



City of Seattle

Seattle City Light

December 16, 2010

Becca Conklin
Washington Dept. of Ecology
Surface Water Quality Standards
P.O. Box 47600
Olympia, WA 98504-7600

RE: Comments on Triennial Review

Dear Ms. Conklin,

We appreciate the opportunity to comment on the state's surface water quality standards as part of the Triennial Review process. We have identified three issues that we would like Ecology to address as part of the current review process. These are: 1) the need provide clear guidance on the sampling locations for monitoring temperature, dissolved oxygen, and pH in lakes and reservoirs (as opposed to rivers and lakes); 2) the benefits of the proposed saturation-based dissolved oxygen standards over the present concentration-based standards; and 3) potential negative effects of the fall salmon spawning standards on the growth and survival of recently listed steelhead in the Puget Sound.

Lake and Reservoir Monitoring

The Water Quality Standards remain unclear regarding the locations in lakes and reservoirs where temperature, dissolved oxygen, and pH measurements should be taken for monitoring and compliance purposes. For water temperature, Section 173-201A-200 (1)(c)(vi) states that:

Temperature measurements should be taken to represent the dominant aquatic habitat of the monitoring site. This typically means samples should:

- (A) Be taken from well mixed portions of rivers and streams; and*
- (B) Not be taken from shallow stagnant backwater areas, within isolated thermal refuges, at the surface, or at the water's edge.*



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For dissolved oxygen, Section 173-201A-200 (1)(d)(vi) states that:

D.O. measurements should be taken to represent the dominant aquatic habitat of the monitoring site. This typically means samples should:

- (A) Be taken from well mixed portions of rivers and streams; and*
- (B) Not be taken from shallow stagnant backwater areas, within isolated thermal refuges, at the surface, or at the water's edge.*

While the Standards do state where samples should not be taken in rivers and stream (i.e., "from well mixed portions"), they do not state where samples should be taken in lakes and reservoirs. Unlike streams and rivers, the majority of large lakes and reservoirs in Washington (defined by Ecology as water bodies with a mean detention time greater than fifteen days) are thermally stratified during much of the summer and fall. Because lakes and reservoirs are not well mixed, they are broken into different habitat and water quality zones by limnologists. Lakes and reservoirs typically possess a warm surface zone (epilimnion), a cooler middle zone (metalimnion), and a cold bottom zone (hypolimnion). Given the spatial complexity of water quality conditions in lakes and reservoirs, Ecology should provide guidance on where temperature, dissolved oxygen, and pH measurements should be taken in these water bodies. We would be pleased to work with Ecology in identifying and assessing options for measuring these water quality variables in lakes and reservoirs during the stakeholder workgroup sessions that will take place in 2011.

Saturation-Based Dissolved Oxygen Standards

As part of the Triennial Review, Ecology is considering a shift from concentration-based criteria to saturation-based criteria for dissolved oxygen (D.O.). We think that this is a good idea, and recommend the shift to a saturation-based. Ecology's 2009 publication on the D.O. standard provides an excellent review and analysis of the D.O. standard for freshwater in the State of Washington, including the advantages of a saturation-based standard over the concentration standard. The current concentration-based criteria, in which D.O. is measured in mg/l, is subject to a wide range of natural variability on both a local and regional scale. D.O. concentrations decline with increasing elevation (a result of decreasing atmospheric pressure), and also decline as water temperatures become warmer (a result of the declining saturation capacity of water at higher temperatures). Consequently, D.O. values are considerably lower in streams, rivers, lakes, and reservoirs that are located at higher elevations. Also, D.O. concentrations are considerable lower in those ecoregions of the state that are naturally warm.

The proposed saturation-based standard incorporates the physical effects of both elevation and temperature on D.O. concentrations, and puts waters that are located at higher elevations or within naturally warm climates on equal footing with water bodies located at sea level or



in regions having a cold climate. This makes sense from a standards making perspective, since the saturation-based standard is much simpler given that a single criteria value may work in most of the ecoregions of the state. In contrast, the concentration-based standard is subject to considerable biological interpretation due to the local and regional effects of elevation and water temperature on D.O. concentrations. The saturation-based standard also makes sense from a biological perspective, since aquatic organisms including invertebrates and fish adapted to the D.O. saturations that naturally occur within the range of elevations and natural water temperatures were they are found. For these reasons, we support Ecology's proposed shift from a concentration-based to a saturation-based D.O. standard.

Impacts of Spawning and Incubation Criteria on Puget Sound Steelhead

As part of 2006 revisions to the state water quality standards, Ecology implemented a new spawning and incubation criteria intended to protect the spawning and incubation life stages of native char, salmon, and steelhead. These criteria are specifically defined for every river system where bull trout, salmon, and steelhead spawn. The spawning and incubation criteria were established prior to 2007 listing of steelhead in the Puget Sound as a Threatened Species under the Endangered Species Act. As a result of this listing, Ecology should reconsider the potential benefits and impacts of the current water quality standards on Puget Sound steelhead. We are concerned that the spawning and incubation temperature criteria that have been established for salmon in rivers of the Puget Sound may require temperatures that are too cold for juvenile steelhead during the late summer and fall. The maximum 7-DADMax temperature allowed under the 2006 spawning and incubation criteria is 13°C. These criteria are implemented during the early spawning period of Chinook salmon in the Puget Sound, typically between August 15 and September 1 depending upon the river. However, this period is critical to the growth of juvenile steelhead rearing in Puget Sound streams and rivers, since juvenile steelhead require warmer temperatures to adequately grow (16 °C is optimal). Juvenile steelhead that don't sufficiently grow have higher mortality rates during subsequent freshwater and saltwater life stages. The reduced growth of juvenile steelhead that can occur as a result of the spawning and incubation criteria for salmon is particularly a concern in rivers located below major storage reservoirs. The outlet facilities of dams can release cold water temperatures that favor early-spawning Chinook and pink salmon, but at the expense of reduced growth and survival rates to juvenile steelhead. Ecology should carefully consider the effects of the 2006 salmon spawning and incubation criteria on the growth and survival of juvenile steelhead in the Puget Sound following this Triennial Review. We look forward to discussing this issue with Ecology during the stakeholder workgroup sessions that will be convened next year, and would be pleased to provide scientific information and data on this issue during these sessions.

Again, thank you for the opportunity to provide comments on the State of Washington's surface water quality standards. Seattle City Light looks forward to working with Ecology as



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a stakeholder, and contributing to the Triennial Review Process. Please contact me at 206-386-4586, or Ed Connor at 206-615-1128, if you have any question regarding these comments.

Sincerely,



Lynn Best, Director
Environmental Affairs Division

LB:

