

LINCOLN LOEHR

I submitted comments on the 2018 draft 303(d) list of impaired waters to Ecology on June 4, 2021.
I am attaching them here as they are also relevant to the proposed Nutrient General Permit.

P. O. Box 226
Winthrop, WA 98862
June 4, 2021

Washington State Department of Ecology
Jeremy Reiman
PO Box 47600
Olympia, WA 98504-7600
303(d)@ecy.wa.gov

Subject: Comments on proposed 2018 303(d) list of impaired waters

Dear Mr. Reiman,

This comment pertains to all of the marine water category 5 (impaired) listings for dissolved oxygen. The listings are based on 53 year old dissolved oxygen criteria that are not biologically based, are lacking in any identified scientific rationale, are not scientifically defensible, and are not based on credible information and literature for developing and reviewing a surface water quality standard.

The dissolved oxygen criteria do not meet the federal requirements of 40 CFR 131.11, nor do they meet the requirements found in Chapter 2 of WQP Policy 1-11 "Ensuring Credible Data for Water Quality Management". Since Ecology is using non-credible criteria, there is no basis for asserting that the waters are impaired. The 0.2 mg/l change component of the criteria is not biologically based. The listings should be changed to Category 2 (unsure) and notation provided that the listings will be re-evaluated after Ecology goes through a credible process to develop new criteria involving scientific input and public and scientific review. EPA should be involved since they have experience with marine DO criteria development.

I urge Ecology to start with the Marine Dissolved Oxygen Criteria developed by EPA and adopted by three states for Chesapeake Bay, which EPA says "may also apply to other estuarine and coastal systems, with appropriate modifications." There are important considerations in the Chesapeake Bay criteria including differences in depth, duration of exposure (averaging periods), and seasonality that are lacking in our criteria.

To prescribe significant wastewater treatment changes for assumed impairment based on ancient, overly protective, non-credible criteria is essentially malpractice. Ecology likes to assert that they are confident that our criteria are protective. I would agree, but they are also needlessly over-protective and therefore not representative of impairment.

To illustrate the overly protective aspect of the criteria, the Good classification includes a numeric criterion of 5 mg/l which "meet or exceed the requirements for all uses including but not limited to, salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning." The Excellent quality classification includes a higher numeric criteria of 6 mg/l which meets all the same requirements protected by 5 mg/l. Similarly, the Extraordinary quality classification includes a higher numeric criteria of 7 mg/l which meets all the same requirements protected by 5 mg/l. The only function served by the Excellent and Extraordinary criteria is to be more

protective than necessary. When the numeric criteria are crossed, that triggers the natural condition and the human caused decrease of 0.2 mg/l components of the criteria. So, a water with a designated criteria of 7, might be at 6.5 with more than 0.2 mg/l of that attributed to human caused decrease. We currently call that impaired, yet it is still higher than 5 mg/l which our criteria assert protects all uses.

I note that the freshwater dissolved oxygen criteria are similarly flawed, should be changed to Category 2 and notation provided to re-evaluate after a credible process to develop freshwater dissolved oxygen criteria. Ecology could start with EPA's freshwater dissolved oxygen criteria recommendations.

Ecology has asserted that effects levels documented in a 2008 report by Vaquer-Sunyer and Duarte support our criteria and even indicate that our criteria should be more stringent.¹ They further discuss a report by John Davis (1975)² as additional information also supporting our criteria. The data reviewed by Davis are also included in the Vaquer-Sunyer and Duarte report, so it isn't additional information. However, Vaquer-Sunyer and Duarte do not give specifics on what effects were measured in different tests. Davis does. Some effects have no significance for the well-being of the tested species, and therefore are not relevant to criteria development or assertions of impairment.

For example, the Ratfish (*Hydrolagus colliei*) is shown as having a DO threshold of 8.54 mg/l. Davis shows that below that threshold, the blood is less than 100% saturated. The Ratfish has large eyes, the better to see with in low light conditions. It lives in deep water in Puget Sound and along the continental shelf and slope along the west coast. In Puget Sound it makes up about 80% of the fish biomass in demersal trawl surveys. It makes up a sizeable percentage of the fish biomass in trawl surveys on the continental shelf as well. The deep water where it resides is substantially lower than 8.54 mg/l. If one was developing water quality criteria for marine dissolved oxygen, studies using blood oxygen saturation of less than 100% as a threshold would not be used. Criteria development has to consider what effects are most relevant to the survival of the species.

Chesapeake Bay states had DO criteria of 5 mg/l as an average and 4 mg/l as a minimum. Those criteria probably did go back to the 1968 Department of Interior water quality criteria recommendations. With help from EPA they developed newer, better criteria that recognized different types of water (surface, deep, bottom, nearshore, heads of tidal inlets) and had different criteria for each. Criteria had averaging periods, seasonality and depth considerations. The biological basis for the criteria were spelled out in detail. The new criteria were less stringent than the old criteria. The EPA recommendations were adopted by the states. The states did not choose to keep their more stringent criteria, which they could have said were more protective.

Sincerely yours,

Lincoln Loehr

¹ See power point from May 30, 2018 Nutrient Forum meeting, and also DOE's August 2018 report, Washington State's Marine Dissolved Oxygen Criteria; Application to Nutrient. An Overview of the Purpose and Application of the Criteria in the Surface Water Quality Standards.

² John Davis. (1975). Minimal Dissolved Oxygen Requirements of Aquatic Life with Emphasis on Canadian Species: a Review.