Fisheries Related Feasibility Studies

SFPUC Calaveras Dam Replacement Project

Fisheries Related Feasibility Studies Components

1. Fish Passage Assessment and Feasibility
2. Feasibility of Screening or Operational Changes at UACDD
3. Migration Flow Studies
4. Habitat Characterization GIS Mapping (Phase II)
5. Temporary Instream Flow Schedule (Phase II)

1. Evaluation of the Feasibility of Fish Passage in the Vicinity of the Calaveras Dam Replacement Project

- Two Elements

  1.1 Fish Passage Barrier Assessment

  1.2 Fish Passage Feasibility

1.1 Fish Passage Barrier Assessment

- Potential passage barriers
  - Little Yosemite Falls on Alameda Creek above the confluence of Alameda Creek and Calaveras Creek
  - Quarry debris obstruction on Calaveras Creek immediately below Calaveras Dam
  - Arroyo Hondo slide

Fish Passage Barrier Assessment Objectives

- Evaluate passability of identified passage barriers by anadromous adult steelhead and resident rainbow trout

Fish Passage Barrier Assessment Methods

- Adapted from Powers and Orsborn 1985 “Analysis of Barriers to Upstream Migration: An Investigation of the Physical and Biological Conditions Affecting Fish Passage Success at Culverts and Waterfalls”
- Evaluated for anadromous steelhead
- Method is based on quantitative fish performance metrics and barrier measurements that are objective, repeatable, and defensible

Description of Deliverables in Relation to Other FRFS Components

- Provide information for consideration by the design and environmental review teams, and agencies, including future fisheries HCP
- Provide an information component for the determination of the potential geographic extent of anadromous salmonid habitat
- Define range of flows at which potential barriers may become passable for Temporary Instream Flow Schedule development
- Identification of potential project mitigation or enhancement opportunities through the modification of impassable fish barriers

1.2 Fish Passage Feasibility Objectives

- Evaluate the feasibility of establishing passage for anadromous steelhead at Calaveras Dam and Upper Alameda Creek Diversion Dam

Fish Passage Program Feasibility Methodology

- Literature review to determine the devices and methods that could be employed
- Evaluation will include the potential construction of fish ladders, fish elevators, trap and haul, and juvenile bypass pipes
- Evaluation will include a consideration of
  - Physical site constraints
  - Operational constraints
  - Applicability of alternatives to the target fish species
  - Passage efficiency, sustainability and potential productivity

Fish Passage Feasibility Deliverables in Relation to Other FRFS Components

- Provide information for consideration by the design and environmental review teams, and agencies, including future fisheries HCP
- Define flows necessary to facilitate potential passage opportunities at UACDD and Calaveras Dam for the Temporary Instream Flow Schedule development
- Identify potential project mitigation or enhancement opportunities associated with fish passage program alternatives

2. Feasibility of Screening and Operational Changes at Upper Alameda Creek Diversion Dam

Screening and Operational Change Objectives

- Evaluate options for providing screening and/or operational changes at UACDD to benefit resident rainbow trout and, in the event of their potential presence, anadromous steelhead

Fish Screen Function

- Fish Screens are designed to prevent juvenile fish
  - Entrainment
  - Impingement
  - Predation

- Operational changes would be designed to compliment screen criteria and site conditions

Fish Screen Evaluation Methodology

- Screen mesh size
- Screen Area
- Approach velocity
- Flow uniformity
- Screen cleaning
- Water supply opportunity cost
- Risk of failure
- Biological risk
- Timing of diversions
- Operational effects
- Maintenance requirements
- Power requirements

Description of Deliverables in Relation to Other FRFS Components

- Provide information for consideration by the design and environmental review teams, and agencies, including future fisheries HCP
- Operational changes may affect the feasibility and/or compliment fish passage objectives at UACDD
- The implementation of screening and operational changes considered will depend, in part, on the geographic extent of adult steelhead migration evaluated in Fish Passage Assessments
- Operational changes recommended will be included in the development of potential flow ranges below UACDD for the Temporary Instream Flow Schedule

3. Alameda Creek Migration Flow Studies

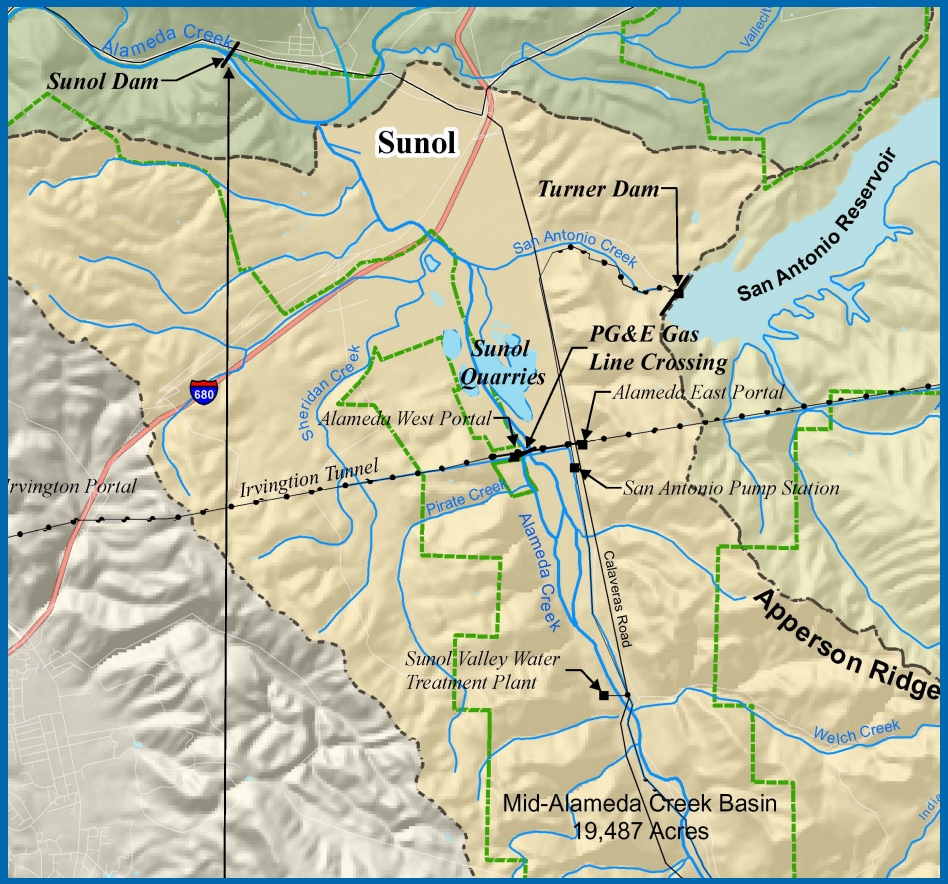
3. Migration Flow Studies Objectives

- Determine the passability of critical riffles located in the Quarry Reach of Alameda Creek in the Sunol Valley during adult upstream and downstream passage and juvenile steelhead downstream passage

- Determine the flows to create passable conditions through critical riffles

3. Migration Flow Studies Methods

- Utilize species specific minimum depths recommended by Thompson (1972) and NMFS (2001) to evaluate passability of selected critical riffles
- Determine which of the critical riffles is most sensitive to decreases in flow during downstream migration periods
  - Adult steelhead: November-April
  - Juvenile: February-June
- Review and synthesize existing data collected for critical riffles located in the Quarry Reach of Alameda Creek (Entrix 2004 and 2005)



3. Migration Flow Studies Methods (continued)

- Review historical flow records by reach during adult and juvenile steelhead emigration life stage periods
- Collect additional transect data on critical riffles
- Model transect data to determine minimum flows to achieve passage through critical riffles

Description of Deliverables in Relation to Other FRFS Components

- Critical riffle assessments will be utilized in part to support the development of the Temporary Flow Schedule
- Contribute these data sets to the Fisheries Habitat Characterization Mapping

FRFS Phase II Components

- Habitat Characterization GIS Mapping
  - Conducted by HES during the summer and fall of 2006
  - Determine the quantity and quality of salmonid habitat in Alameda and Calaveras creeks
- Temporary Flow Schedule Development
  - Conducted by URS/HDR|SWRI upon the completion of other FRFS Tasks
  - Determine a temporary flow regime for Alameda and Calaveras creeks to protect fisheries resources

Calaveras Dam Project
May 25, 2006 Site Tour

- Discussed Fisheries Related Feasibility Study scope, data collection, and preliminary results of high flow field observations