

DEPARTMENT OF ECOLOGY
ENVIRONMENTAL ASSESSMENT PROGRAM
Watershed Ecology Section

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THROUGH: Karol Erickson, Unit Supervisor, Watershed Studies Unit
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SUBJECT: Addendum to Quality Assurance Project Plan for the Wenatchee River Total
Maximum Daily Load Study (conventional parameters)

As reported in the Draft Interim report (Carroll and O'Neal, draft 2004), there appears to be a deleterious dissolved oxygen (DO) condition at the confluence of the Wenatchee River with the Columbia River. While the 2002 data generally did not show DO exceedances in the lower Wenatchee mainstem, data-logger deployments at the mouth on July 25 and August 28, 2002 showed DO levels dropping below 8 mg/L. High pH of the river (greater than 8.5) was also recorded at the same location on August 28, 2004.

Depending on the level of the Columbia River (perhaps from daily adjustment at Rock Island Dam for power generation or from upstream surges), there is a pooling effect and back-up of Columbia River and Wenatchee River water at the mouth during summer low-flow (and perhaps at other times). How DO and pH are influenced by the pooling effect is unknown at present. There is a dominating diel effect due to algal photosynthesis and respiration, but the low DO may be exacerbated by oxidation of organic matter interned in the mouth, and/or reduced reaeration and extended residence time due to the rising water of the Columbia River.

Because of inadequate data at the mouth, the conventional parameter sampling effort for the Wenatchee River TMDL Year 1 will be extended for a one week period in August 2004 (week of August 23rd, weather permitting). The purpose of the additional sampling will be to confirm the low DO conditions and explore the spatial extent of the occurrence, as such. In addition, to the extent that time allows, limited sensitivity analyses will be done using the Wenatchee River water-quality model, QUAL2K, to study the response of DO at the mouth to changes in upstream nutrient inputs.

The sampling protocols presented in the Wenatchee River TMDL Year 1 Technical Study Quality Assurance Project Plan (QAPP) (Bilhimer, et al., 2002) will be used for the additional sample collection with the following amendments listed in this memorandum:

- This memo shall extend the date of sample collection to include August/September 2004.
- Five sampling stations will be established in the mouth area for the sampling, including two boundary stations. The downstream boundary will be in the Columbia River above the mouth of the Wenatchee and the upstream boundary will be in the Wenatchee at RM 1.0 (station 45WR01.0 in 2002); the other three stations will be at approximately RM 0.25, RM 0.5 (station 45WR00.5 in 2002), and RM 0.75. Five Hydrolabs will be simultaneously deployed in the thalweg at each site for at least a 48-hour period.
- Water samples will be collected at each site twice in a 24-hour period (early morning and mid-afternoon) and sent to the Manchester Laboratory for analysis of nutrients (TPN, TP, ortho-P, NH₃⁺, and NO₂-3), TOC, DOC, alkalinity, TSS, TNVSS, and chlorophyll a. During laboratory analysis, better low-end residuals and precision RPD < 10% will be requested for the TP and ortho-P sample analyses. All P sample concentrations are expected to range from 1 to 20 ug/L. For TOC and DOC analyses, low-end standard of 0.5 mg/L will be requested combined with a laboratory control sample of 1.0 mg/L and precision RPD <10%. All TOC and DOC samples are expected to be less than 2 mg/L. Reporting limits of 1 ug/L and 0.5 mg/L will be requested for ortho-P and TOC/DOC analyses, respectively.
- Periphyton samples will be taken at one site in the mouth and sent for analysis of total solids, TSS, ash-free dry weight, TKN, TOC, TP, and chlorophyll a.
- Flow will be measured at a cross section in the mouth reach as a seepage run to assess groundwater contributions to the Wenatchee River below the USGS gage at Monitor.
- There will be a change in the project schedule to accommodate the extra work. The target date for the draft final TMDL technical report will be moved from December 2004 to February 2005. The target date for the final report will be moved from March 2005 to May 2005.

Dave Schneider announced this additional monitoring at the last WRIA 45 Water Quality Subcommittee meeting on July 9, 2004. A Project Change Form (PCF) will be submitted to the CRO preceding the sampling event in late August 2004.

References:

Bilhimer, D., J. Carroll, S. O'Neal, and G. Pelletier, 2002. Quality Assurance Project Plan: Wenatchee River Temperature, Dissolved Oxygen, pH, and Fecal Coliform Total Maximum Daily Load Year 1 Technical Study. Washington State Department of Ecology, Watershed Ecology Section. Olympia, WA. (QAPP is available on-line at <http://www.ecy.wa.gov/biblio/0203069.html>.)

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Carroll, J., and S. O'Neal, (draft interim report 2004). Wenatchee River Basin Total Maximum daily Load for Dissolved Oxygen, pH, and Fecal Coliform; Partial Completion of the Final Technical Report After the First Year of Data Collection. Washington State Department of Ecology, Watershed Ecology Section. Olympia, WA.

JC

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