BEAR RUN

INDIANA AND JEFFERSON COUNTIES

WATER QUALITY STANDARDS REVIEW

STREAM REDESIGNATION EVALUATION REPORT

Segment: Basin,
source to confluence with South Branch Bear Run
Stream Code: 27032
Drainage List: L

WATER QUALITY MONITORING SECTION (MAB)
WATER QUALITY DIVISION
BUREAU OF CLEAN WATER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2021

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Bear Run basin in response to a petition submitted to the Environmental Quality Board (EQB) by the Ken Sink Chapter of Trout Unlimited dated May 15, 2006. The EQB accepted the petition for further study on September 19, 2006, and published acceptance in the Pennsylvania Bulletin on September 30, 2006 (36 Pa B. 6064). The petition requests the Bear Run basin, from its source to its confluence with South Branch Bear Run, be redesignated to High Quality (HQ) or Exceptional Value (EV). The Bear Run watershed is currently designated Cold Water Fishes, Migratory Fishes (CWF, MF). DEP staff conducted an aquatic life use survey of the Bear Run basin on April 7, 2009. In January 2016 the Pennsylvania Fish and Boat Commission (PFBC) proposed adding Bear Run, from its source to confluence with South Branch Bear Run, to its List of Class A Wild Trout Waters. PFBC published its list of proposed stream segments for public comment in the Pennsylvania Bulletin on January 23, 2016 (46 Pa B. 532). PFBC Commissioners voted on and approved the addition of Bear Run to its List of Class A Wild Trout Waters at its March 31 meeting and the classification went into effect on April 16, 2016.

The stream redesignation process begins with an evaluation of the “existing uses” and the “designated uses” of a stream. “Existing uses” are water uses actually attained in the waterbody. When existing uses are determined, the stream is protected for those uses through permit or approval actions taken by the DEP. “Designated uses” are water uses identified in regulations that protect a waterbody. Candidates for stream redesignation may be identified by the DEP based on routine waterbody investigations or based on requests initiated by other agencies or from the general public through a rulemaking petition to the state EQB.

GENERAL WATERSHED DESCRIPTION

The Bear Run basin is a small, cold and shallow fourth order tributary to the West Branch Susquehanna River at river mile 209.72 and has a drainage area of 19.4 square miles. The petitioned portion of Bear Run drains 4.9 square miles and approximately 13.7 stream miles (Figure 1). The petitioned basin is located in Bell Township in Clearfield County, Gaskill Township in Jefferson County and Banks Township in Indiana County. The petitioned area is characterized by relatively steep topography, which is portrayed on the McGees Mill 7.5-minute series USGS quadrangle. The Bear Run basin is located in the Central Appalachian Ecoregion and much of the watershed has a low population density. Land use within the petitioned basin is approximately 73% forested, 24% agricultural and 1% urban. Land ownership is mostly public, with the majority of the petitioned area (approximately 61%) located within State Game Lands (SGL) 174.

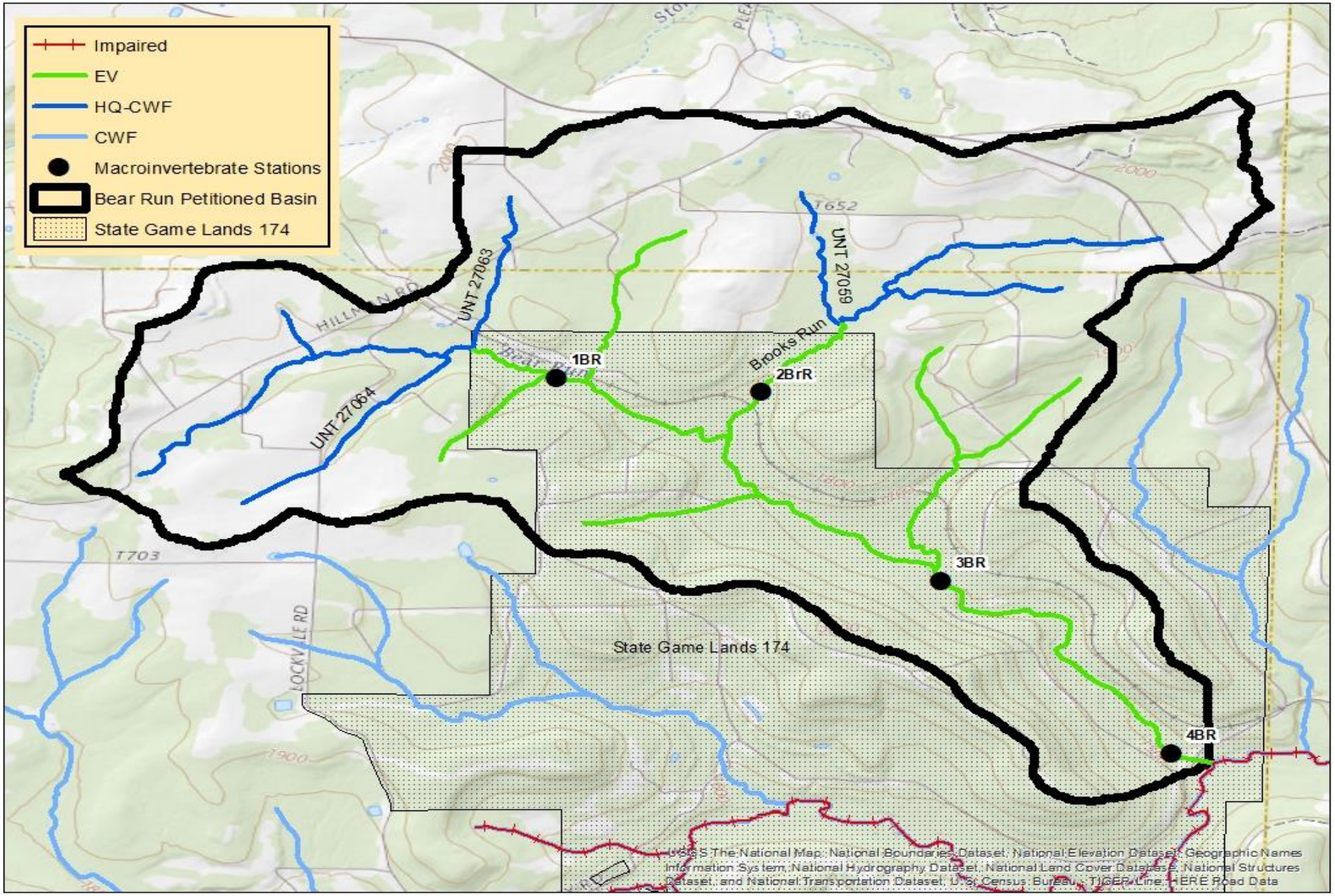

Figure 1: Bear Run Basin – Station Locations

WATER QUALITY AND USES

Surface Water

Long term water quality data were collected from December 11, 2001 to July 27, 2003 as part of the Bear Run Total Maximum Daily Load (TMDL) development to address abandoned mine drainage (AMD) impairments from historical mining operations in the watershed. One NPDES permitted discharge is located within the petitioned basin. P & N Coal Company, Inc. operates a coal processing area and tipple site at the headwaters of Bear Run. Treatment ponds on the Hillman Tipple site flow only in response to precipitation events by capturing and treating surface runoff from the site (DEP 2005).

Water Chemistry

Discrete water chemistry samples were collected at stations 1BR and 4BR. Field meter data was collected at all four of the sampling stations (Tables 1 and 2). Discrete water chemistry samples had elevated levels of aluminum, iron, and manganese but were within criteria. Levels for all three constituents were lower than the average concentrations used for the 2005 TMDL development, indicating that Waste Load Allocations (WLA) for the P & N Coal Hillman Tipple site are effective.

Table 1. Bear Run Basin – Station Locations

STATION	LOCATION
1BR	Bear Run, upstream of pipeline right-of-way near the northern border of SGL 174. Banks Township, Indiana County Lat: 40.899646 Long: -78.843090
2BrR	Brooks Run, 350 meters upstream of confluence with Bear Run and just upstream of SGL road. Banks Township, Indiana County Lat: 40.898794 Long: -78.832379
3BR	Bear Run, 80 meters downstream of UNT 27055. Banks Township, Indiana County Lat: 40.887450 Long: -78.822994
4BR	Bear Run, 200 meters upstream of confluence with South Branch Bear Run. Banks Township, Indiana County Lat: 40.877088 Long: -78.810802
MHR (Ref)	Mine Hole Run, 50 meters upstream of confluence with Cedar Run. Morris Township, Tioga County Lat: 41.555197 Long: -77.458493

Table 2. Bear Run Basin – Water Chemistry

FIELD PARAMETERS	1BR	2BrR	3BR	4BR
pH (SU)	5.97	5.63	5.93	5.97
SPECIFIC CONDUCTANCE (µs/cm)	56	79	47	45
DISSOLVED O_2 (mg/L)	10.5	11.1	10.9	11.73
TEMPERATURE (°C)	4.39	3.36	3.4	3.29
LAB PARAMETER	**1BR**			**4BR**
ACIDITY, TOTAL HOT AS CACO3	2.00 mg/L			3.20 mg/L
ALKALINITY TOTAL AS CACO3	3.6 mg/L			1.8 mg/L
ALUMINUM, DISSOLVED	34.700 µg/L			32.200 µg/L
ALUMINUM, TOTAL	**212.000** µg/L			**103.000** µg/L
AMMONIA TOTAL AS NITROGEN	<.02 mg/L			<.02 mg/L
ARSENIC, DISSOLVED	<3.0 µg/L			<3.0 µg/L
ARSENIC, TOTAL	<3.0 µg/L			<3.0 µg/L
CADMIUM, DISSOLVED	<.20 µg/L			<.20 µg/L
CADMIUM, TOTAL	<0.2 µg/L			<0.2 µg/L
CALCIUM, TOTAL	6.900 mg/L			5.600 mg/L
CHLORIDE, TOTAL	8.6 mg/L			5.2 mg/L
CHROMIUM, TOTAL	<50 µg/L			<50 µg/L
COPPER, DISSOLVED	<4 µg/L			<4 µg/L
COPPER, TOTAL	<4 µg/L			<4 µg/L
Hardness Total	26 mg/L			24 mg/L
IRON, TOTAL	**193.000** µg/L			**65.000** µg/L
LEAD, DISSOLVED	<1.0 µg/L			<1.0 µg/L
LEAD, TOTAL	<1.0 µg/L			<1.0 µg/L
MAGNESIUM, TOTAL	2.210 mg/L			2.410 mg/L
MANGANESE, TOTAL	**119.000** µg/L			**53.000** µg/L
NICKEL, DISSOLVED	4.930 µg/L			<4.0 µg/L
NICKEL, TOTAL	5.320 µg/L			<4.0 µg/L
NITRATE AS NITROGEN	0.94 mg/L			0.43 mg/L
NITRITE NITROGEN, TOTAL	<.01 mg/L			<.01 mg/L
PHOSPHORUS, TOTAL AS P	<.01 mg/L			<.01 mg/L
RESIDUE, DISSOLVED @105 C	58. mg/L			48. mg/L
SULFATE TOTAL	17.0 mg/L			17.4 mg/L
TOTAL SUSPENDED SOLIDS	<5 mg/L			<5 mg/L
ZINC, DISSOLVED	16.700 µg/L			11.200 µg/L
ZINC, TOTAL	16.100 µg/L			11.280 µg/L

"<" indicate concentrations below the reporting limit

Aquatic Biota

The indigenous aquatic community is an excellent indicator of long-term water quality conditions and is used as a measure of water quality. DEP staff collected habitat and benthic macroinvertebrate data at four Bear Run basin locations on April 7, 2009 and from one on the EV reference station, Mine Hole Run, on April 15, 2009 (Table 1, Figure 1).

Habitat. Instream habitat conditions were evaluated at all four candidate stations and the reference station. The habitat evaluation consists of rating twelve parameters to derive an overall station habitat score. The habitat scores for the four Bear Run basin stations ranged from 221 to 231 and the reference station had a habitat score of 228, all reflecting optimal habitat scores (Table 3).

Table 3. Bear Run Basin – Habitat Assessment Results

PARAMETER	STATIONS[1]				REFERENCE[2]
	1BR	2BrR	3BR	4BR	MHR
1. instream cover	17	19	17	20	18
2. epifaunal substrate	18	18	18	20	20
3. embeddedness	16	18	19	18	20
4. velocity/depth	20	19	20	20	19
5. channel alterations	20	20	20	20	19
6. sediment deposition	18	18	17	19	20
7. riffle frequency	17	19	18	18	19
8. channel flow status	20	15	19	20	18
9. bank condition	18	19	17	17	19
10. bank vegetative protection	19	19	18	19	18
11. grazing/disruptive pressures	20	19	20	20	19
12. riparian vegetation zone width	18	20	20	20	19
Total Score	221	223	223	231	228
Rating[3]	OPT	OPT	OPT	OPT	OPT

[1] Refer to Figure 1 & Table 1 for station locations
[2] Reference Station– Refer to Table 1 for location
[3] OPT=Optimal (≥192); SUB=Suboptimal (132-192)

Benthos. Benthic macroinvertebrate samples were collected from four stations in the Bear Run basin and one was collected from the reference station, Mine Hole Run, on April 7-15, 2009. All of the benthic macroinvertebrate samples were collected using DEP's Rapid Bioassessment Protocols (RBP) benthic macroinvertebrate sampling technique, which is a modification of the Environmental Protection Agency's (EPA) RBPs (Plafkin et al. 1989 and Barbour et al. 1999). Taxonomic diversity was fair at all four Bear Run basin stations. The abundance of acid tolerant taxa (*Leuctra* and *Amphinemura*) at the upper two stations (1BR and 2BrR) indicates the watershed is slowly recovering from its historical mining operations. Acid tolerant taxa decreased in downstream stations (Table 4).

Table 4. Bear Run Basin – Semi-Quantitative Benthic Macroinvertebrate Data

TAXA		STATIONS[1]				REFERENCE[2]
		1BR	2BrR	3BR	4BR	MHR
EPHEMEROPTERA (MAYFLIES)						
Ameletidae	***Ameletus***		2			
Baetidae	***Acerpenna***					1
	Baetis				1	3
	Diphetor					4
Heptageniidae	***Epeorus***			3	7	33
	Leucrocuta			2	3	1
	Stenacron			1		
	Maccaffertium				1	1
	Cinygmula					4
Ephemerellidae	***Drunella***					5
	Ephemerella					27
	Eurylophella	1				
	Dannella				2	
Leptophlebiidae	***Habrophlebiodes***			5	4	1
	Paraleptophlebia					6
PLECOPTERA (STONEFLIES)						
Pteronarcidae	***Pteronarcys***					2
Peltoperlidae	***Peltoperla***	1				
	Tallaperla					1
Taeniopterygidae	***Strophopteryx***		5			
Nemouridae	***Amphinemura***	2	28	29	20	7
	Ostrocerca		15	2	4	
	Paranemoura		2			
	Leuctra	159	73	32	28	15
Perlidae	***Acroneuria***		3	11	4	1
	Malirekus					2
Perlodidae	***Isoperla***		1	2		1
	Alloperla	8	2	11	9	2
Chloroperlidae	***Sweltsa***	1	1			2

[1] Refer to Figure 1 & Table 1 for station locations
[2] Reference Station– Refer to Table 1 for location

Table 4 (cont). Bear Run Basin – Semi-Quantitative Benthic Macroinvertebrate Data

TAXA		STATIONS[1]				REFERENCE[2]
		1BR	2BrR	3BR	4BR	MHR
TRICOPTERA (CADDISFLIES)						
Philopotamidae	***Dolophilodes***		1	1	2	
Polycentropodidae	***Polycentropus***	1		4	1	1
Polycentropodidae	***Nyctiophylax***	1				
Hydropsychidae	***Parapsyche***					1
	Diplectrona	2		6	3	1
	Ceratopsyche	1	3	6	4	1
Rhyacophilidae	***Rhyacophila***	7	4	4		7
Uenoidae	***Neophylax***				2	5
DIPTERA (TRUE FLIES)						
Ceratopogonidae	***Ceratopogon***	2			1	
	Probezzia					2
Empididae	***Chelifera***		1	4		
Tabanidae	***Chrysops***	1				
Tipulidae	***Antocha***					1
	Dicranota	1	1	3	1	
	Hexatoma	1		5	4	4
Limoniidae	***Molophilus***		1			
Simuliidae	***Prosimulium***	1	41	5	6	8
	Stegopterna		2			
Chironomidae		21	23	58	56	39
MEGALOPTERA (DOBSON/ FISHFLIES)						
Corydalidae	***Nigronia***	1			3	
ODONATA (DRAGON/ DAMSELFLIES)						
Gomphidae	***Lanthus***	1		1		
Cordulegastridae	***Cordulegaster***	1				
COLEOPTERA (AQUATIC BEETLES)						
Elmidae	***Oulimnius***	2	4	14	16	11
	Promoresia			2		
Non-Insect Taxa						
Cambaridae		1				
Collembola		1				
Nematoda						1
Oligochaeta				1	3	4
Taxa Richness		23	20	24	24	34
Total # of Organisms		218	213	212	185	205

[1] Refer to Figure 1 & Table 1 for station locations
[2] Reference Station– Refer to Table 1 for location

Fishes. On September 2nd and 8th 2015 PFBC staff examined three stations on Bear Run for addition to the PFBC list of Class A streams. The criteria established for Class A streams are estimated biomasses of 30 kg/ha for Brook trout, 40 kg/ha for Brown Trout, and 40 kg/ha for a mixed Brook/Brown fishery. Following established protocols (Weber et al. 2011), PFBC staff estimated a total trout biomass for the combined three stations on Bear Run to be 153.19 kg/ha. All trout collected were brook trout, with the exception of a single brown trout (Kristine 2015).

BIOLOGICAL USE QUALIFICATIONS

Benthic Macroinvertabrates

The criteria applied was the DEP's integrated benthic macroinvertebrate scoring test described at 25 Pa. Code §§ 93.4b(a)(2)(i) and 93.4b(b)(1)(v). Selected benthic macroinvertebrate community metrics from the petitioned basin were compared to those from the reference stream with a comparable drainage area. All stations were compared with a reference station collected on Mine Hole Run in Tioga County (Table 5). The station on Mine Hole Run has served as an EV reference stream in other DEP surveys. The comparison was done using the following metrics that were selected as being indicative of community health: taxa richness, modified EPT index, modified Hilsenhoff Biotic Index, percent dominant taxa, and percent modified mayflies.

Table 5. Bear Run Basin – RBP Metric Comparison

METRIC	STATIONS[1]				REFERENCE[2]
	1BR	2BrR	3BR	4BR	MHR
TAXA RICHNESS	23	20	24	24	34
Cand/Ref (%)	67.6%	58.8%	70.6%	70.6%	-
Biol. Cond. Score	3	0	4	4	8
MOD. EPT INDEX	8	12	12	12	20
Cand/Ref (%)	40.0%	60.0%	60.0%	60.0%	-
Biol. Cond. Score	0	3	3	3	8
MOD. HBI	1.02	1.97	3.20	3.37	2.62
Cand-Ref	-1.60	-0.65	0.58	0.75	-
Biol. Cond. Score	8	8	8	7	8
% DOMINANT TAXA	73	34	27	30	19
Cand-Ref	54	15	8	11	-
Biol. Cond. Score	8	5	8	7	8
% MOD. MAYFLIES	0	1	3	7	38
Ref-Cand	38	37	35	31	-
Biol. Cond. Score	0	0	2	3	8
TOTAL BIOLOGICAL CONDITION SCORE	19	16	25	24	40
% COMPARABILITY TO REFERENCE	**47**	**40**	**62**	**60**	-

[1] Refer to Figure 1 & Table 1 for station locations
[2] Reference Station– Refer to Table 1 for location

Based on these five metrics, candidate stations had Biological Condition Scores (BCS) that ranged from 40% (2BrR) to 62% (3BR) of the reference station. As a result, these candidate stations do not

meet the 83% or 92% comparison standard required to qualify as HQ (§ 93.4b (a)(2)(i)) or EV Waters (§ 93.4b(b)(1)(v)) respectively.

Class A Wild Trout

The criteria applied was the Class A wild trout stream qualifier described at 25 Pa. Code § 93.4b(a)(2)(ii). Based on data collected by PFBC and the criteria at 93.4b(a)(2)(ii), the Bear Run basin from the source to confluence with South Branch Bear Run meets the HQ qualifier.

A total of 13.7 stream miles qualify as HQ Waters under this criterion.

ADDITIONAL EXCEPTIONAL VALUE WATERS QUALIFYING CRITERIA

Due to SGL 174 encompassing approximately 61% of the Bear Run basin, the DEP evaluated additional antidegradation criteria listed in § 93.4b(b). These additional criteria include:

A. The water is an outstanding National, State, regional or local resource water [§ 93.4b(b)(1)(iii) – see Appendix A[1]];

B. The water is a surface water of exceptional ecological significance [§ 93.4b(b)(2) – see Appendix A[2]].

Areas of Bear Run that satisfy these EV qualifying criteria are depicted in Figure 1 and are discussed below:

A. Waters qualifying as EV as outstanding National, State, regional or local resource waters under § 93.4b(b)(1)(iii):

The “outstanding resource waters” EV criterion described at 25 Pa. Code § 93.4b(b)(1)(iii) may be applied to the petitioned waters since they meet the prerequisite HQ designation through the Class A wild trout stream qualifier. The definition of “outstanding National, State, regional or local resource waters” in § 93.1 requires adoption of “water quality protective measures”. “Coordinated water quality protective measures”, also defined at § 93.1, are required for regional or local governments (See Appendix A). Such water quality protective measures have been applied through management activities implemented on lands that are situated along watershed corridors in a manner that provides protection to substantial reaches of the corridor within the Bear Run basin as described below:

Outstanding State Resource Waters

The DEP evaluated water quality protective measures developed by the Pennsylvania Game Commission (PGC) to protect aquatic and adjacent riparian areas as important habitats on state game lands. The PGC has issued aquatic habitat buffer guidelines with inner buffer zones of 100 feet for EV

and 50 feet for HQ streams and with outer buffer zones of 50 and 100 feet respectively, for a total of 150 feet of protection. The management plans allow limited activities within the buffered areas, recommend elimination or minimization of existing roads or parking areas, and encourage restoration of riparian areas.

The water quality protective measures described in PGC resource management plans meet the **"**outstanding National, State, regional or local resource waters" definition and apply to stream segments where SGL 174 lands are situated along watershed corridors in a manner that provides protection to substantial reaches of the corridor within the Bear Run basin (Figure 1).

A total of 7.8 stream miles qualify as EV Waters under this criterion.

Outstanding Local Resource Waters

The DEP typically evaluates "outstanding local resource waters" by identifying and reviewing "coordinated water quality protective measures", which require legally binding measures coupled with a real estate interest. Typically, these measures are presented in conservation easements that are held in perpetuity by or that benefit certain governmental entities. Local conservation easements must be situated along the watershed corridor in a manner that provide protective measures to substantial reaches of the corridor, and also require that such measures be "coupled with" an interest in real estate, as described at § 93.1. Definitions - "*Coordinated water quality protective measures*". The DEP was unable to identify any local conservation easements within the petitioned basin.

B. Waters Qualifying as EV as Surface Waters of Exceptional Ecological Significance under § 93.4b (b)(2):

Information gathered for the Pennsylvania Natural Heritage Program and reported in *Indiana County Natural Areas Inventory* (2011) identified Bear Run as a Biological Diversity Area that supports two dragonfly species of concern, the ocellated darner (*Boyeria grafiana*) and the northern pygmy clubtail (*Lanthus parvulus*). It also identified the Johnsonburg Biological Diversity Area that supports what appears to be an upland species of concern. Although species of concern, threatened species and endangered species status alone, is not an EV qualifier, such species are provided protection implemented through the DEP's permitting and approval processes (See implementation of antidegradation regulations at 25 Pa. Code § 93.4c(a)(2).). The DEP was unable to identify any important, unique or ecologically sensitive areas hydrologically connected to riverine surface water and therefore, water quality dependent that would satisfy the exceptional ecological significance criterion at § 93.4b(b)(2) within the petitioned area.

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The DEP provided public notice of this evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on August 11, 2007 (37 Pa.B 4490) and again on June 25, 2016 (46 Pa.B. 3328) as a result of the most recent PFBC Class A data. In addition, Banks and Gaskill townships were notified of the study in a letter dated May 22, 2007. A second notification letter dated July 8, 2016 was sent to affected municipalities, the Indiana County Conservation District, and Indiana County Commissioners. A notice of intent to assess was published in the Indiana Gazette on May 10, 2010 and on the DEP's website on June 15, 2016. The DEP received one letter expressing support for the petition, but no data was received in response to the notice.

Final Draft Notice, Comments and Response. Once the final draft report was completed it was made available to affected municipalities, County Planning Commissions, County Conservation Districts, the Department of Conservation and Natural Resources, the PFBC, and the PGC in a letter dated February 24, 2017 with a public comment period ending 45-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website. The PFBC offered comments in support of the EV and HQ-CWF recommendations. No additional comments were received regarding the draft report.

RECOMMENDATION

Based on applicable regulatory definitions and requirements of § 93.4(b), the DEP has determined that the entire Bear Run basin from its source to confluence with South Branch Bear Run qualifies as HQ based on § 93.4b(a)(2)(ii) (Class A wild trout stream qualifier). In addition, those portions of Bear Run where SGL 174 lands are situated along watershed corridors in a manner that provides protection to substantial reaches of the corridor, with the prerequisite HQ qualifier, also satisfy EV criteria and are being recommended for redesignation to EV based on § 93.4b(b)(1)(iii) (outstanding State resource waters). The portions of the Bear Run basin being recommended for redesignation to EV are the Bear Run basin from UNT 27063 to South Branch Bear Run, excluding the headwaters of Brooks Run. Portions of Bear Run being recommended for redesignation to HQ-CWF are the Bear Run basin from the source to and including UNT 27063 and the Brooks Run basin from the source to and including UNT 27059 based on §93.4b(a)(2)(ii) (Figure 1).

This recommendation adds approximately **5.2** stream miles of HQ waters and **7.8** stream miles of EV waters to Chapter 93.

APPENDIX A

[1]Definition at 25 Pa. Code § 93.1: *Outstanding National, State, regional or local resource water*—A surface water for which a National or State government Agency has adopted water quality protective measures in a resource management plan, or regional or local governments have adopted coordinated water quality protective measures[3] along a watershed corridor.

[2]Definition at 25 Pa. Code § 93.1: *Surface water of exceptional ecological significance*—A surface water which is important, unique or sensitive ecologically, but whose water quality as measured by traditional parameters (for example, chemical, physical or biological) may not be particularly high, or whose character cannot be adequately described by these parameters. These waters include:

(i) Thermal springs.

(ii) Wetlands which are exceptional value wetlands under § 105.17(1) (relating to wetlands).

[3]Definition at 25 Pa. Code § 93.1: *Coordinated water quality protective measures*—

(i) Legally binding sound land use water quality protective measures coupled with an interest in real estate which expressly provide long-term water quality protection of a watershed corridor.

(ii) Sound land use water quality protective measure include: surface or ground water protection zones, enhanced stormwater management measures, wetland protection zones or other measures which provide extraordinary water quality protection.

(iii) Real estate interests include:

(A) Fee interests.

(B) Conservation easements.

(C) Government owned riparian parks or natural areas

(D) Other interests in land which enhance water quality in a watershed corridor area.

REFERENCES

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