UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Decision Rationale
Total Maximum Daily Loads
Plum Creek Watershed
For Acid Mine Drainage Affected Segments
Allegheny County

Signed

Jon M. Capacasa, Director
Water Protection Division

Date: 2/20/2006

Decision Rationale
Total Maximum Daily Loads
Plum Creek Watershed
For Acid Mine Drainage Affected Segments

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those waterbodies identified as impaired by the state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS), that may be discharged to a water-quality limited waterbody without violating water quality standards.

The Pennsylvania Department of the Environmental Protection (PADEP), Bureau of Watershed Conservation, submitted the *Plum Creek Watershed TMDL*, dated January 18, 2005 (TMDL Report) electronically to The U. S. Environmental Protection Agency (EPA) for final Agency review by email on January 18, 2005 and by letter on January 21, 2005. This report included TMDLs for three metals (aluminum, iron, and manganese) and pH. It addresses two segments on Pennsylvania's 1996 Section 303(d) list of impaired waters, Plum Creek and Little Plum Creek.

EPA's rationale is based on the TMDL Report and information contained in the attachments to the report. EPA's review determined that the TMDL meets the following eight regulatory requirements pursuant to 40 CFR Part 130.

1. The TMDLs are designed to implement the applicable water quality standards.
2. The TMDLs include a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDLs consider the impacts of background pollutant contributions.
4. The TMDLs consider critical environmental conditions.
5. The TMDLs consider seasonal environmental variations.
6. The TMDLs include a (MOS).
7. There is reasonable assurance that the proposed TMDLs can be met.
8. The TMDLs have been subject to public participation.

II. Summary

Table 1 presents the 1996, 1998, and 2002 Section 303(d) listing information for the water quality limited segments listed in 1996.

Table 1. 303(d) Sub-List

State Water Plan (SWP) Subbasin: 18-A Deer Creek

Year	Miles	Segment ID	DEP Stream Code	Stream Name	Designated Use	Data Source	Source	EPA 305(b) Cause Code
1996	3.1	4960	42246	Plum Creek	WWF	305(b) Report	RE	Metals
1998	8.98	4960	42246	Plum Creek	WWF	SWMP	AMD	Metals
2002	4.4	New survey, new segment id 990706-1530-TVP	42246	Plum Creek	WWF	SWAP	AMD	Metals
1996	4	4961	42256	Little Plum Creek	WWF	305(b) Report	RE	Metals
1998	5.15	4961	42256	Little Plum Creek	WWF	SWMP	AMD	Metals
2002	2.7	New survey; new id 990608-1000-TVP	42256	Little Plum Creek	WWF	SWAP	AMD	Metals
2002	4.2	New survey; new id 990712-1100-TVP	42256	Little Plum Creek	WWF	SWAP	AMD	Metals
1996	Not on List							
1998	Not on List							
2002	3.9	990609-1330-TVP	42256	Little Plum Creek	WWF	SWAP	AMD	Metals & pH
1996	Not on List							
1998	Not on List							
2002	1.6	990609-1245-TVP	42256	Little Plum Creek	WWF	SWAP	AMD	Metals

Resource Extraction=RE
Warm Water Fishes = WWF
Surface Water Monitoring Program = SWMP
Surface Water Assessment Program = SWAP
Abandoned Mine Drainage = AMD
Urban Runoff/Storm Sewers = URSS
Combined Sewer Overflow = CSO

Table 1a presents impairment listings that appear on Pennsylvania's 2004 Section 303(d) list, which was approved by EPA after PADEP's submittal of the Plum Creek Watershed TMDL Report. Since a final 2004 Section 303(d) list was not available during the development of this TMDL, the following listings are not explicitly identified in the TMDL Report. However, based on Pennsylvania's assessment, listing, and TMDL development approaches, the TMDL incorporates the loadings from these segments (which are mostly smaller tributaries) and indirectly addresses them in the allocations. As such, the waters identified in Table 1a may be considered for placement under Category 4A in future Pennsylvania Integrated Reports and will not necessarily require TMDL development.

Table 1a. Waters covered under this decision rationale, although not explicitly identified in the TMDL Report.

303(d) List	Year First Listed	Miles	Segment ID	DEP Stream Code	Stream Name	EPA 305(b) Cause Code
2004	2002	0.9	990609-1245-TVP	42260	Little Plum Creek (Unt 42260)	Metals
2004	2002	1.8	990609-1330-TVP	42260	Little Plum Creek (Unt 42260)	Metals, pH
2004	2002	0.2	990609-1245-TVP	42261	Little Plum Creek (Unt 42261)	Metals
2004	2002	0.4	990609-1245-TVP	42262	Little Plum Creek (Unt 42262)	Metals
2004	2002	0.8	990609-1330-TVP	42264	Little Plum Creek (Unt 42264)	Metals, pH
2004	2002	0.3	990609-1330-TVP	42265	Little Plum Creek (Unt 42265)	Metals, pH
2004	2002	0.6	990609-1330-TVP	42266	Little Plum Creek (Unt 42266)	Metals, pH
2004	2002	0.4	990609-1330-TVP	42267	Little Plum Creek (Unt 42267)	Metals, pH

2004	2004	0.3	990608-1001-TVP	42273	Little Plum Creek (Unt 42273)	Metals, pH
2004	2004	0.8	990608-1001-TVP	42274	Little Plum Creek (Unt 42274)	Metals, pH
2004	2004	0.6	990608-1001-TVP	42275	Little Plum Creek (Unt 42275)	Metals, pH

The TMDLs were developed using a statistical procedure to ensure that water quality criteria are met 99 percent of the time as required by Pennsylvania's water quality standards at Pennsylvania Code Title 25, Chapter 96.3(c).

TMDLs are a defined as the summation of the point source WLAs plus the summation of the nonpoint source LAs plus a MOS and are often shown as:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. Conditions, available data, and the understanding of the natural processes can change more than anticipated by the MOS. The option is always available to refine the TMDL for resubmittal to EPA for approval.

Pennsylvania's Surface Water Assessment Program (formerly the Unassessed Waters Protocol) is PADEP's method of conducting biological assessments of Pennsylvania's waters. PADEP's goal is a statewide assessment of surface waters in Pennsylvania. After completion of the initial assessments, the long-range goal is to reassess all waters on a five-year cycle. Therefore, while the TMDL should not be modified at the expense of achieving water-quality standards expeditiously, the TMDL may be modified when warranted by additional data or other information.

III. Background

The Plum Creek Watershed is located in southwestern Pennsylvania, occupying the east central portion of Allegheny County. The entire watershed consists of approximately 20.6 square miles; with Little Plum Creek constituting 8.06 square miles of the total watershed area. Little Plum Creek is a tributary of Plum Creek, which it joins near the community of Unity. Plum Creek drains to Allegheny River approximately 2.5 miles south of the Pennsylvania Turnpike Bridge, and it generally flows from the southeast to the northwest. The major land use in the Plum Creek Watershed is suburban residential development, whereas other land uses include undeveloped forestland on the steeper slopes to

commercial/industrial development on the stream valley areas. Little Plum Creek generally flows from east to west. The major land uses in the Little Plum Creek Watershed are undeveloped farmland and forestland, and minor land uses include residential areas and reclaimed mine sites.

The Pittsburgh Coal seam outcrops in the higher elevations of the Plum Creek and Little Plum Creek Watersheds and has been extensively mined by both surface and deep mining since the early 1900's. The underlying Upper Freeport Coal seam in the Little Plum Creek Watershed has also been extensively deep mined, as the Villa Coal Company operated the Renton Mine in this coal seam. A large coal pile is located near the community of Renton, and seeps from the refuse pile are collected and flow to the Renton mine pool. The Consolidation Coal Company is currently pumping and treating the Renton mine pool. In the past year, a remining permit was issued to remove coal refuse from the site. The refuse is being trucked to a fluidized bed power generating power plant to be burned, and alkaline ash from the plant is being returned to the site. It is expected that replacing the acidic coal refuse with alkaline ash will reduce or eventually eliminate acidic drainage from the site.

There are two active mining operations in the watershed, but only one has a treatment discharge; which is why only one operation was assigned a WLA. The Consolidation Coal Company, Renton Acid Mine Drainage (AMD) Plant, Mining Activity Permit Number 02733702 (no National Pollutant Discharge Elimination System (NPDES) permit) has a treated mine pool discharge that discharges to Little Plum Creek, and this treatment discharge was assigned a WLA. The Robindale Energy Services, Inc., Renton Pile, Surface Mining Permit 02020201 (NPDES Number PA0250121) is a refuse processing operation. Included in the permit is a mine drainage treatment facility discharge; however, because it is a refuse reprocessing operation, there is no pit water to be treated and therefore no discharge. As such, no WLA was assigned to the Renton pile operation. In addition, the pre-exiting seeps from the Renton pile are collected and flow into the Renton deep mine pool, which is pumped and treated by the Consolidation Coal Company.

For purposes of these TMDLs only, point sources are identified as permitted discharge points, and nonpoint sources are identified as other discharges from abandoned mine lands which can include tunnel discharges, seeps and surface runoff. Abandoned and reclaimed mine lands were treated in the allocations as nonpoint sources because there are no NPDES permits associated with these areas; the discharges associated with these landuses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned and reclaimed mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges within these land uses. In addition, by approving these TMDLs with mine drainage discharges treated as LAs, EPA is not determining that these discharges are exempt from NPDES permitting requirements.

PADEP treats each segment on the Section 303(d) list as a separate TMDL while EPA, for purposes of EPA's national tracking system, sums the loads for a watershed TMDL. The

TMDLs are expressed as long-term averages (see the *Plum Creek Watershed TMDL* Report, Attachment C, for TMDL calculations).

The Surface Mining Control and Reclamation Act of 1977 (SMCRA, Public Law 95-87) and its subsequent revisions were enacted to establish a nationwide program to, among other things, protect the beneficial uses of land or water resources, public health and safety from the adverse effects of current surface coal mining operations, as well as promote the reclamation of mined areas left without adequate reclamation prior to August 3, 1977. SMCRA requires a permit for the development of new, previously mined, or abandoned sites for the purpose of surface mining. Permittees are required to post a performance bond that will be sufficient to ensure the completion of reclamation requirements by the regulatory authority in the event that the applicant forfeits. Mines that ceased operating by the effective date of SMCRA (often called "pre-law" mines), are not subject to the requirements of SMCRA.

These TMDLs were completed by PADEP to meet the eighth year TMDL commitments under the requirements of the 1997 TMDL lawsuit settlement agreement, but will be carried over and applied towards the tenth year TMDL commitments under that agreement. Tenth year milestones include the development of TMDLs for 40% of the waters listed on Pennsylvania's 1996 Section 303(d) list of impaired waters by the effects of AMD or 80 waters since 2005, and 100% of waters listed as impaired by non-AMD related impacts. Delisted waters may count for 20% of the requirement.

Computational Procedure

The TMDLs were developed using a statistical procedure to ensure that water-quality criteria are met 99 percent of the time as required by Pennsylvania's water-quality standards. The Plum Creek TMDL allocates loadings to six tributaries, including Little Plum Creek, and five sampling sites along the stream. The Little Plum Creek TMDL allocates to two tributaries and four sampling points along the stream. Between July 2002 and July 2003, five to six samples were collected in the Plum Creek and Little Plum Creek Watersheds at each of the monitoring points.

A critical flow was not identified, and the reductions specified in this TMDL apply at all flow conditions. Regression and correlation analyses between flow and concentration almost always produce little or no correlation and disclose no critical condition.

TMDLs for each parameter were determined using a Monte Carlo simulation, @RISK,[1] with the measured, or existing, pollutant concentration data. For each source and pollutant, it was assumed that the observed data are lognormally distributed. Each pollutant was evaluated separately using @RISK.

[1]@RISK - Risk Analysis and Simulation Add-in for Microsoft Excel®, Palisade Corporation, Newfield, NY.

Using the collected sample concentration parameters, mean and standard deviation, the simulation performs 5000 iterations and predicts an existing long-term average concentration and this analysis shows whether or not the existing data is from a population where water quality standards are exceeded more than one percent of the time. A second simulation of 5000 iterations is performed to calculate the percent reduction necessary to meet the criteria 99 percent of the time. Finally, using the calculated percent reductions, a final simulation is run to confirm that the target value for a long-term average concentration will result in meeting water quality criteria 99 percent of the time.

The existing and allowable long-term average loads were computed using the mean concentration from @RISK multiplied by the average flow. The loads were computed based on average annual flow and should not be taken out of the context for which they are intended, which is to depict how the pollutants affect the watershed and where the sources and sinks are located spatially in the watershed.

IV. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance.

1. The TMDLs are designed to implement the applicable water quality standards.

Water quality standards are state regulations that define the water quality goals of a waterbody. Standards are comprised of three components, including: (1) designated uses, (2) criteria necessary to protect those uses, and (3) antidegradation provisions that prevent the degradation of water quality. All of the stream segments evaluated in the Plum Creek Watershed have been designated by Pennsylvania as Warm Water Fishes with criteria to protect the aquatic life uses. The designations for these stream segments can be found at Pennsylvania Title 25 § 93.9(i). To protect the designated uses, as well as the existing uses, the water quality criteria shown in Table 2 apply to all evaluated segments. The table includes the instream numeric criterion for each parameter and any associated specifications.

Table 2. Applicable Water Quality Criteria

Parameter	Criterion Value (mg/l)	Duration	Total Recoverable/ Dissolved
Aluminum (Al)	0.75	Maximum	Total Recoverable
Iron (Fe)	1.5 0.3	30-day Average Maximum	Total Recoverable Dissolved
Manganese (Mn)	1.0	Maximum	Total Recoverable

Parameter	Criterion Value (mg/l)	Duration	Total Recoverable/ Dissolved
pH	6.0 - 9.0	Inclusive	N/A

Pennsylvania Title 25 § 96.3(c) requires that water quality criteria be achieved at least 99 percent of the time, and TMDLs expressed as long-term average concentrations, are expected to meet these requirements. That is, the statistical Monte Carlo simulation used to develop TMDLs and LAs for each parameter results in a determination that any required percent pollutant reduction assures that the water quality criteria will be met instream at least 99 percent of the time. The Monte Carlo simulation used 5000 iterations where each iteration was independent of all other iterations, and the observed data were assumed to be lognormally distributed for each source and pollutant.

EPA finds that these TMDLs will attain and maintain the applicable narrative and numerical water quality standards. For iron, the TMDL endpoint was expressed as total recoverable iron because all monitoring data was expressed as total recoverable iron.

The pH values shown in Table 2 were used as the TMDL endpoints for these TMDLs. In the case of freestone streams with little or no buffering capacity, the allowable TMDL endpoint for pH may be the natural background water quality; these values can get as low as 5.4 (Pennsylvania Fish and Boat Commission). However, PADEP chose to set the pH standard between 6.0 to 9.0, inclusive; which is presumed to be met when the net alkalinity is maintained above zero. This presumption is based on the relationship between net alkalinity and pH, on which PADEP based its methodology to addressing pH in the watershed (see the *Plum Creek Watershed TMDL* Report, Attachment B). A summary of the methodology is presented as follows.

The parameter of pH, a measurement of hydrogen ion acidity presented as a negative logarithm of effective hydrogen ion concentration, is not conducive to standard statistics. Additionally, pH does not measure latent acidity that can be produced from the hydrolysis of metals. PADEP is using the following approach to address the stream impairments noted on the Section 303(d) list due to pH. Because the concentration of acidity in a stream is partially dependent upon metals, it is extremely difficult to predict the exact pH values which would result from treatment of AMD. Therefore, net alkalinity will be used to evaluate pH in these TMDL calculations. This methodology assures that the standard for pH will be met because net alkalinity is able to measure the reduction of acidity. When acidity in a stream is neutralized or is restored to natural levels, pH will be acceptable ($\geq$6.0). Therefore, the measured instream alkalinity at the point of evaluation in the stream will serve as the goal for reducing total acidity at that point. The methodology that is used to calculate the required alkalinity (and therefore, pH) is the same as that used for other parameters such as iron, aluminum, and manganese that have numeric water quality criteria. EPA finds this approach to pH to be reasonable.

PADEP also has an alkalinity standard. Alkalinity (of a minimum 20 mg/l calcium carbonate except where natural conditions are less) is related to but not identical with pH.

Alkalinity is a measure of the buffering capacity of the water. Adequate buffering prevents large swings in pH with additions of small amounts of acid. Although many of the AMD-impacted streams are naturally low in alkalinity, available monitoring data does not always include upstream waters unimpacted by AMD. As PADEP does not list waters for inadequate alkalinity, TMDLs are not being developed for alkalinity but PADEP should monitor the waters for alkalinity and if, after these TMDLs are implemented, alkalinity is less than 20 mg/l or natural conditions, PADEP should list the waters for alkalinity and develop TMDLs.

2. *The TMDLs include a total allowable load as well as individual WLAs and LAs.*

As mentioned, there are two active mining operations within the watershed. However, only one of the two operations has a treatment discharge and therefore has an explicit WLA. For purposes of these TMDLs only, point sources are identified as permitted discharge points and nonpoint sources are identified as other discharges from abandoned mine lands which can include, but are not limited to, tunnel discharges, seeps, and surface runoff. Abandoned and reclaimed mine lands were treated in the allocations as nonpoint sources because there are no NPDES permits associated with these areas. As such, the discharges associated with these land uses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned and reclaimed mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges within these landuses. In addition, by approving these TMDLs with mine drainage discharges treated as LAs, EPA is not determining that these discharges are exempt from NPDES permitting requirements.

The LA for each sampling point was computed using water-quality data collected from that point. The sampling points are shown on the map in Attachment A, together with a flow diagram.

Once PADEP determined the allowable concentration and load for each pollutant, a mass-balance accounting was performed starting at the top of the watershed and working down in sequence, see the flow diagram in Attachment A. This mass-balance or load tracking is explained below. Load tracking through the watershed utilizes the change in measured loads from sample location to sample location as a guide for expected changes in the allowable loads.

PADEP used two basic rules for the load tracking between two ends of a stream segment: (1) if the measured upstream loads are less than the downstream loads, it is indicative that there is an increase in load between the points being evaluated and no instream processes are assumed, and (2) if the sum of the measured loads from the upstream points is greater than the measured load at the downstream point this is indicative that there is a loss of instream load between the points, and the ratio of the decrease shall be applied to the allowable load being tracked from the upstream point.

Tracking loads through the watershed provides a picture of how the pollutants are affecting the watershed, based on the available information. The analysis is done to insure that

water quality standards will be met at all points in the stream. EPA finds this approach reasonable.

Table 3 presents a summary of the allowable loads for the Plum Creek Watershed. Note the reductions identified for some of the sampling points are the reduction necessary after upstream reductions have been made.

For Table 3, PADEP defined LA to be the sum of the loads entering the stream segment including loads from the upstream segment.

Table 3. Summary Table for Plum Creek Watershed

Station	Parameter	Measured Sample Data		Allowable		WLA (lbs/day)	LA (lbs/day)	Reduction Identified %
		Conc. (mg/L)	Load (lbs/day)	LTA Conc. (mg/L)	Load (lbs/day)			
PLUM17 mouth of UNT42284	Fe	3.54	4.3	0.74	0.9	0	0.9	79
	Mn	2.41	2.9	0.65	0.8	0	0.8	73
	Al	21.23	25.9	0.21	0.3	0	0.3	99
	Acidity	223.87	273.3	1.12	1.4	0	1.4	99
	Alkalinity	7.13	8.7					
PLUM15 mouth of UNT42282	Fe	7.52	6.2	0.30	0.2	0	0.2	96
	Mn	4.25	3.5	0.34	0.3	0	0.3	92
	Al	17.54	14.5	0.35	0.3	0	0.3	98
	Acidity	167.73	138.3	3.35	2.8	0	2.8	98
	Alkalinity	15.37	12.7					
PLUM13 Plum Creek dwnstm of UNT42281	Fe	2.92	10.9	0.41	1.5	0	1.5	0
	Mn	0.94	3.5	0.34	1.3	0	1.3	0
	Al	6.79	25.3	0.27	1.0	0	1.0	0
	Acidity	16.53	61.6	10.91	40.6	0	40.6	0
	Alkalinity	77.57	288.8					
PLUM10 mouth of UNT42279	Fe	1.01	1.7	0.64	1.1	0	1.1	36
	Mn	0.24	0.4	0.24	0.4	NA	NA	0
	Al	2.03	3.4	0.47	0.8	0	0.8	77
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0

	Alkalinity	118.30	200.8					
PLUM09 mouth of UNT42276	Fe	1.17	1.2	0.49	0.5	0	0.5	58
	Mn	0.43	0.5	0.31	0.3	0	0.3	28
	Al	5.86	6.2	0.18	0.2	0	0.2	97
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	98.30	104.3					
PLUM08 Plum Creek upstm of Little Plum Creek	Fe	<0.3	NA	NA	NA	NA	NA	0
	Mn	0.31	5.1	0.30	4.9	0	4.9	0
	Al	0.64	10.6	0.42	6.9	0	6.9	0
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	120.13	1987.9					
LPLM08 Little Plum Creek dwnstm of mouth of UNT42274	Fe	2.49	10.5	0.85	3.6	0	3.6	66
	Mn	1.77	7.4	0.35	1.5	0	1.5	80
	Al	5.94	25.0	0.42	1.7	0	1.7	93
	Acidity	9.96	41.9	5.48	23.0	0	23.0	45
	Alkalinity	27.76	116.7					
LPLM07 mouth of UNT42273	Fe	6.66	10.6	0.40	0.6	0	0.6	94
	Mn	2.19	3.5	0.33	0.5	0	0.5	85
	Al	17.00	26.9	0.34	0.5	0	0.5	98
	Acidity	158.36	251.0	0.00	0.0	0	0	100
	Alkalinity	1.48	2.3					
LPLM05 UNT42260 dwnstm of 42266	Fe	1.19	5.7	0.43	2.1	0	2.1	64
	Mn	1.70	8.2	0.39	1.9	0	1.9	77
	Al	4.82	23.2	0.24	1.2	0	1.2	95
	Acidity	13.16	63.4	6.84	33.0	0	33.0	48
	Alkalinity	43.00	207.1					
LPLM04 mouth of UNT42260	Fe	0.75	10.7	0.65	9.3	0	9.3	0
	Mn	1.01	14.4	0.45	6.5	0	6.5	20
	Al	3.22	46.0	0.16	2.3	0	2.3	90
	Acidity	0.00	0.0	0.00	0.0	0	NA	0
	Alkalinity	69.48	991.3					
LPLM03 Little Plum Creek dwnstm of UNT42260	Fe	1.22	34.7	0.69	19.8	18.0	1.8	88
	Mn	0.90	25.6	0.73	20.7	12.0	8.7	1
	Al	2.98	85.0	0.22	6.4	6.0	0.4	91
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	71.44	2040.2					
LPLM02 Little Plum Creek	Fe	1.07	37.9	0.60	21.2	0	21.2	8
	Mn	0.84	29.6	0.24	8.6	0	8.6	65

dwnstm of UNT42257	Al	3.86	136.4	0.46	16.4	0	16.4	72
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	62.96	2223.0					
LPLM01 mouth of Little Plum Creek	Fe	0.84	32.2	0.76	29.0	0	29.0	0
	Mn	0.53	20.1	0.33	12.4	0	12.4	0
	Al	2.50	95.5	0.28	10.5	0	10.5	9
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	72.80	2780.3					
PLUM05 Plum Creek upstm of UNT42253	Fe	0.57	28.6	0.57	28.6	NA	NA	0
	Mn	0.41	20.7	0.34	17.1	0	17.1	0
	Al	2.18	108.9	0.39	19.6	0	19.6	0
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	107.93	5390.2					
PLUM03 Plum Creek upstm of UNT42247	Fe	<0.3	NA	NA	NA	NA	NA	0
	Mn	0.17	12.3	0.17	12.3	NA	NA	0
	Al	<0.5	NA	NA	NA	NA	NA	0
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	109.97	8037.3					
PLUM02 mouth of UNT42246	Fe	<0.3	NA	NA	NA	NA	NA	0
	Mn	<0.05	NA	NA	NA	NA	NA	0
	Al	<0.5	NA	NA	NA	NA	NA	0
	Acidity	0.0	NA	NA	NA	NA	NA	0
	Alkalinity	139.07	343.8					
PLUM01 mouth of Plum Creek	Fe	<0.3	NA	NA	NA	NA	NA	0
	Mn	0.23	17.8	0.23	17.8	NA	NA	0
	Al	<0.5	NA	NA	NA	NA	NA	0
	Acidity	0.00	0.0	0.00	0.0	NA	NA	0
	Alkalinity	107.84	8405.3					

LTA = Long Term Average

LA = total loads entering segment, including any upstream loads

PADEP allocated to nonpoint sources and one mining operation, Consolidation Coal Company, Renton AMD Plant only. The absence of an explicit WLA for the Robindale Energy Services, Inc. Renton Pile refuse reprocessing operation is interpreted as a WLA of 0 for the mining parameters in Table 2 above. Where there are active mining operations or post-mining discharge treatment in the watershed, Federal regulations require that subsequent to TMDL development and approval, point sources permitted effluent limitations be water quality-based.[2]

[2]It should be noted that technology-based permit limits may be converted to water quality-based limits according to EPA's *Technical Support Document For Water Quality-based Toxics Control,* March 1991, recommendations.

In addition, PA Title 25, Chapter 96, Section 96.4(d) requires that WLAs shall serve as the basis for determination of permit limits for point source discharges regulated under Chapter 92 (relating to NPDES permitting, monitoring and compliance). Therefore, no new mining may be permitted within the watershed without reallocation of the TMDL.

3. The TMDLs consider the impacts of background pollutant contributions.

Plum is located in an area that has been extensively mined. The TMDLs were developed using instream data which account for existing background conditions.

4. The TMDLs consider critical environmental conditions.

The reductions specified in this TMDL apply at all flow conditions. A critical flow condition was not identified from the data used for this analysis. The average flow for each sampling site was used to derive loading values for the TMDL.

5. The TMDLs consider seasonal environmental variations.

All sample sets included data points from various seasons, which together with the lack of correlations between flow and concentration, indicate that PADEP considered seasonal variations to the extent that data was available.

6. The TMDLs include a MOS.

The CWA and Federal regulations require TMDLs to include a MOS to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop the allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS.

PADEP used an implicit MOS in these TMDLs by assuming the treated instream concentration variability to be the same as the untreated stream's concentration variability. This is a more conservative assumption than the general assumption that a treated discharge has less variability than an untreated discharge. By retaining variability in the treated discharge, a lower average concentration is required to meet water quality criteria 99 percent of the time than if the variability of the treated discharge is reduced.

With respect to iron, PADEP identified an additional implicit MOS in the analysis and TMDL development by treating the iron water quality criterion as if the 1.50 mg/l were a maximum value instead of a thirty-day average value.

7. There is reasonable assurance that the proposed TMDLs can be met.

The *Recommendations* section highlights what can be done in the watershed to eliminate or treat pollutant sources. Aside from PADEP's primary efforts to improve water quality in the

Plum Creek Watershed through reclamation of abandoned mine lands and through the NPDES permit program, additional opportunities for reasonable assurance exist. PADEP expects activities, such as research conducted by its Bureau of Abandoned Mine Reclamation, funding from EPA's 319 grant program, and Pennsylvania's Growing Greener program will also help remedy abandoned mine drainage impacts. PADEP also has in place an initiative that aims to maximize reclamation of Pennsylvania's abandoned mineral extraction lands. Through Reclaim PA, Pennsylvania's goal is to accomplish complete reclamation of abandoned mine lands and plugging of orphaned wells. Pennsylvania strives to achieve this objective through legislative and policy land management efforts, and activities described in the TMDL Report.

There is an active watershed group, The Plum Creek Watershed Association, dedicated to protect and improve the water quality and recreational benefits of the watershed. The group was formed in 2001 and is a non-profit, public/private partnership conservation organization. The organization also educates the public on the necessity of water conservation and other natural and recreational resources of the Plum and Little Plum Creek Watershed. The Watershed Association received a Round 6 Growing Greener Grant (November 2004) to conduct a watershed assessment and to develop a watershed restoration and protection plan. This study and plan will lay the groundwork for future remediation projects in the watershed.

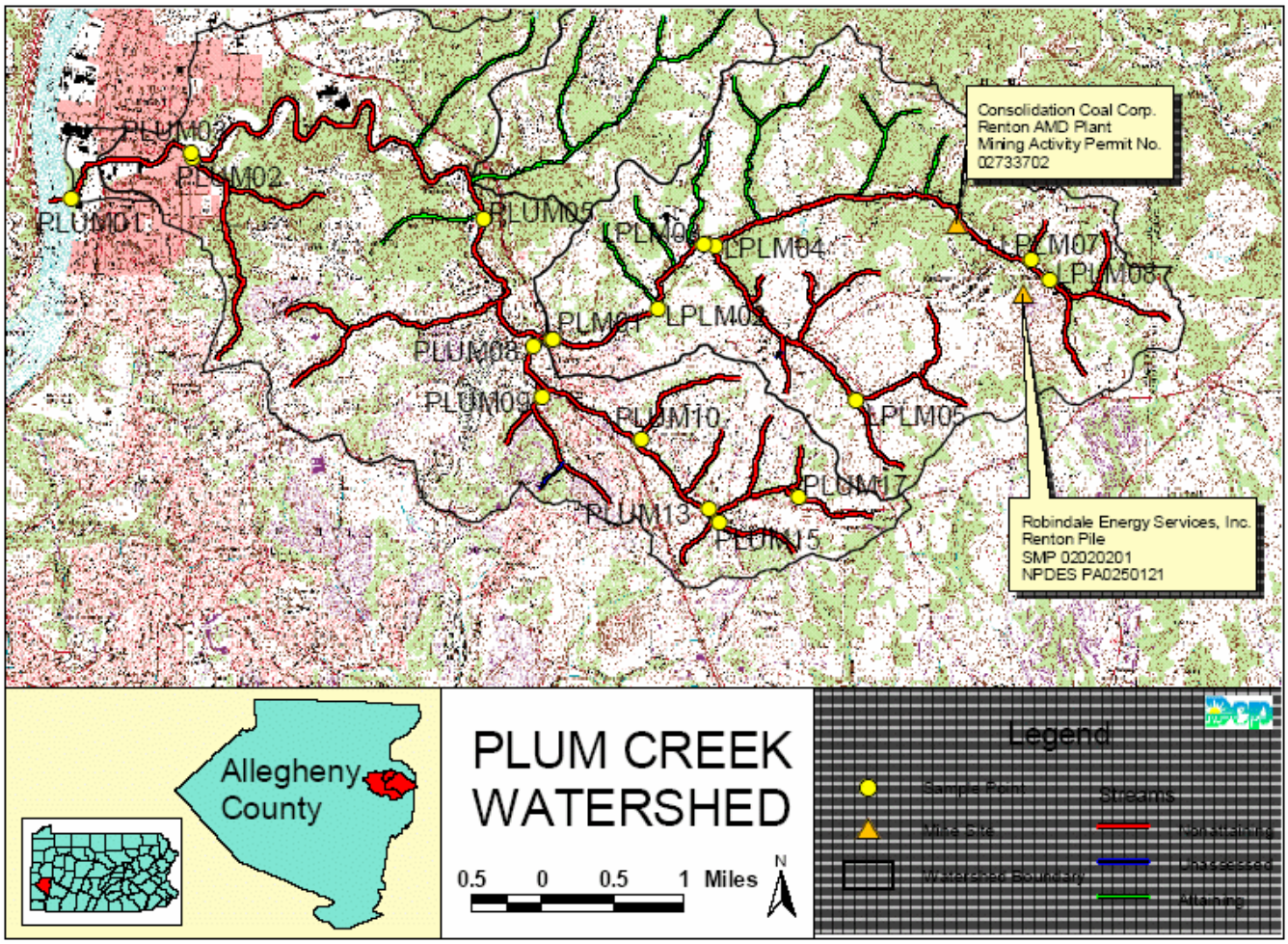
8. The TMDLs have been subject to public participation.

PADEP public noticed the draft TMDLs in the *Pennsylvania Bulletin* on November 6, 2004 and in the *Pittsburgh Post-Gazette* on November 18, 2004. A public meeting was held on December 2, 2004 at the Plum Borough Municipal Building in Plum, Pennsylvania, to discuss the proposed TMDLs. A 60-day public comment period was conducted, and no comments were received during this time.

Although not specifically stated in the TMDL Report, PADEP routinely posts the approved TMDL Report on their web site: www.dep.state.pa.us/watermanagement_apps/tmdl/.

Attachment A

Plum Creek Watershed Maps


Consolidation Coal Corp.
Renton AMD Plant
Mining Activity Permit No.
02733702
Robindale Energy Services, Inc.
Renton Pile
SMP 02020201
NPDES PA0250121
PLUM01
PLUM02
PLUM03
PLUM05
PLUM06
PLUM07
PLUM08
PLUM09
PLUM10
PLUM13
PLUM15
PLUM17
LPLM01
LPLM02
LPLM03
LPLM04
LPLM05
Allegheny
County
PLUM CREEK
WATERSHED
0.5 0 0.5 1 Miles
N
Legend
Streams

Plum Creek Sampling Station Diagram
Arrows indicate direction of flow.
Diagram not to scale.