

**FERC Project No. 14797**  
**Devil Canyon Project**  
***Water Quality and Temperature Study Approach***

**FIELD RESULTS AND DATA SUMMARY**

*April 12, 2018*

The California Department of Water Resources (DWR) provides the following field results and data summary for the Devil Canyon Project, *Water Quality and Temperature Study Approach*, which includes work completed to date, key findings, and associated data files.

***Completed Work:***

DWR has completed the Study Approach. The fieldwork portion included the following steps: (1) select water quality parameters, (2) select sampling locations, (3) collect water quality samples, and (4) collect reservoir profiles. In addition, quality assurance and quality control was completed on all data. That data was then compared to the Lahontan Regional Water Quality Control Board Basin Plan (Basin Plan) water quality objectives for Silverwood Lake.

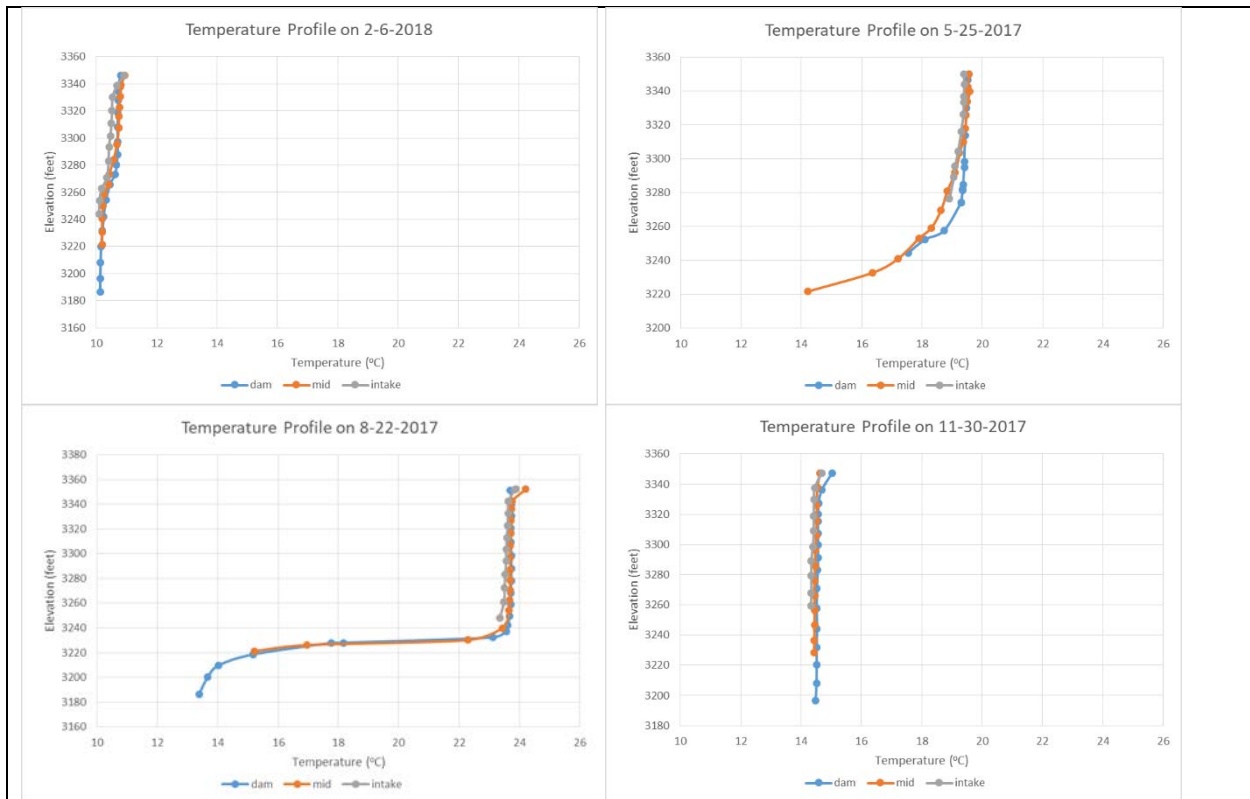
DWR selected water quality parameters consistent with those collected during other water quality efforts at Silverwood Lake and at similar locations near the dam and intake structure. A third monitoring site was added for this study near the center of the reservoir.

DWR collected water quality samples in August 2017 as described in the Study Approach. DWR collected reservoir profiles in the second, third, and fourth quarters of 2017 and in the first quarter of 2018.

***Key Accomplishments/Summary of Findings:***

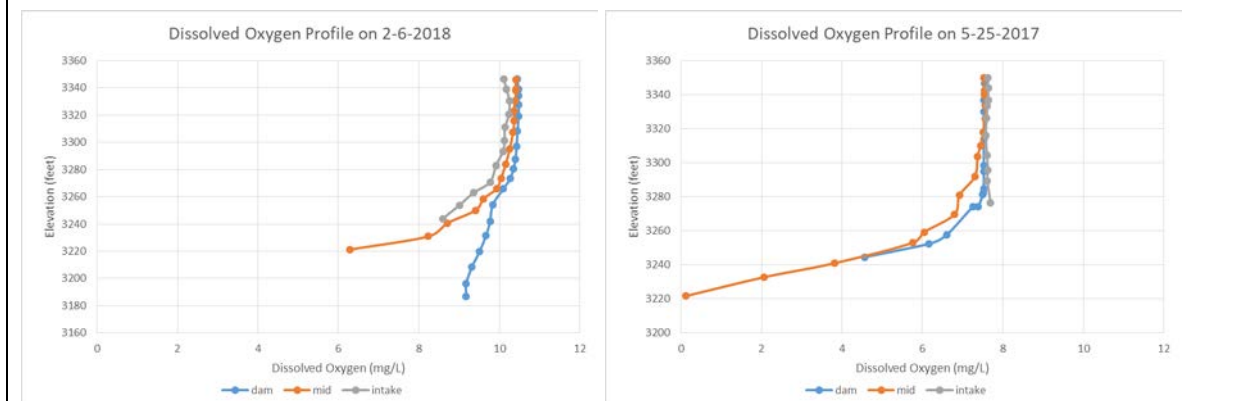
Water quality samples in August 2017 exceeded the Basin Plan objectives for one parameter; dissolved oxygen (DO) concentrations were exceeded in two of the six samples. The Basin Plan objective for DO in a designated "COLD" surface water is a 1 day minimum of 4.0 mg/L. This minimum should be considered as an instantaneous concentration to be achieved at all times. Those two DO samples were collected near the bottom of the reservoir during a time when a thermocline was present. Those two DO samples, which were collected near the dam and at mid-reservoir, had a reading of 0 milligrams per liter (mg/L). Samples were collected at a third location near the tunnel intake. DO concentrations near the bottom at this third location were above the Basin Plan objective.

The water temperature in Silverwood Lake in the winter was well mixed. In the spring the reservoir began to "set up", and in the summer a thermocline was present (Figure 1).

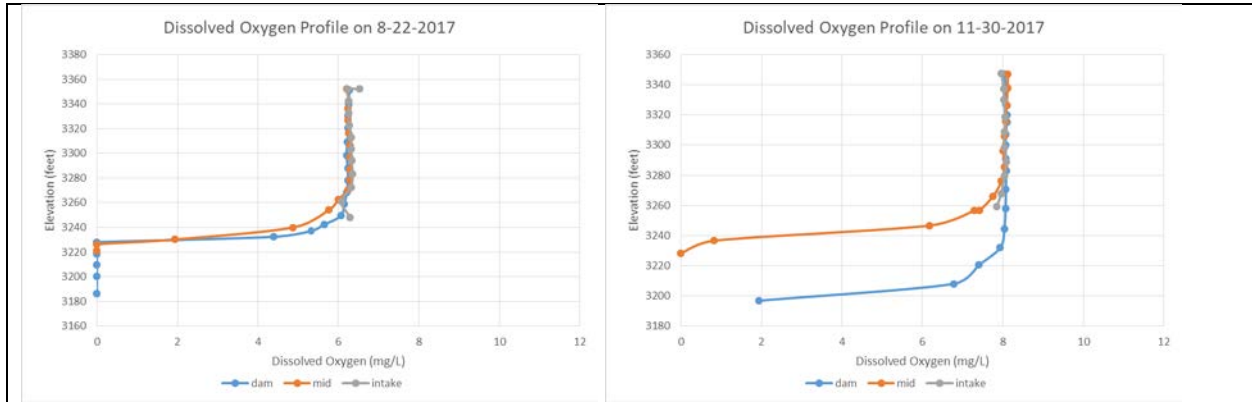


**Figure 1. Silverwood Lake Water Temperature Profiles - Four Quarters of Sampling.**

In addition to DO, other water quality parameters measured during reservoir profiles included pH, specific conductivity, and turbidity. DO concentrations showed the most variability between sample depth and event. Concentrations ranged between 11 mg/L and 0 mg/L. DO concentrations were less than the Basin Plan objective of 4.0 mg/L in the second, third, and fourth quarter sampling events. In each case the DO concentrations near the surface were well above the Basin Plan objective and slowly declined with depth before approaching 0 mg/L at certain locations near the bottom (Figures 2 and 3). The changes in DO were tied closely to changes in water temperature.



**Figure 2. Silverwood Lake DO Profiles - Quarters One and Two.**



**Figure 3. Silverwood Lake DO Profiles - Quarters Three and Four.**

Water pH measurements across all locations, depths, and sampling events ranged from 6.53 to 8.2, all within the Basin Plan objective range of 6.5 to 8.5.

Specific conductivity measured across all locations, depths, and sampling events ranged from 149 to 461  $\mu\text{S}/\text{cm}$ , all within the Basin Plan objective of less than 900  $\mu\text{S}/\text{cm}$ . Specific conductivity was relatively consistent throughout the reservoir at all depths, but a variation in readings was seen between sampling events.

Turbidity measured across all locations, depths, and sampling events ranged from 2.0 to 18.5 NTU. The Basin Plan only provides an objective for turbidity related to point discharge and is not comparable to these results. Higher turbidity measurements were typically recorded near the bottom of the reservoir, as expected. Secchi disk measurements were taken during each reservoir profile sampling event and ranged from 2.25 meters in the third quarter event to 6 meters during the first quarter sampling event.

**Associated Data Files** (All associated data can be found at the file location below on DWR’s Devil Canyon Project Relicensing Website, at <http://devil-canyon-project-relicensing.com/>)

File Name	Data Description	File Type	File Location
20180410_dwr_dc_p14797_water_quality_lab_results.xlsx	Water quality sampling data for Silverwood Lake	Microsoft Excel	Studies/Study-8-Water-Quality-and-Temperature/Associated Data Files
20180410_dwr_dc__p14797_Silverwood_Lake_Reservoir_Profile_Data.xlsx	Reservoir profile data, Quarters 2, 3, and 4, 2017 and Quarter 1, 2018 for Silverwood Lake	Microsoft Excel	Studies/Study-8-Water-Quality-and-Temperature/Associated Data Files

**Variations from Study Methods, Schedule or Approach, and Abnormalities in Expected Field Conditions:**

There were no variations from Study Methods, Schedule, or Approach encountered during the *Water Quality and Temperature Study Approach*.

***Remaining Work:***

The Study is complete.