



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
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**Decision Rationale
Total Maximum Daily Loads
Bear Run Watershed
For Acid Mine Drainage Affected Segments
Clearfield, Indiana, and Jefferson Counties,
Pennsylvania**

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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 *Bear Run Watershed TMDL* (TMDL Report) dated March 29, 2007, to the U.S. Environmental Protection Agency (EPA) for final Agency review on March 29, 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 three 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

¹Pennsylvania'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 Bear Run Watershed, Clearfield, Indiana, and Jefferson Counties, Pennsylvania

Table 1. 303(d) Sub-List								
State Water Plan (SWP) Subbasin: 08-B West Branch Susquehanna River								
Year	Miles	Segment ID	DEP Stream Code	Stream Name	Designated Use	Data Source	Source	EPA 305(b) Cause Code
1996	2.9	4125	27032	Bear Run	CWF	305(b) Report	RE	Metals
1998	8.30	4125, 4126	27032	Bear Run	CWF	SWMP	AMD	Metals, pH
2002	3	4125	27032	Bear Run	CWF	SWMP	AMD	Metals
2002	5.2	4126	27032, 27038	Bear Run & South Branch Bear Run	CWF	SWMP	AMD	Metals, pH
2004	3.2	4126	27032	Bear Run	CWF	Statewide SWMP	AMD	Metals
2004	3.1	4125	27032	Bear Run	CWF	Statewide SWMP	AMD	Metals
1996	5.3	4126	27038	South Branch Bear Run	CWF	305(b) Report	RE	Metals, pH
2004	2	4126	27038	South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	3.2	20030929-1930-JCO	27038	South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	2	20030929-1932-JCO	27039	UNT 27039 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	1	20030929-1929-JCO	27040	UNT 27040 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	0.5	20030929-1929-JCO	27041	UNT 27041 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH

State Water Plan (SWP) Subbasin: 08-B West Branch Susquehanna River								
Year	Miles	Segment ID	DEP Stream Code	Stream Name	Designated Use	Data Source	Source	EPA 305(b) Cause Code
2004	0.6	20030929-1929-JCO	27045	UNT 27045 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	0.8	20030929-1929-JCO	27046	UNT 27046 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	0.7	20030929-1929-JCO	27047	UNT 27047 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	1.2	20030929-1929-JCO	27049	UNT 27049 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH
2004	0.9	20030929-1929-JCO	57051	UNT 27051 to South Branch Bear Run	CWF	Statewide SWMP	AMD	Metals, pH

*Other Inorganics listing is not included on the 2006 Integrated List.

Resource Extraction =RE

Cold Water Fishes=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 93.9. Section IV, Table 3 shows the TMDLs for the Bear Run 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 Bear Run Watershed, addressing metals and pH in the stream segments listed as PADEP stream code 51196.

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:

$$\text{TMDL} = \sum \text{WLAs} + \sum \text{LAs} + \text{MOS}$$

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

The Bear Run Watershed is 19.3 square miles in area and is located in Clearfield, Indiana, and Jefferson Counties, Pennsylvania. A large portion of the Bear Run Watershed lies in State Game Lands 174; private parcels account for the remaining land ownership. Bear Run flows southeast from its origin near Hillman, Indiana County until its confluence with South Branch Bear Run. The origin of South Branch Bear Run is near Flora, Indiana County. It flows southeast until it joins Bear Run. The stream then flows northeast and drains into the West Branch Susquehanna River along State Route 219 between Mahaffey and Burnside at the village of McGees Mills, Clearfield County, Pennsylvania. The major tributary to Bear Run in the watershed is South Branch Bear Run. The long-abandoned mining towns of Keal Run, Sidney, and Lochvale are also in the watershed.

Coal mining has been the primary industry in the watershed from the 1880s to the present. Large tracts of land in the southwestern portion of the watershed have been disturbed by deep and strip mining operations. Abandoned coal mines and quarries disturbed lands make up approximately 5.6 percent of the watershed. Forested land makes up 79 percent of the watershed, though evidence of disturbed lands can still be found with tree cover now growing over top. Agriculture and grassland makes up 15.2 percent of the land use. The watershed is thinly populated, with a negligible percent of developed lands.

The Bear Run Watershed is affected by pollution from AMD. This pollution has caused high levels of metals and low pH in the mainstem of Bear Run, South Branch Bear Run, and eight unnamed tributaries to South Branch Bear Run. The sources of the AMD are deep mine discharges and seeps from areas disturbed by surface mining. Most of the discharges originate from mining on the Lower Kittanning, Clarion, and Brookville coal seams or refuse piles associated with them. All but two of the discharges are considered as nonpoint sources of pollution because they are from abandoned Pre-Act mining operations or from coal companies that have settled their bond forfeitures with the PADEP.

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 date of SMCRA (often called “pre-law” mines) are not subject to the requirements of SMCRA.

There is one active mining operation in the Bear Run Watershed, with several permits are in Stage 2 or 3 bond release including: the Urey Coal Company Neely Strip MP# 32880107 and P & N Coal Company Urey Mine MP# 32930105. These permits are valid for reclamation only; the mine sites are regraded and no water treatment facilities remain on site. Also, the permitted area for these mines barely extend into the Bear Run Watershed and all water treatment facilities discharge into other watersheds. Therefore, the permits do not require a WLA. The P & N Coal Company operates a coal processing and tippie site in the headwaters of Bear Run MP#32851601; PA0095966. The Hillman Tippie site is active and requires a WLA for a surface water runoff treatment pond that flows in response to precipitation events. Two other permits in the Bear Run Watershed are actively treating post-mining discharges and they are considered to be point source discharges and are assigned a WLA. The A & T Coal Company operated MP#32803053; PA0124770, the Fisher Strip, from 1984 to 1994. The mine site was completely backfilled and revegetated by 1994; however, a post-mining discharge occurred from A & T Coal Company’s operation. All bonds remain intact on the permit and the discharge is being treated to effluent standards. The Paul F. Becker Coal Company, Buchanan Job, MP#32860115; PA0597864, operated from 1987 to 1992. The company placed a limestone channel to treat the discharges and bonds remain intact for that treatment system.

Considering that it is possible for a future mining operation in the Bear Run Watershed based on available coal reserves, mining operator interests, and other factors, a fourth WLA was calculated and incorporated into the allocations in the watershed. All of the remaining discharges in the watershed are from abandoned surface and deep mines and are treated as nonpoint sources of pollution because they are from abandoned Pre-Act mining operations.

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 *Bear Run Watershed TMDL Report*, Attachment C, for the TMDL calculations.)

Bear Run was on the 1996 Section 303(d) list of impaired waters and counts 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 @Risk², 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.

In addition to the above analysis, the WLAs for the National Pollutant Discharge Elimination System (NPDES) permitted pit water treatment ponds were determined. Typically, surface mining operations include an open pit where overburden material has been removed to access the underlying coal, and this pit can accumulate water primarily through direct precipitation and surface runoff. The pit water is pumped to a nearby treatment pond where it is treated to the level necessary to meet effluent limitations. However, precipitation events allow intermittent discharges from the treatment pond. If accurate flow data are available for a treatment pond, they can be used to quantify the WLA by multiplying the flow by the best

²@Risk – Risk Analysis and Simulation Add-in for Microsoft Excel, Palisade Corporation, Newfield, NY, 1990-1997.

available technology (BAT) effluent limitations for treatment ponds. However, these flow data are typically not available. Alternatively, PADEP calculated a total average flow for the water draining to the pit using average annual precipitation, the area of the pit, and a runoff factor. Utilizing this value and BAT treatment pond effluent limits, the WLAs were determined.

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 necessary to protect those uses, and (3) antidegradation provisions that prevent the degradation of water quality. Bear Run has been designated by Pennsylvania as a cold water fishery with criteria to protect the aquatic life use, and the designation can be found at Pennsylvania Title 25 § 93.9t. 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 expressed as long-term average concentrations are 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 5000 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 *Bear Run 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 (≥ 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.

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.

To determine the WLAs for the NPDES permitted pit water treatment ponds, PADEP first calculated a total average flow for the water draining to the pit using average annual

precipitation, the area of the pit, and a runoff factor. The WLAs were then calculated using this value and the BAT treatment pond effluent limits and were included in the mass balance along with the LAs.

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 Bear Run Watershed.

Table 3. TMDL Component Summary for the Bear Run 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* (%)
BEAR3.0 - Bear Run Headwaters						
Fe	2.9	2.0	0.0	2.0	0.9	31
Mn	1.6	1.6	0.0	1.6	0.0	0
Al	ND	NA	0.0	NA	NA	NA
Acidity	282.2	31.1	NA	31.1	251.1	89
Bear2.0 - Bar Run above South Branch Bear Run confluence						
Fe	ND	NA	NA	NA	NA	NA
Mn	28.8	5.4	NA	5.4	23.4	81*
Al	ND	NA	NA	NA	NA	NA
Acidity	497.5	119.3	NA	119.3	127.1	52*
SBBR6.0 - South Branch Bear Run after abandoned Johnstown Coal and Coke site						
Fe	50.2	20.1	3.4	16.7	30.1	60
Mn	21.6	13.9	2.3	11.6	7.7	36
Al	31.2	9.6	2.6	7.0	21.6	70

Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Identified* (%)
Acidity	794.8	79.4	NA	79.4	715.4	90
SBBR5.0 - South Branch Bear Run after abandoned drift discharge						
Fe	118.1	20.0	NA	20.0	68.0	77*
Mn	45.8	14.5	NA	14.5	23.6	62*
Al	46.2	12.6	NA	12.6	12.0	51*
Acidity	1,362.0	0.0	NA	0.0	646.6	100*
SBBR4.0 - South Branch Bear Run before UNTs 27045 and 27046 to South Branch Bear Run						
Fe	158.1	23.7	NA	23.7	36.3	61*
Mn	65.7	16.6	NA	16.6	17.8	52*
Al	51.8	13.5	NA	13.5	4.7	26*
Acidity	1,661.5	149.7	NA	149.7	149.8	50*
SBBR3.0 - South Branch Bear Run before UNT 27042 to South branch Bear Run at Keal Run						
Fe	198.0	27.9	NA	27.9	35.7	56*
Mn	101.2	19.2	NA	19.2	32.9	63*
Al	73.3	17.0	NA	17.0	18.0	51*
Acidity	2,125.5	148.7	NA	148.7	465.0	76*
SBTR2.0 - UNT 27042 to South Branch Bear Run						
Fe	ND	NA	NA	NA	NA	NA
Mn	2.1	2.1	NA	2.1	0.0	0
Al	ND	NA	NA	NA	NA	NA
Acidity	206.4	35.1	NA	35.1	171.3	83
SBBR2.0 - South Branch Bear Run above UNT 27039 to South Branch Bear Run						
Fe	222.6	42.1	NA	42.1	10.4	20*
Mn	152.4	32.3	NA	32.3	38.1	54*
Al	96.2	28.1	NA	28.1	11.8	30*
Acidity	2,937.4	205.8	NA	205.8	583.5	74*
SBTR1.0 - UNT 27039 to South Branch Bear Run						
Fe	11.2	8.4	NA	8.4	2.8	25
Mn	15.9	6.1	NA	6.1	9.8	62
Al	36.6	3.7	NA	3.7	32.9	90
Acidity	561.0	3.9	NA	3.9	557.1	99
SBBR1.0 South Branch Bear Run at Mouth						
Fe	224.2	36.0	NA	36.0	12.5	26*
Mn	161.9	36.0	NA	36.0	0.9	2*
Al	135.7	27.0	NA	27.0	7.7	22*
Acidity	3,666.4	256.4	NA	256.4	121.3	32*
BRTR2.0 - UNT 27036 to Bear Run						

Parameter (lbs/day)	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Percent Identified* (%)
Fe	ND	NA	NA	NA	NA	NA
Mn	1.3	1.3	NA	1.3	0.0	0
Al	ND	NA	NA	NA	NA	NA
Acidity	3.2	3.2	NA	3.2	0.0	0
BRTR1.0 - UNT 27033 to Bear Run						
Fe	ND	NA	NA	NA	NA	NA
Mn	ND	NA	NA	NA	NA	NA
Al	ND	NA	NA	NA	NA	NA
Acidity	0.0	NA	NA	NA	NA	NA
BEAR1.0 - Bear Run at mouth						
Fe	244.2	64.0	1.1	62.9	0.0	0*
Mn	209.0	56.2	0.7	55.5	3.5	6*
Al	141.1	48.3	0.7	47.6	0.0	0*
Acidity	5,677.4	510.7	NA	510.7	1,378.5	73*

ND = not detected

NA = not applicable, meets water quality standards, no TMDL necessary

* Percent reduction after upstream reductions are made

**Where existing concentrations are less than criteria and no reductions in existing LA are required, the allowable load is equal to the calculated WLA plus the existing LA, otherwise, the existing LA is reduced to accommodate the WLA.

PADEP allocated to nonpoint sources and point sources, as there are currently four permitted mining operations in the watershed requiring WLAs. 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.³ 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. Additionally, no required reductions of permit limits are necessary at this time, as all necessary reductions have been assigned to nonpoint sources.

Table 4: Wasteload Allocations of Permitted Discharges

³It 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.

Mine	Parameter	Allowable Average Monthly Concentration (mg/L)	Average Flow (MGD)	WLA (lbs/day)
Future Growth	Fe	3.0	0.0446	1.1
	Mn	2.0	0.0446	0.7
	Al	2.0	0.0446	0.7
BCBJ - Paul F. Becker Coal Co., Buchanan Job				
SMP #32860115 NPDES PA0597864	Fe	3.0	0.0411	1.0
	Mn	2.0	0.0411	0.7
	Al	3.0	0.0411	1.0
ATFS - A & T Coal Company Fisher Strip				
SMP #32803053 NPDES PA0124770	Fe	3.0	0.0964	2.4
	Mn	2.0	0.0964	1.6
	Al	2.0	0.0964	1.6
PNHT - P & N Coal Company, Inc., Hillman Tipple				
SMP #32851601 NPDES PA0095966	Fe	3.0	0.0011	0.03
	Mn	2.0	0.0011	0.02
	Al	2.0	0.0011	0.02

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.

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

Two primary programs provide maintenance and improvement of water quality in the watershed. PADEP's efforts to reclaim abandoned mine lands, coupled with its duties and responsibilities for issuing NPDES permits, will be the focal points in water quality improvement.

In 2002, the Indiana County Conservation District (ICCD) received a Growing Greener Grant and wrote a preliminary restoration plan for the Bear Run Watershed. Research and field work for the plan were completed in 2005. Preliminary results suggest that South Branch Bear Run and Bear Run can be restored by treating the major AMD discharges that enter South Branch Bear Run in the area of Lochvale. The abandoned treatment ponds of the Johnstown Coal and Coke are suitable for the construction of AMD treatment system treating the six discharges that occur in the Johnstown Coal and Coke complex. The landowner has expressed interest in selling the property to the ICCD or other interested parties. Four other major

discharges occur on Pennsylvania Game Commission (PGC) property in State Game Lands 174. The PGC has been a willing participant in restoration projects in other watersheds, and it is likely they would cooperate in restoration activities for Bear Run. Anoxic or oxic limestone drains and wetlands are suitable to treat the discharges in the watershed since the discharges are relatively low in metals. Land reclamation of abandoned refuse piles is also likely to happen in the watershed since the opening of the Seward co-generation plant in Indiana County. In 2004, the ICCD found approximately 24 brook trout with two to nine inches in length and four to five age classes that indicated a naturally reproducing population in the Bear Run. In addition, the Western Pennsylvania Conservancy Watershed Assistance Center is applying for a Coldwater Heritage Conservation Plan grant for the Bear Run Watershed.

8. *The TMDLs have been subject to public participation.*

Public notice of the draft TMDL was published in the *Pennsylvania Bulletin* on January 8, 2005, and the *Punxsutawney Spirit* on February 5, 2005, to foster public comment on the calculated allowable loads. A public meeting was held on February 7, 2005, at the Banks Township Municipal Building, Rossiter, 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

Bear Run Watershed Map

