

**Cowlitz-Toutle River Watershed Sediment Assessment
United States Army Corps of Engineers, Portland District**

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The Cowlitz and Toutle River watersheds have been dramatically altered by the 1980 volcanic eruption of Mount St. Helens and the resulting measures constructed to protect the public and control the extraordinary volumes of sediment mobilized by the eruption. The Mount St. Helens (MSH) Project was formulated to control the movement of large amounts of sediment downstream from the debris avalanche resulting from the May 18, 1980 eruption and maintain a congressionally authorized level of flood protection along the lower Cowlitz River. The Sediment Retention Structure (SRS), constructed on the North Fork Toutle River constructed in 1987 has provided significant reduction in the sediment volumes downstream and in the Cowlitz River from 1987 to 1998 while operated as a reservoir, trapping over 100 million cubic yards of sand and silt eroded from the debris avalanche.



**Sediment Retention Structure (SRS)
Below Mount St. Helens**

The North Fork Toutle now meanders through the lower four miles of the sediment-filled reservoir pool, exiting through a spillway and rock ramp. Under the current operation with the retained sediment reaching the spillway elevation, the sediment discharge from the SRS has changed to include a higher portion of sand sized sediment, particularly in the fine sand size class.

In 2007, Biedenbarn Group, LLC was contracted by the US Army Corps of Engineers Portland District to conduct a watershed level sediment assessment of the Cowlitz and Toutle River watershed. Anderson Consulting Engineers, Inc. (ACE) was retained by the Biedenbarn Group as a subcontractor to provide support for the project. Major tasks included in the project scope included: (a) site visit and field reconnaissance; (b) development of a Sediment Impact Analysis Method (SIAM) model utilizing the USACEs SIAM interface with HEC-RAS; (c) formulate a geomorphic assessment and existing condition sediment budget for water year 2007; and (d) formulate a geomorphic assessment and sediment budget estimate through 2035.

As part of the project ACE developed a SIAM model for the Cowlitz-Toutle watershed including the North Fork, South Fork, Toutle, and Cowlitz Rivers. ACE completed the SIAM analysis by conducting the following tasks:

- **Gathered all available water and suspended sediment discharge gage data for water years 1981 through 2007;**
- **Developed annualized flow durations curves for the North Fork, South Fork, Toutle, and Cowlitz Rivers for water years 1981 through 2007;**
- **Formulated sediment source input data;**
- **Developed and utilized a method of simulating tidal influenced tailwater boundary conditions to compute accurate hydraulic conditions;**
- **Developed and calibrated a SIAM model for each water year from 1981 through 2007; and**
- **Utilized SIAM model results to forecast total deposition in the Cowlitz River through the year 2035.**

A second phase of this project has been approved by the USACE Portland District and is under way.