UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
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Reconsideration Decision and Rationale Nutrient and Sediment TMDLs for the Indian Creek Watershed, Pennsylvania

Established by the U.S. Environmental Protection Agency on June 30, 2008

_____/S/_____
Jon M. Capacasa, Director
Water Protection Division

Date: __3/21/2014_____

March 21, 2014

Indian Creek Watershed Nutrient and Sediment TMDLs – Reconsideration Decision

Summary:

The Environmental Protection Agency (EPA) is making this decision today with regards to its reconsideration of the Indian Creek Watershed nutrient and sediment total maximum daily loads (TMDLs) that EPA established on June 30, 2008.

For the nutrient TMDL, EPA has considered the additional information and comments received, reviewed that TMDL in light of that information, and determined that the nutrient TMDL remains technically sound. EPA therefore denies the request of the Telford Borough Authority to withdraw the Indian Creek Watershed nutrient TMDL.

EPA has also reviewed the sediment TMDL for the Indian Creek and, based on that review, EPA will seek a voluntary remand of the sediment TMDL for the Indian Creek watershed from the United States District Court for the Eastern District of Pennsylvania, where the Indian Creek sediment and nutrient TMDLs are being challenged by Lower Salford Township Authority, Lower Salford Township, Franconia Township and Franconia Sewer Authority. Once the sediment TMDL has been remanded to the agency, EPA will engage Pennsylvania Department of Environmental Protection (PADEP) and affected stakeholders regarding the revision and/or withdrawal of the sediment TMDL.

Background:

On June 30, 2008, EPA established nutrient and sediment TMDLs for the Indian Creek watershed in Pennsylvania (*Nutrient and Sediment TMDLs for the Indian Creek Watershed, Pennsylvania Established by the U.S. Environmental Protection Agency*). [1]

The Indian Creek watershed drains approximately seven square miles in Montgomery County, PA and includes portions of eight municipalities. Various degrees of residential development (low, medium and high intensity residential) are scattered throughout the watershed with the middle portion mostly pasture. TMDL wasteload allocations (WLAs) were assigned to three wastewater treatment plants (WWTPs) in the watershed: Telford Borough Authority, Pilgrim's Pride, and Lower Salford Authority (Harleysville sewage treatment plant). Because the entire watershed is served by four Municipal Separate Storm Sewer Systems (MS4s), WLAs were also assigned to the four MS4 jurisdictions of Lower Salford, Telford, Souderton, and Franconia.

EPA developed nutrient and sediment TMDLs for the Indian Creek watershed at the request of the PADEP, and pursuant to requirements of the Pennsylvania TMDL Consent Decree, American Littoral Society v. EPA, Civil No. 96-489 (E.D.Pa.) (J. Katz). The consent decree required EPA to establish TMDLs for water quality limited segments (WQLSs) identified on Pennsylvania's 1996 CWA section 303(d) list of impaired waters. Indian Creek was identified on Pennsylvania's 1996 list as a WQLS impaired for aquatic life uses by an unknown "cause"

[1] *Nutrient and Sediment TMDLs for the Indian Creek Watershed, Pennsylvania Established by the U.S. Environmental Protection Agency, June 30, 2008,* (USEPA 2008c) accessed at: http://www.epa.gov/reg3wapd/pdf/pdf_tmdl/IndianCreekAL_Report_Response.pdf

and "source unknown". Pennsylvania's 2004 list refined this listing as impaired by nutrients, identified the source as municipal point sources, and added an impairment for siltation with the source being from agriculture, small residential runoff and urban runoff/storm sewers.

EPA established the Indian Creek TMDLs to address WQLSs listed on Pennsylvania's 303(d) list that were not meeting aquatic life uses as a result of siltation (sediment) and nutrients. As explained in detail in the Indian Creek TMDL report and supporting documents, EPA relied on extensive water quality data and expert scientific analysis in establishing these TMDLs. Please refer to the Indian Creek Watershed TMDL (USEPA 2008c) for further details.

EPA is making this decision today, in part, to respond to requests for reconsideration and withdrawal of the Indian Creek nutrient TMDL submitted by Mr. John Hall on February 3, 2010 and September 14, 2010, on behalf of a group of Pennsylvania communities, including the Telford Borough Authority (Telford).[2] Additionally, EPA is responding to requests for reconsideration and withdrawal of the Indian Creek sediment TMDL submitted by Mr. Steve Hann on March 18, 2013 and June 26, 2013, on behalf of Lower Salford Township Authority, Lower Salford Township, Franconia Township and Franconia Sewer Authority. Over the years, Mr. Hall, Mr. Hann and others have submitted many comments to (and had many conversations with) EPA – both before and after EPA's establishment of the Indian Creek nutrient and sediment TMDLs. EPA has prepared the attached Chronology of Contacts (Attachment A) to provide a summary of those comments and communications.

In this document, EPA is addressing a number of issues raised about the nutrient TMDL by Mr. Hall in his 2010 letters, as well as additional issues raised by Mr. Hann regarding the sediment TMDL. In addition to raising technical issues regarding the validity of these TMDLs, Mr. Hall and Mr. Hann have raised – in their complaints and elsewhere – a number of purely legal concerns about these TMDLs, e.g., whether establishment of the TMDLs unlawfully revised Pennsylvania's water quality standards and whether EPA lawfully established the TMDLs in the first place. EPA is not addressing such purely legal claims in this document. Should it be necessary, EPA will respond to such legal issues in appropriate motions and briefs filed in the pending lawsuits challenging the TMDLs. Instead, this document responds to the technical concerns raised against the Indian Creek nutrient and sediment TMDLs by Mr. Hall and Mr. Hann, and presents EPA's conclusions regarding their merits.

Indian Creek Watershed Nutrient TMDL Reconsideration:

This section responds to Mr. Hall's and others' requests for reconsideration and withdrawal of the Indian Creek nutrient TMDL. EPA has identified three principal documents in which Mr. Hall on behalf of Telford and others set forth their reasons for seeking reconsideration of the Indian Creek nutrient TMDL. Where those documents also make comments about other nutrient TMDLs that EPA established in the Paxton Creek, Goose (Chester) Creek, Southampton Creek, and Sawmill Run watersheds, it is not necessary for EPA to respond to those issues, except to the extent they overlap with issues raised about the Indian Creek TMDL.

[2] The Telford Borough Authority in their judicial challenge to the Indian Creek TMDLs is challenging the nutrient TMDL but not challenging the Indian Creek Sediment TMDL.

The three documents EPA used as a basis for this reconsideration decision are:

1. February 4, 2010 Letter from John Hall on behalf of others including Telford to EPA Region 3 Water Protection Division Director Jon Capacasa and PADEP Deputy Secretary John Hines (referred to as "T1")
2. September 14, 2010 Letter from John Hall on behalf of others including Telford to EPA Deputy Administrator Robert Perciasepe and EPA Policy Advisor to the Administrator Robert Sussman (Letter mistakenly identifies Mr. Perciasepe as "Assistant Administrator for EPA's Office of Air and Radiation" and Mr. Sussman as "Deputy Administrator") (referred to as "T2")
3. October 4, 2010 Letter from John Hall to Nancy Stoner (referred to as "T3")

Below is an identification of the significant technical issues raised in these letters regarding the Indian Creek TMDL and EPA's responses.

Issue #1: Is Indian Creek impaired by nutrients?

Mr. Hall on behalf of several parties including Telford claims that the listing of Indian Creek was inappropriate because the stream is not impaired for nutrients and does not exhibit characteristics of nutrient impaired streams. T1 at 3; T2 at 3-4.

Issue #1 Response: Indian Creek is impaired by nutrients.

PADEP listed Indian Creek as impaired by nutrients and sediment. After review of all available data, EPA finds that the 2004-2012 section 303(d) list decisions of PADEP appropriately identified Indian Creek as impaired by nutrients. PADEP provided public notice and opportunity to comment on each of their 303(d) lists as did EPA in its development of the Indian Creek TMDL. Any public notice requirements regarding those actions were satisfied by extensive public notice afforded these lists, as well as the TMDLs, their endpoints, and the underlying methodology.

Here is an excerpt from the 2008 TMDL at p. 3 Section 1.2 that explains in detail the basis of PADEP's and EPA's conclusions that Indian Creek is nutrient impaired. EPA reaffirms this conclusion:

> Indian Creek was placed on Pennsylvania's 1996 303 (d) list of impaired waterbodies for not meeting the designated aquatic life use due to various pollutants, including salinity, siltation, and nutrients. Subsequent listing cycles (2004 and 2006) have included additional impairments, as shown in the summary of the 2006 listings in Table 1-1. Attributed causes include municipal point sources, agriculture, and urban and residential stormwater runoff . . . Based on PADEP field assessments, the stream was also overwhelmed by sewage effluents in two locations. Available data show severe swings in dissolved oxygen (DO), oxygen saturation levels and pH. Data also indicate

> phosphorous and nitrogen concentrations in this system are elevated, likely contributing to the presence of thick algal mats that frequently blanket the stream in various locations throughout the watershed.
>
> . . . During this investigation, PADEP conducted chemical and biological sampling at two stations upstream and downstream of the Lower Salford Township Authority Harleysville STP (PA0024422) outfall. Based on the results of this investigation, the invertebrate community at station one was found to be "fair to poor" and the invertebrate community at Station two was found to be "poor". Recommendations of the field staff conducting the investigation included the recommendation "that the unnamed tributary to Indian Creek be listed as impaired from the Lower Salford Township Authority, Harleysville STP outfall to the mouth for municipal point source nutrients." It was upon this recommendation and specific findings in the field as well as others similar to it throughout the Indian Creek watershed, that the stream was included on PADEP's 303(d) list as impaired. As another example, a second field form on which PADEP recorded results of the stream assessment of Indian Creek at Indian Creek Road found: "Indian Creek is impaired based on the taxa collected. This station lacked pollution sensitive taxa and was dominated by facultative taxa. The cause of impairment is likely from storm water runoff from Harleysville and Telford and from sewage effluent as the stream is effluent dominated."

EPA also provided a response to comments (Part A at p.81) that is relevant here regarding claims that the nutrient impairment was not consistent with PADEP's assessment protocols (replacing earlier versions PADEP used including a 1997 document cited by Mr. Hall):

> The Pennsylvania 2007 Assessment Methodology specifies the need to include nutrient data in evaluating the impairment status of a waterbody. Appendix A of the method notes under the source and cause definitions that "…Presence of excessive quantities of Phosphorus and/or Nitrogen that under the proper conditions may result in dense algal or macrophyte growth and wide fluctuations in Dissolved Oxygen levels. Average daily DO may be relatively normal. Biological impairment may occur without Chapter 93 criteria violations." This makes it clear that Pennsylvania understands that biological impairment due to nutrient levels may occur even when DO standards are being met.
>
> Finally, the Bureau of Water Quality Standards and Facility Regulation guidance on *Instream Comprehensive Evaluation (ICE) Surveys (Updated October 5, 2007)* directs field staff to collect nutrient and biological data. Phosphorus data is to be collected for municipal point sources and, total and dissolved nutrients for stormwater discharges and, "if deemed necessary by the investigator, nutrient sampling will occur during the growing season at least once a month from May through October…Water quality analysis should be conducted for total and dissolved nutrients…" These directions to the field staff indicates the state's concern with the impacts of nutrients from both point and nonpoint sources.
>
> The ICE guidance continues to direct the staff on biological data. "1) Benthic macroinvertebrates (required). Because aquatic organisms are excellent indicators of water quality, and are routinely sampled as part of Pennsylvania's ongoing water quality

management program, benthic macroinvertebrates will be collected in most instances to assess the attainment of aquatic life uses." It is clear that macroinvertebrates are a major consideration in determining water impairment with respect to aquatic life.

Table 1 (below) is an excerpt from the Indian Creek TMDL showing Pennsylvania's 303(d) list of impaired waters in the Indian Creek watershed at the time of the TMDL establishment. Pennsylvania's 2008, 2010, and 2012 303(d) lists continue to list Indian Creek as impaired. Since 2010, Pennsylvania has identified Indian Creek on Category 4A of its Integrated Report as impaired waters with nutrient and sediment TMDLs developed in 2008.

Table 1. Summary of 303(d) Listings in the Indian Creek Watershed at the time of TMDL establishment (USEPA, 2008c)

Source	Cause	Assessment Unit	Miles	Date Listed
Indian Creek				
Agriculture	Siltation	New ID:2851 Old ID:20010919-1119-GLW	2.16	2004
Small Residential Runoff	Siltation	New ID:3372 Old ID:20020415-1038-KAW	1.4	2004
Urban Runoff/Storm Sewers				2004
Agriculture				2004
Municipal Point Source	Nutrients			2004
Source Unknown	Cause Unknown	New ID:7958 Old ID:7007	1.05	1996
Municipal Point Source	Salinity/TDS/Chlorides			1996
Golf Courses	Cause Unknown	New ID:10180 Old ID:990405-1500-ACW	1.77	2002
Road Runoff	Siltation			2002
Small Residential Runoff	Cause Unknown			2002
Indian Creek (Unt 00979)				
Golf Courses	Cause Unknown	New ID:10180 Old ID:990405-1500-ACW	1	2002
Road Runoff	Siltation			2002
Small Residential Runoff	Cause Unknown			2002
Indian Creek (Unt 01182)				
Municipal Point Source	Nutrients	New ID:2948 Old ID:20011010-1320-GLW	0.3	2004
Indian Creek (Unt 01185)				
Municipal Point Source	Nutrients	New ID:2948 Old ID:20011010-1320-GLW	0.3	2004
Indian Creek (Unt 01191)				
Small Residential Runoff	Siltation	New ID:3373 Old ID:20020415-1200-KAW	0.76	2004
Indian Creek (Unt 01192)				
Small Residential Runoff	Siltation	New ID:3373 Old ID:20020415-1200-KAW	0.25	2004
Indian Creek (Unt 01194)				
Agriculture	Siltation	New ID:3372	0.54	2004

Source	Cause	Assessment Unit	Miles	Date Listed
		Old ID:20020415-1038-KAW		
Urban Runoff/Storm Sewers				2004
Municipal Point Source	Nutrients			2004
Small Residential Runoff	Siltation			2004
Indian Creek (Unt 01200)				
Agriculture	Siltation	New ID:3372 Old ID:20020415-1038-KAW	0.59	2004
Municipal Point Source	Nutrients			2004
Small Residential Runoff	Siltation			2004
Urban Runoff/Storm Sewers				2004
Municipal Point Source	Salinity/TDS/Chlorides	New ID:7958 Old ID:7007	0.61	1996
Source Unknown	Cause Unknown			1996

Further evidence of Indian Creek's nutrient impairment is represented by photo logs displaying the algal blooms in Indian Creek. Attachment B provides photos taken by EPA and its contractors in June and October of 2005. Additional photos are provided in Attachment C, which were provided by Mr. Hall on behalf of others in including Telford. Both sets of photos clearly demonstrate sediment and nutrient impairment in Indian Creek. In the letter (T1) there is the assertion that the lack of tree canopy is the cause of the nutrient impairment. While the photos certainly support that dense algal blooms are occurring where there is no shade, the pollutant of concern causing the impairment and algal growth is nutrients, in this case total phosphorus (TP), not the lack of shade. A lack of trees or shade is not considered a pollutant. Further, a lack of trees by itself, without the excess nutrient TP, would not cause nuisance algal growth.

In addition, PADEP recently shared with EPA continuous monitoring data that the Agency gathered in 2013. PADEP used water quality sondes, which were deployed at two in-stream locations within Indian Creek and remained, in place from March of 2013 to December 2013 to gather continuous data of pH, DO, temperature and conductivity. The two monitoring locations were at Bergey Road and at Route 63 in the Indian Creek watershed. Attachment D provides graphs of the pH, DO, temperature and conductivity data collected at the two monitoring sites. In addition, Figures 1 and 2 provide graphs of the continuous pH and DO data, respectively, taken at the Route 63 monitoring station. The graphs clearly depict significant diurnal swings of pH and DO indicative of photosynthesis occurring instream during the day and respiration conditions at night. In addition, the data indicated several violations of pH during the growing season of 2013. Pennsylvania's standards cite that pH should be between 6.0 and 9.0 inclusive.

EPA finds that the high pH levels are indirectly caused by the relationship between high nutrient levels and algal growth. Elevated nutrient levels in surface waters may support the growth of algae, which can become prolific when nutrient levels are high. During photosynthesis, algae utilize carbon dioxide, resulting in high pH conditions (Sawyer et al., 1994). In water, carbon dioxide gas dissolves to form soluble carbon dioxide, which reacts with water to form undissociated carbonic acid. Carbonic acid then dissociates and equilibrates as bicarbonate and carbonate. Generally, as carbon dioxide is used up in photosynthesis, pH rises due to the removal

of carbonic acid (Horne and Goldman 1994). The high pH levels in Indian Creek are further evidence indicating primary productivity (algal growth) in the stream and nutrient impairment.

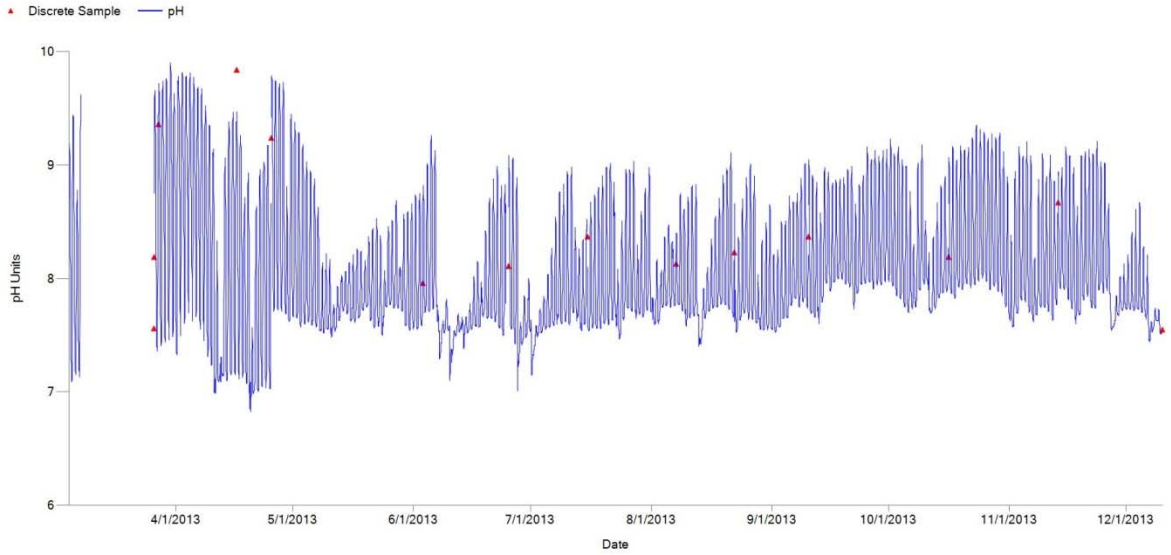

Figure 1. – pH continuous monitoring at Route 63 Indian Creek

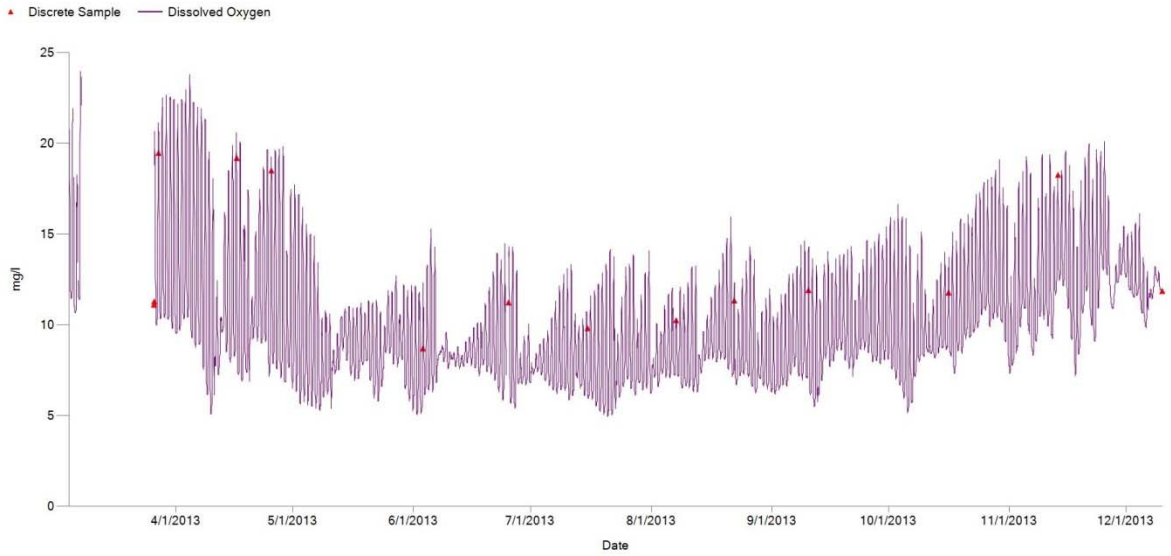

Figure 2. DO continuous monitoring at Route 63 Indian Creek

In conclusion, all data to date support PADEP's identification of a nutrient impairment in Indian Creek in 303(d) lists from 2004-2012. That data includes evidence that Indian Creek's macroinvertebrate community is impaired, as well as evidence of the existence of dense algal blooms, severe swings in dissolved oxygen (DO), oxygen saturation levels and pH and elevated nutrient levels. As to the claim that EPA's TMDL endpoint analysis "assumed" nutrients were the impairing pollutant, it is worth noting that TMDL endpoint calculation occurs *after* the water

has been determined to be impaired and the impairing pollutant has been identified. Based on an assortment of biological, chemical, observational, and modeling data, the Commonwealth and EPA had already concluded that *nutrients* were the impairing pollutant.

Issue #2: Did EPA base the Nutrient TMDL on the appropriate Pennsylvania water quality standard?

Mr. Hall on behalf of several parties including Telford alleges that EPA did not use the appropriate Pennsylvania water quality standard and that the nutrient TMDL for Indian Creek was based on Total Phosphorus (TP) criterion that was created by EPA relying a stressor-response statistical method.

Issue #2 Response: EPA concludes that the Nutrient TMDL was based on the appropriate water quality standard

EPA interpreted Pennsylvania's existing narrative water quality criteria; EPA did not establish a water quality standard or criteria pursuant to Section 303(c) of the CWA. These comments of Telford misunderstand and/or mischaracterize the development of the numeric endpoint as the promulgation of a water quality standard.

In deriving the appropriate endpoints to restore the impaired aquatic life uses in the nutrient TMDL, EPA started by using the applicable water quality standards (WQS) found in 25 PA Code, Chapter 93. The designated use for streams in the Indian Creek Watershed is to provide habitat and appropriate ecological uses as a trout stocking fishery (TSF). The numeric criteria applicable to Indian Creek and its tributaries and the related impairments include the following DO criteria:

- February 1–July 31: Maintain a minimum daily average of 6.0 mg/l with a daily minimum of 5.0 mg/l

- August 1–January 31: Maintain a minimum daily average of 5.0 mg/l with a daily minimum of 4.0 mg/l

Pennsylvania does not currently have numeric criteria applicable to nitrogen and phosphorus, although Pennsylvania has adopted water quality standards implementation regulations applicable to nutrient discharges at 25 PA Code Chapter 96.5. For waters impaired by the discharge of phosphorus, those regulations require point sources discharges "be limited to an average monthly concentration of 2 mg/l" unless more stringent controls on point source discharges are determined to be necessary as a result of TMDL development for the receiving water. 25 PA Code Chapter 96.5(c). In other words, under that regulation, the NPDES permit must include at a minimum, effluent limits for the discharge of phosphorus of 2 mg/l average monthly concentration, unless through the TMDL development a more stringent water quality based effluent limit is determined. This regulation does not by itself establish a numeric water quality criterion since it does not establish an ambient water quality criteria sufficient to protect water uses and moreover is not applicable to nonpoint sources. EPA therefore turned to PADEP's, narrative water quality criteria (25 PA Code Section 93.6 (a) & (b)) which state:

> *Water may not contain substances attributable to point or nonpoint source discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life; and In addition to other substances listed within or addressed by this chapter, specific substances to be controlled include, but are not limited to, floating materials, oil, grease, scum and substances which produce color, tastes, odors, turbidity or settle to form deposits.*

These are the standards that PADEP found (and EPA agreed) were appropriate to address the nutrient impairment of Indian Creek. The narrative criteria language most relevant to the nutrient impairment determination is "water may not contain substances . . .in concentrations . . .to be harmful to . . .aquatic life and . . .specific substances to be controlled include. . .floating materials, and substances which produce color, tastes, odors , turbidity or settle to form deposits." Nutrients in excess quantities can cause floating algal mats and algal deposits. Algal growth from excess nutrients can produce turbid waters, green, blue-green or brown colors and odors in the waterbody, as well as low dissolved oxygen or high pH conditions.

EPA notes that, although the endpoint is based on aquatic life protection, with the goal of a healthy, diverse aquatic community, EPA did evaluate the expected instream biomass and dissolved oxygen through predictive modeling. EPA determined that basing the end point on protecting the aquatic life protection will also be sufficient to reduce the biomass to below the recommended literature values as well as attain the minimum DO criterion. EPA established the nutrient TMDL in order to address the nutrient impairment, attain this narrative water quality standard thus protecting the beneficial water uses.

Issue #3: Did EPA's nutrient TMDL contain an appropriate nutrient endpoint?

Mr. Hall on behalf of several parties including Telford alleges that EPA did not develop appropriate TMDL endpoints for Total Phosphorus and did not follow applicable guidance, or scientifically valid methodology.

Issue #3 Response: EPA's TMDL endpoint was an appropriate interpretation of Pennsylvania's narrative standard, applicable guidance and reflected the latest scientific knowledge and methods regarding the appropriate nutrient levels to address DO swings, nuisance algal blooms and impaired aquatic life.

Pennsylvania does not currently have numeric criteria applicable to nitrogen and phosphorus. See Response to Issue #2 above. EPA's regulations require that TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards. 40 CFR Section 130.7(c)(1). Accordingly, to address the nutrient impairment for Indian Creek watershed, EPA interpreted Pennsylvania's narrative standard at 25 PA Code Section 93.6(a) & (b) to develop a TMDL in-stream target concentration of total phosphorus (TP) that will restore and maintain the designated water uses. It does so by reducing the excessive nutrient concentrations in Indian Creek, eliminating algal blooms and other conditions associated with eutrophication and protecting the aquatic life use of the stream. The development of that endpoint is discussed in detail in the *Development of Nutrient Endpoints for*

the Northern Piedmont Ecoregion of Pennsylvania: TMDL Application (USEPA, 2007a). The TMDL endpoint provides the average seasonal total phosphorus (TP) concentration associated with unimpaired aquatic life uses.

The endpoint identification methodology relied on a multiple (17) lines of evidence approach using frequency distribution based analysis, stressor-responses analyses, and literature based values. EPA then considered the resulting candidate values and applied a weight-of-evidence selection process to select the final endpoint. Based on results and recommendations of the nutrient endpoint identification study, EPA selected the TP endpoint for the Indian Creek TMDL of 40 µg/L (0.04 mg/l), applicable from April 1 – October 31. It is important to note that each line of evidence used in the endpoint analysis presents the best interpretation of a protective TP concentration based on that data. The "frequency distribution" lines of evidence provide TP levels in unimpaired waters. The stressor-response analyses identify the probability of having some adverse condition occur as TP concentration increases. In addition, the literature values provide the TP levels that other studies from EPA and other Agencies found are sufficient to prevent or avoid nuisance algal growth in similar ecosystems. Each line of evidence by itself carries weight. It is important to note that each independent and separate line of evidence pointed to TP concentrations ranging from 2 – 100 µg/l. EPA's chosen endpoint of 40 µg/l TP was within this range. This further supports and confirms the appropriateness of the TMDL endpoint.

The TMDL endpoint approach was done in a manner consistent with the then current EPA guidance on development of such water quality criteria. See Chapter 7 of EPA's Nutrient Criteria Guidance Manual for Rivers and Streams (EPA-822-B-00-002) (USEPA 2000a) which reviews methods for establishing nutrient criteria. Those methods include distribution based approaches, stressor-response analyses, use of published nutrient thresholds or recommended limits, and mechanistic models. PADEP also provided comments during May and June of 2008 that EPA's endpoint for the Indian Creek nutrient TMDL was sufficient to address the nutrient impairments, attain this narrative water quality standard thus protecting the beneficial water uses.

Table 2 – Summary of candidate endpoints considered for each of the analytical approaches discussed. (USEPA 2007a).

Approach		TP Endpoint (μg/L)
Reference Approach		**2-37**
	Reference Site 75th Percentile	16-17
	All Sites 25th Percentile	17
	Modeled Reference Expectation	2-37
Stressor-Response		**36-64**
	Conditional Probability – EPT taxa	38
	Conditional Probability - % Clingers	39
	Conditional Probability - % Urban Intolerant	64
	Conditional Probability - Diatoms TSI	36
Other Literature		**13-100**
	USEPA Recommended Regional Criteria	37
	USEPA Regional Criteria Approach – Local Data	40-51
	Algal Growth Saturation	25-50
	Nationwide Meta-Study TP-Chlorophyll	21-60
	USGS Regional Reference Study	20
	USGS National Nutrient Criteria Study	13-20
	New England Nutrient Criteria Study	40
	Virginia Nutrient Criteria Study	50
	New Jersey TDI	25-50
	Delaware Criteria	50-100

In addition, EPA also considered the criteria in 25 PA Code 93.9f associated with the designated uses of the Indian Creek watershed that specify the applicable in-stream dissolved oxygen criteria noted above. In the Indian Creek TMDL, EPA determined that basing the endpoint on protecting the aquatic life protection will also be sufficient to reduce the biomass to below the recommended literature values, as well as attain the minimum DO criterion.

In summary, since PADEP does not presently have numeric criteria for nutrients, EPA interpreted PADEP's narrative water quality criteria and reasonably determined an appropriately protective endpoint following applicable EPA guidance. EPA used a weight-of-evidence approach, of which conditional probability and change point analysis were part.

Issue #4: Is the Indian Creek nutrient TMDL consistent with EPA guidance and the views of EPA's Scientific Advisory Board (SAB)? T2; T3.

Mr. Hall on behalf of several parties including Telford alleges that EPA developed a Total Phosphorus criteria using the Stressor response analysis and that the Science Advisory Board (SAB) review of the stressor-response methodology stated that the statistical method does not demonstrate " cause and effect" and therefore are not scientifically defensible basis to establish the nutrient standards used in the TMDL.

Issue #4 Response: The Indian Creek nutrient TMDL is consistent with EPA guidance and the views of EPA's SAB.

First, as stated in Issue #2, EPA interpreted Pennsylvania's existing narrative water quality criteria; EPA did not establish a water quality standard or criteria pursuant to Section 303(c) of the CWA. EPA Region 3 developed its TMDL endpoint in the Indian Creek TMDL using the stressor-response methodology (4 lines) as part of a 17-line weight-of-evidence approach. Taken together, the 17 lines of evidence present TP endpoint values that, using the weight of evidence approach, reasonably supported EPA's chosen target of 40 µg/L. While EPA will respond to the issues regarding "stressor –response" lines, it is important to remember that the TMDL endpoint was supported by 17 lines of evidence.

Partly in response to a request from Mr. Hall on behalf of others including Telford, EPA's Office of Science and Technology (OST) requested that the SAB conduct a peer review of EPA's draft technical guidance document entitled "Empirical Approaches for Nutrient Criteria Derivation." This was a draft guidance document EPA developed as a supplement to several EPA Nutrient Criteria Guidance documents.[3] That draft document was intended to supplement existing nutrient criteria guidance (USEPA 2000a, 2000b, 2001, and 2008a) by providing detailed approaches for estimating and interpreting stressor-response relationships for developing numeric criteria to address nitrogen and/or phosphorus pollution. Such a document when final would enable water resource scientists to use additional scientifically valid statistical tools in the derivation of state-specific numeric nutrient criteria. The SAB undertook the peer review of that draft in 2009-2010. This peer review was not focused on a review of any specific EPA TMDLs (including the Indian Creek TMDL). This peer review did, however, review one of the methodologies EPA Region 3 used to develop the Indian Creek TMDL nutrient endpoints, namely the stressor-response (conditional probability) approach. Mr. Hall on behalf of several parties including Telford provided comments on the draft SAB Report, which were considered in SAB's final report. The SAB issued its final report on the draft guidance on April 27, 2010, which included several conclusions and recommendations to EPA for improving the draft guidance document. (USEPA 2010a).

SAB's fundamental conclusion is that "[t]he stressor-response approach is a *legitimate, scientifically based method* for developing numeric nutrient criteria if the approach is appropriately applied (i.e., not used in isolation but as part of a weight-of-evidence approach)."

In November 2010, EPA published the final guidance entitled *Using Stressor-response Relationships to Derive Numeric Nutrient Criteria* (EPA-820-S-10-001) (USEPA 2010c) which supplemented several guidance documents (see footnote 3). EPA has developed this guidance to assist water resource scientists in the derivation of state-specific numeric nutrient criteria. The final guidance addendum incorporates the recommendations made by the SAB. The guidance provides the scientific foundation for using empirical approaches to describe stressor-response

[3]*Nutrient Criteria Technical Guidance Manual: Rivers and Streams*. EPA-822-B-00-002. (U.S. EPA 2000a);. *Nutrient Criteria Technical Guidance Manual. Lakes and Reservoirs*. EPA-822-B-00-001 (US EPA. 2000b);. *Nutrient Criteria Technical Guidance Manual. Estuarine and Coastal Marine Waters.* EPA-822-B-01-003. (U.S.EPA 2001); *Nutrient Criteria Technical Guidance Manual. Wetlands.* EPA-822-B-08-001. (US EPA 2008a)

relationships and outlines a five-step process for using stressor-response relationships to derive criteria. Stated simply, the stressor-response analyses helps identify the probability of having some adverse condition occur as a stressor concentration increases.

EPA developed the TMDL endpoint used in the Indian Creek nutrient TMDL using multiple lines of evidence including the stressor-response analyses. This is the same approach that the EPA's final 2010 guidance recommended for a weight of evidence approach. However, since the SAB and the final guidance provided additional recommendations that might improve upon the TMDL endpoint selection, EPA Region 3 re-analyzed the nutrient endpoint methodology used by EPA in the Indian Creek TMDL and discussed in its 2007 document, *Development of Nutrient Endpoints for the Northern Piedmont Ecoregion of Pennsylvania: TMDL Application* (USEPA 2007a).

First, EPA Region 3 reconsidered the TP endpoint in the Indian Creek nutrient TMDL by removing the four lines of evidence related to the stressor-response analyses from the 17 lines of evidence. Using the remaining 13 lines of evidence, including the literature values and the reference condition approach, EPA confirmed that its initial decision of 40 µg/L was a reasonable TMDL endpoint. The results of this analysis are discussed in detail in the *Technical Memorandum on PA TMDL Endpoints* (USEPA 2008d).

Second, EPA addressed concerns raised by these comments that the four lines of evidence that relied on stressor-response analyses in the endpoint development were flawed. In 2012, EPA Region 3 refined its analysis of the appropriate TP endpoint following the recommendations noted by the SAB Review and recommended in EPA's guidance *Using Stressor-response Relationships to Derive Numeric Nutrient Criteria* (USEPA 2010c). The results of that analysis can be found in the EPA report entitled, *Development of Nutrient Endpoints for Northern Piedmont – Follow Up Analysis"* (USEPA, 2012a)

The follow-up analysis followed a 4-step process to evaluate the effects of confounding or co-varying stressors on nutrients, to attempt to refine the original endpoint analysis to account for those effects, and to research and develop additional lines of evidence. Those four steps were: (1) develop a conceptual model, (2) assemble and explain the data, (3) analyze the data to derive candidate criteria, and (4) review and document the analysis.

Table 3 is a result of this follow-up analysis and updates the original report endpoint summary table (Table 2) based on the additional analysis and information provided in this 2012 report.

Table 3 - Summary of candidate endpoints for each of the analytical approaches discussed. (USEPA 2012a). Differences and new lines of evidence are highlighted in yellow.

Approach		TP Endpoint (µg/L)
Reference Approach		**2-37**
	Reference Site 75th Percentile	16-17
	All Sites 25th Percentile	17
	Modeled Reference Expectation	2-37
Stressor-Response		**8-85**
	Conditional Probability – EPT taxa	38
	Conditional Probability - % Clingers	39
	Conditional Probability - % Urban Intolerant	64
	Conditional Probability - Diatoms TSI	36
	Simple linear regression interpolation – EPT taxa	10-85
	Simple linear regression interpolation – Percent intolerant urban individuals	8-82
	Simple linear regression interpolation – Percent Clinger individuals	8-52
Other Literature		**13-100**
	USEPA Recommended Regional Criteria	37
	USEPA Regional Criteria Approach – Local Data	40-51
	Algal Growth Saturation	25-50
	Nationwide Meta-Study TP-Chlorophyll	21-60
	USGS Regional Reference Study	20
	USGS National Nutrient Criteria Study	13-20
	New England Nutrient Criteria Study	40
	Virginia Nutrient Criteria Study	50
	New Jersey TDI	25-50
	Delaware Criteria	50-100
	National Reference Criteria Study	60
Mechanistic Model		**20-33**
	Indian Creek	20-33

In this follow-up analysis, EPA looked at one additional literature value, four additional stressor response analyses and a mechanistic model to estimate TP concentrations associated with adverse benthic algal concentrations in a Piedmont stream in Pennsylvania, specifically Indian Creek. A dynamic linked process model of Indian Creek using the Generalized Watershed Loading Functions (GWLF) and EPA's Environmental Fluid Dynamics Code (EFDC) was developed and used to evaluate average TP concentrations associated with exceeding a target benthic chlorophyll *a* density of 100 mg/m^2. That chlorophyll *a* density is on the conservative end of the range frequently cited as a nuisance (Dodds and Welch 2000, Suplee et al. 2008). Results indicate that when average TP concentrations are between 20-33 µg/L in Indian Creek, average benthic chlorophyll *a* levels are predicted to remain near the 100 mg/m^2 desired threshold. These levels are slightly lower than, but consistent with the average TP concentration targets derived by the multiple lines of evidence approach.

Even though the mechanistic model indicated that TP levels between 20-33 µg/L in Indian Creek would prevent nuisance algal, EPA decided that the 40 µg/l TP endpoint for Indian Creek should remain unchanged. This is because the new stressor-response analyses provided a range of endpoints that included the 40 µg/l endpoint (i.e., between the lower quartile and average estimate ranges), the distribution based values remain unaltered, and one additional scientific study estimating regional reference concentration recommends a value of 60 µg/l TP (close to the original value and within the range of previous literature). Accordingly, EPA confirms that the recommended TP in the Indian Creek TMDL was appropriately set at 40 µg/L of TP

Miscellaneous Issues

Issue #5: Mr. Hall on behalf of several parties including Telford alleges that the PA TMDL Consent Decree did not cover Indian Creek. T1; T2 (p. 3)

Issue #5 Response: The *American Littoral Society v EPA* consent decree required EPA to establish TMDLs for waterbody segments [WQLSs] identified on PA's list, not "impairments." Indian Creek, for which EPA established these nutrient TMDLs, was identified on PA's 1996 list. In 2004, Indian Creek was identified as impaired by "nutrients." It is immaterial that the 1996 list did not specifically say that Indian Creek was impaired by "nutrients" or "phosphorus." The 1996 list identified those WQLSs as impaired, and that was sufficient to trigger the Consent Decree's TMDL obligation. EPA finds its response provided in the 2008 Indian Creek Response to comments document still valid.

Issue #6: Allegation that EPA told a federal court that EPA needed to collect plant growth data to support the TMDL then removed such data from the record when it showed that nutrients did not cause impairment T1; T2; T3 (p. 3)

Mr. Hall on behalf of several parties including Telford attaches excerpts from a 2007 declaration by Mr. Tom Henry (now retired but then EPA Region 3's TMDL Program Manager) in support of an EPA motion for an extension of the Pennsylvania TMDL Consent Decree deadline for Indian, Goose, and Paxton Creeks. These comments claim that Mr. Henry said EPA "needed additional time *to collect plant growth data* for Indian, Goose, and Paxton Creeks." These comments suggest that EPA told the court it needed time to collect stream-specific plant data but then never did so.

Issue #6 Response: The allegations and quotes from Mr. Henry mischaracterize Mr. Henry's declaration. In the excerpted testimony, Mr. Henry never used the phrase "collect plant growth data" in connection with the three streams. Instead, Mr. Henry identifies a variety of additional actions EPA needed to undertake to complete the TMDLs, including: perform a technical and scientific literature review; evaluate how other states developed numeric nutrient criteria; re-evaluate the regression equations; evaluate the temporal averaging period for endpoints; *perform additional water quality modeling and evaluation for each water*; and translate PA's narrative criteria into a numeric endpoint. EPA performed those activities in development of the TMDL. The testimony does not state that EPA intended to collect extra plant data.

Issue #7: Mr. Hall on behalf of several parties including Telford claims that prior EPA guidance said nutrients were not toxics, and claims there is no "direct connection" between nutrients and insect populations. T2 (p 2)

Issue #7 Response: EPA never asserted a direct cause-and-effect "toxic" link between nutrients and invertebrates, and its choice of a phosphorous TMDL endpoint is not based on such a link. EPA has concluded there is an increased likelihood of indirect adverse effects on benthic organisms due to excess algae, DO and pH swings, and other stressors caused by elevated nutrients. EPA used the statistical approach of "conditional probability" to predict such indirect effects, as well as other lines of evidence, to establish the 40 µg/L TMDL endpoint.

Figure 3 below provides a better albeit simplified understanding of the effects of nutrients on an aquatic ecosystem. As illustrated in Figure 3, nutrients (along with other factors such as temperature and flow) affect aquatic systems in diverse ways. Increased concentrations of nutrients may increase plant, algal and microbial growth within a waterbody. Due to photosynthesis during the day and respiration at night, DO and pH levels may swing from high to low values throughout a 24-hour period, with possible DO and pH water quality standards excursions during that time period. In addition, the increase of plant/algal and microbial growth may affect the habitat and food sources in a water system, changing the aquatic life to those that can compete and survive in that type of ecosystem. The change in DO, pH, food sources, and habitat can exert an effect that alter and degrade the aquatic life use to more pollutant tolerant species.

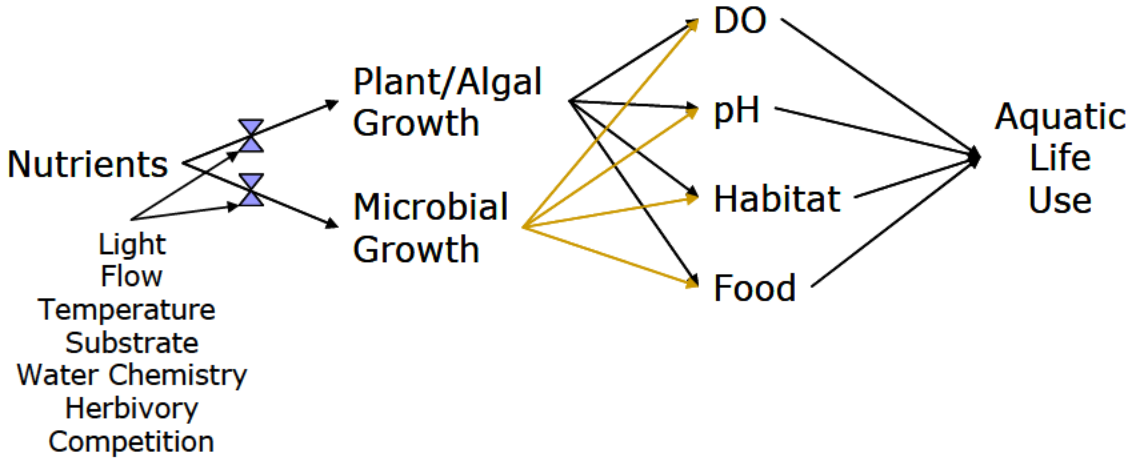

Figure 3. Simplified diagram illustrating the causal pathway between nutrients and aquatic life use impacts (USEPA 2007a).

Issue #8: Mr. Hall on behalf of several parties including Telford claims that numerous excerpts from depositions, testimony and other litigation materials produced in the cases challenging PADEP's actions in front of the Pennsylvania Environmental Hearing Board contradict or otherwise produce new information that undermine the Indian Creek TMDL. T1; T2

Issue #8 Response: EPA has reviewed the quoted excerpts in the full context of the hearing testimony and other litigation materials presented in T1. EPA has determined that they do not undermine the Indian Creek TMDL. The information provided consists of quotes taken out of context that were not representative of, or mischaracterized, the overall testimony of the witness.

EPA Decision on Indian Creek Nutrient TMDL Reconsideration

Based on its consideration of the information presented by Mr. Hall and others including Telford, EPA confirms that the Indian Creek nutrient TMDLs are based on sound science and reflect Agency policy for establishment of nutrient TMDLs. In addition to the concerns specifically raised by Mr. Hall and others including Telford, EPA reviewed the nutrient TMDL with regards to our regulatory program requirements and practice. Section 303(d) and Federal regulations at 40 CFR Section 130.7, set forth several requirements for establishment of a TMDL including it : (1) be designed to attain and maintain the applicable water quality standards; (2) include a total allowable loading and as appropriate, WLAs for point sources and load allocations for nonpoint sources (including the impacts of background pollutant contributions); (3) take critical stream conditions into account (the conditions when water quality is most likely to be violated); (4) consider seasonal variations; (5) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and instream water quality); and (6) be subject to public participation. EPA also considered whether there is reasonable assurance that the TMDLs can be met. EPA also concludes that the GWLF watershed model with its detailed multiple subbasin analysis of Indian Creek was appropriately used to generate watershed nutrient loadings that were linked to a receiving water model in order to evaluate allowable nutrient inputs from the watershed. The hydrodynamics and water quality processes in Indian Creek were simulated using the EFDC hydrodynamic model. The TP target was used as the endpoint to calculate TMDL loads. In addition, average periphyton levels and daily minimum and average DO were also evaluated to ensure that reductions made to comply with the seasonal nutrient endpoint would also adequately address necessary DO criteria and nuisance algal levels.

EPA reviewed the nutrient TMDLs for Indian Creek and has reconfirmed that the 2008 TMDL satisfies each of these requirements.

As previously discussed, EPA's reconsideration has confirmed the Indian Creek nutrient TMDL endpoint selection. EPA has not been presented with or reviewed any post-TMDL site-specific monitoring data or other evidence that would indicate that the waters are not impaired by excessive nutrients. EPA encourages continued monitoring of each stream and is open to considering new site-specific data if presented to determine if the TMDLs should be revised in the future based on that new information.

Conclusion: For the nutrient TMDL, EPA has considered the additional information and comments received, reviewed that TMDL in light of that information, and determined that the nutrient TMDL remains technically sound. EPA therefore denies Telford's request to withdraw the nutrient TMDL.

Sediment TMDL Reconsideration:

EPA has also reviewed the sediment TMDL for Indian Creek and, based on that review, EPA has determined that there are errors in the TMDL. EPA will be seeking a voluntary remand of the sediment TMDL. Once the sediment TMDL has been remanded to the agency, EPA will engage PADEP and affected stakeholders regarding whether to revise and/or withdraw the sediment TMDL.

Lower Salford Plaintiffs sent letters to the United States dated March 18, 2013 and June 26, 2013 that raised the following technical concerns regarding the approach used to develop the Indian Creek sediment TMDL.

- EPA did not derive the Indian Creek TMDL using the reference watershed approach in an appropriate manner.
- The appropriate reference watershed is not Ironworks Creek.
- The sediment loading in Indian Creek is not correctly estimated.
- There is not reasonable assurance that the sediment TMDL can be implemented.

In its reconsideration, EPA reviewed the Indian Creek sediment TMDL, relevant supporting documentation, and information provided by Lower Salford Plaintiffs to determine if the Plaintiffs' concerns have merit. EPA modeling experts also provided input by analyzing the reference watershed approach and the GWLF model.

The sediment TMDL was based on the applicable water quality standards found in Pennsylvania's Water Quality Standards at 25 PA Code Chapter 93. The designated use for streams in the Indian Creek Watershed is to provide habitat and appropriate ecological conditions for a trout stocking fishery (TSF).

EPA's regulations require that TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards. 40 CFR Section 130.7(c)(1).

Pennsylvania does not currently have specific numeric water quality criteria for sediments. However, narrative water quality criteria exist (25 PA Code Chapter 93.6 (a and b)) which state:

> *Water may not contain substances attributable to point or nonpoint source discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life; and In addition to other substances listed within or addressed by this chapter, specific substances to be controlled include, but are not limited to, floating materials, oil, grease, scum and substances which produce color, tastes, orders, turbidity or settle to form deposits.*

These are the standards for which PADEP found, and EPA agrees, were appropriate to use as the basis of the sediment TMDL to address the Indian Creek sediment impairment.

TMDL Endpoint Using Reference Watershed Approach

Comment: Lower Salford Plaintiffs contend that EPA did not derive the Indian Creek TMDL using the reference watershed approach in an appropriate manner. Additionally, Plaintiffs contend that the reference watershed was not Ironworks Creek.

EPA Response: EPA developed TMDL endpoints for sediment in Indian Creek using a reference watershed approach. A reference watershed approach is used to estimate the load reduction of sediment that would be needed to restore a healthy aquatic community and allow the streams in the watershed to achieve their designated uses. Nationally, the reference watershed approach is a common methodology to determine TMDL endpoints for narrative criteria. The reference watershed approach is based on determining the current loading rates for the pollutants of interest from a selected unimpaired watershed that has similar physical characteristics (i.e., land use, soils, size, geology) to the impaired watershed. The objective of this process is to reduce the loading rate of sediment (or other pollutant) in the impaired stream segment to a level equivalent to or slightly lower than the loading rate in the unimpaired reference stream segment. It is expected that achieving the sediment loadings set forth in a reference watershed TMDL will ensure that the designated aquatic life of the impaired stream is achieved.

The Indian Creek TMDL document states that the TMDL targets established for the Indian Creek sediment TMDL were determined using Ironworks Creek as the reference watershed. Ironworks Creek is a subwatershed of the Wissahickon Creek watershed and was also used to establish the reference conditions for the Wissahickon Creek sediment TMDL (USEPA 2003). Ironworks Creek was chosen as the reference watershed because it is an urban watershed that is not impaired by siltation and has similar physical characteristics to the Indian Creek watershed (i.e., watershed size, land use/cover, soils, geology, ecoregion). Based on questions raised by the Lower Salford Plaintiffs, EPA reviewed the Indian Creek modeling report, including the Ironworks Creek loading rates, and the Wissahickon TMDL. Based on that review, EPA has determined that the Indian Creek TMDL used a hybrid reference watershed approach. In that approach, Ironworks Creek was not used directly as a reference watershed for Indian Creek but, rather, loading rates from Ironworks Creek *as applied to subwatersheds of the Wissahickon Creek* were used. Ironworks Creek was used as a reference watershed for five impaired subwatersheds of the Wissahickon Creek TMDL. Though similar in land uses, Wissahickon Creek is much larger than Ironworks Creek. Therefore, in developing the Wissahickon Creek TMDL, Wissahickon Creek was divided into five subwatersheds (SWS). The Ironworks Creek sediment loading rates representative of an unimpaired condition were applied as the TMDL loading rates for each of the five subwatershed of the Wissahickon Creek.

The Wissahickon Creek TMDL sediment loading rates from subwatersheds SWS 1 and SWS 4 were then applied as reference conditions for the Indian Creek. While these subwatershed loading rates were originally derived from Ironworks Creek, as applied to Indian Creek, they were actually Wissahickon Creek loading scenarios. At the time of the Indian Creek TMDL development, it was considered appropriate to use the Wissahickon Creek TMDL scenarios because 1) the watershed area of Indian Creek is similar to subwatershed SWS 1 of Wissahickon Creek (4,480 acres compared to 5,696 acres, respectively); and 2) the sediment delivery ratios for the Indian Creek watershed and its reference subwatershed (SWS 1) were 0.19 and 0.18,

respectively. In addition to loading rates from SWS1, the Indian Creek reference condition also included loading rates of barren lands from SWS 4. This was deemed appropriate because, while SWS 1 did not have these land uses, they were present in the Indian Creek watershed. The approach used in Indian Creek is not commonly used in other EPA Region 3 TMDLs or nationally. After careful consideration of this hybrid reference approach, and based on the concerns raised by the Plaintiffs, EPA agrees the hybrid approach used does not provide the most appropriate TMDL target for sediment in the Indian Creek.

Sediment Loading Rates

Comment: Lower Salford Plaintiffs contend that the existing sediment loading rates used for the Indian Creek TMDL are suspect and may have caused EPA to calculate higher than appropriate existing sediment loading calculations. In particular, Plaintiffs claim that EPA's estimated existing Indian Creek loading rates for two land uses (1) pasture/hay and (2) cropland were 20 and 70 times higher, respectively, than the target values from the reference watershed.

EPA Response: EPA determined the sediment loading rates using a simplified GWLF model (single subbasin) that provided simulated runoff of sediment from different land types and sizes (e.g., agricultural, forested, and developed land). The model uses erosion and sediment yield relying on the Universal Soil Loss Equation (USLE). Considering that the Indian Creek watershed is a small urban stream, the land loading rates developed in the TMDL might be improved by evaluating and separating out the impact of stormwater run off on in-stream sediment. Urbanization with its increased impervious cover has led to increased surface runoff and flashy hydrology within urban streams during storm events. This increased stormwater flow can lead to stream bank erosion and stream bed scouring, resulting in sediment loads being generated within the stream and being deposited downstream. EPA believes it might be to the benefit of the Indian Creek sediment TMDL to consider in-stream erosion as a source of sediment and develop a separate in-stream erosion loading rate. EPA agrees that the sediment TMDL should be reconsidered using loading rates that are more representative of all the sources of sediment in a small urban stream.

Reasonable Assurance

Comment: Lower Salford Plaintiffs contend that there is no reasonable assurance that the high sediment reductions required by the Indian Creek sediment TMDL (99% reduction from pasture/hay and 97% reduction from cropland) are attainable.

EPA Response: EPA believes Plaintiffs misunderstand the concept of reasonable assurance in TMDLs. When EPA establishes or approves a TMDL that allocates pollutant loads to both point and nonpoint sources, it determines whether there is reasonable assurance that the load allocations (LAs) will be achieved and water quality standards will be attained. EPA does that to be sure that the wasteload allocations (WLAs) established in the TMDL are not based on overly generous assumptions regarding the amount of nonpoint source pollutant reductions that will occur.

If the reductions embodied in LAs are not fully achieved because of a failure to fully implement needed nonpoint source pollution controls, or the reduction potential of the proposed best management practices was overestimated, the collective reductions from all sources will not result in attainment of water quality standards. As a result, EPA evaluates whether a TMDL provides reasonable assurance that nonpoint source controls will achieve expected load reductions.

For the Indian Creek sediment TMDL, the entire land area in the watershed is covered by urbanized areas, which are regulated under the National Pollution Discharge Elimination System (NPDES) permit program for municipal separate storm sewer systems. The regulatory definition of an MS4 (40 CFR 122.26(b)(8)) is "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created to or pursuant to state law) including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States. (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2." There are no load allocations for nonpoint sources.

At the time of the TMDL development, EPA could not determine whether portions of the municipalities' land area were subject to the terms of the applicable MS4 permits (e.g., are designated/used for collection or conveying stormwater) as opposed to those portions that were not presently subject to an NPDES permit and therefore were more properly characterized as nonpoint sources. As part of the Phase II stormwater permit process, MS4s are responsible for evaluating and mapping areas that are draining or discharging to storm sewers. Since the precise extent of these MS4 systems had not yet been delineated, EPA was unable to determine an appropriate WLA (point source) and LA (nonpoint source) allocation division between the regulated and unregulated portion of the municipality. Accordingly, EPA assigned the entire loading as WLAs in the Indian Creek TMDL. Should different delineations become available, it may be possible to distinguish nonpoint source loadings from the point source loadings in the WLAs and move them into the LA category. At this time, since the TMDL assigns all of the loads to be controlled under the permitting process and no loads are associated with the LA, it is reasonable to assume that the "zero" LAs will be met.

EPA Decision on the Indian Creek Sediment TMDL Reconsideration:

EPA analysis of the Indian Creek sediment TMDL confirmed Plaintiffs' concerns that the reference watershed approach and sediment loading rates used should be revisited. In accordance with its conclusions above, EPA will seek a voluntary remand of the sediment TMDL for the Indian Creek watershed from the United States District Court for the Eastern District of Pennsylvania, where litigation challenging the Indian Creek TMDL is currently pending. Once the sediment TMDL has been remanded to the agency, EPA will engage PADEP and affected stakeholders regarding the revision and/or withdrawal of the sediment TMDL. EPA

has not seen new site-specific monitoring data or other evidence that would indicate that the waters are not impaired by excessive sediments. EPA's decision regarding the sediment TMDLs does not affect the nutrient TMDL because the modeling used for the Indian Creek nutrient TMDL was not connected or related to the modeling for the Indian Creek sediment TMDL.

Conclusion:

EPA continues to believe that the Indian Creek nutrient TMDLs are based on sound science and reflect Agency policy for nutrient TMDLs. EPA has considered the additional information and comments received, and reviewed the Indian Creek nutrient TMDL in light of that information, and found that nutrient TMDL remains technically sound. EPA therefore denies Telford's request to withdraw the nutrient TMDL. EPA has not seen new site-specific monitoring data or other evidence that would indicate that the waters are not impaired by excessive nutrients. EPA encourages continued monitoring of each stream and is open to considering new site-specific data to determine if the TMDLs should be revised based on that new information.

In accordance with its conclusions above, EPA will seek a voluntary remand of the sediment TMDL for the Indian Creek watershed from the United States District Court for the Eastern District of Pennsylvania, where litigation challenging the Indian Creek TMDL is currently pending. Once the sediment TMDL has been remanded to the agency, EPA will engage PADEP and affected stakeholders regarding the revision and/or withdrawal of the sediment TMDL. EPA has not seen new site-specific monitoring data or other evidence that would indicate that the waters are not impaired by excessive sediments.

It is important to note that the concerns EPA identified in the Indian Creek sediment TMDL are unrelated to the nutrient TMDL. The Indian Creek nutrient TMDL did not use Ironworks as its reference condition to develop its endpoint, but rather used the 17 lines of evidence to develop an appropriate nutrient endpoint as explained in this document. Further, in the Indian Creek nutrient TMDL, EPA used a GWLF watershed model with a detailed multiple subbasins analysis that was separate from the single subbasin GWLF model used for the sediment TMDL. In addition, unlike the sediment TMDL, stream bank erosion is generally not considered a source of nutrients in a watershed and considering stream bank erosion in the nutrient TMDL would have no effect on the final WLAs for nutrient sources.

EPA will continue to engage PADEP and affected stakeholders on implementation activities to address nutrient and sediment impairments.

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