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STAFF REPORT

Date: September 18, 2024

To: TRPA Governing Board

From: TRPA Staff

Subject: Lake Tahoe Dam Concrete Investigation – Department of the Interior Bureau of Reclamation, Region 10, Lake Tahoe Dam, Tahoe City, Placer County, California, Assessor's Parcel Numbers (APNs) 094-290-033, 094-540-008, & 094-540-017 (entirely within Reclamation's easement)

Summary and Staff Recommendation:
Staff will provide an informational presentation to the Governing Board on the Lake Tahoe Dam rehabilitation feasibility study and associated investigatory work.

Required Motions:
This is an informational item only.

Background
Lake Tahoe Dam is located in Tahoe City, California. Completed in 1913, Lake Tahoe Dam is an 18-foot high, 109-foot-long concrete slab and buttress structure that regulates the lake outflow into the Truckee River. The dam controls the top 6.1 feet of Lake Tahoe (between high water 6,229.1 and low water 6,223). The maximum lake level elevation controlled by the dam is 6,229.1 feet. With the large surface area, the relatively small, regulated lake elevation produces a reservoir capacity of 744,600 acre-feet. This water storage regulated by Lake Tahoe Dam accounts for approximately 72 percent of the storage in the Truckee River Basin.

Flows out of Lake Tahoe Dam are dictated by a federal watermaster to ensure that the proper volume of water is released to meet minimum requirements for downstream users per the Truckee River Operating Agreement (TROA). Signed in 2008 and implemented in December 2015, the TROA is an agreement developed by federal, state, tribal, and local agencies and organizations regarding the operation of the Truckee Basin reservoirs. This agreement is prescribed in section 205(a) of Public Law 101-618, which directed the Secretary of the Interior to negotiate an agreement with California and Nevada to increase the operational flexibility and efficiency of certain reservoirs in the Lake Tahoe and Truckee River basins. The TROA creates flexibility in water use and storage while ensuring that existing water rights are served, and flood control and dam safety requirements are met. It allows for coordination of reservoir operations on the Truckee River, stable water supply, enhances streamflow in the Truckee River for threatened and endangered fish species, and improves water quality.

Lake Tahoe Dam Repairs and Modifications To-Date

The U.S. Bureau of Reclamation (Reclamation) modified Lake Tahoe Dam in 1988 under the Safety of Dams program. Modifications included reinforcing the earth embankment abutments and then covering them with a reinforced concrete cap. The modifications also included saw-cutting the existing concrete apron at 20 feet downstream from the dam and replacing that portion of apron with a new concrete apron with a sheet pile cutoff wall and adding concrete energy dissipation blocks.

Since the completion of Lake Tahoe Dam in 1913, substantial deterioration of the structure's concrete has occurred. Reclamation conducted a structural evaluation of the concrete in 2004/2005 to determine the cause and extent of concrete deterioration. Analysis of the concrete indicated signs of deterioration from alkali-aggregate reactions. Much of the deterioration stems from the lack of air entrainment in the concrete. Air entrainment allows space for the expansion and contraction of water molecules as the concrete goes through freeze-thaw cycles. The temperatures at Lake Tahoe Dam routinely drop below freezing at night and climb above freezing during the day, resulting in deterioration of the concrete. Attempted surface concrete repairs have been unsuccessful as the underlying concrete continues to deteriorate beneath the new repair materials. Gate operations have been affected as gates become stuck in the concrete slots or are unable to fully close due to concrete deteriorating and falling between the gate and the concrete wall potentially affecting the ability to provide minimum releases as required by the TROA. Maintenance to restore gate operations often must wait until the water surface elevation in Lake Tahoe drops sufficiently to allow safe access.

Lake Tahoe Dam Rehabilitation Feasibility Study

A feasibility study to analyze potential alternatives for the rehabilitation or repair of Lake Tahoe Dam began in October 2023. The work will include completion of a feasibility-level study and environmental compliance documents that analyze project alternatives for the rehabilitation or replacement of the dam.

Initial work has included: developing project objectives, defining the study area, and identifying planning constraints and considerations. Initial data gathering efforts to support the study will include the collection of concrete core samples from the existing structure to characterize the strength of existing concrete and rate of deterioration, and geotechnical data to inform feasibility design of potential dam rehabilitation or replacement alternatives. These investigations are expected to begin in fall 2024. Following data gathering and investigation work, Reclamation will develop evaluation criteria to identify project alternatives for more detailed feasibility-level design and analysis. Feasibility analysis will include environmental analysis under the National Environmental Protection Act (NEPA), as well as the California Environmental Quality Act (CEQA) and Tahoe Regional Planning Agency environmental review.

TRPA's Role and Coordination with Lahontan Regional Water Quality Control Board

To complete the concrete borings, Reclamation has submitted a Notice of Intent to the Lahontan Regional Water Quality Control Board (Lahontan RWQCB) for authorization of work under Order Number WQ 2021-0048-DWQ. Reclamation will not be making application with TRPA for the concrete borings, as Lahontan RWQCB will be issuing a Notice of Applicability under the Order, consistent with the Memorandum of Understanding (MOU) between TRPA and the Lahontan RWQCB. Reclamation will be submitting a Pre-Construction Notification to the US Army Corps of Engineers for the concrete work around September 14.

The work necessary to complete the concrete borings will not require any permanent lake bottom disturbance. The work area will be temporarily isolated with coffer dams and dewatered to prevent discharge.

The results of the concrete boring investigation will inform the location of the subsequent geotechnical investigation. Depending on the location of the geotechnical investigation, TRPA along with Lahontan, may issue a grading permit to ensure the work adheres to water quality and soil conservation standards.

Contact Information:
For questions regarding this agenda item, please contact Tiffany Good, Principal Planner at (775) 589-5283 or tgood@trpa.gov.

To submit a written public comment, email publiccomment@trpa.gov with the appropriate agenda item in the subject line. Written comments received by 4 p.m. the day before a scheduled public meeting will be distributed and posted to the TRPA website before the meeting begins. TRPA does not guarantee written comments received after 4 p.m. the day before a meeting will be distributed and posted in time for the meeting.

Attachments:

A. Concrete Coring Operations – Contractor Access, Staging, and Work Areas

Attachment A

Concrete Coring Operations – Contractor Access, Staging, and Work Areas


STAGING AREA
VEHICLE ACCESS TO STRUCTURE/STAGING AREA
PERSONNEL ACCESS (VIA LADDERS)
WORK AREA
LAKE TAHOE DAM
WEST LAKE BLVD
FANNY BRIDGE
TRUCKEE RIVER
0
20
40
SCALE IN FEET
AERIAL IMAGERY SOURCE: NEARMAP, JUNE 2023