



Patrick Lizon
Water Quality Program
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

RE: Proposed Water Quality Assessment and 303(d) List for Des Moines Creek

Dear Mr. Lizon,

The Washington State Department of Ecology (Ecology) recently released the Proposed Water Quality Assessment and 303(d) listings for Washington State. Several of the proposed listings identified segments of Des Moines Creek as either waters of concern or impaired waters requiring a TMDL. The Port of Seattle (Port) has reviewed the information for these proposed listings and would like to submit the following comments to Ecology for use in the final determination of the Water Quality Assessment. The individual listings and associated comments are below along with general comments on the assessment methodology.

Listing 42309-copper Des Moines Creek

The proposed listing for this reach is Category 5. This listing directly contradicts the recommendations from Ecology's own recent report on Des Moines Creek (Coots and Friese 2012). In the report, Ecology recommends that the 303(d) listing for dissolved copper be removed from the segment. Data collected in the segment in 2008, 2009 and 2010 led the authors to recommend that Ecology should:

"Remove Des Moines, Massey, and McSorely Creeks from the 303(d) list for dissolved copper," (page 7)

The data collected during the study found only one (1) sample event that exceeded the acute criterion for dissolved copper. Every other sample, whether collected during baseflow or storm conditions was below the acute criterion for dissolved copper. This led the authors to state that:

"Wet season results suggest habitat improvements to the study streams have improved (decreased) dissolved copper and zinc levels during storms." (page 37)

This statement was based on a comparison with a previous study in the basin (Herrera 2001) which showed that the recent average dissolved copper concentrations were nearly half of what they were in the 1990's.

The proposed Category 5 listing is not supported by the findings of the 2012 Ecology report. The proposed listing cites two exceedances while the report only found one. The Ecology study indicates two samples were collected within 1 hour during a single storm event (10/24/10) and both samples exceeded the acute criterion for copper. Ecology's 2012 revision of the Water Quality Program Policy 1-11 (Ecology 2012) states "Only one parameter value per day per segment will be used in the Assessment". According to this policy, one of these two samples should have been used to assess compliance with the water quality standards. The Port requests that Ecology review the data and verify

that the 10/24/10 data was not double counted for the proposed listing. A single exceedance for copper over the three year study period does not meet the criteria for listing this segment as Category 5.

In 2008 the Port completed a site specific water quality study on the west tributary of Des Moines Creek (assessment unit 17110019000665) as required in their NPDES permit (WA-002465-1). The study included several water effect ratio tests for copper in the west tributary of Des Moines Creek using *Ceriodaphnia dubia* and a supplemental test with rainbow trout to ensure that the site specific objectives developed with *C. dubia* were protective of salmonids. Tests were run at the 10th percentile hardness following Ecology's protocols. The study found that the site specific water quality objective for copper in the east tributary of Des Moines Creek is 32.2 µg/L at the 10th percentile hardness of 50.8 mg/L (Nautilus 2008). The observed dissolved copper was 6.40 µg/L on 10/24/10, significantly less than Ecology-approved site-specific acute copper objective.

42352-copper Des Moines Creek –East Tributary

The proposed listing of Des Moines Creek-East Tributary for copper is based on data that is at least 19 years old. In the 19 years since that data was collected the Port has invested over \$80,000,000 in water quality and flow improvements for stormwater runoff at Sea-Tac International Airport. Much of this investment has specifically targeted the treatment and reduction of copper and other metals in stormwater discharges to Des Moines Creek. The Port developed a Comprehensive Stormwater Management Plan in 2001 (Parametrix 2001) and submitted an AKART analysis to Ecology in 2005 (RW Beck 2005). Ecology concurred with the Port's AKART analysis and the Port completed an engineering study identifying pollutant generating surfaces and specifically targeting BMP's to address potential water quality issues related to stormwater runoff from these areas. Within the drainage basin of Des Moines Creek-East Tributary the Port has implemented 29 treatment or structural source control BMP's and 2 flow control BMP's. These include a large stormfilter vault treating runoff from an entire 159 acre subbasin, bioswales installed at many individual facilities, and a bioretention swale with custom media layers engineered specifically to remove dissolved metals from a 12.8 acre subbasin. The majority of this work was completed by 2007. Since then the Port has continued to improve stormwater quality through adaptive management of its facilities in response to monitoring results under its NPDES permit and other studies. The Port has not exceeded its NPDES permit effluent limit for copper since the adaptive management has been implemented (Port of Seattle 2014). These stormwater management actions affect over 21% of the total drainage basin for Des Moines Creek-East Tributary.

In 2008 the Port completed a site specific water quality study on the east tributary of Des Moines Creek as required in their NPDES permit (WA-002465-1). The study included several water effect ratio tests for copper in the east tributary of Des Moines Creek using *Ceriodaphnia dubia* and a supplemental test with rainbow trout to ensure that the site specific objectives developed with *C. dubia* were protective of salmonids. Tests were run at the 10th percentile hardness following Ecology's protocols. The study found that the site specific water quality objective for copper in the east tributary of Des Moines Creek is 25.6 µg/L at the 10th percentile hardness of 21.2 mg/L (Nautilus 2008). The prior listings based on the 19 year old sample are based on the default aquatic life criterion rather than the site specific water quality for copper measured by the Port.

The Port's significant investment in infrastructure and management actions over the past decade to address copper levels in stormwater runoff in the Des Moines Creek-East Tributary basin combined with the determination of a site-specific water quality objective that is substantially higher than the generic acute criterion for this segment suggests that a Category 2 listing would be a more appropriate listing, rather a Category 5 listing based on 19 year-old data.

42313-DO, 73759-temperature, 71855-pH Des Moines Creek

The proposed listings for Des Moines Creek (assessment unit ID 17110019007359) for dissolved oxygen, temperature and pH is Category 5. The data referenced for this listing was collected a few yards downstream of the Northwest Ponds. The water quality conditions in this short reach are dominated by the conditions in the pond since there are no other surface water inputs to this segment. It is well documented that shallow ponds, such as the Northwest Ponds, naturally have seasonal high temperature due to solar heating and high pH and low dissolved oxygen from natural physical and biological processes. These conditions have been observed in the Northwest Ponds and naturally influence water quality in this segment of Des Moines Creek.

Furthermore, the Port and King County have conducted significant restoration work in Northwest Ponds and this segment of Des Moines Creek. The creek and ponds are protected by setbacks and buffers and have been fully replanted since 2008 and are fully vegetated. The ponds are under the protection of a restrictive covenant to ensure that they remain protected indefinitely. The ponds and this segment are fully restored, vegetated, and protected at this time. Considering the actions that have been taken to restore this section of the creek and its riparian zone and that the observed exceedances within this reach are due to the natural conditions within the Northwest Ponds a more appropriate assessment would be to list this reach as Category 1.

General comment about application of instantaneous data to chronic criterion for metals.

Water Quality Program Policy 1-11 (2012) allows for the use of a single measurement to represent the averaging period of the acute and chronic criteria. In the case of metals, this means that a single grab sample can be used to represent the entire 4-day averaging period for the chronic criterion. It is highly unlikely that a grab sample is representative of average conditions over an entire storm hydrograph, much less a 4 day period which could include both storm runoff and baseflow in "flashy" small urban streams. This is particularly true when considering that most grab sampling studies are designed to capture a "first flush" portion of the hydrograph, which theoretically contains the highest concentrations of pollutants. Applying the results of a single grab to the 4-day chronic criteria will likely cause many segments to be listed for metals when in fact the 4-day average concentrations in the stream meet the standard. The United States Environmental Protection Agency (EPA) guidance for assessment (2005) states:

"...if it were known that the watershed draining into a segment had a large number of precipitation-dependant (sic) sources of pollutants, a particular sample had been collected during the only significant rainfall that occurred during that period, and the precipitation event was of a duration shorter than the averaging period used in the water quality standard, then it could make sense to conclude that the concentration in that sample was not roughly equal to the average over the period in question (e.g., 1 day, 4 days, 7 days)." (page 34)

And

“Conversely, use of this decision rule in concert with WQC expressed as average concentrations over specific times can lead to concluding that segment conditions are worse than WQC, when in fact they are not.

If the state applies different decision rules for different types of pollutants (e.g., toxic, conventional, and non-conventional pollutants) and types of standards (e.g., acute vs. chronic criteria for aquatic life or human health), the state should provide a reasonable rationale supporting the choice of a particular statistical approach to each of its different sets of pollutants and types of standards.” (page 40)

Ecology’s own report on copper and zinc in Des Moines, Massey, and McSorely Creeks (Coots and Friesse 2012) states:

“For assessing criteria compliance for metals, the Water Quality Program has determined that a single grab sample is representative of the 1-hour average, referred to in the acute criteria. For this study, only acute criteria are applied to dissolved copper and zinc. Chronic criteria are meant to represent a 4-day average. Because storm samples were never collected over more than a 5-hour period for the first storm, and 2-hour period for the second and third storms, the chronic criteria do not apply.” (page 34)

If a 5-hour sample period is insufficient then clearly a single, instantaneous grab sample should not be applied to the 4-day chronic criterion. Weyerhaeuser and King County have also commented on this issue (Ecology 2012a) with similar concerns. The Port joins King County in requesting that Ecology undertake a study to determine the appropriate sample size and methodology needed to accurately assess a 4-day average concentration within an assessment unit. The EPA, as quoted above, would seem to agree. Until, Ecology has shown that the application of a single data point to the chronic water quality standard is valid it should not be used for assessing water quality under the Clean Water Act Section 303(d).

Sincerely;



Bob Duffner
Senior Manager Environmental Programs
Aviation Division

Attachment: References

References

- Coots and Friese. 2012. Copper and Zinc Levels in Des Moines, Massey, and McSorely Creeks, King County. Washington State Department of Ecology Publication no. 12-03-041.
- Ecology. 2012. Water Quality Program Policy 1-11. Assessment of Water Quality for the Clean Water Act Section 303(d) and 305(b) Integrated Report. July 2012.
- Ecology. 2012a. Response to Comments. Revisions to Policy 1-11. July 2012.
- EPA. 2005. Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act.
- Herrera, 2001. City of Des Moines Water Quality Monitoring Program, Five-Year Project Report. Prepared for the Des Moines Surface Water Management Utility by Herrera Environmental Consultants, Seattle, WA.
- Nautilus Environmental. 2008. Derivation of Site-Specific Water Quality Objectives and Effluent Limits for Copper in Stormwater. Prepared for the Port of Seattle.
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- Parametrix. 2001. Comprehensive Stormwater Management Plan - Master Plan Update Improvements, Seattle-Tacoma International Airport. Prepared for Port of Seattle. December 2000; revised July 200 1.
- Port of Seattle. 2014. Fact Sheet for NPDES Permit WA-002465-1. Seattle-Tacoma International Airport.

