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STAFF REPORT

Date: November 6, 2024

To: TRPA Advisory Planning Commission

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 Advisory Planning Commission (APC) on the Lake Tahoe Dam rehabilitation feasibility study and associated investigatory work.

Required Motions:
This is an informational item only.

Background:
The Newlands Project was one of the first five projects authorized and built under the 1902 Reclamation Act, Public Law 57-161. The Newlands Project was initially planned to irrigate more than 400,000 acres using the combined waters of the Truckee and Carson Rivers. To accomplish this, in 1915 Reclamation acquired a small dam constructed at the outlet of Lake Tahoe, the source of the Truckee River, to control releases into the river. Lake Tahoe was initially envisioned as the main storage facility for the Newlands Project to bring water to the desert.

Lake Tahoe Dam, part of the Newlands Project, is located in Tahoe City, California. The first dam on the Truckee River was constructed in the early 1870s to increase the river's flow to help transport logs for construction of the transcontinental railroad and growing mining industry. In 1909, Reclamation began reconstructing a new dam in its place as part of the Newlands Project, one of Reclamation's oldest projects. 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, creating a reservoir that is about 22 miles long and 12 miles wide with a surface area of about 193 square miles and around 71 miles of shoreline. 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.
On February 24, 1909, Reclamation began condemnation proceedings to acquire this dam (*United States v. Floriston Pulp and Paper Company*) and ensure reliable Truckee River flows for Newlands Project use. Between 1909 and 1913, Reclamation and the Truckee River General Electric Company replaced the original dam with the existing concrete slab and buttress dam. A judgement and consent decree

(Truckee River General Electric Decree) was entered on June 4, 1915, in federal court between the United States and the Truckee River General Electric Company in *United States v. Truckee River General Electric Company* (Case No. 2:68-cv-643 (E.D. Cal.); formerly *United States v. Floriston Pulp and Paper Company*). As of July 1, 1915, this decree effectively granted the United States a perpetual exclusive easement to operate the dam and to use 14 acres of adjoining property at the lake outlet owned by the power company; no change of title occurred associated with this easement.
From 1926 to 1999, Lake Tahoe Dam was operated and maintained by the Truckee Carson Irrigation District as a transferred works as part of the Newlands Project. In 1999 Truckee Carson Irrigation District requested Lake Tahoe Dam be returned to Reclamation at which time Lake Tahoe Dam became a reserved works facility operated and maintained by Reclamation.

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, 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. 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.

<u>Lake Tahoe Dam Repairs and Modifications To-Date</u>
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.

Reclamation also 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. 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.

<u>Lake Tahoe Dam Rehabilitation Feasibility Study</u>
Since the completion of Lake Tahoe Dam in 1913, substantial deterioration of the structure's concrete has occurred. Much of the deterioration stems from the lack of air entrainment in the concrete, which was not widely used until the 1940's. 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 concrete repairs have been unsuccessful as the underlying concrete continues to deteriorate beneath the new repair materials. Gate operations are often affected as gates

become stuck in the concrete slots or are unable to close due to concrete deteriorating and falling between the gate and the concrete walls.

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 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/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, as well as the California Environmental Quality Act and Tahoe Regional Planning Agency environmental review.

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

For the initial investigatory work of concrete corings, the Bureau of Reclamation 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, which has been approved by the RWQCB. The Bureau did not submit an application to TRPA for this investigatory work, as Lahontan RWQCB issued the Notice of Applicability under the Order, consistent with the Memorandum of Understanding (MOU) between TRPA and the Lahontan RWQCB, in recognition of existing areas of overlapping authority and regulatory effort and to avoid duplicative regulation. Reclamation submitted a Pre-Construction Notification to the US Army Corps of Engineers for the concrete work in September 2024.

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

Once the results of the concrete work have been obtained, Reclamation will proceed with permitting and execution of the geotechnical investigations. The geotechnical work will occur entirely from a barge with barge-mounted equipment. The barge will be subject to AIS inspections and launched at a public ramp, likely Lake Forest. The barge will enter the area where investigatory work will occur, which will be lakeward of the Lake Tahoe Dam. There will be no permanent or temporary disturbance to the upland area immediately adjacent to the work area, and the geotechnical work will be reviewed and permitted consistent with the MOU between TRPA and the Lahontan RWQCB following a similar process as with the concrete coring work.

Contact Information:

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

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written comments received after 4 p.m. the day before a meeting will be distributed and posted in time for the meeting.

Attachments:

A. Geotechnical Project Location and Study Area

Attachment A
Geotechnical Project Location and Study Area