Don Russell

Dear Mr. Brown and Ms. Koberstein,
The attached three papers contain my comments about the adequacy and scope of Ecology's current surface water and groundwater water quality standards as being protective of aquatic (with emphasis on salmon) life.
Thank you for this opportunity to comment.
Don Russell

TRIENNIAL REVIEW OF WATER QUALITY STANDARDS

Preface

This document is in response to the opportunity provided by the Washington State Department of Ecology for triennial public review and comment on the adequacy of its surface water and groundwater quality standards (criteria) to be protective of aquatic (particularly salmon) life.

The Current Situation

"More than 1000 freshwater lakes and streams are classified as "impaired" and low oxygen conditions are increasingly frequent in Puget Sound marine waters." [Page 24 of the Puget Sound Partnership's Action Agenda]

According to Ecology's Water Quality Index only 40 % of Washington State waters have good water quality. 60 % of the State waters have fair or poor water quality. Yet the primary underlying assumption and context of the State's Water Quality Standards is that the State's waters are for the most part in compliance with water quality standards and therefore need to be preserved and protected from degradation by acts of human caused pollution. There is too little emphasis and provision in the current water quality standards on restoring water quality in the 60 % of water bodies characterized as having fair or poor water quality.

Legislative Intent Regarding Water Quality

The legislative intent of the State's Surface Water Quality Standards is as follows:

WAC173-201A-010 Purpose.

(1) The purpose of this chapter is to establish water quality standards for surface waters of the state of Washington consistent with public health and public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife, pursuant to the provisions of chapter 90.48 RCW. All actions must comply with this chapter.

The *actions* referred to in the above excerpt are referenced below as follows:

RCW 90.48.010
Policy enunciated

It is declared to be the public policy of the state of Washington to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life, and the industrial development of the state, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington. Consistent with this policy, the state of Washington will exercise its powers, as fully and as effectively as possible, to retain and secure high quality for all waters of the state.

The current Surface Water Quality Standards focus on retaining the good water quality that exists in only 40 % of State waters but largely neglect how the State is going to *secure high quality* water for the 60 % of the waters of the State judged to be of fair or poor water quality.

Why are 60 % of the State's Waters of Fair or Poor Quality?

"According to the draft 2004 Water Quality Assessment, the most common water pollution problems in Washington are high temperature, fecal bacteria, pH, low dissolved oxygen, metals, and nutrients." That this condition exists is primarily attributed to the cumulative impact of nonpoint pollution which *"…is inextricably tied to local land uses and individual actions."* [Washington's Water Quality Management Plan to Control Nonpoint Sources of Pollution]

What is Required to *Secure High Quality for all Waters of the State?*

To secure high quality water in the 60% of Washington's impaired water bodies requires (1) restoration, in so much as practical, of the natural hydrologic function in their watersheds and (2) removal of metals and nutrients from surface and ground water entering these water bodies. The nature of nonpoint pollution requires effective management of local land uses and enlightened individual action in order to prevent metal and nutrient transport by surface and ground water. Both are difficult, time consuming and expensive to achieve.

Until nonpoint pollution can be prevented at its multiple sources the best hope to *secure high quality for all waters of the state* is (1) restore natural hydrologic function and (2) to apply metal and nutrient inactivation chemicals at the source (e.g., septic system drain fields, stormwater infiltration dry wells), at the points of entry of nutrient laden surface or ground water into a water body, or batch treat the water body to inactivate nutrients already present in the water body.

Restoration of Hydrologic Function

Natural hydrologic function is dependent upon maintaining continuity between surface and ground water. As undeveloped natural areas are developed to accommodate human occupancy and use, stresses are placed upon the available water resource. Too often the consequence of human activity (e.g., impervious surfaces and groundwater withdrawals) is to disconnect surface water from its groundwater source. This results in streams with diminished base flow (or go dry) and lakes with reduced flow through. When stream flows and lake levels (and flow through) decline as a result of lowering the groundwater table level the result is higher water temperatures, lower dissolved oxygen concentration and increased concentration of metals and nutrients (due to the lack of dilution).

Washington's Water Quality Standards fail to recognize and acknowledge the vital linkage between surface and ground water quality. Water quantity is an attribute of and a vital component of water quality. Preservation, protection and restoration of this groundwater surface water linkage (continuity) is vital to the preservation, protection and restoration of water quality in Washington's surface water bodies.

RCW 90.22.010 Establishment of minimum water flows or levels states: *"The department of Ecology may* [should read shall] *establish minimum water flows or levels for streams, lakes or other public waters for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same."*

This provision authorizes the Department of Ecology to effectively address the temperature, dissolved oxygen and metal and nutrient effects of nonpoint pollution in the 60 % of the water bodies that Ecology's Water Quality Index indicates have fair or poor water quality.

Restoration of Metal and Nutrient Impaired Water Bodies

It is the Department of Ecology's interpretation and application of the definition of pollution that effectively prevents applications designed to secure high quality water in metal and nutrient impaired water bodies. Whereas the definition of pollution contained in regulations is as follows:

WAC 173-201A-020
Definition of Pollution

"Pollution" *means such contamination, or other alteration of the physical, chemical, or biological properties, of any waters of the state, including change in temperature, taste, color, turbidity, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish, or other aquatic life.*

DOE places heavy emphasis on the first half of this definition as justification for including metal and nutrient inactivation treatments as acts of pollution without regard to the latter half of this definition (underlined). Nutrient inactivation treatments are designed and applied to bring phosphorus impaired (303 (d) listed) lakes back into compliance with State Water Quality Standards. The treatments that inactivate phosphorus also result in adsorbing and co-precipitating toxic forms of dissolved metal.

For the rest of this paper the emphasis will be on salmon habitat restoration. Of relevance in this regard is phosphorus inactivation since phosphorus is a limiting nutrient for toxic cyanobacteria species and aquatic algae and plant growth. Prevention of toxic cyanobacteria blooms is critical to the preservation of good water quality in Washington's lakes. The effect of cyanobacteria blooms are elevated water temperatures, high pH conditions, and upon their senescence the release of potent liver and nerve toxins into the water, and their decomposition depletes dissolve oxygen to the extent of causing major fish kills.

In this context it is interesting to note the following language:

WAC 173-201A-300
Description.

(1) The antidegradation policy is guided by chapter 90.48 RCW, Water Pollution Control Act, chapter 90.54 RCW, Water Resources Act of 1971, and 40 CFR 131.12.

> *(2) The purpose of the antidegradation policy is to: (a) Restore and maintain the highest possible quality of the surface waters of Washington;*

The Big Contradiction

The 60 % of the State waters that are considered as having fair or poor water quality suffer this condition because they are impaired because of external loading by nonpoint pollution conveyed to these waters by surface water runoff and nutrient laden groundwater. The act to restore the natural function of these impaired water bodies is either to prevent their continuing pollution by instituting effective land use practices and metal and nutrient inactivation treatment at the sources of nonpoint pollution or, in the alternative, to apply metal and nutrient inactivation chemicals at the points of entry of nutrient laden surface and ground water into these water bodies or within the water body itself. In so much as it is the Legislature's intent to restore the surface waters of Washington it does not make a lot of sense to consider metal and nutrient inactivation chemicals as pollutants and their application as acts of pollution. The water quality in an impaired water body is already polluted. The application of nutrient inactivation chemicals and sediment removal is intended to restore the natural function and value of a nutrient and sediment impaired water body. Such acts should be encouraged, not discourage, by provisions of the State of Washington's Surface Water Quality Standards.

Metal and nutrient criteria that need to have criteria established.

Washington's metal standards are currently adequate to assure protection of aquatic life, with the except of aluminum, soluble reactive iron and total iron concentration criteria.

Aluminum criteria for the protection of aquatic life have been promulgated by USEPA, but not adopted by Ecology.

Soluble reactive iron (ferrous) can precipitate on the gills of macroinvertebrates and salmon causing asphyxiation when in excess of 0.35 mg/L. Oxidized insoluble iron (ferric) can settle out on and foul salmon spawning beds and stimulate excessive aquatic plant growth when in excess of 1.0 mg/L. British Columbia has adopted 0.35 mg/L soluble reactive iron criteria to assure protection of salmonid life. USEPA promulgates a total iron concentration criteria of 1.0 mg/L for the protection of aquatic life.

The nutrient criteria that need to be established to protect aquatic life include soluble reactive phosphorus (SRP) at 0.020 mg/L and nitrate-nitrogen at 2.0 mg/L. Ecology has already adopted USEPA's recommended concentration criteria for ammonia-nitrogen.

Other water quality standards that need to be adopted

Alkalinity to protect aquatic life should be equal to or higher than 20 mg CaCO3/L concentration.

Sulfide - Hydrogen Sulfide to protect aquatic life should not exceed 2 ug/L as prescribed by USEPA aquatic life criteria.

Sulfate concentrations should not exceed those described in a paper titled Sulfate as a Contaminant in Freshwater Ecosystems: Sources, Impacts and Mitigation which can be accessed at:

https://conference.ifas.ufl.edu/ncer2011/Presentations/Wednesday/Waterview%20C-D/am/0850_Orem.pdf

Cyanotoxin concentration limits that are protective of aquatic life should be adopted.

Sediment physical and chemical criteria that are protective of salmon spawning and rearing activity habitat should be adopted.

Conclusion

To carry out the Legislature's mandate of preserving, protecting and restoring State waters the current emphasis of the Surface Water Quality Standards on preserving and protecting the 40 % of State waters having good water quality should be counter balanced by an equal, or greater, emphasis on restoring the 60 % of the State waters that are classified as having fair or poor water quality.

In this regard there needs to be an understanding that metal, nutrient and sediment impaired streams and lakes are already polluted. To *secure high quality* surface water and groundwater will require restoration of natural hydrologic conditions, application of chemicals and techniques that inactivate the polluting metals, nutrients and sediment that result in their impairment and restoring other important physical, chemical, and biological conditions that will provide suitable (fit) freshwater habitat conditions for aquatic (salmon) life.

Don Russell

9/15/21

CLARKS CREEK TMDL – NOT IN COMPLIANCE WITH THE CWA OR LEGISLATIVE MANDATES

Preface

This paper presents an argument that the Clarks Creek TMDL water quality improvement Plan is not in compliance with provisions of the Federal Clean Water Act or State of Washington's legislative mandates (RCWs).

Provisions of the Clean Water Act

- Assign the designated uses of each surface water body in the State

  Aquatic life – propagation and protection of fish, shellfish and wildlife
  Drinking water – public health of people
  Recreation – public use and enjoyment

- Establish numeric or narrative standards that assure beneficial use
- Monitor water bodies for compliance with water quality standards
- Exceedence of any standard requires that remedial action be taken
- Utilize the TMDL or Straight to Implementation (STI) remediation model
- Monitor effectiveness - utilize adaptive management to make course corrections
- Comply with the antidegradation policy (WAC 173-201A-300)

  Restore and maintain the highest possible quality of the surface waters of Washington

  Both temporary harm and permanent loss of existing uses may be allowed by Ecology where determined necessary to secure greater ecological benefits through major habitat restoration projects designed to return the natural physical structure and associated uses to a water body where the structure has been altered through human action

Designated use of Clarks Creek of concern to the Puyallup Tribe of Indians

Core Summer Salmonid Habitat – The key identifying characteristics of this use are summer (June 15 – September 15) salmonid spawning or emergence, or adult holding; use as important summer rearing habitat by one or more salmonids; or foraging by adult and subadult native char. Other common characteristic aquatic life uses for waters in this category include spawning outside of the summer season, rearing, and migration by salmonids.

Habitat Requirements for Salmonids

Physical Requirements:

- Stream flow regimen - neither flooding, scouring or drying
- Access to suitable migratory, spawning and rearing habitat
- Stream reaches, wetlands and lakes fed by discharging groundwater, not surface water runoff
- Sediment free gravel (of suitable size) substrate stream beds
- Summer time water temperature not more than 16 C or 61 F
- Summer time dissolved oxygen not less than 9.5 mg/L
- Turbidity not to exceed 5 NTU over background

Chemical Requirements:

- 6.5 to 8.5 pH
- A natural buffering system to maintain pH in this range
- Adequate calcium and bicarbonate ions in solution to maintain alkalinity above 20 ppm
- Low nutrient (N< 2 ppm and P< 0.02 ppm or 20 ppb) and toxic material (As, Cd, Cr, Cu, Hg, Pb, Zn, PCB, PAH, cyanotoxin) concentration
- Ferrous iron not to exceed 0.35 mg/L, total iron not to exceed 1.0 mg/L
- Nitrate-nitrogen concentration below toxic conditions (<2.0 mg/L)
- Ammonia-nitrogen concentration below toxic concentrations (<1.9 mg/L)
- Appropriate water salinity for each life cycle stage

Biological Requirements:

- Adequate prey to meet nutritional requirements
- Protection from natural predators
- Favorable riparian conditions
- Absence of introduced or invasive species
- Protection from destructive acts by developers or vandals

Washington State surface water quality standards for the protection of beneficial use of State waters by salmonids only include those yellow highlighted above. There are no State surface water quality standards for the protection of the beneficial use of State waters by salmonid for all other above listed salmonid habitat requirements.

Herein lies the fallacy of the TMDL approach in determining whether or not a specific stream or lake provides beneficial use by salmonid. The Clarks Creek TMDL focused on dissolved oxygen (there is a standard) and sediment (there is no standard).

Furthermore the Clarks Creek TMDL alleges that the cause of these impairments can be attributed to the effects of occasional stormwater runoff events. The proximate cause of Clarks Creek's impairment is nutrient (ammonia-nitrogen, nitrate-nitrogen, soluble reactive phosphorus) and iron pollution of the groundwater that provides its base flow.

Legislative Mandates

The Washington State Legislature has enacted several requirements (RCWs) that govern the conduct of the Department of Ecology's work. These are:

- Ecology is the responsible agency for assuring the State's compliance with provisions of the Clean Water Act.

- All actions that Ecology takes and requires of others shall be based upon credible peer reviewed science and appropriate modeling.

- Ecology's work shall involve participation by affected stakeholders with their input being incorporated into Ecology's final work product.

- During the execution phase of any habitat restoration project there shall be monitoring to determine whether the beneficial use of an affected water body is being restored.

- Adaptive management based upon what is learned as a result of monitoring will suggest the revisions necessary to fulfill the original objective (i.e., restoration of beneficial use) of the project.

- Defining and promulgating time tested and proven best management practices (BMPs) as guidelines to be employed by other governmental agencies to assure protection of State waters that do currently provide beneficial use and to restore water quality in those water bodies that do not currently provide beneficial use for salmon and people.

Ecology's performance of the Clarks Creek TMDL Plan

Ecology is not in compliance with provisions of the Federal Clean Water Act's requirement that it establish appropriate surface water quality standards for assuring the beneficial use of State waters by salmonid. Nor is Ecology in compliance with provisions of State Legislature mandates (RCWs).

As previous stated at the time of the public review of the Clarks Creek Dissolved Oxygen and Sediment Total Maximum Daily Load Plan by Dan Wrye of Pierce County Surface Water Management, WDOT representatives and Don Russell:

"The Clarks Creek TMDL Plan is based upon insufficient and inadequate water quality monitoring data, faulty interpretation of the data contained in the TMDL study, inappropriate models and arbitrary wasteload and load allocations assigned to the several agencies Ecology claimed were responsible for Clarks Creek' impaired condition."

Conclusion

For reasons stated above, execution over the next twenty years of the Clarks Creek TMDL water quality improvement Plan will not result in the restoration of beneficial use of Clarks Creek and its tributaries by Chinook, Coho, pink and chum salmon and Puget Sound steelhead. Clarks Creek and its tributaries will remain nutrient and iron polluted, sediment impacted and aquatic plant choked. And, the salmon entering Meeker "Creek" and Diru Creek will continue to experience pre-spawn mortality as a result of exposure to the seriously degraded habitat conditions that salmonid experience once they enter these two Clarks Creek's tributaries.

Ecology has failed to play the role (establishing appropriate surface water quality standards, requiring monitoring of restoration efforts, and providing adaptive management leadership) required of it by provision of the Clean Water Act and legislative RCW mandates. An example of the consequences of this failure is amply evident to those who familiarize themselves with the results of the City of Puyallup's Meeker "Creek" Restoration Project. This Project was an ill informed and abortive attempt to comply with provisions of the Clarks Creek TMDL water quality improvement Plan.

Don Russell
6/10/18

ADMISSION BY ECOLOGY THAT CURRENT ENVIRONMENTAL REGULATIONS ARE INEFFECTIVE

Below is an excerpt of Ecology's response to a citizen's comment on the May 2015 draft of Washington's Water Quality Management Plan to Control Nonpoint Sources of Pollution.

Citizen's comment: Overall, it is unclear what, if anything, the Puget Sound Partnership adds to the future of nonpoint source control in Washington. If there is something, this document has not articulated it. In addition, the discussion does not explain how these initiatives affect Ecology's nonpoint source priorities, if they do. It is unclear that they should.

This is a pathetic explanation of how the state is addressing—or failing to address—the recovery of threatened and endangered species. Does Ecology establish any priorities in the state nonpoint source program based on the needs of these species? If so, how? Does Ecology assert itself more when evaluating the need for enforcement actions when these species are at stake? Is there anything that is done differently in Ecology's nonpoint program because pollution from nonpoint sources is part of the reason why these species are threatened with extinction?

Ecology's Response: This set of comments points out that Washington has a variety of programs designed to address some pollution problems, but that for the most part, these are uncoordinated, focus on only small geographic areas or on one kind of problem, and are not joined together into a coherent state program designed to address nonpoint pollution statewide and to protect threatened and endangered species as well as public health. Ecology agrees that this is indeed the situation in Washington, and we admit that Ecology has been unable to create a coherent program because all of the disparate programs have their own separate goals and interest groups that have so far been unwilling to work cooperatively together. As we have said earlier in these comments, as long as this situation continues, there is little hope that Washington will be able to successfully solve nonpoint pollution problems. [Page 54 of Responses to Comments on DOE's nonpoint pollution plan]