

# WATERSHED

## Science & Engineering

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## Memorandum

**To:** Chehalis River Basin Flood Authority  
**From:** Larry Karpack, WATERSHED Science & Engineering (WSE)  
**Date:** February 15, 2012  
**Re:** **Lower Chehalis River Hydraulic Model Development Status Update**

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This memorandum provides a brief update on WATERSHED Science & Engineering (WSE) and WEST Consultants (WEST) work on the Lower Chehalis River Hydraulic Model Development Project. Current work is focused on:

- completion of the main stem HEC-RAS model;
- data collection and refinement of the hydraulic modeling of the Satsop, Skookumchuck and Newaukum Rivers; and
- development of information for flood relief alternatives to be modeled.

The status of each of these tasks is described briefly below.

### **Main stem HEC-RAS model:**

WEST Consultants has calibrated and delivered to the Corps a HEC-RAS hydraulic model of the Chehalis River for the main stem of the river between Pe Ell and Montesano. Corps staff met with WEST and WSE to review the model calibration and the Corps is currently conducting a detailed review of the model. The model has also been provided to WSDOT and WSE for review and use in evaluation of flood relief alternatives. WSE has completed development of a model of the Chehalis River between Montesano and Aberdeen. This model will be appended to the WEST model to create a single, comprehensive model of the main stem Chehalis River. A meeting has been scheduled with the State technical review team for Thursday February 23<sup>rd</sup> to present the model and facilitate review by the tech team. Following review the model will be refined as necessary and will then be available for modeling the downstream effects of flood relief alternatives including the proposed retention dams, WSDOT's I-5 protection project, and other alternatives as may be defined in coordination with the Flood Authority.

**Projected Completion Date:** March 12, 2012.

### **Refined hydraulic modeling of the Skookumchuck River in the vicinity of Bucoda (RM 9.8 -12):**

Twenty-one (21) new channel cross sections were surveyed by Pacific Geomatic Services (PGS) for the reach of the Skookumchuck near Bucoda. These have been provided to WSE and are being integrated into the existing HEC-RAS hydraulic model of the Skookumchuck River (PIE, 2001). The model is being calibrated to available high water mark data from the January 2009 flood event. The updated model will be used to evaluate the potential impacts of bridge and/or levee modification on flooding and storage in Bucoda and downstream.

**Projected Completion Date:** February 23, 2012.

**Refined hydraulic modeling of the of Newaukum River** – WSE is in the process of extending the HEC-RAS hydraulic model of the Newaukum River from its current end point (near Labree Road at River Mile 4.1) to near the confluence of the North and South Forks near RM 11.0. The model cross sections are being georeferenced and re-cut cross sections using 2002 PSLC LiDAR. The in channel portion of the cross sections from earlier modeling efforts (NHC, 2001) are being retained – no new survey is proposed for this task. Some level of model validation or calibration will be conducted; however, the validation effort is not expected to be significant.

**Projected Completion Date:** February 23, 2012.

**Collection and comparison of channel survey data for the Satsop River downstream of SR 12:**

Twenty (20) cross sections have been surveyed along the main stem of the Satsop River downstream of SR 12. The survey locations were selected to reoccupy data collected in 2001 and to facilitate refinement of the Satsop River confluence within the Chehalis River hydraulic model. The in-channel portion of each cross section (from vegetation line to vegetation line) was field surveyed using bathymetric and topographic techniques. The new cross section surveys will then be graphically compared to the earlier survey data by WSE. Comparisons of the channel location as shown on available aerial photographs from the time of the earlier survey and the current survey will also be prepared. WSE will summarize these comparisons in a brief tech memo and WEST will incorporate the new channel survey data into the lower Chehalis River model.

**Projected Sub-Task Completion Date:** February 23, 2012.

**Flood Relief Alternatives Analysis:**

WSE is working with the Flood Authority Projects Committee to define a range of flood relief alternatives to be analyzed. These may include some or all of the following:

- Mainstem water retention
  - Comparison w/ previous results
  - Comparison w/ Anchor results
  - Impacts at various points downstream
- Bridges:
  - Mellen St., Sickman Ford, S. Bank Road, S. Montesano
  - Skookumchuck RR trestle
- WSDOT/I-5 project (coordinate w/ NHC/WSDOT)
- Land use: Fill in floodplain, Impact of impervious surfaces
- Impact of other structures: I-5, railroad, levees
- Concept level bypass
- Sediment management (“dredging”)

Once alternatives have been defined WSE will use the WSE/WEST HEC-RAS hydraulic model to simulate the hydraulic effects of the alternatives and to produce information on water level changes and changes in the extent of inundation downstream of Grand Mound resulting from the alternative.

**Projected Sub-Task Completion Date:** March 30, 2012.