MULTNOMAH COUNTY
National Pollutant Discharge Elimination System Permit
Municipal Separate Storm Sewer System
Supplemental Permit Evaluation Report
February 1, 2012

Oregon Department of Environmental Quality
Permit No. 103004
EPA Reference No.: ORS120542
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This report addresses modifications to environmental monitoring permit conditions. The information provided in this report is applicable to conditions found in the following sections of the Permit and Permit Evaluation Report:

- **Schedule B - Monitoring and Reporting Requirements: Table B-1 - Stormwater Monitoring – Mercury; and,**
- **Schedule B – Monitoring and Reporting Requirements: Table B-1 - Special Conditions #3**

SUMMARY OF PERMIT ACTION

Multnomah County owns and/or operates a storm sewer system that serves the following: a) small unincorporated urban pocket areas surrounded by the City of Portland (i.e., Westside Pockets) and City of Fairview (i.e., Interlachen-between Blue Lake and Fairview Lake); b) county-operated roadways in the Cities of Fairview (11 miles), Troutdale (13 miles) and Wood Village (4 miles); c) five county-operated Willamette River bridges (i.e., Sellwood, Hawthorne, Morrison, Burnside, Broadway); and, d) isolated county-owned or operated facilities located in the Cities of Fairview, Gresham, and Troutdale.

Three major drainage areas are within the permit area; these drainage areas are subdivided further into three subbasins. The major receiving waters that accept stormwater drainage from the permit area are the Columbia River, Lower Willamette River, Johnson Creek, Sandy River, Fairview Creek, Fairview Lake, Blue Lake, Osburn Creek, No Name Creek, Salmon Creek, Beaver Creek, Arata Creek, Sweetbriar Creek, Fanno Creek, Balch Creek, and Tryon Creek. The TMDL waterbodies that receive stormwater discharges from Multnomah County's MS4 are the Sandy River, Willamette River, Columbia Slough, and the lower Willamette subbasin tributaries, including Johnson Creek and Fairview Creek.

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces and does not percolate into the ground. As runoff flows over land and impervious surfaces in urbanized areas (such as paved streets, parking lots and building rooftops), it can accumulate chemicals, nutrients, sediment or other pollutants in quantities that could adversely affect water quality. If stormwater runoff discharges from MS4s that serve these urbanized areas, and the runoff is untreated or allowed to accumulate pollutants, it may adversely affect local aquatic organisms and other beneficial uses of water such as swimming, fishing and drinking water.

The municipal separate storm sewer permit (MS4) for Multnomah County was renewed on December 30, 2010, which is the second renewal of this NPDES stormwater permit. No compliance, enforcement or complaints have been associated with or attributed to Multnomah County during previous permit terms or during the current permit term.

Permit Modification Discussion

A Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. Fish consumptions advisories for mercury in the Willamette River Basin represent an impairment of beneficial uses (i.e., fishing), and required DEQ to develop a Total Maximum Daily Load (TMDL) to be protective of the beneficial use of fish consumption.

Mercury (Hg) was broadly addressed in the first phase of the Willamette River Basin Mercury TMDL in 2006, covering the Willamette River and its tributaries. The Water Quality Management Plan (WQMP) associated with the Willamette River Basin TMDL states that because the mercury TMDL does not identify source-specific Wasteload Allocations (WLA) for mercury, "mercury is not considered to be a TMDL pollutant under the Phase I MS4 permit provisions. However, mercury is a 303(d) listed pollutant in the Willamette Basin". In addition, the WQMP highlights the need for a) more extensive source data on total and dissolved Hg and methyl mercury (MeHg) from stormwater sources, and b) a mercury monitoring requirement for sources to collect data that will be used in the mass balance analysis of mercury for WLA development for second phase of the Willamette River Basin Mercury TMDL.[1]

The environmental monitoring requirements identified in Table B-1 of the MS4 Phase I permits include Hg and MeHg to address the following goals: a) ensure information is continually collected for applicable 303(d) pollutants; b) contribute to the characterization of mercury concentrations in urban stormwater runoff (*i.e., stormwater monitoring program objective*); and, c) inform DEQ during the development of the second phase of the Willamette River Basin Mercury TMDL, particularly WLA development. In developing the Table B-1 stormwater monitoring-mercury requirements for Multnomah County, DEQ considered the MS4 Phase I Stormwater section presented in the "Mercury Monitoring Requirements for Willamette Basin Permittees" memo to support TMDL development.[2] This memo states "mercury and methyl mercury samples must be collected from a representative set of stormwater outfalls during significant runoff events," by *each* MS4 Phase I stormwater permit, and indicates stormwater samples must be collected during a wet-season storm event and a dry-season storm event for two years (i.e., a minimum of four sample events). DEQ considered other factors in developing the stormwater monitoring-mercury requirements for Multnomah County, including geographical extent of MS4 drainage area, population served by the MS4, existing stormwater monitoring requirements, cost/resources needed to conduct mercury monitoring and the overall data needs of DEQ to complete the Willamette River Basin Mercury TMDL. Based on these considerations, DEQ has determined that Hg and MeHg stormwater monitoring by Multnomah County continues to be appropriate to address the aforementioned goals, particularly because of the geographical extent of Multnomah County's MS4 system in the Portland Metropolitan area and the overall population served by this transportation-dominated MS4 system.

DEQ reviewed new information submitted by Multnomah County, including information related to the geographical area and population served by the MS4. Based on this information, DEQ has determined that monitoring at one sample location instead of two sample locations is appropriate for Multnomah

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[1] Information related to the mass balance analysis [pg. 14-26 Chapter 14 - Willamette TMDL] (http://www.deq.state.or.us/WQ/TMDLs/docs/willamettebasin/willamette/chpt14wqmp.pdf)

[2] http://www.deq.state.or.us/wq/wqpermit/docs/individual/npdes/ph1ms4/WillametteTMDLMercuryMonitoring.pdf

County due to its limited surface drainage area to the MS4, particularly when compared to other MS4 permittees required to collect Hg and MeHg samples.

DEQ also considered the appropriateness of collecting only one Hg and MeHg stormwater sample during a wet-season storm event and a dry-season storm event during the first two years of the permit, and determined that the Hg and MeHg permit conditions will continue to require monitoring for a minimum of a two-year period, once during a wet-season storm event and a dry-season storm event each year, resulting in at least four sample events. This frequency will ensure there is an equal and sufficient number of stormwater monitoring data points for wet-season and dry-season storm events during a two-year period that will allow DEQ to evaluate seasonal variability over time.

In making this determination, DEQ acknowledges the inverse seasonal pattern between mercury and methyl mercury concentrations in the Willamette River exists. Several studies have identified the importance of seasonality in mercury concentrations in fresh water, where mercury concentrations are highest during winter and spring, while methyl mercury concentrations are highest during the summer and fall. This pattern of increased methyl mercury concentrations during the warmer months (summer and fall) suggests that water quality variables are likely controlling the methylation of mercury and ultimately the methyl mercury concentration in the water column (Shanley, 2005; Ullrich, 2001; Matilainen and Verta, 1995)[3].

DEQ will determine if further Hg and MeHg monitoring is warranted during the permit term based on the submitted MS4 stormwater monitoring results. In the first phase of the Willamette River Basin Mercury TMDL, 0.92 ng/L was identified as an interim water quality criterion. At a minimum, stormwater Hg concentrations and loads will be compared to this criterion, and to in-river Hg concentrations and loads. Additionally, the MeHg/total Hg ratio will be evaluated, which is a good indicator of net methylation activity, to determine if additional Hg/MeHg monitoring is warranted.

As part of the second phase of the Willamette River Basin Mercury TMDL, DEQ's goal is to establish spatial and temporal relationships between in-river concentrations of Hg and MeHg, and to determine how these concentrations are influenced by point and non-point source loading and general water quality parameters which may influence the methylation of mercury. DEQ will provide additional information related to whether additional Hg monitoring will be required once the monitoring data collected during the first two (2) monitoring years of the permit term has been evaluated. As with all other MS4-related environmental monitoring, DEQ continues to encourage permittees to coordinate Hg and MeHg monitoring with other MS4 permittees.

DEQ appreciates the fact that Multnomah County was previously a co-permittee under the Portland MS4 Group and Gresham MS4 Group permits. As a MS4 co-permittee, Multnomah County would have been responsible for Hg or MeHg stormwater monitoring. If Multnomah County remained a co-permittee

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[3] Shanley, J.B., Kamman, N.C., Clair, T.A., and Chalmers, A. 2005. Physical Controls on Total and Methylmercury Concentrations in Streams and Lakes of the Northeastern USA. Ecotoxicology. 14, 125 – 134. Ullrich, S.M., Tanton, T.W. and Abdrashitova, S.A., 2001. Mercury in the Aquatic Environment: A Review of Factors Affecting Methylation. *Critical Reviews in Environmental Science and Technology*, **31**(3): 241-293. Matilainen, T, and Verta, M. 1995. Mercury Methylation and Demethylation in Aerobic Surface Waters. Canadian Journal of Fish. Aquat. Sci. 52: 1597-1608.

under the aforementioned permits, the Hg and MeHg stormwater monitoring requirements in these permits would have likely increased to reflect the fact that Multnomah County was a co-permittee. Although there is close, and in some instances overlapping, geographical proximity of Multnomah County to permittees covered by the aforementioned MS4 Group permits, DEQ expects the stormwater samples collected by Multnomah County will contribute to a more thorough characterization of land use, including a transportation-related land use, within the Willamette River Basin. As with all other MS4-related environmental monitoring, DEQ continues to encourage Multnomah County to coordinate Hg and MeHg monitoring with other MS4 permittees.

The permit modifications to Table B-1 for the Stormwater Monitoring- Mercury condition and Special Condition #3 are shown below. These modifications replace respective sections of the permit issued to Multnomah County on December 30, 2010. These modifications do not alter or eliminate any other conditions described in the December 30, 2010 permit.

Table B-1
Environmental Monitoring

Monitoring Type	Monitoring Location(s)	Monitoring Frequency	Pollutant Parameter(s)
Stormwater Monitoring - Mercury	One (1) site	One (1) wet-weather storm event and one (1) dry-weather storm event/year	Mercury, Total & Dissolved Methyl Mercury, Total & Dissolved

Table B-1
Environmental Monitoring

Special Conditions

3) Monitoring and analysis for mercury and methyl mercury must be conducted in accordance with DEQ's "Mercury Monitoring Requirements for Willamette Basin Permittees" memo. EPA Method 1669 ultra clean sampling protocol must be used to collect mercury and methyl mercury samples. Monitoring for total and dissolved mercury must be performed according to USEPA method 1631E with a quantitation limit of 0.5 ng/L. Monitoring for total and dissolved methyl mercury must be performed according to USEPA method 1630 with a quantitation limit of 0.05 ng/L. Monitoring a wet-weather storm event must occur between October 1 and April 30. Monitoring a dry-weather storm event must occur between May 1 and September 30. After two years and a minimum of four storm events are sampled, the permittee may request in writing to the Department that the mercury and methyl mercury monitoring be eliminated. This monitoring may be eliminated only after written approval by the Department is received by the permittee.

Dennis Ades, Surface Water Quality Section Manager

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