

DEP Stream Code: 01950

PA FISH AND BOAT COMMISSION
COMMENTS AND RECOMMENDATIONS

UNT to Tulpehocken Creek

July 31, 2000

WATER: Unnamed Tributary
to Tulpehocken Creek (603C)
LAT/LON 402221/761056

RECEIVED

Berks County

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EXAMINED: October 1997**BY:** Kaufmann, Miko, Chikotas and GrafPA Fish & Boat Commission
Division of Environmental ServicesBureau Director Action: *Richard A. Snyder* Date: 8-3-00Division Chief Action: *Richard A. Snyder - concern* Date: 8-1-00CW Unit Leader Action: *R. Thomas Greene* Date: 7/31/00

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AREA COMMENTS:

The Unnamed Tributary (UNT) to Tulpehocken Creek is a 2.6 km (1.6 mi) long stream located in sub-subbasin 3C, Heidelberg Township, Berks County. The UNT was surveyed in October 1997 to document the fish community and determine if the stream supported a wild trout population.

Section 02 of the UNT exhibited excellent long-term water quality and supported a reproducing Class A wild brown trout population estimated at 42.58 kg/ha. This population was likely limited by habitat constraints created by low summer flow and periodic disturbance from storm water runoff. Water quality was influenced by the underlying limestone and dolomite geology and probable nutrient release from farmland and residential lawns. Agriculture, residential housing developments and storm water runoff were the primary sources of degradation to the stream.

AREA RECOMMENDATIONS:

1. The Pennsylvania Department of Environmental Protection should recognize the UNT to Tulpehocken Creek independently of Tulpehocken Creek in its Chapter 93 Water Quality Standards and designate the entire stream basin High Quality Cold Water Fishes (HQ-CWF).
2. The Pennsylvania Fish and Boat Commission should continue to manage the wild trout population under conventional statewide angling regulations.
3. The Berks County Conservation District should determine the source of sediment in the basin and implement management to reduce the load entering the stream.
4. Womelsdorf Borough and Heidelberg Township should implement adequate storm water management to minimize environmental impact of future development.

5. Bethany Children's home should establish a riparian buffer to stabilize stream banks upstream of T-923, reduce erosion and increase shading.
6. The Womelsdorf Rod and Gun Club should continue to refrain from planting hatchery trout in Section 02 due to the presence of a Class A (\geq 40kg/ha) wild brown trout population.

CWU COMMENTS:

The Unnamed Tributary to Tulpehocken Creek (603C), Section 02, was initially inventoried during October 1997 to document that status of the coldwater fishery and to collect baseline data on the resource.

Section 02 can be characterized as a small, fertile, limestone stream. A total of six fish species were captured during the 1999 examination, including an excellent Class A wild brown trout fishery estimated in excess of 42 kg/ha.

CWU RECOMMENDATIONS:

1. The Unnamed Tributary to Tulpehocken Creek (603C), Section 02, (402221/761056) should be managed as a Class A wild brown trout fishery. Conventional statewide regulations should apply with no stocking.
2. Due to the presence of an excellent Class A wild brown trout fishery, the DEP Water Quality Standards should be upgraded to HQ-CWF. The special protected use classification should apply to the entire Unnamed Tributary to Tulpehocken Creek basin. A copy of this report should be forwarded to DEP via Environmental Services.

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

Unnamed Tributary to Tulpehocken Creek (603C)
Fisheries Management Report
LAT/LON 402221/761056

Prepared by
B. Chikotas and M. Kaufmann

Date Sampled: October 1997

Date Prepared: December 1998

Introduction

The Unnamed Tributary (UNT) to Tulpehocken Creek (603C) is a 2.6 km (1.6 mi.) long stream located in sub-subbasin 3C, Heidelberg Township, Berks County. The stream originates from a spring at approximately 146 m (479 ft) elevation on the Bethany Children's Home property at the base of South Mountain. The stream flows north through the Borough of Womelsdorf to its confluence with Tulpehocken Creek at River Mile 26.1, 40°22'21" latitude and 76°10'56" longitude. Map coverage is provided by the Womelsdorf, PA, USGS 7.5 minute quadrangle (Figure 1).

The UNT has a 10.0 km² (3.9 mi²) drainage basin where land use is agriculture in the headwaters, community residences in Womelsdorf Borough and undeveloped lowlands from State Route (SR 0422) downstream to the mouth. The underlying geology of the basin is a composite of several formations from the Lebanon and Lehigh Valley Sequences. The predominate Martinsburg Formation, which dates from the Ordovician Age, is composed of slaty to phyllitic shale with a calcareous base. Other formations include the Annville, Epler, Millbach, Schaefferstown, Richland, Leithsville and Hardyston. These formations are composed predominately of limestone and dolomite from Ordovician and Cambrian Age. Precambrian Age formations from the Lehigh Valley sequence make up South Mountain and are composed of granite, hornblende and graphitic gneiss.

The UNT is not listed separately in the Pennsylvania Department of Environmental Protection's (DEP) Chapter 93 Water Quality Standards but is included within the Tulpehocken Creek basin's Trout Stocked Fishes (TSF) designation. The TSF designation requires that any permitted discharges to the UNT meet effluent criteria designed to provide 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. Currently there are no known permitted discharges into the UNT and

the Pennsylvania Fish and Boat Commission (PFBC) has no pollution reports on file for the stream.

The 1997 survey was initiated when survey work on a nearby stream concluded and allowed time for area staff to conduct a survey of the UNT. Visual inspection of the stream showed potential for the stream to support wild trout.

Methods

The examination of the UNT was conducted on October 16 and 21, 1997. All procedures of the survey were carried out according to those outlined by Marcinko et al. (1986).

The UNT was divided into two sections for fisheries management purposes. Section 01 extended from the headwaters at the Bethany Children's Home Property downstream to the SR 3002 Bridge in Womelsdorf. Section 02 extended from the SR 3002 Bridge downstream to the mouth. An inspection of the entire stream was conducted to characterize land use within the basin. Physical and social data were collected in Section 02. The mean width for Section 02 was calculated from the average of ten stream widths at station 0201. Section gradients were determined using USGS 7.5 minute topographic maps. Human population densities were calculated using 1990 census data.

A single representative sampling station was chosen in Section 02. Station 0201 was located 340 meters (m) upstream from the mouth and accessible from SR 3039.

Physical characteristics, physical-chemical values, the aquatic macroinvertebrate community, and fish community were evaluated at the station. Aquatic macroinvertebrates were collected with a kick screen and by hand gleaning rocks. Aquatic macroinvertebrates were generally identified to the familial level and were assigned pollution tolerance index values according to a combination of those developed by or through Illinois EPA (1989), EA Mid-Atlantic Regional Operations Engineering, Science and Technology, Inc. (1990), Klemm et al. (1990), RMC Environmental Services, Inc. (1991), and PFBC field experience. Several aquatic macroinvertebrates were preserved for identification. The fish community was sampled with a backpack electrofishing unit using 75 volts of alternating current. Fish species were assigned a subjective abundance index based on the number of individuals observed per 300 m station. Several sculpins were preserved for species identification. A Chapman modified Petersen population estimate (Ricker 1975) was used to quantify the wild trout population at Station 0201.

Results

Physical and social characteristics for Section 01 are listed in Table 1 and selected values are presented below. Section 01 was 1.4 km long and had a gradient of 20.0 m/km. Stream accessibility was 48% within 100 m, and 100% within 300 m of public roads. Human population density was "suburban" at 96 persons/km².

Physical and social characteristics for Section 02 are listed in Table 1. Section 02 was 1.2 km long, 3.4 m in mean width, encompassed an area of 0.4 ha and had a gradient of 10 m/km. Stream access was 100% within 100 m of public roads. The 1990 human population density for Section 02 was "suburban" at 96 persons/km².

Station 0201

Station 0201 was partially shaded by a canopy of mixed hardwood trees and overhanging shrubs. Bank erosion was heavy and stream substrate consisted of gravel, silt and clay. Gravel interstices were filled with sediment. Silt and sand deposits were present in pools. The stream banks, although vegetated, were steeply eroded and partially undercut, exposing root systems. The station appeared to be in a section of stream that was a channel cut through the silt deposits behind a former milldam. However, this was not certain.

Long shallow riffles and runs with a few pools characterized the station. Overhanging red osier dogwood (*Cornus stolonifera*), multiflora rose (*Rosa multiflora*) undercut banks and some woody debris provided fish habitat.

Physical-chemical parameters and their associated values measured on October 16, were as follows: water temperature 11.0°C, pH 8.0 su, specific conductance 300 umhos, total alkalinity 189 mg/l, and total hardness 229 mg/l (Table 2).

Aquatic macroinvertebrate diversity at Station 0201 was fair. Sixteen taxa were collected (Table 3). The collection included 1 mayfly family and 1 caddisfly family. Gammaridae were rated abundant. No pollution sensitive taxa were present.

The fish community at Station 0201 consisted of 6 species (Table 4) and was dominated by fishes common in streams that are transitional between a coldwater and coolwater environment. Green sunfish (*Lepomis cyanellus*) were representative of fish common to a warmwater habitat. Blacknose dace (*Rhinichthys atratulus*) and mottled sculpin (*Cottus bairdi*) were rated abundant. Wild brown trout and green sunfish were the only sportfish species present. Brown trout abundance and biomass were estimated at 1,047 fish/ha and 42.58 kg/ha, respectively (Table 5). Brown trout collected at Station 0201 ranged from 75 to 374 mm in total length. Brown trout

< 150 mm in total length made up 73.3 % of the population estimate and 26.5% (11.31 kg/ha) of the biomass estimate. The number of adult trout that would be attractive to anglers was limited.

Discussion

Section 01 was reconnoitered in order to provide a context for some of the biological, physical, and chemical attributes discovered in Section 02. Section 01 of the UNT ranged from 0.3 to 0.6 meters in width downstream from the Bethany Children's Home property. Upstream from the T-923 Bridge the stream channel was straight and riparian zone mowed and devoid of woody vegetation to adequately stabilize stream banks. Immediately downstream from the T-923 Bridge, at Womelsdorf Station, the stream flowed under railroad lines and was hidden by the vegetation of a small woodlot comprised of early successional tree and shrub species. This woodlot provided a riparian buffer from the cornfields, which border this area downstream to Womelsdorf. In Womelsdorf the stream received flow from several limestone springs. The springs surfaced from the springhouse located behind the Womelsdorf Veterans of Foreign Wars (VFW) building at the upstream end of Womelsdorf's town park. From the spring outflows the stream channel was contained within rock walls downstream to SR 3002.

In 1996 and 1995 the Womelsdorf Rod and Gun Club sponsored fishing events for children in the park. Rainbow trout were obtained from Arrowhead Trout Hatchery in Newmanstown and stocked in the stream for the events, which were held on May 25 and May 20, respectively. The absence of rainbow trout at Station 0201 during the 1997 survey indicated that there was no migration or holdover of hatchery trout downstream from the park. Hatchery plants of adult trout for future fishing events would appear to pose no threat to the wild brown trout population in Section 02.

Section 02 of the UNT flowed north through Womelsdorf, under SR 0422 and parallel to SR 3039 before joining Tulpehocken Creek. One unnamed tributary entered the stream from the east at the intersection of SR 3039 and T-495. Station 0201 was degraded from agricultural and storm water runoff as evidenced by the amount of sediment in the stream and severity of stream bank erosion. Farming and residential housing developments appeared to be the primary land uses in the basin and sources of sediment entering the stream. Womelsdorf Borough and SR 0422 were the sources of storm water runoff in Section 02.

Physical-chemical values in Section 02 of the UNT reflected the underlying limestone and dolomite geology and influence of springs and agriculture in the basin. Total alkalinity, total hardness and specific conductance were high. The aquatic macroinvertebrate community was characteristic of a limestone stream exhibiting fair diversity and an abundance of Gammaridae. The absence of pollution

sensitive taxa suggested that the stream's insect community was negatively impacted by land use within the basin.

Section 02 of the UNT supported a reproducing Class A wild brown trout population estimated at 42.58 kg/ha (Table 5). This population was likely limited by habitat constraints and periodic disturbance of in stream habitat by storm water runoff. The number of adult trout present that would be attractive to anglers was limited, as few were longer than 200 mm. Green sunfish, a warmwater sportfish, were not present in sufficient numbers or sizes to provide a fishery. Their presence was likely a result of escapement from farm ponds in the basin.

The absence of rainbow trout at Station 0201 indicated that there was no migration of hatchery trout downstream from Womelsdorf Park or upstream from Tulpehocken Creek. Hatchery plants of adult trout for fishing events in Womelsdorf's Park and plants of catchable trout in Tulpehocken Creek by the PFBC appeared to pose no threat to the wild brown trout population in Section 02.

Area Recommendations

1. The Pennsylvania Department of Environmental Protection should recognize the UNT independently of Tulpehocken Creek in its Chapter 93 Water Quality Standards and designate the entire stream as High Quality Cold Water Fishes.
2. The Pennsylvania Fish and Boat Commission should continue manage the wild brown trout population under conventional statewide angling regulations.
3. The Berks County Conservation District should implement best management practices on the farmlands surrounding the headwaters of the UNT to reduce the sediment load entering the stream.
4. Womelsdorf Borough and Heidelberg Township should implement adequate storm water management to minimize environmental impact of future development.
5. Bethany Children's home should establish a riparian buffer to stabilize stream banks upstream of T-923, reduce erosion and increase shading.
6. The Womelsdorf Rod and Gun Club should continue to refrain from planting hatchery trout in Section 02 due to the presence a reproducing Class A wild brown trout population.

Literature Cited

- EA Mid-Atlantic Regional Operations Engineering, Science, and Technology, Inc. 1990. Freshwater macroinvertebrate species list including tolerance values and functional feeding group designations for use in rapid bioassessment protocols. Prepared for the US EPA, Washington, DC.
- Illinois EPA. 1989. Biological stream characterization: a biological assessment of Illinois's stream quality. Special Report # 13, Illinois State Water Plan Task Force, Division of Water Pollution Control. Springfield, IL.
- Klemm, D.J., P.A. Lewis, F. Fulk, and J.M. Lazorchak. 1990. Macroinvertebrate field and laboratory methods for evaluating the biological integrity of surface waters. U.S. EPA, Cincinnati, OH.
- Marcinko, M., R. Lorson, and R. Hoopes. 1986. Procedures for stream and river inventory information input. Pennsylvania Fish and Boat Commission publication, Pleasant Gap, PA.
- Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada Bulletin 191.
- RMC Environmental Services, Inc. 1991. Post-diversion aquatic biology assessment for 1990. Prepared for the Philadelphia Electric Company, Philadelphia, PA.

Table 1. Physical and social characteristics for Sections 01 and 02 of the UNT to Tulpehocken Creek (603C), Berks County.

Characteristic	Section 01	Section 02
USGS Quadrangle(s)	Womelsdorf (P36)	Womelsdorf (P36)
Total length (km)	1.4	1.2
Mean width (m)	na	3.4
Area (ha)	na	0.4
Gradient (m/km)	20.0	10.0
DEP Classification	TSF	TSF
Road Access:		
§ Within 100 m	48	100
§ Within 300 m	100	100
§ Within 500 m	100	100
1990 Human population		
Density(# persons/km ²)	96	96

na = not available

TSF = Trout Stocked Fishes

Table 2. Physical-chemical parameters measured at Station 0201 of the UNT to Tulpehocken Creek (603C), Berks County, in October of 1997.

Parameter	Station 0201
Date	10/16
Time (24 hour)	1547
Air temperature (°C)	nm
Water temperature (°C)	11.0
pH (standard units)	8.0
Specific conductance (umhos)	300
Total alkalinity (mg/l)	189
Total hardness (mg/l)	229
Dissolved oxygen concentration (mg/l)	13.6
Dissolved oxygen saturation concentration (mg/l)	10.4

nm = not measured

Table 3. Aquatic macroinvertebrate taxa collected in Section 02 of the UNT to Tulpehocken Creek (603C), Berks County in October, 1997.

Taxon	Station 0201	PTI
Ephemeroptera		
Baetidae	X	7
Coleoptera		
Dryopidae	X	5
Elmidae	X	8
Trichoptera		
Hydropsychidae	X	4-8
Odonata		
Aeshnidae	X	8
Calopterygidae	X	5
Diptera		
Chironomidae		
Chironomini	X	10
Simuliidae	X	0-10
Tipulidae	X	4
Megaloptera		
Sialidae	X	6
Hemiptera		
Corixidae	X	Na
Gerridae	X	Na
Decapoda		
Cambaridae	X	6
Amphipoda		
Gammaridae	*	2-8
Isopoda		
Asellidae	X	8
Class Gastropoda	X	1-9
Total taxa	16	

X = Present at Station; * = Abundant at Station. PTI = Pollution Tolerance Index. PTI ranges from 0 (very intolerant of pollution) to 10 (very tolerant of pollution). Na = not available.

Table 4. Fish species captured by backpack electrofishing in Section 02 of the UNT to Tulpehocken Creek (603C), Berks County on October 16, 1997.

Scientific name	Common name	Station 0201
<i>Salmo trutta</i>	Brown trout	C
<i>Rhinichthys atratulus</i>	Blacknose dace	A
<i>Rhinichthys cataractae</i>	Longnose dace	C
<i>Catostomus commersoni</i>	White sucker	C
<i>Lepomis cyanellus</i>	Green sunfish	P
<i>Cottus bairdi</i>	Mottled sculpin	A
Total species		6

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

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

Table 5. Wild brown trout population estimate determined at Station 0201 of the UNT to Tulpehocken Creek (603C), Berks County, in 1997.

Length Group (mm)	Population Estimate	Number per Hectare	Number per Kilometer	Kilograms per Hectare
75 - 99	13	125	42	0.88
100 - 124	53	528	176	7.92
125 - 149	11	114	38	2.51
150 - 174	2	20	7	0.96
175 - 199	6	60	20	3.90
200 - 224	15	150	50	13.35
225 - 249	1	10	3	1.09
250 - 274	1	10	3	1.47
275 - 299	1	10	3	2.56
300 - 324	1	10	3	2.82
350 - 374	1	10	3	5.12
Totals	105	1,047	348	42.58

Station 0201 was 300 m long and averaged 3.4 m wide.

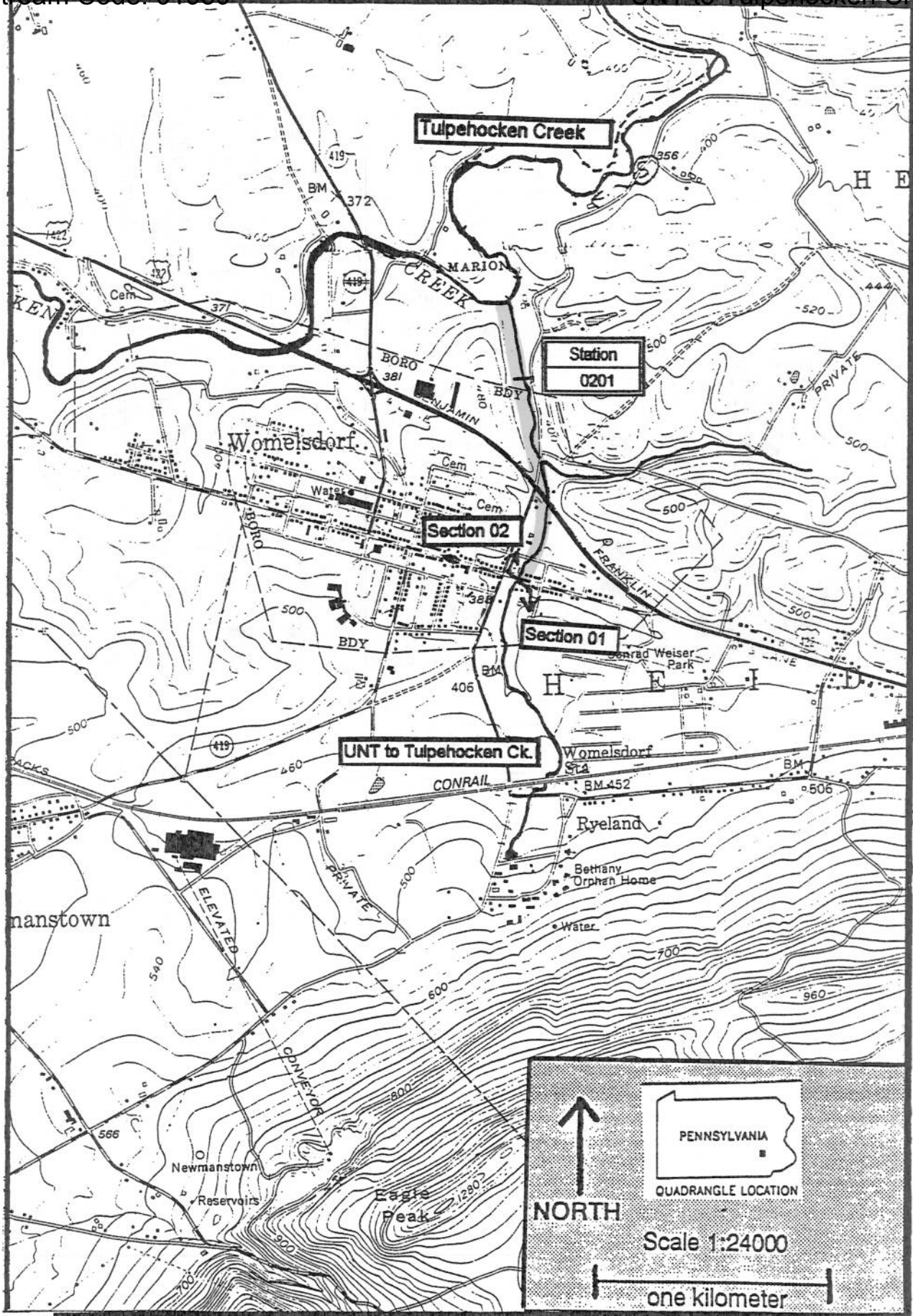


FIGURE 1. LOCATION MAP FOR THE UNT TO TULPEHOCKEN CREEK (603C), BERKS COUNTY.

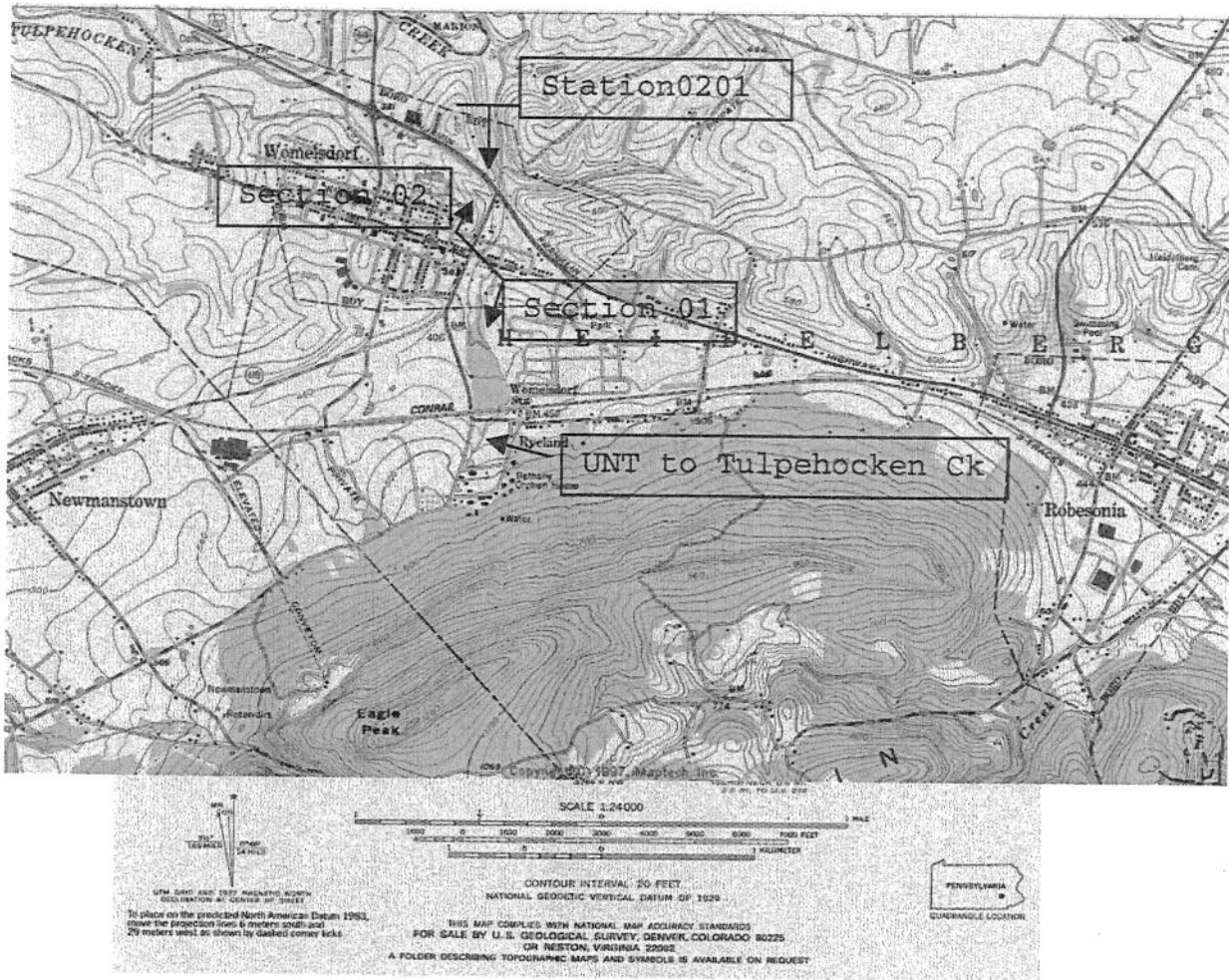


Figure 1. Location map for the UNT to Tulpehocken Creek (603C), Berks County