TRENDS IN SUSPENDED-SEDIMENT TRANSPORT BELOW FALL CREEK DAM DURING OPERATIONAL DRAWDOWNS OF FALL CREEK LAKE, 2012-2015

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The U.S. Geological Survey (USGS) monitored sediment transport related to short-term operational drawdowns of Fall Creek Lake during the fall and winter of water years (WY) 2013-2015. The station on Fall Creek (approximately 1 mile downstream of Fall Creek Dam) was monitored during all three seasons. The USGS deployed turbidity sensors and collected suspended-sediment samples before, during and after the drawdown operations. Regression models using turbidity and/or streamflow were developed to estimate continuous suspended-sediment concentration and compute suspended-sediment loads. During the December 2012 drawdown, the computed suspended-sediment load was 51,000 tons for 6 days. During the December 2013 drawdown, 3,300 tons of sediment was transported in 5½ days. Preliminary data analysis suggests a sediment load of 25,000 – 35,000 tons in the 7½ days of the November 2014 drawdown.

Identifying trends in the suspended-sediment loads over the 3 years of USGS monitoring is difficult due to the extreme variability in weather conditions each year. The 2012 drawdown occurred during a dry period when temperatures were within normal ranges. In 2013, a fresh accumulation of snow and freezing air temperatures kept much of the sediment in the reservoir reach frozen in place. In 2014, the drawdown was interrupted by a period of increased precipitation that raised the elevation of Fall Creek Lake. Elevated turbidity representing increasing sediment loads subsided as the lake elevation increased during the precipitation events. Turbidity and sediment transport then increased as the lake elevation dropped below 690-ft, resulting in two short-term high sediment load events over a period of seven days for the 2014 drawdown. Results from the three years of monitoring suggest that variability in hydrologic and climatic conditions plays an important role in sediment transport during operational drawdowns in addition to sediment supply in Fall Creek Lake.