

## Introduction

### *Goals/Objectives*

The goals and objectives of the Finnon Lake Restoration and Habitat Improvement Project is to mitigate seismic deficiencies of Finnon Lake Dam and to restore a valuable economic and natural watershed resource by restoring the operating capacity of 350 acre-feet while enhancing fishery and aquatic habitats, improving wetland habitat, improving upland forested habitats, and securing a sustainable water supply for multiple beneficial uses and to combat wildfires.

Finnon Lake was constructed using a hydraulic fill placement method in 1905 by Pacific, Gas and Electric Company. In 1939, ownership was transferred to the Mosquito District Mutual Water Company who retained ownership until 1956 when the lake and surrounding property was purchased by the Department of Fish and Game (DF&G) and maintained as a cooperative El Dorado County/Wildlife Conservation Board project. In 1990, the Department of Water Resources, Division of Safety of Dams (DSOD) evaluated the seismic stability of the facilities embankment, and found the structure to be deficient. It was concluded that the hydraulic fill material could liquefy if subjected to a strong ground shaking during the Maximum Credible Earthquake. DSOD directed DF&G to remediate. However, due to budget shortfalls, DF&G was unable to meet the mandated requirements. In 1997, the Mosquito Volunteer Fire Association (MVFA) purchased the facility from DF&G. After acquiring the property, MVFA submitted a repair application to DSOD to initiate the plans to remediate the embankment. Finnon Lake is presently operating under a storage restriction of 50 acre-feet or less due to seismic stability deficiency and all associated watershed values of the lake have also been lost or severely degraded.

### *Purpose/Need*

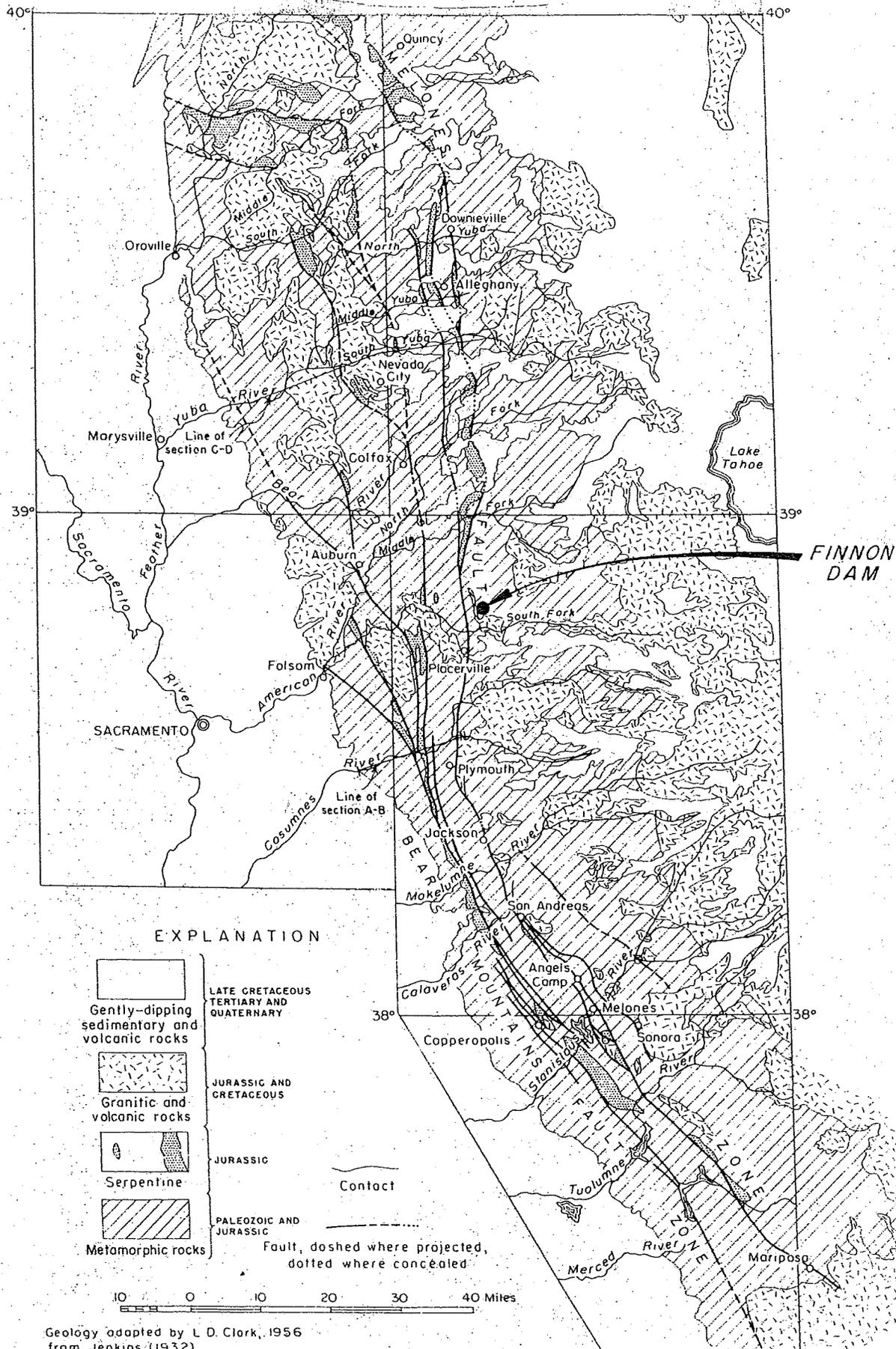
The project was initiated under a partnership between the MVFA, Resource Conservation District and the International Union of Operating Engineers – Job Corps. The Job Corps were scheduled to conduct construction services for the project under their heavy equipment operator training program. Funding was acquired from the Sierra Nevada Conservancy Proposition 84 Competitive Grant Program in the amount of \$610,000. Budget elements under the Prop 84 grant did not include construction budgets based on the anticipated contributions of the Job Corps. One week prior to construction, the Job Corps determined they would not be able to participate in the project. Therefore, this proposal seeks funding to address construction costs related to reconstruction of the embankment. Additional funds to support water supply transfers and habitat improvements supporting beneficial uses are also included.

### *Project list*

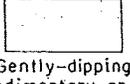
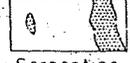
<b>Projects</b>	<b>Abstract</b>	<b>Status</b>
Finnon Lake Restoration & Habitat Improvement	Mitigate seismic deficient embankment to reduce failure potential, restore 350 acre-feet of water supply, enhance fishery and aquatic habitat, improve 5.9 acres of forest habitat, enhance 5.5 wetland habitat, and secure a reliable water supply to combat wildfires. Indirect benefits include:	Design and specification approved and authorized by DSOD Permit #4466. CEQA and all other permits have been obtained. Engineering and contractor agreements in place. The Lake has been

	supporting beneficial used such as public access, camping, swimming, fishing, hiking, boating, and other uses not currently supported	drained.
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*Regional Map*



EXPLANATION

	LATE CRETACEOUS TERTIARY AND QUATERNARY
	JURASSIC AND CRETACEOUS
	JURASSIC
	PALEOZOIC AND JURASSIC
	Contact
	Fault, dashed where projected, dotted where concealed

10 0 10 20 30 40 Miles

Geology adapted by L. D. Clark, 1956  
from Jenkins (1932)

OUTLINE GEOLOGIC MAP OF THE WESTERN SIERRA NEVADA, CALIFORNIA,  
SHOWING FAULTS OF THE FOOTHILLS FAULT SYSTEM

### *Completed Work*

The lake has been drained as of February 1, 2011. On-site engineering and construction contractor agreements have been signed and are in place. Design and specification approved and authorized by DSOD Permit #4466. CEQA and all other permits have been obtained. The Lake has been drained and the fish have been transferred to the temporary holding area.

Accomplishments have been completed through project partners including Federal, State, and local governmental agencies and organizations. Project planning, design, and environmental compliance have been completed under a network of specialists providing in-kind contributions to ensure a high level of quality using acceptable methods of study which demonstrates a unique example of collaboration and support. As such, this Project is ready to be implemented immediately. Project partners include: DWR: Red-Legged Frog Survey & Wetland Delineations, Lead Agency for CEQA; USFS: Red-Legged Frog Surveys & Fish Rescue & Relocation Assistance; NRCS: Wetland Delineation and Mitigation and Monitoring Plan; Department of Conservation: environmental permit coordination; High Sierra RC&D: Archeology surveys, forest stand improvement; El Dorado County RCD: Storm Water Prevention Pollution Plan (SWPPP); MVFA, EDC Fish & Game Commission, Hangtown Fly casters, Trout Unlimited, Sacramento State University: community involvement and outreach.

### *Existing Data and Studies*

- 1) CEQA – Notice of Exemption (December 22, 2005). DWR, DSOD as lead agency adopted NOE under Class 2, Section 15302 (c).
- 2) Design and specification approved and authorized by DSOD Permit #4466. Retired USDA – Soil Conservation Service, Al Thyme, voluntarily completed the Design and Specifications Study used in the alteration application (December 22, 2005).
- 3) Fannon Dam and Reservoir Embankment Seismic Stability Study (October 1973).
- 4) Fish Rescue, Relocation and Monitoring Plan. Adopted by CAF&G under Section 1600 Stream Alteration Permit # 1600-2006-0175-R2 (May 10, 2006).
- 5) Red-legged Frog Survey. Completed by the USFS and adopted by the USF&WS on July 13, 2006.
- 6) Wetland Delineation Study. DWR completed the first Wetland Delineation Report June 2002. The USDA – NRCS completed the second Wetland Delineation Report February 2007. Both reports were adopted by the USACE on September 12, 2008 under Nationwide Permit # SPK-2002-00467.
- 7) Mitigation and Monitoring Plan. USACE adopted September 12, 2008 under Nationwide Permit # SPK-2002-00467 to mitigate for loss of wetlands due to reservoir storage restrictions and restoration on the facility.

- 8) Healthy Forest Plan. USACE adopted September 12, 2008 under Nationwide Permit # SPK-2002-00467 to mitigate for loss of wetlands due to reservoir storage restrictions and restoration on the facility.
- 9) Water Quality Monitoring Plan. USACE adopted September 12, 2008 under Nationwide Permit # SPK-2002-00467 to mitigate for loss of wetlands due to reservoir storage restrictions and restoration on the facility.

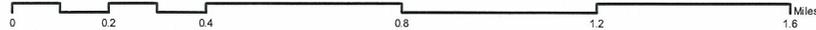
*Project Map*

Date: September 10, 2008

# Finnon Lake Restoration and Habitat Improvement Project Project Location Map

Project: Finnon Lake  
Approximate Acres: 55  
Assisted By: Mark A. Egbert

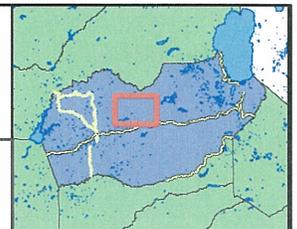
Field Office: Placerville Service Center  
Agency: Georgetown Divide Resource Conservation District  
Image: USGS Topographic



-  Finnon Lake Restoration Project Location
-  County Roads

1:24,000

The El Dorado County and Georgetown Divide Resource Conservation Districts (RCD) make no representations or warranties regarding the accuracy of data or maps. The RCD shall not be liable under any circumstances for any direct, special, incidental, or consequential damages with respect to any user or third party on account of or arising from the use of data or maps.



## Tasks

### Work Plan Outline

#### *Budget Category (a): Direct Project Administration Costs*

**Task 1: Administration/Project Management:** Project Administration and Management includes: technical and administrative services needed for project completion; supervision and review of all work performed; assurance the project is completed within the budget, performance period, and in accordance with approved procedures, applicable laws, and regulations.

**Deliverables:** Preparation of invoices and other deliverables as required.

**Task 2: Labor Compliance Program:** Prevailing Wages and Labor Compliance associated with State Labor Code Section 1771 & 1720 regarding prevailing wages. Monitor all agreements subject to reimbursement from this project to assure that the prevailing wage provisions of State Labor Code Section 1771 & 1720 are being met.

**Deliverables:** Submission of Labor Compliance Program.

**Task 3: Reporting:** Preparation of quarterly, annual and final reports as specified in grant agreement.

**Deliverables:** Submission of quarterly, annual and final reports as specified in grant agreement.

#### *Budget Category (b): Planning/ Design/ Engineering/ Environmental Documentation.*

**Task 4: Planning, Design & Specifications:** Site Plan, design and specification for the reconstructed embankment.

**Deliverables:** Approved DSOD alteration permit.

**Task 5: Environmental Monitoring and Reporting:** Environmental monitoring activities will commence upon start of the project, and will resume until all performance and success criteria have been met. This task describes the long-term management objectives that ensure multiple benefits are realized.

**Deliverables:** Approved and Adopted CEQA and all other Federal, State and local permits. Annual Monitoring and reporting documentation.

#### *Budget Category (b): Construction/Implementation*

**Task 6: Construction Contracting:** Obtain services for construction services to perform on-site construction services.

**Deliverables:** Advertisement for bids; pre-bid contractors meeting, evaluation of bids, award contract.

**Task 7: Engineering Contracting:** Obtain the services of a qualified Consultant to provide on-site engineering services from the initial project review phase through the removal and complete reconstruction of the embankment.

**Deliverables:** Advertisement for bids; pre-bid contractors meeting, evaluation of bids, award contract.

**Task 8: Construction:** The completed Work will provide the Owner with an earth embankment water storage reservoir with approximately 350-400 acre-feet of capacity. The Project includes a significant amount of earthwork, constructed outlet, concrete and steel reinforcement for appurtenant components. The existing dam embankment material will be removed, dried, and stockpiled. There is approximately 100,000 cubic yards in the existing dam. The re-constructed dam will be 49 feet high from the downstream toe to the crest of the spillway. There will be 4 feet of freeboard above the spillway crest making a total height of 53 feet.

**Subtask 8.1: Control and Diversion of Water:** Dewatering shall be performed so that all construction may be performed free of water and that subsurface water removal be accomplished in a manner that assures stable slopes in the adjacent excavation.

**Subtask 8.2: Clearing:** Areas to be removed of vegetation consist of the stockpile area, borrow area, slopes as well as embankment soils of the existing earth dam; and a zone 10 feet beyond the dam footprint, stockpile area and borrow area. Clearing shall consist of removal and disposal of all trees, brush, downed timber, and deleterious material.

**Subtask 8.3: Grubbing:** The entire slopes of the earthen dam, stockpile area, and borrow area shall be grubbed.

**Subtask 8.4: Excavation:** The existing dam embankment shall be removed. Excavation shall be carried to lines, grades, and dimensions as shown on the approved engineered drawings.

**Subtask 8.5: Stockpile:** The stockpile area shall be cleared of all plant growth and any deleterious material before any fill material is placed on it. The existing dam embankment will be removed, and placed in the designated stockpile area. Material placed in the stockpile will be allowed to dry.

**Subtask 8.6: Foundation Treatment:** The entire area to be occupied by the embankment shall be stripped or excavated to a sufficient depth to remove all materials not suitable for foundation. The entire area to be occupied by the foundation of the dam shall be stripped to the moderately weathered rock foundation as observed/recommended by the on-site engineer and approved by the DSOD. Foundation shall be de-watered to remove excess moisture and water.

**Subtask 8.7: Core Trench:** A cutoff trench under the base of the dam shall be constructed as shown on the approved engineered drawings. The cutoff trench shall have a bottom width of twenty-four feet and shall be excavated at the location shown on the approved engineered drawings. The foundation of the cutoff trench shall consist of firm, impermeable, in-place, moderately weathered rock. The cutoff trench shall be backfilled with selected impervious material properly compacted as described in the section Embankment. The backfill material shall

be taken from the stockpile area or the borrow area and shall be soil with the highest clay content possible as evaluated by the on-site engineer. No material shall be placed in the cutoff trench until it is observed and determined adequate by the on-site engineer and approved by the DSOD.

**Subtask 8.8: Embankment:** The foundation and abutment areas shall be scarified to provide a loose bonding surface between the foundation and the embankment. This loose bonding surface shall contain adequate moisture for proper compaction when fill material is placed on it. A sheepsfoot tamper will be used to compact the fill. The first course of fill material shall be spread over the foundation in a thin layer such that the combined thickness of this layer and the scarified surface or the foundation shall be less than eight inches. Each layer shall be placed in lifts not exceeding eight inches in loose thickness then compacted with at least eight passes of a sheepsfoot roller. The moisture content of the fill material before compaction shall be kept within -1 and +3 percent of the optimum moisture content. The embankment shall be compacted to an average relative compaction of at least 93 percent as determined by ASTM D-1557 based on the previous five tests, minimum of 92 percent.

**Subtask 8.9: Spillway:** The existing spillway will be used for the reconstructed dam and shall not be disturbed.

**Subtask 8.10: Outlet:** The outlet conduit alignment shown on the drawings is only approximate. The final alignment is to be determined in the field by the on-site engineer. The conduit shall be constructed in a trench, uniformly sloping downstream to drain. The trench shall be located on native, undisturbed, competent material, moderately weathered bedrock, as determined by the on-site engineer and approved by the DSOD.

The existing slide gate, stem and vent pipe shall be salvaged and will be used on the new dam if possible. Should the slide gate, stem, and accessories have to be replaced, they shall meet the requirements of AWWA Specifications C-501. Trashrack shall consist of galvanized steel members, fabricated and installed in accordance with the details shown on the approved engineered drawings. All structural steel shall conform to ASTM A-36. Reinforced concrete work shall conform to the Building Code requirements ACI318. Portland cement shall conform to ASTM C-150, type II, low alkali. Reinforcing bars shall conform to ASTM A 615, Grade 40.

**Subtask 8.11: Concrete:** Concrete shall meet the requirements of ASTM C-94 specifications and will be placed under the observation of the on-site engineer. Cement used for all concrete structures shall be ASTM C-150, Portland Cement Type II. All concrete aggregate shall be from proven sources of materials not reactive to alkali or sulfates, with a maximum size particles passing 1 ½ inch square opening as verified through Quality Assurance testing by the on-site engineer. Aggregates shall conform to ASTM C-33.

**Subtask 8.12: Steel Reinforcement:** Steel reinforcement shall consist of intermediate grade deformed bars, conforming to ASTM A-615, Grade 40. Reinforcing steel shall be clean and free

from heavy rust, scale, or coating of any kind and shall be held in place and tied at splices, corners, and intersections with 16-gauge annealed wire. The spacing of bars, measured center to center, shall be as shown on the drawings or as recommended by the on-site engineer. All reinforcing bar splices shall provide an overlap of 40-bar-diameters or as shown on the drawings.

**Subtask 8.13: Compaction/ Materials Tests:** The on-site engineer will perform all compaction tests and will provide an inspector for the job.

**Subtask 8.14: Water Supply Delivery:** The El Dorado Irrigation District (EID) has completed engineer, environmental and site plans to provide a reliable water supply for Fannon Lake from the historic Summerfield Ditch. Program elements includes installation of 1500' of a 6" waterline, 1 2" blow off and ARV, gate valve, and water treatment facility, and fire hydrant.

**Deliverables:** Fully operational embankment water storage reservoir with approximately 350-400 acre-feet of capacity.

*Budget Category (c): Environmental Compliance/Mitigation/Enhancement*

**Task 9: Fishery Habitat Improvements:** A Fishery Habitat Improvement Plan has been completed and includes techniques that could enhance aquatic habitat for fish and other biological organisms. Brush Shelters: Brush shelters are designed to improve hard cover and provide microhabitats for fish. Both bass and bluegill congregate around brush shelters. Materials produced from the Forest Restoration will be recycled and used under this task. Boulder Clusters and Rock Piles: Boulders ranging in size from 2 to 4 feet in diameter will be placed individually or in clusters at select sites to provide fish cover and create excellent places to fish. Boulders will be placed while the lake is drawn down. Gravel Beds: Gravel beds will be established in 5 selected sites in the lake. Gravel size will be 0.5 to 1 inch diameter and the depth of the bed approximately 4 to 6 inches. Spawning Boxes. Spawning boxes will be constructed by volunteers and students from local high schools using half of a plastic 35-gallon plastic drum that has two sections removed to provide fish access to a gravel spawning substrate placed in the bottom of the drum. Engineering of the lake bottom will be accomplished and used as a template on which habitat and recreational facilities will be designed. Specialists from the NRCS, Trout Unlimited, CAF&G, and Sacramento State University Biology Department and Bass Club will contribute to the design.

**Deliverables:** 55 acres treated for improved spawning, rearing, juvenile and adult habitat. 5.7 riparian wetland acres established.

**Task 10: Healthy Forests and Restoration Monitoring Plan:** Objectives for upland forest health and habitat improvements include enhancing; wildlife habitat conditions, vegetative health and vigor, reduce fire risk, and to provide for more plant species diversity. These objectives will be accomplished through a partnership with USDA NRCS and CALFIRE with the use of the California Conservation Crews (CCC). The NRCS will provide a Forest Conservation Plan, while CALFIRE will provide CCC crews for in-the-ground restoration work. Volunteers, Boy Scouts of America and k-12 students will build bat and owl boxes that will be placed in appropriate locations.

**Deliverables:** 5.9 acres treated.