

STATE OF CALIFORNIA  
CALIFORNIA NATURAL RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
DIVISION OF SAFETY OF DAMS

**INSPECTION OF DAM AND RESERVOIR IN CERTIFIED STATUS**

Name of Dam Phoenix Lake Dam No. 33-3 County Marin  
 Type of Dam ERTH Type of Spillway Concrete weir and chute  
 Water is 1.6 feet above the spillway crest and 13.6 feet below the dam crest.

Weather Conditions Moderate to heavy rain  
 Contacts Made Lucy Croy, Trinity Leonard, Carl Sanders, and Ronnie Chasteen during the inspection  
 Reason for Inspection Periodic Evaluation

**Important Observations, Recommendations or Actions Taken**

As discussed within the 25 April 2013 inspection report, several deep erosion gullies occupy the lower portions of both downstream groins, and repairs are required to fill the gullies to minimize or prevent future damage to the embankment. I reminded Mr. Sanders and Ms. Croy of the need to develop and implement a plan to address the erosion as soon as is practical.

**Conclusions**

From the known information and visual inspection, the dam, reservoir, and the appurtenances are judged safe for continued use.

**Observations and Comments**

<u>Dam</u>	<p>The visible portion of the upstream face, crest, downstream face, and abutments are in generally satisfactory condition, with no indication of deep seated distress or instability. Several deep erosion gullies occupy the lower portions of both downstream groins, and repairs are required to fill the gullies to minimize or prevent future damage to the embankment. I reminded Mr. Sanders and Ms. Croy of the need to develop and implement a plan to address the erosion as soon as is practical.</p> <p>Vegetation control is generally satisfactory, but emerging bushes along the upstream face and scattered across the downstream face should be removed later in the season. Tule and cattails along the waterline should also be cleared, and overhanging trees and bushes should be trimmed along the right downstream groin.</p> <p>Similar to recent past inspections rodent control remains satisfactory and few to no indications of rodent activity were observed.</p>
<u>Spillway</u>	<p>The spillway control section and exit channel were clear and unobstructed; the entrance is occupied with dormant cattails which are cleared each fall in anticipation of the winter storm season. The spillway was flowing approximately 1.6 feet deep across the entrance weir. Flow within the spillway chute appeared normal, and there was nothing to suggest a significant flaw within the concrete spillway channel. A small rock fall has occurred within the lower left abutment just below the concrete spillway channel outfall; the rock fall did no damage to the spillway channel.</p> <p>The current design storm, prepared in 1984, is for a 35,000 year return period producing 2662 cfs (~1210 cfs / sq mi) from the 2.2 square mile drainage area. The spillway capacity is ~3970 cfs which is greater than the peak inflow. Total freeboard is 15.2 feet and the residual freeboard for the design storm is 3.4 feet. Freeboard is satisfactory.</p>

Photos taken? Yes  No   
 cc for Owner/Book

Inspected by J. Lowe  
 Date of Inspection 8 February 2017  
 Date of Report 13 February 2017

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Date of Inspection 8 February 2017

## Observations and Comments

Outlet Plans show the normally unpressurized outlet to consist of a cast iron pipe with a concrete cap. While most of the cap is unreinforced, a short section of the cap near the upstream end of the outlet is reinforced. Upstream outlet control is provided by two vertically mounted hydraulically operated 20-inch sluice gates; a 30-inch diameter butterfly valve provides downstream control.

Both upstream controls were partially cycled, and appear to be operating normally; the downstream control butterfly valve was not cycled. All upstream and downstream outlet controls were partially cycled during the 7 April 2016 inspection, and all were found to be in satisfactory operating condition at that time. All outlet controls were fully cycled during the 5 March 2015 inspection.

Seepage Rainfall prevented evaluation for minor seepage. No evidence of significant seepage was observed within the downstream face, groins, or abutments.

Instr. Instrumentation consists of the following:

- Ten (10) operable piezometers designated 5-1, 5-2, 6-1, 6-2, 7, 7A, B-3, B-4, B-5, and B-6, installed to monitor the phreatic surface within the embankment. Piezometers are monitored monthly.
- Three (3) crest survey monuments (M-3, M-4 and M-5) installed to monitor settlement and/or displacement of the crest. Monuments are monitored on a roughly five year basis.
- Two (2) crack meters installed to monitor vertical and horizontal displacement of a crack within the raised portion of the concrete spillway chute.

The complete piezometer history is somewhat complicated and is not covered in this report. A detailed review of the piezometer history is presented in the April 25, 2013 inspection report. Since the 2013 inspection four additional piezometers, designated B-3, B-4, B-5, and B-6, were installed in November of 2014.

The latest instrumentation data was received from the owner on December 16, 2015, and no new data has been received since that time. The last instrumentation review is presented in the 7 April 2016 inspection report, and is not repeated here; I direct the reader to the earlier report for a detailed explanation of the instrumentation monitoring the dam, and the performance of the dam as reflected in the 16 December 2015 submittal. The conclusion of the April 2016 review was that, "Based on the data submitted the dam appears to be performing satisfactorily, and no additional instrumentation is believed necessary at this time".

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The upstream face looking towards the spillway entrance (indicated), above. A closer look at the spillway entrance, and the polyethylene log boom protecting the entrance, is shown below.



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View towards the right downstream groin, above, and towards the left downstream groin and spillway, below. Emerging bushes scattered throughout the downstream face should be removed later in the season.



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Flow through the concrete spillway channel appears normal, above.



A small rock fall has occurred within the lower left abutment just below the concrete spillway channel outfall (circled); the rock fall did no damage to the lower spillway channel.