

## MEMORANDUM

---

**To:** Bruce Mackey, ESA Adolfson  
**Date:** April 12, 2011

**From:** Carmen Andonaegui, Anchor QEA  
**Project:** 100705-01.01

**cc:** Paul Schlenger, Anchor QEA

**Re:** Update on Activities Underway for Chehalis River Fish Study

---

This memorandum describes the activities underway by the Anchor QEA Team for the Chehalis River Fish Study. Update information is provided on three main topics: field work, data compilation and analysis, and upcoming activities.

### FIELD WORK

Collection of water samples and water quality data for use in the study analysis has been completed for this project. Continuously-logging temperature data loggers (Tidbits) are still deployed at the ten water quality sample locations where they were installed in August 2010. *At the Flood Authority's request, the Tidbit loggers can be left in place, where they will continue to collect data for download by Flood Authority staff in the future.*

Data collection at low and high flow conditions at the survey locations for IFIM has been completed. If river flows recede in the very near future into the range of middle flow conditions, a middle flow data collection event will be conducted. In order to meet the project completion date, there is limited time for collecting data that can be still be used in the fish modeling efforts.

Gravel sampling (surface pebble counts and sub-armor grab samples) has been completed.

### DATA COMPILATION AND MODELING

Preliminary fish habitat index analysis has been completed and that information made available for use in the SHIRAZ model. Work on the draft IFIM report has begun. If conditions and time allow for the collection of middle flow habitat data, this data will be

---

incorporated into the analysis and a revised analysis will be provided for use in the SHIRAZ model.

Development of the CE-QUAL-W2 model for simulating reservoir temperatures is on-going, with modeling simulations having already begun. Development of the HEC-RAS model for simulation of changes in downstream temperature in the Chehalis River is on-going as well. Calibration of the model continues as does fine-tuning of the model to support low flow simulations. Work on HEC-RAS model applications is on-going with the development of linkages between CE-QUAL-W2 model output and HEC-RAS; model simulations are planned upon completion of the setup work. Post-processing tools for the development of HEC-RAS model output linkages with the SHIRAZ model is planned.

The geomorphic, sediment, and large woody debris evaluation is continuing. Existing reports on sediment inputs, large woody debris input, and watershed conditions have been collected and summarized. Historical maps and aerial photographs from 1856, 1945, 1990, and 2006 were geo-referenced in GIS and the channel position was digitized to provide information on areas of channel migration. HEC-RAS modeling under existing, flood control, and hydro-scenarios has been completed and the hydraulic output was used to calculate bedload transport during 2, 10, 50, and 100-year flood flows in the different geomorphic reaches. The bedload transport results will be used to estimate transport over the past 20 years under the three flow scenarios and compared to average annual sediment inputs to determine the net effect on bedload transport. The geomorphology and large wood report sections are in progress.

The creation of functional relationships between habitat, productivity, and capacity continues for use in SHIRAZ model runs for the three, targeted salmonid species – Chinook, coho, and steelhead. Report writing is on-going with developed sections including a description of the Assessment Reaches and a list of the model parameters. Numeric relationships between percent fines and salmon survival for all three target species has been completed, along with a table showing average percent fines by Assessment Reach. Work will continue developing functional relationships for the SHIRAZ model parameters, running model iterations, and report development.

## **UPCOMING ACTIVITIES PLANNED**

Collection of IFIM middle flow data is planned if flows drop to within middle flow range in time for incorporation of the data into modeling efforts. Target flows for middle range normally do not occur until mid-May according to past flow data; however the hope is that flows will drop early enough to be able to collect data in early spring of 2011.

River levels are being monitored for a stage at which the Tidbit data loggers can be safely located and retrieved for a final download of temperature data; this will likely occur in late-April or early-May.