UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
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Decision Rationale
Total Maximum Daily Loads
Beaverdam Branch Watershed
Burgoon Run (Kittanning Run), Glenwhite Run & Sugar Run, Blair County, Pennsylvania

Signed

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Water Protection Division

Date: 3/14/2007

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I. Introduction

The Clean Water Act (CWA) requires that Total Maximum Daily Loads (TMDLs) 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 waterbody without exceeding water quality standards.

The Pennsylvania Department of Environmental Protection (PADEP) Bureau of Watershed Management electronically submitted the *Beaverdam Branch Watershed TMDL* (TMDL Report) dated September 6, 2006, to the U.S. Environmental Protection Agency (EPA) for final Agency review on January 17, 2007. This report includes the TMDLs for the three primary metals associated with acid mine drainage (AMD) (i.e., iron, manganese, and aluminum) and pH and addresses four segments on Pennsylvania's 1996 Section 303(d) list of impaired waters.

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, 2002, and 2004 Section 303(d) listing information for the impaired segment first listed in 1996.[1]

[1]Pennsylvania's 1996, 1998, 2002, and 2004 Section 303(d) lists were approved by the Environmental Protection Agency (EPA). The 1996 Section 303(d) list provides the basis for measuring progress under the 1997 lawsuit settlement of *American Littoral Society and Public Interest Group of Pennsylvania v. EPA.*

Table 1. 303(d) Sublist for the Beaverdam Branch Watershed, Blair County, Pennsylvania

Table 1. 303(d) Sub-List								
State Water Plan (SWP) Subbasin: 11-A Beaverdam Branch								
Year	**Miles**	**Segment ID Assessment ID**	**DEP Stream Code**	**Stream Name**	**Designated Use**	**Data Source**	**Source**	**EPA 305(b) Cause Code**
1996	2.3	6561	16317	Beaverdam Branch	TSF/WWF	305(b) Report	RE	Metals
1996	1.4		16317	Beaverdam Branch	TSF/WWF	305(b) Report	Combined Sewer Overflow Urban RunOff/ Storm Sewers	Organic Enrichment/ DO Other
1998	6.08	6561	16317	Beaverdam Branch	TSF/WWF	SWMP	AMD Combined Sewer Overflow Urban RunOff/ Storm Sewers	Metals Organic Enrichment /DO Other
2000	6.07	6561	16317	Beaverdam Branch	TSF/WWF	SWMP	AMD Combined Sewer Overflow Urban RunOff/ Storm Sewers	Metals Organic Enrichment /DO Cause Unknown
2002	6.1	6561	16317	Beaverdam Branch	TSF/WWF	SWAP	AMD Combined Sewer Overflow Urban RunOff/ Storm Sewers	Metals Organic Enrichment /DO Cause Unknown

2004	6.1	6561	16317	Beaverdam Branch	TSF/WWF	SWAP	AMD Combined Sewer Overflow Urban RunOff/ Storm Sewers	Metals Organic Enrichment /DO Cause Unknown
1996	6.3	6563	16389	Sugar Run	CWF	305(b) Report	RE	Metals
1998	6.46	6563	16389	Sugar Run	CWF	SWMP	AMD	Metals
2000	6.45	6563	16389	Sugar Run	CWF	SWMP	AMD	Metals
2002	1.0	20000327-1306-TAS	16389	Sugar Run	CWF	SWMP	AMD	pH & Metals
2004	6.4	6563	16389	Sugar Run	CWF	SWMP	AMD	Metals
2004	1.0	20001327-1306-TAS	16389	Sugar Run	CWF	SWMP	AMD	Metals & pH
1996	3.0	6565	16416	Burgoon Run	TSF	305(b) Report	RE	Metals
1998	3.21	6565	16416	Burgoon Run	TSF	SWMP	AMD	Metals
2000	0.04	6565	16416	Burgoon Run	TSF	SWMP	AMD	Metals
2002	0.7	20000314-1331-TAS	16416	Burgoon Run	TSF	SWMP	AMD	pH & Metals
2004	4.0	6565	16416	Burgoon Run	TSF	SWMP	AMD	Metals
2004	0.4	20000406-1131-TAS	16416	Burgoon Run	TSF	SWMP	AMD	Siltation & pH
2004	0.04	6565	65035	UNT Burgoon Run	TSF	SWMP	AMD	Metals
2004	0.7	20000712-1037-TAS	65035	UNT Burgoon Run	TSF	SWMP	AMD	PH & Metals
1996	3.2	2118	16428	Glenwhite Run	CWF	305(b) Report	RE	Metals
1998	3.82	2118	16428	Glenwhite Run	CWF	SWMP	AMD	Metals

2000	1.9	2118	16428	Glenwhite Run	CWF	SWMP	AMD	Metals
2002	0.5	20000407-1031-TAS	16428	Glenwhite Run	CWF	SWMP	AMD	pH
2002	0.4	20000407-1136-TAS	16428	Glenwhite Run	CWF	SWMP	AMD	pH & Siltation
2002	3.8	2118	16428	Glenwhite Run	CWF	SWMP	AMD	Metals
2004	1.9	2118	16428	Glenwhite Run	CWF	SWMP	AMD	Metals
1996	Not Listed on the 1998 Section 303(d) List			UNT Glenwhite Run				
1998	Not Listed on the 1998 Section 303(d) List			UNT Glenwhite Run				
2000	1.91	2118	16431	UNT Glenwhite Run	CWF	SWMP	AMD	Metals
2004	1.91	2118	16431	UNT Glenwhite Run	CWF	SWMP	AMD	Metals
2004	0.4	20000407-1136-TAS	16429	UNT Glenwhite Run	CWF	SWMP	AMD	pH
2004	0.5	20000407-1031-TAS	16430	UNT Glenwhite Run	CWF	SWMP	AMD	pH

Resource Extraction = RE
Cold Water Fishery = CWF
Surface Water Monitoring Program = SWMP
Abandoned Mine Drainage = AMD

See Attachment D of the TMDL Report, *Excerpts Justifying Changes Between the 1996, 1998, 2002, and 2004 Section 303(d) Lists*. The use designations for the stream segments in this TMDL can be found in PA Title 25 Chapter 93.9n. Section IV, Table 3, shows the TMDLs for the Beaverdam Branch Watershed.

In 1997 PADEP began utilizing the Statewide Surface Waters Assessment Protocol to assess Pennsylvania's waters. This protocol is a modification of EPA's 1989 Rapid Bioassessment Protocol II and provides for a more consistent approach to conducting biological assessments than previously used methods. The biological assessments are used to determine which waters are impaired and should be included on the State's Section 303(d) list.

The TMDLs in this report were developed using a statistical procedure to ensure that water quality criteria are met 99% of the time as required by Pennsylvania's water quality standards at Pennsylvania Code Title 25, Chapter 96.3c. Table 3 of the TMDL Report lists the TMDLs for the Beaverdam Branch Watershed, addressing metals and pH in the listed 1996 stream segments listed as PADEP stream codes 16317, 16416, 16428, and 16389.

TMDLs are 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 follows:

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

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

III. Background

Burgoon Run and Sugar Run are severely impacted by acid mine drainage and exhibit a bright orange color. When these waters mix with the highly alkaline Mill Run, the main stem becomes a milky white color for approximately 2000 feet due to aluminum precipitation from the AMD.

Mill Run develops in a gap in the Allegheny Front[2] just as Sugar Run and Burgoon Run do, however, it is not AMD affected. By cutting through the low ridge of the karstic Keyser/ Tonoloway limestone formations in Altoona, Mill Run gains a strong alkaline character. The mouth of Beaverdam Branch occurs 1.5 miles east of Hollidaysburg where it flows into the Frankstown Branch of the Juniata River.

Acid mine drainage impairment of Burgoon Run occurs from Glenwhite Run and Kittanning Run, which form Burgoon Run at the Horseshoe Curve of the Pennsylvania Railroad. AMD also occurs in Sugar Run. The acid mine drainage of Burgoon (Kittanning and Glenwhite) and Sugar Run is the result of coal and clay mining in the headwaters of gaps along the Allegheny Front. Extensive surface and underground mining of coal and fireclay took place in these locations in the early to mid-1900's.

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[2]The Allegheny Front is a portion of the escarpment that delineates the eastern edge of the Appalachian Plateau (locally called the Allegheny Plateau) and the Allegheny Mountains, separating them from the lower Ridge and Valley Appalachians to the east. While the entire escarpment stretches from New York (the Helderbergs) to Tennessee (Cumberland Mountain and Waldens Ridge), the portion known as the Allegheny Front extends southwesterly from south-central Pennsylvania, through western Maryland and eastern West Virginia to a portion of the West Virginia/Virginia border.

Coal collieries such as the Glenwhite Coal and Lumber Company supported the coal and clay mining. Ruins of these structures are evident along the state road that passes the Horseshoe Curve and heads towards the top of the Allegheny Front at Greenfield. The change in elevation between Beaverdam Branch and Greenfield is dramatic as the Allegheny Front is a 1000 foot escarpment.

There is one active mining operation; the Cooney Brothers Coal Co., Inc, SMP 07820101, in the Sugar Run watershed. The site is not currently being mined but has technically been activated. The permit holder recently built a sedimentation pond to keep the permit active. It is a
subchapter F remining permit.

Other mining companies in the Kittanning/Glenwhite area were Harbison Walker Refractories, Cavalier Coal Company, Altoona Coal and Coke Company and General Refractories. In Kittanning Run, the Louden deep mine on the Mercer high alumina flint clay and coal produces some of the most severe acid mine drainage in the entire basin. Drainage from a deep mine across the drainage divide pollutes Sugar Run in its headwaters and severe surface mine drainage further downstream allows it no hope for self-repair.

PADEP treats each segment on the Section 303(d) list as a separate TMDL and expresses each TMDL as a long-term average loading. (See the *Beaverdam Branch Watershed TMDL* Report, Attachment C, for the 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, protect public health and safety from the adverse effects of current surface coal mining operations, and promote the reclamation of mined areas left without adequate reclamation prior to August 3, 1977. SMCRA requires a surface mining 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 data of SMCRA (often called "pre-law" mines) are not subject to the requirements of SMCRA.

Beaverdam Branch, Sugar Run, Burgoon Run, and Glenwhite Run were on the 1996 Section 303(d) list of impaired waters and count toward the tenth year (2007) TMDL milestone commitment under the requirements of the 1997 TMDL lawsuit settlement agreement. Tenth year milestones include the development of TMDLs for 20% of the waters listed on Pennsylvania's 1996 Section 303(d) list of impaired waters by the effects of AMD (80 waters since 2005) and the remaining waters listed as impaired by non-AMD 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% of the time as required by Pennsylvania's water quality standards. A two-step approach was used for the TMDL analysis of impaired stream segments.

The first step used a statistical method for determining the allowable instream concentration at the point of interest necessary to meet water quality standards. An allowable long-term average instream concentration was determined at each sample point for metals and acidity. The analysis was performed using Monte Carlo simulation to determine the necessary long-term average concentration needed to attain water quality criteria 99% of the time, and the simulation was run assuming the data set was log normally distributed. Using @Risk[3], each pollutant source was evaluated separately by performing 5000 iterations of the model where each iteration was independent of all other iterations. This procedure was used to determine the required percent reduction that would allow the water quality criteria to be met instream at least 99% of the time. A second simulation that multiplied the percent reduction by the sampled value was run to ensure that criteria were met 99% of the time. The mean value from this data set represents the long-term average concentration that needs to be met to achieve water quality standards.

The second step was a mass balance of the loads as they passed through the watershed. Loads at these points were computed based on average annual flow. Once the allowable concentration and load for each pollutant was determined, mass-balance accounting was performed starting at the top of the watershed and working downstream in sequence. This mass balance or load tracking through the watershed utilized the change in measured loads from sample location to sample location as a guide for expected changes in the allowable loads.

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. They are intended to depict how the pollutants affect the watershed and where the sources and sinks are located spatially in the watershed. A critical flow was not identified, and the reductions specified in this TMDL apply at all flow conditions.

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: (1) designated uses, (2) criteria

[3]@Risk – Risk Analysis and Simulation Add-in for Microsoft Excel, Palisade Corporation, Newfield, NY, 1990-1997.

necessary to protect those uses, and (3) antidegradation provisions that prevent the degradation of water quality. Streams within the Beaverdam Branch Watershed have been designated by Pennsylvania as cold water fishery and/or trout stocked fishery with criteria to protect the aquatic life use, and the designation can be found at Pennsylvania Title 25 §93.9n. To protect the designated use as well as the existing use, 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)	1.50 0.30	30-day Average Maximum	Total Recoverable Dissolved
Manganese (Mn)	1.00	Maximum	Total Recoverable
pH	6.0 - 9.0	Inclusive	N/A

Pennsylvania Title 25 §96.3c requires that water quality criteria be achieved at least 99% of the time, and TMDLs are expressed as long-term average concentrations expected to meet these requirements. That is, the statistical Monte Carlo simulation used to develop TMDL WLAs and LAs for each parameter resulted in a determination that any required percent pollutant reduction would assure that the water quality criteria would be met instream at least 99% of the time. The Monte Carlo analysis performed 5,000 iterations of the model where each iteration was independent of all other iterations and the data set was assumed to be log normally distributed.

EPA finds that these TMDLs will attain and maintain the applicable narrative and numeric water quality standards.

The pH values shown in Table 2 were used as the 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, and these values can be 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 *Beaverdam Branch 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 has been using an alternate 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 addressing 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 but not identical to 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 do not always include upstream waters not impacted by AMD. As PADEP does not list waters for inadequate alkalinity, TMDLs are not being developed for alkalinity.

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

For purposes of these TMDLs only, point sources are identified as permitted discharge points or discharges having responsible parties, and nonpoint sources are identified as any pollution sources that are not point sources. Abandoned mine lands were treated in the allocations as nonpoint sources. As such, the discharges associated with these land uses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned 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.

The only active permit is for remining where the only discharge is from sedimentation and erosion control structures, therefore, no WLA is required.

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 downstream in sequence. 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, (2) if the sum of the measured loads from the upstream points is greater than the measured load at the downstream point, it 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 performed 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, LAs, and WLAs for the Beaverdam Branch Watershed.

Table 3. TMDL Component Summary for the Beaverdam Branch Watershed

Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Identified* (%)
Most upstream sample point on Glenwhite Run						
Aluminum	98.90	24.70	0.00	24.70	74.20	75
Iron	39.80	39.80	0.00	39.80	0.00	0
Manganese	51.50	39.60	0.00	39.60	11.90	23
Acidity	969.60	116.30	0.00	116.30	853.30	88
Glenwhite Run downstream of confluence with Kittanning Run						
Aluminum	349.6	10.5	0.0	10.5	339.1	97
Iron	862.3	17.2	0.0	17.2	845.1	98
Manganese	424.0	12.7	0.0	12.7	411.3	97
Acidity	5,880.7	0.0	0.0	0.0	5,880.7	100
Burgoon Run downstream Altoona Lake						
Aluminum	622.9	18.7	0.0	18.7	604.2	97
Iron	1,149.0	45.9	0.0	45.9	1,103.1	96
Manganese	915.4	27.5	0.0	27.5	887.9	97
Acidity	10,904.9	0.0	0.0	0.0	10,904.9	100
Burgoon Run upstream of confluence with Mill Run						
Aluminum	490.3	24.5	0.0	24.5	465.8	95
Iron	410.3	78.0	0.0	78.0	332.3	81
Manganese	675.3	40.5	0.0	40.5	634.8	94
Acidity	5,743.1	0.0	0.0	0.0	5,743.1	100
Most upstream Sugar Run sample point						
Aluminum	23.7	2.6	0.0	2.6	21.1	89
Iron	9.6	5.8	0.0	5.8	3.8	40
Manganese	10.7	10.6	0.0	10.6	0.1	1
Acidity	79.4	38.1	0.0	38.1	41.3	52
Upstream of unnamed tributary to Sugar Run						
Aluminum	133.9	10.7	0.0	10.7	123.2	92

Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Identified* (%)
Iron	160.7	20.9	0.0	20.9	139.8	87
Manganese	36.2	13.4	0.0	13.4	22.8	63
Acidity	1,515.5	0.0	0.0	0.0	1,515.5	100
Unnamed tributary to Sugar Run						
Aluminum	83.9	13.4	0.0	13.4	70.5	84
Iron	72.3	24.6	0.0	24.6	47.7	66
Manganese	182.1	14.6	0.0	14.6	167.5	92
Acidity	1,155.8	0.0	0.0	0.0	1,155.8	100
Sugar Run downstream of sample points 42 and 43						
Aluminum	112.0	10.1	0.0	10.1	101.9	91
Iron	114.3	27.4	0.0	27.4	86.9	76
Manganese	62.9	17.6	0.0	17.6	45.3	72
Acidity	1,201.9	0.0	0.0	0.0	1,201.9	100
Sugar Run upstream of confluence with Mill Run						
Aluminum	22.8	6.4	0.0	6.4	16.4	72
Iron	20.5	12.3	0.0	12.3	8.2	40
Manganese	22.1	15.0	0.0	15.0	7.1	32
Acidity	98.6	28.6	0.0	28.6	70.0	71
Beaverdam Branch downstream of sample points 34 & 35						
Aluminum	620.9	62.1	0.0	62.1	558.8	90
Iron	544.9	234.3	0.0	234.3	310.6	57
Manganese	860.8	94.7	0.0	94.7	766.1	89
Acidity	3,050.9	1,464.5	0.0	1,464.5	1,586.4	52
Blair Gap Run tributary to Beaverdam Branch						
Aluminum	8.7	8.7	0.0	8.7	0.0	0
Iron	22.8	22.8	0.0	22.8	0.0	0
Manganese	5.5	5.5	0.0	5.5	0.0	0
Acidity	0.0	0.0	0.0	0.0	0.0	0
Beaverdam Branch at confluence with the Juniata River						
Aluminum	253.9	116.8	0.0	116.8	137.1	54
Iron	415.3	307.5	0.0	307.5	107.8	28
Manganese	507.8	238.6	0.0	238.6	269.2	53
Acidity	0.0	0.0	0.0	0.0	0.0	0

ND = not detected
NA = not applicable, meets water quality standards, no TMDL necessary
* Percent reduction after upstream reductions are made

PADEP allocated to nonpoint sources only. Where there are active mining operations, Federal regulations require that point source permitted effluent limitations be water quality-based subsequent to TMDL development and approval.[4] In addition, PA Title 25, Chapter 96, Section 96.4d requires that WLAs 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.

The TMDLs were developed using instream data, which account for existing background conditions.

4. The TMDLs consider critical environmental conditions.

The reductions specified in these TMDLs apply at all flow conditions. A critical flow condition was not identified from the available data.

5. The TMDLs consider seasonal environmental variations.

The data set included data points from all seasons, thereby accounting for seasonal variation implicitly.

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 that the treated instream concentration variability was 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% of the time than if the variability of the treated discharge is reduced.

Additionally, calculations were performed using a daily average for iron rather than the 30-day average, thereby, incorporating a MOS.

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

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[4] 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.

The *Recommendations* section of the TMDL Report highlights what can be done in the Beaverdam Branch Watershed to eliminate or treat pollutant sources. Aside from PADEP's primary efforts to improve water quality in the Beaverdam Branch Watershed through reclamation of abandoned mine lands and through the NPDES permit program, additional opportunities for reasonable assurance exist. PADEP expects that 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 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.

The Horseshoe Curve Resources Coalition, founded in late 1995, the Blair County Conservation District, and the Altoona City Authority are all active in the Beaverdam Branch, et al, watershed. The Glenwhite watershed has had extensive remediation activities performed since 1999. A total of eight sites were addressed in the Glenwhite watershed. Two were addressed by land reclamation and the remaining six have had various treatment systems constructed. These activities used monies from USDA NCRS PL-566, Section 319, Watershed Protection and Flood Prevention Act:PL83-566, Office of Surface Mining – Appalachian Clean Streams Initiative, Growing Greener, PA DEP Bureau of Abandoned Mine Reclamation, and the Blair County Conservation District: Watershed Restoration Fund. For more information see the Blair County Conservation District document Glenwhite Run Watershed Restoration Project in Attachment F. The Blair County Conservation District has applied for grants in the Sugar Run watershed for assessment and restoration.

Further information regarding watershed restoration is included in the TMDL Report, Attachment F.

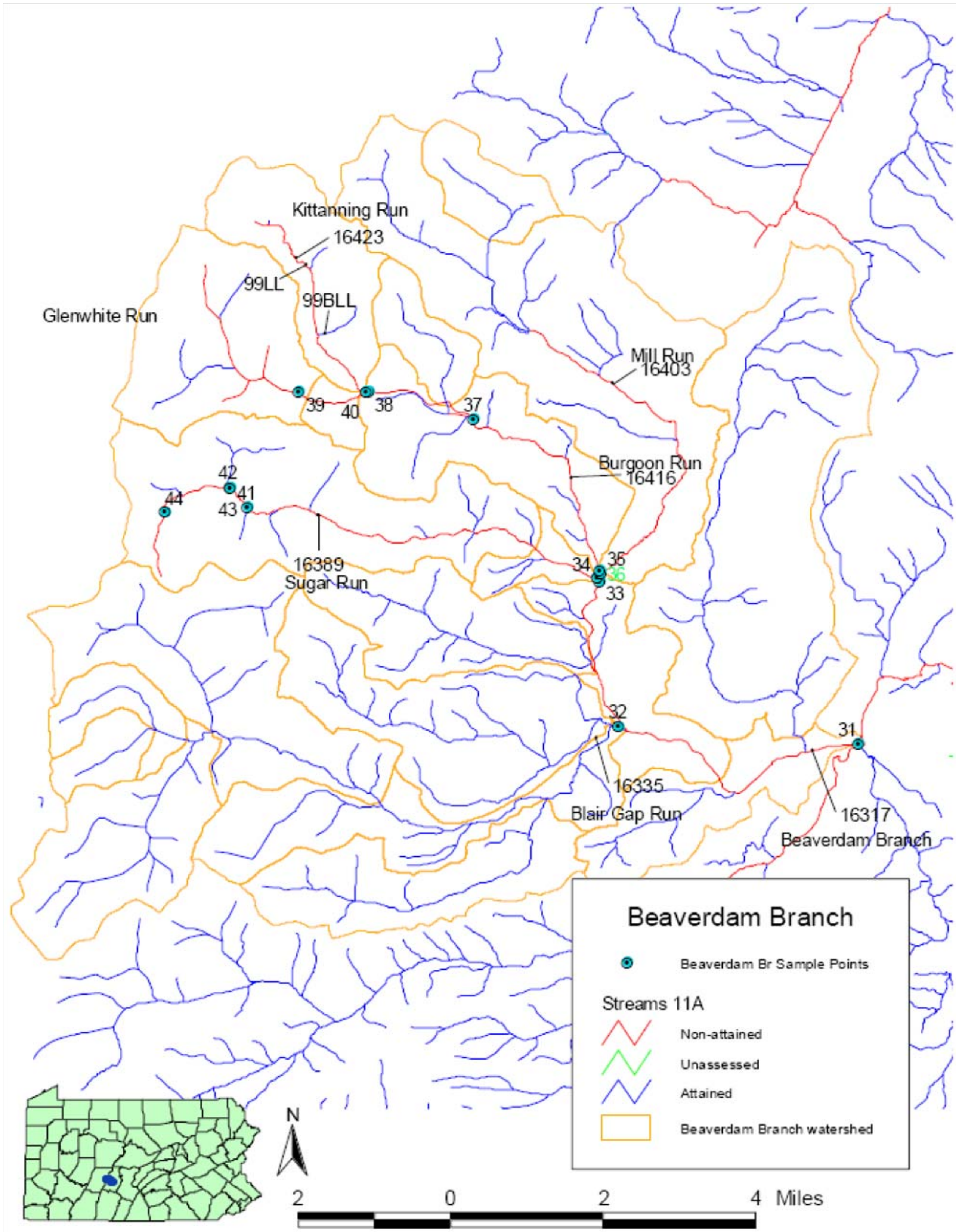
8. The TMDLs have been subject to public participation.

Public notice of the draft TMDL was published in the *Pennsylvania Bulletin,* January 1, 2005, and the *Altoona Mirror* on December 16, 2004 to foster public comment on the allowable loads calculated. A public meeting was held on January 12, 2005, beginning at 6:30 p.m. at the Blair County Courthouse located in Holidaysburg, PA, to discuss the proposed TMDL. No comments were received.

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

Attachment A

Beaverdam Branch Watershed Map


Kittanning Run
16423
99LL
99BLL
Glenwhite Run
Mill Run
16403
39
40
38
37
Burgoon Run
16416
42
41
44
43
16389
Sugar Run
34
35
36
33
32
31
16335
Blair Gap Run
16317
Beaverdam Branch
Beaverdam Branch
Beaverdam Br Sample Points
Streams 11A
Non-attained
Unassessed
Attained
Beaverdam Branch watershed
N
2
0
2
4
Miles