	48	2	0	0	2	0	0	0	0	10281	21	2	0	0	0	0	0	42	0	0	0	0	1	0	0																
RH 12	48	58	0	0	58	0	7	0	0	10300	172	58	0	186	0	0	0	24	0	0	7	7	12	0	0																
RH 1	49	63	0	0	63	0	7	0	0	10300	187	63	0	229	0	0	0	21	0	0	7	7	13	0	0																
RH 2	49	163	0	0	163	0	19	0	0	10300	485	163	0	622	0	0	0	26	0	0	19	19	34	0	0																
RH 3	49	1808	1808	0	1800	0	294	0	0	12400	5384	0	0	2790	0	0	449	45	449	1808	294	2551	377	0	0																
RH 4	49	205	0	0	205	0	39	0	0	12400	611	205	0	739	0	0	0	77	0	0	39	39	43	0	0																
RH 5	49	143	0	0	143	0	27	0	0	12400	426	143	0	453	0	0	0	116	0	0	27	27	30	0	0																
RH 6	49	33	0	0	33	0	4	0	0	12298	100	33	0	92	0	0	0	143	0	0	4	4	7	0	0																
RH 7	49	3	0	0	3	0	1	0	0	12033	33	3	0	127	0	0	0	174	0	0	1	1	2	0	0																
RH 8	49	2	0	0	2	0	0	0	0	11684	20	2	0	209	0	0	0	162	0	0	0	0	1	0	0																
RH 9	49	1	0	0	1	0	0	0	0	11000	15	1	0	565	0	0	0	135	0	0	0	0	1	0	0																
RH 10	49	1	0	0	1	0	0	0	0	10300	17	1	0	631	0	0	0	87	0	0	0	0	1	0	0																
RH 11	49	1	0	0	1	0	0	0	0	10278	19	1	0	0	0	0	0	42	0	0	0	0	1	0	0																
RH 12	49	34	0	0	34	0	4	0	0	10300	102	34	0	89	0	0	0	24	0	0	4	4	7	0	0																
RH 1	50	637	0	0	637	0	92	0	0	10300	1894	637	0	2510	0	0	0	21	0	0	92	92	133	0	0																
RH 2	50	702	75	0	627	0	103	0	0	10468	2087	627	0	2520	0	0	0	26	0	75	103	178	146	0	0																
RH 3	50	167	0	0	167	0	32	0	0	10300	497	167	0	786	0	0	0	46	0	0	32	32	35	0	0																
RH 4	50	134	0	0	134	0	26	0	0	10762	398	134	0	0	0	0	0	70	0	0	26	26	28	0	0																
RH 5	50	67	0	0	67	0	13	0	0	10920	199	67	0	0	0	0	0	108	0	0	13	13	14	0	0																
RH 6	50	20	0	0	20	0	2	0	0	10774	60	20	0	92	0	0	0	135	0	0	2	2	4	0	0																

		C		GA		P		K		L		M		N		O		P		Q		R		S		FN		FZ		GA		GB		GC		FO	
		CE						G																		N		CF				CH					
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir													
RH 7	50	2	0	0	2	0	0	0	0	10506	20	2	0	127	0	0	0	163	0	0	0	0	1	0													
RH 8	50	1	0	0	1	0	0	0	0	10293	13	1	0	76	0	0	0	152	0	0	0	0	1	0													
RH 9	50	1	0	0	1	0	0	0	0	10178	10	1	0	0	0	0	0	126	0	0	0	0	1	0													
RH 10	50	1	0	0	1	0	0	0	0	10111	15	1	0	0	0	0	0	83	0	0	0	0	1	0													
RH 11	50	206	0	0	206	0	128	0	0	10300	2419	206	0	2394	0	0	0	42	0	0	128	128	169	0													
RH 12	50	2222	2222	0	2015	0	297	0	0	12400	5936	0	0	2790	0	0	1021	25	1021	2222	297	3541	416	0													
RH 1	51	1028	960	0	978	0	140	0	0	12400	2745	68	0	2790	0	0	0	23	0	960	140	1100	192	531													
RH 2	51	856	594	0	856	0	114	0	0	12400	2287	262	0	2520	0	0	0	29	0	594	114	708	160	424													
RH 3	51	1026	928	0	1026	0	154	0	0	12400	2742	98	0	2790	0	0	0	50	0	928	154	1082	192	209													
RH 4	51	212	0	0	212	0	36	0	0	12400	566	212	0	701	0	0	0	77	0	0	36	36	40	0													
RH 5	51	176	0	0	176	0	30	0	0	12400	471	176	0	531	0	0	0	116	0	0	30	30	33	0													
RH 6	51	52	0	0	52	0	6	0	0	12323	139	52	0	125	0	0	0	143	0	0	6	6	10	0													
RH 7	51	5	0	0	5	0	2	0	0	12083	56	5	0	127	0	0	0	174	0	0	2	2	4	0													
RH 8	51	3	0	0	3	0	1	0	0	11700	31	3	0	254	0	0	0	163	0	0	1	1	2	0													
RH 9	51	2	0	0	2	0	0	0	0	11000	21	2	0	588	0	0	0	135	0	0	0	0	1	0													
RH 10	51	2	0	0	2	0	0	0	0	10300	27	2	0	642	0	0	0	87	0	0	0	0	2	0													
RH 11	51	5	0	0	5	0	2	0	0	10300	71	5	0	34	0	0	0	42	0	0	2	2	5	0													
RH 12	51	922	62	0	860	0	141	0	0	11101	2756	860	0	2790	0	0	0	25	0	62	141	203	193	0													
RH 1	52	3756	3756	0	2635	0	522	0	0	12400	11230	0	0	2790	0	0	7120	22	7120	3756	522	11398	786	1437													
RH 2	52	1480	1480	0	1422	0	233	0	0	12400	4424	0	0	2520	0	0	0	1875	29	1875	1480	233	3588	310	892												
RH 3	52	2250	2250	0	2209	0	365	0	0	12400	6727	0	0	2790	0	0	0	3887	50	3887	2250	365	6502	471	1268												
RH 4	52	551	0	0	551	0	96	0	0	12400	1646	551	0	2120	0	0	0	77	0	0	96	96	115	305													
RH 5	52	175	0	0	175	0	34	0	0	12400	523	175	0	582	0	0	0	116	0	0	34	34	37	0													
RH 6	52	59	0	0	59	0	8	0	0	12057	176	59	0	434	0	0	0	143	0	0	8	8	12	0													
RH 7	52	6	0	0	6	0	3	0	0	11842	77	6	0	127	0	0	0	172	0	0	3	3	5	0													
RH 8	52	3	0	0	3	0	1	0	0	11632	41	3	0	93	0	0	0	161	0	0	1	1	3	0													
RH 9	52	2	0	0	2	0	0	0	0	11000	28	2	0	527	0	0	0	134	0	0	0	0	2	0													
RH 10	52	4	0	0	4	0	1	0	0	10300	49	4	0	666	0	0	0	87	0	0	1	1	3	0													
RH 11	52	5	0	0	5	0	2	0	0	10300	71	5	0	34	0	0	0	42	0	0	2	2	5	0													
RH 12	52	1076	70	0	1006	0	165	0	0	11688	3197	1006	0	2790	0	0	0	25	0	70	165	235	224	0													
RH 1	53	1577	1577	0	1499	0	244	0	0	12400	4686	0	0	2790	0	0	1162	22	1162	1577	244	2983	328	119													
RH 2	53	343	0	0	343	0	44	0	0	11213	1019	343	0	2520	0	0	0	29	0	0	44	44	71	144													
RH 3	53	448	0	0	448	0	79	0	0	10194	1330	448	0	2749	0	0	0	48	0	0	79	79	93	0													
RH 4	53	174	0	0	174	0	33	0	0	10815	516	174	0	0	0	0	0	69	0	0	33	33	36	0													
RH 5	53	174	0	0	174	0	33	0	0	11398	517	174	0	0	0	0	0	108	0	0	33	33	36	0													
RH 6	53	36	0	0	36	0	4	0	0	11310	106	36	0	92	0	0	0	137	0	0	4	4	7	0													
RH 7	53	3	0	0	3	0	1	0	0	11059	39	3	0	127	0	0	0	167	0	0	1	1	3	0													
RH 8	53	2	0	0	2	0	0	0	0	10851	22	2	0	76	0	0	0	156	0	0	0	0	2	0													
RH 9	53	1	0	0	1	0	0	0	0	10739	16	1	0	0	0	0	0	130	0	0	0	0	1	0													
RH 10	53	2	0	0	2	0	0	0	0	10300	28	2	0	383	0	0	0	86	0	0	0	0	2	0													
RH 11	53	14	0	0	14	0	8	0	0	10300	174	14	0	146	0	0	0	42	0	0	8	8	12	0													
RH 12	53	35	0	0	35	0	4	0	0	10300	103	35	0	113	0	0	0	25	0	0	4	4	7	0													
RH 1	54	382	0	0	382	0	49	0	0	10300	1113	382	0	1474	0	0	0	21	0	0	49	49	78	0													
RH 2	54	686	67	0	619	0	98	0	0	10371	1998	619	0	2520	0	0	0	26	0	67	98	165	140	0													
RH 3	54	580	0	0	580	0	98	0	0	10300	1690	580	0	2295	0	0	0	46	0	0	98	98	118	0													
RH 4	54	240	0	0	240	0	45	0	0	11168	698	240	0	0	0	0	0	70	0	0	45	45	49	0													
RH 5	54	100	0	0	100	0	19	0	0	11448	290	100	0	0	0	0	0	110	0	0	19	19	20	0													
RH 6	54	30	0	0	30	0	3	0	0	11335	86	30	0	92	0	0	0	138	0	0	3	3	6	0													
RH 7	54	2	0	0	2	0	0	0	0	11072	29	2	0	127	0	0	0	167	0	0	0	0	2	0													
RH 8	54	1	0	0	1	0	0	0	0	10859	18	1	0	76	0	0	0	156	0	0	0	0	1	0													
RH 9	54	1	0	0	1	0	0	0	0	10744	13	1	0	0	0	0	0	130	0	0	0	0	1	0													
RH 10	54	1	0	0	1	0	0	0	0	10300	19	1	0	378	0	0	0	86	0	0	0	0	1	0													
RH 11	54	5	0	0	5	0	2	0	0	10300	65	5	0	28	0	0	0	42	0	0	2	2	5	0													
RH 12	54	397	0	0	397	0	52	0	0	10300	1172	397	0	1544	0	0	0	25	0	0	52	52	82	0													
RH 1	55	613	0	0	613	0	88	0	0	10300	1808	613	0	2400	0	0	0	21	0	0	88	88	127	0													
RH 2	55	186	0	0	186	0	21	0	0	9739	548	186	0	1269	0	0	0	26	0	0	21	21	38	0													
RH 3	55	199	0	0	199	0	38	0	0	10272	586	199	0	208	0	0	0	44	0	0	38	38	41	0													
RH 4	55	143	0	0	143	0	27	0	0	10768	422	143	0	0	0	0	0	70	0	0	27	27	30	0													
RH 5	55	99	0	0	99	0	19	0	0	11050	291	99	0	0	0	0	0	108	0	0	19	19	20	0													
RH 6	55	23	0	0	23	0	2	0	0	10913	68	23	0	92	0	0	0	135	0	0	2	2															

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE						G								N		CF						
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Creek Confluence (MG)	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	55	2	0	0	2	0	0	0	0	10648	23	2	0	127	0	0	0	164	0	0	0	0	2	0
RH 8	55	1	0	0	1	0	0	0	0	10435	15	1	0	76	0	0	0	153	0	0	0	0	1	0
RH 9	55	1	0	0	1	0	0	0	0	10320	11	1	0	0	0	0	0	127	0	0	0	0	1	0
RH 10	55	1	0	0	1	0	0	0	0	10249	12	1	0	0	0	0	0	84	0	0	0	0	1	0
RH 11	55	2	0	0	2	0	0	0	0	10237	28	2	0	0	0	0	0	42	0	0	0	0	2	0
RH 12	55	3870	3870	0	1819	0	537	0	0	12400	11591	0	0	2790	0	0	6613	24	6613	3870	537	11021	811	0
RH 1	56	2479	2479	0	1566	0	361	0	0	12400	7425	0	0	2790	0	0	4612	23	4612	2479	361	7452	520	510
RH 2	56	1787	1787	0	1787	0	272	0	0	12400	5351	0	0	2520	0	0	2802	29	2802	1787	272	4861	375	1048
RH 3	56	673	0	0	673	0	116	0	0	12250	2017	673	0	2790	0	0	0	50	0	0	116	116	141	0
RH 4	56	244	0	0	244	0	47	0	0	12400	730	244	0	748	0	0	0	76	0	0	47	47	51	0
RH 5	56	132	0	0	132	0	25	0	0	12400	395	132	0	411	0	0	0	116	0	0	25	25	28	0
RH 6	56	57	0	0	57	0	8	0	0	12334	172	57	0	151	0	0	0	143	0	0	8	8	12	0
RH 7	56	6	0	0	6	0	3	0	0	12115	75	6	0	127	0	0	0	174	0	0	3	3	5	0
RH 8	56	3	0	0	3	0	1	0	0	11700	40	3	0	295	0	0	0	163	0	0	1	1	3	0
RH 9	56	2	0	0	2	0	0	0	0	11000	27	2	0	594	0	0	0	135	0	0	0	0	2	0
RH 10	56	5	0	0	5	0	1	0	0	10300	62	5	0	680	0	0	0	87	0	0	1	1	4	0
RH 11	56	5	0	0	5	0	2	0	0	10300	66	5	0	29	0	0	0	42	0	0	2	2	5	0
RH 12	56	34	0	0	34	0	4	0	0	10300	101	34	0	110	0	0	0	25	0	0	4	4	7	0
RH 1	57	108	0	0	108	0	12	0	0	10300	315	108	0	402	0	0	0	21	0	0	12	12	22	0
RH 2	57	842	0	0	842	0	124	0	0	11058	2462	842	0	2520	0	0	0	26	0	0	124	124	172	0
RH 3	57	224	0	0	224	0	42	0	0	10228	654	224	0	1660	0	0	0	47	0	0	42	42	46	0
RH 4	57	148	0	0	148	0	28	0	0	10740	433	148	0	0	0	0	0	69	0	0	28	28	30	0
RH 5	57	210	0	0	210	0	39	0	0	11455	613	210	0	0	0	0	0	108	0	0	39	39	43	0
RH 6	57	25	0	0	25	0	2	0	0	11322	72	25	0	92	0	0	0	138	0	0	2	2	5	0
RH 7	57	2	0	0	2	0	0	0	0	11056	25	2	0	127	0	0	0	167	0	0	0	0	2	0
RH 8	57	1	0	0	1	0	0	0	0	10841	16	1	0	76	0	0	0	156	0	0	0	0	1	0
RH 9	57	1	0	0	1	0	0	0	0	10725	12	1	0	0	0	0	0	130	0	0	0	0	1	0
RH 10	57	1	0	0	1	0	0	0	0	10300	13	1	0	353	0	0	0	86	0	0	0	0	1	0
RH 11	57	4	0	0	4	0	2	0	0	10300	57	4	0	19	0	0	0	42	0	0	2	2	4	0
RH 12	57	117	0	0	117	0	14	0	0	10300	351	117	0	443	0	0	0	25	0	0	14	14	25	0
RH 1	58	616	97	0	519	0	90	0	0	10300	1843	519	0	2341	0	0	0	21	0	97	90	187	129	0
RH 2	58	2948	2948	0	2221	0	420	0	0	12400	8822	0	0	2520	0	0	4176	26	4176	2948	420	7543	618	0
RH 3	58	2600	2600	0	2302	0	421	0	0	12400	7782	0	0	2790	0	0	4942	50	4942	2600	421	7963	545	1615
RH 4	58	3837	3837	0	1459	0	617	0	0	12400	11484	0	0	2700	0	0	8707	77	8707	3837	617	13162	804	2364
RH 5	58	409	0	0	409	0	74	0	0	12400	1225	409	0	1518	0	0	0	116	0	0	74	74	86	0
RH 6	58	68	0	0	68	0	9	0	0	12069	204	68	0	460	0	0	0	143	0	0	9	9	14	0
RH 7	58	7	0	0	7	0	4	0	0	11868	91	7	0	127	0	0	0	172	0	0	4	4	6	0
RH 8	58	4	0	0	4	0	1	0	0	11642	47	4	0	116	0	0	0	161	0	0	1	1	3	0
RH 9	58	2	0	0	2	0	1	0	0	11000	32	2	0	542	0	0	0	134	0	0	1	1	2	0
RH 10	58	4	0	0	4	0	1	0	0	10300	53	4	0	670	0	0	0	87	0	0	1	1	4	0
RH 11	58	4	0	0	4	0	1	0	0	10300	56	4	0	18	0	0	0	42	0	0	1	1	4	0
RH 12	58	39	0	0	39	0	5	0	0	10300	115	39	0	129	0	0	0	25	0	0	5	5	8	0
RH 1	59	397	0	0	397	0	52	0	0	10300	1172	397	0	1548	0	0	0	21	0	0	52	52	82	0
RH 2	59	1152	0	0	1152	0	176	0	0	12304	3398	1152	0	2520	0	0	0	26	0	0	176	176	238	228
RH 3	59	173	0	0	173	0	33	0	0	10147	510	173	0	2790	0	0	0	50	0	0	33	33	36	0
RH 4	59	93	0	0	93	0	18	0	0	10446	275	93	0	0	0	0	0	69	0	0	18	18	19	0
RH 5	59	55	0	0	55	0	10	0	0	10556	161	55	0	0	0	0	0	106	0	0	10	10	11	0
RH 6	59	22	0	0	22	0	2	0	0	10417	64	22	0	92	0	0	0	132	0	0	2	2	4	0
RH 7	59	2	0	0	2	0	0	0	0	10154	21	2	0	127	0	0	0	160	0	0	0	0	1	0
RH 8	59	1	0	0	1	0	0	0	0	9944	13	1	0	76	0	0	0	148	0	0	0	0	1	0
RH 9	59	1	0	0	1	0	0	0	0	9832	10	1	0	0	0	0	0	123	0	0	0	0	1	0
RH 10	59	1	0	0	1	0	0	0	0	9768	16	1	0	0	0	0	0	81	0	0	0	0	1	0
RH 11	59	1	0	0	1	0	0	0	0	9746	18	1	0	0	0	0	0	41	0	0	0	0	1	0
RH 12	59	15	0	0	15	0	2	0	0	9782	45	15	0	0	0	0	0	24	0	0	2	2	3	0
RH 1	60	113	0	0	113	0	13	0	0	10209	334	113	0	0	0	0	0	20	0	0	13	13	23	0
RH 2	60	617	183	0	434	0	88	0	0	10300	1823	434	0	2140	0	0	0	26	0	183	88	271	128	0
RH 3	60	72	0	0	72	0	14	0	0	10291	213	72	0	249	0	0	0	45	0	0	14	14	15	0
RH 4	60	56	0	0	56	0	11	0	0	10441	164	56	0	0	0	0	0	70	0	0	11	11	11	0
RH 5	60	44	0	0	44	0	8	0	0	10508	129	44	0	0	0	0	0	106	0	0	8	8	9	0
RH 6	60	13	0	0	13	0	1	0	0	10336	39	13	0	92	0	0	0	132	0	0	1	1	3	0

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE					G										N	CF		CH				
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	60	1	0	0	1	0	0	0	0	10193	15	1	0	0	0	0	0	159	0	0	0	0	1	0
RH 8	60	1	0	0	1	0	0	0	0	10056	10	1	0	0	0	0	0	148	0	0	0	0	1	0
RH 9	60	1	0	0	1	0	0	0	0	9941	8	1	0	0	0	0	0	124	0	0	0	0	1	0
RH 10	60	1	0	0	1	0	0	0	0	9878	18	1	0	0	0	0	0	82	0	0	0	0	1	0
RH 11	60	9	0	0	9	0	4	0	0	9952	106	9	0	0	0	0	0	41	0	0	4	4	7	0
RH 12	60	35	0	0	35	0	4	0	0	10059	96	35	0	0	0	0	0	24	0	0	4	4	7	0
RH 1	61	82	0	0	82	0	9	0	0	10300	226	82	0	47	0	0	0	20	0	0	9	9	16	0
RH 2	61	63	0	0	63	0	7	0	0	10257	174	63	0	254	0	0	0	26	0	0	7	7	12	0
RH 3	61	191	0	0	191	0	34	0	0	10300	524	191	0	627	0	0	0	45	0	0	34	34	37	0
RH 4	61	43	0	0	43	0	8	0	0	10392	119	43	0	0	0	0	0	70	0	0	8	8	8	0
RH 5	61	32	0	0	32	0	6	0	0	10408	89	32	0	0	0	0	0	106	0	0	6	6	6	0
RH 6	61	13	0	0	13	0	0	0	0	10325	36	13	0	0	0	0	0	131	0	0	0	0	3	0
RH 7	61	1	0	0	1	0	0	0	0	10183	15	1	0	0	0	0	0	159	0	0	0	0	1	0
RH 8	61	1	0	0	1	0	0	0	0	10048	12	1	0	0	0	0	0	148	0	0	0	0	1	0
RH 9	61	1	0	0	1	0	0	0	0	9935	10	1	0	0	0	0	0	124	0	0	0	0	1	0
RH 10	61	1	0	0	1	0	0	0	0	9864	10	1	0	0	0	0	0	82	0	0	0	0	1	0
RH 11	61	1	0	0	1	0	0	0	0	9841	17	1	0	0	0	0	0	41	0	0	0	0	1	0
RH 12	61	29	0	0	29	0	3	0	0	9932	86	29	0	0	0	0	0	24	0	0	3	3	6	0
RH 1	62	35	0	0	35	0	4	0	0	10051	104	35	0	0	0	0	0	20	0	0	4	4	7	0
RH 2	62	1615	1541	0	1141	0	250	0	0	12400	4821	74	0	2520	0	0	0	26	0	1541	250	1791	337	340
RH 3	62	651	0	0	651	0	112	0	0	12153	1942	651	0	2790	0	0	0	50	0	0	112	112	136	393
RH 4	62	133	0	0	133	0	26	0	0	12400	396	133	0	206	0	0	0	76	0	0	26	26	28	0
RH 5	62	103	0	0	103	0	20	0	0	12400	306	103	0	293	0	0	0	116	0	0	20	20	21	0
RH 6	62	28	0	0	28	0	3	0	0	12366	83	28	0	2	0	0	0	143	0	0	3	3	6	0
RH 7	62	2	0	0	2	0	0	0	0	12095	28	2	0	127	0	0	0	174	0	0	0	0	2	0
RH 8	62	1	0	0	1	0	0	0	0	11700	16	1	0	249	0	0	0	163	0	0	0	0	1	0
RH 9	62	1	0	0	1	0	0	0	0	11000	12	1	0	578	0	0	0	135	0	0	0	0	1	0
RH 10	62	49	40	0	9	0	16	0	0	10300	19	9	0	641	0	0	0	87	0	40	16	56	1	0
RH 11	62	3	0	0	3	0	1	0	0	10300	45	3	0	6	0	0	0	42	0	0	1	1	3	0
RH 12	62	102	0	0	102	0	12	0	0	10300	306	102	0	383	0	0	0	25	0	0	12	12	21	0
RH 1	63	1689	1689	0	723	0	261	0	0	12400	5082	0	0	2790	0	0	171	21	171	1689	261	2121	356	258
RH 2	63	2425	2425	0	1993	0	355	0	0	12400	7296	0	0	2520	0	0	4747	29	4747	2425	355	7527	511	1374
RH 3	63	685	0	0	685	0	118	0	0	12305	2060	685	0	2790	0	0	0	50	0	0	118	118	144	0
RH 4	63	1368	1368	0	1346	0	227	0	0	12400	4116	0	0	2700	0	0	1245	76	1245	1368	227	2840	288	39
RH 5	63	638	0	0	638	0	111	0	0	12400	1921	638	0	2443	0	0	0	116	0	0	111	111	134	324
RH 6	63	56	0	0	56	0	7	0	0	11589	168	56	0	892	0	0	0	143	0	0	7	7	12	0
RH 7	63	5	0	0	5	0	3	0	0	11369	70	5	0	127	0	0	0	169	0	0	3	3	5	0
RH 8	63	3	0	0	3	0	1	0	0	11176	38	3	0	76	0	0	0	158	0	0	1	1	3	0
RH 9	63	2	0	0	2	0	0	0	0	11000	26	2	0	72	0	0	0	132	0	0	0	0	2	0
RH 10	63	4	0	0	4	0	2	0	0	10300	45	4	0	662	0	0	0	87	0	0	2	2	3	0
RH 11	63	43	0	0	43	0	25	0	0	10300	498	43	0	499	0	0	0	42	0	0	25	25	35	0
RH 12	63	92	0	0	92	0	9	0	0	10300	244	92	0	311	0	0	0	25	0	0	9	9	17	0
RH 1	64	666	95	0	571	0	85	0	0	10300	1762	571	0	2312	0	0	0	21	0	95	85	180	123	0
RH 2	64	114	0	0	114	0	12	0	0	9525	302	114	0	1165	0	0	0	26	0	0	12	12	21	0
RH 3	64	129	0	0	129	0	22	0	0	9868	341	129	0	84	0	0	0	43	0	0	22	22	24	0
RH 4	64	100	0	0	100	0	17	0	0	10164	264	100	0	0	0	0	0	68	0	0	17	17	18	0
RH 5	64	66	0	0	66	0	11	0	0	10301	175	66	0	0	0	0	0	104	0	0	11	11	12	0
RH 6	64	21	0	0	21	0	1	0	0	10154	54	21	0	92	0	0	0	130	0	0	1	1	4	0
RH 7	64	2	0	0	2	0	0	0	0	9892	20	2	0	127	0	0	0	157	0	0	0	0	1	0
RH 8	64	1	0	0	1	0	0	0	0	9685	13	1	0	76	0	0	0	145	0	0	0	0	1	0
RH 9	64	1	0	0	1	0	0	0	0	9575	10	1	0	0	0	0	0	121	0	0	0	0	1	0
RH 10	64	1	0	0	1	0	0	0	0	9509	12	1	0	0	0	0	0	80	0	0	0	0	1	0
RH 11	64	10	0	0	10	0	6	0	0	9614	136	10	0	0	0	0	0	40	0	0	6	6	10	0
RH 12	64	1753	1379	0	753	0	267	0	0	12400	5225	374	0	2790	0	0	0	23	0	1379	267	1646	366	0
RH 1	65	3152	3152	0	2679	0	444	0	0	12400	9396	0	0	2790	0	0	6583	23	6583	3152	444	10179	658	0
RH 2	65	520	0	0	520	0	73	0	0	11921	1550	520	0	2520	0	0	0	29	0	0	73	73	109	261
RH 3	65	182	0	0	182	0	35	0	0	10300	543	182	0	2297	0	0	0	49	0	0	35	35	38	89
RH 4	65	1059	0	0	1059	0	176	0	0	12372	3155	1059	0	2072	0	0	0	70	0	0	176	176	221	0
RH 5	65	176	0	0	176	0	34	0	0	12400	526	176	0	559	0	0	0	116	0	0	34	34	37	0
RH 6	65	49	0	0	49	0	6	0	0	12324	146	49	0	128	0	0	0	143	0	0	6	6	10	0

		C		GA		P		K		L		M		N		O		P		Q		R		S		FN		FZ		GA		GB		GC		FO	
		CE						G																N		CF				CH							
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence - MG	Accretion between Calaveras Confluence and San Antonio Reservoir - MG	Total Stream Release from San Antonio Reservoir													
RH 7	65	5	0	0	5	0	2	0	0	12089	61	5	0	127	0	0	0	174	0	0	2	2	4	0													
RH 8	65	2	0	0	2	0	1	0	0	11700	33	2	0	262	0	0	0	163	0	0	1	1	2	0													
RH 9	65	2	0	0	2	0	0	0	0	11000	23	2	0	590	0	0	0	135	0	0	0	0	2	0													
RH 10	65	3	0	0	3	0	1	0	0	10300	39	3	0	655	0	0	0	87	0	0	1	1	3	0													
RH 11	65	43	0	0	43	0	26	0	0	10300	518	43	0	519	0	0	0	42	0	0	26	26	36	0													
RH 12	65	458	0	0	458	0	57	0	0	10300	1254	458	0	1687	0	0	0	25	0	0	57	57	88	0													
RH 1	66	389	0	0	389	0	46	0	0	10278	1067	389	0	1457	0	0	0	21	0	0	46	46	75	0													
RH 2	66	522	0	0	522	0	67	0	0	10179	1431	522	0	2026	0	0	0	26	0	0	67	67	100	0													
RH 3	66	193	0	0	193	0	34	0	0	10300	528	193	0	555	0	0	0	45	0	0	34	34	37	0													
RH 4	66	37	0	0	37	0	7	0	0	10370	103	37	0	0	0	0	0	70	0	0	7	7	7	0													
RH 5	66	42	0	0	42	0	8	0	0	10423	116	42	0	0	0	0	0	106	0	0	8	8	8	0													
RH 6	66	23	0	0	23	0	2	0	0	10284	62	23	0	92	0	0	0	131	0	0	2	2	4	0													
RH 7	66	2	0	0	2	0	0	0	0	10022	21	2	0	127	0	0	0	158	0	0	0	0	1	0													
RH 8	66	1	0	0	1	0	0	0	0	9814	13	1	0	76	0	0	0	147	0	0	0	0	1	0													
RH 9	66	1	0	0	1	0	0	0	0	9703	10	1	0	0	0	0	0	122	0	0	0	0	1	0													
RH 10	66	1	0	0	1	0	0	0	0	9638	14	1	0	0	0	0	0	80	0	0	0	0	1	0													
RH 11	66	9	0	0	9	0	5	0	0	9722	116	9	0	0	0	0	0	41	0	0	5	5	8	0													
RH 12	66	544	0	0	544	0	77	0	0	10300	1623	544	0	1566	0	0	0	24	0	0	77	77	114	0													
RH 1	67	1996	1996	0	546	0	298	0	0	12400	5955	0	0	2790	0	0	1044	21	1044	1996	298	3338	417	0													
RH 2	67	793	610	0	793	0	119	0	0	12400	2366	183	0	2520	0	0	0	29	0	0	610	119	729	166	441												
RH 3	67	1616	1616	0	1474	0	264	0	0	12400	4820	0	0	2790	0	0	1980	50	1980	1616	264	3860	337	699													
RH 4	67	1602	1602	0	1579	0	262	0	0	12400	4777	0	0	2700	0	0	2000	77	2000	1602	262	3864	334	60													
RH 5	67	677	0	0	677	0	116	0	0	12400	2021	677	0	2582	0	0	0	116	0	0	116	116	141	345													
RH 6	67	53	0	0	53	0	7	0	0	11585	158	53	0	883	0	0	0	143	0	0	7	7	11	0													
RH 7	67	5	0	0	5	0	2	0	0	11361	66	5	0	127	0	0	0	169	0	0	2	2	5	0													
RH 8	67	3	0	0	3	0	1	0	0	11166	36	3	0	76	0	0	0	158	0	0	1	1	3	0													
RH 9	67	2	0	0	2	0	0	0	0	11000	24	2	0	60	0	0	0	132	0	0	0	0	2	0													
RH 10	67	3	0	0	3	0	1	0	0	10300	43	3	0	659	0	0	0	87	0	0	1	1	3	0													
RH 11	67	5	0	0	5	0	2	0	0	10300	64	5	0	27	0	0	0	42	0	0	2	2	4	0													
RH 12	67	84	0	0	84	0	10	0	0	10300	247	84	0	306	0	0	0	25	0	0	10	10	17	0													
RH 1	68	828	69	0	759	0	123	0	0	10691	2443	759	0	2790	0	0	0	21	0	69	123	192	171	0													
RH 2	68	443	0	0	443	0	60	0	0	10169	1308	443	0	2246	0	0	0	27	0	0	60	60	92	0													
RH 3	68	353	0	0	353	0	64	0	0	10114	1042	353	0	1405	0	0	0	45	0	0	64	64	73	0													
RH 4	68	175	0	0	175	0	33	0	0	10735	515	175	0	0	0	0	0	69	0	0	33	33	36	0													
RH 5	68	98	0	0	98	0	19	0	0	11015	290	98	0	0	0	0	0	108	0	0	19	19	20	0													
RH 6	68	26	0	0	26	0	2	0	0	10889	75	26	0	92	0	0	0	135	0	0	2	2	5	0													
RH 7	68	2	0	0	2	0	0	0	0	10626	25	2	0	127	0	0	0	164	0	0	0	0	2	0													
RH 8	68	1	0	0	1	0	0	0	0	10413	15	1	0	76	0	0	0	153	0	0	0	0	1	0													
RH 9	68	1	0	0	1	0	0	0	0	10299	12	1	0	0	0	0	0	127	0	0	0	0	1	0													
RH 10	68	1	0	0	1	0	0	0	0	10232	15	1	0	0	0	0	0	84	0	0	0	0	1	0													
RH 11	68	6	0	0	6	0	2	0	0	10270	75	6	0	0	0	0	0	42	0	0	2	2	5	0													
RH 12	68	265	0	0	265	0	31	0	0	10300	794	265	0	1005	0	0	0	24	0	0	31	31	56	0													
RH 1	69	3041	3041	0	1308	0	431	0	0	12400	9097	0	0	2790	0	0	4186	21	4186	3041	431	7659	637	0													
RH 2	69	3438	3438	0	2366	0	482	0	0	12400	10284	0	0	2520	0	0	0	7735	29	7735	3438	482	11655	720	1875												
RH 3	69	1204	1204	0	959	0	200	0	0	12400	3602	0	0	2790	0	0	762	50	762	1204	200	2166	252	439													
RH 4	69	385	0	0	385	0	70	0	0	12400	1152	385	0	1460	0	0	0	77	0	0	70	70	81	0													
RH 5	69	127	0	0	127	0	25	0	0	12400	381	127	0	392	0	0	0	116	0	0	25	25	27	0													
RH 6	69	60	0	0	60	0	8	0	0	12338	179	60	0	158	0	0	0	143	0	0	8	8	13	0													
RH 7	69	5	0	0	5	0	2	0	0	12106	64	5	0	127	0	0	0	174	0	0	2	2	4	0													
RH 8	69	2	0	0	2	0	1	0	0	11700	31	2	0	276	0	0	0	163	0	0	1	1	2	0													
RH 9	69	2	0	0	2	0	0	0	0	11000	29	2	0	596	0	0	0	135	0	0	0	0	2	0													
RH 10	69	4	0	0	4	0	1	0	0	10300	48	4	0	665	0	0	0	87	0	0	1	1	3	0													
RH 11	69	5	0	0	5	0	2	0	0	10300	64	5	0	27	0	0	0	42	0	0	2	2	4	0													
RH 12	69	109	0	0	109	0	12	0	0	10300	323	109	0	407	0	0	0	25	0	0	12	12	23	0													
RH 1	70	1900	1900	0	1384	0	285	0	0	12400	5647	0	0	2790	0	0	736	21	736	1900	285	2921	395	307													
RH 2	70	421	0	0	421	0	57	0	0	11524	1252	421	0	2520	0	0	0	29	0	0	57	57	88	196													
RH 3	70	1135	796	0	868	0	188	0	0	12400	3375	339	0	2790	0	0	0	48	0	796	188	984	236	276													
RH 4	70	139	0	0	139	0	27	0	0	12400	413	139	0	475	0	0	0	77	0	0	27	27	29	0													
RH 5	70	72	0	0	72	0	14	0	0	12400	213	72	0	169	0	0	0	116	0	0	14	14	15	0													
RH 6	70	30	0	0	30	0	3	0	0	12285	90	30	0	92	0	0	0	143	0	0	3	3	6	0													

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO			
		CE						G								N		CF							
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion between Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir	
RH 7	70	3	0	0	3	0	1	0	0	12020	33	3	0	127	0	0	174	0	0	0	0	1	2	0	
RH 8	70	2	0	0	2	0	0	0	0	11681	24	2	0	203	0	0	162	0	0	0	0	0	2	0	
RH 9	70	1	0	0	1	0	0	0	0	11000	19	1	0	567	0	0	135	0	0	0	0	0	1	0	
RH 10	70	2	0	0	2	0	0	0	0	10300	21	2	0	636	0	0	87	0	0	0	0	0	1	0	
RH 11	70	42	0	0	42	0	27	0	0	10300	532	42	0	532	0	0	42	0	0	27	27	37	0	0	
RH 12	70	1430	592	0	1248	0	214	0	0	12400	4077	838	0	2790	0	0	25	0	592	214	807	285	0	0	
RH 1	71	712	0	0	712	0	100	0	0	12330	2031	712	0	2790	0	0	23	0	0	100	100	142	373	0	
RH 2	71	127	0	0	127	0	14	0	0	10281	361	127	0	2508	0	0	29	0	0	14	14	25	0	0	
RH 3	71	355	0	0	355	0	63	0	0	10140	1012	355	0	1463	0	0	45	0	0	63	63	71	0	0	
RH 4	71	203	0	0	203	0	37	0	0	10854	580	203	0	0	0	0	69	0	0	37	37	41	0	0	
RH 5	71	92	0	0	92	0	17	0	0	11099	262	92	0	0	0	0	108	0	0	17	17	18	0	0	
RH 6	71	38	0	0	38	0	4	0	0	11019	109	38	0	92	0	0	136	0	0	4	4	8	0	0	
RH 7	71	3	0	0	3	0	1	0	0	10766	36	3	0	127	0	0	164	0	0	1	1	3	0	0	
RH 8	71	1	0	0	1	0	0	0	0	10555	17	1	0	76	0	0	154	0	0	0	0	1	0	0	
RH 9	71	1	0	0	1	0	0	0	0	10441	13	1	0	0	0	0	128	0	0	0	0	1	0	0	
RH 10	71	2	0	0	2	0	0	0	0	10300	22	2	0	80	0	0	85	0	0	0	0	2	0	0	
RH 11	71	3	0	0	3	0	0	0	0	10299	38	3	0	0	0	0	42	0	0	0	0	3	0	0	
RH 12	71	364	1	0	363	0	46	0	0	10300	1069	363	0	1406	0	0	25	0	1	46	47	75	0	0	
RH 1	72	127	0	0	127	0	14	0	0	10300	373	127	0	479	0	0	21	0	0	14	14	26	0	0	
RH 2	72	238	2	0	236	0	27	0	0	10300	699	236	0	909	0	0	26	0	2	27	29	49	0	0	
RH 3	72	52	0	0	52	0	10	0	0	10266	153	52	0	194	0	0	45	0	0	10	10	11	0	0	
RH 4	72	37	0	0	37	0	7	0	0	10342	109	37	0	0	0	0	69	0	0	7	7	8	0	0	
RH 5	72	17	0	0	17	0	3	0	0	10305	51	17	0	0	0	0	105	0	0	3	3	4	0	0	
RH 6	72	11	0	0	11	0	0	0	0	10125	31	11	0	92	0	0	130	0	0	0	0	2	0	0	
RH 7	72	1	0	0	1	0	0	0	0	9854	12	1	0	127	0	0	156	0	0	0	0	1	0	0	
RH 8	72	0	0	0	0	0	0	0	0	9637	4	0	0	76	0	0	145	0	0	0	0	0	0	0	
RH 9	72	0	0	0	0	0	0	0	0	9523	6	0	0	0	0	0	120	0	0	0	0	0	0	0	
RH 10	72	1	0	0	1	0	0	0	0	9460	15	1	0	0	0	0	79	0	0	0	0	1	0	0	
RH 11	72	127	14	0	113	0	84	0	0	10300	1588	113	0	821	0	0	40	0	14	84	98	111	0	0	
RH 12	72	280	0	0	280	0	31	0	0	10300	799	280	0	1054	0	0	25	0	0	31	31	56	0	0	
RH 1	73	2074	2074	0	1605	0	296	0	0	12400	5911	0	0	2790	0	0	1000	21	1000	2074	296	3370	414	0	0
RH 2	73	3620	3620	0	2225	0	483	0	0	12400	10319	0	0	2520	0	0	7770	29	7770	3620	483	11873	722	1881	0
RH 3	73	1719	1719	0	1719	0	269	0	0	12400	4899	0	0	2790	0	0	2059	50	2059	1719	269	4047	343	942	0
RH 4	73	324	0	0	324	0	58	0	0	12400	924	324	0	1171	0	0	77	0	0	58	58	65	0	0	
RH 5	73	121	0	0	121	0	22	0	0	12400	346	121	0	351	0	0	116	0	0	22	22	24	0	0	
RH 6	73	49	0	0	49	0	6	0	0	12322	140	49	0	124	0	0	143	0	0	6	6	10	0	0	
RH 7	73	5	0	0	5	0	2	0	0	12085	59	5	0	127	0	0	174	0	0	2	2	4	0	0	
RH 8	73	3	0	0	3	0	1	0	0	11700	32	3	0	258	0	0	163	0	0	1	1	2	0	0	
RH 9	73	2	0	0	2	0	0	0	0	11000	30	2	0	597	0	0	135	0	0	0	0	2	0	0	
RH 10	73	7	0	0	7	0	3	0	0	10300	88	7	0	708	0	0	87	0	0	3	3	6	0	0	
RH 11	73	79	0	0	79	0	51	0	0	10167	987	79	0	1156	0	0	42	0	0	51	51	69	0	0	
RH 12	73	1507	770	0	995	0	227	0	0	12400	4310	737	0	2790	0	0	24	0	770	227	997	302	143	0	
RH 1	74	1458	1458	0	1458	0	219	0	0	12400	4170	0	0	2790	0	0	1357	23	1357	1458	219	3035	292	845	0
RH 2	74	229	0	0	229	0	25	0	0	10736	656	229	0	2520	0	0	29	0	0	25	25	46	72	0	
RH 3	74	1409	938	0	1185	0	223	0	0	12400	4030	471	0	2790	0	0	47	0	938	223	1161	282	81	0	
RH 4	74	1425	1425	0	1038	0	225	0	0	12400	4076	0	0	2700	0	0	1299	77	1299	1425	225	2949	285	0	
RH 5	74	199	0	0	199	0	37	0	0	12400	569	199	0	652	0	0	116	0	0	37	37	40	0	0	
RH 6	74	76	0	0	76	0	10	0	0	12076	218	76	0	475	0	0	143	0	0	10	10	15	0	0	
RH 7	74	9	0	0	9	0	5	0	0	11899	113	9	0	127	0	0	172	0	0	5	5	8	0	0	
RH 8	74	3	0	0	3	0	1	0	0	11650	42	3	0	133	0	0	161	0	0	1	1	3	0	0	
RH 9	74	1	0	0	1	0	0	0	0	11000	18	1	0	534	0	0	134	0	0	0	0	1	0	0	
RH 10	74	4	0	0	4	0	1	0	0	10300	54	4	0	671	0	0	87	0	0	1	1	4	0	0	
RH 11	74	7	0	0	7	0	4	0	0	10300	96	7	0	61	0	0	42	0	0	4	4	7	0	0	
RH 12	74	100	0	0	100	0	11	0	0	10300	296	100	0	371	0	0	25	0	0	11	11	21	0	0	
RH 1	75	201	0	0	201	0	23	0	0	10300	597	201	0	777	0	0	21	0	0	23	23	42	0	0	
RH 2	75	2441	2441	0	1693	0	353	0	0	12400	7240	0	0	2520	0	0	2594	26	2594	2441	353	5387	507	207	0
RH 3	75	2700	2700	0	2099	0	433	0	0	12400	8009	0	0	2790	0	0	5169	50	5169	2700	433	8302	561	1663	0
RH 4	75	755	217	0	755	0	128	0	0	12400	2239	538	0	2700	0	0	77	0	217	128	345	157	0	0	
RH 5	75	189	0	0	189	0	36	0	0	12400	561	189	0	634	0	0	116	0	0	36	36	39	0	0	
RH 6	75	66	0	0	66	0	9	0	0	12065	195	66	0	452	0	0	143	0	0	9	9	14	0	0	

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE						G								N		CF		CH				
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	75	8	0	0	8	0	4	0	0	11878	103	8	0	127	0	0	0	172	0	0	4	4	7	0
RH 8	75	5	0	0	5	0	2	0	0	11650	63	5	0	134	0	0	0	161	0	0	2	2	4	0
RH 9	75	4	0	0	4	0	2	0	0	11000	51	4	0	571	0	0	0	134	0	0	2	2	4	0
RH 10	75	6	0	0	6	0	2	0	0	10300	66	6	0	685	0	0	0	87	0	0	2	2	5	0
RH 11	75	7	0	0	7	0	3	0	0	10300	78	7	0	43	0	0	0	42	0	0	3	3	5	0
RH 12	75	35	0	0	35	0	3	0	0	10300	88	35	0	98	0	0	0	25	0	0	3	3	6	0
RH 1	76	32	0	0	32	0	3	0	0	10300	79	32	0	90	0	0	0	21	0	0	3	3	6	0
RH 2	76	36	0	0	36	0	4	0	0	10300	90	36	0	100	0	0	0	26	0	0	4	4	6	0
RH 3	76	88	0	0	88	0	14	0	0	10298	221	88	0	266	0	0	0	45	0	0	14	14	15	0
RH 4	76	36	0	0	36	0	6	0	0	10354	90	36	0	0	0	0	0	70	0	0	6	6	6	0
RH 5	76	16	0	0	16	0	3	0	0	10304	39	16	0	0	0	0	0	106	0	0	3	3	3	0
RH 6	76	7	0	0	7	0	0	0	0	10106	17	7	0	92	0	0	0	130	0	0	0	0	1	0
RH 7	76	1	0	0	1	0	0	0	0	9960	10	1	0	0	0	0	0	156	0	0	0	0	1	0
RH 8	76	1	0	0	1	0	0	0	0	9823	8	1	0	0	0	0	0	146	0	0	0	0	1	0
RH 9	76	1	0	0	1	0	0	0	0	9713	10	1	0	0	0	0	0	122	0	0	0	0	1	0
RH 10	76	2	0	0	2	0	0	0	0	9663	29	2	0	0	0	0	0	80	0	0	0	0	2	0
RH 11	76	3	0	0	3	0	0	0	0	9656	31	3	0	0	0	0	0	41	0	0	0	0	2	0
RH 12	76	12	0	0	12	0	1	0	0	9678	33	12	0	0	0	0	0	23	0	0	1	1	2	0
RH 1	77	55	0	0	55	0	6	0	0	9862	149	55	0	0	0	0	0	20	0	0	6	6	10	0
RH 2	77	23	0	0	23	0	3	0	0	9922	63	23	0	0	0	0	0	26	0	0	3	3	4	0
RH 3	77	49	0	0	49	0	9	0	0	10059	132	49	0	0	0	0	0	44	0	0	9	9	9	0
RH 4	77	25	0	0	25	0	4	0	0	10083	67	25	0	0	0	0	0	69	0	0	4	4	5	0
RH 5	77	18	0	0	18	0	3	0	0	10045	48	18	0	0	0	0	0	104	0	0	3	3	3	0
RH 6	77	7	0	0	7	0	0	0	0	9942	18	7	0	0	0	0	0	128	0	0	0	0	1	0
RH 7	77	1	0	0	1	0	0	0	0	9797	8	1	0	0	0	0	0	154	0	0	0	0	1	0
RH 8	77	0	0	0	0	0	0	0	0	9657	5	0	0	0	0	0	0	144	0	0	0	0	0	0
RH 9	77	0	0	0	0	0	0	0	0	9543	6	0	0	0	0	0	0	120	0	0	0	0	0	0
RH 10	77	0	0	0	0	0	0	0	0	9469	6	0	0	0	0	0	0	79	0	0	0	0	0	0
RH 11	77	1	0	0	1	0	0	0	0	9445	15	1	0	0	0	0	0	40	0	0	0	0	1	0
RH 12	77	126	0	0	126	0	15	0	0	9925	377	126	0	0	0	0	0	23	0	0	15	15	26	0
RH 1	78	2319	2319	0	1353	0	340	0	0	12400	6940	0	0	2790	0	0	1655	20	1655	2319	340	4314	486	720
RH 2	78	1330	1330	0	1109	0	209	0	0	12400	3980	0	0	2520	0	0	1431	29	1431	1330	209	2970	279	797
RH 3	78	1656	1656	0	1119	0	271	0	0	12400	4954	0	0	2790	0	0	2114	50	2114	1656	271	4041	347	1023
RH 4	78	671	0	0	671	0	115	0	0	12400	2009	671	0	2603	0	0	0	77	0	0	115	115	141	53
RH 5	78	159	0	0	159	0	31	0	0	12400	474	159	0	517	0	0	0	116	0	0	31	31	33	0
RH 6	78	61	0	0	61	0	8	0	0	11595	183	61	0	906	0	0	0	143	0	0	8	8	13	0
RH 7	78	5	0	0	5	0	2	0	0	11369	64	5	0	127	0	0	0	169	0	0	2	2	4	0
RH 8	78	2	0	0	2	0	1	0	0	11170	33	2	0	76	0	0	0	158	0	0	1	1	2	0
RH 9	78	2	0	0	2	0	0	0	0	11000	30	2	0	70	0	0	0	132	0	0	0	0	2	0
RH 10	78	2	0	0	2	0	0	0	0	10300	29	2	0	644	0	0	0	87	0	0	0	0	2	0
RH 11	78	4	0	0	4	0	1	0	0	10300	52	4	0	14	0	0	0	42	0	0	1	1	4	0
RH 12	78	26	0	0	26	0	3	0	0	10300	77	26	0	78	0	0	0	25	0	0	3	3	5	0
RH 1	79	457	41	0	416	0	63	0	0	10300	1358	416	0	1753	0	0	0	21	0	41	63	104	95	0
RH 2	79	1228	299	0	929	0	190	0	0	12329	3646	929	0	2520	0	0	0	26	0	299	190	489	255	92
RH 3	79	660	0	0	660	0	113	0	0	12108	1959	660	0	2790	0	0	0	50	0	0	113	113	137	0
RH 4	79	215	0	0	215	0	41	0	0	12400	638	215	0	485	0	0	0	76	0	0	41	41	45	0
RH 5	79	76	0	0	76	0	14	0	0	12400	226	76	0	186	0	0	0	116	0	0	14	14	16	0
RH 6	79	23	0	0	23	0	2	0	0	12255	67	23	0	92	0	0	0	143	0	0	2	2	5	0
RH 7	79	2	0	0	2	0	1	0	0	11988	32	2	0	127	0	0	0	173	0	0	1	1	2	0
RH 8	79	1	0	0	1	0	0	0	0	11669	17	1	0	176	0	0	0	162	0	0	0	0	1	0
RH 9	79	1	0	0	1	0	0	0	0	11000	14	1	0	549	0	0	0	134	0	0	0	0	1	0
RH 10	79	3	0	0	3	0	0	0	0	10300	36	3	0	652	0	0	0	87	0	0	0	0	3	0
RH 11	79	8	0	0	8	0	4	0	0	10300	109	8	0	75	0	0	0	42	0	0	4	4	8	0
RH 12	79	308	0	0	308	0	38	0	0	10300	919	308	0	1202	0	0	0	25	0	0	38	38	64	0
RH 1	80	2057	2057	0	1095	0	306	0	0	12400	6134	0	0	2790	0	0	1223	21	1223	2057	306	3586	429	0
RH 2	80	3951	3951	0	1402	0	546	0	0	12400	11784	0	0	2520	0	0	9235	29	9235	3951	546	13732	825	2127
RH 3	80	840	506	0	839	0	142	0	0	12400	2506	334	0	2790	0	0	0	50	0	506	142	648	175	83
RH 4	80	316	0	0	316	0	59	0	0	12400	942	316	0	1181	0	0	0	77	0	0	59	59	66	0
RH 5	80	125	0	0	125	0	24	0	0	12400	374	125	0	383	0	0	0	116	0	0	24	24	26	0
RH 6	80	51	0	0	51	0	7	0	0	12327	153	51	0	134	0	0	0	143	0	0	7	7	11	0

VBA_BASERH 2009

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE						G								N		CF						
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence - MG	Accretion b/w Calaveras Confluence and San Antonio Reservoir - MG	Total Stream Release from San Antonio Reservoir
RH 7	80	6	0	0	6	0	3	0	0	12105	73	6	0	127	0	0	0	174	0	0	3	3	5	0
RH 8	80	3	0	0	3	0	1	0	0	11700	37	3	0	282	0	0	0	163	0	0	1	1	3	0
RH 9	80	2	0	0	2	0	0	0	0	11000	22	2	0	589	0	0	0	135	0	0	0	0	2	0
RH 10	80	2	0	0	2	0	0	0	0	10300	26	2	0	641	0	0	0	87	0	0	0	0	2	0
RH 11	80	3	0	0	3	0	0	0	0	10296	35	3	0	0	0	0	0	42	0	0	0	0	2	0
RH 12	80	36	0	0	36	0	4	0	0	10300	107	36	0	114	0	0	0	25	0	0	4	4	7	0
RH 1	81	1021	512	0	509	0	156	0	0	11041	3043	509	0	2790	0	0	0	21	0	512	156	668	213	0
RH 2	81	199	0	0	199	0	23	0	0	9915	592	199	0	1890	0	0	0	27	0	0	23	23	41	0
RH 3	81	915	0	0	915	0	153	0	0	10724	2728	915	0	2790	0	0	0	44	0	0	153	153	191	0
RH 4	81	172	0	0	172	0	33	0	0	11338	513	172	0	0	0	0	0	71	0	0	33	33	36	0
RH 5	81	63	0	0	63	0	12	0	0	11478	188	63	0	0	0	0	0	111	0	0	12	12	13	0
RH 6	81	22	0	0	22	0	2	0	0	11335	65	22	0	92	0	0	0	138	0	0	2	2	5	0
RH 7	81	1	0	0	1	0	0	0	0	11058	16	1	0	127	0	0	0	167	0	0	0	0	1	0
RH 8	81	1	0	0	1	0	0	0	0	10837	9	1	0	76	0	0	0	156	0	0	0	0	1	0
RH 9	81	1	0	0	1	0	0	0	0	10716	8	1	0	0	0	0	0	130	0	0	0	0	1	0
RH 10	81	1	0	0	1	0	0	0	0	10300	13	1	0	344	0	0	0	86	0	0	0	0	1	0
RH 11	81	55	0	0	55	0	36	0	0	10300	706	55	0	719	0	0	0	42	0	0	36	36	49	0
RH 12	81	500	94	0	406	0	69	0	0	10300	1469	406	0	1850	0	0	0	25	0	94	69	163	103	0
RH 1	82	2496	2496	0	915	0	357	0	0	12400	7340	0	0	2790	0	0	2429	21	2429	2496	357	5282	514	180
RH 2	82	1508	1508	0	356	0	233	0	0	12400	4434	0	0	2520	0	0	1885	29	1885	1508	233	3626	310	894
RH 3	82	1114	1114	0	361	0	183	0	0	12400	3277	0	0	2790	0	0	437	50	437	1114	183	1734	229	333
RH 4	82	3493	3493	0	2688	0	553	0	0	12400	10273	0	0	2700	0	0	7496	77	7496	3493	553	11542	719	2110
RH 5	82	472	0	0	472	0	83	0	0	12400	1388	472	0	1744	0	0	0	116	0	0	83	83	97	0
RH 6	82	65	0	0	65	0	9	0	0	11878	190	65	0	634	0	0	0	143	0	0	9	9	13	0
RH 7	82	6	0	0	6	0	3	0	0	11670	84	6	0	127	0	0	0	171	0	0	3	3	6	0
RH 8	82	3	0	0	3	0	1	0	0	11481	44	3	0	76	0	0	0	160	0	0	1	1	3	0
RH 9	82	2	0	0	2	0	0	0	0	11000	30	2	0	380	0	0	0	133	0	0	0	0	2	0
RH 10	82	3	0	0	3	0	1	0	0	10300	41	3	0	657	0	0	0	87	0	0	1	1	3	0
RH 11	82	49	17	0	32	0	32	0	0	10300	634	32	0	624	0	0	0	42	0	17	32	49	44	0
RH 12	82	1004	507	0	497	0	153	0	0	10961	2979	497	0	2790	0	0	0	25	0	507	153	660	209	0
RH 1	83	3197	3197	0	2615	0	448	0	0	12400	9483	0	0	2790	0	0	5233	22	5233	3197	448	8878	664	1261
RH 2	83	3829	3829	0	2385	0	528	0	0	12400	11358	0	0	2520	0	0	8809	29	8809	3829	528	13166	795	2056
RH 3	83	5884	5884	0	2920	0	934	0	0	12400	17456	0	0	2790	0	0	14616	50	14616	5884	934	21434	1222	3640
RH 4	83	1358	1358	0	1358	0	223	0	0	12400	4030	0	0	2700	0	0	1253	77	1253	1358	223	2834	282	417
RH 5	83	904	680	0	904	0	151	0	0	12400	2682	224	0	2790	0	0	0	116	0	680	151	831	188	0
RH 6	83	96	0	0	96	0	14	0	0	11173	285	96	0	1465	0	0	0	143	0	0	14	14	20	0
RH 7	83	10	0	0	10	0	6	0	0	11023	133	10	0	127	0	0	0	166	0	0	6	6	9	0
RH 8	83	5	0	0	5	0	3	0	0	10865	68	5	0	76	0	0	0	155	0	0	3	3	5	0
RH 9	83	3	0	0	3	0	1	0	0	10783	45	3	0	0	0	0	0	130	0	0	1	1	3	0
RH 10	83	8	0	0	8	0	3	0	0	10300	93	8	0	498	0	0	0	86	0	0	3	3	7	0
RH 11	83	119	33	0	86	0	73	0	0	10300	1392	86	0	1436	0	0	0	42	0	33	73	106	97	0
RH 12	83	2261	2261	0	1840	0	302	0	0	12400	6041	0	0	2790	0	0	1126	25	1126	2261	302	3689	423	46
RH 1	84	355	0	0	355	0	40	0	0	10891	949	355	0	2790	0	0	0	23	0	0	40	40	66	135
RH 2	84	199	0	0	199	0	21	0	0	10244	532	199	0	1351	0	0	0	27	0	0	21	21	37	0
RH 3	84	221	0	0	221	0	38	0	0	10300	590	221	0	709	0	0	0	45	0	0	38	38	41	0
RH 4	84	194	0	0	194	0	33	0	0	10943	519	194	0	0	0	0	0	70	0	0	33	33	36	0
RH 5	84	167	0	0	167	0	29	0	0	11446	445	167	0	0	0	0	0	109	0	0	29	29	31	0
RH 6	84	42	0	0	42	0	4	0	0	11370	111	42	0	92	0	0	0	138	0	0	4	4	8	0
RH 7	84	3	0	0	3	0	1	0	0	11119	40	3	0	127	0	0	0	167	0	0	1	1	3	0
RH 8	84	2	0	0	2	0	0	0	0	10912	23	2	0	76	0	0	0	156	0	0	0	0	2	0
RH 9	84	1	0	0	1	0	0	0	0	10800	17	1	0	0	0	0	0	130	0	0	0	0	1	0
RH 10	84	3	0	0	3	0	0	0	0	10300	32	3	0	449	0	0	0	86	0	0	0	0	2	0
RH 11	84	85	0	0	85	0	48	0	0	10300	920	85	0	963	0	0	0	42	0	0	48	48	64	0
RH 12	84	189	0	0	189	0	18	0	0	10300	465	189	0	629	0	0	0	25	0	0	18	18	33	0
RH 1	85	93	0	0	93	0	9	0	0	10300	228	93	0	300	0	0	0	21	0	0	9	9	16	0
RH 2	85	391	224	0	167	0	41	0	0	10300	961	167	0	1102	0	0	0	26	0	224	41	265	67	0
RH 3	85	468	0	0	468	0	70	0	0	10300	1148	468	0	1571	0	0	0	45	0	0	70	70	80	0
RH 4	85	68	0	0	68	0	11	0	0	10466	168	68	0	0	0	0	0	70	0	0	11	11	12	0
RH 5	85	70	0	0	70	0	11	0	0	10602	172	70	0	0	0	0	0	106	0	0	11	11	12	0
RH 6	85	30	0	0	30	0	2	0	0	10481	74	30	0	92	0	0	0	133	0	0	2	2	5	0

		C		GA		P		K		L		M		N		O		P		Q		R		S		FN		FZ		GA		GB		GC		FO	
		CE						G																N		CF		CH									
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recapture of MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion bwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir													
RH 7	85	2	0	0	2	0	0	0	0	10222	26	2	0	127	0	0	0	160	0	0	0	0	2	0													
RH 8	85	2	0	0	2	0	0	0	0	10017	17	2	0	76	0	0	0	149	0	0	0	0	1	0													
RH 9	85	1	0	0	1	0	0	0	0	9907	13	1	0	0	0	0	0	123	0	0	0	0	1	0													
RH 10	85	1	0	0	1	0	0	0	0	9839	12	1	0	0	0	0	0	82	0	0	0	0	1	0													
RH 11	85	4	0	0	4	0	1	0	0	9855	54	4	0	0	0	0	0	41	0	0	1	1	4	0													
RH 12	85	50	0	0	50	0	6	0	0	10032	150	50	0	0	0	0	0	24	0	0	6	6	11	0													
RH 1	86	48	0	0	48	0	6	0	0	10201	142	48	0	0	0	0	0	20	0	0	6	6	10	0													
RH 2	86	4512	4512	0	1462	0	618	0	0	12400	13500	0	0	2520	0	0	8755	26	8755	4512	618	13885	945	0													
RH 3	86	2548	2548	0	1400	0	413	0	0	12400	7623	0	0	2790	0	0	4783	50	4783	2548	413	7744	534	1582													
RH 4	86	437	0	0	437	0	78	0	0	12400	1308	437	0	1668	0	0	0	77	0	0	78	78	92	0													
RH 5	86	144	0	0	144	0	28	0	0	12393	430	144	0	465	0	0	0	116	0	0	28	28	30	0													
RH 6	86	53	0	0	53	0	7	0	0	12048	158	53	0	413	0	0	0	143	0	0	7	7	11	0													
RH 7	86	5	0	0	5	0	2	0	0	11821	67	5	0	127	0	0	0	172	0	0	2	2	5	0													
RH 8	86	3	0	0	3	0	1	0	0	11623	36	3	0	76	0	0	0	161	0	0	1	1	3	0													
RH 9	86	1	0	0	1	0	0	0	0	11000	15	1	0	505	0	0	0	134	0	0	0	0	1	0													
RH 10	86	2	0	0	2	0	0	0	0	10300	23	2	0	638	0	0	0	87	0	0	0	0	2	0													
RH 11	86	2	0	0	2	0	0	0	0	10285	25	2	0	0	0	0	0	42	0	0	0	0	2	0													
RH 12	86	28	0	0	28	0	3	0	0	10300	79	28	0	67	0	0	0	24	0	0	3	3	6	0													
RH 1	87	48	0	0	48	0	5	0	0	10300	139	48	0	166	0	0	0	21	0	0	5	5	10	0													
RH 2	87	151	69	0	82	0	17	0	0	10300	433	82	0	489	0	0	0	26	0	69	17	86	30	0													
RH 3	87	133	0	0	133	0	25	0	0	10300	383	133	0	471	0	0	0	45	0	0	25	25	27	0													
RH 4	87	45	0	0	45	0	8	0	0	10403	128	45	0	0	0	0	0	70	0	0	8	8	9	0													
RH 5	87	15	0	0	15	0	3	0	0	10354	42	15	0	0	0	0	0	106	0	0	3	3	3	0													
RH 6	87	10	0	0	10	0	0	0	0	10170	28	10	0	92	0	0	0	131	0	0	0	0	2	0													
RH 7	87	1	0	0	1	0	0	0	0	10025	11	1	0	0	0	0	0	157	0	0	0	0	1	0													
RH 8	87	1	0	0	1	0	0	0	0	9887	8	1	0	0	0	0	0	147	0	0	0	0	1	0													
RH 9	87	1	0	0	1	0	0	0	0	9773	7	1	0	0	0	0	0	122	0	0	0	0	0	0													
RH 10	87	1	0	0	1	0	0	0	0	9703	10	1	0	0	0	0	0	81	0	0	0	0	1	0													
RH 11	87	2	0	0	2	0	0	0	0	9690	26	2	0	0	0	0	0	41	0	0	0	0	2	0													
RH 12	87	99	0	0	99	0	11	0	0	10053	287	99	0	0	0	0	0	24	0	0	11	11	20	0													
RH 1	88	190	0	0	190	0	21	0	0	10300	551	190	0	473	0	0	0	20	0	0	21	21	39	0													
RH 2	88	43	0	0	43	0	5	0	0	10235	125	43	0	206	0	0	0	26	0	0	5	5	9	0													
RH 3	88	31	0	0	31	0	6	0	0	10300	91	31	0	12	0	0	0	45	0	0	6	6	6	0													
RH 4	88	39	0	0	39	0	7	0	0	10381	112	39	0	0	0	0	0	70	0	0	7	7	8	0													
RH 5	88	18	0	0	18	0	3	0	0	10345	51	18	0	0	0	0	0	106	0	0	3	3	4	0													
RH 6	88	9	0	0	9	0	0	0	0	10250	27	9	0	0	0	0	0	130	0	0	0	0	2	0													
RH 7	88	1	0	0	1	0	0	0	0	10104	11	1	0	0	0	0	0	158	0	0	0	0	1	0													
RH 8	88	1	0	0	1	0	0	0	0	9966	8	1	0	0	0	0	0	148	0	0	0	0	1	0													
RH 9	88	1	0	0	1	0	0	0	0	9851	7	1	0	0	0	0	0	123	0	0	0	0	0	0													
RH 10	88	1	0	0	1	0	0	0	0	9782	11	1	0	0	0	0	0	81	0	0	0	0	1	0													
RH 11	88	1	0	0	1	0	0	0	0	9747	17	1	0	12	0	0	0	41	0	0	0	0	1	0													
RH 12	88	43	0	0	43	0	5	0	0	9889	123	43	0	0	0	0	0	24	0	0	5	5	9	0													
RH 1	89	47	0	0	47	0	5	0	0	10052	136	47	0	0	0	0	0	20	0	0	5	5	10	0													
RH 2	89	42	0	0	42	0	5	0	0	10189	121	42	0	0	0	0	0	26	0	0	5	5	8	0													
RH 3	89	158	0	0	158	0	30	0	0	10300	459	158	0	461	0	0	0	45	0	0	30	30	32	0													
RH 4	89	42	0	0	42	0	8	0	0	10395	123	42	0	0	0	0	0	70	0	0	8	8	9	0													
RH 5	89	12	0	0	12	0	2	0	0	10337	36	12	0	0	0	0	0	106	0	0	2	2	3	0													
RH 6	89	9	0	0	9	0	0	0	0	10242	26	9	0	0	0	0	0	130	0	0	0	0	2	0													
RH 7	89	1	0	0	1	0	0	0	0	10096	11	1	0	0	0	0	0	158	0	0	0	0	1	0													
RH 8	89	1	0	0	1	0	0	0	0	9958	8	1	0	0	0	0	0	147	0	0	0	0	1	0													
RH 9	89	1	0	0	1	0	0	0	0	9843	7	1	0	0	0	0	0	123	0	0	0	0	0	0													
RH 10	89	1	0	0	1	0	0	0	0	9773	10	1	0	0	0	0	0	81	0	0	0	0	1	0													
RH 11	89	10	0	0	10	0	5	0	0	9864	122	10	0	0	0	0	0	41	0	0	5	5	9	0													
RH 12	89	35	0	0	35	0	4	0	0	9972	97	35	0	0	0	0	0	24	0	0	4	4	7	0													
RH 1	90	113	0	0	113	0	12	0	0	10300	308	113	0	73	0	0	0	20	0	0	12	12	22	0													
RH 2	90	133	0	0	133	0	14	0	0	10300	364	133	0	471	0	0	0	26	0	0	14	14	25	0													
RH 3	90	76	0	0	76	0	13	0	0	10300	208	76	0	239	0	0	0	45	0	0	13	13	15	0													
RH 4	90	38	0	0	38	0	7	0	0	10371	103	38	0	0	0	0	0	70	0	0	7	7	7	0													
RH 5	90	28	0	0	28	0	5	0	0	10371	77	28	0	0	0	0	0	106	0	0	5	5	5	0													
RH 6	90	11	0	0	11	0	0	0	0	10280	29	11	0	0	0	0	0	131	0	0	0	0	2	0													

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE				G										N		CF		CH				
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence - MG	Accretion btwn Calaveras Confluence and San Antonio Reservoir - MG	Total Stream Release from San Antonio Reservoir
RH 7	90	1	0	0	1	0	0	0	0	10135	12	1	0	0	0	0	0	158	0	0	0	0	1	0
RH 8	90	1	0	0	1	0	0	0	0	9996	8	1	0	0	0	0	0	148	0	0	0	0	1	0
RH 9	90	1	0	0	1	0	0	0	0	9881	7	1	0	0	0	0	0	123	0	0	0	0	0	0
RH 10	90	1	0	0	1	0	0	0	0	9813	13	1	0	0	0	0	0	81	0	0	0	0	1	0
RH 11	90	2	0	0	2	0	0	0	0	9781	20	2	0	14	0	0	0	41	0	0	0	0	1	0
RH 12	90	23	0	0	23	0	3	0	0	9849	69	23	0	0	0	0	0	24	0	0	3	3	5	0
RH 1	91	21	0	0	21	0	3	0	0	9913	63	21	0	0	0	0	0	20	0	0	3	3	4	0
RH 2	91	20	0	0	20	0	2	0	0	9965	58	20	0	0	0	0	0	26	0	0	2	2	4	0
RH 3	91	965	213	0	752	0	160	0	0	10740	2857	752	0	2790	0	0	0	44	0	213	160	373	200	0
RH 4	91	130	0	0	130	0	25	0	0	11184	386	130	0	0	0	0	0	71	0	0	25	25	27	0
RH 5	91	44	0	0	44	0	8	0	0	11249	131	44	0	0	0	0	0	110	0	0	8	8	9	0
RH 6	91	19	0	0	19	0	1	0	0	11185	55	19	0	2	0	0	0	137	0	0	1	1	4	0
RH 7	91	2	0	0	2	0	0	0	0	11041	20	2	0	0	0	0	0	166	0	0	0	0	1	0
RH 8	91	1	0	0	1	0	0	0	0	10900	13	1	0	0	0	0	0	155	0	0	0	0	1	0
RH 9	91	1	0	0	1	0	0	0	0	10781	10	1	0	0	0	0	0	130	0	0	0	0	1	0
RH 10	91	1	0	0	1	0	0	0	0	10294	13	1	0	414	0	0	0	86	0	0	0	0	1	0
RH 11	91	1	0	0	1	0	0	0	0	10270	17	1	0	0	0	0	0	42	0	0	0	0	1	0
RH 12	91	52	0	0	52	0	6	0	0	10300	155	52	0	153	0	0	0	24	0	0	6	6	11	0
RH 1	92	76	0	0	76	0	9	0	0	10300	227	76	0	282	0	0	0	21	0	0	9	9	16	0
RH 2	92	1676	1676	0	1093	0	257	0	0	12400	5000	0	0	2520	0	0	354	26	354	1676	257	2287	350	352
RH 3	92	417	0	0	417	0	75	0	0	11221	1244	417	0	2790	0	0	0	50	0	0	75	75	87	247
RH 4	92	163	0	0	163	0	31	0	0	11798	487	163	0	0	0	0	0	73	0	0	31	31	34	0
RH 5	92	56	0	0	56	0	11	0	0	11907	166	56	0	0	0	0	0	113	0	0	11	11	12	0
RH 6	92	28	0	0	28	0	3	0	0	11877	82	28	0	0	0	0	0	140	0	0	3	3	6	0
RH 7	92	2	0	0	2	0	0	0	0	11735	27	2	0	0	0	0	0	171	0	0	0	0	2	0
RH 8	92	1	0	0	1	0	0	0	0	11592	16	1	0	0	0	0	0	160	0	0	0	0	1	0
RH 9	92	1	0	0	1	0	0	0	0	10910	12	1	0	561	0	0	0	134	0	0	0	0	1	0
RH 10	92	1	0	0	1	0	0	0	0	10178	17	1	0	664	0	0	0	87	0	0	0	0	1	0
RH 11	92	1	0	0	1	0	0	0	0	10155	18	1	0	0	0	0	0	42	0	0	0	0	1	0
RH 12	92	185	0	0	185	0	21	0	0	10300	552	185	0	567	0	0	0	24	0	0	21	21	39	0
RH 1	93	2348	2348	0	1629	0	344	0	0	12400	7025	0	0	2790	0	0	2114	21	2114	2348	344	4806	492	464
RH 2	93	2037	2037	0	1767	0	304	0	0	12400	6097	0	0	2520	0	0	3548	29	3548	2037	304	5889	427	1173
RH 3	93	878	666	0	878	0	148	0	0	12400	2628	212	0	2790	0	0	0	50	0	666	148	814	184	536
RH 4	93	255	0	0	255	0	49	0	0	12400	763	255	0	941	0	0	0	77	0	0	49	49	53	0
RH 5	93	167	0	0	167	0	32	0	0	12400	498	167	0	549	0	0	0	116	0	0	32	32	35	0
RH 6	93	44	0	0	44	0	5	0	0	11760	131	44	0	672	0	0	0	143	0	0	5	5	9	0
RH 7	93	4	0	0	4	0	2	0	0	11520	53	4	0	127	0	0	0	170	0	0	2	2	4	0
RH 8	93	2	0	0	2	0	0	0	0	11316	29	2	0	76	0	0	0	159	0	0	0	0	2	0
RH 9	93	2	0	0	2	0	0	0	0	11000	20	2	0	206	0	0	0	132	0	0	0	0	1	0
RH 10	93	3	0	0	3	0	0	0	0	10300	36	3	0	652	0	0	0	87	0	0	0	0	3	0
RH 11	93	4	0	0	4	0	1	0	0	10300	54	4	0	16	0	0	0	42	0	0	1	1	4	0
RH 12	93	89	0	0	89	0	10	0	0	10300	260	89	0	324	0	0	0	25	0	0	10	10	18	0
RH 1	94	69	0	0	69	0	8	0	0	10300	202	69	0	250	0	0	0	21	0	0	8	8	14	0
RH 2	94	666	45	0	621	0	95	0	0	10324	1949	621	0	2520	0	0	0	26	0	45	95	140	136	0
RH 3	94	120	0	0	120	0	23	0	0	10300	352	120	0	450	0	0	0	45	0	0	23	23	25	0
RH 4	94	87	0	0	87	0	16	0	0	10573	256	87	0	0	0	0	0	70	0	0	16	16	18	0
RH 5	94	77	0	0	77	0	14	0	0	10768	225	77	0	0	0	0	0	107	0	0	14	14	16	0
RH 6	94	16	0	0	16	0	1	0	0	10605	47	16	0	92	0	0	0	134	0	0	1	1	3	0
RH 7	94	1	0	0	1	0	0	0	0	10462	17	1	0	0	0	0	0	161	0	0	0	0	1	0
RH 8	94	1	0	0	1	0	0	0	0	10324	12	1	0	0	0	0	0	151	0	0	0	0	1	0
RH 9	94	1	0	0	1	0	0	0	0	10208	9	1	0	0	0	0	0	126	0	0	0	0	1	0
RH 10	94	0	0	0	0	0	0	0	0	10132	7	0	0	0	0	0	0	83	0	0	0	0	0	0
RH 11	94	17	0	0	17	0	1	0	0	10162	55	17	0	0	0	0	0	42	0	0	1	1	4	0
RH 12	94	136	0	0	136	0	6	0	0	10300	161	136	0	134	0	0	0	24	0	0	6	6	11	0
RH 1	95	4734	4734	0	2507	0	511	0	0	12400	10979	0	0	2790	0	0	6068	21	6068	4734	511	11314	769	1381
RH 2	95	302	0	0	302	0	65	0	0	11562	1409	302	0	2520	0	0	0	29	0	0	65	65	99	230
RH 3	95	4221	4221	0	1898	0	665	0	0	12400	12374	0	0	2790	0	0	8698	48	8698	4221	665	13583	866	2576
RH 4	95	385	1	0	384	0	96	0	0	12400	1647	384	0	1954	0	0	0	77	0	1	96	97	115	275
RH 5	95	547	0	0	547	0	49	0	0	12400	754	547	0	1185	0	0	0	116	0	0	49	49	53	0
RH 6	95	190	0	0	190	0	18	0	0	11694	372	190	0	1125	0	0	0	143	0	0	18	18	26	0

		C		GA		P	K		L	M	N	O	P	Q	R	S	FN	FZ	GA	GB	GC	FO		
		CE						G								N		CF		CH				
Month	Year	Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recaptured MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	95	54	0	0	55	0	9	0	0	11639	186	55	0	127	0	0	0	169	0	0	9	9	13	0
RH 8	95	11	0	0	11	0	3	0	0	11494	80	11	0	76	0	0	0	160	0	0	3	3	6	0
RH 9	95	7	0	0	7	0	2	0	0	11000	54	7	0	422	0	0	0	133	0	0	2	2	4	0
RH 10	95	2	0	0	2	0	1	0	0	10300	52	2	0	667	0	0	0	87	0	0	1	1	4	0
RH 11	95	3	0	0	3	0	1	0	0	10300	49	3	0	10	0	0	0	42	0	0	1	1	3	0
RH 12	95	274	0	0	274	0	25	0	0	10300	658	274	0	907	0	0	0	25	0	0	25	25	46	0
RH 1	96	3154	3118	0	1743	0	252	0	0	12400	4875	36	0	2790	0	0	0	21	0	3118	252	3370	341	0
RH 2	96	4683	4683	0	2495	0	428	0	0	12400	9026	0	0	2520	0	0	6477	29	6477	4683	428	11588	632	1664
RH 3	96	2544	2544	0	2018	0	237	0	0	12400	4302	0	0	2790	0	0	1462	50	1462	2544	237	4243	301	667
RH 4	96	364	0	0	364	0	47	0	0	12400	725	364	0	1012	0	0	0	77	0	0	47	47	51	0
RH 5	96	160	0	0	160	0	33	0	0	12400	510	160	0	554	0	0	0	116	0	0	33	33	36	0
RH 6	96	53	0	0	53	0	10	0	0	12071	225	53	0	464	0	0	0	143	0	0	10	10	16	0
RH 7	96	24	0	0	24	0	3	0	0	11878	82	24	0	127	0	0	0	172	0	0	3	3	6	0
RH 8	96	10	0	0	10	0	1	0	0	11644	39	10	0	121	0	0	0	161	0	0	1	1	3	0
RH 9	96	4	0	0	4	0	1	0	0	11000	37	4	0	551	0	0	0	134	0	0	1	1	3	0
RH 10	96	9	0	0	9	0	1	0	0	10300	54	9	0	676	0	0	0	87	0	0	1	1	4	0
RH 11	96	440	115	0	325	0	84	0	0	10300	1587	325	0	1870	0	0	0	42	0	115	84	199	111	0
RH 12	96	2503	2503	0	1489	0	358	0	0	12400	7380	0	0	2790	0	0	2465	25	2465	2503	358	5327	517	529
RH 1	97	4755	4755	0	2222	0	643	0	0	12400	14064	0	0	2790	0	0	11251	23	11251	4755	643	16649	984	2516
RH 2	97	481	0	0	482	0	66	0	0	11759	1426	482	0	2520	0	0	0	29	0	0	66	66	100	0
RH 3	97	215	0	0	215	0	37	0	0	10300	578	215	0	2203	0	0	0	49	0	0	37	37	40	0
RH 4	97	108	0	0	108	0	21	0	0	10666	328	108	0	0	0	0	0	70	0	0	21	21	23	0
RH 5	97	55	0	0	55	0	12	0	0	10795	181	55	0	0	0	0	0	108	0	0	12	12	13	0
RH 6	97	25	0	0	25	0	4	0	0	10695	101	25	0	92	0	0	0	134	0	0	4	4	7	0
RH 7	97	11	0	0	11	0	2	0	0	10469	52	11	0	127	0	0	0	162	0	0	2	2	4	0
RH 8	97	6	0	0	6	0	1	0	0	10281	33	6	0	76	0	0	0	151	0	0	1	1	2	0
RH 9	97	3	0	0	3	0	1	0	0	10194	36	3	0	0	0	0	0	126	0	0	1	1	3	0
RH 10	97	4	0	0	4	0	1	0	0	10159	44	4	0	0	0	0	0	83	0	0	1	1	3	0
RH 11	97	74	0	0	74	0	12	0	0	10300	246	74	0	137	0	0	0	42	0	0	12	12	17	0
RH 12	97	362	0	0	362	0	34	0	0	10300	839	362	0	1176	0	0	0	25	0	0	34	34	59	0
RH 1	98	2982	2982	0	1821	0	353	0	0	12400	7255	0	0	2790	0	0	2344	21	2344	2982	353	5679	508	227
RH 2	98	5529	5529	0	2775	0	851	0	0	12400	18964	0	0	2520	0	0	16415	29	16415	5529	851	22795	1327	3332
RH 3	98	1019	1019	0	1019	0	199	0	0	12400	3596	0	0	2790	0	0	756	50	756	1019	199	1975	252	159
RH 4	98	1070	1070	0	1070	0	185	0	0	12400	3314	0	0	2700	0	0	537	77	537	1070	185	1792	232	0
RH 5	98	390	0	0	390	0	78	0	0	12400	1300	390	0	1574	0	0	0	116	0	0	78	78	91	0
RH 6	98	182	0	0	182	0	32	0	0	11954	619	182	0	1104	0	0	0	143	0	0	32	32	43	0
RH 7	98	75	0	0	75	0	15	0	0	12031	300	75	0	127	0	0	0	171	0	0	15	15	21	0
RH 8	98	36	0	0	36	0	7	0	0	11700	144	36	0	349	0	0	0	162	0	0	7	7	10	0
RH 9	98	24	0	0	24	0	4	0	0	11000	91	24	0	680	0	0	0	135	0	0	4	4	6	0
RH 10	98	17	0	0	17	0	4	0	0	10300	112	17	0	742	0	0	0	87	0	0	4	4	8	0
RH 11	98	29	0	0	29	0	6	0	0	10300	150	29	0	137	0	0	0	42	0	0	6	6	11	0
RH 12	98	94	0	0	94	0	14	0	0	10300	371	94	0	440	0	0	0	25	0	0	14	14	26	0
RH 1	99	1179	268	0	911	0	84	0	0	10300	1733	911	0	2623	0	0	0	21	0	268	84	352	121	0
RH 2	99	2055	1789	0	1534	0	231	0	0	12400	4380	266	0	2520	0	0	1789	26	1789	2055	231	2020	307	760
RH 3	99	722	0	0	722	0	94	0	0	11894	1612	722	0	2790	0	0	0	50	0	0	94	94	113	80
RH 4	99	1033	158	0	998	0	136	0	0	12400	2406	875	0	2700	0	0	0	75	0	158	136	294	168	0
RH 5	99	192	0	0	192	0	40	0	0	12400	627	192	0	703	0	0	0	116	0	0	40	40	44	0
RH 6	99	77	0	0	77	0	14	0	0	12380	300	77	0	253	0	0	0	143	0	0	14	14	21	0
RH 7	99	25	0	0	25	0	4	0	0	12205	101	25	0	127	0	0	0	174	0	0	4	4	7	0
RH 8	99	13	0	0	13	0	2	0	0	11700	67	13	0	422	0	0	0	163	0	0	2	2	5	0
RH 9	99	9	0	0	9	0	0	0	0	11000	29	9	0	603	0	0	0	135	0	0	0	0	2	0
RH 10	99	6	0	0	6	0	0	0	0	10300	38	6	0	657	0	0	0	87	0	0	0	0	3	0
RH 11	99	12	0	0	12	0	3	0	0	10300	78	12	0	48	0	0	0	42	0	0	3	3	5	0
RH 12	99	15	0	0	15	0	4	0	0	10300	96	15	0	86	0	0	0	25	0	0	4	4	7	0
RH 1	100	821	384	0	437	0	58	0	0	10300	1276	437	0	1692	0	0	0	21	0	384	58	442	89	0
RH 2	100	2448	2448	0	1488	0	311	0	0	12400	6270	0	0	2520	0	0	1624	26	1624	2448	311	4383	439	602
RH 3	100	1366	1366	0	1296	0	203	0	0	12400	3669	0	0	2790	0	0	829	50	829	1366	203	2398	257	754
RH 4	100	183	0	0	183	0	34	0	0	12400	523	183	0	629	0	0	0	77	0	0	34	34	37	0
RH 5	100	91	2	0	89	0	17																	

VBA_BASERH		2009																																									
C		GA										P		K		L		M		N		O		P		Q		R		S		FN		FZ		GA		GB		GC		FO	
CE												G																		N		CF				CH							
Total Inflow to ACDD (MG)	Initial Spill Past ACDD (MG)	Bypass Requirement Limited to Available (MG)	Divertable Flow to Calaveras Reservoir (MG)	Bypass Flow for Requirement (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for MOU (MG)	Total Release for MOU Available for Recapture (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Arroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek (MG)	Total Recapture of MOU Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence blw ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence (MG)	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir																					
0	12	0	0	12	0	2	0	0	12091	67	12	0	127	0	0	0	174	0	0	2	2	5	0																				
0	4	0	0	4	0	0	0	0	11700	29	4	0	262	0	0	0	163	0	0	0	0	2	0																				
0	2	0	0	2	0	1	0	0	11000	40	2	0	607	0	0	0	135	0	0	1	1	3	0																				
0	3	0	0	3	0	1	0	0	10300	48	3	0	664	0	0	0	87	0	0	1	1	3	0																				
0	5	0	0	5	0	2	0	0	10300	67	5	0	30	0	0	0	42	0	0	2	2	5	0																				
0	12	0	0	12	0	4	0	0	10300	113	12	0	100	0	0	0	25	0	0	4	4	8	0																				
0	127	0	0	127	0	19	0	0	10300	491	127	0	597	0	0	0	21	0	0	19	19	34	0																				
0	1037	18	0	1019	0	144	0	0	11596	2823	1019	0	2520	0	0	0	26	0	18	144	162	198	0																				
0	624	77	0	547	0	133	0	0	11651	2347	547	0	2790	0	0	0	48	0	77	133	210	164	0																				
0	154	0	0	154	0	36	0	0	12288	557	154	0	0	0	0	0	74	0	0	36	36	39	0																				
0	54	0	0	54	0	11	0	0	12400	175	54	0	2	0	0	0	115	0	0	11	11	12	0																				
0	12	0	0	12	0	2	0	0	12237	60	12	0	92	0	0	0	143	0	0	2	2	4	0																				
0	3	0	0	3	0	0	0	0	11964	25	3	0	127	0	0	0	173	0	0	0	0	2	0																				
0	2	0	0	2	0	0	0	0	11661	15	2	0	159	0	0	0	162	0	0	0	0	1	0																				
0	1	0	0	1	0	0	0	0	11000	12	1	0	540	0	0	0	134	0	0	0	0	1	0																				
0	1	0	0	1	0	0	0	0	10300	15	1	0	629	0	0	0	87	0	0	0	0	1	0																				
0	10	0	0	10	0	2	0	0	10300	65	10	0	33	0	0	0	42	0	0	2	2	5	0																				
0	802	97	0	705	0	85	0	0	10300	1759	705	0	2439	0	0	0	25	0	97	85	182	123	0																				
0	399	0	0	399	0	49	0	0	10265	1122	399	0	1535	0	0	0	21	0	0	49	49	79	0																				
0	226	0	0	227	0	23	0	0	9874	600	227	0	1192	0	0	0	26	0	0	23	23	42	0																				
0	442	0	0	442	0	84	0	0	10168	1423	442	0	1527	0	0	0	44	0	0	84	84	100	0																				
0	115	0	0	115	0	24	0	0	10586	372	115	0	0	0	0	0	69	0	0	24	24	26	0																				
0	60	0	0	60	0	11	0	0	10712	173	60	0	0	0	0	0	107	0	0	11	11	12	0																				
0	25	0	0	25	0	2	0	0	10582	70	25	0	92	0	0	0	133	0	0	2	2	5	0																				
0	5	0	0	5	0	0	0	0	10317	18	5	0	127	0	0	0	161	0	0	0	0	1	0																				
0	2	0	0	2	0	0	0	0	10102	9	2	0	76	0	0	0	150	0	0	0	0	1	0																				
0	0	0	0	0	0	0	0	0	9985	7	0	0	0	0	0	0	124	0	0	0	0	0	0																				

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF				
		Total Inflow to ACDD (MG)	Unregulate d Flow between ACDD and Calaveras Confluenc e (MG)	Calaveras Release for Complianc e (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Complianc e (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluenc e b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluenc e	Accretion btwn Calaveras and San Antonio Confluenc e - MG	Total Stream Release from San Antonio Reservoir
Month	Year																				
RH 7	20	1	0	140		31087	17	0	0	0	140	140	0	290	16329	140	1	0	141	1	0
RH 8	20	1	0	140		30686	11	0	0	0	140	140	0	272	16169	140	1	0	141	1	0
RH 9	20	1	0	136		30000	9	0	0	333	136	136	0	227	15900	136	1	0	137	1	0
RH 10	20	1	0	140		28500	13	0	0	1224	140	140	0	149	15812	140	1	0	141	1	0
RH 11	20	65	0	97		27000	195	0	0	1525	97	97	0	73	15767	97	65	0	162	14	0
RH 12	20	1098	125	101		27852	3288	497	0	2790	101	150	0	41	16336	101	601	125	827	230	0
RH 1	21	1555	311	240		29916	4655	475	0	2790	240	233	0	36	16500	240	1080	311	1632	326	1042
RH 2	21	829	169	217		30000	2482	286	0	2420	217	210	0	47	16500	217	543	169	929	174	638
RH 3	21	228	59	240		30363	684	0	0	0	240	233	0	81	16500	240	228	59	527	48	0
RH 4	21	98	33	233		30298	293	0	0	0	233	225	0	125	16500	233	98	33	364	21	0
RH 5	21	63	26	240		30058	188	0	0	0	240	233	0	188	16490	240	63	26	330	13	0
RH 6	21	19	7	233		29649	56	0	0	0	233	225	0	232	16378	233	19	7	259	4	0
RH 7	21	3	0	240		29165	36	0	0	0	240	233	0	280	16208	240	3	0	243	3	0
RH 8	21	2	0	240		28683	20	0	0	0	240	233	0	262	16048	240	2	0	242	1	0
RH 9	21	1	0	233		28246	15	0	0	0	233	225	0	218	15900	233	1	0	234	1	0
RH 10	21	2	0	140		27983	21	0	0	0	140	140	0	144	15897	140	2	0	142	1	0
RH 11	21	2	0	97		27000	22	0	0	835	97	97	0	73	15852	97	2	0	99	2	0
RH 12	21	625	97	105		26984	1870	24	0	1764	105	233	0	41	15872	105	601	97	803	131	0
RH 1	22	382	80	240		27851	1143	0	0	0	240	233	0	35	15900	240	382	80	703	80	0
RH 2	22	3212	576	0		31500	9611	0	0	2520	0	0	3397	45	16500	3397	3212	576	7185	673	1646
RH 3	22	1496	230	0		31500	4478	0	0	2790	0	0	1605	83	16500	1605	1496	230	3331	313	859
RH 4	22	524	72	233		31500	1567	0	0	1207	233	225	0	127	16500	233	524	72	829	110	144
RH 5	22	145	15	240		31500	435	0	0	2	240	233	0	193	16500	240	145	15	400	30	0
RH 6	22	34	3	233		31129	100	0	0	0	233	225	0	238	16373	233	34	3	270	7	0
RH 7	22	4	0	240		30655	54	0	0	0	240	233	0	288	16204	240	4	0	245	4	0
RH 8	22	2	0	240		30174	29	0	0	0	240	233	0	269	16045	240	2	0	242	2	0
RH 9	22	1	0	233		29737	20	0	0	0	233	225	0	225	15900	233	1	0	234	1	0
RH 10	22	2	0	140		28500	32	0	0	980	140	140	0	148	15812	140	2	0	142	2	0
RH 11	22	69	6	97		27000	205	0	0	1535	97	97	0	73	15792	97	69	6	172	14	0
RH 12	22	1633	188	105		29482	4853	565	0	2790	105	105	0	41	16500	105	1068	188	1361	340	7
RH 1	23	865	141	240		29251	2572	264	0	2790	240	233	0	37	16500	240	601	141	982	180	534
RH 2	23	733	94	217		30000	2179	190	0	1356	217	210	0	46	16500	217	543	94	854	153	252
RH 3	23	152	23	240		30131	452	0	0	0	240	233	0	81	16500	240	152	23	415	32	0
RH 4	23	477	36	233		31193	1419	0	0	0	233	225	0	124	16500	233	477	36	746	99	18
RH 5	23	68	5	240		30962	201	0	0	0	240	233	0	191	16427	240	68	5	313	14	0
RH 6	23	7	0	233		30590	96	0	0	0	233	225	0	236	16288	233	7	0	240	7	0
RH 7	23	3	0	240		30100	36	0	0	0	240	233	0	285	16119	240	3	0	243	3	0
RH 8	23	2	0	240		29613	20	0	0	0	240	233	0	267	15960	240	2	0	242	1	0
RH 9	23	1	0	233		29173	15	0	0	0	233	225	0	222	15827	233	1	0	234	1	0
RH 10	23	0	0	140		28500	8	0	0	394	140	140	0	147	15775	140	0	0	140	1	0
RH 11	23	0	0	97		27000	0	0	0	1330	97	97	0	73	15730	97	0	0	97	0	0
RH 12	23	0	0	105		26854	0	0	0	0	105	105	0	41	15705	105	0	0	105	0	0
RH 1	24	0	0	200		26619	0	0	0	0	200	200	0	35	15683	200	0	0	200	0	0
RH 2	24	0	0	181		26394	0	0	0	0	181	181	0	44	15655	181	0	0	181	0	0
RH 3	24	1	0	200		26119	1	0	0	0	200	201	0	75	15608	200	1	0	201	0	0
RH 4	24	3	0	194		25815	4	0	0	0	194	194	0	115	15536	194	3	0	197	0	0
RH 5	24	0	0	140		25502	0	0	0	0	140	140	0	172	15426	140	0	0	140	0	0
RH 6	24	0	0	136		25154	0	0	0	0	136	136	0	212	15291	136	0	0	136	0	0
RH 7	24	0	0	140		24758	0	0	0	0	140	140	0	256	15128	140	0	0	140	0	0
RH 8	24	0	0	140		24378	0	0	0	0	140	140	0	240	14974	140	0	0	140	0	0
RH 9	24	0	0	136		24042	0	0	0	0	136	136	0	200	14845	136	0	0	136	0	0
RH 10	24	0	0	140		23775	6	0	0	0	140	140	0	132	15069	140	0	0	140	0	0
RH 11	24	1	0	97		21844	15	0	0	1783	97	97	0	67	12105	97	1	0	98	1	0
RH 12	24	137	12	101		20557	406	0	0	1554	101	179	0	37	8904	101	137	12	250	28	0
RH 1	25	129	10	200		20710	383	0	0	0	200	233	0	30	8961	200	129	10	339	27	0
RH 2	25	1204	190	181		24638	3566	581	0	0	181	181	0	38	12917	181	623	190	994	250	0
RH 3	25	83	25	200		24611	246	0	0	0	200	233	0	73	12976	200	83	25	309	17	0
RH 4	25	180	38	194		24838	532	0	0	0	194	194	0	111	13184	194	180	38	412	37	0
RH 5	25	186	11	140		25079	551	0	0	0	140	140	0	169	13829	140	186	11	337	39	0
RH 6	25	5	2	136		24794	60	0	0	0	136	136	0	210	13711	136	5	2	143	4	0

		C	GA	P		K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	25	2	0	140		24419	20	0	0	0	140	140	0	254	13559	140	2	0	142	1	0
RH 8	25	1	0	140		24053	12	0	0	0	140	140	0	238	13416	140	1	0	141	1	0
RH 9	25	1	0	136		23728	10	0	0	0	136	136	0	199	13686	136	1	0	137	1	0
RH 10	25	1	0	140		23471	14	0	0	0	140	140	0	131	14574	140	1	0	141	1	0
RH 11	25	1	0	97		23323	15	0	0	0	97	97	0	66	14608	97	1	0	98	1	0
RH 12	25	3	0	101		22777	33	0	0	439	101	103	0	38	13837	101	3	0	104	2	0
RH 1	26	134	1	200		22941	396	0	0	0	200	233	0	32	14259	200	134	1	335	28	0
RH 2	26	2387	285	181		30000	7070	595	0	385	181	181	0	41	15536	181	1792	285	2258	495	0
RH 3	26	180	18	200		30252	533	0	0	0	200	233	0	81	15871	200	180	18	399	37	0
RH 4	26	670	85	194		31500	1986	0	0	419	194	194	0	125	16500	194	670	85	949	139	0
RH 5	26	47	2	240		31207	140	0	0	0	240	233	0	193	16500	240	47	2	289	10	0
RH 6	26	7	0	233		30826	88	0	0	0	233	225	0	237	16360	233	7	0	240	6	0
RH 7	26	2	0	240		30330	31	0	0	0	240	233	0	286	16190	240	2	0	242	2	0
RH 8	26	1	0	240		29840	18	0	0	0	240	233	0	268	16031	240	1	0	241	1	0
RH 9	26	1	0	233		29397	13	0	0	0	233	225	0	223	15897	233	1	0	234	1	0
RH 10	26	1	0	140		28500	20	0	0	629	140	140	0	147	15809	140	1	0	141	1	0
RH 11	26	490	25	97		27233	1603	0	0	2700	97	97	0	73	15787	97	490	25	612	112	0
RH 12	26	161	27	105		27000	526	0	0	613	105	196	0	41	15867	105	161	27	293	37	0
RH 1	27	424	65	240		28112	1387	0	0	0	240	233	0	35	15900	240	424	65	729	97	0
RH 2	27	2015	273	0		31500	6593	0	0	2520	0	0	639	45	16500	639	2015	273	2928	462	451
RH 3	27	550	89	240		31500	1799	0	0	1476	240	233	0	83	16500	240	550	89	880	126	0
RH 4	27	694	91	233		31500	2272	0	0	1912	233	225	0	127	16500	233	694	91	1017	159	140
RH 5	27	84	29	240		31341	274	0	0	0	240	233	0	193	16500	240	84	29	354	19	2
RH 6	27	8	12	233		30981	110	0	0	0	233	225	0	237	16408	233	8	12	253	8	0
RH 7	27	3	0	240		30496	42	0	0	0	240	233	0	287	16238	240	3	0	243	3	0
RH 8	27	2	0	240		30011	24	0	0	0	240	233	0	269	16078	240	2	0	242	2	0
RH 9	27	1	0	233		29571	17	0	0	0	233	225	0	224	15900	233	1	0	234	1	0
RH 10	27	2	0	140		28500	25	0	0	808	140	140	0	148	15812	140	2	0	142	2	0
RH 11	27	2	0	97		27000	27	0	0	1357	97	97	0	73	15767	97	2	0	99	2	0
RH 12	27	346	31	105		26876	1032	0	0	1010	105	213	0	41	15651	105	346	31	481	72	0
RH 1	28	176	43	240		27127	526	0	0	0	240	233	0	35	15801	240	176	43	460	37	0
RH 2	28	331	64	217		27854	989	0	0	0	217	210	0	44	15900	217	331	64	612	69	0
RH 3	28	2118	270	240		31500	6326	334	0	2696	240	233	0	77	16500	240	1784	270	2295	443	25
RH 4	28	811	117	233		31500	2423	0	0	2063	233	225	0	127	16500	233	811	117	1161	170	250
RH 5	28	81	7	240		31310	243	0	0	0	240	233	0	193	16452	240	81	7	328	17	0
RH 6	28	3	2	233		30849	9	0	0	0	233	225	0	237	16321	233	3	2	238	1	0
RH 7	28	3	1	240		30357	35	0	0	0	240	233	0	286	16156	240	3	1	244	2	0
RH 8	28	2	0	240		29869	20	0	0	0	240	233	0	268	15997	240	2	0	242	1	0
RH 9	28	1	0	233		29427	14	0	0	0	233	225	0	223	15863	233	1	0	234	1	0
RH 10	28	2	0	140		28500	21	0	0	660	140	140	0	147	15775	140	2	0	142	1	0
RH 11	28	2	2	97		27000	23	0	0	1353	97	97	0	73	15736	97	2	2	100	2	0
RH 12	28	312	13	105		27000	924	0	0	778	105	233	0	41	15761	105	312	13	429	65	0
RH 1	29	239	12	240		27433	708	0	0	0	240	233	0	35	15786	240	239	12	491	50	0
RH 2	29	242	22	217		27729	717	0	0	159	217	210	0	45	15576	217	242	22	481	50	0
RH 3	29	346	38	240		28438	1027	0	0	0	240	233	0	77	15680	240	346	38	625	72	0
RH 4	29	146	5	233		28518	433	0	0	0	233	225	0	120	15626	233	146	5	383	30	0
RH 5	29	41	1	140		28317	121	0	0	0	140	140	0	182	15520	140	41	1	182	8	0
RH 6	29	19	0	136		28013	56	0	0	0	136	136	0	224	15385	136	19	0	155	4	0
RH 7	29	1	0	140		27618	16	0	0	0	140	140	0	271	15221	140	1	0	141	1	0
RH 8	29	1	0	140		27233	10	0	0	0	140	140	0	254	15067	140	1	0	141	1	0
RH 9	29	1	0	136		26893	8	0	0	0	136	136	0	212	14999	136	1	0	137	1	0
RH 10	29	1	0	140		26625	12	0	0	0	140	140	0	140	15329	140	1	0	141	1	0
RH 11	29	1	0	97		24628	15	0	0	1844	97	97	0	71	12426	97	1	0	98	1	0
RH 12	29	11	6	101		22890	33	0	0	1631	101	108	0	39	9204	101	11	6	118	2	0
RH 1	30	314	56	200		23594	936	0	0	0	200	233	0	32	9412	200	314	56	570	66	0
RH 2	30	314	35	181		24307	936	0	0	0	181	210	0	41	11408	181	314	35	530	66	0
RH 3	30	1297	209	200		28100	3870	195	0	0	200	200	0	72	13805	200	1102	209	1512	271	0
RH 4	30	106	19	194		28101	315	0	0	0	194	194	0	120	13811	194	106	19	319	22	0
RH 5	30	49	12	140		27927	146	0	0	0	140	140	0	181	14043	140	49	12	201	10	0
RH 6	30	11	8	136		27600	32	0	0	0	136	136	0	223	13946	136	11	8	155	2	0

		C	GA	P			K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF					
		Total Inflow to ACDD (MG)	Unregulate d Flow between ACDD and Calaveras Confluenc e (MG)	Calaveras Release for Complianc e (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Complianc e (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluenc e b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluenc e	Accretion btwn Calaveras alaveras and San Antonio Confluenc e - MG	Total Stream Release from San Antonio Reservoir	
Month	Year																					
RH 7	30	2	0	140		27213	22	0	0	0	140	140	0	269	13792	140	2	0	142	2	0	
RH 8	30	1	0	140		26834	13	0	0	0	140	140	0	252	13648	140	1	0	141	1	0	
RH 9	30	1	0	136		26497	10	0	0	0	136	136	0	211	14300	136	1	0	137	1	0	
RH 10	30	2	0	140		26241	23	0	0	0	140	140	0	139	14980	140	2	0	142	2	0	
RH 11	30	2	0	97		26098	24	0	0	0	97	97	0	70	14936	97	2	0	99	2	0	
RH 12	30	20	2	101		25644	57	0	0	369	101	113	0	40	14293	101	20	2	124	4	0	
RH 1	31	140	15	200		25806	396	0	0	0	200	233	0	34	14411	200	140	15	356	28	0	
RH 2	31	60	7	181		25750	169	0	0	0	181	210	0	43	14544	181	60	7	248	12	0	
RH 3	31	72	13	200		25680	204	0	0	0	200	233	0	74	14550	200	72	13	286	14	0	
RH 4	31	24	4	194		25440	68	0	0	0	194	194	0	114	14497	194	24	4	222	5	0	
RH 5	31	18	3	140		25180	51	0	0	0	140	140	0	171	14405	140	18	3	162	4	0	
RH 6	31	10	0	136		24860	27	0	0	0	136	136	0	211	14274	136	10	0	146	2	0	
RH 7	31	1	0	140		24479	13	0	0	0	140	140	0	254	14117	140	1	0	141	1	0	
RH 8	31	1	0	140		24110	10	0	0	0	140	140	0	238	15096	140	1	0	141	1	0	
RH 9	31	1	0	136		23784	9	0	0	0	136	136	0	199	15354	136	1	0	137	1	0	
RH 10	31	1	0	140		23520	8	0	0	0	140	140	0	132	15800	140	1	0	141	1	0	
RH 11	31	1	0	97		23372	15	0	0	0	97	97	0	66	15756	97	1	0	98	1	0	
RH 12	31	1064	164	101		26756	3181	388	0	46	101	101	0	38	15823	101	676	164	942	223	0	
RH 1	32	569	82	240		28169	1702	0	0	14	240	233	0	35	15877	240	569	82	891	119	0	
RH 2	32	1026	158	217		30000	3069	483	0	1459	217	210	0	45	16063	217	543	158	918	215	0	
RH 3	32	127	25	240		30060	381	0	0	0	240	233	0	81	16500	240	127	25	392	27	0	
RH 4	32	90	17	233		29972	269	0	0	0	233	225	0	124	16493	233	90	17	340	19	0	
RH 5	32	44	9	240		29678	133	0	0	0	240	233	0	187	16414	240	44	9	293	9	0	
RH 6	32	26	3	233		29293	78	0	0	0	233	225	0	230	16284	233	26	3	261	5	0	
RH 7	32	2	0	240		28801	27	0	0	0	240	233	0	278	16116	240	2	0	243	2	0	
RH 8	32	1	0	240		28317	16	0	0	0	240	233	0	260	15957	240	1	0	241	1	0	
RH 9	32	1	0	233		27879	12	0	0	0	233	225	0	217	15824	233	1	0	234	1	0	
RH 10	32	2	0	140		27622	26	0	0	0	140	140	0	143	15735	140	2	0	142	2	0	
RH 11	32	2	0	97		27000	27	0	0	480	97	97	0	72	15691	97	2	0	99	2	0	
RH 12	32	16	2	105		26466	48	0	0	436	105	114	0	41	14931	105	16	2	122	3	0	
RH 1	33	310	37	200		27135	904	0	0	0	200	233	0	35	15057	200	310	37	548	63	0	
RH 2	33	106	12	181		27219	309	0	0	0	181	210	0	44	15077	181	106	12	299	22	0	
RH 3	33	153	29	200		27387	445	0	0	0	200	233	0	76	15144	200	153	29	382	31	0	
RH 4	33	104	19	194		27380	305	0	0	0	194	194	0	118	15149	194	104	19	317	21	0	
RH 5	33	70	13	140		27266	204	0	0	0	140	140	0	178	15093	140	70	13	223	14	0	
RH 6	33	14	1	136		26953	42	0	0	0	136	136	0	220	14961	136	14	1	150	3	0	
RH 7	33	1	0	140		26564	17	0	0	0	140	140	0	266	14800	140	1	0	141	1	0	
RH 8	33	1	0	140		26187	12	0	0	0	140	140	0	249	14648	140	1	0	141	1	0	
RH 9	33	1	0	136		25853	10	0	0	0	136	136	0	208	14521	136	1	0	137	1	0	
RH 10	33	1	0	140		25587	11	0	0	0	140	140	0	137	14686	140	1	0	141	1	0	
RH 11	33	1	0	97		25436	16	0	0	0	97	97	0	69	14937	97	1	0	98	1	0	
RH 12	33	355	46	101		26353	1058	0	0	0	101	233	0	40	15724	101	355	46	502	74	0	
RH 1	34	479	66	240		27488	1428	0	0	18	240	233	0	35	15869	240	479	66	786	100	0	
RH 2	34	488	68	217		28501	1455	0	0	180	217	210	0	45	15594	217	488	68	773	102	0	
RH 3	34	160	31	240		28660	477	0	0	0	240	233	0	78	15668	240	160	31	431	33	0	
RH 4	34	48	9	233		28450	144	0	0	0	233	225	0	121	15632	233	48	9	290	10	0	
RH 5	34	23	5	140		28198	70	0	0	0	140	140	0	182	15540	140	23	5	168	5	0	
RH 6	34	18	1	136		27892	53	0	0	0	136	136	0	224	15409	136	18	1	155	4	0	
RH 7	34	1	0	140		27499	18	0	0	0	140	140	0	271	15245	140	1	0	141	1	0	
RH 8	34	1	0	140		27117	12	0	0	0	140	140	0	254	15091	140	1	0	141	1	0	
RH 9	34	1	0	136		26779	9	0	0	0	136	136	0	212	15213	136	1	0	137	1	0	
RH 10	34	1	0	140		26514	16	0	0	0	140	140	0	140	15150	140	1	0	141	1	0	
RH 11	34	5	2	97		24623	60	0	0	1783	97	97	0	71	12192	97	5	2	103	4	0	
RH 12	34	41	5	101		23033	121	0	0	1570	101	125	0	39	8925	101	41	5	147	8	0	
RH 1	35	1182	183	200		26897	3515	581	0	0	200	233	0	32	11304	200	601	183	984	246	0	
RH 2	35	109	12	181		26996	324	0	0	0	181	210	0	44	13289	181	109	12	302	23	0	
RH 3	35	435	77	200		28011	1292	0	0	0	200	233	0	76	13850	200	435	77	713	90	0	
RH 4	35	982	164	194		30616	2918	0	0	0	194	194	0	119	15980	194	982	164	1339	204	0	
RH 5	35	200	38	140		30881	595	0	0	0	140	140	0	189	16349	140	200	38	378	42	0	
RH 6	35	34	4	136		30610	100	0	0	0	136	136	0	235	16225	136	34	4	174	7	0	

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE			G											N	CF		CH		
		Total Inflow to ACDD (MG)	Unregulate d Flow between ACDD and Calaveras Confluenc e (MG)	Calaveras Release for Complianc e (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Complianc e (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluenc e b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluenc e	Accretion btwn Calaveras and San Antonio Confluenc e - MG	Total Stream Release from San Antonio Reservoir
Month	Year																				
RH 7	35	3	1	140		30220	35	0	0	0	140	140	0	285	16058	140	3	1	144	2	0
RH 8	35	2	0	140		29833	20	0	0	0	140	140	0	267	15899	140	2	0	142	1	0
RH 9	35	1	0	136		29489	15	0	0	0	136	136	0	223	15767	136	1	0	137	1	0
RH 10	35	2	0	140		28500	22	0	0	723	140	140	0	148	15682	140	2	0	142	2	0
RH 11	35	2	0	97		27000	29	0	0	1359	97	97	0	73	15637	97	2	0	99	2	0
RH 12	35	42	5	101		26551	126	0	0	432	101	125	0	41	14896	101	42	5	148	9	0
RH 1	36	292	35	200		27187	871	0	0	0	200	233	0	35	15014	200	292	35	528	61	0
RH 2	36	1972	295	181		31182	5876	865	0	2520	181	181	0	44	16500	181	1107	295	1583	411	0
RH 3	36	323	60	200		31500	963	0	0	362	200	233	0	82	16500	200	323	60	583	67	0
RH 4	36	326	61	194		31500	971	0	0	650	194	194	0	127	16500	194	326	61	580	68	51
RH 5	36	120	23	240		31426	359	0	0	0	240	233	0	193	16478	240	120	23	383	25	0
RH 6	36	34	4	233		31052	100	0	0	4	233	225	0	238	16346	233	34	4	270	7	0
RH 7	36	3	1	240		30559	35	0	0	0	240	233	0	287	16179	240	3	1	244	2	0
RH 8	36	2	0	240		30070	20	0	0	0	240	233	0	269	16020	240	2	0	242	1	0
RH 9	36	1	0	233		29628	15	0	0	0	233	225	0	224	15887	233	1	0	234	1	0
RH 10	36	2	0	140		28500	22	0	0	861	140	140	0	148	15798	140	2	0	142	2	0
RH 11	36	2	0	97		27000	23	0	0	1353	97	97	0	73	15754	97	2	0	99	2	0
RH 12	36	30	4	105		26944	90	0	0	0	105	122	0	41	15742	105	30	4	138	6	0
RH 1	37	131	15	200		27100	391	0	0	0	200	233	0	35	15780	200	131	15	347	27	0
RH 2	37	1527	239	181		30000	4560	784	0	2219	181	181	0	44	16500	181	743	239	1162	319	195
RH 3	37	2050	333	0		31500	6123	0	0	2790	0	0	1752	81	16500	1752	2050	333	4136	429	1253
RH 4	37	615	106	194		31500	1838	0	0	1517	194	194	0	127	16500	194	615	106	915	129	200
RH 5	37	168	32	240		31500	502	0	0	69	240	233	0	193	16500	240	168	32	441	35	0
RH 6	37	41	5	233		31122	122	0	0	29	233	225	0	238	16330	233	41	5	278	9	0
RH 7	37	4	1	240		30641	47	0	0	0	240	233	0	288	16165	240	4	1	246	3	0
RH 8	37	2	0	240		30158	26	0	0	0	240	233	0	269	16007	240	2	0	243	2	0
RH 9	37	1	0	233		29719	19	0	0	0	233	225	0	225	15874	233	1	0	234	1	0
RH 10	37	2	0	140		28500	22	0	0	953	140	140	0	148	15912	140	2	0	142	2	0
RH 11	37	3	1	97		27000	42	0	0	1372	97	97	0	73	15869	97	3	1	100	3	0
RH 12	37	657	96	105		27000	1966	56	0	1876	105	233	0	41	15978	105	601	96	802	138	0
RH 1	38	705	105	240		28440	2111	104	0	499	240	233	0	35	15799	240	601	105	946	148	0
RH 2	38	4028	557	0		31500	12055	0	0	2520	0	0	6430	46	16500	6430	4028	557	11015	844	1472
RH 3	38	2701	437	0		31500	8084	0	0	2790	0	0	5211	83	16500	5211	2701	437	8349	566	1678
RH 4	38	737	126	233		31500	2205	0	0	1845	233	225	0	127	16500	233	737	126	1095	154	282
RH 5	38	204	39	240		31500	609	0	0	176	240	233	0	193	16500	240	204	39	484	43	0
RH 6	38	58	8	233		31128	173	0	0	74	233	225	0	238	16264	233	58	8	298	12	0
RH 7	38	6	3	240		30675	75	0	0	0	240	233	0	288	16106	240	6	3	249	5	0
RH 8	38	3	1	240		30205	40	0	0	0	240	233	0	269	15951	240	3	1	244	3	0
RH 9	38	2	0	233		29775	27	0	0	0	233	225	0	225	15819	233	2	0	235	2	0
RH 10	38	6	1	140		28500	71	0	0	1057	140	140	0	148	15733	140	6	1	147	5	0
RH 11	38	11	6	97		27000	134	0	0	1464	97	97	0	73	15711	97	11	6	114	9	0
RH 12	38	197	22	105		27000	555	0	0	409	105	217	0	41	15770	105	197	22	323	39	0
RH 1	39	138	15	240		27116	391	0	0	0	240	233	0	35	15825	240	138	15	394	27	0
RH 2	39	298	34	217		27696	842	0	0	0	217	210	0	44	15900	217	298	34	549	59	0
RH 3	39	259	47	240		28108	730	0	0	0	240	233	0	77	16038	240	259	47	547	51	0
RH 4	39	83	15	233		27990	234	0	0	0	233	225	0	120	16023	233	83	15	331	16	0
RH 5	39	35	6	140		27770	100	0	0	0	140	140	0	180	15937	140	35	6	182	7	0
RH 6	39	21	2	136		27472	60	0	0	0	136	136	0	222	15805	136	21	2	158	4	0
RH 7	39	2	0	140		27086	22	0	0	0	140	140	0	268	15639	140	2	0	142	2	0
RH 8	39	1	0	140		26709	15	0	0	0	140	140	0	251	15482	140	1	0	141	1	0
RH 9	39	1	0	136		26375	12	0	0	0	136	136	0	210	15351	136	1	0	137	1	0
RH 10	39	1	0	140		26107	11	0	0	0	140	140	0	139	15532	140	1	0	141	1	0
RH 11	39	1	0	97		24111	15	0	0	1844	97	97	0	70	12628	97	1	0	98	1	0
RH 12	39	11	1	101		22373	33	0	0	1631	101	108	0	39	9389	101	11	1	114	2	0
RH 1	40	1182	184	200		26263	3541	581	0	0	200	233	0	32	11249	200	601	184	986	248	0
RH 2	40	2874	411	0		31500	8607	0	0	2520	0	0	807	44	15644	807	2874	411	4092	602	0
RH 3	40	1764	289	0		31500	5282	0	0	2790	0	0	2409	83	16500	2409	1764	289	4462	370	78
RH 4	40	858	145	194		31500	2569	0	0	2248	194	194	0	127	16500	194	858	145	1197	180	0
RH 5	40	168	32	240		31500	502	0	0	69	240	233	0	193	16500	240	168	32	441	35	0
RH 6	40	48	6	233		31144	144	0	0	29	233	225	0	238	16335	233	48	6	287	10	0

		C	GA	P	K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE			G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluence	Accretion btwn Calaveras and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	40	5	2	240	30676	60	0	0	0	240	233	0	288	16173	240	5	2	247	4	0
RH 8	40	2	1	240	30198	32	0	0	0	240	233	0	269	16016	240	2	1	243	2	0
RH 9	40	2	0	233	29763	22	0	0	0	233	225	0	225	15883	233	2	0	235	2	0
RH 10	40	2	0	140	28500	32	0	0	1006	140	140	0	148	15795	140	2	0	143	2	0
RH 11	40	4	1	97	27000	51	0	0	1381	97	97	0	73	15755	97	4	1	102	4	0
RH 12	40	614	89	105	26995	1836	13	0	1708	105	233	0	41	15892	105	601	89	795	129	0
RH 1	41	1342	211	240	28678	4017	731	0	2790	240	233	0	35	16500	240	611	211	1062	281	203
RH 2	41	2994	426	0	31500	8958	0	0	2520	0	0	3570	46	16500	3570	2994	426	6989	627	1653
RH 3	41	2221	361	0	31500	6645	0	0	2790	0	0	3772	83	16500	3772	2221	361	6354	465	1377
RH 4	41	2778	449	0	31500	8311	0	0	2700	0	0	5484	127	16500	5484	2778	449	8711	582	1271
RH 5	41	498	88	240	31500	1491	0	0	1058	240	233	0	193	16500	240	498	88	826	104	0
RH 6	41	67	9	233	30659	199	0	0	569	233	225	0	238	15429	233	67	9	309	14	0
RH 7	41	7	4	240	30223	89	0	0	0	240	233	0	285	15279	240	7	4	251	6	0
RH 8	41	4	1	240	29761	46	0	0	0	240	233	0	267	15129	240	4	1	246	3	0
RH 9	41	2	1	233	29337	31	0	0	0	233	225	0	223	15002	233	2	1	235	2	0
RH 10	41	4	1	140	28500	50	0	0	599	140	140	0	147	15361	140	4	1	145	4	0
RH 11	41	8	4	97	27000	110	0	0	1440	97	97	0	73	15334	97	8	4	109	8	0
RH 12	41	758	113	105	26962	2259	157	0	2308	105	233	0	41	15690	105	601	113	819	158	0
RH 1	42	2209	325	240	31500	6583	1020	0	2790	240	233	0	35	16500	240	1189	325	1754	461	450
RH 2	42	1989	297	0	31500	5928	0	0	2520	0	0	3360	48	16500	3360	1989	297	5646	415	1145
RH 3	42	792	134	240	31500	2361	191	0	2229	240	233	0	83	16500	240	601	134	975	165	173
RH 4	42	1188	197	0	31500	3542	0	0	2700	0	0	715	127	16500	715	1188	197	2099	248	114
RH 5	42	415	74	240	31500	1238	0	0	805	240	233	0	193	16500	240	415	74	730	87	181
RH 6	42	52	7	233	30886	156	0	0	299	233	225	0	238	15879	233	52	7	292	11	0
RH 7	42	5	2	240	30426	66	0	0	0	240	233	0	286	15721	240	5	2	248	5	0
RH 8	42	3	1	240	29952	35	0	0	0	240	233	0	268	15567	240	3	1	244	2	0
RH 9	42	2	0	233	29519	24	0	0	0	233	225	0	224	15436	233	2	0	235	2	0
RH 10	42	3	1	140	28500	42	0	0	774	140	140	0	148	15462	140	3	1	144	3	0
RH 11	42	31	20	97	27000	403	0	0	1733	97	97	0	73	15496	97	31	20	148	28	0
RH 12	42	129	15	105	26720	378	0	0	512	105	178	0	41	15054	105	129	15	248	26	0
RH 1	43	2450	350	240	31500	7176	669	0	2790	240	233	0	35	16500	240	1781	350	2371	502	0
RH 2	43	910	135	217	31500	2664	121	0	2520	217	210	0	48	16500	217	789	135	1141	186	507
RH 3	43	1043	171	240	31500	3053	60	0	2790	240	233	0	83	16388	240	983	171	1394	214	0
RH 4	43	357	64	233	31500	1046	0	0	686	233	225	0	127	16500	233	357	64	654	73	62
RH 5	43	160	30	240	31500	469	0	0	36	240	233	0	193	16500	240	160	30	431	33	6
RH 6	43	45	5	233	31160	131	0	0	0	233	225	0	238	16381	233	45	5	283	9	0
RH 7	43	4	2	240	30683	51	0	0	0	240	233	0	288	16217	240	4	2	246	4	0
RH 8	43	2	0	240	30201	28	0	0	0	240	233	0	270	16058	240	2	0	243	2	0
RH 9	43	2	0	233	29763	20	0	0	0	233	225	0	225	15900	233	2	0	235	1	0
RH 10	43	3	0	140	28500	35	0	0	1010	140	140	0	148	15813	140	3	0	144	2	0
RH 11	43	6	3	97	27000	79	0	0	1409	97	97	0	73	15778	97	6	3	105	6	0
RH 12	43	53	6	105	27000	155	0	0	9	105	135	0	41	15776	105	53	6	164	11	0
RH 1	44	100	11	200	27059	294	0	0	0	200	233	0	35	15799	200	100	11	312	21	0
RH 2	44	787	116	181	29332	2314	244	0	59	181	210	0	44	15800	181	543	116	840	162	0
RH 3	44	639	109	200	30969	1879	38	0	0	200	233	0	80	16391	200	601	109	910	132	0
RH 4	44	172	32	194	31154	505	0	0	0	194	194	0	126	16500	194	172	32	398	35	0
RH 5	44	100	19	140	31116	293	0	0	0	140	140	0	191	16462	140	100	19	259	21	0
RH 6	44	27	3	136	30822	79	0	0	0	136	136	0	236	16332	136	27	3	165	6	0
RH 7	44	2	0	140	30423	27	0	0	0	140	140	0	286	16163	140	2	0	143	2	0
RH 8	44	1	0	140	30032	17	0	0	0	140	140	0	268	16004	140	1	0	141	1	0
RH 9	44	1	0	136	29685	13	0	0	0	136	136	0	224	15871	136	1	0	137	1	0
RH 10	44	1	0	140	28500	18	0	0	914	140	140	0	148	15804	140	1	0	141	1	0
RH 11	44	9	4	97	25742	112	0	0	2700	97	97	0	73	13773	97	9	4	110	8	0
RH 12	44	86	10	101	24238	256	0	0	1618	101	150	0	40	10597	101	86	10	197	18	0
RH 1	45	210	24	200	24627	622	0	0	0	200	233	0	33	10678	200	210	24	434	44	0
RH 2	45	1798	271	181	30000	5322	829	0	555	181	181	0	42	13776	181	969	271	1421	373	0
RH 3	45	541	94	200	31320	1601	0	0	0	200	233	0	81	14436	200	541	94	835	112	0
RH 4	45	221	42	194	31500	655	0	0	154	194	194	0	127	14839	194	221	42	457	46	0
RH 5	45	169	32	240	31500	500	0	0	67	240	233	0	193	15474	240	169	32	442	35	0
RH 6	45	35	4	233	31132	103	0	0	0	233	225	0	238	15354	233	35	4	271	7	0

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF	CH			
		Total Inflow to ACDD (MG)	Unregulate d Flow between ACDD and Calaveras Confluenc e (MG)	Calaveras Release for Complianc e (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Complianc e (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluenc e b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluenc e	Accretion btwn Calaveras Confluenc e and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	45	3	1	240		30640	36	0	0	0	240	233	0	288	15193	240	3	1	244	3	0
RH 8	45	2	0	240		30151	21	0	0	0	240	233	0	269	15039	240	2	0	242	1	0
RH 9	45	1	0	233		29709	15	0	0	0	233	225	0	225	15244	233	1	0	234	1	0
RH 10	45	2	0	140		28500	21	0	0	942	140	140	0	148	15621	140	2	0	142	1	0
RH 11	45	11	6	97		27000	146	0	0	1476	97	97	0	73	15630	97	11	6	114	10	0
RH 12	45	1625	249	105		29794	4805	925	0	2790	105	105	0	41	16500	105	700	249	1054	336	88
RH 1	46	836	125	240		29435	2473	235	0	2790	240	233	0	37	16500	240	601	125	966	173	471
RH 2	46	401	53	217		29825	1186	0	0	532	217	210	0	46	15602	217	401	53	671	83	0
RH 3	46	243	46	240		30223	719	0	0	0	240	233	0	80	15738	240	243	46	530	50	0
RH 4	46	199	38	233		30456	590	0	0	0	233	225	0	124	15815	233	199	38	470	41	0
RH 5	46	125	24	240		30396	369	0	0	0	240	233	0	189	16141	240	125	24	389	26	0
RH 6	46	34	4	233		30031	101	0	0	0	233	225	0	233	16017	233	34	4	270	7	0
RH 7	46	3	1	240		29544	36	0	0	0	240	233	0	282	15852	240	3	1	244	3	0
RH 8	46	2	0	240		29061	21	0	0	0	240	233	0	264	15695	240	2	0	242	1	0
RH 9	46	1	0	233		28623	15	0	0	0	233	225	0	220	15563	233	1	0	234	1	0
RH 10	46	3	1	140		28376	38	0	0	0	140	140	0	145	15860	140	3	1	144	3	0
RH 11	46	21	12	97		27000	255	0	0	1461	97	97	0	73	15863	97	21	12	130	18	0
RH 12	46	127	14	105		27000	352	0	0	206	105	177	0	41	15891	105	127	14	245	25	0
RH 1	47	130	14	240		27085	360	0	0	0	240	233	0	35	15900	240	130	14	384	25	0
RH 2	47	230	25	217		27462	639	0	0	0	217	210	0	44	15900	217	230	25	472	45	0
RH 3	47	321	56	240		28035	890	0	0	0	240	233	0	77	16074	240	321	56	618	62	0
RH 4	47	215	38	233		28281	598	0	0	0	233	225	0	119	16152	233	215	38	486	42	0
RH 5	47	83	15	140		28189	230	0	0	0	140	140	0	181	16099	140	83	15	238	16	0
RH 6	47	27	2	136		27905	75	0	0	0	136	136	0	224	15970	136	27	2	165	5	0
RH 7	47	2	0	140		27521	27	0	0	0	140	140	0	271	15803	140	2	0	143	2	0
RH 8	47	2	0	140		27145	18	0	0	0	140	140	0	254	15646	140	2	0	142	1	0
RH 9	47	1	0	136		26813	15	0	0	0	136	136	0	212	15515	136	1	0	137	1	0
RH 10	47	2	0	140		26552	20	0	0	0	140	140	0	140	15504	140	2	0	142	1	0
RH 11	47	3	1	97		26428	43	0	0	0	97	97	0	71	15468	97	3	1	101	3	0
RH 12	47	45	5	101		26051	130	0	0	365	101	127	0	41	14843	101	45	5	152	9	0
RH 1	48	43	5	200		25941	125	0	0	0	200	225	0	34	14841	200	43	5	248	9	0
RH 2	48	60	7	181		25892	175	0	0	0	181	210	0	43	14841	181	60	7	248	12	0
RH 3	48	218	41	200		26252	635	0	0	0	200	233	0	74	14957	200	218	41	459	44	0
RH 4	48	363	65	194		27002	1059	0	0	0	194	194	0	115	15143	194	363	65	622	74	0
RH 5	48	165	31	140		27166	481	0	0	0	140	140	0	177	15286	140	165	31	336	34	0
RH 6	48	20	2	136		26870	59	0	0	0	136	136	0	219	15157	136	20	2	157	4	0
RH 7	48	2	0	140		26487	22	0	0	0	140	140	0	265	14995	140	2	0	142	2	0
RH 8	48	1	0	140		26113	15	0	0	0	140	140	0	248	14842	140	1	0	141	1	0
RH 9	48	1	0	136		25783	13	0	0	0	136	136	0	208	15204	136	1	0	137	1	0
RH 10	48	1	0	140		25520	15	0	0	0	140	140	0	137	15140	140	1	0	141	1	0
RH 11	48	2	0	97		25375	21	0	0	0	97	97	0	69	15293	97	2	0	99	1	0
RH 12	48	58	7	101		25406	172	0	0	0	101	134	0	40	15564	101	58	7	166	12	0
RH 1	49	63	7	200		25359	187	0	0	0	200	233	0	34	15571	200	63	7	271	13	0
RH 2	49	163	19	181		25514	485	0	0	106	181	210	0	43	15438	181	163	19	363	34	0
RH 3	49	1808	294	200		31500	5384	1025	0	149	200	200	0	74	16500	200	783	294	1278	377	53
RH 4	49	205	39	194		31500	611	0	0	290	194	194	0	127	16500	194	205	39	438	43	0
RH 5	49	143	27	140		31500	426	0	0	93	140	140	0	193	16495	140	143	27	311	30	0
RH 6	49	33	4	136		31226	100	0	0	0	136	136	0	238	16370	136	33	4	173	7	0
RH 7	49	3	1	140		30831	33	0	0	0	140	140	0	288	16202	140	3	1	144	2	0
RH 8	49	2	0	140		30440	20	0	0	0	140	140	0	270	16042	140	2	0	142	1	0
RH 9	49	1	0	136		30000	15	0	0	94	136	136	0	226	15900	136	1	0	137	1	0
RH 10	49	1	0	140		28500	17	0	0	1228	140	140	0	149	15812	140	1	0	141	1	0
RH 11	49	1	0	97		25649	19	0	0	2700	97	97	0	73	13764	97	1	0	98	1	0
RH 12	49	34	4	101		23915	102	0	0	1694	101	121	0	40	10611	101	34	4	140	7	0
RH 1	50	637	92	200		25612	1894	36	0	0	200	233	0	33	10962	200	601	92	894	133	0
RH 2	50	702	103	181		27634	2087	159	0	0	181	210	0	43	13269	181	543	103	827	146	0
RH 3	50	167	32	200		27854	497	0	0	0	200	233	0	77	13352	200	167	32	399	35	0
RH 4	50	134	26	194		27939	398	0	0	0	194	194	0	119	13388	194	134	26	353	28	0
RH 5	50	67	13	140		27818	199	0	0	0	140	140	0	180	13339	140	67	13	220	14	0
RH 6	50	20	2	136		27520	60	0	0	0	136	136	0	222	13222	136	20	2	157	4	0

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF	CH			
		Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Alameda Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	50	2	0	140		27131	20	0	0	0	140	140	0	269	13075	140	2	0	142	1	0
RH 8	50	1	0	140		26752	13	0	0	0	140	140	0	252	12937	140	1	0	141	1	0
RH 9	50	1	0	136		26416	10	0	0	0	136	136	0	210	12892	136	1	0	137	1	0
RH 10	50	1	0	140		26152	15	0	0	0	140	140	0	139	14165	140	1	0	141	1	0
RH 11	50	206	128	97		27000	2419	0	0	1404	97	97	0	70	15228	97	206	128	431	169	0
RH 12	50	2222	297	101		31150	5936	1147	0	2790	101	101	0	41	16500	101	1075	297	1474	416	0
RH 1	51	1028	140	240		31254	2745	427	0	2790	240	233	0	38	16500	240	601	140	982	192	531
RH 2	51	856	114	217		31069	2287	313	0	2520	217	210	0	48	16500	217	543	114	874	160	424
RH 3	51	1026	154	240		31500	2742	425	0	2413	240	233	0	82	16500	240	601	154	996	192	193
RH 4	51	212	36	233		31500	566	0	0	206	233	225	0	127	16500	233	212	36	481	40	15
RH 5	51	176	30	240		31500	471	0	0	38	240	233	0	193	16500	240	176	30	447	33	7
RH 6	51	52	6	233		31168	139	0	0	0	233	225	0	238	16383	233	52	6	290	10	0
RH 7	51	5	2	240		30696	56	0	0	0	240	233	0	288	16220	240	5	2	247	4	0
RH 8	51	3	1	240		30217	31	0	0	0	240	233	0	270	16062	240	3	1	244	2	0
RH 9	51	2	0	233		29780	21	0	0	0	233	225	0	225	15900	233	2	0	235	1	0
RH 10	51	2	0	140		28500	27	0	0	1019	140	140	0	148	15812	140	2	0	142	2	0
RH 11	51	5	2	97		27000	71	0	0	1401	97	97	0	73	15775	97	5	2	104	5	0
RH 12	51	922	141	105		27141	2756	321	0	2790	105	233	0	41	16238	105	601	141	846	193	0
RH 1	52	3756	522	0		31500	11230	0	0	2790	0	0	4046	35	16500	4046	3756	522	8324	786	1778
RH 2	52	1480	233	0		31500	4424	0	0	2520	0	0	1856	48	16500	1856	1480	233	3569	310	892
RH 3	52	2250	365	0		31500	6727	0	0	2790	0	0	3854	83	16500	3854	2250	365	6469	471	1394
RH 4	52	551	96	233		31500	1646	0	0	1286	233	225	0	127	16500	233	551	96	880	115	84
RH 5	52	175	34	240		31500	523	0	0	90	240	233	0	193	16500	240	175	34	449	37	0
RH 6	52	59	8	233		31176	176	0	0	29	233	225	0	238	16342	233	59	8	300	12	0
RH 7	52	6	3	240		30725	77	0	0	0	240	233	0	288	16183	240	6	3	249	5	0
RH 8	52	3	1	240		30256	41	0	0	0	240	233	0	270	16028	240	3	1	244	3	0
RH 9	52	2	0	233		29826	28	0	0	0	233	225	0	225	15896	233	2	0	235	2	0
RH 10	52	4	1	140		28500	49	0	0	1086	140	140	0	149	15809	140	4	1	145	3	0
RH 11	52	5	2	97		27000	71	0	0	1401	97	97	0	73	15773	97	5	2	104	5	0
RH 12	52	1076	165	105		27736	3197	475	0	2790	105	202	0	41	16500	105	601	165	871	224	0
RH 1	53	1577	244	240		30209	4686	853	0	2790	240	233	0	35	16500	240	724	244	1208	328	942
RH 2	53	343	44	217		29979	1019	0	0	986	217	210	0	47	15863	217	343	44	604	71	0
RH 3	53	448	79	240		30987	1330	0	0	0	240	233	0	81	16233	240	448	79	768	93	0
RH 4	53	174	33	233		31144	516	0	0	0	233	225	0	126	16378	233	174	33	440	36	0
RH 5	53	174	33	240		31230	517	0	0	0	240	233	0	191	16500	240	174	33	448	36	0
RH 6	53	36	4	233		30866	106	0	0	0	233	225	0	237	16376	233	36	4	273	7	0
RH 7	53	3	1	240		30378	39	0	0	0	240	233	0	286	16209	240	3	1	244	3	0
RH 8	53	2	0	240		29892	22	0	0	0	240	233	0	268	16050	240	2	0	242	2	0
RH 9	53	1	0	233		29452	16	0	0	0	233	225	0	223	15900	233	1	0	234	1	0
RH 10	53	2	0	140		28500	28	0	0	692	140	140	0	148	15812	140	2	0	142	2	0
RH 11	53	14	8	97		27000	174	0	0	1504	97	97	0	73	15797	97	14	8	119	12	0
RH 12	53	35	4	105		26957	103	0	0	0	105	125	0	41	15787	105	35	4	144	7	0
RH 1	54	382	49	200		27835	1113	0	0	0	200	233	0	35	15900	200	382	49	631	78	0
RH 2	54	686	98	181		29724	1998	143	0	26	181	210	0	45	15856	181	543	98	822	140	0
RH 3	54	580	98	200		31134	1690	0	0	0	200	233	0	80	16500	200	580	98	879	118	0
RH 4	54	240	45	194		31500	698	0	0	11	194	194	0	127	16500	194	240	45	479	49	62
RH 5	54	100	19	140		31457	290	0	0	0	140	140	0	193	16461	140	100	19	259	20	0
RH 6	54	30	3	136		31170	86	0	0	0	136	136	0	238	16333	136	30	3	169	6	0
RH 7	54	2	0	140		30770	29	0	0	0	140	140	0	288	16164	140	2	0	143	2	0
RH 8	54	1	0	140		30378	18	0	0	0	140	140	0	270	16005	140	1	0	141	1	0
RH 9	54	1	0	136		30000	13	0	0	30	136	136	0	226	15872	136	1	0	137	1	0
RH 10	54	1	0	140		28500	19	0	0	1230	140	140	0	149	15783	140	1	0	141	1	0
RH 11	54	5	2	97		25695	65	0	0	2700	97	97	0	73	13743	97	5	2	104	5	0
RH 12	54	397	52	101		25132	1172	0	0	1593	101	233	0	40	10791	101	397	52	551	82	0
RH 1	55	613	88	240		26678	1808	12	0	0	240	233	0	34	11637	240	601	88	929	127	0
RH 2	55	186	21	217		26965	548	0	0	0	217	210	0	44	13573	217	186	21	424	38	0
RH 3	55	199	38	240		27234	586	0	0	0	240	233	0	76	13679	240	199	38	477	41	0
RH 4	55	143	27	233		27306	422	0	0	0	233	225	0	118	13719	233	143	27	403	30	0
RH 5	55	99	19	140		27279	291	0	0	0	140	140	0	178	13895	140	99	19	258	20	0
RH 6	55	23	2	136		26992	68	0	0	0	136	136	0	220	13777	136	23	2	161	5	0

		C	GA	P		K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SWWTP (MG)	Calaveras Reservoir Release to Creek for Compliance (MG)	Total Recapture and Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	55	2	0	140		26609	23	0	0	0	140	140	0	266	13624	140	2	0	142	2	0
RH 8	55	1	0	140		26234	15	0	0	0	140	140	0	249	13481	140	1	0	141	1	0
RH 9	55	1	0	136		25901	11	0	0	0	136	136	0	208	14074	136	1	0	137	1	0
RH 10	55	1	0	140		25636	12	0	0	0	140	140	0	138	14748	140	1	0	141	1	0
RH 11	55	2	0	97		25497	28	0	0	0	97	97	0	69	15003	97	2	0	99	2	0
RH 12	55	3870	537	0		31500	11591	0	0	2790	0	0	2758	40	16500	2758	3870	537	7166	811	601
RH 1	56	2479	361	0		31500	7425	0	0	2790	0	0	4597	38	16500	4597	2479	361	7436	520	1402
RH 2	56	1787	272	0		31500	5351	0	0	2520	0	0	2783	48	16500	2783	1787	272	4842	375	1048
RH 3	56	673	116	240		31444	2017	72	0	1821	240	233	0	83	16405	240	601	116	957	141	0
RH 4	56	244	47	233		31500	730	0	0	314	233	225	0	127	16500	233	244	47	524	51	16
RH 5	56	132	25	240		31462	395	0	0	0	240	233	0	193	16487	240	132	25	398	28	0
RH 6	56	57	8	233		31135	172	0	0	29	233	225	0	238	16328	233	57	8	297	12	0
RH 7	56	6	3	240		30681	75	0	0	0	240	233	0	288	16169	240	6	3	249	5	0
RH 8	56	3	1	240		30212	40	0	0	0	240	233	0	270	16013	240	3	1	244	3	0
RH 9	56	2	0	233		29781	27	0	0	0	233	225	0	225	15881	233	2	0	235	2	0
RH 10	56	5	1	140		28500	62	0	0	1054	140	140	0	148	15794	140	5	1	146	4	0
RH 11	56	5	2	97		27000	66	0	0	1396	97	97	0	73	15757	97	5	2	104	5	0
RH 12	56	34	4	105		26955	101	0	0	0	105	124	0	41	15746	105	34	4	143	7	0
RH 1	57	108	12	200		27035	315	0	0	0	200	233	0	35	15772	200	108	12	321	22	0
RH 2	57	842	124	181		29526	2462	299	0	45	181	210	0	44	15823	181	543	124	848	172	0
RH 3	57	224	42	200		29899	654	0	0	0	200	233	0	80	15941	200	224	42	466	46	0
RH 4	57	148	28	194		30015	433	0	0	0	194	194	0	124	15978	194	148	28	370	30	0
RH 5	57	210	39	140		30300	613	0	0	0	140	140	0	187	16435	140	210	39	390	43	0
RH 6	57	25	2	136		30003	72	0	0	0	136	136	0	233	16304	136	25	2	163	5	0
RH 7	57	2	0	140		29606	25	0	0	0	140	140	0	282	16135	140	2	0	142	2	0
RH 8	57	1	0	140		29218	16	0	0	0	140	140	0	264	15976	140	1	0	141	1	0
RH 9	57	1	0	136		28874	12	0	0	0	136	136	0	221	15843	136	1	0	137	1	0
RH 10	57	1	0	140		28500	13	0	0	101	140	140	0	146	15754	140	1	0	141	1	0
RH 11	57	4	2	97		27000	57	0	0	1387	97	97	0	73	15716	97	4	2	102	4	0
RH 12	57	117	14	101		26710	351	0	0	498	101	168	0	41	15251	101	117	14	232	25	0
RH 1	58	616	90	200		28333	1843	15	0	0	200	233	0	35	15584	200	601	90	891	129	0
RH 2	58	2948	420	0		31500	8822	0	0	2520	0	0	3090	45	16500	3090	2948	420	6457	618	714
RH 3	58	2600	421	0		31500	7782	0	0	2790	0	0	4909	83	16500	4909	2600	421	7930	545	1615
RH 4	58	3837	617	0		31500	11484	0	0	2700	0	0	8657	127	16500	8657	3837	617	13111	804	2199
RH 5	58	409	74	240		31500	1225	0	0	792	240	233	0	193	16500	240	409	74	723	86	125
RH 6	58	68	9	233		30934	204	0	0	299	233	225	0	238	15889	233	68	9	310	14	0
RH 7	58	7	4	240		30498	91	0	0	0	240	233	0	287	15736	240	7	4	251	6	0
RH 8	58	4	1	240		30036	47	0	0	0	240	233	0	269	15584	240	4	1	246	3	0
RH 9	58	2	1	233		29612	32	0	0	0	233	225	0	224	15455	233	2	1	235	2	0
RH 10	58	4	1	140		28500	53	0	0	876	140	140	0	148	15569	140	4	1	145	4	0
RH 11	58	4	1	97		27000	56	0	0	1386	97	97	0	73	15530	97	4	1	102	4	0
RH 12	58	39	5	105		26969	115	0	0	0	105	127	0	41	15522	105	39	5	148	8	0
RH 1	59	397	52	200		27906	1172	0	0	0	200	233	0	35	15706	200	397	52	650	82	0
RH 2	59	1152	176	181		29978	3398	609	0	1709	181	210	0	45	15862	181	543	176	900	238	0
RH 3	59	173	33	200		30207	510	0	0	0	200	233	0	81	15944	200	173	33	406	36	0
RH 4	59	93	18	194		30163	275	0	0	0	194	194	0	124	15940	194	93	18	305	19	0
RH 5	59	55	10	140		29996	161	0	0	0	140	140	0	188	15981	140	55	10	206	11	0
RH 6	59	22	2	136		29693	64	0	0	0	136	136	0	232	15851	136	22	2	159	4	0
RH 7	59	2	0	140		29294	21	0	0	0	140	140	0	280	15684	140	2	0	142	1	0
RH 8	59	1	0	140		28904	13	0	0	0	140	140	0	263	15527	140	1	0	141	1	0
RH 9	59	1	0	136		28559	10	0	0	0	136	136	0	219	15396	136	1	0	137	1	0
RH 10	59	1	0	140		28289	16	0	0	0	140	140	0	145	15660	140	1	0	141	1	0
RH 11	59	1	0	97		25497	18	0	0	2640	97	97	0	73	13552	97	1	0	98	1	0
RH 12	59	15	2	101		23771	45	0	0	1630	101	110	0	40	10316	101	15	2	118	3	0
RH 1	60	113	13	200		23872	334	0	0	0	200	233	0	33	10353	200	113	13	326	23	0
RH 2	60	617	88	181		25547	1823	74	0	0	181	210	0	41	12644	181	543	88	812	128	0
RH 3	60	72	14	200		25485	213	0	0	0	200	233	0	74	12657	200	72	14	286	15	0
RH 4	60	56	11	194		25342	164	0	0	0	194	194	0	113	12637	194	56	11	261	11	0
RH 5	60	44	8	140		25160	129	0	0	0	140	140	0	171	12575	140	44	8	193	9	0
RH 6	60	13	1	136		24853	39	0	0	0	136	136	0	210	12461	136	13	1	149	3	0

		C	GA	P	K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE			G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SWTP (MG)	Calaveras Reservoir Release to Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	60	1	0	140	24473	15	0	0	0	140	140	0	254	12321	140	1	0	141	1	0
RH 8	60	1	0	140	24105	10	0	0	0	140	140	0	238	12189	140	1	0	141	1	0
RH 9	60	1	0	136	23778	8	0	0	0	136	136	0	199	13486	136	1	0	137	1	0
RH 10	60	1	0	140	23524	18	0	0	0	140	140	0	131	14670	140	1	0	141	1	0
RH 11	60	9	4	97	23467	106	0	0	0	97	97	0	66	14880	97	9	4	110	7	0
RH 12	60	35	4	101	23112	96	0	0	311	101	121	0	38	14341	101	35	4	140	7	0
RH 1	61	82	9	200	23105	226	0	0	0	200	233	0	32	14354	200	82	9	291	16	0
RH 2	61	63	7	181	23058	174	0	0	0	181	210	0	41	14354	181	63	7	251	12	0
RH 3	61	191	34	200	23311	524	0	0	0	200	233	0	70	14442	200	191	34	425	37	0
RH 4	61	43	8	194	23128	119	0	0	0	194	194	0	108	14497	194	43	8	244	8	0
RH 5	61	32	6	140	22915	89	0	0	0	140	140	0	163	14865	140	32	6	178	6	0
RH 6	61	13	0	136	22615	36	0	0	0	136	136	0	200	14733	136	13	0	149	3	0
RH 7	61	1	0	140	22248	15	0	0	0	140	140	0	241	14997	140	1	0	141	1	0
RH 8	61	1	0	140	21894	12	0	0	0	140	140	0	226	15564	140	1	0	141	1	0
RH 9	61	1	0	136	21580	10	0	0	0	136	136	0	188	15819	136	1	0	137	1	0
RH 10	61	1	0	140	21325	10	0	0	0	140	140	0	124	15731	140	1	0	141	1	0
RH 11	61	1	0	97	21183	17	0	0	0	97	97	0	63	15687	97	1	0	98	1	0
RH 12	61	29	3	101	21131	86	0	0	0	101	118	0	36	15674	101	29	3	134	6	0
RH 1	62	35	4	200	21004	104	0	0	0	200	220	0	31	15668	200	35	4	239	7	0
RH 2	62	1615	250	181	26196	4821	649	0	59	181	181	0	39	15800	181	966	250	1396	337	0
RH 3	62	651	112	200	27913	1942	50	0	0	200	233	0	75	16500	200	601	112	913	136	0
RH 4	62	133	26	194	27996	396	0	0	0	194	194	0	119	16500	194	133	26	352	28	26
RH 5	62	103	20	140	27982	306	0	0	0	140	140	0	180	16465	140	103	20	263	21	0
RH 6	62	28	3	136	27706	83	0	0	0	136	136	0	223	16336	136	28	3	167	6	0
RH 7	62	2	0	140	27324	28	0	0	0	140	140	0	270	16167	140	2	0	143	2	0
RH 8	62	1	0	140	26947	16	0	0	0	140	140	0	253	16008	140	1	0	141	1	0
RH 9	62	1	0	136	26613	12	0	0	0	136	136	0	211	15875	136	1	0	137	1	0
RH 10	62	49	16	140	26352	19	0	0	0	140	140	0	140	15851	140	49	16	206	1	0
RH 11	62	3	1	97	26229	45	0	0	0	97	97	0	70	15809	97	3	1	101	3	0
RH 12	62	102	12	101	25920	306	0	0	473	101	160	0	41	15026	101	102	12	215	21	0
RH 1	63	1689	261	200	28500	5082	412	0	2679	200	200	0	34	16414	200	1277	261	1739	356	0
RH 2	63	2425	355	0	31500	7296	0	0	2520	0	0	1730	46	16500	1730	2425	355	4510	511	1288
RH 3	63	685	118	200	31500	2060	84	0	1861	200	233	0	83	16500	200	601	118	919	144	325
RH 4	63	1368	227	0	31500	4116	0	0	2700	0	0	1289	127	16500	1289	1368	227	2884	288	342
RH 5	63	638	111	240	31500	1921	0	0	1488	240	233	0	193	16500	240	638	111	989	134	324
RH 6	63	56	7	233	30563	168	0	0	634	233	225	0	238	15311	233	56	7	296	12	0
RH 7	63	5	3	240	30108	70	0	0	0	240	233	0	285	15158	240	5	3	248	5	0
RH 8	63	3	1	240	29639	38	0	0	0	240	233	0	267	15007	240	3	1	244	3	0
RH 9	63	2	0	233	29210	26	0	0	0	233	225	0	222	14879	233	2	0	235	2	0
RH 10	63	4	2	140	28500	45	0	0	468	140	140	0	147	15281	140	4	2	146	3	0
RH 11	63	43	25	97	27000	498	0	0	1828	97	97	0	73	15679	97	43	25	165	35	0
RH 12	63	92	9	105	27000	244	0	0	98	105	157	0	41	15730	105	92	9	206	17	0
RH 1	64	666	85	240	28464	1762	65	0	88	240	233	0	35	15838	240	601	85	927	123	0
RH 2	64	114	12	217	28200	302	0	0	304	217	210	0	46	15341	217	114	12	343	21	0
RH 3	64	129	22	240	28222	341	0	0	0	240	233	0	78	15381	240	129	22	391	24	0
RH 4	64	100	17	233	28134	264	0	0	0	233	225	0	120	15375	233	100	17	350	18	0
RH 5	64	66	11	140	27988	175	0	0	0	140	140	0	181	15310	140	66	11	217	12	0
RH 6	64	21	1	136	27683	54	0	0	0	136	136	0	223	15181	136	21	1	158	4	0
RH 7	64	2	0	140	27294	20	0	0	0	140	140	0	269	15018	140	2	0	142	1	0
RH 8	64	1	0	140	26914	13	0	0	0	140	140	0	253	14865	140	1	0	141	1	0
RH 9	64	1	0	136	26577	10	0	0	0	136	136	0	211	14737	136	1	0	137	1	0
RH 10	64	1	0	140	26309	12	0	0	0	140	140	0	139	14667	140	1	0	141	1	0
RH 11	64	10	6	97	24434	136	0	0	1844	97	97	0	70	11787	97	10	6	113	10	0
RH 12	64	1753	267	101	27157	5225	429	0	2790	101	101	0	39	11580	101	1324	267	1693	366	0
RH 1	65	3152	444	0	31500	9396	0	0	2790	0	0	2228	35	16332	2228	3152	444	5825	658	0
RH 2	65	520	73	217	30265	1550	0	0	2520	217	210	0	48	16500	217	520	73	810	109	30
RH 3	65	182	35	240	30486	543	0	0	0	240	233	0	81	16500	240	182	35	457	38	0
RH 4	65	1059	176	233	31500	3155	0	0	1783	233	225	0	125	16500	233	1059	176	1468	221	0
RH 5	65	176	34	240	31500	526	0	0	93	240	233	0	193	16500	240	176	34	450	37	21
RH 6	65	49	6	233	31175	146	0	0	0	233	225	0	238	16384	233	49	6	288	10	0

		C	GA	P		K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Reservoir and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	65	5	2	240		30708	61	0	0	0	240	233	0	288	16222	240	5	2	247	4	0
RH 8	65	2	1	240		30231	33	0	0	0	240	233	0	270	16064	240	2	1	243	2	0
RH 9	65	2	0	233		29796	23	0	0	0	233	225	0	225	15900	233	2	0	235	2	0
RH 10	65	3	1	140		28500	39	0	0	1046	140	140	0	148	15814	140	3	1	144	3	0
RH 11	65	43	26	97		27000	518	0	0	1848	97	97	0	73	15872	97	43	26	166	36	0
RH 12	65	458	57	105		26999	1254	0	0	1109	105	233	0	41	15899	105	458	57	619	88	0
RH 1	66	389	46	240		27791	1067	0	0	0	240	233	0	35	15900	240	389	46	676	75	0
RH 2	66	522	67	217		28872	1431	0	0	88	217	210	0	45	15750	217	522	67	806	100	0
RH 3	66	193	34	240		29080	528	0	0	0	240	233	0	79	15836	240	193	34	467	37	0
RH 4	66	37	7	233		28829	103	0	0	0	233	225	0	122	15789	233	37	7	276	7	0
RH 5	66	42	8	140		28621	116	0	0	0	140	140	0	183	15708	140	42	8	190	8	0
RH 6	66	23	2	136		28322	62	0	0	0	136	136	0	226	15579	136	23	2	160	4	0
RH 7	66	2	0	140		27930	21	0	0	0	140	140	0	273	15414	140	2	0	142	1	0
RH 8	66	1	0	140		27547	13	0	0	0	140	140	0	256	15259	140	1	0	141	1	0
RH 9	66	1	0	136		27208	10	0	0	0	136	136	0	214	15129	136	1	0	137	1	0
RH 10	66	1	0	140		26940	14	0	0	0	140	140	0	141	15186	140	1	0	141	1	0
RH 11	66	9	5	97		26888	116	0	0	0	97	97	0	71	15200	97	9	5	111	8	0
RH 12	66	544	77	101		27000	1623	0	0	1369	101	233	0	41	15629	101	544	77	723	114	0
RH 1	67	1996	298	240		30200	5955	311	0	2790	240	233	0	35	16500	240	1685	298	2224	417	285
RH 2	67	793	119	217		30032	2366	250	0	2520	217	210	0	47	16500	217	543	119	879	166	441
RH 3	67	1616	264	0		31500	4820	0	0	2790	0	0	481	81	16500	481	1616	264	2362	337	757
RH 4	67	1602	262	0		31500	4777	0	0	2700	0	0	1950	127	16436	1950	1602	262	3814	334	0
RH 5	67	677	116	240		31500	2021	0	0	1588	240	233	0	193	16500	240	677	116	1033	141	31
RH 6	67	53	7	233		30438	158	0	0	749	233	225	0	238	15114	233	53	7	293	11	0
RH 7	67	5	2	240		29980	66	0	0	0	240	233	0	284	14960	240	5	2	248	5	0
RH 8	67	3	1	240		29509	36	0	0	0	240	233	0	266	14811	240	3	1	244	3	0
RH 9	67	2	0	233		29079	24	0	0	0	233	225	0	222	14683	233	2	0	235	2	0
RH 10	67	3	1	140		28500	43	0	0	335	140	140	0	146	15317	140	3	1	144	3	0
RH 11	67	5	2	97		27000	64	0	0	1394	97	97	0	73	15280	97	5	2	104	4	0
RH 12	67	84	10	105		26673	247	0	0	428	105	153	0	41	14738	105	84	10	198	17	0
RH 1	68	828	123	200		28500	2443	227	0	608	200	233	0	35	15211	200	601	123	924	171	0
RH 2	68	443	60	181		29339	1308	0	0	243	181	210	0	46	15007	181	443	60	684	92	0
RH 3	68	353	64	200		30101	1042	0	0	0	200	233	0	80	15214	200	353	64	617	73	0
RH 4	68	175	33	194		30298	515	0	0	0	194	194	0	124	15273	194	175	33	402	36	0
RH 5	68	98	19	140		30259	290	0	0	0	140	140	0	188	15364	140	98	19	257	20	0
RH 6	68	26	2	136		29966	75	0	0	0	136	136	0	233	15238	136	26	2	164	5	0
RH 7	68	2	0	140		29569	25	0	0	0	140	140	0	282	15075	140	2	0	142	2	0
RH 8	68	1	0	140		29180	15	0	0	0	140	140	0	264	14921	140	1	0	141	1	0
RH 9	68	1	0	136		28835	12	0	0	0	136	136	0	220	15257	136	1	0	137	1	0
RH 10	68	1	0	140		28500	15	0	0	64	140	140	0	146	15654	140	1	0	141	1	0
RH 11	68	6	2	97		27000	75	0	0	1405	97	97	0	73	15619	97	6	2	105	5	0
RH 12	68	265	31	101		27000	794	0	0	651	101	233	0	41	15716	101	265	31	398	56	0
RH 1	69	3041	431	0		31500	9097	0	0	2790	0	0	1772	35	16500	1772	3041	431	5244	637	898
RH 2	69	3438	482	0		31500	10284	0	0	2520	0	0	7716	48	16500	7716	3438	482	11636	720	1875
RH 3	69	1204	200	0		31500	3602	0	0	2790	0	0	729	83	16500	729	1204	200	2133	252	603
RH 4	69	385	70	233		31500	1152	0	0	792	233	225	0	127	16500	233	385	70	688	81	198
RH 5	69	127	25	240		31448	381	0	0	0	240	233	0	193	16500	240	127	25	392	27	0
RH 6	69	60	8	233		31157	179	0	0	0	233	225	0	238	16391	233	60	8	301	13	0
RH 7	69	5	2	240		30692	64	0	0	0	240	233	0	288	16230	240	5	2	248	4	0
RH 8	69	2	1	240		30213	31	0	0	0	240	233	0	270	16072	240	2	1	243	2	0
RH 9	69	2	0	233		29785	29	0	0	0	233	225	0	225	15900	233	2	0	235	2	0
RH 10	69	4	1	140		28500	48	0	0	1044	140	140	0	148	15815	140	4	1	145	3	0
RH 11	69	5	2	97		25694	64	0	0	2700	97	97	0	73	13774	97	5	2	104	4	0
RH 12	69	109	12	105		24259	323	0	0	1613	105	167	0	40	10619	105	109	12	226	23	0
RH 1	70	1900	285	200		28500	5647	788	0	1960	200	200	0	33	13026	200	1112	285	1597	395	0
RH 2	70	421	57	181		29525	1252	0	0	0	181	210	0	46	13226	181	421	57	659	88	0
RH 3	70	1135	188	200		31500	3375	494	0	1614	200	200	0	80	16446	200	641	188	1029	236	0
RH 4	70	139	27	194		31500	413	0	0	92	194	194	0	127	16500	194	139	27	359	29	0
RH 5	70	72	14	240		31280	213	0	0	0	240	233	0	193	16500	240	72	14	326	15	0
RH 6	70	30	3	233		30900	90	0	0	0	233	225	0	237	16372	233	30	3	266	6	0

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE			G										N		CF	CH			
		Total Inflow to ACDD (MG)	Unregulate d Flow between ACDD and Calaveras Confluenc e (MG)	Calaveras Release for Complianc e (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Complianc e (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluenc e b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluenc e	Accretion btwn Calaveras Reservoir and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
Month	Year																				
RH 7	70	3	1	240		30406	33	0	0	0	240	233	0	287	16204	240	3	1	244	2	0
RH 8	70	2	0	240		29922	24	0	0	0	240	233	0	268	16045	240	2	0	242	2	0
RH 9	70	1	0	233		29484	19	0	0	0	233	225	0	224	15900	233	1	0	234	1	0
RH 10	70	2	0	140		28500	21	0	0	718	140	140	0	148	15812	140	2	0	142	1	0
RH 11	70	42	27	97		27000	532	0	0	1862	97	97	0	73	15873	97	42	27	166	37	0
RH 12	70	1430	214	105		28852	4077	710	0	2790	105	105	0	41	16500	105	720	214	1038	285	193
RH 1	71	712	100	240		28500	2031	111	0	2217	240	233	0	36	16500	240	601	100	942	142	373
RH 2	71	127	14	217		27871	361	0	0	727	217	210	0	46	14664	217	127	14	358	25	0
RH 3	71	355	63	240		28566	1012	0	0	0	240	233	0	77	14866	240	355	63	658	71	0
RH 4	71	203	37	233		28792	580	0	0	0	233	225	0	121	14943	233	203	37	473	41	0
RH 5	71	92	17	240		28631	262	0	0	0	240	233	0	183	14902	240	92	17	349	18	0
RH 6	71	38	4	233		28282	109	0	0	0	233	225	0	226	14787	233	38	4	275	8	0
RH 7	71	3	1	240		27805	36	0	0	0	240	233	0	273	14629	240	3	1	244	3	0
RH 8	71	1	0	240		27326	17	0	0	0	240	233	0	255	14478	240	1	0	241	1	0
RH 9	71	1	0	233		26894	13	0	0	0	233	225	0	213	14793	233	1	0	234	1	0
RH 10	71	2	0	140		26635	22	0	0	0	140	140	0	140	15130	140	2	0	142	2	0
RH 11	71	3	0	97		26505	38	0	0	0	97	97	0	71	15090	97	3	0	100	3	0
RH 12	71	364	46	105		27000	1069	0	0	429	105	233	0	41	15724	105	364	46	515	75	0
RH 1	72	127	14	240		27098	373	0	0	0	240	233	0	35	15759	240	127	14	382	26	0
RH 2	72	238	27	217		27376	699	0	0	159	217	210	0	44	15569	217	238	27	482	49	0
RH 3	72	52	10	240		27212	153	0	0	0	240	233	0	77	15560	240	52	10	302	11	0
RH 4	72	37	7	233		26971	109	0	0	0	233	225	0	117	15516	233	37	7	277	8	0
RH 5	72	17	3	140		26705	51	0	0	0	140	140	0	177	15419	140	17	3	161	4	0
RH 6	72	11	0	136		26383	31	0	0	0	136	136	0	217	15284	136	11	0	147	2	0
RH 7	72	1	0	140		25993	12	0	0	0	140	140	0	263	15120	140	1	0	141	1	0
RH 8	72	0	0	140		25610	4	0	0	0	140	140	0	246	14967	140	0	0	140	0	0
RH 9	72	0	0	136		25275	6	0	0	0	136	136	0	205	14908	136	0	0	136	0	0
RH 10	72	1	0	140		25014	15	0	0	0	140	140	0	136	15465	140	1	0	141	1	0
RH 11	72	127	84	97		26437	1588	0	0	0	97	97	0	69	15831	97	127	84	307	111	0
RH 12	72	280	31	101		26708	799	0	0	386	101	233	0	41	15403	101	280	31	413	56	0
RH 1	73	2074	296	240		30467	5911	914	0	2790	240	233	0	35	16500	240	1160	296	1697	414	52
RH 2	73	3620	483	0		31500	10319	0	0	2520	0	0	6719	47	16500	6719	3620	483	10822	722	1881
RH 3	73	1719	269	0		31500	4899	0	0	2790	0	0	2026	83	16500	2026	1719	269	4014	343	1012
RH 4	73	324	58	233		31500	924	0	0	564	233	225	0	127	16500	233	324	58	615	65	107
RH 5	73	121	22	240		31413	346	0	0	0	240	233	0	193	16475	240	121	22	384	24	0
RH 6	73	49	6	233		31083	140	0	0	0	233	225	0	238	16358	233	49	6	287	10	0
RH 7	73	5	2	240		30614	59	0	0	0	240	233	0	287	16196	240	5	2	247	4	0
RH 8	73	3	1	240		30136	32	0	0	0	240	233	0	269	16039	240	3	1	244	2	0
RH 9	73	2	0	233		29709	30	0	0	0	233	225	0	225	15900	233	2	0	235	2	0
RH 10	73	7	3	140		28500	88	0	0	1008	140	140	0	148	15822	140	7	3	150	6	0
RH 11	73	79	51	97		27000	987	0	0	2317	97	97	0	73	15972	97	79	51	227	69	0
RH 12	73	1507	227	105		28941	4310	566	0	2790	105	105	0	41	16500	105	941	227	1273	302	344
RH 1	74	1458	219	240		30874	4170	830	0	2790	240	233	0	36	16500	240	628	219	1088	292	845
RH 2	74	229	25	217		29991	656	0	0	1274	217	210	0	48	15884	217	229	25	471	46	0
RH 3	74	1409	223	240		31500	4030	590	0	2790	240	233	0	81	16500	240	819	223	1282	282	4
RH 4	74	1425	225	0		31500	4076	0	0	2700	0	0	1249	127	16500	1249	1425	225	2898	285	311
RH 5	74	199	37	240		31500	569	0	0	136	240	233	0	193	16500	240	199	37	476	40	32
RH 6	74	76	10	233		31243	218	0	0	4	233	225	0	238	16393	233	76	10	319	15	0
RH 7	74	9	5	240		30828	113	0	0	0	240	233	0	288	16242	240	9	5	254	8	0
RH 8	74	3	1	240		30359	42	0	0	0	240	233	0	270	16087	240	3	1	244	3	0
RH 9	74	1	0	233		29919	18	0	0	0	233	225	0	225	15900	233	1	0	234	1	0
RH 10	74	4	1	140		28500	54	0	0	1184	140	140	0	149	15816	140	4	1	145	4	0
RH 11	74	7	4	97		25726	96	0	0	2700	97	97	0	73	13782	97	7	4	107	7	0
RH 12	74	100	11	105		24262	296	0	0	1614	105	162	0	40	10619	105	100	11	216	21	0
RH 1	75	201	23	200		24626	597	0	0	0	200	233	0	33	10696	200	201	23	424	42	0
RH 2	75	2441	353	181		30087	7240	964	0	2520	181	181	0	42	15604	181	1477	353	2011	507	0
RH 3	75	2700	433	0		31500	8009	0	0	2790	0	0	3725	81	16500	3725	2700	433	6858	561	769
RH 4	75	755	128	194		31500	2239	0	0	1918	194	194	0	127	16500	194	755	128	1076	157	233
RH 5	75	189	36	240		31500	561	0	0	128	240	233	0	193	16500	240	189	36	466	39	30
RH 6	75	66	9	233		31195	195	0	0	29	233	225	0	238	16346	233	66	9	308	14	0

		C	GA	P		K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	75	8	4	240		30770	103	0	0	0	240	233	0	288	16193	240	8	4	253	7	0
RH 8	75	5	2	240		30323	63	0	0	0	240	233	0	270	16042	240	5	2	247	4	0
RH 9	75	4	2	233		29916	51	0	0	0	233	225	0	225	15900	233	4	2	238	4	0
RH 10	75	6	2	140		28500	66	0	0	1192	140	140	0	149	15818	140	6	2	148	5	0
RH 11	75	7	3	97		27000	78	0	0	1408	97	97	0	73	15783	97	7	3	106	5	0
RH 12	75	35	3	105		26526	88	0	0	416	105	125	0	41	15062	105	35	3	143	6	0
RH 1	76	32	3	200		26370	79	0	0	0	200	219	0	35	15053	200	32	3	235	6	0
RH 2	76	36	4	181		26235	90	0	0	0	181	201	0	44	15040	181	36	4	221	6	0
RH 3	76	88	14	200		26181	221	0	0	0	200	233	0	75	15049	200	88	14	303	15	0
RH 4	76	36	6	194		25962	90	0	0	0	194	194	0	115	15001	194	36	6	236	6	0
RH 5	76	16	3	140		25688	39	0	0	0	140	140	0	173	14903	140	16	3	159	3	0
RH 6	76	7	0	136		25356	17	0	0	0	136	136	0	213	14771	136	7	0	143	1	0
RH 7	76	1	0	140		24969	10	0	0	0	140	140	0	257	14610	140	1	0	141	1	0
RH 8	76	1	0	140		24596	8	0	0	0	140	140	0	241	14459	140	1	0	141	1	0
RH 9	76	1	0	136		24269	10	0	0	0	136	136	0	201	14485	136	1	0	137	1	0
RH 10	76	2	0	140		24025	29	0	0	0	140	140	0	133	15049	140	2	0	142	2	0
RH 11	76	3	0	97		23891	31	0	0	0	97	97	0	67	15207	97	3	0	100	2	0
RH 12	76	12	1	101		23784	33	0	0	0	101	108	0	39	15366	101	12	1	115	2	0
RH 1	77	55	6	200		23700	149	0	0	0	200	232	0	33	15535	200	55	6	261	10	0
RH 2	77	23	3	181		23541	63	0	0	0	181	194	0	41	15518	181	23	3	207	4	0
RH 3	77	49	9	200		23402	132	0	0	0	200	228	0	71	15505	200	49	9	258	9	0
RH 4	77	25	4	194		23167	67	0	0	0	194	194	0	108	15449	194	25	4	223	5	0
RH 5	77	18	3	140		22912	48	0	0	0	140	140	0	163	15352	140	18	3	161	3	0
RH 6	77	7	0	136		22594	18	0	0	0	136	136	0	200	15217	136	7	0	143	1	0
RH 7	77	1	0	140		22221	8	0	0	0	140	140	0	241	15054	140	1	0	141	1	0
RH 8	77	0	0	140		21859	5	0	0	0	140	140	0	226	15348	140	0	0	140	0	0
RH 9	77	0	0	136		21542	6	0	0	0	136	136	0	188	15604	136	0	0	136	0	0
RH 10	77	0	0	140		21283	6	0	0	0	140	140	0	124	15516	140	0	0	140	0	0
RH 11	77	1	0	97		21138	15	0	0	0	97	97	0	63	15472	97	1	0	98	1	0
RH 12	77	126	15	101		21209	377	0	0	169	101	173	0	36	15217	101	126	15	242	26	0
RH 1	78	2319	340	200		28500	6940	770	0	188	200	200	0	31	16173	200	1549	340	2089	486	0
RH 2	78	1330	209	181		30365	3980	631	0	2520	181	181	0	46	16500	181	699	209	1089	279	470
RH 3	78	1656	271	0		31500	4954	0	0	2790	0	0	947	81	16500	947	1656	271	2875	347	1023
RH 4	78	671	115	194		31500	2009	0	0	1688	194	194	0	127	16500	194	671	115	980	141	169
RH 5	78	159	31	240		31500	474	0	0	41	240	233	0	193	16500	240	159	31	430	33	8
RH 6	78	61	8	233		31212	183	0	0	0	233	225	0	238	16392	233	61	8	302	13	0
RH 7	78	5	2	240		30748	64	0	0	0	240	233	0	288	16231	240	5	2	248	4	0
RH 8	78	2	1	240		30270	33	0	0	0	240	233	0	270	16073	240	2	1	243	2	0
RH 9	78	2	0	233		29843	30	0	0	0	233	225	0	225	15900	233	2	0	235	2	0
RH 10	78	2	0	140		28500	29	0	0	1083	140	140	0	149	15897	140	2	0	142	2	0
RH 11	78	4	1	97		27000	52	0	0	1382	97	97	0	73	15856	97	4	1	102	4	0
RH 12	78	26	3	105		26931	77	0	0	0	105	120	0	41	15843	105	26	3	134	5	0
RH 1	79	457	63	200		28054	1358	0	0	0	200	233	0	35	15900	200	457	63	720	95	0
RH 2	79	1228	190	181		29988	3646	529	0	2015	181	181	0	45	15880	181	699	190	1070	255	0
RH 3	79	660	113	200		31500	1959	59	0	225	200	233	0	81	16500	200	601	113	914	137	0
RH 4	79	215	41	194		31500	638	0	0	317	194	194	0	127	16500	194	215	41	450	45	2
RH 5	79	76	14	140		31393	226	0	0	0	140	140	0	193	16500	140	76	14	231	16	0
RH 6	79	23	2	136		31087	67	0	0	0	136	136	0	238	16368	136	23	2	161	5	0
RH 7	79	2	1	140		30691	32	0	0	0	140	140	0	287	16200	140	2	1	143	2	0
RH 8	79	1	0	140		30298	17	0	0	0	140	140	0	270	16041	140	1	0	141	1	0
RH 9	79	1	0	136		29951	14	0	0	0	136	136	0	225	15900	136	1	0	137	1	0
RH 10	79	3	0	140		28500	36	0	0	1198	140	140	0	149	15813	140	3	0	144	3	0
RH 11	79	8	4	97		25739	109	0	0	2700	97	97	0	73	13782	97	8	4	109	8	0
RH 12	79	308	38	101		24856	919	0	0	1660	101	233	0	40	10841	101	308	38	447	64	0
RH 1	80	2057	306	240		28549	6134	623	0	2790	240	233	0	33	13662	240	1434	306	1980	429	0
RH 2	80	3951	546	0		31500	11784	0	0	2520	0	0	6267	46	16500	6267	3951	546	10764	825	0
RH 3	80	840	142	240		31500	2506	239	0	2422	240	233	0	83	16500	240	601	142	983	175	256
RH 4	80	316	59	233		31500	942	0	0	582	233	225	0	127	16500	233	316	59	607	66	28
RH 5	80	125	24	240		31441	374	0	0	0	240	233	0	193	16482	240	125	24	389	26	0
RH 6	80	51	7	233		31120	153	0	0	4	233	225	0	238	16361	233	51	7	290	11	0

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE			G											N	CF		CH		
		Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence e b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	80	6	3	240		30665	73	0	0	0	240	233	0	288	16202	240	6	3	249	5	0
RH 8	80	3	1	240		30192	37	0	0	0	240	233	0	269	16046	240	3	1	244	3	0
RH 9	80	2	0	233		29756	22	0	0	0	233	225	0	225	15900	233	2	0	235	2	0
RH 10	80	2	0	140		28500	26	0	0	994	140	140	0	148	15812	140	2	0	142	2	0
RH 11	80	3	0	97		27000	35	0	0	1365	97	97	0	73	15768	97	3	0	100	2	0
RH 12	80	36	4	105		26545	107	0	0	416	105	125	0	41	15050	105	36	4	145	7	0
RH 1	81	1021	156	200		28500	3043	290	0	1143	200	200	0	35	15647	200	731	156	1088	213	0
RH 2	81	199	23	181		28455	592	0	0	411	181	210	0	46	15011	181	199	23	403	41	0
RH 3	81	915	153	200		31218	2728	314	0	0	200	233	0	78	15571	200	601	153	955	191	0
RH 4	81	172	33	194		31410	513	0	0	0	194	194	0	127	15628	194	172	33	399	36	0
RH 5	81	63	12	140		31266	188	0	0	0	140	140	0	192	15698	140	63	12	215	13	0
RH 6	81	22	2	136		30958	65	0	0	0	136	136	0	237	15569	136	22	2	159	5	0
RH 7	81	1	0	140		30547	16	0	0	0	140	140	0	287	15404	140	1	0	141	1	0
RH 8	81	1	0	140		30147	9	0	0	0	140	140	0	269	15249	140	1	0	141	1	0
RH 9	81	1	0	136		29795	8	0	0	0	136	136	0	225	15249	136	1	0	137	1	0
RH 10	81	1	0	140		28500	13	0	0	1019	140	140	0	148	15667	140	1	0	141	1	0
RH 11	81	55	36	97		27000	706	0	0	2036	97	97	0	73	15766	97	55	36	188	49	0
RH 12	81	500	69	101		27000	1469	0	0	1326	101	233	0	41	16061	101	500	69	670	103	0
RH 1	82	2496	357	240		31500	7340	225	0	2790	240	233	0	35	16500	240	2271	357	2868	514	949
RH 2	82	1508	233	0		31500	4434	0	0	2520	0	0	1866	48	16500	1866	1508	233	3607	310	894
RH 3	82	1114	183	240		31500	3277	0	0	2790	240	233	164	83	16500	404	1114	183	1701	229	443
RH 4	82	3493	553	0		31500	10273	0	0	2700	0	0	7446	127	16500	7446	3493	553	11492	719	1691
RH 5	82	472	83	240		31500	1388	0	0	955	240	233	0	193	16500	240	472	83	795	97	48
RH 6	82	65	9	233		30740	190	0	0	479	233	225	0	238	15580	233	65	9	306	13	0
RH 7	82	6	3	240		30298	84	0	0	0	240	233	0	286	15428	240	6	3	250	6	0
RH 8	82	3	1	240		29834	44	0	0	0	240	233	0	268	15276	240	3	1	244	3	0
RH 9	82	2	0	233		29408	30	0	0	0	233	225	0	223	15147	233	2	0	235	2	0
RH 10	82	3	1	140		28500	41	0	0	662	140	140	0	147	15381	140	3	1	144	3	0
RH 11	82	49	32	97		27000	634	0	0	1964	97	97	0	73	15619	97	49	32	178	44	0
RH 12	82	1004	153	105		27326	2979	283	0	2790	105	105	0	41	16500	105	721	153	979	209	0
RH 1	83	3197	448	0		31500	9483	0	0	2790	0	0	2484	35	16500	2484	3197	448	6129	664	1747
RH 2	83	3829	528	0		31500	11358	0	0	2520	0	0	8790	48	16500	8790	3829	528	13146	795	2056
RH 3	83	5884	934	0		31500	17456	0	0	2790	0	0	14583	83	16500	14583	5884	934	21401	1222	3640
RH 4	83	1358	223	0		31500	4030	0	0	2700	0	0	1203	127	16500	1203	1358	223	2783	282	302
RH 5	83	904	151	240		31434	2682	0	0	2315	240	233	0	193	16388	240	904	151	1296	188	0
RH 6	83	96	14	233		30050	285	0	0	1199	233	225	0	238	14265	233	96	14	342	20	0
RH 7	83	10	6	240		29661	133	0	0	0	240	233	0	282	14130	240	10	6	256	9	0
RH 8	83	5	3	240		29224	68	0	0	0	240	233	0	264	13993	240	5	3	248	5	0
RH 9	83	3	1	233		28815	45	0	0	0	233	225	0	221	13946	233	3	1	237	3	0
RH 10	83	8	3	140		28500	93	0	0	122	140	140	0	146	14844	140	8	3	151	7	0
RH 11	83	119	73	97		27022	1392	0	0	2700	97	97	0	73	15548	97	119	73	289	97	0
RH 12	83	2261	302	105		31174	6041	1047	0	2790	105	105	0	41	16500	105	1214	302	1620	423	214
RH 1	84	355	40	240		29055	949	0	0	2790	240	233	0	38	16500	240	355	40	635	66	135
RH 2	84	199	21	217		28802	532	0	0	522	217	210	0	46	15013	217	199	21	437	37	0
RH 3	84	221	38	240		29073	590	0	0	0	240	233	0	79	15117	240	221	38	499	41	0
RH 4	84	194	33	233		29237	519	0	0	0	233	225	0	122	15177	233	194	33	460	36	0
RH 5	84	167	29	240		29257	445	0	0	0	240	233	0	185	15257	240	167	29	436	31	0
RH 6	84	42	4	233		28907	111	0	0	0	233	225	0	228	15140	233	42	4	279	8	0
RH 7	84	3	1	240		28431	40	0	0	0	240	233	0	276	14981	240	3	1	244	3	0
RH 8	84	2	0	240		27955	23	0	0	0	240	233	0	258	14828	240	2	0	242	2	0
RH 9	84	1	0	233		27524	17	0	0	0	233	225	0	215	15071	233	1	0	234	1	0
RH 10	84	3	0	140		27274	32	0	0	0	140	140	0	142	15412	140	3	0	144	2	0
RH 11	84	85	48	97		25464	920	0	0	2561	97	97	0	72	13415	97	85	48	230	64	0
RH 12	84	189	18	105		24185	465	0	0	1599	105	212	0	40	10314	105	189	18	312	33	0
RH 1	85	93	9	240		24139	228	0	0	0	240	233	0	33	10335	240	93	9	342	16	0
RH 2	85	391	41	217		24842	961	0	0	0	217	210	0	42	12513	217	391	41	649	67	0
RH 3	85	468	70	240		25676	1148	0	0	0	240	233	0	73	12781	240	468	70	778	80	0
RH 4	85	68	11	233		25498	168	0	0	0	233	225	0	114	12761	233	68	11	312	12	0
RH 5	85	70	11	140		25358	172	0	0	0	140	140	0	171	12973	140	70	11	221	12	0
RH 6	85	30	2	136		25085	74	0	0	0	136	136	0	211	12862	136	30	2	168	5	0

		C	GA	P	K		L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF	CH			
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Creek for Compliance (MG)	Total Recaptured Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/C alaveras Creek Confluence	Accretion btwn Calaveras and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir
RH 7	85	2	0	140		24715	26	0	0	0	140	140	0	256	12719	140	2	0	143	2	0
RH 8	85	2	0	140		24352	17	0	0	0	140	140	0	240	12584	140	2	0	142	1	0
RH 9	85	1	0	136		24030	13	0	0	0	136	136	0	200	13241	136	1	0	137	1	0
RH 10	85	1	0	140		23769	12	0	0	0	140	140	0	132	14354	140	1	0	141	1	0
RH 11	85	4	1	97		23659	54	0	0	0	97	97	0	67	14627	97	4	1	102	4	0
RH 12	85	50	6	101		23306	150	0	0	364	101	130	0	38	14007	101	50	6	157	11	0
RH 1	86	48	6	200		23215	142	0	0	0	200	228	0	32	14009	200	48	6	254	10	0
RH 2	86	4512	618	0		31500	13500	0	0	2520	0	0	2654	41	16500	2654	4512	618	7785	945	0
RH 3	86	2548	413	0		31500	7623	0	0	2790	0	0	4750	83	16500	4750	2548	413	7711	534	1582
RH 4	86	437	78	194		31500	1308	0	0	987	194	194	0	127	16500	194	437	78	709	92	4
RH 5	86	144	28	240		31497	430	0	0	0	240	233	0	193	16500	240	144	28	412	30	0
RH 6	86	53	7	233		31184	158	0	0	0	233	225	0	238	16387	233	53	7	293	11	0
RH 7	86	5	2	240		30723	67	0	0	0	240	233	0	288	16226	240	5	2	248	5	0
RH 8	86	3	1	240		30249	36	0	0	0	240	233	0	270	16069	240	3	1	244	3	0
RH 9	86	1	0	233		29806	15	0	0	0	233	225	0	225	15900	233	1	0	234	1	0
RH 10	86	2	0	140		28500	23	0	0	1040	140	140	0	149	15812	140	2	0	142	2	0
RH 11	86	2	0	97		27000	25	0	0	1355	97	97	0	73	15767	97	2	0	99	2	0
RH 12	86	28	3	105		26933	79	0	0	0	105	121	0	41	15753	105	28	3	136	6	0
RH 1	87	48	5	200		26837	139	0	0	0	200	228	0	35	15752	200	48	5	254	10	0
RH 2	87	151	17	181		27045	433	0	0	0	181	210	0	44	15791	181	151	17	349	30	0
RH 3	87	133	25	200		27151	383	0	0	0	200	233	0	76	15840	200	133	25	358	27	0
RH 4	87	45	8	194		26968	128	0	0	0	194	194	0	117	15800	194	45	8	247	9	0
RH 5	87	15	3	140		26693	42	0	0	0	140	140	0	177	15700	140	15	3	158	3	0
RH 6	87	10	0	136		26368	28	0	0	0	136	136	0	217	15564	136	10	0	146	2	0
RH 7	87	1	0	140		25977	11	0	0	0	140	140	0	262	15398	140	1	0	141	1	0
RH 8	87	1	0	140		25598	8	0	0	0	140	140	0	246	15243	140	1	0	141	1	0
RH 9	87	1	0	136		25264	7	0	0	0	136	136	0	205	15113	136	1	0	137	0	0
RH 10	87	1	0	140		24998	10	0	0	0	140	140	0	136	15502	140	1	0	141	1	0
RH 11	87	2	0	97		24859	26	0	0	0	97	97	0	68	15657	97	2	0	99	2	0
RH 12	87	99	11	101		24705	287	0	0	300	101	158	0	39	15165	101	99	11	212	20	0
RH 1	88	190	21	200		25022	551	0	0	0	200	233	0	33	15227	200	190	21	412	39	0
RH 2	88	43	5	181		24924	125	0	0	0	181	205	0	42	15219	181	43	5	229	9	0
RH 3	88	31	6	200		24741	91	0	0	0	200	218	0	73	15195	200	31	6	237	6	0
RH 4	88	39	7	194		24548	112	0	0	0	194	194	0	112	15153	194	39	7	240	8	0
RH 5	88	18	3	140		24290	51	0	0	0	140	140	0	168	15057	140	18	3	162	4	0
RH 6	88	9	0	136		23975	27	0	0	0	136	136	0	207	14924	136	9	0	145	2	0
RH 7	88	1	0	140		23596	11	0	0	0	140	140	0	250	14763	140	1	0	141	1	0
RH 8	88	1	0	140		23230	8	0	0	0	140	140	0	234	15080	140	1	0	141	1	0
RH 9	88	1	0	136		22906	7	0	0	0	136	136	0	195	15337	136	1	0	137	0	0
RH 10	88	1	0	140		22649	11	0	0	0	140	140	0	129	15783	140	1	0	141	1	0
RH 11	88	1	0	97		22504	17	0	0	0	97	97	0	65	15739	97	1	0	98	1	0
RH 12	88	43	5	101		22488	123	0	0	0	101	126	0	37	15732	101	43	5	149	9	0
RH 1	89	47	5	200		22392	136	0	0	0	200	227	0	32	15731	200	47	5	253	10	0
RH 2	89	42	5	181		22292	121	0	0	0	181	205	0	40	15721	181	42	5	228	8	0
RH 3	89	158	30	200		22482	459	0	0	0	200	233	0	69	15791	200	158	30	388	32	0
RH 4	89	42	8	194		22305	123	0	0	0	194	194	0	106	16147	194	42	8	244	9	0
RH 5	89	12	2	140		22042	36	0	0	0	140	140	0	159	16474	140	12	2	155	3	0
RH 6	89	9	0	136		21737	26	0	0	0	136	136	0	196	16334	136	9	0	145	2	0
RH 7	89	1	0	140		21371	11	0	0	0	140	140	0	236	16165	140	1	0	141	1	0
RH 8	89	1	0	140		21018	8	0	0	0	140	140	0	221	16006	140	1	0	141	1	0
RH 9	89	1	0	136		20705	7	0	0	0	136	136	0	184	16095	136	1	0	137	0	0
RH 10	89	1	0	140		20453	10	0	0	0	140	140	0	122	15919	140	1	0	141	1	0
RH 11	89	10	5	97		18809	122	0	0	1608	97	97	0	61	13160	97	10	5	112	9	0
RH 12	89	35	4	101		17326	97	0	0	1445	101	121	0	34	9758	101	35	4	140	7	0
RH 1	90	113	12	200		17406	308	0	0	0	200	233	0	28	10736	200	113	12	325	22	0
RH 2	90	133	14	181		17555	364	0	0	0	181	210	0	35	12967	181	133	14	328	25	0
RH 3	90	76	13	200		17502	208	0	0	0	200	233	0	60	13563	200	76	13	290	15	0
RH 4	90	38	7	194		17319	103	0	0	0	194	194	0	92	14431	194	38	7	238	7	0
RH 5	90	28	5	140		17116	77	0	0	0	140	140	0	139	15820	140	28	5	173	5	0
RH 6	90	11	0	136		16839	29	0	0	0	136	136	0	171	16487	136	11	0	147	2	0

		C	GA	P		K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Reservoir and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	90	1	0	140		16504	12	0	0	0	140	140	0	206	16316	140	1	0	141	1	0
RH 8	90	1	0	140		16180	8	0	0	0	140	140	0	193	16156	140	1	0	141	1	0
RH 9	90	1	0	136		15891	7	0	0	0	136	136	0	160	16232	136	1	0	137	0	0
RH 10	90	1	0	140		15658	13	0	0	0	140	140	0	106	15949	140	1	0	141	1	0
RH 11	90	2	0	97		15528	20	0	0	0	97	97	0	53	15900	97	2	0	99	1	0
RH 12	90	23	3	101		15411	69	0	0	54	101	115	0	30	15794	101	23	3	127	5	0
RH 1	91	21	3	200		15248	63	0	0	0	200	212	0	26	15782	200	21	3	224	4	0
RH 2	91	20	2	181		15092	58	0	0	0	181	192	0	32	15763	181	20	2	203	4	0
RH 3	91	965	160	200		18057	2857	364	0	0	200	233	0	56	16499	200	601	160	962	200	0
RH 4	91	130	25	194		18155	386	0	0	0	194	194	0	94	16500	194	130	25	349	27	22
RH 5	91	44	8	140		18004	131	0	0	0	140	140	0	142	16426	140	44	8	193	9	0
RH 6	91	19	1	136		17748	55	0	0	0	136	136	0	175	16292	136	19	1	156	4	0
RH 7	91	2	0	140		17416	20	0	0	0	140	140	0	212	16122	140	2	0	142	1	0
RH 8	91	1	0	140		17091	13	0	0	0	140	140	0	198	15963	140	1	0	141	1	0
RH 9	91	1	0	136		16800	10	0	0	0	136	136	0	165	15980	136	1	0	137	1	0
RH 10	91	1	0	140		16564	13	0	0	0	140	140	0	109	15892	140	1	0	141	1	0
RH 11	91	1	0	97		16429	17	0	0	0	97	97	0	55	15847	97	1	0	98	1	0
RH 12	91	52	6	101		16451	155	0	0	0	101	131	0	32	15845	101	52	6	160	11	0
RH 1	92	76	9	200		16451	227	0	0	0	200	233	0	27	15858	200	76	9	285	16	0
RH 2	92	1676	257	181		21857	5000	622	0	1	181	181	0	34	15898	181	1054	257	1492	350	0
RH 3	92	417	75	200		22833	1244	0	0	0	200	233	0	68	16277	200	417	75	692	87	0
RH 4	92	163	31	194		23019	487	0	0	0	194	194	0	107	16464	194	163	31	388	34	0
RH 5	92	56	11	140		22883	166	0	0	0	140	140	0	162	16500	140	56	11	207	12	0
RH 6	92	28	3	136		22629	82	0	0	0	136	136	0	200	16371	136	28	3	167	6	0
RH 7	92	2	0	140		22274	27	0	0	0	140	140	0	242	16202	140	2	0	143	2	0
RH 8	92	1	0	140		21924	16	0	0	0	140	140	0	226	16043	140	1	0	141	1	0
RH 9	92	1	0	136		21612	12	0	0	0	136	136	0	189	16046	136	1	0	137	1	0
RH 10	92	1	0	140		21364	17	0	0	0	140	140	0	124	15900	140	1	0	141	1	0
RH 11	92	1	0	97		21222	18	0	0	0	97	97	0	63	15855	97	1	0	98	1	0
RH 12	92	185	21	101		21615	552	0	0	22	101	207	0	36	15862	101	185	21	308	39	0
RH 1	93	2348	344	240		28500	7025	927	0	796	240	233	0	31	16500	240	1421	344	2005	492	697
RH 2	93	2037	304	0		31500	6097	0	0	2520	0	0	531	46	16500	531	2037	304	2872	427	1173
RH 3	93	878	148	240		31500	2628	277	0	2582	240	233	0	83	16500	240	601	148	990	184	536
RH 4	93	255	49	233		31500	763	0	0	403	233	225	0	127	16500	233	255	49	537	53	0
RH 5	93	167	32	240		31500	498	0	0	65	240	233	0	193	16500	240	167	32	440	35	14
RH 6	93	44	5	233		31160	131	0	0	0	233	225	0	238	16381	233	44	5	282	9	0
RH 7	93	4	2	240		30685	53	0	0	0	240	233	0	288	16217	240	4	2	246	4	0
RH 8	93	2	0	240		30204	29	0	0	0	240	233	0	270	16058	240	2	0	243	2	0
RH 9	93	2	0	233		29766	20	0	0	0	233	225	0	225	15900	233	2	0	235	1	0
RH 10	93	3	0	140		28500	36	0	0	1014	140	140	0	148	15851	140	3	0	144	3	0
RH 11	93	4	1	97		27000	54	0	0	1384	97	97	0	73	15812	97	4	1	102	4	0
RH 12	93	89	10	105		27000	260	0	0	114	105	155	0	41	15826	105	89	10	204	18	0
RH 1	94	69	8	200		26967	202	0	0	0	200	233	0	35	15835	200	69	8	277	14	0
RH 2	94	666	95	181		28814	1949	123	0	0	181	210	0	44	15900	181	543	95	819	136	0
RH 3	94	120	23	200		28886	352	0	0	0	200	233	0	79	15942	200	120	23	343	25	0
RH 4	94	87	16	194		28827	256	0	0	0	194	194	0	121	15934	194	87	16	297	18	0
RH 5	94	77	14	140		28729	225	0	0	0	140	140	0	183	15879	140	77	14	232	16	0
RH 6	94	16	1	136		28414	47	0	0	0	136	136	0	226	15745	136	16	1	152	3	0
RH 7	94	1	0	140		28017	17	0	0	0	140	140	0	273	15579	140	1	0	141	1	0
RH 8	94	1	0	140		27633	12	0	0	0	140	140	0	256	15423	140	1	0	141	1	0
RH 9	94	1	0	136		27292	9	0	0	0	136	136	0	214	15292	136	1	0	137	1	0
RH 10	94	0	0	140		27018	7	0	0	0	140	140	0	141	15708	140	0	0	140	0	0
RH 11	94	17	1	97		25121	55	0	0	1783	97	97	0	71	12749	97	17	1	115	4	0
RH 12	94	136	6	101		23587	161	0	0	1554	101	179	0	40	9525	101	136	6	244	11	0
RH 1	95	4734	511	0		31500	10979	0	0	2790	0	0	243	33	15869	243	4734	511	5489	769	0
RH 2	95	302	65	181		30160	1409	0	0	2520	181	210	0	48	15900	181	302	65	548	99	0
RH 3	95	4221	665	0		31500	12374	0	0	2790	0	0	8163	81	16500	8163	4221	665	13048	866	1977
RH 4	95	385	96	194		31500	1647	0	0	1326	194	194	0	127	16500	194	385	96	675	115	0
RH 5	95	547	49	240		31500	754	0	0	321	240	233	0	193	16500	240	547	49	836	53	0
RH 6	95	190	18	233		31272	372	0	0	129	233	225	0	238	16213	233	190	18	441	26	0

		C	GA	P	K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE			G										N	CF		CH		
Month	Year	Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)	Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Compliance (MG)	Total Recapture d Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras Confluence and San Antonio Reservoir	Total Stream Release from San Antonio Reservoir
RH 7	95	54	9	240	30929	186	0	0	0	240	233	0	288	16079	240	54	9	303	13	0
RH 8	95	11	3	240	30498	80	0	0	0	240	233	0	271	15932	240	11	3	254	6	0
RH 9	95	7	2	233	30000	54	0	0	93	233	225	0	226	15806	233	7	2	241	4	0
RH 10	95	2	1	140	28500	52	0	0	1263	140	140	0	149	15813	140	2	1	143	4	0
RH 11	95	3	1	97	27000	49	0	0	1379	97	97	0	73	15772	97	3	1	101	3	0
RH 12	95	274	25	105	26702	658	0	0	810	105	233	0	41	15340	105	274	25	404	46	0
RH 1	96	3154	252	240	29504	4875	992	0	2790	240	233	0	35	16500	240	2162	252	2654	341	0
RH 2	96	4683	428	0	31500	9026	0	0	2520	0	0	4464	46	16500	4464	4683	428	9575	632	1664
RH 3	96	2544	237	0	31500	4302	0	0	2790	0	0	1429	83	16500	1429	2544	237	4210	301	612
RH 4	96	364	47	233	31500	725	0	0	365	233	225	0	127	16500	233	364	47	643	51	90
RH 5	96	160	33	240	31500	510	0	0	77	240	233	0	193	16500	240	160	33	433	36	17
RH 6	96	53	10	233	31250	225	0	0	4	233	225	0	238	16394	233	53	10	296	16	0
RH 7	96	24	3	240	30804	82	0	0	0	240	233	0	288	16237	240	24	3	268	6	0
RH 8	96	10	1	240	30332	39	0	0	0	240	233	0	270	16081	240	10	1	251	3	0
RH 9	96	4	1	233	29911	37	0	0	0	233	225	0	225	15900	233	4	1	237	3	0
RH 10	96	9	1	140	28500	54	0	0	1176	140	140	0	149	15816	140	9	1	150	4	0
RH 11	96	440	84	97	27217	1587	0	0	2700	97	97	0	73	15838	97	440	84	620	111	0
RH 12	96	2503	358	0	31500	7380	0	0	2790	0	0	265	41	16500	265	2503	358	3127	517	728
RH 1	97	4755	643	0	31500	14064	0	0	2790	0	0	11236	38	16500	11236	4755	643	16633	984	2516
RH 2	97	481	66	217	30141	1426	0	0	2520	217	210	0	48	16500	217	481	66	764	100	234
RH 3	97	215	37	240	30397	578	0	0	0	240	233	0	81	16500	240	215	37	493	40	98
RH 4	97	108	21	233	30368	328	0	0	0	233	225	0	125	16500	233	108	21	362	23	0
RH 5	97	55	12	240	30120	181	0	0	0	240	233	0	189	16500	240	55	12	307	13	0
RH 6	97	25	4	233	29756	101	0	0	0	233	225	0	232	16375	233	25	4	261	7	0
RH 7	97	11	2	240	29287	52	0	0	0	240	233	0	280	16211	240	11	2	253	4	0
RH 8	97	6	1	240	28817	33	0	0	0	240	233	0	263	16054	240	6	1	247	2	0
RH 9	97	3	1	233	28402	36	0	0	0	233	225	0	219	15900	233	3	1	236	3	0
RH 10	97	4	1	140	28161	44	0	0	0	140	140	0	145	15815	140	4	1	145	3	0
RH 11	97	74	12	97	27000	246	0	0	1237	97	97	0	73	15816	97	74	12	183	17	0
RH 12	97	362	34	105	26764	839	0	0	930	105	233	0	41	15498	105	362	34	500	59	0
RH 1	98	2982	353	0	31194	7255	0	0	2790	0	0	0	35	16500	0	2982	353	3335	508	371
RH 2	98	5529	851	0	31500	18964	0	0	2520	0	0	16090	48	16500	16090	5529	851	22469	1327	3332
RH 3	98	1019	199	0	31500	3596	0	0	2790	0	162	723	83	16500	723	1019	199	1942	252	0
RH 4	98	1070	185	233	31500	3314	0	0	2700	233	225	254	127	16500	487	1070	185	1741	232	63
RH 5	98	390	78	240	31500	1300	0	0	867	240	233	0	193	16500	240	390	78	708	91	194
RH 6	98	182	32	233	31181	619	0	0	468	233	225	0	238	15942	233	182	32	446	43	0
RH 7	98	75	15	240	30952	300	0	0	0	240	233	0	288	15834	240	75	15	330	21	0
RH 8	98	36	7	240	30585	144	0	0	0	240	233	0	271	15702	240	36	7	283	10	0
RH 9	98	24	4	233	30000	91	0	0	217	233	225	0	226	15584	233	24	4	260	6	0
RH 10	98	17	4	140	28500	112	0	0	1323	140	140	0	149	15789	140	17	4	161	8	0
RH 11	98	29	6	97	27000	150	0	0	1480	97	97	0	73	15769	97	29	6	132	11	0
RH 12	98	94	14	105	27000	371	0	0	225	105	158	0	41	15801	105	94	14	213	26	0
RH 1	99	1179	84	240	28500	1733	519	0	476	240	233	0	35	15900	240	660	84	984	121	0
RH 2	99	2055	231	217	30970	4380	873	0	2520	217	210	0	46	16500	217	1182	231	1630	307	285
RH 3	99	722	94	240	31500	1612	121	0	881	240	233	0	82	16500	240	601	94	936	113	0
RH 4	99	1033	136	233	31500	2406	0	0	2046	233	225	0	127	16500	233	1033	136	1402	168	22
RH 5	99	192	40	240	31500	627	0	0	194	240	233	0	193	16500	240	192	40	473	44	0
RH 6	99	77	14	233	31235	300	0	0	94	233	225	0	238	16257	233	77	14	324	21	0
RH 7	99	25	4	240	30808	101	0	0	0	240	233	0	288	16105	240	25	4	270	7	0
RH 8	99	13	2	240	30364	67	0	0	0	240	233	0	270	15955	240	13	2	256	5	0
RH 9	99	9	0	233	29935	29	0	0	0	233	225	0	225	15823	233	9	0	242	2	0
RH 10	99	6	0	140	28500	38	0	0	1184	140	140	0	149	15736	140	6	0	147	3	0
RH 11	99	12	3	97	25708	78	0	0	2700	97	97	0	73	13698	97	12	3	111	5	0
RH 12	99	15	4	105	23963	96	0	0	1696	105	113	0	40	10539	105	15	4	124	7	0
RH 1	100	821	58	200	25225	1276	220	0	0	200	229	0	33	10754	200	601	58	859	89	0
RH 2	100	2448	311	181	30000	6270	847	0	2119	181	181	0	43	14786	181	1601	311	2093	439	0
RH 3	100	1366	203	200	31500	3669	738	0	2626	200	200	0	81	16500	200	628	203	1032	257	0
RH 4	100	183	34	194	31500	523	0	0	202	194	194	0	127	16500	194	183	34	411	37	0
RH 5	100	91	17	240	31336	269	0	0	0	240	233	0	193	16500	240	91	17	349	19	0
RH 6	100	35	5	233	30991	125	0	0	0	233	225	0	237	16380	233	35	5	273	9	0

		C	GA	P			K	L	M	N	O	P	Q	R	S	T	FN	FZ	GA	GB	GC	FO
		CE				G										N	CF					
		Total Inflow to ACDD (MG)	Unregulated Flow between ACDD and Calaveras Confluence (MG)	Calaveras Release for Compliance (MG)		Calaveras Reservoir Storage (MG)	Calaveras Reservoir Inflow from Aroyo Hondo (MG)	Calaveras Reservoir Inflow from Upper Alameda Creek (MG)	Calaveras Reservoir Release to San Antonio Reservoir (MG)	Calaveras Reservoir Release to SVWTP (MG)	Calaveras Reservoir Release to Calaveras Creek for Compliance (MG)	Total Recaptured Release (MG)	Calaveras Reservoir Spill to Calaveras Creek (MG)	Calaveras Reservoir Evap (MG)	San Antonio Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Flow Passing Alameda Creek Diversion Dam	Accretion to Confluence b/w ACDD/Cal Dam - MG	Flow below Alameda/Calaveras Creek Confluence	Accretion btwn Calaveras and San Antonio Confluence - MG	Total Stream Release from San Antonio Reservoir	
RH 7	100	12	2	240		30531	67	0	0	0	240	233	0	287	16219	240	12	2	255	5	0	
RH 8	100	4	0	240		30050	29	0	0	0	240	233	0	269	16060	240	4	0	245	2	0	
RH 9	100	2	1	233		29634	40	0	0	0	233	225	0	224	15900	233	2	1	236	3	0	
RH 10	100	3	1	140		28500	48	0	0	893	140	140	0	148	15815	140	3	1	144	3	0	
RH 11	100	5	2	97		27000	67	0	0	1397	97	97	0	73	15778	97	5	2	104	5	0	
RH 12	100	12	4	105		26480	113	0	0	488	105	112	0	41	14940	105	12	4	121	8	0	
RH 1	101	127	19	200		26736	491	0	0	0	200	233	0	35	14994	200	127	19	346	34	0	
RH 2	101	1037	144	181		29828	2823	494	0	0	181	210	0	44	15883	181	543	144	868	198	0	
RH 3	101	624	133	200		31500	2347	23	0	417	200	233	0	80	16449	200	601	133	935	164	0	
RH 4	101	154	36	194		31500	557	0	0	236	194	194	0	127	16500	194	154	36	384	39	16	
RH 5	101	54	11	140		31342	175	0	0	0	140	140	0	193	16500	140	54	11	206	12	0	
RH 6	101	12	2	136		31029	60	0	0	0	136	136	0	237	16366	136	12	2	149	4	0	
RH 7	101	3	0	140		30627	25	0	0	0	140	140	0	287	16196	140	3	0	143	2	0	
RH 8	101	2	0	140		30232	15	0	0	0	140	140	0	269	16037	140	2	0	142	1	0	
RH 9	101	1	0	136		29884	12	0	0	0	136	136	0	225	15900	136	1	0	137	1	0	
RH 10	101	1	0	140		28500	15	0	0	1110	140	140	0	149	15812	140	1	0	141	1	0	
RH 11	101	10	2	97		27000	65	0	0	1395	97	97	0	73	15774	97	10	2	109	5	0	
RH 12	101	802	85	101		27000	1759	201	0	1817	101	233	0	41	15900	101	601	85	787	123	0	
RH 1	102	399	49	240		27847	1122	0	0	0	240	233	0	35	15900	240	399	49	689	79	0	
RH 2	102	226	23	217		28045	600	0	0	140	217	210	0	45	15663	217	226	23	466	42	0	
RH 3	102	442	84	240		29150	1423	0	0	0	240	233	0	78	15948	240	442	84	767	100	0	
RH 4	102	115	24	233		29167	372	0	0	0	233	225	0	122	15970	233	115	24	372	26	0	
RH 5	102	60	11	140		29016	173	0	0	0	140	140	0	184	15902	140	60	11	211	12	0	
RH 6	102	25	2	136		28723	70	0	0	0	136	136	0	227	15773	136	25	2	163	5	0	
RH 7	102	5	0	140		28325	18	0	0	0	140	140	0	275	15607	140	5	0	145	1	0	
RH 8	102	2	0	140		27936	9	0	0	0	140	140	0	258	15451	140	2	0	142	1	0	
RH 9	102	0	0	136		27592	7	0	0	0	136	136	0	215	15320	136	0	0	136	0	0	

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 7	20	12117	0	1	0	0
RH 8	20	11700	0	1	0	0
RH 9	20	11000	0	1	0	0
RH 10	20	10300	0	1	0	0
RH 11	20	10300	0	65	0	0
RH 12	20	11731	0	1098	140	265
RH 1	21	12400	1174	1555	1555	3040
RH 2	21	12400	0	829	762	931
RH 3	21	10472	0	228	0	59
RH 4	21	10793	0	98	0	33
RH 5	21	10935	0	63	0	26
RH 6	21	10784	0	19	0	7
RH 7	21	10533	0	3	0	0
RH 8	21	10327	0	2	0	0
RH 9	21	10217	0	1	0	0
RH 10	21	10157	0	2	0	0
RH 11	21	10139	0	2	0	0
RH 12	21	10300	0	625	153	250
RH 1	22	10300	0	382	0	80
RH 2	22	12400	4965	3212	3212	8752
RH 3	22	12400	1638	1496	1496	3364
RH 4	22	12400	0	524	0	72
RH 5	22	12395	0	145	0	15
RH 6	22	12015	0	34	0	3
RH 7	22	11774	0	4	0	0
RH 8	22	11569	0	2	0	0
RH 9	22	11000	0	1	0	0
RH 10	22	10300	0	2	0	0
RH 11	22	10300	0	69	0	6
RH 12	22	12400	0	1633	1571	1759
RH 1	23	12400	0	865	624	765
RH 2	23	12400	0	733	363	457
RH 3	23	10164	0	152	0	23
RH 4	23	11991	0	477	0	36
RH 5	23	12146	0	68	0	5
RH 6	23	12015	0	7	0	0
RH 7	23	11756	0	3	0	0
RH 8	23	11541	0	2	0	0
RH 9	23	11000	0	1	0	0
RH 10	23	10300	0	0	0	0
RH 11	23	10258	0	0	0	0
RH 12	23	10233	0	0	0	0
RH 1	24	10212	0	0	0	0
RH 2	24	10186	0	0	0	0
RH 3	24	10060	0	1	0	0
RH 4	24	9998	0	3	0	0
RH 5	24	9895	0	0	0	0
RH 6	24	9676	0	0	0	0
RH 7	24	9525	0	0	0	0
RH 8	24	9383	0	0	0	0
RH 9	24	9265	0	0	0	0
RH 10	24	9193	0	0	0	0
RH 11	24	9170	0	1	0	0
RH 12	24	9690	0	137	0	12
RH 1	25	10182	0	129	0	10
RH 2	25	12223	0	1204	183	373
RH 3	25	10300	0	83	0	25
RH 4	25	10942	0	180	0	38
RH 5	25	11570	0	186	0	11
RH 6	25	11405	0	5	0	2
RH 7	25	11133	0	2	0	0
RH 8	25	10914	0	1	0	0

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
31087	140	1	1	141
30686	140	1	1	141
30000	136	1	1	137
28500	140	1	1	141
27000	97	65	65	162
27852	101	1098	601	827
29916	240	1555	1080	1632
30000	217	829	543	929
30363	240	228	228	527
30298	233	98	98	364
30058	240	63	63	330
29649	233	19	19	259
29165	240	3	3	243
28683	240	2	2	242
28246	233	1	1	234
27983	140	2	2	142
27000	97	2	2	99
26984	105	625	601	803
27851	240	382	382	703
31500	3397	3212	3212	7185
31500	1605	1496	1496	3331
31500	233	524	524	829
31500	240	145	145	400
31129	233	34	34	270
30655	240	4	4	245
30174	240	2	2	242
29737	233	1	1	234
28500	140	2	2	142
27000	97	69	69	172
29482	105	1633	1068	1361
29251	240	865	601	982
30000	217	733	543	854
30131	240	152	152	415
31193	233	477	477	746
30962	240	68	68	313
30590	233	7	7	240
30100	240	3	3	243
29613	240	2	2	242
29173	233	1	1	234
28500	140	0	0	140
27000	97	0	0	97
26854	105	0	0	105
26619	200	0	0	200
26394	181	0	0	181
26119	200	1	1	201
25815	194	3	3	197
25502	140	0	0	140
25154	136	0	0	136
24758	140	0	0	140
24378	140	0	0	140
24042	136	0	0	136
23775	140	0	0	140
21844	97	1	1	98
20557	101	137	137	250
20710	200	129	129	339
24638	181	1204	623	994
24611	200	83	83	309
24838	194	180	180	412
25079	140	186	186	337
24794	136	5	5	143
24419	140	2	2	142
24053	140	1	1	141

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 9	25	10795	0	1	0	0
RH 10	25	10300	0	1	0	0
RH 11	25	10274	0	1	0	0
RH 12	25	10285	0	3	0	0
RH 1	26	10300	0	134	0	1
RH 2	26	12400	2424	2387	2387	5096
RH 3	26	10275	0	180	0	18
RH 4	26	12400	0	670	160	245
RH 5	26	12400	0	47	0	2
RH 6	26	12260	0	7	0	0
RH 7	26	11992	0	2	0	0
RH 8	26	11670	0	1	0	0
RH 9	26	11000	0	1	0	0
RH 10	26	10300	0	1	0	0
RH 11	26	10300	0	490	129	154
RH 12	26	10300	0	161	0	27
RH 1	27	10300	0	424	0	65
RH 2	27	12400	1947	2015	2015	4235
RH 3	27	11909	0	550	0	89
RH 4	27	12400	0	694	17	108
RH 5	27	12400	0	84	0	29
RH 6	27	12283	0	8	0	12
RH 7	27	12027	0	3	0	0
RH 8	27	11683	0	2	0	0
RH 9	27	11000	0	1	0	0
RH 10	27	10300	0	2	0	0
RH 11	27	10287	0	2	0	0
RH 12	27	10300	0	346	155	186
RH 1	28	10300	0	176	0	43
RH 2	28	10300	0	331	62	126
RH 3	28	12400	1391	2118	2118	3779
RH 4	28	12400	0	811	457	575
RH 5	28	12400	0	81	0	7
RH 6	28	12177	0	3	0	2
RH 7	28	11915	0	3	0	1
RH 8	28	11647	0	2	0	0
RH 9	28	11000	0	1	0	0
RH 10	28	10300	0	2	0	0
RH 11	28	10283	0	2	0	2
RH 12	28	10300	0	312	0	13
RH 1	29	10300	0	239	0	12
RH 2	29	10300	0	242	0	22
RH 3	29	10300	0	346	0	38
RH 4	29	10809	0	146	0	5
RH 5	29	10863	0	41	0	1
RH 6	29	10712	0	19	0	0
RH 7	29	10440	0	1	0	0
RH 8	29	10224	0	1	0	0
RH 9	29	10108	0	1	0	0
RH 10	29	10038	0	1	0	0
RH 11	29	10012	0	1	0	0
RH 12	29	10032	0	11	0	6
RH 1	30	10300	0	314	0	56
RH 2	30	10300	0	314	0	35
RH 3	30	11677	0	1297	955	1164
RH 4	30	12023	0	106	0	19
RH 5	30	12104	0	49	0	12
RH 6	30	11913	0	11	0	8
RH 7	30	11640	0	2	0	0
RH 8	30	11418	0	1	0	0
RH 9	30	11000	0	1	0	0
RH 10	30	10300	0	2	0	0

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
23728	136	1	1	137
23471	140	1	1	141
23323	97	1	1	98
22777	101	3	3	104
22941	200	134	134	335
30000	181	2387	1792	2258
30252	200	180	180	399
31500	194	670	670	949
31207	240	47	47	289
30826	233	7	7	240
30330	240	2	2	242
29840	240	1	1	241
29397	233	1	1	234
28500	140	1	1	141
27233	97	490	490	612
27000	105	161	161	293
28112	240	424	424	729
31500	639	2015	2015	2928
31500	240	550	550	880
31500	233	694	694	1017
31341	240	84	84	354
30981	233	8	8	253
30496	240	3	3	243
30011	240	2	2	242
29571	233	1	1	234
28500	140	2	2	142
27000	97	2	2	99
26876	105	346	346	481
27127	240	176	176	460
27854	217	331	331	612
31500	240	2118	1784	2295
31500	233	811	811	1161
31310	240	81	81	328
30849	233	3	3	238
30357	240	3	3	244
29869	240	2	2	242
29427	233	1	1	234
28500	140	2	2	142
27000	97	2	2	100
27000	105	312	312	429
27433	240	239	239	491
27729	217	242	242	481
28438	240	346	346	625
28518	233	146	146	383
28317	140	41	41	182
28013	136	19	19	155
27618	140	1	1	141
27233	140	1	1	141
26893	136	1	1	137
26625	140	1	1	141
24628	97	1	1	98
22890	101	11	11	118
23594	200	314	314	570
24307	181	314	314	530
28100	200	1297	1102	1512
28101	194	106	106	319
27927	140	49	49	201
27600	136	11	11	155
27213	140	2	2	142
26834	140	1	1	141
26497	136	1	1	137
26241	140	2	2	142

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 11	30	10284	0	2	0	0
RH 12	30	10300	0	20	0	2
RH 1	31	10300	0	140	0	15
RH 2	31	10300	0	60	0	7
RH 3	31	10288	0	72	0	13
RH 4	31	10310	0	24	0	4
RH 5	31	10274	0	18	0	3
RH 6	31	10089	0	10	0	0
RH 7	31	9947	0	1	0	0
RH 8	31	9812	0	1	0	0
RH 9	31	9700	0	1	0	0
RH 10	31	9629	0	1	0	0
RH 11	31	9604	0	1	0	0
RH 12	31	10654	0	1064	382	546
RH 1	32	10300	0	569	0	82
RH 2	32	11836	0	1026	13	171
RH 3	32	10300	0	127	0	25
RH 4	32	10589	0	90	0	17
RH 5	32	10659	0	44	0	9
RH 6	32	10630	0	26	0	3
RH 7	32	10371	0	2	0	0
RH 8	32	10161	0	1	0	0
RH 9	32	10050	0	1	0	0
RH 10	32	9995	0	2	0	0
RH 11	32	9983	0	2	0	0
RH 12	32	10023	0	16	0	2
RH 1	33	10300	0	310	0	37
RH 2	33	10092	0	106	0	12
RH 3	33	10300	0	153	0	29
RH 4	33	10639	0	104	0	19
RH 5	33	10806	0	70	0	13
RH 6	33	10636	0	14	0	1
RH 7	33	10365	0	1	0	0
RH 8	33	10152	0	1	0	0
RH 9	33	10039	0	1	0	0
RH 10	33	9968	0	1	0	0
RH 11	33	9944	0	1	0	0
RH 12	33	10300	0	355	0	46
RH 1	34	10300	0	479	86	152
RH 2	34	10300	0	488	0	68
RH 3	34	10300	0	160	0	31
RH 4	34	10422	0	48	0	9
RH 5	34	10409	0	23	0	5
RH 6	34	10257	0	18	0	1
RH 7	34	10118	0	1	0	0
RH 8	34	9984	0	1	0	0
RH 9	34	9871	0	1	0	0
RH 10	34	9806	0	1	0	0
RH 11	34	9830	0	5	0	2
RH 12	34	9968	0	41	0	5
RH 1	35	11855	0	1182	0	183
RH 2	35	10300	0	109	0	12
RH 3	35	10300	0	435	0	77
RH 4	35	12400	0	982	41	205
RH 5	35	12400	0	200	0	38
RH 6	35	11741	0	34	0	4
RH 7	35	11482	0	3	0	1
RH 8	35	11270	0	2	0	0
RH 9	35	11000	0	1	0	0
RH 10	35	10300	0	2	0	0
RH 11	35	10289	0	2	0	0
RH 12	35	10300	0	42	0	5

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
26098	97	2	2	99
25644	101	20	20	124
25806	200	140	140	356
25750	181	60	60	248
25680	200	72	72	286
25440	194	24	24	222
25180	140	18	18	162
24860	136	10	10	146
24479	140	1	1	141
24110	140	1	1	141
23784	136	1	1	137
23520	140	1	1	141
23372	97	1	1	98
26756	101	1064	676	942
28169	240	569	569	891
30000	217	1026	543	918
30060	240	127	127	392
29972	233	90	90	340
29678	240	44	44	293
29293	233	26	26	261
28801	240	2	2	243
28317	240	1	1	241
27879	233	1	1	234
27622	140	2	2	142
27000	97	2	2	99
26466	105	16	16	122
27135	200	310	310	548
27219	181	106	106	299
27387	200	153	153	382
27380	194	104	104	317
27266	140	70	70	223
26953	136	14	14	150
26564	140	1	1	141
26187	140	1	1	141
25853	136	1	1	137
25587	140	1	1	141
25436	97	1	1	98
26353	101	355	355	502
27488	240	479	479	786
28501	217	488	488	773
28660	240	160	160	431
28450	233	48	48	290
28198	140	23	23	168
27892	136	18	18	155
27499	140	1	1	141
27117	140	1	1	141
26779	136	1	1	137
26514	140	1	1	141
24623	97	5	5	103
23033	101	41	41	147
26897	200	1182	601	984
26996	181	109	109	302
28011	200	435	435	713
30616	194	982	982	1339
30881	140	200	200	378
30610	136	34	34	174
30220	140	3	3	144
29833	140	2	2	142
29489	136	1	1	137
28500	140	2	2	142
27000	97	2	2	99
26551	101	42	42	148

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 1	36	10300	0	292	0	35
RH 2	36	12400	1230	1972	1972	3496
RH 3	36	10846	0	323	0	60
RH 4	36	12071	0	326	0	61
RH 5	36	12400	0	120	0	23
RH 6	36	12299	0	34	0	4
RH 7	36	12036	0	3	0	1
RH 8	36	11685	0	2	0	0
RH 9	36	11000	0	1	0	0
RH 10	36	10300	0	2	0	0
RH 11	36	10283	0	2	0	0
RH 12	36	10300	0	30	0	4
RH 1	37	10300	0	131	0	15
RH 2	37	12400	0	1527	1441	1679
RH 3	37	12400	3283	2050	2050	5666
RH 4	37	12400	0	615	0	106
RH 5	37	12400	0	168	0	32
RH 6	37	12035	0	41	0	5
RH 7	37	11787	0	4	0	1
RH 8	37	11579	0	2	0	0
RH 9	37	11000	0	1	0	0
RH 10	37	10300	0	2	0	0
RH 11	37	10300	0	3	0	1
RH 12	37	10300	0	657	84	180
RH 1	38	10305	0	705	0	105
RH 2	38	12400	7414	4028	4028	11999
RH 3	38	12400	5244	2701	2701	8382
RH 4	38	12400	0	737	165	291
RH 5	38	12400	0	204	0	39
RH 6	38	12056	0	58	0	8
RH 7	38	11838	0	6	0	3
RH 8	38	11630	0	3	0	1
RH 9	38	11000	0	2	0	0
RH 10	38	10300	0	6	0	1
RH 11	38	10300	0	11	0	6
RH 12	38	10300	0	197	0	22
RH 1	39	10300	0	138	0	15
RH 2	39	10300	0	298	0	34
RH 3	39	10300	0	259	0	47
RH 4	39	10547	0	83	0	15
RH 5	39	10575	0	35	0	6
RH 6	39	10432	0	21	0	2
RH 7	39	10169	0	2	0	0
RH 8	39	9961	0	1	0	0
RH 9	39	9851	0	1	0	0
RH 10	39	9782	0	1	0	0
RH 11	39	9757	0	1	0	0
RH 12	39	9777	0	11	0	1
RH 1	40	11674	0	1182	16	200
RH 2	40	12400	5333	2874	2874	8618
RH 3	40	12400	2442	1764	1764	4495
RH 4	40	12400	0	858	650	795
RH 5	40	12400	0	168	0	32
RH 6	40	12044	0	48	0	6
RH 7	40	11810	0	5	0	2
RH 8	40	11608	0	2	0	1
RH 9	40	11000	0	2	0	0
RH 10	40	10300	0	2	0	0
RH 11	40	10300	0	4	0	1
RH 12	40	10300	0	614	0	89
RH 1	41	12400	0	1342	448	659
RH 2	41	12400	6409	2994	2994	9829

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
27187	200	292	292	528
31182	181	1972	1107	1583
31500	200	323	323	583
31500	194	326	326	580
31426	240	120	120	383
31052	233	34	34	270
30559	240	3	3	244
30070	240	2	2	242
29628	233	1	1	234
28500	140	2	2	142
27000	97	2	2	99
26944	105	30	30	138
27100	200	131	131	347
30000	181	1527	743	1162
31500	1752	2050	2050	4136
31500	194	615	615	915
31500	240	168	168	441
31122	233	41	41	278
30641	240	4	4	246
30158	240	2	2	243
29719	233	1	1	234
28500	140	2	2	142
27000	97	3	3	100
27000	105	657	601	802
28440	240	705	601	946
31500	6430	4028	4028	11015
31500	5211	2701	2701	8349
31500	233	737	737	1095
31500	240	204	204	484
31128	233	58	58	298
30675	240	6	6	249
30205	240	3	3	244
29775	233	2	2	235
28500	140	6	6	147
27000	97	11	11	114
27000	105	197	197	323
27116	240	138	138	394
27696	217	298	298	549
28108	240	259	259	547
27990	233	83	83	331
27770	140	35	35	182
27472	136	21	21	158
27086	140	2	2	142
26709	140	1	1	141
26375	136	1	1	137
26107	140	1	1	141
24111	97	1	1	98
22373	101	11	11	114
26263	200	1182	601	986
31500	807	2874	2874	4092
31500	2409	1764	1764	4462
31500	194	858	858	1197
31500	240	168	168	441
31144	233	48	48	287
30676	240	5	5	247
30198	240	2	2	243
29763	233	2	2	235
28500	140	2	2	143
27000	97	4	4	102
26995	105	614	601	795
28678	240	1342	611	1062
31500	3570	2994	2994	6989

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 3	41	12400	3805	2221	2221	6387
RH 4	41	12400	5534	2778	2778	8762
RH 5	41	12400	0	498	0	88
RH 6	41	11788	0	67	0	9
RH 7	41	11587	0	7	0	4
RH 8	41	11402	0	4	0	1
RH 9	41	11000	0	2	0	1
RH 10	41	10300	0	4	0	1
RH 11	41	10300	0	8	0	4
RH 12	41	10432	0	758	70	183
RH 1	42	12400	1804	2209	2209	4338
RH 2	42	12400	3379	1989	1989	5665
RH 3	42	12301	0	792	412	546
RH 4	42	12400	667	1188	1188	2051
RH 5	42	12400	0	415	0	74
RH 6	42	11770	0	52	0	7
RH 7	42	11544	0	5	0	2
RH 8	42	11347	0	3	0	1
RH 9	42	11000	0	2	0	0
RH 10	42	10300	0	3	0	1
RH 11	42	10300	0	31	0	20
RH 12	42	10300	0	129	0	15
RH 1	43	12400	2265	2450	2450	5065
RH 2	43	12400	115	910	910	1160
RH 3	43	12400	213	1043	1043	1427
RH 4	43	12400	0	357	0	64
RH 5	43	12400	0	160	0	30
RH 6	43	12318	0	45	0	5
RH 7	43	12072	0	4	0	2
RH 8	43	11698	0	2	0	0
RH 9	43	11000	0	2	0	0
RH 10	43	10300	0	3	0	0
RH 11	43	10300	0	6	0	3
RH 12	43	10300	0	53	0	6
RH 1	44	10300	0	100	0	11
RH 2	44	10855	0	787	0	116
RH 3	44	10511	0	639	25	134
RH 4	44	11117	0	172	0	32
RH 5	44	11401	0	100	0	19
RH 6	44	11277	0	27	0	3
RH 7	44	11013	0	2	0	0
RH 8	44	10800	0	1	0	0
RH 9	44	10684	0	1	0	0
RH 10	44	10300	0	1	0	0
RH 11	44	10300	0	9	0	4
RH 12	44	10300	0	86	0	10
RH 1	45	10300	0	210	0	24
RH 2	45	12400	676	1798	1798	2745
RH 3	45	11702	0	541	0	94
RH 4	45	12400	0	221	0	42
RH 5	45	12400	0	169	0	32
RH 6	45	12303	0	35	0	4
RH 7	45	12041	0	3	0	1
RH 8	45	11687	0	2	0	0
RH 9	45	11000	0	1	0	0
RH 10	45	10300	0	2	0	0
RH 11	45	10300	0	11	0	6
RH 12	45	12400	0	1625	1515	1765
RH 1	46	12400	0	836	496	621
RH 2	46	11438	0	401	0	53
RH 3	46	10300	0	243	0	46
RH 4	46	11019	0	199	0	38

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
31500	3772	2221	2221	6354
31500	5484	2778	2778	8711
31500	240	498	498	826
30659	233	67	67	309
30223	240	7	7	251
29761	240	4	4	246
29337	233	2	2	235
28500	140	4	4	145
27000	97	8	8	109
26962	105	758	601	819
31500	240	2209	1189	1754
31500	3360	1989	1989	5646
31500	240	792	601	975
31500	715	1188	1188	2099
31500	240	415	415	730
30886	233	52	52	292
30426	240	5	5	248
29952	240	3	3	244
29519	233	2	2	235
28500	140	3	3	144
27000	97	31	31	148
26720	105	129	129	248
31500	240	2450	1781	2371
31500	217	910	789	1141
31500	240	1043	983	1394
31500	233	357	357	654
31500	240	160	160	431
31160	233	45	45	283
30683	240	4	4	246
30201	240	2	2	243
29763	233	2	2	235
28500	140	3	3	144
27000	97	6	6	105
27000	105	53	53	164
27059	200	100	100	312
29332	181	787	543	840
30969	200	639	601	910
31154	194	172	172	398
31116	140	100	100	259
30822	136	27	27	165
30423	140	2	2	143
30032	140	1	1	141
29685	136	1	1	137
28500	140	1	1	141
25742	97	9	9	110
24238	101	86	86	197
24627	200	210	210	434
30000	181	1798	969	1421
31320	200	541	541	835
31500	194	221	221	457
31500	240	169	169	442
31132	233	35	35	271
30640	240	3	3	244
30151	240	2	2	242
29709	233	1	1	234
28500	140	2	2	142
27000	97	11	11	114
29794	105	1625	700	1054
29435	240	836	601	966
29825	217	401	401	671
30223	240	243	243	530
30456	233	199	199	470

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 5	46	11404	0	125	0	24
RH 6	46	11310	0	34	0	4
RH 7	46	11055	0	3	0	1
RH 8	46	10847	0	2	0	0
RH 9	46	10733	0	1	0	0
RH 10	46	10300	0	3	0	1
RH 11	46	10300	0	21	0	12
RH 12	46	10300	0	127	0	14
RH 1	47	10300	0	130	0	14
RH 2	47	10300	0	230	0	25
RH 3	47	10300	0	321	0	56
RH 4	47	11043	0	215	0	38
RH 5	47	11247	0	83	0	15
RH 6	47	11120	0	27	0	2
RH 7	47	10857	0	2	0	0
RH 8	47	10647	0	2	0	0
RH 9	47	10535	0	1	0	0
RH 10	47	10300	0	2	0	0
RH 11	47	10300	0	3	0	1
RH 12	47	10300	0	45	0	5
RH 1	48	10300	0	43	0	5
RH 2	48	10300	0	60	0	7
RH 3	48	10300	0	218	0	41
RH 4	48	11652	0	363	0	65
RH 5	48	12186	0	165	0	31
RH 6	48	12031	0	20	0	2
RH 7	48	11756	0	2	0	0
RH 8	48	11536	0	1	0	0
RH 9	48	11000	0	1	0	0
RH 10	48	10300	0	1	0	0
RH 11	48	10281	0	2	0	0
RH 12	48	10300	0	58	0	7
RH 1	49	10300	0	63	0	7
RH 2	49	10300	0	163	0	19
RH 3	49	12400	449	1808	1808	2551
RH 4	49	12400	0	205	0	39
RH 5	49	12400	0	143	0	27
RH 6	49	12298	0	33	0	4
RH 7	49	12033	0	3	0	1
RH 8	49	11684	0	2	0	0
RH 9	49	11000	0	1	0	0
RH 10	49	10300	0	1	0	0
RH 11	49	10278	0	1	0	0
RH 12	49	10300	0	34	0	4
RH 1	50	10300	0	637	0	92
RH 2	50	10468	0	702	75	178
RH 3	50	10300	0	167	0	32
RH 4	50	10762	0	134	0	26
RH 5	50	10920	0	67	0	13
RH 6	50	10774	0	20	0	2
RH 7	50	10506	0	2	0	0
RH 8	50	10293	0	1	0	0
RH 9	50	10178	0	1	0	0
RH 10	50	10111	0	1	0	0
RH 11	50	10300	0	206	0	128
RH 12	50	12400	1021	2222	2222	3541
RH 1	51	12400	0	1028	960	1100
RH 2	51	12400	0	856	594	708
RH 3	51	12400	0	1026	928	1082
RH 4	51	12400	0	212	0	36
RH 5	51	12400	0	176	0	30
RH 6	51	12323	0	52	0	6

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
30396	240	125	125	389
30031	233	34	34	270
29544	240	3	3	244
29061	240	2	2	242
28623	233	1	1	234
28376	140	3	3	144
27000	97	21	21	130
27000	105	127	127	245
27085	240	130	130	384
27462	217	230	230	472
28035	240	321	321	618
28281	233	215	215	486
28189	140	83	83	238
27905	136	27	27	165
27521	140	2	2	143
27145	140	2	2	142
26813	136	1	1	137
26552	140	2	2	142
26428	97	3	3	101
26051	101	45	45	152
25941	200	43	43	248
25892	181	60	60	248
26252	200	218	218	459
27002	194	363	363	622
27166	140	165	165	336
26870	136	20	20	157
26487	140	2	2	142
26113	140	1	1	141
25783	136	1	1	137
25520	140	1	1	141
25375	97	2	2	99
25406	101	58	58	166
25359	200	63	63	271
25514	181	163	163	363
31500	200	1808	783	1278
31500	194	205	205	438
31500	140	143	143	311
31226	136	33	33	173
30831	140	3	3	144
30440	140	2	2	142
30000	136	1	1	137
28500	140	1	1	141
25649	97	1	1	98
23915	101	34	34	140
25612	200	637	601	894
27634	181	702	543	827
27854	200	167	167	399
27939	194	134	134	353
27818	140	67	67	220
27520	136	20	20	157
27131	140	2	2	142
26752	140	1	1	141
26416	136	1	1	137
26152	140	1	1	141
27000	97	206	206	431
31150	101	2222	1075	1474
31254	240	1028	601	982
31069	217	856	543	874
31500	240	1026	601	996
31500	233	212	212	481
31500	240	176	176	447
31168	233	52	52	290

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 7	51	12083	0	5	0	2
RH 8	51	11700	0	3	0	1
RH 9	51	11000	0	2	0	0
RH 10	51	10300	0	2	0	0
RH 11	51	10300	0	5	0	2
RH 12	51	11101	0	922	62	203
RH 1	52	12400	7120	3756	3756	11398
RH 2	52	12400	1875	1480	1480	3588
RH 3	52	12400	3887	2250	2250	6502
RH 4	52	12400	0	551	0	96
RH 5	52	12400	0	175	0	34
RH 6	52	12057	0	59	0	8
RH 7	52	11842	0	6	0	3
RH 8	52	11632	0	3	0	1
RH 9	52	11000	0	2	0	0
RH 10	52	10300	0	4	0	1
RH 11	52	10300	0	5	0	2
RH 12	52	11688	0	1076	70	235
RH 1	53	12400	1162	1577	1577	2983
RH 2	53	11213	0	343	0	44
RH 3	53	10194	0	448	0	79
RH 4	53	10815	0	174	0	33
RH 5	53	11398	0	174	0	33
RH 6	53	11310	0	36	0	4
RH 7	53	11059	0	3	0	1
RH 8	53	10851	0	2	0	0
RH 9	53	10739	0	1	0	0
RH 10	53	10300	0	2	0	0
RH 11	53	10300	0	14	0	8
RH 12	53	10300	0	35	0	4
RH 1	54	10300	0	382	0	49
RH 2	54	10371	0	686	67	165
RH 3	54	10300	0	580	0	98
RH 4	54	11168	0	240	0	45
RH 5	54	11448	0	100	0	19
RH 6	54	11335	0	30	0	3
RH 7	54	11072	0	2	0	0
RH 8	54	10859	0	1	0	0
RH 9	54	10744	0	1	0	0
RH 10	54	10300	0	1	0	0
RH 11	54	10300	0	5	0	2
RH 12	54	10300	0	397	0	52
RH 1	55	10300	0	613	0	88
RH 2	55	9739	0	186	0	21
RH 3	55	10272	0	199	0	38
RH 4	55	10768	0	143	0	27
RH 5	55	11050	0	99	0	19
RH 6	55	10913	0	23	0	2
RH 7	55	10648	0	2	0	0
RH 8	55	10435	0	1	0	0
RH 9	55	10320	0	1	0	0
RH 10	55	10249	0	1	0	0
RH 11	55	10237	0	2	0	0
RH 12	55	12400	6613	3870	3870	11021
RH 1	56	12400	4612	2479	2479	7452
RH 2	56	12400	2802	1787	1787	4861
RH 3	56	12250	0	673	0	116
RH 4	56	12400	0	244	0	47
RH 5	56	12400	0	132	0	25
RH 6	56	12334	0	57	0	8
RH 7	56	12115	0	6	0	3
RH 8	56	11700	0	3	0	1

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
30696	240	5	5	247
30217	240	3	3	244
29780	233	2	2	235
28500	140	2	2	142
27000	97	5	5	104
27141	105	922	601	846
31500	4046	3756	3756	8324
31500	1856	1480	1480	3569
31500	3854	2250	2250	6469
31500	233	551	551	880
31500	240	175	175	449
31176	233	59	59	300
30725	240	6	6	249
30256	240	3	3	244
29826	233	2	2	235
28500	140	4	4	145
27000	97	5	5	104
27736	105	1076	601	871
30209	240	1577	724	1208
29979	217	343	343	604
30987	240	448	448	768
31144	233	174	174	440
31230	240	174	174	448
30866	233	36	36	273
30378	240	3	3	244
29892	240	2	2	242
29452	233	1	1	234
28500	140	2	2	142
27000	97	14	14	119
26957	105	35	35	144
27835	200	382	382	631
29724	181	686	543	822
31134	200	580	580	879
31500	194	240	240	479
31457	140	100	100	259
31170	136	30	30	169
30770	140	2	2	143
30378	140	1	1	141
30000	136	1	1	137
28500	140	1	1	141
25695	97	5	5	104
25132	101	397	397	551
26678	240	613	601	929
26965	217	186	186	424
27234	240	199	199	477
27306	233	143	143	403
27279	140	99	99	258
26992	136	23	23	161
26609	140	2	2	142
26234	140	1	1	141
25901	136	1	1	137
25636	140	1	1	141
25497	97	2	2	99
31500	2758	3870	3870	7166
31500	4597	2479	2479	7436
31500	2783	1787	1787	4842
31444	240	673	601	957
31500	233	244	244	524
31462	240	132	132	398
31135	233	57	57	297
30681	240	6	6	249
30212	240	3	3	244

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 9	56	11000	0	2	0	0
RH 10	56	10300	0	5	0	1
RH 11	56	10300	0	5	0	2
RH 12	56	10300	0	34	0	4
RH 1	57	10300	0	108	0	12
RH 2	57	11058	0	842	0	124
RH 3	57	10228	0	224	0	42
RH 4	57	10740	0	148	0	28
RH 5	57	11455	0	210	0	39
RH 6	57	11322	0	25	0	2
RH 7	57	11056	0	2	0	0
RH 8	57	10841	0	1	0	0
RH 9	57	10725	0	1	0	0
RH 10	57	10300	0	1	0	0
RH 11	57	10300	0	4	0	2
RH 12	57	10300	0	117	0	14
RH 1	58	10300	0	616	97	187
RH 2	58	12400	4176	2948	2948	7543
RH 3	58	12400	4942	2600	2600	7963
RH 4	58	12400	8707	3837	3837	13162
RH 5	58	12400	0	409	0	74
RH 6	58	12069	0	68	0	9
RH 7	58	11868	0	7	0	4
RH 8	58	11642	0	4	0	1
RH 9	58	11000	0	2	0	1
RH 10	58	10300	0	4	0	1
RH 11	58	10300	0	4	0	1
RH 12	58	10300	0	39	0	5
RH 1	59	10300	0	397	0	52
RH 2	59	12304	0	1152	0	176
RH 3	59	10147	0	173	0	33
RH 4	59	10446	0	93	0	18
RH 5	59	10556	0	55	0	10
RH 6	59	10417	0	22	0	2
RH 7	59	10154	0	2	0	0
RH 8	59	9944	0	1	0	0
RH 9	59	9832	0	1	0	0
RH 10	59	9768	0	1	0	0
RH 11	59	9746	0	1	0	0
RH 12	59	9782	0	15	0	2
RH 1	60	10209	0	113	0	13
RH 2	60	10300	0	617	183	271
RH 3	60	10291	0	72	0	14
RH 4	60	10441	0	56	0	11
RH 5	60	10508	0	44	0	8
RH 6	60	10336	0	13	0	1
RH 7	60	10193	0	1	0	0
RH 8	60	10056	0	1	0	0
RH 9	60	9941	0	1	0	0
RH 10	60	9878	0	1	0	0
RH 11	60	9952	0	9	0	4
RH 12	60	10059	0	35	0	4
RH 1	61	10300	0	82	0	9
RH 2	61	10257	0	63	0	7
RH 3	61	10300	0	191	0	34
RH 4	61	10392	0	43	0	8
RH 5	61	10408	0	32	0	6
RH 6	61	10325	0	13	0	0
RH 7	61	10183	0	1	0	0
RH 8	61	10048	0	1	0	0
RH 9	61	9935	0	1	0	0
RH 10	61	9864	0	1	0	0

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
29781	233	2	2	235
28500	140	5	5	146
27000	97	5	5	104
26955	105	34	34	143
27035	200	108	108	321
29526	181	842	543	848
29899	200	224	224	466
30015	194	148	148	370
30300	140	210	210	390
30003	136	25	25	163
29606	140	2	2	142
29218	140	1	1	141
28874	136	1	1	137
28500	140	1	1	141
27000	97	4	4	102
26710	101	117	117	232
28333	200	616	601	891
31500	3090	2948	2948	6457
31500	4909	2600	2600	7930
31500	8657	3837	3837	13111
31500	240	409	409	723
30934	233	68	68	310
30498	240	7	7	251
30036	240	4	4	246
29612	233	2	2	235
28500	140	4	4	145
27000	97	4	4	102
26969	105	39	39	148
27906	200	397	397	650
29978	181	1152	543	900
30207	200	173	173	406
30163	194	93	93	305
29996	140	55	55	206
29693	136	22	22	159
29294	140	2	2	142
28904	140	1	1	141
28559	136	1	1	137
28289	140	1	1	141
25497	97	1	1	98
23771	101	15	15	118
23872	200	113	113	326
25547	181	617	543	812
25485	200	72	72	286
25342	194	56	56	261
25160	140	44	44	193
24853	136	13	13	149
24473	140	1	1	141
24105	140	1	1	141
23778	136	1	1	137
23524	140	1	1	141
23467	97	9	9	110
23112	101	35	35	140
23105	200	82	82	291
23058	181	63	63	251
23311	200	191	191	425
23128	194	43	43	244
22915	140	32	32	178
22615	136	13	13	149
22248	140	1	1	141
21894	140	1	1	141
21580	136	1	1	137
21325	140	1	1	141

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 11	61	9841	0	1	0	0
RH 12	61	9932	0	29	0	3
RH 1	62	10051	0	35	0	4
RH 2	62	12400	0	1615	1541	1791
RH 3	62	12153	0	651	0	112
RH 4	62	12400	0	133	0	26
RH 5	62	12400	0	103	0	20
RH 6	62	12366	0	28	0	3
RH 7	62	12095	0	2	0	0
RH 8	62	11700	0	1	0	0
RH 9	62	11000	0	1	0	0
RH 10	62	10300	0	49	40	56
RH 11	62	10300	0	3	0	1
RH 12	62	10300	0	102	0	12
RH 1	63	12400	171	1689	1689	2121
RH 2	63	12400	4747	2425	2425	7527
RH 3	63	12305	0	685	0	118
RH 4	63	12400	1245	1368	1368	2840
RH 5	63	12400	0	638	0	111
RH 6	63	11589	0	56	0	7
RH 7	63	11369	0	5	0	3
RH 8	63	11176	0	3	0	1
RH 9	63	11000	0	2	0	0
RH 10	63	10300	0	4	0	2
RH 11	63	10300	0	43	0	25
RH 12	63	10300	0	92	0	9
RH 1	64	10300	0	666	95	180
RH 2	64	9525	0	114	0	12
RH 3	64	9868	0	129	0	22
RH 4	64	10164	0	100	0	17
RH 5	64	10301	0	66	0	11
RH 6	64	10154	0	21	0	1
RH 7	64	9892	0	2	0	0
RH 8	64	9685	0	1	0	0
RH 9	64	9575	0	1	0	0
RH 10	64	9509	0	1	0	0
RH 11	64	9614	0	10	0	6
RH 12	64	12400	0	1753	1379	1646
RH 1	65	12400	6583	3152	3152	10179
RH 2	65	11921	0	520	0	73
RH 3	65	10300	0	182	0	35
RH 4	65	12372	0	1059	0	176
RH 5	65	12400	0	176	0	34
RH 6	65	12324	0	49	0	6
RH 7	65	12089	0	5	0	2
RH 8	65	11700	0	2	0	1
RH 9	65	11000	0	2	0	0
RH 10	65	10300	0	3	0	1
RH 11	65	10300	0	43	0	26
RH 12	65	10300	0	458	0	57
RH 1	66	10278	0	389	0	46
RH 2	66	10179	0	522	0	67
RH 3	66	10300	0	193	0	34
RH 4	66	10370	0	37	0	7
RH 5	66	10423	0	42	0	8
RH 6	66	10284	0	23	0	2
RH 7	66	10022	0	2	0	0
RH 8	66	9814	0	1	0	0
RH 9	66	9703	0	1	0	0
RH 10	66	9638	0	1	0	0
RH 11	66	9722	0	9	0	5
RH 12	66	10300	0	544	0	77

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
21183	97	1	1	98
21131	101	29	29	134
21004	200	35	35	239
26196	181	1615	966	1396
27913	200	651	601	913
27996	194	133	133	352
27982	140	103	103	263
27706	136	28	28	167
27324	140	2	2	143
26947	140	1	1	141
26613	136	1	1	137
26352	140	49	49	206
26229	97	3	3	101
25920	101	102	102	215
28500	200	1689	1277	1739
31500	1730	2425	2425	4510
31500	200	685	601	919
31500	1289	1368	1368	2884
31500	240	638	638	989
30563	233	56	56	296
30108	240	5	5	248
29639	240	3	3	244
29210	233	2	2	235
28500	140	4	4	146
27000	97	43	43	165
27000	105	92	92	206
28464	240	666	601	927
28200	217	114	114	343
28222	240	129	129	391
28134	233	100	100	350
27988	140	66	66	217
27683	136	21	21	158
27294	140	2	2	142
26914	140	1	1	141
26577	136	1	1	137
26309	140	1	1	141
24434	97	10	10	113
27157	101	1753	1324	1693
31500	2228	3152	3152	5825
30265	217	520	520	810
30486	240	182	182	457
31500	233	1059	1059	1468
31500	240	176	176	450
31175	233	49	49	288
30708	240	5	5	247
30231	240	2	2	243
29796	233	2	2	235
28500	140	3	3	144
27000	97	43	43	166
26999	105	458	458	619
27791	240	389	389	676
28872	217	522	522	806
29080	240	193	193	467
28829	233	37	37	276
28621	140	42	42	190
28322	136	23	23	160
27930	140	2	2	142
27547	140	1	1	141
27208	136	1	1	137
26940	140	1	1	141
26888	97	9	9	111
27000	101	544	544	723

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 1	67	12400	1044	1996	1996	3338
RH 2	67	12400	0	793	610	729
RH 3	67	12400	1980	1616	1616	3860
RH 4	67	12400	2000	1602	1602	3864
RH 5	67	12400	0	677	0	116
RH 6	67	11585	0	53	0	7
RH 7	67	11361	0	5	0	2
RH 8	67	11166	0	3	0	1
RH 9	67	11000	0	2	0	0
RH 10	67	10300	0	3	0	1
RH 11	67	10300	0	5	0	2
RH 12	67	10300	0	84	0	10
RH 1	68	10691	0	828	69	192
RH 2	68	10169	0	443	0	60
RH 3	68	10114	0	353	0	64
RH 4	68	10735	0	175	0	33
RH 5	68	11015	0	98	0	19
RH 6	68	10889	0	26	0	2
RH 7	68	10626	0	2	0	0
RH 8	68	10413	0	1	0	0
RH 9	68	10299	0	1	0	0
RH 10	68	10232	0	1	0	0
RH 11	68	10270	0	6	0	2
RH 12	68	10300	0	265	0	31
RH 1	69	12400	4186	3041	3041	7659
RH 2	69	12400	7735	3438	3438	11655
RH 3	69	12400	762	1204	1204	2166
RH 4	69	12400	0	385	0	70
RH 5	69	12400	0	127	0	25
RH 6	69	12338	0	60	0	8
RH 7	69	12106	0	5	0	2
RH 8	69	11700	0	2	0	1
RH 9	69	11000	0	2	0	0
RH 10	69	10300	0	4	0	1
RH 11	69	10300	0	5	0	2
RH 12	69	10300	0	109	0	12
RH 1	70	12400	736	1900	1900	2921
RH 2	70	11524	0	421	0	57
RH 3	70	12400	0	1135	796	984
RH 4	70	12400	0	139	0	27
RH 5	70	12400	0	72	0	14
RH 6	70	12285	0	30	0	3
RH 7	70	12020	0	3	0	1
RH 8	70	11681	0	2	0	0
RH 9	70	11000	0	1	0	0
RH 10	70	10300	0	2	0	0
RH 11	70	10300	0	42	0	27
RH 12	70	12400	0	1430	592	807
RH 1	71	12330	0	712	0	100
RH 2	71	10281	0	127	0	14
RH 3	71	10140	0	355	0	63
RH 4	71	10854	0	203	0	37
RH 5	71	11099	0	92	0	17
RH 6	71	11019	0	38	0	4
RH 7	71	10766	0	3	0	1
RH 8	71	10555	0	1	0	0
RH 9	71	10441	0	1	0	0
RH 10	71	10300	0	2	0	0
RH 11	71	10299	0	3	0	0
RH 12	71	10300	0	364	1	47
RH 1	72	10300	0	127	0	14
RH 2	72	10300	0	238	2	29

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
30200	240	1996	1685	2224
30032	217	793	543	879
31500	481	1616	1616	2362
31500	1950	1602	1602	3814
31500	240	677	677	1033
30438	233	53	53	293
29980	240	5	5	248
29509	240	3	3	244
29079	233	2	2	235
28500	140	3	3	144
27000	97	5	5	104
26673	105	84	84	198
28500	200	828	601	924
29339	181	443	443	684
30101	200	353	353	617
30298	194	175	175	402
30259	140	98	98	257
29966	136	26	26	164
29569	140	2	2	142
29180	140	1	1	141
28835	136	1	1	137
28500	140	1	1	141
27000	97	6	6	105
27000	101	265	265	398
31500	1772	3041	3041	5244
31500	7716	3438	3438	11636
31500	729	1204	1204	2133
31500	233	385	385	688
31448	240	127	127	392
31157	233	60	60	301
30692	240	5	5	248
30213	240	2	2	243
29785	233	2	2	235
28500	140	4	4	145
25694	97	5	5	104
24259	105	109	109	226
28500	200	1900	1112	1597
29525	181	421	421	659
31500	200	1135	641	1029
31500	194	139	139	359
31280	240	72	72	326
30900	233	30	30	266
30406	240	3	3	244
29922	240	2	2	242
29484	233	1	1	234
28500	140	2	2	142
27000	97	42	42	166
28852	105	1430	720	1038
28500	240	712	601	942
27871	217	127	127	358
28566	240	355	355	658
28792	233	203	203	473
28631	240	92	92	349
28282	233	38	38	275
27805	240	3	3	244
27326	240	1	1	241
26894	233	1	1	234
26635	140	2	2	142
26505	97	3	3	100
27000	105	364	364	515
27098	240	127	127	382
27376	217	238	238	482

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/Calaveras Creek Confluence
RH 3	72	10266	0	52	0	10
RH 4	72	10342	0	37	0	7
RH 5	72	10305	0	17	0	3
RH 6	72	10125	0	11	0	0
RH 7	72	9854	0	1	0	0
RH 8	72	9637	0	0	0	0
RH 9	72	9523	0	0	0	0
RH 10	72	9460	0	1	0	0
RH 11	72	10300	0	127	14	98
RH 12	72	10300	0	280	0	31
RH 1	73	12400	1000	2074	2074	3370
RH 2	73	12400	7770	3620	3620	11873
RH 3	73	12400	2059	1719	1719	4047
RH 4	73	12400	0	324	0	58
RH 5	73	12400	0	121	0	22
RH 6	73	12322	0	49	0	6
RH 7	73	12085	0	5	0	2
RH 8	73	11700	0	3	0	1
RH 9	73	11000	0	2	0	0
RH 10	73	10300	0	7	0	3
RH 11	73	10167	0	79	0	51
RH 12	73	12400	0	1507	770	997
RH 1	74	12400	1357	1458	1458	3035
RH 2	74	10736	0	229	0	25
RH 3	74	12400	0	1409	938	1161
RH 4	74	12400	1299	1425	1425	2949
RH 5	74	12400	0	199	0	37
RH 6	74	12076	0	76	0	10
RH 7	74	11899	0	9	0	5
RH 8	74	11650	0	3	0	1
RH 9	74	11000	0	1	0	0
RH 10	74	10300	0	4	0	1
RH 11	74	10300	0	7	0	4
RH 12	74	10300	0	100	0	11
RH 1	75	10300	0	201	0	23
RH 2	75	12400	2594	2441	2441	5387
RH 3	75	12400	5169	2700	2700	8302
RH 4	75	12400	0	755	217	345
RH 5	75	12400	0	189	0	36
RH 6	75	12065	0	66	0	9
RH 7	75	11878	0	8	0	4
RH 8	75	11650	0	5	0	2
RH 9	75	11000	0	4	0	2
RH 10	75	10300	0	6	0	2
RH 11	75	10300	0	7	0	3
RH 12	75	10300	0	35	0	3
RH 1	76	10300	0	32	0	3
RH 2	76	10300	0	36	0	4
RH 3	76	10298	0	88	0	14
RH 4	76	10354	0	36	0	6
RH 5	76	10304	0	16	0	3
RH 6	76	10106	0	7	0	0
RH 7	76	9960	0	1	0	0
RH 8	76	9823	0	1	0	0
RH 9	76	9713	0	1	0	0
RH 10	76	9663	0	2	0	0
RH 11	76	9656	0	3	0	0
RH 12	76	9678	0	12	0	1
RH 1	77	9862	0	55	0	6
RH 2	77	9922	0	23	0	3
RH 3	77	10059	0	49	0	9
RH 4	77	10083	0	25	0	4

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/Calaveras Creek Confluence
27212	240	52	52	302
26971	233	37	37	277
26705	140	17	17	161
26383	136	11	11	147
25993	140	1	1	141
25610	140	0	0	140
25275	136	0	0	136
25014	140	1	1	141
26437	97	127	127	307
26708	101	280	280	413
30467	240	2074	1160	1697
31500	6719	3620	3620	10822
31500	2026	1719	1719	4014
31500	233	324	324	615
31413	240	121	121	384
31083	233	49	49	287
30614	240	5	5	247
30136	240	3	3	244
29709	233	2	2	235
28500	140	7	7	150
27000	97	79	79	227
28941	105	1507	941	1273
30874	240	1458	628	1088
29991	217	229	229	471
31500	240	1409	819	1282
31500	1249	1425	1425	2898
31500	240	199	199	476
31243	233	76	76	319
30828	240	9	9	254
30359	240	3	3	244
29919	233	1	1	234
28500	140	4	4	145
25726	97	7	7	107
24262	105	100	100	216
24626	200	201	201	424
30087	181	2441	1477	2011
31500	3725	2700	2700	6858
31500	194	755	755	1076
31500	240	189	189	466
31195	233	66	66	308
30770	240	8	8	253
30323	240	5	5	247
29916	233	4	4	238
28500	140	6	6	148
27000	97	7	7	106
26526	105	35	35	143
26370	200	32	32	235
26235	181	36	36	221
26181	200	88	88	303
25962	194	36	36	236
25688	140	16	16	159
25356	136	7	7	143
24969	140	1	1	141
24596	140	1	1	141
24269	136	1	1	137
24025	140	2	2	142
23891	97	3	3	100
23784	101	12	12	115
23700	200	55	55	261
23541	181	23	23	207
23402	200	49	49	258
23167	194	25	25	223

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 5	77	10045	0	18	0	3
RH 6	77	9942	0	7	0	0
RH 7	77	9797	0	1	0	0
RH 8	77	9657	0	0	0	0
RH 9	77	9543	0	0	0	0
RH 10	77	9469	0	0	0	0
RH 11	77	9445	0	1	0	0
RH 12	77	9925	0	126	0	15
RH 1	78	12400	1655	2319	2319	4314
RH 2	78	12400	1431	1330	1330	2970
RH 3	78	12400	2114	1656	1656	4041
RH 4	78	12400	0	671	0	115
RH 5	78	12400	0	159	0	31
RH 6	78	11595	0	61	0	8
RH 7	78	11369	0	5	0	2
RH 8	78	11170	0	2	0	1
RH 9	78	11000	0	2	0	0
RH 10	78	10300	0	2	0	0
RH 11	78	10300	0	4	0	1
RH 12	78	10300	0	26	0	3
RH 1	79	10300	0	457	41	104
RH 2	79	12329	0	1228	299	489
RH 3	79	12108	0	660	0	113
RH 4	79	12400	0	215	0	41
RH 5	79	12400	0	76	0	14
RH 6	79	12255	0	23	0	2
RH 7	79	11988	0	2	0	1
RH 8	79	11669	0	1	0	0
RH 9	79	11000	0	1	0	0
RH 10	79	10300	0	3	0	0
RH 11	79	10300	0	8	0	4
RH 12	79	10300	0	308	0	38
RH 1	80	12400	1223	2057	2057	3586
RH 2	80	12400	9235	3951	3951	13732
RH 3	80	12400	0	840	506	648
RH 4	80	12400	0	316	0	59
RH 5	80	12400	0	125	0	24
RH 6	80	12327	0	51	0	7
RH 7	80	12105	0	6	0	3
RH 8	80	11700	0	3	0	1
RH 9	80	11000	0	2	0	0
RH 10	80	10300	0	2	0	0
RH 11	80	10296	0	3	0	0
RH 12	80	10300	0	36	0	4
RH 1	81	11041	0	1021	512	668
RH 2	81	9915	0	199	0	23
RH 3	81	10724	0	915	0	153
RH 4	81	11338	0	172	0	33
RH 5	81	11478	0	63	0	12
RH 6	81	11335	0	22	0	2
RH 7	81	11058	0	1	0	0
RH 8	81	10837	0	1	0	0
RH 9	81	10716	0	1	0	0
RH 10	81	10300	0	1	0	0
RH 11	81	10300	0	55	0	36
RH 12	81	10300	0	500	94	163
RH 1	82	12400	2429	2496	2496	5282
RH 2	82	12400	1885	1508	1508	3626
RH 3	82	12400	437	1114	1114	1734
RH 4	82	12400	7496	3493	3493	11542
RH 5	82	12400	0	472	0	83
RH 6	82	11878	0	65	0	9

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
22912	140	18	18	161
22594	136	7	7	143
22221	140	1	1	141
21859	140	0	0	140
21542	136	0	0	136
21283	140	0	0	140
21138	97	1	1	98
21209	101	126	126	242
28500	200	2319	1549	2089
30365	181	1330	699	1089
31500	947	1656	1656	2875
31500	194	671	671	980
31500	240	159	159	430
31212	233	61	61	302
30748	240	5	5	248
30270	240	2	2	243
29843	233	2	2	235
28500	140	2	2	142
27000	97	4	4	102
26931	105	26	26	134
28054	200	457	457	720
29988	181	1228	699	1070
31500	200	660	601	914
31500	194	215	215	450
31393	140	76	76	231
31087	136	23	23	161
30691	140	2	2	143
30298	140	1	1	141
29951	136	1	1	137
28500	140	3	3	144
25739	97	8	8	109
24856	101	308	308	447
28549	240	2057	1434	1980
31500	6267	3951	3951	10764
31500	240	840	601	983
31500	233	316	316	607
31441	240	125	125	389
31120	233	51	51	290
30665	240	6	6	249
30192	240	3	3	244
29756	233	2	2	235
28500	140	2	2	142
27000	97	3	3	100
26545	105	36	36	145
28500	200	1021	731	1088
28455	181	199	199	403
31218	200	915	601	955
31410	194	172	172	399
31266	140	63	63	215
30958	136	22	22	159
30547	140	1	1	141
30147	140	1	1	141
29795	136	1	1	137
28500	140	1	1	141
27000	97	55	55	188
27000	101	500	500	670
31500	240	2496	2271	2868
31500	1866	1508	1508	3607
31500	404	1114	1114	1701
31500	7446	3493	3493	11492
31500	240	472	472	795
30740	233	65	65	306

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 7	82	11670	0	6	0	3
RH 8	82	11481	0	3	0	1
RH 9	82	11000	0	2	0	0
RH 10	82	10300	0	3	0	1
RH 11	82	10300	0	49	17	49
RH 12	82	10961	0	1004	507	660
RH 1	83	12400	5233	3197	3197	8878
RH 2	83	12400	8809	3829	3829	13166
RH 3	83	12400	14616	5884	5884	21434
RH 4	83	12400	1253	1358	1358	2834
RH 5	83	12400	0	904	680	831
RH 6	83	11173	0	96	0	14
RH 7	83	11023	0	10	0	6
RH 8	83	10865	0	5	0	3
RH 9	83	10783	0	3	0	1
RH 10	83	10300	0	8	0	3
RH 11	83	10300	0	119	33	106
RH 12	83	12400	1126	2261	2261	3689
RH 1	84	10891	0	355	0	40
RH 2	84	10244	0	199	0	21
RH 3	84	10300	0	221	0	38
RH 4	84	10943	0	194	0	33
RH 5	84	11446	0	167	0	29
RH 6	84	11370	0	42	0	4
RH 7	84	11119	0	3	0	1
RH 8	84	10912	0	2	0	0
RH 9	84	10800	0	1	0	0
RH 10	84	10300	0	3	0	0
RH 11	84	10300	0	85	0	48
RH 12	84	10300	0	189	0	18
RH 1	85	10300	0	93	0	9
RH 2	85	10300	0	391	224	265
RH 3	85	10300	0	468	0	70
RH 4	85	10466	0	68	0	11
RH 5	85	10602	0	70	0	11
RH 6	85	10481	0	30	0	2
RH 7	85	10222	0	2	0	0
RH 8	85	10017	0	2	0	0
RH 9	85	9907	0	1	0	0
RH 10	85	9839	0	1	0	0
RH 11	85	9855	0	4	0	1
RH 12	85	10032	0	50	0	6
RH 1	86	10201	0	48	0	6
RH 2	86	12400	8755	4512	4512	13885
RH 3	86	12400	4783	2548	2548	7744
RH 4	86	12400	0	437	0	78
RH 5	86	12393	0	144	0	28
RH 6	86	12048	0	53	0	7
RH 7	86	11821	0	5	0	2
RH 8	86	11623	0	3	0	1
RH 9	86	11000	0	1	0	0
RH 10	86	10300	0	2	0	0
RH 11	86	10285	0	2	0	0
RH 12	86	10300	0	28	0	3
RH 1	87	10300	0	48	0	5
RH 2	87	10300	0	151	69	86
RH 3	87	10300	0	133	0	25
RH 4	87	10403	0	45	0	8
RH 5	87	10354	0	15	0	3
RH 6	87	10170	0	10	0	0
RH 7	87	10025	0	1	0	0
RH 8	87	9887	0	1	0	0

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
30298	240	6	6	250
29834	240	3	3	244
29408	233	2	2	235
28500	140	3	3	144
27000	97	49	49	178
27326	105	1004	721	979
31500	2484	3197	3197	6129
31500	8790	3829	3829	13146
31500	14583	5884	5884	21401
31500	1203	1358	1358	2783
31434	240	904	904	1296
30050	233	96	96	342
29661	240	10	10	256
29224	240	5	5	248
28815	233	3	3	237
28500	140	8	8	151
27022	97	119	119	289
31174	105	2261	1214	1620
29055	240	355	355	635
28802	217	199	199	437
29073	240	221	221	499
29237	233	194	194	460
29257	240	167	167	436
28907	233	42	42	279
28431	240	3	3	244
27955	240	2	2	242
27524	233	1	1	234
27274	140	3	3	144
25464	97	85	85	230
24185	105	189	189	312
24139	240	93	93	342
24842	217	391	391	649
25676	240	468	468	778
25498	233	68	68	312
25358	140	70	70	221
25085	136	30	30	168
24715	140	2	2	143
24352	140	2	2	142
24030	136	1	1	137
23769	140	1	1	141
23659	97	4	4	102
23306	101	50	50	157
23215	200	48	48	254
31500	2654	4512	4512	7785
31500	4750	2548	2548	7711
31500	194	437	437	709
31497	240	144	144	412
31184	233	53	53	293
30723	240	5	5	248
30249	240	3	3	244
29806	233	1	1	234
28500	140	2	2	142
27000	97	2	2	99
26933	105	28	28	136
26837	200	48	48	254
27045	181	151	151	349
27151	200	133	133	358
26968	194	45	45	247
26693	140	15	15	158
26368	136	10	10	146
25977	140	1	1	141
25598	140	1	1	141

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 9	87	9773	0	1	0	0
RH 10	87	9703	0	1	0	0
RH 11	87	9690	0	2	0	0
RH 12	87	10053	0	99	0	11
RH 1	88	10300	0	190	0	21
RH 2	88	10235	0	43	0	5
RH 3	88	10300	0	31	0	6
RH 4	88	10381	0	39	0	7
RH 5	88	10345	0	18	0	3
RH 6	88	10250	0	9	0	0
RH 7	88	10104	0	1	0	0
RH 8	88	9966	0	1	0	0
RH 9	88	9851	0	1	0	0
RH 10	88	9782	0	1	0	0
RH 11	88	9747	0	1	0	0
RH 12	88	9889	0	43	0	5
RH 1	89	10052	0	47	0	5
RH 2	89	10189	0	42	0	5
RH 3	89	10300	0	158	0	30
RH 4	89	10395	0	42	0	8
RH 5	89	10337	0	12	0	2
RH 6	89	10242	0	9	0	0
RH 7	89	10096	0	1	0	0
RH 8	89	9958	0	1	0	0
RH 9	89	9843	0	1	0	0
RH 10	89	9773	0	1	0	0
RH 11	89	9864	0	10	0	5
RH 12	89	9972	0	35	0	4
RH 1	90	10300	0	113	0	12
RH 2	90	10300	0	133	0	14
RH 3	90	10300	0	76	0	13
RH 4	90	10371	0	38	0	7
RH 5	90	10371	0	28	0	5
RH 6	90	10280	0	11	0	0
RH 7	90	10135	0	1	0	0
RH 8	90	9996	0	1	0	0
RH 9	90	9881	0	1	0	0
RH 10	90	9813	0	1	0	0
RH 11	90	9781	0	2	0	0
RH 12	90	9849	0	23	0	3
RH 1	91	9913	0	21	0	3
RH 2	91	9965	0	20	0	2
RH 3	91	10740	0	965	213	373
RH 4	91	11184	0	130	0	25
RH 5	91	11249	0	44	0	8
RH 6	91	11185	0	19	0	1
RH 7	91	11041	0	2	0	0
RH 8	91	10900	0	1	0	0
RH 9	91	10781	0	1	0	0
RH 10	91	10294	0	1	0	0
RH 11	91	10270	0	1	0	0
RH 12	91	10300	0	52	0	6
RH 1	92	10300	0	76	0	9
RH 2	92	12400	354	1676	1676	2287
RH 3	92	11221	0	417	0	75
RH 4	92	11798	0	163	0	31
RH 5	92	11907	0	56	0	11
RH 6	92	11877	0	28	0	3
RH 7	92	11735	0	2	0	0
RH 8	92	11592	0	1	0	0
RH 9	92	10910	0	1	0	0
RH 10	92	10178	0	1	0	0

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
25264	136	1	1	137
24998	140	1	1	141
24859	97	2	2	99
24705	101	99	99	212
25022	200	190	190	412
24924	181	43	43	229
24741	200	31	31	237
24548	194	39	39	240
24290	140	18	18	162
23975	136	9	9	145
23596	140	1	1	141
23230	140	1	1	141
22906	136	1	1	137
22649	140	1	1	141
22504	97	1	1	98
22488	101	43	43	149
22392	200	47	47	253
22292	181	42	42	228
22482	200	158	158	388
22305	194	42	42	244
22042	140	12	12	155
21737	136	9	9	145
21371	140	1	1	141
21018	140	1	1	141
20705	136	1	1	137
20453	140	1	1	141
18809	97	10	10	112
17326	101	35	35	140
17406	200	113	113	325
17555	181	133	133	328
17502	200	76	76	290
17319	194	38	38	238
17116	140	28	28	173
16839	136	11	11	147
16504	140	1	1	141
16180	140	1	1	141
15891	136	1	1	137
15658	140	1	1	141
15528	97	2	2	99
15411	101	23	23	127
15248	200	21	21	224
15092	181	20	20	203
18057	200	965	601	962
18155	194	130	130	349
18004	140	44	44	193
17748	136	19	19	156
17416	140	2	2	142
17091	140	1	1	141
16800	136	1	1	137
16564	140	1	1	141
16429	97	1	1	98
16451	101	52	52	160
16451	200	76	76	285
21857	181	1676	1054	1492
22833	200	417	417	692
23019	194	163	163	388
22883	140	56	56	207
22629	136	28	28	167
22274	140	2	2	143
21924	140	1	1	141
21612	136	1	1	137
21364	140	1	1	141

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/Calaveras Creek Confluence
RH 11	92	10155	0	1	0	0
RH 12	92	10300	0	185	0	21
RH 1	93	12400	2114	2348	2348	4806
RH 2	93	12400	3548	2037	2037	5889
RH 3	93	12400	0	878	666	814
RH 4	93	12400	0	255	0	49
RH 5	93	12400	0	167	0	32
RH 6	93	11760	0	44	0	5
RH 7	93	11520	0	4	0	2
RH 8	93	11316	0	2	0	0
RH 9	93	11000	0	2	0	0
RH 10	93	10300	0	3	0	0
RH 11	93	10300	0	4	0	1
RH 12	93	10300	0	89	0	10
RH 1	94	10300	0	69	0	8
RH 2	94	10324	0	666	45	140
RH 3	94	10300	0	120	0	23
RH 4	94	10573	0	87	0	16
RH 5	94	10768	0	77	0	14
RH 6	94	10605	0	16	0	1
RH 7	94	10462	0	1	0	0
RH 8	94	10324	0	1	0	0
RH 9	94	10208	0	1	0	0
RH 10	94	10132	0	0	0	0
RH 11	94	10162	0	17	0	1
RH 12	94	10300	0	136	0	6
RH 1	95	12400	6068	4734	4734	11314
RH 2	95	11562	0	302	0	65
RH 3	95	12400	8698	4221	4221	13583
RH 4	95	12400	0	385	1	97
RH 5	95	12400	0	547	0	49
RH 6	95	11694	0	190	0	18
RH 7	95	11639	0	54	0	9
RH 8	95	11494	0	11	0	3
RH 9	95	11000	0	7	0	2
RH 10	95	10300	0	2	0	1
RH 11	95	10300	0	3	0	1
RH 12	95	10300	0	274	0	25
RH 1	96	12400	0	3154	3118	3370
RH 2	96	12400	6477	4683	4683	11588
RH 3	96	12400	1462	2544	2544	4243
RH 4	96	12400	0	364	0	47
RH 5	96	12400	0	160	0	33
RH 6	96	12071	0	53	0	10
RH 7	96	11878	0	24	0	3
RH 8	96	11644	0	10	0	1
RH 9	96	11000	0	4	0	1
RH 10	96	10300	0	9	0	1
RH 11	96	10300	0	440	115	199
RH 12	96	12400	2465	2503	2503	5327
RH 1	97	12400	11251	4755	4755	16649
RH 2	97	11759	0	481	0	66
RH 3	97	10300	0	215	0	37
RH 4	97	10666	0	108	0	21
RH 5	97	10795	0	55	0	12
RH 6	97	10695	0	25	0	4
RH 7	97	10469	0	11	0	2
RH 8	97	10281	0	6	0	1
RH 9	97	10194	0	3	0	1
RH 10	97	10159	0	4	0	1
RH 11	97	10300	0	74	0	12
RH 12	97	10300	0	362	0	34

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/Calaveras Creek Confluence
21222	97	1	1	98
21615	101	185	185	308
28500	240	2348	1421	2005
31500	531	2037	2037	2872
31500	240	878	601	990
31500	233	255	255	537
31500	240	167	167	440
31160	233	44	44	282
30685	240	4	4	246
30204	240	2	2	243
29766	233	2	2	235
28500	140	3	3	144
27000	97	4	4	102
27000	105	89	89	204
26967	200	69	69	277
28814	181	666	543	819
28886	200	120	120	343
28827	194	87	87	297
28729	140	77	77	232
28414	136	16	16	152
28017	140	1	1	141
27633	140	1	1	141
27292	136	1	1	137
27018	140	0	0	140
25121	97	17	17	115
23587	101	136	136	244
31500	243	4734	4734	5489
30160	181	302	302	548
31500	8163	4221	4221	13048
31500	194	385	385	675
31500	240	547	547	836
31272	233	190	190	441
30929	240	54	54	303
30498	240	11	11	254
30000	233	7	7	241
28500	140	2	2	143
27000	97	3	3	101
26702	105	274	274	404
29504	240	3154	2162	2654
31500	4464	4683	4683	9575
31500	1429	2544	2544	4210
31500	233	364	364	643
31500	240	160	160	433
31250	233	53	53	296
30804	240	24	24	268
30332	240	10	10	251
29911	233	4	4	237
28500	140	9	9	150
27217	97	440	440	620
31500	265	2503	2503	3127
31500	11236	4755	4755	16633
30141	217	481	481	764
30397	240	215	215	493
30368	233	108	108	362
30120	240	55	55	307
29756	233	25	25	261
29287	240	11	11	253
28817	240	6	6	247
28402	233	3	3	236
28161	140	4	4	145
27000	97	74	74	183
26764	105	362	362	500

VBA_BASERH (2009)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Month	Year	Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
RH 1	98	12400	2344	2982	2982	5679
RH 2	98	12400	16415	5529	5529	22795
RH 3	98	12400	756	1019	1019	1975
RH 4	98	12400	537	1070	1070	1792
RH 5	98	12400	0	390	0	78
RH 6	98	11954	0	182	0	32
RH 7	98	12031	0	75	0	15
RH 8	98	11700	0	36	0	7
RH 9	98	11000	0	24	0	4
RH 10	98	10300	0	17	0	4
RH 11	98	10300	0	29	0	6
RH 12	98	10300	0	94	0	14
RH 1	99	10300	0	1179	268	352
RH 2	99	12400	0	2055	1789	2020
RH 3	99	11894	0	722	0	94
RH 4	99	12400	0	1033	158	294
RH 5	99	12400	0	192	0	40
RH 6	99	12380	0	77	0	14
RH 7	99	12205	0	25	0	4
RH 8	99	11700	0	13	0	2
RH 9	99	11000	0	9	0	0
RH 10	99	10300	0	6	0	0
RH 11	99	10300	0	12	0	3
RH 12	99	10300	0	15	0	4
RH 1	100	10300	0	821	384	442
RH 2	100	12400	1624	2448	2448	4383
RH 3	100	12400	829	1366	1366	2398
RH 4	100	12400	0	183	0	34
RH 5	100	12400	0	91	2	19
RH 6	100	12313	0	35	0	5
RH 7	100	12091	0	12	0	2
RH 8	100	11700	0	4	0	0
RH 9	100	11000	0	2	0	1
RH 10	100	10300	0	3	0	1
RH 11	100	10300	0	5	0	2
RH 12	100	10300	0	12	0	4
RH 1	101	10300	0	127	0	19
RH 2	101	11596	0	1037	18	162
RH 3	101	11651	0	624	77	210
RH 4	101	12288	0	154	0	36
RH 5	101	12400	0	54	0	11
RH 6	101	12237	0	12	0	2
RH 7	101	11964	0	3	0	0
RH 8	101	11661	0	2	0	0
RH 9	101	11000	0	1	0	0
RH 10	101	10300	0	1	0	0
RH 11	101	10300	0	10	0	2
RH 12	101	10300	0	802	97	182
RH 1	102	10265	0	399	0	49
RH 2	102	9874	0	226	0	23
RH 3	102	10168	0	442	0	84
RH 4	102	10586	0	115	0	24
RH 5	102	10712	0	60	0	11
RH 6	102	10582	0	25	0	2
RH 7	102	10317	0	5	0	0
RH 8	102	10102	0	2	0	0
RH 9	102	9985	0	0	0	0

CDRP_Jul28_Recap_RHAlt (July 2010)

K	FN	C	FZ	GB
G	N	CE	CF	CH

Calaveras Reservoir Storage (MG)	Total Stream Release from Calaveras Reservoir	Total Inflow to ACDD (MG)	Flow Passing Alameda Creek Diversion Dam	Flow below Alameda/C alaveras Creek Confluence
31194	0	2982	2982	3335
31500	16090	5529	5529	22469
31500	723	1019	1019	1942
31500	487	1070	1070	1741
31500	240	390	390	708
31181	233	182	182	446
30952	240	75	75	330
30585	240	36	36	283
30000	233	24	24	260
28500	140	17	17	161
27000	97	29	29	132
27000	105	94	94	213
28500	240	1179	660	984
30970	217	2055	1182	1630
31500	240	722	601	936
31500	233	1033	1033	1402
31500	240	192	192	473
31235	233	77	77	324
30808	240	25	25	270
30364	240	13	13	256
29935	233	9	9	242
28500	140	6	6	147
25708	97	12	12	111
23963	105	15	15	124
25225	200	821	601	859
30000	181	2448	1601	2093
31500	200	1366	628	1032
31500	194	183	183	411
31336	240	91	91	349
30991	233	35	35	273
30531	240	12	12	255
30050	240	4	4	245
29634	233	2	2	236
28500	140	3	3	144
27000	97	5	5	104
26480	105	12	12	121
26736	200	127	127	346
29828	181	1037	543	868
31500	200	624	601	935
31500	194	154	154	384
31342	140	54	54	206
31029	136	12	12	149
30627	140	3	3	143
30232	140	2	2	142
29884	136	1	1	137
28500	140	1	1	141
27000	97	10	10	109
27000	101	802	601	787
27847	240	399	399	689
28045	217	226	226	466
29150	240	442	442	767
29167	233	115	115	372
29016	140	60	60	211
28723	136	25	25	163
28325	140	5	5	145
27936	140	2	2	142
27592	136	0	0	136