JONES CREEK

SUSQUEHANNA COUNTY

WATER QUALITY STANDARDS REVIEW

DRAFT STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 31859
Drainage List: I

WATER QUALITY MONITORING SECTION
WATER QUALITY DIVISION
BUREAU OF CLEAN WATER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Jones Creek basin in Susquehanna County as part of ongoing monitoring and assessment efforts. The entire Jones Creek basin is currently designated Cold Water Fishes, Migratory Fishes (CWF, MF).

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. Existing uses are protected 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 Environmental Quality Board (EQB).

GENERAL WATERSHED DESCRIPTION

Jones Creek is a second order, high gradient tributary to Snake Creek within the Susquehanna River basin and is located within Liberty Township, Susquehanna County. Jones Creek originates at Tripp Lake and flows southeast to Snake Creek. Jones Creek has a drainage area of approximately 1.70 square miles and consists of 4.50 stream miles. Based on 2019 National Land Cover Database (NLCD) data, the basin consists of 82.6% forested, 8.2% open lands and 6.4% developed lands (Dewitz 2021). There are no National Pollutant Discharge Elimination System (NPDES) discharges located within the Jones Creek basin.

WATER QUALITY

Discrete Physiochemical

DEP staff collected in-situ field meter data as well as comprehensive water chemistry samples in March 2022 from two candidate stations throughout the Jones Creek basin and from the Dimmock Meadow Brook reference (Figure 1, Table 1). Discrete physicochemical data collected throughout the Jones Creek basin is indicative of excellent water quality conditions. Generally, metals concentrations are low, nutrient concentrations are very low and often below reporting limits (Table 2).

Table 1. Station Locations – Jones Creek Basin and Reference (REF).

STATION	DESCRIPTION
1JC	Jones Creek upstream of Jones Creek Road Liberty Township, Susquehanna County Lat: 41.957781 Long: -75.862871
2JC	Jones Creek upstream of Snake Creek confluence Liberty Township, Susquehanna County Lat: 41.949888 Long: -75.834783
DMB (REF)	Dimmock Meadow Brook Milford Township, Pike County Lat: 41.349077 Long: -74.836317

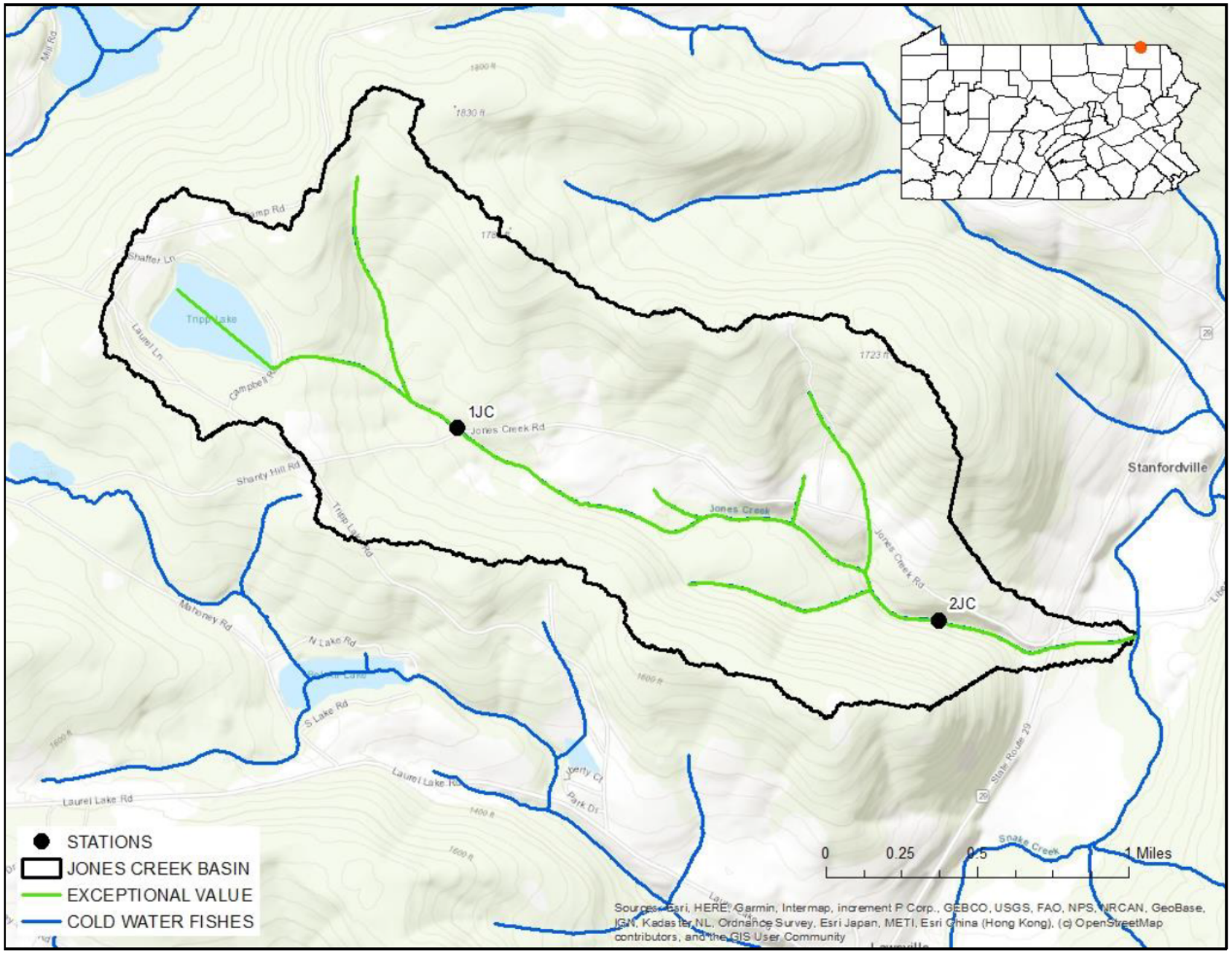

Figure 1. Jones Creek Basin Station Locations and Redesignation Recommendation.

Table 2. Discrete Physicochemical Data – Jones Creek Basin.

	PARAMETERS	UNITS	STATIONS[1]		REF[1]
			1JC	2JC	DMB
METALS AND IONS	ALUMINUM D	ug/L	15.000	<15.0	22.700
	ALUMINUM T	ug/L	92.300	269.000	28.500
	BARIUM T	ug/L	14.00	<10.0	<10.0
	BORON T	ug/L	<200.0	<200.0	<200.0
	BROMIDE	ug/L	<25.0	<25.0	<25.0
	CADMIUM D	ug/L	<0.200	<0.200	<200.0
	CALCIUM T	mg/L	2.90	3.50	1.74
	CHLORIDE T	mg/L	1.84	1.98	1.76
	COPPER D	ug/L	<4.00	<4.00	<4.00
	COPPER T	ug/L	<4.00	<4.00	<4.00
	IRON D	ug/L	<100.0	<100.0	<100.0
	IRON T	ug/L	<100.0	371.00	<100.0
	LEAD D	ug/L	<1.00	<1.00	<1.00
	LEAD T	ug/L	<1.00	<1.00	<1.00
	LITHIUM D	ug/L	<25.0	<25.0	<25.0
	LITHIUM T	ug/L	<25.0	<25.0	<25.0
	MAGNESIUM T	mg/L	0.89	1.16	0.62
	MANGANESE D	ug/L	<10.0	<10.0	<10.0
	MANGANESE T	ug/L	<10.0	<10.0	<10.0
	NICKEL D	ug/L	<50.0	<50.0	<50.0
	NICKEL T	ug/L	<50.0	<50.0	<50.0
	POTASSIUM T	mg/L	<1.00	<1.00	<1.00
	SELENIUM D	mg/L	<4.00	<4.00	<4.00
	SELENIUM T	ug/L	<4.00	<4.00	<4.00
	SODIUM T	mg/L	1.01	1.21	1.61
	STRONTIUM T	ug/L	<10.0	10.00	<10.0
	SULFATE - IC	mg/L	4.22	5.19	4.50
NUTRIENTS	AMMONIA-N D	mg/L	<0.02	<0.02	<0.20
	AMMONIA-N T	mg/L	<0.02	<0.02	0.05
	NITRATE & NITROGEN D	mg/L	0.14	0.24	<0.05
	NITRATE & NITROGEN T	mg/L	0.15	0.23	<0.05
	NITROGEN D	mg/L	0.24	0.35	0.11
	NITROGEN T	mg/L	<0.25	0.30	<0.25
	ORTHO PHOSPHORUS D	mg/L	0.01	<0.01	<0.01
	ORTHO PHOSPHORUS T	mg/L	<0.01	<0.01	<0.01
	PHOSPHORUS D	mg/L	0.01	<0.01	<0.01
	PHOSPHORUS T	mg/L	0.02	0.02	<0.01
PHYSICAL / OTHER	ALKALINITY	mg/L	7.40	12.60	8.20
	FIELD DISSOLVED OXYGEN	mg/L	13.40	13.80	13.46
	HARDNESS	mg/L	11	14	7
	FIELD WATER TEMP	C	1.06	0.91	2.12
	OSMO PRES	mosM	<1	<1	<1
	pH	pH units	6.70	6.80	6.50
	SPECIFIC COND	µS/cm[c]	30.00	36.50	23.50
	TDS	mg/L	<20	<20	<20
	TOC	mg/L	1.65	1.65	1.93
	TSS	mg/L	<20	<20	<20

"<" indicate concentrations below the reporting limit.

[1] Refer to Table 1 and/or Figure 1 for station locations

Biological

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. DEP staff collected macroinvertebrate data from two stations within the Jones Creek basin, and from one reference station on Dimmock Meadow Brook in Pike County. Data was collected using DEP benthic macroinvertebrate data collection protocols, which is a modification of the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (Barbour et al. 1999, Plafkin et al. 1989, Shull 2017).

Table 3. Benthic Macroinvertebrate Data – Jones Creek Basin

TAXA		STATIONS[1]		REF[1]
		1JC	2JC	DMB
Ephemeroptera (Mayflies)				
Ameletidae	*Ameletus*	-	1	1
Baetidae	*Baetis*	4	12	17
Ephemerellidae	*Drunella*	1	-	-
	Ephemerella	4	10	11
Heptageniidae	*Cinygmula*	3	6	2
	Epeorus	46	65	67
	Maccaffertium	2	3	-
	Stenacron	1	-	-
Leptophlebiidae	*Paraleptophlebia*	6	10	3
Plecoptera (Stoneflies)				
Capniidae	*Paracapnia*	14	14	5
Chloroperlidae	*Haploperla*	1	6	-
	Sweltsa	5	5	4
Leuctridae	*Leuctra*	8	4	5
Nemouridae	*Amphinemura*	2	1	-
	Prostoia	-	9	-
Peltoperlidae	*Tallaperla*	1	-	1
Perlidae	*Acroneuria*	6	3	12
	Eccoptura	-	-	1
Perlodidae	*Isoperla*	5	11	3
	Malirekus	1	-	-
Pteronarcyidae	*Pteronarcys*	1	-	3
Taeniopteryx	*Taenionema*	-	1	-
Trichoptera (Caddisflies)				
Hydropsychidae	*Ceratopsyche*	-	6	7
	Diplectrona	21	4	7
	Hydropsyche	6	-	-
Lepidostomatidae	*Lepidostoma*	-	1	3
Polycentropodidae	*Dolophilodes*	7	1	6
	Polycentropus	-	1	-
Rhyacophilidae	*Rhyacophila*	10	3	7
Thremmatidae	*Neophylax*	1	6	-
Megaloptera (Dobsonflies/Alderflies)				
Corydalidae	*Nigronia*	-	-	1
Diptera (True Flies)				
Ceratopogonidae	*Bezzia*	-	-	2
Chironomidae		8	3	12
Simulidae	*Prosimulium*	26	14	33
Tipulidae	*Dicranota*	3	-	-
	Hexatoma	5	2	1
Coleoptera (Aquatic Beetles)				
Psephenidae	*Ectopria*	1	-	-
Non-Insect Taxa				
Cambaridae	*Cambarus*	1	-	-
Taxa Richness		29	26	24
Total Organisms		200	202	214

"-" indicate taxa was not identified at a particular station

[1] Refer to Table 1 and/or Figure 1 for station locations

Macroinvertebrate data collected from the Jones Creek basin is consistent with excellent water quality conditions (Table 3). The farthest upstream candidate station (1JC) had a taxa richness of 29 and the downstream station (2JC) had a taxa richness of 26. Both stations were overwhelmingly dominated by Ephemeroptera, Plecoptera and Trichoptera (EPT) taxa with an EPT richness of 24 at 1JC and 23 at 2JC.

Physical

Instream habitat was evaluated at each station where benthic macroinvertebrates were collected (Table 4). The habitat evaluation consists of rating twelve parameters to derive a station habitat score. The total habitat scores for the Jones Creek stations and the Dimmick Meadow Brook reference station were above the optimal threshold (192).

Table 4. Habitat Evaluation Data – Jones Creek Basin

PARAMETERS	STATIONS[1]		REF[1]
	1JC	2JC	DMB
1. INSTREAM COVER	17	17	18
2. EPIFAUNAL SUBSTRATE	17	17	19
3. EMBEDDEDNESS	15	16	18
4. VELOCITY/DEPTH	17	17	20
5. CHANNEL ALTERATIONS	19	18	20
6. SEDIMENT DEPOSITION	16	15	18
7. RIFFLE FREQUENCY	17	17	20
8. CHANNEL FLOW STATUS	20	19	20
9. BANK CONDITION	16	15	17
10. BANK VEGETATIVE PROTECTION	19	18	20
11. GRAZING/DISRUPTIVE PRESSURES	20	20	20
12. RIPARIAN VEG.ZONE WIDTH	20	20	20
Total Score	213	209	230
Rating[2]	OPT	OPT	OPT

[1] Refer to Figure 1 and/or Table 1 for station locations

[2] OPT = Optimal (≥192)

INTEGRATED BENTHIC MACROINVERTEBRATE SCORING TEST

The DEP applied its integrated benthic macroinvertebrate scoring test described at 25 Pa. Code § 93.4b(b)(1)(v) to the Jones Creek basin. Selected benthic macroinvertebrate community metrics calculated from the Jones Creek stations were compared to the reference station from Dimmock Meadow Brook. Dimmock Meadow Brook was used as a reference because it has demonstrated an existing use of Exceptional Value (EV) based on biological measures and the macroinvertebrate community has demonstrated best attainable biological communities by scoring well above the top 25th percentile of Pennsylvania EV reference streams. In addition, the Dimmock Meadow Brook reference station has optimal habitat and similar gradient, drainage area, pH and alkalinity to the candidate stream station (DEP 2003). The comparisons were done using the following metrics that were selected as being indicative of community health: taxa richness, modified EPT index, modified Hilsenhoff Biotic Index (HBI), percent dominant taxon, and percent modified mayflies.

Based on these five metrics, the candidate stations on Jones Creek exceeded the EV qualifying criterion of 92% (Table 5).

Table 5. Benthic Macroinvertebrate Metric Comparison

METRIC	STATIONS[1]		REF[1]
	1JC	2JC	DMB
1. TAXA RICHNESS	29	26	24
Cand/Ref (%)	121	108	
Biol. Cond. Score	8	8	8
2. MOD. EPT INDEX	22	21	17
Cand/Ref (%)	129	124	
Biol. Cond. Score	8	8	8
3. MOD. HBI	1.23	1.33	1.54
Cand-Ref	-0.31	-0.21	
Biol. Cond. Score	8	8	8
4. % DOMINANT TAXA	22.4	32.2	31.3
Cand-Ref	-8.9	0.9	
Biol. Cond. Score	8	8	8
5. % MOD. MAYFLIES	30.7	47	39.3
Ref-Cand	8.6	-7.7	
Biol. Cond. Score	8	8	8
TOTAL BIOLOGICAL CONDITION SCORE	40	40	40
% COMPARABILITY TO REFERENCE	**100**	**100**	

[1] Refer to Table 1 and/or Figure 1 for station locations

PUBLIC RESPONSE AND REQUEST FOR TECHNICAL DATA

The DEP provided public notice of this redesignation evaluation and requested any technical data from the general public through publication in the *Pennsylvania Bulletin* on October 24, 2020 (50 Pa.B. 5921) and on the DEP website on October 23, 2020. Susquehanna County, Liberty Township, the Pennsylvania Fish and Boat Commission, and Trout Unlimited were notified of the redesignation evaluation in an emailed letter dated October 24, 2020. In addition, notifications were distributed through the DEP eNotice. In response to the notices, the DEP received a letter of support and additional water quality data from the Glacial Lakes Conservation Association.

RECOMMENDATION

Based on applicable regulatory definitions in 25 Pa. Code § 93.4b(b)(1)(v) (the DEP's integrated benthic macroinvertebrate scoring test), the DEP recommends that the Jones Creek basin be redesignated to Exceptional Value, Migratory Fishes (EV, MF).

This recommendation adds **4.5** miles of Exceptional Value stream miles to Chapter 93.

LITERATURE CITED

Barbour, M. T., Gerritsen, J., Snyder, B. D., Stribling, J. B. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. United States Environmental Protection Agency. EPA 841-B-99-002.

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Shull, D. R. (editor). 2017. Wadeable riffle-run stream macroinvertebrate data collection protocol. Chapter 3.1, pages 2–8 in M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.