SECTION 1:
PROJECT AREA CHARACTERISTICS

A 1950's Air Photo of the Tohickon Creek

Section 1: Project Area Characteristics

The following section is recommended by the Pennsylvania Department of Conservation and Natural Resources (PADCNR) and is intended to provide the reader with a very broad overview of the project area. More detailed information regarding biological, cultural, and land use resources is provided in subsequent sections of the document.

1.1 Location

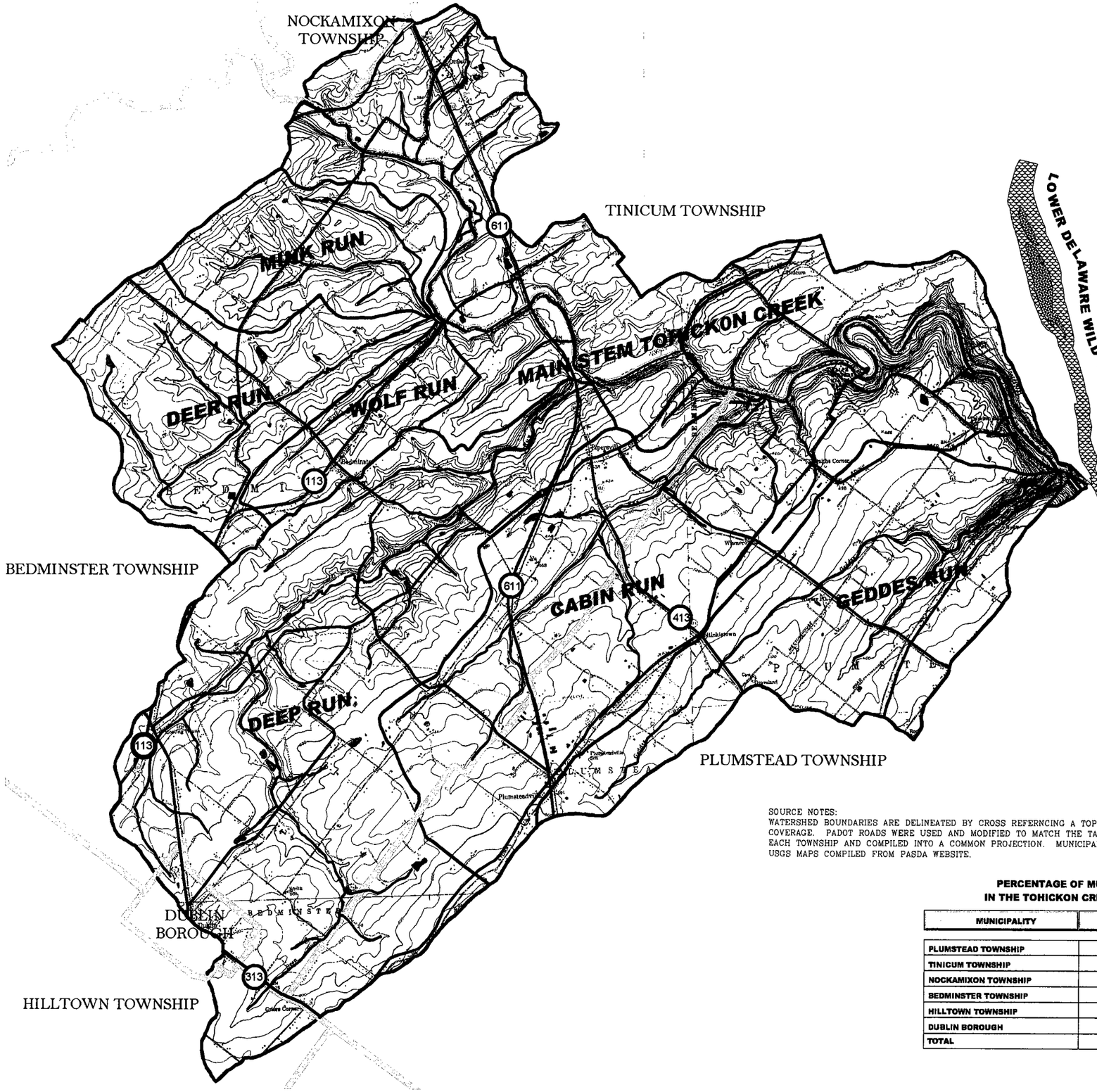
The Tohickon Creek is located in Northern Bucks County and is tributary to the Delaware River. Although the Tohickon Creek in its entirety drains a substantial portion of upper Bucks County, this Plan is limited to the Lower Tohickon Creek watershed, which begins at the Lake Nockamixon Dam and terminates at the creek's confluence with the Delaware River in Point Pleasant, an area of 37.69 square miles. The watershed contains portions of Dublin Borough and Bedminster, Hilltown, Tinicum, Nockamixon, and Plumstead Townships (Map 1).

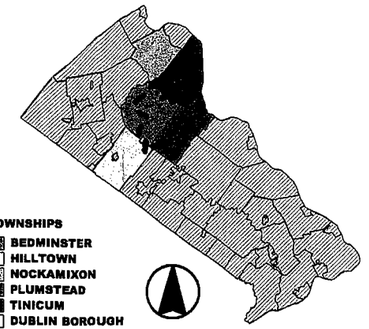
1.2 Watershed Area

The Lower Tohickon Creek Watershed comprises approximately 24,125 acres, or 37.69 square miles, (hereinafter the Lower Tohickon Creek will be referred to as the Tohickon Creek). The rolling farmlands, woodlands, steep slopes, and stream valleys of this watershed give it a rural and nostalgic character, a glance backwards to earlier periods of its history. The entire watershed area is an important natural, historic, cultural, and recreational resource. The area contains habitat for both plant and animal Species of Special Concern, National Landmarks, and other significant features described later in this plan.

The majority of Tohickon Creek watershed land lies within Bedminster (12,731 acres), Plumstead (7,302 acres), and Tinicum Townships (3,411 acres). Portions of Hilltown Township (313 acres), Dublin Borough (202 acres), and Nockamixon Township (167 acres) make up the rest. The focus of this plan is Bedminster, Plumstead, and Tinicum Townships, and the tributaries and portions of the main stem within them, which make up more than 97% of the watershed.

The mainstem of Tohickon Creek flows approximately twelve linear miles from the Nockamixon Dam at Nockamixon State Park, to its Delaware River confluence at Point Pleasant, Pennsylvania. Ralph Stover State Park, Tohickon Valley Park, the Delaware Canal State Park and Nockamixon State Park account for a large portion of the land in the watershed. The remainder of the basin is privately owned. Many acres are preserved under a variety of governmental and non-governmental programs.





SYMBOL KEY
TEXT SIGNIFICANT PLACENAMES
WATER RESOURCES
ISLANDS
DELAWARE RIVER
MAIN STEM TOHICKEN CREEK
NETWORKED STREAMS
LAKES (USGS)
DIVISIONS
TOHICKEN CREEK WATERSHED BOUNDARY
SUBWATERSHEDS
MUNICPAL BOUNDARIES

SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRPAHIC INTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. USGS MAPS COMPILED FROM PASDA WEBSITE.

PERCENTAGE OF MUNICIPALITIES IN THE TOHICKON CREEK WATERSHED

MUNICIPALITY	ACREAGE	% OF WATERSHED
PLUMSTEAD TOWNSHIP	7301.84	30.27
TINICUM TOWNSHIP	3410.76	14.14
NOCKAMIXON TOWNSHIP	167.02	0.59
BEDMINSTER TOWNSHIP	12730.79	52.77
HILLTOWN TOWNSHIP	312.77	1.30
DUBLIN BOROUGH	201.95	0.83
TOTAL	24124.93	100.0

NOTES: 1. DATA ACCURACIES ARE LIMITED TO THE ACCURACY AND SCALE OF THE ORIGINAL DATA SOURCES.
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3. DIGITAL MAPS ARE PERIDOICALLY UPDATED AND THE USER IS RESPONSIBLE FOR VERIFYING AND OBTAINING THE LATEST VERSION OF THE DATA.

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REVISIONS

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS
SCALE: 1: 55,000; ~ = 4500'
2000 0 2000 4000 6000 Feet

PAGE: I-2

TOHICKON CREEK WATERSHED PLAN

MAP NO.: 1

REGIONAL LOCATION MAP

DRAWN BY: KJM
CHECKED BY: MGGJD
REVISION NO.: 002.03
REVISION DATE: JUNE 15, 2002

PROJECT NUMBER: 229.01

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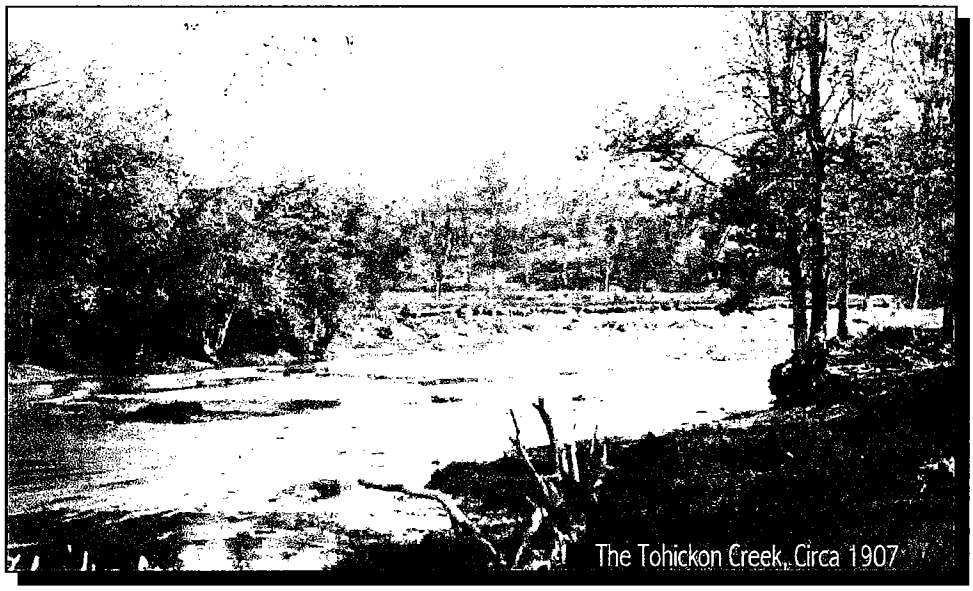
1.3 Major Tributaries

There are six secondary tributaries to the Tohickon Creek main stem. Secondary tributaries include Deep Run Creek (18.7 miles), Cabin Run (8.7 miles), Wolf Run (1.7 miles), Deer Run (5.5 miles), Mink Run (4.4 miles) and Geddes R
un (6.5 miles). There are several, smaller and unamed tributaries as well as tertiary tributaries within the Watershed.

Figure 1.1
Tohickon Creek Watershed ConservationPlan
The Tohickon Creek, Circa 1907



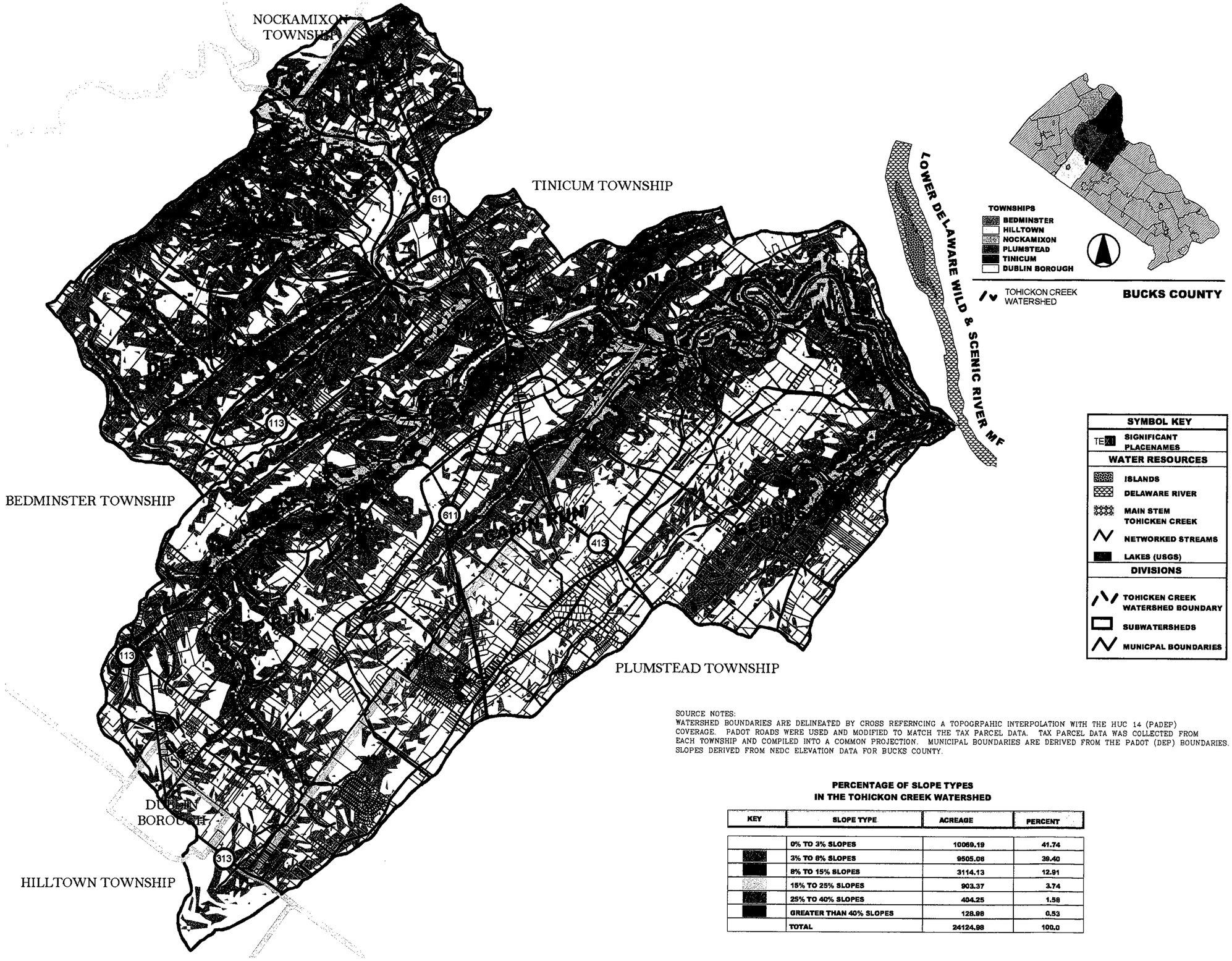
Source: Real Photo Postcard, Personal Collection, Mark Gallagher

1.4 Topography

The Tohickon Creek watershed is a mosaic of steep valleys, high cliffs, floodplains, and gently rolling hills. Elevations range from 100 feet mean sea level (MSL) for floodplains adjacent to the Tohickon Creek and the Delaware River to 400 MSL in areas such as the High Rocks State Park. The steeply sloping creek valleys characterize the watershed and provide for outstanding views, and a variety of recreational opportunities. The majority of the watershed consists of nearly level to rolling slopes of 0% - 8% slope, although slopes in the 25% to > 40% range are common. Most of the steep slopes are adjacent to the main stem between Dark Hollow Road and River Road, and along Geddes Run between Tollgate Road and River Road (Map 2).

Figure 1.2
Tohickon Creek Watershed Conservation Plan
Home in Agricultural Preservation (AP) District, Bedminster

Source: Princeton Hydro, LLC, 2001



SOURCE NOTES:
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PERCENTAGE OF SLOPE TYPES IN THE TOHICKON CREEK WATERSHED

KEY	SLOPE TYPE	ACREAGE	PERCENT
	0% TO 3% SLOPES	10069.19	41.74
	3% TO 8% SLOPES	9505.06	39.40
	8% TO 15% SLOPES	3114.13	12.91
	15% TO 25% SLOPES	903.37	3.74
	25% TO 40% SLOPES	404.25	1.68
	GREATER THAN 40% SLOPES	128.98	0.53
	TOTAL	24124.98	100.0

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REVISIONS

TOHICKON CREEK WATERSHED PLAN

MAP NO.: 2

TOPOGRAPHY

DRAWN BY:	KJM
CHECKED BY:	MC GG JD
REVISION NO.	002.03
REVISION DATE	JUNE 10, 2002

PROJECT NUMBER: 229.01

pH
1186 OLD YORK ROAD
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2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~= 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

1.5 Land Use and Land Use Planning in the Tohickon Creek Watershed and Corridor

In Pennsylvania, the power and responsibility for land use and its regulation lies with local government, as the General Assembly delegated planning and land use control "police power" to the counties and municipalities through the Pennsylvania Municipal Planning Code (MPC). The MPC does not demand that municipalities plan or zone, but enables local government to shape planning and land use programs. Neither does the MPC require individual municipalities to adopt Comprehensive Plans, Zoning Ordinances, and Subdivision and Land Development (SALDO) ordinances; Bucks County, however, has a history of strong county-wide and municipal planning and zoning.

The following subsections provide land use information compiled by the county to assist municipalities in their individual planning efforts, and an overview of the comprehensive planning and land use regulatory efforts implemented within the Tohickon Creek Watershed to protect natural, cultural, and recreational resources. Since the Tohickon Creek was recently designated a "Wild and Scenic River", the final subsection provides a description of the Lower Delaware River Management Plan as it pertains to the Tohickon Creek tributary.

1.5.1 County-wide and Municipal Land Use

According to the Pennsylvania Department of Community and Economic Development, land is one of our most valuable natural resources, and the way it is used or developed creates a significant part of our physical surroundings (DCED, 1999). It is therefore important to understand how land is presently used in the Tohickon Creek watershed.

Based on information obtained from municipal comprehensive plans, and land use/land cover provided by the Bucks County Planning Commission and other sources (Map 3), the majority of land in the watershed is used for agricultural (40%) and rural residential (28%) purposes. These figures are based on property use and should not be confused with land cover which designates the types of cover, i.e., forest, pasture, row crops etc. For example, although 28% of the land is designated on the land use map as being residential only 391.26 acres or 1.6% of the entire watershed is actually developed (Map 3 and Map 4). Most of the watershed, 97%, is either in agricultural use or is forested. Land cover will be described in detail later in this section.

As differentiated from the larger watershed, the Tohickon Creek Corridor is defined as the land within 500 feet of both sides of the main stem. The Land Use map indicates that the predominant land use in the Tohickon Creek corridor consists of parks/recreation/open space (325 acres) followed by agricultural (325 acres), rural residential (237 acres), vacant (232 acres), single family residential (87 acres), seasonal residential (14 acres), and commercial (13 acres). The term "vacant" may include fallow fields, meadows, and areas undergoing secondary succession.

LAND USE

MAP NO.: 3

NOCKAMIXON TOWNSHIP

TINICUM TOWNSHIP

BEDMINSTER TOWNSHIP

PLUMSTEAD TOWNSHIP

DUBLIN BOROUGH

HILLTOWN TOWNSHIP

LOWER DELAWARE WILD & SCENIC RIVER

611 113 313 413

TOWNSHIPS
- BEDMINSTER
- HILLTOWN
- NOCKAMIXON
- PLUMSTEAD
- TINICUM
- DUBLIN BOROUGH

TOHICKON CREEK WATERSHED

BUCKS COUNTY

SYMBOL KEY

TEXT SIGNIFICANT PLACENAMES

WATER RESOURCES
- ISLANDS
- DELAWARE RIVER
- MAIN STEM TOHICKEN CREEK
- NETWORKED STREAMS
- LAKES (USGS)

DIVISIONS
- TOHICKEN CREEK WATERSHED BOUNDARY
- SUBWATERSHEDS
- MUNICPAL BOUNDARIES

SOURCE NOTES:
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PERCENTAGE OF LAND USE TYPES IN THE TOHICKON CREEK WATERSHED

KEY	LAND COVER	ACREAGE	% OF WATERSHED
	ACRICULTURAL	9729.77	40.33
	COMMERCIAL	277.29	1.15
	GOVERNMENT & INSITUTIONAL	212.11	0.88
	MINING & MANUFACTURING	187.88	0.78
	MULTI-FAMILY RESIDENTIAL	19.91	0.08
	PARKS, REC, & PROTECTED OPEN SPACE	1001.39	4.15
	RURAL RESIDENTIAL	6825.54	28.29
	SEASONAL RESIDENTIAL	29.37	0.12
	SINGLE-FAMILY RESIDENTIAL	2341.17	9.70
	TRANSPORTATION & UTILITIES	68.11	0.28
	VACANT	3204.65	13.28
	TOTAL	23897.19	99.10

TABLE NOTES:
FOR CALCULATION OF THE AREAS ON THIS TABLE EXTENTS OF THE LANDUSE COVERAGE WAS USED, GAPS IN THE TINICUM COVERAGE INCLUDE TRANSPORTATION EASEMENTS, THIS ACCOUNTS FOR THE LOWER ACREAGE VALUE.

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REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~= 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

PAGE: I-7

DRAWN BY:	KJM
CHECKED BY:	MG,GG,JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 15, 2002

PROJECT NUMBER: 229.01

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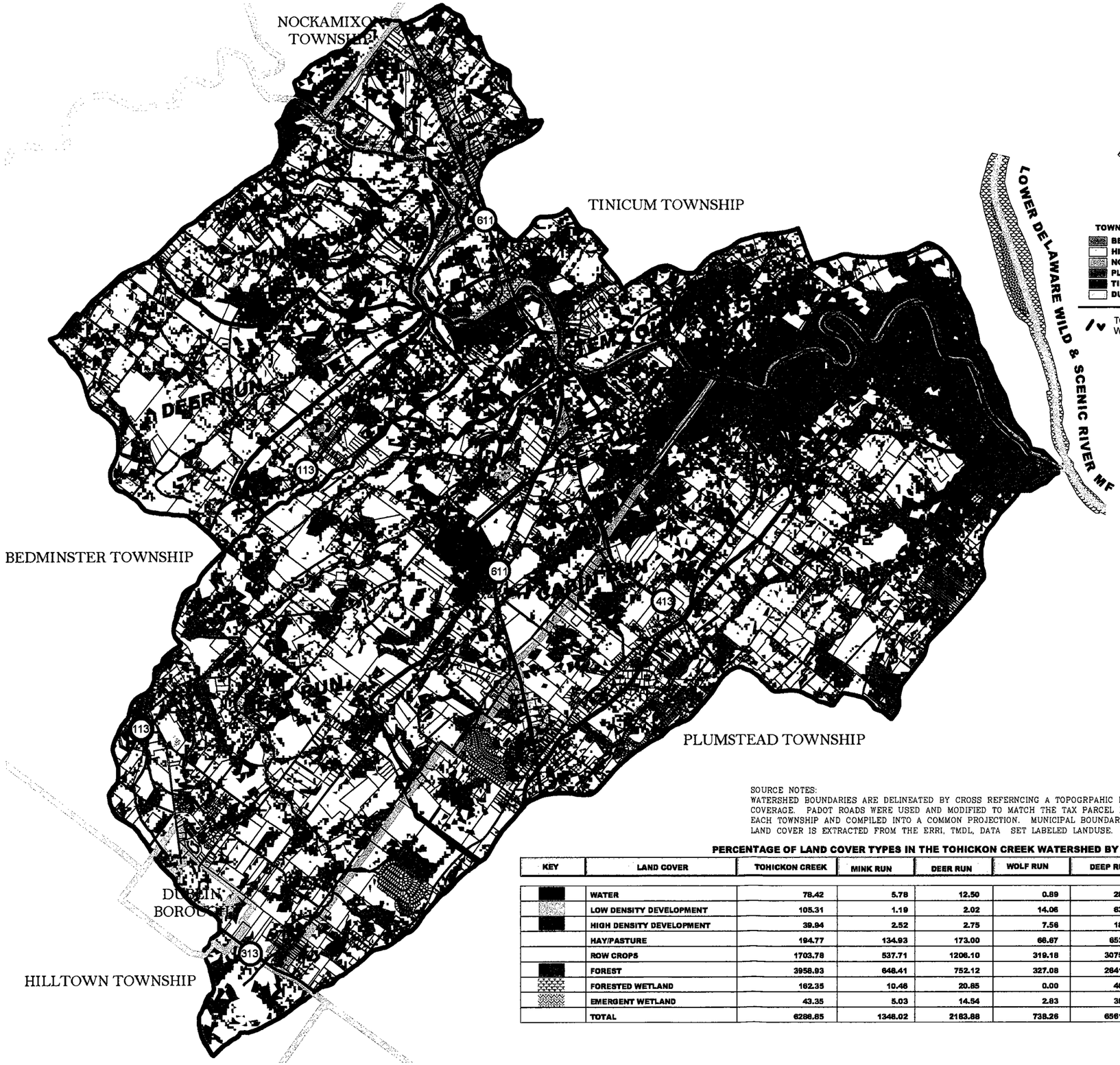

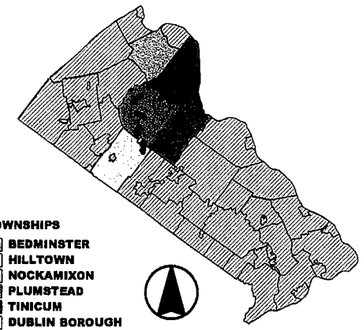

SYMBOL KEY
SIGNIFICANT PLACENAMES
WATER RESOURCES
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DELAWARE RIVER
MAIN STEM TOHICKEN CREEK
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PERCENTAGE OF LAND COVER TYPES IN THE TOHICKON CREEK WATERSHED BY SUBWATERSHED LABEL

KEY	LAND COVER	TOHICKON CREEK	MINK RUN	DEER RUN	WOLF RUN	DEEP RUN	CABIN RUN	GEDDES RUN	TOTALS
	WATER	78.42	5.78	12.50	0.89	28.86	13.89	18.44	158.78
	LOW DENSITY DEVELOPMENT	105.31	1.19	2.02	14.06	63.32	51.88	6.30	244.08
	HIGH DENSITY DEVELOPMENT	39.94	2.52	2.75	7.56	18.19	58.05	10.45	139.43
	HAY/PASTURE	194.77	134.93	173.00	66.67	652.89	236.60	179.84	1638.70
	ROW CROPS	1703.78	537.71	1206.10	319.18	3075.85	1746.18	1399.35	9988.15
	FOREST	3958.93	648.41	752.12	327.08	2641.73	1702.37	1547.60	11578.24
	FORESTED WETLAND	162.35	10.46	20.85	0.00	40.93	21.16	0.00	255.75
	EMERGENT WETLAND	43.35	5.03	14.54	2.83	39.30	5.68	3.72	114.45
	TOTAL	6286.85	1348.02	2183.88	738.26	6561.06	3835.80	3165.69	24116.99

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TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet
SCALE: 1: 55,000; ~= 4500'
MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

MAP NO.: 4

LAND COVER

DRAWN BY:	KIM
CHECKED BY:	MC,CC,JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 14, 2002

PROJECT NUMBER: 229.01

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Bedminster Township

The Bedminster Township Comprehensive Plan (1996 Bucks County Planning Commission & Bedminster Township Planning Commission) indicates that land use within the municipality is primarily agricultural (43%), rural residential (27%), and vacant (15%) (land that is not inhabited). The predominant housing type (6% of Township land use) is single-family detached, while multi-family residential makes up only about 0.3% of the 1990 land use. The Bucks County Continuum document (BCPC, 1994) indicates that between 1980 and 1990, Bedminster experienced a 37% increase in housing units. The same document estimates a 57% increase in housing units by 2020.

Plumstead Township

The 1992 Plumstead Township Comprehensive Plan (Froelich, 1992) prescribes predominantly rural residential and agricultural land interspersed with suburban residential land uses throughout the municipality. Much smaller areas of commercial and industrial use are located along Route 611 and Danboro-Point Pleasant Pike. Open space/recreational uses are located along the Tohickon Creek. The Land Use Continuum (BCPC, 1994) estimates a 59% increase in housing units between 1990 and 2020.

Tinicum Township

Planning information obtained from the Tinicum Township Comprehensive Plan (Coughlin, Keene, and Associates, 1993) and the Open Space Plan (Brandywine Conservancy, 2000) also indicates that considerable areas are dedicated to farming, single family homes on large lots, and areas preserved for recreation and conservation. In Tinicum Township, the single family dwellings are located on large tracts, with higher residential densities within villages. The municipal comprehensive plan indicates that between 1979 and 1990, there were 447 new lots created in the Township, resulting primarily from 189 subdivisions. Of these, 37 subdivisions resulted in large lots of 10 acres or more. There were also 84 minor subdivisions (only two lots) and 31 major subdivisions during this time period. The latter resulted in an average of just under four lots per major subdivision. County-based information (Bucks County Planning Commission, 1994) indicates that by 1990, the municipality contained 1, 709 housing units. Low housing unit projections suggest that the number of housing units will almost double by 2020.

1.5.2 Comprehensive Planning in the Tohickon Creek Watershed

According to state planning documents, *a comprehensive plan is more than just a document disclosing past and present land use trends with a proposed course of action. It is a process of*

organizing for the future. It creates a blueprint for our land use patterns of tomorrow (DCED, 1999). The comprehensive plan is therefore a tool by which local governments may direct growth and change within the community. The intent is to direct that change, while at the same time, protecting the health, safety, and welfare of citizens.

The Bucks County Planning Commission and the three municipalities comprising the majority of land within the Tohickon Creek watershed have adopted comprehensive plans in the last ten years. Each municipal plan contains a resource protection component as well as goals, objectives, and recommended activities to protect natural and cultural resources. In addition, some of the municipalities within the watershed have initiated additional study to create functional plans based on individual elements in their comprehensive plans. All three municipalities have adopted open space plans, for example, and Plumstead Township has a recently adopted recreational trail plan (BCPC, 2001). A comprehensive stormwater management plan for the entire watershed governs stormwater infiltration and stormwater best management practices (BCPC, 2002).

Bedminster Township Comprehensive Plan

The Bedminster Township Comprehensive Plan was adopted six years ago, and contains twelve elements (Bedminster & BCPC, 1996). Although all twelve elements directly or indirectly influence watershed resources, the agricultural, natural resources and cultural/heritage resource elements are particularly pertinent to the Tohickon Creek Watershed Conservation Plan.

With regard to agriculture, the plan states that *beyond its historical value, Bedminster farmland is a productive resource, by contributing to the local economy and providing scenic open space valued by residents.* The plan recommends a package of techniques to preserve agriculture and enhance the economic viability of agriculture in the Township. The Bedminster Township plan also contains a strong natural resource protection element as well as statements noting that a *high quality environment is an important goal for the township.* The element further states that *development without concern for the natural limitations and amenities of land can be costly for people, as individuals and as taxpayers in the community.* The plan also describes the wealth of historic, even pre-historic, resources in the Township and the need to protect them as they are *essential to an understanding of past settlement patterns and provide insight into Bedminster's heritage.* As historic development patterns are often in proximity to rivers and their tributaries, the historic preservation element notes separate studies completed for the historic significance of the Cabin Run area and the Deep Run Valley.

The following goals are included in the Bedminster Township Comprehensive Plan and are supportive of watershed conservation efforts currently underway in the Tohickon Creek Watershed area:

- Protect and conserve agricultural land and support the agricultural industry in Bedminster Township.
- Protect the people's constitutional right to clean air, pure water, and other natural, scenic and aesthetic natural resources and features that create the character and environment of the township.
- Retain the character and qualities of the villages that have played and continue to play an important role in Bedminster Township.
- Recognize and protect the cultural heritage, natural resources, and character of Bedminster Township so that landmarks are preserved for future generations.

Plumstead Township Comprehensive Plan

The Plumstead Township Comprehensive Plan was adopted ten years ago and is a thorough compilation of historic, natural features, environmental protection, open space preservation, and historic preservation information. The plan considers planning policies in the surrounding municipalities as well as a plan for capital improvements (Froelich, 1992). Background data, current planning policies, and future needs and recommendation support the following pertinent watershed resource protection goals:

- Protect the natural features of the township, including the drainage areas of creeks and their tributaries, wooded areas, steep slopes, wetlands, floodplains, and other sensitive areas.
- Preserve the traditional character of Plumstead Township, its villages and its natural landscape.
- Encourage the preservation of open space in the Township for farming, protection of natural features, and recreational uses. Open space should form an important part of the township landscape.
- Work toward a development pattern that is compatible with those in surrounding communities and that respects the plans for the future adopted by county, regional, and state agencies.

Tinicum Township Comprehensive Plan

The Tinicum Township Comprehensive Plan was adopted nine years ago (Coughlin, Keene, and Associates, 1993). The most comprehensive element in the plan is entitled Resources Worth Protecting. The element provides information on the significance, diversity, and location of Township environmental, cultural, and historical resources and the need to preserve them. The environmental resources section notes that *Tinicum Township is fortunate in having strong natural elements that define its boundaries and contribute to its sense of identity. These are the Delaware River and Tohickon Creek with their associated steep slopes, and the generally rocky area of Coffman Hill, or The Swamp, much of which is set aside as State Gamelands.*

Tinicum Township has been working for many years to implement the following resource and watershed protection goals:

- To preserve and enhance the traditional character of Tinicum Township, particularly its heritage of buildings and landscapes with their natural beauty and rural quality.
- To conserve the natural environment, by preserving open space, stream valleys, and floodplains in order to control pollution, maintain natural amenities, and minimize the danger of natural hazards such as flooding.
- To accommodate a variety of commercial uses in a manner that complements the existing resources of the Township.
- To provide adequate facilities without causing unnecessary disruption of the traditional character of the township.
- To protect the public's health by ensuring proper management of wastes and avoiding impairment of the quality of the water, air, and land.
- To reduce the consumption of non-renewable energy resources and encourage the use of renewable energy resources.

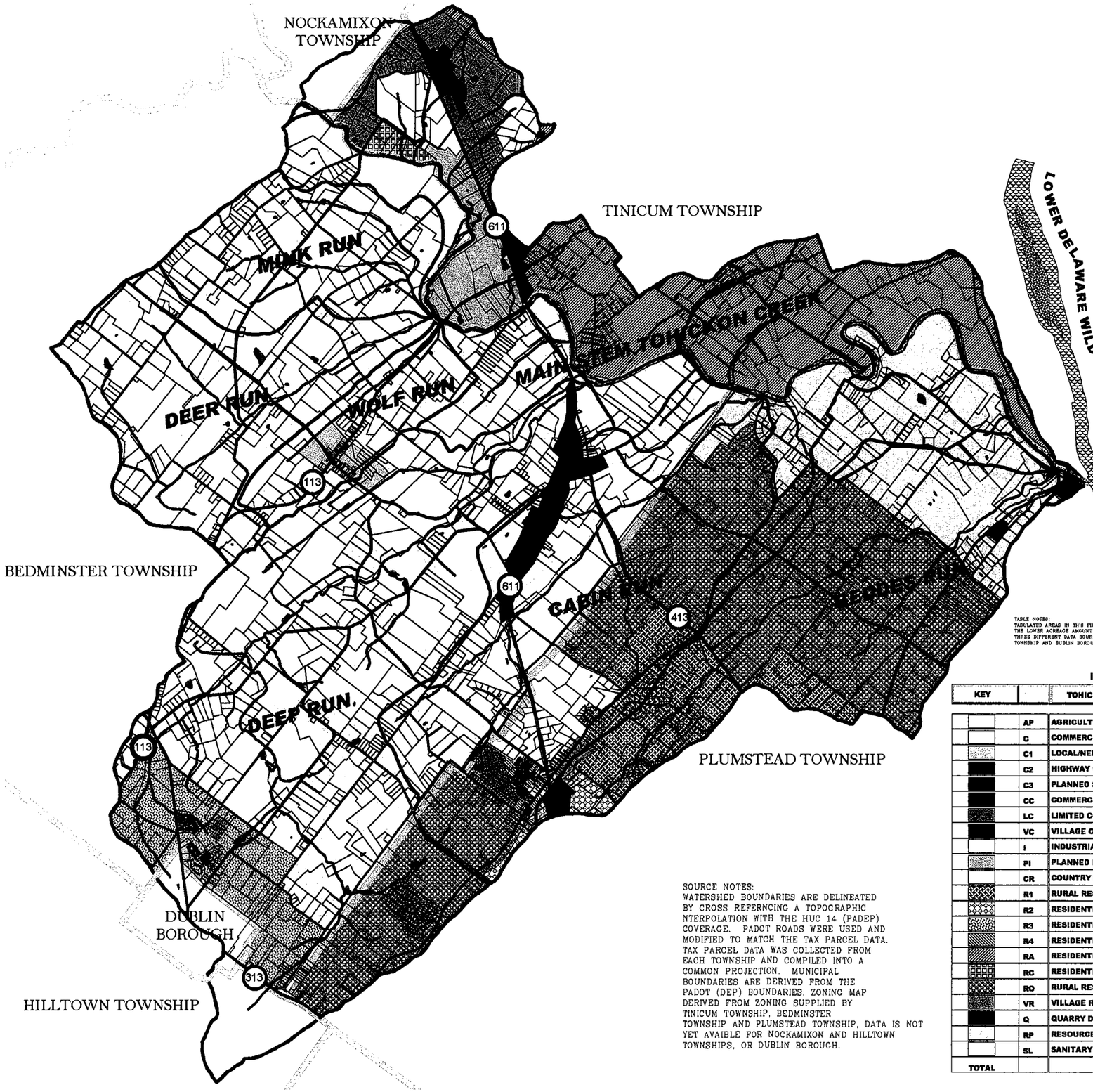
1.5.3 Zoning and Protection of Resources Through Zoning in the Tohickon Creek Watershed

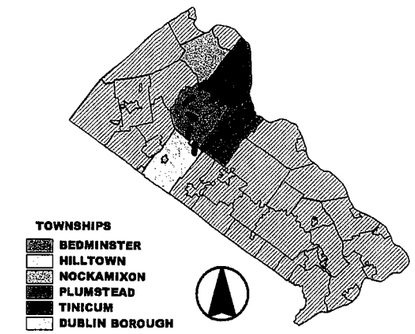
The terms "planning" and "zoning" are often used interchangeably, but a distinction should be made between the two. Planning involves taking an inventory of the development alternatives, analyzing the collected data, projecting future development alternatives, and establishing policies to be implemented in the future. Zoning is one method of implementing the plan and is concerned with the present. Zoning is the basic means of land-use control employed by local governments in the United States today. Zoning divides the community into districts (zones) and imposes different land-use controls on each district, specifying the allowed uses of land and buildings, the intensity or density of such uses, and the bulk of buildings on the land (DCED, 1999).

The zoning information for the three municipalities within the Tohickon Creek watershed was obtained from the individual municipalities and their selected engineering and planning consultants. The information is based upon individual municipal zoning ordinances (Map 5). Additional regulations included in each zoning ordinance and designed to protect municipal resources are also included in this subsection.

Bedminster Township

Map 5 shows that most of the land within the Tohickon Creek Corridor and in the surrounding Tohickon Creek watershed is located in Bedminster Township. The Bedminster





SYMBOL KEY
TE SIGNIFICANT PLACENAMES
WATER RESOURCES
ISLANDS
DELAWARE RIVER
MAIN STEM TOHICKEN CREEK
NETWORKED STREAMS
LAKES (USGS)
DIVISIONS
TOHICKEN CREEK WATERSHED BOUNDARY
SUBWATERSHEDS
MUNICPAL BOUNDARIES

TABLE NOTES:
TABULATED AREAS IN THIS FIGURE INCLUDE THE STENTS OF THE ZONING COVERAGE. THE LOWER ACREAGE AMOUNT IS ATTRIBUTED TO DATA GAPS BETWEEN THREE DIFFERENT DATA SOURCES, AND MISSING DATA FOR NOCKAMIXON AND HILLTOWN TOWNSHIP AND DUBLIN BOROUGH.

PERCENTAGE OF ZONING TYPES IN THE TOHICKON CREEK WATERSHED

KEY		TOHICKON CREEK	MINK RUN	DEER RUN
	AP	AGRICULTURAL PRESERVATION DISTRICT	10821.46	46.73
	C	COMMERCIAL	198.44	0.86
	C1	LOCAL/NEIGHBORHOOD COMMERCIAL DISTRICT	124.63	0.54
	C2	HIGHWAY COMMERCIAL DISTRICT	237.59	1.03
	C3	PLANNED SHOPPING CENTER DISTRICT	15.56	0.07
	CC	COMMERCIAL DISTRICT	50.97	0.22
	LC	LIMITED COMMERCIAL	11.44	0.35
	VC	VILLAGE CENTER DISTRICT	86.72	0.37
	I	INDUSTRIAL	840.23	3.63
	PI	PLANNED INDUSTRIAL	359.62	1.55
	CR	COUNTRY RESIDENTIAL	81.28	0.35
	R1	RURAL RESIDENTIAL	854.83	3.69
	R2	RESIDENTIAL DISTRICT	96.59	0.42
	R3	RESIDENTIAL DISTRICT	847.64	3.66
	R4	RESIDENTIAL DISTRICT	115.44	0.50
	RA	RESIDENTIAL AGRICUTURAL	2028.28	8.76
	RC	RESIDENTIAL CONSERVATION	61.52	64.52
	RO	RURAL RESIDENTIAL DISTRICT	3854.94	16.65
	VR	VILLAGE RESIDENTIAL	509.97	2.20
	Q	QUARRY DISTRICT	11.63	0.05
	RP	RESOURCE PROTECTION DISTRICT	1934.01	8.35
	SL	SANITARY LANDFILL DISTRICT	10.1	0.04
TOTAL			23155.85	100.0

SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRAPHIC NTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. ZONING MAP DERIVED FROM ZONING SUPPLIED BY TINICUM TOWNSHIP, BEDMINSTER TOWNSHIP AND PLUMSTEAD TOWNSHIP, DATA IS NOT YET AVAIBLE FOR NOCKAMIXON AND HILLTOWN TOWNSHIPS, OR DUBLIN BOROUGH.

MAP NO.: 5

ZONING

DRAWN BY:	KJM
CHECKED BY:	MC,GG,JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 10, 2002

PROJECT NUMBER: 229.01

pH
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NOTES: 1. DATA ACCURACIES ARE LIMITED TO THE ACCURACY AND SCALE OF THE ORIGINAL DATA SOURCES.
2. THESE MAPS ARE PART OF A WATERSHED PLAN AND SHOULD BE USED IN CONJUNCTION WITH THE COMPILED TEXT.
3. DIGITAL MAPS ARE PERIODICALLY UPDATED AND THE USER IS RESPONSIBLE FOR VERIFYING AND OBTAINING THE LATEST VERSION OF THE DATA.

FILE: C:\0022901\GIS\0022901nri.apr (POR_FIG_5

DATE: JUL 3 2002 , 9:55 AM

REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~ = 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

Township Zoning Ordinance (Bedminster Township, February 14, 2000) indicates that within the watershed, approximately 46% (11,053 acres) of land is zoned Agricultural Protection (AP). Section 405 of the Ordinance indicates that land zoned AP is intended for the production of agricultural, horticultural, arboricultural, viticultural, apicultural, and dairy products. Permitted uses also include the keeping of livestock, poultry, and other similar creatures raised for human use or profit. The AP zoning district is further separated into general farming, nursery, intensive agriculture, industrial animal production, commercial kennel, noncommercial kennel, equestrian, agricultural retail, and forestry uses. Minimum lot areas (range 80, 000 square feet - 10 acres), set backs, structural, and impervious surface restrictions vary based on the subclassification.

Other Zoning Districts in Bedminster include the Residential (R-3) district in proximity to Routes 313 and 113 (approximately 828 acres) followed by an Industrial District (I) located between Route 611 and Route 313 and bordering Plumstead Township (approximately 410 acres), a Highway Commercial Zoning District (C2) in an area adjacent to Route 611 (260 acres), and a local commercial (C1) District in the Center of the municipality at the intersection of Route 113 and Kellers Church Road (199 acres).

In addition to the establishment of zoning districts and use regulations, Section VI of the Bedminster Zoning Ordinance contains performance standards addressing a variety of measures to protect water quality, floodplains, open space and other resources. These are briefly listed below.

- **Environmental Performance Standards (Section 601)** - The developer is required to determine the presence of environmental or natural features on the site.
- **Floodplain Performance Standards and Floodplain Soils (Section 613-620)**- This section includes floodplain definitions and area descriptions and prohibits development in the one-hundred year floodplain except with design approval from PADEP. It allows limited alteration of existing structures, requires notification of changes in delineations, and regulates dispute procedures. It sets design and construction standards for construction in the floodway, flood fringe and floodplain areas above the one-hundred year flood elevation, and for storm drainage facilities, utilities, streets, storage, and anchoring.
- **Steep Slopes [Section 601-(3)]** - No more than 30% of areas with 15-25% slopes may be developed, regraded, or stripped of vegetation except for 10 acre parcels in the AP District. For these areas, no more than 75% may be developed, regraded, or stripped of vegetation. No more than 15% of areas with >25% slopes may be developed, regraded, or stripped of vegetation, with certain exceptions in the AP District.
- **Woodlands [Section 601-(4)]** - No more than 20% of woodlands in environmentally sensitive areas (floodplains, floodplain soils, steep slopes, wetlands, wetland margins, lake/pond shorelines) may be altered, re-graded, cleared or built upon. No more than 50% of woodlands not located in environmentally sensitive areas may be altered. In AP District

(parcels 10 acres or more) no more than 75% of woodlands (not in sensitive areas) may be altered, regraded, or built upon.

- **Lakes, Ponds, Wetlands, Swales & Streams [Section 601-(5)]** - Such areas may not be altered, regraded, developed, or filled. Roads may cross them with design approval from PADEP or USEPA permits.
- **Wetland Margins [Section 601-(6)]** - Defined as 100'. No more than 30% may be altered, regraded filled etc. No more than 10% disturbance with impermeable surfaces. PADEP (Chapter 105) regulations must be met.
- **Prime Farmland/Agricultural Soils in AP District [Section 601-(8)]** - On tracts with ten acres or more, no more than 40% of prime farmland may be developed. On tracts with ten acres or more, no more than 50% of farmlands of statewide & local importance may be developed.
- **Stormwater [Section 601-(9)]** - Compliance with SALDO and state stormwater management act required.
- **Soil Erosion & Sedimentation [Section 601 (10-12)]**- Compliance with Chapter 102 and E&S plans at preliminary stage required for areas < 25 acres. Permanent removal of topsoil and subsurface solids prohibited (2 exceptions).
- **Riparian Buffer [Section 601(13)]** - No land disturbance in riparian buffer (75') and two distinct zones of use. Zone 1 (buffer edge + 25') allows for open space uses. Zone 2 (edge of Zone 1 + 50') allows for open space uses. Prohibited uses in both zones include clear cutting, selective cutting, hazardous waste storage, roads/driveways, parking lots, and subsurface sewage disposal. Replanting of streambank buffer required where there is little or no streambank vegetation.
- **Site Capacity Calculations (Section 602)** - Requires determination of appropriate intensity of use for watercourses, floodplains, floodplain soils, wetlands, lakes/ponds, riparian buffer, wetland margin, land/pond shoreline, steep slopes, and woodlands in all zoning districts. Requires determination of above plus prime farmland, farmlands of statewide importance, and farmland of local importance.
- **Buffer Yards (Section 603)** - Requires 3 step process for determining buffer yard class, selection of planting options, and selection of planting materials for all existing land uses. Buffer yard classes range from 25' to 45' wide. Suggested list contains native and non-native flora.
- **Noise & Vibration Ordinances (Section 604-05)** - Ordinance intended to protect citizens and requires inspection and testing and establishment of noise sensitive zones with associated general sound standards.
- **Air Pollution (Section 606)** - Regulations setting PADEP limitations upon fugitive, particulate matter, and sulfer compound emissions.
- **Toxic & Noxious Matter (Section 607)** - Offensive odors beyond the ASTM odor threshold limits are prohibited. Industrial Districts shall comply with odor threshold concentrations from ground level to 40' from ground level.

- **Water Quality (Section 612)** - No surface water withdrawals without DRBC permission or in cases of emergencies (e.g. fire ponds). Stream discharge limitations (e.g. heat, metal oil, suspended matter etc) per PADEP.
- **Open Space Provisions (Section 621-626)** - Requirements for residential developments (B2 & B3 Uses) including layout (best principles for site design), site plan designation (use & maintenance), stormwater management area allowances, open space performance bond requirements, ownership and dedication methods and associated requirements, and deed restrictions.
- **Sign Ordinance (Article VIII)** - Article contains definitions, area/location/type/density requirements, and different requirements based on Zoning District designation.

Plumstead Township

The majority of land in Plumstead Township and within the Tohickon Creek Corridor is zoned Rural Residential (RR) and Resource Protection (RP). The RR district is the zoning classification for approximately 16% (3,798 acres), and the RP district is assigned to 8% (1,955 acres) of Plumstead Township land within the Tohickon Creek Watershed.

The Plumstead Township Zoning Ordinance (Plumstead Township, 1991) was amended after this section of the document, and the associated GIS maps were completed. The predominant zoning for the Tohickon Creek watershed located in Plumstead Township is Rural Residential (RO) District (3,798 acres) and Resource Protection (RP) (955 acres). The purpose of the RO District is to encourage low density residential development on lots of sufficient size to provide for on-lot sewage disposal and on-lot water supply where community systems will not be provided (Article VI). Cluster development is permitted in the RO District to preserve open space and natural resources. Uses permitted by right in the RO District include all types of farming, commercial forestry, nurseries, detached dwellings, residential accessory uses and structures, municipal buildings, and recreational facilities. Minimum lots of 12,500 square feet are required for cluster subdivisions while two acre lots are required for all other uses.

The RP District (Article IV) in Plumstead Township is intended to protect areas containing sensitive natural features and areas of natural scenic beauty such as the Tohickon Creek and the Delaware Canal. Agricultural and low-intensity residential uses are permitted with standards and densities designed to encourage preservation of natural resources. Permitted uses include general farming, commercial forestry, nurseries, detached dwellings, and residential accessory uses. Detached dwellings in the RP district must be placed on a minimum of 2 acres, bed and breakfasts on 3 acres and other permitted uses on 10 acres.

Other Zoning Districts in Bedminster and within the Tohickon Creek watershed area include the Rural Residential District (R1) located northwest and southeast of Stump Road and between

Routes 611 and 413, Agricultural Preservation (AP) located in the vicinity of Dark Hollow Road, the Industrial Zoning District (I) east and west of Route 611 and north of Stump Road, and a small Residential Zoning District (R2) in the vicinity of Stump Road and Route 611.

In addition to the establishment of zoning districts and use regulations included in the Plumstead Township Zoning Ordinance, there is also a Floodplain Overlay Zone (Article XXII) and Natural Resource Protection Standards (Article XXVI) protecting the municipalities resources. An overlay district is an additional set of standards added to standards associated with the underlying zoning district. Floodplain overlay districts are the most common as they add stricter setback and construction standards in an effort to protect people and their property from the destructive effects of flooding. Briefly these regulations include:

- **Floodplain Overlay Zoning (Sections 2200-2229)** - Floodway (FW), flood fringe (FF), and general floodplain (FA) districts were created and serve to supplement the underlying zoning districts. Federal Environmental Management Agency (FEMA), United States Army Corps of Engineer (COE), and Pennsylvania Department of Environmental Protection (PADEP) regulations require that structures be built above the one-hundred year flood.
- **Natural Resource Protection (Floodplain) Standards (Section 2600)** - These natural resource protection standards state that areas within the one-hundred year recurrence interval flood level shall not be altered, re-graded, filled or build upon unless in conformance with Article XXII.
- **Floodplain Soils (Section 2600 B)** - Regulations state that soils shall not be altered, re-graded, filled or built upon unless design approval is obtained from the Township and PADEP. Certain structures may take place with above-stated approvals.
- **Streams, Watercourse, Wetlands, Lakes or Ponds (Section 2600 C)** - No alteration except when design approval is obtained from the Township and PADEP. Certain structures may take place with above-stated approvals.
- **Steep Slopes (Section 2600 D)** - The regulations apply to contiguous areas of steep slopes exceeding 3000 square feet. Where slopes are 16-25%, no more than 30% may be altered, re-graded, cleared or built. Where areas are >25%, no more than 15% may be altered etc.
- **Forests (Section 2600 E)** - No more than 20% of forested areas shall be altered, re-graded, cleared or built upon (RP, RO, R-1, R-2, R-3, VR, MHP Districts). Cluster developments (R-1A) may build upon an additional 10%, and no more than 40% of forested acres shall be altered, re-graded, cleared or built upon in all other districts.
- **Tree Protection Zone (Section 2600 F)** - No land within the tree protection zone (e.g. drip line of outer tree beyond) may be altered, re-graded, compacted etc.
- **Application of Resource Protection Standards (Section 2601)** - To meet preceding requirements, the applicant must provide information: minium building envelope, sewage system, site plan showing all existing resources and intended encroachments, and site capacity

calculations (floodplains, floodplain soils, streams/watercourses, lakes & ponds, wetlands, steep slopes, forests, tree protection zone, minimum open space).

- **Sign Regulations (Sections 2800-2816)** - Article contains definitions, size, height, density per zoning district, exemptions, and nonconforming sign information.
- **Open Space Requirements (Section 2900-2905)** - Open space requirements established for all zoning districts whereby each district has a total percentage of open space and a minimum required recreational area. Ownership, dedication, maintenance, and fee in lieu of provisions are included.
- **Buffer Yard Requirements (Section 3000-3003)** - Buffer yard provisions for non-residential district adjoining residential districts along with minium buffer area widths, buffer planting, buffer planting densities, and suggested plant materials (native & non-native plant materials are on the list).

Tinicum Township

The majority of land in Tinicum Township is zoned Rural Agricultural (RA, 2028 acres). Other zones include Planned Industrial (PI, 358 acres), Village Residential (VR, 475 acres), Village Center (VC, 99 acres), Country Residential (CR, 81 acres), Residential Conservation (RC, 60 acres), Commercial (CC, 51 acres), Quarry District (Q, 15 acres), and Limited Commercial (LC, 11 acres). Zoning in the Tohickon Creek corridor follows a similar pattern with Residential Agriculture comprising the majority of the corridor. The Tinicum Township Zoning Ordinance (Tinicum Township, 2000) notes that land zoned RA is composed of residential properties of a rural character on lands which do not have the severe drainage or water supply limitations prevailing in the RC district. Requirements for this district are designed to protect the essential characteristics of these areas, to promote and encourage a suitable and safe environment for family life (Article IV).

The following uses are permitted within the RA zoning district: single family detached dwellings, cemeteries, veterinarians, utilities, emergency services, home occupations, accessory offices, residential accessory buildings, and signs. Single family homes in the RA district are required to have two acre lots, while the remaining uses require three acre minimum lots. Common setbacks, minimum yard requirements, and impervious surface ratios (0.10) are required for single homes and other uses in the RA zoning district.

In addition to the zoning requirements associated with the RA district, the Tinicum Township Zoning Ordinance includes several overlay districts (Article 3) as well as associated protection regulations in the Environmental Performance Standards section (Article 8). Regulatory highlights are as follows:

- **Site Capacity Calculations (Section 801)** - The following calculations are required at the initial plan stage: wetlands, floodway, floodplain (alluvial) soils, waterways, pond/lake

shorelines, and steep slopes exceeding 30%, have 100% protection. Flood fringe areas have 75% protection.

- **Environmental Performance Standards (Section 802)** - A maximum permissible intrusion is set for the following natural resources: streams, rivers, waterways, lakes, ponds, floodways, floodplain soils, wetlands, lake/pond shorelines, very steep slopes with gradients exceeding 30 % (no intrusion), very steep slopes with gradients of 25%-30% (10% intrusion), steep slopes with gradients of 20%-25% (15% intrusion), steep slopes with gradients of 15% - 20% (30% intrusion), steep slopes with gradients of 8% to 15% (40%y intrusion), and forested areas (20% intrusion).
- **Floodplain District (Section 804)** - Proposed uses or activities must not adversely affect the capacity of the channels or floodways of any waterway, drainage ditch, or any other drainage facility or system. Accessory uses are permitted in the Floodway (FW) provided they are set back 50' from the floodplain.
- **Steep Slope Conservation District (Section 805)** - The district is comprised of steep (15%-25%) and very steep (25% and greater) slopes. Permitted principal uses in very steep districts include agriculture, conservation, recreation, pre-existing structures, and front/rear/side yard areas. Cut and fill, mineral extraction, removal of topsoil and OLDS are prohibited. Permitted uses and prohibited uses are the same as in the very steep slope district.
- **Wetlands and Wetland Margin (Section 806)** - Wetlands must be protected (100%), delineations are required by on-site assessment, and a riparian buffer of fifty feet beyond the wetland boundary is required. Margins shall not be altered, regraded, developed, diverted, etc. Crossings are allowed when no other alternative is available and only with a conditional use from the Township.
- **Riparian Buffer (Section 806)** - Field surveys are required to delineate the riparian buffer (fifty feet beyond the top of bank). Buildings and structures are not permitted and buffers shall not be altered, re-graded, developed, filled etc. Crossings are permitted with conditional use approval and where no other alternative is available.
- **Critical Groundwater Recharge Areas (Section 806)** - Critical recharge areas include headwaters of Exceptional Value and High Quality streams. The applicant is required to delineate the recharge area based on the regional USGS study for the area. Proposed development in these areas requires conditional approval, impervious surfaces shall be 50% less than underlying district, buildings/structures must be placed in areas having least impact on recharge. Applicant must submit all soil tests to DOH & Township, septic tank absorption areas shall be located at least 150 feet from the top of bank of all waterways, and spray irrigation systems are not permitted.
- **Tinicum Creek Watershed (Section 806)** - The Tinicum Creek is an EV stream and has Wild & Scenic River Program status. All proposed development requires conditional use approval, buildings/structures must be placed in areas having least impact on recharge. Applicant must submit all soil tests to DOH & Township, septic tank absorption areas shall be located at least 150 feet from the top of bank of all waterways, and spray irrigation systems

are not permitted.

- **Tohickon Creek Watershed (Section 806)** - The Tohickon Creek is a Cold Water Fishery and has Wild & Scenic River Program status. All proposed development requires conditional use approval, and all limitations are as above.
- **Woodland and Hedgerow (Section 806)** - No more than 20% or more of a mature tree stand shall be removed. Within priority inventory areas (BC Resource Inventory, 2000) no more than 10% shall be removed. If more than stated percentage is removed, replacement is required. Species shall be approved by township and shall be 2.5-3 inch caliper.
- **Critical Biodiversity Areas (Section 806)** - Areas containing species of threatened, endangered, or special significance shall be protected. Mapping of areas (BC Resource Inventory, 2000 & Morris Arboretum, 2000) shall be submitted by applicant. No development or disturbance of these areas.
- **Prime Farmland and Agricultural Soils (Section 806)** - No more than 25% of such areas (prime agricultural soils, additional farmland of statewide importance, locally important soils) may be developed. The flexible development option or Village/hamlet option is encouraged in these areas.
- **Delaware River Wild and Scenic (Section 806)** - All development in these areas subject to conditional approval. The applicant must demonstrate that all buildings/structures are sited to preclude adverse environmental impacts. Buildings/structures shall not exceed 20' in height and materials shall blend in with existing conditions, and development shall be screened and buffered.
- **Scenic Resources (Section 806)** - No buildings/structures shall exceed 2 stories, no scenic roadways shall be widened/realigned, no grading in excess of 2' cut/fill shall take place within 150' of a scenic road, natural materials shall be used, screening & buffering required.

Additional protective provisions included in the Tinicum Township Zoning Ordinance require traffic [Section 1508 (1)], water feasibility [Section 1508 (2)], and environmental impact assessment report requirements.

1.5.4 Protection of Resources Through the Subdivision and Land Development Ordinances In the Tohickon Creek Watershed

The subdivision and land development ordinance is the most commonly used development control mechanism in Pennsylvania, and is considered the most basic of land use regulations Subdivision is the creation of new property lines while land development involves construction of public or private improvements (DCED, 1999). The following sections are intended to provide an overview of the local subdivision and land development requirements in the municipalities within the Tohickon Creek Watershed. The focus will be on resource protective measures included in the individual ordinances.

Bedminster Township

The most recent Bedminster Township Subdivision and Land Development Ordinance (SALDO) was adopted June 9, 1999. The ordinance contains seven articles, six appendices, and two stand-alone ordinances. Although all sections within the SALDO (e.g., submission procedures, traffic impact studies, street standards) are pertinent to natural and cultural resource protection, the most related are as follows:

- **Traffic Impact Studies (Section 406)** - Regulations enable the municipality to assess the impact of proposed development to the existing transportation system. The section requires a traffic impact study for all subdivisions and land development proposals in residential (>20 dwelling units or lots), non-residential (>10 lots), commercial (> 25, 000 square feet), office (> 25,000 square feet), industrial (> 10 lots, > 50,000 square feet, > 75 employees) and institutional (> 25,000 square feet) zoning districts.
- **Sewage Facilities and Sanitary Sewage Disposal (Sections 407 & 520)** - PADEP requirements must be met. Township is required to review all planning modules and proof of soil suitability to Township via the BCDOH. Standard sanitary disposal language for public and on-lot disposal systems. No OLDS maintenance requirements.
- **Water Resources Impact Study and Water Supply (Sections 408 & 519)** - DRBC approval required for projects withdrawing 10,000 gpd of groundwater or surface water. DRBC submissions must also be provided to the Township. All other withdrawals must be reviewed by the Township. Where public water is not provided, a water resources impact study shall be completed. The study is required for all zoning districts (e.g., residential subdivisions with 3> proposed lots). Site-specific investigations are required. Standard community and on-lot water supply language for public, private and on-lot wells.
- **Wetland Delineation (Section 409)** - Sites showing wetlands (NWI Mapped) or hydric soils require an on-site investigation and must be approved by the municipality. Delineation must be validated by ACOE.
- **Landscaping and Street Trees (Section 515)** - Street trees (native and non-native list) are required for all land developments where street trees are not present. Off-street parking areas and detention basins must be landscaped at a specified density.
- **Stormwater Management (Section 516)** - Facilities must convey flow of stormwater runoff (rate limitations shall not exceed pre-construction, 2-100 year calculations) from the development site. Easements shall be dedicated to the Township, owner is responsible for maintenance, and maintenance agreement required. No water quality treatment requirements.
- **Excavation and Grading (Section 517)** - No excavation or fill steeper than 3:1 ratio (exceptions provided). Temporary crossings for live streams with PADEP, BCD & Township approval.
- **Erosion and Sedimentation (E&S)Control (Section 518)** - E&S plan must be submitted with all applications. Standard Chapter 102 language incorporated.

- **Recreational Facilities (Section 525) -** Public dedication of land required for active park and recreation (athletic fields, tot lots, courts) purposes (>25 lots and >20 dwelling units). Consolidation options are included. (No passive recreation options included in this section)
- **Well Drilling and Groundwater Withdrawal Restrictions (Ordinance #128)** - Well construction requirements and well permit requirements.
- **Wellhead Protection (Ordinance #129) -** Section 410 of the SALDO is amended to provide for all subdivisions and land developments proposing public (well) water supply. Wellheads must be delineated (3 zones) and each zone has associated regulations (land disturbance, waste storage, stormwater discharge).

Plumstead Township

The most recent Plumstead Township Subdivision and Land Development Ordinance (SALDO) was enacted April 18, 1995. The ordinance contains thirteen articles, nine appendices, and one stand-alone ordinance. Again, all sections within the SALDO are pertinent to natural and cultural resource protection, however the most related are contained in Article 9 (Design Standards), Article 10 (Erosion and Sedimentation Controls), and Article 11 (Dedication of Recreational Land) are as follows:

- **Design Standards (Article 9)-** Pertinent design standards include landscape requirements (native & non-native), tree protection during construction, landscaping in detention basins, buffer yard requirements, landscaping performance standards, clearing and grading, stormwater management (peak rate requirements/release rate districts/quality requirements-see below), surface drainage, open space, pre-construction conference, traffic impact analysis, tree protection standards, .
- **Stormwater Management Design Standards (9-23 D)** - The stormwater management section contains water quality provisions and requires that provisions for improving water quality be incorporated. Innovative BMPs are encouraged and a list of recommended BMPs are provide along with design and suitability requirements (e.g., soil suitability).
- **Water & Sewage (Section 9-7)** - Public and private water and sewage supply sections per PADEP requirements & Township 537 Plan.
- **Erosion & Sediment Controls (Article 10) -** General performance, site grading, excavation, fill, responsibility, requirements per PADEP Chapter 102 requirements.
- **Mandatory Dedication of Recreation Land (Article 11)** - Residential developments must provide recreation land or fee in lieu of recreational land. Dedication, criteria for determining location/suitability, ownership, dedication, and fee-in-lieu of requirements included.
- **Ordinance Revisions (Ordinance 7-18-2)** - The amendment requires that all residential subdivisions (>10 lots) and all developments proposing any use that has open space be reviewed by the Township Environmental Advisory Committee (EAC).Comments are provided to the Township Planning Commission. The EAC may request a meeting with the

applicant. Landscape requirements (density, varieties, material specifications) are also added for street trees (native and non-native), buffer yards, detention basins, parking areas, open space plantings, etc. Stormwater management requirements for swales and water course channels. Storm and surface drainage portion is replaced with excavation and grading article requiring no excavation on slopes of 3:1 (with exceptions).

Tinicum Township

The most recent Tinicum Township Subdivision and Land Development Ordinance (SALDO) was amended March 14, 2000. The ordinance contains seven articles, an amendments section, and appendices. In addition to the administrative, procedural, penalties, and other requirements, the most related sections pertaining to resource protection include the following:

- **Erosion & Sedimentation (Section 505)** - E&S provisions per State Act 102 regulations.
- **Open Space (Section 517)** - Performance subdivisions, single-family detached, and mobile home parks shall meet open space requirements per Section 702 of the SALDO (see below).
- **Recreation Areas (Section 518)** - Along with a minimum amount of open space, this section requires that a portion of dedicated open space be portioned off for recreational purposes.
- **Environmental Performance Standards (Section 523-26)** - This section requires developers to meet environmental protections standards for streams, rivers watercourses, steep slopes exceeding 30% (100% protection from disturbance), as well as less steep slopes, flood fringe areas, lake/pond shorelines, and forested areas (70-80% protection from disturbance). Each resource is defined in Section 525. Site capacity calculations are contained in Section 526.
- **Required Improvements (Section 600-619)** - This section includes provisions for streets, lights grading, planting, special drainage, and other improvements including storm water management, private/public water, sewage disposal requirements in keeping with state and local regulations.
- **Amendments Section** - Section contains ordinances adopted to amend the SALDO. Those pertinent to resource protection include maximum intrusion to flood fringes (#82, #95) protection regulations, scenic road improvement regulations (#86), construction requirements for spray irrigation systems (#100), flexible development standards (#103), amendments to performance standards/forested areas with environmentally sensitive features (#107), definitional changes for septic/basins systems changed and now defined as a structure (#11), impervious surface requirements (#130), floodplain standards (#133), EIA report requirements for short form report waivers and requirements for a full report (#141).

The Tinicum Subdivision ordinance additionally requires the use of native tree and shrub species and recommends that an attempt be made to duplicate natural plant communities.

1.6 Land Cover

Nearly 97% of the Tohickon Creek watershed is either forested or in agricultural use. Forested land comprises 49% or 11,836.13 acres (consisting of 11,555.5 acres of forest and 280.63 acres of forested wetland) of the approximately 24,125 acre watershed (Map 4). The most extensive areas of forest in the watershed occur along the mainstem of Tohickon Creek; 65% of this sub-watershed is forested. Agricultural land comprises approximately 48% of the watershed. Of the land in agricultural use 86% is in row crop production and the balance is designated as hay/pasture.

Only 1.6% of the watershed is developed. Included in this is only 0.6 % of high density development. Developed areas are limited to a few widely scattered locations along Route 611 near Plumsteadville and Ottsville as well as in Dublin Borough and Bedminsterville, as is clearly shown on the Land Cover Map (Map 4).

The proportion of each cover type varies by subwatershed based on such elements as zoning, land ownership, soil limitations and topography. The highest proportion of forest in the watershed is located along the Tohickon Creek mainstem, a result of the large amount of protected land and steep unbuildable slopes. Only 30% of the Tohickon Creek subwatershed is in agricultural use, as contrasted with 62.6% in the subwatershed of Deer Run.

The overall rural character of the Tohickon watershed is interrupted only by a few higher density historic villages. The highest percentage of development, 3.1%, within a subwatershed is associated with the village of Bedminster in the Wolf Run subwatershed.

Source: Mark Gallagher, PH photos

Figure 1.3
Tohickon Creek Watershed
Conservation Plan
Village of Bedminster

Although only 23.43 acres are developed in this subwatershed, the relatively high percentage is due to the small size of the watershed, (743.74 acres). The largest area, 58.92 acres, of higher density development occurs in the vicinity of Plumsteadville in the Cabin Run subwatershed; it covers only 1.5% of the subwatershed. The largest concentration of low density development occurs in the Tohickon Creek subwatershed in the vicinity of the historic village of Ottsville. This area covers 1.7% of the subwatershed.

Figure 1.4
Tohickon Creek Watershed
Conservation Plan
Ottsville

Source: Mark Gallagher, ph photos

1.7 Population Information

The information source used to complete this section was the Delaware Valley Regional Planning Commission's web page. The United States Census Bureau information, for the municipalities of the Delaware Valley, is linked to this page. The table below (Table 1.1) illustrates population trends in the three municipalities between 1990 and 2000, as well as the percent population change experienced in those ten years.

Table 1.1
Tohickon Creek Watershed Plan
1980-1990 Population Comparison

Population	1990	2000	Difference	Percent Change
Bedminster Township	4,602	4,804	202	4.39%
Plumstead Township	6,289	11,409	5,120	81.41%
Tinicum Township	4,167	4,206	39	0.94%

Source: US Census information

The Bucks County Continuum contains population projection information for the three municipalities. The data indicates that all three municipalities are expected to experience continued but sustainable growth in the future. Populations are expected to increase at much lower percentages in the watershed than past county averages due to soil septic suitability constraints, absence of public sewers, and resource protection zoning.

Another source of population information was the Pennsylvania Department of Environmental Protection's planning document entitled the 2D Delaware River Tohickon Creek (PADEP, Draft, 2001). According to this document (1990 Census), Bedminster Township had a population of 4,602, all residing within the surveyed portion of the watershed. Plumstead Township had a population of 6,289 people, roughly one half living within the Tohickon Creek watershed. Tinicum Township's population was 4,167 people, of whom 943 were living within the watershed. All three municipal Comprehensive Plans note that population density and population growth in each of these three municipalities is lower than the County average.

1.8 Transportation Facilities

Although access to the Tohickon Creek watershed is possible via a variety of routes, the only major arterial road is Route 611 (Easton Road). Minor arterial roadways include: Route 413 (Durham Road), Route 313 (Swamp Road), Route 32 (River Road, a state designated scenic road), and Route 113 (Bedminster Road). Secondary roads include the following: Dark Hollow Road, Danboro Point Pleasant Pike, and South Park Road. Many of the roads criss-crossing the watershed

are scenic and provide drivers and passengers with views of wooded agricultural landscapes, historic districts, scenic vistas, and historic bridges. Cabin Run Bridge, one of the covered bridges in the watershed, (Figure 1.3) was built about 1790. The bridge is located on Covered Bridge Road west of Ralph Stover State Park in Plumstead Township. A second covered bridge, Loux covered bridge spans Cabin Run Creek on the border of Bedminster and Plumstead Townships.

The rural nature of the watershed is also characterized by the absence of airport and rail facilities. Although the portion of Bucks County currently serviced by railroads is substantially smaller than it was in the past, the railroads never had rail service to the Tohickon Creek watershed. At the turn of the century, a trolley line ran from Willow Grove to Easton. Historically, the Delaware Canal provided transportation opportunities for passengers and cargo.

Figure 1.5
Tohickon Creek Watershed Conservation Plan
Cabin Run Covered Bridge

Source: Princeton Hydro, LLC, 2002

Many of the local streets within the watershed remain unpaved, rural, and highly valued designated scenic roadways. These scenic roadways meander through wooden covered bridges, stone arch bridges, and unpaved creek crossings. To maintain the rural character of the watershed, Tinicum Township has a Scenic Roads Ordinance that stipulates that designated scenic roadways may not be paved with asphalt, widened, or straightened. Sheephole, Tankhannen, Bunker Hill, and Ervin are among the roads so designated.

1.9 Employment Sources

Due to the rural character of the Tohickon Creek watershed, there are few employment opportunities. The commercial centers located within the watershed are comparatively small relative to the more heavily developed areas of Central and Southern Bucks County. As indicated by Map

4, only 1.6 % of the watershed is developed and only 0.6 % is designated as high density development. Although limited, the types of employment opportunities in the watershed include manufacturing, tourism, retail, farming, governmental, and service sector employment. Most of these employment opportunities are located along the Route 611 corridor, in Dublin Borough, and along Route 32 in Point Pleasant.

1.10 Outstanding and Unique Features

The Tohickon Creek watershed possesses a wealth of outstanding scenic and unique natural and man-made features. The Bucks County Natural Areas Inventory, a scientific study listing natural features worthy of protection (Rhoads & Block, 2000), designated the entire Tohickon Creek watershed as a Priority 1 site due to its significant, state-wide and county-wide, biological, ecological, geological, and hydrological features. These same attributes were integral to its inclusion along with Tinicum Creek and Panucussing Creek into the Federal Wild and Scenic Rivers Program. The Tohickon Creek was designated as a Wild and Scenic River on November 1, 2000.

The Bucks County Natural Resource Inventory was commissioned to identify and prioritize the most significant remaining natural resources in the County. Rankings were based on biological, ecological, geological, and hydrological criteria. Nineteen sites attained Priority 1 designation due to the state-wide and county-wide significance of their natural resources. The Tohickon's inclusion in this exclusive group of first priority sites was based on the unique or exceptionally high quality of its resources. More specific information on these features is included in Section 5.

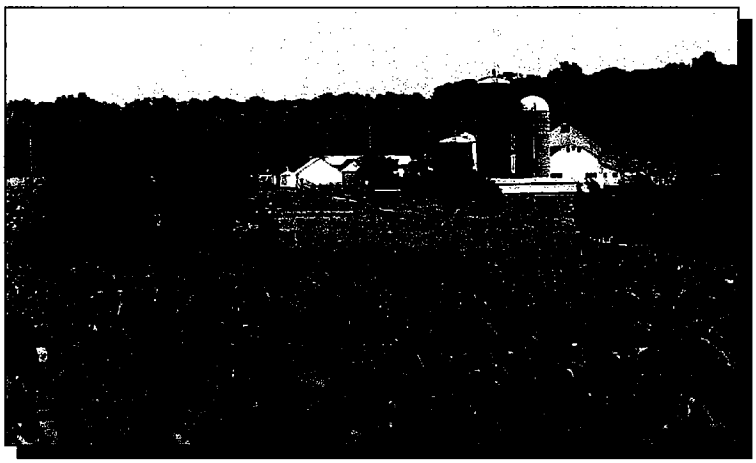
Sentinel Rock, an outstanding geological feature of Pennsylvania, is located within Nockamixon State Park. This 25-foot pinnacle of red shale and siltstone rises approximately 1000 feet downstream from the dam.

The High Rocks in Ralph Stover State Park, with their 200 foot high cliffs are both a unique geological formation and an unusual recreational opportunity for rock climbers. Another recreational opportunity, unique in Eastern Pennsylvania, exists in this watershed during dam releases at the Nockamixon State Park and following natural rainstorms, due to the innate flashy nature of streams in this geological formation Whitewater canoeists, kayakers and rafters may experience technical whitewater with Class 3 and 4 rapids.

In Sections 5.2 and 5.3, of this document, there is a detailed list of the notable features from the Natural Areas Inventory of Bucks County, PA, along with a PNDI (Pennsylvania Natural Diversity Inventory) list of all species and ecological communities of special concern within the Tohickon Creek Watershed. The presence of rare species in the watershed is an excellent indicator of the quality of the habitats present in the watershed.

Volunteer watershed assessors identified other significant historic and scenic elements present within the watershed. These features are identified in Section 7 of this document.

Figure 1.6
Tohickon Creek Watershed
ConservationPlan
Farmland in the Watershed



Source: Dorothy L. Longacre, personal photos

SECTION 2:
ISSUES, CONCERNS, CONSTRAINTS AND OPPORTUNITIES

Volunteers in the Tohickon Creek Watershed

Section 2: Issues, Concerns, Constraints & Opportunities

Public participation has been widespread and enthusiastic for this watershed study. Citizens and officials have raised concerns, offered suggestions, and volunteered time towards the effort of identifying issues, concerns, constraints and opportunities.

2.1 The Public Participation Process

It is important to identify the issues and concerns of the land owners, elected officials, citizens, and agency personnel in any watershed. It is the job of a plan advisory committee to ensure that the planning process proceeds efficiently, that the public is involved throughout the planning process, and that a variety of public participation strategies are implemented.

Even before consultant contracts were signed, a Plan Advisory Committee (PAC) was organized. This committee developed strategies intended to involve as many citizens as possible throughout the duration of the project. One goal was to generate public discussion and participation. Since it is often difficult to get public input, several strategies for doing so were implemented early in the planning process. These strategies included the following outreach efforts:

- Assuring that the PAC was well-rounded,
- Advertising and holding public meetings,
- Holding frequent plan advisory committee meetings,
- Circulating questionnaires and compiling questionnaire responses,
- Completing a watershed and creek corridor tour,
- Writing articles and press releases, and
- Inviting volunteer participation in a corridor and watershed assessment process.

The following subsections of this plan provide an overview of the methods used to involve the public, and the information resulting from those efforts.

2.2 The Plan Advisory Committee

The public must be involved in any planning project in order to determine recreational needs and to identify the attributes, attitudes, beliefs and behaviors of community residents. A crucial part of the Tohickon Creek Watershed and Trail Feasibility Study process was the formation of a Plan Advisory Committee (PAC) which provided a forum for community residents and leaders to voice

their opinions, and developed a framework for completion of key phases of the plan. The groups represented in the PAC included the following organizations: Tinicum Conservancy, Bedminster Township, Bedminster Land Conservancy, Plumstead Township, Plumstead Township Park and Recreation Committee, Tinicum Township, Tinicum Township Open Space Commission, Delaware River Greenway Partnership, the Tinicum Township Environmental Advisory Commission, and the Tinicum Township Open Space Commission. A Plan Advisory Committee membership list is included in Appendix A.

2.3 Public Meetings

The first public meeting was held on March 7, 2001 at the Tinicum Township building. This meeting was intended to introduce the newly-appointed advisory committee members and the invited public to the project. The committee was pleased that over forty (40) people attended the initial meeting. The two-hour meeting included an introduction to the Plan Advisory Committee members, a watershed plan presentation from Princeton Hydro, LLC, an overview of the Trail Feasibility component of the project presented by the Heritage Conservancy, and an open agenda item devoted to questions and input from the attending public. The public comments received indicated that the public is very concerned about 1) protecting the flora and fauna within the watershed, 2) the potential ecological impacts related to Nockamixon dam releases, 3) increased development within the watershed, and 4) the impacts of increased recreational use in the Tohickon Creek Watershed. Meeting notes are included in Appendix A of this plan.

The second public meeting was held on September 27, 2001 in the Bedminster Township Building. Several local experts were invited to present along with each member of the Plan Advisory Committee (e.g. Bucks County Agricultural Preservation Board, Friends of the Delaware Canal, Local Conservancies and Historic Groups, the Delaware River Greenway Partnership). Panelists presented an overview of their program missions and how these missions applied to amenities within the watershed. The components of the watershed and greenway study were outlined by the consultant.

Most of the meeting was devoted to obtaining public input. An overriding concern for surface water quality was expressed by those attending this meeting (eg, effluent, chemical and road run-off and non-point pollution). The Quakertown sewage plant was noted specifically. There were questions regarding the impact of periodic Nockamixon Dam releases and the value of bottom releases versus top releases. People voiced concerns about the impact of stormwater upon the ecology of the creek. Local landowners noted that groundwater and surface water levels have decreased in recent years (e.g., Deep Run). With regard to stormwater planning (Act 167 Plans), attendees felt that regionally consistent planning was needed, and that implementing local plans was

important. Attendees felt that land in the watershed area should be conserved for habitat as well as for people.

Recreation, public access, and aesthetic amenities were also topics of interest. Attendees felt that access for hiking and canoeing (especially just south of the dam) and the maintenance of the scenic and historic character (eg., High Rocks, historic mills) were important. Attendees noted the importance of preserving farmland within the watershed and of maintaining riparian buffers. Many felt that regional zoning, stricter guidelines, and the prevention of urban sprawl (including expansion of the highways) were important implementation strategies. Overall, people were very interested in citizen involvement and in becoming part of watershed associations.

The third public meeting was held on June 12, 2002 at the Tinicum Township Building. Princeton Hydro, LLC, presented a summary of the draft plan to the public. Attendees included several representatives from the Lenape Nation, township officials, DCNR representatives, and local citizens.

The fourth public meeting was held on November 14, 2002 at the Plumstead Township Municipal Building. Princeton Hydro, LLC, and Marion Kyde, PhD, Chair, presented a summary of the final plan to the public. Attendees included supervisors, planning commission members, EAC members and citizens from the four townships, as well as County Conservation District and Planning Commission representatives and local press. A lively comment period followed the formal presentation. EAC and Planning Commission members expressed plans to initiate projects based on recommendations in the plan.

Figure 2.1
Tohickon Creek Watershed Plan
Workshop Meeting

Source: Suzanne Forbes, personal photos

2.4 Plan Advisory Committee Work Sessions

The Plan Advisory Committee communicated frequently at scheduled meetings, in the field, and through phone and e-mail conversations. In preparation for the first work session, the Chair of the PAC and the consultants compiled a list of questions designed to initiate discussion and stimulate the required research. The list of questions is included in Appendix A of this plan.

During the first work session discussion, the PAC members agreed on the following issues, concerns, constraints, and opportunities within the Tohickon Creek Watershed:

- Citizens value the natural resources, water supply, scenic resources, wildlife and habitat within the Tohickon Creek Watershed.
- Amenities are threatened due to pollutants commonly associated with development (e.g., sediments, nutrients, bacteria, heavy metals, litter).
- Specific information to document in the watershed study will include pollutant sources, eroded streambank areas, areas under development pressures, and protection strategies as well as amenities and resources.
- Maintaining and improving water quality is important, and that pollutant sources should be clearly identified in the study maps and narrative.
- Identifying the best route for a continuous trail, if feasible, from Lake Nockamixon to the Delaware River is important, but that protecting corridor amenities is even more important.
- Study findings should help to initiate zoning and development provisions that will be required to conserve watershed and corridor amenities.

Subsequent work sessions were held to develop a watershed and corridor questionnaire, evaluate questionnaire responses, develop watershed amenity and watershed problem area maps, evaluate research findings and Geographic Information System (GIS) maps, prepare for public meetings, and to review draft and final versions of the Tohickon Creek Watershed Plan.

2.5 Volunteer Watershed and Corridor Assessment

On April 25th, 2001, the watershed consultant (Princeton Hydro, LLC) and the Chair of the Tohickon Creek Plan Advisory Committee (M.. Kyde, Tinicum Conservancy) completed a preliminary watershed field assessment. The project partners took photographs illustrating historic, scenic, natural resource and open space amenities. The exercise provided the framework for subsequent detailed field assessments. Watershed amenities (e.g., preserved farmland, historic

structures, well-buffered corridor areas) and potential problem areas (e.g., oil in Geddes Creek, flood debris on Kellers Church Bridge) were recorded and located on a field map. A more formal field survey approach was developed based on this preliminary field experience. It is included in Appendix A of this plan.

The Tohickon Creek Watershed assessment included an educational outreach component. Two vans, with fourteen people, including volunteers, PAC members, and consultants from Heritage Conservancy and Princeton Hydro completed a watershed assessment for portions of the watershed. This was an educational project in order to give an overview of how to complete an assessment. The participants were helped through a visual evaluation of the watershed in order to identify amenities and problem areas. One of the vans toured the watershed and the other stayed closer to the main corridor and tributaries.

This teaching experience excited many of the participants who volunteered to complete individual corridor assessments.

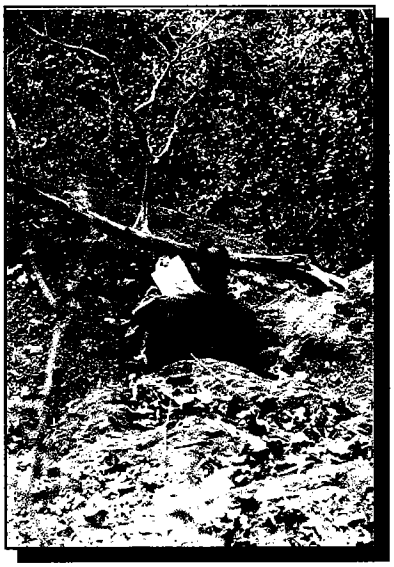
During 2001 and 2002, PAC members and other volunteers worked together to complete the watershed, subwatershed, and corridor assessments. Volunteers were recruited at public meetings, and in response to mailed questionnaires and newsletter articles. The information was used to augment resource sections of this plan (Sections 3 to 6) and to identify watershed and corridor areas that could benefit from management attention (Section 7). Examples of significant natural features identified during the field assessments include: wetlands, geologic features, forested habitat, scenic vistas, and threatened or endangered species. Significant cultural, historic and scenic features noted include: historic villages and historic structures, eg. houses, mills, barns. Problem areas within the study area are relatively minor but include: failing septic systems, abandoned vehicles, eroded banks, litter, lack of adequate riparian buffer, and water flow obstructions, agricultural runoff, and deer browse.

Figure 2.2
Tohickon Creek Watershed Conservation Plan
Lack of Riparian Buffer on Deep Run

Source: Marion M. Kyde, personal photos

The plan has benefitted from information gathered from the volunteer field assessments, and from impressive public involvement. With public involvement and education comes greater awareness of the important resources and amenities of the watershed and a more widespread desire to protect the watershed and solve its problems.

Figure 2.3
Tohickon Creek Watershed Conservation Plan
Volunteer



Source: Suzanne Forbes, personal photos

2.6 Other Public Participation & Outreach Efforts

Not everyone is comfortable attending or voicing opinions at public meetings. Therefore, the PAC and consultants used other means to reach people and to obtain their input. In addition to meetings, public involvement was also encouraged by:

- Press Releases and Public Notices
- Meeting Invitations and Mailings
- Newsletter Articles
- One-on-one discussions

Press releases were provided to seven local and regional newspapers at various stages during the Tohickon Creek Watershed Planning Process (e.g., commencement of assessment, completion of management plan, adoption of plan). Another will be released when the Tohickon Creek Watershed is successfully placed on the Pennsylvania Rivers Registry. Public notices were placed in local newspapers before each public meeting.

In addition, invitations to attend each public meeting along with agendas and handouts were provided to municipal supervisors, appointed chairs (e.g., planning and environmental commissions), and agency directors (e.g., County Planning Commission, County Park and Recreation Department, DCNR State Parks) before each public meeting.

Newsletter articles and updates on the planning process appeared in each township and conservancy newsletters. This provided an alternate method for Township residents to read about the progress of the Tohickon Creek Watershed Study. This is an easy way to inform the most active, concerned and influential people in a Township and to promote their support through volunteer hours. Some of these articles can be found in Appendix A.

2.7 Watershed and Corridor Questionnaires and Findings

The first two work session meetings were devoted to reviewing questionnaires from similar planning projects (e.g., Neshaminy Creek and Pocono Creek Watershed Plans) and developing one to suit the needs of the Tohickon Creek Watershed Area. The questionnaire was available at the first public meeting and distributed at all subsequent public meetings.

To widen distribution, the questionnaire was included in local organization and municipal newsletters. It was distributed with the Bedminster Land Conservancy newsletter, the Plumstead Township newsletter, the Tinicum Township newsletter, and the Tinicum Conservancy newsletter. It was also sent to agency directors responsible for managing large land holdings in the watershed (e.g., DCNR State Park Superintendent, Bucks County Department of Parks and Recreation, National Park Service). The questionnaire is included in Appendix A of this plan.

A knowledgeable, interested, and proactive public is key in order to implement a conservation management plan efficiently and effectively. This particular community exhibits all three characteristics, and reacted enthusiastically to preserving the Tohickon Creek Watershed and exploring traditional and innovative means of maintaining the water quality of the Creek and its tributaries. Overwhelmingly respondents opted to protect resources and habitat.

In Bedminster Township, of the 300 questionnaires circulated, 48 were returned. Of the amenities listed, wildlife habitat was chosen as the most important to protect, closely followed by scenic character and good water quality. People encouraged the protection of groundwater, natural resources, farmland, historical and cultural resources, and scenic character. There were mixed opinions on redevelopment, tourism, river recreational opportunities, and land-based recreational opportunities. Comments on these choices emphasized low impact, environmentally based recreation such as birding, hiking, and nature study. Respondents were mostly not in favor of landowner rights nor any kind of development - residential, commercial or institutional. Economic opportunities were ranked the least important amenity.

The questionnaire was circulated to 3000 people through the Plumstead Township newsletter. In the 16 responses returned, wildlife habitat was again rated the most important amenity, good water quality was second most important, and groundwater recharge was third. In this municipality economic and recreational opportunities rated least important. River and land based recreational opportunities, were more discouraged than encouraged.

The response rate in Tinicum was highest with 93 responses out of 206 questionnaires circulated. In this case, good water quality was the amenity that ranked highest, with scenic character and then groundwater recharge as second and third most important, respectively. Economic opportunities again ranked last. The trends in activities that residents encourage and discourage are similar to those of Bedminster except that there were a couple of responses in which people encouraged residential, commercial, and institutional development. It is perhaps notable that these came from people engaged in land development.

This was a lengthy questionnaire and required at least 20 minutes to complete. In addition to answering the questions many respondents added written comments, all of which were considered in writing sections 7 and 8 of this plan.

SECTION 3:

LAND RESOURCES

Forested Main Stem Tohickon Creek

Section 3: Land Resources

3.1 Introduction

The rolling landscape of woodlands and farmlands dissected by steep slopes and stream valleys that characterizes the Tohickon Creek Watershed creates a nostalgic rural atmosphere. The steep valleys or "hollows" that characterize the watershed are often associated with local nomenclature. Place names given by early settlers to roads and settlements reflect the landscape (eg. "Dark Hollow Road", "Tohickon Hill Road"; McNealy, 2001).

The Tohickon Creek is listed as one of only nineteen Priority 1 sites in Bucks County with natural features worthy of this designation (Rhoads and Block, 1999) (see Section 1.10). The inventory emphasizes ecologically sustainable sites based on the amounts of large forested area, wooded ridgetops, and stream valleys. The following sections provide a more thorough description of the land resources within the approximate 37.7 square mile Tohickon Creek Watershed.

The mainstem of the Tohickon Creek divides Tinicum Township and a small portion of Nockamixon Township from the Townships of Bedminster and Plumstead. It flows primarily through forest and to a lesser extent privately owned farms. A considerable portion of the creek is located in state and county parkland. The rural nature of this watershed is also reflected in the low density of residential development and the near absence of high density development. As of 1999, only 1.6% of the watershed was developed (Map 4).

3.2 Land Ownership

Most of the 24,125 acres that comprise the Lower Tohickon Creek Watershed are privately owned, (96%); only 4% is publicly owned. However, almost a quarter of the land in the stream corridor (parcels adjacent to the main stem), is publically owned. The public land in the Plumstead Township portion of the corridor consists of Stover-Myers Mill County Park and Ralph Stover State Park. In Tinicum Township, Bucks County Park Land, High Rocks State Park and Tohickon Valley County Park are publicly owned. Nockamixon State Park accounts for publicly owned land in Bedminster.

Ralph Stover State Park occupies approximately 45 acres of the watershed. Tohickon Valley Park occupies approximately another 606 acres. A small part of the 5,283 acres in Nockamixon State Park is located within the portion of the watershed under study.

3.3 Geologic Characteristics

The Tohickon Creek is located in the Gettysburg-Newark Lowland section of the Piedmont Physiographic Province (USGS, 1980). The course of the Tohickon Creek cuts through alternating bands of Triassic (180-230 million years ago) shales, sandstones, and argillites of the Brunswick and Lockatong Formations (Map 6). Steeply sloping creek valleys are characteristic of the Tohickon Creek Watershed. Although much of the area possesses relatively flat to rolling topography, 0-3% slopes, nearly 130 acres of land have slopes in excess of 40% (USGS, 1980).

The three major geologic formations in the Tohickon Creek Watershed are the Lockatong, Brunswick, and Diabase. Approximately 99% of the watershed is underlain by either the Brunswick Formation or the Lockatong Formation. Diabase is limited to a narrow band in the southeastern portion of the watershed proximate to Point Pleasant. This formation occupies less than 1% of the watershed.

The narrow band of Diabase in the watershed is part of the Point Pleasant sheet (Willard, et al, 1959). This diabase intrusion is part of a larger formation that extends to the east across the Delaware River. Diabase is a dark gray to black, dense, fine-grained igneous rock. The diabase present in the watershed is associated with dikes and sheets that intruded and locally metamorphosed the rocks of the Lockatong and Brunswick Formations. Due to the relatively high resistance of this rock to erosion, diabase formations are typically associated with ridges and promontories. Typically diabase has poor water-bearing qualities and good well yields are rare in this formation. The diabase has no primary porosity and all ground water flow is through fractures.

The Lockatong Formation consists predominately of black to dark gray and black shale and siltstone. In Plumstead Township there are distinct beds of the Lockatong Formation that consist of reddish brown, sandy siltstone. These thin beds of reddish rock are interfingered with the gray rock that comprises most of the formation. In those areas that the Lockatong borders diabase the shales and siltstones have been metamorphosed to a purplish-red, light gray, and dark gray fine grained hornfels. The rock of this formation is resistant to weathering and therefore tends to be associated with ridges. Due to the resistence of the rock most of the streams and ridges within an outcrop area are parallel to the strike of the bedding. The ability for a stream to more easily erode the underlying rock along beds rather than across them is directly related to the development of the distinctive cliffs and scenic attributes of the Lower Tohickon Creek.

Figure 3.1
Tohickon Creek Watershed Plan
Tohickon Creek Streambank

Source: Stu Horn personal photo

The Lockatong formation has a water-bearing capacity only slightly better than diabase and thus tends to be a relatively poor source of ground water. The rock comprising this formation has no primary porosity or permeability and virtually all groundwater is transmitted through widely spaced, poorly interconnected, and relatively tight fractures and joints. Groundwater movement is further restricted as a result of weathering. The rock of this formation weathers to a dense clayey soil that plugs fractures and joints in the weathered zone. The clayey soils also restrict recharge. The generally higher landscape positions in which this formation typically occurs also tend to limit recharge.

The Brunswick Formation consists primarily of soft, red to reddish-brown, and gray to greenish-gray mudstones, and clay and mud shales The Brunswick shales are more easily eroded than either the Lockatong or diabase formations. The landscape of areas underlain by this formation is lower and gently rolling, with broad shallow valleys and low ridges parallel to the strike of the

beds. According to Willard (1959) the difference in resistence to erosion between the Lockatong and Brunswick Formations is exemplified by the Tohickon Creek. The course of the creek through the Brunswick shales is in a broad open valley with gentle slopes, but where it crosses the Lockatong it flows through steep-sided gorges rimmed by high cliffs. Particularly interesting is the stratigraphic structure of Lockatong and Brunswick Formations that are exposed on some of these cliff faces. The Brunswick formation is primarily made up of soft, weak, bright-red to brownish-red, fine-grained, thin-bedded shales, and is responsible for much of the visual characteristics of the creeks.

This formation provides a moderately good source of groundwater for domestic, industrial, and municipal water uses. Although the shale is non-porous, the formation is highly fractured and has many closely spaced joints, which results in a relatively high secondary permeability. The groundwater flows in vertical fractures and joints and along bedding planes.

Figure 3.2
Tohickon Creek Watershed Plan
Lockatong Formation, Cabin Run

Source: Mark Gallagher, pH photos

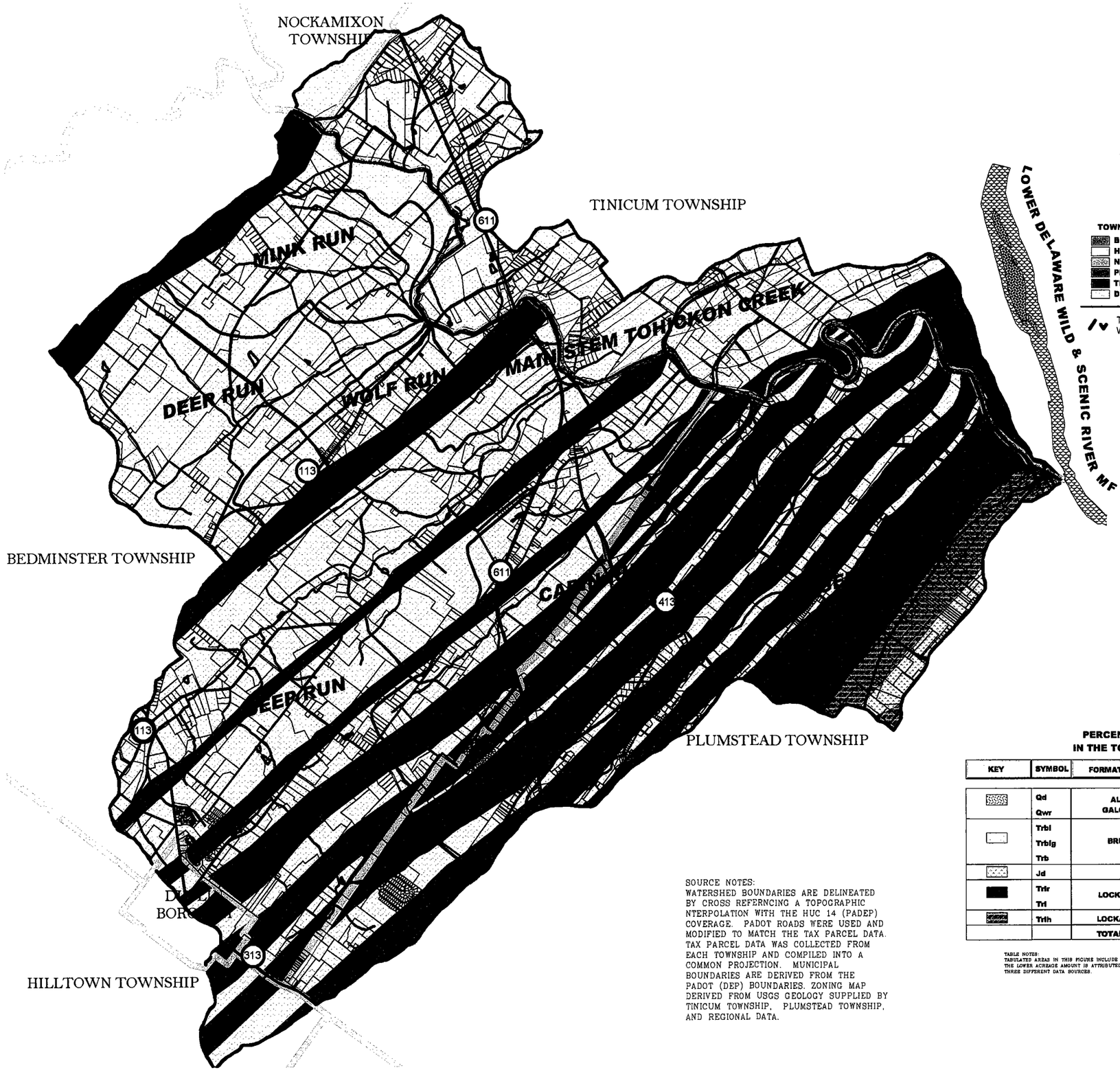
Most of the unique geologic features located within the watershed are currently within public lands or otherwise protected. However, the most sensitive and important component of the underlying geology, groundwater, requires regulatory controls through local zoning and ordinances to protect and maintain sustainable yields of this resource.

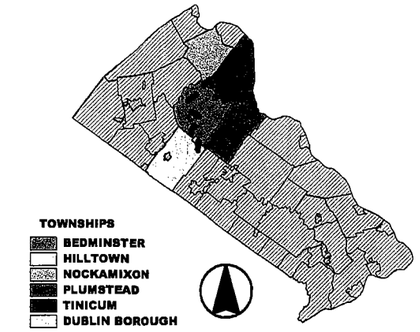
Due to the limitations attributable to the underlying geology regarding recharge and groundwater yield, several of the Townships in the watershed have taken steps to protect groundwater resources. In the Tinicum Township zoning ordinance, Section 806, Critical Groundwater Recharge Areas are protected. These recharge areas include headwaters of Exceptional Value and High Quality streams. Proposed development in these areas requires conditional approval, impervious services shall be 50% less than the underlying district, and buildings/structures must be placed in areas having the least impact on recharge. Ordinance 123 restricts new withdrawals to 100 gal/acre/day, and establishes standards for wells, aquifer testing and nitrate testing.

The most recent Bedminster Township Subdivision and Land Development Ordinance was adopted June 9, 1999. Sections 408 and 519 protect water supply. DRBC approval is required for projects withdrawing 10,000 gpd of groundwater or surface water. Ordinance 128, in the same document, discusses well construction requirements and well permit requirements, in order to make restrictions on groundwater withdrawal.

Figure 3.3
Tohickon Creek Watershed Plan
Agricultural Land

Source: Dorothy L. Longacre, personal photos





SYMBOL KEY	
TE	SIGNIFICANT PLACENAMES
WATER RESOURCES	
	ISLANDS
	DELAWARE RIVER
	MAIN STEM TOHICKEN CREEK
	NETWORKED STREAMS
	LAKES (USGS)
DIVISIONS	
	TOHICKEN CREEK WATERSHED BOUNDARY
	SUBWATERSHEDS
	MUNICPAL BOUNDARIES

SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRAPHIC NTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. ZONING MAP DERIVED FROM USGS GEOLOGY SUPPLIED BY TINICUM TOWNSHIP, PLUMSTEAD TOWNSHIP, AND REGIONAL DATA.

PERCENTAGE OF GEOLOGIC UNITS IN THE TOHICKON CREEK WATERSHED

KEY	SYMBOL	FORMATION NAME	ACREAGE	PERCENT
	Qd	ALLUVIUM AND GALCIAL OUTWASH	0.26	>0.01
	Qwr		5.65	0.02
	Trbl	BRUNSWICK GROUP	2438.99	10.15
	Trblg		627.83	2.61
	Trb		11352.82	47.25
	Jd	DIABASE	164.04	0.68
	Trlr	LOCKATONG FORMATION	102.79	0.43
	Trl		8862.54	36.88
	Trlh	LOCKATONG HORNFELS	473.61	1.97
		TOTALS	473.61	1.97

TABLE NOTES:
TABULATED AREAS IN THIS FIGURE INCLUDE THE EXTENTS OF THE GEOLOGY COVERAGE.
THE LOWER ACREAGE AMOUNT IS ATTRIBUTED TO DATA GAPS BETWEEN THREE DIFFERENT DATA SOURCES.

NOTES: 1. DATA ACCURACIES ARE LIMITED TO THE ACCURACY AND SCALE OF THE ORIGINAL DATA SOURCES.
2. THESE MAPS ARE PART OF A WATERSHED PLAN AND SHOULD BE USED IN CONJUNCTION WITH THE COMPILED TEXT.
3. DIGITAL MAPS ARE PERIDOICALLY UPDATED AND THE USER IS RESPONSIBLE FOR VERIFYING AND OBTAINING THE LATEST VERSION OF THE DATA.

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DATE: JUL 3 2002 . 9:56AM

REVISIONS

MAP NO.: 6

GEOLOGY

DRAWN BY:	KJM
CHECKED BY:	MG,GG,JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 15, 2002

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INFO@PHWORTHINGTON.COM

PROJECT NUMBER: 229.01

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~ = 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

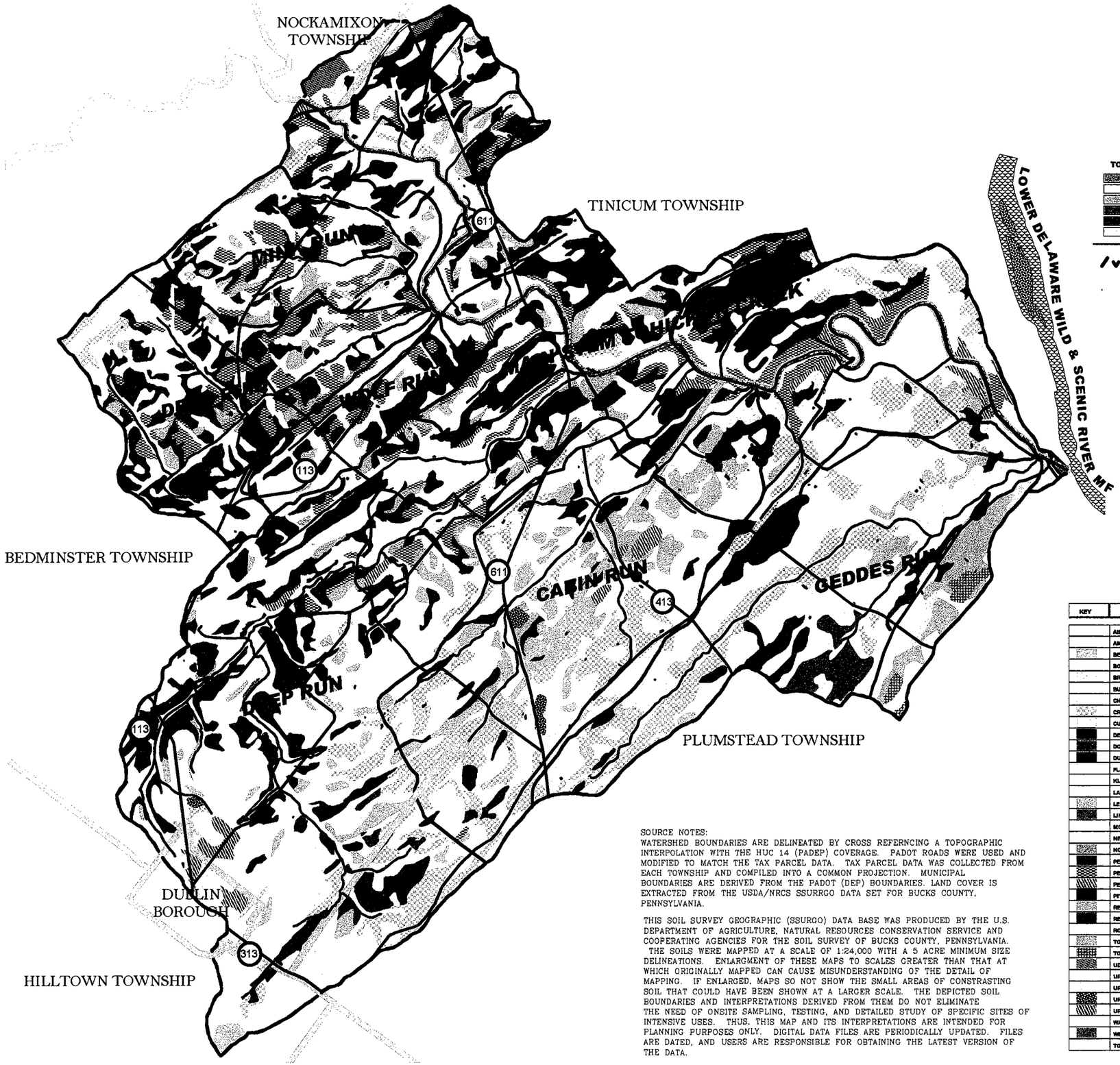
3.4 Soil Characteristics

Soil characteristics such as fertility, depth to bedrock, depth to seasonal high water table and slope strongly influence land use. Historically, relatively flat to gently sloping fertile soils in the Tohickon Creek watershed were in row crop production, while land that was too steep, or poorly drained, was used for grazing or woodlots. As the population of Upper Bucks County increased over the past several decades, some of the fertile farmland was converted to residential and commercial uses. The best land for development having been used, lands with constraints such as steep slopes and high water tables will be under greater development pressure in the future. However, soils with specific constraints such as steep slopes, shallow depth to bedrock or shallow depth to groundwater as well as soils associated with sensitive resources (hydric or alluvial soils) limit the type and the density of development.

The soils of the Tohickon Creek watershed consist of fine textured silt loams and silty clay loams, weathered from shale and sandstone. The physical limitations associated with some of them may prohibit the downward entry of water into soil surface (*infiltration*), the movement of water through soil layers (*percolation*), the ability of the soil to transmit water (*permeability*), and the extent to which soils wear away from the land surface by wind, running water and other geological agents *(erodability)*. These four qualities (infiltration, percolation, permeability, and erodability) of soils determine whether on lot sewage treatment systems are acceptable, and if so, the type of system. Soils also affect land development and the construction techniques required to implement a development project. Soil characteristic related to steep slopes, depth to bedrock, and the presence of hydric soils and alluvial soils can significantly impact land development activities. and the construction techniques implemented on any piece of land.

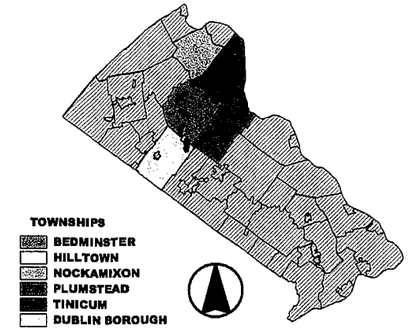
The most common soil association within the watershed is the *Abbottstown-Doylestown-Reaville Association*. 6,400.62 acres or 26.53% of watershed soils are in the Abbottstown series. Reaville soils are the second-most dominant soil type, occupying 4,532.24 acres or 18.79% of the watershed (Map 7). Twenty-nine other soil series are present in the watershed; none comprises as much as 10% of the total acreage.

Abbottstown soils are deep and somewhat poorly drained, restricted in permeability and have a compact subsoil and seasonal high water table. They are found at the base of slopes and on broad ridgetops. Doylestown soils have similar characteristics to those of the Abbottstown soils but are found mainly in depressions at the base of slopes and on broad upland flats. Reaville soils are moderately deep, moderately well to somewhat poorly drained, and have a seasonal high water table. They are found on the tops and sides of ridges (Richardson and Vepraskas, 2001). In Plumstead, the



SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRAPHIC INTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. LAND COVER IS EXTRACTED FROM THE USDA/NRCS SSURRGO DATA SET FOR BUCKS COUNTY, PENNSYLVANIA.

THIS SOIL SURVEY GEOGRAPHIC (SSURGO) DATA BASE WAS PRODUCED BY THE U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE AND COOPERATING AGENCIES FOR THE SOIL SURVEY OF BUCKS COUNTY, PENNSYLVANIA. THE SOILS WERE MAPPED AT A SCALE OF 1:24,000 WITH A 5 ACRE MINIMUM SIZE DELINEATIONS. ENLARGMENT OF THESE MAPS TO SCALES GREATER THAN THAT AT WHICH ORIGINALLY MAPPED CAN CAUSE MISUNDERSTANDING OF THE DETAIL OF MAPPING. IF ENLARGED, MAPS SO NOT SHOW THE SMALL AREAS OF CONSTRASTING SOIL THAT COULD HAVE BEEN SHOWN AT A LARGER SCALE. THE DEPICTED SOIL BOUNDARIES AND INTERPRETATIONS DERIVED FROM THEM DO NOT ELIMINATE THE NEED OF ONSITE SAMPLING, TESTING, AND DETAILED STUDY OF SPECIFIC SITES OF INTENSIVE USES. THUS, THIS MAP AND ITS INTERPRETATIONS ARE INTENDED FOR PLANNING PURPOSES ONLY. DIGITAL DATA FILES ARE PERIODICALLY UPDATED. FILES ARE DATED, AND USERS ARE RESPONSIBLE FOR OBTAINING THE LATEST VERSION OF THE DATA.



SYMBOL KEY
SIGNIFICANT PLACENAMES
WATER RESOURCES
ISLANDS
DELAWARE RIVER
MAIN STEM TOHICKEN CREEK
NETWORKED STREAMS
LAKES (USGS)
DIVISIONS
TOHICKEN CREEK WATERSHED BOUNDARY
SUBWATERSHEDS
MUNICPAL BOUNDARIES

PERCENTAGE OF SOILS SERIES UNITS IN THE TOHICKON CREEK WATERSHED

KEY	SERIES TYPE	ACREAGE	PERCENTAGE
	ABBOTTSTOWN	5913.05	24.52
	AMWELL	1694.72	7.03
	BEDINGTON	81.58	0.34
	BOWMANSVILLE-KNAUERS	1368.97	5.67
	BRECKNOCK	36.82	0.15
	BUCKINGHAM	784.69	3.25
	CHALFONT	77.34	0.32
	CROTON	2199.92	9.08
	CULLEOKA-WEIKERT	340.36	1.41
	DELAWARE	1.32	0.01
	DOYLESTOWN	163.13	0.68
	DUNCANNON	6.69	0.03
	FLUVAQUENTS	39.71	0.16
	KLINESVILLE	1498.38	6.20
	LANSDALE	617.69	2.56
	LEHIGH	88.88	0.36
	LINDEN	4.81	0.02
	MOUNT LUCAS	68.41	0.28
	NESHAMINY	17.21	0.07
	NOCKAMIXON	19.38	0.08
	PENN	498.57	2.07
	PENN-KLINESVILLE	1167.04	4.84
	PENN-LANSDALE	223.28	0.93
	PITS, QUARRY	12.07	0.05
	READINGTON	1436.03	5.95
	REAVILLE	4488.42	18.61
	ROWLAND	116.45	0.48
	TOWNEE	127.98	0.53
	TOWNEE-GLENVILLE	53.40	0.22
	UDORTHENTS	57.78	0.24
	URBAN LAND	104.34	0.43
	URBAN LAND-ABBOTTSTOWN	485.14	2.01
	URBAN LAND-REAVILLE	45.27	0.19
	URBAN LAND-UDORTHENTS	81.12	0.34
	WATER	211.51	0.88
	WEIKERT-CULLEOKA	5.12	0.03
	TOTAL	24117.58	100.0

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MAP NO.: 7

SOIL SERIES

DRAWN BY:	KJM
CHECKED BY:	MG GG JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 15, 2005

PROJECT NUMBER: 229.01

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FILE: C:\0022901\GIS\0022901mri.apr (POR_FIG_7)
DATE JUL 3 2002 9:59 AM

REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet
SCALE: 1: 55,000; ~= 4500'
MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

waterways are bordered by alluvial (floodplain) soils while stony soils in the Lansdale Stony Loam group make up the Township's steep, rocky slopes.

Many soils in the Tohickon Creek watershed restrict development due to their drainage characteristics or erodible nature. The Abbottstown silt loam, on 8-15% slopes, has limitations that include erodibility, seasonal high water table, and slow permeability. The Reaville series has runoff that is slow to medium and slight to moderate danger of erosion. These characteristics cause limitations to non-farm uses of these soils. Readington Silt Loam and Penn Silt Loam, also found in the watershed, have similar limitations for non-farming uses. All of the soils mentioned are classified as wet, erodible or shallow. Wet soils have poor drainage, a seasonal high water table of 0-18 inches and moderate to slow permeability and run off. The low permeability affects the functioning of on-lot septic systems, which can lead to system failure and even well-water contamination. Seasonal high water tables also restrict subsurface wastewater management system and foundation design.

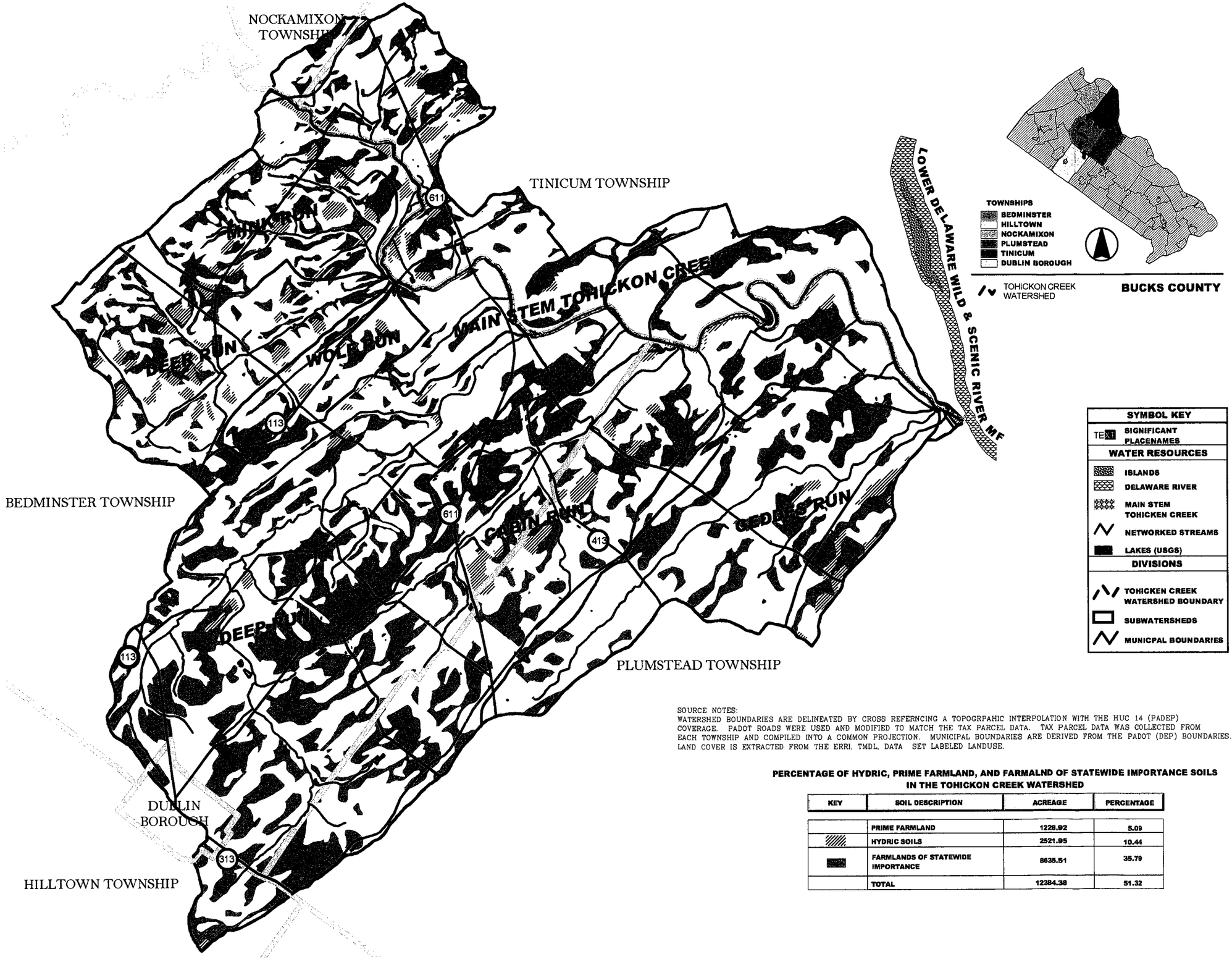
Erodible soils exhibit particularly low resistance to naturally occurring stormwater runoff and wind, and are especially vulnerable to farming and construction disturbances. Shallow soils, so called because of their shallow depth to bedrock (20 inches), and low moisture holding capacity (Roy F. Weston, 1978) have limitations for residential development because they are unsuitable for conventional on-lot systems.

Klinesville series soils have medium to rapid runoff; the hazard of erosion is medium to high. The shallow depth to bedrock of 1 to 1 ½ feet, limits many non-farm uses and even the choice of crops that can be successfully grown. These soils are located on the side slopes, hills, and ridges of the Tohickon Creek Watershed.

Reaville series soils have similar limitations to those of the Klinesville series. Runoff is slow to medium, and the hazard of erosion slight to moderate. Due to a shallow depth to bedrock of 1 ½ to 2 ½ feet, there are limitations to non-farm uses of the soil, and to crop choice. These soils are found on broad ridges and the sides of slopes.

Penn series soils, specifically Penn silt loam, 8 to 15% slopes are found on the convex sides of hills and ridges. The depth to bedrock ranges from 1 ½ to 3 ½ feet, which limits most non-agricultural use.

More than 40% of the soils in the watershed are prime farmland soils or soils of statewide importance (Map 8). Class I soils (prime farmland) have few limitations that restrict their use. Class



SOURCE NOTES:
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PERCENTAGE OF HYDRIC, PRIME FARMLAND, AND FARMALND OF STATEWIDE IMPORTANCE SOILS IN THE TOHICKON CREEK WATERSHED

KEY	SOIL DESCRIPTION	ACREAGE	PERCENTAGE
	PRIME FARMLAND	1226.92	5.09
	HYDRIC SOILS	2521.95	10.44
	FARMLANDS OF STATEWIDE IMPORTANCE	8635.51	35.79
	TOTAL	12384.38	51.32

MAP NO.: 8

SPECIAL SOILS

DRAWN BY:	KJM
CHECKED BY:	MG,GG,JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 15, 2002

PROJECT NUMBER: 229.01

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DATE: JUL 3 2002 , 10:00 AM

REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet
SCALE: 1: 55,000; ~= 4500'
MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. Class III soils have more severe limitations that reduce the choice of plants, require special conservation practices or both (Bucks Conservation District, Supplement to 1975 USDA data). These three soil classes are generally suitable for most kinds of field crops.

According to the USDA/NRCS, 1999 data, (Map 8), the most fertile agricultural soils (prime agricultural soils) are located around Mink Run, Deer Run, and Wolf Run in Bedminster Township, and Cabin Run in Bedminster and Plumstead Townships.

Prime Farmland

Prime Farmland is land best suited to and available for producing food, feed, forage, fiber, and oilseed crops. Prime farmland soils exhibit the quality, growing season and moisture required to produce economically viable and sustained high yield (USDA Supplement). In Bucks and Philadelphia Counties, there are twenty-eight soils that qualify as prime farmland. Of these, there are eight found in the Tohickon Creek Watershed (Table 3.1).

Table 3.1
Tohickon Creek Watershed Plan
Soil Mapping Units That Qualify as Prime Farmland in Tohickon Creek Watershed

Soil Series Symbol	Soil Series Name
BeA	Bedington Silt Loam, 0-3% slopes
BeB	Bedington Silt Loam, 3-8% slopes
DuA	Duncannon Silt Loam, 0-3% slopes
MlA	Mount Lucas Silt Loam, 0-3% slopes
PeA	Penn Silt Loam, 0-3% slopes
PeB	Penn Silt Loam, 3-8% slopes
PnB	Penn-Lansdale complex, 3-8% slopes
Ro	Rowland Silt Loam

Source: USDA Supplement

Additional Farmland of Statewide Importance

Additional Farmland of Statewide Importance is defined in Pennsylvania, as being comprised of Class II and Class III soils that do not qualify as prime farmland. In general, farmland of statewide importance is land, other than prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage and oilseed crops (USDA Supplement). In Bucks and Philadelphia Counties, there are thirty-two soils that qualify as Additional Farmland of Statewide Importance. Of these, thirteen are found in the Tohickon Creek Watershed (Table 3.2).

Table 3.2
Tohickon Creek Watershed Plan
Soil Mapping Units That Qualify as Additional Farmland of Statewide Importance in the Tohickon Creek Watershed

Soil Series Symbol	Soil Series Name
AbA	Abbottstown Silt Loam, 0-3% slopes
AbB	Abbottstown Silt Loam, 3-8% slopes
AbC	Abbottstown Silt Loam, 8-15% slopes
BeC	Bedington Silt Loam, 8-15% slopes
CwB	Culleoka-Weikert Shaly Silt Loams
KlB	Klinesville Very Shaly Silt Loam, 3-8% slopes
LgB	Lawrenceville Silt Loam, 3-8% slopes
LhB	Lehigh Channery Silt Loam, 2-8% slopes
MlB	Mount Lucas Silt Loam, 3-8% slopes
PeC	Penn Silt Loam, 8-15% slopes
PnC	Penn-Lansdale Complex, 8-15% slopes
ReA	Reaville Shaly Silt Loam, 0-3% slopes
ReB	Reaville Shaly Silt Loam, 3-8% slopes

Source: USDA Supplement

Steep Slopes

Although the slopes found in over 81% of the watershed are relatively flat to gently sloping, (0-8%), steeply sloping areas of 15% to over 40% also occur (Map 2). The steepest slopes are limited to stream valleys. The most extensive area of steep slopes is located along the main stem of Tohickon Creek proximate to its confluence with the Delaware River.

The identification and protection of steep slopes is primarily related to soil erosion. Steep slopes are prone to erosion once these areas are disturbed or cleared of vegetation. The slopes throughout much of the Tohickon watershed are subject to high rates of stormwater runoff due to the low permeability of the soils. Soil erosion occurs when soil particles are displaced and carried off in stormwater runoff. In general there are three types of soil erosion; sheet, rill and gully. Sheet erosion displaces soil particles uniformly across a slope. Rill erosion occurs when runoff begins to concentrate and creates tiny gullies. Gully erosion occurs in areas where runoff is highly concentrated and the downward cutting resulting from concentrated flow creates large gullies or ravines. Left unchecked the soils displaced by erosion are carried by stormwater runoff deposited at a point downgradient, typically, in a wetland or stream. The addition of soil particles to streams results in degraded water quality and can severely impact aquatic habitat.

All three Townships recognize the sensitivity of steep slopes and have developed measures to restrict development on these sensitive resources. In Section 601-(3) of the Bedminster Zoning Ordinance, steep slopes are protected. No more than thirty percent of areas with 15-25% slopes may be developed, regraded, or stripped of vegetation except for 10 acre parcels in the AP District. For these areas, no more than 75% may be developed, re-graded or stripped of vegetation. No more than fifteen percent of areas with >25% slopes may be developed, re-graded or stripped of vegetation. Again the exception is > 10 acre parcels in AP Districts whereby no more than 70% may be developed, regraded, or stripped of vegetation.

Section 2600 D of the Plumstead Ordinances protects steep slopes. The regulations apply to contiguous areas of steep slopes exceeding 3000 square feet. Where slopes are 16-25%, no more than 30% may be altered, re-graded, cleared or built. Where areas are >25%, no more than 15% may be altered, etc.

The Tinicum Township zoning ordinances describe a Steep Slope Conservation District in Section 805, comprising steep (15%-25%) and very steep (25% and greater) slopes. Permitted uses in very steep districts include agriculture, conservation, recreation, pre-existing structures, and front/rear/side yard areas. Cut and fill, mineral extraction, removal of topsoil and on-lot disposal systems (OLDS) are prohibited. No incursion is permitted in slopes of greater than 30%. A sliding scale controls the amount of regrading and disturbance for slopes of 15-20%, 20-25%, and 25-30%.

Alluvial Soils

The United States Department of Agriculture's Soil Survey Division states that "alluvium consists of sediment deposited by running water". Alluvial (flood plain) soils occur in the normally flooded bottom land of existing streams or on terraces above present streams. Along many old established streams, young alluvium deposits occur in the immediate flood plain, while older deposits occur in steps towards the highest terrace.

The Bedminster Township Zoning Ordinance protects flood plain soils in Section 613-620, by prohibiting development in the one-hundred year flood plain except with design approval from PADEP (see Section 1.5 for greater detail). In Plumstead Township, flood plain soils are protected in Section 2600 B of the Zoning Ordinance. Regulations state that soils shall not be altered, regraded, filled or built upon unless design approval is obtained from the Township and PADEP. In order to protect flood plain soils, the Tinicum Subdivision and Land Development Ordinance, Section 524, allows no intrusion into areas of floodway, wetlands and hydric soils. Ordinance 95 allows an intrusion of 10% into the first 10 acres of alluvial soils and less after the first 10%.

Hydric Soils

According to the National Technical Committee for Hydric Soils a hydric soil is "a soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part". Hydric soils are subject to prolonged periods of saturation (usually more than 14 consecutive days during the growing season). Hydric soils consist of very poorly drained, poorly drained, or somewhat poorly drained soils that have a seasonal high water table within six inches of the surface. Undrained hydric soils are typically associated with wetlands and the use of existing soil mapping information is an essential tool for identifying wetland resources. Hydric soils in the watershed include the following; Bowmansville, Croton, Doylestown, Fluvaquents, and Towhee.

The Bedminster Township Land Development Ordinance specifically requires that a wetland delineation be performed if hydric soils are indicated to be present on a property proposed for development. Tinicum prohibits intrusion into wetlands and requires that a Jurisdictional Delineation (JD) be done in accordance with COE and DEP standards.

3.5 Land Preservation Programs and Preserved Land

Although much of Bucks County has been subject to suburban sprawl, the Tohickon Creek watershed remains relatively undeveloped. As previously indicated, only 1.6% of the watershed has been developed. In Bucks County, a significant portion of new development has come at the expense of agricultural land, since the best properties for farming typically possess attributes related to topography and the types of soils that are also desirable for real estate development (e.g., flat to gently sloping, well drained, and proximite to water bodies). In order to help maintain the rural character of Bucks County communities and preserve historically valuable farmlands, a variety of initiatives have been developed to preserve farmland.

The Bucks County Agricultural Land Easement Program, established in 1990 as part of the Pennsylvania Farmland Protection Program, provides funds for agricultural conservation easement purchases. These easements limit use of the land to agricultural operations in perpetuity. Limited numbers of farms can be preserved under this program, though interest among farmers is high. Although the process is onorous, several farms within the Tohickon Creek Watershed met the criteria of the Bucks County Agricultural Preservation Program and have been preserved. As noted in Section 2 of this plan, residents of the watershed feel that additional measures are needed in order to preserve additional agricultural land in the watershed and to enhance the economic viability of agriculture.

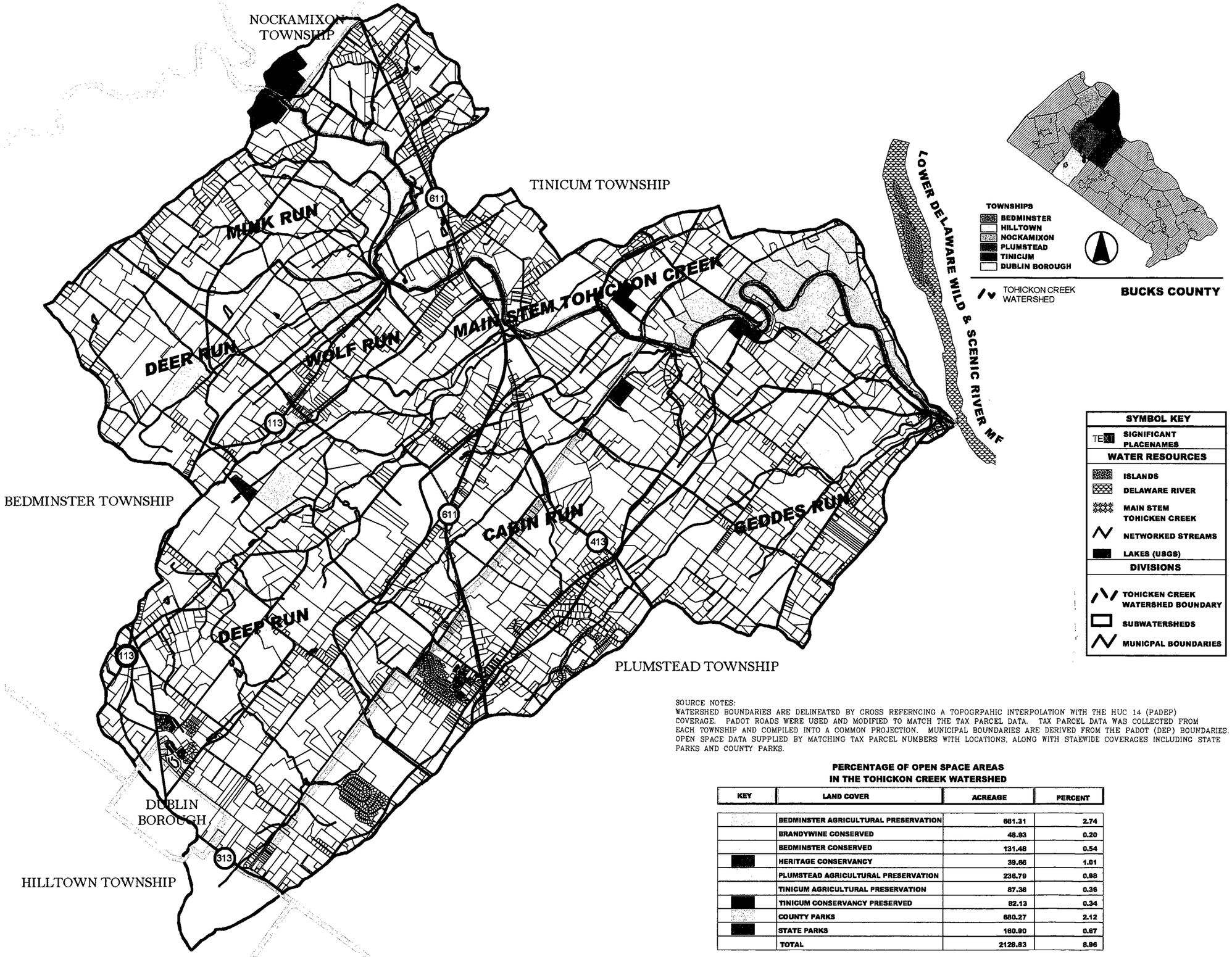
Other public and private land preservation programs operate in Bucks County, including the Heritage Conservancy, the Bedminster Land Conservancy, the Tinicum Conservancy, and the National Lands Trust. Land preserved through these programs is shown on the Open Space Map, (Map 9). The Heritage Conservancy is a non-profit organization, concerned with the rapid loss of open space in Bucks County. It is dedicated to preserving the natural and historic heritage of the County. Through a planned giving program that helps donors and friends to plan estates, Heritage Conservancy has preserved 235.85 acres within the watershed (Heritage Conservancy, personal communication).

Bedminster Land Conservancy is also a non-profit organization. It is a volunteer (501c3) organization committed to the protection and preservation of agricultural heritage and rural lifestyle. Its goals are to acquire either donated or purchased conservation easements on land. Bedminster Conservancy has preserved 293.35 acres of land in the Tohickon Creek Watershed (Bedminster Conservancy, personal communication).

The Tinicum Conservancy is a private not-for-profit (501c3) corporation formed less than ten years ago for the purpose of protecting natural resources in Tinicum Township. It has three parts to its mission: to preserve land through voluntary conservation easements, to protect water resources in Tinicum, and to preserve local history. Tinicum Conservancy has over 1500 acres in easements, all voluntary, most of which are in the Tinicum Creek Watershed. It also acts as the recipient for the easements placed on lands acquired through County and other grant monies. Only 26 acres are preserved in the Tohickon Creek Watershed, but the Conservancy is actively trying to add to that number (Tinicum Conservancy, personal communication). This watershed study and conservation plan development is a project of Tinicum Conservancy's water-resource protection mandate.

Figure 3.4
Tohickon Creek Watershed Conservation Plan
Preserved Farmland in the Watershed

Source: Mark Gallagher, ■ photos



SOURCE NOTES:
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PERCENTAGE OF OPEN SPACE AREAS IN THE TOHICKON CREEK WATERSHED

KEY	LAND COVER	ACREAGE	PERCENT
	BEDMINSTER AGRICULTURAL PRESERVATION	661.31	2.74
	BRANDYWINE CONSERVED	48.93	0.20
	BEDMINSTER CONSERVED	131.48	0.54
	HERITAGE CONSERVANCY	39.86	1.01
	PLUMSTEAD AGRICULTURAL PRESERVATION	236.79	0.98
	TINICUM AGRICULTURAL PRESERVATION	87.36	0.36
	TINICUM CONSERVANCY PRESERVED	82.13	0.34
	COUNTY PARKS	680.27	2.12
	STATE PARKS	160.90	0.67
	TOTAL	2128.83	8.96

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MAP NO.: 9

OPEN SPACE

	KJM
DRAWN BY:	
CHECKED BY:	MCGG JD
REVISION NO.	003.03
REVISION DATE:	JUNE 10, 2004

PROJECT NUMBER: 229.01

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FILE: C:\0022901\GIS\0022901nri.apr (POR_FIG_9)

DATE: JUL 3 2002 , 10:03 AM

REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~= 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

3.6 Potential Hazard Areas

The United States Environmental Protection Agency (EPA) and the Pennsylvania Department of Environmental Protection (DEP) monitor hazardous waste facilities. Areas of environmental concern include EPA Superfund Sites, RCRA Inspection Sites, CERCLA landfills and other areas. The permit process assures that the public and the environment is protected. DEP reserves the right to randomly inspect the facility both during construction and throughout its existence. If there is a failure in compliance, the DEP reserves the right to shut down a hazardous waste facility.

According to the EPA and the DEP, there are no hazardous waste facilities or areas of environmental concern in the Lower Tohickon Creek Watershed.

3.7 Quarries and Sinkholes

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. When underground support becomes inadequate, sudden dramatic collapses of the land surface may occur. Although carbonate geologic formations occur elsewhere in Bucks County, they do not exist within the Lower Tohickon Watershed.

Most of the quarries present in the portion of the Delaware River Basin in upper Bucks County are for crushed stone including; Triassic red or black sandstone, argillite and shale, Triassic gray to black baked shale and Triassic diabase. According to the Geology and Mineral Resources of Bucks County, Pennsylvania (Willard, Bradford et al., 1959) only five quarries were identified in the watershed. Two of the quarries were indicated to be located in the Brunswick geologic formation and three in the Lockatong Formation. Two of the quarries identified, The George Wiley Quarry and the Plumstead Township Quarry, are located to the southwest of Point Pleasant and mined baked triassic argillite for crushed stone. The Bedminster and Lumberville USGS maps indicate the presence of only one quarry, southwest of Point Pleasant in the Geddes Run watershed. None of the quarries is currently active.

SECTION 4:

WATER RESOURCES

Tohickon Creek

Section 4: Water Resources

4.1 The Lower Tohickon Creek and its Tributaries

The Tohickon Creek and its tributaries above and below Lake Nockamixon drain 112 square miles of the upper portion of Bucks County. The portion of the watershed covered by this plan begins below the Lake Nockamixon Dam and consists of approximately 24,125 acres or 37.69 square miles. A separate Watershed Conservation Plan covers the Upper Tohickon and its tributaries.

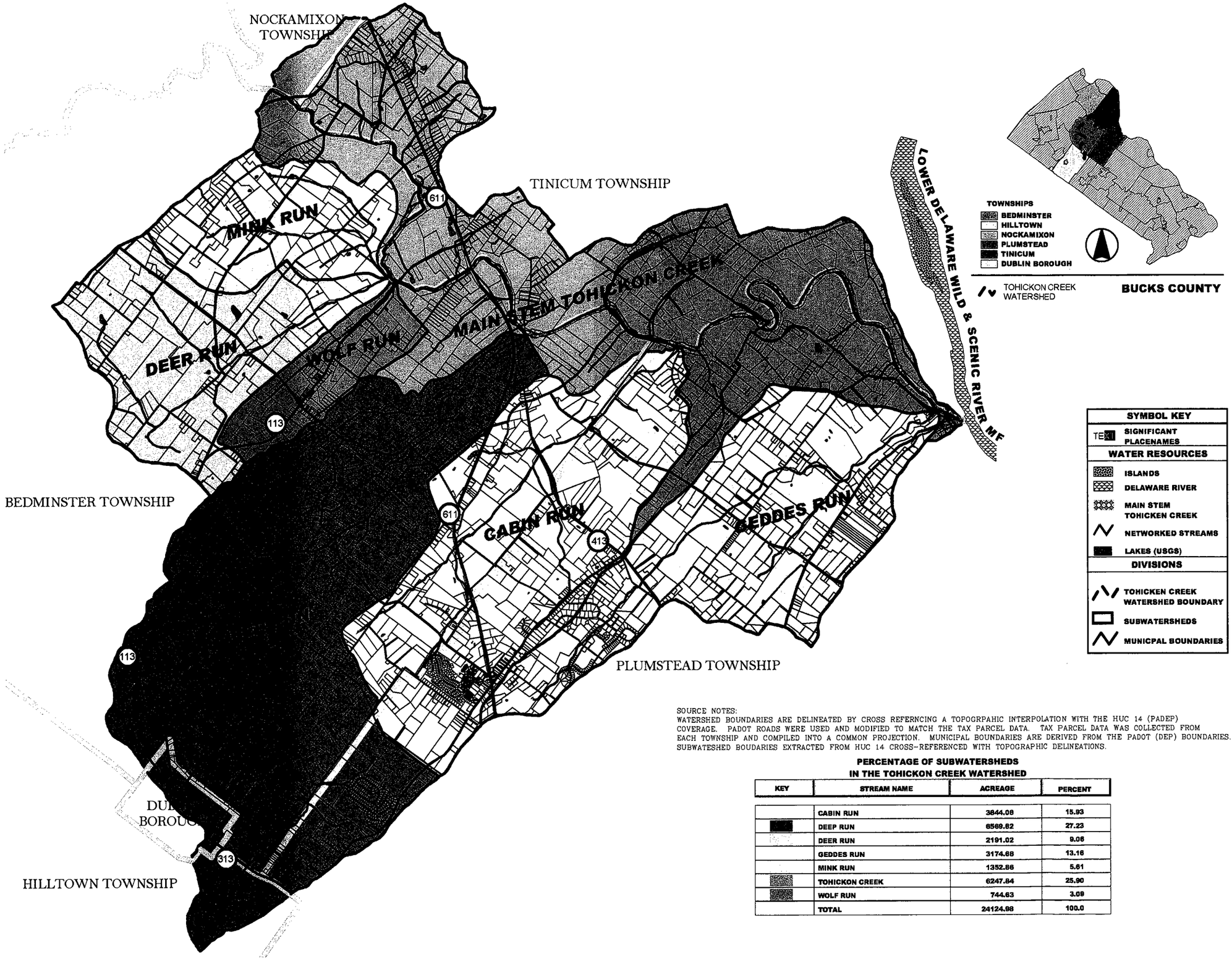
The Lower Tohickon Creek possesses six major tributaries; Deep Run (18.7 miles), Cabin Run (8.7 miles), Wolf Run (1.7 miles), Deer Run (5.5 miles), Mink Run (4.4 miles) and Geddes Run (6.5 miles). The watersheds of each of these tributaries are shown on the map entitled "Subwatersheds" (Map 10). Each of the tributaries has distinct attributes based on environmental features landscape and land use.

The largest tributary watershed area is that of Deep Run which flows in a northeasterly direction through Bedminster Township. Small portions of this watershed occur in Plumstead, Dublin, and Hilltown Townships. The Deep Run watershed encompasses approximately 6,569 acres (10.26 square miles), or 27.23% of the Lower Tohickon Creek watershed. The confluence of Deep Run and the Tohickon Creek is located southeast of the intersection of Creek Road and 611 (EPA, 1998). Nearly 57% of the Deep Run watershed is in agricultural use. Land cover designated as low or high density development account for only 1.2% of the subwatershed. Forest is designated to cover approximately 2,691 acres (41%) of the watershed.

Cabin Run drains the second largest subwatershed, 3,840 acres, roughly half of which is in Plumstead Township and the balance in Bedminster Township. The headwaters of Cabin Run begin in one of the most developed portions of the Tohickon Creek watershed. Although the percentage of the watershed that is developed is relatively small, 2.9%, it amounts to 119.64 acres. Approximately, 1,724 acres (45%) of the watershed are forested. Most of the forested portion of the watershed occurs proximate to Tohickon Creek. Agricultural consists of the largest land cover type in the watershed; 1,986 acres (51.7%) of the watershed is in agricultural use.

Geddes Run is located entirely in Plumstead Township. The Geddes Run watershed encompasses 3,174 acres of which nearly 49% is forested. Approximately 50% of the watershed is in agricultural use. The percentage of the subwatershed designated as developed is just 0.6%.

The 2,190 acre Deer Run watershed is located entirely in Bedminster Township. Most of the watershed (62.6%) is in agricultural use, mainly row crops. Forest cover is approximately 36%. Less than 0.3% of the watershed is designated as developed.



SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRPAHIC INTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. SUBWATESHED BOUDARIES EXTRACTED FROM HUC 14 CROSS-REFERENCED WITH TOPOGRAPHIC DELINEATIONS.

PERCENTAGE OF SUBWATERSHEDS IN THE TOHICKON CREEK WATERSHED

KEY	STREAM NAME	ACREAGE	PERCENT
	CABIN RUN	3844.08	15.93
	DEEP RUN	6569.82	27.23
	DEER RUN	2191.02	9.08
	GEDDES RUN	3174.68	13.16
	MINK RUN	1352.86	5.61
	TOHICKON CREEK	6247.84	25.90
	WOLF RUN	744.63	3.09
	TOTAL	24124.98	100.0

NOTES: 1. DATA ACCURACIES ARE LIMITED TO THE ACCURACY AND SCALE OF THE ORIGINAL DATA SOURCES.
2. THESE MAPS ARE PART OF A WATERSHED PLAN AND SHOULD BE USED IN CONJUNCTION WITH THE COMPILED TEXT.
3. DIGITAL MAPS ARE PERIODICALLY UPDATED AND THE USER IS RESPONSIBLE FOR VERIFYING AND OBTAINING THE LATEST VERSION OF THE DATA.

MAP NO.: 10

SUB WATERSHEDS

DRAWN BY:	KJM
CHECKED BY:	MG,GG,JD
REVISION NO.	002.03
REVISION DATE	JUNE 24, 2002

PROJECT NUMBER: 229.01

pH
1105 OLD YORK ROAD
BUILDING 2, 2ND FLOOR
WARMINSTER, PA 18974
(215) 443-5550
INFO@PENNORTHWEST.COM

FILE: C:\022901\GIS\022901ri.apr (POR_FIG_10)

DATE: JUL 3 2002 , 10:02 AM

REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~= 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

Mink Run watershed, 1,350 acres, is also located entirely within Bedminster Township. Agricultural land covers roughly 50% of the watershed and forest cover accounts for all but 0.4% of the rest. Only 5.32 acres or 0.4% of the watershed is developed.

Wolf Run, located entirely in Bedminster Township, is the smallest subwatershed of the Tohickon Creek, encompassing only 742.2 acres or 3.0% of the watershed. Approximately 44% of the subwatershed is forested, 43% in row crop production, and 8.9% in pasture/hay.

Table 4.1
Tohickon Creek Watershed Plan
Tributaries and Subwatersheds of the Lower Tohickon Creek

Name	Location	Confluence	Length (miles)	Watershed Size	Percentage of Watershed
Deep Run	Bedminster	Creek Road and 611	18.7	6,569 acres (10.26 square miles)	27.23
Cabin Run	Bedminster and Plumstead	Covered Bridge Rd. & Schlentz Hill Rd.	8.7	3,840 acres (6.00 square miles)	15.9
Geddes Run	Plumstead	Tohickon Hill Rd. & Swagger Rd.	6.5	3,174 acres (4.96 square miles)	13.16
Deer Run	Bedminster	Deer Run Rd, NW of 113	5.5	2,190 acres (3.42 square miles)	9.06
Mink Run	Bedminster	Same Confluence Point as Deer Run	4.4	1,350.4 acres (2.11square miles)	5.61
Wolf Run	Bedminster	Slightly SE of Deer Run Confluence Point	1.7	742.2 acres (1.16 square miles)	3.0

Souce: ERRI county wide coverages of the County of Bucks, 1998.

The balance of the Lower Tohickon Creek watershed, consists of all the unnamed tributaries and surrounding land areas that drain directly into the Tohickon Creek. This 9.76 square mile subwatershed, comprises the second largest portion (25.90%) of the study site's total watershed area (EPA, 1998). Most of this portion of the Tohickon Creek watershed is forested (65%). Forest cover occurs along most of the creek but is especially significant below Route 611. Although agricultural land makes up about a third of the land cover, (30%), this is the least agricultural of all of the subwatersheds. Only 2.3% of the subwatershed is covered by development.

In summary, land cover in the Tohickon Creek watershed remains rural in nature and thus lacks many of the problems associated with the more highly developed sections of Southeastern Pennsylvania. The lack of substantial development in the watershed provides a unique opportunity to manage the existing water resources of this area so as to avoid the pitfalls related to surface and ground water quality degradation, unchecked streambank erosion and stressed groundwater supplies experienced by other communities.

4.2 Water Quality

Water is the most precious natural resource on earth; without it, life could not exist. The degradation of water quality negatively impacts food supply, recreation, and availability of ample, safe drinking water. The protection of this resource requires an understanding of the hydrologic cycle. Precipitation occurring within a watershed either evaporates, transpires to the atmosphere thorough plants, falls directly into the waterbodies, or percolates through the soils to recharge groundwater. How much precipitation infiltrates into the soil depends on land cover, soil permeability and slope. When rainfall is greater than the soil's ability to absorb it, runoff results. Clearing, development and other modifications to the landscape increases the amount of runoff which effects watershed hydrology and stream hydraulics.

The type and extent of development (e.g., pavement, density and orientation of buildings) and associated impervious cover within a watershed affect the rate, volume, and characteristics of groundwater and surface water recharge. In heavily developed areas, impervious surfaces (eg, roadways, homes, stores) replace natural pervious land. Most of the precipitation in developed areas runs directly off the land (eg, stormwater runoff) into the streams, leading to more intense and more frequent flooding. Increases in stormwater runoff often result in wider stream channels, eroded streambanks, and deposition of stones, silt, sand, and flood debris. Increased runoff results in less infiltration and recharge of groundwater supplies, in addition to the destruction of wetland and riparian habitat. Lack of recharge is especially significant in areas where people are dependent upon individual on-site wells or surface water for potable drinking water. Maintaining the quality and rate of recharge in these areas is crucial to maintaining water supply.

Modifications to a watershed due to stormwater runoff and erosion directly alter habitats for terrestrial and aquatic organisms. Sensitive organisms may be unable to tolerate changes in temperature, water flow, water level, and chemistry all of which may result from a reduction in recharge.

The following subsections of the Tohickon Creek Watershed Plan contain information about the significant groundwater and surface water resources in the Tohickon Creek Watershed. Narrative and maps describing the location and importance of major tributaries, floodplains, and wetlands are included in this section, as well as a brief description of the existing regulatory measures that pertain to the protection and maintenance of the existing water quality of Tohickon Creek.

4.2.1 Surface Water Quality Protection

Understanding the need to protect our water resource led to the enactment of the Clean Water Act in the 1970's and has become an integral aspect of regulations at the Federal, State and Municipal level. The maintenance and enhancement of high water quality is a vital and achievable goal that requires environmentally sound planning, strong environmental regulations and a commitment from all stakeholders.

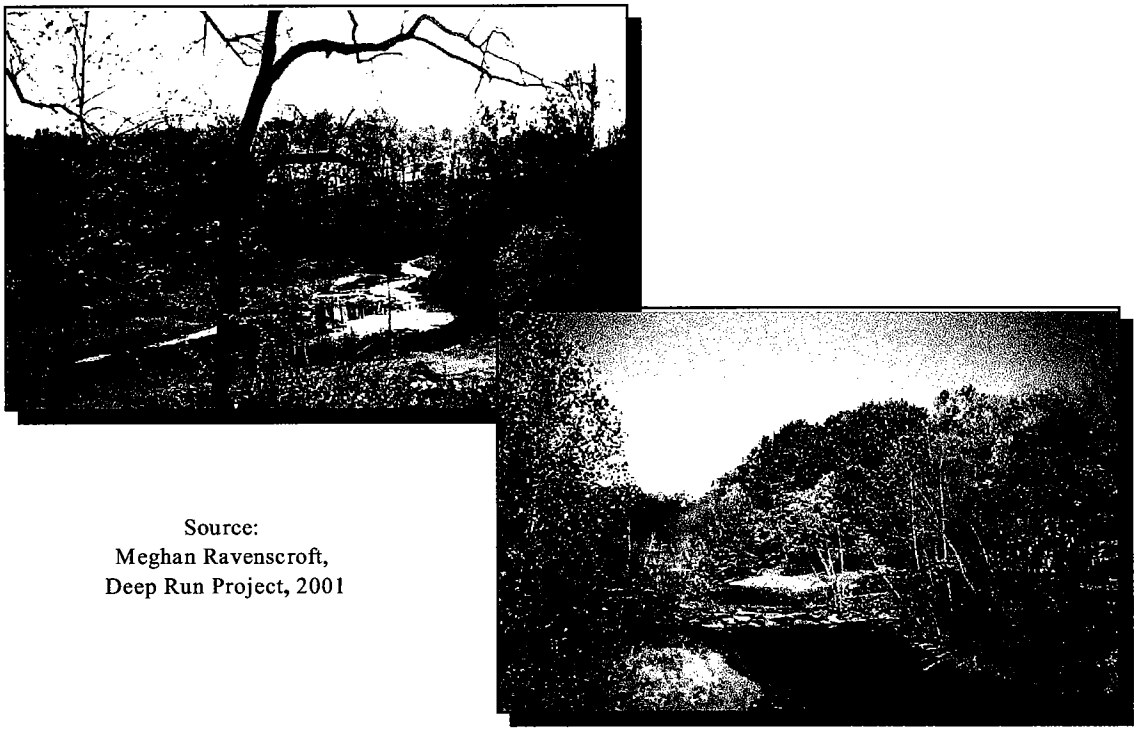
Pennsylvania's surface water quality standards are established in Chapter 93 of the Pennsylvania Code. Chapter 93 establishes the water quality goals and policies underlying the management of the state's surface water quality. These standards require that all surface water bodies be classified based upon use and water quality. Once classified, existing instream water uses and the level of water quality necessary to protect the existing uses of a stream shall be maintained and protected in accordance with the anti-degradation aspect of Chapter 93. These criteria are used to establish waste discharge permit limits. The basis for these anti-degradation standards is established in the Clean Water Act at 40 CFR 131.12. Anti-degradation standards apply to all surface waters and stipulate that existing uses must be either maintained or protected and that no irreversible changes to water quality are allowed that would impair or preclude attainment of designated uses. This regulation also requires states to adopt anti-degradation policies based on at least three levels of protection.

In addition to most surface water bodies Pennsylvania regulations recognize two categories of special protection waters: Exceptional Value Waters (EV) and High Quality Waters (HQ). The Exceptional Value Waters designation refers to streams that are unpolluted, have little or no development or access, and constitute an outstanding natural resource. Exceptional Value waters must be protected to maintain their existing quality. In a High Quality stream the water quality can be lowered only if a discharge is the result of necessary social or economic development, the water

quality criteria are met, and all the existing uses of the stream are protected. Streams are also classified by fishery: cold water or trout propagation; trout stocking; migratory and warm water (PADEP, 2001).

The Tohickon Creek is classified as a Cold Water Fishery (CWF) as are all of the tributaries to the Tohickon Creek except for Deep Run which is classified as Warm Water Fishery (WWF). In accordance with the requirements of Chapter 93, the CWF designation for the Tohickon Creek requires the *maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna indigenous to a cold water habitat.* A pending petition to PADEP would upgrade the Lower Tohickon Creek to EV based on its exceptional geology, scenic attributes (the main stem of the creek was included in the Federal Wild and Scenic River Program in 2000), the presence of several species of special concern and the excellent water quality of the creek.

Figure 4.1
Tohickon Creek WatershedConservation Plan
Deep Run



Source:
Meghan Ravenscroft,
Deep Run Project, 2001

4.2.2 Surface Water Quality

Pollution in surface water can be attributed to either point sources or nonpoint sources. Point source pollution enters either ground or surface waters at a specific point, such as a pipe. Non-point source pollutants are carried in stormwater runoff or snowmelt runoff to surface waters and may be highly variable and difficult to measure. Nonpoint source pollution is largley responsible for surface water quality degradation. It originates from agricultural operations (row crops and livestock), urban/suburban runoff, and storm sewers. Runoff from agricultural land is currently the primary threat to the surface water quality of the Tohickon Creek; poorly conceived land development projects may be the worst threat in the future.

Point source discharges can also impair surface water quality. These discharges are regulated by PADEP and require NPDES permits, which establish effluent limits, specify self-monitoring requirements, and require submission of periodic monitoring reports. Permits must be obtained to discharge treated wastewater to a receiving stream. Currently there are twelve sewage discharge points to the Tohickon Creek, one in Dublin Borough, six in Plumstead, three in Bedminster, one in Haycock and one in Hilltown. The specifics of these points are listed in Appendix C, and correlate with the mapped points on Map 11.

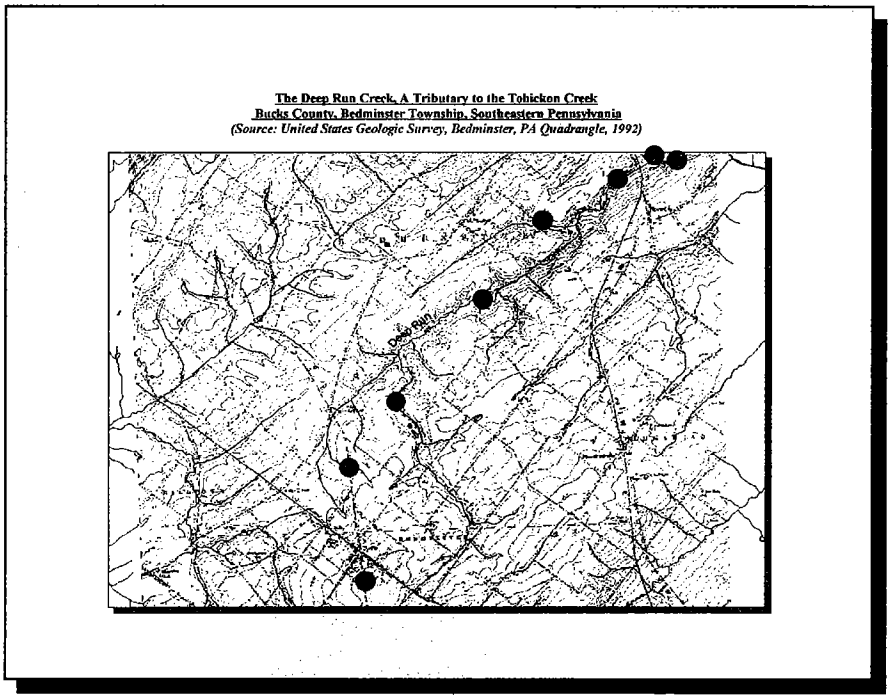
Available water quality data from the Tohickon watershed indicate that neither point nor nonpoint sources are serious problems. Water quality data collected by PADEP in 1997 at 16 stations throughout the Tohickon Creek Basin indicate that, with noted exceptions, water quality in the Tohickon Creek Basin is generally better than applicable standards. The nitrate levels observed in Deep Run, Mink Run, and Deer Run reflect the agricultural nature of these subwatersheds which drain some of the best farmlands in the Tohickon Creek watershed.

A stream survey conducted in the fall of 1997 by Coastal Environmental Services, Inc., included two sampling stations along Tohickon Creek. The first sampling station was adjacent to Fretz Road crossing, and the second was located in Ralph Stover Park. Water quality was generally better than established criteria described under State-wide water quality standards. The habitat quality of the Tohickon Creek sites was greater than 90% of the selected reference streams, including Tinicum Creek, an EV stream. The number and variety of macroinvertebrate species was high, and in addition, three genera of mayflies, that are particularly sensitive to water quality were found at the two sites. Based on these data, both water quality and habitat are considered of exceptional value.

A recent study by the Bedminster Land Conservancy (BLC) on Deep Run, a stream in which 57% of the land cover is agricultural, reported on the quality of the water. The study was conducted from September 2001 to August 2002. The objective was to collect physical, chemical, and

biological data on Deep Run in order to develop a watershed management plan. Figure 4.2 displays the sample sites that were chosen. Monitoring occurred five times throughout 2001 and once in January 2002. *In-situ* measurements of temperature, flow, conductivity, salinity, and pH were conducted. The temperature measurements were appropriate for each respective season. Salinity was low, which is typical for a non-tidal stream. Conductivity was slightly elevated, probably related to agricultural phosphorus. Elevated pH levels observed on some dates are atypical but not a cause for concern. Overall, the study indicates that the water quality of Deep Run Creek is not severely impacted by pollution and remains relatively clean (Princeton Hydro, 2002).

Figure 4.2
Tohickon Creek Watershed Conservation Plan
Deep Run Sampling Locations



Source: Meghan Ravenscroft, Deep Run Project, 2002

In addition to the State and Federal Regulations discussed in Section 4.2.1, the Townships in the Tohickon watershed have implemented specific measures to protect surface water quality resources such as stream buffer requirements. Their resource sensitive comprehensive plans and

zoning ordinances are directed toward the successful management of land development and resource protection. Some provisions of these plans are discussed in Section 1. Tinicum Township, for example, requires a riparian buffer of fifty feet from the top of bank, restricts the construction of buildings, and structures, and stipulates that buffers shall not be altered, regraded, developed or filled. Bedminster Township has a similar buffer restriction.

Figure 4.3
Tohickon Creek Watershed ConservationPlan
Volunteers Taking Water Samples

Source: Suzanne Forbes, pH photos

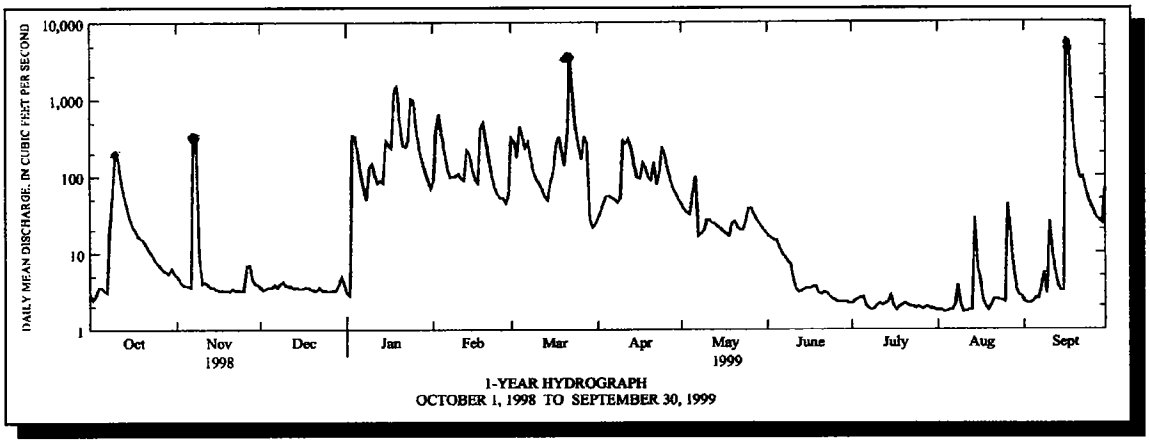
4.2.3 Surface Water Flow

On September 15th and 16th, 1999, according to USGS records, rainfall associated with Hurricane Floyd caused significant flooding in the Delaware River Basin. Approximately 6.5 to 10.5 inches of rain fell during a 15-hour period. At station number 01459500, near Pipersville (latitude: 40:26:01N, longitude: 075:07:01W), the Tohickon Creek crested at an elevation of 11.84 feet. The previous peak elevation had been 11.32 feet. This large a storm has only a 4% probability of occurring in any given year, or once in every 25 years.

Average flow rate on the Tohickon from October 1998 to September 1999 was approximately 127 cubic feet per second. Four peak flow events occurred. The dates of the higher

events are as follows: October 10-11, 1998, November 7-8, 1998, March 22-23, 1999 and September 16-18, 1999 (Figure 4.4). The peak flow events in November and March were due to releases at the Nockamixon dam which will be discussed further. The September peak which is very obvious on Figure 4.4, was caused by Hurricane Floyd. The October 1998 peak was caused by heavy rainfall.

Figure 4.4
Tohickon Creek Watershed Plan
USGS Water Flow Rate Information



Source: USGS Web page, 2002

The Bureau of State Parks has been releasing water from Lake Nockamixon to the Tohickon Creek, during the first weekend in November for many years. Recently, releases have also occurred in March (Figure 4.4). These releases provide a recreational opportunity for whitewater enthusiasts. The November 2001 release was cancelled due to mechanical problems with the dam and the March 2002 release due to the drought that affected the entire northeast. A typical release provides approximately eight hours of white water recreation. Kayaking enthusiasts may travel downstream from Ralph Stover to Point Pleasant. The releases are well known to whitewater enthusiasts, but normal storm events are often larger than the planned releases and thus attract local kayakers throughout the year. Although the periodic releases of water from Lake Nockamixon into Tohickon Creek may be popular with whitewater enthusiasts, they are opposed by some residents bordering the creek because of unpermitted incursions onto private property by some of the participants.

Figure 4.5
Tohickon Creek Watershed Plan
Whitewater Release

Source: Suzanne Forbes, volunteer photos 2001

4.2.4 Ground Water Quality & Quantity

Groundwater is the primary source of potable water for most of the residents of Tohickon Creek watershed. Its contamination can affect not only drinking water, but also surface water quality since it provides the base flow for the Tohickon as well as for most streams throughout the Commonwealth. Drinking contaminated groundwater can make people and animals sick, and the installation and operation of treatment systems to remove it from the groundwater are expensive. Contaminated groundwater that reaches surface waters adversely affects organisms in aquatic ecosystems. Groundwater contamination may result from various industrial activities. Wellhead protection legislation in the Safe Drinking Water Act Amendments of 1986 was designed to protect drinking water wells from such contamination.

Municipalities must be able to provide a reliable, safe, and adequate water supply in order to support all uses without exceeding available groundwater resources. To sustain these resources three municipalities have formed a Joint Groundwater Committee (JGC). Member municipalities recognize the need to protect and preserve both the quantity and quality of their groundwater resources, which defy municipal boundaries and require cooperative planning and management. Member municipalities are working together to protect their interrelated watersheds and aquifers through regional planning, conservation, and management of groundwater resources. The Joint Groundwater Committee is currently mapping wetlands and quantifying recharge areas for the three townships with a grant from the EPA. The result of this work will be a wetland Management Recommendation Plan for the combined watersheds, of which the Tohickon is one.

In addition, under a grant from the Department of Commerce and Economic Development, the JGC plans to create a Regional Model Ordinance to present for municipal consideration and adoption. An important component of this grant is a groundwater educational program to explain to residents groundwater interactions and their importance. A third project, under the aegis of DCNR is the GIS mapping of all headwater areas in the three municipalities. At present, many headwaters are unmapped and first order streams unnamed.

On June 23, 1999 the Delaware River Basin Commission amended the Ground Water Protected Area Regulations for Southeastern Pennsylvania. Numerical withdrawal limits for 62 subbasins entirely or partially within the Protected Area were established. The purpose of setting limits is to reduce stress on groundwater supplies in the protected areas (DRBC, 2001).

The USGS Hydrogeology and Ground-Water Quality Study of Northern Bucks County (1994) provides water quality data from aquifers in the Tohickon watershed which are available from its database. These data include latitude and longitude for each sampling point and cation, anion, iron, magnesium, nitrate, and radon concentrations, but are not specific to the Tohickon watershed.

Other water quality protection mechanisms are found in the Sewage Facilities Plan for each Township. The Pennsylvania Sewage Facilities Act enacted in 1966 (Act 537), requires municipalities within the Commonwealth of Pennsylvania to develop and implement official Sewage Facilities Plans that provide for the resolution of existing sewage disposal problems, and future sewage disposal needs of the municipality. Act 537 also requires local agencies (Bucks County Department of Health, SE Regional PADEP office) to work with local municipalities to administer a permitting program for the installation of on-lot sewage disposal systems. This program is meant to prevent public health and environmental problems resulting from substandard or malfunctioning on-lot systems.

4.3 Floodplains in the Tohickon Creek Watershed

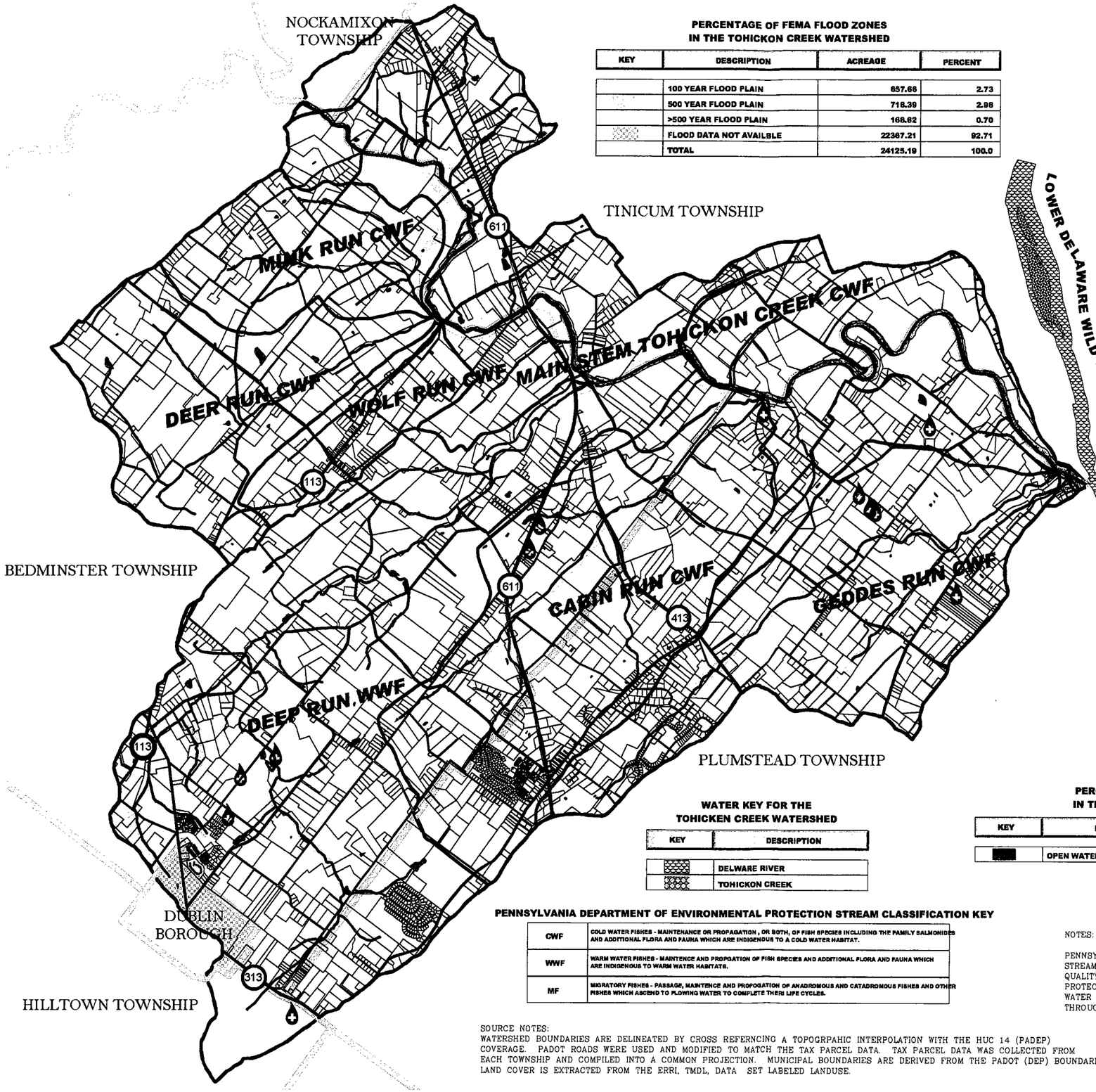
Floodplains are valuable low lying areas bordering streams, ponds or lakes which are subject to flooding. Natural floodplains serve many beneficial functions including groundwater recharge, flood storage, prevention of soil erosion, maintenance of water quality and wildlife habitat. The Bucks County Natural Resources Plan notes that floodplains that support natural vegetation help trap sediment from the upland surface runoff. Undisturbed floodplains protect the structural integrity of stream banks thereby reducing soil erosion and maintaining water quality. Naturally occurring vegetation in floodplain areas provides wildlife habitat and natural travel corridors for a variety of birds and mammals. The Tinicum Township Open Space Plan specifically calls for preservation of wildlife corridors.

Figure 4.6
Tohickon Creek Watershed Conservation Plan
Floodplain-Mainstem Tohickon, North of Cabin Run

Source: Richard McNutt, Volunteer Photos, 2001

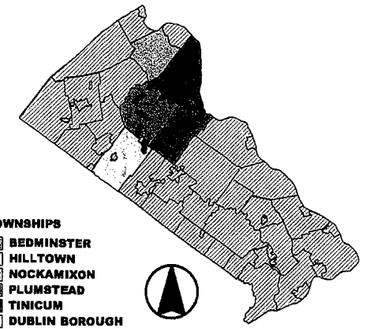
Floodplains also naturally ameliorate and mitigate flood sources and the dangers associated with storm related flooding. Undisturbed floodplain areas store water by accommodating fluctuating stream volumes during heavy rains, which moderates storm surges and decreases the magnitude of flooding. When floodplains are maintained in an undisturbed state, expensive flood control structures are unnecessary. In response to disastrous flood events in the past, the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program (NFIP), have implemented measures to regulate development upon floodplains. Maps produced by FEMA define and delineate floodways and flood fringe areas. The NFIP states that there shall be no new construction or substantial improvements in floodways and that all new construction must be above the base flood elevation.

The Tohickon Creek Watershed has 657.66 acres of 100-year floodplain and 718.39 acres of 500-year floodplain (Map 11). Most floodplain areas occur directly adjacent to the Tohickon Creek. Steep slopes delimit most of the floodplains, which are characterized by lush vegetation, species-rich bottomland forest communities and certain species of special concern. The Tinicium Township Open Space Plan specifically calls for the preservation of riparian forests.



PERCENTAGE OF FEMA FLOOD ZONES IN THE TOHICKON CREEK WATERSHED

KEY	DESCRIPTION	ACREAGE	PERCENT
	100 YEAR FLOOD PLAIN	657.66	2.73
	500 YEAR FLOOD PLAIN	718.39	2.98
	>500 YEAR FLOOD PLAIN	168.62	0.70
	FLOOD DATA NOT AVAILBLE	22367.21	92.71
	TOTAL	24125.19	100.0



TOWNSHIPS
- BEDMINSTER
- HILLTOWN
- NOCKAMIXON
- PLUMSTEAD
- TINICUM
- DUBLIN BOROUGH

TOHICKON CREEK WATERSHED

BUCKS COUNTY

SYMBOL KEY

- SIGNIFICANT PLACENAMES

WATER RESOURCES

- ISLANDS
- DELAWARE RIVER
- MAIN STEM TOHICKEN CREEK
- NETWORKED STREAMS
- LAKES (USGS)
- SEWERAGE DISCHRAGE POINTS

DIVISIONS

- TOHICKEN CREEK WATERSHED BOUNDARY
- SUBWATERSHEDS
- MUNICPAL BOUNDARIES

WATER KEY FOR THE TOHICKEN CREEK WATERSHED

KEY	DESCRIPTION
	DELWARE RIVER
	TOHICKON CREEK

PERCENTAGE OF OPEN WATER AREAS IN THE TOHICKON CREEK WATERSHED

KEY	DESCRIPTION	ACREAGE	PERCENTAGE
	OPEN WATERS (NWI)	24.36	0.10

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION STREAM CLASSIFICATION KEY

CWF	COLD WATER FISHES - MAINTENANCE OR PROPAGATION , OR BOTH, OF FISH SPECIES INCLUDING THE FAMILY SALMONIDES AND ADDITIONAL FLORA AND FAUNA WHICH ARE INDIGENOUS TO A COLD WATER HABITAT.
WWF	WARM WATER FISHES - MAINTENCE AND PROPOGATION OF FISH SPECIES AND ADDITIONAL FLORA AND FAUNA WHICH ARE INDIGENOUS TO WARM WATER HABITATS.
MF	MIGRATORY FISHES - PASSAGE, MAINTENCE AND PROPOGATION OF ANADROMOUS AND CATADROMOUS FISHES AND OTHER FISHES WHICH ASCEND TO FLOWING WATER TO COMPLETE THERI LIFE CYCLES.

NOTES:

PENNSYLVANIA STREAM CLASSIFICATION:
STREAM CLASSIFICATIONS FOR WATER QUALITY COMPLIED FROM "PENNSYLVANIA CODE, TITLE 25, ENVIRONMENTAL PROTECTION, DEPARTMENT OF ENVIRONMENTAL PROTECTION, CHAPTER 93, WATER QUALITY STANDARDS", PAGES 93-8 TO 93-11, 93-45, CURRENT THROUGH APRIL 15, 2000.

SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRPAHIC INTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. LAND COVER IS EXTRACTED FROM THE ERRI, TMDL, DATA SET LABELED LANDUSE.

MAP NO.: 11

SURFACE WATER RESOURCES AND FLOODPLAINS

pH
1108 OLD YORK ROAD
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ABINGTON, PA 19001
INFO@PENNSYLVANIAH2O.COM

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CHECKED BY:	MG,GG,JD
REVISION NO	002.03
REVISION DATE	JUNE 14, 2002

PROJECT NUMBER: 229.01

NOTES: 1. DATA ACCURACIES ARE LIMITED TO THE ACCURACY AND SCALE OF THE ORIGINAL DATA SOURCES.
2. THESE MAPS ARE PART OF A WATERSHED PLAN AND SHOULD BE USED IN CONJUNCTION WITH THE COMPILED TEXT.
3. DIGITAL MAPS ARE PERIDOICALLY UPDATED AND THE USER IS RESPONSIBLE FOR VERIFYING AND OBTAINING THE LATEST VERSION OF THE DATA.

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DATE: JUL 3 2002 , 10:03 AM

REVISIONS

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet

SCALE: 1: 55,000; ~ = 4500'

MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

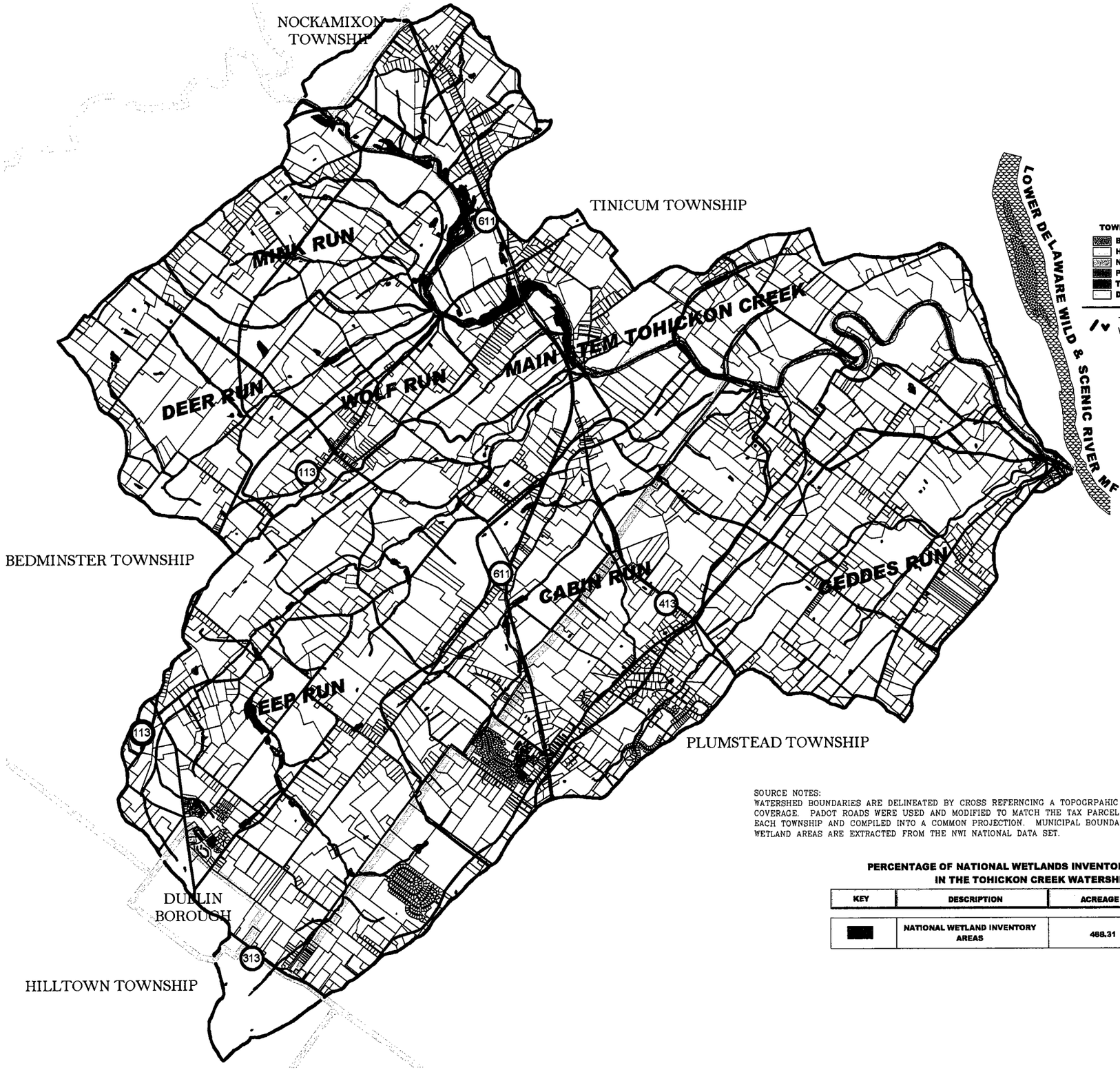
The functional and ecological values associated with floodplains have caused the Townships of the watershed to emphasize the importance of these resources in their Comprehensive Plans and to implement protective measures through zoning, and subdivision/land development ordinances. Each of the Townships prohibits development in floodplains and restricts development on alluvial soils.

4.4 Wetlands in The Tohickon Creek Watershed

In the Commonwealth of Pennsylvania, freshwater wetlands are currently regulated at the State and Federal levels of government. At the Federal level, the U.S. Army Corps of Engineers (COE), in accordance with Section 404 of the Clean Water Act, regulates the filling of "Waters of the United States"; this includes streams, lakes, impoundments, intermittent drainage ways, and associated wetlands. At the State level, wetlands, bodies of water (*a natural or artificial lake, pond, reservoir, swamp, marsh or wetland*) and watercourses (*a channel or conveyance of surface water having defined bed and banks, whether natural of artificial, with perennial or intermittent flow*) are regulated by the in accordance with Chapter 105 of the Dam Safety and Waterway Management Act. Both regulatory agencies define wetlands as:

> *"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

The majority of wetlands in the Tohickon Creek watershed occur along the Tohickon Creek from the Lake Nockamixon dam to the confluence of Deep Run. Map 12 illustrates the wetlands mapped by the National Wetlands Inventory (NWI), and indicates that there are approximately 468 acres of wetlands within the Tohickon Creek watershed. Most of these are small man made ponds, and are defined as impounded, palustrine open water. Also occurring throughout the basin are temporary or seasonal flooded palustrine emergent and scrub-shrub wetlands. Emergent wetlands in the watershed are dominated by herbaceous vegetation such as rushes, sedges, cattails, and forbs. Scrub-shrub wetlands are dominated by shrubs and small trees with a canopy height of less than 20 feet. Palustrine broad-leaved deciduous forested wetlands are also present. Forested wetlands are characterized by woody vegetation more than 20 feet high. Temporarily flooded areas or vernal pools within forested wetlands are crucial habitat for several important amphibian species. Riverine open water areas are designated along Deep Run, Cabin Run, Geddes Run, and the Tohickon Creek mainstem. One intermittently flooded beach/bar riverine wetland is present on the Tohickon Creek



SOURCE NOTES:
WATERSHED BOUNDARIES ARE DELINEATED BY CROSS REFERNCING A TOPOGRPAHIC INTERPOLATION WITH THE HUC 14 (PADEP) COVERAGE. PADOT ROADS WERE USED AND MODIFIED TO MATCH THE TAX PARCEL DATA. TAX PARCEL DATA WAS COLLECTED FROM EACH TOWNSHIP AND COMPILED INTO A COMMON PROJECTION. MUNICIPAL BOUNDARIES ARE DERIVED FROM THE PADOT (DEP) BOUNDARIES. WETLAND AREAS ARE EXTRACTED FROM THE NWI NATIONAL DATA SET.

PERCENTAGE OF NATIONAL WETLANDS INVENTORY (NWI) AREAS IN THE TOHICKON CREEK WATERSHED

KEY	DESCRIPTION	ACREAGE	PERCENT
	NATIONAL WETLAND INVENTORY AREAS	468.31	1.94

NOTES: 1. DATA ACCURACIES ARE LIMITED TO THE ACCURACY AND SCALE OF THE ORIGINAL DATA SOURCES.
2. THESE MAPS ARE PART OF A WATERSHED PLAN AND SHOULD BE USED IN CONJUNCTION WITH THE COMPILED TEXT.
3. DIGITAL MAPS ARE PERIODICALLY UPDATED AND THE USER IS RESPONSIBLE FOR VERIFYING AND OBTAINING THE LATEST VERSION OF THE DATA.

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REVISIONS

MAP NO.: 12

WETLAND RESOURCES

TOHICKON CREEK WATERSHED PLAN

2000 0 2000 4000 6000 Feet
SCALE: 1: 55,000; ~= 4500'
MAP PROJECTION: ALBERS-CONIC EQUAL AREA, METERS

DRAWN BY:	KJM
CHECKED BY:	MC GG JD
REVISION NO.:	002.03
REVISION DATE:	JUNE 15, 2002

PROJECT NUMBER: 229.01

pH
1105 OLD YORK ROAD
SUITE A-1 2ND FLOOR
RIDGERS, NJ 08561
INFO@PENNCRYSTAL.COM

mainstream downstream of Ralph Stover State Park. Local studies indicate that additional wetlands not indicated on NWI maps exist in the watershed. The Townships of Tinicum and Nockamixon are currently performing a study to map existing wetland resources.

Although the COE and the PADEP regulate activities in wetlands and watercourses the Townships of the Lower Tohickon Watershed have enacted additional protective measures, recognizing the value of wetlands and their incompatibility with development. All Townships prohibit development in wetlands and Tinicum Township requires a buffer of 50 feet from the wetland boundary. The Township is considering adding specific vernal pool regulations to its wetland protection legislature. Vernal pools are vital to the life cycles of many woodland amphibians, including several rare or endangered salamander species. Hydric soils may also support special plant communities and animal habitats.

The inclusion of the Tohickon Creek into the United States Wild and Scenic Rivers Program provides an additional layer of protection regarding regulated activities in wetlands. Due to this designation any proposed regulated activity will require the approval of the Department of the Interior in order to insure that the activity is consistent with the goals of the Wild and Scenic Rivers Act.

4.5 Lakes and Ponds in the Tohickon Creek Watershed

As with most rural areas of Pennsylvania, lakes and ponds are common components of the landscape. In the Tohickon Creek watershed most of the ponds are relatively small man-made impoundments of streams or excavations in areas of shallow groundwater. Historically, man-made ponds have been used by farmers for irrigation or to provide drinking water for livestock.

Lakes and ponds increase the biodiversity of a watershed by providing habitat for a variety of aquatic organisms including amphibians, fish, aquatic mammals, and birds such as waterfowl and wading birds. Upstream pollutants may cause lakes and ponds to suffer accelerated eutrophication siltation and chemical contamination if they are not properly managed (Lubnow, 2001).

Figure 4.7
Tohickon Creek Watershed Conservation Plan
Farm Pond

Source: Mark Gallagher, pH photos

Although not located in the study area, Lake Nockamixon was created by damming Tohickon Creek in 1973. The 120 foot high dam created a 6.4 mile long lake with 24 miles of shoreline and 1,450 acres of water. The deepest part of the lake, located behind the dam, is about 90 feet. Creation of the lake flooded homes, businesses, and farmland, but it has provided boating, fishing and other seasonal recreation since 1977. Concerns regarding water quality triggered an EPA funded, Phase I diagnostic feasibility study. The study evaluated the pollutant loads from agricultural land, developed land, and a wastewater treatment plant. Automated water samplers were established at three stations, and the water quality and flow data collected were used to prepare a pollutant budget for the lake.

The study indicated that the Quakertown wastewater treatment plant contributed 60% of the phosphorus to Lake Nockamixon. Based on study results, the treatment plant was upgraded to tertiary treatment, resulting in a significant reduction in the amount of phosphorus discharged to the lake. EPA also funded implementation of numerous agricultural best management practices (BMPs) throughout the watershed, including provisions for animal waste facilities, pasture management, grass waterway installation, and cropland management.

Activities in ponds and lakes such as dredging are also regulated by the COE, the PADEP and the townships in the watershed.

Figure 4.8
Tohickon Creek Watershed
Conservation Plan
Bedminster Farm Pond

Source: Volunteer Photos, 2001

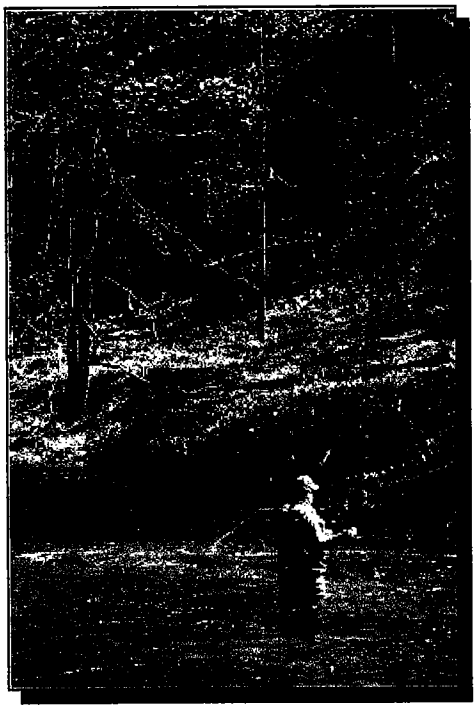


Figure 4.9
Tohickon Creek Watershed Conservation Plan
Fisher on Tohickon Creek

Source: Marion Kyde, Volunteer Photos, 2002

SECTION 5:

BIOLOGICAL RESOURCES

Wild Columbine
Found in the Tohickon Creek Watershed

Section 5: Biological Resources

5.1 The Landscape of the Tohickon Creek Watershed

The landscape of the Tohickon Creek watershed is a complex mosaic consisting predominantly of forest and agricultural land. The landscape composition and pattern of the watershed reflects land use history and environmental elements such as the underlying geology and slope. The development of future planning initiatives that focus on water quality as well as habitat preservation issues, especially those involving the protection of rare species, will require an understanding of this landscape pattern. The Tinicum Township Open Space plan and the study prepared by the Morris Arboretum entitled *Delineation and Management Recommendations for the Vegetation Communities of Tinicum Township* (Sullivan et al, 2000) are excellent examples of how the principals of landscape ecology can be adapted to better manage local and watershed resources. The principals of landscape ecology stressed in the open space plan include the size, shape, and connectivity of natural areas necessary to maximize biodiversity. The goals of this type of watershed based approach are clearly stated in the Bedminster Township Comprehensive Plan, which states *Protect the people's constitutional right to clean air, pure water, and other natural, scenic, and aesthetic natural resources and features which (sic) create the character and environment of the Township.*

Although not a detailed vegetation study, the land cover map provided in Section 1 provides a general understanding regarding the type and distribution of plant communities present in the watershed. 49% of the watershed's land cover is forested. The composition of these forested communities varies depending on age, soil moisture, amount of sunlight, and other factors. The highest percent of forest cover, 63%, occurs along the mainstem of the Tohickon Creek. This high percentage is due to the steep slopes and floodplains that limit agricultural and other development. According to Sullivan, et al, 2000, the majority of mature forests in Tinicum Township occur on steep slopes and floodplains. The extensive nature of the forest bordering the easternmost segment of the Tohickon Creek can be readily observed from High Rocks (Figure 5.1). This relatively large viewshed is unobstructed by any man-made structures.

Figure 5.1
Tohickon Creek Watershed Plan
High Rocks

Source:Mark Gallagher, pH photos

Agricultural land consisting of both row crops and pasture/hay fields makes up almost 48% of the watershed. Many of the areas identified as pasture are meadows that are subject to only periodic maintenance. The subwaters with the greatest percentage of agricultural land cover is Deer Run Creek, with approximately 62.6% in agricultural cover as contrasted with 30% of the main stem of the Tohickon. Agricultural land, especially row crops, are found mainly in the upper reaches of the tributaries, where the topography is more gently sloping. However, even in areas where agriculture is relatively extensive, there are still significant patches of forest and hedgerow networks that serve to connect these forest patches.

One of the best ways to maintain biodiversity in a watershed is to conserve large woodlots that possess distinct forest interiors and to maximize connections between these forest patches through hedgerows and riparian corridors. Fragmentation and isolation of forest habitat is known to cause the decline of many forest-dwelling neotropical migrant birds and to allow proliferation of invasive alien plant species at the expense of native plants. As larger forests are fragmented, the proportion of edge to interior increases, which encourages generalist edge dwelling species and results in a loss of area sensitive forest interior species of both plants and animals. Loss of forest interior habitat also increases nest parasitism, which leads to greater decline in forest bird populations.

The preservation of riparian corridors is also important to the maintenance of stream water quality. Vegetated riparian areas not only provide habitat and serve to reduce stream water temperatures, but serve as buffers that trap sediment in stormwater runoff and maintain the integrity of stream banks. In agricultural areas such as Upper Bucks County, the use of farm Best Management Practices (BMPs) that establish stream buffers and fence streams against grazing and pollution from farm animals can improve both stream water quality and wildlife habitat.

Although Bucks County is undergoing substantial growth, the Tohickon Creek watershed is distinctive in that it remains relatively undeveloped. Including both high and low density development land cover, only 1.6% of the watershed is developed. These development areas lie mainly along Route 611. Although future land development in the watershed is inevitable, sustainable growth that is sensitive to water quality and wildlife can be attained with proactive watershed based planning. The preservation and enhancement of other landscape features, such as riparian corridors, mature forests, linkage corridors, and rare plant comminutes, can be achieved through implementation of watershed-based planning and preservation initiatives. Early identification of these resources is vital to their protection. The Townships in this watershed have already initiated many resource based planning tools to maintain the character of their communities (See Sections 5.6 and 1.5).

5.2 Flora and Fauna

5.2.1 Flora of the Tohickon Creek Watershed

Sullivan et al (2000) identified 21 distinct plant communities in Tinicum Township, 15 of which were forested. Although this study was limited to Tinicum Township, extensive field assessments in the watershed indicate that these vegetation communities also occur throughout the watershed.

Land use history has influenced the composition and location of present day plant communities. Areas that were too difficult to cultivate, such as steep slopes and floodplains were abandoned first causing the majority of mature forests to be found in these areas. The dominant mature trees in the Tohickon Creek watershed are oak, beech, sugar maple, hemlock, and white pine. The understory in some of the area's woodlands has been impoverished as a result of overgrazing by white tail deer. In these areas most of the visible undergrowth is comprised of invasive and more resilient species such as non-native raspberries and honeysuckle, though native spice bush remains common.

Much of what was historically in agricultural use, is often covered today by successional forests that have developed in the last 20 to 50 years. Succession begins with a variety of annual and perennial weeds, wild flowers and grasses after fields are abandoned . Eastern red cedar, black cherry, ash, and other pioneer tree species dominate these fields for 5 to 30 years or more, but these young woodlands nourish the growth of the eventual hardwoods which constitute mature forests. Successional forests of varying ages are common in the Tohickon watershed and account for most of the land characterized as "vacant" on land use maps (Map 3).

Agriculture remains a common land use throughout the watershed. Corn and wheat are the most common row crops, although pasture and hay fields are increasingly common. Recently-abandoned agricultural land may be included as agricultural land. Early successional communities, such as meadows or grasslands, occur throughout the watershed and provide important habitat for a variety of grassland birds.

Most of the upland deciduous forest in the watershed is the red oak-mixed hardwood type. Tuliptree-beech-maple forest is the most common forest type on diabase, but can be found interspersed with red oak-mixed hardwood on drier sites. Bottomland oak-hardwood palustrine forest, including pin oak, swamp white oak, elm, and shagbark hickory are characteristic in poor drainage areas. Hemlock is the tree typically found on the north and west-facing slopes along creeks. According to the Bucks County Natural Areas Inventory, a large population of Canadian yew, a species that has become rare due to deer browse, exists in Bedminster Township along the stream near Route 611. South-facing slopes, with greater light exposure and therefore drier conditions, hold mainly deciduous trees. Due to deer browsing and selectivity, sugar maple is the dominant species in the sapling layer, regardless of the types of trees in the canopy. The herbaceous layer of the forests is species rich. In spring the woods are covered with trout lily, bloodroot, mayapple, spring beauty, violets, Virginia bluebell, hepatica, red trillium, and Dutchmans' breeches. In late summer and fall, wood aster and wood goldenrod are common. Ferns such as ebony spleenwort, lady fern, Christmas fern, and rattlesnake fern fill the forest floor from early spring to hard frost, or, in the case of the evergreen species, year long.

Hedgerows between properties or fields are common features of agricultural landscapes. In the Tohickon watershed, these narrow corridors create the network that facilitates the movement of wildlife between woodlots and riparian corridors. The importance of the role of hedgerows in the landscape is acknowledged by Tinicum Towship as a specific overlay district developed *to protect and preserve the ecological health of the Township.*

5.2.2 Fauna of the Tohickon Creek Watershed

The complex mosaic of landscape elements that comprises the Tohickon Creek Watershed provides the habitat diversity to support a species-rich wildlife community. There are hundreds of species of mammals, birds, reptiles, amphibians and invertebrates inhabiting the various communities in the watershed (Brandywine Conservancy & Tinicum Open Space Commission, 2000). Many of these species are considered significant, rare and/or endangered. To maintain the biodiversity of the watershed careful planning will be needed to preserve or enhance existing forests, forested corridors grasslands, wetlands and hedgerows. The loss or disturbance of these habitats will decrease wildlife diversity and facilitate the colonization and spread of invasive species.

Half of the watershed and 65% of the Tohickon mainstem are forested. The forest canopy provides habitat for a variety of fauna including insects, migratory songbirds and mammals. Woodpeckers, owls and some small mammals make their homes in standing dead trees and tree cavities. The understory and shrub layers of mature forests provide nesting habitat for bird species such as the wood thrush. Fruit producing understory and shrub layer species also provide valuable food sources for wildlife. The herbaceous layer provides habitat for wood frogs, spotted salamanders, ground-nesting birds such as the ovenbird, and other species.

Mammals are found throughout the watershed. Forty-five species have been documented. The area supports gray fox, red fox, beaver, red squirrel, ermine, mink and in the past, bobcat. These mammals benefit from the numerous large and small patches of forest and their interconnection through corridors.

Due to the diversity of habitats in the watershed, the area supports 82 species of birds, of which 10 are rare breeders (Rhoads & Block, 1999). The stream corridor provides important habitat for many species of special concern including the yellow-throated Vireo, cerulean warbler, yellow-throated warbler, hooded warbler, Kentucky warbler, worm-eating warbler, northern parula, black-and-white warbler, ovenbird, and scarlet tanager. The meadows of the watershed support a variety of grassland birds including the Eastern meadowlark, northern Harrier, grasshopper sparrow, bobolink, bobwhite, and woodcock. Bucks County designates grasshopper sparrow as threatened, and bobolink (which were sighted in June, 2002) and Eastern meadowlark as species of special concern. The rarity of these species is related to the paucity of these temporal habitats in Southeastern Pennsylvania. Forest birds requiring large forest tracts include the pileated woodpecker, red shouldered hawk, and cooper's hawk, all present in the watershed. The cerulean warbler and red shouldered hawk were identified by the US Fish and Wilidlfe Sevice (1992) as migratory nongame species that warrant special habitat management consideration. Many of the species mentioned require specialized habitat including large, healthy mature woodlands, stream corridors, or

grasslands. Due to the existing richness of the avian community, one of the recommendations of this plan is to have the area designated as an Important Bird Area (IBA) under the program administered by National Audubon Society and Cornell University.

At least 30 species of salamanders, frogs, turtles, and snakes are found in the Tohickon Creek Watershed. Connections and corridors are especially important for these animals because of the different habitats they require throughout their lifecycles. Many breed in wooded wetlands or streams and move to wooded uplands later in the year. Some require vernal pools such as spotted salamander and wood frog. Wood turtle, eastern box turtle and snapping turtle are present, as are copperhead, eastern ring snake, water snake, milk snake, and garter snake.

There are at least 24 species of fish in the Tohickon Creek (EV Petition, 1995). This relatively high diversity is a good indicator of stream quality and health. Creek chub, white sucker, blacknose dace, longnose dace, and fallfish can all be found in the creek and some are dependent on the cool waters of a cold water fishery.

5.3 Endangered and Threatened Species

The Pennsylvania Natural Diversity Inventory (PNDI) is a partnership between the Western Pennsylvania Conservancy, the Pennsylvania Bureau of Forestry, and The Nature Conservancy. Its goal is to build, maintain, and provide accurate and accessible ecological information needed for conservation, development planning, and natural resource management. The collected data identify and describe the Commonwealth's rarest and most significant ecological features including plant and animal species of special concern, rare and exemplary natural communities, and outstanding geologic features. Site-specific information describing these features is stored in an integrated data management system consisting of map, manual, and computer files, and regularly updated (Harris 2002).

As of September 2001 the following species of special concern were listed for the Tohickon Creek Watershed:

Table 5.1
Tohickon Creek Watershed Plan
PNDI Species and Ecological Communities of Special Concern

Common Name	Scientific Name	PA Status (if applicable)
Allegheny woodrat	Neotoma magister	PT*
Appalachian jewelwing	Calopteryx angustipennis	
Black-banded bandwing	Calopteryx aequabilis	
Northeastern bullrush	Scirpus ancistrochaetus	PE*
Tiger beetle	Cicindela ancocisconensis	
Coal skink	Eumeces anthracinus	
Ski-tailed emerald	Somatochlora elongata	
Brown sedge	Carex buxbaumii	TU*
Abbreviated clubtail dragonfly	Gomphus abbreviatus	
Timber rattlesnake	Crotalus horridus	PC*

Source: Pennsylvania Natural Diversity Inventory, 2001 (*See below for abbreviation definitions)

The following information describes the abbreviations in Table 5.1:
PT: Pennsylvania Threatened- Species which may become endangered
PE: Pennsylvania Endangered- Species in danger of extinction
TU: Tentatively Undetermined- Species believed to be in population decline but that cannot be included in another classification due to insufficient data or limited evidence
PC: Animals that could become endangered or threatened in the future. Uncommon, have restricted distribution or are at risk

(Appendix B contains a copy of the letter requesting these data).

The PNDI inventory is a dynamic list that changes based on documented records of organisms. There may however be a lag time between discovery of a species and its listing. Dr. Ann Rhoads and Timothy Block conducted a Bucks County Natural Areas Inventory in 1999 and found several additional, biologically important species such as yellow lamp mussel, nodding trillium, eastern floater, riverweed, and a freshwater sponge. Section 5.4 details these findings.

5.4 Bucks County Natural Areas Inventory

The biological significance of the Tohickon Creek has been noted in many Bucks County planning documents, including a notable reference to the Tohickon Creek Watershed made in the Bucks County Natural Areas Inventory (Rhoads & Block, 1999). This inventory was produced by examining historical data, then surveying 240 individual sites for unusual plants, animals, natural communities, and geological and hydrological features. Following evaluation based on ecological criteria, 115 sites at 4 levels of importance were designated. The Tohickon Creek Watershed was designated as one of only nineteen Priority 1 sites in the County. Priority 1 sites are defined as having state-wide or county-wide significance due to the unique or exceptionally high quality of their natural features.

The following is a list of notable features cited in the Natural Areas Inventory of Bucks County (Rhoads & Block, 1999).

- Extensive forested valley
- High Rocks, 200 foot high cliffs
- Dry oak heath forest
- Red oak-mixed hardwood forest
- Sugar maple-basswood forest
- Virginia pine-mixed hardwood shale woodland
- Calcereous opening/cliff community
- Floodplain forest
- High gradient rocky creek bed
- Eastern prickly pear cactus
- Nodding trillium
- Eastern floater
- Yellow lamp mussel
- Birds, 82 species and 10 rare breeders

The creek itself contains populations of rare species which (sic) are indicators of high water quality including Riverweed, a higher plant which encrusts the rocks in fast-moving water. A freshwater sponge is also found in the creek as are several species of freshwater mussels. Mussels are particularly abundant in the section of the creek between Route 611 and Route 113, at the mouth of Cabin Run, and at the mouth of the Tohickon Creek in Point Pleasant. Four different species were found in 1998 surveys. (Rhoads & Block, 1999).

5.5 Federal Wild And Scenic Rivers Designation

According to the National Park Service website, several criteria determine a river's suitability for wild and scenic designation: its free flowing quality, the presence of outstanding remarkable resources, and whether or not designation makes sense and will provide lasting protection. Designation is determined by Congress and the Secretary of the Interior.

Portions of the Lower Delaware River and three major tributaries were designated Wild and Scenic on November 1, 2000. The outstanding resources of the Tohickon Creek, from the Lake Nockamixon Dam to the Delaware River, were responsible for its inclusion in the Federal system and an additional level of protection for those natural and cultural resources is afforded due to this designation.

5.6 Township Protection of Biological Resources

All of the Townships in the Tohickon Creek Watershed realize the importance of the area's Biological Resources. In the Bedminster Township Zoning Ordinance, wetland margins, woodlands, and riparian buffers are protected from land disturbance (see Section 1.5 for greater detail). The Plumstead Township Zoning Ordinance highlights forests and tree protection zones, and provides buffer yard requirements (Section 1.5). In the Tinicum Township Zoning Ordinance, riparian buffers, woodland and hedgerow, and critical biodiversity areas are protected (Section 1.5).

The biological significance of this area has also been noted in the comprehensive plans for each municipality. The Natural Features Map in the Plumstead Township Comprehensive Plan defines much of the area within the watershed as Resource Protection District (RP). In the Bedminster Township Comprehensive Plan, the scenic qualities, outstanding natural resources and high aesthetic value of the Tohickon Creek are noted in many areas: the confluence of Deep Run with the Tohickon Creek, the area below the Lake Nockamixon dam and the area of Stover Mill Park. Special zoning is designed to protect these qualities. In the section on "Resources Worth Protecting" in the Tinicum Township Comprehensive plan, the Tohickon Creek is named as a vital resource that defines boundaries and contributes to its sense of identity. The Tinicum Open Space Plan specifically names the Tohickon Creek Watershed as targeted for preservation, and Tinicum is noted for the quality of its resource protection ordinances.

Figure 5.2

Tohickon Creek Watershed Plan

Tohickon Creek from High Rocks

Source: Jim Forbes, Personal Photo, 2001

SECTION 6:
HISTORIC, CULTURAL, SCENIC AND RECREATIONAL RESOURCES

Stover-Myers Mill
Dark Hollow Rd.

Section 6: Historic, Cultural, Scenic and Recreational Resources

6.1 Introduction

The Delaware River Valley, which includes the Tohickon Watershed, has a rich and diverse history. The following is an excerpt from the Lower Delaware River Management Plan (NPS, 1997).

> *The Lower Delaware River Flows through the very heart of the birthplace of our great nation. Every bend in the river speaks to us of history, of beauty, of opportunity - of life itself. Its fresh, free-flowing water nourishes human inhabitants as it has for over twelve thousand years. Along its path evolved the greatest economy in the world.*

The following section of the Tohickon Creek Watershed Plan provides an overview of the historic, cultural, scenic and recreational amenities found in the in the study area.

6.2 Historic Overview

The Delaware River, given the name *Wihitttuck* or *beautiful river* by the Lenni Lenape tribe, was inhabited as long ago as 3000 BC, possibly even 12000 BC. According to Bucks County Historical sources (McNealy, 2001), the Lenni Lenape Indians were living in the Delaware Valley long before the arrival of the first European settlers. The creeks and rivers in the region were quite important to the Lenni Lenapi, as groups hunted, fished, traveled and traded along the Delaware River and its tributaries. The Tohickon Creek was named by the Lenape, however it is not clear whether the word *Tohickon* can be translated as *the stream over which we pass by means of a bridge of driftwood or deer-bone creek* (McNealy, 2001).

Archeological evidence of Native American life is found throughout Bucks County and within the Tohickon Creek watershed. Archeologic studies indicate artifacts from three broad periods of Indian prehistory: Paleo- Indian (12,000 years ago to 8000 BC), Archaic (8000 BC to 1000 BC), and Woodland (1000 BC to 1500 AD). Artifacts found include Lenape stone arrowheads, projectile points, and pottery fragments. Artifact finds provide archeologists with clues about life before European inhabitation. One site in the watershed, an argillite quarry located near the confluence of the Tohickon Creek and Delaware River, was studied in the late 1800's by Henry Mercer. This local archeologist, and others studying the site in the 1980's, discovered extensive evidence of argillite tool production from 4, 000 years ago (McNealy, 2001).

Archeological evidence indicate that the Lenape lived in small, communal bands that traveled through the region on a well-developed system of trails and paths. Seasonal travel was common and based upon fall hunting, spring fishing, and spring/summer farming. An example of a seasonal, temporary shelter in the Tohickon Creek Watershed is the Rock shelter or *Indian House* site (Figure 6.1). Rock shelter is located five miles above the confluence of the Delaware River and the Tohickon Creek. A pioneer archeologic survey was completed by Henry Mercer, a local archeologist, in the late 1800s. Animal bones, arrowheads and Indian pottery were unearthed and indicate the site was probably used as temporary shelter during the fall hunting season.

Also located within the study area are a Native-American burial ground and Mound, and a Warrior Wall, a sacred site which the Lenape believe is guarded by the spirits of Native-American Warrior braves. This site was sacred to Woodland cultures and remains so to their descendents.

Figure 6.1
Tohickon Creek Watershed Conservation Plan
Rock shelter

Source: Eric and Colette Greb personal photos

The first European settlers arrived in the area in the early 17th century. Nockamixon was organized by 1724, Plumstead in 1725, Tinicum in 1738, and Bedminster in 1742. Native Americans did not leave the region until approximately 1730, and many resettled in the Ohio Valley at the time of the Walking Purchase. An account of the walking purchase is described in the book entitled: Bucks County: An Illustrated History (McNealy, 2001).

Early settlers were mainly English and German. They transformed the area from wilderness to fertile farmland. Names common in present-day Tinicum, Bridgeton, and Nockamixon Townships include Steeper, Erwin, Heaney, Hoenig, Kolb, and Fretz. These early settlers provided place names for many geographic and man-made features, eg. Heaney's Run, Fretz Valley Rd., Erwinna.

The first industry was the manufacturing of pottery as red clay was readily available. Local specialties included red tulipware from the Kinter, Herstine, Harin, and Singer pottery kilns as well as baskets. Charcoal was also produced in the area and sold for cooking fuel. The historic components in the Comprehensive Plans of all three municipalities boast thousands of buildings, and hundreds of sites with historic and cultural merit. Many of the villages and historic structures still exist and are in good condition in this relatively undisturbed watershed.

6.3 Historic Villages and Structures

In Tinicum Township, the historic landscape is typified by villages and hamlets. Two of these villages, Ottsville and Pt. Pleasant, date from the 18th century. Ottsville, originally Red Hill, is one of the oldest villages in Bucks county, and Point Pleasant, was listed in the National Register of Historic Places in September 1989. The village had local significance as an 18th and 19th century commercial and transportation center and a fishing and summer resort area in the late 19th and early 20th century. The Point Pleasant Historic District has had few intrusions to affect the placement, scale, and relationship of buildings and structures from its period of significance. The village represents two important early settlements located on opposite sides of Tohickon Creek. South of Tohickon Creek, a ferry crossing the Delaware was established in 1739. This was the second oldest ferry on the Delaware, north of New Hope. It operated until the Lumberville Bridge was opened in 1835. The Point Pleasant ferry crossing was at an eddy in the river that became known as Black's Eddy. By the late 18th/early 19th century a fishery was developed and a tavern was built near the ferry crossing. The area later became know as Lower Black's Eddy, so that it could be differentiated from Upper Black's Eddy which was approximately 10mi north in Bridgeton Township.

Plumstead Township, organized in 1725, was named after Francis Plumstead, one of the first people to own land in the township. He received a grant of two thousand five hundred acres from William Penn on October 25, 1683.

Bedminster was organized in 1742 and named after the town of Bedminster near Bristol, England. The first settlers were Irish, from the counties of Donelgal and Antrim. Before the close of the 18th century many of the descendants of the Irish families migrated to Carolina, and Mennonites followed the Irish into Bedminster. Villages in Bedminster have examples of buildings

from the 1700's to the 1940's, creating an architectural museum of examples from our earliest history to the present. Pipersville, in Tinicum Township, also contains an historical architectural melange.

Local citizens and officials feel the "original settlement pattern of this watershed remains remarkably intact".

In August 2001 a request for data was made to The Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, National Register of Listed and Eligible Properties in Pennsylvania (Appendix B). The response list includes many historic properties and districts in the Tohickon Creek Watershed (Appendix B).

Figure 6.2
Tohickon Creek Watershed ConservationPlan
Bucks County Stone Farmhouse, Bedminster

Source: Volunteer pH Photos

Properties that are eligible are those that meet the National Criteria. How quickly they are listed depends on the quality of the submission. Listed properties are those that have been accepted, after board meetings, by the Pennsylvania Historical and Museum Commission and the National Park Service. A property or district will remain listed unless it is altered to the extent that it loses its eligibility, or is demolished.

The Loux Covered Bridge is built of hemlock and nestled in a scenic valley. It is one of two bridges to span the Cabin Run Creek. The bridge, built in 1874 at the insistence of local residents due to the danger of crossing the creek, is 60 ft long by 15 ft wide. The stone marker on this bridge indicates that it is the "Cabin Run Bridge", although the real Cabin Run Bridge is located downstream.

Figure 6.3
Tohickon Creek Watershed Conservation Plan
Loux Covered Bridge

Source: Mark Gallagher, pH photos

Cabin Run Bridge is 82 ft long and 15 ft wide. It was built in 1871 by David Sutton. It is a typical Bucks County covered bridge in an isolated, wooded and picturesque location. The red-and-white portals are a little more ornate than most.

Stover-Myers Mill (photo on Section 6 Cover page), a water-powered grain mill, was built in the 1800's. The combination gristmill and sawmill operated well into the 20th century. Much of the original machinery is intact. Eventual reactivation of both the gristmill and "up and down" sawmill is planned as restoration proceeds. The Mill, open for tours on summer weekends, is located on Dark Hollow Road.

6.4 Scenic Natural Resources

The Delaware River Valley, including the Tohickon Creek Watershed area still contains some of the most beautiful landscapes and farmland in the Eastern United States. It is due to the aesthetic, historic, recreational and scenic elements of the Delaware River and several of its tributaries, that the river was included in the National Wild and Scenic River Designation for the Lower Delaware River. The study includes a listing of the unique vegetation, wildlife, and geologic features.

Scenic vistas, forested areas, water bodies, and other natural features add to the character of any community. These cannot be replaced so they must be protected. High Rocks State Park in Tinicum Township is one of the most scenic places in the watershed. From its steep cliffs and rocky

bluffs, hikers, kayakers, climbers, and recreational enthusiasts from all over are treated to a breathtaking overlook and wonderful views. Deep Run Valley joins Tohickon Creek in another scenic area with steep slopes. The areas below the Nockamixon dam and at the Stover Mill Park are also designated as especially scenic by their respective municipalities. According to the Bedminster Township Comprehensive Plan, the portion of the creek located in Bedminster Township is designated as scenic for almost its entire length, based on its outstanding natural features and aesthetic qualities.

6.5 Recreational Resources

Scenic areas can often be used as recreation resources. Nature trails and park facilities are common resources found in the Tohickon Creek Watershed.

The Ralph Stover State Park was donated to the Commonwealth in 1931 in honor of Ralph Stover, a mill owner and local politician of the nineteenth century. The property is located two miles north of Point Pleasant on State Park Road and Stump Road, in Plumstead Township. Located in a steep gorge, it is among the most dramatic sites in the county. The mill burned in 1880 but the miller's house and the mill race remain. This mill race diverted the water from above the dam in order to power the mill. Recreational facilities at Ralph Stover Park were first opened in 1935. The creation of this park encouraged the preservation of adjacent areas as well (Bucks County Planning Commission, 2001).

High Rocks State Park, donated by noted author James A. Michener, and known for its spectacular views and geological features, is used extensively as a rock climbing site. It is located in Tinicum Township at Stover Park and Tory Roads. The 612 acre Tohickon Valley Park, owned by Bucks County, is located at Cafferty Road in Point Pleasant, and is open all year. Amenities include hiking, camping, swimming, playgrounds and picnic areas. Camp Ockanickon Boy Scout Camp is located along the Tohickon creek in Plumstead Township on State Park Road. Recently the Boy Scout Council donated a conservation easement on a large segment of the Camp to preserve the resources there for the future.

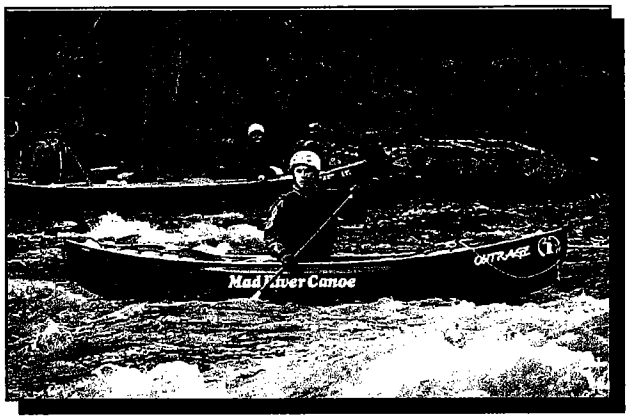
One of the most popular recreational activities on the Tohickon Creek is whitewater boating by canoe and kayak. Due to the natural flashy nature of the Tohickon and to biannual releases from Lake Nockamixon, boaters are able to enjoy class 3 and 4 whitewater opportunities several times a year. At the Pipersville gauge, 200 cfs is about minimum flow. During a normal dam release, the flow is around 700cfs. During the March 1998 release, the stream was flowing at about 150 cfs the day before the release (March 27). On March 28 and 29, it was up to almost 800 cfs (Graham, 2001). Ordinary storm events also provide sufficient flow for recreational whitewater boating, often more cubic feet per second than the scheduled releases.

There are mixed opinions about the releases, as was discussed earlier (Section 4.3.2). Those who support the releases feel they provide a very rare opportunity for whitewater canoeists, kayakers, and rafters to experience technical whitewater with Class 3 and 4 rapids, a lot of surfing waves, holes and ledges. During release weekends and storm events, the stream is very popular with boaters. The spring releases for example may draw 3,000 whitewater enthusiasts daily. Most people launch their crafts at Ralph Stover State Park, near Pipersville, Bucks County and travel about 4 miles along the Tohickon Creek to its junction with the Delaware River (Graham, 2001).

Although white water rafting is an uncommon recreational opportunity, some people argue that the limited availability of this recreation on this stream, as well as the occasional negative impact it has on the ecosystem, precludes its consideration as a feature of recreational significance. Another objection to the highly publicized releases is the disregard of private property by nonlocal boaters. Ordinary high waters are generally used by local people who are more aware of and more sensitive to the land in private ownership.

The lightly traveled country roads of the area offer cyclists a choice of steep and challenging or flat and scenic rides. Bicycle clubs organize rides throughout the watershed and the Annual "Tour de Tinicum" is sponsored by Tinicum Township's Parks and Recreation Committee. Road rallies are also common along the scenic roads of the watershed.

Figure 6.4
Tohickon Creek Watershed Conservation Plan
Release Day

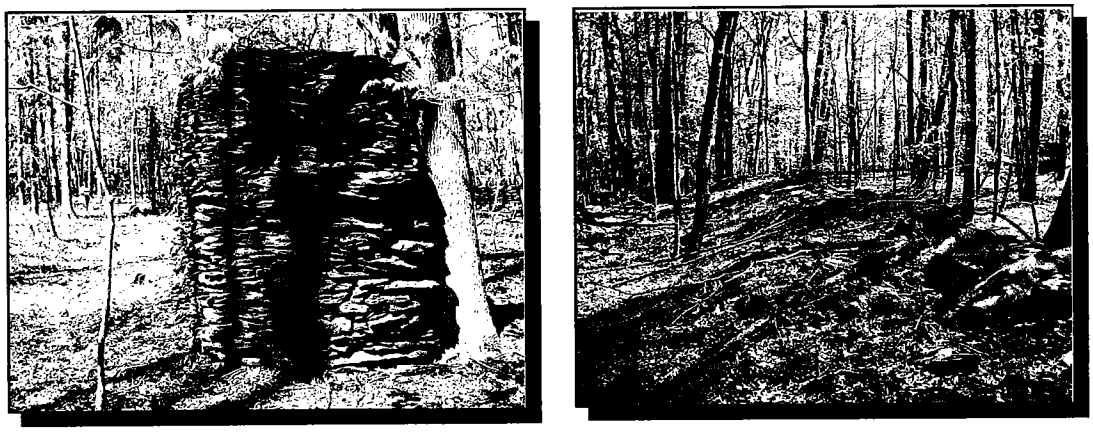


Source: Jim Forbes, personal photos

Open Space is defined as areas with resource restrictions, land used for agriculture, and land used for recreation. The Bucks County Open Space Task Force preserves farmland and provides for park and recreation areas. In Plumstead Township, the environmental protection standards require the preservation of lands with natural resources as open space. Land is proposed to be set aside as open space and is to be maintained as lawn area, active recreation area, passive recreation area, natural area, and agricultural areas. The purpose is to protect property values, preserve aspects of the natural landscape for future generations, enhance the community, protect public health, and provide land for recreation. Small recreational parks are scattered throughout Plumstead; some of these are in the watershed.

Ralph Stover State Park provides 45 acres of open space and Tohickon Valley Park, 612 acres. Voluntary conservation easements to local and regional land trusts protect still more and the land development provisions of the three municipalities are designed to protect the open space resource values of the watershed (see Section 1.5 for greater detail on municipal efforts to protect open space).

Figure 6.5
Tohickon Creek Watershed Plan
Lenape Rock Cairn and Warrior Wall



Source: Marion Kyde, Volunteer Photos, 2002

SECTION 7:

WATERSHED ASSESSMENT & CREEK CORRIDOR INVENTORY

A Volunteer at Tohickon Creek, Tohickon Valley County Park

Section 7: Watershed Assessment and Creek Corridor Inventory

7.1 Comprehensive Watershed Background Assessment

The previous six sections of the Tohickon Creek Watershed Plan contain narrative, figures, tables, and geographic information system (GIS) maps that describe, locate, and quantify the historic, cultural, recreational, and natural resource amenities located within the Tohickon Creek Watershed. These data were obtained from previously published information and municipal, county, and state resources, all noted in the bibliography. They constitute the Background Assessment.

In summary, Sections 1-6 include the following information:

- **Location** - The Tohickon Creek Watershed occupies most of Bedminster, about half of Plumstead, and a fifth of Tinicum Township. Very small portions of Nockamixon and Hilltown Townships and Dublin Borough lie at the periphery (Map 1).

- **Tributaries** - There are six secondary waterways that are tributaries to the Tohickon Creek: Deep Run, Cabin Run, Wolf Run, Deer Run, Mink Run, and Geddes Run (All maps).

- **Demographic Data** - In Bedminster, Plumstead, and Tinicum Townships, the population increased by approximately 27%, 22%, and 18% respectively between 1980 and 1990. Much of the increase was within the Tohickon Creek Basin. Employment possibilities include jobs in the manufacturing, tourist-based, retail, and service sector. Many of these job opportunities are located along the Route 611 and Route 32 corridors (Section 1).

- **Topography** - The Tohickon Creek Watershed is made up of steep valleys, high cliffs and extensive forested areas (Map 2).

- **Land Use** - The land use in the watershed is predominantly agricultural and rural residential Approximately 4% of the watershed is publicly owned and the other 96% is owned privately. Of the acres in the corridor (parcels adjacent to the main stem of the Tohickon), approximately 25% is publically owned and 75% is privately owned (Map 3).

- **Land Cover**- Only 1.6% of the entire watershed is actually developed. Most of the watershed (97%) is either in agricultural use or is forested (Map 4).

- **Zoning** - The predominant zoning districts in the Tohickon Creek Watershed are Agricultural Preservation (AP), Rural Residential (RR), Residential Agriculture, and Resource Protection (RP) (Map 5). These districts reflect the largely wooded and rural make up of the watershed.

- **Geology** - The course of the Creek cuts through alternating bands of Triassic shales, sandstones, and argillites of the Brunswick and Lockatong Formations (Map 6).

- **Soil Characteristics** - The soils in the Tohickon Creek Watershed are comprised of loamy and silty material, weathered mainly from shale and sandstone. The major soil association within the watershed is the *Abbottstown-Doylestown-Reaville Association* (Map 7).

- **Special Soils** - Both prime farmland soils and soils of statewide importance are present in the Tohickon Creek Watershed. The most fertile (prime agricultural soils) are located around Mink Run, Deer Run, and Wolf Run in Bedminster Township, and near Cabin Run, which runs through Bedminster and Plumstead Townships (Map 8).

- **Locally Preserved Land** - Several farms within the Tohickon Creek Watershed are preserved through the Bucks County Agricultural Preservation Program. Some other private land preservation programs preserving land in the watershed include the Heritage Conservancy, the Bedminster Land Conservancy, and the Tinicum Conservancy (Map 9).

- **Areas of Concern** - According to Federal and State data, there are no hazardous waste facilities or other critical areas of concern in the Tohickon Creek Watershed (Section 3.6).

- **Watersheds and Subwatersheds** - The Tohickon Creek Watershed area is approximately 24,125 acres. There are six subwatersheds within the Tohickon Creek Watershed including the Tohickon Main Stem, Deep Run, Cabin Run, Geddes Run, Deer Run, Mink Run, and Wolf Run (Map 10).

- **Surface Water Quality** - Studies show the water quality in the Tohickon Creek and its tributaries is generally better than applicable standards (Section 4).

- **Ground Water Quality** - Residents are dependent on private wells for drinking water. Groundwater is not plentiful in this area and recent drought years have exacerbated this situation. Citizens and governing bodies are very concerned about groundwater resource protection (Section 4).

- **Floodplains** - There are approximately 1, 375 acres of one-hundred and five-hundred year floodplains in the Tohickon Creek Watershed (Map 11).

- **Wetlands** - The National Wetland Inventory (NWI) maps indicate approximately 470 acres of wetlands in the watershed. The wetlands are predominantly riparian (Map 12).

- **The Pennsylvania Natural Diversity Inventory (PNDI)** - According to the PNDI, a list of ten (10) species and ecological communities of special concern are located within the Tohickon Creek Watershed (Section 5.3).

- **Significant Habitat & Rare Species** - The Tohickon Creek Watershed is listed as a Priority 1 site in the Bucks County Natural Resource Inventory (Rhoads & Block, 2000) due to populations of rare species, significant natural features, and rare habitats (Section 5.4). According to Audubon records, there are several rare nestors and other avian Species of Special Concern, especially along the mainstem.

- **Historic & Cultural Resources** - Local archeological evidence confirms that the Lenni Lenape Indians were present in the Delaware River Basin as long ago as 12000-3000 BCE. The first European settlers arrived in the early 17th century. The watershed contains some of the oldest villages, hamlets, and structures in Bucks County, many of which are listed on historic registries (Section 6.3).

- **Scenic Resources** - The Delaware River Valley and the Tohickon Creek Watershed contain some of the most beautiful landscapes in the Eastern United States. The creek is part of the Lower Delaware River Wild and Scenic River segment. Sentinel Rock and High Rocks provide breath taking views (Section 6.4).

- **Recreational Resources** - Although there are mixed feelings among local citizens about bi-annual Nockamixon Dam releases, the Class 3 and Class 4 rapids created by the releases are known to whitewater kayakers and canoeists throughout the northeastern United States. Other recreational resources in the watershed include state and local parks containing creek access, fishing, hiking, picnicking, and tremendous scenic beauty (Section 6.5).

7.2 Volunteer-Based Watershed and Corridor Visual Assessment

Perhaps even more important than background information to the production of a conservation management plan, is the visual assessment. This in situ research was completed by the consultant, the Plan Advisory Committee, an organized water-quality monitoring group, citizen volunteers, and students.

The Pennsylvania DCNR program supports a planning philosophy that encourages the development of locally-based watershed plans with locally-determined management strategies to conserve, enhance and restore Pennsylvania's many streams and rivers (DCNR, 2000). The DCNR Public Participation Guide notes that public participation is important, because *it provides the general public and community leaders with an opportunity to support and be involved with the execution of the plan* (DCNR 2000).

Other environmental documents also note the importance of involving local citizens in watershed and river corridor surveys. One such agency resource notes that the first critical step in improving water quality, reducing nonpoint source pollution, and involving citizens in stewardship efforts is for people to become aware of the conditions affecting their local streams and watersheds. (West Virginia DEP, 1995). The Tohickon Creek Plan Advisory Committee (PAC) has been cognizant of this philosophy and has involved local land owners and other stake holders in the preparation of this plan.

One way in which local involvement often creates improved resource stewardship is illustrated by the number of volunteers who were involved in completing a visual assessment of the stream and its watershed. A visual assessment involves walking along the stream, exploring the entire watershed, and noting key features (West Virginia DEP, 1995).

The Tohickon Creek visual watershed assessment was begun by car and completed on foot, while the visual corridor assessment was undertaken by kayak, foot, and even horseback! Volunteers were trained at an initial workshop led by the environmental planning consultant (Princeton Hydro, LLC). Individual assessments were completed in smaller groups throughout the duration of the project. Each volunteer was given an assessment area and provided with a field assessment form (Appendix A). The consultant was present at subsequent field assessments or available by phone or e-mail to answer questions pertaining to the visual assessment.

All field assessment notes, photographs, and maps are contained in a large binder in the Tohickon Creek Watershed Plan project files of the consultant. The figures on the following pages provide an overview of the watershed assessment effort that occurred before the first public meeting

(Figures 7.1- 7.26). Information resulting from a more intensive Tohickon Creek corridor assessment (Table 7.1) follows Figure 7.26. Remaining watershed and secondary tributary assessment information is contained in table format in Appendix C of this plan.

Figure 7.1
Tohickon Creek Watershed Plan
Lenape Historic Site

Source: Marion Kyde, Volunteer Photos, 2002

Figures 7.2 - 7.4
The Tohickon Creek Watershed Assessment
Visual Assessment, Amenity Photographs

Figure 7.2 ~ Ralph Stover State Park Is a natural, historical, and recreational amenity located within The Tohickon Creek watershed. The park is located in Plumstead Township on State Park Road.

Figure 7.3 ~ The confluence of the Geddes Run and the main stem Tohickon Creek is located in Point Pleasant on Tohickon Creek Road. The confluence is an important recreational and aesthetic amenity.

Figure 7.4 ~ Cabin Run Creek and the homes within the subwatershed are visually pleasing. The subwatershed contains historic, cultural, and associated natural amenities. This farmstead and stone dam are located in Plumstead Township.

Source: Princeton Hydro, LLC

Figures 7.5 - 7.7
The Tohickon Creek Watershed Assessment
Visual Assessment, Amenity Photographs

Figure 7.5 ~ The bridge on Farm School Road in Bedminster Township crosses the tributary of Mink Run. This subwatershed contains economic, cultural, historical, and natural amenities, and is largely agricultural in nature.

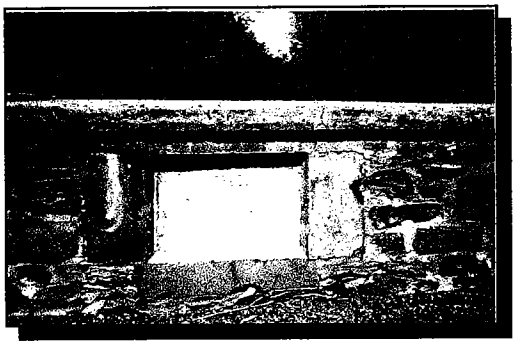


Figure 7.6 ~ The Wismer Road Bridge was constructed in 1885. It is a historic and aesthetic amenity located on Wismer Road in Plumstead Township. The bridge spans Geddes Run.

Figure 7.7 ~ The Cabin Run Covered Bridge is located on Covered Bridge Road in Plumstead Township. The bridge crosses Cabin Run just above its confluence with the Tohickon Creek. The bridge is an historic amenity and the surrounding area breathtaking!

Source: Princeton Hydro, LLC

Figures 7.8 - 7.10
The Tohickon Creek Watershed Assessment
Visual Assessment, Amenity Photographs

Figure 7.8 ~ The Stover-Myers Mill is located on the Tohickon Creek on Headquarters Road in Bedminster Township. It is an historic, recreational, and aesthetic amenity.

Figure 7.9 ~ Throughout the watershed, there are farms preserved through the Bucks County Agricultural Preservation Program. The Bupp farm located off Route 113 in Bedminster Township is a preserved cultural and economic amenity.

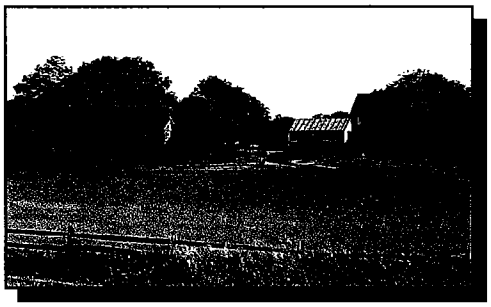


Figure 7.10 ~ There are also agricultural districts in the Tohickon Creek Watershed. This particular Agricultural District is located in Bedminster Township.

Source: Princeton Hydro, LLC

Figures 7.11 - 7.13
The Tohickon Creek Watershed Assessment
Visual Assessment, Amenity Photographs

Figure 7.11 ~ Historically, dams were placed on creeks to redirect water to fuel grain mills. This historic dam on Deep Run is located near Quarry Road in Bedminster Township.

Figure 7.12 ~ This Tributary to Deep Run is located in Bedminster Township Scott Road in the vicinity to Dublin Borough. The creek is a scenic and natural amenity to nearby homeowners.

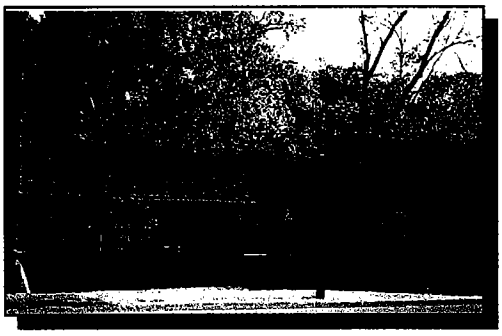


Figure 7.13 ~ Stover-Myers Mill is on the Tohickon Main Stem on the border of Tinicum and Bedminster Townships. The mill is open on weekends. There are plans to restore the mill to working condition.

Source: Princeton Hydro, LLC

Figures 7.14-7.16
The Tohickon Creek Watershed Plan
Visual Assessment, Potential Problem Areas

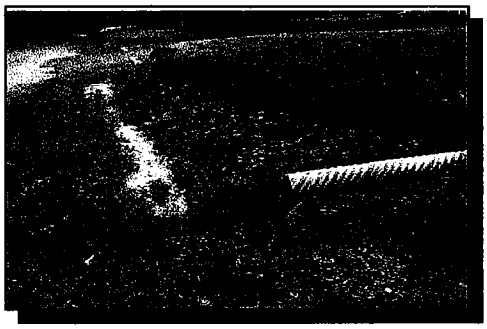


Figure 7.14 ~ This pipe is from a public restroom at Ralph Stover State Park, Plumstead Township. It may be contributing pollutants to the Tohickon Creek.

Figure 7.15 ~ This farm is located in the Kellers Church Road vicinity in Bedminster Township. The farm is for sale and may be replaced with higher density development.

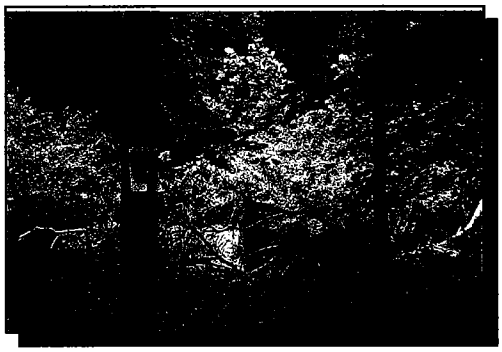


Figure 7.16 ~ Litter is present at several locations in the watershed. This area is located in the Mink Run subwatershed in Bedminster Township.

Source: Princeton Hydro, LLC

Figures 7.17 -7.19
The Tohickon Creek Watershed Plan
Visual Assessment, Potential Problem Areas

Figure 7.17 ~ An informal creek access area off Dark Hollow Road in Plumstead Township shows signs of streambank erosion.

Figure 7.18 ~ A dam in proximity to a commercial lot and a tributary to Cabin Run shows signs of disrepair.

Figure 7.19 ~ A large parcel on Deer Run Road and Fretz Valley Road in Tinicum Township is presently being surveyed. The soil tests indicate that a development survey is taking place.

Source: Princeton Hydro, LLC

Figures 7.20 -7.22
The Tohickon Creek Watershed Plan
Visual Assessment, Potential Problem Areas

Figure 7.20 ~ A stormwater outlet is illustrated in this photo. The outlet empties into Cabin Run from the Appletree Lane commercial development.

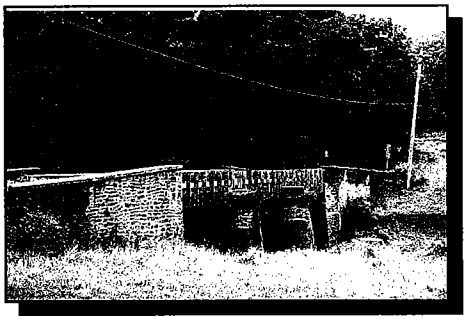


Figure 7.21 ~ The bridge at Kellers Church Road crosses a tributary to Deep Run Creek. The bridge abuttment is surrounded with flood debris and the streambanks on both sides of the bridge are heavily eroded.

Figure 7.22 ~ Geddes Run is located in Plumstead Township. The creek in the Potters Lane vicinity does not have an adequate buffer and nearby landowners are mowing the grass right up to the streambank.

Source: Princeton Hydro, LLC

Figures 7.23 -7.25
The Tohickon Creek Watershed Plan
Visual Assessment, Potential Problem Areas

Figure 7.23 ~ A treatment outfall to a Deep Run Creek tributary is pictured here. The plant is located in the vicinity of Deep Run Road in Bedminster Township.

Figure 7.24 ~ Stormwater Runoff from roadways is evident throughout steeply sloping portions of the watershed. This area is adjacent to Cabin Run in proximity to its' confluence with the Tohickon in Plumstead Township.

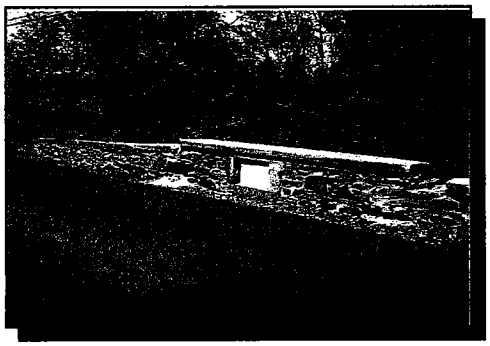


Figure 7.25 ~ Many of the historic stone bridges are in disrepair.

Source: Princeton Hydro, LLC

Table 7.1
The Tohickon Creek Watershed Study
Visual Assessment Findings, Main Stem Corridor

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Main Stem Corridor, Bridge Crossings	Stu & Sally Horn Richard McNutt Sally Mirrick 8/4/01	Corridor Tour Site 2, Stover-Myers Mill, Headquarter Road Bridge	Mill structure, deer and deer paths, mature trees (red maple, water birch, walnut, rose), beauty, hawks, cat birds, mallards, racoon and USGS gauge.	Public latrine effluent pipe, large storm drain out falls, large rocks by mill race causing stagnation, agricultural uses upstream, erosion at public access, trash, evidence of mountain bike traffic, tractor trails, ATV use, horse manure, deer hunting stands, vegetation scours, and some invasive species (multi-flora rose).
Same as above	Same as above	Corridor Tour Site 3, Gruver Road Bridge, Route 611	Woodland buffer, historic mill structure, frogs, potential easement for trail, scenic, and mature trees (river birch).	Side channeling, old mill dam upstream blocking flow, rocks dumped in side channel, ATV and Jeep activity, trash, no trespassing signs, land for sale, discharge pipes, culverts, oil slick on surface, submerged vegetation, and invasive species.
Same as above	Same as above	Corridor Tour Site 4, New Bridge, Route 113	Islands, sunnys, carp, bass, bullfrogs, cat birds, deer, crow nesting area, lilies, and mature trees.	Stagnant backwater, agricultural and residential uses upstream, asphalt dumping, general road debris, ATV use, tire tracks, smell horses, lots of mosquitos and poison ivy, and a storm culvert.
Same as above	Same as above	Corridor Tour Site 5, South Park Road Bridge	Fishing area, sunnys, carp, baby robins, historic mill structure, and numerous oaks.	Informal paths, trash around bridge, small concrete dam upstream, and stands of submerged vegetation.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

Table 7.1 (Continued)
The Tohickon Creek Watershed Study
Visual Assessment Findings, Main Stem Corridor

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Main Stem Tohickon	Suzanne Forbes & Louise Wilkens, 2/15/02 Forbes Family 2/24/02	Nockamixon Dam to South Park Road	State park land, river right is steeply sloping geologic outcropping, government owned, clear water, mature trees, deer, beaver, racoon, great blue heron, canada geese, turkey vulture, mallards, woodpeckers, jays, chickadees, 1976 municipal tree planting river left, informal trails on both sides, and people using trails.	Obstructions (Nockamixon Dam & much smaller mill dam), small dam is broken, river right by apron dam, also along upper trail, littering along river right closer to South Park Road bridge and river left by earthen dam, rifle shells throughout area, and signs of camp fires on both sides.
Main Stem Tohickon	Suzanne Forbes & Louise Wilkens 3/21/02	South Park Road to Route 611	Extensive floodplains/riparian wetlands, numerous small island habitats, river birch, sycamore, red maple, shag bark hickory & fairly well buffered. Gorgeous geologic outcropping with fern, moss and sculpted wall, healthy tree under story, large osprey, Canada geese, red-tail hawks, mallards, hooded merganser, robins, jays, beaver, and beautiful paddling stretch.	Large strainer on river right, some erosion on river left, more significant erosion at bridge crossings, some homes not very well-buffered, abandoned machinery, large manure pile and junked automobiles on river left farm by Route 113 crossing, farm vehicle crossing at Farm School Road, and most private land heavily posted.
Main Stem Tohickon	Suzanne Forbes & Louise Wilkens 1/18/02	Route 611 to Ralph Stover Park Dam	Uninhabited forests & floodplains, combination of semi-preserved, large lots and parkland, healthy woodlands, small mouth bass, pickerel, sunnys, eels, red-tailed hawk, jays, sparrows, Canada geese, vulture, chickadee, white tailed deer, gray squirrel, scenic geologic outcropping, beautifully sculpted cliffs, old mill (Gruver Road) and mill house, and great boating.	Heavy canada geese just below confluence with Deep Run Creek, areas eroded but not easy to reach, erosion at islands, littering at 611, confluence of Deep Run, and extensive at river left just beyond Stover Myers Mill, several areas where homeowners are mowing right up to the bank, some homes (above Stover-Myers Mill) very close to creek and show flood damage, areas in Ralph Stover Park.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

Table 7.1 (Continued)
The Tohickon Creek Watershed Study
Visual Assessment Findings, Main Stem Corridor

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Main Stem Tohickon	Eric & Colette Greb, 12/19/01	Ralph Stover Dam to Horn Residence (section 1 below)	Below Dam: Popular recreation area (fishing, kayaking), Great Blue Heron, hawks, frogs, bridge is an historic structure along with restored park structures (CCC in 1933). Below foot bridge: Hawks, owls, racoons, leopard frogs, variety of wildflowers, hemlock stands, beautiful rock formations, and the historic Doans Cave.	Below Dam: Erosion (from flooding? Overuse?), outfall pipe in bank over creek and near latrines, lots of trash, scum and foam on water. Below Foot Bridge: Erosion, loss of mature trees, litter, many well-worn trails, broken glass around Doans Cave, and overall overuse.
Main Stem Tohickon, The "S" Curve	Stu & Sally Horn, Victoria Halliday 11/8/01	Section 1- Privately Owned Land Beyond Ralph Stover Park (Horn Remsen Properties)	Geologically interesting tilted shelves, cliffs, rock shelves and boulders. Pool and riffle habitats, stocked and native fish, great blue heron, nesting areas, freshwater clams, salamanders, water snakes, morel patches, copperheads, and mature trees. Native American artifacts, very little human use due to steep slopes,	Land has development potential, areas adjacent to bank flood during stormflows and dam releases, erosion, litter, lack of buffer, discharges, bridges, dams, and stranded litter due to periodic high water flow.
Same as above	Same as above	Section 2- Privately Owned Land Beyond Ralph Stover Park (Remsen)	Gentler slopes than section 1, information similar to above.	Similar to above, and some invasive species.
Same as above	Same as above	Section 3- Privately Owned Land Beyond Ralph Stover (TMPs 43, 42,96)	Magnificent vistas, rich soil deposits, freshwater clams & mussels, squirrels, racoons, hawks, dogwood, sycamore, shagbark hickory, river birch, hophorn, prickly pair, and wetland sedges. High rocks recreational area just beyond segment, appearance very wild, and water quality is excellent.	Development of the area is a potential problem and all development (including trails) would pose a threat to the wilderness feel of the area.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

Table 7.1 (Continued)
The Tohickon Creek Watershed Study
Visual Assessment Findings, Main Stem Corridor

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Main Stem Tohickon, The "S" Curve	Stu & Sally Horn, Victoria Halliday 11/8/01	Section 4 - High Rocks State Park & Portion of Tohickon Valley County Park (TMPs 43 & 44)	Majestic woodlands beech, birch, ferns, choke berry, and great wildlife habitat. Remnants of Boy Scout wilderness campsite and log cabin/fireplace remains from 1930's.	Some debris and litter washed up from stream. Development would jeopardize sensitivity of area.
Main Stem Tohickon	Marion Kyde & Jessica DiMauro 11/14/01	High Rocks State Park to Doe Run Campground, Tohickon Valley County Park	Trees look healthy, High Rocks are beautiful!, entire valley Lenni Lenapi territory, area is parkland,	Creek very low, drought, lack of under story (deer?), invasive flora (raspberries, honey suckle), lack of easements, overuse, trash, graffiti, informal trails and erosion.
Main Stem Tohickon	Marion Kyde, Suzanne Forbes, Meghan Ravenscroft 11/9/01	Tohickon Valley County Park (Doe Run) and one mile beyond.	Informal, passive trail along river right, river left & right entirely uninhabited county and municipal parkland with trails/cabins/pool, important regional bird habitat, oak/hickory/beach forests river left, hemlock/hardwoods river right, under story in good shape, pools and riffles, mussels, clams, water spiders, water striders, water fleas, kettle of broad tail hawks, squirrels, deer (tracks), area of 3 and 4 white water, and commemorative plaque at Class 4 rapid. Native American warrior wall and sacred burial ground river right.	Creek very low, woody debris in high areas and in some cases three to four feet above current level, and only slight litter.
Main Stem Tohickon	Richard McNutt & Jan Holmes 11/9/01	One mile beyond Tohickon Valley Park to Delaware River Confluence	Delaware River floodplain, mature floodplain forest, Tohickon Aqueduct, canal trail, historic stone bridge pillars, important bird habitat,	Tree cutting (Point Pleasant Church) lack of buffer in areas, potential for increased stormwater runoff if Bucks County River Country paves its' parking lot.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

Table 7.2
The Tohickon Creek Watershed Study
Visual Assessment Findings, Tohickon Creek Watershed

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Deep Run Creek	Chris Myers	Monitoring sites along Deep Run Creek	The last ½ mile of Deep Run before it meets Tohickon, holds most diverse plant life (blue lobelia, red cardinal flower, monkey flowers, bull rushes and several sedges). Trees in area (due to steep slopes) are fairly large (sycamores, oak and ash). Steep slopes keep the trees from being cut.	Erosion at Kellers Church and Meadow Lane; Deep Run winds through pasture area with severe erosion from lack of vegetation (only grass) and cattle crossing/walking along the streambank. At Deep Run/Tohickon junction: There are ATV trails. Several sites have problems with invasive vegetation-mainly multi-flora rose. Some high residential housing developments, water quality is a concern. Small streams also act as seed dispersal systems taking non-native invasive garden plants (eg. Butterfly Bush, iris, honey suckle, ivy and others).
Deep Run Creek	Wendy Battisti	Sites along creek	Varies from adjacent fields with hedgerows 1-2 ft. wide, to areas that appear to be 20-30 year old woodlands and shrub. Trees (ash, hickory and cedar) bordering creek.	Multi-flora rose is most apparent invasive from roadside view but in some areas it helps provide only shade and plant filter to bordering fields, thus any program to clear rose must aggressively replant these areas.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

Table 7.2 (Continued)
The Tohickon Creek Watershed Study
Visual Assessment Findings, Tohickon Creek Watershed

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Headwater Area	Dr. Kyde	A	Ponds provide nesting waterfowl habitat-1pair geese, 1 pair mallards seen. Tall wetland vegetation at north end of smaller pond provides marsh grasses for nesting. Some remnants of woody cover left along stream. Wetlands adjoin creek near smaller pond.	Concrete spillway carries runoff from 611 and dumps it into the stream near park road (could carry road debris, oil and gasoline from highway). Horse stable on creek at main stem, paddocks bare (muddy); manure not contained (could be draining directly into creek. Welding shop (Creamery Rd.) and Environs has a collection of dead trucks and trailers-stream runs through, or adjacent to junkyard. Tree cover removed from some areas.
Headwater Area-	Forbes and Ravenscroft 3/10/02	Headwaters/ Trib Corridors-Deep Run Creek (northeast rte 313, between 113 & Stump Rd.	Primarily fields interspersed with woodlots and residential lawns/horticultural plants. Trees (white pine, red maple, yellow birch, white birch, beech). Low-growing woody vegetation (wild rose, red-twigged dogwood). Noted robin red breast, blue jay, sparrow, mallards, turkey vulture, grey squirrel, white-tailed dear.	Some erosion where tributaries pass under route 313. Area appears ripe for development and new residential developments are taking place in headwater areas. Newer commercial development and large lot residential developments have been taking place along 313 in last 2-3 years. Litter is a problem in proximity to 313.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

Table 7.2 (Continued)
The Tohickon Creek Watershed Study
Visual Assessment Findings, Tohickon Creek Watershed

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Headwater Area	Victoria Halliday	Geddes Run- a tributary of the Tohickon Creek. Headwaters begin at Plumsteadville, Plumstead Township and flow South East through residential and then rural landscapes crossing 413 and then crossing back and forth over Groveland Road. It meets the Tohickon Creek in the Village of Point Pleasant.	Historic Field Stone Bridge on Wismer Rd. off of Groveland Rd. (in bad repair and should be monitored). Passes through Private Farms with houses eligible for the historic register and buildings of local importance. These are primarily located in the eastern end of the tributary, in the Groveland Rd. area where some tracts of land can be traced back to William Penn, and on through Point Pleasant Village (on the Historical Register). Much of the scenic value of the upper regions of the tributary have been compromised by suburban sprawl development. Little or no effort was made to plan development to reduce environmental or visual impact to the once rural and serene landscape.	In parts of the creek, where the banks are mowed, erosion could be a problem. There are very few places that I can find but there might be more on private property that I could not see. Proposed Timberly Farms development on Meeting House Road plans to discharge treated septic water into the stream. In the same Development described above, topography is very flat, ground does not purk and the Township is allowing development. They have made a deal with the developer to build a sidewalk along meeting house road that crosses over Geddes Run and a water connection to another development in Plumstead in exchange for more houses. This creek is under threat. People downstream are not informed of things that are proposed up stream. WAWA service station should be monitored as it discharges into the headwaters.

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

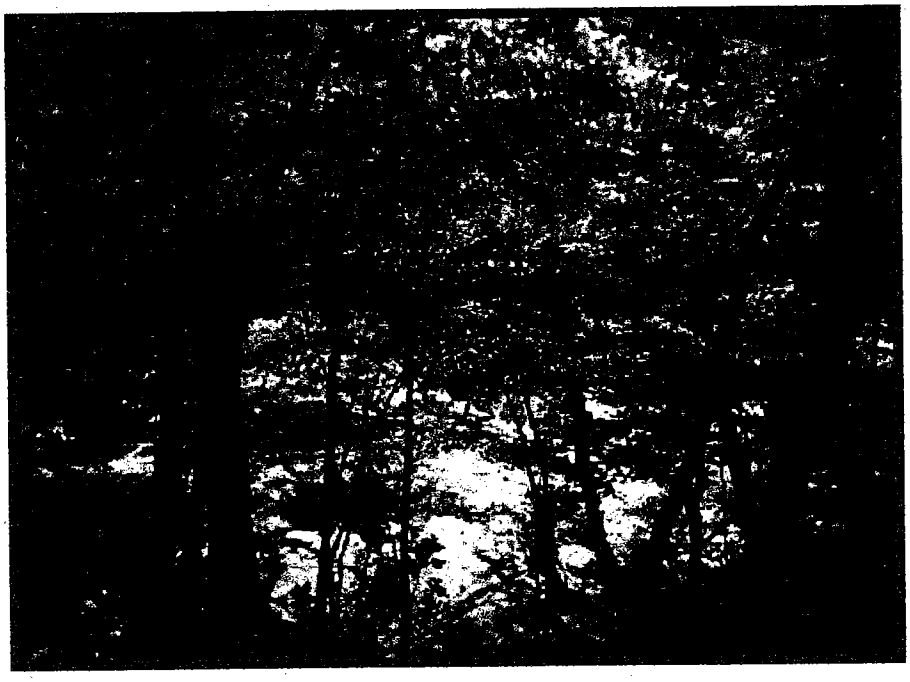
Table 7.2 (Continued)
The Tohickon Creek Watershed Study
Visual Assessment Findings, Tohickon Creek Watershed

Field Segment	Volunteer/ Date	Specific Location	Amenities	Problems
Mink Run, Deer Run, Wolf Run	Wendy P. Battisti 3/30/0	C	kayakers, canoers, put in at Mink Run Haldeman farm at corner of Rte. 113 and Deer Run, preserved farm	erosion- areas of Wolf Run, just off of Rte. 113 wide areas of floodplain bordering Rte. 113 and Deer Run Rd. litter- road litter, potential old farm dump, hard to tell from road but litter and old equipment adjacent to creek other problems- 110 acre farm to be developed for 8 large homes, a lot of dump sites near watershed, second farm in from corner of Fretz Valley and Rolling Hills, a lot of dumping, cinder blocks, equipment

Source: Princeton Hydro, LLC & Watershed Volunteers, 2001-2002

SECTION 8:

WATERSHED & CORRIDOR MANAGEMENT PLAN



Rapids Near Cabin Run Bridge

Section 8: The Conservation Management Plan

8.1 Management Plan Introduction

The Pennsylvania Department of Conservation and Natural Resources grant application guidelines (DCNR, 2000) contain the following directives for a watershed and rivers conservation plan:

- Identify significant natural, recreational, and cultural resources in the river corridor and surrounding watershed.
- Determine locally perceived issues, concerns and threats to local river and watershed resources.
- Recommend locally conceived management, maintenance and enhancement measures to conserve, enhance and restore river resources.

The preceding sections of the document contain well-researched regional and local planning information intended to identify, locate, and quantify local resources. A volunteer-based watershed and corridor assessment and public outreach effort augmented planning information with field data obtained by citizens from the Tohickon Creek Watershed. The volunteer effort resulted in a comprehensive list of watershed and river corridor amenities and problem areas potential problem areas. In addition preliminary data pertaining to the feasibility of a trail along the Tohickon Corridor were gathered in preparation for a Trail Feasibility Study which represents Phase II of this watershed conservation plan study.

Figure 8.1
The Tohickon Creek Watershed Conservation Plan
Local Land Owner Victoria Halliday Completing Corridor Assessment

Source: Plan Advisory Committee, Stu Horn, 2001

To determine the locally perceived issues, concerns and threats to the Tohickon Creek and the surrounding watershed, a number of efforts for public outreach and public involvement were made. These efforts included the formation of a well-rounded plan advisory committee with a strong leader, a citizen survey resulting in a high response rate, work sessions at key stages of plan completion, a volunteer monitoring workshop, a volunteer-based field assessment, three public meetings, a questionnaire for key agency and nonprofit leaders in the watershed, key interviews, public notices, newsletter articles, and a proactive effort to obtain municipal resolutions of support.

Early in the planning process, and before the first public meeting, the Plan Advisory Committee Chair provided each committee member with a sheet entitled "Questions to Ponder". Each member provided his or her ideas about plan components, information resources, and plan format. Each member was also asked to answer the following questions:

- What is it that you value most about the Tohickon Creek watershed?
- Do you feel those values are being threatened?
- How do you think we should address those threats?

Members of the community were asked similar questions at the plan kickoff meeting as well as at the first public meeting. Work sessions and the first two public meetings were well-attended, so the PAC felt confident that local concerns were identified and the basis for a locally conceived management plan was established. Subsequent management recommendations were obtained from citizen volunteers, municipal officials, committee members, department heads, other local watershed efforts, and the environmental planning consultant. A discussion and lists of these recommendations are found in Section 2 and Appendix A of this plan.

Following are the locally-conceived goals and recommendations designed to conserve, protect, and enhance the Tohickon Creek Corridor and surrounding watershed. These were developed by the Plan Advisory Committee from input from citizens, municipal commissions and supervisors, and comments from park and county officials during the public participation processes. Under each broad goal are specific recommendations for achieving it. These are not intended to be exhaustive. Other specific projects that meet the broad goals of this plan should be considered.

It is clear from the response to the questionnaire and public comments received that preservation of this watershed is more important to area citizens than expanded recreational opportunities or economic development. Citizens are aware of the importance of maintaining water quality and quantity and also of the areas in which riparian habitat falls short of the ideal. Protection, preservation, and conservation were the words most often used by citizens contributing to the fact

finding segment of this study. While a number of people feel that expansion of recreational opportunities might be desirable, they did not want it to come at the expense of the environment. Many people were vehement in believing that the forested area in particular, should not be further developed in any way.

8.2 Goals & Recommendations for the Tohickon Creek Watershed

- **Goal One: Natural and Cultural Resources Protection** ~ Protect and preserve outstanding natural biodiversity and cultural resources in the Tohickon Creek and the surrounding watershed.

✔ Protect rare natural resources including floodplain areas, wetlands and species of special concern.
✔ Complete a flora study for the entire watershed area.
✔ Create a Native American museum to showcase the important early history of the Tohickon and its tributaries and explain the native burial ground and warrior wall.
✔ Create an inventory of Native American sites and artifacts in the watershed.
✔ Apply for Important Bird Area Status. Preserve significant bird habitat.
✔ Protect sacred native American sites through purchase of easements or parcels.
✔ Develop a conservation greenway along the mainstem of the creek to serve primarily for wildlife functions, minimizing human impacts.
✔ Purchase and restore historic Randt's Mill.
✔ Limit access and prohibit development in the mainstem valley.
✔ Upgrade zoning to preserve resources. Encourage wildlife zones.
✔ Establish a volunteer network for trail maintenance and litter removal in the parks.
✔ Cooperate with park personnel to restore and revegetate damaged resources within the parks.
✔ Consider a permitting system for use of High Rocks to raise money to remediate the damages caused by overuse and to limit the amount of use.
✔ Establish an invasive plant removal program with a strong public educational component.
✔ Create corridors that will connect larger woodlands in order to enhance wildlife habitat.
✔ Apply for Important Mammal Area status.
✔ Protect and maintain historic and cultural bridges (e.g., Dark Hollow Road, River Road).

- **Goal Two: Water Quality & Water Quantity Protection** ~ Protect and enhance existing water quality and water quantity in the Tohickon Creek and its tributaries.

✔ Upgrade and strengthen municipal ordinances where necessary to highest protection levels for both headwater and riverine areas with special emphasis on groundwater protection (municipal advisory boards, supervisors, interested citizens).
✔ Protect and expand buffer areas to maintain water temperature and quality.
✔ Restore eroded streambanks, where they exist, to reduce erosion, sedimentation and associated pollutants.
✔ Continue to support upgrading the stream to Exceptional Value (EV) status (municipalities, organizations, interested citizens).
✔ Establish and fund volunteer water quality monitoring and nps protection committees on main stem and tributaries, similar to that on Deep Run Creek.
✔ Fence off Deep Run Creek from grazing in order to protect water quality.
✔ Review the Deep Run Creek sewage treatment facility plant enlargement proposal carefully (agencies, nonprofit groups, municipalities, and private citizens).
✔ Implement programs for maintenance of water quality and groundwater protection.
✔ Preserve forested areas and update stormwater regulations to increase groundwater recharge as suggested in The Tohickon Creek Watershed Act 167 Stormwater Management Plan (Bucks County Planning Commission, 2002).

- **Goal Three: Stream Corridor Protection** ~ Protect and preserve the forested reaches of the Tohickon Creek Corridor and tributaries; enhance and restore areas where necessary.

✔ Protect and preserve as much land as possible by all available means in the stream corridor in order to protect habitats from the Quakertown Swamp to the Delaware River.
✔ Preserve unbroken woodland cover along main stem for habitat. Prohibit development, even for recreation, in the area.
✔ Apply for Audubon Society Important Bird Area (IBA) status.
✔ Restore eroded streambank and replant forest cover throughout corridor to improve river corridor amenities.
✔ Encourage private conservation easements along main stem wooded areas in particular, and along stream fronts on all tributaries.

- ✔ Locate proposed high impact uses (e.g., paved trails, picnic facilities, overnight camping) outside of the stream corridor, and prohibit streamside camping by boaters and others.
- ✔ Reserve Greenway area for wildlife, nature preservation and passive recreation. Prohibit use of motorized vehicles and mountain bikes on existing trails. Locate low impact trails outside of sensitive areas.
- ✔ Provide pedestrian access on PennDOT bridges in the corridor.

- **Goal Four: Education and Stewardship Implementation** ~ Create and maintain an informed and pro-active citizenry throughout the Tohickon Creek Watershed.

- ✔ Initiate an education program that links land use and water quality and quantity impacts.
- ✔ Expand education efforts (public meetings, mailings, workshops, programs) with particular focus on private landowners next to the creeks and tributaries.
- ✔ Implement a volunteer litter removal clean-up with educational signage, and a volunteer trail maintenance program.
- ✔ Foster better communication between residents and local government.
- ✔ Circulate findings of the study.

- **Goal Five: Environmental Planning and Protection** ~ Enforce existing environmental protection tools and provide additional planning protection where needed.

- ✔ Place conservation easements on parklands to protect in perpetuity.
- ✔ Implement and strengthen municipal zoning revisions to protect resource protection districts and stream corridors; prohibit commercial and residential areas within corridors.
- ✔ Require better pollution prevention (eg. septic system maintenance).
- ✔ Encourage and support state Green legislation to foster preservation.
- ✔ Consider the use of "purchase of development rights" (PDRs) and other methods of funding to preserve riparian areas.

- **Goal Six: Recreational Resources Enhancement** ~ Enhance existing recreational resources without negatively impacting natural and cultural resources.

✔ Locate high impact recreation further from the stream corridor (paved trails, picnic facilities, overnight camping).
✔ Encourage dam releases from the lake bottom rather than the spillway to improve the fishery and restore a natural cold-water fishery.
✔ Limit recreational opportunities along stream corridors (especially mainstem) to unpaved and noninvasive ones, and expand parkland outside of the stream corridors to provide recreation. Improve trails only in the least sensitive areas of the watershed.
✔ Establish an equestrian park/center to provide trails, recreational opportunities, and facilities, in order to maintain an equestrian based economy in the area which provides employment and supports agriculture.
✔ Examine possible access areas for boaters along 611 and other public locations (e.g., Stover-Myers mill parking lot, Ralph Stover State Park, other Bucks County park Land).
✔ Undertake a feasibility study to determine a possible route for a Greenway Trail in the Lower Tohickon Watershed.

- **Goal Seven: Capital Improvement Provision** ~ Provide reliable and consistent funding to preserve, restore, and manage the natural, cultural, and recreational amenities within the Tohickon Creek Watershed.

✔ Provide financial incentives for preservation and protection efforts (e.g., tax write-offs).
✔ Continue state and county preservation funding programs.
✔ Encourage financial support for land preservation groups.
✔ Use funding for resource protection not recreation amenities.
✔ Pursue local, county, state, and federal funding to preserve land, scenic character and water quality improvement.
✔ Fund any improved access and recreational opportunities by municipal bonds and permits/user fees (Bedminster), municipal bonds and taxes (Plumstead) and user permits and municipal bonds (Tinicum).
✔ Require permits for rock climbers and use funds at that park.

SECTION 9:
BIBLIOGRAPHY

Tohickon Aqueduct

Section 9: Bibliography

Bedminster Township. 1999. Subdivision and Land Development Ordinance. Ordinance # 124.

Ibid. 2000. Zoning Ordinance.

Ibid. 1996. Bedminster Township Comprehensive Plan.

Brandywine Conservancy and Tinicum Open Space Committee. 2000. Tinicum Township Open Space Plan.

Brauning, Daniel. 1992. Atlas of Breeding Birds in Pennsylvania. Pittsburgh: University of Pittsburgh Press.

Bucks County Audubon Society. 2002. Personal Communication with Diane Allison.

Ibid. 1991-2001. Central Bucks Christmas Bird Count. Unpublished Field Data. Available through Bucks County Audubon Society.

Ibid. 1993-2001. North American Migration Count. Unpublished Field Data. Available through Bucks County Audubon Society.

Bucks County Planning Commission. 1985. Conservation and Management Practices for Buckingham and Durham Carbonate Valleys Part I and II. Unpublished. Available through Princeton Hydro, LLC.

Ibid. 1985. Conservation and Management Practices for Buckingham and Durham Carbonate Valleys Part III. Unpublished. Available through Princeton Hydro, LLC.

Ibid. 1994. Bucks County Continuum, Land Use, Demographics, Socio-Economics, Community Facilities.

Ibid. 2001. Plumstead Township Greenway and Trail Linkage Feasibility Study.

Ibid. 2002. The Tohickon Watershed Act 167 Stormwater Management Plan.

Ibid. The Villages of Bucks County, a guidebook. Unpublished. Available through Princeton Hydro, LLC.

Coughlin, Keene and Associates. 1993. Tinicum Township Comprehensive Plan. Adopted Feb. 10, 1993.

Department of Community and Economic Development (DCED). 1999. Zoning, Planning Series # 4. Available through The Governor's Center for Local Government Services.

Environmental Quality Board. 1995. Petition to Redesignate the Tohickon Creek Watershed Bucks County, Pennsylvania.

Froelich, AICP. 1992. Plumstead Township Comprehensive Plan Update. Adopted June 16, 1992.

Graham, J. 2001.Personal communications, Nockamixon State Park.

Harris, J. 2002. Personal communications, PNDI list, copies available upon request.

Hoover, J et al. 1995. Effects of Forest Patch Size on Nesting Success of Wood Thrushes. The Auk 112 (1): 146-155.

Lower Delaware River Wild and Scenic River Study Task Force. 1997. Lower Delaware River Management Plan. Unpublished. Available through Princeton Hydro, LLC.

Lubnow, F. 2002. Personal communications, Senior Aquatic Biologist, Princeton Hydro, LLC.

McNealy, Terry. 2001. Bucks County, An Illustrated History. Doylestown: Bucks County Historical Society.

Montgomery, Carla. 1986. Environmental Geology. Dubuque: Wm. C. Brown Publishers.

Nockamixon Township. 1990. Subdivision and Land Development Ordinance.

Ibid. 1990. Zoning Ordinance.

Ibid. 1988. Comprehensive Plan.

Nockamixon Township Environmental Advisory Council. 1993. Nockamixon Township Environmental Resource Inventory.

PADCNR. 2000. Keystone Conservation Grant Application Manual.

PADEP. 2001. Commonwealth of Pennsylvania, Pennsylvania Code Title 25. Environmental Protection.

Ibid. 2001. 2D Draft Delaware River Tohickon Creek. Draft.

Pennoni Associates, Inc. and Brandywine Conservancy. 1999. Bedminster Township Open Space Plan.

Pennsylvania Historical & Museum Commission. 2001. National Register/Listed and Eligible Properties in PA.

Plumstead Township. 1995. Subdivision/Land Development Ordinance. Ordinance #95-4-18-2

Plumstead Township Zoning Ordinance. 1991. Enacted September 17, 1991.

PNDI. Pennsylvania Natural Diversity Inventory. 2001. Response received from PNDI September 3, 2001.

Princeton Hydro LLC. 2002. Bedminster Land Conservancy Deep Run Water Quality Monitoring Program. Unpublished. Available through Princeton Hydro, LLC.

Rhoads and Block. 2000. Natural Bucks County Guide to Public Natural Areas. Doylestown: Bucks County Commissioners.

Ibid. 1999. Natural Areas Inventory of Bucks County, Pennsylvania.

Richardson and Vepraskas. 2001. Wetland Soils. New York: Lewis Publishers.

Roy F. Weston Inc. 1978. Environmental Assessment for On-Lot Sewage System Suitability in the Carbonate Valleys of Bucks County, Pennsylvania. Unpublished. Available through Princeton Hydro, LLC.

So, F. 1988. The Practice of Local Government Planning. Published by the International City/County Management Association.

Sullivan, Rhoads, Block. 2000. Delineation and Management Recommendations for the Vegetation Communities of Tinicum Township, Bucks County, Pennsylvania. Unpublished. Available through Princeton Hydro, LLC.

Tinicum Township Zoning Ordinance. 2000.

Tinicum Township Subdivision and Land Development Ordinance. 1990.

US Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, January, 1987.

US Department of Agriculture. 1993. Soil Survey Manual. Handbook No. 18, October 1993.

USEPA. 1997. Volunteer Stream Monitoring: A Methods Manual. United States Environmental Protection Agency Office of Water, EPA 841-B-97-003, November, 1997.

US House of Representatives. 2000. Greenwood to Urge Designation of Tohickon Creek. News from US Rep. James C. Greenwood.

WVDEP. Conducting a Watershed Survey. Timothy Craddock, Citizens Monitoring Coordinator, West Virginia Save Our Streams Program.

Willard et al. 1959. Geology and Mineral Resources of Bucks County.

(www.americanwhitewater.org)

(www.bcas.org)

(www.birdnature.com)

(www.dcnr.state.pa.us/stateparks/parks/nock.htm)

(www.dcnr.state.pa.us/topogeo)

(www.dcnr.state.pa.us/forestry/pndi/pndiweb.htm)

(www.dep.state.pa.us)

(www.drbc.net)

(www.dvrpc.org)

(www.epa.gov)

(www.freepages.genealogy.rootsweb.com)

(www.fxbrowne.com)

(www.ga.usgs.gov)

(www.history.inbucks.com)

(www.livingplaces.net)

(www.nps.gov)

(www.state.nj.us/drbc/)

(www.townliving.com)

(www.usace.army.mil/)

(www.usgs.gov)

APPENDIX A:

SUPPORTING INFORMATION, PLANNING DATA & PUBLIC PARTICIPATION

Tohickon Creek Watershed Plan
Plan Advisory Committee Members

Name of PAC member	Affiliation
Wendy P. Battisti, PhD	Bedminster Land Conservancy, President
Victoria Halliday	Plumstead Resident, Parks and Recreation Board Member, Landscape Architect
Stu and Sally Horn	Tinicum Township Residents, Engineer
Marion Kyde, PhD	Consulting Mycologist, Tinicum Conservancy, Tinicum EAC, Tinicum Open Space Commission
Norman Mac Arthur	Tinicum EAC, Tinicum Open Space Committee, Chair
Richard McNutt	Plumstead Township Park & Recreation Commission; and President of Delaware River Greenway Partnership (DRGP)
Sally Mirick	Tinicum Resident, Botanist
Christopher Meyers	Bedminster Resident, Wetlands Biologist
Alan Powell	Tinicum Conservancy Treasurer

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Pennsylvania Organization for Watersheds & Rivers

WATERSHED SPOTLIGHT: "WEEKLY SPLASH"

Tinicum Creek Watershed Conservation Plan Named on Rivers Conservation Registry

(Bucks County) - On Friday, February 16, 2001 after an eighteen month study, the Tinicum Creek Watershed Conservation Plan, a seventeen square mile study area located in Tinicum, Bridgeton and Nockamixon Townships was approved as a conserved body of water under Governor Ridge's Rivers Conservation Program.

The Plan will include Tinicum Creek, Rapp Creek and Beaver Creek and their respective tributaries. The Tinicum Creek Watershed Conservation Plan contains a number of conservation recommendations suitable for implementation, development or acquisition in the Townships of Tinicum, Bridgeton and Nockamixon. All governing bodies and partners will endeavor to take appropriate action to implement the recommendations of the Plan.

Partners include PA DCNR, The Brandywine Conservancy, Bridgeton Township, Nockamixon Township, Tinicum Township Planning Commission, Tinicum Township Environmental Advisory Board, Tinicum Creek Watershed Association, The Bridgeton-Nockamixon-Tinicum Groundwater Committee, The Delaware River Greenway Partnership, National Park Service, and The Tinicum Conservancy. Consultant for the Plan was Princeton Hydro, LLC who assisted with the Plan's registry acceptance.

For additional information on PA DCNR's Rivers Conservation Projects, contact Terry Hough, PA DCNR at (717) 783-2712 orthough@dcnr.state.pa.us. For more information about the Tinicum Creek Watershed Rivers Conservation Plan, contact Suzanne Forbes, Princeton Hydro, LLC at (609) 397-5335 or sforbes@princetonhydro.com.

Approval Granted to Proceed with a Rivers Conservation Plan

(Bucks County) – A portion of Tohickon Creek proposed for a Rivers Conservation study is located in Bedminster, Tinicum, Plumstead and Nockamixon Townships. The recently completed Bucks County Natural Resource Inventory designates the Tohickon Creek as a Priority One Inventory Site. The watershed also provides habitat for both plants and animal species of special concern, contains a National Landmark, and has been designated as eligible into the Federal Wild and Scenic Rivers System. The stream is currently designated as HQ-CWF by the state as well as a 1-A priority status as a scenic waterway.

Tinicum Conservancy has received approval from PA DCNR to complete a Rivers Conservation Plan to further protect the Tohickon Creek, its tributaries and the surrounding watershed. The Tohickon Creek Watershed Rivers Conservation Plan will take approximately eighteen months to complete. The estimated cost of $54,000 includes GIS/Mapping.

For more information on PA DCNR's Rivers Conservation Projects, contact Terry Hough, PA DCNR at (717) 783-2712 or though@dcnr.state.pa.us. For more information about the Tohickon Creek Rivers Conservation Plan, contact Suzanne Forbes, Princeton Hydro, LLC at (609) 397-5335 or sforbes@princetonhydro.com.

"How to Start a Watershed Association" Materials Now Available

The Pennsylvania Organization for Watersheds and Rivers (POWR) and the Environmental Fund for PA (EFP) have produced a "Fact Pack" and companion video made possible by funding received through a first-round Growing Greener grant. The "Fact Pack" and video contain information helpful to local communities who want to form a watershed association. The hard cover two-compartment video/literature album holds a video produced by Kelly Meinhart (EFP), narrated by Janie French of Canaan Valley Institute, as well as, an easy-to-read "Fact Pack" outlining the steps needed to form a watershed association along with a reference bibliography. Conveniently packaged, it sells for $15.00 including tax and shipping. The video or "Fact Pack" can also be purchased separately. For more information, please call POWR at (717) 234-7910 or email sparry@pawatersheds.org.

Information From First Meeting &
Questions for the Advisory Committee's April 30th Meeting
(Suzanne Forbes, AICP, Princeton Hydro)

Note: I was happily surprised with the number of people that attended our first meeting (thanks Dr. Kyde!). Due to the large turnout, I think we gathered quite a bit of initial information and feedback.

I. Recommendations/questions from the First Meeting

Watershed Wide (both project) Comments

- Is the BC Parks Department involved? Both studies should involve their input. Previous trail studies should be obtained as they already have a tiered land acquisition plan.
- People seemed very interested in water flows (dam releases) & how releases are regulated. I will be sure to include information in the watershed plan.
- People were puzzled about how the two studies were "working together". At all meetings and in all written materials, I think we need to make this clear. We may also have to revisit this issue at the April 30th meeting (see questions following in Part II)
- An attendee suggested informing the Audubon Society about our projects and including published and unpublished birding information from them. She mentioned seeing shrikes, bald eagles, and hawks in the study area & a trend indicating loss of amphibians.

Greenway/Trail Feasibility Study

- Greenway should be defined for the public. (I would add that I did not define watershed during my presentation & will fix that during future meetings!)
- What are landowner responsibilities if a trail is put in?
- People wanted information the land development vulnerability in the greenway/trail study area.
- Attendees had questions regarding recreational development plans for the Tohickon Creek (e.g., Was a formal livery much like Bucks County River Outfitters proposed for the main stem?)
- One attendee felt that the canal trail is meant for bicycles & that additional bike trails were not needed in the area. Another mentioned that additional and/or improved equestrian trails were needed.
- Other attendees expressed that multi-use trails should be considered (e.g. Mt. Bikes & horses & hikers, while another stated that there were already too many Mt. Bikes in the High Rocks & Cafferty Road area.
- A person asked if an eminent domain type approach would be used to obtain additional land for a trail.
- A landowner stated that littering is a problem in the Pt. Pleasant Area & discussed a

history of small camp fires etc.

II Questions to Ponder For Our April 30th Meeting

Due to the large attendance at our first meeting (again a good thing), and the time devoted to discussing trails, I felt the need to gather your input on the watershed-wide study. You can jot your answers below or talk about them on April 30th.

- Advisory committee members for this study were carefully selected, because you have knowledge about the watershed, problems in the watershed, and potential solutions to watershed problems. Some were selected based on their municipal work and areas of expertise. With that in mind, what type of information would you like to see included in the watershed study? _____

  _____

  _____

  _____

- The DCNR watershed study outline requires the study to include the following information: Project Area Characteristics, Watershed-Specific Issues, Land Resource Inventory, Water Resource Inventory, Biological Resource Inventory, Cultural Resource Inventory, (A main stem and tributary) Corridor Assessment, and Management Options. With that in mind, please provide your input on 1) Local resources to obtain the information, and 2) Information you already know is important and should be included._____

  _____

  _____

  _____

- Dr. Kyde asked the following set of questions at our last meeting & I thought they were good ones.
  - What is it that you value most about the Tohickon (e.g., special places, quiet, birding opportunities?)
  - What do you think poses threats to the Tohickon & tributaries?
  - How might we address those threats?

  The audience provided some feedback, and we will have other opportunities to ask them again. However, how would each member answer the above-listed list of questions?

  _____

  _____

  _____

  _____

  _____

Thank you very much! If you arrive at the next meeting prepared to discuss your answers, it will really help us with research efforts and to formulate ideas for our first public meeting.

The Tohickon Creek Watershed Study
Tohickon Creek Trail Feasibility Study
Advisory Committee Meeting
April 30, 2001
7:30 PM, Plumstead Township Municipal Building

- **Introductions,** *All Attendees*

- **Administrative Tasks,** *Marion Kyde, PhD*
  - Pass out time sheets
  - *Reminder: Please remember to record hours spent so far and to record future hours (e.g., surveys, annotating information, research).*

- **Project Status Report,** *Consultants*

  - The Tinicum Creek Greenway/Trail Feasibility Study, *Charles Levin, Heritage Conservancy*
  - The Tinicum Creek Watershed Study, *Suzanne Forbes, Princeton Hydro, LLC*

- **Open Discussion,** *All Attendees*

  - Contents of the Tohickon Creek Watershed Study*

- **Tools For Gathering Information,** *Consultants*

  - Distribution & Discussion, Draft Field Work (Corridor Assessment) Forms, *Suzanne Forbes*
  - Distribution & Discussion, Draft Questionnaire, *Charles Levin*
  - First Public Meeting, *Advisory Committee*

- **Next Meeting Date,** *Please bring your calenders*!

- **Adjourn**

** **Note to the Committee:** We have attached some general information from our first meeting. In addition, there is a list of questions to ask yourselves before attending the next meeting. Thank you! Coming prepared to provide input will help set the framework for our project research efforts. Also remember to record any time spent working on these tasks and provide your hours to Dr. Kyde on April 30th (See Agenda Item II)*

To: **Tohickon Creek Field Assessment Volunteers**
From: **Marion Kyde, Tinicum Conservancy**
Date: **August 31, 2001**
Re: **Watershed Assessment Package**

Thank you all for agreeing to help with the Tohickon Creek watershed field assessment. We will be meeting **Saturday, August 4, 2001 at 9AM at Ralph Stover State Park** (directions attached).

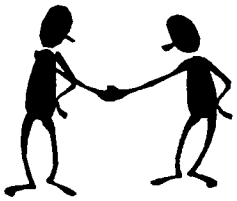
After coffee, donuts, and a short overview, we will be heading out in two vans to complete our watershed field assessment. We searched high and wide for one van large enough for all of us, but we were not successful. Therefore, one van will focus upon significant amenities and potential problem areas along the *main stem of the Tohickon Creek* (Charles Levin, Heritage Conservancy, Driver), while the second van will complete the same type of assessment for *tributaries of the Tohickon Creek* (Suzanne Forbes, Princeton Hydro, Driver). We will be stopping along the way to take selected photographs which will be included in the final plan.

The package contains the following for your review and consideration:

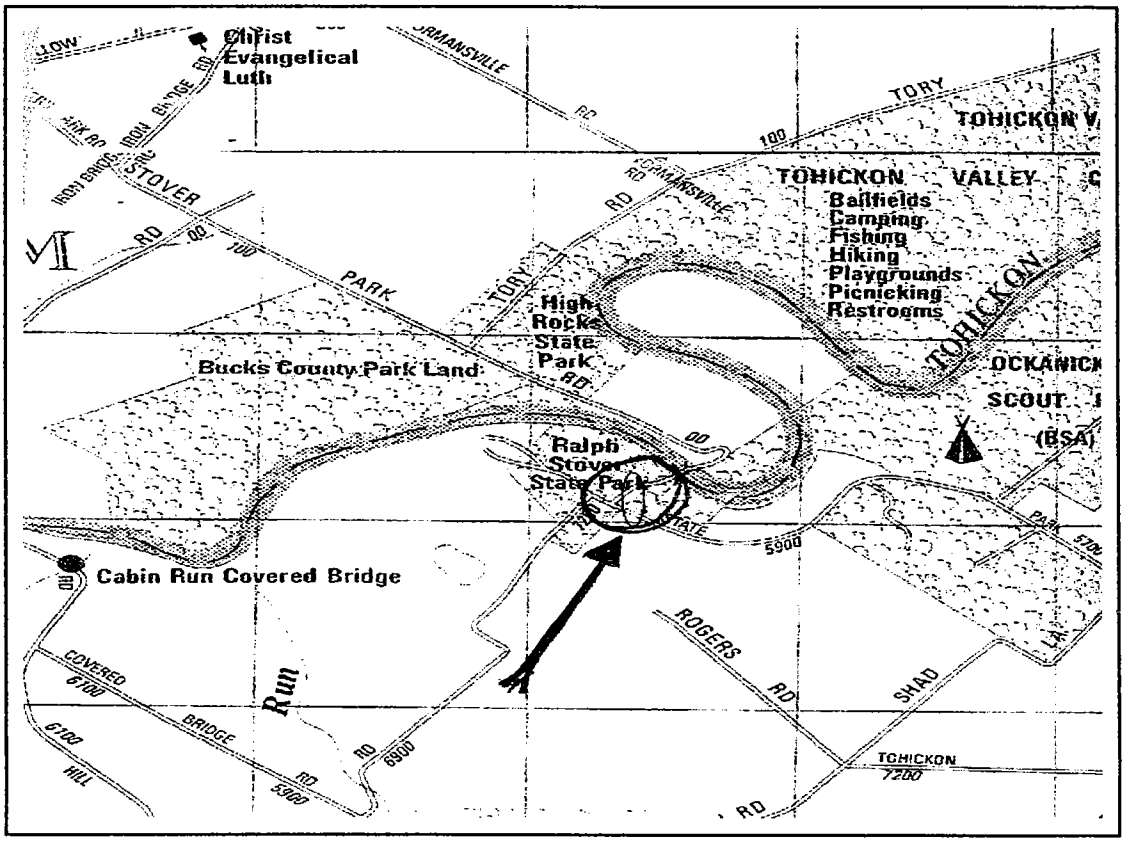
- Directions to meeting point
- List of Volunteers
- Agenda
- Field Assessment Sheets
- Recent Article on the pros and cons of Dam Releases

Please call Suzanne Forbes at Princeton, Hydro LLC if you have any questions on the enclosures or cannot attend. Her number is (610) 397-5335 and her e-mail is sforbes@princetonhydro.com

Directions To Meeting Point



We will be meeting at 9AM at Ralph Stover State Park. Please park in the designated parking area. We will set up coffee & donuts at the picnic tables next to the parking area. For those of you that are unfamiliar with the location, a map is provided below.



A List of Volunteers
(Thank you!)

- **Wendy Battisti, Resident, 1906 Sweetbriar Road, Ottsville, PA (215) 795-2352, wendy_battisti@merk.com.**
- **James C. Blayden, 57 Oak Grove Road, Ottsville, PA 18942, (610) 847-2128, corinne@epix.net**
- **Deborah W. Christ, Resident, 23 Lily Valley Road (610) 847-8290.**
- **Suzanne Forbes, Princeton Hydro, 80 Lambert Lane, Lambertville, NJ 08530 (609) 397-5335, sforbes@princetonhydro.com.**
- **Stu Horn, 14 Stover Park Road, Pipersville, PA (215) 297-5636, stuhorn@voicenet.com**
- **Sally Horn, Resident, 14 Stover Park Road, Pipersville, PA (215) 297-5636, stuhorn@voicenet.com**
- **Marion Kyde, Resident, 15 Tankhannen Road, Ottsville, PA 18942, (610) 847-8650, mrm@epix.net.**
- **Charles Levin, Heritage Conservancy, 85 Old Dublin Pike, Doylestown, PA 18901 clevin@heritageconservancy.org**
- **Norman MacArthur, Resident, PO Box 107, Erwinna, PA 18920, (610) 294-1097, normbill@epix.net.**
- **Richard H. McNutt, Resident, 5556 Stump Rd. Pipersville, PA 18947-1090, (215) 766-8668, mcnuttrh@yahoo.com**
- **Sally Mirick, Resident, PO Box 145, Ottsville, PA 18942, (610) 847-5197, mmander@epix.net**
- **Chris Meyers, Resident, Bedminster Organics, (215) 795-2479, organic@epix.net**
- **Meghan Ravenscroft, Student, 12 Brookdale Drive, New Britain, PA 18901 (215) 340-1252, Suzanne Forbes @home.com**
- **Chris Watkins, Princeton Hydro, LLC, 80 Lambert Lane, Lambertville, NJ 08530 (609) 397-5335, cwatkins@princetonhydro.com.**

Tohickon Creek Watershed Assessment Agenda

(August 4, 2001)

- 9:00 AM, Meet at Ralph Stover State Park, *Park Cars/Coffee/Donuts*
- 9:15 AM, Introductions, *Marion Kyde, Tinicum Conservancy*
- 9:15 AM, Reasons For Main Stem & Tributary Assessment, Overview of Sheets, *Suzanne Forbes & Charles Levin*
- 9:30 AM, Questions on Field Sheets, *All Volunteers*
- 9:45 AM, Board Vans & Leave Ralph Stover State Park, *All Volunteers*
- 9:45 AM- 12:00 PM, Van 1, Complete Main Stem Assessment
- 9:45 AM- 12:00 PM, Van 2, Complete Tributary Assessment
- 12:00 PM, Volunteers Return to Ralph Stover Park

~ Please Sign Up For Unfinished Assessment Areas ~

THE TOHICKON CREEK WATERSHED AND RIPARIAN CORRIDOR STUDY

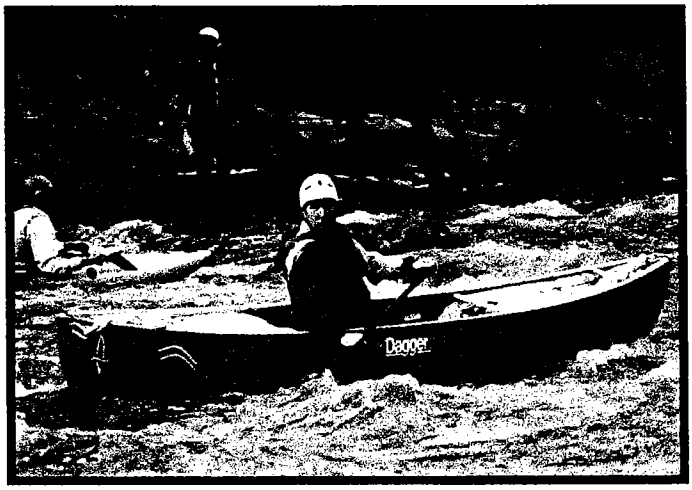
VOLUNTEERS NEEDED

The Tinicum Conservancy was recently awarded a grant to develop a Watershed Conservation Plan and Riparian Corridor Feasibility Study for the Tohickon Creek Watershed. The projects will include information about the significant natural, cultural, historical and recreational resources in the watershed as well as measures to conserve identified resources while providing for a viable and sustainable economy. The area of study includes the main stem of the Tohickon Creek and its tributaries. Five municipalities (Bedminster, Nockamixon, Plumstead, and Tinicum Townships, and Dublin Borough) are located in the land area (watershed) surrounding the Tohickon.

Volunteers are needed to help complete a watershed and stream corridor field assessment. The assessment is really quite simple. Volunteers will be provided with training, maps, and easy-to-complete field sheets. Field volunteers will travel through a selected portion of the study area looking for significant natural features (wildlife, plants), and potential problem areas (streambank erosion, pollution entering streams, stream obstructions etc.). Your information will be added to the maps and narrative in the Tohickon Creek Watershed Plan.

Please give us a call if you would like to help with this interesting and needed conservation study!

Suzanne Forbes, AICP, Princeton Hydro, LLC (609) 397-5335
Marion Kyde, PhD, (610) 847-8650



The Tohickon Creek at Tohickon Valley County Park
Dam Release, November 2000

Bucks County, ss.

Timothy J. Weaver being duly affirmed according to law, deposes and says that he is the Controller

(Manager or Designated Agent)

of the CALKINS NEWSPAPERS INCORPORATED, Publisher of the Intelligencer/Record, a daily newspaper of general circulation, published and having its place of business at Doylestown, Bucks County, Pa. and Horsham, Montgomery County, Pa.; that said newspaper was established in 1886; that securely attached hereto is a printed notice which is exactly as printed and published in said newspaper on

September 25, 2001

and is a true copy thereof; and that this affiant is not interested in said subject matter or advertising; and that all of the allegations in this statement as to the time, place and character of publication are true.

Affirmed and subscribed to before me

this 25 day of September

A.D. 2001

Notarial Seal
Normajean Leidy, Notary Public
Doylestown Twp., Bucks County
My Commission Expires Apr. 26, 2003

NOTICE
TINICUM
CONSERVANCY

The **Tinicum Conservancy** is completing the **Tohickon Creek Watershed & Riparian Protection Plan** that is funded by the PA Department of Conservation and Natural Resources. The plan will include land and water resource information, GIS mapping, a riparian corridor/trail feasibility study and a conservation management plan for the Tohickon Creek & its tributaries.

The public is invited to attend a public meeting to discuss project components, watershed amenities, and to provide comment.

The **meeting** will take place **September 27, 2001**, 7:30 PM at the Bedminster Township Office, 3112 Bedminster Road, Bedminster, PA 18910.

Further information may be obtained by calling Marion M. Kyde, Ph. D, Grant Administrator, Tinicum Conservancy (610) 847-8650.

1t S 25

The Intelligencer / Record ~ Upper Bucks Edition ~ (215) 345-3071 Attn: Cindy

CLASSIFIED ADS ~ LEGAL SECTION

Publishing Date: Tuesday, September 25, 2001

Contact: Suzanne Forbes, Princeton Hydro
80 Lambert Lane
Lambertville, NJ 08530
609-397-5335
609-397-5333 FAX

Billing: Forward statement to "Contact" person

PROOF OF PUBLICATION REQUESTED

Ad:

NOTICE
TINICUM CONSERVANCY

The Tinicum Conservancy is completing the Tohickon Creek Watershed & Riparian Protection Plan that is funded by the PA Department of Conservation and Natural Resources. The plan will include land and water resource information, GIS mapping, a riparian corridor/trail feasibility study and a conservation management plan for the Tohickon Creek & it's tributaries.

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Further information may be obtained by calling Marion M. Kyde, Ph. D, Grant Administrator, Tinicum Conservancy (610) 847-8650

FAXED 9/21/01 @ 4pm

Bucks County, ss.

Susan McGurk being duly affirmed according to law, deposes and says that he is the Billing Manager

(Manager or Designated Agent)

of the CALKINS NEWSPAPERS INCORPORATED, Publisher of the Intelligencer/Record, a daily newspaper of general circulation, published and having its place of business at Doylestown, Bucks County, Pa. and Horsham, Montgomery County, Pa.; that said newspaper was established in 1886; that securely attached hereto is a printed notice which is exactly as printed and published in said newspaper on

May 29 & June 5, 2002

and is a true copy thereof; and that this affiant is not interested in said subject matter or advertising; and that all of the allegations in this statement as to the time, place and character of publication are true.

Susan J. McGurk

Affirmed and subscribed to before me

this 11 day of June

A.D. 20 02

SEP 27 2002

Notarial Seal
Normajean Leidy, Notary Public
Doylestown Twp., Bucks County
My Commission Expires Apr. 26, 2003

NOTICE

Tinicum Conservancy, with the cooperation of Bedminster, Plumstead and Tinicum Townships is completing work on a **Tohickon Creek Watershed Rivers Conservation Plan** which is funded by the Pennsylvania Department of Conservation and Natural Resources. The plan will include land resource information, GIS mapping, a watershed field assessment and a conservation management plan to help preserve open space and maintain the water quality, protect wildlife habitat, and remediate problem areas.

The public is invited to a presentation of the draft plan and to share their comments and recommendations with the Plan Advisory Committee during a **special meeting** on **Wednesday, June 12 at 7:30 p.m.** at the Tinicum Township Municipal Building. After final additions and corrections, the plan is expected to be presented for adoption in July, 2002.

Further information may be obtained by calling the Township Building at (610) 294-9154.

21 M 29, J 5

Bucks County, SS.

Susan McGurk being duly affirmed according to law, deposes and says that he/she is the

Billing Manager

(Manager or Designated Agent)

of the CALKINS NEWSPAPERS INCORPORATED, Publisher of the Intelligencer, a newspaper of general circulation, published and having its place of business at Doylestown, Bucks County, Pa. and Horsham, Montgomery County, Pa.; that said newspaper was established in 1886; that securely attached hereto is a printed notice which is exactly as printed and published in said newspaper on

November 5, 2002

and is a true copy thereof; and that this affiant is not interested in said subject matter of advertising; and that all of the allegations in this statement as to the time, place and character of publication are true.

Susan L McGurk

NOTICE
TINICUM
CONSERVANCY

Tinicum Conservancy, with the cooperation of Bedminster, Plumstead, Nockamixon, and Tinicum Townships has completed the **Lower Tohickon Creek Watershed Conservation Plan** funded by the Pennsylvania Department of Conservation and Natural Resources. The plan includes land resource information, GIS mapping, a watershed field assessment and a conservation management plan to help preserve open space and maintain the water quality, protect wildlife habitat, and remediate problem areas.

The Plan will be presented to the public during a **special meeting** on **Thursday, November 14, at 7:30 p.m.** at the Plumstead Township Municipal Building, 5168 Stump Road, Plumsteadville, PA 18949. Citizens from the four townships are invited to come and share their comments and suggestions with the Plan Advisory Committee.

Further information may be obtained by calling Marion M. Kyde, Ph.D. Grant Administrator, Tinicum Conservancy (610) 847-8650.

1t:N 5

Affirmed and subscribed to before me

this 06 day of November

A.D. 20 02

Normajean Leidy

Notarial Seal
Normajean Leidy, Notary Public
Doylestown Twp., Bucks County
My Commission Expires Apr. 26, 2003

THE TOHICKON CREEK WATERSHED STUDY IS UNDERWAY!

Public Meeting Announcement
SEPTEMBER 27, 2001, 7:30 PM
Bedminster Township Municipal Building, 3112 Bedminster Road

The Tinicum Conservancy was recently awarded a grant to develop a Watershed Plan and Riparian Corridor Study for the Tohickon Creek Watershed. The public is invited to hear about the project, but more importantly, to participate in providing us with your recommendations for solving problems and enhancing our resources.

Please attend our first public meeting to hear about the study and, more importantly, to provide us with your input!

The area of study includes the main stem of the Tohickon Creek and its' tributaries (e.g., Deep Run, Deer Run, Cabin Run, Geddes Run, Irish Run, and Hickory Creek). The study area also includes the land area (watershed area) surrounding the Creeks in Tinicum Township, Nockamixon Township, Bedminster Township, Plumstead Township, and Dublin Borough. The studies will contain the following information:

- An Inventory of Significant Natural, Cultural, Historical, and Recreational Resources,
- Demographic Information and Projections,
- Geographic Information System (GIS) Maps,
- Photographs of the Area,
- Trail Feasibility Study, and
- A Watershed Management Plan.

What is important to you about the Tohickon Creek Watershed?
Are there any problems or threats to the future of this area that concern you?
Are their issues that you feel are not being addressed?
What area values would you particularly like to see preserved?

For Questions or more information, call Dr. Marion Kyde, Grant Administrator, Tinicum Conservancy (610) 847-8650

The Tohickon Creek Watershed , First Public Mtg.
(Draft Outline for Sept. 27th Meeting)

Time Allotment: 10-15 minutes including Questions and (hopefully) intelligent & informed responses from Forbes

I. Similar DCNR Funded Projects In Bucks
(Intent: Get People Interested In Potential Implementation Projects that may be funded through DCNR program)

- Nehaminy Creek Watershed Education/Restoration/Planning Projects
- Tinicum Creek Watershed Education/Restoration/Planning Projects

II General Overview of Tohickon Creek Watershed Project Area
(Intent: Photographs of project area. Please note: I will show similar slides/photos from kick off meeting, but will delete any reference to the hotdog man!)

- Photographic Tour, Nockamixon Dam to Delaware River

III. The Project Planning Process
(Intent: An overview of what is required by DCNR and how the committee will meet them)

- Public Meetings
- Assessment
- Plan
- Municipal Resolutions of Support
- Rivers Registry
- Implementation Funding

IV. Watershed Plan Outline
(Intent: Provide an overview of plan components)

- Project Area Characteristics
- Public Issues/Concerns
- Watershed & Creek Corridor Assessment Findings
- List of Significant Natural, Cultural, Historical, & Recreational Features
- Conservation Management Plan

V. Research Effort Update
(Intent: Provide examples of the type of information attendees could help us with & obtain additional volunteers for upcoming river trip/corridor assessment)

- Questionnaires & Response Update
- Initial Field Assessment, Significant Natural/Cultural Features
- Initial Field Assessment, Potential Problem Areas

??? Questions & Feedback From Attendees & Committee ???

The Tohickon Creek Watershed Study & Riparian Corridor Study
Public Meeting #1, September 27, 2001, 7:30 PM
Bedminster Township Building
3112 Bedminster, PA 18910

I. **Introductions,** *Marion Kyde PhD, Project Administrator*

II. **Watershed Study & Riparian Corridor Study Overview,** *Suzanne Forbes, Princeton Hydro, LLC, Environmental Consultant*

III. **Open Space Features & Current Preservation Efforts in Watershed,** *Wendy Batiste, Bedminster Land Conservancy & Marion Kyde,PhD Tinicum Conservancy & Tinicum Open Space Commission*

IV. **Agricultural Features & Current Preservation Efforts in Watershed,** *Ken Goldenburg & Ken Bupp, Bucks County Agricultural Preservation Program*

V. **Significant Natural Features In Watershed, Bucks County Inventory,** *Marion Kyde PhD, Tinicum Conservancy*

VI. **Significant Historic Features In Watershed,** *Randy Apgar, Friends of the Delaware Canal*

VII. **Wild & Scenic River Designation** *Richard McNutt, Vice President, Delaware River Greenway Partnership & Plumstead Township Parks & Recreation Commission*

VIII. **Guided Questions, Open Discussion & Public Comment,** *Subcommittee & Attending Public*

- What is important to you about the Tohickon Creek Watershed?
- Are there any problems or threates to the future of this area that concern you?
- Are there issues that you feel are not being addressed?
- What area values would you particularly like to see preserved?
- How would you preserve the identified values?

IX. **Adjourn, 9:00 PM**

pH Princeton Hydro, Memorandum

To: **Marion Kyde, PhD**

CC: **Suzanne Forbes, AICP**

From: **Jessica DiMauro, Project Planner**

Date: **6/4/02**

Re: **Tohickon Creek Watershed Plan, # 229.01**

The following are the public comments received from the first public meeting for the Tohickon Creek Watershed Plan (September 27, 2001). Please feel free to distribute this information to the Plan Advisory Committee, Attendees, DCNR and others:

Water Quality & Water Quantity

The first concern expressed had to do with what goes into the creek (including effluent, chemical and road run-off and non-point pollution). The Quakertown sewage plant was brought up specifically. There was also a question about bottom releases from the Nockamixon Dam. People were worried about whether there is sufficient water of high quality for reasons including fishing. Questions arose about a loss of groundwater and whether the watershed level has gotten lower, (especially at Deep Run). With regard to stormwater planning (Act 537 Plans), attendees felt that regionally consistent planning was needed., but implementing the plan was probably more important. Also, improving storm sewers and their impact on the watershed while enforcing sewage disposal laws and taking notice of road pollution (mud from trucks) which can impact the stormwater system.

Recreation , Public Access, and Aesthetic Amenities

Public access for hiking and canoeing (especially south of the dam) along with the maintenance of the scenic and historic character (ex. High rocks) of the area were deemed important. In order to maintain the agricultural character, people want to preserve the farms along the watershed. There is an interest in maintaining the riparian canopies, (e.g., over story and under story). They asked for regional zoning, stricter guidelines and the prevention of urban sprawl (including expansion of the highways). The public wants to prohibit the use of public funds in the development of the "watershed growth boundary".

Education & Citizen Involvement

People were very interested in citizen involvement and in becoming part of watershed associations.

Other Concerns

Suggestions included enforcing weight limits to protect bridges and characteristic roads.

Name/Address	**Would You like to be Added to the mailing list?**	**Would you like to Volunteer?**	**Phone/e-mail**
Suzanne ForbesPrinceton Hydro, LLC, 80 Lambert Lane, Lambertville, NJ 08530	Yes	Yes	609-397-5333 sforbes@princetonhydro.com
Harold Meyers Bedminster Twp.	No	No	---
Joy Platz Bedminster Twp.	Yes	No	joyus@epix.net
Bill Mischke Bucks Co. Boy Scouts Plumstead Twp.	Yes	Not Sure?	215-297-5290 ext. 10 campock@voicenet.com
George Simpson PO Box 119 Pt. Pleasant, PA 18950	Yes	Not Sure?	215-297-5011 mbxd@ix.netcom.com
Owen & Pat Simmons 57 Blueberry Lane Perkasie, PA 18944	Yes	No	215-766-2025
Barbara Thomas 1274 Birch Lane Perkasie, PA	Yes	No	215-795-0626
Dorothy Longacre 1216 Kellers Chruch Rd. Perkasie, PA 18944	Yes	No	215-795-2689
Gabriel A. Battioti 1906 Sweetbriar Rd. Ottsville, PA 18942	Yes	No	215-795-2822
Tom Fountain Pennoni Associates Bedminster Twp.	Yes	Yes	215-345-4591 tfountain@pennoni.com

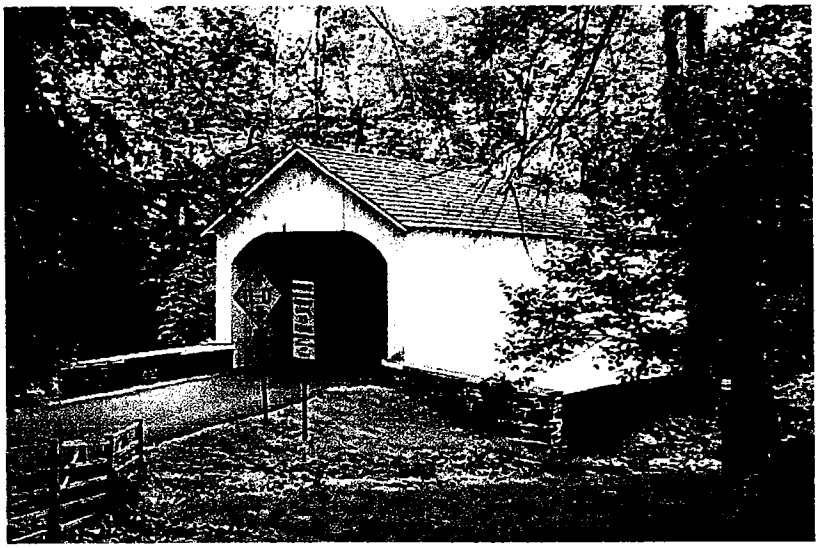
Don Steeley Bedminster	Yes	No	215-795-0219
Harold Steeley Tinicum	Yes	No	215-795-2245
Joan Quinby Tinicum	Yes	No	610-294-9548
Churchville Nature Center			cncbc@verizon.net

PUBLIC MEETING

Presentation of the Lower Tohicken Creek Watershed Conservation Plan

Presentation will be conducted for citizens of the watershed including Bedminster, Plumstead, Nockamixon, and Tinicum Townships

Thursday, November 14
7:30 pm
Plumstead Township
Municipal Building
5168 Stump Road, Plumsteadville, PA



For Further Information Contact
Marion M. Kyde, Ph.D, Grant Administrator

Lower Tohickon Creek Watershed Conservation Plan

~ Final Meeting ~

Attendance

Name	Address/Email	Phone Number
Bill Rankin	Wrankin99@hotmail.com	
Gretchen Schatschneider	gretchenschats@bucksconservation.org	215-345-7577 x106
Bridget Wingert Joe Wingert	Bucks County Herald P.O. Box 685 Lahaska, PA 18931	215-794-1096
Mike Frank	Heritage Conservancy	215-345-7020
Wendy P. Battisti	Bedminster Land Conservancy	215-795-2352
Suzanne Forbes	DRGP	215-340-1252
Neil Kyde	Tinicum Open Space Commission	610-847-8650
Nick Forte	Tinicum Township (Supervisor)	610-294-9599
Norman MacArther	Tinicum Township	610-294-1097
Richard McNutt	DR Greenway	215-340-1707
Martie Kyde	Tinicum Conservancy, Tinicum Township EAC, OSC	
Bob Red Hawk, Chief	Lenape Nation	610-277-8639
Rich Myers	Delaware River Keeper Network P.O. Box 326 Washington Crossing, PA 18977	215-369-1188
Reng Willoughby	Pipersville, PA	215-766-8896

Lower Tohickon Creek Watershed Conservation Plan

~ Final Meeting ~

Attendance

Name	Address/Email	Phone Number
Sally Horn Stu Horn	14 Stover Park Road	215-297-5636
Sheree Cote	kingsisl@comcat.com	215-297-0528
Tom Lurz	Plumstead EAC kingsisl@comcat.com	215-297-0528
Andrew Thomas	Plumstead EAC athamas@arci.net	215-297-9328
Trevor McNeill	Tinicum Township, Planning Commission environs@epix.net	610-294-9803
Craig Tauger	cgtrauges@prodigy.net	215-766-8549
Donald E. Steeley	3612 Spruce Hill Road Ottsville, PA	215-795-0219
C.C. Hopf	Bridgeton Township, Planning Commission	
Lynn Bush	BC Planning Commission, Director	
Fred Werkheiser	Consultant to Lenape Nation Werkheisershres@aol.com	610-759-7046
Dorothy Longacre	Bedminster Planning Commission Perkasie PA 18944	
Ron La Rue	Bedminster, PA	

Minutes of a
PUBLIC MEETING

Presentation of the
Lower Tohickon Creek Watershed Conservation Plan

Presentation conducted for the citizens of the watershed

November 14, 2002
7:30 P.M.
Plumstead Township Municipal Building
5168 Stump Road, Plumsteadville, PA

Attendees: see attached attendance sheets

Introduction of the Plan Advisory Committee: Marion M. Kyde

Introduction of Mark Gallagher, VP, Princeton Hydro: Marion Kyde

Highlights of Plan Process: Mark Gallagher

- The watershed was examined for its strengths and weaknesses.
- The process included data collection from as wide a variety of residents as possible, from public officials, and from questionnaires.
- The watershed is still in remarkably pristine condition –65% forested along the main stem.
- Major goals were developed from questionnaires, public comment, interviews with residents and township officials.

Presentation of the Management Goals and Recommendations: Dr. M. Kyde

- Management goals are seven in number:
  - ⇒ Natural and cultural resources protection
  - ⇒ Water quality and water quantity protection
  - ⇒ Stream corridor protection
  - ⇒ Education and stewardship implementation
  - ⇒ Environmental planning and protection
  - ⇒ Recreation resource enhancement
  - ⇒ Capital improvement provision

- Why do a plan like this? Having the plan may provide funding/planning opportunities.

Questions from the audience: M.M.K. and M.G.

- Bill Rankin: can the Plan be issued on CD-Rom? Ans: Princeton Hydro will do this.

- Gretchen Schatschneider: Is there a list of proposed projects? Ans: Any of the recommendations may be considered a project. Others are suggested in Section 7 and the Appendices.

- Rene Willoughby: How were people picked for surveys? How many were involved? Ans: Questionnaires were sent to all Tinicum and Plumstead residents through their newsletters, Bedminster and Tinicum Conservancies were sent questionnaires, input was requested at all public meetings, questionnaires were available at municipal buildings, and public officials were interviewed.

- Andrew Thomas, Plumstead EAC: Are there materials contained in the Plan that would help in a study of water resources –groundwater, wetlands, etc—that would help lead to a plan for sustainable growth? Ans: Yes, and when this plan is approved, there may be funding for this kind of work.

- Tom Lurz, Plumstead EAC; Is there anything in the plan to help us with a contemplated Natural Resources Inventory? Ans: Yes, and there are plans to apply for a study assisted by Dr. Ann Rhoads.

- Several questions related to potential development in the watershed, eliciting these responses from Mark Gallagher:

  -recharge/infiltration is going to assume more importance in the future. NJ is going to enact new regulations in the next year, and perhaps PA will follow.
  -minimize the amount of land that a developer can disturb/reshape. This will help with recharge issues.
  -identify priority areas and shape township regulations to limit development in these areas. Development can't be stopped , but it can be guided to appropriate places.

- C.C.Hopf: Citizens need to make their feelings known by going to local meetings and speaking out. Urge local bodies to deal with the critical issues of sprawl, water resources, etc. The land we live on has only a certain capacity; we need to push for sustainable growth.

- Rene Willoughby: How do we protect land? Neighbors are getting older and may wish to sell to developers. Ans: There are many programs/methods –conservation easements, local/county/state programs to purchase development rights, farmland preservation programs.

Chief Robert red Hawk Ruth, representing the Lenape Nation, presented a proclamation from the Pennsylvania Tribal Council to Marion Kyde, Plan Administrator, recognizing her efforts to include Native Americans in the study.

Marion Kyde and Mark Gallagher thanked all in attendance for coming and invited the attendees to continue informal discussions over refreshments.

Meeting was adjourned at 9:00 P.M.

Respectfully submitted,

Norman A. Mac Arthur, Lower Tohickon Watershed Conservation Plan Advisory Board

The Lower Tohickon Creek Watershed Conservation Plan

November 14, 2002
(7:30 PM Plumstead Township Municipal Building)
Fourth Public Meeting
Final Plan Presentation

pH

The Lower Tohickon Creek Watershed Conservation Plan Overview

presented by
Tinicum Conservancy
and
pH Princeton Hydro, LLC
First Public Meeting March 7, 2001
Second Public Meeting September 27, 2001
Third Public Meeting June 12, 2002
Funding from ~
Department of Conservation & Natural Resources
& Citizen Volunteers

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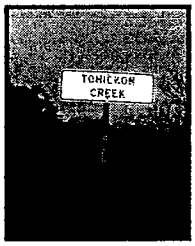
The Tohickon Creek Watershed Plan



Plan Advisory Committee

Marion M. Kyde, PhD, Chair
Wendy Battisti, PhD
Robert Red Hawk Ruth
Victoria Halliday
Stuart Horn
Sally Horn
Norman MacArthur
Richard McNutt
Sally Mirick
Alan Powell

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The Tohickon Creek Project Area *From the Nockamixon Dam...*

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The Project Area *...through Bedminster Township*

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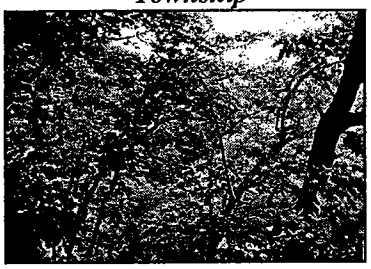
The Project Area *...Stover Myers Mill*

pH

The Project Area

...High Rocks State Park, Tinicum Township



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The Project Area

... Ralph Stover State Park, Plumstead Township

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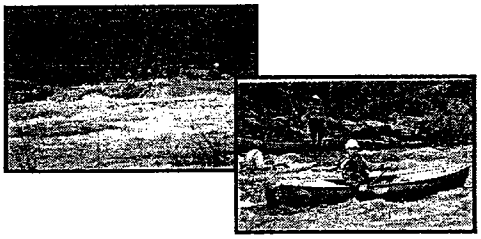
The Project Area

... Tohickon Valley County Park, Tinicum Township



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The Project Area

... Delaware Canal State Park

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The Project Area

...Confluence With the Delaware River

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The Project Area Also Includes....

.... 6 tributaries; Deep Run, Cabin Run, Geddes Run, Deer Run, Wolf Run, and Mink Run and all or portions of 5 Municipalities; Bedminster, Tinicum, Plumstead, Nockamixon and Dublin

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The watershed study area encompasses 24,125 rural acres.

Watershed Study Planning Process

1. **Project Start Up** - Organize Steering Committee, Begin Gathering Information, Inform the Public.
2. **Collect & Analyze Resource Data**- Physical, Natural & Cultural, Keep Public Informed
3. **Draft Plan**- Present at Public Meetings
4. **Final Plan**- Submit to DCNR along with Municipal Resolutions of Support
5. **Formalize Effort**- DCNR Approval, Pennsylvania Rivers Registry
6. **Plan Implementation**- Implement Management Plan Recommendations

Parts of a Watershed Plan

Project Area Characteristics
Watershed Specific Issues
Land Resource Inventory
Water Resource Inventory
Biological Resource Inventory
Cultural Resource Inventory
Corridor Assessment
Identification of Potential Problem Areas
Management Options
Appendices & Figures

Identifying Local Issues

Study Questionnaire

- **Nonprofit Newsletters**
- **Municipal Newsletters**
- **Public Meeting Distribution**

Watershed Assessment

A Volunteer Based Watershed Assessment Helped to Identify Significant Cultural, Historical and Natural Features.

Similar DCNR Funded Projects

Neshaminy Creek Watershed Plan
Tinicum Creek Watershed Plan

Neshaminy Creek Watershed Plan

Four Municipalities~ Doylestown EAC (Applicant)
Implementation ~ On Rivers Registry, Currently Working on Phase IV Grants
Completed To Date ~ Central Bucks 6th Grade Curriculum, Creek Access Trail, Kiosks, Stream Crossing Signs, Wetland and Riparian Corridor Enhancement, and Stream bank Restoration

Tinicum Creek Plan

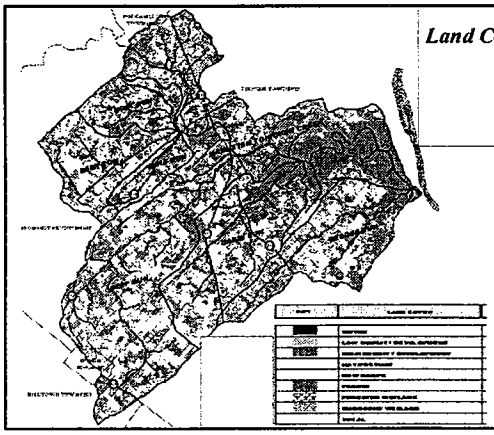
Three Municipalities – Bridgeton, Nockamixon and Tinicum
Implementation ~ On Rivers Registry, Currently Working on Phase II Grants
Current Grant Applications - Headwater Protection, First and Second Order Stream Mapping, groundwater resource mapping

Cabin Run

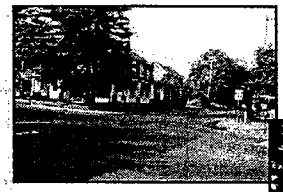
Key Features of the Watershed

- *The Tohickon Creek is one of 19 sites designated as Priority I Areas in the Bucks County Natural Resources Inventory*
- *The Tohickon Creek mainstem is designated as Wild and Scenic*
- *48.5% of the watershed is forested; 65% along the mainstem*
- *Only 1.6% of the watershed is developed*

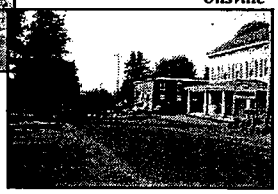
Land Cover



Existing Development Features

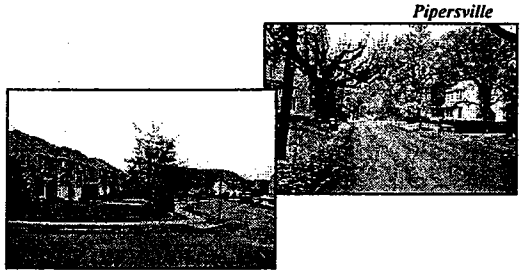


Ottsville



Bedminster

Existing Development Features



Pipersville

Plumsteadville

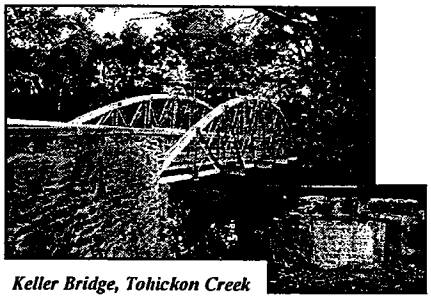
Historic Amenities

Loux Bridge, Cabin Run

Historic Amenities

Cabin Run Bridge

Historic Amenities



Keller Bridge, Tohickon Creek

Historic Amenities

Lenni Lenape Cairn

Historic Amenities

Rock Shelter

Agriculture

Scenic Farms and....

Agriculture

More Scenic Farms

Natural Resources

View from High Rocks

Natural Resources

Riverine Wetlands

Inventory Findings

Inventory of Natural, Scenic, Recreational and Cultural Resources

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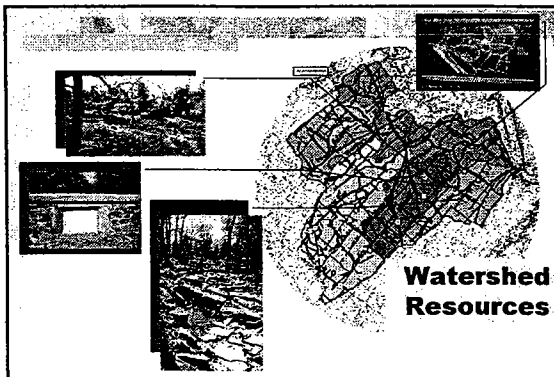

Historic Bridges, Forests, Important Geologic Features & Recreational Amenities.

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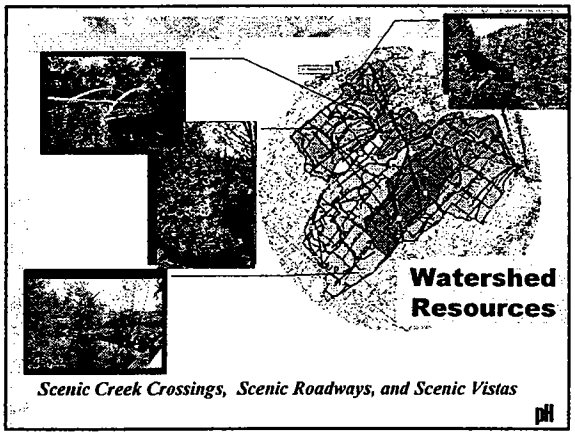

Scenic Creek Crossings, Scenic Roadways, and Scenic Vistas

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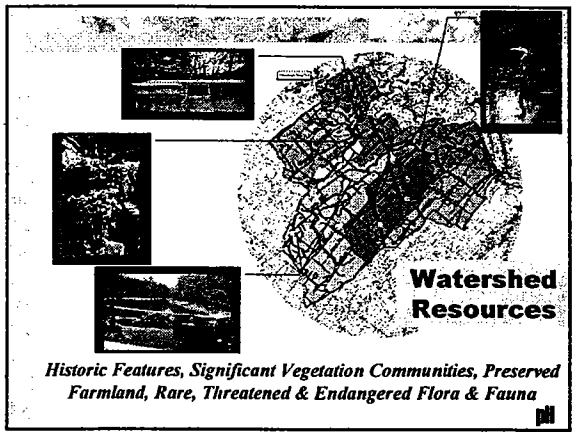

Historic Features, Significant Vegetation Communities, Preserved Farmland, Rare, Threatened & Endangered Flora & Fauna

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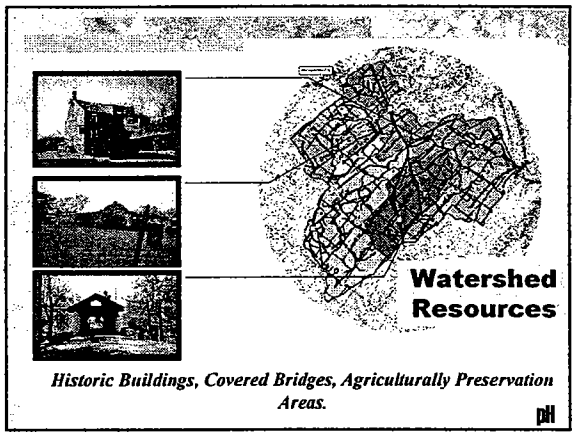

Historic Buildings, Covered Bridges, Agriculturally Preservation Areas.

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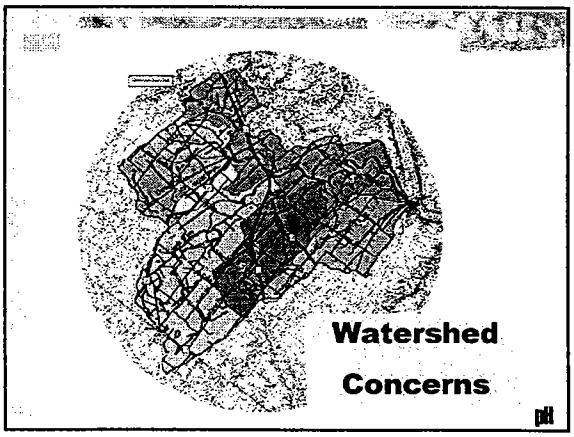

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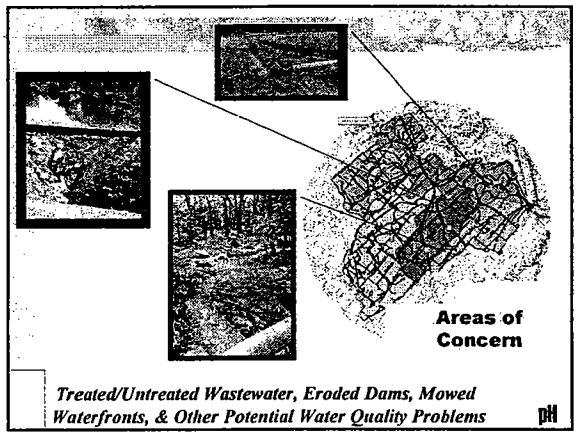

Treated/Untreated Wastewater, Eroded Dams, Mowed Waterfronts, & Other Potential Water Quality Problems

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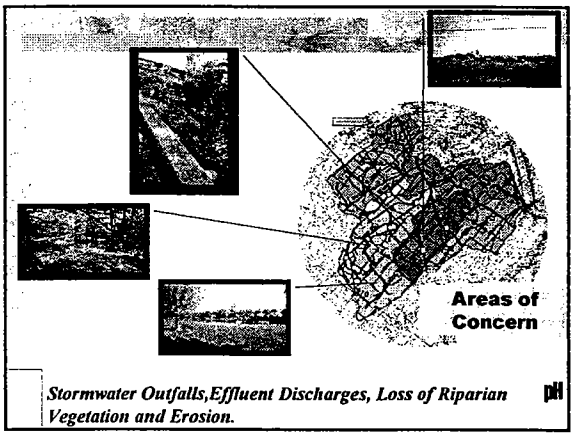

Stormwater Outfalls,Effluent Discharges, Loss of Riparian Vegetation and Erosion.

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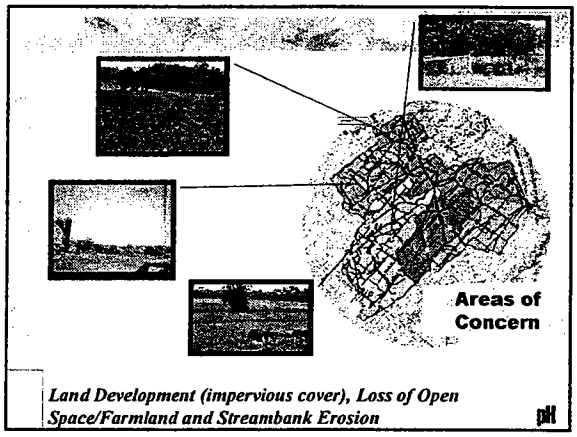
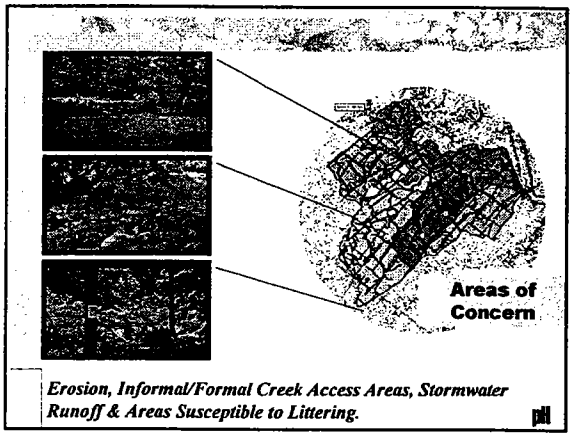
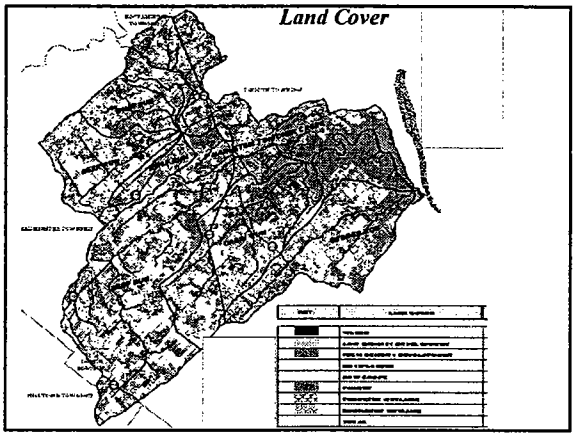


Land Development (impervious cover), Loss of Open Space/Farmland and Streambank Erosion



Erosion, Informal/Formal Creek Access Areas, Stormwater Runoff & Areas Susceptible to Littering.



Management goals

Goal One: Natural and cultural resource protection – protect and preserve outstanding natural biodiversity and cultural resources in the Tohickon Creek and surrounding watershed.

- Protect rare natural resources: floodplains,wetlands, SSC.
- Develop a conservation greenway along the mainstem to serve primarily as wildlife habitat, minimizing human impacts.
- Complete a flora for the watershed area.
- Create an inventory of Native American sites and artifacts in the watershed.
- Apply for Important Bird Area status. Preserve habitat.
- Create a Native American Museum to showcase the early history and explain the important sacred sites.
- Limit access and prohibit development in the mainstem valley.

Management Goals

Goal Two: Water quality and water quantity protection – protect and maintain existing water quality and quantity in the Tohickon creek and its tributaries.

Upgrade and strengthen municipal ordinances to highest protection levels with special emphasis on groundwater protection.

Protect and expand buffer areas to maintain water quality and temperature.

Restore eroded streambanks, where they exist, to reduce erosion, sedimentation, and associated pollutants.

Establish and fund volunteer water quality monitoring and nps protection committees on main stem and tribs.

Implement programs for maintenance of water quality and groundwater protection.

Preserve forested areas and update stormwater regulations to increase groundwater recharge.

Management goals

Goal Three: River corridor protection - preserve the forested reaches of the Tohickon Creek Corridor and tributaries; enhance and restore areas where necessary.

Protect and preserve as much land as possible in the stream corridor in order to protect habitats from the Quakertown Swamp to the Delaware River.

Restore eroded streambank and replant forest cover where needed to improve river corridor amenities.

Encourage private conservation easements along main stem and tributaries.

Prohibit use of motorized vehicles and mountain bikes on existing trails.

Management Goals

Goal Four: Education and stewardship implementation - create and maintain an informed and pro-active citizenry throughout the watershed.

Initiate an education program that links land use and water quality and quantity.

Expand education efforts with emphasis on private landowners next to the creeks and tributaries.

Implement a volunteer clean-up and trail maintenance program.

Circulate findings of the study.

Management Goals

Goal Five: Environmental planning and protection- enforce existing environmental protection tools and provide additional planning protection where needed.

Place conservation easements on parkland in perpetuity.

Implement and strengthen municipal zoning to protect stream corridors and resource protection districts.

Require better pollution prevention.

Management Goals

Goal Six: Recreational resource enhancement- enhance existing passive recreational opportunities without negatively impacting natural and cultural resources.

Locate high impact recreation away from the stream corridor. (paved trails, overnight camping, picnic areas.)

Encourage dam releases from the bottom, not the spillway, to restore a cold water fishery.

Establish an equestrian park/center to provide trails and recreational opportunities for riders and support local agriculture.

Examine possible boating access areas along 611 and other public locations, such as parklands.

Undertake a feasibility study to determine a possible route for a Greenway trail in the Lower Tohickon watershed.

Management Goals

Goal Seven: Capital improvement provision- provide reliable and consistent funding to preserve, restore and manage the natural, cultural and recreational amenities within the Tohickon Creek Watershed.

Provide financial incentives for preservation and protection efforts.

Continue state and county preservation finding programs.

Encourage financial support for land preservation groups.

Use funding for resource protection, and fund improved recreational access by user fees/permits/municipal bonds.

Thank You

Memo

To:	Tohickon Creek Corridor Assessment Volunteers (Stu Horn, Sally Horn, Victoria Halliday & Colette Grub)
From:	Suzanne Forbes, AICP (609) 397-5335
Date:	10/25/01
Subject:	Volunteer Assessment (Ralph Stover to Delaware)
cc:	Marion Kyde, PH.D

–

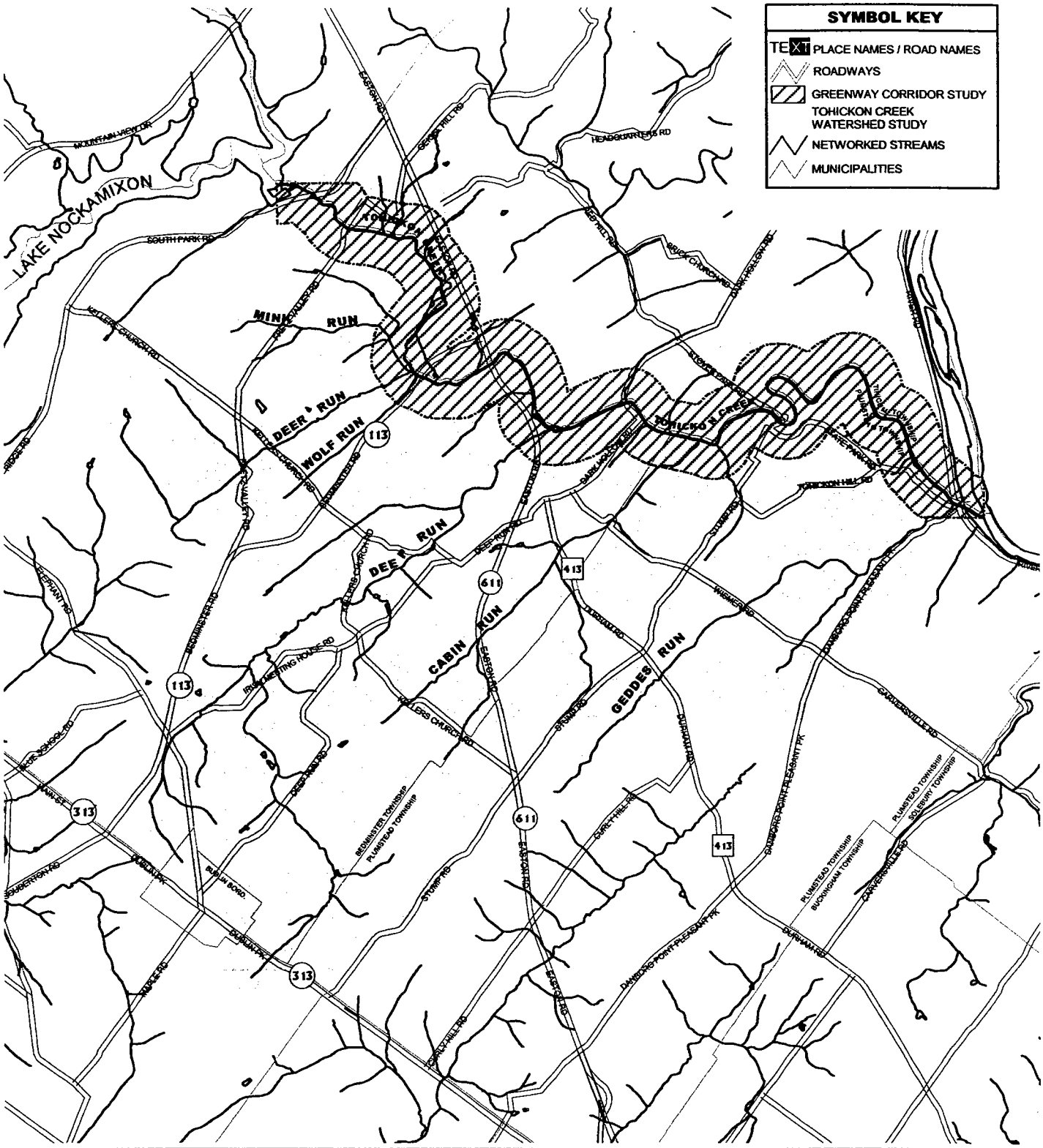
Thank you!: A number of you have volunteered to complete a corridor assessment for the Tohickon Creek from Ralph Stover Park to the Delaware River. Thank you!

Paperwork: I have attached a map & a directions sheet entitled " The Tohickon Creek Watershed Field Assessment" for each of you. I will need these sheets after you have completed your assessment. I also sent a larger package to Colette Grub, because she is just joining us and she wanted to catch up! Thank you Colette!

An Assessment? On horseback?: Victoria Halliday is planning on completing her assessment on horse back while I imagine the rest of you will be performing your assessments on foot. It's probably best that you coordinate with each other and that you all remember to assess the creek and approximately 500' on either side of the creek.

Things to remember: We are interested in assessing 1) Amenities such as birds, animals, geological features, view sheds and 2) Potential problems such as erosion, litter, lack of flow, potential pollution etc. Also, if you plan on taking photographs, make sure you note exactly where the photograph was taken. Finally, remember to keep track of your volunteer hours and provide them to Marion Kyde for her "books".

Most Important: Have fun & call me if you have questions!



TOHICKON CREEK WATERSHED STUDY, 2001

500 0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 Feet

SCALE 1: 24,000
Map Projection: STATE PLANE, PA, NORTH, FEET

Figure 1: Tohickon Creek Location Map

DRAWN BY:	KJM
CHECKED BY:	GMG, SF

Project No.: 229.01

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THE TOHICKON CREEK RIVER CORRIDOR ASSESSMENT

Interested in Boating, Enjoying the Outdoors & Helping With the Tohickon Creek Watershed Plan?

Several people expressed an interest in completing the Tohickon Creek Corridor Assessment. Ideally, the assessment will involve boating from South Park Road in Nockamixon to Ralph Stover Park in Plumstead Township. However, volunteers may park their cars at convenient access areas/cross roads if they prefer to leave earlier.

- **When:** Saturday, November 10th, 2001
- **Time:** 10:00 AM - 2:00 PM
- **Meeting Location:** South Park Road, Nockamixon Township (Bridge over Tohickon Creek)
- **Bring:** Your Canoe/Kayak, Boating Equipment, Your Lunch, Water, & Extra Set of Dry Clothing, please dress for the weather.

Several extra kayaks may be available for those of you without boats and game enough to join us! We will be taking photographs of resource amenities and problem areas throughout the day. All photographs will be correlated with maps and field sheets. Field sheets, clip boards, water-proof pens will be supplied.

Please Call Suzanne Forbes, AICP of Princeton Hydro, LLC if you are coming or if you have any questions about the event. She may be reached at (609) 397-5335 during working hours.

TOHICKON CREEK WATERSHED SURVEY

The Tohickon Creek Watershed is the entire land area draining to the Tohickon Creek and its tributaries (Deer Run, Mink Run, Deep Run, etc) while the "Tohickon Creek Greenway Study/Trail Feasibility Study Area" is the area within 500 feet of both sides of the Main Stem of the Tohickon Creek. Please refer to the attached map illustrating the two study areas.

Questions For Both Studies

- ***Do you live in the Tohickon Creek corridor or the Tohickon Creek Watershed Area (See Attached Map)? Yes or No***

- ***In which municipality do you live?*** _____

- ***(Optional Question) Where? (Mark on attached map or note as much location information as willing)***

  _____

- ***Circle one: Own home or rent home?***

- ***Circle one: Year-round or seasonal use?***

- ***Are you employed in the Tohickon Creek Greenway/Trail area or the Tohickon Creek Watershed Area (See Attached Map)? Yes or No***

- ***(Optional Question) If so, where? (Mark on attached map or note as much location information as willing)***

  _____

- ***If you would like to see increased river access within the study areas (e.g. boat ramps/launches, to service canoes, rafts, and kayaking, where should additional access sites be located (mark on attached map)?***

- ***Please let us know (mark on the attached map) if there are problems (e.g. littering, erosion, flooding) or perceived/confirmed problems with water quality (e.g., odor, color) in or adjacent to the Tohickon Creek and its' tributaries.***

  Please mark on the map any areas you know that are especially important as plant or animal habitat or are particularly scenic.

Questions For the Tohickon Creek Watershed Study

A watershed is all of the land area that surrounds and drains to a stream, river or lake (Please take a look at the attached map showing the Tohickon Creek Watershed before you answer the following)

- ***Did you know the definition of "watershed" before you read the definition above? (Circle one: yes or no or somewhat).***

- ***Did you know the boundary of the Tohickon Creek watershed before you looked at the attached map? (circle one: yes or no or somewhat)***

- ***Please rate the most important amenities (e.g., quality of life, natural resources, cultural/historical) you feel are present in the Tohickon Creek Watershed. (Rate in order of priority, with "1" as highest)***

____Scenic value
____Cultural and historic resources
____Recreation options
____Groundwater recharge areas
____Good Water Quality
____Wildlife habitat
____ Rare & Endangered Species
____ Economic Opportunities
____Other (please specify)_____

- Please indicate whether you would recommend encouraging or discouraging each of the following throughout the Tohickon Creek Watershed Area

ENCOURAGE	DISCOURAGE	
____	_____	Preservation of undeveloped land (no dev)
____	_____	Groundwater protection
____	_____	Natural resource protection (for wildlife)
_____	_____	Preservation of farmland and farming
_____	_____	Preservation of historic/cultural resources
_____	_____	Preservation of scenic character
_____	_____	Wildlife habitat preservation
_____	_____	Protection of natural resources (for human use)
____	_____	Residential development (homes)
____	_____	Shopping centers and retail development
____	_____	Other commercial development (offices)
____	_____	Institutional development (hospitals/schools)
____	_____	Industrial development (manufacturing)
____	_____	Redevelopment (using abandoned blgs etc)
_____	_____	Tourism
_____	_____	River recreational opportunities
_____	_____	Land-based recreational opportunities
_____	_____	Protection of landowner rights

List the steps (if any) we (individuals, agencies, elected representatives, local officials, non-profit groups, business leaders) need to take in order to allow for the items you noted in the previous question?_____

_____

_____

Questions for the
Tohickon Creek Greenway Study

- How many times have you been within 500 feet of Tohickon Creek?
  __ 0-2 times ___ 3-5 times __ 6-10 times ___ >10 times

- How often do you use the Tohickon Creek Greenway/ Trail Study Area for any purpose?
  __ 0-2 times/month __ 3-5 times/month __ >5 times/month

- How many times were you in the Tohickon Creek Greenway/Trail Study Area last June through August? __ 0-2 __ 3-5 __ 6-9 __ >9

- Were your activities within the Tohickon Creek Greenway/Trail Study Area primarily: ___ recreation ___ related to property ownership __ other

- Please check the types of recreation that you have participated in within the Tohickon Creek Greenway Study Area

  __ Fishing
  __ Mountain biking
  __ Hunting
  __ Rafting/canoeing/kayaking
  __ Bird watching
  __ photography
  __ horseback riding
  __ hiking
  __ nature study
  __ Other (please list) _____

- The most significant features of Tohickon Creek greenway/trail area: (rate in order of priority, with "1" as highest)

  ____Scenic value
  ____Cultural and historic resources
  ____Recreation options
  ____Environmental Features (Wildlife habitat, clean water, fertile soils)
  ____Economic Opportunities (e.g., Employment)
  ____Other (please specify)

- How would you personally like to use the Tohickon Creek Trail Feasibility Study Area in the future?

  _____
  _____
  _____
  _____

  I would like to see ___ all
  ____some
  of the Tohickon Creek Greenway Study Area preserved in its existing condition.

Please explain why: _____
_____
_____

* Please show us *(by marking on the attached map)* which sections of the Tohickon you feel are important to preserve.

- I would like to see some or all of the Tohickon Creek Greenway Study Area:

  __ developed only for non-paved trails suitable for pedestrians on foot.

  __ developed for non-paved trails suitable for a wider mix of user groups, including hikers, mountain bikers, equestrians

  __ developed for paved trails to accommodate road bicycles and strollers, as well as pedestrians

  __ developed more fully to include picnic facilities, interpretive materials, paved and non-paved trails

  __left undeveloped

- Please indicate whether you would recommend encouraging or discouraging each of the following activities along Tohickon Creek

ENCOURAGE	DISCOURAGE	
____	____	Preservation of undeveloped land
____	____	Residential development
____	____	Shopping centers and retail development
____	____	Other commercial development
____	____	Industrial development
_____	_____	Preservation of farmland and farming
_____	_____	Tourism
_____	_____	River-based recreational opportunities
_____	_____	Land-based recreational opportunities
_____	_____	Preservation of historic resources
_____	_____	Maintenance/improvement of water quality
_____	_____	Fishing opportunities
_____	_____	Preservation of scenic character
_____	_____	Protection of landowner rights
_____	_____	Protection of wildlife habitat
_____	_____	Maintenance of biodiversity (variety of animals and plants)

- __ I would like to see provisions made in the Tohickon Creek Study Area for an activity not listed above. (Please Describe):

- What Steps, if any, would need to be taken in order to allow for your preferred uses?

- Would you be willing to support capital improvements to improve access and recreational opportunities along Tohickon Creek?

  Municipal Bond ___
  Increased Taxes ___
  Permits and/or User Fees ____

A List of Comments Received From the
Tohickon Creek Watershed Plan /Greenway Trail Questionnaire

The following is a tally of responses from the Tohickon Creek Watershed Survey.
Bedminster Land Conservancy Responses: Number Circulated **300** Number Returned **44**

I. Part I:Questions For Both Studies

Watershed Question	Response	Response
Live in the Creek corridor?	# Yes- 9	# No- 28
Live in watershed?	# Yes-37	# No- 6
List the municipality	# Bedminster	
Mark home on map	# Marked- 26	# Not marked-13
List Ownership	# Own home- 42	# Rent home
Home Use	# Year-Round- 41	# Seasonal Use
Employed in study area?	#Yes- 5	# No- 36

II. PART II: Watershed Study Questions

Do you know definition of watershed?	# Yes- 30	# No- 4
Did you know the boundary?	# Yes- 6	# No- 17
Rate most important amenities	***1 is highest, 8 is lowest; Rankings are the first number, the number of people is second.***	
Scenic	1 12 2 3 3 11 4 4	5 8 6 1 7 1 8 0
Cultural/Historic	1 0 2 1 3 6 4 7	5 6 6 10 7 7 8 0
Recreation	1 1 2 0 3 5 4 2	5 3 6 10 7 15 8 0
Good Water Quality	1 9 2 14 3 3 4 5	5 5 6 1 7 0 8 0
Wildlife Habitat	1 14 2 4 3 9 4 6	5 2 6 2 7 1 8 0
Rare & Endangered Species	1 3 2 9 3 0 4 5	5 4 6 6 7 5 8 0
Economic Opportunities	1 0 2 0 3 0 4 0	5 0 6 0 7 0 8 0
Groundwater Recharge	1 6 2 8 3 4 4 5	5 6 6 4 7 1 8 0

~ Watershed Responses Continued ~

Watershed Question	Response	Response
No Development	# Encourage-41	# Discourage
Groundwater protection	# Encourage-41	# Discourage
Natural Resource Protection (Wildlife)	# Encourage-40	# Discourage
Preservation of farmland/farming	# Encourage-41	# Discourage
Preservation of Hist/Cultural resources	# Encourage-35	# Discourage-1
Preservation of Scenic Character	# Encourage-39	# Discourage
Protection Natural Resources (Humans)	# Encourage-37	# Discourage-1
Residential Development (Homes)	# Encourage-0	# Discourage-40
Shopping Centers/Retail Development	# Encourage-0	# Discourage-41
Other Commercial Development (offices)	# Encourage-0	# Discourage-41
Institutional Dev. (hospitals/schools)	# Encourage-0	# Discourage-41
Industrial Devel. (manufacturing)	# Encourage-0	# Discourage-41
Redevelopment (using abandoned bldgs)	# Encourage-17	# Discourage-22
Tourism	# Encourage-13 1/2	# Discourage-24 1/2
River Recreational opportunities	# Encourage-20	# Discourage -18
Land-based Recreational Opportunities	# Encourage-19	# Discourage -19
Protection of Landowner Rights	# Encourage-37 1/2	# Discourage - 1 1/2

III. PART III: *Tohickon Creek Greenway Questions/Responses*

Greenway Question	Response	Response
How many times have you been within 500 ' of the Tohickon Creek?	0-2 times -1 3-5 times - 3	6-10 times -2 > 10 times - 36
How often do you use the corridor for any purpose?	0-2 times/month - 22 3-5 times/month - 6	> 5 times/month - 8
How many times were you in the trail study area last June-August?	0-2 times - 21 3-5 times - 6	6-9 times - 1 > 9 times - 14
Activities in trail study area?	Recreation - 10 Related to property - 2	Other - 4 (trash clean up, meditation, relaxing)

PART III- *Tohickon Creek Greenway Questions/Responses Continued*

Note the types of recreation you have participated in?	Fishing - 14 Mountain Biking - 4 Hunting - 6 Canoeing/rafting/kayaking - 6 Birding - 21	Photography - 11 Horseback riding - 4 Hiking - 22 Nature study - 13 Other - 5 (visiting relatives, walking, historic)
List most significant features in corridor area	***1 is highest, 5 is lowest; Rankings are the first number, the number of people is second.***	
Scenic value	1 15 2 18 3 9	4 1 5 1
Cultural and historic resources	1 0 2 4 3 18	4 16 5 0
Recreational Options	1 2 2 10 3 18	4 16 5 0
Environmental Features (habitat, clean water, fertile soils)	1 24 2 9 3 5	4 1 5 0
Economic Opportunities (e.g. work)	1 0 2 0 3 0	4 0 5 26
Other (please specify)		
I would like to see ALL or SOME of the Greenway Study Area Preserved in its existing condition.	# All-33	# Some-8
I would like to see some or all of the Greenway Study Area:	***Number Responding to this preference***	
Developed only for non-paved trails suitable for pedestrians on foot.	14	
Developed for paved trails to accommodate road bicycles and strollers as well as pedestrians.	0	
Developed more fully to include picnic facilities, interpretive materials, paved and non-paved trails.	4	
Developed for non-paved trails suitable for wider mix of user groups including hikers, mountain bikers and equestrians.	9	

PART III- *Tohickon Creek Greenway Questions/Responses Continued*

Greenway Question	Response	Response
Do you encourage or discourage each of the following activities along the creek.	***Number Encourage***	***Number Discourage***
Preservation of undeveloped land	38	
Residential development		38
Shopping centers/retail development		38
Other commercial development		38
Industrial development		38
Preservation of farmland and farming		38
Tourism	10	26
River-Based Recreational Opportunities	17	20
Land Based Recreational Opportunities	17	22
Preservation of Historic Resources	38	
Maintenance/improvement water quality	38	
Fishing Opportunities	32	6
Preservation of Scenic Character	38	1
Protection of Landowner Rights	37 1/2	1 1/2
Protection of biodiversity	38	
Wildlife habitat	39	
Would you be willing to support capital improvements to improve access and recreational opportunities along the creek?	***Number Yes - 1***	***Number No- 15***
Municipal Bond	17	
Increased Taxes	9	
Permits/User Fees	16	1
Grants	1	

Bedminster Conservancy, Written Comments

- Creek Road is very scenic from Route 611 to Kellers Church Road.
- Please do not allow any development along this creek including access to boating and the public.
- Keep this creek free from development: Period!
- Do not advertise this creek. The more people, the more trash and destruction.
- If the resources are to be protected, there should be some uses permitted (eg. Canoeing, water supply, hydro-power).
- Land should be purchased within the riparian corridor. We should begin with tracks having the greatest development risk and not the greatest preservation value, because all land is worthy of protection.
- Land on Route 113 and along the creek is presently for sale (Schrantz lots) and are zoned industrial. The lots should be purchased.
- Route 611 (from Pipersville-Rolling Hills Intersection north to Route 113 or at least Old Easton Road) should be placed in a tunnel.
- Regional zoning should be established.
- The link park should be extended from Point Pleasant to Valley Forge.
- A land trail from Point Pleasant to Nockamixon should be established and a water trail from Nockamixon to Point Pleasant.
- Expansion of regional zoning power (e.g. Pinelands, Adirondack Park Agency) would allow for environmental preservation.
- There is already enough development and it is impacting the quality of the environment in our area.
- Funding to implement conservation goals is needed.
- Additional education is needed for Bedminster Township residents through public meetings and mailings.
- Zoning close to streams should allow for the least development and smallest number of users.
- High impact uses (e.g., paved trails, picnic facilities, overnight camping) should be further away from the stream corridor.
- Forested areas should be left alone and unforested areas should be replanted to increase groundwater recharge.
- Watercraft should be allowed, but should not be permitted to camp along the streamside. They should use campsites further inland.
- Development rights should be purchased in the greenway. Easements are fine as long as they are permanent. When money is short eminent domain should be used.
- The actions of individual landowners can have a negative impact on others. Therefore individual land rights should be limited somewhat.
- If a trail was placed along the Tohickon, passive recreational uses should be fostered.
- Geologically rugged areas should be preserved, because they show the Pennsylvania of 200 years ago.
- Paved trails and picnic areas out to be developed in parks adjacent to the greenway study area not in it. Paving trails invites higher numbers. Unpaved trails invite the dedicated, and those less inclined to abuse resources.
- Land in the watershed should be purchased and preserved. Land closer to the Tohickon Creek should be the priority.
- Protecting land in proximity to the creek provides more habitat and a buffer. The stream also provides a fly-way for birds.
- The scenery and environmental features in the greenway area should be preserved. If all the land is preserved, builders would not be able to gain a foothold in the area.
- The proposed Deep Run wastewater treatment plant is a concern. The Dublin Treatment Plant already discharges into the Deep Run. Sometimes the flow is made up entirely of sewage effluent.
- More pollution-prevention education is needed (e.g. septic system maintenance).
- Too much focus is on land/farm preservation rather than protecting waterways.
- We should continue to purchase land development rights.
- Preserving natural habitat and maintaining good water quality is important.

- We do not need increased access to the creek and funding should not be used to improve access along the creek.
- The character of the area is unique to Bucks County and should be preserved.
- People should not be encouraged to use the area. When people move in, pollution and trash tends to follow.
- Wildlife and other species have a right to exist on this planet. We have already taken too much away from wildlife.
- State or local governments should purchase properties or conservation easements from willing sellers.
- Financial incentives encourage preservation and protection.
- The trail feasibility area should be used for hiking, photography, and kayaking.
- The greenway area should be preserved for wildlife, nature preservation, and recreation.
- Local and state legislation is needed to protect the watershed area.
- Adding some recreational facilities (eg, walking trails, picnic tables) the riparian area would be more enjoyable to local residents.
- Personal efforts for preservation, encouraging green legislation, allowing areas for wildlife, and minimal motor use is best.
- The riparian area should be protected and preserved and people are the stewards of wildlife and nature.
- Land protection easements should continue as well as more protective legislation. Education, including river cleanups, should take place especially for landowners right along the creek.
- Passive recreation in the creek corridor and improved walking trails in only the least sensitive areas, because there are many rare and endangered species and important birding areas in the creek corridor area.
- Money should not be used to allow greater access to the river.
- Purchasing easements or working with the Tinicum Conservancy are good ways to block development is a good idea. There should be an economic benefit to the landowner.
- Education and communication is essential to natural resource preservation.
- Taking a leisurely walk along a trail that is several miles long along the Tohickon would be a nice thing to be able to do in the future.
- Preserving the greenway area will increase bio-diversity, provide habitat, and help keep the water clean.
- Walking and hiking trails should be kept separate. Stepping in horse manure is not fun.
- Purchasing and restoring Randts Mill (Route 611) would be a great project.
- Hiking, fishing, and horseback riding trail would be nice.
- Preserving the riparian area is a good idea: less pollution, less traffic, cleaner water, and better for wildlife.
- A location for boats (boat ramp) on the Tohickon is suggested.
- Keeping developers out of the trail feasibility area is a good idea.
- The Tinicum Conservancy is doing an incredible job.
- Humans and animals depend upon good water quality in the Tohickon, therefore the corridor should be preserved in its existing condition.
- Landowners should be encouraged to donate or sell easement rights along the proposed greenway corridor area.
- The natural corridor from Lake Nockamixon to the Delaware River should be preserved in its existing condition for fishing, hiking, boating, and hunting.
- When open space is developed, it's gone forever.
- Pristine natural areas in Upper Bucks County are disappearing. We need to leave as much as possible alone. No development at all (including recreational areas).
- I would support releasing water (from the dam) on a regular basis from the bottom of Lake Nockamixon, not over the spillway. This would maintain natural stream flow to create a tailwater, cold water fishery.
- People need to be better informed.
- Bedminster Township should be maintained as rural.
- More communication is needed between Township residents and local government.
- Let's preserve some of the beauty of this area. Must we ruin all of our land?
- Retaining some natural beauty must take place somewhere in this crazy world.
- Preserving all of the greenway study area is important. Existing parks (e.g., Nockamixon should be used for recreational activities. The rest should be preserved for natural studies (plants, birds, wildlife). We have a

sailboat at Lake Nockamixon and we pay for the privilege. This is where recreation should take place.

- The riparian study area should be left undeveloped. Access and recreational opportunities = no...preservation= yes.
- We are encroaching on the natural habitats of animals. We need to leave land undisturbed for them.
- The trail feasibility area should not allow motorized anything. It should be preserved for water use, nature study, and bicycles.
- State and county funds should be used for preservation.
- The creek area should be preserved, because it is not adaptable to development.
- Providing recreational access is a good thing, but without altering the character of the area.
- Land should be preserved and lot sizes should be increased. We need to fight development.
- Do not make the Tohickon any more of a recreational playground.
- The area should be preserved as it is. It is experiencing enough use.
- The distance between the lake and the river is short. It should be preserved.
- Some areas need bank restoration, so low impact trails may keep people off the more sensitive areas and help to contain "traffic".
- More education is needed (especially for those landowners adjoining the creeks) and should focus upon the importance of watersheds and the quality of life attributes.
- People should support the appropriate environmental groups as well as bond proposals designed to protect land. We should support green candidates.
- So few riparian areas remain in their original state (pre-Columbian) condition. They are important and should be preserved in their natural state for wildlife as well as their aesthetic value for human kind.
- I would support an unpaved trail for foot traffic only.
- Development should be stopped as much as possible!
- Lets keep the area undeveloped with less pollution!!
- Property owners rights should be respected.

Plumstead Township Newsletter Responses
Number Circulated **3000** Number Returned **16**

I. Part I:Questions For Both Studies

Watershed Question	Response	Response
Live in the Creek corridor?	# Yes- 10	# No - 4
Live in watershed?	# Yes - 15	# No - 1
List the municipality	# Plumstead	
Mark home on map	# Marked	# Not marked
List Ownership	# Own home - 13	# Rent home - 2
Home Use	# Year-Round - 15	# Seasonal Use
Employed in study area?	#Yes - 3	# No - 13

II. PART II, Watershed Study Questions

Do you know definition of watershed?	# Yes - 14	# No - 1
Did you know the boundary?	# Yes - 5	# No - 3
Rate most important amenities	***1 is highest, 8 is lowest; Rankings are the first number, the number of people is second.***	
Scenic	**1 4 2 2 3 0 4 3**	**5 5 6 1 7 0 8 0**
Cultural/Historic	**1 1 2 0 3 2 4 0**	**5 5 6 1 7 0 8 0**
Recreation	**1 0 2 1 3 0 4 0**	**5 1 6 1 7 5 8 0**
Groundwater Recharge	**1 5 2 3 3 2 4 2**	**5 1 6 1 7 1 8 0**
Good Water Quality	**1 6 2 3 3 3 4 1**	**5 2 6 1 7 0 8 0**

~ *Watershed Responses Continued* ~

Watershed Question	Response	Response
Wildlife Habitat	1 8 2 2 3 5 4 1	5 0 6 0 7 0 8 0
Rare & Endangered Species	1 2 2 4 3 1 4 6	5 0 6 1 7 0 8 0
Economic Opportunities	1 0 2 0 3 0 4 0	5 0 6 0 7 0 8 9
Other Please Specify		
No Development	# Encourage - 16	# Discourage
Groundwater protection	# Encourage - 16	# Discourage
Natural Resource Protection (Wildlife)	# Encourage - 16	# Discourage
Preservation of farmland/farming	# Encourage - 14	# Discourage - 2
Preservation of Hist/Cultural resources	# Encourage - 13	# Discourage - 2
Preservation of Scenic Character	# Encourage - 16	# Discourage
Protection Natural Resources (Humans)	# Encourage - 16	# Discourage
Residential Development (Homes)	# Encourage	# Discourage - 16
Shopping Centers/Retail Development	# Encourage	# Discourage - 16
Other Commercial Development (offices)	# Encourage	# Discourage - 16
Institutional Dev. (hospitals/schools)	# Encourage	# Discourage - 16
Industrial Devel. (manufacturing)	# Encourage	# Discourage - 16
Redevelopment (using abandoned bldgs)	# Encourage - 8	# Discourage - 8
Tourism	# Encourage - 4	# Discourage - 12
River Recreational opportunities	# Encourage - 4 1/2	# Discourage - 11 1/2
Land-based Recreational Opportunities	# Encourage - 4 1/2	# Discourage - 11 1/2
Protection of Landowner Rights	# Encourage - 7 1/2	# Discourage - 9 1/2

III. PART III: *Tohickon Creek Greenway Questions/Responses*

Greenway Question	Response	Response
How many times have you been within 500 ' of the Tohickon Creek?	0-2 times 3-5 times	6-10 times > 10 times - 16
How often do you use the corridor for any purpose?	0-2 times/month - 6 3-5 times/month - 1	> 5 times/month - 9
How many times were you in the trail study area last June-August?	0-2 times - 0 3-5 times - 5	6-9 times - 1 > 9 times - 10
Activities in trail study area?	Recreation - 10 Related to property - 2	Other - 4 (trash clean up, mediation, relaxing)
Note the types of recreation you have participated in?	Fishing -6 Mountain Biking - 1 Hunting - 1 Canoeing/rafting/kayaking - 6 Birding - 9	Photography - 9 Horseback riding - 4 Hiking - 12 Nature study - 9 Other (list) - 4
List most significant features in corridor area	***1 is highest, 5 is lowest; Rankings are the first number, the number of people is second.***	
Scenic value	1 4 2 9 3 4	4 0 5 0
Cultural and historic resources	1 0 2 5 3 4	4 6 5 0
Recreational Options	1 0 2 1 3 4	4 8 5 0
Environmental Features (habitat, clean water, fertile soils)	1 14 2 1 3 1	4 0 5 0
Economic Opportunities (e.g. work)	1 0 2 0 3 0	4 0 5 10
I would like to see ALL or SOME of the Greenway Study Area Preserved in its existing condition.	# All - 16	# Some
I would like to see some or all of the Greenway Study Area:	***Number Responding to this preference***	
Developed only for non-paved trails suitable for pedestrians on foot.	2	
Developed for non-paved trails suitable for wider mis of user groups including hikers, mountain bikers and equestrians.	2	
Left Undeveloped	16	

PART III- *Tohickon Creek Greenway Questions/Responses Continued*

Greenway Question	Response	Response
Developed for paved trails to accommodate road bicycles and strollers as well as pedestrians.	0	
Developed more fully to include picnic facilities, interpretive materials, paved and non-paved trails.	0	
Do you encourage or discourage each of the following activities along the creek.	***Number Encourage***	***Number Discourage***
Preservation of undeveloped land	15	1
Residential development	0	16
Shopping centers/retail development	0	16
Other commercial development	0	16
Industrial development	0	16
Preservation of farmland and farming	14	2
Tourism	5 1/2	11 1/2
River-Based Recreational Opportunities	5 1/2	9
Land Based Recreational Opportunities	2 1/2	11 1/2
Preservation of Historic Resources	13	2
Maintenance/improvement water quality	15	0
Fishing Opportunities	14	2
Preservation of Scenic Character	16	0
Protection of Landowner Rights	10	6
Protection of biodiversity	16	0
Wildlife habitat	16	0
Would you be willing to support capital improvements to improve access and recreational opportunities along the creek?	***Number Yes - 0***	***Number No - 7***
Municipal Bond	4	
Increased Taxes	4	
Permits/User Fees	1	1

Plumstead Township Newsletter , Written Comments

- I would not like to see increased stream access.
- We should not disturb what nature is trying to correct or overcome. Let the area be and nature will reclaim it.
- Leave the area as it is.
- I would like to see recreation and scenic beauty in the study area in the future. Nature should reclaim it.
- Local, state and federal funding is needed to preserve land, preserve scenic character, and maintain water quality.
- As much as possible, the greenway study area should be preserved as one of the last remaining natural areas of such size; in addition it is critical to continue protecting the Delaware River .
- More funding for land preservation is needed.
- The entire area is very scenic.
- There should be no parking lots or pavement in the Greenway study area.
- We should purchase land or buy development rights.
- We should not change the greenway area at all. It should remain for hiking, bird watching and canoeing.
- The area is beautiful and a haven for wildlife. Development is destroying our area.
- Any additional recreational opportunities should be non-paved and non-invasive.
- We should support local environmental agencies such as Riverkeeper Network. We should also consider the notion that leaving parks in their natural condition provides as valid a use for citizens as developing them for recreation.
- I consider it imperative that some park land be set aside so that people may experience the natural beauty of the land with as little evidence of mankind as possible. If I can be of any assistance on working on this project/survey, please contact me.
- I am not in favor of using money to improve access or recreational opportunity in the greenway area. Money should be used for open space and preservation only.
- I would like to see the Tohickon Creek greenway area preserved completely. No new development, no new trails. I would like it to remain as close to wilderness as possible, because it is one of the most important natural corridors remaining untouched in NE Pennsylvania.
- Strong and strict preservation ordinances (with public watch dogs) should be undertaken.
- I would favor using money to preserve the greenway area not to increase access/recreational opportunities.
- River recreation and land based recreation should be encouraged, but only in moderation and where appropriate.
- Strict preservation and protection laws/ordinances are needed.
- No increased access!!
- The greenway corridor area should be used as it is with limited access. I think bikes should be banned, because they cause erosion.
- Capital improvements for improved access and recreational opportunities? No!!!
- The area in Stovers Park from the dam down to the bridge is mismanaged. The trees and vegetation are slowly disappearing. The area should be closed down for years and planted with native trees and plants. Also High Rocks is also over used and should be patrolled better. I have been going to High Rocks for over 30 years, and it had definitely not improved. Climbers should be made to get permits to raise money, but mostly to limit the number of climbers. The face of the cliffs and the top rim are losing trees and foliage due to over use and people who damage natural resources on purpose.
- We should buy as much land available as possible, stop advertising the area for use of noisy and destructive "toys".

Tinicum Conservancy & Tinicum Township Newsletter Responses:
Number Circulated 206 Number Returned 85

I. Part I:Questions For Both Studies

Watershed Question	Response	Response
Live in the Creek corridor?	# Yes- 17	# No-64
Live in watershed?	# Yes-24	# No-57
List the municipality	# Tinicum	
Mark home on map	# Marked-52	# Not marked-26
List Ownership	# Own home-83	# Rent home-1
Home Use	# Year-Round-84	# Seasonal Use-1
Employed in study area?	#Yes- 5	# No- 74
Employment Information		
Locate potential access areas on map	3	29
Note problem areas on map		
Mark important habitat areas on map		

II. PART II: Watershed Study Questions

Do you know definition of watershed?	# Yes-57	# No-5
Did you know the boundary?	# Yes-11	# No-38
Rate most important amenities	***1 is highest, 8 is lowest; Rankings are the first number, the number of people is second.***	
Scenic	**1** 32 **2** 9 **3** 10 **4** 12	**5** 12 **6** 2 **7** 2 **8** 0
Cultural/Historic	**1** 4 **2** 10 **3** 4 **4** 6	**5** 17 **6** 27 **7** 8 **8** 0
Recreation	**1** 2 **2** 3 **3** 3 **4** 4	**5** 9 **6** 16 **7** 26 **8** 0
Groundwater Recharge	**1** 21 **2** 19 **3** 6 **4** 11	**5** 9 **6** 6 **7** 1 **8** 0
Good Water Quality	**1** 34 **2** 18 **3** 10 **4** 6	**5** 5 **6** 3 **7** 1 **8** 0
Wildlife Habitat	**1** 14 **2** 13 **3** 27 **4** 14	**5** 7 **6** 2 **7** 0 **8** 0

~ Watershed Responses Continued ~

Watershed Question	Response	Response
Rare & Endangered Species	1 9 2 6 3 10 4 16	5 7 6 10 7 7 8 0
Economic Opportunities	1 0 2 0 3 0 4 0	5 0 6 0 7 4 8 47
No Development	# Encourage - 77	# Discourage -1
Groundwater protection	# Encourage - 78	# Discourage
Natural Resource Protection (Wildlife)	# Encourage - 77	# Discourage - 1
Preservation of farmland/farming	# Encourage - 78	# Discourage
Preservation of Hist/Cultural resources	# Encourage - 77	# Discourage
Preservation of Scenic Character	# Encourage - 78	# Discourage
Wildlife Habitat Protection	# Encourage - 76	# Discourage - 1
Protection Natural Resources (Humans)	# Encourage - 73	# Discourage - 2 1/2
Residential Development (Homes)	# Encourage - 2 1/2	# Discourage - 76
Shopping Centers/Retail Development	# Encourage - 1	# Discourage - 77
Other Commercial Development (offices)	# Encourage - 2	# Discourage - 76
Institutional Dev. (hospitals/schools)	# Encourage - 4	# Discourage - 73 1/2
Industrial Devel. (manufacturing)	# Encourage - 1	# Discourage - 77
Redevelopment (using abandoned bldgs)	# Encourage - 45 1/2	# Discourage - 27
Tourism	# Encourage - 28	# Discourage - 40
River Recreational opportunities	# Encourage - 39	# Discourage - 28
Land-based Recreational Opportunities	# Encourage - 34 1/2	# Discourage - 34
Protection of Landowner Rights	# Encourage - 54 1/2	# Discourage - 8

III. PART III- *Tohickon Creek Greenway Questions/Responses*

Greenway Question	Response	Response
How many times have you been within 500 ' of the Tohickon Creek?	0-2 times - 3 3-5 times	6-10 times - 4 > 10 times - 72
How often do you use the corridor for any purpose?	0-2 times/month - 46 3-5 times/month - 10	> 5 times/month - 24
How many times were you in the trail study area last June-August?	0-2 times - 18 3-5 times - 20	6-9 times - 13 > 9 times - 29
Activities in trail study area?	Recreation - 65 Related to property - 8	Other - 15 (walks, exercise)
Note the types of recreation you have participated in?	Fishing - 11 Mountain Biking - 11 Hunting - 4 Canoeing/rafting/kayaking- 17 Birding - 45	Photography - 34 Horseback riding - 4 Hiking - 70 Nature study - 31 Other (list) - 5 (driving, swimming, painting, bicycling)
List most significant features in corridor area	***1 is highest, 5 is lowest; Rankings are the first number, the number of people is second.***	
Scenic value	**1** 37 **2** 39 **3** 4	**4** 2 **5** 0
Cultural and historic resources	**1** 2 **2** 8 **3** 43	**4** 26 **5** 0
Recreational Options	**1** 7 **2** 5 **3** 19	**4** 34 **5** 1
Environmental Features (habitat, clean water, fertile soils)	**1** 47 **2** 23 **3** 5	**4** 2 **5** 0
Economic Opportunities (e.g. work)	**1** 0 **2** 0 **3** 1	**4** 1 **5** 49
Other (please specify)		
I would like to see ALL or SOME of the Greenway Study Area Preserved in its existing condition.	# All - 72	# Some - 2
I would like to see some or all of the Greenway Study Area:	***Number Responding to this preference***	
Developed only for non-paved trails suitable for pedestrians on foot.	39	
Developed for non-paved trails suitable for wider mix of user groups including hikers, mountain bikers and equestrians.	27	
Left Undeveloped	42	

PART III- ***Tohickon Creek Greenway Questions/Responses Continued***

Greenway Question	Response	Response
Developed for paved trails to accommodate road bicycles and strollers as well as pedestrians.	3	
Developed more fully to include picnic facilities, interpretive materials, paved and non-paved trails.	4	
Do you encourage or discourage each of the following activities along the creek.	***Number Encourage***	***Number Discourage***
Preservation of undeveloped land	84	1
Residential development	1	83
Shopping centers/retail development		85
Other commercial development		84
Industrial development		85
Preservation of farmland and farming	82	1
Tourism	26 1/2	43
River-Based Recreational Opportunities	47	29
Land Based Recreational Opportunities	41	32
Preservation of Historic Resources	82	1
Maintenance/improvement water quality	81	1
Fishing Opportunities	66	10
Preservation of Scenic Character	83	2
Protection of Landowner Rights	59	8
Protection of biodiversity	81	2
Wildlife habitat preservation	81	3
Would you be willing to support capital improvements to improve access and recreational opportunities along the creek?	***Number Yes***	***Number No - 16***
Municipal Bond	28 1/2	1
Increased Taxes	11 1/2	3
Permits/User Fees	38 1/2	2

Tinicum Conservancy Newsletter, Written Comments

- weed encroachment narrowing waterways
- buy as much land available as possible
- extend conservation easements, approve bond issues to purchase relevant land for conservation
- modest increased access
- sufficient river access currently
- no additional access
- no increase in river access
- limit development
- stop development in this area
- there is enough development in this county; we need, and wildlife needs, an escape from it
- greenway is a unique part of Tinicum; it's my backyard and is unique in a world of encroaching developments
- stop unnecessary construction
- flooding in past, springtime, on Dark Hollow near bridge
- hiking, recreation (low noise, low impact on environment)
- as (the greenway) exists now, we could be doing a better job of preservation of historic structures around the area and trails
- preserve what little is left of this beautiful and historic county
- Stover Park between Tory and the creek is filled with wildflowers and orchids, so traffic should stay on trails
- protect farmland and forest near creek
- enforce parking and littering laws
- quality of life for residents and visitors
- there are very few places like this to go, they are beautiful and very natural
- protect landowner rights but not at the expense of the environment
- steep slopes are very sensitive
- protection of landowner rights but discourage development rights
- don't need the Tohickon Creek Trail Feasibility Study Area personally, have acreage
- preservation of natural resources, environment, water, wildlife and beauty of the area
- community involvement in all decisions impacting the watershed and surrounding environment
- the reason that we moved here is the natural beauty and its preservation for the future
- the Tohickon Greenway Study Area is a prime example of what has made this part of Bucks County so attractive, providing for a quality of life that needs to be preserved here; it becomes ever more precious with increased development and population growth
- need volunteer trail maintenance and litter removal
- should have volunteer trail maintenance
- will support capital improvements only if this discourages residential, economic or industrial development
- the preservation of undeveloped land is the catalyst that allows all other things to occur (groundwater protection, natural resource protection etc.)
- need programs for the maintenance of water quality
- easements! Stronger protective legislature, river cleanups, education of property owners along the creek
- Tohickon Creek Greenway Study Area contains rare and endangered species of plants and animals; it's an important bird corridor with many nesting species
- a low impact scenic trail is ideal
- keep the traffic out!
- we moved here from NY to get away from over crowding, high taxes, pollution and danger; we want to see Tinicum stay as beautiful tomorrow as it is today
- publish results of survey, protect or buy open space, elect officials who will protect environment, sensitive zoning
- There is no alternative (to theTohickon Creek Greenway Study) that has any relative merit

- area is already tramped down and trashed by mountain bikers, hikers, dogs and kayakers
- study, raise money, buy land
- you're the experts, you tell me
- preservation of significant bird habitat areas
- strong land use regulations at all levels
- fees and increased taxes are alright provided that funds go back into maintenance and upkeep and fees are kept well controlled to prevent overcharging
- would like to see existing trails preserved and expanded including future connection of Tohickon Valley Park to Nockamixon State Park
- Trail user education may be needed in the future
- make sure ordinances are kept current to ensure no loopholes for developers; communicate more with the general public to help them understand the unique geological situation in Tinicum which limits the water available (or not available) in Tinicum
- feels a bit hypocritical to discourage residential development since I live here; this is always a difficult call to make; I mainly discourage it because of limited water supply
- one thing I feel we must do is put our money where our mouth is and as a community, tax ourselves to come up with the funds along with the funding options to preserve open space; in the long run, this will save money, and the environment
- I wouldn't be willing to support capital improvements to improve access and recreational opportunities BUT I would be willing to support expenditure to preserve habitat and open space
- write grants, involve the community to develop new ideas, involve schools
- would like to see arts community camps in the watershed
- would like to see community cabin space
- protect land by acquiring it as a county or state park, or under conservation easements
- areas along steams are very sensitive areas-important for water quality here and down stream as well as for wildlife and native plants
- any change is likely to be influenced by folks with an economic interest in the change
- I would be happy to show you where the dumps are in the park, they need to be cleaned up
- need more clearly defined processes for enforcement of environmental protection
- purchase development rights; zoning and applicable ordinances to protect the sizes of building lots
- purchase and restore Randt's mill
- I moved here to get away from pavement and noise
- we feel the (Tinicum) conservancy and Tinicum Township are taking the necessary steps to allow for these things (preservation etc.) to happen
- make us aware; solicit help and feedback
- allowing man to use it for economic reasons will destroy it
- PENNDOT bridges should meet pedestrian requirements in the corridor
- would like to preserve the corridor so my grandchildren can enjoy it as I have
- do not grant any commercial zoning in areas adjacent to the creek
- preserve the corridor because there are no new Tohickon Creeks being built!!!!
- we should not develop new access, because it's fine as it is.
- with proper zoning we can control development.
- deer are a problem.
- we should follow the guidelines of the recently released PA action plan guidelines.
- I bicycle the canal towpath every week. Sometimes I bicycle from School Road and cross the Tohickon near Route 611.
- the Tohickon Canal Aqueduct should always be maintained. When and if a new River Road Bridge is designed, it should be pedestrian-friendly.
- is protection of the watershed a part of Bucks County and Tinicum's Master Plan?
- it is not only unrealistic, but unfair to deny landowners right to develop their land to its greatest and best use
- local government needs to work with landowners to allow for mutually beneficial and appropriate development

APPENDIX B:

SUPPORTING INFORMATION, NATURAL AND CULTURAL RESOURCES

Princeton
Hydro, LLC
80 Lambert Lane
Lambertville, NJ 08530

August 22, 2001

Pennsylvania Department of Conservation & Natural Resources
Bureau of Forestry
PO Box 8552
Harrisburg, PA 17105-8552
717-787-2703

Attn: Jeanne Harris
Environmental Review Specialist

Re: Request for Natural Heritage Database Search
Tohickon Creek Watershed Rivers Conservation Plan
Tinicum Township, Bedminster Township and Plumstead Township,
Bucks County, Pennsylvania
Princeton Hydro, LLC Project No. 229.01

Dear Ms. Harris:

Attached please find our request for a PNDI search for the Tohickon Creek Watershed (see attached copy of Lumbertville, Doylestown and Bedminster quads). Our request is to be included as part of Tinicum Conservancy's effort to place Tohickon Creek and its watershed on the Rivers Conservation registry.

Once the search is complete, please forward a copy of the results to our office (***80 Lambert Lane, Lambertville, NJ 08530***) as well so we may properly direct our client.

I hope this proves helpful in your search. If you have any questions, please feel free to contact me, 609-397-5335. Thank you for your assistance, we will wait for your approval.

Sincerely,

Cloree Kerrick

Cloree Kerrick
Project Scientist

Enclosures x4
Cc: Suzanne Forbes, AICP, Environmental Planner / Project Manager
Dr. Marti Kyde, Tinicum Conservancy
Tohickon Creek File 229.01

Phone: 609.397.5335 Fax: 609.397.5333
E-Mail pHydro@worldnet.att.net

3630-PM-WQ0041 Rev. 7/2000

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER QUALITY PROTECTION
BUREAU OF WATERWAYS ENGINEERING

PNDI Screening
Reviewer
Date
Phone No.

SUPPLEMENT NO. 1
PENNSYLVANIA NATURAL DIVERSITY INVENTORY SEARCH FORM

This form provides site information necessary to perform a computer screening for species of special concern listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat Code or the PA Game and Wildlife Code. Records regarding species of special concern are maintained by PA DCNR in a computer data base called the "Pennsylvania Natural Diversity Inventory" (PNDI). Results from this search are not intended to be a conclusive compilation of all potential special concern resources located within a proposed project site. On-site biological surveys may be recommended to provide a definitive statement on the presence or absence, or degree of natural integrity of any project site. Results of this PNDI search are valid for one year.

Please complete the information below, attach an 8½" x 11" photocopy (DO NOT REDUCE) of the portion of the U.S.G.S. Quadrangle Map that identifies the project location and outlines the approximate boundaries of the project and mail to the appropriate DEP regional office or delegated County Conservation District prior to completing a Chapter 105 environmental assessment or any other DEP permit application. (SEE REVERSE SIDE FOR LIST OF OFFICES AND ADDRESSES).

NAME: Tinicum Conservancy
ATTN: Dr. Marion Kyde
ADDRESS: 15 Tankhannen Rd
Ottsville, PA 18942-9708

PHONE: (610) 847-8650

COUNTY: Bucks

TWP./MUNICIPALITY: Tinicum; Bedminster; Plumstead

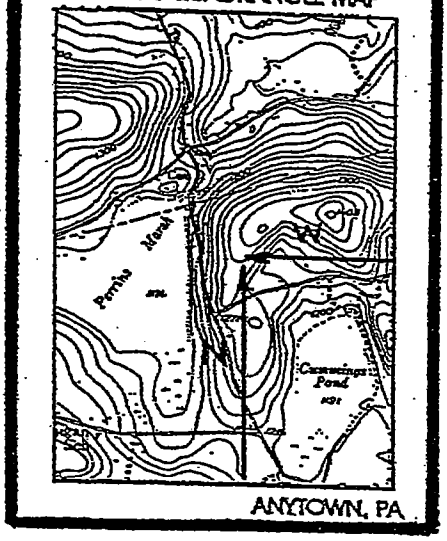
U.S.G.S. 7½ Minute Quadrangles

Doylestown; Lumbertville; Bedminster

PROJECT DESCRIPTION AND SIZE (Briefly describe entire area relevant to your project, including acreage.)

Rural w/ significant natural features)
The entire watershed is 3.5 mi²

U.S.G.S. QUADRANGLE MAP



North (Up) SEE ALL 3 Quads inches

West (to the left) _____ inches

INDICATE PROJECT LOCATION TO THE NEAREST ONE TENTH INCH MEASURING FROM THE EDGE OF THE MAP IMAGE FROM THE LOWER RIGHT CORNER.

FOR OFFICIAL USE ONLY

CREENING RESULTS - Follow the directions of the checked block.

☐ No potential conflicts were encountered during the PNDI inquiry. Include this form and the PNDI receipt with your Chapter 105 environmental assessment or other DEP permit application submissions.

☐ Potential conflicts must be resolved by contacting the natural resource agencies listed on the PNDI receipt. Please ovide a copy of this form and the PNDI receipt along with a brief description of your project to the listed agency for consultation and recommendations. Include this form, the printed PNDI search results and the natural resource agency's written recommendation with your Chapter 105 environmental assessment or other DEP permit application submissions.

S2 **Imperiled** - Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals or acres.

S3 **Vulnerable** - Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences.

S4 **Apparently Secure** - Uncommon but not rare, and usually widespread in the state. Usually more than 100 occurrences.

S5 **Secure** - Demonstrably widespread, abundant, and secure in the state, and essentially ineradicable under present conditions.

S? **Unranked** - State rank is not yet assessed.

SU **Unrankable** - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible, the most likely rank is assigned and a question mark added (e.g.., S2?) to express uncertainty, or a range rank (e.g.., S2S3) is used to delineate the limits (range) of uncertainty.

S#S# **Range Rank** - A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the Element. Ranges cannot skip more than one rank (e.g.., SU should be used rather than S1S4).

HYB **Hybrid** - Element represents an interspecific hybrid.

SE **Exotic** - An exotic established in the state; may be native in nearby regions (e.g.., house finch or catalpa in eastern U.S.).

SE# **Exotic Numeric** - An exotic established in the state that has been assigned a numeric rank to indicate its status, as with S1 through S5.

SA **Accidental** - Accidental or casual in the state (i.e., infrequent and outside usual range). Includes species (usually birds or butterflies) recorded once or only a few times. A few of these species may have bred on the one or two occasions they were recorded. Examples include European strays or western birds on the East Coast and vice-versa.

SZ **Zero Occurrences** - Not of practical conservation concern in the state because there are no definable occurrences, although the taxon is native and appears regularly in the state. An SZ rank will generally be used for long distance migrants whose occurrences during their migrations have little or no conservation value for the migrant as they are typically too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped, and protected. In other words, the migrant regularly passes through the subnation, but enduring, mappable Element Occurrences cannot be defined. Typically, the SZ rank applies to a non-breeding population in the subnation -- for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population, for example certain Lepidoptera which regularly die out every year with no significant return migration. Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ only applies when

the migrants occur in an irregular, transitory, and dispersed manner.

SP **Potential** - Potential that Element occurs in the state but no extant or historic occurrences reported.

SR **Reported** - Element reported in the state but without a basis for either accepting or rejecting the report. Some of these are very recent discoveries for which the program hasn't yet received first-hand information; others are old, obscure reports.

SRF **Reported Falsely** - Element erroneously reported in the state (e.g., misidentified specimen) and the error has persisted in the literature.

SSYN **Synonym** - Element reported as occurring in the state, but state does not recognize the taxon; therefore the Element is not ranked by the state.

***** S rank has been assigned and is under review. Contact the individual state Natural Heritage program for assigned rank.

Not Provided Species is known to occur in this state. Contact the individual state Natural Heritage program for assigned rank.

Breeding Status Qualifiers

B **Breeding** - Basic rank refers to the breeding population of the Element in the state.

N **Non-breeding** - Basic rank refers to the non-breeding population of the Element in the state.

Note A breeding status subrank is only used for species that have distinct breeding and/or non-breeding populations in the state. A breeding-status SRANK can be coupled with its complementary non-breeding-status SRANK. The two are separated by a comma, with the higher-priority rank listed first in their pair (e.g.., AS2B,S3N@ or ASHN,S4S5B@).

Other Qualifiers

? **Inexact or Uncertain** - Denotes inexact or uncertain numeric rank. For SE denotes uncertainty of exotic status. (The ? qualifies the character immediately preceding it in the SRANK.)

C **Captive or Cultivated** - Element is presently extant in the state only in captivity or cultivation, or as a reintroduced population not yet established.

The Nature Conservancy (6 August 1996 version)

Pennsylvania Status Definitions

Native Plant Species Legislative Authority: Title 17 Chapter 45, Conservation of Native Wild Plants, January 1, 1988; Pennsylvania Department of Conservation and Natural Resources.

Native Plant Status Codes and Definitions

PE **Pennsylvania Endangered** - Plant species which are in danger of extinction throughout most of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.

PT **Pennsylvania Threatened** - Plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained to prevent their future decline, or if the species is greatly exploited by man.

PR **Pennsylvania Rare** - Plant species which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.

Disjunct Significantly separated from their main area of distribution

Endemic Confined to a specialized habitat.

Limit of Range At or near the periphery of their natural distribution

Restricted Found in specialized habitats or habitats infrequent in Pennsylvania.

PX **Pennsylvania Extirpated** - Plant species believed by the Department to be extinct within this Commonwealth. These plants may or may not be in existence outside the Commonwealth.

PV **Pennsylvania Vulnerable** - Plant species which are in danger of population decline within Commonwealth because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.

TU **Tentatively Undetermined** - A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxanomic uncertainties, limited evidence within historical records, or insufficient data.

N No current legal status exists, but is under review for future listing.

Wild Birds and Mammals Legislative Authority: Title 34 Chapter 133, Game and Wildlife Code, revised Dec. 1, 1990, Pennsylvania Game Commission.

Wild Birds and Mammals Status Codes and Definitions

PE **Pennsylvania Endangered** - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation from the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public Law 93 205 (87 Stat. 884), as amended.

PT **Pennsylvania Threatened** - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public Law 93205 (87 Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".

N No current legal status but is under review for future listing.

Fish, Amphibians, Reptiles, and Aquatic Organisms Legislative Authority: Title 30, Chapter 75, Fish and Boat Code, revised February 9, 1991; Pennsylvania Fish Commission.

Fish, Amphibians, Reptiles, and Aquatic Organisms Status Codes and Definitions

PE **Pennsylvania Endangered** - All species declared by: 1) the Secretary of the United States Department of the Interior to be threatened with extinction and appear on the Endangered Species List or the Native Endangered Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission, Executive Director to be threatened with extinction and appear on the Pennsylvania Endangered Species List published by the Pennsylvania Bulletin.

PT **Pennsylvania Threatened** - All species declared by: 1) the Secretary of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens, and appear on a Threatened Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission Executive Director to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the

Pennsylvania Bulletin.

PC Animals that could become endangered or threatened in the future. All of these are uncommon, have restricted distribution or are at risk because of certain aspects of their biology.

N No current legal status, but is under review for future listing.

Invertebrates Legislative Authority: No state agency has been assigned to develop regulations to protect terrestrial invertebrates although a federal status may exist for some species. Aquatic invertebrates are regulated by the Pennsylvania Fish Commission but have not been listed to date.

Invertebrates Status Codes and Definitions

N No current legal status but is under review for future listing.

Pennsylvania Biological Survey (PBS) Suggested Status Definitions

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Pennsylvania Biological Survey (PBS) Suggested Status Codes and Definitions

Note: the same PBS Status codes and definitions are used for all PNDI tracked species.

PE **Pennsylvania Endangered** - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation from the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public Law 93 205 (87 Stat. 884), as amended.

PT **Pennsylvania Threatened** - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public Law 93205 (87 Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".

PR **Pennsylvania Rare** - Plant species which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.

Disjunct Significantly separated from their main area of distribution

Endemic Confined to a specialized habitat.

Limit of Range At or near the periphery of their natural distribution

Restricted Found in specialized habitats or habitats infrequent in Pennsylvania.

CP **Candidate Proposed** - Species comprising taxa for which the Pennsylvania Biological Survey (PBS) currently has substantial information on hand to support the biological appropriateness of proposing to list as Endangered or Threatened.

CA **Candidate at Risk** - Species that although relatively abundant now are particularly vulnerable to certain types of exploitation or environmental modification.

CR **Candidate Rare** - Species which exist only in one of a few restricted geographic areas or habitats within Pennsylvania, or they occur in low numbers over a relatively broad area of the Commonwealth.

CU **Condition Undetermined** - Species for which there is insufficient data available to provide an adequate basis for their assignment to other classes or categories.

PX **Pennsylvania Extirpated** - Species that have disappeared from Pennsylvania since 1600 but still exist elsewhere.

DL **Delisted** - Species which were once listed but are now cited for delisting.

N No current legal status, but is under study for future listing.

Federal Status Definitions

Native Plant and Animal Species Legislative Authority: United States Endangered Species Act of 1973: Public Law 93-205. U.S. Fish and Wildlife Service.

Federal Status Codes and Definitions

LE	**Listed Endangered** - A species which is in danger of extinction throughout all or a significant portion of its range.
LT	**Listed Threatened** - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
LELT	Listed **Endangered** in part of range; listed **Threatened** in the remaining part.
PE	**Proposed Endangered** - Taxa proposed to be listed as endangered.
PT	**Proposed Threatened** - Taxa proposed to be listed as threatened.
PEPT	Proposed **Endangered** in part of range; proposed **Threatened** in the remaining part.
C	**Candidate** for listing.
E(S/A)	Treat as **Endangered** because of similarity of appearance.
T(S/A)	Treat as **Threatened** because of similarity of appearance.
XE	Essential **Experimental** population.
XN	Nonessential **Experimental** population.
"xy" (mixed status)	Status varies for different populations or parts of range.
"x" NL	Status varies for different populations or parts of range with at least one part not listed.

Princeton
Hydro, LLC
80 Lambert Lane
Lambertville, NJ 08530

August 22, 2001

Mr. Kurt W. Carr, Division of Archaeology & Protection
Pennsylvania Historical and Museum Commission
Bureau of Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093

Re: Cultural Resources Search
Tohickon Creek Watershed Rivers Conservation Plan
Plumstead, Bedminister, Tinicum Townships, Bucks County, Pennsylvania
Princeton Hydro, LLC Project No. 229.01

Dear Mr. Carr:

I am submitting a Cultural Resource Notice form for a proposed Rivers Conservation Plan for the Tohickon Creek Watershed, located in Bucks County, Pennsylvania on behalf of the Tinicum Conservancy, a non-profit organization.

Tinicum Conservancy has proposed a Rivers Conservation Plan for the Tohickon Creek Watershed located within the Townships of Plumstead, Bedminster and Tinicum, Bucks County, Pennsylvania. The USGS Topo Quad (Lumbertville, Bedminster, Doylestown) maps has been attached to indicate the area of the requested search. We are not proposing any earthmoving to this area, merely a conservation plan for protection of the watershed. Our request is to be included as part of Tinicum Conservancy's effort to place Tohickon Creek and its watershed on the Rivers Conservation registry.

We would like to request that a copy of the results also be forwarded to our Lambertville office (***80 Lambert Lane, Lambertville, NJ 08530***). If you have any questions pertaining to this request, please do not hesitate to contact Dr. Marti Kyde, Tinicum Conservancy (610) 847-8650 or myself at our Lambertville office (609) 397-5335.

Thank you.

Sincerely,

Clorece Kerrick

Clorece Kerrick
Project Scientist

Enclosures x 4

Cc: Suzanne Forbes, AICP, Environmental Planner / Project Manager
Dr. Marti Kyde, Tinicum Conservancy
Tohickon Creek File 229.01

Phone: 609.397.5335 Fax: 609.397.5333
E-Mail pHydro@worldnet.att.net

0120-PM-PY0003 Rev. 6/96

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bar Code

CULTURAL RESOURCE NOTICE

Before completing this form, read the step-by-step instructions provided with this form.

OFFICIAL USE ONLY

ID# (Assigned by State Agency)

Stamp Date Application Received

SECTION A. APPLICANT IDENTIFIER

Applicant Name: Tinicum Conservancy; Attn: Marion M. Kyde, Ph.D.

15 Tankhannen Rd
Street Address

610-847-8650
Telephone Number

Ottsville
City

PA
State

18942-9708
Zip

Project Title

The Tohickon Creek Rivers Conservation Plan

SECTION B. LOCATION OF PROJECT

Municipalities

Tinicum, Bedminster & Plumstead Twp.

County Name: Bucks County
DEP County Code

SECTION C. REQUEST

☐ DEP Permit ☒ DEP Approval

List other permits, funding or approvals required, if known (federal/state/local).

Name of Specific DEP Permit or Approval Requested

SECTION D. RESPONSIBLE DEP REGIONAL, CENTRAL, DISTRICT MINING or OIL AND GAS MGMT. OFFICE

DEP Regional Office Responsible for Review of Permit Application

- ☒ Southeast Regional Office (Conshohocken)
- ☐ Southcentral Regional Office (Harrisburg)
- ☐ Southwest Regional Office (Pittsburgh)
- ☐ District Mining Office: _____
- ☐ Central Office (Harrisburg)
- ☐ Northeast Regional Office (Wilkes-Barre)
- ☐ Northcentral Regional Office (Williamsport)
- ☐ Northwest Regional Office (Meadville)
- ☐ Oil and Gas Office: _____

SECTION E. RESPONSIBLE COUNTY CONSERVATION DISTRICT, if applicable.

Bucks Conservation District
County Conservation District

215-345-7577
Telephone Number, if known

924 Town Center
New Britian, PA 18901

SECTION F. CONSULTANT

Princeton Hydro, LLC ; Attn: Clarece Kerrick
onsultant, if applicable

80 Lambert Lane, Suite 115
Street Address

Lambertville NJ 08530
City, State, Zip

609-397-5335
Telephone Number

SECTION G. PROJECT BOUNDARIES AND DESCRIPTION

REQUIRED

Indicate the total acres in the property under review. Of this acreage, indicate the total acres of earth disturbance for the proposed activity.

Attach a 7.5' U.S.G.S. Map indicating the defined boundary of the proposed activity.

Attach photographs of any building over 50 years old. Indicate what is to be done to all buildings in the project area.

Attach a narrative description of the proposed activity.

Attach the return receipt of delivery of this notice to the Pennsylvania Historical and Museum Commission.

REQUESTED

Attach photographs of any building over 40 years old

Attach construction drawing, if available.

SECTION H. SIGNATURE BLOCK

8-22-01
Date of Submission of Notice to PHMC

Clarece Kerrick for Dr. Marion Kyd
Applicant's Signature

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

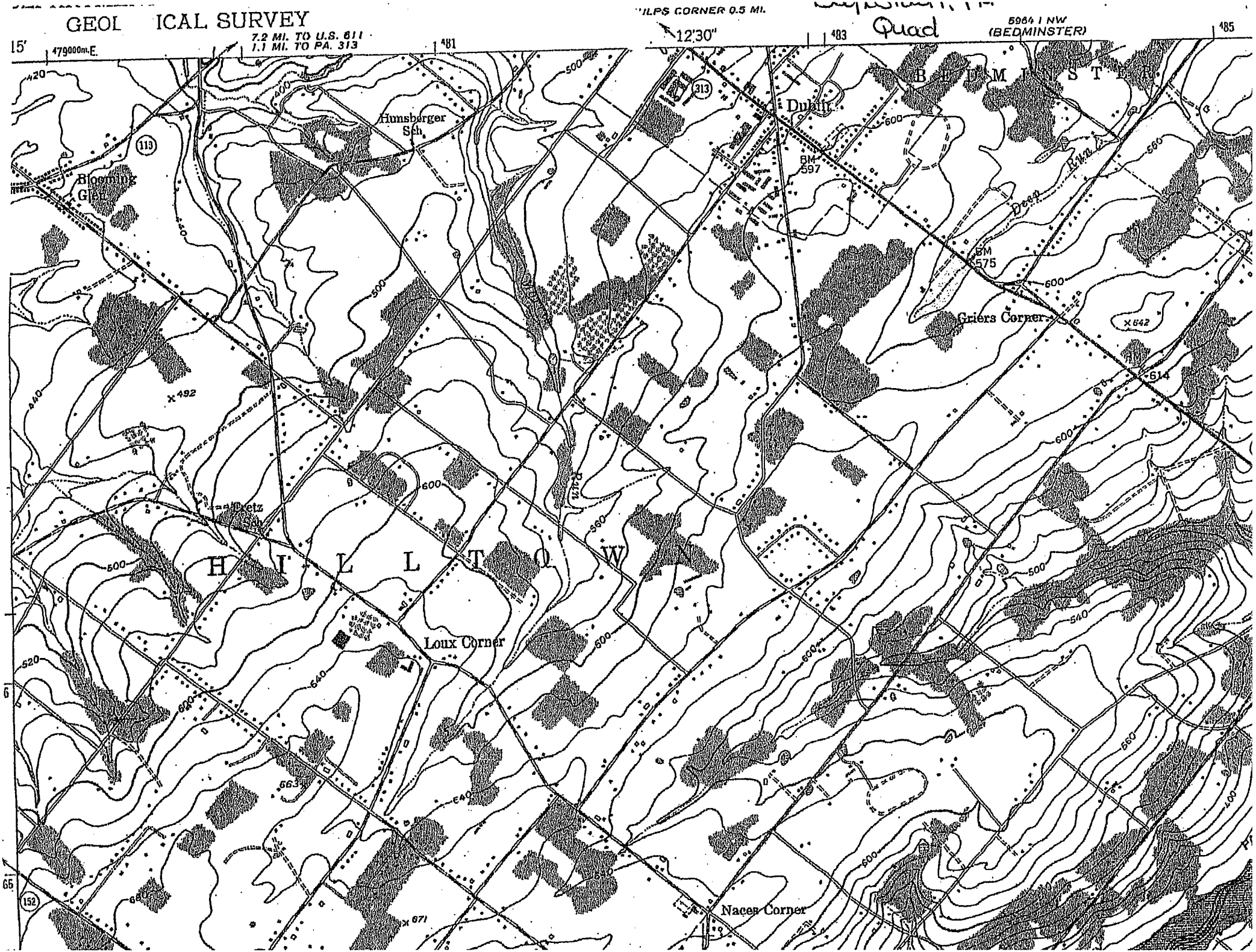
CULTURAL RESOURCE NOTICE

APPLICANT'S √ CHECKLIST

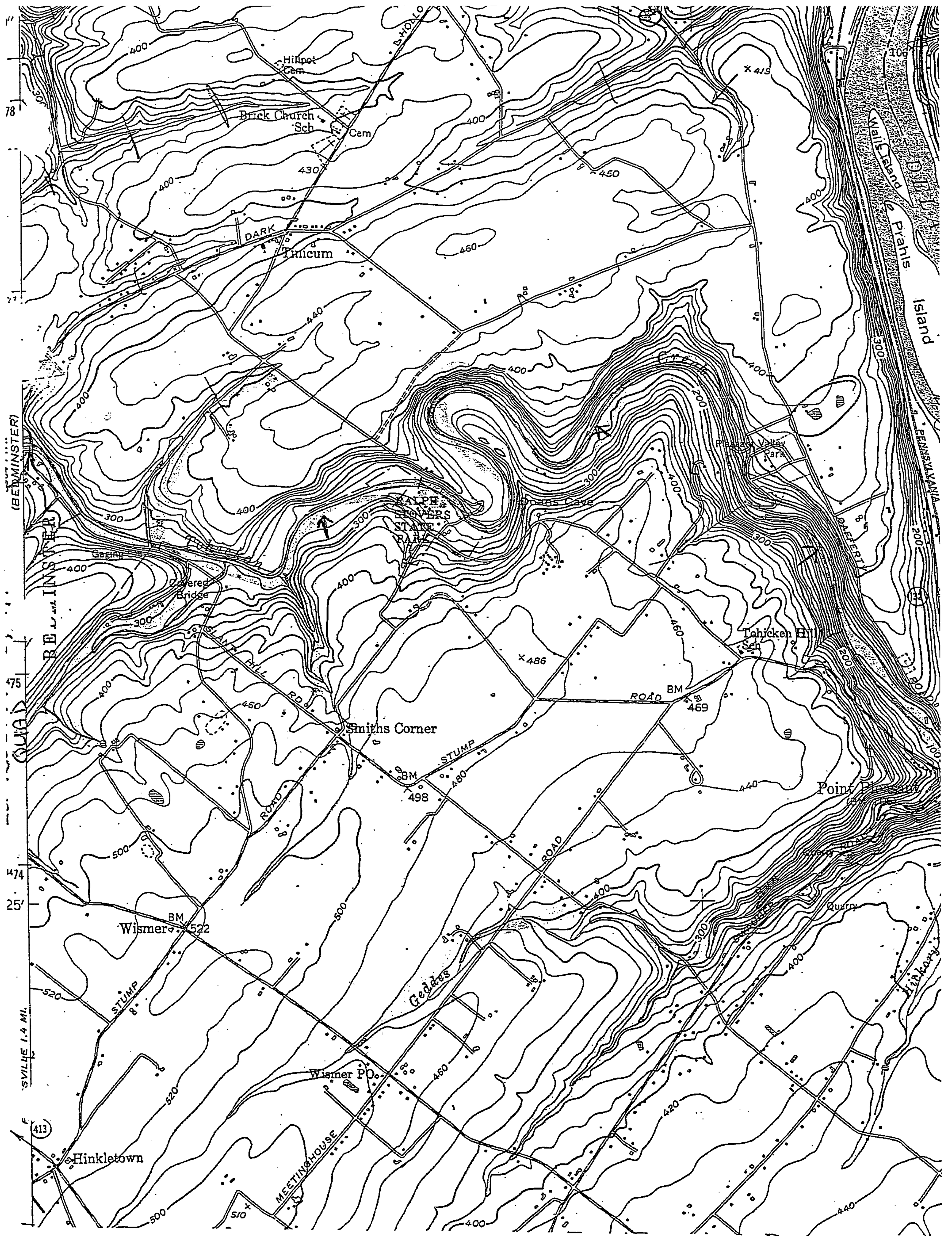
Please check the following list to make sure that you have included all the required information. Place a checkmark in the column provided for all items completed and/or provided.

Failure to provide all of the requested information will delay the processing of the application and may result in the application being placed on hold with no action, or will be considered withdrawn and the application file closed.

	Requirement	Check √ If Included
1.	Attachments, where appropriate, are included.	
	a) Section B - Additional municipality information.	
	b) Section B - Additional county information.	
	c) Section G - 7.5' USGS Map (with defined boundaries of proposed activity).	
	d) Section G - Narrative description of proposed activity.	
	e) Section G - Photographs of any buildings over 50 years old. Indicate what is to be done to all buildings in the project area.	
	f) Section G - Total acres in property under review. Of this acreage, total acres of earth disturbance for the proposed activity.	
	h) Return receipt of delivery of Cultural Resource Notice to the Pennsylvania Historical and Museum Commission	
2.	Mailings	
	a) Notice mailed to PHMC on _____.	
	b) Received Returned Receipt from PHMC on _____.	
	c) Submitted application to DEP Regional, Central, District Mining or Oil and Gas Mgmt. Office on _____ with copy of Returned Receipt from PHMC as proof of submittal. or d) Submitted application to County Conservation District Office _____ with copy of return receipt from PHMC as proof of submittal.	
	Requests	**Check √ If Included**
3.	Attachments requested, where approriate, are included	
	a) Section G - Photographs of any buildings over 40 years old	
	b) Section G - Construction drawings of the proposed activity, if available	


GEOL ICAL SURVEY
7.2 MI. TO U.S. 611
1.1 MI. TO PA. 313
ILPS CORNER 0.5 MI.
12'30"
Quad
5964 I NW
(BEDMINSTER)
479000m.E.
481
483
485
Hunsberger Sch.
Dublin
BEDMINSTER
Blooming Glen
BM 597
BM 575
Deep Run
Griers Corner
X 642
BM 614
X 492
Beetz Sch.
HILLTOWN
Loux Corner
Nacen Corner
X 671
313
113
152

QUAD


Hillpot Cem
Brick Church Sch
Cem
Tinicum
DARK
Walls Island
Prahls Island
DELA
Creek
Pleasant Valley Park
RALPH STOVERS STATE PARK
Doans Cave
Tohickon
Gaging
Covered Bridge
(BEDMINSTER)
PENNSYLVANIA
Tohicken Hill Sch
SLANT HILL RD
STUMP ROAD
Smiths Corner
BM 469
BM 498
× 486
× 419
Point Pleasant
Quarry RD
Quarry
Wismer
BM 522
Geddes
Hickory
STUMP
MEETINGHOUSE
Wismer PO
Hinkletown
413
32
510
400
430
450
460
440
300
200
480
500
520
420
25′
78
475
474

Tohickon Creek Watershed Plan

Pennsylvania Historical and Museum Commission, National Register of Listed and Eligible Properties

			National Register		
Historic Name	Location	Dating From	Listed	Eligible	Ownership
Cabin Run Valley Historic District	Multiple Properties	1800's		Jun. 8, 1987	N/A
Loux Covered Bridge	L.R. 09060 Southeast of Pipersville	1874	Dec. 1, 1980		public
Presbyterian Church of Deep Run	Elephant Rd. (L.R. 09090) & Bedminster Rd. (T-113)	1841		May. 10, 1984	private
Stover-Myers Mill	Dark Hollow Rd.	1800's	Sept. 13, 1978		public
Cabin Run Covered Bridge	L.R. 09099, West of Ralph Stover State Park	1871	Dec. 1, 1980		public
Point Pleasant Historic District	River Rd. & Point Pleasant Pike	1800's	Oct. 5, 1989		N/A
Red Hill Church and School	P.O. Box 59, Durham Rd.	1800's	May. 22, 1978		private
Tinicum Township	Headquarters Rd.	1738		Mar. 17, 1994	N/A

TOHICKON CREEK EV STATUS PETITION: PLANTS OF SPECIAL CONCERN

Approximately nine hundred different species have been reported from the watershed area bounded by Latitude 40-24-30 to 40-28-30 and Longitude 75-03-45 to 75-11-45 according to Dr. Ann Rhoads, Director of the Pennsylvania Flora Project. This includes most of the Tohickon Watershed below the dam at Lake Nockamixon and a small part of the Tinicum Creek Watershed. Complete plant lists are available from her office at the Morris Arboretum in Philadelphia.

This report was prepared during the winter and early spring of 1994. As a result, it was not feasible to conduct field investigations of plant species within the watershed. Absent field studies, information was obtained from available documents and publications. These include the Pennsylvania Natural Diversity Index (PNDI), the Bucks County Planning Commission listing of Species of Special Concern, the Tinicum Creek Exceptional Value Stream Application and Flora of Bucks County.

Below is a listing of plant species of special concern reported from the watershed. Species of special concern are defined as those ranked as rare, threatened, or endangered by the Department of Environmental Resources and those included on the PNDI listing. Information pertaining to the data and precise location of previous field observations are provided where known. Specific rankings and designations are also indicated. An explanation of PNDI designations can be found at the conclusion of this section. To our knowledge no recent exhaustive scientific study has been made of the watershed to define the current status of these plants.

PLANTS OF SPECIAL CONCERN IN THE TOHICKON CREEK WATERSHED

Botanical Name	Common Name	DER Ranking	PNDI Designation	Comments
Eleocharis quadrangulata	Four-angled Spike-rush	Endangered	SI/G4	Last sighting in 1989 at Camp Ockanickon Pond in Pt. Pleasant
Eupatorium rotundifolium	Wild horehound		G5/S3	Last observed in 1933 in Tinicum
Heterodon platirhinos			G5/S3S4	Last collected near Pt. Pleasant in 1942 and in 1947
Juncus biflorus Ell.			G5/S3	Last collected in 1912 in Tinicum
Najas gracillima	Naiad		G5/S2	Last observed in 1923 in Pt. Pleasant
Opuntia humifusa	Prickly-pear Cactus	Rare	G5/S3	Last observed in 1988 around Ralph Stover State Park
Onosmodium virginianum	False Gromwell		G4/S4	Last observed in 1908 in Tinicum
Potamogeton alpinus	Northern Pondweed	Endangered	G5/SX	Last observed in 1923 in Pt. Pleasant
Potamogeton illinoinsis	Illinois pondweed		G5/S3S4	Last observed in 1963 at Tohickon Creek in Pt. Pleasant
Ranunculus micranthus	Small-flowered Crowfoot	Rare	G5/S3	Last observed in 1991 around Ralph Stover State Park
Scleria pauciflora	Few-flowered Nutrush	Rare	G5/S2	Last observed in 1866 in Tinicum
Hydrocastyle umbellata	Umbellate water pennywort		G5/SX	Last observed in Tohickon Creek west of Doylestown Pike in 1931
Linum intercursum Bicken	Wild Flax		G4G5/S1	Last observed in 1954 around Keller's Church
Lythrum hyssopifolia	Hyssop Loosetrife	Endangered	G5/S1	Last observed in 1989 per PNDI. Found in Plumstead Township per Flora of Bucks County.
Myriophyllum heterophyllum	Broad-leaved Water-milfoil	Endangered	G5/S1	Last observed in 1866 per PNDI. Found in Pt. Pleasant pe Flora of Bucks County.
Orontium aquaticum	Golden Club		G5/S2S3	Last observed in 1958 1 mile north of Blooming Glen
Potamogeton perfoliatus	Clasping Leaved Pondweed		G5/S3S4	Last observed in 1989 at Tohickon Creek north northwest of Pipersville.

PLANTS OF SPECIAL CONCERN IN THE TOHICKON CREEK WATERSHED CONTINUED

Botanical Name	Common Name	DER Ranking	PNDI Designation	Comments
Solidago rigida	Stiff Goldenrod		G5S3	Last observed in 1870 in Pipersville
Carex buxbaumii	Buxbaum's Sedge		G5S3	Last observed in 1866 in Bedminster
Carex meadii	Mead's Sedge	Threatened	G4G5/S2	Last observed in 1989 at Haycock Mt.
Carex tetanica	Wood's Sedge	Threatened	G4G5/S2	Last observed in 1892 in Bedminster
Cyperus diandrus	Umbrella Flatsedge	Threatened	G5/S2	Last observed in 1917 in Haycock per PNDI. Also reported from Pt. Pleasant per Flora of Bucks County.
Amelanchier obovalis sanguinea	Round leaved serviceberry		G4G5/S1	Last observed in 1926 west northwest of Pt. Pleasant
Aster ericoides	White Heather Aster	Rare	G5/S3	Last observed in 1923 in Pt. Pleasant
Draba reptans (Lam.)	Fern		G5/SX	Last observed in 1880 in Pt. Pleasant
Juncus dichotomus	Forked Rush	Endangered		Reported from Pt. Pleasant per Flora of Bucks County
Helianthemum bicknellii	Birknell's Hoary Rockrose	Threatened		Reported from Soliday's Island, Pt. Pleasant per Flora of Bucks County
Eleocharis obtusa var. peasii	Wright's Spikerush	Endangered		Reported from Pt. Pleasant and Plumstead per Flora of Bucks County
Aplectrum hyemale	Prettyroot	Rare		Reported from woods near Deep Run per Flora of Bucks County

ELEMENT RANKING - PNDI

Global and state element ranks are listed and defined below.

GLOBAL ELEMENT RANKS

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4 Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally, though it may be quite rare in parts of it range, especially at the periphery.

GH Of historical occurrence throughout its range, i.e., formerly part of the established biota, with the exception that it may be rediscovered (e.g. Bachman's Warbler).

GU Possible in peril range-wide but status uncertain, need more information.

GI Believed to be extinct throughout range, (e.g., Passenger Pigeon).

STATE ELEMENT RANKS

S1 Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state.

S2 Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3 Rare or uncommon in state (on the order of 21 to 100 occurrences).

S4 Apparently secure in state.

S5 Demonstrably secure in state.

SA Accidental in state, including species recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range or species which only sporadically breed in state.

SE An exotic established in state; may be native elsewhere in North America (e.g., house finch or catalpa in eastern states).

SH Of historical occurrence in the state, perhaps having not been verified in the past 20 years, and suspected to be still extant.

SN Regularly occurring, usually migratory and typically non-breeding species for which no significant or effective habitat conservation measures can be taken in the state.

SR Reported from the state, but without persuasive documentation which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.

SRF Reported falsely (in error) from state but this error persisting in the literature.

SU Possibly in peril in state but status uncertain, need more information.

SX Apparently extirpated from state.

The Nature Conservancy
Arlington, Virginia
Natural Heritage Program Operations Manual
April 1982.

TOHICKON CREEK EV STATUS PETITION: FAUNA

INTRODUCTION

Preservation of stream corridors within the Tohickon Creek Watershed is of vital importance for animal life in the area. The Bucks County Planning Commission in their 1991 publication Species of Special Concern in Bucks County notes that "of the factors affecting breeding bird populations, the single most significant is loss of habitat". All animals require three elements for survival: food, water and shelter from predators and elements. Stream corridors provide all three. For this reason, the Tohickon Creek watershed is host to a rich variety of birds, mammals, and reptiles. Many of these species require large forested tracts for their breeding habitats. In the ever-developing mid-Atlantic region, this habitat is becoming increasingly rare. However, there are still significant extant forest tracts within the Tohickon Creek system that provide this type of habitat. It is noteworthy that of the nearly 100 species of birds known to nest in the Tohickon Creek watershed, many are absent or rare in the rest of Bucks County. (See list following.)

The Tohickon Creek watershed is also important because it is part of the Delaware River flyway for migrating birds of national significance. Waterfowl such as Common Merganser, Bufflehead, and Ring-necked Duck rely on the undeveloped areas of the larger watershed for their migratory routes.

Populations of Osprey (endangered in Bucks County) and Bald Eagle (federally listed as endangered) have been increasing along the Delaware; it is no longer unusual to observe an Osprey stooping on a fish in a farm pond within the Tohickon Creek watershed. It is the intention of the authors of this application that natural phenomena of this kind be protected and encouraged.

Beavers extirpated from the area by hunting have recently recolonized at the dam at the base of Lake Nockamixon in The Tohickon Creek in addition to parts of the Tinicum watershed just to the north.

Red squirrels, more common in the mountainous regions to the north and west have established local populations in suitable habitat along the Tohickon Creek corridor. A wide variety of other mammals utilize the diverse micro habitats provided by the watershed (see list).

Large numbers of butterflies live in the forests and area along the streams comprising the watershed and many reptiles and amphibians as well. The lists which follow are incomplete as both are part of continuing studies sponsored by Bucks County Conservancy (now Heritage Conservancy) and Bucks County Audubon Society. (See lists following.)

Sources for the data on these lists follow on page 27.

KEY TO BIRDS

KEY

Fed. & Blue List Source
"Birds in Jeopardy"

E	-	Endangered
T	-	Threatened
BL	-	Blue Listed
SC	-	Special Concern
LC	-	Local Concern

Bucks County Source
"Species of Special Concern in Bucks County"

T	-	Threatened
SC	-	Special Concern
RB	-	Rare Breeder
X	-	Extirpated

PA Source
"Pennsylvania Birds Vol 5 #2"

E	-	Endangered
T	-	Threatened
X	-	Extirpated
AR	-	At Risk
R	-	Rare
U	-	Undetermined

Neotropical Source
"Checklist of the Neotropical Migrants" Smithsonian

BT	-	Broad Tropical
M	-	Mexico
W	-	West Indies/Caribbean
CA	-	Central America
SA	-	South America

N	-	Nested
A	-	Abundant
C	-	Common
U	-	Uncommon
O	-	Occasional
R	-	Rare

TOHICKON CREEK EV STATUS PETITION: MAMMALS

MAMMALS	LATIN NAME	STATUS
OPOSSUM	DIDELPHIS MARSUPIALIS	COMMON
MASKED SHREW	SOREX CINEREUS	COMMON
MARYLAND SHREW		UNDETERMINED
SMOKY SHREW	SOREX FUMEUS	COMMON
LONG-TAILED SHREW	SOREX DISPAR	RARE
N.SHORT-TAILED SHREW	BLARINA BREVICAUDA	ABUNDANT
LEAST SHREW	CRYPTOTIS PARVA	UNDETERMINED
HAIRY-TAILED MOLE	PARASCALOPS BREWERI	COMMON
EASTERN MOLE	SCALOPUS AQUATICUS	COMMON
STAR-NOSED MOLE	CONDYLURA CRISTATA	COMMON
LITTLE BROWN BAT	MYOTIS LUCIFUGUS	COMMON
KEEN'S BAT	MYOTIS KEENII	VULNERABLE
SMALL-FOOTED BAT	MYOTIS SUBULATUS	THREATENED
SILVER HAIRED BAT	LASIONYCTERIS NOCTIVAGANS	UNDETERMINED
EASTERN PIPISTRELLE	PIPISTRELLUS SUBFLAVUS	COMMON
BIG BROWN BAT	EPTESICUS FUSCUS	COMMON
RED BAT	LASIURUS BOREALIS	OCCASIONAL
HOARY BAT	LASIURUS CINEREUS	OCCASIONAL
EVENING BAT	NYCTICEIUS HUMERALIS	UNDETERMINED
EASTERN COTTONTAIL	SYLVILAGUS FLORIDANUS	COMMON
NEW ENGLAND COTTONTAIL	SYLVILAGUS TRANSITIONALIS	UNDETERMINED
EASTERN CHIPMUNK	TAMIAS STRIATUS	COMMON
WOODCHUCK	MARMOTA MONAX	COMMON
GRAY SQUIRREL	SCIURUS CAROLINENSIS	COMMON
RED SQUIRREL	TAMIASSCIURUS HUDSONICUS	?
SOUTHERN FLYING SQUIRREL	GLAUCOMYS VOLANS	COMMON
BEAVER	CASTOR CANADENSIS	OCCASIONAL
WHITE FOOTED MOUSE	PEROMYSCUS LEUCOPUS	ABUNDANT
SOUTHERN RED-BACKED VOLE	CLETHRIONOMYS GAPPERI	UNDETERMINED
MEADOW VOLE	MICROTUS PENNSYLVANICUS	ABUNDANT
WOODLAND VOLE	MICROTUS PINETORUM	COMMON
SOUTHERN BOG LEMMING	SYNAPTOMYS COOPERI	COMMON
MUSKRAT	ONDATRA ZIBETHICUS	COMMON
NORWAY RAT	RATTUS NORVEGICUS	COMMON
HOUSE MOUSE	MUS MUSCULUS	ABUNDANT
MEADOW JUMPING MOUSE	ZAPUS HUDSONIUS	COMMON
COYOTE	CANIS LATRANS	UNDETERMINED
RED FOX	VULPES FULVA	COMMON
GRAY FOX	UROCYON CINEROARGENTEUS	COMMON
RACCOON	PROCYON LOTOR	COMMON
ERMINE	MUSTELA ERMINEA	RARE
LONG-TAILED WEASEL	MUSTELA FRENATA	COMMON
MINK	MUSTELA VISON	OCCASIONAL
STRIPED SKUNK	MEPHITIS MEPHITIS	COMMON
WHITE-TAILED DEER	ODOCOILEUS VIRGINIANUS	ABUNDANT

TOHICKON CREEK EV STATUS PETITION: BUTTERFLIES

BUTTERFLIES	LATIN NAME
BLACK SWALLOWTAIL	PAPILIO POLYXENES
TIGER SWALLOWTAIL	PTEROURUS GLAUCUS
SPICEBUSH SWALLOWTAIL	PTEROURUS TROILUS
CABBAGE WHITE	ARTOGEIA RAPAE
ALFALFA SULPHUR (ORANGE SULPHUR)	COLIAS EURYTHEME
COMMON SULPHUR	COLIAS PHILODICE
MEADOW FRITILLARY	CLOSSIANA BELLONA
PEARL CRESCENT	PHYCIODES THAROS
COMMA	POLYGONIA COMMA
QUESTION MARK	POLYGONIA INTERROGATIONIS
MOURNING CLOAK	NYMPHALIS ANTIOPA
RED ADMIRAL	VANESSA ATLANTA
RED SPOTTED PURPLE	BASILARCHIA ASTYANAX
VICEROY	BASILARCHIA ARCHIPPUS
MONARCH	DANAUS PLEXIPPUS
DELAWARE SKIPPER	ATRYTONE DELAWARE
SILVER SPOTTED SKIPPER	EPARGYREUS CLARUS

TOHICKON CREEK EV STATUS PETITION: REPTILES AND AMPHIBIANS

REPTILES AND AMPHIBIANS	LATIN NAME
SNAPPING TURTLE	CHELYDRA SERPENTINA
STINKPOT	STERNOTHERUS ODORATUS
EASTERN BOX TURTLE	TERRAPENE CAROLINA
EASTERN PAINTED TURTLE	CHRYSEMYS PICTA PICTA
WOOD TURTLE	CLEMMYS INSCULPTA
NORTHERN WATER SNAKE	NERODIA SIPEDON
QUEEN SNAKE	REGINA SEPTEMVITTATA
EASTERN GARTER SNAKE	THAMNOPHIS SIRTALIS
EASTERN RIBBON SNAKE	THAMNOPHIS SAURITUS
NORTHERN RINGNECK SNAKE	DIADOPHIS PUNCTATUS
NORTHERN BLACK RACER	COLUBER CONSTRICTOR CONSTRICTOR
EASTERN MILK SNAKE	LAMPROPELTIS TRIANGULUM
NORTHERN COPPERHEAD	AGKISTRODON CONTORTRIX
RED SPOTTED NEWT	NOTOPHTHALMUS VIRIDESCENS
RED BACKED SALAMANDER	PLETHODON CINEREUS
AMERICAN TOAD	BUFO AMERICANUS
NORTHERN CRICKET FROG	ACRIS CREPITANS
SPRING PEEPER	HYLA CRUCIFER
GRAY TREEFROG	HYLA VERSICOLOR
UPLAND CHORUS FROG	PSEUDACRIS TRISERIATA
BULLFROG	RANA CATESBEIANA
GREEN FROG	RANA CLAMITANS
NORTHERN LEOPARD FROG	RANA PIPIENS
PICKEREL FROG	RANA PALUSTRIS
WOOD FROG	RANA SYLVATICA

FISH	LATIN NAME
AMERICAN EEL	ANGUILLA ROSTRATA
CARP	CYPRINUS CARPIO
CUTLIP MINNOW	EXOGLOSSUM MAXILLINGUA
COMMON SHINER	NOTROPIS CORNUTUS
SWALLOWTAIL SHINER	NOTROPIS PROCNE
SPOTFIN SHINER	NOTROPIS SPILOPTERUS
GOLDEN SHINER	NOTEMIGONUS CRYSOLEUCAS
BLUNTNOSE MINNOW	PIMEPHALES NOTATUS
BLACKNOSE DACE	RHINICHTHYS ATRATULUS
FALLFISH	SEMOTILUS CORPORALIS
CREEK CHUB	SEMOTILUS ATROMACULATUS
WHITE SUCKER	CATOSTOMUS COMMERSONI
NORTHERN HOG SUCKER	HYPENTILIUM NIGRICANS
MARGINED MADTOM	NOTORUS INSIGNIS
ROCK BASS	AMBLOPLITES RUPESTRIS
RED-BREAST SUNFISH	LEPOMIS AURITUS
GREEN SUNFISH	LEPOMIS CYANELLUS
PUMPKIN SEED	LEPOMIS GIBBOSUS
BLUEGILL	LEPOMIS MACROCHIRUS
SMALLMOUTH BASS	MICROPTERUS DOLOMIEUI
LARGEMOUTH BASS	MICROPTERUS SALMOIDES
TESSELATED DARTER	ETHEOSTOMA OLMSTEDI
BROWN BULLHEAD	ICTALURUS NEBULOSUS
REDFIN PICKEREL	ESOX AMERICANUS

BIRDS OF SPECIAL CONCERN IN THE TOHICKON CREEK WATERSHED

	Status					Occurrence in Tohickon Watershed				
	Fed	Blu Lst	Pa	Bucks	NeoT	Nest	Spg	Sum	Fall	Wint
Loon		LC					U		U	
Pied-billed Grebe			R				U		U	O
Horned Grebe		BL					O			O
Double-crested Cormorant							O			
American Bittern		BL	T				R		R	
Least Bittern		BL	T	T		N	O	O	O	
Great Blue Heron		LC		X			C	U	C	C
Great Egret			T				U		U	
Snowy Egret			AR				O		O	
Green-backed Heron						N	C	C	C	
Black-crowned Night Heron		LC		X			R		R	
Tundra Swan							R		R	
Mute Swan							O			O
Snow Goose (White)							O			O
Canada Goose						N	C	C	C	C
Wood Duck						N	C	U	C	
Green-winged Teal			R				O		O	
American Black Duck		SC		SC			O		O	
Mallard						N	C	C	C	C
Northern Pintail							O		O	
Blue-winged Teal					BT		O		O	
Gadwall			U				O		O	
American Wigeon			U				U		U	
Ring-necked Duck							U		U	
Lesser Scaup							O		O	
Common Goldeneye							O		O	
Bufflehead							O		O	
Hooded Merganser							O		O	
Common Merganser							O		O	
Black Vulture						N	O	O	O	O
Turkey Vulture					BT	N	C	C	C	C
Osprey			E	X	BT		C	O	C	
Bald Eagle	E		E				R	R	R	
Northern Harrier		BL	AR				O		O	O
Sharp-shinned Hawk		BL		SC		N	U		U	U
Cooper's Hawk		BL		T		N	U		U	U
Northern Goshawk			R						R	
Red-shouldered Hawk		BL		T		N	O	O	O	O
Broad-winged Hawk				SC	C-SA	N	C	U	C	
Red-tailed Hawk						N	C	C	C	C
Rough-legged Hawk							R		R	R
American Kestral						N	C	C	C	C
Merlin									R	
Peregrine Falcon	E	SC	E	X			R		R	
Ring-necked Pheasant				SC		N	O	O	O	O
Ruffed Grouse						N	R	R	R	R
Wild Turkey						N	C	C	C	C
Northern Bobwhite		LC	U	RB		N	O	O	O	O
Virginia Rail				T		N	O	O	O	O
Sora				T			R			
Killdeer						N	C	C	C	C
Solitary Sandpiper					BT		U		U	
Spotted Sandpiper						N	O		O	
American Woodcock				SC		N	C	C	C	
Ring-billed Gull							C		C	U
Gull							C		C	C
Dove						N	U	U	U	U

BIRDS OF SPECIAL CONCERN IN THE TOHICKON CREEK WATERSHED

	Status					Occurrence in Tohickon Watershed				
	Fed	Blu Lst	Pa	Bucks	NeoT	Nest	Spg	Sum	Fall	Wint
.ing Dove						N	A	A	A	A
Black-billed cuckoo					SA	N	U	U	U	
Yellow-billed Cuckoo		SC			SA		U	U	U	
Barn Owl		SC	AR	T		N	O			
Eastern Screech Owl		SC				N	C	C	C	C
Great Horned Owl						N	U	U	U	U
Long Eared Owl			U				U			U
Northern Saw-whet Owl			U	RB		N	O		O	U
Common Nighthawk		SC	U	SC	SA		O		O	
Whip-poor-will		SC	U		M-CA		R			
Chimney Swift					SA	N	A	C	A	
Ruby-throated Hummingbird		BL			M-CA	N	U	U	U	
Belted Kingfisher						N	C	C	C	U
Red-headed Woodpecker		SC		T			O		O	
Red-bellied Woodpecker						N	C	C	C	C
Yellow-bellied Sapsucker					CA		U		U	O
Downy Woodpecker						N	C	C	C	C
Hairy Woodpecker		SC				N	U	U	U	U
Northern Flicker						N	C	C	C	C
Pileated Woodpecker				SC		N	U	U	U	U
Olive-sided Flycatcher			X		SA		O		U	
Eastern Wood Pewee					SA	N	U	C	C	
Yellow-bellied Flycatcher			T		M-CA		O		O	
Acadian Flycatcher				SC	C-SA		O	U	O	
Willow Flycatcher					M-CA	N	U	U		
Least Flycatcher		LC					O	O	O	
E[illegible]n Phoebe		SC				N	U	C	U	
C[illegible]reasted Flycatcher					M-CA	N	U	U	U	
Eastern Kingbird					SA	N	U	C	U	
Purple Martin		SC		T	SA	N	O	O	O	
Tree Swallow					M-CA	N	U	U	U	
N. Rough-winged Swallow					M-CA	N	C	C	C	
Bank Swallow				T	C-SA	N	U	O		
Cliff Swallow		LC		SC	SA	N	U	U	U	
Barn Swallow					C-SA	N	C	C	C	
Blue Jay						N	A	A	A	C
American Crow						N	A	A	A	A
Fish Crow				SC			O		O	O
Black-capped Chickadee						N	A	A	A	A
Carolina Chickadee							U			
Tufted Titmouse						N	C	C	C	C
Red-breasted Nuthatch							O		O	O
White-breasted Nuthatch						N	C	C	C	C
Brown Creeper				RB		N	C	C	C	C
Carolina Wren						N	U	U	U	U
House Wren						N	C	C	C	
Winter Wren							U			U
Golden-crowned Kinglet							U		U	U
Ruby-crowned Kinglet							C		U	
Blue-gray Gnatcatcher					M-CA	N	U	U	U	
Eastern Bluebird		SC		SC		N	C	C	C	C
Veery					SA	N	C	C	C	C
Gray-cheeked Thrush					W-SA		R		R	
[illegible]n' Thrush			R		BT		U		U	
[illegible]hrush							U		U	O

BIRDS OF SPECIAL CONCERN IN THE TOHICKON CREEK WATERSHED

	Status					Occurrence in Tohickon Watershed				
	Fed	Blu Lst	Pa	Bucks	NeoT	Nest	Spg	Sum	Fall	Wint
.hrush					M-CA	N	C	C	C	
American Robin						N	A	A	A	C
Gray Catbird					M-CA	N	C	C	C	
Northern Mockingbird						N	C	C	C	C
Brown Thrasher						N	U	U	U	
Cedar Waxwing						N	C	O	U	U
European Starling						N	A	A	A	A
White-eyed Vireo					M	N	U	U	U	
Solitary Vireo					M-CA		U		U	
Yellow-throated Vireo				SC	M-CA		U	U	U	
Warbling Vireo					M-CA		U	U	U	
Philadelphia Vireo					CA		O		O	
Red-eyed Vireo					SA	N	C	C	C	
Blue-winged Warbler					M-CA	N	C	C		
Golden-winged Warbler		SC			CA		O			
Tennessee Warbler					M-CA		U			
Nashville Warbler					M-CA		U			
Northern Parula Warbler					W-M		U	O		
Yellow Warbler					BT	N	C	C		
Chestnut-sided Warbler				RB	CA		C	O	C	
Magnolia Warbler					M-CA		C		C	
Cape May Warbler					W		U		U	
Black-throated Warbler					W		U		U	
Yellow-rumped Warbler							C		C	U
Black-throated Green Warbler					M-CA		U		U	
Blackburnian Warbler					SA		U		U	
Y -throated Warbler				SC	W-CA	N	O	O		
P arbler							O			
P Warbler					W	N	U	U	U	
Palm Warbler					W-M		U		U	
Bay-breasted Warbler					C-SA		U		C	
Blackpoll Warbler					SA		U		C	
Cerulean Warbler				SC	CA	N	R			
Black-and-White Warbler					BT	N	U	U	U	
American Redstart					BT	N	C	C		
Worm-eating Warbler				SC	BT	N	U	U		
Ovenbird					BT	N	C	C		
Northern Waterthrush					BT		U			
Louisiana Waterthrush					BT	N	U	U		
Kentucky Warbler				SC	M-CA	N	U	U		
Mourning Warbler					C-SA		R			
Common Yellowthroat					M-CA	N	C	A	C	
Hooded Warbler				SC	M-CA		O			
Wilson's Warbler					M-CA		O			
Canada Warbler					SA		U		U	
Yellow-breasted Chat				SC	M	N	O	O	O	
Scarlet Tanager					SA	N	C	C		
Northern Cardinal						N	A	A	A	A
Rose-breasted Grosbeak					C-SA	N	C	C	C	
Blue Grosbeak							R	R		
Indigo Bunting					M-CA	N	C	C		
Dickcissel			R		SA					R
Rufous-sided Towhee						N	C	C	C	O
American Tree Sparrow							U			U
C g Sparrow						N	U	C		C
arrow						N	C	C	C	U

BIRDS OF SPECIAL CONCERN IN THE TOHICKON CREEK WATERSHED

	Status					Occurrence in Tohickon Watershed				
	Fed	Blu Lst	Pa	Bucks	NeoT	Nest	Spg	Sum	Fall	Wint
...vannah Sparrow							O			O
Grasshopper Sparrow		BL		T		N	O	O		
Fox Sparrow							U		O	
Song Sparrow						N	C	C	C	C
Lincoln's Sparrow					M-CA				R	
Swamp Sparrow				SC		N	U		O	
White-throated Sparrow							C		C	C
White-crowned Sparrow									R	
Dark-eyed Junco							C		C	C
Bobolink				SC	SA	N	O	O	U	
Red-winged Blackbird						N	C	C	C	
Eastern Meadowlark		SC		SC		N	O	O	O	
Rusty Blackbird							U		U	
Common Grackle						N	C	C	A	O
Brown-headed Cowbird						N	C	C	U	O
Orchard Oriole		SC			M-CA	N	O	O	O	
Northern Oriole					M-CA	N	C	C	U	
Pine Grosbeak										R
Purple Finch						N	C	R	C	C
House Finch						N	A	A	A	A
Common Redpoll										O
Pine Siskin							U			U
Am...rican Goldfinch						N	C	C	C	U
...g Grossbeak							O		O	
...e Sparrow						N	A	A	A	A

APPENDIX C:

WATERSHED INFORMATION

Sewerage Discharge Points Table

Shape	Site_name	Site_Id	Primary_fa	Pf_Id	Pf_kind	County	Municipali	Pf_status	Sf_name	Sf_id	Sf_type	Other_id	Lat__d	Lat_m	Lat_s	Long_d	Long_m	Long_s	Lat_dd	Long_dd	Bop_v_	Watershed_	Site_locat	Site_locat	Site_conta
Shape	DUBLIN BORO STP	238866	DUBLIN BORO STP	243122	SP	Bucks	Dublin	ACTIV	DUBLIN BORO STP-OUTFALL 001	208908	DP	PA0021741	40	23	32.0935	75	11	24.298	40.39224819	-75.19008278		2D- Three Mile	617 STONEBRIDGE RD	617 STONEBRIDGE RD	2157668479
Shape	LAWRENCE LOT 5 SRSTP	4257	LAWRENCE, LOIS-LOT #5 STP	5787	SN	Bucks	Plumstead	ACTIV	LAWRENCE-LOT #5 OUTFALL 001	17300	DP	PA0053619	40	26	5.2106	75	5	45.0842	40.41811406	-75.09585372		2D- Three Mile	5650 TOLLGATE RD	5650 TOLLGATE RD	
Shape	OAK GROVE MOTEL STP	456780	OAK GROVE MOTEL	487880	SN	Bucks	Bedminster	ACTIV	OAK GROVE-OUTFALL 001	364278	DP	PA0056481	40	24	54.1239	75	8	58.0244	40.41503442	-75.14945122		2D-Three Mile	6755 EASTON RD	6755 EASTON RD	2157662430
Shape	S & S STYLES PROP	481411	S & S STYLES - SMALL FLOW TREATMENT FACILITY	518093	SN	Bucks	Bedminster	ACTIV	DISCHARGE POINT - OUTFALL 001	400137	DP	PA0057401	40	25	4.6684	75	8	52.7782	40.41796372	-75.14799394		2D-Three Mile	EASTON RD	EASTON RD	
Shape	ADAMS SRSTP	487508	ADAMS WILLIAM P - SRSTP	521193	SN	Bucks	Haycock	PENN	ADAMS - OUT FALL 001	403240	DP	PA0057525	40	23	22.6287	75	11	44.0253	40.38981908	-75.19556288		2D-Three Mile	452 STONEBRIDGE RD	452 STONEBRIDGE RD	
Shape	CURCIO SRSTP	237662	SMITH, JACOB-LOT #2	240136	SN	Bucks	Hilltown	ACTIV	SMITH-OUTFALL 001	200126	DP	PA0056375	40	21	41.6493	75	11	19.7526	40.36156925	-75.18882017		2D-Three Mile	2020 BROAD ST	2020 BROAD ST	2154630290
Shape	LAWRENCE SRSTP	4260	LAWRENCE,LOIS E-SINGLE RES STP	5790	SN	Bucks	Plumstead	ACTIV	LAWRENCE,LOIS E-LOT #1 OUTFALL	17304	DP	PA0053597	40	26	11.6347	75	5	52.3898	40.41990408	-75.09788017		2D-Three Mile	LOT 1	LOT 1	
Shape	STEINMETZ SRSTP	237754	STEINMETZ, RICHARD & BRENDA	240257	SN	Bucks	Plumstead	ACTIV	STEINMETZ-LOT #4 OUTFALL	200532	DP	PA0053601	40	25	6.9846	75	5	47.1904	40.41860883	-75.09644178		2D-Three Mile	5584 TOLLGATE RD	5584 TOLLGATE RD	2152971084
Shape	JONES SRSTP	238938	JONES, DAVID & KATHRYN	238980	SN	Bucks	Plumstead	ACTIV	JONES,DAVID-OUTFALL 001	195405	DP	PA0055280	40	26	50.5397	75	6	44.9738	40.43070547	-75.11249272		2D-Three Mile	6179 COVERED BRIDGE	6179 COVERED BRIDG	2157660756
Shape	WILLIAMS SRSTP	237640	WILLIAMS,WILLIAM & JOY	240099	SN	Bucks	Plumstead	ACTIV	WILLIAMS,WM-OUTFALL 001	199936	DP	PA0055964	40	25	42.3381	75	5	11.7519	40.42642725	-75.08660053		2D-Three Mile	7263 TOHICKON HILL RD	7263 TOHICKON HILL	2152970762
Shape	MACRI SRSTP	237685	MACRI, STEVE & CAROLINE	240416	SN	Bucks	Plumstead	ACTIV	MACRI-OUTFALL 001	200994	DP	PA0056677	40	24	29.2252	75	4	54.9751	40.40728478	-75.08193753		2D-Three Mile	6770 PT PLEASANT PK	6770 PT PLEASANT P	2157849965
Shape	BEDMINSTER MUNI AUTH STP & SEW SYS	245441	STONEBRIDGE STP	250654	SN	Bucks	Bedminster	ACTIV	STONE BRIDGE-OUTFALL 001	228324	DP	PA0050768	40	23	6.222	75	11	49.3769	40.38506167	-75.19704914		2D-Three Mile	PO BOX 92	PO BOX 92	2157952190

APPENDIX D:

TOWNSHIP RESOLUTIONS

TOWNSHIP RESOLUTION 02-10

Township of Bedminster
Bucks County, State of Pennsylvania

A RESOLUTION OF THE BOARD OF SUPERVISORS OF BEDMINSTER TOWNSHIP, BUCKS COUNTY, PA. SUPPORTING the Tohickon Creek Watershed Conservation Plan and listing Tohickon Creek and Tohickon Creek Tributaries on The Pennsylvania Conservation Registry.

WHEREAS, the Board of Supervisors of Bedminster Township recognizes the importance of conserving the Tohickon Creek Watershed to foster the quality of life in Bedminster Township, Bucks County, and;

WHEREAS, the Commonwealth of Pennsylvania, Department of Conservation and Natural Resources, Division of Conservation Partnerships (PA DCNR), has established a "Pennsylvania Rivers Conservation Registry", and;

WHEREAS, Princeton Hydro, LLC has completed The Tohickon Creek Watershed Plan for The Tohickon Creek Watershed which contains a number of conservation recommendations suitable for implementation development or acquisition in the Township of Bedminster, Bucks County and throughout the entire Tohickon Creek Watershed, and;

WHEREAS, the Tohickon Creek Watershed Plan has been reviewed and found acceptable by the Board of Supervisors of Bedminster Township, Bucks County and;

WHEREAS, the Township of Bedminster, Bucks County does endorse The Tohickon Creek Watershed Plan and will endeavor to take appropriate action to implement its recommendations.

NOW, THEREFORE, the Board of Supervisors of Bedminster Township, Bucks County approves the listing of rivers, river segments or tributaries listed above within its boundaries on the Pennsylvania Conservation Registry.

RESOLVED, this 14th DAY OF AUGUST 2002.

APPROVAL

TOWNSHIP RESOLUTION

Township of Nockamixon
Bucks County, State of Pennsylvania

A RESOLUTION OF THE BOARD OF SUPERVISORS OF NOCKAMIXON TOWNSHIP, BUCKS COUNTY, PA. SUPPORTING the Tohickon Creek Watershed Conservation Plan and listing Tohickon Creek and Tohickon Creek Tributaries on The Pennsylvania Conservation Registry.

WHEREAS, the Board of Supervisors of Nockamixon Township recognizes the importance of conserving the Tohickon Creek Watershed to foster the quality of life in Nockamixon Township, Bucks County, and;

WHEREAS, the Commonwealth of Pennsylvania, Department of Conservation and Natural Resources, Division of Conservation Partnerships (PA DCNR), has established a "Pennsylvania Rivers Conservation Registry", and;

WHEREAS, Princeton Hydro, LLC has completed The Tohickon Creek Watershed Plan for The Tohickon Creek Watershed which contains a number of conservation recommendations suitable for implementation development or acquisition in the Township of Nockamixon, Bucks County and throughout the entire Tohickon Creek Watershed, and;

WHEREAS, the Tohickon Creek Watershed Plan has been reviewed and found acceptable by the Board of Supervisors of Nockamixon Township, Bucks County and;

WHEREAS, the Township of Nockamixon, Bucks County does endorse The Tohickon Creek Watershed Plan and will endeavor to take appropriate action to implement its recommendations.

NOW, THEREFORE, the Board of Supervisors of Nockamixon Township, Bucks County approves the listing of rivers, river segments or tributaries listed above within its boundaries on the Pennsylvania Conservation Registry.

RESOLVED, this 18 DAY OF SEPTEMBER 2002.

Bruce R. Kuyper

APPROVAL

TOWNSHIP RESOLUTION

Township of Tinicum
Bucks County, State of Pennsylvania

A RESOLUTION OF THE BOARD OF SUPERVISORS OF TINICUM TOWNSHIP, BUCKS COUNTY, PA. SUPPORTING the Tohickon Creek Watershed Conservation Plan and listing Tohickon Creek and Tohickon Creek Tributaries on The Pennsylvania Conservation Registry.

WHEREAS, the Board of Supervisors of Tinicum Township recognizes the importance of conserving the Tohickon Creek Watershed to foster the quality of life in Tinicum Township, Bucks County, and;

WHEREAS, the Commonwealth of Pennsylvania, Department of Conservation and Natural Resources, Division of Conservation Partnerships (PA DCNR), has established a "Pennsylvania Rivers Conservation Registry", and;

WHEREAS, Princeton Hydro, LLC has completed The Tohickon Creek Watershed Plan for The Tohickon Creek Watershed which contains a number of conservation recommendations suitable for implementation development or acquisition in the Township of Tinicum, Bucks County and throughout the entire Tohickon Creek Watershed, and;

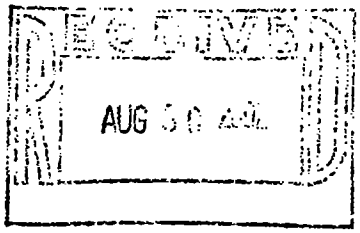
WHEREAS, the Tohickon Creek Watershed Plan has been reviewed and found acceptable by the Board of Supervisors of Tinicum Township, Bucks County and;

WHEREAS, the Township of Tinicum, Bucks County does endorse The Tohickon Creek Watershed Plan and will endeavor to take appropriate action to implement its recommendations.

NOW, THEREFORE, the Board of Supervisors of Tinicum Township, Bucks County approves the listing of rivers, river segments or tributaries listed above within its boundaries on the Pennsylvania Conservation Registry.

RESOLVED, this 20th DAY OF August 2002.

Nicholas C Forte
APPROVAL



BOARD OF SUPERVISORS OF TINICUM TOWNSHIP

RESOLUTION NO. 2002 - 12-3

SUPPORTING THE LOWER TOHICKON CREEK WATERSHED CONSERVATION MANAGEMENT PLAN AND LISTING THE LOWER TOHICKON WATERSHED AND ITS TRIBUTARIES ON THE PENNSYLVANIA RIVERS REGISTRY

WHEREAS, the Tinicum Township Supervisors recognize the importance of conserving the importance of conserving the Lower Tohickon Creek Watershed and its tributaries to foster the quality of life in Tinicum Township; and

WHEREAS, the Commonwealth of Pennsylvania, Department of Conservation and Natural Resources, Bureau of Recreation and Conservation (PA DCNR), has established a "Pennsylvania Rivers Conservation Registry"; and

WHEREAS, Tinicum Conservancy has completed a Lower Tohickon Creek Watershed Conservation Management Plan for the Lower Tohickon Creek Watershed and its tributaries, which contains a number of conservation recommendations suitable for implementation, development or acquisition in Tinicum Township and throughout the entire Lower Tohickon Creek Watershed and its tributaries; and

WHEREAS, the Lower Tohickon Creek Watershed Conservation Management Plan has been reviewed and found acceptable by the Tinicum Township Supervisors; and

WHEREAS, Tinicum Township does endorse the Lower Tohickon Creek Watershed Conservation Management Plan, and will endeavor to take appropriate action to implement its recommendations.

NOW, THEREFORE, the Tinicum Township Supervisors requests that rivers, river segments or tributaries defined above be listed on the Pennsylvania Rivers Conservation Registry.

RESOLVED This 3rd Day of December, 2002.

(Chairperson of Supervisors)

(Vice-Chairperson of Supervisors)

(Supervisor)

ATTEST:

By: _____
(Linda Wieand, Township Manager)