

BERMUDIAN CREEK

ADAMS COUNTY

WATER QUALITY STANDARDS REVIEW STREAM EVALUATION REPORT

**Segment: Basin
Stream Code: 08596
Drainage List: O**

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

2019

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 Unnamed Tributary (UNT) 08727 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 very 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 UNT 08727, has a drainage area of 11.2 square miles and consists of 18.0 stream miles. The current land use within this portion of the basin consists of forested (31%), agricultural (53%), water/wetlands (4%), and urban/developed areas (12%). There are three NPDES permits within the basin including one industrial waste discharge, one pesticide application, and one stormwater permit. The industrial waste discharge and the stormwater permit are associated with the Knouse Foods Cooperative Facility located in the headwaters of Bermudian Creek.

WATER QUALITY AND USES

Aquatic Biota

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 on March 28, 2006 (Figure 1, Table 1).

Benthos. Benthic macroinvertebrate samples were collected using the DEP's SSWAP from UNT 08741 immediately downstream of the Knouse Foods facility (UNT1) and from Bermudian Creek downstream of UNT 08741 (BC1). Both samples indicate biological impairment resulting in the Bermudian Creek 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 (UNT2) and UNT 08728 (UNT4) also indicate biological impairment and are listed as impaired for Aquatic Life Use for Source – Agriculture, Cause – Siltation. Benthic macroinvertebrate samples were collected using the DEP's SSWAP from three additional locations (BC2, BC3, BC4) on Bermudian Creek, from the source to UNT 08727 that indicated attainment 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 (BC2) and 808.6 CFUs/100mL (UNT3) (Table 2). Results exceeded the criteria for fecal coliform bacteria in 25 Pa. Code § 93.7, which specifies 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.

Fishes. Fish were collected using backpack electrofishing gear, targeting salmonids and characterizing total species composition using single-pass electrofishing methods. The sample reach was approximately 325 meters. A total of 13 species were collected including wild brown trout (*Salmo trutta*) ranging in length from 100 mm to 274 mm, which demonstrates multiple year classes and natural reproduction of trout (Frederick and Kuhn 2015, Detar et al. 2011).

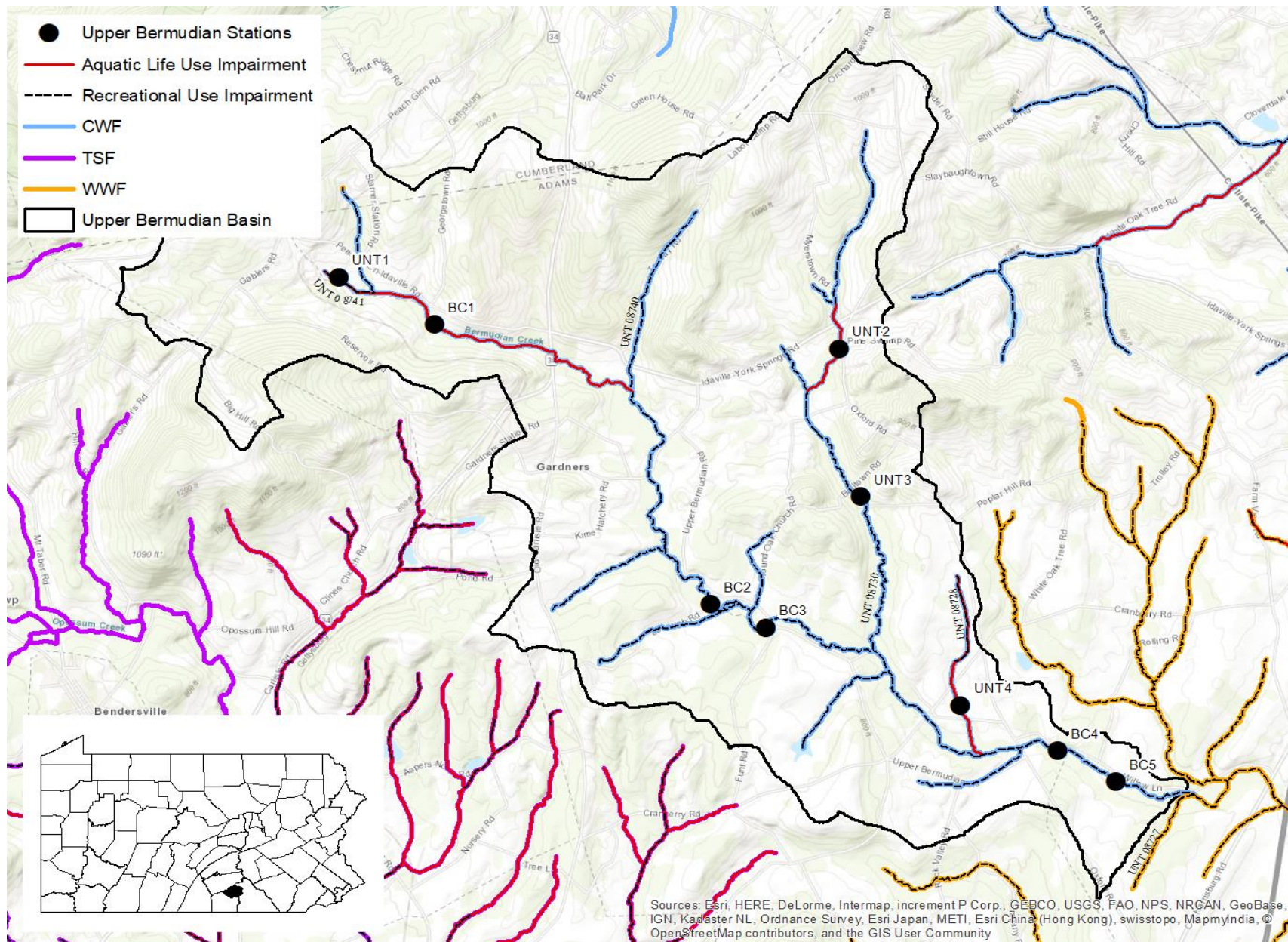


Figure 1. Upper Bermudian Creek basin – station locations

Table 1. Upper Bermudian Creek basin – station locations

STATION	DESCRIPTION
UNT1	UNT 08741, 400 meters upstream of the confluence with Bermudian Creek 2004 SSWAP Lat: 40.01940 Long: -77.22419
BC1	Bermudian Creek, 900 meters downstream of UNT 08741 2004 SSWAP Lat: 40.01547 Long: -77.21439
BC2	Bermudian Creek, upstream of Lobaugh Road 2016 Bacteriological Monitoring Lat: 39.99218 Long: -77.18621
BC3	Bermudian Creek, upstream of Upper Bermudian Road 2006 SSWAP Lat: 40.99026 Long: -77.180543
UNT2	UNT 08730, downstream of Idaville-York Springs Road and along Oxford Road 2004 SSWAP Lat: 40.01347 Long: -77.17309
UNT3	UNT 08730, upstream of Blueberry Road 2016 Bacteriological Monitoring 2006 SSWAP Lat: 40.00117 Long: -77.17089
UNT4	UNT 08728, upstream of Zeigler Mill Road 2006 SSWAP Lat: 39.98379 Long: -77.16068
BC4	Bermudian Creek, 450 meters downstream of Oxford Road along Willow Lane 2006 SSWAP Lat: 39.98002 Long: -77.15078
BC5	Bermudian Creek, 900 meters upstream of UNT 08727 2006 PFBC Survey Lat: 39.97743 Long: -77.14478

Table 2. Bacteriological sample results – Bermudian Creek and UNT 08730

STATION	UNITS	DATE					GEOMETRIC MEAN
		6/9/14	6/16/14	6/18/14	6/23/14	6/30/14	
UNT3	CFUs/100 mL	590	360	1100	2000	740	808.6
BC2	CFUs/100 mL	320	260	270	190	300	263.9

Table 3. PFBC fisheries data collected on March 28, 2006 – Bermudian Creek (BC5)

COMMON NAME	SCIENTIFIC NAME
Blacknose Dace	<i>Rhinichthys atratulus</i>
Brown Trout	<i>Salmo trutta</i>
Brown Trout - Hatchery	<i>Salmo trutta</i>
Central Stoneroller	<i>Campostoma anomalum</i>
Common Shiner	<i>Luxilus cornutus</i>
Creek Chub	<i>Semotilus atromaculatus</i>
Cutlips Minnow	<i>Exoglossum maxillingua</i>
Fantail Darter	<i>Etheostoma flabellare</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Longnose Dace	<i>Rhinichthys cataractae</i>
Margined Madtom	<i>Noturus insignis</i>
Rainbow Trout - Hatchery	<i>Oncorhynchus mykiss</i>
White Sucker	<i>Catostomus commersonii</i>
Rock Bass	<i>Ambloplites rupestris</i>

BIOLOGICAL USE QUALIFICATIONS

Biological use qualifying criterion evaluated for Bermudian Creek 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.”

The PFBC survey, conducted in 2006 has documented the maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat. The survey results demonstrate existing use of CWF.

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

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.

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 08727 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.

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REFERENCES

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., Wnuk R., Greene R.T., Kaufmann M. 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.

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

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