

Controls and Variability of Water Column Stratification of the Hells Canyon Complex Reservoirs on the Snake River, Idaho and Oregon

Jesse Naymik
Senior Biologist - Water Quality

Idaho Power Company
1221 West Idaho Street
Boise, ID 83702
Telephone: 208-388-2409
Email: jnaymik@idahopower.com

In 2014, the U. S. Geological Survey, in collaboration with Idaho Power Company, initiated an investigation to determine key processes and factors controlling concentrations of mercury and methylmercury in surface water, sediment, and biota in the Hells Canyon Reach of the Snake River. Understanding the controls and variability of thermal stratification and dissolved oxygen dynamics within the reservoirs over the year is a key component of this study. Previous study has shown that methylmercury accumulates in anoxic hypolimnion waters during periods of thermal stratification. While thermal stratification and anoxia of the water column consistently occur in the Hells Canyon Complex (HCC) reservoirs during the summer and fall months, the temperature of the various zones in the reservoirs and the location, initiation and duration of anoxia varies year to year. This variability has implications relative to mercury dynamics and eventual bioaccumulation through the food web.

Idaho Power Company has measured stratification conditions within the HCC reservoirs over the past 20 years. The results shows that the variability in thermal stratification and anoxia is primarily related to water year conditions (i.e., low or high water years) and the Army Corps of Engineers mandated spring drawdown of Brownlee Reservoir for flood control. However, variability in anoxia is seen even among low water years. Sampling during recent low water years as part of the collaborative mercury study has shown initiation of anoxia in the hypolimnion can occur earlier (2015) or later (2014) in the season. Understanding the factors involved in this variability will be important when interpreting the results of the mercury sampling.