

**Project:** Lower Granite Total Dissolved Gas Exchange Study

**PI:** Mike Schneider

**Branch/Group:** Inland Hydraulic Structures Branch, Environmental Hydraulics Group

**Project Description/Activities/Capabilities:**

The purpose of this field study was to define and quantify processes that contribute to dissolved gas transfer during spill at Lower Granite Dam. In general, the transfer of dissolved gas has been found to be a function of the unit spillway discharge, spill pattern, spillway geometry, stilling basin and tailwater depth and flow conditions, forebay TDG concentration, project head, and water temperature. This study focused on resolving questions regarding the change in TDG saturation in the Snake River cause by project operations at Lower Granite Dam.

**Sponsor:** Walla Walla District, POC Lynn Reese

**Personnel:** Mike Schneider

**Project Location and Description:**

Lower Granite Lock and Dam is the upstream-most project on the Lower Snake River, located 107.5 miles above the Snake River confluence with the Columbia River. The main structure includes the powerhouse, spillway and stilling basin, navigation lock, fish facilities, concrete non-overflow sections, and a rock-filled embankment adjacent to the north shore. The dam spans 3,200 ft including the earthen non-overflow embankment. The powerhouse is located near the south shore with the spillway and navigation lock to the north. The powerhouse consists of six generator bays with a maximum total discharge capacity of 130,000-cfs. The powerhouse capacity is only 123 kcfs when all units are operated within 1 percent of peak efficiency. The turbine units are numbered from 1 to 6 starting at the south bank. The Lower Granite spillway is 512 ft long. It has eight 50-ft-wide spillway bays separated by seven 14-ft-wide piers. The spill bays are numbered consecutively from north to south. The spillway crest elevation is 681.0 fmsl. The spillway discharge is controlled by eight radial (tainter) gates that are 50 ft wide by 60 ft high. The spillway will pass the project design flood of 850,000-cfs, with the maximum pool elevation of 746.5 fmsl, and the standard project flow of 678,000-cfs with the normal full pool elevation 738.0 fmsl. A raised spillway crest was added to spillbay 1 during the winter of 2002. The RSW is operated in a full open or closed mode with an average discharge of about 6.8 kcfs.

**Facilities:** Field Study

**Related Topic Areas:** Hydraulic Structures, Environmental Studies, Spillway Flow Deflectors, Total Dissolved Gas, Hydropower, reservoir

