

Distribution

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**PA FISH AND BOAT COMMISSION
COMMENTS AND RECOMMENDATIONS**

January 24, 2013

WATER: Rabbit Run (603A) Schuylkill County
EXAMINED: September 11, 2012
BY: G. Murphy, J. Buzzar, and M. Kaufmann

Bureau Director Action: _____ Date: _____

Division Chief Action: _____ Date: _____

CW Unit Leader Action: _____ Date: _____

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AREA COMMENTS:

Rabbit Run, located in sub-subbasin 03A, Walker Township, Schuylkill County, was surveyed on September 11, 2012 in an attempt to determine whether or not the stream supports a population of reproducing trout and qualifies for the statewide list of such waters. The presence of multiple year classes of wild Brook Trout in Sections 01 and 02 of Rabbit Run, including young-of-the-year, verifies that these stream sections support natural reproduction of trout, as outlined in 58 PA Code §57.11. The brook trout biomass estimates determined from the surveys in Sections 01 (36.14 kg/ha) and 02 (35.40 kg/ha) met the Pennsylvania Fish and Boat Commission's minimum biomass criteria for Class A wild trout populations, as outlined in 58 PA Code §57.8a. The abundance of legal-size Brook Trout was 39 trout/mi at Station 0101 (RM 1.42), which was between the 67th and 75th percentiles for legal-size Brook Trout abundance in Pennsylvania's wild Brook Trout streams. At Station 0201 (RM 0.00), the abundance of legal-size Brook Trout was 122 trout/mi, which exceeded the 90th percentile for legal-size Brook Trout in Pennsylvania's wild Brook Trout streams. No legal-size Brown Trout were captured at either sampling station. 10.8% of the stream length was sampled.

AREA RECOMMENDATIONS:

1. Add Rabbit Run (03A), Sections 01 and 02, to the list of stream sections that support natural reproduction of trout. Submitted in December 2012.
2. Add Rabbit Run (03A), Sections 01 and 02, to the List of Class A Wild Trout Waters.
3. Request the Pennsylvania Department of Environmental Protection to upgrade the 25 Pennsylvania Code Chapter 93 Water Quality Standards listing for Rabbit Run from Cold Water Fishes and Migratory Fishes to High Quality - Cold Water Fishes and Migratory Fishes based on the Class A wild trout stream qualifier.
4. Within the next five years, the Schuylkill County Conservation District should work with landowners in the headwaters of the Rabbit Run basin

to implement Best Management Practices to control storm-water runoff and reduce erosion.

This work made possible by funding from the Sport Fish Restoration Act Project F-57-R Fisheries Management.

**PENNSYLVANIA FISH & BOAT COMMISSION
BUREAU OF FISHERIES
FISHERIES MANAGEMENT DIVISION**

Rabbit Run (603A)
Sections 01 and 02
Fisheries Management Report
Unassessed Water

Prepared by
G. Murphy

Fisheries Management Database Name: Rabbit Run
Lat/Lon: 40°46'42"/75°57'43"

Date Sampled: September 11, 2012 Date Prepared: January 24, 2013

Introduction

Rabbit Run is a small, 3.44 km (2.14 mi) long stream located in sub-subbasin 03A, Walker Township, Schuylkill County. The stream originates in the New England Valley between Sharp Mountain and Wildcat Mountain at approximately 323 m (1,060 ft) elevation before flowing northeast to its confluence with the Little Schuylkill River at river mile (RM) 21.82, 40°46'42" latitude and 75°57'43" longitude. Rabbit Run Reservoir, a small, 4.94 acre impoundment, is located on the stream approximately 2.0 km (1.25 mi) upstream from the mouth and is stocked with adult trout by the Pennsylvania Fish and Boat Commission and by the Rabbit Run Fish and Game Association Cooperative Nursery. Rabbit Run can be found on the Tamaqua, PA U.S. Geological Survey 7.5 minute quadrangle (Figure 1).

The stream has a drainage area of 6.29 km² (2.43 mi²). The basin is primarily forested (76%) but also includes a mixture of rural residences and agricultural fields in the northern half of the basin along East Valley Road. Portions of the basin are located within the Pennsylvania Game Commission's State Game Lands Number 257. The Mauch Chunk Formation of the Mississippian Period, which consists of grayish-red shale, siltstone, sandstone, and some conglomerate, underlies the majority of the basin. Riparian ownership along the stream is approximately 36% public (State Game Lands 257 and Borough of Tamaqua) and 64% private.

Rabbit Run was surveyed as part of the Unassessed Waters Program to gather baseline information on the resource for management purposes and to determine whether or not the stream supports a reproducing population of trout. The stream was suspected of supporting a wild Brook Trout *Salvelinus fontinalis* population based on information obtained from an angler. A cursory survey conducted by the

Pennsylvania Fish and Boat Commission on July 26, 2012 indicated that the stream may support a Class A wild Brook Trout population. This resulted in a follow-up survey on September 11, 2012. Documenting wild trout in streams is important in the proper permitting of land use activities, protection of associated wetlands, and for long-term restoration projects, such as the Eastern Brook Trout Joint Venture.

Methods

The examination of Rabbit Run was conducted on September 11, 2012. All procedures were carried out according to those outlined by Weber et al. (2011).

Rabbit Run was managed as two sections for Fisheries Management purposes (Figure 1). Section 01 extended from the headwaters downstream to the backwater of Rabbit Run Reservoir. Section 02 extended from the Rabbit Run Reservoir dam downstream to the mouth. One sampling station was established within each section, designated as Stations 0101 and 0201. Physical characteristics, physical-chemical values, and fish communities were examined. Rapid bioassessment protocols (RBP) were used to assess stream and riparian habitats (Barbour et al. 1999). Fish communities were sampled using an electrobackpack equipped with a TAS generator and Coffelt (BP-1C) variable voltage electrofisher set between 150 and 200 volts alternating current. Wild trout abundance and biomass estimates were determined using the Zippin three-pass depletion method (Zippin 1958). Wild trout were measured and recorded in 25 mm (1.0 inch) length groups. Biomass estimates were calculated using statewide average weights for each length group. Scientific and common fish names were referenced in the Integrated Taxonomic Information System (<http://www.itis.gov>).

Results

Section 01

Station 0101 (RM 1.42) was located 26 m upstream from Rabbit Run Reservoir, 40°46'29" latitude and 75°58'56" longitude. The reservoir was partially drawn down at the time of the survey possibly due to leakage or low rainfall. The 142 m long station averaged 4.1 m in width and covered twelve percent of the section length (Table 1). This portion of the stream flowed along the edge of a densely shaded deciduous forest, consisting of poplar, cherry, witch hazel, maple, and rhododendron.

The instream habitat was comprised of long riffles with frequent boulders and pocket pools up to 0.25 m in depth. Cover was provided by boulders, fallen trees, overhanging rhododendron, and a few undercut banks. The stream substrate consisted primarily of boulder, cobble, and sand, and was covered with water moss *Fontinalis sp.* in places. The stream receives substantial stormwater runoff from agricultural fields within the northern portion of the basin along East Valley Road, but is well armored by

an abundance of naturally occurring boulders; therefore, bank erosion was only moderate. The RBP analysis yielded a high final score of 161, indicating optimal habitat conditions (Table 2).

Physical-chemical parameters and their associated values recorded under low flow conditions were as follows: air temperature 16°C, water temperature 10.5°C, specific conductance 95 umhos, pH 6.6 standard units, total alkalinity 14 mg/L, and total hardness 38 mg/L (Table 3).

Seven fish species were captured or observed at Station 0101 (RM 1.42), including wild Brook Trout. One adult Rainbow Trout *Oncorhynchus mykiss* of hatchery origin was captured, which was a holdover from the fish stocked in Rabbit Run Reservoir. Of the other species observed, juvenile Bluegill *Lepomis macrochirus*, juvenile Pumpkinseed *Lepomis gibbosus*, and Brown Bullhead *Ameiurus nebulosus*, which are common in warmwater environments, were observed in the greatest densities based on the subjective abundance indices. These species were mostly seen in the lower portion of the sampling station and were likely from Rabbit Run Reservoir (Table 4).

A total of 203 wild Brook Trout were captured at Station 0101 (RM 1.42), ranging from 50 to 199 mm in total length (TL). Only three (one percent) were greater than or equal to the minimum legal harvestable length (175 mm or 7 in). Total Brook Trout biomass was estimated to be 36.14 kg/ha. Brook Trout abundance was estimated to be 1,494 trout/km (2,404 trout/mi) with 24 trout/km (39 trout/mi) being 175 mm or longer (Table 5).

Section 02

Station 0201 (RM 0.00) was located at the mouth, 40°46'42" latitude and 75°57'43" longitude. The 231 m long station averaged 3.4 m in width and covered eleven percent of the section length (Table 1). This portion of the stream in part flowed along an active railroad bed and was densely shaded by a mixture of Japanese knotweed, multiflora rose, and some deciduous trees and shrubs.

The instream habitat was comprised of shallow riffles, shallow runs, pocket pools, and a large culvert hole up to 1.5 m in depth. Cover was provided by pool depth and overhanging vegetation. The stream substrate consisted primarily of cobble, gravel, and some boulder. Bank erosion was light. The RBP analysis yielded a final score of 134, indicating sub-optimal habitat conditions, as assessed during a cursory examination on July 26, 2012 (Table 2).

Physical-chemical parameters and their associated values were not recorded at the time of the survey because they were previously recorded during a cursory survey on July 26, 2012 under normal flow conditions. The physical-chemical parameters and their associated values recorded on July 26 were as follows: air temperature 26.4°C, water temperature 18.7°C, specific conductance 60 umhos, pH 7.4

standard units, total alkalinity 22 mg/L, and total hardness 42 mg/L (Table 3).

Twelve fish species were captured or observed at Station 0201 (RM 0.00), including wild Brook Trout and wild Brown Trout *Salmo trutta*. Of the other species observed, Blacknose Dace *Rhinichthys atratulus* and Creek Chub *Semotilus atromaculatus*, which are common in streams that are transitional between coldwater and coolwater, were observed in the greatest densities and were rated as common based on the subjective abundance indices. Several warmwater species, such as Bluegill, Pumpkinseed, Green Sunfish *Lepomis cyanellus*, and Largemouth Bass *Micropterus salmoides*, were also observed in lesser numbers and were likely from Rabbit Run Reservoir (Table 4).

A total of 24 wild Brown Trout were captured at Station 0201 (RM 0.0), ranging from 75 to 124 mm in total length (TL). None was greater than or equal to the minimum legal harvestable length (175 mm or 7 in). Total Brown Trout biomass was estimated to be 3.39 kg/ha. Brown Trout abundance was estimated to be 110 trout/km (177 trout/mi) with none being of legal length (Table 6).

A total of 106 wild Brook Trout were captured at Station 0201 (RM 0.0), ranging from 50 to 299 mm in total length (TL). Fifteen (14 percent) were greater than or equal to the minimum legal harvestable length (175 mm or 7 in). Total Brook Trout biomass was estimated to be 35.40 kg/ha. Brook Trout abundance was estimated to be 494 trout/km (795 trout/mi) with 76 trout/km (122 trout/mi) being 175 mm TL or longer (Table 7).

Discussion

The presence of multiple year classes of wild Brook Trout in Sections 01 and 02 of Rabbit Run, including young-of-the-year, verifies that these stream sections support natural reproduction of trout, as outlined in 58 PA Code §57.11., Listing of Wild Trout Streams. The Brook Trout biomass estimates determined from the surveys in Sections 01 (36.14 kg/ha) and 02 (35.40 kg/ha) met the Pennsylvania Fish and Boat Commission's minimum biomass criteria for Class A wild trout populations, as outlined in 58 PA Code §57.8a., Class A Wild Trout Streams.

The abundance of legal-size Brook Trout ranged from 39 trout/mi at Station 0101 (RM 1.42) to 122 trout/mile at Station 0201 (RM 0.00). The abundance of legal-size Brook Trout at Station 0101 (RM 1.42) was between the 67th and 75th percentiles for legal-size Brook Trout in Pennsylvania's wild Brook Trout streams, while the abundance of legal-size Brook Trout at Station 0201 (RM 0.00) exceeded the 90th percentile for legal-size Brook Trout in Pennsylvania's wild Brook Trout streams. No legal-size Brown Trout were captured at either sampling station.

The current 25 Pennsylvania Code Chapter 93 Water Quality Standards listing of Cold Water Fishes and Migratory Fishes (CWF, MF) for the Little Schuylkill River basin between Owl Creek and Cold Run, which encompasses Rabbit Run, does not adequately protect the existing flora and fauna present within the Rabbit Run basin. The protected use for the Rabbit Run basin should be upgraded to High Quality - Cold Water Fishes and Migratory Fishes (HQ-CWF, MF) based on the Class A wild trout stream qualifier.

Management Recommendations

1. Add Rabbit Run (03A), Sections 01 and 02, to the list of stream sections that support natural reproduction of trout. Submitted in December 2012.
2. Add Rabbit Run (03A), Sections 01 and 02, to the List of Class A Wild Trout Waters.
3. Request the Pennsylvania Department of Environmental Protection to upgrade the 25 Pennsylvania Code Chapter 93 Water Quality Standards listing for Rabbit Run from Cold Water Fishes and Migratory Fishes to High Quality - Cold Water Fishes and Migratory Fishes based on the Class A wild trout stream qualifier.
4. Within the next five years, the Schuylkill County Conservation District should work with landowners in the headwaters of the Rabbit Run basin to implement Best Management Practices to control storm-water runoff and reduce erosion.

Literature Cited

- Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid bioassessment protocols for use in wadeable streams and rivers. U.S. Environmental Protection Agency. Report 814-99-002. Washington, DC.
- Weber, R., R.T. Greene, and D. Miko. 2011. Protocols for conducting biological assessments of unassessed trout waters. Pages 95-101 in D. Miko, editor. Sampling protocols for Pennsylvania's wadeable streams. Pennsylvania Fish and Boat Commission. Harrisburg, PA.
- Zipin, C. 1958. The removal method of population estimation. Journal of Wildlife Management 22: 82-90.

Table 1. Rabbit Run (03A), Schuylkill County. Site sampling locations, lengths surveyed, average site widths, and site areas.

Site Date	River Mile	Downstream Limit Description	Length (m)	Ave. Width (m)	Site Area (ha)
9/11/2012	1.42	26 m upstream of Rabbit Run Reservoir	142	4.1	0.06
9/11/2012	0.00	Mouth	231	3.4	0.08

Table 2. High Gradient Rapid Bioassessment Protocol ratings for Station 0101 (RM 1.42) on September 11, 2012 and Station 0201 (RM 0.00) on July 26, 2012 on Rabbit Run (03A), Schuylkill County.

Station 0101 (RM 1.42)

Habitat Parameter	Score	Habitat Parameter	Score
Epifaunal Substrate / Available Cover	18	Left Bank Stability	7
Embeddedness	14	Right Bank Stability	7
Velocity / Depth Regime	14	Left Bank Vegetative Protection	9
Sediment Deposition	13	Right Bank Vegetative Protection	9
Channel Flow Status	16	Left Bank Riparian Vegetative Width	10
Channel Alteration	16	Right Bank Riparian Vegetative Width	10
Frequency of Riffles or bends	18	Total Score	161

Station 0201 (RM 0.0)

Habitat Parameter	Score	Habitat Parameter	Score
Epifaunal Substrate / Available Cover	14	Left Bank Stability	7
Embeddedness	16	Right Bank Stability	7
Velocity / Depth Regime	15	Left Bank Vegetative Protection	6
Sediment Deposition	10	Right Bank Vegetative Protection	6
Channel Flow Status	14	Left Bank Riparian Vegetative Width	5
Channel Alteration	12	Right Bank Riparian Vegetative Width	4
Frequency of Riffles or bends	18	Total Score	134

Table 3. Chemical parameters and their associated values recorded at Station 0101 (RM 1.42) on September 11, 2012 and Station 0201 (RM 0.00) on July 26, 2012 on Rabbit Run (03A), Schuykill County.

Parameter	Station 0101
Site RM	1.42
Sample Date	09/11/2012
Time (24 hour)	1200
Water Temperature (C)	10.5
pH Field Colorimetric (SU)	6.6
Specific Conductance (UMHOS)	95
Total Alkalinity Field Mixed Indicator (MG/L)	14
Air Temperature (C)	16.0
Total Hardness - Method Unknown (MG/L)	38

Parameter	Station 0201
Site RM	0.00
Sample Date	07/26/2012
Time (24 hour)	1115
Water Temperature (C)	18.7
pH Field Colorimetric (SU)	7.4
Specific Conductance (UMHOS)	60
Total Alkalinity Field Mixed Indicator (MG/L)	22
Air Temperature (C)	26.4
Total Hardness - Method Unknown (MG/L)	42

Table 4. Fish species occurrence and subjective abundance indices at Station 0101 (RM 1.42) and Station 0201 (RM 0.00) on Rabbit Run (03A), Schuylkill County, on September 11, 2012.

Station 0101 (RM 1.42)

Common Name	Scientific Name	Subjective Abundance
Blacknose Dace	<i>Rhinichthys atratulus</i>	R
Bluegill	<i>Lepomis macrochirus</i>	A
Brook Trout	<i>Salvelinus fontinalis</i>	-
Brown Bullhead	<i>Ameiurus nebulosus</i>	P
Golden Shiner	<i>Notemigonus crysoleucas</i>	R
Pumpkinseed	<i>Lepomis gibbosus</i>	P
Rainbow Trout - Hatchery	<i>Oncorhynchus mykiss</i>	-

Station 0201 (RM 0.00)

Common Name	Scientific Name	Subjective Abundance
Blacknose Dace	<i>Rhinichthys atratulus</i>	C
Bluegill	<i>Lepomis macrochirus</i>	P
Brook Trout	<i>Salvelinus fontinalis</i>	-
Brown Trout	<i>Salmo trutta</i>	-
Creek Chub	<i>Semotilus atromaculatus</i>	C
Golden Shiner	<i>Notemigonus crysoleucas</i>	R
Green Sunfish	<i>Lepomis cyanellus</i>	P
Largemouth Bass	<i>Micropterus salmoides</i>	R
Longnose Dace	<i>Rhinichthys cataractae</i>	P
Pumpkinseed	<i>Lepomis gibbosus</i>	P
Tessellated Darter	<i>Etheostoma olmstedi</i>	P
White Sucker	<i>Catostomus commersonii</i>	P

Notes:

Subjective Abundance Index (based on 300 m long station):

R = Rare (<3); P = Present (3-25); C = Common (26-100); and A = Abundant (>100)

Table 5. Wild Brook Trout Zippin 3 pass abundance and biomass estimates at Station 0101 (RM 1.42) on Rabbit Run (03A), Schuylkill County, on September 11, 2012.

Size Group	Estimate	p	Low95CI	High95CI	NumHa	KgHa	NumKm
50	91	0.5731	84	100	1565	3.86	641
75	77	0.7369	76	80	1330	7.93	545
100	5	0.8248	5	5	86	1.18	35
125	19	0.7757	19	20	330	8.07	135
150	16	0.7857	16	17	278	11.40	114
175	3	0.5228	3	6	58	3.70	24
Totals	211				3647	36.14	1494

Table 6. Wild Brown Trout Zippin 3 pass abundance and biomass estimates at Station 0201 (RM 0.00) on Rabbit Run (03A), Schuylkill County, on September 11, 2012.

Size Group	Estimate	p	Low95CI	High95CI	NumHa	KgHa	NumKm
75	12	0.7243	12	13	156	1.00	53
100	13	0.5665	12	17	166	2.39	57
Totals	25				322	3.39	110

Table 7. Wild Brook Trout Zippin 3 pass abundance and biomass estimates at Station 0201 (RM 0.00) on Rabbit Run (03A), Schuylkill County, on September 11, 2012.

Size Group	Estimate	p	Low95CI	High95CI	NumHa	KgHa	NumKm
50	59	0.6256	56	65	753	1.85	256
75	21	0.6595	21	24	279	1.66	95
125	7	0.6595	7	9	93	2.27	32
150	8	0.4998	7	12	102	4.19	35
175	2	0.3923	2	7	33	2.10	11
200	7	0.5731	7	10	97	8.95	33
225	4	0.4835	4	8	59	7.73	20
250	1	0.3923	1	4	16	2.94	6
275	1	0.3923	1	4	16	3.71	6
Totals	110				1448	35.40	494

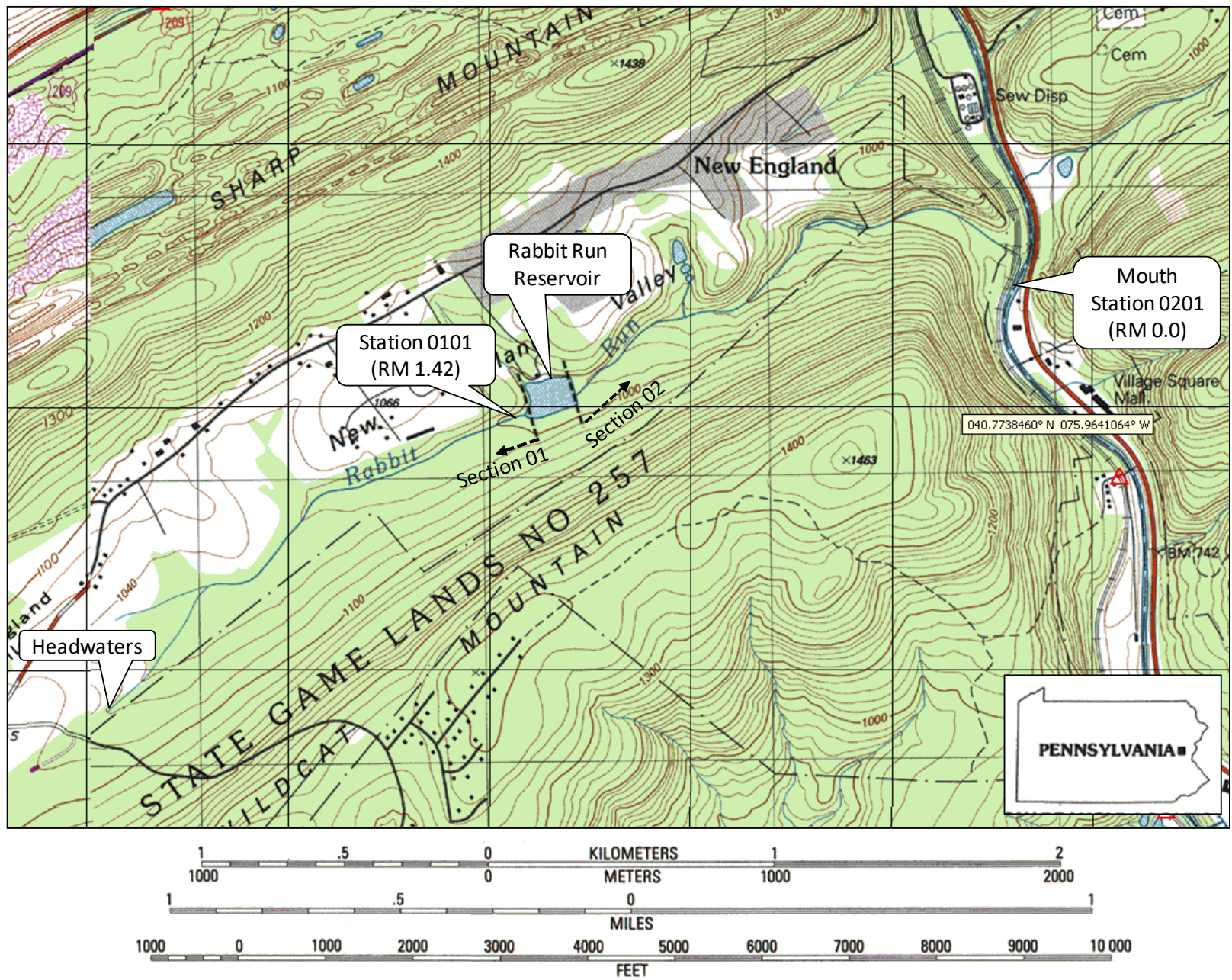


Figure 1. Location map for Stations 0101 (RM 1.42) and 0201 (RM 0.00) on Rabbit Run (03A), Schuylkill County.