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PROPOSED TOTAL PHOSPHORUS TMDL FOR THE WISSAHICKON CREEK WATERSHED

Public Meeting – June 10, 2015

PUBLIC NOTICE

EPA Proposes Total Phosphorus TMDL for the Wissahickon Creek Watershed—Notice of Availability, Solicitation of Public Comment

The U.S. Environmental Protection Agency, Region III (EPA) plans to establish a Total Maximum Daily Load (TMDL) for total phosphorus in the Wissahickon Creek Watershed. The TMDL will establish reductions necessary to address the poor stream health caused by excessive total phosphorus from wastewater treatment plants, stormwater runoff, and other sources. The Wissahickon Creek drains approximately 64 square miles in Montgomery and Philadelphia Counties in Pennsylvania. Major tributaries of Wissahickon Creek include Cresheim Creek, Sandy Run, Willow Creek, Trewellyn Creek, and Pine Run. Municipalities impacted by this action include Abington, Ambler, Cheltenham, Horsham, Lansdale, Lower Gwynedd, Montgomery, North Wales, Philadelphia, Springfield, Upper Dublin, Upper Gwynedd, Upper Moreland, Whitemarsh, Whitpain, and Worcester.

EPA welcomes input from the public and interested parties regarding the proposed TMDL. A draft of the *Total Phosphorus TMDL for the Wissahickon Creek Watershed, Pennsylvania* is available on EPA's website at http://www.epa.gov/reg3wapd/tmdl/. Hard copies of the draft TMDL report can also be requested. Please direct questions to Ms. Ashley Toy at (215) 814-2774 or toy.ashley@epa.gov. Written comments will be accepted through July 4, 2015. *The end of the comment period falls on a holiday, so all comments postmarked by the following business day, July 6, 2015, will be accepted.* All written comments should be sent to Ms. Lenka Berlin (contact information below). Please reference "Wissahickon Creek TMDL" on all submitted comments.

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EPA will hold a public meeting to present the details and answer questions regarding the proposed TMDL on June 10, 2015 at 7:00 pm. The meeting will be held at Temple University Ambler Campus, Ambler Learning Center Room 202, 580 Meetinghouse Road, Ambler, PA 19002.

Tonight's presentations will be made publically available on our website at:
http://www.epa.gov/reg3wapd/tmdl/

YOUR NOTES:

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EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency, Region 3 (EPA) is establishing a total maximum daily load (TMDL) for total phosphorus (TP) the Wissahickon Creek Watershed in southeastern Pennsylvania. Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (codified at Title 40 of the *Code of Federal Regulations* Part 130) require states to develop TMDLs for impaired water bodies. A TMDL establishes the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources.

The Wissahickon Creek drains approximately 64 square miles and extends 24.1 miles in a southeasterly direction through lower Montgomery County and northwestern Philadelphia County before entering the Schuylkill River. The watershed covers portions of sixteen municipalities which include urbanized areas. The headwaters and upper portions of the watershed consist primarily of residential, agricultural, and wooded land use. The mid-section of the watershed is dominated by industrial, commercial, and residential land use, and includes a limestone quarry that adds flow to the creek. The lower 6.8 miles of the stream is enclosed by Fairmount Park, a predominantly wooded area, while the remaining lower watershed is dominated by residential land use.

Multiple stream segments in the Wissahickon Creek watershed have been identified as not protective of aquatic life due to nutrients and other nutrient related conditions such as organic enrichment and low dissolved oxygen. Nutrients are a natural part of an aquatic ecosystem. They also support the growth of algae and aquatic plants, which in turn provide food and habitat for fish, shellfish, and smaller organisms that live in water. However, when excess nutrients enter the environment, algae grows to amounts beyond what the ecosystems can handle and ultimately impair the use of a stream for aquatic life.

Excessive nutrient concentrations in streams and rivers do not have a direct toxicological effect on insects, fish, and other animal aquatic life, but does cause indirect effects from the adverse impacts on algal and other plant aquatic life. Excessive nutrient concentrations directly impact algae and other aquatic plant life by altering the diversity and composition of those assemblages needed to support a healthy ecosystem. Excessive nutrients contribute to increased algal growth which leads to changes in the physical and chemical stream environment associated with eutrophication such as low dissolved oxygen (DO), changes to pH, loss of reproductive habitat, alteration on the availability of palatable algal taxa, etc. Such significant increases in algae harm water quality, food resources and habitats, and decrease the DO that fish and other aquatic life need to survive.

EPA is establishing this TMDL for TP as a supplemental action to restore the aquatic life use impairment caused by excessive nutrient concentrations in the Wissahickon Creek Watershed. In October 2003, EPA established TMDLs for the pollutants ammonia nitrogen, nitrate-nitrite, orthophosphate, and carbonaceous biochemical oxygen demand, to support restoration of the

aquatic life use impairment in the Wissahickon Creek Watershed caused by nutrients (herein referred to as the 2003 Nutrient TMDL). The 2003 Nutrient TMDL was intended to ensure the Pennsylvania's water quality standard for DO, a variable for eutrophic conditions, was met during critical conditions. Although the 2003 Nutrient TMDL adequately addressed DO concentrations, it did not adequately address nuisance algal growth and its negative impact on aquatic life uses. For this reason, the stream segments previously addressed in the 2003 Nutrient TMDL are still impaired due to nutrients and must be further addressed in this TMDL. This TMDL addresses the nuisance algal growth by focusing on TP, a nutrient that did not have water quality goal in the 2003 Nutrient TMDL. This TP TMDL does not replace the TMDLs for ammonia nitrogen, nitrate-nitrite, orthophosphate, and carbonaceous biochemical oxygen demand pollutants, and should be viewed as supplemental to the 2003 Nutrient TMDL.

EPA developed the Wissahickon Creek watershed TMDL based on extensive information on the streamflow characteristics of the watershed, distribution and acreage of various land uses, meteorological data, and many other factors. During 2005, EPA, as well as the United States Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), Philadelphia Water Department (PWD), and Pennsylvania Department of Environmental Protection (PADEP), collected a substantial amount of environmental data through extensive monitoring in the Wissahickon Creek Watershed. The data collected helped provide a clear picture of the environmental characteristics of the watershed.

Knowledge of the TP sources and transport of TP within the watershed was also necessary in developing the TMDL. For purposes of a TMDL, it is important to distinguish the sources of TP based on their classification as a point sources which are regulated or a nonpoint sources which are not regulated under the Clean Water Act in order to assign wasteload allocations (WLA) to point sources or load allocations (LA) to nonpoint sources. Almost all of the TP in the Wissahickon Creek Watershed is attributable to point sources which require coverage by a National Pollutant Discharge Elimination System (NPDES) permit, which is a mechanism for implementation of this TMDL. There are several municipal waste water treatment plants (WWTPs) in the Wissahickon Creek watershed which are sources of TP. These WWTPs make up the majority of the streamflow during low-flow periods. In addition, the entire Wissahickon Creek Watershed lies within the political boundaries of municipal separate stormwater sewer systems (MS4s), which are regulated as point sources. Discharges from MS4s are generated by runoff from urban land and impervious areas such as paved streets, parking lots, and rooftops during precipitation events. These discharges often contain concentrations of various pollutants including TP. Due to a lack of refined sewersheds that would delineate areas contributing stormwater discharges to the Wissahickon Creek and its tributaries through regulated MS4s, this TMDL assigns TP loadings from all land-uses within the political boundaries of the MS4s to the respective MS4. EPA acknowledges that this methodology may include loadings from nonpoint sources that may exist within the political boundaries of MS4s such as agricultural lands, golf courses, etc. Therefore, this TMDL fully evaluates any loadings from potential nonpoint sources and their impacts on the watershed, but does not disaggregate loadings based on regulatory status. Septic systems are the only category of nonpoint sources identified as a separate source of TP in this TMDL. There are also numerous other point sources scattered through the watershed which were determined to have *de minimis* discharges of TP.

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EPA developed a scientifically supported nutrient endpoint for this TMDL, since Pennsylvania has applicable narrative criteria, but no numeric water quality criteria for nutrients. This TP endpoint for the TMDL was developed based on a separate EPA study to determine an appropriately protective endpoint for the northern Piedmont region of Pennsylvania, in which the Wissahickon flows. EPA applied a weight of evidence approach, (as discussed in Section 1 of the report) showing that a TP endpoint of 40 micrograms per liter (µg/L) would be both protective of aquatic life uses in this region and defensible (Paul and Zheng 2007).

In the development of this TMDL and its allocations, EPA relied on two computer models that use observed and simulated data to replicate what is occurring in the Wissahickon Creek watershed to make future predictions on water quality. The computer modeling process consisted of several steps. First, the characteristics of the drainage area including land use, soil type, and stream geometry, were entered into the models. The models were then calibrated using observed data to ensure reasonably accurate representation of the Wissahickon Creek watershed. Once the models were calibrated, EPA used them to determine the reductions in TP necessary to meet the TP endpoint, and the basis to support the TMDL pollutant allocations.

The TMDL itself is composed of waste load allocations (WLA) for point sources and load allocations (LA) for nonpoint sources, and includes a margin of safety (MOS) to account for the uncertainty in the relationship between TP loads and the water quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$\text{TMDL} = \Sigma\, WLAs + \Sigma\, LAs + MOS$$

The final TMDL for the Wissahickon Creek Watershed expressed as annual loadings is shown in Table E-1. The TMDL is also expressed as daily loadings in Section 5 of this report. The nutrient TMDL for the Wissahickon Creek Watershed used an implicit MOS because the assumptions made in the development of the TMDL were conservative.

This TMDL will inform future NPDES permits (re)issued in the watershed. Federal regulations require that NPDES permit effluent limits be consistent with the assumptions and requirements of the TMDL WLAs. While the applicable permit effluent limits need not be identical to the WLA, EPA anticipates future permits will include more stringent limits on TP discharged by sewage treatment plants and requirements for MS4 communities to develop and implement short and long-term plans to control TP in stormwater.

EPA is required to seek public comment pursuant to 40 C.F.R. §130.7(d)(2) for TMDLs developed by EPA. Public participation for this TMDL development process is discussed in Section 7.

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Table E-1. Annual TMDL loads for TP for the Wissahickon Creek watershed.

Source Group	Allocation Type	Source	Baseline TP Load* (lbs/year)	Allocated TP Load (lbs/year)	Percent Reduction (%)
Point Sources: WWTP	WLA	Upper Dublin (PA0029441)	9634.00	171.47	98.2
		Abington (PA0026867)	45734.00	361.45	99.2
		Ambler (PA0026603)	81115.00	798.63	99.0
		Upper Gwynedd (PA0023256)	47311.00	282.58	99.4
		North Wales (PA0022586)	3976.08	47.71	98.8
Point Sources: MS4	WLA	Abington (PAG130012)	9574.45	209.60	97.8
		Ambler (PAG130036)	2707.77	79.37	97.1
		Cheltenham (PAG130054)	576.99	27.82	95.2
		Horsham (PAG130157)	563.86	15.28	97.3
		Lansdale (PAG130038)	1912.30	26.03	98.6
		Lower Gwynedd (PAG130072)	23505.76	1458.61	93.8
		Montgomery (PAG130016)	5143.51	119.85	97.7
		North Wales (PAG130005)	1639.47	27.01	98.4
		Philadelphia (PA0054712)	24799.61	2404.14	90.3
		Springfield (PAG130130)	15038.23	641.87	95.7
		Upper Dublin (PAG130075)	30535.65	1587.65	94.8
		Upper Gwynedd (PAG130031)	12149.69	458.51	96.2
		Upper Moreland (PAG130019)	156.50	1.78	98.9
		Whitemarsh (PAG130103)	16595.84	1373.25	91.7
		Whitpain (PAG130137)	12295.91	784.40	93.6
		Worcester (PAG130026)	314.64	9.82	96.9
Nonpoint Sources	LA	Septics	2289.11	274.69	88.0
Total Point Sources: WWTP			**187770.08**	**1661.84**	**99.1**
Total Point Sources: MS4			**157510.18**	**9224.99**	**94.1**
Total Nonpoint Sources			**2289.11**	**274.69**	**88.0**
Total			**347569.37**	**11161.52**	**96.8**

*For septics and MS4s, the baseline TP load represents existing TP loadings from 2005-2006. For WWTPs, baseline TP loads are calculated using observed phosphorus data and effluent discharge rate, or the flow used to calculate effluent limitations for a National Pollutant Discharge Elimination System (NPDES) permit.