BUREAU OF RECLAMATION

Lake Tahoe Dam Rehabilitation Feasibility Study

Tahoe Regional Planning Agency Advisory Planning Commission

November 13, 2024

Agenda

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  - Lake Tahoe Dam
- Lake Tahoe Dam Rehabilitation Feasibility Study
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  - Concrete Condition and Geotechnical Field Investigations

TAHOE REGIONAL PLANNING AGENCY

TRPA Role

- Lahontan is the lead on concrete coring and geotechnical investigation per TRPA/Lahontan MOU
  - BoR submitted Pre-Construction Notification to the USACE for concrete work in Oct. 2024
  - Issuance of that permit is pending SHPO consultation
- Concrete coring sample results will inform geotechnical investigation
- TRPA will likely have a permitting action for the eventual dam rehabilitation project

Introductions

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Project Summary

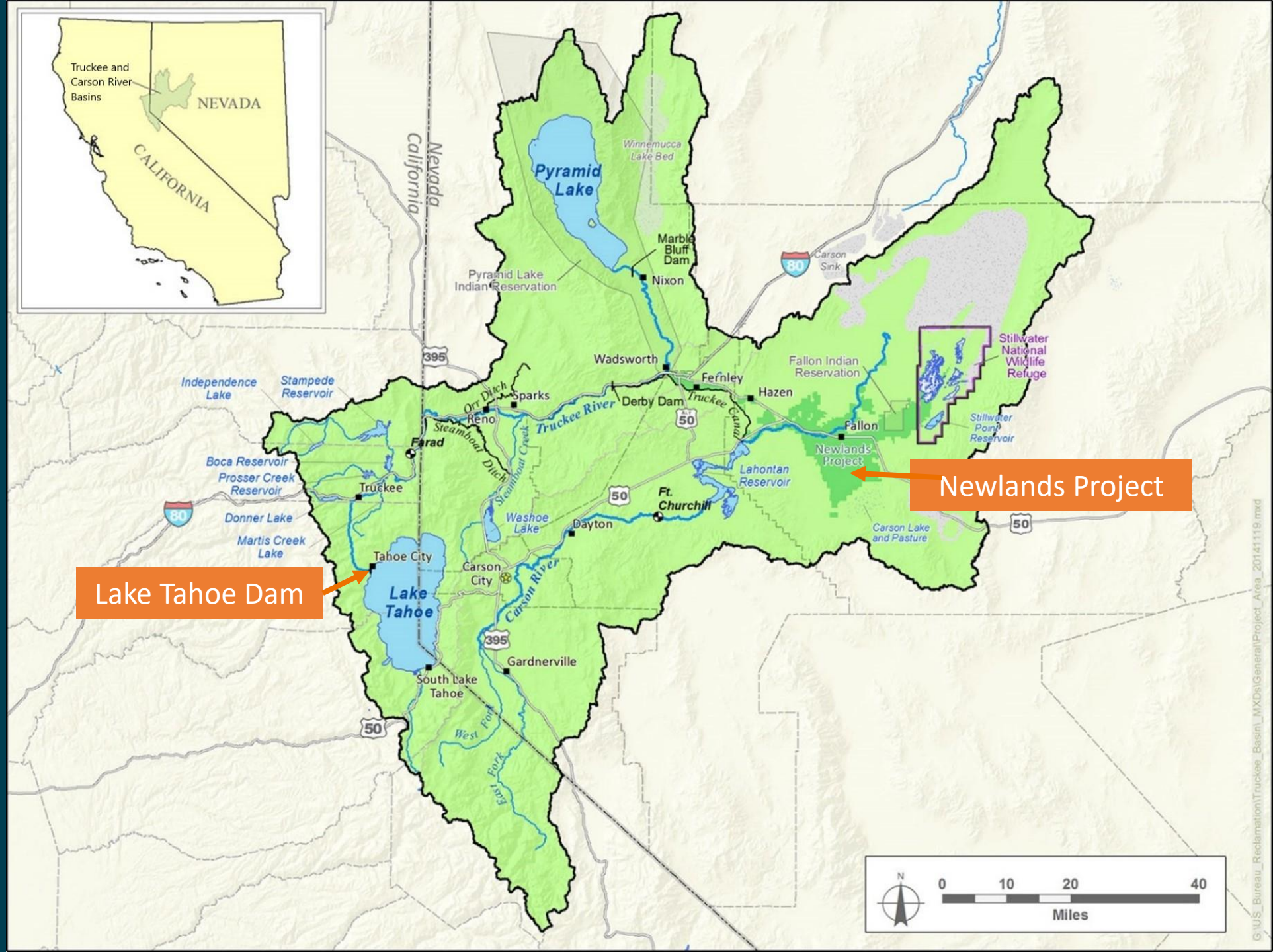
Project Location: Tahoe City, CA (Placer County)

Project Owner/Proponent: U.S. Department of the Interior, Bureau of Reclamation

Project Summary: Lake Tahoe Dam, constructed in 1913, is an 18-foot high, 109-foot-long concrete slab buttress structure that regulates flow on the Truckee River. It controls the top 6.1 feet of Lake Tahoe. The Dam exhibits signs of deterioration and attempted concrete repairs have been unsuccessful, which has affected gate operations.

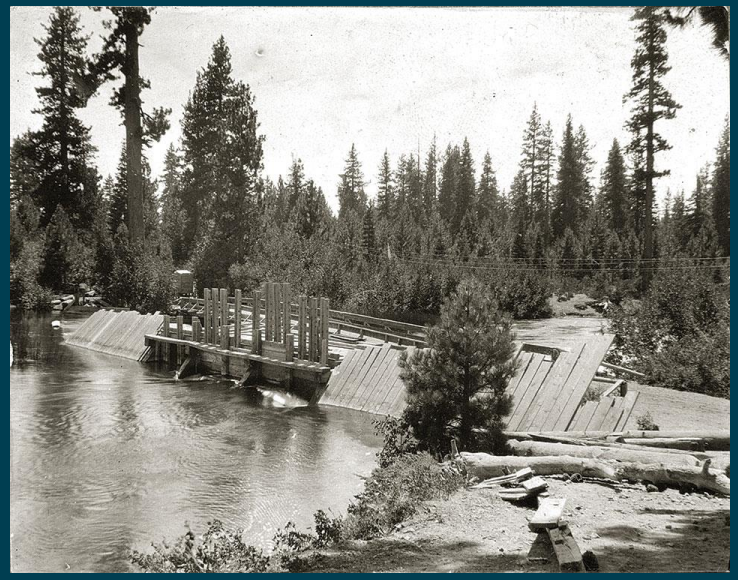
Although there is no imminent threat to public safety, Reclamation is preparing a feasibility level study and associated environmental compliance to evaluate alternatives for the rehabilitation or replacement of the Dam.

Newlands Project and Lake Tahoe Dam

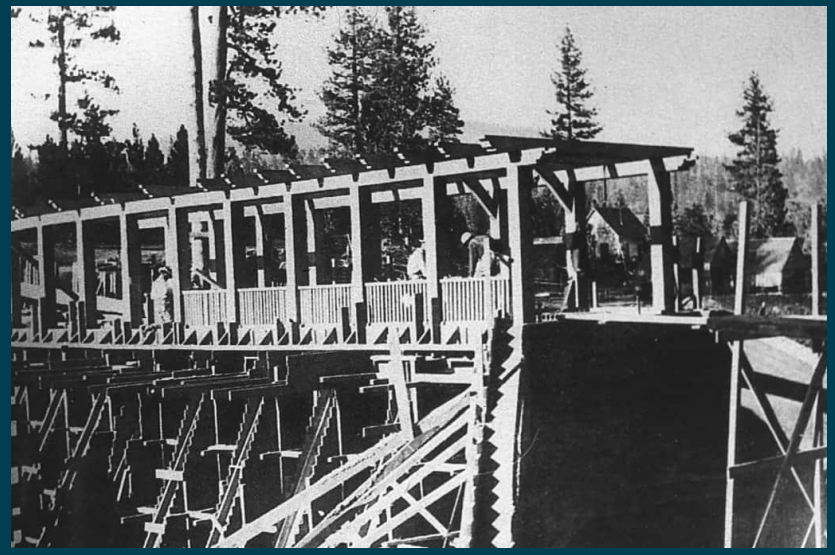


Lake Tahoe Dam
Major Historical Milestones

- 1860s: Construction of initial dam at Truckee River outlet
- 1902: Newlands Project authorized
- 1909-1913: Construction of existing structure by Reclamation
- 1915: Easement and right to exclusive possession of dam and land obtained by Reclamation
- 1981: Lake Tahoe Dam added to National Register of Historic Places
- 2008: Truckee River Operating Agreement signed
- 2015: Truckee River Operating Agreement implemented



Initial Dam



Construction of Existing Dam

State Highway 28/River Road
Lake Tahoe Dam
Fanny Bridge/W. Lake Blvd.
Truckee River
Reclamation Easement Boundary

Existing Lake Tahoe Dam

- Constructed by Reclamation between 1909 and 1913 as part of the Newlands Project
- Reinforced concrete structure
  - Controls top 6.1 feet of Lake Tahoe
  - Total Storage: 744,000 acre-feet
  - Outlet Works Capacity: 2,600 cfs
- 17 cast iron sluice gates
  - 4-foot tall by 5-foot wide (each)
- Wooden superstructure
  - Houses gate mechanisms

Operations of Lake Tahoe Dam

- Operational considerations
  - Truckee River General Electric Decree (1915)
  - Truckee River Agreement (1935)
  - Orr Ditch Decree (1944)
  - Tahoe/Prosser Exchange (1959)
  - Truckee River Operating Agreement (2017)
- Currently gates operated manually (LBAO)

When water from Lake Tahoe is available, it is released to maintain Floriston rates as follows:

- *Release from Lake Tahoe when Lake Tahoe elevation is below 6,225.5 feet (NGVD29)*
- *Release from Boca Reservoir when Lake Tahoe elevation is above 6,225.5 feet (NGVD29)*

Floriston Rates and Reduced Floriston Rates				
Lake Tahoe Elevation (NAVD88)	Truckee River Flow at Farad (cfs)			
	October	***November-February***	***March***	***April - September***
Less than 6,225.25 feet	400	300	300	500
Between 6,225.25 and 6,226.0 feet	400	350	350	500
More than 6,226.00 feet	400	400	500	500

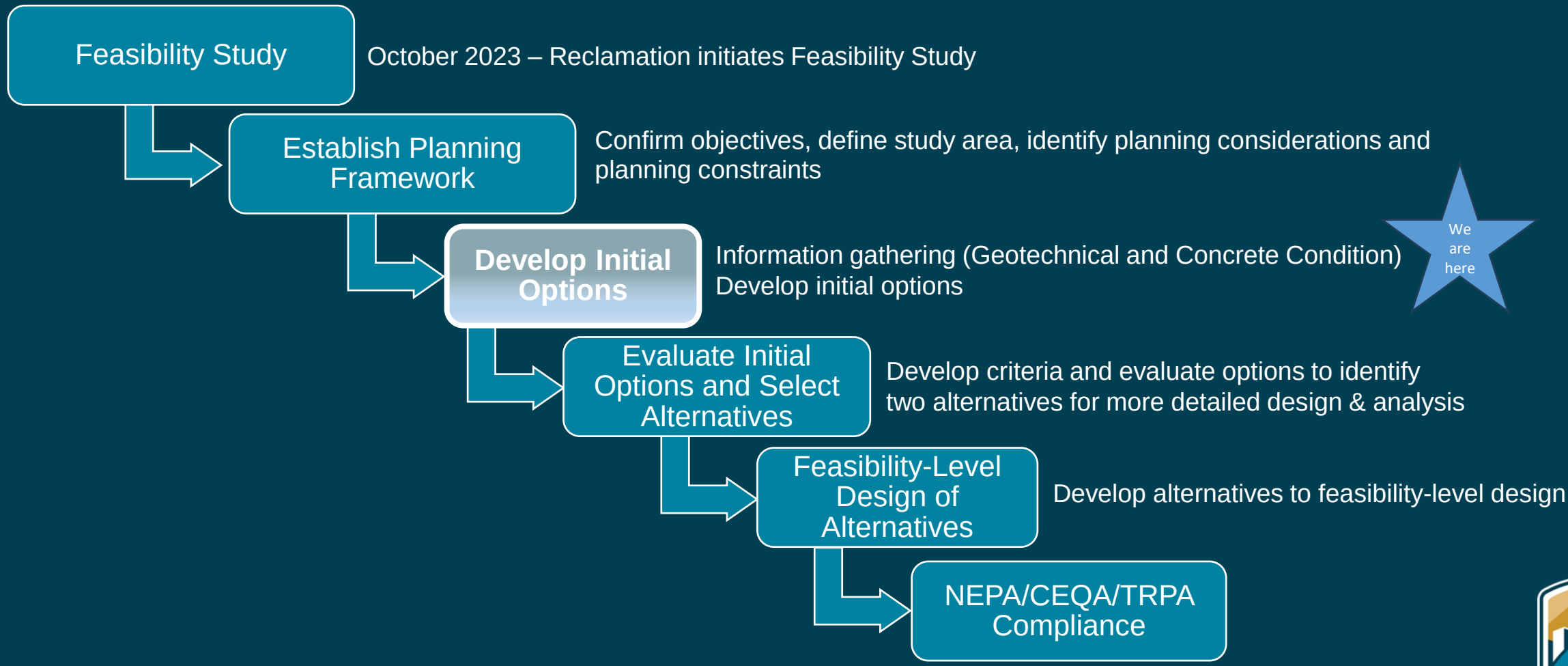
If Floriston flow is met, Lake Tahoe releases:

- *50 cfs from October – March*
- *70 cfs from April – September*

Truckee River Operating Agreement (TROA)

- 1990 Settlement Act includes direction to Secretary to negotiate an operating agreement for the Truckee River (1990 Public Law 101-618 enacted).
- Agreement among the United States, California, Nevada, Pyramid Lake Paiute Tribe and Truckee Meadows Water Authority (municipal provider for Reno/Sparks metropolitan area).
- Core of TROA is ability to store additional water upstream with comprehensive coordination of storage, releases and exchanges.

Lake Tahoe Dam Rehabilitation Feasibility Study

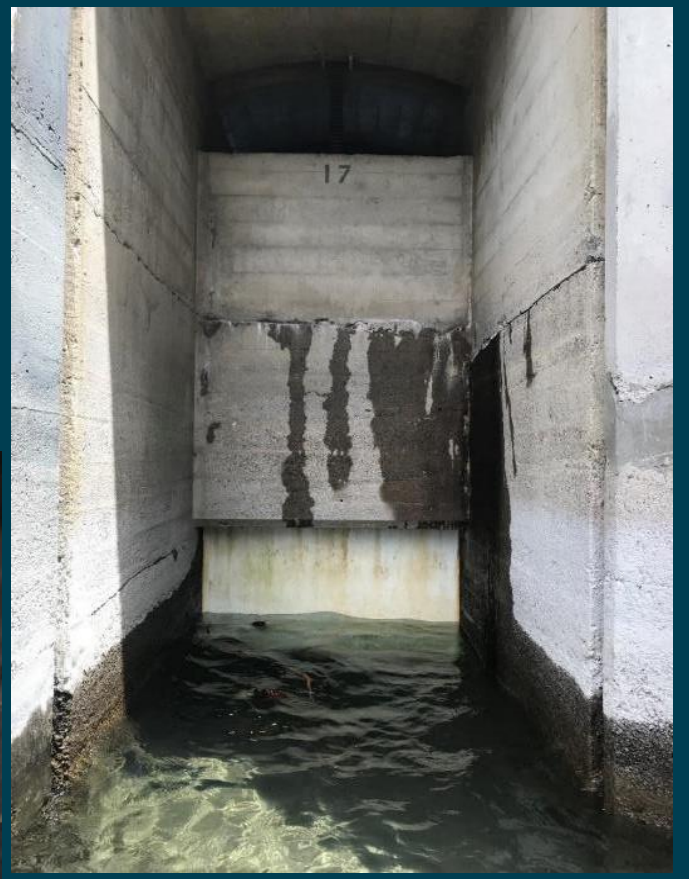


Current Dam Condition

- Concrete Deterioration
  - Constructed before development of admixtures to resist freeze-thaw damage
  - Reduced material strength properties and exposure of steel reinforcement to corrosive environment
  - Potential to affect gate operations and structural performance

Current Dam Condition

- Disbonded Concrete Joint
  - Disbonded horizontal concrete joint in piers near top of gate openings
  - Weakens piers' ability to resist lateral loads
  - Structure is vulnerable to seismic loads



Objectives and Need for Project

Improve the operational reliability and maintain safe operation of Lake Tahoe Dam

- *Improved reliability of gate operations is important for protecting downstream fisheries and recreation, and managing water quality and supply*
- *Structure improvements are necessary to extend the life of the Lake Tahoe Dam, which is over 110 years old*
- *Maintain or enhance safety features of existing dam for the public, facility operators and maintenance staff*

Concrete Condition and Geotechnical Investigations Study

- Concrete condition permitting (Summer/Fall 2024)
- Concrete condition sampling (Fall – October/November 2024)

- Geotechnical permitting (Fall 2024)
- Geotechnical bores/Cone Penetration Tests (TBD 2025, following results of Concrete Coring results)

Agencies contacted

- US Army Corps of Engineers
- US Fish and Wildlife
- Washoe Tribe
- CA State Lands Commission
- CA Department of Fish and Wildlife
- CA Regional Water Quality Control Board – Lahontan
- CA State Parks
- Tahoe City, Public Utilities
- Placer County
- Shorezone Committee

Questions

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Concrete Condition Field Investigation

Purpose: Characterize strength of existing concrete and rate of deterioration

Up to 21 core samples

- 2 samples left wing wall
- 2 samples right wing wall
- 12 horizontal pier samples
- 2 angled pier base samples
- 1 operations deck sample
- 2 foundation slab samples

Access

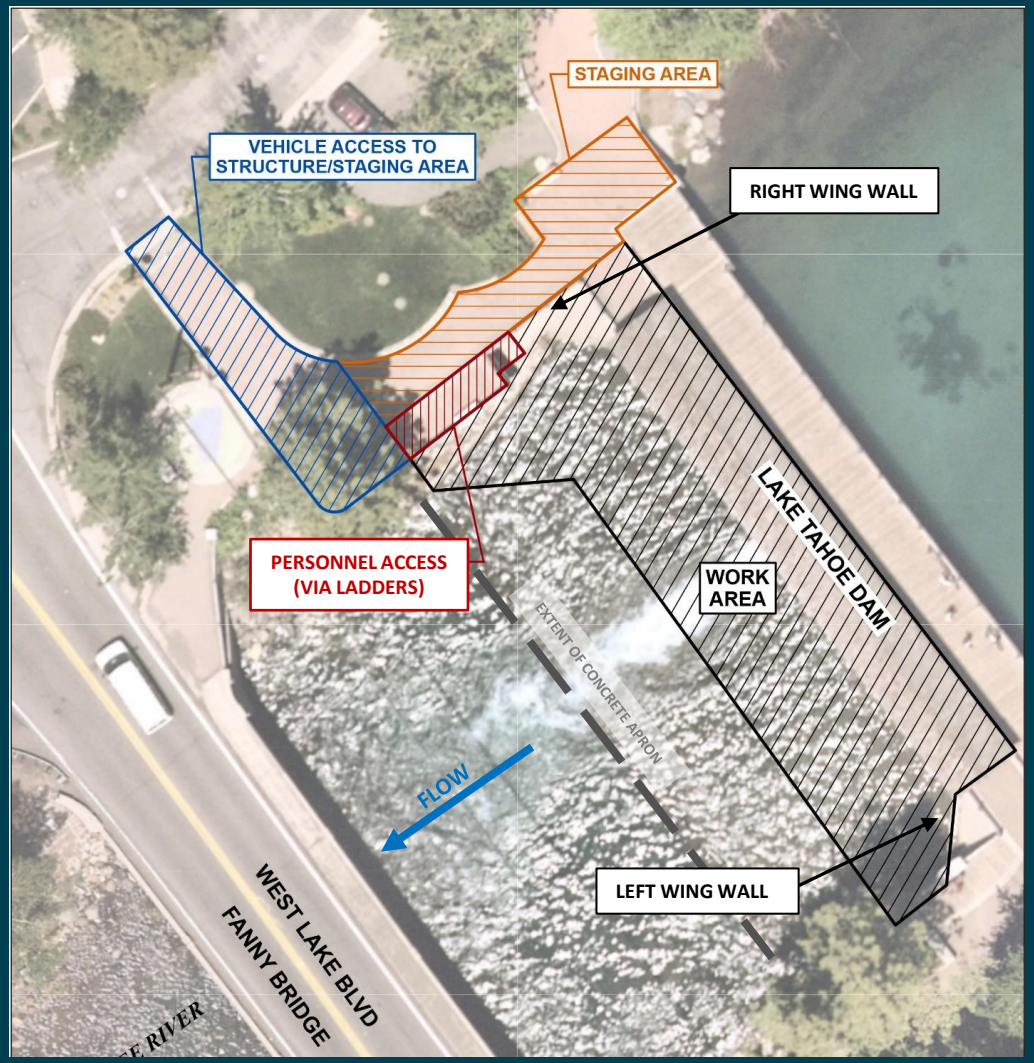
- North abutment

Work duration

- Five working days

Permitting

- In progress (Lahontan and US Army Corps)



Geotechnical Field Investigation Summary

Purpose: Inform feasibility design of dam rehabilitation/replacement alternatives

5 In-Water Borings and Cone Penetration Tests (all barge-based)

- Up to 3 for new alignment + 2 near existing dam
- Up to 3 for existing alignment*

Access

- Lake Forest Boat Ramp

Work Duration

- Six working days

Permitting

- Not started

*Contingency bores will occur if potential upstream replacement alignment is screened out