Regulatory Analysis Form

(Completed by Promulgating Agency)

(All Comments submitted on this regulation will appear on IRRC's website)

INDEPENDENT REGULATORY REVIEW COMMISSION

RECEIVED

Independent Regulatory Review Commission

November 23, 2026

IRRC Number: 3506

(1) **Agency**
Environmental Protection

(2) **Agency Number**: 7
Identification Number: 592

(3) **PA Code Cite**: 25 Pa. Code Chapter 93

(4) **Short Title**:

Water Quality Standards; Chester Creek et al. Stream Redesignations

(5) **Agency Contacts (List Telephone Number and Email Address)**:

Primary Contact: Laura Campbell, (717) 772-5830, laurcampbe@pa.gov
Secondary Contact: Lauren Imgrund, (717) 783-8727, limgrund@pa.gov

(6) **Type of Rulemaking (check applicable box)**:

- ☒ Proposed Regulation
- ☐ Final Regulation
- ☐ Final Omitted Regulation
- ☐ Emergency Certification Regulation
- ☐ Certification by the Governor
- ☐ Certification by the Attorney General

(7) **Briefly explain the regulation in clear and nontechnical language. (100 words or less)**

The water quality standards program consists of the designated uses of the surface waters of the Commonwealth along with numerical and narrative criteria necessary to achieve and maintain those uses, and an antidegradation policy that protects the water quality of the surface waters. Water quality standards are instream water quality goals that are implemented by imposing specific requirements on individual sources of pollution. The amendments to Chapter 93 (relating to water quality standards) update and revise stream use designations for 16 stream basins totaling 138.47 stream miles in seven drainage lists based upon the various protected water use definitions in § 93.3 (relating to protected water uses) and the High Quality Waters (HQ) and Exceptional Value Waters (EV) qualifiers in § 93.4b (relating to qualifying as High Quality or Exceptional Value Waters).

(8) **State the statutory authority for the regulation. Include specific statutory citation.**

This proposed rulemaking is authorized under sections 5(b)(1) and 402 of The Clean Streams Law (CSL) (35 P.S. §§ 691.5(b)(1) and 691.402), which authorize the Environmental Quality Board (Board) to develop and adopt rules and regulations to implement the CSL (35 P.S. §§ 691.1—691.1001), and section 1920-A of The Administrative Code of 1929 (71 P.S. § 510-20), which grants to the Board the power and duty to formulate, adopt and promulgate rules and regulations for the proper performance of the work of the Department of Environmental Protection (Department). In addition, sections 101(a)(2) and 303(c)(2)(A) of

the Federal Clean Water Act (CWA) (33 U.S.C. §§ 1251(a)(2) and 1313(c)(2)(A)) set forth requirements for water quality standards.

(9) **Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as, any deadlines for action.**

The continued development of water quality standards, including revisions and updates, is required by Federal and State law. Section 5 of the CSL instructs the Board to consider water quality management and pollution control in the watershed as a whole, and the present and possible future uses of waters when adopting rules and regulations. In addition to these requirements, the Commonwealth has responsibilities under the CWA that require water quality standards to be reviewed and approved by the United States Environmental Protection Agency (EPA) for consistency with the mandates under that act and to be effective for purposes of implementing CWA actions. Section 101(a)(2) of the CWA establishes the National goal that, wherever attainable, water quality should provide for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the water. Section 303(c)(2)(A) of the CWA requires water quality standards to include designated uses of waters, taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial and other purposes. Section 303(d)(4)(B) of the CWA establishes an antidegradation policy for waters where the quality of the water equals or exceeds levels necessary to protect the designated uses for these waters. Section 303(c)(1) of the CWA requires states to periodically review and revise, as necessary, their water quality standards. The designated uses in this proposed rulemaking are consistent with these Federal and State statutory mandates.

(10) **State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.**

Water quality standards protect Pennsylvania's surface waters for a variety of uses relating to aquatic life, water supply, recreation and fish consumption, special protection and navigation. Rulemakings to update Pennsylvania's water quality standards are in the public interest because they ensure the uses of surface waters are protected based on the latest science and available data.

Benefits

Overall, this Commonwealth's residents and visitors and its natural resources will benefit from this proposed rulemaking because it protects the surface waters in this Commonwealth at appropriate levels. Protecting water quality provides economic and societal value to present and future generations in the form of a clean water supply that can support all current and potential future uses, including: human consumption, wildlife, irrigation and industrial use; recreational opportunities such as fishing (also for fish consumption); water contact sports and boating; and aquatic life protection.

The following paragraphs describe four specific categories of economic and social benefits of clean water that are protected by this proposed rulemaking. More generally, Farber and Griner found that 217 households near Loyalhanna Creek and the Conemaugh River in western Pennsylvania valued water quality improvements in those streams up to $27,179 per year. (Farber, S., & Griner, B. (2000). "Valuing watershed quality improvements using conjoint analysis." *Ecological Economics*, 34(1), 63—76. https://doi.org/10.1016/S0921-8009(00)00153-1) Research estimating benefits of clean water specific to

Pennsylvania is rare, but research done outside of Pennsylvania still provides concepts and findings that are translatable to this Commonwealth.

Increased property values

A substantial body of research demonstrates that improved water quality increases nearby property values.

In 2018, researchers from Michigan State University and Texas A&M University published an article that reviewed 43 distinct hedonic studies of the effects of water quality on property values, including studies from across the United States plus a handful of studies in other countries. (Nicholls, S., & Crompton, J. (2018). "A comprehensive review of the evidence of the impact of surface water quality on property values." *Sustainability*, 10(2), 500. https://doi.org/10.3390/su10020500) Nicholls and Crompton found that "the expected, statistically significant relationship between water quality and property price was demonstrated in at least one of the [numerous hedonic] models developed in all but two studies." Nicholls and Crompton concluded that when viewed as a whole, the studies provided "convincing evidence that clean water has a positive effect on property values" and that the value homebuyers associate with water quality persists even during economic downturns. Specific to Pennsylvania, the meta-analysis by Nicholls and Crompton included a study by Epp and Al-Ani of over 200 properties located near small rivers and streams in Pennsylvania that found a positive correlation between water quality and housing values, and concluded that buyers are aware of the environmental setting of a home and that differences in the quality of nearby waters affect the price paid for a residential property. (Epp, D. J., & Al-Ani, K. S. (1979). "The effect of water quality on rural nonfarm residential property values." *American Journal of Agricultural Economics*, 61(3), 529—534. https://doi.org/10.2307/1239441) Also included in the meta-analysis by Nicholls and Crompton was a study conducted by staff at the EPA's National Center for Environmental Economics, described as "the largest hedonic analysis of water quality ever completed," which evaluated over 225,000 property sales between 1996 to 2008 for single-family homes and townhouses in Maryland, located within 4 kilometers of the Chesapeake Bay tidal waters across 14 counties. (Walsh, P. et al. (2017). "Modeling the property price impact of water quality in 14 Chesapeake Bay counties." *Ecological Economics*, 135, 103—113. https://doi.org/10.1016/j.ecolecon.2016.12.014) The authors concluded that better water clarity had a statistically significant positive impact on waterfront property prices in half of the counties. While the analysis was less clear for nonwaterfront properties, the authors still observed that water quality could affect the value of homes even when they were not located directly on the waterfront.

The Delaware Riverkeeper Network published a report that discusses a case study from the Maine Agricultural and Forest Experiment Station which found that properties located near higher quality waters had higher market value, and that a decline in water quality can completely abate the market value premium associated with a home being a waterfront property. (Delaware Riverkeeper Network. (2010). "River values: The value of a clean and healthy Delaware River." https://rucore.libraries.rutgers.edu/rutgers-lib/57797/PDF/1/play/)

A 2006 study from the Great Lakes region by Braden et al. estimated that property values were significantly depressed in two regions associated with toxic contaminants in river sediments. (Braden, J. B. et al. (2006). "Economic benefits of sediment remediation." Project GL-96553601. https://www.nemw.org/wp-content/uploads/2015/06/EconBenReport06.pdf) The study showed depressed property values between $57 million and $118 million for single-family and multifamily homes in a portion of the lower Buffalo River in New York and between $80 million and $120 million for single family homes in the lower Sheboygan River in Ohio due to toxic contamination of river sediments.

Perry et al. of Key-Log Economics prepared a report for Our Pocono Waters that analyzed more than 240,000 residential and 5,000 commercial properties across five counties in northeastern Pennsylvania and determined that "residential and commercial land value increases for properties closer to an EV or HQ stream, when compared to otherwise similar properties farther away." (Perry, A. et al. (2022). "Economic effects of special protection stream designations in the Pocono Mountains region." Our Pocono Waters. https://ourpoconowaters.files.wordpress.com/2022/08/ourpoconowaters_report_final_web-pdf_8.11.22.pdf) (Perry et al. (2022)) The report attributed this increase in property values to willingness on the part of landowners to pay more for the better aesthetic qualities and increased recreational opportunities that can be better provided by streams afforded special protection status.

Maintenance of abundant and healthy fish and wildlife populations and support for outdoor recreation

Clean surface waters also benefit the Commonwealth by providing for increased tourism and recreational use of the waters. Clean water provides for improved wildlife habitat and more productive fisheries. This proposed regulation benefits local residents and those from outside the affected areas who come to enjoy the benefits and aesthetics associated with outdoor recreation.

Businesses, including small businesses, requiring high-quality source water and those in the recreation industry will be positively affected by this proposed rulemaking. The maintenance and protection of water quality will ensure the long-term availability of recreational fisheries and other activities. The purpose of this proposed rulemaking is to preserve these resources for current and future sportspersons, outdoor recreators and wildlife enthusiasts so that the social and economic benefits are maintained in local areas. The preservation of unique resources adds economic value to the local areas and, importantly, provides a valuable social function for outdoor recreation. One such example is the proposed redesignation of Unnamed Tributary (UNT) 03181 to Tohickon Creek due to its location within the Quakertown Swamp. The Quakertown Swamp is recognized as a significant ecological resource by the Pennsylvania Natural Diversity Inventory and provides the opportunity for nature walks and wildlife watching. The maintenance and protection of the water quality that would result from this proposed rulemaking will ensure the long-term availability of wildlife watching and other forms of outdoor recreation in the area. Specific revenue-related benefits associated with outdoor recreation and the range of economic value of the outdoor recreation industry in this Commonwealth are outlined in the following reports.

The Perry et al. (2022) report linked improved water quality to increased recreational spending, which leads to job creation and increased wages. Among other things, the study concluded that "improvements in water quality may lead to increases in outdoor recreation expenditures and/or trips."

The 2024 Outdoor Recreation Economic Statistics report from the United States Bureau of Economic Analysis documents over $20 billion in total economic value generated in this Commonwealth from the outdoor recreation industry, including over $9.5 billion in total compensation with 176,752 jobs in outdoor recreation in this Commonwealth. (United States Department of Commerce, United States Bureau of Economic Analysis. (2026). "Outdoor recreation economic statistics, U.S. and states, 2024." https://www.bea.gov/news/2026/outdoor-recreation-economic-statistics-us-and-states-2024)

Southwick Associates has prepared several reports for the Theodore Roosevelt Conservation Partnership that analyze the economic contribution of outdoor recreation in this Commonwealth. The latest report revealed that, in 2020, the outdoor recreation industry in this Commonwealth contributed more than $32 billion to this Commonwealth's state gross domestic product, supporting more than 430,000 jobs (more than the number of jobs in this Commonwealth for the production of durable goods in the same year) with nearly $20 billion in salaries and wages, and generating over $6.5 billion in tax revenue at the Federal, State and

local levels. (Southwick Associates. (2022). "Estimating the economic contributions of outdoor recreation in Pennsylvania: An analysis of 2020 state-level economic contributions made by hunting, fishing, and other outdoor recreation activities." Theodore Roosevelt Conservation Partnership. www.trcp.org/wp-content/uploads/2018/12/TRCP-and-Southwick-PA-Economic-Analysis-12-6-18.pdf) This report includes indirect effects, like purchases made by businesses supplying goods and services for outdoor recreation activities, and induced economic effects, like household spending generated by wages paid to workers in the outdoor recreation industry.

According to a 2005 report published jointly by the Pennsylvania Fish and Boat Commission (PFBC), the United States Geological Survey and the Pennsylvania State University, wild trout streams provide unique angling opportunities that contributed over $7.16 million to this Commonwealth's economy during the regular trout season in 2004. (Greene, R. R. et al. (2005). "Angler use, harvest and economic assessment on wild trout streams in Pennsylvania." PFBC Files, Bellefonte, PA)

The United States Fish and Wildlife Service periodically conducts National surveys of fishing, hunting and wildlife-associated recreation. According to the 2011 survey, approximately 1.1 million anglers participated in fishing and approximately 3.6 million persons participated in wildlife watching in this Commonwealth during 2011, with fishing-related expenditures totaling $485 million (including food and lodging, transportation, and other expenses such as equipment rental, bait and cooking fuel) and wildlife-watching expenditures totaling $1.3 billion (including trip-related costs and equipment). (United States Department of the Interior, United States Fish and Wildlife Service, and United States Department of Commerce, United States Census Bureau. (2018). "2011 National survey of fishing, hunting, and wildlife-associated recreation—Pennsylvania." https://www2.census.gov/programs-surveys/fhwar/publications/2011/fhw11-pa.pdf)

Maintenance of the current green infrastructure along streams and the associated reduction in tax expenditures

A 2014 report by the Lehigh Valley Planning Commission demonstrates the benefits when clean water and natural areas are protected. (Lehigh Valley Planning Commission. (2014). "Lehigh Valley return on environment." https://greenways.delawareandlehigh.org/wp-content/uploads/sites/6/2016/05/ReturnOnEnvironment_Dec_18_2014.pdf) The report states, "[t]he current green infrastructure along streams in the Lehigh Valley reduces tax dollars by avoiding more than $110.3 million annually in expenditures for water supply ($45.0 million), disturbance (flood) mitigation ($50.6 million) and water quality ($14.7 million)." This report describes how investing in green infrastructure to improve water quality (such as watershed conservation, forest buffers, and wetlands construction) can be much more cost effective than more traditional gray infrastructure approaches (such as pipes and treatment plants).

More recently, similar studies in Chester, Delaware, Montgomery and Northampton Counties have also found many millions of dollars in benefits from environmental services provided by natural lands, including benefits to water supplies, water quality, and flood mitigation. (Chester County Planning Commission. (2019). "Return on environment – The economic value of protected open space in Chester County, Pennsylvania." www.chescoplanning.org/Publications/PDF/ROE-FullDocument.pdf) (Econsult Solutions. (2022). "Return on environment – The economic impact of protected open space in Delaware County, Pennsylvania." Delaware County Planning Department. www.delcopa.gov/sites/default/files/2024-11/ESI-ROE_DelawareCo_2022-05-04_FINAL_Report-compressed.pdf) (Montgomery County Planning Commission. (2022). "Return on environment – The economic impact of protected open space in Montgomery County, Pennsylvania." www.montgomerycountypa.gov/departments/planning-

commission/planning-topic/projects/return-environment) (Northampton County Parks and Recreation. (2025). "Northampton County, Pennsylvania – Return on environment and outdoor recreation economic impact." https://econsultsolutions.com/wp-content/uploads/2026/02/Northampton-Co-Return-on-Environment-Report-2025-11-13_LowRes.pdf)

Savings in water treatment for downstream communities that rely on surface waters for water supplies and availability of unpolluted water for domestic, agricultural and industrial uses

Safe drinking water is vital to maintaining healthy and sustainable communities, and maintaining clean surface waters is crucial for ensuring safe drinking water supplies. Maintaining clean surface water benefits public water suppliers and their customers, enabling communities to plan and build future capacity for economic growth and setting the foundation for long-term sustainability for years to come. By maintaining clean surface water, public water suppliers may avoid the costly capital investments that are often required for the installation of advanced water treatment processes as well as the higher annual operations and maintenance costs associated with effective operation of these processes – costs which would likely be passed on to public water system customers.

For example, in a study of 27 water suppliers, the Trust for Public Land and the American Water Works Association found that every 10% increase in forest cover in source watersheds was associated with an approximate 20% decrease in treatment and chemical costs. (Trust for Public Land, & American Water Works Association. (2004). "Protecting the source – Land conservation and the future of America's drinking water." www.tpl.org/wp-content/uploads/2014/03/water-protecting_the_source_final.pdf) In a review of seven cities across the United States, Postel and Thompson also documented avoided capital and operating costs ranging from hundreds of thousands of dollars to hundreds of millions of dollars annually. (Postel, S. L., & Thompson, B. H., Jr. (2005). "Watershed protection: Capturing the benefits of nature's water supply services." *Natural Resources Forum.* 29, 98—108. https://doi.org/10.1111/j.1477-8947.2005.00119.x) A similar case could be made for agricultural, industrial and other water supply uses benefiting from the availability of better source water quality. Protecting the quality of drinking water sources is also an additional safeguard to protect consumers from illnesses caused or worsened by exposure to pollutants in drinking water, and associated health care costs.

(11) **Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.**

No. The proposed regulations are not more stringent than federal standards.

(12) **How does this regulation compare with those of the other states? How will this affect Pennsylvania's ability to compete with other states?**

Other states are also required to maintain water quality standards, based on the federal mandate of the CWA as described in the Department's response to question #9.

Therefore, the proposed amendments do not put Pennsylvania at a competitive disadvantage to other states. On the contrary, if Pennsylvania's water quality is sufficiently better than that found in other states, it may attract industries which rely on high quality water to do business within the Commonwealth. Higher water quality may also support the Commonwealth as a preferred tourist destination for various outdoor recreational activities and related business.

(13) **Will the regulation affect any other regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.**

No other regulations are affected by this proposed regulation.

(14) **Describe the communications with and solicitation of input from the public, any advisory council/group, small businesses and groups representing small businesses in the development and drafting of the regulation. List the specific persons and/or groups who were involved. ("Small business" is defined in Section 3 of the Regulatory Review Act, Act 76 of 2012.)**

These amendments are the result of stream evaluations conducted by the Department in response to: the EPA's partial approval of the Triennial Review of Water Quality Standards final-form rulemaking published at 50 Pa.B. 3426 (July 11, 2020) (Reynolds Run and Chester Creek); a request from The Nature Conservancy (UNT 64027 to Sixpenny Creek); the Department's ongoing statewide monitoring activities (Bermudian Creek; UNT 32599 to North Fork Dunkard Fork; and the Middle Lehigh River tributaries, which include Bear Creek (04123), Nesquehoning Creek tributaries (Jeans Run, Broad Run, Dennison Run, Bear Creek (04115), Grassy Meadow Run) and Mahoning Creek tributaries (Stewart Creek, UNT 04055 and UNT 04060)); and permit writers' requests associated with renewals for National Pollutant Discharge Elimination System (NPDES) permits (UNT 03181 to Tohickon Creek, and Logan Spring Run). In this proposed rulemaking, stream redesignations rely on definitions and qualifications in §§ 93.3 and 93.4b(a)(2)(ii) and (b)(1)(iii), (v) and (vi).

As part of the stream redesignation process, and in accordance with § 93.4c (relating to implementation of antidegradation requirements), the Department offered opportunities for the public to provide data and other information during the review of the uses of the streams. The Department provided public notice of its intent to assess the streams in this proposed rulemaking and requested water quality data for these streams through publications in the *Pennsylvania Bulletin* as summarized in Table 1.

Additionally, notices of the intent to evaluate these streams were posted on the Department's website. The Department directly notified affected municipalities, planning commissions, conservation districts, and Commonwealth agencies of these redesignation evaluations in letters dated as summarized in Table 1.

Table 1. *Pennsylvania Bulletin* Publication Dates for Notices of Stream Evaluation and Dates of Notification Letters Sent to Affected Governmental Organizations and Agencies

Stream Name	*County*	*Pennsylvania Bulletin*	*Notification Letters*
Reynolds Run	Lancaster	51 Pa.B. 6320 (October 2, 2021)	October 2, 2021
Chester Creek	Chester	51 Pa.B. 6320	October 2, 2021
UNT 32599 to North Fork Dunkard Fork	Greene	52 Pa.B. 6785 (October 29, 2022)	November 3, 2022
UNT 64027 to Sixpenny Creek	Berks	46 Pa.B. 1287 (March 5, 2016)	May 27, 2016
Bermudian Creek	Adams	48 Pa.B. 3491 (June 9, 2018)	June 12, 2018
Logan Spring Run	Huntingdon Blair	48 Pa.B. 3491	June 12, 2018

Stream Name	*County*	*Pennsylvania Bulletin*	*Notification Letters*
Bear Creek (04123)	Carbon	48 Pa.B. 7265 (November 17, 2018)	October 19, 2018
Jeans Run	Carbon	48 Pa.B. 7265	October 19, 2018
Broad Run	Carbon	48 Pa.B. 7265	October 19, 2018
Dennison Run	Carbon	48 Pa.B. 7265	October 19, 2018
Bear Creek (04115)	Carbon	48 Pa.B. 7265	October 19, 2018
Grassy Meadow Run	Carbon	48 Pa.B. 7265	October 19, 2018
Stewart Creek	Carbon	48 Pa.B. 7265	October 19, 2018
UNT 04055 to Mahoning Creek	Carbon	48 Pa.B. 7265	October 19, 2018
UNT 04060 to Mahoning Creek	Carbon	48 Pa.B. 7265	October 19, 2018

In response to these notifications, the Department received one letter in support of the redesignation for Reynolds Run and additional fish data from the PFBC. One letter of support was received for UNT 64027 to Sixpenny Creek. Two letters of support were received for Logan Spring Run. Two letters of general support as well as additional information to be considered as part of the evaluation were received for UNT 03181 to Tohickon Creek. One letter of support for UNT 32599 to North Fork Dunkard Fork was received.

Following the period for data submission described in the notices of intent to assess, the Department evaluated all available water quality data and other applicable information for these streams, and drafted and published stream evaluation reports on its website for public review and comment. Notices of availability were published in the *Pennsylvania Bulletin*, and the Department directly notified affected municipalities, planning commissions, conservation districts, and Commonwealth agencies of these redesignation evaluations in letters dated as summarized in Table 2. Members of the public interested in receiving notifications of stream evaluations, including notices of intent to assess and draft stream evaluation reports, may subscribe to the Department's Electronic Notification System, eNotice, at www.ahs.dep.pa.gov/eNOTICEWeb.

Table 2. Stream Evaluation Draft Report Publication for Public Comment

Stream Name	*Pennsylvania Bulletin*	*Notification Letters*
Reynolds Run	54 Pa.B. 2168 (April 20, 2024)	April 20, 2024
Chester Creek	54 Pa.B. 2168	April 20, 2024
UNT 32599 to North Fork Dunkard Fork	54 Pa.B. 2168	April 20, 2024
UNT 64027 to Sixpenny Creek	49 Pa.B. 6919 (November 16, 2019)	November 16, 2019
Bermudian Creek	49 Pa.B. 6919	November 16, 2019
Logan Spring Run	49 Pa.B. 6919	November 16, 2019
UNT 03181 to Tohickon Creek	51 Pa.B. 6704 (October 23, 2021)	October 23, 2021
Bear Creek (04123)	50 Pa.B. 6468 (November 14, 2020)	November 14, 2020; December 30, 2020
Jeans Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020

Stream Name	*Pennsylvania Bulletin*	*Notification Letters*
Dennison Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Bear Creek (04115)	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Grassy Meadow Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Stewart Creek	50 Pa.B. 6468	November 14, 2020; December 30, 2020
UNT 04055 to Mahoning Creek	50 Pa.B. 6468	November 14, 2020; December 30, 2020
UNT 04060 to Mahoning Creek	50 Pa.B. 6468	November 14, 2020; December 30, 2020

Each draft report was open for public comment for no less than a 30-day period. In response to these notifications, the Department received the following feedback.

For Reynolds Run, two comments were received in support of the redesignation recommendations. For Chester Creek, the Department received two comments in support of the redesignation recommendation. For UNT 32599 to North Fork Dunkard Fork, there were three comments in support. For Bermudian Creek, there was one comment submitted by PFBC with a recommended revision. The PFBC provided additional fish survey data collected in May 2016. No letters were received regarding UNT 64027 to Sixpenny Creek or Logan Spring Run. UNT 03181 to Tohickon Creek received support regarding the redesignation recommendation from 7 organizations and 276 citizens. The Department received additional data from the Heritage Conservancy regarding UNT 03181 to Tohickon Creek. One comment of support was received for Bear Creek (04123). Tributaries to Nesquehoning Creek (that is, Bear Creek, Jeans Run, Broad Run, Dennison Run, Grassy Meadow Run, and Stewart Creek) and Mahoning Creek (UNT 04055 and UNT 04060) had approximately 471 letters of support, and 1 letter requesting an extension of the formal comment period by 60 days.

Copies of the stream evaluation reports for these waterbodies are available on the Department's website and are included with this Regulatory Analysis Form. All data and comments received in response to these notifications were considered in the review of the surface water evaluations for these streams. The data and information collected on these waterbodies support the Board's proposed rulemaking as set forth in Annex A.

In addition to the public participation solicited prior to this rulemaking, the public will be afforded the opportunity to comment on this proposed rulemaking, which will include a public hearing during a 45-day public comment period.

Department staff presented a summary of this proposed rulemaking to the Department’s Agricultural Advisory Board on April 10, 2025.

The Department’s Bureau of Clean Water is coordinating with the Department’s Small Business Ombudsman to ensure the small business community will be notified of their opportunity to submit comments on this proposed rulemaking during the 45-day public comment period following publication in the *Pennsylvania Bulletin*.

(15) **Identify the types and number of persons, businesses, small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012) and organizations which will be affected by the regulation. How are they affected?**

Entities that will and may benefit from this rulemaking are discussed in the Department's response to question #10.

Regarding permitted discharges to waters proposed for redesignation to special protection in this rulemaking, the Department identified 11 NPDES general permits (for nonpublicly owned sewage and for stormwater associated with either mining or industrial activity) and one "no exposure" conditional exclusion from an NPDES stormwater permit as provided under § 92a.32(b) (relating to stormwater discharges). The Department considers four of these 11 permits to be small businesses based on available information. For context, statewide, approximately 17,850 facilities or activities hold NPDES permits, not including NPDES permits for stormwater associated with construction activity, as explained below. Existing permitted discharges authorized under an NPDES general permit and entities that have obtained a "no exposure" conditional exclusion may be affected because point source discharges to special protection streams are not eligible for coverage under NPDES general permits or for a conditional exclusion from NPDES stormwater permits, based on § 92a.32(b) and § 92a.54(a)(8) and (e)(9) (relating to general permits), and therefore require individual permits. Additional cost may be incurred by these facilities required to obtain an individual permit.

The Department's permit evaluation did not include NPDES permits for stormwater associated with construction activities issued under Chapter 102 (relating to erosion and sediment control). These permits were not included in the permit analyses because of the short-term, temporary nature of these permitted discharges.

The permit count also does not include NPDES permits within the Reynolds Run basin. The permits within this basin are already issued with the HQ designated use recommendation in this proposed rulemaking. In other words, although § 93.9o (relating to Drainage List O) would be updated for this basin from High Quality Waters – Trout Stocking (HQ-TSF) to High Quality Waters – Cold Water Fishes (HQ-CWF), the current EPA-approved designated use for Reynolds Run used for CWA actions, such as NPDES permits, already includes the HQ designation, which will not change.

While an HQ or EV use does not prohibit activities, any new, additional or increased discharge to a stream with a protected use of HQ or EV requires additional evaluations to be completed by the permit applicant and may require the use of additional treatment technologies or best management practices (BMPs). Discharge permits to surface waters with a protected use of HQ or EV may be issued if a permit applicant can sufficiently demonstrate to the Department that the activity will protect existing water quality. The Department identified eight individual permits for existing discharges to waters proposed for redesignation to special protection in this proposed rulemaking. These eight permits could be affected by the proposed regulation in the future if additional or increased discharges are requested by these permittees.

Broader estimates of who will be affected by the stream redesignations in this proposed rulemaking and how they will be affected would be speculative at this time because: (1) a discharger will not be impacted until a future activity requires a new or modified NPDES permit; (2) the characteristics of each receiving stream and each effluent discharge are unique; (3) social and economic justification (SEJ) may be available to modify the requirement; (4) persons currently discharging under a general permit to these waters may or may not continue with their permitted activity after the stream uses are redesignated; and (5) generic

technology or cost equations are not available for purposes of comparing the costs or savings, or both, for persons who are responsible for discharges.

(16) **List the persons, groups or entities, including small businesses, that will be required to comply with the regulation. Approximate the number that will be required to comply.**

Please see the Department's response to question #15.

(17) **Identify the financial, economic and social impact of the regulation on individuals, small businesses, businesses and labor communities and other public and private organizations. Evaluate the benefits expected as a result of the regulation.**

Please see the Department's response to question #10 for discussion of the benefits of this proposed rulemaking.

These proposed amendments to Chapter 93 will not impose any new compliance costs on persons engaged in regulated activities under existing individual permits or approvals from the Department because existing discharges are included in any determination of the existing water quality when streams are redesignated to HQ or EV. Since the presence of these discharge activities did not preclude the attainment of the HQ or EV use and the water quality of the HQ or EV water will be maintained and protected under existing permit coverage, these discharges are considered to satisfy the antidegradation requirements in § 93.4a(c) (relating to antidegradation) so long as the discharge quality and quantity remain the same. Additional compliance costs may arise when permits or approvals are necessary for new or expanded regulated activities to a stream protected as HQ or EV.

Discharges to special protection streams are not eligible for coverage under NPDES general permits, based on § 92a.54(a)(8), and, therefore, require individual permits. Individual permits are required in special protection waters because the existing quality of the water must be protected. Therefore, each discharge must be evaluated individually for each stream. Site-specific characteristics of the stream water quality are used to determine effluent limitations for discharges to a stream. The individual permits are necessary to track the quality and quantity of existing permitted discharges to ensure that additional or increased discharges to a special protection water do not occur without the Department's review in accordance with the antidegradation regulations.

In addition, stormwater discharges associated with industrial activity to surface waters classified as HQ or EV under Chapter 93 do not qualify for conditional exclusion from an NPDES permit as provided under § 92a.32(b). Some additional cost will be incurred by a facility required to obtain an individual permit. The Department will implement stream redesignations through permit and approval actions.

Table 3 compares fees associated with individual and general NPDES permits, as established in §§ 92a.26, 92a.62 and 102.6 (relating to application fees; annual fees; and permit applications and fees). The fees in Table 3 include notice of intent (NOI) fees for general permits, and application and annual fees for individual permits. For simplicity, the table does not show fees for permit amendments or transfers of coverage.

Table 3. Summary of Fees Associated with Individual and General NPDES Permits

Permit Type	*Individual Permit Application Fees*	*Individual Permit Annual Fees*	*General Permit NOI Fees**
Small flow sewage treatment plants:			
Single residences	$200	$100	$100 (PAG-04)
All others	$500	$250	$200 (PAG-04)
Stormwater associated with industrial activity	$3,000	$1,500	$2,500 (PAG-03)*
Municipal separate storm sewer system (MS4)	$5,000	$2,500	$2,500 (PAG-13)*
Concentrated animal feeding operations (CAFO)	$500	$500	$2,000 (PAG-12)
Application of pesticides	$3,000	$300	$2,500 (PAG-15)*
Stormwater associated with construction activity	$1,500 + $100/acre of earth disturbance	$500	$500 + $100/acre of earth disturbance (PAG-01 and PAG-02)
Industrial waste:			
Minor to major (>=250 MGD)	$3,000—$10,000	$1,500—$50,000	N/A
Petroleum contaminated groundwater systems	$3,000—$10,000	$3,000—$10,000	$2,500 (PAG-05)
Hydrostatic test water	$3,000—$10,000	$3,000—$10,000	$2,500 (PAG-10)

* The NOI fee is paid in annual installments over the 5-year term of the permit.

The protection of HQ and EV streams does not limit economic growth and development. While a new, additional or increased discharge to a stream with a protected use of HQ or EV does require additional evaluations and may require the use of additional treatment technologies or BMPs, it does not prohibit activities. Discharge permits to surface waters with a protected use of HQ or EV may be issued if a permit applicant can sufficiently demonstrate to the Department that the activity will protect existing water quality.

In the future, persons adding or expanding a discharge to a stream may need to provide a higher level of treatment or additional BMPs to protect the designated and existing uses of the affected streams. A person who proposes a new, additional or increased point source discharge to a stream with a protected use of EV or HQ would need to satisfy the antidegradation requirements in § 93.4c(b)(1). An applicant for any new, additional or increased point source discharge to special protection waters shall evaluate nondischarge alternatives, and the applicant shall use an alternative that is environmentally sound and cost effective when compared to the cost associated with achieving a nondegrading discharge. If a nondischarge alternative is not environmentally sound and cost-effective, an applicant for a new, additional or increased discharge shall utilize antidegradation best available combination of technologies (ABACT), which include cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies.

The permit applicant shall demonstrate in the permit application that their new or expanded activities will not lower the existing water quality of special protection streams. If an applicant cannot meet these nondegrading discharge requirements, a person who proposes a new, additional or increased discharge to a stream with a protected use of HQ is given an opportunity to demonstrate there is a social or economic benefit of the project that would justify a lowering of the water quality. The SEJ demonstration must show that the discharge is necessary to accommodate important economic or social development in the area in which the waters are located and that a lower water quality will protect all other applicable water uses for

the waterbody. SEJ is not available for proposed discharges to streams with a protected use of EV. The water quality of streams with a protected use of EV must be maintained and protected. Due to the technology-specific and location-specific natures of this demonstration, it is not possible to estimate costs associated with new, additional or increased discharges to streams with a designated use of HQ or EV.

Costs associated with new, additional or increased discharges to surface waters may include increased consulting fees to complete the additional antidegradation analyses and permit application requirements that address antidegradation of surface water quality, along with increased engineering design fees and installation, operation and maintenance costs for additional treatment technologies or BMPs. The treatment technology(s) or BMPs necessary for each discharge and their costs are based on the specific design and operation of a facility, which also requires consideration of the size of the discharge in relation to the size of the stream and many other factors. It is not possible to forecast these additional costs because there is no way to predict if existing permitted facilities or activities will expand, or if new facilities or activities will apply for permits in the future.

For nonpoint source control, under § 93.4c(b)(2), cost-effective and reasonable BMPs must be achieved for pollution sources to surface waters with a protected use of HQ and EV.

When onlot sewage systems are planned, compliance with the sewage facilities planning and permitting regulations in Chapters 71—73 (relating to administration of sewage facilities planning program; administration of sewage facilities permitting program; and standards for onlot sewage treatment facilities) will continue to satisfy § 93.4c in the waters that are proposed for redesignation to HQ or EV in this rulemaking. Permit applicants of sewage facilities with proposed discharges to surface waters with a protected use of HQ, subject to antidegradation requirements, may demonstrate SEJ at the sewage facilities planning stage and need not redemonstrate SEJ at the discharge permitting stage. The SEJ demonstration process is available to sewage and nonsewage discharge applicants for any naturally occurring substances identified in accordance with the Department's *Water Quality Antidegradation Implementation Guidance* (391-0300-002). This proposed rulemaking will not increase costs or trigger adverse effects on existing or planned onlot sewage systems.

(18) **Explain how the benefits of the regulation outweigh any cost and adverse effects.**

Please see the Department's response to question #10 for discussion of the benefits of this proposed rulemaking and the Department's response to questions #15 and #17 for discussion about anticipated compliance obligations.

It is important for the Commonwealth to realize the benefits of clean water and to ensure that associated opportunities and activities continue and grow in a manner that is environmentally, socially and economically sound. Protection and maintenance of water quality ensures its future availability for all uses.

Perry et al. (2022) found that, overall, the economic benefits of special protection waters outweighed the costs. The report noted a positive relationship between prevalence of HQ and EV designated streams and all three measures of economic prosperity: personal income; earnings; and employment. Furthermore, this economic study did not find evidence to support the claim that HQ and EV designation harms economic development prospects.

Thus, the certain benefits of this proposed rulemaking outweigh any potential future costs for permitted activities and potential adverse impacts.

(19) **Provide a specific estimate of the costs and/or savings to the regulated community associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.**

Please see the Department's response to questions #15 and #17.

Based on the site-specific nature of the antidegradation evaluations and the variety of potential discharges, costs and/or savings to the regulated community will depend upon: technologies chosen to address new, additional or increased pollutants; effluent discharge and receiving stream characteristics; and demonstrations of SEJ for less stringent limitations.

(20) **Provide a specific estimate of the costs and/or savings to the local governments associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.**

The Department has identified two MS4 permits and two publicly-owned water treatment plants (WTP) in the watersheds proposed for redesignation in this rulemaking. A WTP with an NPDES permit to discharge industrial wastewater will not be affected by the stream redesignations in this proposed rulemaking for existing discharges. A new publicly-owned treatment works (POTW) or WTP may be impacted by this proposed rulemaking in the future if the POTW or WTP proposes to discharge to waters identified in this proposed rulemaking. For existing discharges, if a person proposes to change the quality or quantity of their permitted discharge(s) after a stream is redesignated, any subsequent permit action will take the redesignation into account when establishing permit conditions. See the Department's response to question #17 for more detailed information on antidegradation requirements, SEJ, nondegrading discharge and nondischarge alternatives.

Local governments that are MS4s will most likely have additional costs associated with MS4 permitting requirements for discharges to surface waters with a protected use of HQ or EV. Any MS4 that discharges to a stream with a protected use of HQ or EV will be required to obtain an individual permit or an individual permit waiver. Discharge activities to special protection streams are not eligible for coverage under NPDES general permits, based on § 92a.54(a)(8) and (e)(9), and therefore, require individual permits. See the Department's response to questions #15 and #17 for additional information on costs to NPDES permittees, including MS4s.

Local governments may gain or increase income from the redesignations due to potential tourism and recreational revenue. For local governments that receive income from the tourism industry, the redesignations may help maintain local revenue and employment. In addition, local land values may increase in the future as homes that are near areas of clean water and protected resources become more desirable places to live. Local governments that use these waters as a public water supply may also gain an economic benefit by reduced source water treatment requirements. See the Department's response to questions #10, #15 and #17 for additional details.

(21) **Provide a specific estimate of the costs and/or savings to the state government associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.**

No costs will be imposed directly upon Commonwealth government by this proposed rulemaking. This proposed regulation will be implemented through existing Department programs, procedures and policies.

No permits have been issued to a Commonwealth agency for discharges to the 16 streams that are proposed for redesignation in this proposed rulemaking.

(22) **For each of the groups and entities identified in items (19)-(21) above, submit a statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.**

Existing Department paperwork, procedures and guidance will be used to implement antidegradation requirements for discharges to the streams being considered for redesignation to HQ and EV in this proposed rulemaking. No new forms, reports or implementation procedures are necessary. As detailed in the response to question #17, a permit applicant who proposes to discharge new, additional or increased pollutants might need the assistance of a consultant to evaluate certain elements of the antidegradation requirements such as nondischarge alternatives and nondegrading treatment options or BMPs. A permit applicant for a new or renewed permit must apply for an individual permit; however, a permit renewal does not trigger antidegradation review until new, additional or increased pollutants are proposed in the permit application.

(22a) **Are forms required for implementation of the regulation?**

No new forms are required to implement this regulation. For a permit applicant who proposes to discharge new, additional or increased pollutants, the appropriate permit applications are needed when applying for a permit. The permit application should include an antidegradation module, if available, corresponding to the appropriate Department permitting program.

Permit application modules for discharges to special protection waters can be found at the links listed in the response to question #22b. If a permit application lacks an antidegradation module, the permit applicant must still provide the required antidegradation analyses and evaluations as required by § 93.4c(b)(1).

(22b) **If forms are required for implementation of the regulation, attach copies of the forms here. If your agency uses electronic forms, provide links to each form or a detailed description of the information required to be reported. Failure to attach forms, provide links, or provide a detailed description of the information to be reported will constitute a faulty delivery of the regulation.**

The following are links to existing antidegradation permit application modules or forms that include antidegradation requirements:

Antidegradation Supplement for Mining Permits
http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=3713

Mining SEJ module
https://greenport.pa.gov/elibrary//GetFolder?FolderID=3713

Oil and Gas Program Erosion and Sediment Control General Permit
www.depgreenport.state.pa.us/elibrary/GetDocument?docId=56433&DocName=03 - NOTICE OF INTENT %28NOI%29.PDF <span style%3D"color:blue%3b">%28NEW%29

Industrial Waste Antidegradation Module (including Industrial Waste Stormwater Only Discharges)
http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=11982&DocName=3800-PM-BCW0008g Module 4 and Module 4 Instructions.pdf

Pesticides Permit Antidegradation Module
http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=3675

Erosion and Sediment Control Individual Permit
https://greenport.pa.gov/elibrary/GetFolder?FolderID=105509

(23) **In the table below, provide an estimate of the fiscal savings and costs associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.**

	Current FY 2026-27	FY +1 2027-28	FY +2 2028-29	FY +3 2029-30	FY +4 2030-31	FY +5 2031-32
SAVINGS:	**$**	**$**	**$**	**$**	**$**	**$**
Regulated Community	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable
Local Government	"	"	"	"	"	"
State Government	"	"	"	"	"	"
Total Savings	"	"	"	"	"	"
COSTS:						
Regulated Community	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable
Local Government	"	"	"	"	"	"
State Government	"	"	"	"	"	"
Total Costs	"	"	"	"	"	"
REVENUE LOSSES:						
Regulated Community	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable
Local Government	"	"	"	"	"	"
State Government	"	"	"	"	"	"
Total Revenue Losses	"	"	"	"	"	"

(23a) **Provide the past three-year expenditure history for programs affected by the regulation.**

Program	FY -3 (2023-24)	FY -2 (2024-25)	FY -1 (2025-26)	Current FY (2026-27)
160-10381 Enviro Protection Operations	$116,450,000	$125,881,000	$134,693,000	$136,806,000
161-10382 Enviro Program Management	$39,714,000	$42,510,000	$45,486,000	$47,566,000

(24) **For any regulation that may have an adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), provide an economic impact statement that includes the following**:

(a) An identification and estimate of the number of small businesses subject to the regulation.

Persons, including small businesses, who propose to discharge new, additional or increased pollutants into surface waters of the Commonwealth must comply with the regulation. The Department considers four of the 11 NPDES-permitted facilities in waters being redesignated to special protection in this proposed rulemaking to be small businesses based on available information, and none of these existing discharges will be immediately affected when this proposed regulation goes into effect. Please also see the response to questions #15 and #17.

(b) The projected reporting, recordkeeping and other administrative costs required for compliance with the proposed regulation, including the type of professional skills necessary for preparation of the report or record.

Existing Department paperwork procedures and guidance will be used to implement the antidegradation requirements that apply to discharges to the streams being considered for redesignation to HQ or EV in this proposed regulation. No new forms, reports, or implementation procedures are necessary. NPDES permit application modules for discharges to surface waters with a protected use of HQ or EV can be found at the links in the response to question #22b. A permit applicant who proposes to discharge new, additional or increased pollutants might need the assistance of a consultant to evaluate certain elements of the antidegradation requirements such as nondischarge alternatives and nondegrading treatment options or BMPs.

(c) A statement of probable effect on impacted small businesses.

In general, if a person has an NPDES permit to discharge pollutants into waters of the Commonwealth, the existing permit limits will not be affected by the stream redesignations in this proposed rulemaking, and no new costs will be incurred. If, however, a person proposes to change the quality or quantity of their permitted discharge(s) after a stream is redesignated to HQ or EV, any subsequent permit action will take the redesignation into account when establishing permit conditions.

(d) A description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation.

The opportunity for examination of the least costly alternative treatment method for a person or entity seeking a new, additional, or increased discharge of pollutants through the permit application process are provided in Chapter 93. This examination is performed when an applicant evaluates whether nondischarge alternatives (that is, alternatives to the discharge) exist that are cost-effective and environmentally sound; and, if not, whether a nondegrading discharge is possible. Since this proposed rulemaking involves designations of streams to HQ, Chapter 93 allows a reduction of water quality if lowering water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

(25) **List any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, the elderly, small businesses, and farmers.**

While no special provisions are included in this proposed rulemaking, it is important to note that this rulemaking will afford the protection of water quality necessary to ensure clean water for residents of and visitors to this Commonwealth.

(26) **Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.**

This proposed regulation meets the Commonwealth's obligations under the CSL and the CWA to protect water uses. The proposed regulations reflect the results of a scientific evaluation of regulatory criteria. No alternative regulatory schemes are available to achieve the correct level of protection for the waters of the Commonwealth.

(27) **In conducting a regulatory flexibility analysis, explain whether regulatory methods were considered that will minimize any adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), including**:

a) The establishment of less stringent compliance or reporting requirements for small businesses;

This proposed regulation does not establish or revise compliance or reporting requirements for small businesses. Those requirements would be addressed through the applicable permitting program. No alternative regulatory schemes are available to achieve the correct level of protection for the waters of the Commonwealth. The proposed regulations reflect the results of a scientific evaluation of regulatory criteria.

b) The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses;

This proposed regulation does not establish or revise schedules or deadlines for compliance or reporting requirements for small businesses. Schedules of compliance and reporting requirements are considered when permit or approval actions are taken, in accordance with Chapter 92a (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance) or other applicable permitting programs.

c) The consolidation or simplification of compliance or reporting requirements for small businesses;

This proposed regulation does not establish or revise compliance or reporting requirements for small businesses. Compliance and reporting requirements are considered when permit or approval actions are taken, in accordance with Chapter 92a or other applicable permitting programs.

d) The establishment of performance standards for small businesses to replace design or operational standards required in the regulation; and

Any evaluation of treatment technologies or BMPs for persons who discharge pollutants to streams with a protected use of HQ or EV would be speculative at this time since: (1) a discharger will not be impacted until a future activity requiring a new or modified NPDES permit is proposed; (2) the characteristics of each receiving stream and each effluent discharge are unique; (3) SEJ may be available to modify the compliance requirement; and (4) generic technology or cost equations are not available for purposes of comparing the costs and/or savings for persons who are responsible for discharges.

e) The exemption of small businesses from all or any part of the requirements contained in the regulation.

No exemptions of small businesses are available in this case.

(28) **If data is the basis for this regulation, please provide a description of the data, explain <u>in detail</u> how the data was obtained, and how it meets the acceptability standard for empirical, replicable and testable data that is supported by documentation, statistics, reports, studies or research. Please submit data or supporting materials with the regulatory package. If the material exceeds 50 pages, please provide it in a searchable electronic format or provide a list of citations and internet links that, where possible, can be accessed in a searchable format in lieu of the actual material. If other data was considered but not used, please explain why that data was determined not to be acceptable.**

These amendments are the result of stream evaluations conducted by the Department in response to the EPA's partial approval of the Triennial Review of Water Quality Standards final-form rulemaking published at 50 Pa.B. 3426 (Reynolds Run and Chester Creek); a request from The Nature Conservancy (UNT 64027 to Sixpenny Creek); the Department's ongoing statewide monitoring activities (Bermudian Creek, UNT 32599 to North Fork Dunkard Fork, and the Middle Lehigh River tributaries, which include Bear Creek (04123), Nesquehoning Creek tributaries (Jeans Run, Broad Run, Dennison Run, Bear Creek (04115), Grassy Meadow Run) and Mahoning Creek tributaries (Stewart Creek, UNT 04055 and UNT 04060)); and permit writers' requests associated with NPDES permit renewals (UNT 03181 to Tohickon Creek, and Logan Spring Run). The stream redesignations rely on definitions and qualifications in §§ 93.3 and 93.4b(a)(2)(ii) and (b)(1)(iii). This proposed rulemaking was developed by the Department's Bureau of Clean Water following a comprehensive evaluation of the physical, chemical and biological characteristics, and other information available on these waterbodies.

The results of the Department's review can be found in the Department's Stream Evaluation Reports for each stream included in this proposed rulemaking and are available on the Department's website at:

Reynolds Run
2024_Final_Stream_Evaluation_Report_Reynolds_Run.pdf

Chester Creek
2024_Final_Stream_Evaluation_Report_Chester_Creek.pdf

UNT 32599 to North Fork Dunkard Fork
2024_Final_Stream_Evaluation_Report_UNT_North_Fork_Dunkard_Fork.pdf

UNT 64027 to Sixpenny Creek
2024_Final_Stream_Evaluation_Report_UNT_Sixpenny_Creek.pdf

Bermudian Creek
2024_Final_Stream_Evaluation_Report_Bermudian_Creek.pdf

Logan Spring Run
2024_Final_Stream_Evaluation_Report_Logan_Spring_Run.pdf

UNT 03181 to Tohickon Creek
2024_Final_Stream_Evaluation_Report_UNT_03181_Tohickon_Creek_Bog_Run.pdf

Middle Lehigh Tributaries (Bear Creek, Jeans Run, Broad Run, Dennison Run, Grassy Meadow Run, Stewart Creek, UNT 04055 to Mahoning Creek, and UNT 04060 to Mahoning Creek)
2024_Final_Stream_Evaluation_Report_Middle_Lehigh.pdf

(29) **Include a schedule for review of the regulation including**:

A. The length of the public comment period:	45 days
B. The date or dates on which any public meetings or hearings will be held:	January 26, 2027
C. The expected date of delivery of the final-form regulation:	Quarter 4, 2027
D. The expected effective date of the final-form regulation:	Upon publication in *Pennsylvania Bulletin* as final-form rulemaking for CSL permit and approval actions, or as approved by the EPA for purposes of implementing the CWA.
E. The expected date by which compliance with the final-form regulation will be required:	Upon issuance or renewal of NPDES permits or other approvals of the Department – subsequent to publication of the final-form rulemaking in the *Pennsylvania Bulletin*.

F. The expected date by which required permits, licenses or other approvals must be obtained:	When permits or approvals are issued or renewed – subsequent to publication of the final-form rulemaking in the *Pennsylvania Bulletin.*

(30) **Describe the plan developed for evaluating the continuing effectiveness of the regulations after its implementation.**

The Board is not proposing to establish a sunset date for these proposed regulations because they are needed for the Department to carry out its statutory authority. The Department will continue to closely monitor these proposed regulations for their effectiveness and recommend updates to the Board as necessary.

Also, since the CWA requires review and revision of water quality standards as necessary, but at least once every three years, a schedule for review is inherently established.

BERMUDIAN CREEK

ADAMS COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 08596
Drainage List: O

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

Prepared by:

Josh Lookenbill
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Bermudian Creek basin in response to a request from the DEP's Southcentral Regional Office that identified a potential conflict between the Pennsylvania Fish and Boat Commission (PFBC) Wild Trout Waters classification and the Warm Water Fishes, Migratory Fishes (WWF, MF) designation for a portion of the basin. The Bermudian Creek basin from the source to Wiermans Mill Road is currently listed on the PFBC Wild Trout Waters list. The Bermudian Creek basin is currently designated WWF, MF with the exception of the Latimore Creek subbasin, which is currently designated Cold Water Fishes, Migratory Fishes (CWF, MF). The Wild Trout Waters classification suggests that the upper portion of the basin should be evaluated to determine the appropriate Aquatic Life Use.

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

Bermudian Creek is a tributary to Conewago Creek, located in the lower Susquehanna River basin. The entire Bermudian Creek basin encompasses portions of Washington, Warrington, and Franklin townships, York County as well as portions of Latimore, Huntington, Tyrone, and Redding townships, Adams County. The basin has drainage area of approximately 110 square miles and consists of 220 stream miles. The headwaters of the basin drain the southern slope of South Mountain, which is the southern border of Pennsylvania's Ridge and Valley Physiographic Province. Most of the basin lies with the Piedmont Physiographic Province and consists of rolling and fertile agricultural lands, including a high concentration of orchards in the headwater reaches and mixed agricultural in the lower portion of the basin. The portion of the Bermudian Creek basin being evaluated, from the source to State Route (SR) 94, has a drainage area of 20.6 square miles and consists of 57.1 stream miles. The current land cover within this portion of the basin consists of forested (31%), agricultural (53%), water/wetlands (4%), and urban/developed areas (12%) (Dewitz 2019). There are three NPDES permits within the basin including two industrial waste discharges and one industrial stormwater permit. Both industrial waste discharges and the stormwater permit are associated with the Knouse Foods Cooperative Facility located in the headwaters of Bermudian Creek.

WATER QUALITY

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. DEP *Stream Surface Water Assessment Protocol* (SSWAP) macroinvertebrate surveys were completed at seven locations in 2004 and 2006. Bacteriological surveys were completed June 2014. PFBC staff collected fisheries data from one location (9BC) in 2006 and from a second location (10BC) in 2016 (Figure 1, Table 1).

Table 1. Station Locations – Upper Bermudian Creek Basin.

STATION	DESCRIPTION
1UNT	UNT 08741, 400 meters upstream of the confluence with Bermudian Creek Huntington Township, Adams County 2004 SSWAP Lat: 40.01940 Long: -77.22419
2BC	Bermudian Creek, 900 meters downstream of UNT 08741 Huntington Township, Adams County 2004 SSWAP Lat: 40.01547 Long: -77.21439
3BC	Bermudian Creek, upstream of Lobaugh Road Huntington Township, Adams County 2016 Bacteriological Monitoring Lat: 39.99218 Long: -77.18621
4BC	Bermudian Creek, upstream of Upper Bermudian Road Huntington Township, Adams County 2006 SSWAP Lat: 40.99026 Long: -77.180543
5UNT	UNT 08730, downstream of Idaville-York Springs Road and along Oxford Road Huntington Township, Adams County 2004 SSWAP Lat: 40.01347 Long: -77.17309
6UNT	UNT 08730, upstream of Blueberry Road Huntington Township, Adams County 2016 Bacteriological Monitoring 2006 SSWAP Lat: 40.00117 Long: -77.17089
7UNT	UNT 08728, upstream of Zeigler Mill Road Huntington Township, Adams County 2006 SSWAP Lat: 39.98379 Long: -77.16068
8BC	Bermudian Creek, 450 meters downstream of Oxford Road along Willow Lane Huntington Township, Adams County 2006 SSWAP Lat: 39.98002 Long: -77.15078
9BC	Bermudian Creek, 900 meters upstream of UNT 08727 Huntington Township, Adams County 2006 PFBC Survey Lat: 39.97743 Long: -77.14478
10BC	Bermudian Creek, 240 meters upstream of Wiermans Mill Road Huntington Township, Adams County 2016 PFBC Survey Lat: 39.97333 Long: -77.11942

Benthos

Benthic macroinvertebrate samples were collected using the DEP's SSWAP from UNT 08741 immediately downstream of the Knouse Foods facility (1UNT) and from Bermudian Creek downstream of UNT 08741 (2BC). Both samples indicate biological impairment resulting in the Bermudian Creek

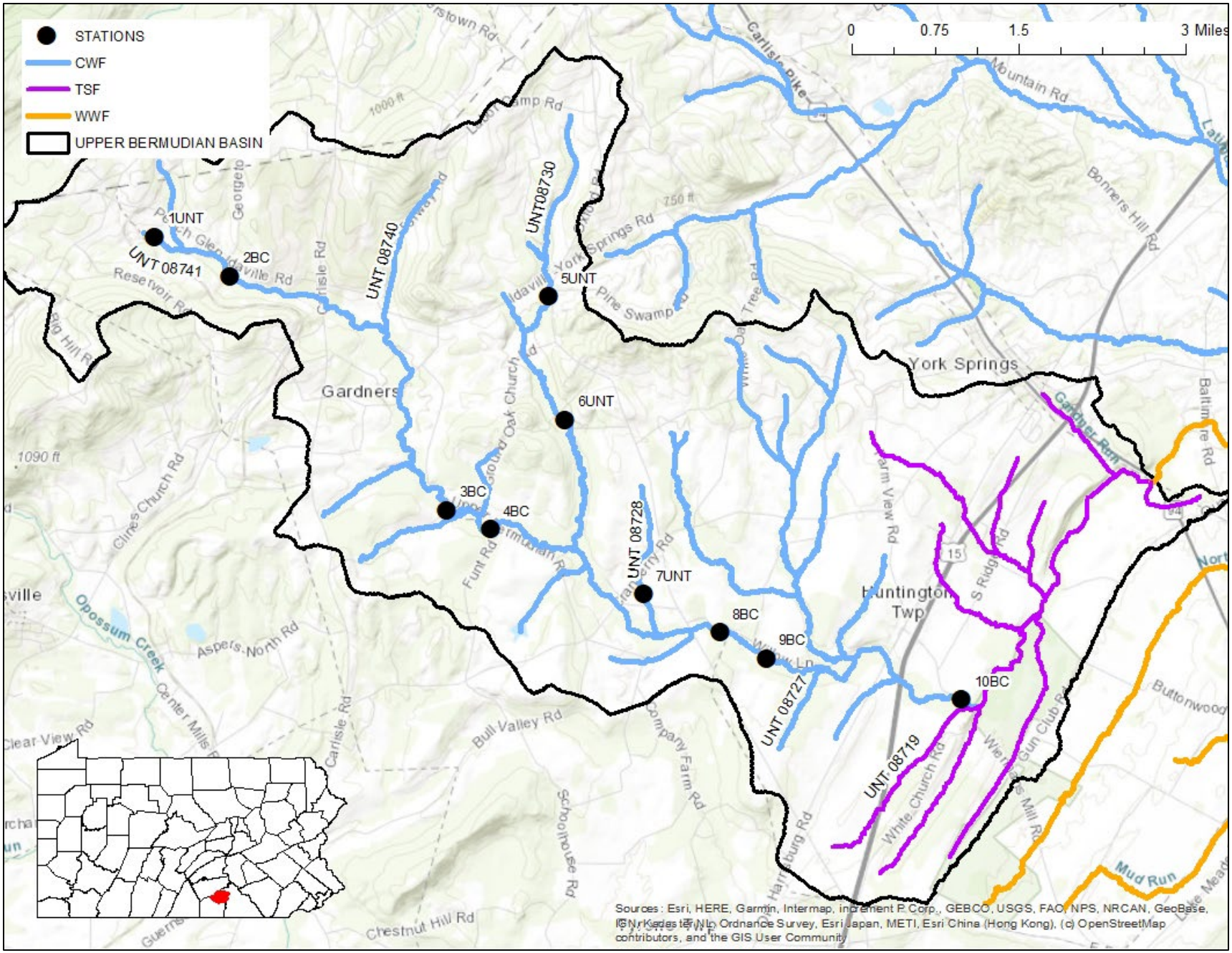


Figure 1. Upper Bermudian Creek Basin – Station Locations and Redesignation Recommendation.

basin from the source to UNT 08740 being listed on the Commonwealth's 303(d) list of impaired waters for Aquatic Life Use (Category 5 of the Integrated Report) for Source – Industrial Point Source, Cause – Organic Enrichment/Low Dissolved Oxygen.

Samples collected from UNT 08730 (5UNT) and UNT 08728 (7UNT) also indicate biological impairment and are listed as Aquatic Life Use impaired for Source – Agriculture, Cause – Siltation. Benthic macroinvertebrate samples were collected using the DEP's SSWAP from three additional locations (3BC, 4BC, 8BC) on Bermudian Creek, from the source to UNT 08727 that indicated support of the Aquatic Life Use (Figure 1, Table 1).

Bacteria

A total of 10 fecal coliform samples were collected from two locations throughout the targeted subbasin in accordance with the DEP's *Bacteriological Data Collection Protocol* (Bradburn and Miller 2015). Results ranged from 190 to 2000 colony forming units per 100 mL (CFUs/100mL). The geometric mean for each location was 263.9 CFUs/100mL (3BC) and 808.6 CFUs/100mL (6UNT) (Table 2). Results exceeded the criteria for fecal coliform bacteria at the time, which specified that during the swimming season (May 1 - September 30), the maximum fecal coliform level shall be a geometric mean of 200 CFUs/100 mL based on a minimum of 5 samples collected in a 30-day period. In addition, no more than 10% of samples collected in a 30-day period shall exceed 400 CFUs/100 mL. The entire Bermudian Creek basin from the source to UNT 08727 is listed on the Commonwealth's 303(d) list of impaired waters for Recreation Use (Category 5 of the Integrated Report) for Source – Unknown, Cause – Pathogens.

Table 2. Bacteriological Data – Bermudian Creek (3BC) and UNT 08730 (6UNT).

STATION[1]	UNITS	DATE					GEOMETRIC MEAN
		6/9/14	6/16/14	6/18/14	6/23/14	6/30/14	
3BC	CFUs/100 mL	320	260	270	190	300	263.9
6UNT	CFUs/100 mL	590	360	1100	2000	740	808.6

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

Fishes

Fish were collected using backpack electrofishing gear, targeting salmonids and characterizing total species composition using single-pass electrofishing methods from one location (9BC) on March 28, 2006 and from a second location (10BC) on May 26, 2016 (Table 3). The sample reaches were approximately 325 meters and 217 meters respectively. During the 2006 survey, a total of 13 species were collected including wild Brown Trout (*Salmo trutta*) ranging in length from 100 mm to 274 mm. During the 2016 survey, a total of 15 species were collected including wild brown trout (*Salmo trutta)* ranging from 50 to 199 mm. The 2006 and 2016 survey results demonstrate multiple year classes and natural reproduction of trout (Frederick and Kuhn 2015, Kuhn et al. 2016, Detar et al. 2011).

Table 3. PFBC Fisheries Data.

THERMAL PREF.[2]	TAXA		STATIONS[1]	
			9BC	10BC
			3/28/2006	5/26/2016
Cold	Rainbow Trout (hatchery)	*Oncorhynchus mykiss*	*x*	-
Cold-Cool	Brown Trout (hatchery)	*Salmo trutta*	*x*[3]	-
Cold-Cool	Brown Trout (wild)	*Salmo trutta*	*x*[3]	*x*
Cool	White Sucker	*Catostomus commersonii*	*x*	*x*
Cool	Fantail Darter	*Etheostoma flabellare*	*x*	*x*
Cool	Tesselated Darter	*Etheostoma olmstedi*	-	*x*
Cool	Cutlips Minnow	*Exoglossum maxillingua*	*x*	*x*
Cool	Eastern Blacknose Dace	*Rhinichthys atratulus*	*x*	*x*
Cool	Longnose Dace	*Rhinichthys cataractae*	*x*	*x*
Cool	Creek Chub	*Semotilus atromaculatus*	*x*	*x*
Cool-Warm	Rock Bass	*Ambloplites rupestris*	*x*	*x*
Cool-Warm	Central Stoneroller	*Campostoma anomalum*	*x*	*x*
Cool-Warm	Greenside Darter	*Etheostoma blennioides*	-	*x*
Cool-Warm	Common Shiner	*Luxilus cornutus*	*x*	*x*
Cool-Warm	Smallmouth Bass	*Micropterus dolomieu*	-	*x*
Cool-Warm	Margined Madtom	*Noturus insignis*	*x*	*x*
Cool-Warm	Bluntnose Minnow	*Pimephales notatus*	-	*x*
Warm	Green Sunfish	*Lepomis cyanellus*	*x*	-
Taxa Richness			13	15

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

[2] Thermal preferenance as described in *Technical Development of a Thermal Fish Index* (Wertz 2021)

[3] Wild vs. hatchery counted as a single taxon

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

AQUATIC LIFE USE EVALUATION

The Aquatic Life Use of Bermudian Creek was evaluated according to definitions described at 25 Pa. Code § 93.3, Table 1 – *Protected Water Uses.* Table 1 defines the Cold Water Fishes (CWF) protected use as;

> *Maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.*

The PFBC surveys, conducted in 2006 and 2016 both document the maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat. The survey results demonstrate a CWF existing use for the Bermudian Creek basin from the source to UNT 08719.

Table 1 defines Trout Stocking (TSF) protected use as;

> *Maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.*

Bermudian Creek from Cranberry Road (SR 1014) to Wiermans Mill Road and from Greenbriar Road (Township Route (TR) 619) to SR 94 are currently listed as Stocked Trout Waters by the PFBC. In addition, PFBC records indicate that trout stocking has occurred and is scheduled to occur in 2023 on both of these reaches. PFBC stocking records along with the presence of fish species preferring cool water habitats indicates that seasonal maintenance of stocked trout is appropriate for the Bermudian Creek basin as far downstream as SR 94 south of York Springs.

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

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 June 9, 2018 (48 Pa.B. 3491). Adams County Conservation District, Adams County Board of Commissioners, Huntington Township, Menallen Township, Tyrone Township, Cumberland County and Dickinson Township, Cumberland County were notified of the redesignation evaluation in a letter dated June 12, 2018. In addition, a notification was posted on the DEP's website. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notices.

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 and the PFBC in a letter dated November 16, 2019 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on November 16, 2019 (49 Pa.B. 6919). In response to the draft report notification, the PFBC provided additional fish survey data collected in May 2016.

RECOMMENDATION

Based on applicable regulatory definitions in 25 Pa. Code § 93.3, the DEP recommends that the Bermudian Creek basin from the source to UNT 08719 be redesignated from Warm Water Fishes, Migratory Fishes (WWF, MF) to Cold Water Fishes, Migratory Fishes (CWF, MF) based on documented maintenance and propagation of Salmonidae. In addition, the DEP recommends that the Bermudian Creek basin from and including UNT 08719 to SR 94 be redesignated from WWF, MF to Trout Stocking, Migratory Fishes (TSF, MF) based on PFBC Stocked Trout Waters listings and trout stocking records.

This recommendation adds approximately 39.8 total stream miles of CWF and 17.1 TSF waters to Chapter 93.

LITERATURE CITED

Bradburn, M. and S. Miller. 2015. Bacteriological data collection protocol. Chapter 4., pages 133 – 147. *In* Shull, D. R. and M. J. Lookenbill. (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.

Detar, J., R. Wnuk, R. T. Greene, M. Kaufmann. 2011. Standard electrofishing protocols for sampling Pennsylvania wadeable streams. Pages 5-24 *In* Miko, D., (editor). Sampling protocols for Pennsylvania's wadeable streams. Pennsylvania Fish and Boat Commission. Harrisburg, PA.

Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, https://doi.org/10.5066/P96HHBIE.

Frederick, J. R., K. M. Kuhn. 2015. Bermudian Creek (07F) Section 02 Fisheries Management Report March 2006. Pennsylvania Fish and Boat Commission. Harrisburg, PA.

Kuhn, K. M., J. Frederick, K. Shollenberger, D. Lehman. 2016. Pennsylvania Fish and Boat Commission comments and recommendations, subbasins 6C, 7A, 7C, 7F, 11A, and 12B. Pennsylvania Fish and Boat Commission. Harrisburg, Pennsylvania

Wertz, T. A. 2021. Technical development of a thermal fish index. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania. (Available online at: https://www.dep.pa.gov/Business/Water/CleanWater/WaterQuality/Pages/Macroinvertebrates.aspx)

CHESTER CREEK

CHESTER COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 00520
Drainage List: G

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

Prepared by:

Tim Wertz, Erika Arnold, and Josh Lookenbill
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of Chester Creek from its source to Rocky Run. The evaluation is in response to the Environmental Protection Agency's (EPA) partial approval of the Environmental Quality Board's (EQB) adoption of the 2017 Triennial Review of Water Quality Standards published in the *Pennsylvania Bulletin* at 50 Pa.B. 3426 (July 11, 2020). The partial approval did not include the revision to the designated use for Chester Creek in 25 Pa. Code § 93.9g. EPA requested that the DEP provide a summary of the designated use history of each waterbody and current available data that may include fish assemblage and macroinvertebrate data in support of the use designation corrections in the 2017 Triennial Review. In response, the DEP conducted an evaluation of the Chester Creek watershed including portions 'locally known as Goose Creek' to document the correct stream names and appropriate designated uses.

The first stream segment referenced in rulemakings as Goose Creek is the headwaters of Chester Creek upstream of the confluence with East Branch Chester Creek. In the EQB proposed rulemaking for the Phase 1 Triennial Review, published in the *Pennsylvania Bulletin* on September 22, 1984 (14 Pa.B. 3473), 15 priority waterbodies for construction grant decisions were identified and stream surveys were conducted for several of these streams, including Goose Creek (Chester Creek), to determine if designated uses were attained, and if not, what use is attainable. At the time of this proposed regulation, Goose Creek (Chester Creek) was designated Trout Stocking (TSF) and the Phase 1 Triennial Review provided a summary of the stream survey for Goose Creek (Chester Creek) which noted the degraded water quality and the inability to attain the designated use of TSF. The proposed rulemaking included a less restrictive use of Warm Water Fishes (WWF) as the appropriate attainable use based on the biological, chemical and physical characteristics of Goose Creek (Chester Creek). Publication of the final rulemaking included the Goose Creek (Chester Creek) designated use of WWF in the *Pennsylvania Bulletin* on February 16, 1985 (15 Pa.B. 544). On May 14, 1985 EPA Regional Administrator, James Seif, approved Pennsylvania's Phase 1 Triennial Review which included the redesignation of Goose Creek (Chester Creek) to the less restrictive use of WWF.

The second stream segment in the Chester Creek watershed, referenced in rulemakings as Goose Creek, is an Unnamed Tributary (UNT) to East Branch Chester Creek near River Mile 0.4. This stream is also known as UNT 00605 and in the Pa. Code as Westtown Run (prior to the recent codification of the 2017 Triennial). The original TSF designated use for UNT 00605 was included in the *Pennsylvania Bulletin* on February 16, 1985 (15 Pa.B. 544), being included in the East Branch Chester Creek basin.

On August 3, 1996, the EQB again revisited Goose Creek in a drainage list corrections package published at 26 Pa.B. 3637. The intention was to delete the reference to the name 'Goose Creek' while retaining the February 1985 designation of WWF. Since the name Goose Creek was not listed in *Pennsylvania Gazetteer of Streams* (DEP 2003) the designated use of UNT 00605 was erroneously changed to WWF instead of Chester Creek source to East Branch Chester Creek. Chester Creek source to East Branch Chester Creek retained the TSF designated use. The description of the original evaluation in the 1984 *Pennsylvania Bulletin* (14 Pa.B. 3473) was clearly referencing Chester Creek source to East Branch Chester Creek and not UNT to East Branch Chester Creek (UNT 00605).

Successive attempts to correct the Goose Creek listing in Chapter 93 continued to either omit Goose Creek or incorrectly identify other streams as Goose Creek (Chester Creek).

After extensive research of the EQB's record of rulemakings, the EQB published the designated use of 'Chester Creek from its source to East Branch Chester Creek, which includes Goose Creek, as WWF, MF' in the *Pennsylvania Bulletin* on Saturday, July 11, 2020 (50 Pa.B. 3426). The stream described as UNT to East Branch Chester Creek at River Mile 0.4 (also known as UNT 00605 and in the Pa. Code as 4—Westtown Run prior to the recent codification of the 2017 Triennial Review) would have been corrected to the original (1984) designated use of TSF, MF in the same publication (50 Pa.B. 3426). Table 1 represents the current zone delineations and water uses protected at 25 Pa. Code § 93.9g. This includes '2—Chester Creek Basin (locally known as Goose Creek basin), Source to East Branch Chester Creek' currently designated WWF, MF as a result of corrections made in the 2017 Triennial Review, but was not identified by EPA as a simple correction and was instead identified as a redesignation to a less restrictive use (TSF to WWF). As such, 25 Pa. Code § 93.4(b) and 40 CFR § 131.10(g), (h) & (j) require that less restrictive use redesignations be accompanied by a Use Attainability Analysis (UAA) and public participation.

Table 1. Excerpt from 25 Pa. Code § 93.9g for the Chester Creek Basin.

STREAM	ZONE	COUNTY	WATER USES PROTECTED
2—Chester Creek	Basin (locally known as Goose Creek basin), Source to East Branch Chester Creek	Chester	WWF, MF
3—East Branch Chester Creek	Basin	Chester	TSF, MF
2—Chester Creek	Basin, East Branch Chester Creek to Rocky Run	Delaware	TSF, MF
3—Rocky Run	Basin	Delaware	HQ-CWF, MF
2—Chester Creek	Basin, Rocky Run to Confluence with West Branch	Delaware	TSF, MF
3—West Branch Chester Creek	Basin, Source to Green Creek	Delaware	TSF, MF
4—Green Creek	Basin	Delaware	CWF, MF
3—West Branch Chester Creek	Basin, Green Creek to Mouth	Delaware	TSF, MF
2—Chester Creek	Basin, West Branch to Dutton Mills Road Bridge	Delaware	TSF, MF
2—Chester Creek	Nontidal Portions of Basin, Dutton Mills Road Bridge to Mouth	Delaware	WWF, 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 EQB.

GENERAL WATERSHED DESCRIPTION

Chester Creek is a tributary to the Delaware River that originates in Chester County. Chester Creek flows southeast through Delaware County to the confluence with the Delaware River. This entire watershed includes 132.8 stream miles and drains approximately 100 square miles of the Piedmont Upland Plateau. Chester Creek source to East Branch Chester Creek drains approximately 11.5 square miles and UNT to East Branch Chester Creek (UNT 00605) drains 1.2 square miles (Figure 1).

According to the National Land Cover Database (NLCD) 2016, the vast majority of land cover in the Chester Creek watershed is developed (60%), with some forested (28%), agricultural (8%) and the remaining barren lands, open water or wetlands (4%) (Dewitz 2019). There are a total of 89 National Pollutant Discharge Elimination System (NPDES) permits scattered throughout the basin, including one collection system, 5 industrial waste discharges, 43 public and nonpublic sewage facilities, and 41 stormwater activities. There are two surface water withdrawals. There are currently no active permitted gas wells permitted within the watershed.

WATER QUALITY

Discrete Physicochemical

Physicochemical data including comprehensive water chemistry was collected from stations 1CC, 2CC and 3CC at an approximate monthly frequency beginning November 2013 through August 2015, and from stations 4CC, 5CC and 6WCC March 2017 through August 2017 (Appendix A). The data across all stations indicates that water quality is consistent with high percent developed land cover. Chloride concentrations across all stations ranged from <0.5 – 1277 mg/L with highest concentrations found at upstream stations 1CC, 2CC and 3CC. The highest concentrations of barium (138 – 234 ug/L) were consistently found at station 1CC. The highest concentrations of bromide (116 – 317 ug/L) were consistently found at stations 1CC and 2CC. Osmotic pressure results ranged from (<1 – 67 mosm/kg) with the highest results from station 1CC in February 2014 (67 mosm/kg) and in March 2017 (50 mosm/kg) at or exceeding the criterion (50 mosm/kg) at 25 Pa. Code § 93.7. The highest concentration of dissolved nitrate and nitrite (20.185 mg/L, Sept. 2014), total nitrate and nitrite (20.372 mg/L, Sept. 2014), dissolved nitrogen (21.013, May 2015), total nitrogen (21.832, May 2015), dissolved ortho phosphorus (2.345, May 2015), total ortho phosphorus (2.476 mg/L, May 2015), dissolved phosphorus (2.377 mg/L, May 2015), and total phosphorus (2.668 mg/L, May 2015) were found at station 2CC (Appendix A).

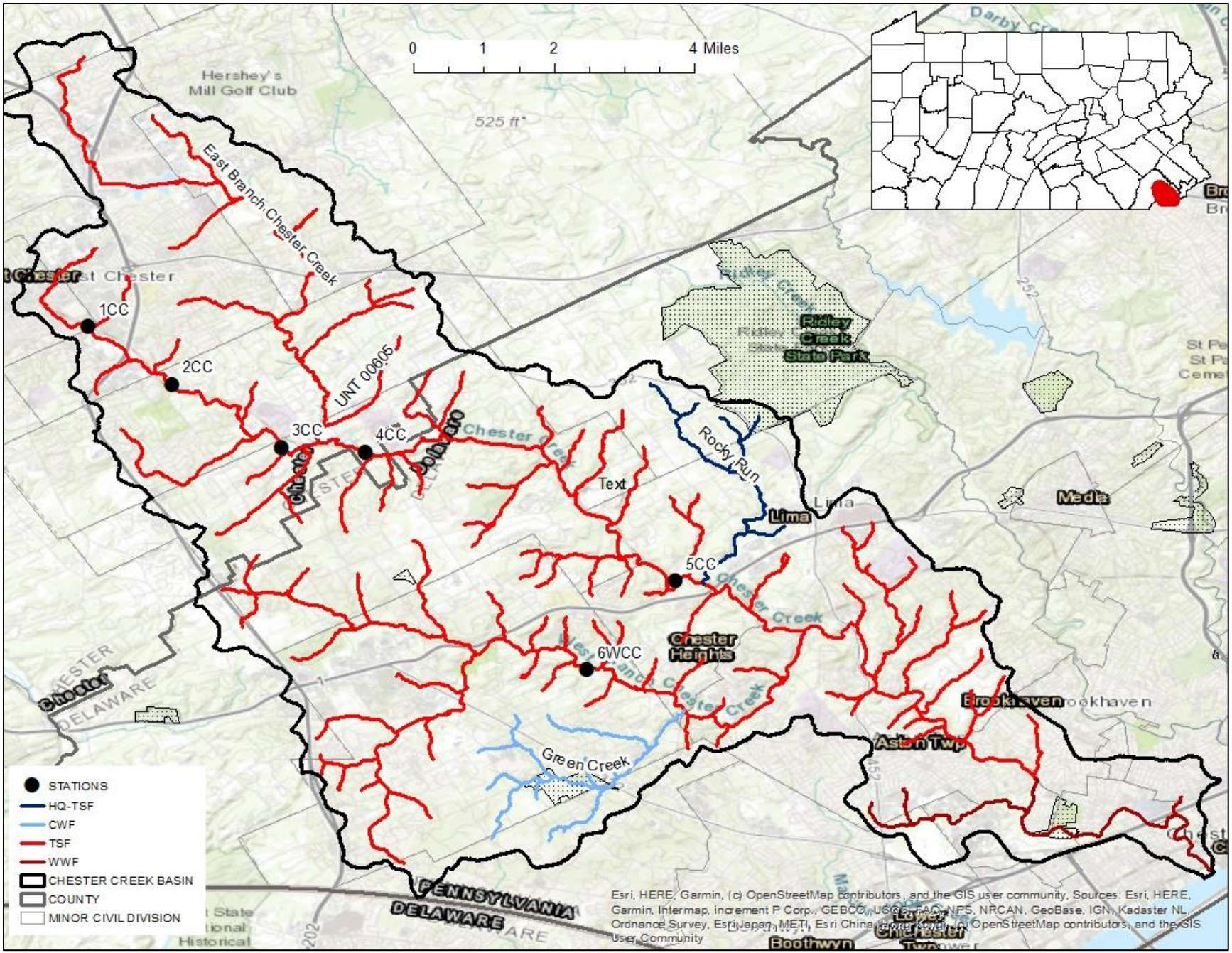


Figure 1. Chester Creek Basin Station Locations and Redesignation Recommendation.

Table 2. Stations Locations – Chester Creek Basin.

STATION	DESCRIPTION
1CC	Chester Creek at Mostellar Park West Chester Borough, Chester County Lat: 39.95515 Long: -75.59018
2CC	Chester Creek at Oakbourne Road Westtown Township, Chester County Lat: 39.94324 Long: -75.57285
3CC	Chester Creek at Thornbury Park Thornbury Township, Chester County Lat: 39.93026 Long: -75.55022
4CC	Chester Creek at Dilworthtown Road Thornbury Township, Chester County Lat: 39.92926 Long: -75.53286
5CC	Chester Creek at Darlington Park Middletown Township, Delaware County Lat: 39.90267 Long: -75.468812
6WCC	West Branch Chester Creek at Ivy Mills Road Concord Township, Delaware County Lat: 39.88446 Long: -75.487005

Continuous Physicochemical

Continuous instream monitoring (CIM) was implemented by DEP at all stations. Monitoring occurred at stations 1CC, 2CC and 3CC during various periods from 2013 through 2015, and at stations 4CC, 5CC and 6WCC during various periods in 2017. CIM is implemented according to DEP protocols (Hoger et al. 2017), and data and reports are located on the DEP CIM website.

Biological

Fish data were collected in 2014 and 2017 following DEP's *Fish Data Collection Protocol* (Wertz 2021a) from six stations throughout the Chester Creek watershed. (Figure 1 and Table 2). No fish data were available from UNT 00605. Thermal Fish Index (TFI) scores were calculated following DEP's, *Stream Fish Assemblage Assessment Method* (Wertz 2021b). TFI scores are used here to describe the thermal fish assemblage at each station.

The TFI scores increase from upstream to downstream. TFI scores between 2.0 and 5.0 represent a cold water fish assemblage. TFI scores between 5.1 and 7.0 represent a transitional fish assemblage, and TFI scores between 7.1 and 10.0 represent a warm water fish assemblage. TFI scores ranged from 6.1 to 7.2. Stations 1CC, 2CC and 6WCC had fish assemblages characterized as a transitional (TFI = 6.1, 6.6, and 6.1 respectively). The dominant species at these stations were the Eastern Blacknose Dace, Creek Chub, Redbreast Sunfish, and Tesselated Darter; all have a cool water preference except the Redbreast Sunfish which has a cool-warm water preference (Table 3). The stations 3CC, 4CC and 5CC all had a fish assemblage characterized as warm water assemblages with TFI scores greater than 7.0 (Wertz 2021b). The warm water assemblages were due to displacement (reduced relative abundance) of species with cool thermal preference by species with cool-warm and warm thermal preference (Coker 2001, Wertz 2021c). The warmwater assemblage at stations 3CC, 4CC, and 5CC demonstrated full replacement by having a total of six warm water (cool-warm and

Table 3. Fish Assemblage Data and Thermal Fish Index (TFI) Scores.

THERMAL PREF.	TAXA		STATIONS[1]					
			1CC	2CC	3CC	4CC	5CC	6WCC
			7/8/2014	7/8/2014	7/8/2014	8/2/2017	8/2/2017	8/2/2017
Cold-Cool	Rosyside Dace	*Clinostomus funduloides*	-	-	-	2	-	-
Cool	American Eel	*Anguilla rostrata*	12	26	2	17	17	20
Cool	Creek Chub	*Semotilus atromaculatus*	49	9	3	6	-	-
Cool	Cutlip Minnow	*Exoglossum maxillingua*	-	-	-	-	3	21
Cool	Eastern Blacknose Dace	*Rhinichthys atratulus*	99	72	27	22	1	69
Cool	Longnose Dace	*Rhinichthys cataractae*	-	-	-	-	1	-
Cool	Swallowtail Shiner	*Notropis procne*	-	15	2	1	-	-
Cool	Tessellated Darter	*Etheostoma olmstedi*	-	25	12	27	2	34
Cool	White Sucker	*Catostomus commersonii*	15	5	30	57	3	2
Cool-Warm	Common Shiner	*Luxilus cornutus*	-	-	23	9	-	7
Cool-Warm	Fallfish	*Semotilus corporalis*	-	-	-	-	25	-
Cool-Warm	Pumpkinseed	*Lepomis gibbosus*	-	4	-	5	-	-
Cool-Warm	Redbreast Sunfish	*Lepomis auritus*	2	38	6	46	8	-
Cool-Warm	Smallmouth Bass	*Micropterus dolomieu*	-	-	-	-	1	-
Cool-Warm	Spottail Shiner	*Notropis hudsonius*	3	1	14	43	-	-
Cool-Warm	Yellow Bullhead	*Ameiurus natalis*	-	-	-	1	-	-
Warm	Bluegill	*Lepomis macrochirus*	-	-	-	2	1	-
Warm	Eastern Banded Killifish	*Fundulus diaphanus diaphanus*	-	6	-	28	-	-
Warm	Goldfish	*Carassius auratus*	-	-	-	1	-	-
Warm	Green Sunfish	*Lepomis cyanellus*	-	-	1	-	-	-
Warm	Largemouth Bass	*Micropterus salmoides*	-	-	-	1	-	-
Warm	Satinfin Shiner	*Cyprinella analostana*	-	-	16	41	1	-
Warm	Spotfin Shiner	*Cyprinella spiloptera*	-	1	-	-	-	-
	Taxa Richness		6	11	11	17	11	6
	Total Individuals		180	202	136	309	64	153
	TFI		6.1	6.6	7.1	7.6	7.2	6.1

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

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

warm) species not found at the transitional assemblage stations 1CC, 2CC and 6WCC. Station 4CC had 11 warm water species. The presence of Rosyside Dace, *Clinostomus funduloides,* with a cold-cool thermal preference (Coker 2001, Wertz 2021c) at station 4CC is an indication that fish species representing the colder end of the thermal preference gradient may be present at reduced numbers throughout the basin. No fish species in the family Salmonidae (trout) were present at any of the six stations.

Physical

Instream habitat was evaluated at each station where fish were collected using the DEP's *Stream Habitat Data Collection Protocol* (Lookenbill 2017). The habitat evaluation consists of rating twelve parameters to derive a total habitat score. The total habitat scores ranged from 117 (3CC) to 150 (4CC) and fell within marginal or suboptimal ratings. Low scores for embeddedness and bank condition consistently resulted in marginal condition scores or lower (≤10) at all stations, except station 6WCC where the bank condition scored 14. (Table 4).

Table 4. Habitat Evaluation Data – Chester Creek Basin.

PARAMETER	STATIONS[1]					
	1CC	2CC	3CC	4CC	5CC	6WCC
1. INSTREAM COVER	15	14	8	14	14	15
2. EPIFAUNAL SUBSTRATE	12	14	10	10	12	13
3. EMBEDDEDNESS	7	9	5	8	10	10
4. VELOCITY/DEPTH	16	17	18	16	16	10
5. CHANNEL ALTERATIONS	13	7	8	14	16	10
6. SEDIMENT DEPOSITION	11	11	5	12	5	8
7. RIFFLE FREQUENCY	14	12	11	8	13	15
8. CHANNEL FLOW STATUS	8	17	18	16	16	16
9. BANK CONDITION	6	10	7	10	4	14
10. BANK VEGETATIVE PROTECTION	11	11	13	11	6	13
11. GRAZING/DISRUPTIVE PRESSURES	7	7	8	15	15	11
12. RIPARIAN VEG. ZONE WIDTH	5	14	6	16	17	12
Total Score	125	143	117	150	144	147
Rating[2]	MAR	SUB	MAR	SUB	SUB	SUB

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

[2] OPT = Optimal (≥192); SUB = Suboptimal (132-192); MAR = Marginal (72-132)

BIOLOGICAL USE QUALIFICATIONS

The DEP's Biological use qualifying criterion evaluated for Chester Creek were the aquatic life use definitions described at 25 Pa. Code § 93.3, Table 1 – *Protected Water Uses*. Table 1 defines the TSF protected use as;

> *Maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.*

A review of PFBC records indicates that trout stocking has occurred and was scheduled to occur in 2023. Two reaches on Chester Creek have trout stocking records. The first reach is Chester Creek mainstem from Forge Road (39.91590, -75.48470) to the confluence with West Branch Chester Creek. The second reach is Chester Creek from West Branch Chester Creek to Bridgewater Road (39.86430, -75.39730). PFBC stocking records along with the dominance of fish species preferring cool-water habitats indicates that seasonal maintenance of stocked trout is appropriate throughout the watershed.

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this redesignation evaluation and requested any technical data from the general public on the DEP website and through publication in the *Pennsylvania Bulletin* on October 2, 2021 (51 Pa.B. 6320). In addition, Chester County, Chester County Conservation District, Lancaster County Conservation District, Lancaster County, Little Britain Township, West Chester Borough, West Goshen Township, Trout Unlimited, and Delaware Riverkeeper Network were notified of the redesignation evaluation in a letter dated October 2, 2021. No data on water chemistry, instream habitat or aquatic communities were received in response to these notices.

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, and the PFBC in a letter dated April 20, 2024 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on April 20, 2024 (54 Pa.B. 2168). In addition, notifications were distributed through the DEP eNotice.

All comments received were in support of the redesignation recommendations in the draft report. Comments were received from the PFBC and the Theodore Roosevelt Conservation Partnership. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATION

As a result of the 2017 Triennial Review of Water Quality Standards, the designated use of Chester Creek was changed from TSF, MF to WWF, MF in 25 Pa. Code § 93.9g. This change was made to correct errors that had occurred as a result of a 1996 rulemaking. EPA's partial approval of the 2017 Triennial Review did not include the change to the Chester Creek designated use. Subsequently, the DEP performed a more detailed evaluation of Chester Creek.

Based on survey data and PFBC trout stocking records, the DEP recommends the designated use for the Chester Creek basin from source to East Branch Chester Creek be updated to TSF, MF. In addition, the DEP is also recommending the designated use for the Chester Creek basin from Dutton Mills Road Bridge to UNT 00526 be redesignated from WWF, MF to TSF, MF.

LITERATURE CITED

Coker, G. A., C. B. Portt, and C. K. Minns. 2001. Morphological and ecological characteristics of Canadian freshwater fishes. Fisheries and Oceans Canada, Burlington, Ontario.

DEP. 2003. Pennsylvania Gazetteer of Streams. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Dewitz, J. 2019. National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, https://doi.org/10.5066/P96HHBIE.

Hoger, M. S., D. R. Shull, and M. J. Lookenbill. 2017. Continuous physicochemical data collection protocol. Chapter 4.3, pages 25–92 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Lookenbill, M. J. (editor). 2017. Stream habitat data collection protocol. Chapter 5.1, pages 2–7 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Wertz, T. A. 2021a. Fish data collection protocol. Chapter 3.7, pages 44–63 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Wertz, T. A. 2021b. Stream fish assemblage assessment method. Chapter 2.7, pages 88–108 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Wertz, T. A. 2021c. Technical development of a thermal fish index. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania. (Available online at: https://www.dep.pa.gov/Business/Water/CleanWater/WaterQuality/Pages/Macroinvertebrates.aspx)

APPENDIX A – PHYSICOCHEMICAL DATA

Table A1. November 2013 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	56	375	67
	BARIUM T	ug/L	194	77	83
	BORON T	ug/L	30	140	120
	BROMIDE T	ug/L	124.818	125.207	113.62
	CALCIUM T	mg/L	62.7	47.4	43.5
	CHLORIDE T	mg/L	169	143	128
	COPPER T	ug/L	2.25	10.3	7.13
	IRON T	ug/L	207	355	141
	LEAD T	ug/L	1.14	0.277	0.19
	MAGNESIUM T	mg/L	30.1	20.2	18
	MANGANESE T	ug/L	84	125	27
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	0.911	0.662	0.8
	SODIUM T	mg/L	36.9	60.6	56.6
	STRONTIUM T	ug/L	274	265	276
	SULFATE T	mg/L	39.874	49.69	45.144
	ZINC T	ug/L	28	46	29
NUTRIENTS	AMMONIA D	mg/L	0.082	0.087	0.02
	AMMONIA T	mg/L	0.08	0.086	0.018
	NITRATE & NITRITE D	mg/L	2.862	17.576	16.208
	NITRATE & NITRITE T	mg/L	2.826	17.089	16.227
	NITROGEN D	mg/L	3.201	19.537	18.465
	NITROGEN T	mg/L	3.573	19.526	18.739
	ORTHO PHOSPHORUS D	mg/L	0.095	1.266	1.213
	ORTHO PHOSPHORUS T	mg/L	0.088	1.332	1.228
	PHOSPHORUS D	mg/L	0.113	1.348	1.315
	PHOSPHORUS T	mg/L	0.129	1.647	1.368
PHYSICAL/OTHER	ALKALINITY T	mg/L	110.6	58.8	53.8
	DISCHARGE	CFS	0.78	8.047	12.08
	DISSOLVED OXYGEN	mg/L	11.14	11.26	13.34
	DISSOLVED OXYGEN	%	93	103.6	113
	HARDNESS T	mg/L	281	202	183
	OSMOTIC PRESSURE	mosm/kg	14	14	11
	pH	pH units	7.26	6.91	7.46
	SPECIFIC COND	umhos/cm	809	803	737
	TEMPERATURE	C	7.49	11.55	8.03
	TDS	mg/L	588	532	456
	TSS	mg/L	10	16	<5
	TOC	mg/L	2.303	4.574	3.646

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A2. January 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	64	214	101
	BARIUM T	ug/L	232	98	95
	BORON T	ug/L	40	100	130
	BROMIDE T	ug/L	142.4	120.36	107.21
	CALCIUM T	mg/L	70.9	51	47.6
	CHLORIDE T	mg/L	185	196.85	132
	COPPER T	ug/L	3.2	9.37	6.41
	IRON T	ug/L	251	281	149
	LEAD T	ug/L	0.716	0.246	0.199
	MAGNESIUM T	mg/L	30.9	20.6	19
	MANGANESE T	ug/L	147	110	51
	NICKEL T	ug/L	15	<12	14
	SELENIUM T	ug/L	0.914	0.486	0.519
	SODIUM T	mg/L	146	96.1	88
	STRONTIUM T	ug/L	305	255	270
	SULFATE T	mg/L	35.51	38.3	33.6
	ZINC T	ug/L	41	42	30
NUTRIENTS	AMMONIA D	mg/L	0.095	0.189	0.021
	AMMONIA T	mg/L	0.089	0.188	0.049
	NITRATE & NITRITE D	mg/L	2.293	13.133	11.189
	NITRATE & NITRITE T	mg/L	2.282	12.316	11.128
	NITROGEN D	mg/L	2.838	14.919	12.583
	NITROGEN T	mg/L	2.639	14.778	12.398
	ORTHO PHOSPHORUS D	mg/L	0.03	1.194	1.051
	ORTHO PHOSPHORUS T	mg/L	0.035	1.264	1.093
	PHOSPHORUS D	mg/L	0.031	1.289	1.074
	PHOSPHORUS T	mg/L	0.053	1.464	1.124
PHYSICAL/OTHER	ALKALINITY T	mg/L	110	64.8	48.2
	DISCHARGE	CFS	0.61	6.84	10.05
	DISSOLVED OXYGEN	mg/L	10.04	10.41	13.67
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	305	212	197
	OSMOTIC PRESSURE	mosm/kg	22	16	15
	pH	pH units	6.91	6.64	7.8
	SPECIFIC COND	umhos/cm	1389	975.5	911.9
	TEMPERATURE	C	7.84	11.3	15.58
	TDS	mg/L	732	522	544
	TSS	mg/L	6	10	6
	TOC	mg/L	2.684	6.082	5.408

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A3. February 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	91	62	94
	BARIUM T	ug/L	209	122	132
	BORON T	ug/L	20	80	60
	BROMIDE T	ug/L	317.131	135.809	110.703
	CALCIUM T	mg/L	79.3	50.9	53.4
	CHLORIDE T	mg/L	1277	337	303
	COPPER T	ug/L	3.55	8.47	6.28
	IRON T	ug/L	359	341	313
	LEAD T	ug/L	1.02	0.301	0.329
	MAGNESIUM T	mg/L	27.3	21.3	21.39
	MANGANESE T	ug/L	224	137	119
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	<0.32605	0.519	0.464
	SODIUM T	mg/L	699	182	171.5
	STRONTIUM T	ug/L	398	274	284
	SULFATE T	mg/L	52.114	41.141	34.485
	ZINC T	ug/L	45	43	35
NUTRIENTS	AMMONIA D	mg/L	0.298	2.723	2.388
	AMMONIA T	mg/L	0.291	2.676	2.353
	NITRATE & NITRITE D	mg/L	2.496	11.613	9.778
	NITRATE & NITRITE T	mg/L	2.489	11.668	9.717
	NITROGEN D	mg/L	3.722	15.713	12.982
	NITROGEN T	mg/L	3.864	14.897	13.03
	ORTHO PHOSPHORUS D	mg/L	0.029	1.759	1.281
	ORTHO PHOSPHORUS T	mg/L	0.049	1.798	1.341
	PHOSPHORUS D	mg/L	0.051	1.904	1.384
	PHOSPHORUS T	mg/L	0.098	2.012	1.465
PHYSICAL/OTHER	ALKALINITY T	mg/L	107.6	87.8	76.4
	DISCHARGE	CFS	3.833	13.011	17.005
	DISSOLVED OXYGEN	mg/L	13.61	12.57	13.52
	DISSOLVED OXYGEN	%	111.2	107.6	105
	HARDNESS T	mg/L	311	215	222
	OSMOTIC PRESSURE	mosm/kg	67	22	20
	pH	pH units	7.36	7.12	7.44
	SPECIFIC COND	umhos/cm	4085	1441	1281
	TEMPERATURE	C	6.09	8.35	4.55
	TDS	mg/L	2188	816	722
	TSS	mg/L	8	6	6
	TOC	mg/L	3.563	5.708	3.89

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A4. March 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	34	82	78
	BARIUM T	ug/L	216	101	106
	BORON T	ug/L	30	100	60
	BROMIDE T	ug/L	252.54	97.546	79.787
	CALCIUM T	mg/L	69.6	48.1	43.4
	CHLORIDE T	mg/L	888	214	165
	COPPER T	ug/L	2.61	7.42	7.59
	IRON T	ug/L	248	347	242
	LEAD T	ug/L	0.382	0.257	0.373
	MAGNESIUM T	mg/L	27.4	19.5	17.6
	MANGANESE T	ug/L	201	135	97
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	<0.32605	0.377	0.462
	SODIUM T	mg/L	458	100	70.8
	STRONTIUM T	ug/L	343	257	251
	SULFATE T	mg/L	51.16	40.34	33.278
	ZINC T	ug/L	36	41	28
NUTRIENTS	AMMONIA D	mg/L	0.194	0.187	0.055
	AMMONIA T	mg/L	0.181	0.183	0.061
	NITRATE & NITRITE D	mg/L	2.558	9.283	8.454
	NITRATE & NITRITE T	mg/L	2.54	9.368	8.188
	NITROGEN D	mg/L	3.047	9.899	8.502
	NITROGEN T	mg/L	2.938	10.176	8.671
	ORTHO PHOSPHORUS D	mg/L	0.024	0.63	0.479
	ORTHO PHOSPHORUS T	mg/L	0.034	0.655	0.502
	PHOSPHORUS D	mg/L	0.043	0.683	0.491
	PHOSPHORUS T	mg/L	0.072	0.798	0.568
PHYSICAL/OTHER	ALKALINITY T	mg/L	113.8	82	67.6
	DISCHARGE	CFS	1.78	12.34	20.71
	DISSOLVED OXYGEN	mg/L	13.91	12.45	13.01
	DISSOLVED OXYGEN	%	108.1	103.7	101.5
	HARDNESS T	mg/L	287	201	181
	OSMOTIC PRESSURE	mosm/kg	50	14	13
	pH	pH units	7.25	6.99	7.29
	SPECIFIC COND	umhos/cm	3115	1054	828
	TEMPERATURE	C	4.27	7.31	4.74
	TDS	mg/L	1694	588	472
	TSS	mg/L	8	8	14
	TOC	mg/L	3.525	4.603	3.174

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A5. April 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	52	143	107
	BARIUM T	ug/L	180	76	85
	BORON T	ug/L	40	130	80
	BROMIDE T	ug/L	127.031	116.101	95.884
	CALCIUM T	mg/L	68.13	47.11	41.1
	CHLORIDE T	mg/L	223	164	153
	COPPER T	ug/L	2.61	15.2	5.5
	IRON T	ug/L	264	317	260
	LEAD T	ug/L	0.468	0.536	0.24
	MAGNESIUM T	mg/L	31.52	20.29	17.8
	MANGANESE T	ug/L	92	81	51
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	0.569	0.437	0.502
	SODIUM T	mg/L	68.98	72.06	53.3
	STRONTIUM T	ug/L	294	233	267
	SULFATE T	mg/L	38.9	39.06	33.35
	ZINC T	ug/L	10	32	16
NUTRIENTS	AMMONIA D	mg/L	0.039	0.044	0.024
	AMMONIA T	mg/L	0.038	0.046	0.024
	NITRATE & NITRITE D	mg/L	2.447	13.156	9.207
	NITRATE & NITRITE T	mg/L	2.426	13.013	9.253
	NITROGEN D	mg/L	2.829	14.422	10.008
	NITROGEN T	mg/L	3.069	14.632	10.117
	ORTHO PHOSPHORUS D	mg/L	0.04	1.479	0.771
	ORTHO PHOSPHORUS T	mg/L	0.034	1.537	0.803
	PHOSPHORUS D	mg/L	0.05	1.605	0.856
	PHOSPHORUS T	mg/L	0.078	1.792	0.942
PHYSICAL/OTHER	ALKALINITY T	mg/L	113	65	65.8
	DISCHARGE	CFS	1.902	17.781	18.616
	DISSOLVED OXYGEN	mg/L	15.68	12.74	14.41
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	300	201	176
	OSMOTIC PRESSURE	mosm/kg	16	12	10
	pH	pH units	8.26	7.25	8.79
	SPECIFIC COND	umhos/cm	100.7	794.1	722.1
	TEMPERATURE	C	17.77	16.31	17.29
	TDS	mg/L	664	560	474
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	3.362	5.489	3.489

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A6. May 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	60	145	106
	BARIUM T	ug/L	186	92	107
	BORON T	ug/L	30	70	50
	BROMIDE T	ug/L	117.666	87.836	79.438
	CALCIUM T	mg/L	69.7	51.02	45.3
	CHLORIDE T	mg/L	209	144	129
	COPPER T	ug/L	3.05	8.12	5.18
	IRON T	ug/L	254	324	279
	LEAD T	ug/L	0.77	0.336	0.377
	MAGNESIUM T	mg/L	30.1	21.24	18.9
	MANGANESE T	ug/L	109	96	79
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	1.01	0.81	0.813
	SODIUM T	mg/L	73.8	67.69	56.4
	STRONTIUM T	ug/L	310	240	271
	SULFATE T	mg/L	44.46	35.585	32.12
	ZINC T	ug/L	29	33	31
NUTRIENTS	AMMONIA D	mg/L	0.119	0.146	0.144
	AMMONIA T	mg/L	0.116	0.15	0.146
	NITRATE & NITRITE D	mg/L	2.77	11.899	8.659
	NITRATE & NITRITE T	mg/L	2.778	11.938	8.583
	NITROGEN D	mg/L	3.088	12.377	9.211
	NITROGEN T	mg/L	3.068	13.155	9.154
	ORTHO PHOSPHORUS D	mg/L	0.029	0.806	0.469
	ORTHO PHOSPHORUS T	mg/L	0.036	0.847	0.494
	PHOSPHORUS D	mg/L	0.042	0.844	0.516
	PHOSPHORUS T	mg/L	0.057	1.156	0.586
PHYSICAL/OTHER	ALKALINITY T	mg/L	129.8	76.8	73.4
	DISCHARGE	CFS	2.252	17.605	24.932
	DISSOLVED OXYGEN	mg/L	11.36	9.77	11.43
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	298	215	191
	OSMOTIC PRESSURE	mosm/kg	15	12	9
	pH	pH units	7.44	7.07	7.63
	SPECIFIC COND	umhos/cm	1027	807	722
	TEMPERATURE	C	16.71	16.22	16.38
	TDS	mg/L	708	558	510
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	2.461	4.248	3.05

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A7. June 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	54	164	121
	BARIUM T	ug/L	212	75	84
	BORON T	ug/L	20	110	80
	BROMIDE T	ug/L	128.395	126.548	100.187
	CALCIUM T	mg/L	72.3	49.82	43.9
	CHLORIDE T	mg/L	199	138	123
	COPPER T	ug/L	2.29	9.45	6.24
	IRON T	ug/L	197	359	236
	LEAD T	ug/L	0.478	0.317	0.303
	MAGNESIUM T	mg/L	34.7	21.17	19
	MANGANESE T	ug/L	66	94	36
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	0.958	1.07	0.963
	SODIUM T	mg/L	57.9	61.49	54
	STRONTIUM T	ug/L	312	242	265
	SULFATE T	mg/L	35.673	37.59	32.882
	ZINC T	ug/L	22	33	31
NUTRIENTS	AMMONIA D	mg/L	0.058	0.133	0.035
	AMMONIA T	mg/L	0.056	0.124	0.033
	NITRATE & NITRITE D	mg/L	2.839	13.884	11.678
	NITRATE & NITRITE T	mg/L	2.842	14.005	11.645
	NITROGEN D	mg/L	3.192	14.724	11.81
	NITROGEN T	mg/L	3.168	14.819	12.229
	ORTHO PHOSPHORUS D	mg/L	0.048	1.229	0.802
	ORTHO PHOSPHORUS T	mg/L	0.056	1.286	0.818
	PHOSPHORUS D	mg/L	0.046	1.263	0.828
	PHOSPHORUS T	mg/L	0.062	1.438	0.895
PHYSICAL/OTHER	ALKALINITY T	mg/L	116.4	66.8	59.2
	DISCHARGE	CFS	1.04	5.27	13.04
	DISSOLVED OXYGEN	mg/L	7.84	8.75	9.67
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	324	212	188
	OSMOTIC PRESSURE	mosm/kg	13	11	10
	pH	pH units	7.41	7.1	7.61
	SPECIFIC COND	umhos/cm	970.3	775.8	698.9
	TEMPERATURE	C	18.55	19.82	20.78
	TDS	mg/L	656	572	510
	TSS	mg/L	<5	6	8
	TOC	mg/L	1.919	4.456	3.542

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A8. July 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	24	513	162
	BARIUM T	ug/L	183	66	76
	BORON T	ug/L	30	110	90
	BROMIDE T	ug/L	108.758	121.571	110.383
	CALCIUM T	mg/L	59.8	48.31	45.78
	CHLORIDE T	mg/L	184	138	124
	COPPER T	ug/L	3.17	11.1	7.47
	IRON T	ug/L	301	322	231
	LEAD T	ug/L	0.314	0.391	0.313
	MAGNESIUM T	mg/L	28.1	19.8	18.48
	MANGANESE T	ug/L	79	81	29
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	0.457	0.447	0.414
	SODIUM T	mg/L	67	62.11	54.79
	STRONTIUM T	ug/L	251	240	250
	SULFATE T	mg/L	34.866	40.566	35.939
	ZINC T	ug/L	17	35	19
NUTRIENTS	AMMONIA D	mg/L	0.104	0.067	0.021
	AMMONIA T	mg/L	0.109	0.065	0.023
	NITRATE & NITRITE D	mg/L	2.196	18.372	15.001
	NITRATE & NITRITE T	mg/L	2.191	18.324	15.249
	NITROGEN D	mg/L	2.794	19.318	16.432
	NITROGEN T	mg/L	2.636	19.399	16.195
	ORTHO PHOSPHORUS D	mg/L	0.057	0.849	0.785
	ORTHO PHOSPHORUS T	mg/L	0.076	0.984	0.806
	PHOSPHORUS D	mg/L	0.054	0.878	0.809
	PHOSPHORUS T	mg/L	0.083	1.33	0.86
PHYSICAL/OTHER	ALKALINITY T	mg/L	117.2	47	49.8
	DISCHARGE	CFS	0.907	10.77	12.26
	DISSOLVED OXYGEN	mg/L	6.31	8.75	9.57
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	265	202	191
	OSMOTIC PRESSURE	mosm/kg	13	12	10
	pH	pH units	7.21	6.93	7.55
	SPECIFIC COND	umhos/cm	924.6	796.7	721.7
	TEMPERATURE	C	18.98	20.81	21.32
	TDS	mg/L	604	558	512
	TSS	mg/L	<5	<5	6
	TOC	mg/L	3.258	4.191	3.482

[1] Refer to Table 1 and Figure for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A9. August 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	<13.7514	172	144
	BARIUM T	ug/L	210	73	77
	BORON T	ug/L	40	140	120
	BROMIDE T	ug/L	119.177	130.696	111.54
	CALCIUM T	mg/L	73.58	49.9	45.2
	CHLORIDE T	mg/L	199	150	132
	COPPER T	ug/L	2.1	10.6	7.8
	IRON T	ug/L	145	270	290
	LEAD T	ug/L	0.352	0.423	0.721
	MAGNESIUM T	mg/L	34.5	20.8	18.4
	MANGANESE T	ug/L	62	88	33
	NICKEL T	ug/L	<13.7856	<13.7856	<13.7856
	SELENIUM T	ug/L	0.766	0.745	0.772
	SODIUM T	mg/L	49.18	60.5	54.9
	STRONTIUM T	ug/L	302	265	263
	SULFATE T	mg/L	35.859	43.473	40.099
	ZINC T	ug/L	15	35	20
NUTRIENTS	AMMONIA D	mg/L	0.052	0.287	0.026
	AMMONIA T	mg/L	0.06	0.317	0.033
	NITRATE & NITRITE D	mg/L	2.642	16.67	16.569
	NITRATE & NITRITE T	mg/L	2.649	16.534	16.91
	NITROGEN D	mg/L	2.731	17.916	16.279
	NITROGEN T	mg/L	2.887	18.907	16.909
	ORTHO PHOSPHORUS D	mg/L	0.053	1.523	1.309
	ORTHO PHOSPHORUS T	mg/L	0.059	1.573	1.338
	PHOSPHORUS D	mg/L	0.058	1.645	1.447
	PHOSPHORUS T	mg/L	0.081	1.957	1.464
PHYSICAL/OTHER	ALKALINITY T	mg/L	117.4	49	45.4
	DISCHARGE	CFS	0.5644	7.28	3.88
	DISSOLVED OXYGEN	mg/L	7.33	8.4	10.35
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	326	210	189
	OSMOTIC PRESSURE	mosm/kg	13	12	12
	pH	pH units	7.23	6.89	7.6
	SPECIFIC COND	umhos/cm	942.6	830.1	748.4
	TEMPERATURE	C	18.81	21.01	21.1
	TDS	mg/L	672	604	482
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	2.656	4.511	3.88

[1] Refer to Table 1 and Figure 1for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A10. September 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	23	187	130
	BARIUM T	ug/L	234	65	71
	BORON T	ug/L	40	140	130
	BROMIDE T	ug/L	121.72	122.686	108.982
	CALCIUM T	mg/L	63.5	47.4	44.4
	CHLORIDE T	mg/L	154	130	120
	COPPER T	ug/L	1.81	9.83	8.43
	IRON T	ug/L	124	211	166
	LEAD T	ug/L	0.231	0.229	0.254
	MAGNESIUM T	mg/L	30.6	19.4	17.8
	MANGANESE T	ug/L	47	72	19
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	0.433	0.413	0.377
	SODIUM T	mg/L	42.3	65.1	60.5
	STRONTIUM T	ug/L	317	268	275
	SULFATE T	mg/L	36.096	45.55	41.382
	ZINC T	ug/L	22	41	30
NUTRIENTS	AMMONIA D	mg/L	0.044	0.061	0.023
	AMMONIA T	mg/L	0.046	0.059	0.025
	NITRATE & NITRITE D	mg/L	2.661	20.185	17.974
	NITRATE & NITRITE T	mg/L	2.65	20.372	17.974
	NITROGEN D	mg/L	3.099	20.251	17.575
	NITROGEN T	mg/L	2.799	21.134	17.58
	ORTHO PHOSPHORUS D	mg/L	0.057	1.84	1.72
	ORTHO PHOSPHORUS T	mg/L	0.065	1.885	1.717
	PHOSPHORUS D	mg/L	0.058	1.834	1.696
	PHOSPHORUS T	mg/L	0.072	2.104	1.782
PHYSICAL/OTHER	ALKALINITY T	mg/L	116.2	50.4	49
	DISCHARGE	CFS	0.5638	6.84	7.81
	DISSOLVED OXYGEN	mg/L	8.4	9.73	12.07
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	285	198	184
	OSMOTIC PRESSURE	mosm/kg	12	12	12
	pH	pH units	7.27	7.11	8.04
	SPECIFIC COND	umhos/cm	899	850.4	774
	TEMPERATURE	C	14.89	18.32	17.31
	TDS	mg/L	636	552	408
	TSS	mg/L	<5	<5	10
	TOC	mg/L	2.058	4.618	4.089

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A11. October 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	18	154	67
	BARIUM T	ug/L	189	61	64
	BORON T	ug/L	50	180	150
	BROMIDE T	ug/L	128.487	112.6955	94.3515
	CALCIUM T	mg/L	61	45.2	41.9
	CHLORIDE T	mg/L	179	139	131
	COPPER T	ug/L	2.6	8.32	6.74
	IRON T	ug/L	166	234	129
	LEAD T	ug/L	0.229	0.198	0.169
	MAGNESIUM T	mg/L	29.4	18.6	17.2
	MANGANESE T	ug/L	79	84	19
	NICKEL T	ug/L	15	<12	14
	SELENIUM T	ug/L	0.585	0.486	0.519
	SODIUM T	mg/L	46.5	63.5	57.9
	STRONTIUM T	ug/L	263	240	244
	SULFATE T	mg/L	37.475	46.438	41.615
	ZINC T	ug/L	23	25	24
NUTRIENTS	AMMONIA D	mg/L	0.619	0.375	0.066
	AMMONIA T	mg/L	0.623	0.366	0.072
	NITRATE & NITRITE D	mg/L	2.056	16.129	16.211
	NITRATE & NITRITE T	mg/L	2.049	17.011	16.112
	NITROGEN D	mg/L	2.878	16.765	16.761
	NITROGEN T	mg/L	2.952	16.907	15.931
	ORTHO PHOSPHORUS D	mg/L	0.063	1.697	1.387
	ORTHO PHOSPHORUS T	mg/L	0.075	1.736	1.439
	PHOSPHORUS D	mg/L	0.072	1.721	1.419
	PHOSPHORUS T	mg/L	0.093	1.854	1.444
PHYSICAL/OTHER	ALKALINITY T	mg/L	124.4	62.8	50.6
	DISCHARGE	CFS	0.61	6.84	10.05
	DISSOLVED OXYGEN	mg/L	7.62	9.41	11.78
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	274	190	176
	OSMOTIC PRESSURE	mosm/kg	12	11	12
	pH	pH units	7.3	7.01	7.54
	SPECIFIC COND	umhos/cm	887.2	817	744.7
	TEMPERATURE	C	10.67	14.9	13.53
	TDS	mg/L	568	522	480
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	2.969	5.286	4.366

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A12. November 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	15	153	86
	BARIUM T	ug/L	195	76	78
	BORON T	ug/L	30	130	130
	BROMIDE T	ug/L	122.7815	128.7454	108.1606
	CALCIUM T	mg/L	69.1	50.3	43.5
	CHLORIDE T	mg/L	185	148	132
	COPPER T	ug/L	1.96	12.2	9.16
	IRON T	ug/L	117	224	120
	LEAD T	ug/L	0.258	0.2	0.189
	MAGNESIUM T	mg/L	32.9	20.9	17.6
	MANGANESE T	ug/L	60	91	23
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	0.914	<0.763	<0.763
	SODIUM T	mg/L	46.8	62.9	55.7
	STRONTIUM T	ug/L	271	269	270
	SULFATE T	mg/L	35.29	45.937	41.704
	ZINC T	ug/L	22	41	34
NUTRIENTS	AMMONIA D	mg/L	0.063	0.069	0.021
	AMMONIA T	mg/L	0.066	0.073	0.019
	NITRATE & NITRITE D	mg/L	2.366	19.301	19.037
	NITRATE & NITRITE T	mg/L	2.343	19.351	19.037
	NITROGEN D	mg/L	2.653	19.286	17.911
	NITROGEN T	mg/L	2.685	19.404	17.636
	ORTHO PHOSPHORUS D	mg/L	0.061	1.861	1.666
	ORTHO PHOSPHORUS T	mg/L	0.07	1.908	1.69
	PHOSPHORUS D	mg/L	0.066	1.795	1.625
	PHOSPHORUS T	mg/L	0.079	1.957	1.646
PHYSICAL/OTHER	ALKALINITY T	mg/L	120.4	55.2	48.2
	DISCHARGE	CFS	-	-	-
	DISSOLVED OXYGEN	mg/L	7.91	9.48	11.76
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	308	212	181
	OSMOTIC PRESSURE	mosm/kg	14	14	12
	pH	pH units	7.08	7.01	7.96
	SPECIFIC COND	umhos/cm	889.5	848.3	770.3
	TEMPERATURE	C	13	16.13	15.58
	TDS	mg/L	558	524	470
	TSS	mg/L	6	8	6
	TOC	mg/L	2.256	5.52	5.408

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A13. December 2014 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	64	214	101
	BARIUM T	ug/L	232	98	95
	BORON T	ug/L	40	100	80
	BROMIDE T	ug/L	142.4	120.36	107.21
	CALCIUM T	mg/L	70.9	51	47.6
	CHLORIDE T	mg/L	<0.5	196.85	183.1
	COPPER T	ug/L	3.2	9.37	6.41
	IRON T	ug/L	251	281	149
	LEAD T	ug/L	0.716	0.246	0.199
	MAGNESIUM T	mg/L	30.9	20.6	19
	MANGANESE T	ug/L	147	110	51
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	146	96.1	88
	STRONTIUM T	ug/L	305	255	258
	SULFATE T	mg/L	35.51	38.3	33.6
	ZINC T	ug/L	41	42	30
NUTRIENTS	AMMONIA D	mg/L	0.095	0.189	0.053
	AMMONIA T	mg/L	0.089	0.188	0.049
	NITRATE & NITRITE D	mg/L	2.293	13.133	11.189
	NITRATE & NITRITE T	mg/L	2.282	12.316	11.128
	NITROGEN D	mg/L	2.838	14.919	12.583
	NITROGEN T	mg/L	2.639	14.778	12.398
	ORTHO PHOSPHORUS D	mg/L	0.03	1.194	1.051
	ORTHO PHOSPHORUS T	mg/L	0.035	1.264	1.093
	PHOSPHORUS D	mg/L	0.031	1.289	1.074
	PHOSPHORUS T	mg/L	0.053	1.464	1.124
PHYSICAL/OTHER	ALKALINITY T	mg/L	110	64.8	59.8
	DISCHARGE	CFS	-	-	-
	DISSOLVED OXYGEN	mg/L	10.04	10.41	13.67
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	305	212	197
	OSMOTIC PRESSURE	mosm/kg	22	16	15
	pH	pH units	6.91	6.64	7.8
	SPECIFIC COND	umhos/cm	1389	975.5	911.9
	TEMPERATURE	C	7.84	11.3	9.73
	TDS	mg/L	732	522	544
	TSS	mg/L	6	10	<5
	TOC	mg/L	2.684	6.082	4.408

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A14. February 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	52	239	185
	BARIUM T	ug/L	220	113	116
	BORON T	ug/L	30	100	80
	BROMIDE T	ug/L	114.25	92.71	80.06
	CALCIUM T	mg/L	75.1	54.4	50.5
	CHLORIDE T	mg/L	407	276	244
	COPPER T	ug/L	4.87	9.28	5.5
	IRON T	ug/L	456	351	256
	LEAD T	ug/L	0.606	0.325	0.291
	MAGNESIUM T	mg/L	30.9	21	19.7
	MANGANESE T	ug/L	385	159	124
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	0.849	0.919	<0.763
	SODIUM T	mg/L	180	140	114
	STRONTIUM T	ug/L	306	265	270
	SULFATE T	mg/L	41.137	44.026	36.48
	ZINC T	ug/L	47	60	37
NUTRIENTS	AMMONIA D	mg/L	0.592	0.831	0.562
	AMMONIA T	mg/L	0.594	0.823	0.567
	NITRATE & NITRITE D	mg/L	2.407	14.862	11.651
	NITRATE & NITRITE T	mg/L	2.376	15.032	11.318
	NITROGEN D	mg/L	3.562	16.952	12.79
	NITROGEN T	mg/L	3.705	17.295	12.38
	ORTHO PHOSPHORUS D	mg/L	0.058	1.495	1.018
	ORTHO PHOSPHORUS T	mg/L	0.08	1.644	1.095
	PHOSPHORUS D	mg/L	0.078	1.568	1.098
	PHOSPHORUS T	mg/L	0.157	1.905	1.26
PHYSICAL/OTHER	ALKALINITY T	mg/L	118.6	65.6	62.8
	DISCHARGE	CFS	1.791	10.535	7.27
	DISSOLVED OXYGEN	mg/L	10.56	11.21	13.22
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	315	223	207
	OSMOTIC PRESSURE	mosm/kg	24	19	16
	pH	pH units	7.73	6.58	7.27
	SPECIFIC COND	umhos/cm	1588	1272	1096
	TEMPERATURE	C	4.09	7.74	5.46
	TDS	mg/L	942	740	670
	TSS	mg/L	8	8	<5
	TOC	mg/L	2.848	7.026	4.759

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A15. March 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	106	213	267
	BARIUM T	ug/L	171	101	106
	BORON T	ug/L	20	80	60
	BROMIDE T	ug/L	201.6	134.77	115.04
	CALCIUM T	mg/L	61.8	52	43.2
	CHLORIDE T	mg/L	816	529	459
	COPPER T	ug/L	8.69	9.6	7.27
	IRON T	ug/L	452	321	388
	LEAD T	ug/L	0.721	0.314	0.444
	MAGNESIUM T	mg/L	21	18.2	15.5
	MANGANESE T	ug/L	257	146	123
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	471	310	268
	STRONTIUM T	ug/L	255	246	232
	SULFATE T	mg/L	29.347	35.152	27.148
	ZINC T	ug/L	47	43	30
NUTRIENTS	AMMONIA D	mg/L	0.418	0.752	0.415
	AMMONIA T	mg/L	0.405	0.748	0.417
	NITRATE & NITRITE D	mg/L	1.575	9.52	7.091
	NITRATE & NITRITE T	mg/L	1.495	9.382	7.027
	NITROGEN D	mg/L	2.68	11.25	8.308
	NITROGEN T	mg/L	2.557	11.091	8.146
	ORTHO PHOSPHORUS D	mg/L	0.054	1.082	0.659
	ORTHO PHOSPHORUS T	mg/L	0.054	1.141	0.697
	PHOSPHORUS D	mg/L	0.082	1.087	0.695
	PHOSPHORUS T	mg/L	0.119	1.251	0.779
PHYSICAL/OTHER	ALKALINITY T	mg/L	88.8	66	54
	DISCHARGE	CFS	0.59	-	-
	DISSOLVED OXYGEN	mg/L	10.72	12.11	13.86
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	241	205	172
	OSMOTIC PRESSURE	mosm/kg	-	14	18
	pH	pH units	7.36	6.91	7.58
	SPECIFIC COND	umhos/cm	2830	1926	1664
	TEMPERATURE	C	3.84	8.09	7.55
	TDS	mg/L	1558	1090	938
	TSS	mg/L	<5	6	10
	TOC	mg/L	3.774	6.036	4.877

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A16. April 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	55	167	89
	BARIUM T	ug/L	202	95	99
	BORON T	ug/L	20	90	80
	BROMIDE T	ug/L	122.73	106.38	91.33
	CALCIUM T	mg/L	61.3	50.8	46.9
	CHLORIDE T	mg/L	260	184	162
	COPPER T	ug/L	5.12	9.45	6.06
	IRON T	ug/L	481	408	199
	LEAD T	ug/L	1.05	0.386	0.185
	MAGNESIUM T	mg/L	27.9	21.6	19.7
	MANGANESE T	ug/L	390	151	85
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	1	<0.763	<0.763
	SODIUM T	mg/L	82.2	82.4	68
	STRONTIUM T	ug/L	263	254	261
	SULFATE T	mg/L	38.925	41.206	36.371
	ZINC T	ug/L	91	48	56
NUTRIENTS	AMMONIA D	mg/L	0.337	0.975	1.206
	AMMONIA T	mg/L	0.408	0.932	1.202
	NITRATE & NITRITE D	mg/L	1.71	18.103	14.937
	NITRATE & NITRITE T	mg/L	1.664	17.585	14.938
	NITROGEN D	mg/L	2.584	18.835	13.927
	NITROGEN T	mg/L	2.849	17.81	14.137
	ORTHO PHOSPHORUS D	mg/L	0.043	2.069	1.365
	ORTHO PHOSPHORUS T	mg/L	0.067	2.191	1.434
	PHOSPHORUS D	mg/L	0.055	2.222	1.421
	PHOSPHORUS T	mg/L	0.147	2.533	1.534
PHYSICAL/OTHER	ALKALINITY T	mg/L	122.6	61	56.6
	DISCHARGE	CFS	0.64	14.1	15.1
	DISSOLVED OXYGEN	mg/L	7.96	9.64	12.55
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	268	216	198
	OSMOTIC PRESSURE	mosm/kg	15	12	10
	pH	pH units	7.12	6.81	7.42
	SPECIFIC COND	umhos/cm	1099	932.5	823.3
	TEMPERATURE	C	12.5	13.82	13.61
	TDS	mg/L	768	532	594
	TSS	mg/L	<5	6	<5
	TOC	mg/L	5.11	5.318	4.208

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A17. May 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	247	322	262
	BARIUM T	ug/L	220	85	106
	BORON T	ug/L	25	111	101
	BROMIDE T	ug/L	121.51	126.34	106.75
	CALCIUM T	mg/L	67.2	50.9	47.5
	CHLORIDE T	mg/L	217	170	155
	COPPER T	ug/L	4.27	11.2	8.18
	IRON T	ug/L	760	507	466
	LEAD T	ug/L	2.58	0.518	0.518
	MAGNESIUM T	mg/L	34	22.1	20.2
	MANGANESE T	ug/L	267	118	90
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	59.3	80.3	65.4
	STRONTIUM T	ug/L	284	254	281
	SULFATE T	mg/L	37.437	43.764	39.519
	ZINC T	ug/L	35	43	39
NUTRIENTS	AMMONIA D	mg/L	0.617	1.875	1.085
	AMMONIA T	mg/L	0.613	1.898	1.086
	NITRATE & NITRITE D	mg/L	1.835	18.96	17.606
	NITRATE & NITRITE T	mg/L	1.851	18.971	17.461
	NITROGEN D	mg/L	2.675	21.013	18.795
	NITROGEN T	mg/L	2.823	21.832	18.569
	ORTHO PHOSPHORUS D	mg/L	0.057	2.345	1.603
	ORTHO PHOSPHORUS T	mg/L	0.078	2.476	1.677
	PHOSPHORUS D	mg/L	0.056	2.377	1.633
	PHOSPHORUS T	mg/L	0.12	2.668	1.795
PHYSICAL/OTHER	ALKALINITY T	mg/L	119.6	63.4	51
	DISCHARGE	CFS	0.65	8.09	9.39
	DISSOLVED OXYGEN	mg/L	5.54	7.65	8.32
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	308	218	202
	OSMOTIC PRESSURE	mosm/kg	16	12	11
	pH	pH units	7.2	6.95	7.2
	SPECIFIC COND	umhos/cm	975	917	816
	TEMPERATURE	C	18.79	20.02	21.73
	TDS	mg/L	728	632	586
	TSS	mg/L	10	12	12
	TOC	mg/L	2.186	5.654	4.774

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A18. June 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	245	296	97
	BARIUM T	ug/L	85	69	132
	BORON T	ug/L	65	98	31
	BROMIDE T	ug/L	77.06	102.43	72.92
	CALCIUM T	mg/L	39.164	44.6	51.22
	CHLORIDE T	mg/L	123	146	151
	COPPER T	ug/L	6.84	8.78	4.56
	IRON T	ug/L	476	367	592
	LEAD T	ug/L	1.13	0.889	1.57
	MAGNESIUM T	mg/L	16.13	17.24	19.32
	MANGANESE T	ug/L	53	85	125
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	60	70.89	70.92
	STRONTIUM T	ug/L	198	204	183
	SULFATE T	mg/L	29.159	36.733	27.692
	ZINC T	ug/L	26	30	20
NUTRIENTS	AMMONIA D	mg/L	1.684	1.491	0.132
	AMMONIA T	mg/L	1.708	1.487	0.13
	NITRATE & NITRITE D	mg/L	10.441	15.017	1.248
	NITRATE & NITRITE T	mg/L	10.634	15.134	1.225
	NITROGEN D	mg/L	12.47	16.842	1.705
	NITROGEN T	mg/L	12.648	16.426	1.701
	ORTHO PHOSPHORUS D	mg/L	0.769	1.387	0.041
	ORTHO PHOSPHORUS T	mg/L	0.79	1.458	0.063
	PHOSPHORUS D	mg/L	0.8	1.4	0.054
	PHOSPHORUS T	mg/L	0.903	1.597	0.095
PHYSICAL/OTHER	ALKALINITY T	mg/L	57.8	56.2	104.2
	DISCHARGE	CFS	12.718	9.451	2.197
	DISSOLVED OXYGEN	mg/L	7.72	7.25	6.05
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	164	183	208
	OSMOTIC PRESSURE	mosm/kg	-	-	-
	pH	pH units	7.43	7.04	7.28
	SPECIFIC COND	umhos/cm	669	792	758
	TEMPERATURE	C	22.8	21.76	20.19
	TDS	mg/L	440	516	466
	TSS	mg/L	8	10	<5
	TOC	mg/L	4.824	5.196	4.036

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

"<" indicate concentrations below the reporting limit

"-" indicate parameter was not tested

Table A19. July 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	59	127	81
	BARIUM T	ug/L	201	73	83
	BORON T	ug/L	31	109	86
	BROMIDE T	ug/L	118.42	131.56	101.85
	CALCIUM T	mg/L	66.2	47.3	44.6
	CHLORIDE T	mg/L	196.2	152.33	140.59
	COPPER T	ug/L	6.36	11.1	19.6
	IRON T	ug/L	324	228	147
	LEAD T	ug/L	1.06	0.282	0.445
	MAGNESIUM T	mg/L	30.9	20	18.8
	MANGANESE T	ug/L	115	74	20
	NICKEL T	ug/L	13	<12	<12
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	62.9	65.9	61.9
	STRONTIUM T	ug/L	276	241	248
	SULFATE T	mg/L	34.57	36.39	33.44
	ZINC T	ug/L	23	28	19
NUTRIENTS	AMMONIA D	mg/L	0.083	0.521	0.012
	AMMONIA T	mg/L	0.078	0.535	0.012
	NITRATE & NITRITE D	mg/L	2.39	15.665	12.985
	NITRATE & NITRITE T	mg/L	2.631	15.712	12.977
	NITROGEN D	mg/L	2.713	15.87	13.257
	NITROGEN T	mg/L	2.66	16.374	12.804
	ORTHO PHOSPHORUS D	mg/L	0.046	1.167	0.867
	ORTHO PHOSPHORUS T	mg/L	0.057	1.246	0.884
	PHOSPHORUS D	mg/L	0.049	1.195	0.897
	PHOSPHORUS T	mg/L	0.083	1.298	0.936
PHYSICAL/OTHER	ALKALINITY T	mg/L	117.2	50.6	51.8
	DISCHARGE	CFS	-	-	-
	DISSOLVED OXYGEN	mg/L	6.81	8.76	11.7
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	293	201	189
	OSMOTIC PRESSURE	mosm/kg	13	10	9
	pH	pH units	7.11	6.82	7.55
	SPECIFIC COND	umhos/cm	966.9	835.6	767.5
	TEMPERATURE	C	19.57	20.85	21.39
	TDS	mg/L	704	598	556
	TSS	mg/L	8	8	10
	TOC	mg/L	2.252	3.614	3.073

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A20. August 2015 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1CC	2CC	3CC
METALS AND IONS	ALUMINUM T	ug/L	28	95	124
	BARIUM T	ug/L	138	62	76
	BORON T	ug/L	26	104	88
	BROMIDE T	ug/L	104.38	125.83	102.1
	CALCIUM T	mg/L	53.4	47.3	42.4
	CHLORIDE T	mg/L	137	142	125
	COPPER T	ug/L	5.74	9.93	7.74
	IRON T	ug/L	258	238	249
	LEAD T	ug/L	0.514	0.26	0.407
	MAGNESIUM T	mg/L	22.9	18.4	16.4
	MANGANESE T	ug/L	94	74	28
	NICKEL T	ug/L	<12	<12	<12
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	40.3	58.3	50.2
	STRONTIUM T	ug/L	192	225	228
	SULFATE T	mg/L	37.582	45.176	39.359
	ZINC T	ug/L	13	24	17
NUTRIENTS	AMMONIA D	mg/L	0.092	0.578	0.049
	AMMONIA T	mg/L	0.094	0.578	0.042
	NITRATE & NITRITE D	mg/L	1.887	17.247	15.796
	NITRATE & NITRITE T	mg/L	1.855	17.131	16.459
	NITROGEN D	mg/L	2.16	17.681	15.387
	NITROGEN T	mg/L	2.126	17.463	15.304
	ORTHO PHOSPHORUS D	mg/L	0.059	1.257	1.142
	ORTHO PHOSPHORUS T	mg/L	0.076	1.296	1.168
	PHOSPHORUS D	mg/L	0.057	1.217	1.13
	PHOSPHORUS T	mg/L	0.084	1.338	1.176
PHYSICAL/OTHER	ALKALINITY T	mg/L	103.2	48.6	43.6
	DISCHARGE	CFS	0.835	7.72	9.752
	DISSOLVED OXYGEN	mg/L	6.18	7.32	9.35
	DISSOLVED OXYGEN	%	-	-	-
	HARDNESS T	mg/L	228	194	174
	OSMOTIC PRESSURE	mosm/kg	3	10	9
	pH	pH units	7.2	7.02	7.45
	SPECIFIC COND	umhos/cm	764.9	836.4	761.5
	TEMPERATURE	C	20.056	21.68	22.03
	TDS	mg/L	480	538	516
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	2.906	4.304	3.631

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A21. March 2017 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			4CC	5CC	6WCC
METALS AND IONS	ALUMINUM T	ug/L	157	101	162
	BARIUM T	ug/L	104	94	99
	BORON T	ug/L	40	45	38
	BROMIDE T	ug/L	83.568	68.408	50.938
	CALCIUM T	mg/L	36.5	35.05	29.355
	CHLORIDE T	mg/L	158	141	129
	COPPER T	ug/L	4.26	3.243	2.787
	IRON T	ug/L	339	246	339
	LEAD T	ug/L	0.296	0.213	0.228
	MAGNESIUM T	mg/L	15	14.989	11.904
	MANGANESE T	ug/L	76	59	49
	NICKEL T	ug/L	<12	<12	<12
	POTASSIUM	mg/L	5.186	4.792	4.48
	SELENIUM T	ug/L	<0.763	1.193	<0.763
	SODIUM T	mg/L	70.7	66.092	62.555
	STRONTIUM T	ug/L	228	218	187
	SULFATE T	mg/L	22.116	26.8	22.72
	ZINC T	ug/L	16	10	10
NUTRIENTS	AMMONIA D	mg/L	0.424	0.066	0.063
	AMMONIA T	mg/L	0.428	0.069	0.065
	NITRATE & NITRITE D	mg/L	6.145	5.403	1.857
	NITRATE & NITRITE T	mg/L	6.076	5.368	1.868
	NITROGEN D	mg/L	7.869	6.273	2.436
	NITROGEN T	mg/L	7.577	6.271	2.474
	ORTHO PHOSPHORUS D	mg/L	0.543	0.427	0.06
	ORTHO PHOSPHORUS T	mg/L	0.505	0.493	0.065
	PHOSPHORUS D	mg/L	0.616	0.462	0.043
	PHOSPHORUS T	mg/L	0.663	0.508	0.066
PHYSICAL/OTHER	ALKALINITY T	mg/L	54	54.4	52.4
	HARDNESS T	mg/L	153	149	122
	OSMOTIC PRESSURE	mosm/kg	<1	-	-
	pH	pH units	7.6	7.8	7.6
	SPECIFIC COND	umhos/cm	731	672	595
	TEMPERATURE	C	-	-	-
	TDS	mg/L	456	394	352
	TSS	mg/L	12	<5	<5
	TOC	mg/L	4.108	3.704	3.616

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A22. April 2017 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			4CC	5CC	6WCC
METALS AND IONS	ALUMINUM T	ug/L	72	77	76
	BARIUM T	ug/L	122	89	103
	BORON T	ug/L	48	35	23
	BROMIDE T	ug/L	82.591	75.117	49.461
	CALCIUM T	mg/L	46.61	41.685	34.899
	CHLORIDE T	mg/L	138	120	103
	COPPER T	ug/L	3.43	2.77	11.2
	IRON T	ug/L	196	167	173
	LEAD T	ug/L	0.187	0.154	0.54
	MAGNESIUM T	mg/L	19.68	16.995	13.462
	MANGANESE T	ug/L	58	35	36
	NICKEL T	ug/L	<12	<12	<12
	POTASSIUM	mg/L	5.689	4.519	4.302
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	55.94	46.81	44.376
	STRONTIUM T	ug/L	273	220	194
	SULFATE T	mg/L	26.833	27.767	23.4497
	ZINC T	ug/L	20	8	10
NUTRIENTS	AMMONIA D	mg/L	0.323	0.031	0.044
	AMMONIA T	mg/L	0.318	0.033	0.04
	NITRATE & NITRITE D	mg/L	7.799	5.426	2.594
	NITRATE & NITRITE T	mg/L	8.031	5.356	2.591
	NITROGEN D	mg/L	8.831	5.957	3.271
	NITROGEN T	mg/L	8.683	5.939	3.144
	ORTHO PHOSPHORUS D	mg/L	0.645	0.312	0.033
	ORTHO PHOSPHORUS T	mg/L	0.723	0.321	0.03
	PHOSPHORUS D	mg/L	0.723	0.32	0.047
	PHOSPHORUS T	mg/L	0.782	0.358	0.056
PHYSICAL/OTHER	ALKALINITY T	mg/L	59.6	59.2	58
	HARDNESS T	mg/L	198	174	143
	OSMOTIC PRESSURE	mosm/kg	8	8	7
	pH	pH units	7.7	8.2	7.8
	SPECIFIC COND	umhos/cm	705	616	530
	TEMPERATURE	C	-	-	-
	TDS	mg/L	504	416	344
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	2.988	2.81	2.756

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A23. May 2017 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			4CC	5CC	6WCC
METALS AND IONS	ALUMINUM T	ug/L	98	74	68
	BARIUM T	ug/L	109	105	106
	BORON T	ug/L	46	40	29
	BROMIDE T	ug/L	72.446	67.359	56.603
	CALCIUM T	mg/L	45.159	41.1	34.6
	CHLORIDE T	mg/L	130	118	92.1
	COPPER T	ug/L	3.81	2.78	2.83
	IRON T	ug/L	191	190	209
	LEAD T	ug/L	0.233	0.207	0.149
	MAGNESIUM T	mg/L	20.267	17.2	13.1
	MANGANESE T	ug/L	33	30	30
	NICKEL T	ug/L	<12	<12	<12
	POTASSIUM	mg/L	5.274	4.82	4.676
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	57.834	46.8	36.1
	STRONTIUM T	ug/L	258	246	208
	SULFATE T	mg/L	26.7516	25.4221	25.0522
	ZINC T	ug/L	10	6	5
NUTRIENTS	AMMONIA D	mg/L	0.07	0.019	0.038
	AMMONIA T	mg/L	0.073	0.023	0.04
	NITRATE & NITRITE D	mg/L	7.939	5.932	2.394
	NITRATE & NITRITE T	mg/L	7.861	5.931	2.385
	NITROGEN D	mg/L	8.267	6.521	2.939
	NITROGEN T	mg/L	8.19	6.348	2.991
	ORTHO PHOSPHORUS D	mg/L	0.501	0.4	0.12
	ORTHO PHOSPHORUS T	mg/L	0.511	0.395	0.106
	PHOSPHORUS D	mg/L	0.58	0.338	0.08
	PHOSPHORUS T	mg/L	0.611	0.36	0.1
PHYSICAL/OTHER	ALKALINITY T	mg/L	64.8	63.6	57.2
	HARDNESS T	mg/L	196	174	140
	OSMOTIC PRESSURE	mosm/kg	9	7	3
	pH	pH units	8.1	7.9	7.8
	SPECIFIC COND	umhos/cm	680	601	491
	TEMPERATURE	C	-	-	-
	TDS	mg/L	436	370	532
	TSS	mg/L	<5	10	14
	TOC	mg/L	2.759	2.608	2.974

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A24. June 2017 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			4CC	5CC	6WCC
METALS AND IONS	ALUMINUM T	ug/L	85	123	66
	BARIUM T	ug/L	115	106	116
	BORON T	ug/L	83	52	40
	BROMIDE T	ug/L	93.488	81.387	60.394
	CALCIUM T	mg/L	47	40.201	37.503
	CHLORIDE T	mg/L	134	116	101
	COPPER T	ug/L	4.46	4.02	3.46
	IRON T	ug/L	186	167	133
	LEAD T	ug/L	0.235	0.155	0.138
	MAGNESIUM T	mg/L	20.1	17.573	14.88
	MANGANESE T	ug/L	28	20	21
	NICKEL T	ug/L	<12	<12	<12
	POTASSIUM	mg/L	6.991	5.75	6.379
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	52.6	47.729	45.877
	STRONTIUM T	ug/L	288	266	238
	SULFATE T	mg/L	29.183	27.396	29.917
	ZINC T	ug/L	10	9	10
NUTRIENTS	AMMONIA D	mg/L	0.04	0.068	0.047
	AMMONIA T	mg/L	0.037	0.075	0.056
	NITRATE & NITRITE D	mg/L	10.7	7.266	3.306
	NITRATE & NITRITE T	mg/L	10.711	7.278	3.358
	NITROGEN D	mg/L	11.751	8.08	4.017
	NITROGEN T	mg/L	11.978	7.951	4.002
	ORTHO PHOSPHORUS D	mg/L	0.87	0.531	0.705
	ORTHO PHOSPHORUS T	mg/L	0.875	0.567	0.703
	PHOSPHORUS D	mg/L	0.95	0.583	0.736
	PHOSPHORUS T	mg/L	0.983	0.601	0.737
PHYSICAL/OTHER	ALKALINITY T	mg/L	57.4	56.6	71.4
	HARDNESS T	mg/L	200	173	155
	OSMOTIC PRESSURE	mosm/kg	9	7	3
	pH	pH units	7.6	7.8	8
	SPECIFIC COND	umhos/cm	715	633	579
	TEMPERATURE	C	-	-	-
	TDS	mg/L	508	458	386
	TSS	mg/L	<5	<5	<5
	TOC	mg/L	3.039	2.467	3.39

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A25. July 2017 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			4CC	5CC	6WCC
METALS AND IONS	ALUMINUM T	ug/L	109	49	116
	BARIUM T	ug/L	100	97	109
	BORON T	ug/L	61	51	42
	BROMIDE T	ug/L	81.11	72.016	57.415
	CALCIUM T	mg/L	43.146	40.4	38.6
	CHLORIDE T	mg/L	129	117	96
	COPPER T	ug/L	5.77	4.71	4.16
	IRON T	ug/L	205	116	238
	LEAD T	ug/L	0.231	0.115	0.179
	MAGNESIUM T	mg/L	19.041	17	13.8
	MANGANESE T	ug/L	25	15	32
	NICKEL T	ug/L	<12	<12	<12
	POTASSIUM	mg/L	6.537	5.693	6.455
	SELENIUM T	ug/L	<0.763	1.22	1.19
	SODIUM T	mg/L	53.053	43.5	41.7
	STRONTIUM T	ug/L	277	244	227
	SULFATE T	mg/L	27.7358	28.0045	31.202
	ZINC T	ug/L	17	6	11
NUTRIENTS	AMMONIA D	mg/L	<0.012	<0.012	0.03
	AMMONIA T	mg/L	0.015	<0.012	0.03
	NITRATE & NITRITE D	mg/L	7.917	7.312	4.081
	NITRATE & NITRITE T	mg/L	7.924	7.295	4.094
	NITROGEN D	mg/L	8.447	7.17	4.43
	NITROGEN T	mg/L	8.319	7.151	4.496
	ORTHO PHOSPHORUS D	mg/L	0.55	0.437	0.653
	ORTHO PHOSPHORUS T	mg/L	0.553	0.442	0.655
	PHOSPHORUS D	mg/L	0.634	0.45	0.687
	PHOSPHORUS T	mg/L	0.636	0.448	0.721
PHYSICAL/OTHER	ALKALINITY T	mg/L	64.4	63	68.4
	HARDNESS T	mg/L	186	171	153
	OSMOTIC PRESSURE	mosm/kg	8	7	6
	pH	pH units	7.8	7.8	7.8
	SPECIFIC COND	umhos/cm	681	619	547
	TEMPERATURE	C	-	-	-
	TDS	mg/L	460	432	352
	TSS	mg/L	6	<5	<5
	TOC	mg/L	3.038	2.726	3.726

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

Table A26. August 2017 Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			4CC	5CC	6WCC
METALS AND IONS	ALUMINUM T	ug/L	88	56	67
	BARIUM T	ug/L	88	94	111
	BORON T	ug/L	43	45	38
	BROMIDE T	ug/L	54.018	54.827	55.49
	CALCIUM T	mg/L	33.7	38.2	36
	CHLORIDE T	mg/L	93.2	90.7	91.1
	COPPER T	ug/L	3.96	3.74	4.28
	IRON T	ug/L	292	154	170
	LEAD T	ug/L	0.293	0.151	0.371
	MAGNESIUM T	mg/L	14	15.1	13
	MANGANESE T	ug/L	22	12	22
	NICKEL T	ug/L	<12	<12	<12
	POTASSIUM	mg/L	4.938	5.332	5.642
	SELENIUM T	ug/L	<0.763	<0.763	<0.763
	SODIUM T	mg/L	36.5	37.8	36.9
	STRONTIUM T	ug/L	202	220	214
	SULFATE T	mg/L	18.155	29.335	25.555
	ZINC T	ug/L	5	6	11
NUTRIENTS	AMMONIA D	mg/L	0.09	0.026	0.027
	AMMONIA T	mg/L	0.094	0.021	0.037
	NITRATE & NITRITE D	mg/L	6.484	5.934	3.13
	NITRATE & NITRITE T	mg/L	6.504	5.863	3.102
	NITROGEN D	mg/L	6.874	6.683	3.719
	NITROGEN T	mg/L	6.878	6.399	3.702
	ORTHO PHOSPHORUS D	mg/L	0.399	0.312	0.275
	ORTHO PHOSPHORUS T	mg/L	0.404	0.312	0.284
	PHOSPHORUS D	mg/L	0.442	0.36	0.32
	PHOSPHORUS T	mg/L	0.469	0.54	0.34
PHYSICAL/OTHER	ALKALINITY T	mg/L	55.2	57	58.6
	HARDNESS T	mg/L	142	158	144
	OSMOTIC PRESSURE	mosm/kg	5	6	6
	pH	pH units	7.8	7.8	7.7
	SPECIFIC COND	umhos/cm	507	519	496
	TEMPERATURE	C	-	-	-
	TDS	mg/L	346	350	356
	TSS	mg/L	8	<5	<5
	TOC	mg/L	3.659	2.986	3.333

[1] Refer to Table 1 and Figure 1 for station locations
"<" indicate concentrations below the reporting limit
"-" indicate parameter was not tested

LOGAN SPRING RUN

HUNTINGDON AND BLAIR COUNTIES

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 15823
Drainage List: N

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

Prepared by:

Josh Lookenbill
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

TABLE OF CONTENTS

TABLE OF CONTENTS 1
INTRODUCTION 1
GENERAL WATERSHED DESCRIPTION 1
WATER QUALITY 1
Physicochemical 1
Biological 4
Physical 6
AQUATIC LIFE USE EVALUATION 6
CLASS A WILD TROUT – HIGH QUALITY QUALIFICATION 6
PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA 7
Evaluation Notice 7
Final Draft Notice, Comments and Response 7
RECOMMENDATION 8
LITERATURE CITED 9
APPENDIX A – PHYSICOCHEMICAL DATA 10
APPENDIX B – PFBC AQUATIC BIOLOGICAL INVESTIGATION LOGAN SPRING RUN 15

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Logan Spring Run basin in response to a National Pollutant Discharge Elimination System (NPDES) permit renewal for the Narehood Quarry located at the confluence of Logan Spring Run and the Little Juniata River. The Logan Spring Run basin is currently designated Warm Water Fishes, Migratory Fishes (WWF, 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

Logan Spring Run is a "true" limestone tributary to the Little Juniata River. The majority of the Logan Spring Run basin is located in Warriors Mark Township, Huntingdon County. A small portion of the basin, the farthest downstream reach, is located in Snyder Township, Blair County. The basin has a drainage area of approximately 7.7 square miles and consists of 13.5 stream miles. The surrounding area is fertile limestone valley surrounded by steep ridges characteristic of Central Pennsylvania's Ridge and Valley Province. The current land cover within the basin consists of forested (57%), agricultural (37%), water/wetlands (4%), urban/developed areas (1%), and barren areas (1%) (Dewitz 2019). The Narehood Quarry has two NPDES permits, including an industrial stormwater discharge and an industrial mining discharge. These are the only NPDES permits in the basin.

WATER QUALITY

Physicochemical

Physicochemical data has been collected throughout the lower portion of the basin by the DEP's Bureau of District Mining Operations staff for over two decades to characterize background instream conditions as part of the NPDES permit renewal process and for compliance monitoring for the Narehood Quarry. Additional physicochemical data has been collected by Bureau of Clean Water staff as part of routine Aquatic Life Use surveys and as part of the protected use evaluation. Physicochemical data collected 2014 through 2018, along with samples from 2005 and 2008 are included in this report.

Physicochemical data was collected from two locations on Logan Spring Run mainstem as well as from approximately six large alkaline limestone springs throughout the lower portion of the basin. Locations on Logan Spring Run are located upstream of the permitted quarry (2LSR) and just downstream of the quarry near the confluence with the Little Juniata River (9LSR) (Table 1, Figure 1). The six limestone spring locations are all located upstream of the quarry. Most of the physicochemical data includes a limited number of analytical tests (total alkalinity, total acidity, pH, specific conductance, total suspended solids, and total iron), but some also include additional tests for select metals and ions (Appendix A).

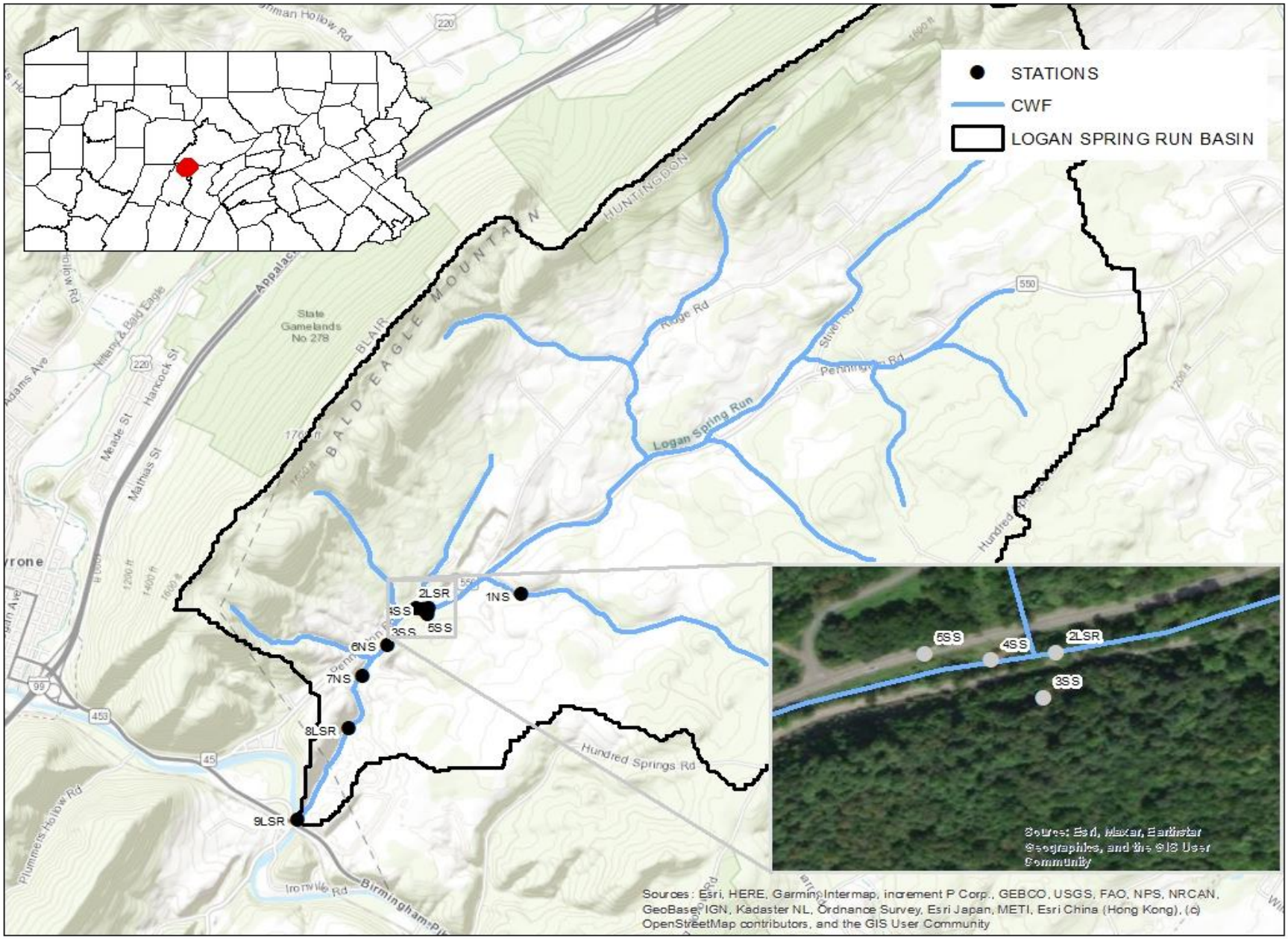


Figure 1. Logan Spring Run Basin Station Locations and Redesignation Recommendation.

Table 1. Station Locations – Logan Spring Run Basin.

STATION	DESCRIPTION
1NS	"North Spring" – Limestone Spring 1, right descending of unnamed tributary (UNT) 15827 and 350 meters upstream of the confluence with Logan Spring Run Water Chemistry August 2005 Lat: 40.676 Long: -78.199
2LSR	Logan Spring Run, 100 meters upstream of Stover Lane and Pennington Road intersection and 20 meters upstream of "Stover Springs" (4SS). DEP Survey February 2018 Water Chemistry February 2018 Lat: 40.675 Long: -78.207
3SS	"Stover Springs" – Limestone Spring 1, left descending of Logan Spring Run, in the vicinity of 2LSR. Water Chemistry August 2005 Lat: 40.674 Long: -78.206
4SS	"Stover Springs" – Limestone Spring A, right descending of Logan Spring Run and 20 meters downstream of 2LSR. Water Chemistry 2014 - 2017 Lat: 40.675 Long: -78.206
5SS	"Stover Springs" – Limestone Spring 3, right descending of Logan Spring Run, in the vicinity of 2LSR. Water Chemistry 2014 - 2017 Lat: 40.675 Long: -78.207
6NS	"North Spring" – Limestone Spring 3, left descending of Logan Spring Run, 350 meters upstream of 7NS and approx. 420 meters downstream of 2LSR and "Stover Springs". Water Chemistry 2014 - 2015 Lat: 40.673 Long: -78.209
7NS	"North Spring" – Limestone Spring 2, left descending of Logan Spring Run, upstream of Narehood Quarry and 350 meters downstream of 6NS Water Chemistry June 2014 Lat: 40.671 Long: -78.211
8LSR	Logan Spring Run, upstream portion of the Narehood Quarry permit area. PFBC Fish Surveys August 1993, August 2004 and July 2016 Lat: 40.675 Long: -78.217
9LSR	Logan Spring Run, 40 meters upstream of the confluence with the Little Juniata River PFBC Fish Survey July 1993 SSWAP Survey May 2000 DEP Survey February 2018 Water Chemistry February 2018 Lat: 40.662 Long: -78.216

Samples collected on August 31, 2005 from upstream of the quarry operation (2LSR; Table A1) and on March 11, 2015 downstream of the quarry operation (9LSR; Table A7) were collected during elevated stream flow. Additional samples were collected on February 6, 2018 at base flow conditions from upstream and downstream of the quarry operation (2LSR and 9LSR; Table A7).

Physicochemical results from the Logan Spring Run basin are indicative of a "true" limestone stream. Alkalinity results range from 156.6 to 266 mg/L except for the sample collected (104 mg/L) during a high flow event on March 11, 2015. Instream nitrogen concentrations that range from 4.23 to 6.83 mg/L and the reduced alkalinity documented from the 2015 sample may indicate nonpoint source or other impacts. Total acidity results are all significantly less than zero and range from -301.4 to -135.2 mg/L. Results from samples collected on February 6, 2018 during base flow conditions indicate similar water quality conditions upstream and downstream of the quarry operation (Appendix A).

Biological

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. Pennsylvania Fish and Boat Commission (PFBC) staff collected fisheries data from two locations (8LSR and 9LSR) in 1993 and again at a single location (8LSR) in 2001 and 2016 (Figure 1, Table 1). Macroinvertebrate surveys were conducted at two locations on February 6, 2018.

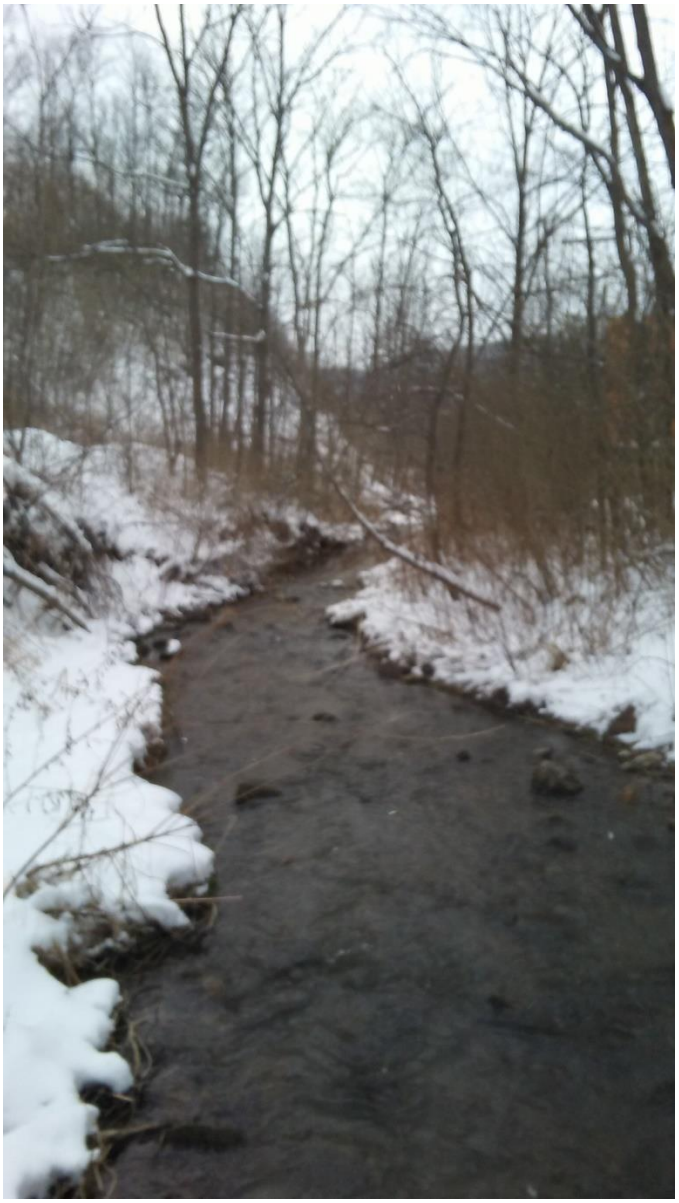


Figure 2. Logan Spring Run – Station 2LSR, Looking Downstream.



Figure 3. Logan Spring Run – Station 9LSR, Looking Downstream.

Benthos

A macroinvertebrate survey was completed on February 6, 2018 using DEP's *Wadeable Limestone Stream Macroinvertebrate Data Collection Protocol* (Williams 2017b). Samples were collected from upstream and downstream (2LSR and 9LSR) of the quarry operation. The macroinvertebrate community at both stations are indicative of a true limestone stream. The Index of Biotic Integrity (IBI)

assessment threshold for limestone streams is 60. IBI scores for the 2018 samples were 71.5 (2LSR) and 80.0 (9LSR) (Williams 2017a). Both samples are above the assessment threshold. Five macroinvertebrate taxa including*, Lirceus, Gammarus, Ephemerella, Optioservus,* and Chironomidae account for approximately 80% of the total organisms collected from DEP limestone method development samples (Botts 2009). Comparatively *Gammarus, Ephemerella,* and Chironomidae comprise 86% of the 2LSR sample and 79% of the 9LSR sample. *Gammarus* was the dominant taxon comprising over half of the subsample from each station. Taxa richness was higher at 9LSR (15) than at 2LSR (10), and diversity metrics were also higher at 9LSR (Tables 2 and 3).

Table 2. Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]	
		2LSR	9LSR
Ephemeroptera			
Baetidae	*Baetis*	2	14
Ephemerellidae	*Ephemerella*	61	63
Leptophlebiidae	*Paraleptophlebia*	2	-
Plecoptera			
Nemouridae	*Amphinemura*	-	2
Trichoptera			
Uenoidae	*Neophylax*	3	1
Diptera			
Chironomidae		-	27
Simuliidae	*Prosimulium*	5	1
	Simulium	5	5
Tipulidae	*Antocha*	-	1
	Tipula	-	1
Coleoptera			
Elmidae	*Optioservus*	43	5
	Oulimnius	1	-
Non-Insect Taxa			
Cambaridae	*Cambarus*	-	1
Gammaridea	*Gammarus*	172	181
Oligochaeta		1	5
Planariidae		-	5
Stygobromus		-	1
Taxa Richness		10	15

[1] Refer to Table 1 for station locations

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

Table 3. Benthic Macroinvertebrate Metrics.

METRIC	STATIONS[1]	
	2LSR	9LSR
Total Richness	10	15
EPT Richness	4	4
Beck's Index (Version 4)	8	10
Hilsenhoff Biotic Index	3.39	3.85
% Tolerant Individuals (PTV 7-10)	0.3	3.2
Shannon Diversity	1.21	1.40
IBI for Limestone Streams	71.5	80.0

[1] Refer to Table 1 for station locations

Fishes

Fish were collected using backpack electrofishing gear and populations were estimated during 1993 PFBC surveys using a two-pass Zippin Removal Method. Approximately 75 meters were sampled on July 15, 1993 just downstream of the quarry (9LSR), and 248 meters were sampled on August 31, 1993 within the quarry permit area (8LSR). A total of 20 brown trout (*Salmo trutta*) and a single brook trout (*Salvelinus fontinalis*) ranging 50-350 mm, along with mottled sculpin (*Cottus bairdii*) and Eastern blacknose dace (*Rhinichthys atratulus*) were collected during the July 15th survey. A total of 108 brown trout ranging 75-474 mm, along with rainbow trout (*Oncorhynchus mykiss*), and mottled sculpin were collected during the August 31st survey. A biomass of 191.68 kg/ha of brown trout was calculated (Appendix B – *Aquatic Biological Investigation Logan Spring Run*; PFBC, 1993).

Additional PFBC surveys were completed using backpack electrofishing gear on August 10, 2004 and again on July 14, 2016 within the quarry permit area (8LSR). Blacknose dace, brook trout, brown trout, mottled sculpin and rainbow trout were collected in 2004 (PFBC 2004). Creek chub (*Semotilus atromaculatus*) and slimy sculpin (*Cottus cognatus*) were collected in 2016 but no trout were collected (PFBC 2016).

Physical

Instream habitat was assessed at each station where benthic macroinvertebrates were sampled during the 2018 survey (Table 4). The habitat evaluation consists of rating twelve parameters to derive a station habitat score. The total habitat scores were suboptimal (172) at 2LSR, upstream of the permitted quarry area and optimal (194) at 9LSR, downstream of the of the quarry. Suboptimal scores at 2LSR were influenced by low scores for instream cover, embeddedness, sediment deposition, and riparian zone width.

Table 4. Habitat Evaluation Data.

PARAMETER	STATIONS[1]	
	2LSR	9LSR
1. INSTREAM COVER	12	17
2. EPIFAUNAL SUBSTRATE	16	19
3. EMBEDDEDNESS	11	16
4. VELOCITY/DEPTH	16	16
5. CHANNEL ALTERATIONS	13	13
6. SEDIMENT DEPOSITION	9	14
7. RIFFLE FREQUENCY	16	19
8. CHANNEL FLOW STATUS	20	20
9. BANK CONDITION	15	16
10. BANK VEGPROTECTION	18	16
11. GRAZING/DISRUPT PRESS	19	20
12. RIPARIAN VEG. ZONE WIDTH	7	8
Total Score	**172**	**194**
Rating[2]	**SUB**	**OPT**

[1] Refer to Table 1 for station locations

[2] OPT=Optimal (≥192); SUB=Suboptimal (132-191)

AQUATIC LIFE USE EVALUATION

The Aquatic Life Use of Logan Spring Run was evaluated according to definitions described at 25 Pa. Code § 93.3, Table 1 – *Protected Water Uses.* Table 1 defines the Cold Water Fishes (CWF) protected use as;

> *Maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.*

PFBC surveys conducted in 1993 and 2004 have documented the maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat. While the 2016 survey did not document Salmonidae, it did document sculpin (Cottidae), which are also indigenous to cold water habitat (Eaton & Scheller 1996, Lyons et al. 2009, Zorn et al. 2002). Regardless of the 2016 survey results, the 1993 and 2004 surveys have demonstrated an existing use of CWF. Subsequent evaluations do not supersede prior demonstrations of meeting the CWF Aquatic Life Use, and any additional biological measures of water quality would be used to measure changes in water quality from the benchmark biological characterization. The benchmark for water quality is that use attained in the waterbody on or after November 28, 1975, whether or not it is included in the water quality standards (25 Pa. Code § 93.1).

CLASS A WILD TROUT – HIGH QUALITY QUALIFICATION

The DEP is required by regulation, 25 Pa. Code § 93.4b(a)(2)(ii) to consider streams for High Quality Waters (HQ) designation when the PFBC provides information that indicates a stream is a Class A Wild Trout stream based on wild trout biomass and the PFBC, after public notice and comment, classifies the stream as a Class A Wild Trout Water. A PFBC survey conducted in 1993 (Appendix B) documented a biomass of brown trout (191.68 kg/ha) that exceeds the PFBC Class A Wild Trout Stream criteria listed in Table 5. The PFBC classification process includes a public notice, review of comments, and approval by their Commissioners. Logan Spring Run has not been officially classified as a Class A Wild

Trout Stream by PFBC, and therefore does not meet the qualifications listed in 25 Pa. Code § 93.4b(b)(a)(2)(ii).

Table 5. PFBC Trout Biomass Estimates Classes and Criteria.

CLASS	CRITERIA
A (Brook Trout)	a. Total wild brook trout biomass of at least 30 kg/ha (26.7 lbs./acre) b. Total biomass of wild brook trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre) c. Wild brook trout biomass must comprise at least 75% of the total wild trout biomass
A (Brown Trout)	a. Total wild brown trout biomass of at least 40 kg/ha (35.6 lbs. acre) b. Total biomass of wild brown trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre). c. Wild brown trout biomass must comprise at least 75% of the total wild trout biomass
A (Mixed Brown and Brook)	a. Combined wild brook and wild brown trout biomass of at least 40 kg/ha (35.6 lbs. acre) b. Total biomass of wild brook trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre). c. Total biomass of wild brown trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre). d. Wild brook trout biomass comprises less than 75% of total trout biomass e. Wild brown trout biomass comprises less than 75% of total trout biomass
A (Rainbow Trout)	Total biomass of wild rainbow trout less than 15 cm (5.9 inches) in total length of at least 2.0 kg/ha (1.78 lbs./acre).

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this redesignation evaluation and requested any technical data from the general public on the DEP website and through publication in the *Pennsylvania Bulletin* on June 9, 2018 (48 Pa.B. 3491). Blair County Conservation District, Blair County Board of Commissioners, Huntingdon County Conservation District, Huntingdon County Board of Commissioners, Snyder Township, and Warriors Mark Township were notified of the redesignation evaluation in a letter dated June 12, 2018. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notices.

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 DCNR and the PFBC in a letter dated November 16, 2019 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on November 16, 2019 (49 Pa.B. 6919). No comments were received in response to the draft report notification

RECOMMENDATION

Based on applicable regulatory definitions in 25 Pa. Code § 93.3, the DEP recommends that the Logan Spring Run basin be redesignated from Warm Water Fishes, Migratory Fishes (WWF, MF) to Cold Water Fishes, Migratory Fishes (CWF, MF) based on documented maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat.

This recommendation adds approximately 13.5 total stream miles of CWF waters to Chapter 93.

LITERATURE CITED

Botts, W. F. 2009. Wadable limestone stream macroinvertebrate assessment method. Chapter 2, pages 225-35. *In* Shull, D. R., and M. Pulket. (editors). Assessment methodology for rivers and streams. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.

Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, https://doi.org/10.5066/P96HHBIE.

Eaton, J. G. and Scheller, R. M. 1996. Effects of climate warming on fish thermal habitat in streams of the United States. Limnology and Oceanography, 41(5):.1109-1115.

Lyons, J., Zorn, T., Stewart, J. Seelbach, P., Wehrly, K., Wang, L. 2009. Defining and characterizing coolwater streams and their fish assemblages in Michigan and Wisconsin, USA. North American Journal of Fisheries Management 29:1130-1151.

Pennsylvania Fish and Boat Commission (PFBC). 2004. Logan Spring Run fisheries management data. Unpublished raw data. Pennsylvania Fish and Boat Commission. Bellefonte, Pennsylvania.

PFBC. 2016. Logan Spring Run fisheries management data. Unpublished raw data. Pennsylvania Fish and Boat Commission. Bellefonte, Pennsylvania.

Shull, D. R. and M. J. Lookenbill. 2018. Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.

Williams, A. (editor). 2017a. Wadeable limestone stream macroinvertebrate assessment method. Chapter 2.2, pages 25–35 *in* D. R. Shull, and R. Whiteash (editors). Assessment methodology for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Williams, A. (editor). 2017b. Wadeable limestone stream macroinvertebrate data collection protocol. Chapter 3.2, pages 9–13 in M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Zorn, T., Seelbach, P., Whiley, M. 2002. Distributions of stream fishes and their relationship to stream size and hydrology in Michigan's Lower Peninsula. Transactions of the American Fisheries Society 131:70-82.

APPENDIX A – PHYSICOCHEMICAL DATA

Table A1. Logan Spring Run Basin Physicochemical Data – August 31, 2005

PARAMETER	UNITS	STATIONS[1]		
		1NS	2LSR	3SS
ALKALINITY T	mg/L	253	175.2	245.4
ACIDITY T	mg/L	-211.6	-143	-201.4
pH	SU	7.78	8	7.5
SPECIFIC COND	µS/CM[C]	537	398	531
TSS	mg/L	2	52	10
ALUMINUM T	µg/L	<200	854	<200
CALCIUM T	mg/L	63.8	52.6	62.7
IRON T	µg/L	<20	2000	<20
MAGNESIUM T	mg/L	32.9	19.8	29.4
MANGANESE T	µg/L	<10	48	<10
POTASSIUM T	mg/L	1.28	4.81	1.67
SODIUM T	mg/L	3.09	4.79	3.84
CHLORIDE T	mg/L	11.3	9	10.2
SULFATE T	mg/L	<20	23.2	27.5
ZINC T	µg/L	19	16	15
NITRATE NITROGEN T	mg/L	6.83	-	6.44
NITRATE T	mg/L	-	4.23	-

[1] Refer to Table 1 for station locations

"<" indicate concentrations below the reporting limit.

"-" indicate parameter was not tested

Table A2. Logan Spring Run Basin Physicochemical Data – June 18, 2014

PARAMETER	UNITS	STATIONS[1]					
		2LSR	4SS	5SS	6NS	7NS	9LSR
ALKALINITY	mg/L	165.2	220.8	150.8	214.6	266	169.6
ACIDITY T	mg/L	-159.2	-197.8	-135.2	-191.4	-243	-163.6
pH	SU	8.3	8	7.8	8	8	8.3
SPECIFIC COND	µS/CM[C]	409	548	418	486	592	528
TSS	mg/L	16	<5	<5	<5	10	8
IRON T	µg /L	303	43	77	<20	<45	174

[1] Refer to Table 1 for station locations

"<" indicate concentrations below the reporting limit.

Table A3. Logan Spring Run Basin Physicochemical Data – June 10, 2015

PARAMETER	UNITS	STATIONS[1]				
		2LSR	4SS	5SS	6NS	9LSR
ALKALINITY	mg/L	156.6	242.6	235.6	213.4	216.6
ACIDITY T	mg/L	-142.4	-209	-190.8	-184.2	-185.4
pH	SU	8.5	7.8	7.8	8	8.5
SPECIFIC COND	µS/CM[C]	366	574	555	491	517
TSS	mg/L	< 5	8	6	10	8
IRON T	µg /L	106	22	<20	<20	55

[1] Refer to Table 1 for station locations

"<" indicate concentrations below the reporting limit.

Table A4. Logan Spring Run Basin Physicochemical Data – October 27, 2015

PARAMETER	UNITS	STATIONS[1]			
		2LSR	4SS	5SS	9LSR
ALKALINITY	mg/L	244.6	245	245.4	246
ACIDITY T	mg/L	-209	-200.8	-200.6	-145.8
pH	SU	8.5	7.8	7.8	8.5
SPECIFIC COND	µS/CM[C]	566	586	585	568
TSS	mg/L	< 5	<5	<5	<5
IRON T	µg /L	<20	<20	<20	38

[1] Refer to Table 1 for station locations

"<" indicate concentrations below the reporting limit.

Table A5. Logan Spring Run Basin Physicochemical Data – May 19, 2016

PARAMETER	UNITS	STATIONS[1]			
		2LSR	4SS	5SS	9LSR
ALKALINITY	mg/L	156.6	243.2	137.8	170
ACIDITY T	mg/L	-142.4	-224.4	-136.4	-167.8
pH	SU	8.5	7.7	7.7	8.5
SPECIFIC COND	µS/CM[C]	366	554	368	414
TSS	mg/L	< 5	14	6	< 5
IRON T	µg /L	151	<20	31	83

[1] Refer to Table 1 for station locations

"<" indicate concentrations below the reporting limit.

Table A6. Logan Spring Run Basin Physicochemical Data – May 17, 2017

PARAMETER	UNITS	STATIONS[1]			
		2LSR	4SS	5SS	9LSR
ALKALINITY	mg/L	193.4	241.6	169.8	194
ACIDITY T	mg/L	-181.4	-235.4	-159.4	-178.2
pH	SU	8.4	7.7	7.6	8.4
SPECIFIC COND	µS/CM[C]	440	555	426	480
TSS	mg/L	8	14	12	6
IRON T	µg /L	187	309	176	378

[1] Refer to Table 1 for station locations

"<" indicate concentrations below the reporting limit.

Table A7. Logan Spring Run Basin Physicochemical Data – February 6, 2018 and March 11, 2015

PARAMETER		UNITS	STATIONS[1]		
			2LSR[2]	9LSR[3]	9LSR[2]
METALS AND IONS	ALUMINUM D	µg/L	<10	-	<10
	ALUMINUM T	µg/L	49	5557	36
	BARIUM T	µg/L	52	96	44
	BORON T	µg/L	<200	<19.105	<200
	BROMIDE	µg/L	<25	<8.041	<25
	CADMIUM D	µg/L	<0.2	-	<0.2
	CALCIUM T	mg/L	56.011	75.46	59.022
	CHLORIDE T	mg/L	10.69	16.141	11.16
	COPPER D	µg/L	<4	-	<4
	COPPER T	µg/L	<4	17.9	<4
	IRON D	µg/L	<20	-	<20
	IRON T	µg/L	98	8713	59
	LEAD D	µg/L	<1	-	<1
	LEAD T	µg/L	<1	15.2	<1
	LITHIUM D	µg/L	<25	-	<25
	LITHIUM T	µg/L	<25	-	<25
	MAGNESIUM T	mg/L	21.022	29.43	22.594
	MANGANESE D	µg/L	<10	-	<10
	MANGANESE T	µg/L	<10	363	<10
	NICKEL D	µg/L	<50	-	<50
	NICKEL T	µg/L	<50	14	<50
	POTASSIUM T	mg/L	1.895	-	1.984
	SELENIUM T	µg/L	<7	0.77	<7
	SODIUM T	mg/L	5.68	7.548	5.546
	STRONTIUM T	µg/L	291	187	237
	SULFATE T	mg/L	18.18	21.621	22.54
	ZINC D	µg/L	14	-	12
	ZINC T	µg/L	12	82	13
NUTRIENTS	AMMONIA D	mg/L	<0.02	0.183	<0.02
	AMMONIA T	mg/L	<0.02	0.177	<0.02
	NITRATE & NITRITE D	mg/L	5.8	2.948	5.3
	NITRATE & NITRITE T	mg/L	5.79	2.913	5.54
	NITROGEN T	mg/L	5.77	4.662	5.4
	ORTHO PHOS D	mg/L	0.019	0.105	0.016
	ORTHO PHOS T	mg/L	0.018	0.1	0.017
	PHOSPHORUS D	mg/L	0.015	0.117	0.016
	PHOSPHORUS T	mg/L	0.021	0.471	0.016

Table A7 (cont.). Logan Spring Run Basin Physicochemical Data – February 6, 2018 and March 11, 2015

PARAMETER		UNITS	STATIONS[1]		
			2LSR[2]	9LSR[3]	9LSR[2]
PHYSICAL/OTHER	ALKALINITY T	mg/L	199	104	199.4
	HARDNESS T	mg/L	227	310	241
	OSMOTIC PRESSURE	mOsm	-	150	-
	pH	SU	8.3	7.76	8.2
	SPECIFIC COND	µs/cm[c]	455	306	464
	SSC COURSE FRACTION	PPM	-	160.8	-
	SSC FINE FRACTION	PPM	-	319.2	-
	SSC T	PPM	-	480	-
	TDS	mg/L	300	220	296
	TOC	mg/L	0.62	8.296	0.67
	TSS	mg/L	<5	420	<5

[1] Refer to Table 1 for station locations

[2] February 6, 2018

[3] March 11, 2015

"<" indicate concentrations below the reporting limit.

"-" indicate parameter was not tested

APPENDIX B – PFBC AQUATIC BIOLOGICAL INVESTIGATION LOGAN SPRING RUN

AQUATIC BIOLOGICAL INVESTIGATION
LOGAN SPRING RUN
HUNTINGDON AND BLAIR COUNTIES

OCTOBER 12, 1993

PREPARED BY:

PENNSYLVANIA FISH AND BOAT COMMISSION
DIVISION OF ENVIRONMENTAL SERVICES
450 ROBINSON LANE
BELLEFONTE, PA 16823

AQUATIC BIOLOGICAL INVESTIGATION
LOGAN SPRING RUN, HUNTINGDON AND BLAIR COUNTIES

Introduction

Logan Spring Run was surveyed on 15 July and 31 August 1993 in response to proposed and permitted encroachments at the New Enterprise Stone and Lime Company Mine Site, Permit Number 4275SM14. The purpose of the study was to collect baseline data on Logan Spring Run to determine the stream's biological sensitivity. Two stations were sampled on Logan Spring Run for this study. The initial sampling (15 July 1993) was conducted to determine if wild trout were present downstream of the active quarry, while the 31 August 1993 survey was conducted within the active quarry permit area to estimate populations of wild trout.

Description of Study Area

Logan Spring Run has a total length of approximately 7.3 km and confluences with the Little Juniata River near the town of Tyrone. The primary drainage area can be seen on the 7.5 minute USGS Tyrone Quadrangle (Figure 1).

Methods

The benthic macroinvertebrate community for the two sampling dates was characterized by one qualitative sample (kick-net), with this sampling being conducted in as many different stream habitats as possible. The samples were preserved in alcohol and transported to the laboratory where the invertebrates were sorted from debris and identified to the genus level of taxonomic classification, where possible.

Fish populations were sampled using a Coffelt BP-1C electrofisher. Approximately 75 meters were electrofished downstream of the permit area (Station 01A) during the 15 July 1993 survey for the purpose of evaluating the stream for wild trout populations. A 248 meter stream section was electrofished at Station 01 (Figure 1) on 31 August 1993 with this station being located within the permit boundary. The fish populations were estimated using a two-pass Zippin Removal Method for wild brown trout while all other species were noted.

Results and Discussion

The qualitative benthic macroinvertebrate sampling for both survey dates collected 15 taxa at Station 01A and 14 taxa at Station 01 (Table 1). The communities were dominated by Gammaridae and Hydropsychidae which reflects the limestone stream system sampled.

The initial 15 July 1993 qualitative sampling at Station 01A for fish species revealed a naturally reproducing population of brown trout and brook trout. Approximately 75 meters were electrofished with 20 brown trout and one brook trout being captured with these ranging from 50-350 mm (2-14 inches). In addition mottled sculpins and blacknose dace were identified. Table 2 contains the results of electrofishing at Station 01. A two-pass Zippin Population

Table 1. Results of qualitative benthic macroinvertebrate sampling on Logan Spring Run, Blair County, 15 July* and 31 August 1993**.

Taxa	Station 01A*	Station 01**
DIPTERA		
CHIRONOMIDAE	X	X
SIMULIIDAE		
PROSIMULIUM		X
SIMULIUM	X	X
TIPULIDAE		
ANTOCHA	X	X
MUSCIDAE	X	
TRICHOPTERA		
HYDROPSYCHIDAE		
HYDROPSYCHE	X	X
GLOSSOSOMATIDAE		
GLOSSOSOMA	X	
PLECOPTERA		
NEMOURIDAE		
AMPHINEMURA	X	
EPHEMEROPTERA		
BAETIDAE		
BAETIS	X	X
EPHEMERELLIDAE		
EPHEMERELLA	X	
COLEOPTERA		
ELMIDAE		
PROMORESIA		X
OPTIOSERVUS	X	X
STENELMIS		X
OTHER		
GAMMARIDAE	X	X
HIRUDINEA	X	X
GASTROPODA		X
BIVALVIA		X
PLANARIA		X
PLANORBIDAE	X	
AMPHIPODA	X	
LUMBRICINA	X	
TOTAL TAXA	15	14

Table 2. Results of electrofishing one station on Logan Spring Run, Blair County, 31 August 1993, using a 2–Pass Zippin Removal population estimate.

Species	Size Class (mm)	Total fish Pass 1–2	Population Estimate	
			Fish Per Hectare	Kg Per Hectare
Brown Trout	0–49	–	–	–
(Salmo trutta)	50–74	–	–	–
	75–99	10	100	1.00
	100–124	25	273	3.82
	125–149	3	30	0.68
	150–174	–	–	–
	175–199	9	90	8.54
	200–224	13	159	20.87
	225–249	14	139	21.88
	250–274	10	177	37.71
	275–299	10	120	32.89
	300–324	3	30	11.62
	325–349	6	59	23.66
	350–374	2	20	9.34
	375–399	1	10	4.43
	400–449	1	10	6.88
	450–474	1	10	8.36
Totals		108	1227	191.68

Station Length: 248 meters
Station Width: 4.1 meters

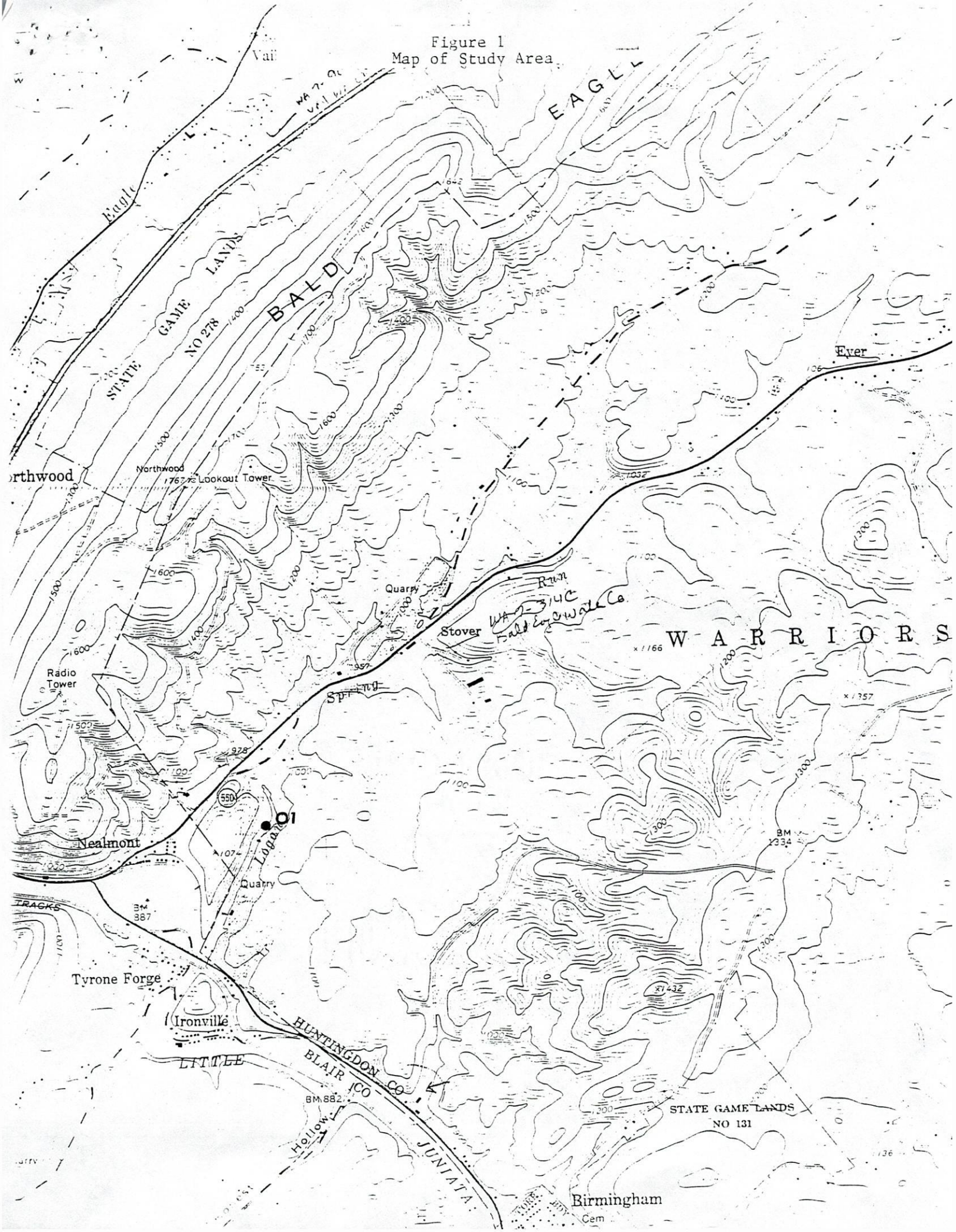
Other Species Collected
Rainbow Trout
Palomino Trout
Mottled Sculpin
Blacknose Dace

Estimate was calculated for this 248 meter stream section with an estimate of 1227 trout per hectare and a biomass of 191.68 kilograms per hectare (Kg/ha). The presence of sub-legal trout along with fish scale samples indicate natural reproduction. In addition to the wild brown trout captured, four other fish species were collected which include mottled sculpins, blacknose dace, and palomino and rainbow trout (both fish species of hatchery origin).

Summary

The Pennsylvania Fish and Boat Commission's (PFBC) criteria for Class A Brown Trout Waters is a brown trout biomass of 40 Kilograms per Hectare and the presence of natural reproduction. Logan Spring Run contains a brown trout population with a biomass estimate of 192 Kg/ha and the presence of natural reproduction which meets the criteria for a Class A water. This significant brown trout fishery illustrates the biological sensitivity of the watershed and requires the full protection available through existing law and regulation. Furthermore, since it is now documented that this Little Juniata tributary maintains excellent water quality sufficient to support a Class A wild trout fishery, it is recommended that Logan Spring Run be upgraded from its present 25 PA Code Chapter 93 designation of a Warm Water Fishery (WWF) to a High-Quality Coldwater Fishery (HQ-CWF). The information contained within this report shows the need to immediately protect the aquatic uses of the Logan Spring Run to the standards provided by the HQ-CWF regulatory designation. To do less could compromise the future integrity of this outstanding local/regional resource.

Figure 1
Map of Study Area



MIDDLE LEHIGH RIVER TRIBUTARIES

CARBON COUNTY

WATER QUALITY STANDARDS REVIEW
STREAM EVALUATION REPORT

Segments: Bear Creek (04123), basin;

Nesquehoning Creek Tributaries – Jeans Run (04101), basin; Broad Run (04111), basin; Dennison Run (04113), basin; Bear Creek (04115), basin; Grassy Meadow Run (04117), basin;

Mahoning Creek Tributaries – Stewart Creek (04040), basin; UNT 04055, basin; UNT 04060, basin

Drainage List: D

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

Prepared by:

Erika Arnold
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

TABLE OF CONTENTS

TABLE OF CONTENTS 3
INTRODUCTION 4
GENERAL WATERSHED DESCRIPTION 4
WATER QUALITY 8
Biological 8
Discrete Physicochemical 15
Physical 16
INTEGRATED BENTHIC MACROINVERTEBRATE SCORING TEST 18
CLASS A WILD TROUT – HIGH QUALITY QUALIFICATION 18
ADDITIONAL EXCEPTIONAL VALUE WATERS QUALIFYING CRITERIA 22
PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA 24
Evaluation Notice 24
Final Draft Notice, Comments and Response 24
RECOMMENDATION 25
LITERATURE CITED 26
APPENDIX A - DEFINITIONS 27
APPENDIX B – PHYSICOCHEMICAL DATA 29

INTRODUCTION

The Department of Environmental Protection (DEP) conducted evaluations of Bear Creek basin, a tributary to the Lehigh River, and multiple tributaries in the Nesquehoning Creek and Mahoning Creek basins as part of routine monitoring and assessment efforts. Past biological surveys indicated that the small, forested tributaries within these basins may have existing uses different from the current designated uses. The DEP completed benthic macroinvertebrate data collection in February and March 2005 and physicochemical data collection in 2019. The Bear Creek (04123) basin is currently designated High Quality Waters – Cold Water Fishes, Migratory Fishes (HQ-CWF, MF). Tributaries evaluated in the Nesquehoning Creek basin include Jeans Run, Broad Run, Dennison Run, Bear Creek (04115), and Grassy Meadow Run and are all currently designated HQ-CWF, MF. Tributaries evaluated in the Mahoning Creek basin include Stewart Creek, Unnamed Tributary (UNT) 04055, and UNT 04060; these tributaries are currently designated Cold Water Fishes, Migratory Fishes (CWF, MF). In addition to routine monitoring efforts, UNT 04055 was further prioritized for evaluation in response to a permit application within the basin.

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

Bear Creek, Nesquehoning Creek and Mahoning Creek watersheds are within the larger Hydrologic Unit Code (HUC) 10 Middle Lehigh River watershed. This larger HUC watershed is contained within the Anthracite Upland Section of the Ridge and Valley Province. Topography consists of rounded hills with steep slopes, defined mountain ridges and valleys. While strip mining is common in this Upland Section, no active mines are found within the basins and tributaries evaluated in this report. However, abandoned mine land envelopes the lower limits of Bear Creek (04115) and Dennison Run, near the mouths and at the confluences with Nesquehoning Creek (Figure 1, Tables 1 - 3). There are a total of 20 National Pollutant Discharge Elimination System (NPDES) permitted activities, including sewage (5), industrial stormwater (11), and four active mining operations that include mining stormwater (2) and industrial mine discharges (2) within the basins being evaluated. In addition, groundwater Public Water Supply (PWS) wells do exist in the Broad Run, Bear Creek (04115), Stewart Creek, UNT 04055 and UNT 04060 basins.

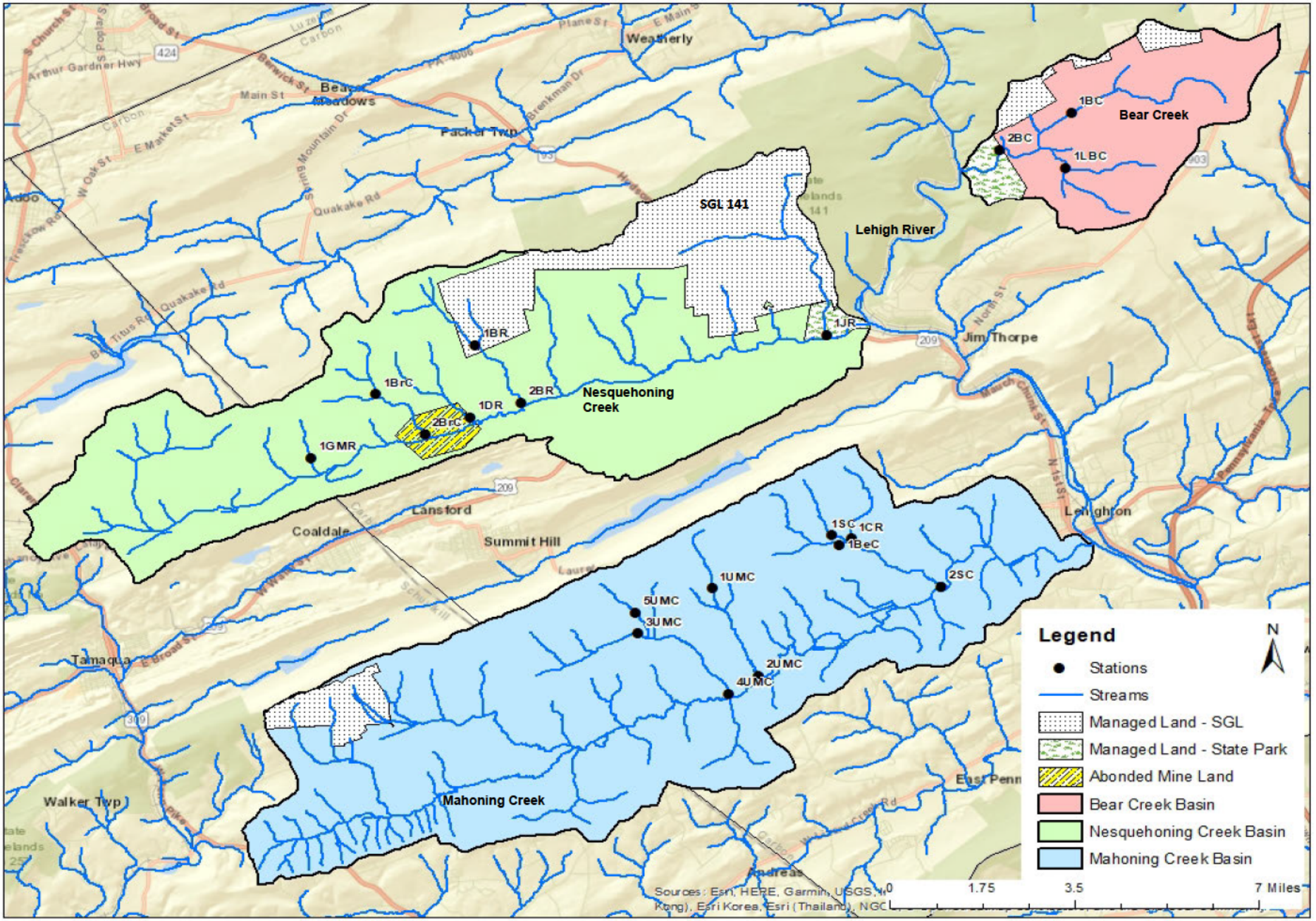


Figure 1. Middle Lehigh Tributaries Survey – Watersheds and Stations.

Table 1. Bear Creek Tributary – Station Locations.

STATION	DESCRIPTION
1BC	Bear Creek (04123), 1.25 kilometers upstream of junction with Little Bear Creek. Penn Forest Township, Carbon County Lat: 40 55 25.8N Long: 75 42 21.9W
2BC	Bear Creek, 1.25 kilometers upstream of mouth. Penn Forest Township, Carbon County Lat: 40 54 54.9N Long: 75 43 32.5W
1LBC	Little Bear Creek (04125), 900 meters upstream of mouth. Penn Forest Township, Carbon County Lat: 40 54 40.5N Long: 75 42 27.5W

Table 2. Nesquehoning Creek Tributaries – Station Locations.

STATION	DESCRIPTION
1JR	Jeans Run (04101), 25 meters upstream of mouth. Nesquehoning Borough, Carbon County Lat: 40 52 22.8N Long: 75 46 24.0W
1BR	Broad Run (04111), 25 meters upstream of reservoir. Nesquehoning Borough, Carbon County Lat: 40 52 14.4N Long: 75 52 10.7W
2BR	Broad Run, 50 meters upstream of mouth. Nesquehoning Borough, Carbon County Lat: 40 51 27.2N Long: 75 51 25.4W
1DR	Dennison Run (04113), 75 meters upstream of mouth. Nesquehoning Borough, Carbon County Lat: 40 51 15.0N Long: 75 52 16.0W
1BrC	Bear Creek (04115), immediately upstream of Bear Creek Reservoir. Nesquehoning Borough, Carbon County Lat: 40 51 34.1N Long: 75 53 49.6W
2BrC	Bear Creek, 100 meters upstream of mouth. Nesquehoning Borough, Carbon County Lat: 40 51 01.3N Long: 75 53 00.9W
1GMR	Grassy Meadow Run (04117), 75 meters upstream of Lake Drive. Nesquehoning Borough, Carbon County Lat: 40 50 41.7N Long: 75 54 53.4W

Table 3. Mahoning Creek Tributaries – Station Locations.

STATION	DESCRIPTION
1SC	Stewart Creek (04040), 150 meters upstream of Stewart Creek Road (T353). Mahoning Township, Carbon County Lat: 40 49 37.8N Long: 75 46 19.0W
2SC	Stewart Creek, 50 meters upstream of mouth. Mahoning Township, Carbon County Lat: 40 48 55.7N Long: 75 44 30.4W
1BeC	Bear Creek (04042), 150 meters upstream of State Route 3006. Mahoning Township, Carbon County Lat: 40 49 30.2N Long: 75 46 11.2W
1CR	Crooked Run (04041), 150 meters upstream of mouth. Mahoning Township, Carbon County Lat: 40 49 35.0N Long: 75 45 59.
1UMC	UNT Mahoning Creek (04055), 400 meters downstream of Twin Crest Drive (Township Route 381). Mahoning Township, Carbon County Lat: 40 48 54.4N Long: 75 48 17.

Table 3. Mahoning Creek Tributaries – Station Locations.

STATION	DESCRIPTION
2UMC	UNT Mahoning Creek (04055), 200 meters upstream of mouth. Mahoning Township, Carbon County Lat: 40 47 42.4N Long: 75 47 31.3W
3UMC	UNT Mahoning Creek (04060), 100 meters downstream of Township Route 377. Mahoning Township, Carbon County Lat: 40 48 17.1N Long: 75 49 30.3W
4UMC	UNT Mahoning Creek (04060), 50 meters upstream of mouth. Mahoning Township, Carbon County Lat: 40 47 27.6N Long: 75 48 00.9W
5UMC	UNT to UNT Mahoning Creek (04062), 800 meters upstream of confluence with UNT 04060. Mahoning Township, Carbon County Lat: 40 48 34.1N Long: 75 49 32.3W

Table 4. Wild Creek Reference – Station Location.

STATION	DESCRIPTION
R1	Wild Creek (03959) reference station, 50 meters upstream of State Route 1001. Penn Forest Township, Carbon County Lat: 40 56 24.7N Long: 75 35 6.5W

Bear Creek is a tributary to the Lehigh River located in Jim Thorpe and Penn Forest townships, Carbon County. Bear Creek is being evaluated from source to mouth. The Bear Creek basin is approximately 8.6 square miles; land cover is 87% forested, 4% urban and 9% transitional (USGS 2019). Development within this basin is confined to the upper portions of the watershed, situated around Bear Creek Lake. Approximately 25% of the watershed (1,500+ acres) is state managed land; 890 acres are managed by the Pennsylvania Game Commission (PGC) within State Game Lands (SGL) 141, and 617 acres

are managed by the Pennsylvania Department of Conservation and Natural Resources (DCNR) within the Lehigh Gorge State Park (Figure 1, Tables 1 - 4).

Tributaries to the Nesquehoning Creek evaluated were small first and second order basins, most no larger than 2.5 square miles. Jeans Run is the largest basin surveyed in the Nesquehoning watershed. Jeans Run is approximately 4.2 square miles, and almost entirely managed as SGL 141 (2496 acres); the lower reaches of Jeans Run are within Lehigh Gorge State Park (192 acres). The other small tributaries surveyed are largely forested (94% - 99% forested; Grassy Meadow Run and Broad Run respectively) (USGS 2019). Any development within these basins are confined to the lower limits of the confluences with Nesquehoning Creek to include small, urbanized areas (Figure 1, Tables 1 - 4). All tributaries are being evaluated from source to mouth and are within Nesquehoning Township, Carbon County.

Tributaries evaluated in the Mahoning Creek watershed were all small first and second order streams no larger than 4.0 square miles. UNT 04060 is the largest basin surveyed in the Mahoning Creek watershed, at approximately 4.0 square miles. Major land cover of these tributaries are forest and agriculture. Stewart Creek basin is comprised of 81% forested, 18% agricultural and 1% urban land cover. UNT 04055 basin is comprised of 75% forested, 24% agricultural and 1% urban land cover (USGS 2019). UNT 04060 basin is comprised of 96% forested and 4% agricultural land cover (Figure 1, Tables 1 - 4). All tributaries were evaluated from source to mouth and are within Mahoning Township, Carbon County.

WATER QUALITY

Biological

Since the indigenous aquatic community is a better indicator of long-term water quality conditions, biological data was collected to evaluate water quality conditions in the surveyed basins. A total of 19 candidate stations and one reference station were sampled (Figure 2, Tables 1 - 4).

Benthos

Benthic macroinvertebrate samples were collected at all stations using DEP benthic macroinvertebrate data collection protocols, which is a modification of the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (Plafkin et al. 1989, Barbour et al. 1999, Shull 2017). All stations except 2BC were collected in February 2005; station 2BC was collected in March 2005.

Stations surveyed support a diverse benthic macroinvertebrate population dominated by genera sensitive to pollution. Taxa richness at the candidate stations ranged from 21 – 31. Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (EPT) taxa with pollution tolerance values (PTV) 0 – 4 were numerous in each sample. EPT taxa richness ranged between 11 – 21; the ratio between EPT with PTV 0 – 4 and overall abundance was over 50% at most sites, with the exception of stations 2SC and 3UMC (Tables 5 and 6).

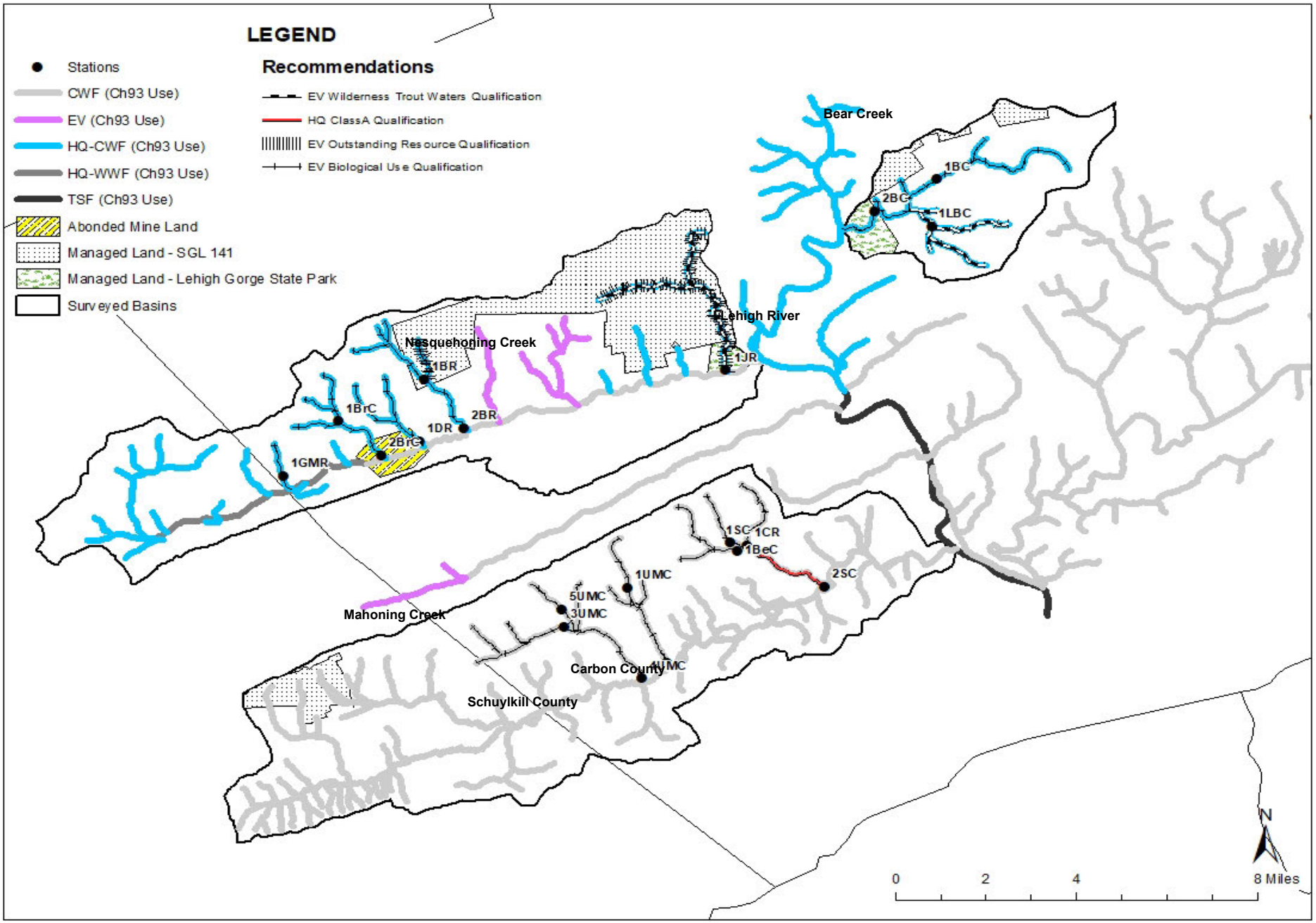


Figure 2. Middle Lehigh Tributaries – Redesignation Recommendations. Refer to Tables 1 - 4 for station location descriptions.

Table 5. Bear Creek and Nesquehoning Creek Tributaries –Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]										REF[2]
		1BC	2BC	1LBC	1JR	1BR	2BR	1DR	1BrC	2BrC	1GMR	R1
Ephemeroptera (Mayflies)												
Ameletidae	*Ameletus*	-	-	-	-	2	-	-	-	-	-	-
Baetidae	*Baetis*	8	17	7	10	14	31	31	24	10	12	19
Ephemerellidae	*Ephemerella*	9	13	4	2	12	2	15	1	4	-	14
	Eurylophella	-	-	-	-	-	-	-	-	-	2	-
	Serratella	-	-	-	-	-	-	2	-	-	-	7
Heptageniidae	*Cinygmula*	-	-	-	-	1	1	3	-	2	-	-
	Epeorus	13	32	9	11	10	84	13	12	32	21	11
	Stenacron	1	-	-	-	-	-	-	-	-	-	-
	Stenonema	-	1	2	2	3	1	6		3	2	16
Leptophlebiidae	*Paraleptophlebia*	13	13	4	-	12	1	15	5	3	-	11
Plecoptera (Stoneflies)												
Capnidae	*Paracapnia*	-	1	-	9	-	-	1	-	-	5	3
Chloroperlidae	*Sweltsa*	4	10	6	3	1	6	1	1	3	6	-
Leuctridae	*Leuctra*	8	13	56	49	21	2	11	17	8	37	4
Nemouridae	*Amphinemura*	-	6	14	29	17	2	2	9	7	10	1
Peltoperlidae	*Tallaperla*	1	2	10	9	2	-	2	9	3	6	6
Perlidae	*Acroneuria*	1	2	-	4	-	4	1	-	2	1	2
Perlodidae	*Isoperla*	4	2	4	2	6	5	10	6	1	5	5
	Malirekus	-	1	1	-	-	-	-	-	-	-	-
Pteronarcyidae	*Pteronarcys*	-	6	-	-	3	1	2	3	10	-	1
Taeniopterygidae	*Oemopteryx*	3	-	2	12	3	2	7	-	3	4	-
Tricoptera (Caddisflies)												
Brachycentridae	*Adicrophleps*	-	-	-	-	2	-	-	2	-	-	-
	Bracycentrus	1	-	1	-	-	-	-	-	-	-	4
Hydropsychidae	*Cheumatopsyche*	1	1	-	-	-	1	-	-	-	-	3

Table 5 (cont.). Bear Creek and Nesquehoning Creek Tributaries –Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]										REF[2]
		1BC	2BC	1LBC	1JR	1BR	2BR	1DR	1BrC	2BrC	1GMR	R1
	Diplectrona	5	9	-	8	9	14	17	-	17	5	3
	Hydropsyche	1	-	-	1	-	-	4	-	5	-	8
	Parapsyche	-	-	8	-	8	-	-	5	-	4	-
Hydroptilidae	*Hydroptila*	-	-	-	-	1	-	-	-	-	-	-
	Paleagapetus	2	-	-	-	8	-	-	11	-	1	-
Lepidostomatidae	*Lepidostoma*	1	1	1	4	1	-	1	-	-	-	3
Philopotamidae	*Dolophilodes*	4	5	4	1	3	13	5	5	9	7	11
Polycentropodidae	*Polycentropus*	-	1	-	-	-	-	-	-	-	-	1
Rhyacophilidae	*Rhyacophila*	1	7	20	5	11	4	8	16	7	5	7
Uenoidae	*Neophylax*	-	-	-	-	1	-	-	-	-	-	-
Coleoptera (Aquatic Beetles)												
Elmidae	*Optioservus*	-	1	1	-	2	-	-	4	-	-	-
	Oulimnius	3	2	-	-	-	1	6	-	3	-	5
	Promoresia	3	-	-	-	-	-	3	-	-	-	1
Psephenidae	*Ectopria*	-	-	-	-	-	-	1	-	1	-	-
Ptilodactylidae	*Anchytarsus*	-	-	-	-	-	-	-	-	-	-	7
Diptera (True Flies)												
Ceratopogonidae	*Probezzia*	2	-	-	-	-	-	-	1	-	-	-
Empididae	*Chelifera*	-	-	1	-	-	-	-	-	-	-	-
Empididae		-	-	-	-	-	-	-	-	-	1	-
Muscidae	*Limnophora*	1	-	-	-	-	-	-	-	-	-	-
Simuliidae	*Prosimulium*	89	21	3	3	22	14	19	22	42	31	11
	Stegopterna	-	-	-	-	-	-	-	-	-	-	2
Tipulidae	*Antocha*	1	-	-	-	-	1	-	-	-	-	-
	Dicranota	3	1	-	1	2	-	-	1	1	1	4
	Hexatoma	8	1	2	-	3	2	1	6	1	1	3
Chironomidae		39	57	57	50	49	46	34	63	47	65	36
Megaloptera (Dobson/ Fishflies)												
Corydalidae	*Nigronia*	-	-	-	-	-	-	-	-	-	-	2
Odonata (Dragon/ Damselflies)												
Gomphidae	*Lanthus*	1	2	2	1	3	-	-	2	-	1	1
Non-Insect Taxa												
Cambaridae	*Cambarus*	-	-	-	-	-	-	-	-	-	1	-
Crangonyctidae	*Crangonyx*	-	-	2	-	-	-	-	2	-	-	-
Hydracarina		-	-	-	-	-	-	-	1	-	-	-
Oligochaeta		2	-	-	-	-	-	-	-	1	-	-
Sphaeriidae	*Pisidium*	1	1	-	-	-	-	-	-	-	-	-
Total Richness		31	28	24	21	29	22	27	24	25	24	31
Total Organisms		234	229	221	216	232	238	221	228	225	234	212

[1]Refer to Figure 1 & Tables 1 - 2 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location

Table 6. Mahoning Creek Tributaries –Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]									REF[2]
		1SC	2SC	1BeC	1CR	1UMC	2UMC	3UMC	4UMC	5UMC	R1
Ephemeroptera (Mayflies)											
Baetidae	*Baetis*	17	51	36	45	24	34	30	45	23	19
Ephemerellidae	*Attenella*	-	-	-	-	-	3	-	-	-	-
	Ephemerella	61	13	11	5	13	37	34	32	10	14
	Eurylophella	-	2	-	-	1	-	-	-	-	-
	Serratella	-	-	-	-	-	-	3	4	-	7
Heptageniidae	*Cinygmula*	5	-	2	6	4	1	-	-	1	-
	Epeorus	1	3	21	17	3	9	7	26	1	11
	Stenacron	-	-	2	-	-	-	-	-	-	-
	Stenonema	-	4	5	8	2	2	4	18	-	16
Isonychiidae	*Isonychia*	-	-	-	-	1	3	-	2	-	-
Leptophlebiidae	*Paraleptophlebia*	16	1	29	21	36	7	10	8	27	11
Plecoptera (Stoneflies)											
Capnidae	*Paracapnia*	-	-	4	2	-	-	-	2	4	3
Chloroperlidae	*Sweltsa*	1	-	2	1	-	2	1	2	1	-
Leuctridae	*Leuctra*	7	1	8	12	12	1	3	1	12	4
Nemouridae	*Amphinemura*	6	-	1	6	33	-	-	-	9	1
	Prostoia	-	2	-	-	-	-	-	2	-	-
Peltoperlidae	*Tallaperla*	13	-	8	6	11	1	4	-	4	6
Perlidae	*Acroneuria*	-	-	1	1	-	-	-	4	-	2
	Paragnetina	-	-	-	-	-	-	-	1	-	-
Perlodidae	*Alloperla*	-	-	-	-	-	-	3	-	-	-
	Isoperla	16	-	3	11	5	6	9	4	6	5
	Remenus	-	-	-	-	1	-	-	-	-	-
Pteronarcyidae	*Pteronarcys*	-	4	-	2	1	-	-	1	3	1
Taenioptergidae	*Oemopteryx*	1	-	-	1	-	-	-	1	-	-
	Taeniopteryx	-	-	-	-	-	-	-	-	-	-

[1] Refer to Figure 1 & Table 3 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location

Table 6 (cont.). Mahoning Creek Tributaries –Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]									REF[2]
		1SC	2SC	1BeC	1CR	1UMC	2UMC	3UMC	4UMC	5UMC	R1
Tricoptera (Caddisflies)											
Brachycentridae	*Brachycentrus*	1	-	-	-	-	-	2	-	-	4
	Micrasema	-	-	-	-	-	-	-	-	2	-
Hydropsychidae	*Cheumatopsyche*	-	6	-	-	-	8	-	2	-	3
	Diplectrona	11	4	27	28	25	15	19	-	25	3
	Hydropsyche	-	6	1	2	-	4	2	7	-	8
	Parapsyche	1	-	-	-	-	-	-	-	-	-
Hydroptilidae	*Hydroptila*	-	-	-	-	1	1	-	-	-	-
	Paleagapetus	-	-	-	-	3	-	-	-	-	-
Lepidostomatidae	*Lepidostoma*	-	-	-	-	1	-	-	-	-	3
Limnephilidae	*Hydatophylax*	1	-	-	-	-	-	-	-	-	-
	Pycnopsyche	2	-	-	-	-	-	-	-	-	-
Philopotamidae	*Dolophilodes*	1	4	5	7	3	6	1	10	12	11
Polycentropodidae	*Polycentropus*	-	-	-	-	-	-	-	-	-	1
Rhyacophilidae	*Rhyacophila*	6	6	6	5	3	4	4	4	5	7
Coleoptera (Aquatic Beetles)											
Elmidae	*Optioservus*	1	3	1	-	-	1	6	5	1	-
	Oulimnius	5	6	3	2	5	1	4	9	-	5
	Promoresia	-	1	-	1	-	17	6	-	1	1
	Stenelmis	-	-	-	-	-	-	1	-	-	-
Psephenidae	*Ectopria*	-	1	-	-	-	-	1	2	-	-
	Psephenus	-	2	-	-	-	-	-	1	-	-
Ptilodactylidae	*Anchytarsus*	-	-	-	-	-	1	1	-	-	7
Diptera (True Flies)											
Ceratopogonidae	*Probezzia*	-	-	-	1	-	-	-	-	1	-
Chironomidae		36	43	27	25	37	21	32	27	57	36
Empididae	*Chelifera*	2	-	-	-	-	-	-	-	1	-
	Hemerodromia	-	-	-	-	-	1	-	-	-	-
Psychodidae	*Pericoma*	-	-	-	1	-	-	-	-	-	-
Simuliidae	*Prosimulium*	-	64	18	7	-	22	5	4	2	11
	Simulium	-	-	-	1	-	-	3	-	1	-
	Stegopterna	-	2	-	-	2	2	-	-	-	2
Tabanidae	*Chrysops*	-	-	-	-	-	-	-	1	-	-
Tipulidae	*Antocha*	-	2	-	-	1	-	2	1	-	-
	Dicranota	2	4	1	2	2	1	10	6	4	4
	Hexatoma	-	-	2	2	-	-	3	-	4	3
	Tipula	-	-	1	1	-	-	1	-	-	-

[1] Refer to Figure 1 & Table 3 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location

Table 6 (cont.). Mahoning Creek Tributaries –Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]									REF[2]
		1SC	2SC	1BeC	1CR	1UMC	2UMC	3UMC	4UMC	5UMC	R1
Megaloptera (Dobson/ Fishflies)											
Corydalidae	*Nigronia*	-	-	-	-	-	-	1	1	-	2
Odonata (Dragon/ Damselflies)											
Gomphidae	*Lanthus*	-	-	-	1	1	1	-	-	2	1
Non-Insect Taxa											
Cambaridae	*Cambarus*	1	-	-	2	-	-	-	-	-	-
Hydracarina		-	-	-	-	1	-	-	-	-	-
Oligochaeta		-	-	-	-	-	-	2	-	-	-
Total Richness		24	24	25	31	27	28	31	30	26	31
Total Organisms		214	235	225	232	232	212	214	233	219	212

[1] Refer to Figure 1 & Table 3 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location

Discrete Physicochemical

No discrete water chemistry samples were collected as part of the 2005 sampling effort. However, in-situ field chemistry data was collected. Specific conductance was low at all sites; values ranged from 8.2 to 69.8 µS/cm[C]. Measurements of pH were near neutral at each station; dissolved oxygen concentrations were consistent amongst the stations ranging from 9.02 to 10.73 mg/L (Table 7). Follow-up water chemistry data, collected in 2019, is provided as an Appendix (Appendix B).

Table 7. Middle Lehigh Tributaries Survey – In-situ Field Chemistry Results.

FIELD PARAMETER	UNITS	STATIONS[1]				
		1BC	**2BC**	**1LBC**	**1JR**	**1BR**
TEMPERATURE	°C	2.5	2.1	5	4.5	5.9
SPECFIC COND	umhos/cm	26.3	17.9	14.6	13.6	9.1
pH	pH units	6.9	6.9	7	6.9	6.9
DISS. OXYGEN	mg/L	10.73	9.93	9.96	10.14	9.52
		STATIONS[1]				
		1SC	**2SC**	**1BeC**	**1CR**	**1UMC**
TEMPERATURE	°C	7.4	5.9	5.8	6.3	7.1
SPECFIC COND	umhos/cm	16.8	39.6	18.1	25	18.5
pH	pH units	7	7	6.9	7	7
DISS. OXYGEN	mg/L	9.24	9.55	9.42	9.29	9.29
		STATIONS[1]				
		2BR	**1DR**	**1BrC**	**2BrC**	**1GMR**
TEMPERATURE	°C	4.2	3.7	6.6	5.6	4.7
SPECFIC COND	umhos/cm	12	9	8.2	9.4	8.3
pH	pH units	6.9	7	7.1	6.9	7.1
DISS. OXYGEN	mg/L	9.44	10.4	9.49	9.85	10.07
		STATIONS[1]				
		2UMC	**3UMC**	**4UMC**	**5UMC**	**R1**
TEMPERATURE	°C	3.3	7.4	6.9	6.9	3.1
SPECFIC COND	umhos/cm	26.8	42.2	69.8	40.9	36.3
pH	pH units	7	7.1	7.1	7.1	7
DISS. OXYGEN	mg/L	10.68	9.02	9.72	9.2	10.7

[1] Refer to Figure 1 & Tables 1 - 4 for station locations

Physical

Instream habitat was surveyed at each station where benthic macroinvertebrates were sampled (Table 8). The habitat evaluation consists of rating twelve parameters to derive a station habitat score. The total habitat scores ranged from 163 (3UMC) to 232 (2SC). An optimal score (≥192) was observed at all stations except 2SC and 3UMC which scored in the suboptimal category (132 – 180). Suboptimal scores at 2SC and 3UMC were a result of low scores in the instream fish cover, embeddedness, velocity depth regimes and sediment deposition categories.

Table 8. Habitat Evaluation Data.

PARAMETER	STATIONS[1]					
	1BC	2BC	1LBC	1JR	1BR	2BR
1. INSTREAM COVER	19	20	16	19	16	16
2. EPIFAUNAL SUBSTRATE	19	19	18	19	18	18
3. EMBEDDEDNESS	15	18	16	19	18	19
4. VELOCITY/DEPTH	18	19	13	17	16	12
5. CHANNEL ALTERATIONS	20	20	20	20	20	18
6. SEDIMENT DEPOSITION	13	19	18	19	18	18
7. RIFFLE FREQUENCY	19	19	19	19	19	18
8. CHANNEL FLOW STATUS	18	18	18	18	16	17
9. BANK CONDITION	19	20	20	19	19	11
10. BANK VEGETATION PROTECTION	20	20	20	20	20	15
11. GRAZING/DISRUPTIVE PRESSURES	20	20	20	20	20	16
12. RIPARIAN VEGETATION ZONE WIDTH	20	20	20	20	20	14
Total Score	220	232	218	229	220	192
Rating[3]	OPT	OPT	OPT	OPT	OPT	OPT

[1] Refer to Figure 1 & Tables 1 - 4 for station locations
[3] OPT=Optimal (≥192); SUB=Suboptimal (132-192)

Table 8 (cont.). Habitat Evaluation Data.

PARAMETER	STATIONS[1]													REF[2]
	1DR	1BrC	2BrC	1GMR	1SC	2SC	1BeC	1CR	1UMC	2UMC	3UMC	4UMC	5UMC	R1
1. INSTREAM COVER	17	18	17	15	13	14	16	16	14	15	13	16	15	19
2. EPIFAUNAL SUBSTRATE	18	18	18	17	15	15	17	17	17	16	15	18	16	19
3. EMBEDDEDNESS	17	18	18	17	13	12	17	16	14	15	12	16	14	18
4. VELOCITY/DEPTH	16	16	14	12	10	16	14	13	13	16	13	16	12	18
5. CHANNEL ALTERATIONS	20	20	16	20	20	20	20	20	19	19	18	15	16	20
6. SEDIMENT DEPOSITION	17	18	17	18	13	12	15	13	12	13	10	14	12	18
7. RIFFLE FREQUENCY	19	19	19	18	17	16	17	18	18	17	15	18	17	19
8. CHANNEL FLOW STATUS	16	17	18	17	16	19	18	16	17	17	19	19	16	19
9. BANK CONDITION	18	20	17	16	19	16	19	16	19	12	13	16	18	19
10. BANK VEGETATION PROTECTION	19	20	19	18	18	15	18	19	19	18	14	17	18	20
11. GRAZING/DIS. PRESSURES	17	20	15	15	19	15	18	20	20	15	11	14	19	20
12. RIP. VEG. ZONE WIDTH	14	20	13	14	19	15	18	20	19	14	10	11	17	20
Total Score	208	224	201	197	192	185	207	204	201	187	163	190	190	229
Rating[3]	OPT	OPT	OPT	OPT	OPT	SUB	OPT	OPT	OPT	OPT	SUB	OPT	OPT	OPT

[1] Refer to Figure 1 & Tables 1 - 4 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location
[3] OPT=Optimal (≥192); SUB=Suboptimal (132-192)

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 surveyed basins. Selected benthic macroinvertebrate community metrics calculated for the basin stations evaluated were compared to a station on Wild Creek in Carbon County. Wild Creek was chosen as an Exceptional Value Waters (EV) reference because it has demonstrated an existing use of EV based on biological measures and the macroinvertebrate community has demonstrated best attainable biological communities. Wild Creek has a comparable drainage area, is found in similar geologic settings as the candidate stations, has optimal habitat and has similar gradient, pH and alkalinity to the candidate stream stations (DEP 2013). 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 (Tables 9 and 10).

Based on these five metrics, the following candidate surface waters exceeded the EV qualifying criterion of 92% (§ 93.4b(b)(1)(v)):

- Bear Creek (04123) basin (1BC, 2BC, and 1LBC);
- Broad Run basin (1BR and 2BR);
- Dennison Run basin (1DR);
- Bear Creek (04115) basin (1BrC and 2BrC);
- Grassy Meadow Run basin (1GMR);
- Stewart Creek basin (1SC);
- Bear Creek (04042) basin (1BeC);
- Crooked Run basin (1CR);
- UNT 04055 basin (1UMC and 2UMC);
- UNT 04060 basin (3UMC and 4UMC);
- UNT 04062 basin (5UMC)

A total of 37.2 stream miles qualify as EV under this criterion.

CLASS A WILD TROUT – HIGH QUALITY QUALIFICATION

The DEP is required by regulation, 25 Pa. Code § 93.4b(a)(2)(ii) [See Appendix A[1]], to consider streams for High Quality Waters (HQ) designation when the Pennsylvania Fish and Boat Commission (PFBC) submits information that indicates a stream is a Class A Wild Trout stream based on wild trout biomass. DEP staff conducted an independent review of the trout biomass data along with a review of the surface water's basic use attainability and water quality requirements. Stewart Creek from the confluence with Crooked Run to its mouth was identified as being a Class A Wild Trout stream based on Wild Brown Trout biomass criteria found during surveys completed by the PFBC in 2013. Stewart Creek, from Crooked Run to the mouth, was surveyed under the Unassessed Waters Program. The survey estimated Wild Brown Trout biomass to be 88.08 kg/ha; this is above the minimum total Brown Trout biomass criteria (40 kg/ha) (Arnold, 2015) found at 58 Pa. Code § 57.8a. The PFBC submitted notice

to list Stewart Creek as Class A and sought public response in the *Pennsylvania Bulletin* on July 18, 2015 (45 Pa.B. 3946). Based on this review station 2SC qualifies for HQ designation.

A total of 2.0 stream miles qualify as HQ under this criterion.

Table 9. Bear Creek and Nesquehoning Creek Tributaries – Benthic Macroinvertebrate Metric Comparison.

METRIC	STATIONS[1]										REF[2]
	1BC	2BC	1LBC	1JR	1BR	2BR	1DR	1BrC	2BrC	1GMR	R1
1. TAXA RICHNESS	31	28	24	21	29	22	27	24	25	24	31
Cand/Ref (%)	100	90	77	68	94	71	87	77	81	77	
Biol. Cond. Score	8	8	7	3	8	5	8	7	8	7	8
2. MOD. EPT INDEX	16	17	16	15	21	15	19	14	16	16	17
Cand/Ref (%)	94	100	94	88	124	88	112	82	94	94	
Biol. Cond. Score	8	8	8	8	8	8	8	8	8	8	8
3. MOD. HBI	2.65	2.61	2.33	2.46	2.57	2.27	2.73	3.09	2.41	2.66	2.99
Cand-Ref	-0.34	-0.38	-0.66	-0.53	-0.42	-0.72	-0.26	0.10	-0.58	-0.33	
Biol. Cond. Score	8	8	8	8	8	8	8	8	8	8	8
4. % DOMINANT TAXON	38	24.9	25.8	23.1	21.1	35.3	15.4	27.6	20.9	27.8	17
Cand-Ref	21	7.9	8.8	6.1	4.1	18.3	-1.6	10.6	3.9	10.8	
Biol. Cond. Score	**8**[3]	8	8	8	8	**8**[3]	8	8	8	8	8
5. % MOD. MAYFLIES	15.4	25.8	8.6	6.9	17.2	37.4	24.4	7.9	19.6	10.7	27.8
Ref-Cand	12.4	2	19.2	20.9	10.6	-9.6	3.4	19.9	8.2	17.1	
Biol. Cond. Score	7	8	6	5	8	8	8	6	8	6	8
TOTAL BIOLOGICAL CONDITION SCORE	39	40	37	32	40	37	40	37	40	37	40
% COMPARABILITY TO REFERENCE	98	100	93	80	100	93	100	93	100	93	

[1] Refer to Figure 1 & Tables 1 - 2 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location
[3] Dominant Taxa with PTV ≤ 3

Table 10. Mahoning Creek Tributaries – Benthic Macroinvertebrate Metric Comparison

METRIC	STATIONS[1]									REF[2]
	1SC	2SC	1BeC	1CR	1UMC	2UMC	3UMC	4UMC	5UMC	R1
1. TAXA RICHNESS	24	24	25	31	27	28	31	30	26	31
Cand/Ref (%)	77	77	81	100	87	90	100	97	84	
Biol. Cond. Score	7	7	8	8	8	8	8	8	8	8
2. MOD. EPT INDEX	17	11	16	17	18	14	14	17	15	17
Cand/Ref (%)	100	65	94	100	106	82	82	100	88	
Biol. Cond. Score	8	4	8	8	8	8	8	8	8	8
3. MOD. HBI	2.44	3.78	2.37	2.63	2.65	2.85	2.97	3.12	2.87	2.99
Cand-Ref	-0.55	0.79	-0.62	-0.36	-0.34	-0.14	-0.02	0.13	-0.12	
Biol. Cond. Score	8	7	8	8	8	8	8	8	8	8
4. % DOMINANT TAXON	28.5	27.2	16	19.4	15.9	17.5	15.9	19.3	26	17
Cand-Ref	11.5	10.2	-1	2.4	-1.1	0.5	-1.1	2.3	9	
Biol. Cond. Score	**8**[3]	8	8	8	8	**8**[3]	**8**[3]	8	8	8
5. % MOD. MAYFLIES	38.8	9.8	31.1	24.6	25.9	29.2	27.1	38.6	17.8	27.8
Ref-Cand	-11	18	-3.3	3.2	1.9	-1.4	0.7	-10.8	10	
Biol. Cond. Score	8	6	8	8	8	8	8	8	8	8
TOTAL BIOLOGICAL CONDITION SCORE	39	32	40	40	40	40	40	40	40	40
% COMPARABILITY TO REFERENCE	98	80	100	100	100	100	100	100	100	

[1] Refer to Figure 1 & Table 3 for station locations
[2] Reference (REF) Station – Refer to Table 4 for location
[3] Dominant Taxa with PTV ≤ 3

ADDITIONAL EXCEPTIONAL VALUE WATERS QUALIFYING CRITERIA

The DEP considered the evaluation of candidate stations for additional EV qualifying criteria under § 93.4b(b). Those criteria considered are as follows:

A. The water is an outstanding National, State, regional or local resource water [§ 93.4b(b)(1)(iii) – see Appendix A[2]];

B. The water is a surface water of exceptional recreational significance [§ 93.4b(b)(1)(iv) – see Appendix A[3]].

C. The water is designated as a "wilderness trout stream" by the Fish and Boat Commission following public notice and comment [§ 93.4b(b)(1)(vi) – see Appendix A[4]].

Streams within the surveyed basins that satisfy these EV qualifying criteria are discussed below:

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 are currently designated HQ. 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[5]). 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 Jeans Run basin and UNT 04112 to Broad Run as described below.

Outstanding State Resource Waters

The DEP evaluated water quality protective measures developed by the 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 qualifying 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.

Due to SGL 141 encompassing approximately 93% of the Jeans Run basin, the DEP evaluated criteria listed in § 93.4b(b)(1)(iii). 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 141 are situated along watershed corridors in a manner that provides protection to substantial reaches of the corridor within the Jeans Run basin. While portions of Broad Run are contained within SGL 141, SGL 141 lands are not situated along the Broad Run mainstem corridor in a manner that provides protection to substantial reaches of the corridor. Broad

Run mainstem does not qualify for EV designation under this criterion. UNT 04112 to Broad Run, however, is contained completely within SGL 141 where substantial reaches of the UNT are along a watershed corridor in a manner that provides protection to the stream reach; this qualifies UNT 04112 for EV designation under § 93.4b(b)(1)(iii), **"**outstanding National, State, regional or local resource waters".

The DEP evaluated water quality protective measures developed by the DCNR in the Lehigh Gorge State Park Resource Management Plan (RMP). Specifically, "coordinated water quality protective measures" were considered (See Appendix A[5]). While general statewide objectives to include the review of any new development within park boundaries to ensure no significant adverse impacts, no objectives listed specifically address watershed corridor protections. In addition, the RMP describes objectives to protect, maintain and conserve fisheries, aquatic life and water uses; however, none address the protection of specific watershed corridors in a manner that meets water quality protective measures. Therefore, no recommendations are given as it relates to management objectives provided in the RMP.

The DEP further evaluated specific management prescriptions for all management units in Lehigh Gorge State Park. Strategies and prescriptions do not address water quality protective measures specifically but rather describe strategies for vegetation, wildlife and use areas. Management units are built around the sections of the Lehigh River within the park except for the Jeans Run Low Density Management Unit; this management unit incorporates the lower reaches of Jeans Run. The prescription for the Jeans Run Management Unit describes that vegetation shall be left undisturbed to allow for natural succession. The use of natural succession would provide water quality protective measures for watershed corridors of Jeans Run and would qualify the basin for EV designation under this criterion.

A total of 5.8 stream miles qualify as EV under this Outstanding State Resource Waters criterion.

<u>Outstanding Local Resource Waters</u>

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 such protective measures within the basins surveyed.

The water is a surface water of exceptional recreational significance [§ 93.4b(b)(1)(iv) – see Appendix A[3]].

The "exceptional recreational significance" EV criterion described at 25 Pa. Code § 93.4b(b)(1)(iv) may be applied to the petitioned waters since they are currently designated HQ. A significant portion of the lower Bear Creek (04123) basin and the lower reaches of Jeans Run are contained within Lehigh Gorge

State Park and SGL 441. While Lehigh Gorge State Park and SGL 441 offer recreational opportunities of whitewater rafting, waterfall hikes, scenic overlooks and fishing and hunting opportunities within managed boundaries, these activities are common in Pennsylvania where such opportunities are universal across the State. No recommendations are given as it relates to this qualification.

The water is designated as a "wilderness trout stream" by the Fish and Boat Commission following public notice and comment [§ 93.4b(b)(1)(vi) – see Appendix A[4]]

The "wilderness trout stream" EV criterion described at 25 Pa. Code § 93.4b(b)(1)(vi) may be applied to the petitioned waters since they are currently designated HQ. Of the streams surveyed Little Bear Creek, source to mouth is classified a Wilderness Trout, Class A Wild Trout stream. Little Bear Creek was surveyed by the PFBC in 1970 where staff found an excellent population of Wild Brook Trout, last stocked in 1935, with no determination that this stream qualifies for future stockings. The Little Bear Creek basin is mostly forested with limited accessibility as is characterized by the Wilderness Trout Stream PFBC classification (Reed and Hoopes 1970). Jeans Run is classified as a Wilderness Trout Stream based on the Class B Wild Trout stream classification and the limited accessibility due to the remoteness of Jeans Run being situated almost entirely within SGL 441. Two surveys were conducted on Jeans Run in 1992 and 1993 which resulted in Wild Brook Trout biomasses of 28.84 kg/ha and 28.35 kg/ha respectively (Arnold and Bourke 1994). Based on PFBC Wilderness Trout classifications of Little Bear Creek and Jeans Run, natural reproduction of trout demonstrations, and an independent review of the data these basins qualify for EV designation under the wilderness trout stream criterion.

A total of 8.7 stream miles qualify as EV under this criterion.

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this stream redesignation evaluation and requested any technical data from the general public through publication in the *Pennsylvania Bulletin* on November 17, 2018 (48 Pa.B. 7265). Jim Thorpe, Penn Forest, Nesquehoning, and Mahoning townships, Trout Unlimited, the Delaware RiverKeeper Network (DRN), the Delaware River Basin Commission and the Carbon County Office of Planning and Development as well as the Carbon Conservation District were notified of the redesignation evaluation in a letter dated October 19, 2018. In addition, a notification was posted on the DEP's website. In response to the *Pennsylvania Bulletin* Notice, the DEP received a letter of support from the DRN. Within DRN's letter of support, it was further recommended a review of additional EV qualifying criteria from Chapter 93.4b in which this report addresses above. No additional data on water chemistry, instream habitat or the aquatic community were received in response to these notices.

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, Trout Unlimited, the DRN, and the Delaware River Basin Commission in a letter dated December 14, 2020 with a public comment period ending 30-days later. In addition, the DEP provided notice in the *Pennsylvania Bulletin* on November 14, 2020 (50

Pa. B. 6468) that the draft report was available for public comment. It was requested through public comment that the comment period for the draft report be extended; the DEP granted the request and extended the comment period for another 60-days in a letter dated December 14, 2020. The public comment period for the draft report ended on February 12, 2021. The DEP received 471 letters in support of the recommendations in the draft report. Support came from citizens, Penn Future, DRN, Clean Air Council, Audubon Pennsylvania, Trout Unlimited, North Pocono CARE, Theodore Roosevelt Conservation Partnership, Backcountry Hunters and Anglers, Pennsylvania Federation of Sportsmen and Conservationists, the Izaak Walton League (Pennsylvania Division), United Bowhunters of Pennsylvania, Ruffed Grouse Society/American Woodcock Society, and American Sportfishers Association. Additionally, the DRN and Clean Air Council provided critical comments for DEP consideration. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATION

Based on applicable regulatory definitions and requirements of § 93.4b(b)(1)(v) (the DEP's integrated benthic macroinvertebrate scoring test) the DEP recommends that:

- Bear Creek (04123) basin from source to mouth be redesignated EV;
- Broad Run basin from source to mouth be redesignated EV;
- Dennison Run from source to mouth be redesignated EV;
- Bear Creek (04115) from source to mouth be redesignated EV;
- Grassy Meadow Run from source to mouth be redesignated EV;
- Stewart Creek from source to Crooked Run to include direct tributaries Bear Creek (04042) and Crooked Run be redesignated EV;
- UNT 04055 from source to mouth be redesignated EV; and
- UNT 04060 from source to mouth to include direct tributary UNT 04062 be redesignated EV

The DEP additionally recommends, Little Bear Creek, mainstem, source to mouth be redesigned EV based on § 93.4b(b)(1)(vi) (wilderness trout water qualifiers).

The DEP further recommends Jeans Run from source to mouth and UNT 04112 to Broad Run source to mouth be redesigned EV based on § 93.4b(b)(1)(iii and vi) (outstanding State resource waters and wilderness trout water qualifiers).

Based on applicable regulatory definitions and requirements of § 93.4b(a)(2)(ii) (the Class A wild trout HQ qualifier), the DEP recommends Stewart Creek from the confluence with Crooked Run to its mouth be redesignated HQ-CWF (Figure 2).

This recommendation adds approximately 45.6 stream miles with the designation of EV and 2.0 stream miles with the designation of HQ-CWF to Chapter 93.

LITERATURE CITED

Arnold, D. A. 2015. Stewart Creek (02B) Section 02 fisheries management report. Pennsylvania Fish and Boat Commission. Bellefonte, PA.

Arnold, D. A. and Bourke, D. E. 1994. Jeans Run (502B) Section 01 fisheries management report. Pennsylvania Fish and Boat Commission. Bellefonte, PA.

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

DEP. 2013. Water quality antidegradation implementation guidance. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania. http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=7842&DocName=WATER%20QUALITY%20ANTIDEGRADATION%20IMPLEMENTATION%20GUIDANCE.PDF%20

Plafkin, J. L., Barbour, M. T., Porter, K. D., Gross, S. K., Hughes, R. M. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001.

Reed, J. and Hoopes, R. 1970. Stream survey report Little Bear Creek. Pennsylvania Fish and Boat Commission. Bellefonte, Pennsylvania.

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.

U.S. Geological Survey, 2019, The StreamStats program, online at https://streamstats.usgs.gov/ss/, accessed on (unknown date).

APPENDIX A - DEFINITIONS

[1]Definition at 25 Pa. Code § 93.1: Class A wild trout water—A surface water classified by the Fish and Boat Commission, based on species-specific biomass standards, which supports a population of naturally produced trout of sufficient size and abundance to support long-term and rewarding sport fishery.

[2]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[5]" along a watershed corridor.

[3]Definition at 25 Pa. Code § 93.1: Surface water of exceptional recreational significance—A surface water which provides a water-based, water quality-dependent recreational opportunity (such as fishing for species with limited distribution) because there are only a number of naturally occurring areas and waterbodies across the State where the activity is available or feasible.

[4]Definition at 25 Pa. Code § 93.1: Wilderness Trout Stream— A surface water designated by the Fish and Boat Commission to protect and promote native trout fisheries and maintain and enhance wilderness aesthetics and ecological requirements necessary for the natural reproduction of trout.

[5]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.

APPENDIX B – PHYSICOCHEMICAL DATA

Table B1. 2019 Water Chemistry Data Collected June 2019. Results indicate that the stations considered in the 2005 stream evaluation survey have low concentrations of surface water constituents.

	PARAMETER	UNITS	STATIONS[1]												
			1BC	2BC	1LBC	1JR	1BR	2BR	1DR	1BrC	2BrC	1GMR	1SC	2SC	1BeC
METALS	ALUMINUM D	ug/L	13	20	24	82	< 10	< 10	< 10	11	< 10	14	< 10	< 10	10
	ALUMINUM T	ug/L	39	84	31	105	17	65	100	20	51	37	90	83	101
	BARIUM T	ug/L	16	18	22	< 10	< 10	13	12	< 10	10	13	26	15	14
	BORON T	ug/L	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
	IRON D	ug/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
	IRON T	ug/L	158	< 100	< 100	105	< 100	< 100	121	< 100	< 100	< 100	216	234	262
	LITHIUM T	ug/L	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25
	MANGANESE D	ug/L	12	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	MANGANESE T	ug/L	51	28	11	13	< 10	17	18	< 10	12	< 10	13	16	24
	NICKEL D	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	NICKEL T	ug/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
	STRONTIUM T	ug/L	16	< 10	11	< 10	< 10	12	10	< 10	< 10	< 10	21	22	13
	CHLORIDE T	mg/L	12	4	8	4	1	1	1	1	1	1	11	5	1
	ZINC D	ug/L	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	ZINC T	ug/L	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	41	< 30	< 30	< 30
	CALCIUM T	mg/L	2.8	1.3	1.4	0.7	1	1.5	1.5	0.8	1.1	0.6	3.9	4	2.6
	MAGNESIUM T	mg/L	1	0.8	1	0.4	0.5	0.6	0.6	0.5	0.6	0.5	1.9	1.8	1.2
	COPPER D	ug/L	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
	COPPER T	ug/L	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
	CADMIUM D	ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	LEAD D	ug/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	LEAD T	ug/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	BROMIDE	ug/L	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25
	POTASSIUM T	mg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	SELENIUM T	ug/L	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
	SODIUM T	mg/L	6.17	2.44	3.15	2.37	0.61	0.62	0.59	0.56	0.55	0.51	5.03	5.58	2.86
	SULFATE T	mg/L	1.46	2.7	3.2	1.4	2.63	2.9	3.04	2.07	2.69	3.32	1.82	7.26	3.89

[1] Refer to Figure 1 & Tables 1 - 3 for station locations
< indicate concentration below the reporting limit

Table B1 (cont.). 2019 Water Chemistry Data Collected June 2019.

	PARAMETER	UNITS	STATIONS[1]												
			1BC	2BC	1LBC	1JR	1BR	2BR	1DR	1BrC	2BrC	1GMR	1SC	2SC	1BeC
NUTRIENTS	AMMONIA D	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.024	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.04
	AMMONIA T	mg/L	0.03	< 0.02	< 0.02	< 0.02	0.02	0.29	0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02
	NITRATE & NITRITE D	mg/L	0.3	0.24	0.25	0.1	< 0.05	< 0.05	0.07	0.05	< 0.05	< 0.05	0.84	0.82	0.24
	ORTHO PHOSPHORUS D	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	0.012	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.013	0.016	< 0.01
	NITROGEN D	mg/L	0.401	0.327	0.299	0.215	< 0.1057	0.149	< 0.1057	0.117	0.134	< 0.1057	0.85	0.846	0.28
	PHOSPHORUS D	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.011	0.019	< 0.01
	NITRATE & NITRITE T	mg/L	0.3	0.25	0.24	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	0.84	0.81	0.24
	NITROGEN T	mg/L	0.4	0.3	0.27	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	0.86	0.88	0.32
	ORTHO PHOSPHORUS T	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.016	< 0.01
	PHOSPHORUS T	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.011	0.014	0.024	0.014
PHYSICAL/OTHER	HARDNESS T	mg/L	11	6	7	4	4	6	6	4	5	4	18	17	11
	OSMOTIC PRESSURE	mos/kg	< 1	< 1	< 1	< 1	1	1	1	1	< 1	< 1	2	1	1
	TDS	mg/L	50	30	26	26	16	22	26	20	20	28	46	50	32
	TSS	mg/L	< 5	8	< 5	< 5	< 5	< 5	12	< 5	< 5	< 5	8	6	10
	ALKALINITY	mg/L	6.4	2.4	2.6	1.8	3.4	4	3.4	3.8	3.8	0.8	8.8	10.4	7.8
	SPECIFIC COND	µS/cm	59.1	29.2	36.4	21.7	14.8	17.6	18.2	13.4	15.8	13.1	67.9	69.2	40.2
	pH	pH units	6.8	6.6	6.7	6.1	6.8	6.7	6.6	6.9	6.9	6	6.7	6.9	6.8
	TOC	mg/L	1.31	0.62	0.57	1.92	< 0.5	0.71	0.61	< 0.5	< 0.5	0.52	0.54	0.82	0.69
FIELD	TEMPERATURE	°C	15.7	13.1	12.5	13.4	11.7	15.7	12.8	11.4	11.9	12.1	12.9	15	14
	SPECIFIC COND	µS/cm	59.7	30	37	22.1	15.1	18.3	18.6	13.6	16.1	13.5	69.2	70.5	41.2
	PH	pH units	6.54	6.41	5.94	5.96	6.42	6.62	6.16	6.35	6.05	NA	6.66	6.84	6.79
	DISS OXYGEN	mg/L	9.1	9.8	9.8	9.9	9.9	9.4	9.8	10.3	10.1	10	10.1	10.2	10
	DISS OXYGEN	%	91.3	NA	92.3	94.9	91.2	94.2	92.6	94.2	93.2	92.7	95.7	100.8	96.7

[1] Refer to Figure 1 & Tables 1 - 3 for station locations
< indicate concentration below the reporting limit

Table B1 (cont.). 2019 Water Chemistry Data Collected June 2019.

	PARAMETER	UNITS	STATIONS[1]					REF[2]
			1CR	1UMC	3UMC	4UMC	5UMC	R1
METALS	ALUMINUM D	ug/L	14	< 10	< 10	< 10	< 10	25
	ALUMINUM T	ug/L	217	49	30	46	17	62
	BARIUM T	ug/L	17	16	29	26	16	14
	BORON T	ug/L	< 200	< 200	< 200	< 200	< 200	< 200
	IRON D	ug/L	< 100	< 100	< 100	246	< 100	< 100
	IRON T	ug/L	408	117	130	344	< 100	128
	LITHIUM T	ug/L	< 25	< 25	< 25	< 25	< 25	< 25
	MANGANESE D	ug/L	< 10	< 10	< 10	11	< 10	< 10
	MANGANESE T	ug/L	32	10	< 10	18	< 10	30
	NICKEL D	ug/L	< 50	< 50	< 50	< 50	< 50	< 50
	NICKEL T	ug/L	< 50	< 50	< 50	< 50	< 50	< 50
	STRONTIUM T	ug/L	14	12	25	34	10	11
	CHLORIDE T	mg/L	7	40	5	11	6	19
	ZINC D	ug/L	< 30	< 30	< 30	< 30	< 30	< 30
	ZINC T	ug/L	< 30	< 30	< 30	< 30	< 30	< 30
	CALCIUM T	mg/L	2.7	2.7	4.4	5.2	2	2.3
	MAGNESIUM T	mg/L	1.6	1.3	2.3	2.3	1	0.8
	COPPER D	ug/L	< 4	< 4	< 4	< 4	< 4	< 4
	COPPER T	ug/L	< 4	< 4	< 4	< 4	< 4	< 4
	CADMIUM D	ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	LEAD D	ug/L	< 1	< 1	< 1	< 1	< 1	< 1
	LEAD T	ug/L	1.06	< 1	< 1	< 1	< 1	< 1
	BROMIDE	ug/L	< 25	< 25	< 25	26.9	< 25	< 25
	POTASSIUM T	mg/L	< 1	< 1	< 1	1.06	< 1	< 1
	SODIUM T	mg/L	3.27	2.67	2.78	6.7	7.33	10.9
	SULFATE T	mg/L	1.73	39.86	2.41	3.94	2.52	1.69
	SELENIUM T	ug/L	< 7	< 7	< 7	< 7	< 7	< 7

[1] Refer to Figure 1 & Tables 1 - 3 for station locations
[2] Reference (REF) Station – Refer to Table 1 for location
< indicate concentration below the reporting limit

Table B1 (cont.). 2019 Water Chemistry Data Collected June 2019.

	PARAMETER	UNITS	STATIONS[1]					REF[2]
			1CR	1UMC	3UMC	4UMC	5UMC	R1
NUTRIENTS	AMMONIA D	mg/L	< 0.02	< 0.02	< 0.02	0.024	< 0.02	< 0.02
	AMMONIA T	mg/L	< 0.02	0.02	< 0.02	0.02	< 0.02	0.03
	NITRATE & NITRITE D	mg/L	0.8	0.71	2.62	1.36	0.15	< 0.05
	ORTHO PHOSPHORUS D	mg/L	< 0.01	< 0.01	0.013	< 0.01	< 0.01	< 0.01
	NITROGEN D	mg/L	0.834	0.752	2.56	1.444	0.198	< 0.1057
	PHOSPHORUS D	mg/L	< 0.01	0.01	0.012	0.013	< 0.01	< 0.01
	NITRATE & NITRITE T	mg/L	0.8	0.69	2.61	1.36	0.14	< 0.05
	NITROGEN T	mg/L	0.91	0.78	2.59	1.51	< 0.25	< 0.25
	ORTHO PHOSPHORUS T	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	PHOSPHORUS T	mg/L	0.02	0.01	0.016	0.024	< 0.01	< 0.01
PHYSICAL/OTHER	HARDNESS T	mg/L	13	12	20	22	9	9
	OSMOTIC PRESSURE	mos/kg	2	< 1	1	2	< 1	1
	TDS	mg/L	36	44	54	62	46	46
	TSS	mg/L	16	< 5	8	8	< 5	< 5
	ALKALINITY	mg/L	6.2	8	8.8	15	5	4.2
	SPECIFIC COND	µS/cm[C]	48.5	41.1	64.4	89.5	60.4	78
	pH	pH units	6.7	6.9	6.8	7	6.6	6.8
	TOC	mg/L	0.68	< 0.5	0.64	1.6	< 0.5	1.09
FIELD	TEMPERATURE	°C	14.1	13.2	14	16.6	12.7	16.3
	SPECIFIC COND	µS/cm[C]	49.5	42	65.6	91.1	61.8	78.1
	PH	pH units	6.65	6.53	6.79	6.62	6.39	6.65
	DISS OXYGEN	mg/L	9.8	10.1	10	9.4	10	8.9
	DISS OXYGEN	%	94.8	95.9	97.5	96	94	NA

[1] Refer to Figure 1 & Tables 1 - 3 for station locations
[2] Reference (REF) Station – Refer to Table 1 for location
< indicate concentration below the reporting limit

REYNOLDS RUN

LANCASTER COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 06995
Drainage List: O

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

Prepared by:

Tim Wertz and Josh Lookenbill
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of Reynolds Run from its source to confluence with Octoraro Creek. The evaluation is in response to the Environmental Protection Agency's (EPA) partial approval of the Environmental Quality Board's (EQB) adoption of the 2017 Triennial Review of Water Qualty Standards published in the *Pennsylvania Bulletin* at 50 Pa.B. 3426 (July 11, 2020). The partial approval did not include the revision to the designated use for Reynolds Run in 25 Pa. Code § 93.9o.

Components of this evaluation include a review of the designated use history along with historical and current water quality data. This stream evaluation does not reexamine the High Quality Waters (HQ) designated use.

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 EQB.

DESIGNATED USE HISTORY

The Reynolds Run basin was initially designated a Conservation Area (3.5) and Cold Water Fishes (1.1) in the final rulemaking at 3 Pa.B. 768 published on April 28, 1973. The Conservation Area designation was converted to HQ in the 1979 final rulemaking published at 9 Pa.B. 3051(September 8, 1979). Results of a 1989 study, which included a Use Attainability Analysis (UAA), recommended retention of HQ, special protection status based on "good water quality despite agricultural impacts" (DEP 1989). The 1989 study also recommended redesignation from Cold Water Fishes (CWF) to Trout Stocking (TSF) based on absence of cold water fish species and instream temperature. The 1989 report describes:

> *Although they [Reynolds and Mcreary Run] are not currently stocked with trout, they are capable of seasonal use by salmonids; in late spring, the temperature and dissolved oxygen levels are still adequate for trout.*, and …*good quality water despite some agricultural impacts. While they [Reynolds and Mcreary Run] maintain a warm-water fishery, they could support seasonal use by salmonids* (DEP 1989).

At that time, American Eel was also documented throughout the watershed providing supporting evidence for recommending the addition of the Migratory Fishes (MF) protected use. Reynolds Run was redesignated from High Quality Waters – Cold Water Fishes (HQ-CWF) to High Quality Waters – Trout Stocking, Migratory Fishes (HQ-TSF, MF) in the final rulemaking at 48 Pa.B. 5513 published on November 30, 1991. On June 28, 1997, the designated use of Reynolds Run was incorrectly published as HQ-CWF, MF on June 28, 1997 at 27 Pa.B. 3050. The DEP's 2017 Triennial Review corrected this error and revised the designated use from HQ-CWF, MF to HQ-TSF, MF. Though this error was

corrected in the 2017 Triennial Review, it was not identified by EPA as a simple correction, and was instead identified as a redesignation to a less restrictive use (HQ-CWF to HQ-TSF). As such, 25 Pa. Code § 93.4(b) and 40 CFR § 131.10(g), (h) & (j) require that less restrictive use redesignations be accompanied by a UAA and public participation.

GENERAL WATERSHED DESCRIPTION

Reynolds Run is a freestone tributary to Octoraro Creek located in Little Britain Township, Lancaster County. The Reynolds Run basin includes 8.1 stream miles and drains approximately 4.7 square miles of the Piedmont Upland physiographic province. The majority of the basin is typified by riffle/run habitat with higher slopes located in the downstream reaches. The majority of land cover is agricultural (58%) with an additional 25% forested and 15% developed (Dewitz 2019). There are currently no National Pollutant Discharge Elimination System (NPDES) activities within the surveyed basin.

WATER QUALITY

Discrete Physicochemical

DEP staff collected in-situ field meter data and water chemistry data in December 2014 and August 2021 from two stations on Reynolds Runs (Table 1, Figure 1). Field meter data (temperature, specific conductance, pH, dissolved oxygen) were collected at stations through time (Table 2). Additional discrete water chemistry samples were also collected. Data from 1989 at stations 1RR and 2RR is limited to only a few parameters. Additional parameters were added to the 2014 water chemistry sampling effort conducted at station 1RR (Table 3).

Although the sample size is small, discrete physicochemical data collected throughout the Reynolds Run basin appears to be consistent with land cover, with parameter concentrations decreasing from upstream to downstream. Generally, metals and ion concentrations are moderate and may be increasing through time. Total nutrient concentrations are high with decreasing phosphorus and ammonia concentrations coupled with increasing nitrite-nitrogen concentrations through time.

Table 1. Station Locations – Reynolds Run Basin.

STATION	DESCRIPTION
1RR	Reynolds Run upstream of Kirks Mill Road Little Britain Township, Lancaster County Lat: 39.7592 Long: -76.1055
2RR	Reynolds Run downstream of Kirks Mill Road Little Britain Township, Lancaster County Lat: 39.7433 Long: -76.1111

Table 2. In-Situ Physicochemical Data.

PAREMETER		UNITS	STATIONS[1]				
			1RR			2RR	
			1989*	12/10/2014	8/9/2021	1989*	12/10/2014
PHYSICAL/ OTHER	DISSOLVED OXYGEN	mg/L	8.4	11.53	9.06	10.8	12.54
	pH	pH units	8	7.08	7.07	6.8	7.41
	SPECIFIC COND	µS/cm[c]	130	262	278	145	258
	TEMPERATURE	°C	21	6.2	20.3	17	6

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

"*" indicate date undocumented

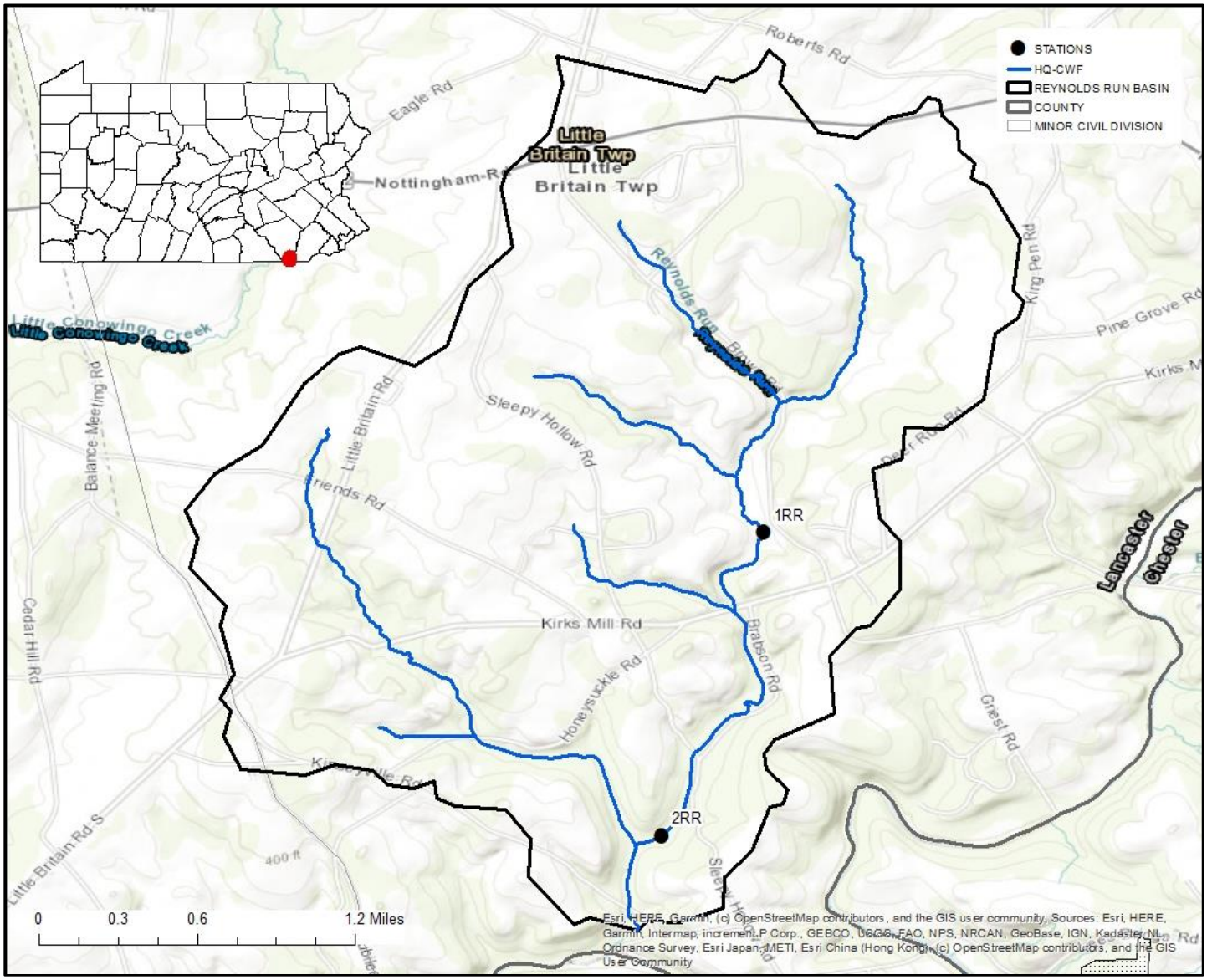


Figure 1. Reynolds Run Basin and Station Locations and Redesignation Recommendation.

Table 3. Discrete Physicochemical Data.

	PARAMETER	UNITS	STATIONS[1]		
			1RR	1RR	2RR
			1989*	8/9/2021	1989*
METALS AND IONS	ALUMINUM T	ug/L	149	122	<135
	BARIUM T	ug/L	-	47	-
	BORON T	ug/L	-	<200	-
	BROMIDE	ug/L	-	<25	-
	CALCIUM T	mg/L	14.1	22.5	13.7
	CHLORIDE T	mg/L	11	23.86	11
	COPPER T	ug/L	-	<4	-
	IRON T	ug/L	235	206	151
	LEAD T	ug/L	-	<1	-
	LITHIUM T	ug/L	-	<25	-
	MAGNESIUM T	mg/L	6	10.9	5.6
	MANGANESE T	ug/L	-	13	-
	NICKEL T	ug/L	-	<50	-
	POTASSIUM T	mg/L	-	2.48	-
	SELENIUM T	ug/L	-	<4	-
	SODIUM T	mg/L	-	11.03	-
	STRONTIUM T	ug/L	-	154	-
	SULFATE T	mg/L	14	17.96	16
	ZINC T	ug/L	-	<30	-
NUTRIENTS	AMMONIA D	mg/L	-	<0.02	-
	AMMONIA T	mg/L	0.05	0.02	0.04
	NITRATE & NITRATE D	mg/L	-	13.23	-
	NITRATE & NITRITE T	mg/L	8.4	13.5	7
	ORTHO PHOSPHORUS D	mg/L	-	0.021	-
	ORTHO PHOSPHORUS T	mg/L	-	0.024	-
	NITROGEN D	mg/L	-	12.43	-
	NITROGEN T	mg/L	-	12.46	-
	PHOSPHORUS D	mg/L	-	0.019	-
	PHOSPHORUS T	mg/L	0.09	0.031	0.08
PHYSICAL/OTHER	ALKALINITY T	mg/L	20	25.6	22
	DIC	mg/L	-	-	-
	DOC	mg/L	-	-	-
	DISSOLVED OXYGEN	mg/L	-	-	-
	HARDNESS T	mg/L	58	101	55
	OSMOTIC PRESSURE	mosm/kg	-	3	-
	pH	pH units	7.5	7.3	7.6
	SPECIFIC COND	µS/cm[c]	-	284	-
	TEMPERATURE	°C	-	-	-
	TDS	mg/L	124	176	110
	TOC	mg/L	-	1.33	-
	TSS	mg/L	6	<5	6

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

"<" indicate concentrations below the reporting limit.

"-" indicate parameter was not tested

"*" indicate date undocumented

Biological

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. Qualitative macroinvertebrate data was collected at two stations during the 1989 study (DEP 1989). DEP staff collected macroinvertebrate data from the two stations throughout the Reynolds Run basin in 2014. Data were collected using the DEP's *Wadeable Riffle-Run Stream Macroinvertebrate Data Collection Protocol* (Shull 2017).

Macroinvertebrate data from Reynolds Run stations in 2014 are consistent with land cover and water quality conditions. The sample from 2RR, representing the downstream portion of Reynolds Run basin, had an Ephemeroptera Plecoptera Trichoptera (EPT) richness of 19 taxa with 8 Ephemeroptera (mayfly) taxa, 5 Plecoptera (stonefly) taxa and 6 Trichoptera (caddisfly) taxa with an overall sample Hilsenhoff Biotic Index (HBI) of 3.5. The sample from 1RR representing the upstream portion had EPT richness values of 15, with less mayfly taxa (6), less stonefly taxa (4) and less caddisfly taxa (5) than the downstream sample (Table 4). The upstream sample at 1RR had an HBI of 4.01. The differences in the macroinvertebrate communities are consistent with differences expected from the higher-gradient, higher percent forested conditions located in the downstream reaches (Table 5). When comparing presence/absence macroinvertebrate data from 1989, taxanomic richness showed dramatic increases through time. Far fewer taxa where observed in 1989 at both sites when compared to 2014. Taxa richness at 1RR in 1989 was 9 taxa; and, taxa richness at 2RR in 1989 was 11 taxa (Table 4).

Fish data were collected from 1RR following DEP's *Fish Data Collection Protocol* (Wertz 2021a) in August 2021. The 1RR location was chosen to be representative of Reynolds Run based on the small drainage size (< 5mi^2) and fairly homogenous habitat availability. Historic fish data were available from the 1989 study (DEP 1989), these data were included even though they were classified by presence/absence, for species-level comparisons. Themal Fish Index (TFI) scores were calculated following DEP's, *Stream Fish Assemblage Assessment Method* (Wertz 2021b).

Fish data from Reynolds Run are consistent with improving habitat and water quality conditions through time. At 1RR, two species with thermal preference of cool-warm have been replaced by two species with thermal preference of cold-cool. Naturally reproducing Brown Trout, with a thermal preference for cold-cool water habitats (Coker 2001, Wertz 2021c), were evidenced by multiple length classes and young-of-year individuals. Rosyside Dace, with a thermal preference of cold-cool water habitats (Wertz 2021c), were also observed. Creek Chub, Longnose Dace, and Tesselated Darter were additional species observed in 2021 that were not documented at 1RR in the 1989 study (Table 6). Presence/absence data reported in the 1989 study only allow for general TFI scoring unless all species collected are in the same thermal preference group, as was the case with 2RR. Specific TFI scores for 1RR from the 1989 study are unknown but are, at a minimum, greater than 6.0.

Table 4. Benthic Macroinvertebrate Data.

TAXA		STATIONS[1]			
		1RR		2RR	
		1989*	12/10/2014	1989*	12/10/2014
Ephemeroptera (Mayflies)					
Baetidae	*Acentrella*	-	-	-	1
	Baetis	-	3	x	6
	Diphetor	-	2	-	-
Ephemerellidae	*Ephemerella*	-	49	-	58
	Teloganopsis	-	1	-	2
Heptageniidae	*Epeorus*	-	-	-	4
	Leucrocuta	-	-	-	1
	Maccaffertium	-	11	-	5
	Stenonema	-	-	x	-
Isonychiidae	*Isonychia*	-	2	-	1
Plecoptera (Stoneflies)					
Capnidae	*Allocapnia*	-	2	x	2
Leuctridae	*Leuctra*	-	1	-	-
Perlidae	*Acroneuria*	-	-	-	1
	Isoperla	-	1	-	1
	Neoperla	-	-	x	-
	Sweltsa	-	-	-	1
Taeniopterygidae	*Strophopteryx*	-	1	-	6
Trichoptera (Caddisflies)					
Hydropsychidae	*Cheumatopsyche*	-	56	-	21
	Hydropsyche	x	21	x	40
Philopotamidae	*Chimarra*	-	17	x	11
	Dolophilodes	-	-	-	5
Polycentropodidae	*Polycentropus*	-	-	-	2
Rhyacophilidae	*Rhyacophila*	-	1	-	3
Thremmatidae	*Neophylax*	-	1	-	-
Coleptera (Aquatic Beetles)					
Elmidae	*Optioservus*	-	21	-	5
	Oulimnius	-	-	-	2
	Stenelmis	-	8	-	6
Diptera (True Flies)					
Chironomidae		x	21	x	23
Simuliidae	*Prosimulium*	x	-	-	1
Tipulidae	*Antocha*	-	-	-	7
	Dicranota	-	-	-	2
	Hexatoma	x	-	x	-
	Tipula	-	-	x	-
Megaloptera (Dobsonflies)					
Corydalidae	*Nigronia*	-	1	-	-
Sialidae	*Sialis*	x	-	x	-
Non-Insect Taxa					
Decapoda		x	-	-	-
Isopoda		x	-	-	-
Oligochaeta		x	-	X	-
Turbellaria		x	-	-	-
Total Richness		9	19	11	26
Total Organisms			220		217

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

"*" indicate date undocumented

"x" indicate taxa present

"-" indicate taxa was not identified in sample

Table 5. Benthic Macroinvertebrate Metrics and IBI Scores.

METRIC	STATIONS[1]			
	1RR		2RR	
	1989*	12/10/2014	1989*	12/10/2014
EPT RICHNESS (PTV 0-4)	1	11	0	15
BECKS INDEX V.3	-	10	-	21
HILSENHOFF INDEX	-	4.07	-	3.5
SHANNON DIVERSITY	-	2.18	-	2.47
% SENSITIVE INDIV. (PTV 0-3)	-	32.3	-	46.1
IBI SCORE	-	54.9	-	72.3

[1] Refer to Figure 1 and Table 1 for station locations
"-" indicate metric was not calculated

Table 6. Fish Assemblage Data and Thermal Fish Index (TFI) Scores.

THERMAL PREF.	TAXA		STATIONS[1]		
			1RR		2RR
			1989*	8/9/2021	1989*
Cold-Cool	Brown Trout (wild)	*Salmo trutta*	-	13	-
Cold-Cool	Rosyside Dace	*Clinostomus funduloides*	-	8	-
Cool	American Eel	*Anguilla rostrate*	x	4	x
Cool	Creek Chub	*Semotilus atromaculatus*	-	2	-
Cool	Cutlips Minnow	*Exoglossum maxillingua*	-	-	x
Cool	Eastern Blacknose Dace	*Rhinichthys atratulus*	x	60	x
Cool	Longnose Dace	*Rhinichthys cataractae*	-	13	-
Cool	Tessellated Darter	*Etheostoma olmstedi*	-	6	-
Cool	White Sucker	*Catostomus commersonii*	x	1	-
Cool-Warm	Common Shiner	*Luxilus cornutus*	x	-	-
Cool-Warm	Fallfish	*Semotilus corporalis*	x	-	-
	Taxa Richness		5	8	3
	Total Individuals			107	
	TFI		> 6.0	5.6	6.0

[1] Refer to Figure 1 and Table 1 for station locations
"*" indicate date and time undocumented
"-" indicate taxa was not identified at a particular station

Physical

Instream habitat was evaluated at each station where benthic macroinvertebrates and fish were collected using DEP's *Stream Habitat Data Collection Protocol* (Lookenbill 2017). The habitat evaluation consists of rating twelve parameters for high-gradient reaches to derive a total habitat score. Total habitat scores for 1RR and 2RR were at suboptimal and optimal thresholds, respectively (Table 7).

Table 7. Habitat Evaluation Data.

PARAMETER	STATIONS[1]		
	1RR	1RR	2RR
	12/10/14	8/9/21	12/10/14
1. INSTREAM COVER	15	15	17
2. EPIFAUNAL SUBSTRATE	14	13	17
3. EMBEDDEDNESS	14	14	15
4. VELOCITY/DEPTH	17	16	18
5. CHANNEL ALTERATION	14	15	17
6. SEDIMENT DEPOSITION	15	14	18
7. RIFFLE FREQUENCY	16	17	18
8. CHANNEL FLOW STATUS	16	15	17
9. BANK CONDITION	15	10	16
10. BANK VEG. PROTECTION	16	11	18
11. GRAZING/DISRUPT PRES.	12	11	17
12. RIP. VEG. ZONE WIDTH	11	11	17
TOTAL SCORE	175	162	205
RATING[2]	SUB	SUB	OPT
EMBEDDEDNESS + SEDIMENT DEPOSITION	29	28	33
BANK CONDITION + BANK VEG. PROTECTION	31	21	34

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

[2] OPT = Optimal (≥192), SUB = Suboptimal (132-192)

BIOLOGICAL USE QUALIFICATIONS

The DEP's Biological use qualifying criterion evaluated for Reynolds Run were the aquatic life use definitions described at 25 Pa. Code § 93.3, Table 1 – *Protected Water Uses*. Table 1 defines the Cold Water Fishes (CWF) protected use as;

> *Maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.*

While the 1989 survey did not document cold water fish species, the 2021 survey did document the maintenance and propogation of Salmonidae (Brown Trout) and additional fauna indigenous to a cold water habitat (Rosyside Dace), which demonstrates an existing use of CWF.

A total of 8.1 stream miles qualify as CWF under this criterion.

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this redesignation evaluation and requested any technical data from the Lancaster County Conservation District, Little Britain Township and Trout Unlimited in an email dated October 1, 2021. A second notice went out to the general public on the DEP website and through publication in the *Pennsylvania Bulletin* on October 2, 2021 (51 Pa.B. 6320). In addition, notifications were distributed through the DEP eNotice. No data on water chemistry, instream habitat, or aquatic community were received in response to these notices.

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, and the PFBC in a letter dated April 20, 2024 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on April 20, 2024 (54 Pa.B. 2168). In addition, notifications were distributed through the DEP eNotice.

All comments received were in support of the redesignation recommendations in the draft report. Comments were received from the PFBC and the Theodore Roosevelt Conservation Partnership. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATION

As a result of the 2017 Triennial Review of Water Quality Standards, the designated use of Reynolds Run was changed from HQ-CWF, MF to HQ-TSF, MF in 25 Pa. Code § 93.9o. This change was made to correct an error that had occurred as a result of a 1997 rulemaking. EPA's partial approval of the 2017 Triennial Review did not include the change to the Reynolds Run designated use. Subsequently, the DEP performed a more detailed evaluation of Reynolds Run.

Based on the 1973 rulemaking, the 1979 rulemaking, the evaluation of data available, and the documented improving water quality conditions since the 1989 UAA, the DEP recommends the designated use for the entire Reynolds Run basin be updated to HQ-CWF, MF.

LITERATURE CITED

Coker, G. A., C. B. Portt, and C. K. Minns. 2001. Morphological and ecological characteristics of Canadian freshwater fishes. Fisheries and Oceans Canada, Burlington, Ontario.

DEP. 1989. Octoraro Creek Special Protection Evaluation Report, Use Attainability Report, Water Quality Standards Review. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, https://doi.org/10.5066/P96HHBIE.

Lookenbill, M. J. (editor). 2017. Stream habitat data collection protocol. Chapter 5.1, pages 2–7 in M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

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.

Wertz, T. A. 2021a. Fish data collection protocol. Chapter 3.7, pages 44–63 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Wertz, T. A. 2021b. Stream fish assemblage assessment method. Chapter 2.7, pages 88–108 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

Wertz, T. A. 2021c. Technical Development of a Thermal Fish Index. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania. (Available online at: https://www.dep.pa.gov/Business/Water/CleanWater/WaterQuality/Pages/Macroinvertebrates.aspx)

UNNAMED TRIBUTARY TO TOHICKON CREEK (BOG RUN)

BUCKS COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 03181
Drainage List: E

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

Prepared by:

Mark Brickner
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Unnamed Tributary (UNT) to Tohickon Creek, locally known as Bog Run, basin in response to a National Pollutant Discharge Elimination System (NPDES) permit (PA0594121) renewal for the Rockhill Quarry (aka Hanson Quarry) located within the UNT to Tohickon Creek basin. The UNT to Tohickon Creek basin is currently designated Trout Stocking, Migratory Fishes (TSF, MF). Components of this evaluation include discrete physicochemical data collection and a review of the exceptional ecological significance qualification.

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

The UNT to Tohickon Creek is a second order tributary to Tohickon Creek located at River Mile 21.60. The UNT to Tohickon Creek basin is located in Richland, East Rockhill, West Rockhill and Haycock townships, Bucks County. The basin has a drainage area of approximately 4.88 square miles and consists of 4.73 stream miles. The land cover within the basin consists of deciduous forest (70%), woody wetlands (9%), developed open space (8%) and pasture/hayfields (7%) (Dewitz 2019). Within the UNT to Tohickon Creek basin is the Quakertown Swamp, a 400-acre wetland that encompasses most of the riparian corridor. The Rockhill Quarry had a single NPDES permit and was one of nine NPDES permits within the basin. Currently, the Rockhill Quarry is inactive. Active NPDES permits include and five sewage permits.

WATER QUALITY

Discrete Physicochemical

Discrete physicochemical data were at a single station located near the mouth once in 2015 and again in 2020 (Table 1, Figure 1). The total iron result (2,130 ug/L) from the 2020 sample exceeds the water quality criterion (1,500 ug/L) in 25 Pa. Code § 93.7 and is more elevated than the 2015 result (672 ug/L). In addition, other concentrations of parameters indicate some degree of anthropogenic influence is occurring within the basin. Additional physicochemical data collection efforts were completed in 2021. These efforts started in July 2021 and ended in December 2021 (Table 2). Total iron concentrations were higher than the water quality criterion (1,500 ug/L) in 25 Pa. Code § 93.7 during the July 2021 sampling events; all other samples iron concentrations were below the criterion.

Table 1. Discrete Physicochemical Data – UNT to Tohickon Creek , 2015 and 2020.

	PARAMETER	UNITS	2015	2020
METALS AND IONS	ALUMINUM D	ug/L	-	<15.0
	ALUMINUM T	ug/L	462.0	117.0
	BARIUM T	ug/L	-	19.0
	BORON T	ug/L	-	<200.0
	BROMIDE	ug/L	-	40.66
	CADMIUM D	ug/L	<0.2	<0.2
	CALCIUM T	mg/L	12.3	24.9
	CHLORIDE	mg/L	39.3	29.63
	COPPER D	ug/L	-	<4.0
	COPPER T	ug/L	<10	<4.0
	IRON D	ug/L	-	<100.0
	IRON T	ug/L	672.0	2130.0
	LEAD D	ug/L	-	<1.0
	LEAD T	ug/L	1.09	<1.0
	LITHIUM D	ug/L	-	<25.0
	LITHIUM T	ug/L	-	<25.0
	MAGNESIUM T	mg/L	5.787	12.1
	MANGANESE D	ug/L	-	503.0
	MANGANESE T	ug/L	46.0	528.0
	MERCURY T	ug/L	<0.2	
	NICKEL D	ug/L	-	<50.0
	NICKEL T	ug/L	<50.0	<50.0
	POTASSIUM T	mg/L	-	1.38
	SELENIUM T	ug/L	-	<7.0
	SODIUM T	mg/L	-	10.7
	STRONTIUM T	ug/L	-	88.0
	SULFATE T	mg/L	11.47	13.11
	ZINC D	ug/L	-	<30.0
	ZINC T	ug/L	<10.0	<30.0
NUTRIENTS	AMMONIA D	mg/L	-	0.074
	AMMONIA T	mg/L	<0.02	0.08
	NITROGEN D	mg/L	-	0.64
	NITROGEN T	mg/L	0.34	0.69
	NITRATE & NITRITE D	mg/L	-	0.13
	NITRATE & NITRITE T	mg/L	-	0.13
	ORTHO PHOSPHORUS D	mg/L	-	0.033
	ORTHO PHOSPHORUS T	mg/L	-	0.07
	PHOSPHORUS D	mg/L	-	0.031
	PHOSPHORUS T	mg/L	0.026	0.13
PHYSICAL/OTHER	ALKALINITY	mg/L	32.4	81.0
	CBOD	mg/L	2	-
	COD	mg/L	23.7	-
	HARDNESS	mg/L	55.0	112.0
	OSMOTIC PRES	mosm	-	3.0
	pH	pH units	6.96	7.3
	SPECIFIC COND	µS/cm[c]	213.0	299.0
	TOC	mg/L	-	7.22
	TSS	mg/L	16.0	6.0
	TDS	mg/L	144.0	194.0

"<" indicate concentrations below the reporting limit.

"-" indicate parameter was not tested

Table 2. Discrete Physicochemical Data – UNT to Tohickon Creek, 2021.

	PARAMETER	UNITS	2021				
			7/14	7/23	8/23	11/23	12/21
METALS AND IONS	ALUMINUM D	ug/l	20.4	<15	48.4	<15	<15
	ALUMINUM T	ug/l	242	117	301	111	163
	BARIUM T	ug/l	15	19	14	12	<10
	BORON T	ug/l	<200	<200	<200	<200	<200
	BROMIDE T low-level	ug/l	32.3	40.66	<25	40.71	42.46
	CADMIUM D	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2
	CALCIUM T	mg/l	19.88	24.9	11.4	22.5	27.67
	CHLORIDE T	mg/l	25.18	29.63	16.18	31.86	37.56
	COPPER D	ug/l	<4	<4	<4	<4	<4
	COPPER T	ug/l	<4	<4	<4	<4	<4
	IRON D	ug/l	710	<100	506	352	198
	IRON T	ug/l	1547	2130	1150	971	1087
	LEAD D	ug/l	<1	<1	<1	<1	<1
	LEAD T	ug/l	<1	<1	1.59	<1	<1
	LITHIUM D	ug/l	<25	<25	<25	<25	<25
	LITHIUM T	ug/l	<25	<25	<25	<25	<25
	MAGNESIUM T	mg/l	8.82	12.1	5.15	11.4	13.89
	MANGANESE D	ug/l	57	503	16	79	115
	MANGANESE T	ug/l	84	528	21	83	117
	NICKEL D	ug/l	<50	<50	<50	<50	<50
	NICKEL T	ug/l	<50	<50	<50	<50	<50
	POTASSIUM T	mg/l	1.18	1.38	1.55	1.62	1.26
	SELENIUM D	ug/l	-	-	-	<4	<4
	SELENIUM LOW D	ug/l	<4	-	<4	-	-
	SELENIUM T	ug/l	<4	<7	<4	<4	<4
	SODIUM T	mg/l	13.67	10.7	9.24	12.4	13.7
	STRONTIUM T	ug/l	70	88	42	72	86
	SULFATE T	mg/l	3.97	13.11	6.89	8.99	11.24
	ZINC D	ug/l	<30	<30	<30	<30	<30
	ZINC T	ug/l	<30	<30	<30	<30	<30
NUTRIENTS	AMMONIA-N D	mg/l	0.035	0.074	0.021	0.02	<0.02
	AMMONIA-N T	mg/l	0.03	0.08	0.02	0.02	<0.02
	NITROGEN D	mg/l	0.707	0.64	0.718	0.41	0.329
	NITROGEN T	mg/l	0.71	0.69	0.77	0.37	0.35
	NITRATE & NITRITE D	mg/l	0.06	0.13	<0.05	0.07	0.08
	NITRATE & NITRITE T	mg/l	0.05	0.13	<0.05	0.06	0.07
	ORTHO PHOSPHORUS D	mg/l	0.05	0.033	0.043	0.024	0.016
	ORTHO PHOSPHORUS T	mg/l	0.065	0.07	0.051	0.031	0.024
	PHOSPHORUS D	mg/l	0.059	0.031	0.063	0.022	0.014
	PHOSPHORUS T	mg/l	0.107	0.13	0.097	0.04	0.037
PHYSICAL/OTHER	ALKALINITY	mg/l	71.8	81	39	74.8	92.4
	HARDNESS T (Calculated)	mg/l	86	112	50	103	126
	OSMOTIC PRESSURE	mosm/kg	2	3	NA	4	4
	pH	pH units	7.6	7.3	7.2	7.2	7.4
	SPECIFIC COND	umhos/cm	223	299	144.8	267	320
	TOC	mg/l	10.89	7.22	13.56	5.28	4.35
	TDS	mg/l	170	194	140	164	196
	TSS	mg/l	6	6	<5	<20	<20

"<" indicate concentrations below the reporting limit.

"-" indicate parameter was not tested

SURFACE WATERS OF EXCEPTIONAL ECOLOGICAL SIGNIFICANCE

The DEP reviewed information gathered for the Pennsylvania Natural Heritage Program and reported in the Bucks County Natural Heritage Inventory. The Bucks County Natural Heritage Inventory identified an area with statewide ecological significance that is based upon the importance, rarity and uniqueness of the areas' endemic ecological community types. The area, Quakertown Swamp (Figure 1), contains a Bottomland Oak – Hardwood Palustrine Forest Community (The Nature Conservancy 2011), which is a rare and endemic community type hydrologically connected to riverine surface water and therefore, is water quality dependent.

Bottomland oak – hardwood palustrine forest occurs on poorly drained land along the stream valley. It is characterized by white ash (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica*), shagbark hickory (*Carya ovata*), red maple (*Acer rubrum*), American elm (*Ulmus americana*), basswood (*Tilia americana*), swamp white oak (*Quercus bicolor*), pin oak (*Quercus palustris*), and blackgum (*Nyssa sylvatica*). It serves as important habitat for wood frogs (*Rana sylvatica*), spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opacum*) and Jefferson salamander (*Ambystoma jeffersonianum*) and provides an important buffer for sediment and other pollution from neighboring development (The Nature Conservancy 2011 and Zimmerman et al. 2012). This palustrine community has a NatureServe state rank of S2, which indicates that it is imperiled in the state because of rarity or some factor(s), making it vulnerable to extirpation (Master et al. 2012 and The Nature Conservancy 2011). The presence of this plant community dependent on water quality or hydrology, its ecological and hydrological importance and rarity in Pennsylvania satisfies the exceptional ecological significance criterion at § 93.4b(b)(2)[1].

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this evaluation and requested any technical data from the general public on the DEP website and through publication in the *Pennsylvania Bulletin* on November 2, 2019 (49 Pa.B. 6626). In addition, Bucks County Conservation District, Bucks County, East Rockhill Township, West Rockhill Township and Richland Township were notified of the redesignation evaluation in a letter dated October 31, 2019. In response to the public notice, The Pennsylvania Campaign for Clean Water and the Delaware Riverkeeper Network offered general support for the evaluation and offered additional information to be considered as part of the evaluation.

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, Delaware RiverKeeper Network, Trout Unlimited, the Pennsylvania Game Commission, and the Department of Conservation and Natural Resources in a letter dated October 23, 2021 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on October 23, 2021 (51 Pa.B. 6704).

All comments received were in support of the redesignation recommendations in the draft report. Comments were received from the PFBC, Heritage Conservancy, PennFuture, East Rockhill Township, Delaware RiverKeeper Network, Pennsylvania Campaign for Clean Water, Pennsylvania Chapter of Native Fish Coalition, and 276 citizens. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATION

The DEP recommends that the UNT to Tohickon Creek (Bog Run) basin be redesignated from Trout Stocking, Migratory Fishes (TSF, MF) to Exceptional Value Waters, Migratory Fishes (EV, MF) based on 25 Pa. Code § 93.4b(b)(2)[1] (exceptional ecological significance).

This recommendation adds 4.73 stream miles with the designation of EV to Chapter 93.

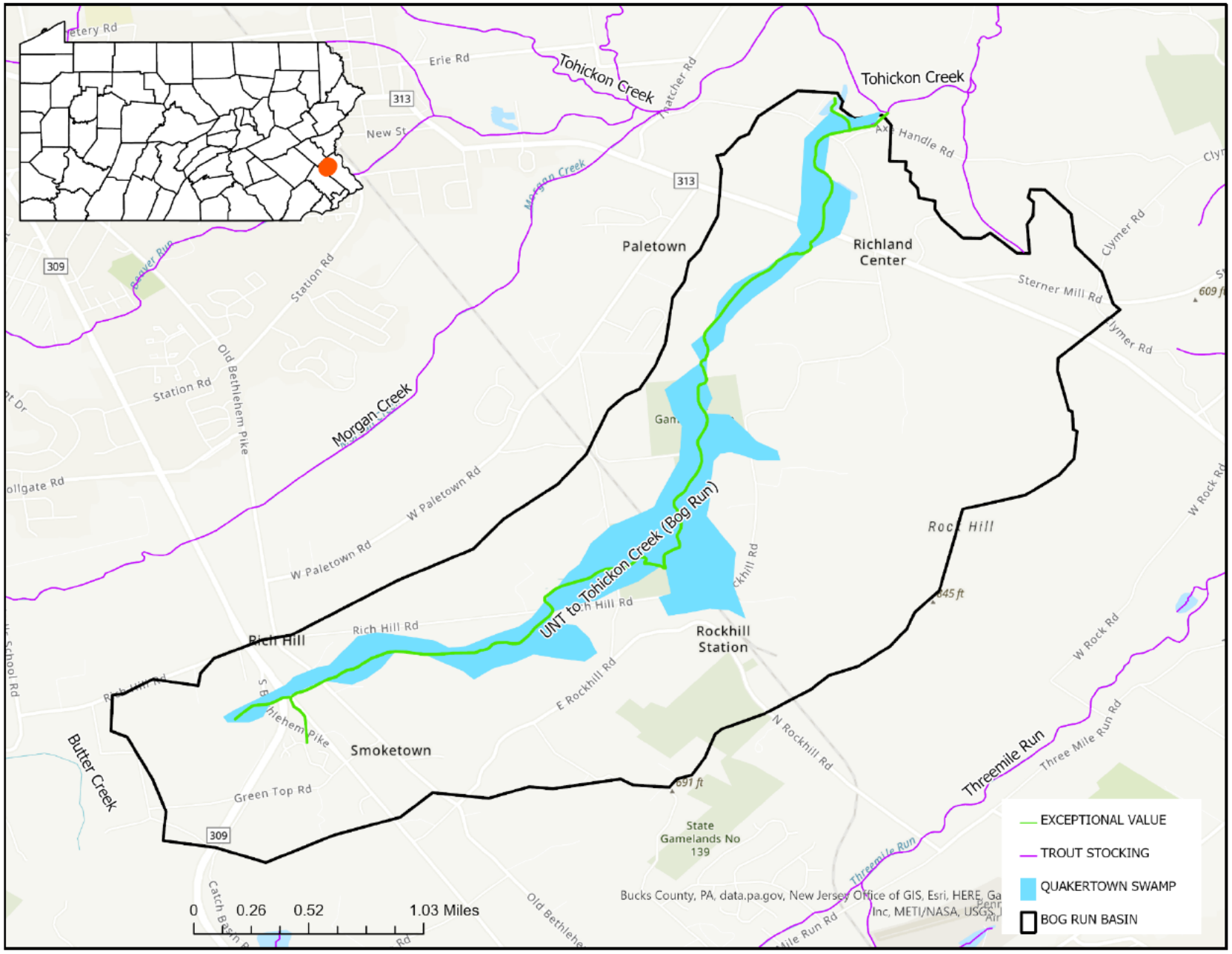


Figure 1. UNT to Tohickon Creek Basin Redesignation Recommendation.

LITERATURE CITED

Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, https://doi.org/10.5066/P96HHBIE.

Master, L. L., D. Faber-Langendoen, R. Bittman, G. A. Hammerson, B. Heidel, L. Ramsay, K. Snow, A. Teucher, and A. Tomaino. 2012. NatureServe conservation status assessments: Factors for evaluating species and ecosystem risk. NatureServe, Arlington, Virginia.

The Nature Conservancy (Pennsylvania Science Office). 2011. A Natural Areas Inventory Update of Bucks County, Pennsylvania. Bucks County.

Zimmerman, E., Davis, T., Podniesinski, G., Furedi, M., McPherson, J., Seymour, S., Eichelberger, B., Dewar, N., Wagner, J. and Fike, J. (editors). 2012. Terrestrial and palustrine plant communities of Pennsylvania, 2nd Edition. Pennsylvania Natural Heritage Program, Pennsylvania Department of Conservation and Natural Resources, Harrisburg, Pennsylvania.

UNNAMED TRIBUTARY TO NORTH FORK DUNKARD FORK

GREENE COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 32599
Drainage List: W

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

Prepared by:

Erika Arnold and Josh Lookenbill
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Unnamed Tributary (UNT) to North Fork Dunkard Fork basin in Greene County as a result of routine DEP monitoring efforts that suggested the existing use may be different than the current designated use. The entire UNT to North Fork Dunkard Fork basin is currently designated Trout Stocking (TSF).

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

The UNT to North Fork Dunkard Fork is a first order, high gradient tributary to North Fork Dunkard Fork within the Ohio River basin and is located within Richhill Township, Greene County. The UNT to North Fork Dunkard Fork has a drainage area of approximately 0.4 square miles and consists of 0.73 stream miles. According to the National Land Cover Database (NLCD) 2019, the basin consists of 96.2% forested, 1.2% planted/cultivated, 1.2% developed lands and 1.4% other land cover (Dewitz 2021). There are two oil and gas wells, one abandoned and one plugged, and no National Pollutant Discharge Elimination System (NPDES) activities located within the UNT to North Fork Dunkard Fork basin.

WATER QUALITY

Discrete Physiochemical

DEP staff collected in-situ field meter data and water chemistry data in December 2007 from the UNT to North Fork Dunkard Fork and Limestone Run reference stations (Figure 1, Table 1). Temperature, pH, specific conductivity, and dissolved oxygen were collected from UNT to North Fork Dunkard Fork; and pH was collected from Limestone Run (Table 2).

Table 1. Station Locations - UNT to North Fork Dunkard Fork and Limestone Run Reference (REF).

STATION	DESCRIPTION
1UNTNFDF	UNT 32599 to North Fork Dunkard Fork, 500 meters upstream of mouth Richhill Township, Greene County Lat: 39.88126 Long: -80.44030
LR (REF)	Limestone Run 30, meters upstream of mouth Dunbar Township, Fayette County Lat: 39.92798 Long: -79.58659

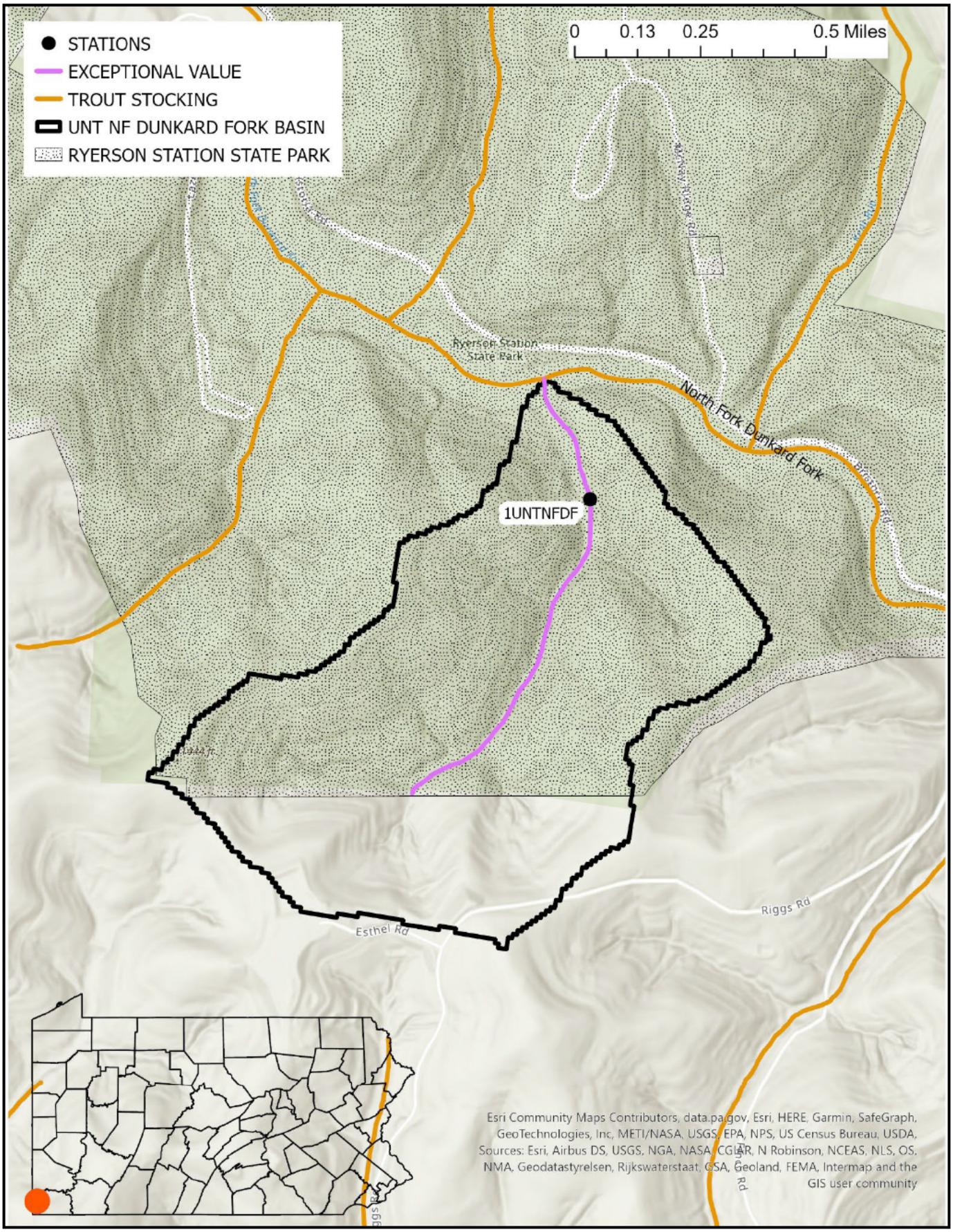


Figure 1. UNT to North Fork Dunkard Fork Station Location and Redesignation Recommendation.

Table 2. In-situ Physicochemical Data.

PARAMETERS	UNITS	STATION[1]	REF[1]
		1UNTNFDF	LR
TEMPERATURE	°C	9.15	-
pH	pH Units	7.68	6.7
SPECIFIC COND	µS/cm[c]	244	-
DISSOVLED OXYGEN	mg/L	11.18	-

"-" indicate measurement was not collected

[1] Refer to Figure 1 and/or Table 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 one station on the UNT to North Fork Dunkard Fork and from one reference station on Limestone Run in Fayette County in December 2007 (Figure 1 & Table 1). Data was collected using the DEP benthic macroinvertebrate data collection protocols, which is a modification of the US Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (Plafkin et al. 1989, Barbour et al. 1999). Data collected from both the UNT to North Fork Dunkard Fork and Limestone Run were collected using DEP's *Wadeable Riffle-Run Stream Macroinvertebrate Data Collection Protocol* (Shull 2017).

Macroinvertebrate data collected from the UNT to North Fork Dunkard Fork is consistent with excellent water quality conditions (Table 3). The UNT to North Fork Dunkard Fork had a total taxa richness of 30. At Limestone Run total taxa richness was 34. Ephemeroptera Plecoptera and Trichoptera (EPT) richness at both sites was 17. Taxa present are indicative of a healthy and robust macroinvertebrate community (Tables 3 and 5).

Table 3. Benthic Macroinvertebrate Data.

TAXA		STATION[1]	REF[1]
		1UNTNFD	LR
Ephemeroptera		-	-
Ameletidae	*Ameletus*	6	1
Baetidae	*Acerpenna*	-	3
	Baetis	-	3
	Diphetor	16	-
Ephemerellidae	*Ephemerella*	17	1
	Eurylophella	1	-
Ephemeridae	*Ephemera*	1	-
Heptageniidae	*Epeorus*	9	43
	Stenacron	-	1
	Stenonema	1	2
Leptophlebiidae	*Habrophlebiodes*	-	12
	Paraleptophlebia	3	-

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

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

Table 3 (cont.). Benthic Macroinvertebrate Data.

TAXA		STATION[1]	REF[1]
		1UNTNFD	LR
Plecoptera		-	-
Capniidae	*Allocapnia*	2	4
	Paracapnia	55	8
Chloroperlidae	*Sweltsa*	10	9
Leuctridae	*Leuctra*	3	10
Perlidae	*Acroneuria*	2	3
Perlodidae	*Isoperla*	3	1
Taeniopterygidae	*Taenionema*	-	2
Trichoptera		-	-
Hydropsychidae	*Ceratopsyche*	-	4
	Diplectrona	36	12
Philopotamidae	*Dolophilodes*	-	7
	Wormaldia	4	2
Polycentropodidae	*Cyrnellus*	-	1
	Polycentropus	-	7
Rhyacophilidae	*Rhyacophila*	2	3
Uenoidae	*Neophylax*	5	1
Diptera		-	-
Ceratopogonidae	*Probezzia*	4	-
Chironomidae	*Chironomidae*	31	22
Dolichopodidae	*Dolichopodidae*	-	1
Simuliidae	*Prosimulium*	-	2
Stratiomyidae	*Euparyphus*	1	-
Tipulidae	*Dicranota*	1	1
	Hexatoma	5	1
	Molophilus	-	1
	Pseudolimnophila	2	-
	Tipula	2	-
Coleoptera		-	-
Elmidae	*Optioservus*	2	-
	Oulimnius	-	11
	Stenelmis	1	-
Psephenidae	*Ectopria*	2	2
Non-Insect Taxa		-	-
Cambaridae	*Orconectes*	1	1
Clitellata		1	15
Taxa Richness		229	197
Total Organisms		30	33

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

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

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 score for the UNT to North Fork Dunkard Fork was within the suboptimal range (132-192) and the reference station fell within the optimal range (≥192). Velocity/depth regimes, sediment deposition, bank condition, and bank vegetative protection were observed to be lower at the UNT to North Fork Dunkard Fork station than the Limestone Run reference station.

Table 4. Habitat Evaluation Data.

PARAMETERS	STATION[1]	REF[1]
	1UNTNFDF	LR
1. INSTREAM COVER	13	18
2. EPIFAUNAL SUBSTRATE	15	16
3. EMBEDDEDNESS	14	17
4. VELOCITY/DEPTH	11	18
5. CHANNEL ALTERATIONS	15	20
6. SEDIMENT DEPOSITION	8	18
7. RIFFLE FREQUENCY	18	17
8. CHANNEL FLOW STATUS	16	20
9. BANK CONDITION	5	19
10. BANK VEGETATIVE PROTECTION	11	16
11. GRAZING/DISRUPTIVE PRESSURES	15	19
12. RIPARIAN VEG. ZONE WIDTH	16	19
Total Score	157	217
Rating[2]	SUB	OPT

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

[2] OPT = Optimal (≥192), SUB = Suboptimal (132-192)

INTEGRATED BENTHIC MACROINVERTEBRATE SCORING TEST

The DEP applied its integrated benthic macroinvertebrate scoring test described at 25 Pa. Code § 93.4b(a)(2)(i)(A) to the UNT to North Fork Dunkard Fork. Selected benthic macroinvertebrate community metrics from the UNT to North Fork Dunkard Fork station were compared to the reference station from Limestone Run. Limestone Run was used as a reference because it has demonstrated an existing use of Exceptional Value Waters (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 Limestone Run reference station has optimal habitat and similar gradient, drainage area, pH and alkalinity to the candidate stream station (DEP 2013). 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 (Table 5).

Based on these five metrics, the candidate station on the UNT to North Fork Dunkard Fork exceeded the EV qualifying criterion of 92% (Table 5).

Table 5. Benthic Macroinvertebrate Metric Comparison.

METRIC		STATION[1]	REF[1]
		1UNTNFDF	LR
1.	TAXA RICHNESS	30	33
	Cand/Ref (%)	91	
	Biol. Cond. Score	8	8
2.	MOD. EPT INDEX	17	17
	Cand/Ref (%)	100	
	Biol. Cond. Score	8	8
3.	MOD. HBI	2.14	3.01
	Cand-Ref	-0.87	
	Biol. Cond. Score	8	8
4.	% DOMINANT TAXA	24	21.8
	Cand-Ref	2.2	
	Biol. Cond. Score	8	8
5.	% MOD. MAYFLIES	16.6	24.4
	Ref-Cand	7.8	
	Biol. Cond. Score	8	8
TOTAL BIOLOGICAL CONDITION SCORE		40	40
% COMPARABILITY TO REFERENCE		100	

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

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this redesignation evaluation and requested any technical data from the general public on the DEP website on October 28, 2022 and through publication in the *Pennsylvania Bulletin* on October 29, 2022 (52 Pa.B. 6785). Greene County, Richhill Township, the Pennsylvania Department of Conservation and Natural Resources (DCNR), and Greene County Conservation District were notified of the redesignation evaluation in an emailed letter dated October 28, 2022. In addition, notifications were distributed through the DEP eNotice. In response to the notices, the DEP received a letter of support from the Theodore Roosevelt Conservation Partnership.

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 DCNR, and the PFBC in a letter dated April 20, 2024 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on April 20, 2024 (54 Pa.B. 2168). In addition, notifications were distributed through the DEP eNotice.

All comments received were in support of the redesignation recommendations in the draft report. Comments were received from the PFBC, the Center for Coalfield Justice and the Theodore Roosevelt Conservation Partnership. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

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 UNT to North Fork Dunkard Fork basin be redesignated to EV based on a score greater than 92% when compared to a reference station.

This recommendation adds 0.73 stream miles with the designation of EV 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.

DEP. 2013. Water Quality Antidegradation Implementation Guidance. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania. http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=7842&DocName=WATER%20QUALITY%20ANTIDEGRADATION%20IMPLEMENTATION%20GUIDANCE.PDF%20

Dewitz, J., and U.S. Geological Survey. 2021. National Land Cover Database (NLCD) 2019 Products (ver. 2.0, June 2021): U.S. Geological Survey data release, https://doi.org/10.5066/P9KZCM54

Plafkin, J. L., Barbour, M. T., Porter, K. D., Gross, S. K., Hughes, R. M. 1989. Rapid Bioassessment Protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001.

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.

UNNAMED TRIBUTARY TO SIXPENNY CREEK

BERKS COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 64027
Drainage List F

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

Prepared by:

Mark Brickner
Pennsylvania Department of Environmental Protection
Office of Water Programs
Bureau of Clean Water
11th Floor: Rachel Carson State Office Building
Harrisburg, PA 17105

2024

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Unnamed Tributary (UNT) to Sixpenny Creek in response to request from The Nature Conservancy and based on the results of routine DEP monitoring efforts that suggested the existing use may be different than the current designated use. The UNT to Sixpenny Creek basin is currently designated High Quality Waters – Cold Water Fishes, Migratory Fishes (HQ-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

UNT to Sixpenny Creek is a small, shallow and cold first-order tributary to Sixpenny Creek located in Union Township, Berks County. UNT to Sixpenny Creek drains 1.03 square miles with a total of 6.91 stream miles (Table 1, Figure 1). The stream originates within and approximately 80% of it lies within French Creek State Park. UNT to Sixpenny Creek is located on the Elverson 7.5-minute series USGS quadrangle map. Land cover is 100% forested (Dewitz 2019). There are no NPDES permits within the watershed.

Table 1. Station Locations – UNT to Sixpenny Creek and Pine Creek Reference (REF).

STATION	DESCRIPTION
UNTSC	UNT to Sixpenny Creek, 500 meters upstream of the confluence with Sixpenny Creek Union Township, Berks County Lat: 40.239866 Long: -75.777984
PC (REF)	Pine Creek, 250 downstream of Long Lane Pike Township, Berks County Lat: 40.4232399 Long: -75.704330

WATER QUALITY

Physicochemical

Physicochemical data was collected from one location (UNTSC) on UNT to Sixpenny Creek and from the Pine Creek reference station (PC) on December 7, 2017. Results were generally comparable between the two stations. The majority of metals and nutrient parameters were below reporting limits. Alkalinity, hardness, pH, specific conductance and total dissolved solids (TDS) were slightly higher but comparable at the Pine Creek reference station (Table 2).

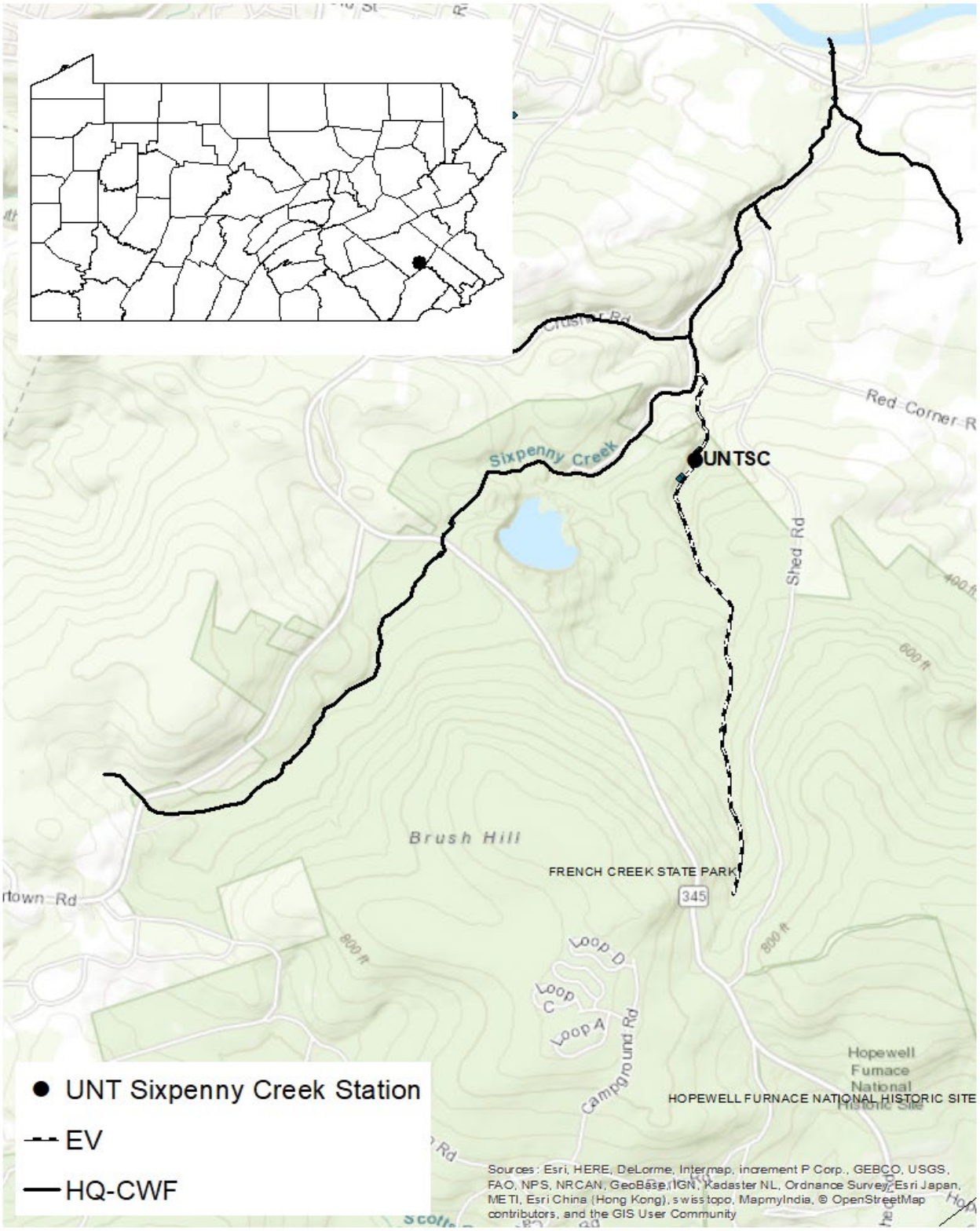


Figure 1. UNT to Sixpenny Creek Basin Redesignation Recommendations.

Table 2. Discrete Physicochemical Data – UNT to Sixpenny Creek and Pine Creek REF.

	PARAMETER	UNITS	STATIONS[1]	
			UNTSC	PC
METALS AND IONS	ALUMINUM D	µg/L	<10	<10
	ALUMINUM T	µg/L	22.2	14.9
	BARIUM T	µg/L	26	21
	BORON T	µg/L	<200	<200
	BROMIDE	µg/L	<25.0	<25.0
	CADMIUM D	µg/L	<.20	<.20
	CALCIUM T	mg/L	6.629	10.692
	CHLORIDE	mg/L	11	16.6
	COPPER D	µg/L	<4	<4
	COPPER T	µg/L	<4	<4
	IRON D	µg/L	<20	30
	IRON T	µg/L	34	53
	LEAD D	µg/L	<1.0	<1.0
	LEAD T	µg/L	<1.0	<1.0
	LITHIUM D	µg/L	<25	<25
	LITHIUM T	µg/L	<25	<25
	MAGNESIUM T	mg/L	2.925	4.686
	MANGANESE D	µg/L	<10	<10
	MANGANESE T	µg/L	<10.00	<10.00
	NICKEL D	µg/L	<50	<50
	NICKEL T	µg/L	<50	<50
	POTASSIUM T	mg/L	<1.00	1.142
	SELENIUM T	µg/L	<7	<7
	SODIUM T	mg/L	5.892	8.855
	STRONTIUM T	µg/L	24	98
	SULFATE	mg/L	7.16	10.6
	ZINC D	µg/L	<10.0	<10.0
	ZINC T	µg/L	<10.0	<10.0
NUTRIENTS	AMMONIA D	mg/L	<.02	<.02
	AMMONIA T	mg/L	<.02	<.02
	NITRATE & NITRITE D	mg/L	<0.05	0.87
	NITRATE & NITRITE T	mg/L	<0.05	0.92
	NITROGEN T	mg/L	<0.25	1.02
	ORTHO PHOSPHORUS D	mg/L	0.012	0.014
	ORTHO PHOSPHORUS T	mg/L	0.011	0.015
	PHOSPHORUS D	mg/L	<0.01	0.01
	PHOSPHORUS T	mg/L	0.011	0.01
PHYSICAL/OTHER	ALKALINITY	mg/L	17	31
	DISSOLVED OXYGEN	mg/L	12.22	12.74
	HARDNESS	mg/L	29	46
	pH	SU	7.3	7.49
	SPECIFIC CONDUCTANCE	µS/cm[c]	91.3	147.1
	TDS	mg/L	76	104
	TEMPERATURE	°C	5.7	5.0
	TOTAL SUSPENDED SOLIDS	mg/L	<5	<5
	TOTAL ORGANIC CARBON	mg/L	1.43	1.6

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

"<" indicate concentrations below the reporting limit.

Biological

Benthic macroinvertebrate samples were collected using the DEP benthic macroinvertebrate data collection protocols, which is a modification of EPA's Rapid Bioassessment Protocols (Barbour et al. 1999, Plafkin et al. 1989, Shull 2017; Table 4). DEP staff collected benthic macroinvertebrate data at both the UNT to Sixpenny Creek station and Pine Creek reference station. The dominant taxon for both samples was the pollution sensitive *Ephemerella* mayfly. Overall taxa richness was high with 30 and 29 taxa for UNT to Sixpenny and Pine Creek respectively. Both samples were dominated by pollution sensitive Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (EPT) taxa.

Table 4. Benthic Macroinvertebrate Data.

TAXA		STATIONS[1] UNTSC	STATIONS[1] PC
Ephemeroptera			
Ameletidae	*Ameletus*	3	-
Baetidae	*Acentrella*	-	1
	Baetis	1	1
Ephemerellidae	*Drunella*	9	19
	Ephemerella	70	57
Heptageniidae	*Cinygmula*	14	3
	Epeorus	11	4
	Leucrocuta	1	-
	Rhithrogena	-	10
	Stenacron	1	-
	Stenonema	3	-
Leptophlebiidae	*Paraleptophlebia*	5	2
Plecoptera			
Chloroperlidae	*Alloperla*	-	2
	Sweltsa	4	-
Leuctridae	*Leuctra*	3	1
Nemouridae	*Amphinemura*	3	2
Perlidae	*Acroneuria*	3	2
	Perlesta	-	10
Perlodidae	*Malirekus*	1	-
	Isoperla	20	8
Peltoperlidae	*Peltoperla*	-	9
	Tallaperla	9	-
Pteronarcyidae	*Pteronarcys*	17	2

TAXA		STATIONS[1] UNTSC	STATIONS[1] PC
Tricoptera			
Glossosomatidae	*Agapetus*	-	10
Hydropsychidae	*Diplectrona*	13	1
Philopotamidae	*Dolophilodes*	11	38
Polycentropodidae	*Polycentropus*	1	-
Rhyacophilidae	*Rhyacophila*	5	6
Odonata			
Gomphidae	*Lanthus*	4	-
Megaloptera			
Corydalidae	*Nigronia*	1	3
Coleoptera			
Psephenidae	*Psephenus*	-	2
	Ectopria	-	1
Elmidae	*Oulimnius*	3	5
	Promoresia	-	1
Diptera			
Blepharicaridae	*Blepharicera*	-	1
Tipulidae	*Tipula*	2	-
	Dicranota	3	1
	Hexatoma	2	3
Chironomidae		16	10
Non-Insect Taxa			
Oligochaeta		1	-
Taxa Richness		30	29
Total Organisms		239	215

[1] Refer to Figure 1 and/or Table 1 for station locations
"-" indicate taxa was not identified at a particular station

Physical

Instream habitat was assessed at the UNT to Sixpenny Creek station and Pine Creek Exceptional Value Waters (EV) reference station. The total habitat score for the UNT to Sixpenny Creek basin station was 202, reflecting optimal habitat conditions (Table 5).

BIOLOGICAL USE QUALIFICATIONS

The qualifying criterion applied to the UNT to Sixpenny Creek basin was the DEP integrated benthic macroinvertebrate scoring test described at 25 Pa. Code § 93.4b(b)(1)(v) (Table 6). Selected benthic macroinvertebrate community metrics from UNT to Sixpenny Creek basin were compared to an

available reference station with comparable drainage areas from Pine Creek located in Berks County. The Pine Creek basin was used as a reference because it has demonstrated an existing use of 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 Pine Creek basin has optimal habitat and similar gradient, drainage area, pH and alkalinity to the candidate stream stations (DEP 2003). Comparisons with the following metrics were used as an indicator of community health: taxa richness, modified Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (EPT) index, modified Hilsenhoff Biotic Index (HBI), percent dominant taxon, and percent modified mayflies (Table 6).

Based on these five metrics, the UNT to Sixpenny Creek candidate surface waters exceeded the EV qualifying criterion of 92% (§ 93.4b(b)(1)(v)).

Table 5. Habitat Evaluation Data.

PARAMETER	STATIONS[1]	
	UNTSC	PC
1. INSTREAM COVER	17	17
2. EPIFAUNAL SUBSTRATE	18	18
3. EMBEDDEDNESS	17	18
4. VELOCITY/DEPTH	15	17
5. CHANNEL ALTERATIONS	19	19
6. SEDIMENT DEPOSITION	16	18
7. RIFFLE FREQUENCY	16	18
8. CHANNEL FLOW STATUS	16	17
9. BANK CONDITION	16	17
10. BANK VEGETATIVE PROTECTION	15	18
11. GRAZING/DISRUPTIVE PRESSURES	18	19
12. RIPARIAN VEGETATION ZONE WIDTH	19	18
Total Score	202	214
Rating[2]	OPT	OPT

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

[2] OPT=Optimal (≥192)

Table 6. Benthic Macroinvertebrate Metric Comparison.

	METRIC	STATIONS[1]	
		UNTSC	PC
1	TAXA RICHNESS	30	29
	Candidate/Reference (%)	114	
	Biol. Cond. Score	8	8
2	MOD. EPT INDEX	20	19
	Candidate/Reference (%)	111	
	Biol. Cond. Score	8	8
3	MOD. HBI	1.43	1.36
	Candidate-Reference	0.48	
	Biol. Cond. Score	8	8
4	% DOMINANT TAXA	29.2	26.5
	Candidate-Reference	2	
	Biol. Cond. Score	8	8
5	% MOD. MAYFLIES	48.8	44.7
	Reference-Candidate	-5	
	Biol. Cond. Score	8	8
TOTAL BIOLOGICAL CONDITION SCORE		40	40
% COMPARABILITY TO REFERENCE		**100**	

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

PUBLIC RESPONSE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided notice of this redesignation evaluation and requested any technical data from the general public through publication in the *Pennsylvania Bulletin* on March 2, 2016 (46 Pa.B. 1287). The Berks County Planning Commission, Berks County Conservation District and Union Township were notified of the evaluation in a letter dated May 27, 2016. In addition, a notification was posted on the DEP's website on June 15, 2016.

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, Delaware RiverKeeper Network, Trout Unlimited, the Pennsylvania Game Commission, and the Department of Conservation and Natural Resources in a letter dated November 16, 2019 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on November 16, 2019 (49 Pa.B. 6919).

All comments received were in support of the redesignation recommendations in the draft report. Comments were received from the Pennsylvania Fish and Boat Commission. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATION

Based on applicable regulatory definitions and requirements of 25 Pa. Code § 93.4b(b)(1)(v) (the DEP's integrated benthic macroinvertebrate scoring test) the DEP recommends that the UNT 64027 to Sixpenny Creek basin be redesignated to EV, MF.

This recommendation adds approximately 6.91 stream miles with the designation of EV 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.

DEP. 2003. Water quality antidegradation implementation guidance. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania. http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=7842&DocName=WATER%20QUALITY%20ANTIDEGRADATION%20IMPLEMENTATION%20GUIDANCE.PDF%20

Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, https://doi.org/10.5066/P96HHBIE.

Plafkin, J. L., Barbour, M. T., Porter, K. D., Gross, S. K., Hughes, R. M. 1989. Rapid Bioassessment Protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001.

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.

CDL-1

FACE SHEET
FOR FILING DOCUMENTS
WITH THE LEGISLATIVE REFERENCE BUREAU

(Pursuant to Commonwealth Documents Law)

RECEIVED

Independent Regulatory
Review Commission

November 23, 2026

DO NOT WRITE IN THIS SPACE

Copy below is hereby approved as to form and legality.
Attorney General

By: Amy M. Elliott
(Deputy Attorney General)

11/16/2026

DATE OF APPROVAL

☐ Check if applicable
Copy not approved. Objections attached.

Copy below is hereby certified to be true and correct copy of a document issued, prescribed or promulgated by:

DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

(AGENCY)

DOCUMENT/FISCAL NOTE NO. 7-592

DATE OF ADOPTION October 13, 2026

BY Jessica L Shirley

TITLE JESSICA SHIRLEY
CHAIRPERSON

EXECUTIVE OFFICER CHAIRPERSON OR SECRETARY

Copy below is hereby approved as to form and legality
Executive or Independent Agencies

BY Cynthia K Montz

October 22, 2026

DATE OF APPROVAL

(Deputy General Counsel)
~~(Chief Counsel - Independent Agency)~~
(Strike inapplicable title)

☐ Check if applicable. No Attorney General Approval or objection within 30 days after submission.

NOTICE OF PROPOSED RULEMAKING

DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

Water Quality Standards; Chester Creek et al. Stream Redesignations

25 Pa. Code Chapter 93

PROPOSED RULEMAKING

ENVIRONMENTAL QUALITY BOARD

[25 PA. CODE CH. 93]

Water Quality Standards; Chester Creek et al. Stream Redesignations

The Environmental Quality Board (Board) proposes to amend Chapter 93 (relating to water quality standards). The amendments will modify the drainage lists in §§ 93.9d, 93.9e, 93.9f, 93.9g, 93.9n, 93.9o and 93.9w to read as set forth in Annex A. The purpose of this proposed rulemaking is to update designated uses for surface waters of this Commonwealth as required by the Federal Clean Water Act (CWA) (33 U.S.C. §§ 1251—1389). The proposed rulemaking fulfills the Commonwealth's obligations under Federal and State law to review and revise, as necessary, water quality standards that are protective of surface waters.

This proposed rulemaking was adopted by the Board at its meeting of October 13, 2026.

A. *Effective Date*

This proposed rulemaking will be effective upon final-form publication in the *Pennsylvania Bulletin*. Once approved by the United States Environmental Protection Agency (EPA), water quality standards are used to implement the CWA.

B. *Contact Persons*

For further information, contact Michael (Josh) Lookenbill, Program Manager, Water Quality Division, Bureau of Clean Water, 11th Floor, Rachel Carson State Office Building, P.O. Box 8774, 400 Market Street, Harrisburg, PA 17105-8774, (717) 787-9637; or Jennie Demjanick, Supervisory Counsel, Bureau of Regulatory Counsel, 9th Floor, Rachel Carson State Office Building, P.O. Box 8464, Harrisburg, PA 17105-8464, (717) 787-7060. Persons with a disability may use the Pennsylvania Hamilton Relay Service at (800) 654-5984 (TDD users) or

(800) 654-5988 (voice users). This proposed rulemaking is available on the Department of Environmental Protection's (Department) website at www.pa.gov/agencies/dep (select "Public Participation," then "Environmental Quality Board" and then navigate to the Board meeting of October 13, 2026).

C. *Statutory Authority*

This proposed rulemaking is authorized under sections 5(b)(1) and 402 of The Clean Streams Law (CSL) (35 P.S. §§ 691.5(b)(1) and 691.402), which authorize the Board to develop and adopt rules and regulations to implement the CSL (35 P.S. §§ 691.1—691.1001), and section 1920-A of The Administrative Code of 1929 (71 P.S. § 510-20), which grants to the Board the power and duty to formulate, adopt and promulgate rules and regulations for the proper performance of the work of the Department. In addition, sections 101(a)(2) and 303(c)(2)(A) of the CWA (33 U.S.C. §§ 1251(a)(2) and 1313(c)(2)(A)) set forth requirements for water quality standards.

D. *Background and Purpose*

The purpose of developing water quality standards is to protect this Commonwealth's surface waters. Water quality standards are in-stream water quality goals that are implemented by imposing specific regulatory requirements (such as treatment requirements, effluent limits and best management practices (BMPs)) on individual sources of pollution. Water quality standards include designated uses, numeric and narrative criteria to protect those uses, and antidegradation requirements for surface waters. The Commonwealth protects its surface waters for a variety of uses relating to aquatic life, water supply, recreation and fish consumption, special protection and navigation.

The continued development of water quality standards, including revisions and updates, is required by Federal and State law. Section 5 of the CSL instructs the Board to consider water quality management and pollution control in the watershed as a whole, and the present and possible future uses of waters when adopting rules and regulations. In addition to these requirements, the Commonwealth has responsibilities under the CWA that require water quality standards to be reviewed and approved by the EPA for consistency with the mandates under that act and to be effective for purposes of implementing CWA actions. Section 101(a)(2) of the CWA establishes the National goal that, wherever attainable, water quality should provide for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the water. Section 303(c)(2)(A) of the CWA requires water quality standards to include designated uses of waters, taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial and other purposes. Section 303(d)(4)(B) of the CWA establishes an antidegradation policy for waters where the quality of the water equals or exceeds levels necessary to protect the designated uses for these waters. Section 303(c)(1) of the CWA requires states to periodically review and revise, as necessary, their water quality standards. The designated uses in this proposed rulemaking are consistent with these Federal and State statutory mandates.

Designated uses represent the water quality goals and expectations for the surface waters of this Commonwealth. Designated uses do not need to be currently attained to be designated but rather can represent the Commonwealth's current or future management goals for a waterbody. Federal regulations in 40 CFR 131.10(i) (relating to designation of uses) require states to revise their water quality standards to reflect the uses that are actually being attained (that is, existing

uses), when water quality standards specify designated uses that are less protective than existing uses.

In addition to establishing appropriate designated uses, the Department also has an obligation to protect existing uses when data indicates that a surface water attains or has attained an existing use. Section 93.1 (relating to definitions) defines "existing uses" as "[t]hose uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." When the existing uses are different than the designated uses for a surface water, the water body will receive the water quality protection identified by either the existing uses or the designated uses, whichever use is most protective.

For example, if the designated use of a stream is listed as Cold Water Fishes (CWF) but the Department's evaluation of available existing use information indicates that the water also attains the use of High Quality Waters (HQ), the stream would be protected for this High Quality Waters – Cold Water Fishes (HQ-CWF) existing use through Department permit or approval actions. Section 93.4c (relating to implementation of antidegradation requirements) requires the Department to make a final determination of existing use protection for a surface water as part of a final permit or approval action. During review of a permit application and draft permit, interested persons may provide the Department with additional information regarding existing use protection for the surface water. This additional information is included in the draft stream evaluation reports that are published on the Department's website for public review and comment.

In addition to existing use determinations made during a Department permit or approval process, stream use evaluations may be initiated in other ways. The Department may identify candidate streams for redesignation of uses during routine waterbody investigations. Other

agencies may request use evaluations to be considered, and members of the public may submit a rulemaking petition to the Board in accordance with § 93.4d (relating to processing of petitions, evaluations and assessments to change a designated use). When an evaluation of the data demonstrates that existing uses are incongruent with the designated uses, a stream redesignation proposal will be initiated through the rulemaking process to ensure the designated uses in the drainage lists found in §§ 93.9a—93.9z are consistent with the existing uses of the stream.

By protecting the water uses, and the quality of the water necessary to maintain the uses, benefits may be gained in a variety of ways by all residents and visitors of this Commonwealth. For example, clean water used for drinking water supplies benefits the consumers by lowering drinking water treatment costs and reducing medical costs associated with illnesses caused or worsened by exposure to pollutants in drinking water. Clean surface waters benefit this Commonwealth by providing for increased tourism and recreational use of the waters. Clean water provides for increased wildlife habitat and more productive fisheries. Furthermore, clean water attracts businesses and industry that require a high quality of surface water for production or operation.

The purpose of this proposed rulemaking is to update designated uses to be consistent with the existing uses of surface waters of this Commonwealth, as required by the CWA. The proposed amendments to the designated uses of streams benefit not only local residents but those persons from outside the areas affected by this rulemaking who come to enjoy the benefits and aesthetics of outdoor recreation.

The proposed amendments are the result of stream evaluations conducted by the Department in response to: the EPA's partial approval of the Triennial Review of Water Quality Standards final-form rulemaking published at 50 Pa.B. 3426 (July 11, 2020) (Reynolds Run and

Chester Creek); a request from The Nature Conservancy (Unnamed Tributary (UNT) 64027 to Sixpenny Creek); the Department's ongoing Statewide monitoring activities (Bermudian Creek; UNT 32599 to North Fork Dunkard Fork; and the Middle Lehigh River tributaries, which include Bear Creek (04123), Nesquehoning Creek tributaries (Jeans Run, Broad Run, Dennison Run, Bear Creek (04115), Grassy Meadow Run) and Mahoning Creek tributaries (Stewart Creek, UNT 04055 and UNT 04060)); and permit writers' requests associated with National Pollutant Discharge Elimination System (NPDES) permit renewals (UNT 03181 to Tohickon Creek, and Logan Spring Run). The stream redesignations rely on qualifications and definitions in §§ 93.3 and 93.4b(a)(2)(ii) and (b)(1)(iii), (v) and (vi) (relating to protected water uses; and qualifying as High Quality or Exceptional Value Waters). The specific qualifiers applied for each of the stream redesignation recommendations are detailed in the individual stream evaluation reports available on the Department's website.

This proposed rulemaking was developed by the Department's Bureau of Clean Water following a comprehensive evaluation of the physical, chemical and biological characteristics and other information available on these waterbodies.

As part of this stream redesignation process, and in accordance with § 93.4c, the Department offered opportunities for the public to provide data and other information during the review of surface water uses. The Department provided public notice of its intent to evaluate the streams in this proposed rulemaking and requested water quality data for these streams through publications in the *Pennsylvania Bulletin* as summarized in Table 1.

Additionally, notices of the intent to evaluate these streams were posted on the Department's website. The Department directly notified affected municipalities, planning

commissions, conservation districts and Commonwealth agencies of these redesignation evaluations in letters dated as summarized in Table 1.

Table 1. *Pennsylvania Bulletin* Publication Dates for Notices of Stream Evaluation and Dates of Notification Letters Sent to Affected Governmental Organizations and Agencies

Stream Name	*County*	*Pennsylvania Bulletin*	*Notification Letters*
Reynolds Run	Lancaster	51 Pa.B. 6320 (October 2, 2021)	October 2, 2021
Chester Creek	Chester	51 Pa.B. 6320	October 2, 2021
UNT 32599 to North Fork Dunkard Fork	Greene	52 Pa.B. 6785 (October 29, 2022)	November 3, 2022
UNT 64027 to Sixpenny Creek	Berks	46 Pa.B. 1287 (March 5, 2016)	May 27, 2016
Bermudian Creek	Adams	48 Pa.B. 3491 (June 9, 2018)	June 12, 2018
Logan Spring Run	Huntingdon Blair	48 Pa.B. 3491	June 12, 2018
UNT 03181 to Tohickon Creek	Bucks	49 Pa.B. 6626 (November 2, 2019)	October 31, 2019
Bear Creek (04123)	Carbon	48 Pa.B. 7265 (November 17, 2018)	October 19, 2018
Jeans Run	Carbon	48 Pa.B. 7265	October 19, 2018
Broad Run	Carbon	48 Pa.B. 7265	October 19, 2018
Dennison Run	Carbon	48 Pa.B. 7265	October 19, 2018
Bear Creek (04115)	Carbon	48 Pa.B. 7265	October 19, 2018
Grassy Meadow Run	Carbon	48 Pa.B. 7265	October 19, 2018
Stewart Creek	Carbon	48 Pa.B. 7265	October 19, 2018
UNT 04055 to Mahoning Creek	Carbon	48 Pa.B. 7265	October 19, 2018
UNT 04060 to Mahoning Creek	Carbon	48 Pa.B. 7265	October 19, 2018

In response to these notifications, the Department received one letter in support of the redesignation for Reynolds Run and additional fish data from the Pennsylvania Fish and Boat Commission (PFBC). One letter of support was received for UNT 64027 to Sixpenny Creek. Two letters of support were received for Logan Spring Run. Two letters of general support as well as additional information to be considered as part of the evaluation were received for UNT

03181 to Tohickon Creek. Additionally, one letter of support for UNT 32599 to North Fork Dunkard Fork was received.

Following the period for data submission described in the notices of intent to assess, the Department evaluated all available water quality data and other applicable information for these streams, and drafted and published stream evaluation reports on the website for public review and comment. Notices of availability were published in the *Pennsylvania Bulletin*, and the Department directly notified affected municipalities, planning commissions, conservation districts and Commonwealth agencies of these redesignation evaluations in letters dated as summarized in Table 2. Members of the public interested in receiving notifications of stream evaluations, including the notices of intent to assess and draft stream evaluation reports, may subscribe to the Department's Electronic Notification System, eNotice, at www.ahs.dep.pa.gov/eNOTICEWeb.

Table 2. Stream Evaluation Draft Report Publication for Public Comment

Stream Name	*Pennsylvania Bulletin*	*Notification Letters*
Reynolds Run	54 Pa.B. 2168 (April 20, 2024)	April 20, 2024
Chester Creek	54 Pa.B. 2168	April 20, 2024
UNT 32599 to North Fork Dunkard Fork	54 Pa.B. 2168	April 20, 2024
UNT 64027 to Sixpenny Creek	49 Pa.B. 6919 (November 16, 2019)	November 16, 2019
Bermudian Creek	49 Pa.B. 6919	November 16, 2019
Logan Spring Run	49 Pa.B. 6919	November 16, 2019
UNT 03181 to Tohickon Creek	51 Pa.B. 6704 (October 23, 2021)	October 23, 2021
Bear Creek (04123)	50 Pa.B. 6468 (November 14, 2020)	November 14, 2020; December 30, 2020
Jeans Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Broad Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Dennison Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020

Bear Creek (04115)	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Grassy Meadow Run	50 Pa.B. 6468	November 14, 2020; December 30, 2020
Stewart Creek	50 Pa.B. 6468	November 14, 2020; December 30, 2020
UNT 04055 to Mahoning Creek	50 Pa.B. 6468	November 14, 2020; December 30, 2020
UNT 04060 to Mahoning Creek	50 Pa.B. 6468	November 14, 2020; December 30, 2020

Each draft report was open for public comment for no less than a 30-day period. In response to these notifications, the Department received the following feedback.

For Reynolds Run, two comments were received in support of the redesignation recommendations. For Chester Creek, the Department received two comments in support of the redesignation recommendation. For UNT 32599 to North Fork Dunkard Fork, there were three comments in support. For Bermudian Creek, there was one comment submitted by the PFBC with a recommended revision. The PFBC provided additional fish survey data collected in May 2016. No letters were received regarding UNT 64027 to Sixpenny Creek or Logan Spring Run. UNT 03181 to Tohickon Creek received support regarding the redesignation recommendation from 7 organizations and 276 citizens. The Department received additional data from the Heritage Conservancy regarding UNT 03181 to Tohickon Creek. One comment of support was received for Bear Creek (04123). Tributaries to Nesquehoning Creek (that is, Bear Creek, Jeans Run, Broad Run, Dennison Run, Grassy Meadow Run and Stewart Creek) and Mahoning Creek (UNT 04055 and UNT 04060) had approximately 471 letters of support and 1 letter requesting an extension of the formal comment period by 60 days.

Copies of the stream evaluation reports for these waterbodies are available on the Department's website or from the contact persons listed in section B of this preamble. All data

and comments received in response to these notifications were considered in the review of the surface water evaluations for these streams. The data and information collected on these waterbodies support this proposed rulemaking as set forth in Annex A.

Department staff presented a summary of this proposed rulemaking to the Department's Agricultural Advisory Board on April 10, 2025.

E. *Summary of Proposed Rulemaking*

Proposed Redesignations of Chester Creek et al.

This proposed rulemaking updates and revises stream use designations for 16 stream basins totaling 138.47 stream miles in 7 drainage lists based on the various HQ and Exceptional Value Waters (EV) qualifiers in § 93.4b. The following is a brief summary of the Department's recommendations for each waterbody:

Section 93.9d. Drainage List D

The Department conducted evaluations on the following streams in Drainage List D as part of routine monitoring and assessment efforts. Because the indigenous aquatic community is an excellent indicator of long-term water quality conditions, biological data were collected to evaluate the water quality conditions in the surveyed basins. The Department applied its integrated benthic macroinvertebrate scoring test to each of the streams listed and compared the biological data collected in these streams to biological data collected from a reference waterbody. The reference waterbody used to evaluate each of the streams was Wild Creek in Carbon County.

Bear Creek (04123) – Bear Creek (04123) exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that Bear Creek (04123) be redesignated EV from source to mouth.

Jeans Run – Jeans Run meets the applicable definitions and requirements as defined in § 93.4b(b)(1)(iii) and (vi) regarding outstanding State resource waters and wilderness trout water qualifiers. Therefore, it is being recommended that Jeans Run be redesignated EV from source to mouth.

Broad Run – Broad Run exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that Broad Run be redesignated EV from source to mouth.

Bear Creek (04115) – Bear Creek (04115) exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that Bear Creek (04115) be redesignated EV from source to mouth.

Dennison Run – Dennison Run exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that Dennison Run (04123) be redesignated EV from source to mouth.

Grassy Meadow Run – Grassy Meadow Run exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that Grassy Meadow Run be redesignated EV from source to mouth.

Stewart Creek – As provided by § 93.4b(a)(2)(ii), streams designated by the PFBC as Class A wild trout streams qualify for HQ designation. Stewart Creek from the confluence with Crooked Run to its mouth was identified as being a Class A Wild Trout stream based on Wild Brown Trout biomass criteria found during the PFBC surveys conducted in 2013 showed that Stewart Creek, from the confluence with Crooked Run to the mouth, is above the minimum total brown trout biomass criteria in 58 Pa. Code § 57.8a (relating to Class A wild trout streams). The PFBC published notice that Stewart Creek would be considered for Class A listing and sought

public response at 45 Pa.B. 3941 (July 18, 2015). The PFBC approved the addition of Stewart Creek as a Class A stream at the PFBC's September 29, 2015, meeting, with notice published at 45 Pa.B. 6373 (October 24, 2015). Based on this Class A designation by the PFBC, the area of Stewart Creek, from Crooked Run to the mouth qualifies as HQ. Stewart Creek from source to Crooked Run and including direct tributaries Bear Creek and Crooked Run also exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that Stewart Creek be redesignated EV from source to Crooked Run and including Crooked Run, with Stewart Creek, from Crooked Run to mouth recommended to be redesignated HQ.

UNT 04055 to Mahoning Creek – UNT 04055 to Mahoning Creek exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that UNT 04055 be redesignated EV from source to mouth.

UNT 04060 to Mahoning Creek – UNT 04060 to Mahoning Creek exceeded the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v). Therefore, it is being recommended that UNT 04060 be redesignated EV from source to mouth.

Section 93.9e. Drainage List E

UNT 03181 to Tohickon Creek (locally Bog Run) – The Department conducted an evaluation on UNT 03181 to Tohickon Creek, locally known as Bog Run, in response to a permit writer's request associated with an NPDES permit renewal located within the basin. The Department reviewed information gathered for the Pennsylvania Natural Heritage Program and reported in the Bucks County Natural Heritage Inventory. The Bucks County Natural Heritage Inventory identified an area with Statewide ecological significance that is based upon the importance, rarity and uniqueness of the area's endemic ecological community types. The area, Quakertown Swamp, contains a Bottomland Oak – Hardwood Palustrine Forest Community,

which is a rare and endemic community type hydrologically connected to riverine surface water and therefore is water quality-dependent. The UNT 03181 to Tohickon Creek basin, which runs through Quakertown Swamp, is currently designated Trout Stocking (TSF). The Department is recommending redesignation of UNT 03181 (Bog Run) basin from its current designation of TSF to EV based on the exceptional ecological significance qualifier in § 93.4b(b)(2).

Section 93.9f. Drainage List F

UNT 64027 to Sixpenny Creek – The Nature Conservancy submitted a request that UNT 64027 to Sixpenny Creek, from its source to mouth, be considered for redesignation to EV. The stream originates within and approximately 80% of it lies within the French Creek State Park. The Department looked at physiochemical data, physical habitat data, as well as benthic macroinvertebrate samples collected at both UNT 64027 and Pine Creek (Berks County) as the reference waterbody. It is recommended that UNT 64027 be redesignated to EV based on the basin exceeding the EV qualifying criterion of 92% as defined in § 93.4b(b)(1)(v).

Section 93.9g. Drainage List G

Chester Creek – The Department conducted an evaluation of the Chester Creek basin from its source to Rocky Run in response to an EPA disapproval. In the Triennial Review of Water Quality Standards final-form rulemaking published at 50 Pa.B. 3426, the designated use of Chester Creek was changed from TSF to Warm Water Fishes (WWF) to correct errors introduced in the final-form rulemaking published at 27 Pa.B. 3050 (June 28, 1997). The EPA did not approve this change to Chester Creek because it had the appearance of a redesignation to a less restrictive use, though it was actually to correct errors. In response, the Department conducted a more detailed evaluation of the Chester Creek watershed to document the appropriate designated uses. The Department is recommending redesignation of Chester Creek

from WWF to TSF. This recommendation aligns with the current EPA-approved designation for Chester Creek, which remains TSF, with respect to CWA actions.

Section 93.9n. Drainage List N

Logan Spring Run – The Department evaluated Logan Spring Run in response to a permit writer's request associated with an NPDES permit renewal located at the confluence of Logan Spring Run and the Little Juniata River. Biological data were collected to evaluate Logan Spring Run because the indigenous aquatic community is an excellent indicator of long-term water quality conditions. In addition, PFBC surveys conducted in 1993 and 2004 documented the maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat. An additional PFBC survey conducted in 2016 documented sculpin, which are also indigenous to a cold water habitat. Logan Spring Run has not been officially classified as a Class A Wild Trout Stream by the PFBC, and therefore does not meet the qualifications for HQ in § 93.4b(a)(2)(ii). Based on applicable definitions in § 93.3, the Department is recommending redesignation of the Logan Spring Run basin, from its source to the mouth, from its current designation of WWF to CWF.

Section 93.9o. Drainage List O

Reynolds Run – The Department conducted an evaluation of the Reynolds Run basin in response to an EPA disapproval of a change to the designated use. In the Triennial Review of Water Quality Standards final-form rulemaking published at 50 Pa.B. 3426, the designated use of Reynolds Run was changed from HQ-CWF to HQ-TSF to correct an error in the final-form rulemaking published at 27 Pa.B. 3050. The EPA did not approve this change because, although it was to correct an introduced error, it had the appearance of a redesignation to a less restrictive use. The EPA provided comment and requested that the Department provide a summary of the

designated use history of Reynolds Run and current available data that may include fish assemblage and macroinvertebrate data in support of the use designation corrections in the Triennial Review of Water Quality Standards final-form rulemaking published at 50 Pa.B. 3426. In response, the Department conducted a more detailed evaluation of the Reynolds Run watershed to document the appropriate designated uses. The Department is recommending redesignation of the Reynolds Run basin from HQ-TSF to HQ-CWF. This recommendation aligns with the current EPA-approved designation for Reynolds Run, which remains HQ-CWF, with respect to CWA actions.

Bermudian Creek – The Department conducted an evaluation of the Bermudian Creek basin as part of routine monitoring and assessment efforts. The Bermudian Creek basin from its source to UNT 08727 is currently listed on the PFBC's listing of wild trout streams (that is, streams supporting naturally reproducing populations of trout) under 58 Pa. Code § 57.11 (relating to listing of wild trout streams). The Bermudian Creek basin is currently designated WWF with the exception of the Latimore Creek subbasin, which is currently designated CWF. PFBC surveys conducted in 2006 and 2016 both document the maintenance and propagation of Salmonidae and other fish species indigenous to a cold water habitat. In addition to the PFBC survey, the Department also collected biological, bacteriological and chemistry samples. Based on the results of the PFBC surveys, as well as the Department's evaluation, and following the applicable definitions in § 93.3, the recommendations for Bermudian Creek include redesignation to CWF from its source to UNT 08719 and redesignation to TSF from and including UNT 08719 to the State Route 94 bridge.

Section 93.9w. Drainage List W

UNT 32599 to North Fork Dunkard Fork – The Department evaluated UNT 32599 to North Fork Dunkard Fork as part of routine monitoring and assessment efforts. Biological data were collected to evaluate UNT 32599 because the indigenous aquatic community is an excellent indicator of long-term water quality conditions. The biological assessment procedures referenced in § 93.4b(b)(1)(v) were applied to UNT 32599, with Limestone Run in Fayette County as the reference waterbody. The UNT 32599 basin met the 92% comparison required to qualify for EV. Therefore, the Department recommends the UNT 32599 basin be designated as EV.

F. *Benefits, Costs and Compliance*

Benefits

Updates to the Commonwealth's water quality standards are in the public interest because they ensure the uses of surface waters are protected based on the latest science and available data. This Commonwealth's residents, visitors and natural resources will benefit from this proposed rulemaking because it protects the surface waters in this Commonwealth at appropriate levels. Protecting water quality provides economic and societal value to present and future generations in the form of a clean water supply that can support all current and potential future uses, including: human consumption, wildlife, irrigation and industrial use; recreational opportunities such as fishing (also for fish consumption); water contact sports and boating; and aquatic life protection.

The following paragraphs describe four specific categories of economic and social benefits of clean water that are protected by this proposed rulemaking. More generally, Farber and Griner found that 217 households near Loyalhanna Creek and the Conemaugh River in western Pennsylvania valued water quality improvements in those streams up to $27,179 per year. (Farber, S., & Griner, B. (2000). "Valuing watershed quality improvements using conjoint

analysis." *Ecological Economics*, 34(1), 63—76. https://doi.org/10.1016/S0921-8009(00)00153-1) Research estimating benefits of clean water specific to Pennsylvania is rare, but research done outside of Pennsylvania still provides concepts and findings that are translatable to this Commonwealth.

Increased property values

A substantial body of research demonstrates that improved water quality increases nearby property values.

In 2018, researchers from Michigan State University and Texas A&M University published an article that reviewed 43 distinct hedonic studies of the effects of water quality on property values, including studies from across the United States plus a handful of studies in other countries. (Nicholls, S., & Crompton, J. (2018). "A comprehensive review of the evidence of the impact of surface water quality on property values." *Sustainability*, 10(2), 500. https://doi.org/10.3390/su10020500) Nicholls and Crompton found that "the expected, statistically significant relationship between water quality and property price was demonstrated in at least one of the [numerous hedonic] models developed in all but two studies." Nicholls and Crompton concluded that when viewed as a whole, the studies provided "convincing evidence that clean water has a positive effect on property values" and that the value homebuyers associate with water quality persists even during economic downturns. Specific to Pennsylvania, the meta-analysis by Nicholls and Crompton included a study by Epp and Al-Ani of over 200 properties located near small rivers and streams in Pennsylvania that found a positive correlation between water quality and housing values, and concluded that buyers are aware of the environmental setting of a home and that differences in the quality of nearby waters affect the price paid for a residential property. (Epp, D. J., & Al-Ani, K. S. (1979). "The effect of water

quality on rural nonfarm residential property values." *American Journal of Agricultural Economics*, 61(3), 529—534. https://doi.org/10.2307/1239441) Also included in the meta-analysis by Nicholls and Crompton was a study conducted by staff at the EPA's National Center for Environmental Economics, described as "the largest hedonic analysis of water quality ever completed," which evaluated over 225,000 property sales between 1996 to 2008 for single-family homes and townhouses in Maryland, located within 4 kilometers of the Chesapeake Bay tidal waters across 14 counties. (Walsh, P. et al. (2017). "Modeling the property price impact of water quality in 14 Chesapeake Bay counties." *Ecological Economics*, 135, 103—113. https://doi.org/10.1016/j.ecolecon.2016.12.014) The authors concluded that better water clarity had a statistically significant positive impact on waterfront property prices in half of the counties. While the analysis was less clear for nonwaterfront properties, the authors still observed that water quality could affect the value of homes even when they were not located directly on the waterfront.

The Delaware Riverkeeper Network published a report that discusses a case study from the Maine Agricultural and Forest Experiment Station which found that properties located near higher quality waters had higher market value, and that a decline in water quality can completely abate the market value premium associated with a home being a waterfront property. (Delaware Riverkeeper Network. (2010). "River values: The value of a clean and healthy Delaware River." https://rucore.libraries.rutgers.edu/rutgers-lib/57797/PDF/1/play/)

A 2006 study from the Great Lakes region by Braden et al. estimated that property values were significantly depressed in two regions associated with toxic contaminants in river sediments. (Braden, J. B. et al. (2006). "Economic benefits of sediment remediation." Project GL-96553601. https://www.nemw.org/wp-content/uploads/2015/06/EconBenReport06.pdf) The

study showed depressed property values between $57 million and $118 million for single-family and multifamily homes in a portion of the lower Buffalo River in New York and between $80 million and $120 million for single family homes in the lower Sheboygan River in Ohio due to toxic contamination of river sediments.

Perry et al. of Key-Log Economics prepared a report for Our Pocono Waters that analyzed more than 240,000 residential and 5,000 commercial properties across 5 counties in northeastern Pennsylvania and determined that "residential and commercial land value increases for properties closer to an EV or HQ stream, when compared to otherwise similar properties farther away." (Perry, A. et al. (2022). "Economic effects of special protection stream designations in the Pocono Mountains region." Our Pocono Waters. https://ourpoconowaters.files.wordpress.com/2022/08/ourpoconowaters_report_final_web-pdf_8.11.22.pdf) (Perry et al. (2022)) The report attributed this increase in property values to willingness on the part of landowners to pay more for the better aesthetic qualities and increased recreational opportunities that can be better provided by streams afforded special protection status.

Maintenance of abundant and healthy fish and wildlife populations and support for outdoor recreation

Clean surface waters also benefit the Commonwealth by providing for increased tourism and recreational use of the waters. Clean water provides for improved wildlife habitat and more productive fisheries. This proposed regulation benefits local residents and those from outside the affected areas who come to enjoy the benefits and aesthetics associated with outdoor recreation.

Businesses, including small businesses, requiring high-quality source water and those in the recreation industry will be positively affected by this proposed rulemaking. The maintenance

and protection of water quality will ensure the long-term availability of recreational fisheries and other activities. The purpose of this proposed rulemaking is to preserve these resources for current and future sportspersons, outdoor recreators and wildlife enthusiasts so that the social and economic benefits are maintained in local areas. The preservation of unique resources adds economic value to the local areas and, importantly, provides a valuable social function for outdoor recreation. One example is the proposed redesignation of UNT 03181 to Tohickon Creek due to its location within the Quakertown Swamp. The Quakertown Swamp is recognized as a significant ecological resource by the Pennsylvania Natural Diversity Inventory and provides the opportunity for nature walks and wildlife watching. The maintenance and protection of the water quality that would result from this proposed rulemaking will ensure the long-term availability of wildlife watching and other forms of outdoor recreation in the area. Specific revenue-related benefits associated with outdoor recreation and the range of economic value of the outdoor recreation industry in this Commonwealth are outlined in the following reports.

The Perry et al. (2022) report linked improved water quality to increased recreational spending, which leads to job creation and increased wages. Among other things, the study concluded that “improvements in water quality may lead to increases in outdoor recreation expenditures and/or trips.”

The 2024 Outdoor Recreation Economic Statistics report from the United States Bureau of Economic Analysis documents over $20 billion in total economic value generated in this Commonwealth from the outdoor recreation industry, including over $9.5 billion in total compensation with 176,752 jobs in outdoor recreation in this Commonwealth. (United States Department of Commerce, United States Bureau of Economic Analysis. (2026). “Outdoor

recreation economic statistics, U.S. and states, 2024." https://www.bea.gov/news/2026/outdoor-recreation-economic-statistics-us-and-states-2024)

Southwick Associates has prepared several reports for the Theodore Roosevelt Conservation Partnership that analyze the economic contribution of outdoor recreation in this Commonwealth. The latest report revealed that, in 2020, the outdoor recreation industry in this Commonwealth contributed more than $32 billion to this Commonwealth's state gross domestic product, supporting more than 430,000 jobs (more than the number of jobs in this Commonwealth for the production of durable goods in the same year) with nearly $20 billion in salaries and wages, and generating over $6.5 billion in tax revenue at the Federal, State and local levels. (Southwick Associates. (2022). "Estimating the economic contributions of outdoor recreation in Pennsylvania: An analysis of 2020 state-level economic contributions made by hunting, fishing, and other outdoor recreation activities." Theodore Roosevelt Conservation Partnership. www.trcp.org/wp-content/uploads/2018/12/TRCP-and-Southwick-PA-Economic-Analysis-12-6-18.pdf) This report includes indirect effects, like purchases made by businesses supplying goods and services for outdoor recreation activities, and induced economic effects, like household spending generated by wages paid to workers in the outdoor recreation industry.

According to a 2005 report published jointly by the PFBC, the United States Geological Survey and the Pennsylvania State University, wild trout streams provide unique angling opportunities that contributed over $7.16 million to this Commonwealth's economy during the regular trout season in 2004. (Greene, R. R. et al. (2005). "Angler use, harvest and economic assessment on wild trout streams in Pennsylvania." PFBC Files, Bellefonte, PA)

The United States Fish and Wildlife Service periodically conducts National surveys of fishing, hunting and wildlife-associated recreation. According to the 2011 survey, approximately

1.1 million anglers participated in fishing and approximately 3.6 million persons participated in wildlife watching in this Commonwealth during 2011, with fishing-related expenditures totaling $485 million (including food and lodging, transportation, and other expenses such as equipment rental, bait and cooking fuel) and wildlife-watching expenditures totaling $1.3 billion (including trip-related costs and equipment). (United States Department of the Interior, United States Fish and Wildlife Service, and United States Department of Commerce, United States Census Bureau. (2018). "2011 National survey of fishing, hunting, and wildlife-associated recreation—Pennsylvania." https://www2.census.gov/programs-surveys/fhwar/publications/2011/fhw11-pa.pdf)

Maintenance of the current green infrastructure along streams and the associated reduction in tax expenditures

A 2014 report by the Lehigh Valley Planning Commission demonstrates the benefits when clean water and natural areas are protected. (Lehigh Valley Planning Commission. (2014). "Lehigh Valley return on environment" (https://greenways.delawareandlehigh.org/wp-content/uploads/sites/6/2016/05/ReturnOnEnvironment_Dec_18_2014.pdf) The report states, "[t]he current green infrastructure along streams in the Lehigh Valley reduces tax dollars by avoiding more than $110.3 million annually in expenditures for water supply ($45.0 million), disturbance (flood) mitigation ($50.6 million) and water quality ($14.7 million)." This report describes how investing in green infrastructure to improve water quality (such as watershed conservation, forest buffers, and wetlands construction) can be much more cost effective than more traditional gray infrastructure approaches (such as pipes and treatment plants).

More recently, similar studies in Chester, Delaware, Montgomery and Northampton Counties have also found many millions of dollars in benefits from environmental services

provided by natural lands, including benefits to water supplies, water quality, and flood mitigation. (Chester County Planning Commission. (2019). "Return on environment – The economic value of protected open space in Chester County, Pennsylvania." www.chescoplanning.org/Publications/PDF/ROE-FullDocument.pdf) (Econsult Solutions. (2022). "Return on environment – The economic impact of protected open space in Delaware County, Pennsylvania." Delaware County Planning Department. www.delcopa.gov/sites/default/files/2024-11/ESI-ROE_DelawareCo_2022-05-04_FINAL_Report-compressed.pdf) (Montgomery County Planning Commission. (2022). "Return on environment – The economic impact of protected open space in Montgomery County, Pennsylvania." www.montgomerycountypa.gov/departments/planning-commission/planning-topic/projects/return-environment) (Northampton County Parks and Recreation. (2025). "Northampton County, Pennsylvania – Return on environment and outdoor recreation economic impact." https://econsultsolutions.com/wp-content/uploads/2026/02/Northampton-Co-Return-on-Environment-Report-2025-11-13_LowRes.pdf)

Savings in water treatment for downstream communities that rely on surface waters for water supplies and availability of unpolluted water for domestic, agricultural and industrial uses

Safe drinking water is vital to maintaining healthy and sustainable communities, and maintaining clean surface waters is crucial for ensuring safe drinking water supplies. Maintaining clean surface water benefits public water suppliers and their customers, enabling communities to plan and build future capacity for economic growth and setting the foundation for long-term sustainability for years to come. By maintaining clean surface water, public water suppliers may avoid the costly capital investments that are often required for the installation of

advanced water treatment processes as well as the higher annual operations and maintenance costs associated with effective operation of these processes – costs which would likely be passed on to public water system customers.

For example, in a study of 27 water suppliers, the Trust for Public Land and the American Water Works Association found that every 10% increase in forest cover in source watersheds was associated with an approximate 20% decrease in treatment and chemical costs. (Trust for Public Land, & American Water Works Association. (2004). "Protecting the source – Land conservation and the future of America's drinking water." www.tpl.org/wp-content/uploads/2014/03/water-protecting_the_source_final.pdf) In a review of seven cities across the United States, Postel and Thompson also documented avoided capital and operating costs ranging from hundreds of thousands of dollars to hundreds of millions of dollars annually. (Postel, S. L., & Thompson, B. H., Jr. (2005). "Watershed protection: Capturing the benefits of nature's water supply services." *Natural Resources Forum.* 29, 98—108. https://doi.org/10.1111/j.1477-8947.2005.00119.x) A similar case could be made for agricultural, industrial and other water supply uses benefiting from the availability of better source water quality. Protecting the quality of drinking water sources is also an additional safeguard to protect consumers from illnesses caused or worsened by exposure to pollutants in drinking water, and associated health care costs.

Compliance costs

These proposed amendments to Chapter 93 will not impose any new compliance costs on persons engaged in regulated activities under existing individual permits or approvals from the Department because existing discharges are included in any determination of the existing water quality when streams are redesignated to HQ or EV. Because the presence of these discharge

activities did not preclude the attainment of the HQ or EV use and the water quality of the HQ or EV water will be maintained and protected under existing permit coverage, these discharges are considered to satisfy the antidegradation requirements in § 93.4a(c) (relating to antidegradation) so long as the discharge quality and quantity remain the same. Additional compliance costs may arise when permits or approvals are necessary for new or expanded regulated activities to a stream protected as HQ or EV.

Discharges to special protection streams are not eligible for coverage under NPDES general permits, based on § 92a.54(a)(8) (relating to general permits), and therefore, require individual permits. Individual permits are required in special protection waters because the existing quality of the water must be protected. Therefore, each discharge must be evaluated individually for each stream. Site-specific characteristics of the stream water quality are used to determine effluent limitations for discharges to a stream. The individual permits are necessary to track the quality and quantity of existing permitted discharges to ensure that additional or increased discharges to a special protection water do not occur without the Department's review in accordance with the antidegradation regulations.

In addition, stormwater discharges associated with industrial activity to surface waters classified as HQ or EV under Chapter 93 do not qualify for conditional exclusion from an NPDES permit as provided under § 92a.32(b) (relating to stormwater discharges). Some additional cost will be incurred by a facility required to obtain an individual permit. The Department will implement stream redesignations through permit and approval actions.

Table 3 compares fees associated with individual and general NPDES permits, as established in §§ 92a.26, 92a.62 and 102.6 (relating to application fees; annual fees; and permit applications and fees). The fees in Table 3 include notice of intent (NOI) fees for general

permits, and application and annual fees for individual permits. For simplicity, the table does not show fees for permit amendments or transfers of coverage.

Table 3. Summary of Fees Associated with Individual and General NPDES Permits

Permit Type	*Individual Permit Application Fees*	*Individual Permit Annual Fees*	*General Permit NOI Fees**
Small flow sewage treatment plants:			
Single residences	$200	$100	$100 (PAG-04)
All others	$500	$250	$200 (PAG-04)
Stormwater associated with industrial activity	$3,000	$1,500	$2,500 (PAG-03)*
Municipal separate storm sewer system	$5,000	$2,500	$2,500 (PAG-13)*
Concentrated animal feeding operations	$500	$500	$2,000 (PAG-12)
Application of pesticides	$3,000	$300	$2,500 (PAG-15)*
Stormwater associated with construction activity	$1,500 + $100/acre of earth disturbance	$500	$500 + $100/acre of earth disturbance (PAG-01 and PAG-02)
Industrial waste:			
Minor to major (>=250 million gallons per day)	$3,000—$10,000	$1,500—$50,000	N/A
Petroleum contaminated groundwater systems	$3,000—$10,000	$3,000—$10,000	$2,500 (PAG-05)
Hydrostatic test water	$3,000—$10,000	$3,000—$10,000	$2,500 (PAG-10)

* The NOI fee is paid in annual installments over the 5-year term of the permit.

The protection of HQ and EV streams does not limit economic growth and development. While a new, additional or increased discharge to a stream with a protected use of HQ or EV does require additional evaluations and may require the use of additional treatment technologies or BMPs, it does not prohibit activities. Discharge permits to surface waters with a protected use

of HQ or EV may be issued if a permit applicant can sufficiently demonstrate to the Department that the activity will protect existing water quality.

In the future, persons adding or expanding a discharge to a stream may need to provide a higher level of treatment or additional BMPs to protect the designated and existing uses of the affected streams. A person who proposes a new, additional or increased point source discharge to a stream with a protected use of EV or HQ would need to satisfy the antidegradation requirements in § 93.4c(b)(1). An applicant for any new, additional or increased point source discharge to special protection waters shall evaluate nondischarge alternatives, and the applicant shall use an alternative that is environmentally sound and cost effective when compared to the cost associated with achieving a nondegrading discharge. If a nondischarge alternative is not environmentally sound and cost-effective, an applicant for a new, additional or increased discharge shall utilize antidegradation best available combination of technologies (ABACT), which include cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies.

The permit applicant shall demonstrate in the permit application that their new or expanded activities will not lower the existing water quality of special protection streams. If an applicant cannot meet these nondegrading discharge requirements, a person who proposes a new, additional or increased discharge to a stream with a protected use of HQ is given an opportunity to demonstrate there is a social or economic benefit of the project that would justify a lowering of the water quality. The social and economic justification (SEJ) demonstration must show that the discharge is necessary to accommodate important economic or social development in the area in which the waters are located and that a lower water quality will protect all other applicable water uses for the waterbody. SEJ is not available for proposed discharges to streams

with a protected use of EV. The water quality of streams with a protected use of EV must be maintained and protected. Due to the technology-specific and location-specific natures of this demonstration, it is not possible to estimate costs associated with new, additional or increased discharges to streams with a designated use of HQ or EV.

Costs associated with new, additional or increased discharges to surface waters may include increased consulting fees to complete the additional antidegradation analyses and permit application requirements that address antidegradation of surface water quality, along with increased engineering design fees and installation, operation and maintenance costs for additional treatment technologies or BMPs. The treatment technology or BMPs necessary for each discharge and their costs are based on the specific design and operation of a facility, which also requires consideration of the size of the discharge in relation to the size of the stream and many other factors. It is not possible to forecast these additional costs because there is no way to predict if existing permitted facilities or activities will expand, or if new facilities or activities will apply for permits in the future.

For nonpoint source control, under § 93.4c(b)(2), cost-effective and reasonable BMPs must be achieved for pollution sources to surface waters with a protected use of HQ and EV.

When onlot sewage systems are planned, compliance with the sewage facilities planning and permitting regulations in Chapters 71—73 (relating to administration of sewage facilities planning program; administration of sewage facilities permitting program; and standards for onlot sewage treatment facilities) will continue to satisfy § 93.4c in the waters that are proposed for redesignation to HQ or EV in this rulemaking. Permit applicants of sewage facilities with proposed discharges to surface waters with a protected use of HQ, subject to antidegradation requirements, may demonstrate SEJ at the sewage facilities planning stage and need not

redemonstrate SEJ at the discharge permitting stage. The SEJ demonstration process is available to sewage and nonsewage discharge applicants for any naturally occurring substances identified in accordance with the Department's *Water Quality Antidegradation Implementation Guidance* (391-0300-002). This proposed rulemaking will not increase costs or trigger adverse effects on existing or planned onlot sewage systems.

Regarding permitted discharges to waters proposed for redesignation to special protection in this rulemaking, the Department identified 11 NPDES general permits (for nonpublicly owned sewage and for stormwater associated with either mining or industrial activity) and 1 "no exposure" conditional exclusion from an NPDES stormwater permit as provided under § 92a.32(b). The Department considers 4 of these 11 permits to be small businesses based on available information. For context, Statewide, approximately 17,850 facilities or activities hold NPDES permits, not including NPDES permits for stormwater associated with construction activity. Existing permitted discharges authorized under an NPDES general permit and entities that have obtained a "no exposure" conditional exclusion may be affected because point source discharges to special protection streams are not eligible for coverage under NPDES general permits or for conditional exclusion from NPDES stormwater permits, based on §§ 92a.32(b) and 92a.54(a)(8) and (e)(9), and therefore require individual permits. Additional cost may be incurred by these facilities required to obtain an individual permit.

The Department's permit evaluation did not include NPDES permits for stormwater associated with construction activities issued under Chapter 102 (relating to erosion and sediment control). These permits were not included in the permit analyses because of the short-term, temporary nature of these permitted discharges.

The permit count also does not include NPDES permits within the Reynolds Run basin. The permits within this basin are already issued with the HQ designated use recommendation in this proposed rulemaking. In other words, although § 93.9o (relating to Drainage List O) would be updated for this basin from HQ-TSF to HQ-CWF, the current EPA-approved designated use for Reynolds Run used for CWA actions, such as NPDES permits, already includes the HQ designation, which will not change.

While an HQ or EV use does not prohibit activities, any new, additional or increased discharge to a stream with a protected use of HQ or EV requires additional evaluations to be completed by the permit applicant and may require the use of additional treatment technologies or BMPs. Discharge permits to surface waters with a protected use of HQ or EV may be issued if a permit applicant can sufficiently demonstrate to the Department that the activity will protect existing water quality. The Department identified eight individual permits for existing discharges to waters proposed for redesignation to special protection in this proposed rulemaking. These eight permits could be affected by the proposed regulation in the future if additional or increased discharges are requested by these permittees.

Broader estimates of who will be affected by the stream redesignations in this proposed rulemaking and how they will be affected would be speculative at this time because: (1) a discharger will not be impacted until a future activity requires a new or modified NPDES permit; (2) the characteristics of each receiving stream and each effluent discharge are unique; (3) SEJ may be available to modify the requirement; (4) persons currently discharging under a general permit to these waters may or may not continue with their permitted activity after the stream uses are redesignated; and (5) generic technology or cost equations are not available for purposes of comparing the costs or savings, or both, for persons who are responsible for discharges.

Compliance assistance plan

This proposed rulemaking will not impose any new compliance requirements on persons engaged in regulated activities under existing individual permits or approvals from the Department. When applying for permits or approvals for new, additional or increased discharges, the Department will provide compliance assistance.

Paperwork requirements

NPDES general permits are not available for discharges to waters with a protected use of HQ or EV. Applications for individual permits will require additional paperwork. The individual permits are necessary to track the quality and quantity of any existing permitted discharges to ensure that additional or increased discharges to a special protection water do not occur without the Department's review in accordance with the antidegradation regulations. The additional paperwork is necessary to review applications that contain the antidegradation analysis as well as to tailor the permit conditions to the treatment or BMPs necessary to protect the existing water quality of the streams with a designated use of HQ or EV.

This proposed rulemaking will not impose any new paperwork requirements on persons engaged in regulated activities under existing individual permits or approvals from the Department. When applying for permits or approvals for new, additional or increased discharges, additional information may need to be submitted to the Department as part of the permit application or approval request. As discussed previously, the permit applicant will complete an antidegradation analysis. The applicant will describe how the proposed activity will be conducted to maintain existing water quality. If water quality cannot be maintained and the proposed discharge will be to a water with a protected use of HQ, the applicant may submit an SEJ demonstration for the lowering of water quality.

G. *Pollution Prevention*

The Federal Pollution Prevention Act of 1990 (42 U.S.C. §§ 13101—13109) established a National policy that promotes pollution prevention as the preferred means for achieving state environmental protection goals. The Department encourages pollution prevention, which is the reduction or elimination of pollution at its source, through the substitution of environmentally friendly materials, more efficient use of raw materials, and the incorporation of energy efficiency strategies. Pollution prevention practices can provide greater environmental protection with greater efficiency because they can result in significant cost savings to facilities that permanently achieve or move beyond compliance.

The water quality standards and antidegradation program are major pollution prevention tools because the objective is to prevent degradation by maintaining and protecting existing water quality and existing uses. Although the antidegradation program does not prohibit new or expanding wastewater discharges, nondischarge alternatives must be implemented when environmentally sound and cost-effective. Nondischarge alternatives, when implemented, remove impacts to surface water and may reduce the overall level of pollution to the environment by remediation of the effluent through the soil. In addition, if no environmentally sound and cost-effective alternatives are available, discharges must be nondegrading except as provided in § 93.4c(b)(1)(iii) regarding SEJ in waters with a protected use of HQ.

H. *Sunset Review*

The Board is not establishing a sunset date for these regulations, because they are needed for the Department to carry out its statutory authority. The Department will continue to closely monitor these regulations for their effectiveness and recommend updates to the Board as necessary.

I. *Regulatory Review*

Under section 5(a) of the Regulatory Review Act (RRA) (71 P.S. § 745.5(a)), on November 23, 2026, the Department submitted a copy of this proposed rulemaking and a copy of the Regulatory Analysis Form (RAF) to the Independent Regulatory Review Commission (IRRC), and to the chairpersons of the Environmental Resources and Energy Committee of the Senate and the chairpersons of the Environmental and Natural Resource Protection Committee of the House of Representatives. A copy of this material is available to the public upon request.

Under section 5(g) of the RRA, IRRC may convey any comments, recommendations or objections to the proposed rulemaking within 30 days of the close of the public comment period. The comments, recommendations or objections must specify the regulatory review criteria in section 5.2 of the RRA (71 P.S. § 745.5b) which have not been met. The RRA specifies detailed procedures for review, prior to final publication of the rulemaking, by the Department, the General Assembly and the Governor.

J. *Public Comments*

Interested persons are invited to submit to the Board written comments, suggestions, support or objections regarding this proposed rulemaking. Comments, suggestions, support or objections must be received by the Board by February 2, 2027.

Comments may be submitted to the Board online, by e-mail, by mail or express mail as follows. Comments submitted by facsimile will not be accepted.

Comments may be submitted to the Board by accessing eComment at http://www.ahs.dep.pa.gov/eComment.

Comments may be submitted to the Board by e-mail at RegComments@pa.gov. A subject heading of this proposed rulemaking and a return name and address must be included in each transmission.

If an acknowledgement of comments submitted online or by e-mail is not received by the sender within 2 working days, the comments should be retransmitted to the Board to ensure receipt.

Written comments should be mailed to the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477. Express mail should be sent to the Environmental Quality Board, Rachel Carson State Office Building, 16th Floor, 400 Market Street, Harrisburg, PA 17101-2301.

K. *Public Hearing*

The Board will hold a virtual public hearing for the purpose of accepting comments on this proposed rulemaking. The hearing will be held at 2 p.m. on January 26, 2027.

Persons wishing to present testimony at a hearing are requested to contact the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477, (717) 787-8727 or RA-EPEQB@pa.gov at least 1 week in advance of the hearing to reserve a time to present testimony. Language interpretation services are available upon request. Persons in need of language interpretation services shall contact Casey Damicantonio at (717) 787-8727 by 5 p.m. on January 19, 2027.

Oral testimony is limited to 5 minutes for each witness. Organizations are limited to designating one witness to present testimony on their behalf at one hearing. Witnesses may provide testimony by means of telephone or Internet connection. Video demonstrations and screen sharing by witnesses will not be permitted.

Witnesses are requested to submit written copy of their verbal testimony by email to RegComments@pa.gov after providing testimony at the hearing.

Information on how to access the virtual public hearing is available on the Board's webpage found through the Public Participation link on the Department's website at www.pa.gov/agencies/dep (select "Public Participation," then "Environmental Quality Board"). Prior to a hearing, individuals are encouraged to visit the Board's webpage for the most current information for accessing the hearing.

Members of the public wishing to observe a virtual public hearing without providing testimony are also directed to access the Board's webpage.

Persons in need of accommodations as provided for in the Americans with Disabilities Act of 1990 should contact the Board at (717) 787-8727 or through the Pennsylvania Hamilton Relay Service at (800) 654-5984 (TDD users) or (800) 654-5988 (voice users) to discuss how the Board may accommodate their needs.

JESSICA SHIRLEY,

Chairperson

Annex A

TITLE 25. ENVIRONMENTAL PROTECTION

PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE II. WATER RESOURCES

CHAPTER 93. WATER QUALITY STANDARDS

DESIGNATED WATER USES AND WATER QUALITY CRITERIA

§ 93.9d. Drainage List D.

Delaware River Basin in Pennsylvania

Lehigh River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
* * * * *				
4—Quakake Creek	Basin, Wetzel Creek to Mouth	Carbon	CWF, MF	None
4—Tributaries to Black Creek	Basins, Quakake Creek to Mouth	Carbon	HQ-CWF, MF	None
2—Lehigh River	**Basin, Black Creek to Bear Creek**	**Carbon**	**HQ-CWF, MF**	**None**
3—Bear Creek	**Basin**	**Carbon**	**EV, MF**	**None**
2—Lehigh River	Basin, **[Black]** **Bear** Creek to Nesquehoning Creek	Carbon	HQ-CWF, MF	None
3—Nesquehoning Creek	Basin, Source to Lake Greenwood at 40°49'41.5"N; 75°57'19.7"W	Schuylkill	HQ-CWF, MF	None
3—Nesquehoning Creek	Mainstem, Lake Greenwood to Tibbetts Pond Dam at 40°50'53.2"N; 75°53'18.0"W	Carbon	HQ-WWF, MF	None

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
4—Tributaries to Nesquehoning Creek	Basins, Lake Greenwood to **[Tibbetts Pond Dam]** **Grassy Meadow Run**	**[Schuylkill-]** Carbon	HQ-CWF, MF	None
4—Grassy Meadow Run	**Basin**	**Carbon**	**EV, MF**	**None**
4—Tributaries to Nesquehoning Creek	**Basins, Grassy Meadow Run to Bear Creek**	**Carbon**	**HQ-CWF, MF**	**None**
4—Bear Creek	**Basin**	**Carbon**	**EV, MF**	**None**
4—Tributaries to Nesquehoning Creek	**Basins, Bear Creek to Tibbetts Pond Dam**	**Carbon**	**HQ-CWF, MF**	**None**
3—Nesquehoning Creek	Mainstem, Tibbetts Pond Dam to Mouth	Carbon	CWF, MF	None
4—Tributaries to Nesquehoning Creek	Basins, Tibbetts Pond Dam to **[Deep]** **Dennison** Run	Carbon	HQ-CWF, MF	None
4—Dennison Run	**Basin**	**Carbon**	**EV, MF**	**None**
4—Tributaries to Nesquehoning Creek	**Basins, Dennison Run to Broad Run**	**Carbon**	**HQ-CWF, MF**	**None**
4—Broad Run	**Basin**	**Carbon**	**EV, MF**	**None**
4—Tributaries to Nesquehoning Creek	**Basins, Broad Run to Deep Run**	**Carbon**	**HQ-CWF, MF**	**None**
4—Deep Run	Basin	Carbon	EV, MF	None
4—Tributaries to Nesquehoning Creek	Basins, Deep Run to UNT 04106 at 40°51'49.0"N; 75°49'14.9"W	Carbon	HQ-CWF, MF	None
4—UNT 04106 (locally First Hollow Run)	Basin	Carbon	EV, MF	None
4—Tributaries to Nesquehoning Creek	**Basins, UNT 04106 to Jeans Run**	**Carbon**	**HQ-CWF, MF**	**None**
4—Jeans Run	**Basin**	**Carbon**	**EV, MF**	**None**

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
4—Tributaries to Nesquehoning Creek	Basins, **[UNT 04106] <u>Jeans Run</u>** to Mouth	Carbon	HQ-CWF, MF	None
2—Lehigh River	Basin, Nesquehoning Creek to the point at 40°52'3.5"N; 75°44'9.3"W	Carbon	HQ-CWF, MF	None
2—Lehigh River	Mainstem, the point at 40°52'3.5"N; 75°44'9.3"W to Allentown Dam at 40°36'24.0"N; 75°27'16.0"W	Lehigh	TSF, MF	None
* * * * *				
3—Mahoning Creek	Basin, Wash Creek to UNT 04074 at 40°46'43.4"N; 75°50'35.2"W	Schuylkill	CWF, MF	None
4—UNT 04074	Basin	Schuylkill	HQ-CWF, MF	None
3—Mahoning Creek	Basin, UNT 04074 to **[Mouth] <u>UNT 04060 at 40°47'25.4"N; 75°48' 0.7"W</u>**	Carbon	CWF, MF	None
<u>4—UNT 04060</u>	**<u>Basin</u>**	**<u>Carbon</u>**	**<u>EV, MF</u>**	**<u>None</u>**
<u>3—Mahoning Creek</u>	**<u>Basin, UNT 04060 to UNT 04055 at 40°47'39.8'N; 75°47'24.8"W</u>**	**<u>Carbon</u>**	**<u>CWF, MF</u>**	**<u>None</u>**
<u>4—UNT 04055</u>	**<u>Basin</u>**	**<u>Carbon</u>**	**<u>EV, MF</u>**	**<u>None</u>**
<u>3—Mahoning Creek</u>	**<u>Basin, UNT 04055 to Stewart Creek</u>**	**<u>Carbon</u>**	**<u>CWF, MF</u>**	**<u>None</u>**
<u>4—Stewart Creek</u>	**<u>Basin, Source to Crooked Run</u>**	**<u>Carbon</u>**	**<u>EV, MF</u>**	**<u>None</u>**
<u>4—Stewart Creek</u>	**<u>Basin, Crooked Run to Mouth</u>**	**<u>Carbon</u>**	**<u>HQ-CWF, MF</u>**	**<u>None</u>**
<u>3—Mahoning Creek</u>	**<u>Basin, Stewart Creek to Mouth</u>**	**<u>Carbon</u>**	**<u>CWF, MF</u>**	**<u>None</u>**

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
3—Tributaries to Lehigh River	Basins, Mahoning Creek to Pohopoco Creek	Carbon	CWF, MF	None
3—Pohopoco Creek	Basin, Source to SR 3016 Bridge at Merwinsburg at 40°58'6.2"N; 75°27'53.6"W	Monroe	CWF, MF	None
* * * * *				

§ 93.9e. Drainage List E.

Delaware River Basin in Pennsylvania

Delaware River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
* * * * *				
2—Tinicum Creek	Basin	Bucks	EV, MF	None
2—Smithtown Creek	Basin	Bucks	TSF, MF	None
2—Tohickon Creek	Basin, Source to **[Lake Nockamixon Dam]** **UNT 03181 at 40°26'25.9"N; 75°17'48.4"W**	Bucks	TSF, MF	None
3—UNT 03181 (locally Bog Run)	**Basin**	**Bucks**	**EV, MF**	**None**
2—Tohickon Creek	**Basin, UNT 03181 to Lake Nockamixon Dam at 40°28'4.1"N; 75°11'16.9"W**	**Bucks**	**TSF, MF**	**None**
2—Tohickon Creek	Basin, Lake Nockamixon Dam to Deep Run	Bucks	CWF, MF	None
3—Deep Run	Basin	Bucks	WWF, MF	None
* * * * *				

§ 93.9f. Drainage List F.

Delaware River Basin in Pennsylvania

Schuylkill River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
	* * * * *			
3—Hay Creek	Basin, Birdsboro Boundary to Mouth	Berks	CWF, MF	None
2—Schuylkill River	Basin, Hay Creek to Sixpenny Creek	Berks	WWF, MF	None
3—Sixpenny Creek	Basin**, Source to UNT 64027 at 40°14'33.5"N; 75°46'40.1"W**	Berks	HQ-CWF, MF	None
4—UNT 64027	**Basin**	**Berks**	**EV, MF**	**None**
3—Sixpenny Creek	**Basin, UNT 64027 to Mouth**	**Berks**	**HQ-CWF, MF**	**None**
2—Schuylkill River	Basin, Sixpenny Creek to Monocacy Creek	Berks	WWF, MF	None
3—Monocacy Creek	Basin, Source to UNT 01762 at 40°22'1.3"N; 75°48'35.3"W	Berks	WWF, MF	None
	* * * * *			

§ 93.9g. Drainage List G.

Delaware River Basin in Pennsylvania

Delaware River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
	* * * * *			
2—Ridley Creek	Basin, Media Water Intake to LR 23013 (SR 2006) Bridge	Delaware	TSF, MF	None
2—Ridley Creek	Non-Tidal Portions of Basin, LR 23013 Bridge to Mouth	Delaware	WWF, MF	None

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
2—Chester Creek	Basin **[(locally known as Goose Creek basin), Source to East Branch Chester Creek],** **Source to Rocky Run**	Chester	**[WWF]** **TSF**, MF	None
[3—East Branch Chester Creek	**Basin**	**Chester**	**TSF, MF**	**None**
2—Chester Creek	**Basin, East Branch Chester Creek to Rocky Run**	**Delaware**	**TSF, MF**	**None]**
3—Rocky Run	Basin	Delaware	HQ-CWF, MF	None
2—Chester Creek	Basin, Rocky Run to Confluence with West Branch	Delaware	TSF, MF	None
3—West Branch Chester Creek	Basin, Source to Green Creek	Delaware	TSF, MF	None
4—Green Creek	Basin	Delaware	CWF, MF	None
3—West Branch Chester Creek	Basin, Green Creek to Mouth	Delaware	TSF, MF	None
2—Chester Creek	Basin, West Branch to Dutton Mills Road Bridge **at 39°52'9.6"N; 75°24'31.8"W**	Delaware	TSF, MF	None
2—Chester Creek	**Non-Tidal Portions of Basin, Dutton Mills Road Bridge to UNT 00526 at 39°51'45.4"N; 75°23'42.4"W**	**Delaware**	**TSF, MF**	**None**
4—UNT 00526	**Basin**	**Delaware**	**WWF, MF**	**None**
2—Chester Creek	Nontidal Portions of Basin, **[Dutton Mills Road Bridge]** **UNT 00526** to Mouth	Delaware	WWF, MF	None

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
2—Stoney Creek	Non-Tidal Portions of Basin	Delaware	WWF, MF	None
2—Marcus Hook Creek	Non-Tidal Portions of Basin	Delaware	WWF, MF	None
* * * * *				

§ 93.9n. Drainage List N.

Susquehanna River Basin in Pennsylvania

Juniata River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
* * * * *				
4—Bald Eagle Creek (South)	Basin, Vanscoyoc Run to Mouth	Blair	TSF, MF	None
4—Tributaries to Little Juniata River	Basins, Bald Eagle Creek to Logan Spring Run	Blair	WWF, MF	None
4—Logan Spring Run	Basin	Blair	**[WWF]** **CWF**, MF	None
3—Little Juniata River	Mainstem, Logan Spring Run to McLain Run	Huntingdon	HQ-CWF, MF	None
4—Tributaries to Little Juniata River	Basins, Logan Spring Run to Sinking Run	Blair-Huntingdon	WWF, MF	None
* * * * *				

§ 93.9o. Drainage List O.

Susquehanna River Basin in Pennsylvania

Susquehanna River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
* * * * *				
3—Oppossum Creek	Basin	Adams	TSF, MF	None
2—Conewago Creek (West)	Basin, Oppossum Creek to Bermudian Creek	York	WWF, MF	None
3—Bermudian Creek	Basin, Source to **[Latimore Creek] UNT 08719 at 39°58'21.4"N; 77°7'2.9"W**	Adams	**[WWF] CWF**, MF	None
4—UNT 08719	**Basin**	**Adams**	**TSF, MF**	**None**
3—Bermudian Creek	**Basin, UNT 08719 to SR-94 Bridge at 39°59'42.9"N; 77°5'40.3"W**	**Adams**	**TSF, MF**	**None**
3—Bermudian Creek	**Basin, SR-94 Bridge to Latimore Creek**	**Adams**	**WWF, MF**	**None**
4—Latimore Creek	Basin	Adams	CWF, MF	None
3—Bermudian Creek	Basin, Latimore Creek to Mouth	York	WWF, MF	None
* * * * *				
3—UNT 07001	Basin	Chester	EV, MF	None
3—Tributaries to Octoraro Creek	Basins, UNT 07001 to Reynolds Run	Lancaster-Chester	TSF, MF	None
3—Reynolds Run	Basin	Lancaster	**[HQ-TSF] HQ-CWF**, MF	None
3—Tributaries to Octoraro Creek	Basins (all sections in PA), Reynolds Run to PA-MD State Border	Lancaster-Chester	TSF, MF	None
2—Octoraro Creek (MD)				
* * * * *				

§ 93.9w. Drainage List W.

Ohio River Basin in Pennsylvania

Ohio River

Stream	Zone	County	Water Uses Protected	Exceptions To Specific Criteria
	* * * * *			
4—Unnamed Tributaries to Enlow Fork	Basins (all sections in PA), PA-WV Border to Confluence with Dunkard Fork	Washington-Greene	WWF	None
3—Dunkard Fork				
4—North Fork Dunkard Fork	Basin, Source to **[Confluence with South Fork]** **UNT 32599 at 39°53'2.3"N; 80°26'30.9"W**	Greene	TSF	None
5—UNT 32599	**Basin**	**Greene**	**EV**	**None**
4—North Fork Dunkard Fork	**Basin, UNT 32599 to Confluence with South Fork Dunkard Fork**	**Greene**	**TSF**	**None**
4—South Fork Dunkard Fork	Basin (all sections in PA), Source to Confluence with North Fork	Greene	TSF	None
3—Dunkard Fork	Main Stem, Confluence of North and South Forks to PA-WV State Border	Greene	WWF	None
	* * * * *			

Pennsylvania
Department of
Environmental Protection

November 23, 2026

David Sumner
Executive Director
Independent Regulatory Review Commission
555 Walnut Street, Suite 804
Harrisburg, PA 17101

Re: Proposed Rulemaking: Water Quality Standards—Chester Creek et al. Stream Redesignations (#7-592)

Dear Mr. Sumner:

Pursuant to Section 5(a) of the Regulatory Review Act, please find enclosed a copy of the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking for review by the Independent Regulatory Review Commission (Commission). The Environmental Quality Board adopted this rulemaking on October 13, 2026. This proposal is scheduled for publication in the *Pennsylvania Bulletin* on December 19, 2026, with a 45-day public comment period ending on February 2, 2027. A virtual public hearing is scheduled for January 26, 2027.

Section 303(c)(1) of the Federal Clean Water Act requires states to periodically review and revise, as necessary, water quality standards. The water quality standards evaluated in this rulemaking are the designated uses of surface waters. The proposed stream redesignations are based on the available data and appropriate regulatory criteria for 16 stream basins totaling 138.47 stream miles in seven drainage lists. The stream redesignations rely on the definitions and qualifications in 25 Pa. Code §§ 93.3 and 93.4b(a)(2)(ii) and (b)(1)(iii), (v), and (vi), regarding protected water uses, and qualifying as High Quality or Exceptional Value Waters.

As set forth in the Regulatory Review Act, the Department will consider any comments and recommendations made by the Commission, as well as the House Environmental and Natural Resource Protection Committee, the Senate Environmental Resources and Energy Committee and the public, prior to final adoption of the enclosed rulemaking.

Please contact me by e-mail at laurcampbe@pa.gov or by telephone at 717.772.5830 if you have any questions or need additional information.

Sincerely,

Laura Campbell

Laura Campbell
Regulatory Coordinator

Enclosures

From:	Bulletin
To:	Campbell, Laura
Cc:	Imgrund, Lauren; Reiley, Robert A.; Griffin, Laura; Kelly, Elizabeth
Subject:	[External] Re: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Date:	Monday, November 23, 2026 11:17:15 AM
Attachments:	image001.png

ATTENTION: *This email message is from an external sender. Do not open attachments or click links from unknown senders. To report suspicious email, use the Report Phish button in Outlook.*

Hello Laura!

Thank you for sending Proposed Rulemaking 7-592 for publication in the December 19 Bulletin issue.

Have a wonderful Thanksgiving holiday!

RECEIVED

Independent Regulatory Review Commission

November 23, 2026

Leah D. Brown
Legal Assistant
Pa. Code and Bulletin Office
501 North Street
647 Main Capitol Building
Harrisburg, PA
(717) 783-2272 (Direct Line)
(717) 783-1530 (Main Office Line)

From: Campbell, Laura <laurcampbe@pa.gov>
Sent: Monday, November 23, 2026 10:48 AM
To: Bulletin <bulletin@palrb.us>
Cc: Lauren Imgrund <limgrund@pa.gov>; Robert A. Reiley <rreiley@pa.gov>; Laura Griffen <laurgriffi@pa.gov>; Kelly, Elizabeth <elkelly@pa.gov>
Subject: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)

Good morning,

Pursuant to Section 5(a) of the Regulatory Review Act, please find attached the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking (7-592). The rulemaking documents are attached in a zip folder. This is the official filing of proposed rulemaking 7-592. Preamble and annex files were provided on November 17, 2026, for initial processing.

A copy of the transmittal sheet is attached for your records – the House and Senate Committee chairs are receiving the rulemaking electronically.

Please confirm receipt of this rulemaking by replying to all recipients.

Thank you,

Laura

RECEIVED
Independent Regulatory
Review Commission
November 23, 2026

Laura Campbell | Regulatory Coordinator | *She/Her/Hers*
Department of Environmental Protection | Policy Office

Rachel Carson State Office Building
400 Market Street | Harrisburg, PA 17105
Mobile: 717-772-5830
dep.pa.gov

PRIVILEGED AND CONFIDENTIAL COMMUNICATION The information transmitted is intended only for the person or entity to whom it is addressed and may contain confidential and/or privileged material. Any use of this information other than by the intended recipient is prohibited. If you receive this message in error, please send a reply e-mail to the sender and delete the material from any and all computers.

From:	Osenbach, Matt
To:	Campbell, Laura
Cc:	Eyster, Emily; Troutman, Nick; Imgrund, Lauren; Nezat, Taylor; Reiley, Robert A.; Griffin, Laura; Kelly, Elizabeth
Subject:	Re: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Date:	Monday, November 23, 2026 10:35:10 AM

RECEIVED
Independent Regulatory Review Commission
November 23, 2026

Good morning Laura,

Message received. Thank you!

Matt Osenbach

Director, Environmental Resources & Energy Committee

Office of State Senator Gene Yaw (R-23)

362 Main Capitol Building, Senate Box 203023

Harrisburg, PA 17120

T: (717) 787-3280

F: (717) 772-0575

www.SenatorGeneYaw.com

On Nov 23, 2026, at 10:33 AM, Campbell, Laura <laurcampbe@pa.gov> wrote:

CAUTION : External Email
Good morning, Pursuant to Section 5(a) of the Regulatory Review Act, please find attached the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking (7-592) for review by the Senate Environmental Resources and
ZjQcmQRYFpfptBannerStart
This Message Is From an External Sender
This message came from outside your organization.

ZjQcmQRYFpfptBannerEnd
Good morning,

Pursuant to Section 5(a) of the Regulatory Review Act, please find attached the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking (7-592) for review by the Senate Environmental Resources and Energy Committee. The rulemaking documents are attached in a zip folder and

the cover letters for Senator Yaw and Senator Comitta are attached separately.

A copy of the transmittal sheet is attached for your records – the House and Senate Committee chairs are receiving the rulemaking electronically.

Please confirm receipt of this rulemaking by replying to all recipients.

Thank you,

RECEIVED
Independent Regulatory Review Commission
November 23, 2026

Laura

[cid:image001.png@01DD78D9.632F8D40]

Laura Campbell | Regulatory Coordinator | She/Her/Hers
Department of Environmental Protection | Policy Office

Rachel Carson State Office Building
400 Market Street | Harrisburg, PA 17105
Mobile: 717-772-5830
dep.pa.gov<https://urldefense.com/v3/__http://www.dep.pa.gov/__;!!CQG60v2-!mRlmpaOzKKOUVY_wkg3kF3xh-YF-xXF9_j7Z11hu1FnKDVxeeeebxBjUF6-LOmHMZs5KqUMtFffZkWNtuNhMsA$>

PRIVILEGED AND CONFIDENTIAL COMMUNICATION The information transmitted is intended only for the person or entity to whom it is addressed and may contain confidential and/or privileged material. Any use of this information other than by the intended recipient is prohibited. If you receive this message in error, please send a reply e-mail to the sender and delete the material from any and all computers.

<7-592_Chester Creek_Proposed_Comitta.pdf>
<7-592_Chester Creek_Proposed_Transmittal Sheet.docx>
<7-592_Chester Creek_Proposed_Yaw.pdf>
<7-592_Chester Creek_Proposed.zip>

From:	Eyster, Emily
To:	Campbell, Laura; Osenbach, Matt
Cc:	Troutman, Nick; Imgrund, Lauren; Nezat, Taylor; Reiley, Robert A.; Griffin, Laura; Kelly, Elizabeth
Subject:	Re: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Date:	Monday, November 23, 2026 10:44:40 AM
Attachments:	image001.png

RECEIVED
Independent Regulatory Review Commission
November 23, 2026

Received. Thanks Laura!

Emily Eyster
Legislative Director, Office of Senator Carolyn T. Comitta
Executive Director, Senate Environmental Resources and Energy Committee
Cell: (717) 756-4702
Phone: (717) 787-5709
www.pasenatorcomitta.com

From: Campbell, Laura <laurcampbe@pa.gov>
Sent: Monday, November 23, 2026 10:30 AM
To: Eyster, Emily <Emily.Eyster@pasenate.com>; mosenbach@pasen.gov <mosenbach@pasen.gov>
Cc: ntroutman@pasen.gov <ntroutman@pasen.gov>; Imgrund, Lauren <limgrund@pa.gov>; Nezat, Taylor <tnezat@pa.gov>; Reiley, Robert A. <rreiley@pa.gov>; Griffin, Laura <laurgriffi@pa.gov>; Kelly, Elizabeth <elkelly@pa.gov>
Subject: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)

■ EXTERNAL EMAIL ■

Good morning,

Pursuant to Section 5(a) of the Regulatory Review Act, please find attached the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking (7-592) for review by the Senate Environmental Resources and Energy Committee. The rulemaking documents are attached in a zip folder and the cover letters for Senator Yaw and Senator Comitta are attached separately.

A copy of the transmittal sheet is attached for your records – the House and Senate Committee chairs are receiving the rulemaking electronically.

Please confirm receipt of this rulemaking by replying to all recipients.

Thank you,

RECEIVED

Independent Regulatory
Review Commission

November 23, 2026

Laura



Laura Campbell | Regulatory Coordinator | *She/Her/Hers*
Department of Environmental Protection | Policy Office

Rachel Carson State Office Building
400 Market Street | Harrisburg, PA 17105
Mobile: 717-772-5830
dep.pa.gov

PRIVILEGED AND CONFIDENTIAL COMMUNICATION The information transmitted is intended only for the person or entity to whom it is addressed and may contain confidential and/or privileged material. Any use of this information other than by the intended recipient is prohibited. If you receive this message in error, please send a reply e-mail to the sender and delete the material from any and all computers.

This message and any attachment may contain privileged or confidential information intended solely for the use of the person to whom it is addressed. If the reader is not the intended recipient then be advised that forwarding, communicating, disseminating, copying or using this message or its attachments is strictly prohibited. If you receive this message in error, please notify the sender immediately and delete the information without saving any copies.

From:	Franzese, Evan B.
To:	Campbell, Laura; Marisa Thomas; Shupe, Hayley
Cc:	Imgrund, Lauren; Nezat, Taylor; Reiley, Robert A.; Griffin, Laura; Kelly, Elizabeth
Subject:	RE: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Date:	Monday, November 23, 2026 10:37:24 AM
Attachments:	image001.png

RECEIVED
Independent Regulatory Review Commission
November 23, 2026

Confirming receipt. Thank you!

Evan Franzese-Peterson
Executive Director | House Environmental & Natural Resource Protection Committee (D)
Representative Greg Vitali
Pennsylvania House of Representatives
M: 223-797-7185
O: 717-783-2189
F: 717-780-4780

From: Campbell, Laura <laurcampbe@pa.gov>
Sent: Monday, November 23, 2026 10:30 AM
To: Mthomas@pahousegop.com; Franzese, Evan B. <EFranzese@pahouse.net>; Shupe, Hayley <HShupe@pahouse.net>
Cc: Imgrund, Lauren <limgrund@pa.gov>; Nezat, Taylor <tnezat@pa.gov>; Reiley, Robert A. <rreiley@pa.gov>; Griffin, Laura <laurgriffi@pa.gov>; Kelly, Elizabeth <elkelly@pa.gov>
Subject: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Importance: High

Good morning,

Pursuant to Section 5(a) of the Regulatory Review Act, please find attached the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking (7-592) for review by the House Environmental and Natural Resource Protection Committee. The rulemaking documents are attached in a zip folder and the cover letters for Representative Vitali and Representative Rader are attached separately.

A copy of the transmittal sheet is attached for your records – the House and Senate Committee chairs are receiving the rulemaking electronically.

Please confirm receipt of this rulemaking by replying to all recipients.

Thank you,

Laura

RECEIVED

Independent Regulatory
Review Commission

November 23, 2026

Laura Campbell | Regulatory Coordinator | *She/Her/Hers*
Department of Environmental Protection | Policy Office

Rachel Carson State Office Building
400 Market Street | Harrisburg, PA 17105
Mobile: 717-772-5830
dep.pa.gov

PRIVILEGED AND CONFIDENTIAL COMMUNICATION The information transmitted is intended only for the person or entity to whom it is addressed and may contain confidential and/or privileged material. Any use of this information other than by the intended recipient is prohibited. If you receive this message in error, please send a reply e-mail to the sender and delete the material from any and all computers.

From:	Marisa Thomas
To:	Campbell, Laura; Franzese, Evan B.; Shupe, Hayley
Cc:	Imgrund, Lauren; Nezat, Taylor; Reiley, Robert A.; Griffin, Laura; Kelly, Elizabeth
Subject:	RE: [EXTERNAL]: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Date:	Monday, November 23, 2026 10:31:06 AM
Attachments:	image001.png

RECEIVED
Independent Regulatory Review Commission
November 23, 2026

Received.

Thank you,

Marisa Thomas
Administrative Assistant II

Office of State Representative Brenda Pugh
120th Legislative District
422 Irvis Office Building
Harrisburg, PA 17120-2092
Phone: (717) 787-3798

Office of State Representative Jack Rader
176th Legislative District
423 Irvis Office Building
Harrisburg, PA 17120-2176
Phone: (717) 787-7732

From: Campbell, Laura <laurcampbe@pa.gov>
Sent: Monday, November 23, 2026 10:30 AM
To: Marisa Thomas <Mthomas@pahousegop.com>; EFranzese@pahouse.net; HShupe@pahouse.net
Cc: Imgrund, Lauren <limgrund@pa.gov>; Nezat, Taylor <tnezat@pa.gov>; Reiley, Robert A. <rreiley@pa.gov>; Griffin, Laura <laurgriffi@pa.gov>; Kelly, Elizabeth <elkelly@pa.gov>
Subject: [EXTERNAL]: Delivery of Proposed Rulemaking - Water Quality Standards—Chester Creek et al. Stream Redesignations (7-592)
Importance: High

Good morning,

Pursuant to Section 5(a) of the Regulatory Review Act, please find attached the Water Quality Standards—Chester Creek et al. Stream Redesignations proposed rulemaking (7-592) for review by the House Environmental and Natural Resource Protection Committee. The rulemaking documents are attached in a zip folder and the cover letters for Representative Vitali and Representative Rader are attached separately.

A copy of the transmittal sheet is attached for your records – the House and Senate Committee chairs are receiving the rulemaking electronically.

RECEIVED
Independent Regulatory Review Commission
November 23, 2026

Please confirm receipt of this rulemaking by replying to all recipients.

Thank you,

Laura

Laura Campbell | Regulatory Coordinator | *She/Her/Hers*
Department of Environmental Protection | Policy Office

Rachel Carson State Office Building
400 Market Street | Harrisburg, PA 17105
Mobile: 717-772-5830
dep.pa.gov

PRIVILEGED AND CONFIDENTIAL COMMUNICATION The information transmitted is intended only for the person or entity to whom it is addressed and may contain confidential and/or privileged material. Any use of this information other than by the intended recipient is prohibited. If you receive this message in error, please send a reply e-mail to the sender and delete the material from any and all computers.

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The information transmitted is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. Any review, retransmission, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited. If you received this information in error, please contact the sender and delete the message and material from all computers.

TRANSMITTAL SHEET FOR REGULATIONS SUBJECT TO THE REGULATORY REVIEW ACT

I.D. NUMBER: 7-592

SUBJECT: Water Quality Standards—Chester Creek et al. Stream Redesignations

AGENCY: DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

RECEIVED

Independent Regulatory Review Commission

November 23, 2026

TYPE OF REGULATION

X Proposed Regulation

Final Regulation

Final Regulation with Notice of Proposed Rulemaking Omitted

120-day Emergency Certification of the Attorney General

120-day Emergency Certification of the Governor

Delivery of Tolled Regulation
a. With Revisions b. Without Revisions

FILING OF REGULATION

DATE	SIGNATURE	DESIGNATION	
		HOUSE COMMITTEE ON ENVIRONMENTAL & NATURAL RESOURCE PROTECTION	
11/23/2026	Evan Franzese-Peterson *(via electronic delivery)*	MAJORITY CHAIR	Representative Greg Vitali
11/23/2026	Marisa Thomas *(via electronic delivery)*	MINORITY CHAIR	Representative Jack Rader, Jr.
		SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES AND ENERGY	
11/23/2026	Matt Osenbach *(via electronic delivery)*	MAJORITY CHAIR	Senator Gene Yaw
11/23/2026	Emily Eyster *(via electronic delivery)*	MINORITY CHAIR	Senator Carolyn Comitta
		INDEPENDENT REGULATORY REVIEW COMMISSION	
	(via electronic delivery)	EXECUTIVE DIRECTOR	David Sumner
~~_____~~	~~_____~~	~~*ATTORNEY GENERAL* (for Final Omitted only)~~	
11/23/2026	Leah Brown *(via electronic delivery)*	*LEGISLATIVE REFERENCE BUREAU* (for Proposed only)	