
Acknowledgements

Tookany Creek Watershed Management Plan Steering Committee

Official Members:

Barbara E. Duffy, Chair, Cheltenham Township
Arthur Bernstein, Vice Chair, Jenkintown Borough
Tom Johnston, Cheltenham Township
Lorna Rosenberg, Cheltenham Township
Frank Campbell, Abington Township EAC
Cathy Gauthier, Abington Township EAC
Scott Marlin, Abington Township
Judith Bishop, Jenkintown Borough
Ralph V. McDermott, Jenkintown Borough
C. Bernadette Ivy, Rockledge Borough
Charles Aungst, Rockledge Borough

Participating Members:

Hal Krieger, Cheltenham Township
Debra Marburger, Cheltenham Township
Andy Rudin, Cheltenham Township
Nathan Walker, Watershed Coordinator, Montgomery County Conservation District
Drew Shaw, Senior Environmental Planner, Montgomery County Planning Commission
Monica Burcik, Environmental Planner, Montgomery County Planning Commission
Katherine Ember, County Planner, Montgomery County Planning Commission
Dorothy Pulcher, County Affairs Manager, PECO Energy Company
Brian Sladky, Senior Project Manager, PECO Energy Company
Joanne Dahme, Watersheds Programs Manager, Philadelphia City Water Department
Dr. Mildred M. Wintz, Old York Road Historical Society

Other Participating Members

Visual Assessment Task Group

Richard Allen	Tom Maclockey
Karen and Harry Bower	Debra, Jacob, and John Marburger
Tock Conarro	Bill Michaels
Alysse Einbender	Eve, Steve and Sarah Monheim
Kerry Krieger	Gary San Pietro

Municipal Staff

Abington Township Staff

Thomas B. Conway, Township Manager
Michael Powers, Township Engineer

Cheltenham Township Staff

David G. Kraynik, Township Manager
Bryan Havir, P.P., AICP, Assistant Township Manager
David Lynch, PE, Township Engineer

Charles D. Gray Jr., Director of Health
Rudy Kastenhuber, Public Works Coordinator

Jenkintown Borough Staff
Ed Geissler, Jenkintown Borough Manager

Rockledge Borough Staff
Troy Madres, Rockledge Borough Manager

State Liaisons

The Honorable Ellen M. Bard
The Honorable Lawrence H. Curry
The Honorable Allyson Y. Schwartz

PA Department of Conservation and Natural Resources

Victor Banks, PA DCNR, Rivers Conservation Grant Coordinator
Terri Hough, PA DCNR, Rivers Conservation Program
Fran Rubert, PA DCNR Regional Recreation and Parks Advisor
Don Gephardt, PA DCNR, Regional Recreation and Parks Supervisor

Project Consultants

NAM Planning & Design, LLC
Nancy Minich, HTR, ASLA, Project Manager

Heritage Conservancy
Gary Bowles, GIS Manager
Michael May, Historic Preservation
Sharon Yates, VP Planning

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Also, the Steering Committee expresses much appreciation to the elected officials from Abington and Cheltenham Townships, and Jenkintown and Rockledge Boroughs who held office during the formation of the plan. Their support of this watershed management planning effort was invaluable.



Tookany Creek Watershed Management Plan Goals

(These are the goals that were developed for the PA DCNR grant application and later presented at the September 2000 public meeting.)

Improve coordination of river-related activities and ordinances.



Improve public education to promote stewardship of river resources.



Improve environmental and land conservation efforts by preserving open space, sensitive environmental areas and habitats by promoting concepts such as riparian buffer preservation and restoration, reforestation, floodplain preservation, water quality, streambank maintenance, and improve water quality by reducing non-point source pollution.



Design non-engineering best management practices and techniques aimed at reducing flooding and improving soil and sedimentation controls.



Design methods for improved communication among local, county, state, and federal governments.

Photographs taken by Nancy Minich during the community streambank restoration planting of the Tookany Creek in June 2003.



Table of Contents

Acknowledgements	i
Tookany Creek Watershed Management Plan Goals	iii
Executive Summary	ix
I. Introduction	1
Project History	1
Study Area	1
Regional Context	1
The Watershed Planning Process	1
II. Public Comment and Participation	5
Initial Project Meeting	5
Steering Committee	5
Community Survey	6
III. Resource Inventory	9
Mapping	9
Natural Resources	9
Physiographic Provinces and Topography	9
Geology	10
Soils	10
Land Cover	15
Vegetation	15
Wildlife	16
Birds.....	16
Fish.....	16
Herpetology	17
Deer and Geese	18
Water Resources	19
Stream Network.....	19
Overview of the Watershed.....	19
Floodplains.....	23
Riparian Corridor	23
Wetlands	27
Hydric Soils	27
The Tookany Creek and Its Tributaries	28
Stormwater Systems	29
Non-Point Source Pollution	30
MS4/Phase II Stormwater Regulations	31
Other Stormwater Implications.....	31
Water Supply.....	33
Sanitary Sewerage System.....	33
Tookany Creek Water Quality	34
Recreational Uses of the Tookany Creek and its Tributaries	34
Other Utilities	34
Significant Resources	35
Montgomery County Natural Areas Inventory.....	35

Cultural and Community Resources.....	35
Cultural, Historical and Archeological Resources.....	35
Abington Township.....	36
Cheltenham Township.....	36
Rockledge Borough.....	38
Archaeological Sites.....	39
Parks, Recreation and Open Space.....	39
Abington Township.....	39
Cheltenham Township.....	40
Jenkintown Borough.....	43
Rockledge Borough.....	43
Community Background.....	43
Population and Housing.....	43
Municipal Profile.....	45
Transportation.....	46
Municipal Zoning and Ordinances.....	49
IV. Visual Assessment of Streams.....	53
Main Stem of the Tookany Creek.....	53
Holy Sepulchre Cemetery to Ralph Morgan Park.....	54
Ralph Morgan Park to Greenwood Avenue.....	58
Greenwood Avenue to Wyncote Post Office.....	62
Wyncote Post Office to Washington Lane Underpass.....	62
Washington Lane Underpass to Church Road.....	64
Church Road at Chelten Hills Drive to Church Road near Ogontz Field.....	65
High School Park to Ashbourne Road along the Tookany Creek Parkway.....	67
Unnamed Tributary in Glenside.....	71
Baeder Creek Watershed.....	72
Western Branch of Baeder Creek.....	77
Eastern Branch of the Baeder Creek.....	78
Rock Creek Watershed.....	79
Mill Run Watershed.....	83
Leeches Run Watershed.....	84
Abington Country Club to Township Line Road.....	84
Township Line Road near Foxcroft Road to Main Stem.....	87
Jenkintown Creek.....	89
Fox Chase Road to Alverthorpe Manor Pond.....	89
Abington Friends School to Township Line Road.....	89
East side of Alverthorpe Park to Serrill Road.....	90
Township Line Road to Tookany Creek Parkway.....	93
V. Management Options.....	95
Watershed Management Options.....	96
GOAL #1 - Improve the Health of the Riparian Corridor Area.....	96
Stream Corridor Improvements.....	96
Landscape Management.....	96
Erosion and Sedimentation Control Measures.....	97
Stormwater Management.....	97
MS4/NPDES Phase II Stormwater Regulations.....	97

Reduce Non-Point Source Pollution.....	97
Flood Control.....	98
GOAL #2 - Enhance Recreation Opportunities and Economic Development	99
Greenway and Trail Development	99
Economic Development	99
Land Development	99
Recreation Development/Creek Access.....	99
GOAL #3 - Develop Public Outreach and Education Programs.....	100
Landscape Management.....	100
Establish Watershed Clean-Ups Days	100
Monitoring.....	100
Implement Model Education Projects in the watershed	100
GOAL #4 - Develop and Implement Land Acquisition and Preservation Strategies	102
Land/Resource Protection Strategies	102
Conserve Major Woodlands	102
Zoning Ordinances.....	102
Historic Preservation.....	102
GOAL #5 - Improve Watershed Communication	103
Form Local and Regional EAC or Watershed Associations.....	103
Individual Municipal Management Options.....	104
Abington.....	104
GOAL #1 – Improve the Health of the Riparian Corridor Area.....	104
GOAL #2 – Enhance Recreational Opportunities and Economic Development	104
GOAL #3 – Continue to Produce Educational Materials in the EAC.....	104
GOAL #4 – Develop and Implement Land Acquisition and Preservation Strategies	104
Cheltenham.....	105
GOAL #1 – Improve the Health of the Riparian Corridor Area.....	105
GOAL #2 – Enhance Recreational Opportunities and Economic Development	106
GOAL #3 – Develop Educational Programs and Public Outreach Program	107
GOAL #4 – Develop and Implement Land Acquisition and Preservation Strategies	107
Jenkintown.....	109
GOAL #1 – Improve Stormwater Management.....	109
GOAL #2 – Enhance Recreation and Economic Development.....	109
GOAL #3 – Employ BMPs and Develop Education Programs and Public Outreach .	109
GOAL #4 – Develop and Implement Land Acquisition and Preservation Strategies	109
Rockledge.....	110
GOAL #1 – Improve the Health of the Riparian Corridor.....	110
GOAL #2 – Enhance Recreational Opportunities and Economic Development	110
GOAL #3 – Develop Educational Programs and Public Outreach Program	110
List of Abbreviations	125
References.....	127

Appendices

Appendix A Landowner Survey

Appendix B Visual Assessment
Appendix C Public Comments

List of Tables

Table 1 – Impaired Streams	20
Table 2 - Riparian Forest Buffer Status of Streams in the Watershed.....	24
Table 3 - Water Resources Statistics	28
Table 4 - Stream Length.....	29
Table 5 - Population	44
Table 6 - Population Projections.....	44
Table 7 - Housing.....	44
Table 8 - Tookany Creek Watershed Management Options Chart	111

List of Maps

Study Area Map.....	3
Topography Map	11
Soils and Geology Map.....	13
Water Resources Map	21
Riparian Buffer Assessment Map	25
Parks Recreation and Open Space Map.....	41
Land Cover Map	47
Visual Assessment – Holy Sepulchre Cemetery to Abington Township Border.....	55
Visual Assessment – Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads	59
Visual Assessment - Main Stem of Tookany Creek – New Second Street.....	69
Visual Assessment - Unnamed Tributary of Tookany Creek – Park Grove Map....	73
Visual Assessment - Baeder Creek Map.....	75
Visual Assessment - Rock Creek Map.....	81
Visual Assessment - Mill Run Map.....	85
Visual Assessment - Jenkintown Creek Map	91

Executive Summary

The Tookany Creek Watershed Management Plan has been developed to be a road map for municipalities, landowners, conservation groups, and citizens interested in taking positive steps to improve the long-term health of the Tookany Creek. The Tookany Creek Watershed Management Plan is the result of a partnership between state, regional and local organizations. Cheltenham Township, with most of the land in the watershed within its municipal boundaries, had a strong interest in preserving the Tookany Creek watershed resources. The other communities directly involved in the plan are Abington Township, Jenkintown Borough and Rockledge Borough. The municipal partners all agreed on the need for a watershed conservation plan as an important step to address the severe flooding, streambank degradation, and poor water quality, all of which are the unfortunate results of suburban development. Because of the commitment of citizens and government leaders in these communities, a watershed management plan will aid in protecting the vital resources of the Tookany Creek and the entire Tookany/Tacony-Frankford watershed.

The Tookany Creek Watershed Management Plan includes the headwater tributaries of the Tookany Creek in the four lower Montgomery County municipalities of Abington and Cheltenham Townships, and Jenkintown and Rockledge Boroughs. The six main tributaries in the headwaters of the study area are Baeder Creek, Jenkintown Creek, an unnamed Tributary, Mill Run, Rock Creek and the main stem of the Tookany Creek. Their total length is 21.22 linear miles. Most of the open land in these municipalities is along the creeks and in municipal holdings. The Tookany Creek name changes to the "Tacony Creek" when it enters into the city of Philadelphia. A watershed management plan is currently under development in this lower portion of the watershed under the auspices of the Philadelphia Water Department.

The purpose of developing a watershed management plan is to analyze the significant natural, recreational and cultural resources within the watershed. The Tookany Creek Watershed Management Plan recommends a long-term course of action to protect the resources of the Tookany/Tacony-Frankford Creek. The plan sought input from the participating municipalities through a steering committee and through a public meeting in September 2000. The first part of this plan documents conditions within the study area. Existing resources data was gathered and reviewed by the consultants with input from the steering committee to understand the greater trends occurring in the study area. It is also important to note that a study of this magnitude has never been undertaken, therefore, this will be a baseline document for all future studies. The inventoried information includes: natural resources of topography, geology, vegetation, soils, land uses, wildlife, water resources, wetlands, and threatened and endangered species; recreation, cultural and the community background. A visual assessment was conducted on the major creeks in each municipality, documenting the existing conditions with photos and text.

Analysis of the resource data and visual assessments led the consultants and steering committee to identify assets to be preserved, and issues to be addressed. The primary issues of concern are stormwater and flood management, restoration and management of the riparian

areas, implementation of best management practices (BMPs), community education and improving and increasing preservation ordinances.

The final section of the Tookany Creek Watershed Management Plan includes the recommended goals and management options. A public meeting was held in May 2003 to present and discuss these goals. This plan will provide the four municipalities with an opportunity to build a strong inter-municipal relationship and to protect the upper portion of the watershed as well as the whole Tookany/Tacony-Frankford watershed for future generations to enjoy. Coordinating municipal plans and programs will provide strong, ongoing stewardship for this regional effort.

The Tookany Creek Watershed Management Plan was developed with the financial support of the Commonwealth's Department of Conservation and Natural Resources (DCNR) "Rivers Conservation Program" and Pennsylvania Department of Environmental Protection (PADEP) Coastal Zone Management Program and its recommendations are eligible for implementation funding from the DCNR.

I. Introduction

Project History

The development of the Tookany Creek Watershed Management Plan (TCWMP) is an outgrowth of Cheltenham Township's interest in preserving the Tookany Creek watershed resources by curtailing the effects of repeated and damaging flood water and erosion on streambeds. Since watersheds do not follow municipal boundaries, it is prudent to involve all contiguous municipalities in the Tookany Creek watershed. Abington Township and Jenkintown Borough agreed to be partners in the watershed study early on, as they noticed similar water-related problems. Rockledge Borough joined the group as the study progressed. Although Rockledge does not have any water bodies within its borders, approximately one-half of the borough does contribute stormwater to the Tookany Creek watershed.

Study Area

The Tookany Creek Watershed Management Plan includes the headwater tributaries of the Tookany Creek in the four lower Montgomery County municipalities of Abington and Cheltenham townships, and Jenkintown and Rockledge boroughs. The six main tributaries in the headwaters of the study area are Baeder Creek, Jenkintown Creek, an unnamed Tributary, Mill Run, Rock Creek, Leeches Run (formerly called an unnamed tributary) and the main stem of the Tookany Creek. Their total length is 21.22 linear miles.

Regional Context

The four municipalities of Abington, Cheltenham, Jenkintown and Rockledge are in the first ring of suburban development around Philadelphia. They are largely "built-out" or at maximum density according to existing zoning and subdivision ordinances. Although they all have various periods of settlement from early colonial times to the present, the major development and growth occurred after World War II. With this development came a major change in the hydrological cycle and function, and an increase in impervious surfaces. The impact of this imbalance is apparent in most reaches of the watershed in the form of flooding, severe erosion and sedimentation, slumping banks and poor water quality. The aging municipal infrastructure and related facilities compound the problems.

The Watershed Planning Process

Generally, RCPs are intended to inventory the significant river resources, identify the potential threats to those resources and recommend restoration, maintenance or enhancement in the form of management options or goals. River Conservation Plans should identify specific projects that are eligible for funding from any grant sources that can support watershed activities or projects. Furthermore, when the watershed area studied within the Rivers Conservation Plan are placed on the Pennsylvania River Conservation Registry, implementation activities identified within the watersheds become eligible for specific funding under The Pennsylvania Rivers Conservation Program.

PADCNR has established the following five-step conservation action steps to guide this planning process, which has been followed for this TCWMP:

- Step 1 Determine public interest
- Step 2 Collect and analyze resource data
- Step 3 Prepare the preliminary draft plan
- Step 4 Prepare draft plan
- Step 5 Prepare final plan

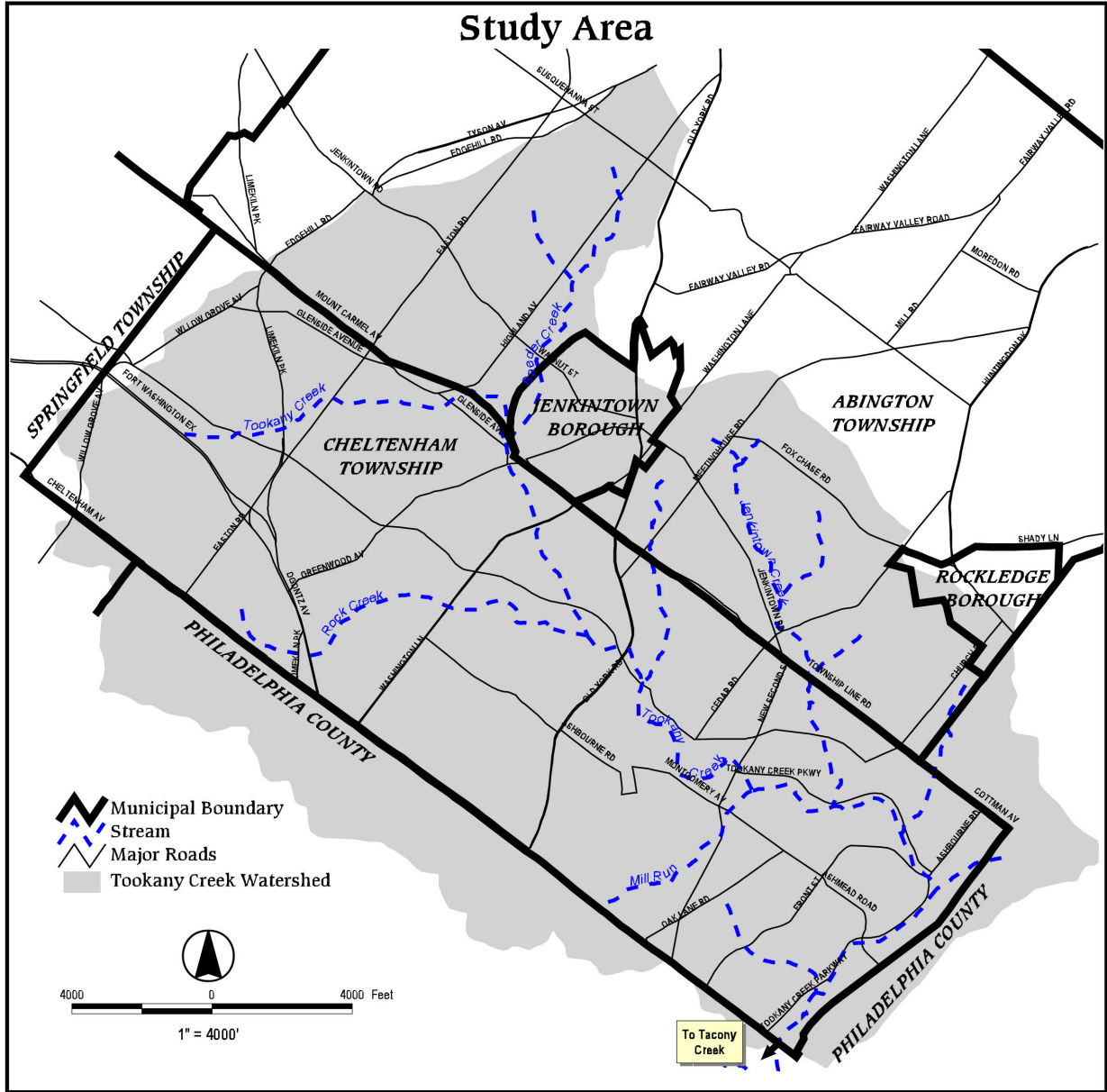
PADCNR has several purposes for all river conservation plans:

- * To foster development of locally initiated river conservation plans, which restore, maintain, or enhance river resources throughout the commonwealth.
- * To provide financial and technical assistance for local river conservation planning activities;
- * To establish a Pennsylvania Rivers Registry to recognize rivers or river segments that have an approved river conservation plan; and
- * To encourage state and local organizations to take actions that are consistent with local river conservation plans.

Funding for this plan was initially provided to Cheltenham Township under a grant from the Rivers Conservation Program of the Pennsylvania Department of Conservation and Natural Resources (PADCNR). PA DEP, Coastal Zone Management, also provided grant funding for the project. Heritage Conservancy and NAM Planning & Design, LLC were the consultants contracted to prepare this River Conservation Plan (RCP) for the Tookany Creek Watershed.

Study Area Map

TOOKANY CREEK WATERSHED MANAGEMENT PLAN (TCWMP)



Funded in part by a grant from the Pennsylvania Department of Conservation and Natural Resources (DCNR).



This survey was funded in part through the generosity of PECO and Impressions Printing.

Prepared For:



Township of Abington, Township of Cheltenham, Borough of Jenkintown, Rockledge Borough

Prepared By:



Heritage Conservancy
85 old Dublin Pike
Doylestown, Pa 18901
215-345-7020
www.heritageconservancy.org

II. Public Comment and Participation

Initial Project Meeting

The first public meeting regarding the Tookany Creek watershed was held on September 25, 2000 to announce the initiation of the TCWMP and to gather public input on creek issues, concerns and opportunities. The purpose of the meeting was to:

- * Inform the public about the intent of the management plan;
- * Determine levels of interest in the management plan;
- * Collect suggestions and comments on what should be done;
- * Solicit and receive offers of assistance;
- * Identify likely members for the steering committee; and
- * Promote protection, preservation, and general environmental stewardship of river-related resources.

Approximately 50 participants gathered to understand the process and offer comments following a presentation on the DCNR River Conservation Planning Process. A discussion followed that focused on the need for coordinated efforts to protect the Tookany Creek as a recreational, economic, natural and cultural resource.

The following comments were recorded as part of the public input portion of the meeting:

- * Identify areas of sewerage infiltration into the creek.
- * Evaluate unfunded mandates for Phase 2 implementation of the Clean Water Act regulations.
- * Evaluate each municipality's controls and regulations for stormwater runoff.
- * Coordinate local, county, state and government efforts.
- * Provide educational programs, activities and materials.
- * Identify key areas for connectability of greenways and recreational opportunities.
- * Supplement organizations to aid in their existing watershed training programs.
- * Add a sixth goal addressing the components of the Clean Water Act.
- * Identify ways to increase habitat and biodiversity.
- * Look at all components that comprise a sustainable watershed.
- * Address erosion problems and implement streambank stabilization before public investment of additional public recreational facilities.
- * Coordinate efforts with DEP for the future design of the Glenside flood control structure Phase 2.
- * Look at ways to implement measures that employ immediate results (no mow zones, protective barriers).
- * Look at alternative ways to retrofit existing developed areas to address stormwater runoff (i.e. porous paving, underground seepage beds, and wetland recharge areas.)

Steering Committee

The steering committee was developed at the outset of the process in 1999, with Abington, Cheltenham and Jenkintown committed to the planning process. The committee consisted of several appointed members from each of the three municipalities, the Philadelphia Water

Department, Montgomery County Planning Commission, Montgomery County Conservation District, and key members of each municipality such as the township engineers.

Members of the Tookany/Tacony Frankford Partnership (T/TFP) joined the steering committee when it was formed in 2000. Rockledge Borough joined in the planning process in early 2001 since it was determined that one-half of the borough lies within the watershed.

The role of the steering committee in the planning process was in an advisory capacity. They assisted in the review of the resident surveys, developed the key components of the inventory and the visual assessment, and developed management options based on their assessment of the tributaries. They also reviewed and evaluated the report data and maps as they were developed and determined if the report contained relevant and accurate data.

Meetings were held regularly to discuss issues germane to the watershed and the plan development, with emphasis on the visual assessment of the streams in each municipality. These projects are an important element in assessing current conditions of the local tributaries from a local person's perspective. Their local knowledge and understanding is invaluable baseline documentation of watershed conditions.

Community Survey

A random survey collecting every tenth resident and business on the tax roles in each municipality was sent in Spring 2001. The questionnaire is included in the appendix. (See Landowner Survey in **Appendix A**.) Highlights of the summary of the survey results are:

- * One hundred, forty surveys (15 percent) were received from the 1,000 surveys sent to the four municipalities. This is considered an average return rate for this type of random survey. Of those received, 101 were from Cheltenham and all were from residences.
- * The majority (90 percent) think that the Tookany Creek is an important natural and scenic resource.
- * A majority recommended preservation of undeveloped land, preservation of historic resources, preservation of scenic character, protection of wildlife habitat, municipal ordinances that preserve forested land, improvement of water quality and education.
- * A majority also recommended discouraging residential development, shopping centers, retail development and other commercial and industrial development.
- * The main issues that respondents feel need to be addressed are trash, water pollution and flooding.
- * One-half (51 percent) of respondents said they use the Tookany Creek or its tributaries for nature walks. Twenty-nine (29) percent use it for biking and hiking, while 22 percent use it for jogging and a small percentage use it for fishing (8 percent). Respondents participate in the above activities about 5 times per month.
- * When asked what improvements they would like to see, comments included more parking, trails for biking, walking, signage, safety and better maintenance in general.
- * If there were better access to the creeks, more than half would use the creek and its tributaries more.

-
- * Seventy-seven percent feel that municipalities should be responsible for increased conservation and management while 65 percent feel it should be a county park system responsibility.
 - * Forty-four percent said the money for these projects should come from municipal bonds while a majority (77 percent) said it should come from federal, state or private grants.
 - * When asked to rank eight priority projects, most projects were in the low to average ranking. About one-third (32 percent) said they want stronger land use ordinances to regulate how land is used along stream corridors, while another third (31 percent) want streambank restoration to filter pollutants, 17 percent indicated that they would want a tree replacement program and physical improvements to reduce flooding.
 - * Most respondents want education and land use regulations to conserve and protect creek corridors.
 - * Prior to this survey, 65 percent of people had not heard about any conservation efforts along the Tookany Creek, and those that did, (20 percent) read it in the newspaper.
 - * More than one-half of the respondents (55 percent) would like to receive written updates on the progress of the TCWMP.
 - * Only 3 percent of respondents own creek front property.
 - * Half of the respondents said they do not want to serve on a volunteer coalition or volunteer to participate in a streambank restoration.

III. Resource Inventory

Mapping

The natural and cultural resources of the study area were inventoried and mapped on GIS where compatible data layers were available. The mapped resources were analyzed to gain an understanding of their significance in relationship to the Tookany Creek.

Map coverages include:

- * Topography
- * Soils and Geology Map
- * Land Cover Map
- * Water Resources
- * Riparian Buffer Coverage
- * Parks, Recreation and Open Space

An important step in the mapping process was the continual review and comment of the steering committee members. As the mapping was completed, members reviewed information and provided local insight into the key relationships uncovered through the inventory process.

Natural Resources

“In the 1930s underneath Limekiln Pike at the corner of Cheltenham and Limekiln, was a place called Sunken Gardens. Further, down, there was an underground waterway-I think it was a storm sewer- but the water was not all underground. We kids used to play in the waterway for hours, riding our rafts down its length. Scouts Woods, near what is now the Cheltenham Mall, was a forest— linked to the Estate of Curtis Arboretum.”

- Sister Jeanne Hunter, Dominican Retreat in Elkins Park

Physiographic Provinces and Topography

(See *Topography Map*) The study area is located in the Coastal Plain and the Piedmont physiographic provinces. A physiographic province is the expression of bedrock at the surface of the land. The lower fourth of the watershed lies distinctly in the Coastal Plain below the fall line, the official demarcation, while the upper watershed is in the Piedmont province. The topography map, which includes the Germantown and Hatboro USGS quadrangle maps, illustrates the gently rolling hills found in the Piedmont landscape.

The highest elevation in the watershed rises to about 420 feet above sea level in the northwestern area of Cheltenham Township in the vicinity of Cheltenham Avenue west of Holy Sepulchre Cemetery. The lowest topography is 90 feet above sea level and is found in the southern area of Cheltenham Township on the southwestern area by Cheltenham Avenue at the Tookany Creek junction. The steeper slopes are found along the Rock Creek tributary and the main stem of the Tookany Creek along the township-owned areas of the Tookany Parkway. Not surprisingly, these are also the areas that have remained vegetated and undeveloped. The geological variability in the slopes is often revealed in the attractive rock outcroppings, which are exposed in the Tookany Creek valleys.

Geology

(See Soils & Geology Map) The Soils and Geology Map illustrates two features of geology, the depth to bedrock and the specific types of geology. Except for rock outcrops, the underlying geology of the study area is not visible and as a result, its influence on natural features is not always acknowledged. Characteristics of the bedrock, along with the hydrologic cycle are responsible for the changes in elevation, steep slopes, location of watercourses and orientation in the landscape.

The Wissahicken formation, an oligoclase mica schist, is the largest formation in the watershed comprising roughly 7/8th of the lower area of the watershed. Felssic gneiss, pyroxene bearing, is the next most common formation and lies in the northwestern-most area with bands of chickies quartz on either side. Small isolated areas of the Bryn Mawr formation are located along the southern area bordering Philadelphia. (Montgomery County Planning Commission, Natural Areas Inventory, 1996)

A majority of the watershed has no data on the depth to bedrock. The areas with known depth to bedrock appear to be around the headwater areas of the Tookany and its tributaries and the lower end of the Tookany adjacent to the city line. The Soils and Geology Map illustrates that the darker the color on the map, the deeper the soils and greater the depth to bedrock. This is an important characteristic to know when planning projects and developing Best Management Practices (BMPs) that would need deep soils for infiltration and underground storage of stormwater.

The watershed geology is split between the lowlands of the Coastal Plain and the Triassic Piedmont uplands.

Soils

(See Soils & Geology Map)

The distribution of soils reflects the bedrock geology and physiography of the area. In turn, these soil patterns influence land patterns and vegetation. The soils in most of the Tookany Creek Watershed have been classified as “urban land” or “man-made” indicating that their composition and structure has been disturbed and cannot be classified. According to the Natural Resources Conservation Service (NRCS), soils that have been altered during construction and development tend to be limited in their drainage capabilities.

Planning Implications

With much of the basic soils information unknown, it is difficult to draw reasonable conclusions to determine suitability for recharge or infiltration BMPs. It will require site-specific investigations to determine the suitability on a site-by-site basis. The soils information can be found online and would help determine general areas suitable for recharge using hydrological classifications.

Topography Map

Soils and Geology Map

Land Cover

The National Land Cover Dataset was compiled from Landsat satellite TM imagery (circa 1992). The analysis and interpretation of the satellite imagery was conducted using very large, sometimes multi-state image mosaics. A relatively small number of aerial photographs were “ground truthed”, resulting in thematic interpretations, which are necessarily estimated, from a spatially broad perspective.

The largest land cover in the watershed is low-intensity residential, with 51 percent coverage, followed by deciduous forest at 16 percent and commercial industrial and transportation at 11 percent. High density residential is the fourth largest coverage comprising 8 percent.

Urban /Recreational grasses which includes grasses planted in developed settings for recreation or aesthetic purposes is the next largest coverage at 643.1 acres or 6.2 percent of the Tookany Watershed.

Land Cover Classification	Acres
Open water	4.9
Low intensity residential	5,293.0
High intensity residential	865.8
Commercial industrial/transportation	1098.1
Transitional	1.6
Deciduous forest	1695.3
Evergreen forest	160.3
Mixed forest	542.4
Urban/recreational grasses	643.1
Woody wetlands	1.8
Emergent herbaceous wetlands	43.4
Total	10,349.7

Vegetation

Eastern Pennsylvania was once almost completely forested as most of the Commonwealth, but over time as man cleared the land for agriculture and development, the original vegetation has diminished with only remnants of the native landscapes remaining. The relatively flat fertile soils in proximity to the Port of Philadelphia made it a prime area for development. Only small remnants of forest remain and generally can be found along creeks.

Vegetation grows in response to the conditions created by the underlying soil and geology. The few remnant forests remaining in the watershed are representative of the Piedmont section of the Oak-Chestnut Forest Region. Oaks predominate, frequently mixed with hickory, red maple and tulip popular. A shrub layer of viburnum and spicebush is present. Red oak, black oak, and white oak are characteristic of the dry sites on quartzite, schist or gneiss, with maples and tulips on the more moist lowland areas.

Most of the native plant habitats have become overgrown with invasive plant species that have the ability to tolerate the stressful conditions created by the disturbance of suburban and urban areas within the watershed. Japanese knotweed and Japanese honeysuckle appear to be the

dominant plants in many areas of the Tookany Creek with tree of heaven, oriental bittersweet and garlic mustard becoming commonplace species. Cheltenham Township, with most of the Tookany Creek corridor, has made attempts to restore the native vegetation along a portion of the streambank. Many local groups like friends of Ralph Morgan Park have devoted many hours to the replanting of native shrubs and trees along the park riparian buffer areas.

Wildlife

Habitat loss and landscape fragmentation are the most significant threats to wildlife populations. Since most of the Tookany Creek watershed was developed after World War II, very little of the existing landscape is intact. Development and sprawl has all but eliminated many of the significant species once found there. There is no specific organization within the watershed that documents or conducts inventories of wildlife. Pennypack Ecological Restoration Trust, although located in the Pennypack watershed in Huntington Valley, PA, was contacted for a general list of birds because it is located immediately adjacent to the Tookany Creek and has similar geology, soils, vegetation and land uses.

Birds

Some of the more abundant bird species are:

Eastern Towhee	Downy Woodpecker	House Wren
Canada Geese	Red-bellied Woodpecker	American Robin
Mallard	Eastern Wood Pewee	Grey Catbird
Great Blue Heron	Barn Swallow	European Starling
Green Heron	Tree Swallows	Red-eyed Vireo
Red-tailed Hawk	American Crow	Song sparrow
Turkey Vulture	Blue Jay	White-throated Sparrow
Mourning Dove	Carolina Chickadee	House Sparrow
Rock Dove	Tufted Titmouse	American Goldfinch
Great Horned Owl	Carolina Wren	House Finch
Belted Kingfisher		

Fish

Fish in the Tookany Creek Watershed have been inventoried largely by the Philadelphia Water Department through their Biological Assessment of the Tacony-Frankford Watershed, (2000-2001). Seven biomonitoring sites were sampled in 2000-2001, four of which were in the upper reaches in the Tookany Creek Watershed study area, TF-04 through TF-07. Only four mainstem locations had fish assessments, two of which were in this study area, TF-05 and TF-06.

Using EPA guidelines, fish were collected by electrofishing. A Smith-Root DC backpack electroshocker, operated between 0.4 and 0.6 amps direct current (DC) was used to stun fish. A 100-meter reach of the stream was blocked at the upstream and downstream limits with nets to prevent immigration or emigration from the study site. Each reach was uniformly sampled and all fish captured were placed in buckets for identification and counting. An additional pass without replacement was completed along the reach to insure a maximum likelihood population estimate.

The TF-04 habitat assessment indicated this reach had the lowest total of all the assessment sites due to channelization, sedimentation and a poor riparian zone with little to no vegetation protection. It was placed in the non-supporting category for habitat assessment. It is considered moderately impaired according to the biological quality of the seven biomonitoring sites. The banks were very unstable and even the channelized portion appeared undercut by erosive forces.

TF-05, like the above assessment, had eroded banks, reduced riparian vegetated zone and sedimentation that placed the site in the poor category for habitat assessment. It is considered moderately impaired according to the biological quality of the seven biomonitoring sites. The site was dominated by pollution-tolerant (92 percent) and moderately tolerant (9 percent) species. The individual species collected at TF-05 are:

- * Blacknose Dace 50.0 percent
- * White Sucker 37.7 percent
- * Spottail Shiner 6.5 percent
- * American Eel 1.3 percent
- * Common Shinner 1.1 percent

TF-06 had a much reduced riparian zone with one side bordered by the train line and the other paralleling the roadway. A faint hydrocarbon (e.g. gasoline) odor was noticed. TF-06 was placed in the non-supporting assessment category for habitat. It was dominated by pollution tolerant (98.67 percent) species and had the lowest species diversity, therefore, it is considered severely impaired according to the biological quality of the seven biomonitoring sites. This reach may be impaired by unstable habitat and periods of degraded water.

The individual fish species collected at TF-06 are:

- * Blacknose Dace 80.57 percent
- * Creek Chub 18.10 percent
- * American Eel 1.33 percent

TF-07 was the healthiest of the four sites in the Tookany Creek watershed, with a partially supporting assessment in habitat. It is located on Jenkintown Creek considered a transition between high gradient and low gradient reaches. It was observed that many of the homes maintain mowed lawns to the creek resulting in unstable banks with little vegetative protection and a reduced riparian zone.

Herpetology

Documentation of herptiles of the area is not available, however, it has been reported anecdotally that Northern water snake is found frequently in the main tributaries of the Tookany Creek and Garter snakes found in the gardens of many residences and woodlands. Box turtles have been spotted near various creeks. It can also be surmised that salamanders and frogs are located in specific areas around the watershed.

There are no known Pennsylvania Natural Diversity Inventory (PNDI) species within the watershed.

Deer and Geese

Deer and Canada geese are two wildlife populations that have become problematic in the landscapes of the Tookany Creek Watershed, a ubiquitous problem in every suburban area. They contribute significantly to the decline in the health of the watershed; deer through foraging extensively on the vegetation, and geese with their high nitrogen and phosphorus droppings that flow into the water.

Deer, a mammal found in the forests of Pennsylvania, have grown to unnaturally high numbers in many suburban areas. Deer can thrive in the same suburban landscape in which people live, fragmented plant communities with many edge species as a result of development. They only need small patches of landscapes in which to live and raise their young. In the Tookany, they browse the understory vegetation so severely that there is often no understory in many areas and limited species of the future forest reproducing, causing a major problem in plant communities especially along the main stem of the Tookany. They tend to leave the invasive species like multiflora rose and honeysuckle. The forest will have great difficulty regenerating itself when the seedlings and young trees are over-browsed.

Homeowners appear to be frustrated with the large populations of deer since the deer eat their ornamental trees and shrubs causing a financial loss as well as a decrease in the aesthetics of their landscape.

Deer have no predators in PA; therefore, they continue to reproduce without any natural controls. There is much controversy in the Philadelphia area on how to control the deer population. Some areas have sharpshooters to cull the herd, while other areas and regulatory agencies are considering a form of birth control to reduce the numbers. A reasonable solution needs to be developed.

Geese are a serious threat to the water quality in the Tookany because of the high concentrations of nitrogen and phosphorus that flow into the water bodies. They populate the unbuffered ponds, creeks, water bodies and areas close to water with mowed lawns. People benignly feed the geese, which encourages them to stay in the areas in lieu of migrating. They can be found at most of the golf courses and municipal parks where the riparian buffer is mowed. Geese often will not venture into vegetation above their eye level for fear of predation; therefore, having a riparian buffer eliminates most of the problem.

Planning Implications

The existing native forest along the Tookany and its tributaries should be supplemented and restored to connect and link the significant natural features through a greenway. Decades of development and sprawl have all but extirpated some of the more significant stands of native vegetation and the associated habitat it once supported along the Tookany Creek. Riparian buffers should be restored to enhance the biodiversity of the watershed and protect the water quality.

The biological assessment conducted by the Philadelphia Water Department indicated that the upper reaches of the Tookany Creek Watershed have moderately to severely impaired habitats as a result of limited riparian buffers, which contribute to low fish diversity. Non-

buffered riparian areas encourage geese and cause a subsequent decline in the water quality creating greater costs to treat drinking water downstream. All new plantings should be protected against deer browse and vandalism.

Fragmented, edge-dominated landscapes provide perfect habitat for deer, which further threatens the natural vegetation. Landowners need to be educated about the importance of riparian buffers and the habitats they support. A patchy natural habitat has negative implications including reduced species diversity, increased species extinction and the establishment of invasive plant species. A strong native plant campaign, buttressed by a local native nursery needs to be developed to bring back the native plants throughout the watershed and the wildlife and aquatic habitats they support and protect.

Water Resources

Stream Network

(See the Water Resources Map) The size of a watershed is closely related to the network of streams contained within its borders. Streams with no upstream tributaries are designated as first order streams down to their confluence. A second order stream is formed when two first order streams meet, and third order created by the confluence of two second-order, and so on.

Headwater streams are defined as first-and second-order streams. Headwater streams dominate the landscape, accounting for roughly 75 percent of the total stream and river mileage in the United States. Headwater streams are the dominant drainage feature and subsequently receive the bulk of runoff from residential developments, construction sites, parking lots, roads and other features in the urban/suburban landscape in the watershed. Like many communities, the municipalities in the Tookany Creek watershed collect run-off by a storm sewer system with no treatment. Increases in the volume and rate of stormwater runoff have historically resulted in the construction of concrete channels and drainage pipes, eliminating many headwater streams.

Overview of the Watershed

The Tookany Creek and the Tacony-Frankford Creek watersheds are located in PA DEP subbasin 03J, which is shared with the Poquessing Creek and Pennypack Creek Watersheds. This is a subbasin included in HUC Area 2040202, Delaware River, a Category I, FY99/2000 priority watershed in the Unified Watershed Assessment.

Larger watershed scales, or national watershed scales, are classified by using the Hydrologic Unit Code (HUC) system, a system of hierarchical codes used by federal agencies, states, interstate commissions, and others to identify watersheds at the national level. The U.S. Geological Survey (USGS) has developed the HUC system for the purpose of inventorying all the "national scale watersheds in the United States". To accomplish this objective the agency divided the county into 21 regions that account for 21 major river basins. Within those major river basins, they identified a total of 222 watershed sub regions. The accounting units were further broken down into smaller watershed units.

The Tookany Creek subbasin suffers from urbanization, resulting in point and non-point source pollution from urban/stormwater runoff, hydrologic modification, illicit connections, sanitary laterals hooked into the storm sewers, heavy industry, and commercial and residential development. Even though the major streams have adjacent greenways, their water quality has been severely affected by runoff, habitat modification and extremely high water/flow fluctuations. Many of the greenways are narrow and severely eroded. The invasion of exotic plant species and soil compaction from intense recreational use has also taken their toll on streamside parklands. Japanese knotweed is the most pernicious of all the invasives as it has shallow roots and does little to stabilize the creek banks.

Urbanization and paving can have a severe effect on stream aquatic life. Studies by the Maryland Department of Natural Resources indicated that a reduction in stream aquatic species diversity may begin with as little as 2 percent impervious cover. Maryland streams with over 15 percent impervious cover were rated fair to poor for aquatic species.

Stormwater from paved areas can also wash oil, grease and other pollutants into streams. The paved area also restricts replenishment of groundwater, and contributes to flash flooding and extreme fluctuations in stream water levels. Cheltenham Township has had a long history of flooding going back to the 1950s and 1960s.

Extreme fluctuations also impact the biological activity in streams. Fluctuations cause difficulties for bottom dwelling organisms and also scour the substrate. Retention of riparian vegetation in the first-order streams that may comprise as much as 50 percent of the streams in a watershed, can be especially critical to the protection of organisms in the downstream watershed.

More specifically, the EPA listed the Tacony /Frankford Creek watershed as impaired and has listed eight unnamed tributaries on its 303d/305b listing. The causes of impairment of many of the streams in this subbasin are indicated as water flow variability or flow alterations due to urbanization and new residential development.

Table 1 – Impaired Streams				
Stream	Stream code	Drainage area sq. miles	Miles impaired	Causes/sources of impairment
Mill Run	02400	2.05	1.08	Urban: Flow alterations, water flow variability, habitat alterations
Jenkintown Creek & two unnamed tributaries	02396	1.84	2.99	Urban: Flow & habitat alterations, flow variability
East Branch Jenkintown Creek	02398	.52	.61	Urban: Flow & habitat alterations, flow variability

Water Resources Map

Floodplains

The 100-year floodplain affects the health, safety and welfare of residents. While much of the time the floodplain may be dry, during storms the floodplain stores and conveys large quantities of water. Development within the floodplain reduces the carrying capacity and increases the height and destructive ability of floodwater. In addition to carrying flood waters, the floodplain and stream corridor serve other important functions. The condition of the stream corridor is important in minimizing erosion and water pollution, protecting water quality (temperature and velocity) and providing animal habitat and recreation opportunities.

The actual delineation of the floodplain elevation was in the 1970s. The Army Corps of Engineers is in the process of developing a study to re-evaluate the Tookany/Tacony-Frankford watershed floodplain elevations in the near future.

The Water Resources Map illustrates that there are a total of 395.17 acres that are within the 100 year flood plain. Cheltenham Township has 273.49 acres or 69 percent of the land area in the watershed in floodplain, and Abington Township has 121.68 acre or 30.79 percent of the floodplain within the Tookany Creek Watershed. The two boroughs do not have any floodplain since they do not have any of the Tookany Creek flowing through their borders.

Riparian Corridor

(See Riparian Buffer Assessment Map) The riparian corridor is the vegetated area generally found along waterways. Seventy-six feet on each side of a water body is the recommended width of a riparian buffer. These corridors usually coincide with the delineated floodplain. However, in some areas, such as the headwater of the stream, the riparian corridor may expand beyond the floodplain. If vegetation is provided along the banks of tributaries as well as the main stream, pollutant loads can be greatly reduced. Well-vegetated stream corridors will help reduce flooding and drop out sediment flowing into the streams, shade the stream, and provide habitat for wildlife. The riparian area is the most important area for high ecological biodiversity. As discussed in the Wildlife section of this report, loss of habitat is the most serious cause of the loss of wildlife.

In 2002, Heritage Conservancy completed an evaluation of the riparian buffer in the Tookany/Tacony-Frankford watershed. Aerial photos and helicopter over-flights were evaluated to determining the presence or absence of forested buffers on both sides of the streams in the watershed.

The following chart is the summary of the Riparian Buffer Map and indicates the results of the riparian buffer assessment by individual stream. (does not include Leeches Run)

Table 2 - Riparian Forest Buffer Status of Streams in the Watershed.		
Watershed	Feet	Miles
Baeder Creek		
Both Sides Lacking	3,153	0.60
One Side Lacking	1,392	0.26
Burholme Creek		
Both Sides Lacking	475	0.09
One Side Lacking	741	0.14
Cheltenham Village/Lawndale		
Both Sides Lacking	0	0.00
One Side Lacking	0	0.00
Elkins Park		
Both Sides Lacking	2,377	0.45
One Side Lacking	3,304	0.63
Glenside/Edge Hill		
Both Sides Lacking	713	0.14
One Side Lacking	2,112	0.40
Jenkintown Borough		
Both Sides Lacking	0	0.00
One Side Lacking	0	0.00
Jenkintown Creek		
Both Sides Lacking	1,801	0.34
One Side Lacking	2,433	0.46
LaMott/East Oak Lane		
Both Sides Lacking	0	0.00
One Side Lacking	0	0.00
Mill Run Creek		
Both Sides Lacking	721	0.14
One Side Lacking	437	0.08
Rock Creek		
Both Sides Lacking	2,245	0.43
One Side Lacking	1,570	0.30
Rowland Park		
Both Sides Lacking	1,138	0.22
One Side Lacking	7,431	1.41

During the stream visual assessment conducted by the steering committee (see Visual Assessment) the most common observation along the creek sections was the lack of riparian buffer on both private and municipal land. Native vegetation that is found in the riparian buffer often has been removed or mowed, and the riparian zone is often a place where brush and other lawn wastes are dumped. The creeks with sections where flooding has been a problem such as in the Baederwood and Rock Creeks also tend to have the riparian buffer removed and/or a large amount of impervious surfaces.

Riparian Buffer Assessment Map

Wetlands

Wetlands filter and impede stormwater and provide a habitat for aquatic life. They are frequently found along a stream corridor. Wetlands are defined by the EPA and Army Corps of Engineers as, “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstance do support a prevalence of vegetation typically adapted for life in saturated soil conditions.” Depending on where they are located, wetlands may serve one or more beneficial functions. Almost all wetlands provide habitat for birds, amphibians and fish. These in turn support other wildlife. Wetlands also mitigate flooding by holding back floodwater and slowing stream velocity. Wetlands also improve water quality. As water flows through a wetland, it slows and drops much of its sediment load. In addition, nutrients that can cause algae blooms and other pollution problems are typically absorbed by wetland vegetation.

According to the National Wetlands Inventory (NWI) maps, there is a total of 21.48 acres of wetlands in the Tookany Creek Watershed. Cheltenham Township has 12.60 acres or 58.66 percent of the total wetlands in the Tookany Creek Watershed, and Abington Township has 8.88 acres or 41.34 percent of the total. The two boroughs do not have any wetlands mainly since they do not have any of the Tookany Creek flowing through their borders. It is likely that other areas of wetland are present in the watershed in addition to those documented by the NWI maps. Site specific assessments would be required to locate additional wetlands.

Planning Implications

Wetlands serve an important function in the watershed and are rapidly diminishing. Municipalities can further buttress the federal protection by adding buffer ordinances to the known NWI sites, much like New Jersey and New York states.

Hydric Soils

(See the Water Resources Map) The Hatboro soil type is the only hydric soil known and documented in the watershed. The presence of hydric soils, or soils that are characteristic of flat and poorly drained bottomlands, may indicate the existence of wetlands as it is one of three parameters used to determine the presence or absence of wetlands. Hydric soils are generally a strong indicator that there may be wetlands; therefore, wetland soils are mapped to afford greater recognition, and protection of, this soil type.

In Cheltenham Township there are a total of 92.50 acres of hydric soils or 51 percent of the total hydric soils in the Tookany Creek watershed. Abington Township, although it contains a smaller percentage of the overall watershed land area has an almost equal amount of hydric soil area—88.81 acres or 48 percent. The two boroughs do not have any hydric soils.

Table 3 - Water Resources Statistics

Natural Resource	Area (acres)	% Total Area
<i>Cheltenham Twp</i>		
100 Year Floodplain	273.49	69.21%
Hydric Soil	92.50	51.02%
NWI Wetland	12.60	58.66%
<i>Abington Twp</i>		
100 Year Floodplain	121.68	30.79%
Hydric Soil	88.81	48.98%
NWI Wetland	8.88	41.34%
<i>Jenkintown Borough</i>		
100 Year Floodplain	0.00	0.00%
Hydric Soil	0.00	0.00%
NWI Wetland	0.00	0.00%
<i>Rockledge Borough</i>		
100 Year Floodplain	0.00	0.00%
Hydric Soil	0.00	0.00%
NWI Wetland	0.00	0.00%

The Tookany Creek and Its Tributaries

The Tookany Creek Watershed Management Plan includes the headwater tributaries of the Tookany Creek in four lower Montgomery County municipalities of Abington and Cheltenham townships, and Jenkintown and Rockledge boroughs. The six main tributaries in the headwaters of the study area are: Baeder Creek, Jenkintown Creek, Leeches Run, Mill Run, Rock Creek and the main stem of the Tookany Creek. Their total length is 21.22 linear miles.

Baeder Creek is 1.75 miles long or 8.24 percent of the linear miles of the watershed. Jenkintown Creek is 3.61 miles long or 16.97 percent of the watershed; Mill Run, the shortest length, 1.08 miles long, or 5.09 percent of the linear miles; Rock Creek is 1.97 miles long and comprises 9.25 percent of the watershed. Leeches Run, formerly an unnamed tributary in the *Draft Tookany Creek Watershed Management Plan* is 1.5 miles long. It is not included in many of the previous formal or reported calculations in the watershed.) It will, however, change the previously reported length of the Tookany Creek watershed tributaries from 19.72 linear miles to 21.22 linear miles (for more information see Section IV Leeches Run). The two main Tookany Creek branches are the largest comprising 11.31 linear miles or 53.30 percent of the linear miles. The headwaters of the main stem of the Tookany Creek begin in Laverock near Cheltenham Avenue. The creek leaves Cheltenham Township further south on Cheltenham Avenue at the Philadelphia border.

Subwatershed	Length (feet)	Length (miles)	% Total Length
Mill Run	5,682	1.08	5.09 %
Leeches Run	7,920	1.5	7.07 %
Baeder Creek	9,245	1.75	8.25 %
Rock Creek	10,402	1.97	9.28 %
Jenkintown Creek	19,063	3.61	17.01 %
Tookany Creek	59,726	11.31	53.30 %
Total	112,038	21.22	100 %

Stormwater Systems

Stormwater is the runoff from a rain event or snow event. It can flow in a natural channel or man-made collection system. In the natural system, the normal flow is to woodland or meadow to swales to rivers and finally to the ocean. Much of it is infiltrated into the ground where it is used by plants. Vegetation and soil acts as a filter removing sediment, pollutants and slows down the velocity. Water is also infiltrated to recharge the groundwater aquifers and build the base flow for streams.

Once humans build on the land, they add impervious surfaces of roofs, concrete and buildings, which do not allow water to soak in. This increases the amount of stormwater runoff and pollution and decreases groundwater recharge. Ultimately, this results in downstream habitat destruction and flooding, especially in urban environments like the Tookany Creek watershed.

An imbalance in the hydrological cycle from excessive stormwater runoff is the single most serious problem plaguing the Tookany Creek watershed. The municipalities in this study have stormwater systems that are on average 80 years old. They consist predominantly of a system of pipes and storm drains and few detention basins or other best stormwater management practices. It has only been in the last twenty to thirty years that detention basins had been developed as a BMP to detain the water prior to discharge into the creek. By the time they became an accepted BMP, in the 1970's, most of the land in this first ring of the Philadelphia suburbs was largely built-out.

Conversely, impervious surfaces in the form of parking lots have increased throughout the municipalities. This has caused greater amounts of stormwater runoff and less on-site infiltration, resulting in a rapid surge of stormwater and NPS pollution discharge into the Tookany Creek.

The Center for Watershed Protection (CWP) in Maryland, has produced a guide for managing urbanizing watersheds called "Rapid Watershed Planning Handbook" that includes the development of threshold amounts of impervious surfaces and stream impacts. It has been shown that once a watershed has over 10 percent impervious surface, a stream is not able to maintain its biodiversity and channel stability. As a watershed reaches this threshold, it will generally show a decline in physical, biological or water quality indicators. Beyond 25 percent

impervious surface, there is serious damage to the creek and the watershed requiring expensive and extensive intervention and BMPs.

The combination of an aging stormwater infrastructure and increasing impervious land features has created many flood-related problems. With today's percentage of impervious surfaces, it is virtually impossible to build storm sewers large enough to collect all runoff. Notable is the alarming frequency of the larger storm events such as the recent Hurricane Floyd in 2000 that caused enormous damage within the Tookany Creek, ripping out areas of a recent biotechnical streambank restoration along the main stem of the Tookany at High School Park in Cheltenham Township. These storm events have uprooted large trees and debris, carrying them downstream where they gouge paving, roads, and other fixed structures.

The most serious impact is to the Tookany Creek bed, which bears the signs of these violent activities in the form of gouged banks, slumping and downstream siltation. With the siltation comes the non-point source pollution.

Non-Point Source Pollution

One of the most difficult areas of watershed management is control of non-point source (NPS) pollution runoff from myriad sources after it is washed from its source and transported downstream in stormwater runoff. Some of the indirect sources of NPS pollution in the Tookany Creek watershed are the numerous gas stations, auto repair and body shops, industries, residential yards, driveways, parking lots, winter road salts and other sites of everyday human activity. Suburban residential gardens and lawns use a wide array of consumer and commercial products that can introduce potentially harmful materials into the Tookany Creek and its tributaries. The degradation of the watershed is influenced by the presence of harmful substances, sediment, bacteria, and nutrients in runoff water. Loss of wetlands and the riparian buffers also contribute to the problem, reducing the ability of runoff water to naturally cleanse itself as it proceeds downstream in the Tacony-Frankford Creek and to the Delaware River via the urban environment of Philadelphia.

In this region of the United States, the frequency of storms is an important consideration since each storm event leaches and/or washes the chemicals from the impervious surfaces or lawns downstream in this first flush. The best management practices recommend developing management strategies to capture and treat the first flush from the two-year storm events. These frequent storm events not only carry the largest amount of pollution to our natural infrastructure, the streams, but the two year events also help in the formation of the channel shape, especially if carrying destructive sediment in the stormwater.

The National Water Quality Inventory, 1998 Report to Congress identified urban runoff as one of the leading sources of water quality impairment in surface waters (USEPA, 2002 p.I-1). Urban runoff/storm sewers was ranked as the sixth leading source of impairment in rivers. (Although agricultural runoff is the largest contributing factor to NPS pollution, the Tookany Creek watershed does not have any agricultural land uses.)

One of the most effective methods to address non-point source pollution is to intercept it between the source and the water. Riparian buffers are being preserved or created near

waterways in an effort to filter out pollutants carried from higher elevations in the watershed. As the runoff moves through the riparian zone, sediment, nutrients, and some heavier pollutants are deposited, preventing them from reaching the water.

MS4/Phase II Stormwater Regulations

The United States Environmental Protection Agency's (US EPA) National Pollutant Discharge Elimination System (NPDES) Phase I Stormwater Regulations were developed in 1992 and affected larger cities such as Philadelphia and Allentown. Phase II of NPDES has set March 10, 2003 as the compliance date for the municipalities in the Tookany Creek Watershed. Municipalities fall into the "designated small MS4" category if they have less than 1000 people per square mile and are located near an urbanized area such as Philadelphia or Trenton. Small is defined as less than 100,000 people and MS4 is Municipal Separate Storm Sewer System. A separate storm sewer system is a series of curbs, gutters, ditches, channels, pipes or other means of conveying water that was not specifically put in place to handle only stormwater. This does not include combined or separate sanitary sewers. The system can include natural features such as swales to a storm drain.

The goal of Phase II is to protect the environment from negative effects of runoff from human activities. The way the municipalities of the Tookany Creek watershed can meet this goal is to require applications for permits not only to be filed by the compliance deadline but also to develop a comprehensive stormwater management program outlining what actions the municipalities will take to meet the six minimum measures mandated by the rule. These six measures are:

- * Public education and outreach
- * Public participation and involvement
- * Identification and elimination of illicit discharges or connections'
- * Tighter controls for construction-site runoff one acre and larger
- * Post-construction controls for new development and redevelopment
- * Good housekeeping type policies and pollution prevention

The most important component of the rule is to reduce the discharge of pollutants from a designated separate storm sewer system to the "maximum extent practical". Proper use, storage, and disposal of chemicals are emphasized, along with keeping clean rainfall away from pollutants, preserving pervious surfaces, intelligent land use planning and post-construction runoff equal to pre-runoff. These are the very things that this river conservation plan aims to do.

Multiple MS4s can submit one package as co-applicants. Cheltenham Township has contacted Abington Township and Jenkintown and Rockledge boroughs to submit as co-applicants. Municipalities can share the workload or do all. In addition, Cheltenham has applied on its own.

Other Stormwater Implications

According to the Cheltenham Township engineer, at this time, 25 to 40 percent of homes in the township have sump pumps to eliminate the water in basements. This is ground water and

rarely contains pollutants, however, when it is discharged onto the streets and mixed with surface stormwater it increases the volume of stormwater. This is also the case in the other three municipalities where sump pumps are in use.

Abington, Jenkintown and Cheltenham have a street sweeper to travel over the several hundred miles of roads to help reduce the NPS pollution that could easily run off into the surrounding waterways. It has not been determined if Rockledge provides this service.

There are several low-lying areas within the watershed that have experienced frequent flooding with damage to homes and businesses. It appears that dwellings were built over time in the floodplain without recognizing the value of the floodplain in attenuating floodwaters. Compounding the problem is the gradual addition of impervious surfaces over decades to the watershed's creeks thus causing less on-site infiltration and more direct volume flowing quickly into the creeks.

In the early 1950s, the PA DEP built a levee along the Tookany Creek to contain the floodwaters to prevent damage to the surrounding homes. This has decreased the severe damage the area once experienced, but the surrounding area roads and some homes continue to flood. In 1978, a pump house was built on Rices Mill Road in Glenside, to curtail the more serious flood events.

The Keswick area has experienced flooding as a result of inadequate storm sewer capacity. Many of the storm drains cannot capture and divert the flows in time to prevent flooding in the intersections. Many of the creeks also overflow their banks, causing localized flooding.

Abington Township has recently completed a major flood attenuation project in the Baeder Creek sub-watershed due to ongoing and repeated damage.

The Montgomery County Conservation District has received a grant to distribute rain barrels to residents in the county or watershed for a minimal fee if built at a community outreach workshop. The Tookany/Tacony-Frankford Watershed Partnership has also distributed approximately 135 barrels to residents in Cheltenham, Abington and Jenkintown in summer 2003. This will allow for garden reuse of the rain that would ordinarily exit downspouts and spill into the streets and eventually into the storm sewers.

Planning Implications

Stormwater and NPS pollution are the most serious problems afflicting the Tookany Creek watershed, especially in light of the large storm events that have produced such destructive results. The entire watershed from the headwaters downstream, needs to increase the amount of on site infiltration, decrease the amount of stormwater that flows directly into the creek channels, and reduce the amount of NPS pollutants. There are many infiltration and NPS pollution BMPs that can be implemented to achieve this result.

Phase II stormwater regulations and the TCWMP can work hand-in-hand towards the same goal of proper stormwater management. The four municipalities already are working

together on the TCWMP; therefore, extending the effort to Phase II should not be difficult. There are already common goals and this will help establish the TMDL levels for the watershed. It will require a concerted effort by all individuals, businesses, and organizations within the watershed.

It is recommended that an Act 167 study be undertaken with Montgomery County, Philadelphia County under the auspices of the PWD and the municipalities affected in the watershed to develop a more strategic plan to alleviate the flood damage. Although the Act 167 study can only plan for future development, it will establish the parameter for the TMDLs within the watershed. This is a high priority within the watershed.

The municipalities may also secure a grant through DCNR to assist in the development of a training program for municipal public works staff, businesses and residents in the Tookany Creek Watershed. The program should focus on watershed BMPs that support the requirements of the MS4.

Water Supply

The residents and businesses in the four municipalities of the Tookany Creek watershed rely predominantly on public water from Philadelphia Suburban Water Company utilizing surface water.

Sanitary Sewerage System

The sanitary sewerage consists of a conveyance system that only transports the wastes to the Northeast Wastewater Treatment Plant in Philadelphia; there is no active treatment facility within the Tookany Creek watershed. Most of the sanitary sewers in the Tookany Creek watershed are gravity feed and connect, via metering chambers to the city's combined sewer, which convey wastewater to the Northeast Wastewater Treatment Plant. Several lines flow into Cheltenham Township from Abington Township and Jenkintown Borough and are metered as they enter Cheltenham Township. The flows are then combined with Cheltenham's gravity flow system. One section of Philadelphia sewers flows through Cheltenham and then out again.

The majority of the sanitary sewage system runs along the Tookany Creek. The Philadelphia Water Department has been collecting water quality samples at locations in the Tookany Creek watershed. From PWD ongoing water testing, present water quality indicates that Tookany Creek has high levels of fecal coliform, possibly because of the aged infrastructure. Further evaluation of the infrastructure needs to be conducted to conclusively determine the source of the bacteria in the creek.

The stream visual assessments conducted along the various Tookany Creek sections over the past few years as part of this plan, corroborate that the aging sewerage system is in poor condition as evidenced by surcharging, noticeable dry weather flows in the creeks, and missing and broken manholes throughout. Cheltenham Township is aware of the problems and has developed a five-year plan to repair the system. A quarter million dollars per year is allocated for television inspection, cleaning and point repairs. This will help alleviate the blow-outs by avoiding the surcharging of pipes.

There is an estimate of 270 older homes in Cheltenham Township that rely on a private septic system. Residents are required to have them emptied every one to three years, but one would question their structural integrity and functioning level considering the age of the system.

Tookany Creek Water Quality

The focus of this study is not water quality, therefore, no new water quality testing has been conducted other than that conducted routinely by the PWD. PWD has four locations within the Tookany Creek watershed where they routinely take samples. Three points are within the Montgomery County portion on the Tookany Creek and one is located on the Philadelphia and Montgomery County line in the southern most point in Cheltenham Township. One of the four points exceeds the fecal coliform limits as established by the state water standards that are in compliance with the Clean Water Act. The other two points are marginal.

Dissolved Oxygen (DO) levels are good (91 to 100 percent) when sampling has been conducted during the critical times in sunlight and summer. This is a strong indicator that it can support aquatic life.

Recreational Uses of the Tookany Creek and its Tributaries

The primary recreational use of the Tookany Creek and its tributaries is for fishing. Cheltenham Township has an ordinance and signs posted prohibiting swimming. People and pets occasionally can be seen wading in the warmer months.

Planning Implications

A localized water quality monitoring program should be developed to monitor the individual watersheds to pinpoint areas of NPS pollution and seek actions to mitigate. It may be possible to involve local schools to develop a long-term monitoring program as part of the mandated Pennsylvania "Environment and Ecology" educational competencies.

Cheltenham Township plans to develop an ordinance for owners with sump pumps to regulate the quantity.

Other Utilities

Texas Eastern Transcontinental Corporation Pipeline (TETCP) traverses Cheltenham Township for an estimated nine miles. In the late 1990's, Texas Eastern identified several concrete casings that were visible along crossings of the Tookany Creek in Gimbel Park and Tookany Creek Parkway. It was imperative that the pipeline be lowered by four feet to protect the lines, which became exposed as the Tookany creek bed became downcut to accommodate the increased volume of stormwater. This will be an ongoing and costly problem for Texas Eastern if the stormwater volume continues to increase.

Planning Implications

Continue to work cooperatively with TETCP on any maintenance work that could impact the watershed.

Significant Resources

Montgomery County Natural Areas Inventory

In 1997, the Montgomery County Natural Areas Inventory (NAI) was conducted. It is a synopsis of the Natural Areas Inventory compiled and written by the Pennsylvania Science Office of The Nature Conservancy. The summary gives general information on the locations of rare, threatened, and endangered species and the highest quality natural areas in Montgomery County. Nothing of significance was found in the Tookany Creek watershed in any of the four municipalities.

Many of the significant land resources that generally support habitat in this built-out suburban community no longer exist. If the water quality and habitat along the Tookany Creek and its tributaries were to improve significantly, there may be an increased potential for extirpated species to return.

Planning Implications

Conduct a current, more in-depth baseline study of the significant natural resources within the Tookany Creek watershed, and develop a list of potential areas that have opportunities for increasing the biodiversity based on the study.

Cultural and Community Resources

Cultural, Historical and Archeological Resources

The Tookany Watershed contains a number of historic resources that have been identified in cultural resource studies or have been deemed significant by Heritage Conservancy staff. The majority of resources were identified from information in records of the Pennsylvania Historical and Museum Commission (PHMC) and municipal documents. Heritage Conservancy staff also completed a windshield survey of the study area. Resources identified fit into one of three categories: those already listed on the National Register of Historic Places; those deemed eligible for listing on the National Register by PHMC; and resources that appear eligible for National Register listing, but no determination regarding their status has been made. All sites identified in the opinion of Heritage Conservancy staff, have historic and/or architectural significance that make them locally significant.

The National Register of Historic Places is the federal list of properties considered worthy of preservation. This list is maintained by the National Park Service and was established by the National Historic Preservation Act of 1966. Districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering and culture are included. The PHMC is responsible for administering the National Register program in the commonwealth. Properties listed or deemed eligible for listing on the National Register are provided a degree of protection when federal or federally-assisted projects are planned.

The National Register program also forms the basis for local preservation programs. PHMC must first find a district eligible for the National Register for a local government to implement historic district zoning.

Historic district zoning is perhaps the most effective device for protecting historic resources. Zoning establishes local controls for an area with historic and or architectural significance. It provides for orderly review of alteration and additions to historic resources, and acts as a means to protect and enhance a district. Historic district zoning can be implemented only after a passage of an historic district ordinance, guidelines, and establishment of an advisory historic architectural review board (HARB). In Pennsylvania, the advisory review board serves under the borough council or township board of supervisors, who makes final determinations. In the Tookany Creek watershed, only Cheltenham Township has historic district zoning.

The TCWMP area encompasses parts of four municipalities. Historically these areas are among the oldest communities in Montgomery County and contain the region's oldest transportation routes, villages, and industries. The following is a discussion of the cultural resources within each municipality.

Abington Township

Abington Township is one of Montgomery County's oldest communities, dating back before 1700. The township was incorporated in 1704. Today Abington has a high concentration of early to mid 20th century suburban housing, as well as scattered historic landmarks from the 18th and 19th centuries in rural settings. Two of its most densely populated areas are now independent boroughs, Jenkintown and Rockledge.

Properties in Abington on the National Register of Historic Places, with their date of inclusion on the Register, include:

- * Abington Township High School, Susquehanna Road, Abington, 8/2/1985
- * Keswick Theatre, 291 Keswick Avenue, Glenside, 6/30/1984

The following individual sites have been determined eligible for listing on the National Register by the Pennsylvania Historical and Museum Commission. The date of determination is indicated:

- * Pennsylvania Railroad, Philadelphia to Bethlehem, 7/17/1995
- * Unnamed property, Sewell Lane, 1/31/1991
- * Abington Branch of the YMCA, 1073 Old York Road, 4/7/1988
- * Meadowbrook Passenger Station, New Valley Road, 7/2/1991

The following historic district has been determined eligible for listing on the National Register by the Pennsylvania Historical and Museum Commission. The date of determination is indicated.

- * Hollywood Historic District; San Gabriel, Pasadena, and Los Angeles Roads, 1/24/91

Cheltenham Township

There are two national register districts within Cheltenham Township: LaMott Historic District (10/85), with 40 resources; Wyncote Historic District (10/86) with 232 resources. Like much of the surrounding area, Cheltenham's early development was centered around transportation routes, including Old York Road, which was laid out in 1711. Waterpower provided by the Tookany Creek and its tributaries spurred growth around mills well into the

19th century. Large estates, associated with wealthy Philadelphians, appeared by the late 19th century, eventually giving way to early 20th century suburban growth.

Today Cheltenham retains a wealth of historic resources that reflect its diverse history and architectural heritage.

Properties already listed on the National Register include:

- * Rowland House, 300 Ashbourne Road, 10/25/1979 (000568)
- * Elkins Park Railroad Station, 10/25/1990 (090076)
- * Grey Towers, Easton Road and Limekiln Pike, 2/14/1980 (000538)
- * St Paul's Episcopal Church, Old York and Ashbourne, 4/22/1982 (000573)
- * Wall House, Old York Road, 6/28/1979 (000579)
- * Wyncote Historic District, 10/16/1986 (067759)
- * LaMott (also known as Camptown) Historic District, 10/31/1985
- * Curtis Hall and Arboretum, 1250 Church Road, 3/20/2002 (1035)
- * George K. Heller School, 439 Ashbourne Road, 2/2/2002 (1084)

Properties determined eligible for listing on the National Register include:

- * Bend Terrace, Bent Road, and Greenwood Avenue, 5/23/1991 (079645)
- * Beth Shalom Synagogue, 8231 Old York Avenue, 4/17/2000 (112901)
- * Henry W. Breyer, Jr. House, 8230 Old York Avenue, 2/6/2001
- * Cedarbrook Hills Historic District, Limekiln Pike, 1/3/1996 (104537)
- * Chelton House, Ashbourne Road, 5/23/1991 (110400)
- * Cresheim Branch of PA Railroad, Willow Grove Avenue, 7/17/1995 (103988)
- * Elkins-Cole House, 502 Spring Avenue, 6/24/1981 (079604)
- * Elstowe Manor/W.L. Elkins, Ashbourne Road, 5/23/1991 (11-403)
- * Fallow Field, Church Road, 12/09/1985, (086613)
- * Georgian Terrace, 7725 Penrose Avenue, 5/23/1991 (110406)
- * Glenside War Memorial Hall, 185 S. Keswick Avenue, 11/30/2000
- * Grau Property, Rices Mill Road and Deaver Road, 2/28/1991 (097241)
- * Holy Sepulchre Cemetery, 7/17/1995 (103984)
- * Lynnewood Hall, 920 Spring Avenue, 1/05/1993 (079692)
- * John C. Martin Estate, 1299 Church Road, 8/24/1999 (111588)
- * Milmoral, 1150 W. Church Road, 5/18/2000 (112594)
- * Pleasant Hill Farm, Ashbourne Road, 7/14/1987 (092729)
- * Westminster Theological Seminary, Willow Grove Avenue, 7/17/1995 (103983)
- * Tacony/Glenside Train Station, 101 West Glenside Avenue, 1/14/2003

A comprehensive cultural resource survey was completed for the township in the fall of 1999. This study revealed a large number of additional sites that appear to meet the criteria for eligibility to the National Register of Historic Places.

Identified sites that appear eligible for the National Register include:

* 318 Limekiln Pike	Glenside	GL008
* 312 Limekiln Pike	“	GL009
* 2960 Church Road	“	GL012
* 2539 Church Road	“	GL016
* 31 Hewett Road	Wyncote	WY002
* 213 Royal Avenue	“	WY006
* 1601 West Church Road	“	WY008
* 8107 Accomac Road	“	WY016
* 1150 West Church Road	“	WY017
* 7725 Penrose Avenue	Elkins Park	EP013
* 628 Stetson Road	“	EP014
* 429 Ashbourne Road	“	EP017
* 404 Ashbourne Road	“	EP018
* Mill Road Properties	“	EP010-EP029 (District)
* 250 Ashbourne Road	“	EP030

Jenkintown Borough

The Borough of Jenkintown was incorporated in 1874, but was already a well-established village in the early 1800s. Like many communities in southeast Pennsylvania, the railroad along with its location along major thoroughfares spurred late 19th and early 20th century development. Today Jenkintown’s main corridor--Old York Road--houses the core of the central business district. A variety of low-scale commercial buildings from the c. 1920 to 1940 era form the heart of the borough. Few vacant building lots are found in the borough.

Two individual buildings are listed on the National Register of Historic Places:

- * Jenkins Town Lyceum Building, Old York and Vista Roads., 10/16/1979
- * Strawbridge & Clothier Store, Old York and Rydal Roads., 12/22/1988

A historic district and one building have also been determined eligible for listing on the National Register:

- * Unidentified Building, West Avenue (097920)
- * Jenkintown Syndicate Historic District, 2/6/2000 (112504)

A new comprehensive historic site survey of Jenkintown would most likely result in the inclusion of additional buildings.

Rockledge Borough

Rockledge, established in 1893, is a small borough with an early to mid 20th century commercial heart along Huntingdon Pike. Most buildings post date 1900 and are found close together on relatively small lots. City like streets form a traditional grid pattern radiating from Huntingdon Pike. It is recommended that a comprehensive historic site survey of the borough be completed to determine a list of historic resources.

No resources have been identified that are listed or have been determined eligible for listing on the National Register.

A windshield survey indicates that the adjacent Hollywood historic district in Abington, determined eligible in 1991, might be extended into the borough. Lawnview Cemetery, established in 1906 and situated partially in the borough, is perhaps the municipality's most visible landmark. Additional study however is necessary to determine the eligibility of both areas.

Archaeological Sites

The Tookany Creek watershed has been inhabited by man from prehistoric times and contains both prehistoric and historic remains. The Pennsylvania Archaeological Survey Site (PASS) forms housed in Harrisburg at the Pennsylvania Historical and Museum Commission indicate only two surveyed sites. While there are at this time only two sites recorded, it is likely there are many more that have not as yet been found. In general, these sites would be located in areas that have not experienced considerable ground disturbing activities. Areas with major commercial, industrial and residential development are less likely to house archaeological sites. Based on generalized predictive models, relatively flat, well-drained settings within several hundred feet of streams, springs, and wetlands have the potential to contain archaeological resources from both prehistoric and historic periods. Soil type, topographic setting, slope direction and distance to water are the most important environmental variables to consider in predicting the locations of such resources.

Survey sites include:

- * 036MG77, Abington Township
A small prehistoric upland camp from which quartz projectile points (probably spearheads) were collected.
- * 36MG116, Cheltenham Township
A colonial-period historic site associated with a mill owner's house in the Elkins Park area.

Parks, Recreation and Open Space

(See Parks, Recreation and Open Space Map) There are no federal, state, or county parks or facilities within any of the four municipalities in the Tookany Creek watershed. There is however, the potential for regional connections at municipal level. For example, Rockledge and Abington have the potential to link with the Pennypack Creek through internal municipal trails or greenways.

The parks and open space, the "green" infrastructure of the watershed, are significant for many reasons.

Abington Township

Abington Township has a comprehensive system of parks and open spaces located throughout the municipality. These protected open spaces provide residents with numerous opportunities to explore the local environment and recreate close to home. There are over 300 acres of

municipal parks and open space in the township. The system includes community parks, bird and wildlife sanctuaries, mini-parks, special use facilities and conservancy areas.

Several parks are located within the Tookany Creek watershed. Alverthorpe Park, a 116-acre community park, offers a variety of activities and recreational services. A 1.75 mile trail winds around the perimeter of the park. The northern half of the site remains wooded and includes a 5-acre manmade lake. The southern half contains mostly active recreational facilities bordered by woodlands. Proof of township residency is required for park admission.

Alverthorpe Manor is located on the grounds of an estate that has become the cornerstone of the Township's park system. The stone manor house is used for various activities and the landscape contains a regionally significant sculpture garden. Alverthorpe Manor houses the Abington Art Center, the Jenkintown Branch of the Settlement Music School and the Bureau of Parks and Recreation for the township.

Baederwood Park encompasses 26.1 acres. This park is in a natural wooded open space with limited facilities. Steep slopes exist and Baeder Creek traverses the site. The park is an important link between the Jr./Sr. High School campus and the Coates property.

The Coates property is located directly east of Baederwood Park on Highland Avenue. This 10-acre parcel is leased for use as a bird and wildlife sanctuary. The site contains steep slopes and offers limited access.

The Abington Club Golf Course, a semi-public club located on 30 acres, lies within the Tookany Creek watershed.

Cheltenham Township

Cheltenham Township contains a number of parks both active and passive in character with area totaling 397 acres. The major parks in the Township are Curtis Arboretum and Tookany Creek Parkway. Curtis Arboretum encompasses 45.55 acres of passive open space located at Church Road near Greenwood Avenue in Wyncote.

Tookany Creek Parkway contains the following parks on 132 acres:
Fred Griffin Field, Tookany Creek Tennis Courts, Tookany Playground, Kleinheinz Pond, and Gimbel Field. There are 17 other parks in the Township.

The Township contains three golf courses including the 106-acre Ashbourne Country Club, Melrose Country Club and Cedarbrook Country Club.

A trail master plan was developed in 1999 to enhance the pedestrian walking and biking trails that run parallel to the Tookany Creek Parkway from High School Park to Central Avenue. The master plan details common design issues and elements such as accessibility, trail tread, facilities and road crossings by map segment. The Tookany Creek Trail Master Plan has not formally been adopted by the Township Commissioners.

Parks Recreation and Open Space Map

Cheltenham Township, which has the largest area of land and miles of the creek in the watershed, is experiencing a decline in the health of some of its green infrastructure due to the stress on its old trees, many of which are at least 100 years. This has been reported by many of the volunteers who live in the community and assist in the management of the neighborhood parks. At the present time, old dead or dying trees or large branches are falling in wooded areas and are killing vital small trees and shrubs when they fall. They can be a danger to people walking and playing in the parks and neighborhoods. The overburdened Public Works Department does not have the manpower and often not the technical skill to assess and correct the problems in a timely manner. This is where the deferred maintenance begins. Funding is also low to provide the proper education and training.

Jenkintown Borough

The Borough contains athletic fields at the Jenkintown Elementary and High Schools. A village green and community plaza have recently been developed in the town center.

Rockledge Borough

Of the two parks located in the Borough, only Cegielski Park is situated in the Tookany Creek watershed. Two cemeteries, Lawnview and Montfiore, make up the largest open spaces in Rockledge, with tombstones more dense at Montfiore than Lawnview.

Planning Implications

It is recommended that all the parks and passive/natural recreation areas have a master plan developed from an ecological perspective to ensure that the landscapes are designed and maintained in a sustainable rather than horticultural manner. The emphasis should be managing plant communities rather than individual species. Street tree plantings can provide some relief from the built landscapes especially in the densely built-out boroughs.

Municipalities should adopt a policy to replace all trees that are removed with native trees from a professionally prepared list to ensure the future forest.

Public works staff in all departments should attend training on care and management of natural landscapes. Funds should be allocated to provide for the proper maintenance and trimming to increase the longevity of all trees and to prevent the loss of property or injuries.

Community Background

Population and Housing

Each of the four municipalities in the Tookany Creek watershed is nearly built-out with limited area for infill development. In terms of population and housing, each community has remained stable over the last few decades. According to the U.S. Census Bureau for the year 2000, Abington Township and Jenkintown and Rockledge boroughs had a small population decrease from their 1990 population level. Abington lost 219 residents for a 0.4 percent decrease, while Jenkintown and Rockledge decreased by 96 persons and 102 persons respectively. As indicated in the Table below, only Cheltenham Township showed an increase in population by adding 1,952 people in the ten-year period between 1990 and 2000.

Municipality	1990 Population	2000 Population	Absolute Change 1990-2000	Percent Change 1990- 2000
Abington	22,129	22,367	-219	-0.4%
Cheltenham	14,459	14,897	1,952	5.6%
Jenkintown	2,072	2,085	-96	-2.1%
Rockledge	1,119	1,091	-102	-3.8%

Source: U.S. Census Bureau

It is difficult to assess whether an overall net increase in population of 1,535 between 1990 and 2000 impacted the quality of the watershed. However, according to the Montgomery County Planning Commission's population projections to the year 2025, each municipality is expected to have a slight decline in population. The projections point to the fact that each community is well-established and expected to remain stable. Therefore, it is unlikely that small shifts in population will affect the quality of the watershed.

Municipality	2000 Population	2025 Population Projection	Projected Change 2000- 2025	Percent Change 2000- 2025
Abington	56,103	55,790	-223	-0.4%
Cheltenham	36,875	36,730	-145	-0.4%
Jenkintown	4,478	4,280	-198	-4.4%
Rockledge	2,577	2,480	-97	-3.7%

Source: U.S. Census Bureau

Delaware Valley Regional Planning Commission
Montgomery County Planning Commission

Although there were population declines in three of the municipalities between 1990 and 2000, all the municipalities except for Rockledge Borough had increases in the housing stock. As shown on the Table below, a total of 689 housing units were added by Abington, Cheltenham and Jenkintown in the ten-year period from 1990 to 2000. Rockledge lost 28 housing units. Since only a portion of Abington lies within the Tookany Creek watershed it cannot be ascertained as to exact number of units that were constructed in the watershed. However, additional housing brings more paved surfaces and generates additional runoff.

	#of Housing Units - 1990	# of Housing Units - 2000	Absolute Change 1990-2000	Percent Change 1990- 2000
Abington	56,322	56,103	238	1.1%
Cheltenham	34,923	36,875	438	3.0%
Jenkintown	4,574	4,478	13	0.6%
Rockledge	2,679	2,577	-28	-3.8%

Source: U.S. Census Bureau

Although the four municipalities in the Tookany Creek watershed are considered mature and nearly built-out, there are still limited opportunities for infill development. (This can be seen on the Land Cover Map.) The area is a desirable place to live and there will be pressure to develop remaining open land. In many cases the remaining land for infill development may be the environmentally sensitive land that was left-over when the area was first developed. It is important that measures be taken to ensure that new construction has the least negative impact on the watershed.

Municipal Profile

(See Land Cover Map)

Abington Township is located in southeastern Montgomery County and is bounded by the city of Philadelphia and Rockledge Borough to the east, Cheltenham Township and Jenkintown to the south, Upper Dublin to the west, and Upper and Lower Moreland townships to the north. The Township encompasses 14.9 square miles or 9,520 acres of land.

The Township is an integral part of the Philadelphia metropolitan area. Though suburban in nature, it has evolved into a very diverse center of retail, wholesale, office, industrial and residential land uses.

According to the Land Cover Map, residential use constitutes the largest percentage of land use with nearly one-half of the land area devoted to residential use. A substantial portion of the land is also being used commercially. The largest development to occur within the last 30 years involved the conversion of the old Willow Grove Amusement Park into the Willow Grove Mall complex. Abington also received CRP funds.

Industrial uses are concentrated west of Jenkintown Borough and east of the Willow Grove Mall.

Cheltenham Township boundaries include an area of approximately 5,600 acres of land or 9.06 square miles. The Township is 98 percent developed. Being one of many suburban municipalities adjacent to the city of Philadelphia, Cheltenham serves as the suburban gateway to the northern suburbs.

Cheltenham is served by four major retail areas: Cheltenham Shopping Center, Cedarbrook Plaza, Melrose Shopping Center, Elkins Park Square and commercial strips along Easton Road, Glenside Avenue and Ogontz Avenue. Since these shopping areas were built at least thirty years ago, they face strong competition from newer retail centers that have been constructed beyond the township limits such as the Willow Grove Mall and retail uses along Old York Road in Abington Township. Spot commercial uses exist in Cheltenham Village. The Township has only a small proportion of its land devoted to industrial uses.

One of Cheltenham Township's biggest efforts focuses on enhancing the commercial base. They value the strong mix of taxes to help stabilize residential taxes and ensure the long-term viability of the community.

The Township has instituted various programs to foster economic development including a Main Street Program, a Commercial District Enhancement Plan (CDEP), tax abatement ordinance for improvement to business and a Façade Enhancement Program. Montgomery County's new Community Revitalization Program (CRP) includes \$150,000 earmarked for Cheltenham. One census tract is eligible for funding from CRP for projects that improve residential or commercial areas. Some sections of the eligible tracts overlap the districts in the CDEP. The township is currently working with a consultant and meeting with residents and business owners in the designated census tracts to develop the required community vision plan for this program.

Jenkintown Borough is about one-half square mile in land area and is surrounded by Abington and Cheltenham townships. The Borough is situated less than two miles from Philadelphia's northwest boundary. The Borough has been influenced by this proximity to the city and has been densely developed, the majority of it being residential.

There is a linear concentration of commercial development along Old York Road (Route 611), which becomes a larger commercial core towards the center of the Borough. Jenkintown's Central Business District (CBD) is comprised mostly of specialty stores. These businesses serve residents as well as the surrounding communities. They also received CRP funds.

Rockledge Borough is on the border of Montgomery County and the northeast section of Philadelphia, about 12 miles from Center City. It is surrounded by Hollywood and McKinley neighborhoods of Abington Township, and borders the Fox Chase neighborhood of Philadelphia to the east.

The 0.39 square miles (250 acres) of Rockledge Borough is serviced completely by public sewer and water. A small community of residential uses supports a small commercial area along Huntingdon Pike. No major employers are located within Rockledge Borough. They also received CRP funds.

Transportation

Abington Township is served by an extensive network of township streets, county roads and state highways. As an important member of the growing Philadelphia metropolitan area, Abington has had to struggle with traffic congestion. Moreover, the shift to inter-suburban travel has dramatically increased usage of major township thoroughfares such as Old York, Easton and Moreland Roads.

In addition to roadways, rail transit is of major importance to commuters. SEPTA operates seven passenger stations served by three separate rail lines. Bus service is provided by five SEPTA bus routes and a neighborhood shuttle bus.

Land Cover Map

Cheltenham Township's predominant traffic routes run in a north-south direction, reflecting the fact that the highways which link Cheltenham to Philadelphia and Springfield and Abington townships continue to be major channels for the movement of people and goods. The major north-south highway is Route 611 (Old York Road), Easton Road, Washington Lane and New Second Street.

The major east-west arterial highway is route 73, which runs the width of the Township passing Church Road, Washington Lane and Township Line Road. The other east-west highway is Cheltenham Avenue, which is the boundary line between the city of Philadelphia and Cheltenham. Route 309 is the only expressway in the Township.

The Township is served by the SEPTA Regional Rail train line with four stations, three rail lines and eleven bus lines. There is a neighborhood shuttle bus.

Jenkintown Borough is connected to the region by train and Old York Road. Route 73 (Washington Lane) passes along the Borough's eastern boundary and is a major secondary route. The one train station is located at the far western end of the Borough. In addition to three SEPTA rail lines, two bus routes serve the Borough.

Rockledge Borough Huntingdon Pike is the main thoroughfare through the Borough. Public transit is provided by SEPTA and all transit services are within easy walking distance for residents.

Municipal Zoning and Ordinances

Zoning and subdivision and land development ordinances are in effect for all four of the municipalities in the study area. Development impacts on the creeks are regulated primarily through floodplain and stormwater management ordinances with various degrees of limitations. These ordinances regulate construction in flood-prone areas, restrict grading modifications to and obstruction in the floodplain, and require protection and/or flood proofing for any uses that do occur in flood-prone areas. The table below indicates types of ordinances in effect for the municipalities in the watershed study area.

Abington Township Zoning Ordinance (1996) contains provisions to protect environmental resources including:

- * Floodplain conservation district is an overlay district, which limits use and development of land within the floodplain;
- * Steep slope conservation district is an overlay zone, which protects slopes greater than 15 percent from development;
- * Open space provisions, which include requirements for landscaping and/or open space; erosion and sedimentation control; shade tree plans; and tree preservation standards;
- * Land preservation district, which requires a mandatory cluster for development in the five Residential Zoning Districts. Includes all parcels with gross site areas of 10 acres or larger to preserve a minimum of 75 percent of buildable site area.
- * RC Recreation/Conservation District purpose is to protect township's natural resources such as prime agricultural soils; stream valley areas; floodplain areas; steep slope areas;

woodland areas; and scenic open sites; to encourage, for ecological purposes, environmental conservation; flood water. This district allows such uses as wildlife sanctuary, woodland preserve, arboretum, passive recreation areas, excluding enclosed structures; game farm, reforestation in accordance with recognized soil conservation practices; recreational uses; outdoor plant nursery or orchard with recognized soil conservation practices and a wide range of other uses permitted by special exception.

The Township Subdivision and Land Development Ordinance (1991) also contains provisions to protect open space and natural amenities. Under the ordinance, all plans are required to identify natural features. Easements are required to be dedicated for watercourses. The erosion and sedimentation control regulations encourage the retention of existing vegetation wherever feasible. The landscaping regulations require trees, shrubs, and other plantings whenever land is development. Credit is given for the required placement of trees when existing trees are preserved.

Cheltenham Township has three overlay zoning districts: Floodplain Conservation District; Historical District and Preservation Overlay District; and Steep Slope Conservation District.

Floodplain Conservation District permits construction within the floodplain area, consistent with the “need to minimize flood damage” or “minimize or eliminate flood damage” or “to reduce exposure to flood hazards. No new construction or development within the floodway is permitted and any use, activity or encroachment that would cause any increase in flood heights in floodway is prohibited.

Within FE (Special Floodplain Area), no new construction or development unless demonstrated that cumulative effect of proposed development and all other existing and anticipated development will not increase elevation of 100 year flood more than one foot at any point.

Within FE or FA (General Floodplain Area) no new construction or development located within area measured 50 feet landward from top of bank of any watercourse or within any designated floodway.

H-D Historical District requires certificate of appropriateness by Board of Historical Architectural Review. The BHAR considers historic and architectural nature of district, general design, arrangement, texture, material and color of building or structure, relation of such factors to similar features of buildings and structures in district and appropriateness of exterior architectural features, which can be seen, from a public street or way. Uses allowed by underlying zoning are permitted.

The Steep Slope Conservation District was developed to conserve and protect steep areas from inappropriate development and excessive grading; to permit and encourage use of such areas for open space purposes; to constitute a harmonious aspect of the continuing physical development of the Township.

This ordinance applies to slopes 15 percent or greater, and to areas where soil type is “stony land, steep” as indicated in “Soil Survey of Montgomery County, Pennsylvania,” from USDA, April 1967.

The overlay requirements supersede the requirements of the underlying zoning district.

The Preservation Overlay District was developed to encourage innovation and to promote flexibility, economy and ingenuity in the residential development of large tracts, including subdivisions and land development; to respond to site conditions for the preservation of floodplains, wetlands, streams, valleys, woodlands and other natural and scenic features and historic resources; to provide for creation, retention and protection of historic sites and open space areas and attain objectives of the Comprehensive Plan with regard to open space preservation, orderly growth and enhancement of environmental resources.

This applies to all parcels having five or more acres or any residential site with a development proposal of eight dwelling units or more within any residential district designated. Development in this district must provide for preservation of significant buildings or structures, and/or the preservation of open space and natural features and environmentally sensitive areas. Architecture of other development on the tract must be compatible with historic buildings being preserved

The Subdivision and Land Development Code (as Amended through December 26, 1995) requires a Environmental impact study to assess projected impacts on storm drainage, open space usage/consumption, traffic generation, sewer hookups, sedimentation and erosion mitigation (less than 5 acres) or detailed sedimentation and erosion control plans (greater than 5 acres), erosion plans for development on sites greater than 10 percent slopes, effect on adjacent property values adjacent, increases in population from proposed development, type and design of existing structures in area.

Jenkintown Borough’s Zoning Ordinance contains a Floodplain Conservation District as an overlay district. No new construction is allowed unless it is demonstrated that the cumulative effect of the proposed development will not increase the elevation of the 100-year flood plain by more than one foot at any point.

The Subdivision and Land Development Ordinance requires that shade trees be planted within the right-of-way subject to the regulations of the Shade Tree Commission.

Rockledge Borough has limited natural resource standards since it is nearly built out. The ordinances require that existing vegetation be conserved and/or require new plants in critical areas of land developments for a variety of enumerated environmental purposes. This includes parking lots, street trees, buffers and screens for subdivisions and land developments.

Ordinance 525, enacted Oct. 28, 1996, sets standards for tree protection and planting in public rights-of-ways and highways.

IV. Visual Assessment of Streams

The members of the steering committee conducted a visual assessment along most segments of the major tributaries to develop a baseline inventory of the existing conditions. In spring and summer 2001, the steering committee formed small groups by tributary and stream reach and were trained in conducting the stream assessments. The process employed was a modified version of the USDA's Visual Streambank Assessment Protocol. A form was developed to be used in the field by the steering committee (see Visual Assessment form in Appendix). All steering committee members received field training provided by Montgomery County Conservation District and Heritage Conservancy in understanding the methodology to assess the various parameters of the USDA's protocol. Each member of the steering committee then recruited other volunteers to accompany them along specific reaches of the watershed.

The assessment form was used to record and document the conditions observed at the time of the assessments. The consultant accompanied each group in the initial field assessment to assist in applying the visual assessment protocols and in completing the forms. Photographs were taken to document the conditions and then linked to the general location on a map of the area. The creek reach contains descriptions found at the time and serves as a baseline for all future studies. The level of description for each reach will vary due to the differences in individual interpretation, background and skill of the participants in understanding the conditions.

Some areas in Cheltenham Township, in particular the main stem of Tookany Creek along the 2-1/2 mile reach of the Tookany Creek Parkway, was not assessed because the reach from High School Park to Gimble Field was previously assessed as part of the Trail Master Plan completed in 1999. Currently, the early phases of the trail implementation and the riparian buffer restoration are under construction.

Photographs of the stream are linked to each map with a summary text and plan recommendations.

The assessments are broken down into six main headwater tributaries: Main stem of the Tookany Creek, Baeder Creek, Rock Creek, Mill Run, Leeches Run (new name of formerly unnamed tributary) and Jenkintown Creek. Small but significant tributaries along these streams are described accordingly under each creek heading.

Main Stem of the Tookany Creek

The main stem of the Tookany Creek is the longest reach in the watershed comprising over 11 miles. Due to the length of the creek, the committee assessed the stream in seven separate segments using various features such as streets or significant natural features such as an obvious segment landmark.

Holy Sepulchre Cemetery to Ralph Morgan Park

(See *Visual Streambank Assessment Map – Holy Sepulchre Cemetery to Abington Township Border*) The western most headwater of the Tookany Creek rises in Laverock in Cheltenham Township, traverses Renniger Park, the bird sanctuary and briefly enters into Abington Township near the Wyncote-Jenkintown Train Station for a total length of 1.59 miles, or 8,500 feet of streambank.

The adjacent land uses along this stretch are residential (50 percent), institutional (12 percent), public open space (15 percent), industrial (12 percent), commercial (11 percent). Generally the water appeared to be clear throughout the stretch. Series of pools and riffles are present throughout the entire reach. Underlying geology, grade of the streambed and man-made features influence the proportion of pool to riffle. Obviously, in the areas where the creek is channelized, no pools or riffles are present.

The topography within the northern portion of the overall watershed is generally less than 15 percent. The streambanks varied greatly throughout the reach with some banks almost entirely vertical. Severe undercutting and scour from high velocity, flash flooding, and overland flow is evident throughout the entire section. Many landowners mow directly to the creek banks, thereby removing nature's best filtering of NPS pollution and sediment.

The depth of water within this segment was approximately 4 to 8 inches. Numerous odors were detected along the reach, but the source was unknown. The depth of water is greater in areas directly adjacent to stormwater outfalls such as pipes, headwalls and culverts. Excessive downcutting and undermining is a major problem found immediately downstream from the channeled areas and bridges. In these areas the estimated depth appeared to be about 5 feet deep. Numerous catch basins adjacent to the six bridges along the overall reach appear to be malfunctioning. This causes the water to sheet over the sidewalks, developing rills and undermining the footpaths and foundations of the bridges.

The first mile of the creek has remnants of the once prominent grist mill industry. Today, cemeteries, universities, greenhouses and residences line the riparian corridor. The next 0.41 miles adjacent to the creek is primarily single family residential. A local grade school abuts the creek close to Limekiln Pike. The school has a vast amount of undeveloped space that would allow the opportunity to incorporate a stormwater infiltration/storage system on the property. This system could help alleviate the excessive high water velocities down stream, reduce sedimentation, recharge groundwater and enhance the animal habitat. The interpretation of this system could be worked into the curriculum of the grade school and educate the students as to the importance of water in our ecosystem. Cheltenham Township School District may be able to incorporate this into the mandatory State "Environment and Ecology curriculum competencies.

Further downstream, evidence of misuse, neglect and improper stormwater management from high-density residential land use and PennDOT roadways has left a large stretch of stream in disrepair. A few single-family residential neighbors have done a remarkable job in preserving the native forest flora and left the riparian buffer intact.

Visual Assessment – Holy Sepulchre Cemetery to Abington Township Border

The portion of the creek between Spring House Road and Glenside Avenue is in poor condition. A large percentage of the adjacent land use is residential. The aggressive nature of the adjacent land uses has encroached on the stream corridor and eliminated all natural characteristics. In addition, lawn debris was observed dumped over streambanks. This area of the creek to Glenside Avenue in Abington has a levee that was built in the 1950's as a DEP flood-control project. The DEP Bureau of Dams and Waterways requires that all vegetation be lower than the levee.

The Tookany Creek then runs between the Glenside Swimming Pool and Renninger Park, both part of the Cheltenham Township park system. The lack of definition of the playground and the riparian corridor has left the banks without any vegetation and the ground is very compacted. Improper selection of shade and canopy trees has overpowered the understory and deprived them of any water or light. A park master plan is recommended to help define the riparian buffer and active park area. An additional portion of the reach runs through the Township-owned Bird Sanctuary. Footpaths, bike trails and interpretation of the stream corridor would benefit from this somewhat under-used park space. This area will be part of the future plan for flood control in Phase II Stormwater.

From Glenside Avenue to the Abington Township line the surrounding land uses are largely industrial. The landowners have channelized and covered the creek with a bus parking lot. Towards the end of the reach for this segment the creek is exposed and forced to make a series of 90 degree bends. It is obvious by the erosion taking place and the evidence of high water markings on the adjacent buildings that this is an area of excessive flooding. Cyclone fencing and bridges exist across the creek approximately 8 to 12 feet above the mean water level. These impediments appear to have intercepted large amounts of debris from previous storms, including a mattress. The railroad grade manipulates the creek into one of the two 90 degree turns. Many of the industrial buildings in this area are rebuilding from the damage of the last major storm in 2001.

General problems found in this reach are illegal dumping of lawn debris over stream banks. Many of the residents have eliminated the riparian buffer in favor of a larger yard. As a result, there is structural failure of the streambanks and many invasives have colonized along the streambank.

Planning Implications

- * Initiate a plan to study local geomorphology and sinuosity capabilities for the amount of stormwater passing through this area.
- * Restore the riparian buffer in areas where adequate land permits.
- * Conduct biotechnical streambank stabilization.
- * Control invasive plants and replant with natives.
- * Enforce riparian corridor and waterway regulations.
- * Educate and inform adjacent land users of BMPs.
- * Incorporate stormwater filtration devices.
- * Conduct regular trash cleanup.
- * Remove fencing that crosses the stream that appears to be impeding the normal flow of water.

- * Relocate structures or purchase properties in the floodplain and convert land to open space.
- * Develop master plans for Cheltenham Township's parks to ensure that they enhance the watershed resources and meet health and safety standards.
- * Develop homeowner education manuals on the do's and don'ts in the watershed.
- * Work with Cheltenham School District to have dual usages of the playing field at the elementary school.
- * Work with Bishop McDevitt to implement BMP's to decrease stormwater runoff from property.

Ralph Morgan Park to Greenwood Avenue

(See Visual Streambank Assessment - Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads.) This segment of the Tookany Creek is located in Cheltenham Township starting at Ralph Morgan Park and extending approximately 1,500 feet from the railroad underpass at South Avenue to the Greenwood Avenue underpass.

The railroad underpass at the beginning of this reach is about 10 feet wide and 15 feet high. It is not large enough to manage the water flow during a heavy rain resulting in the washing away of much of the banks behind the channeled wall where the water first enters the park. However, it does retain water in some high volume storm events. Damage also occurs from the undercutting of the banks farther downstream where the wall ends. The banks behind the walls are not planted and are mowed up to the wall. The footbridge at this end of the park was washed out in June 2001 after tropical storm Allison. The bridge has since been replaced. The creek bed along the walled area is cemented and where it ends the banks are sparsely tree lined, which creates a canopy, but there is no substantial riparian buffer zone on either side of the creek. The trees that do exist along the creek bank are severally undercut with tree roots exposed.

There is a macadam walking path approximately 3 feet wide that weaves along both sides of the creek about 10 to 15 feet from the creek banks. At about the middle of this reach on the right bank, there is a small stream of water that comes from stormwater outlets on Glenside Avenue. A small concrete culvert is blocked by asphalt from the recent flood. This area also has a cinder block retaining wall that was from an old footbridge. It sticks out of the creek bank and there is undercut erosion around this area. On the left bank about five feet downstream from this area is a large concrete stormwater drain that discharges water from West Avenue in Jenkintown.

The whole left side of the creek is mowed up to the creek bank throughout the park and Japanese knotweed can be seen along stretches of the bank especially in areas where the canopy is more open. Also on the left side of the creek there is a parking lot owned by SEPTA. The yews and cedars lining the parking lot are dying due to age and poor maintenance practices (i.e.; shoveling high mounds of snow from the parking lot onto them and, after the recent flood, gravel and debris was bulldozed onto the base of the bushes). This sediment from the parking lot eventually makes its way to the creek via runoff. This is evident from looking at the grass area that has much sand and gravel in its soil content. Tropical storm Allison has also contributed much of the sediment left behind.

Visual Assessment – Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads

In some of the areas on the right bank there is more of a riparian buffer to the right of the walking path. There are large river birches, beeches, tulip poplars and some viburnum and rhododendron along a steep slope coming down from Glenside Avenue. Some of these trees are covered in poison ivy or Oriental bittersweet, especially the trees located closer to the Glenside Avenue curved area.

At the second footbridge that leads to the train station, the old retaining wall on the left bank is deteriorating due to overland erosion. This reach ends with the creek heading into the Greenwood Avenue underpass. On the right bank, before the underpass, is a new stormwater outlet that is half blocked with rock and silt. At the opening of this outlet, in a stagnant area of the creek, is an orange, milky substance that may be iron oxidizing from the soil. The creek bed in the underpass is deep, sandy sediment. The underpass then leads to a smaller channeled area so the water going under the bridge during a heavy rain then backs up into the park, and the entrance into the underpass becomes a water retaining area.

The creek water was clear on the day of the assessment, but local residents have reported seeing occasional milky and/or cloudiness of the water from upstream. PA DEP is currently in the process of investigating this problem.

The streambed was occasionally littered with flood debris (wood planks, car parts, leaf pack and trash). Small fish were seen in the deeper pools and there have been reports of seeing eels, northern water snakes and an occasional turtle. There are visits by mallard ducks. Birds and squirrels are the most common wildlife seen. Neighborhood children, dog walkers and people walking to and from the train station, utilize the park most. This park has an active Friend's group that could help with cleanups, water monitoring, restoration and/or planting projects. Fifty Eastern redbud (*Cercis canadensis*) trees were planted in this park in spring of 2002 as part of a National Tree Trust grant.

Planning Implications

- * Clean debris from creek, especially in front of stormwater outlets.
- * Restore creek banks where there is severe undercutting.
- * Plant creek banks and areas around retaining walls to prevent washed out areas and to slow flood waters and to create a healthier buffer.
- * Create "no mow" zones for park maintenance staff.
- * Educate staff on BMPs and specifically to not blow leaves in the creek during fall cleanups.
- * Remove Japanese knotweed and replant these areas with native vegetation.
- * Remove the invasive plants and vines from trees.
- * Remove the cinder block footbridge base and regrade and plant the area.
- * Remove the retaining wall near the second footbridge, regrade and plant the bank to facilitate a natural retaining basin when there are heavy rains.
- * Develop communication with SEPTA to improve their maintenance practices regarding their parking lot.
- * Consider relocating and replacing the macadam walking path with a natural material to facilitate the replanting of the buffer zone.

- * Identify the orange milky substance that appears to be the iron in the soil oxidizing, and monitor water quality.

Greenwood Avenue to Wyncote Post Office

(See *Visual Assessment – Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads.*) This segment begins at the Greenwood Avenue Bridge and ends behind the Wyncote Post Office in Cheltenham Township. It is approximately 1,000 feet in length.

This reach was walked in July 2001 one month after tropical storm Allison had flooded the area. At the beginning of this reach the creek flows under the Greenwood Avenue Bridge. The walls of the underpass contain several storm water outlets from Greenwood and Glenside Avenues' runoff. The creek bed under the bridge is a deep pool of silt and sand. Once through the bridge the creek is channeled by a 12-foot high stone wall on both banks. The right bank wall extends about 100 feet to a small wooden bridge that is a car exit from the train station parking lot. The wall has one large stormwater outlet draining from Glenside Avenue. The left bank wall only extends about 15 feet from the bridge and is in disrepair. It also has a large stormwater outlet possibly draining from Greenwood Avenue. There is little or no buffer zone as the right bank above the wall is only about 5 or 6 feet from Glenside Avenue and is mowed to the wall. On the left bank there is a 3-foot tree-lined area above the wall extending to the parking lot of the Jenkintown Train Station.

There is evidence of runoff erosion from the parking lot where the wall ends on the left bank. The banks become steeper past the wooden bridge and there are more trees and underbrush. There are many tree roots exposed and the banks are undercut. There are large sycamores, ash and Norway maples on the banks. There are also invasive species of Japanese knotweed, mulberry and honeysuckle along these banks.

Large concrete sewer manholes extending out of the creek bed and the creek banks exist along this reach. Trash, especially car parts, and storm debris litter the creek bed and banks. Past the opening of the Greenwood Avenue Bridge the creek bed contained stone and gravel with only one small shallow pool where small fish were sighted.

Planning Implications

- * Routinely cleanup debris and trash in creek after storms.
- * It is recommended that if parking lots are renovated, BMPs be utilized such as pervious material, the addition of tree islands and a filtration system to reduce pollutants from washing into the creek.
- * Have the Township inspect and repair the sewer manhole covers as needed.
- * Remove invasive plants from creek banks and plant native shrubs.

Wyncote Post Office to Washington Lane Underpass

(See *Visual Assessment – Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads.*) This segment starts behind the Wyncote Post Office and flows about 1,000 feet to the Washington Lane underpass.

This reach was walked in July 2001. The right bank behind the post office is steep and well planted with sycamores, box elders, red maples, privet and Norway maples. However, above the bank there is little or no buffer zone. Past the post office there is a field area of Township-owned property, possibly part of the Edward Hicks Parry Bird Sanctuary. This open space, the sanctuary, was formerly an industrial and commercial site during the 1800's and 1900's and is the focus of an ongoing environmental study. The area is kept as lawn and is mowed to the edge of the narrow riparian buffer. Sections of an old stone wall on the right bank appear near the beginning of this reach. An orange jell-like substance, an iron precipitate, is seen seeping from the wall area.

The left bank is about six feet high with some trees. There are railroad tracks about five feet from the top of the bank with debris along the bank. For example, in one area there was a whole section of abandoned railroad track. There was also old metal piping found along the creek bed. In some places it was buried in the creek bed and in other places it was in the creek.

Many trees along the right bank have roots exposed and the banks are undercut. Midway along this reach are two storm water outlets possibly from Glenside Avenue runoff. The area around the outlets is eroded and tree roots are exposed. Rocks from an old retaining wall are washed into the creek bed. Also along this reach there are several concrete sewer manholes on the creek bed and banks in need of repair. Cheltenham Township was notified about this. The orange gel-like substance was also seen near one of the broken sewer manholes and there was a foul odor.

The creek bed along this reach is generally rocky with little or no visible aquatic life. However, at the end of the reach near the underpass of Washington Lane there is a deep pool area and the creek bed is sand and silt. Also, in this area, dumping of construction material, such as cement and metal piping and a high mound of asphalt, was observed.

Planning Implications

- * This reach should be targeted for a major cleanup. The steepness of the right bank and the railroad tracks on the left will make this task difficult.
- * The Township should contact SEPTA to begin talks about railroad debris cleanup.
- * The Township should inspect and repair all sewer manhole covers and cement encasements.
- * The Township should investigate the source of the orange jell-like substance.
- * The Township should investigate who is dumping construction material.
- * PECO Energy environmental department should be contacted regarding the results of the studies being done in this area.
- * Depending on the results from the PECO study noted above, it is recommended that the open field next to the Wyncote Post Office be planted with native trees and shrubs to increase the buffer zone and to extend the bird sanctuary, to enhance the health and beauty of this open space area.

Washington Lane Underpass to Church Road

(See *Visual Assessment – Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads.*) This segment starts at the Washington Lane underpass along Glenside Avenue and runs about 2000 feet through the Edward Hicks Parry Bird Sanctuary and ends at the Church Road and Chelten Hills Drive underpass.

This reach was walked on July 14, 2001 on a warm and overcast day. Once through the underpass the creek turns sharply with its right bank no longer steep but rather flat and planted with native trees and bittersweet vines. The left bank is a large granite stone about 25 feet high and 30 to 40 feet wide, which is why the creek turns. Beyond the stone is a wooded area. The creek bed is sandy and pooled where the water comes under Washington Lane and then curves. There is about a 60 foot area beyond the pooled area where both banks have a 50-foot wide buffer zone. However, once past this area, the creek winds toward Glenside Avenue (or Chelten Hills Drive) and the right bank loses its buffer zone and becomes stone wall when the creek turns left and runs along the roadside. The left bank has a 100-foot buffer zone of oaks, red maples and dogwoods with ivy on some trees for about 200 linear feet before the creek meets up with the railroad tracks again. Where the railroad track rejoins the creek side there is an open canopy and Japanese knotweed has taken over. The creek takes a sharp left turn under the railroad tracks. The bridge opening is very small relative to the flow of water from a heavy rain. The water therefore, pools back and some continues flowing straight where SEPTA cleared an area of trees. During tropical storm Allison, the tracks washed out. The creek bed under the bridge is a deep pool of all sand and silt.

Once the water flows under the train track bridge it turns right again into a wooded area the continuation of the Edward Hicks Parry Bird Sanctuary, but with the railroad track now close to its right bank. There are areas on the right bank where trees have been taken down by SEPTA possibly because of their proximity to the tracks. There are also small trees that appear to be dead or dying. There are areas on the right bank where Japanese knotweed has taken over. The wooded area on the left bank near the end of this reach has a nice canopy with many mature trees but some with bittersweet vine and wild grapes are beginning to take over. There is a storm drain outlet, possibly from Meetinghouse Road, toward the end of this reach on the left bank. Near the outlet was the orange jell-like substance. This reach ends at the Church Road underpass and the underpass walls have graffiti on them. The creek bed is gravel and silt and there are some areas with small fish.

Hawks once lived in this bird sanctuary, formerly a Boy Scout training camp, until the trees were removed for a nearby townhouse development construction. The townhouse development is located on a steep slope beyond the bird sanctuary on the left bank. The steep slope appears not to be planted well and shows some signs of erosion. There are retaining basins on the townhouse property that need to be inspected and maintained regularly. This reach also has trash and storm debris littered along its banks and creek bed. Chelten Hills Drive also has litter along the roadside thrown from passing cars. This trash will eventually make its way into the creek if not cleaned up. Homeowners along Chelten Hills Drive near this reach have ivy climbing their trees. While beautiful to see, this ivy will overtake the small and medium trees and the weight will topple the trees. The ivy has also prevented forest undergrowth from developing and is therefore jeopardizing the future of this beautiful wooded area.

Planning Implications

- * Clean up trash, storm debris and graffiti from this area. Possibly get a group to adopt the bird sanctuary area to clean and maintain on an ongoing basis.
- * The Township should develop a dialog and educate SEPTA regarding the needs of the bird sanctuary, the health of the creek and railroad track safety
- * Have SEPTA plant low-growing shrubs in the areas of the bird sanctuary to develop wildlife habitat.
- * Educate homeowners near the creek on ways to manage the land around them so as to better affect the health of the creek and to protect their property.
- * Check and/or change Township ordinances to assure that any new development includes best management practices for watershed protection
- * Remove invasive vines from trees. Remove knotweed and replant native shrubs and ground cover. (Possibly get SEPTA to donate plant materials and the Township to provide labor via volunteers and public works employees.)

Church Road at Chelten Hills Drive to Church Road near Ogontz Field

(See Visual Assessment – Main Stem Tookany Creek - Ralph Morgan Park to Church and Old York Roads) This segment starts at the Church Road and Chelten Hills Drive underpass and extends for about 3,000 feet along Wall Park and a small commercial center at Church and Old York Roads and then ends at Church Road where it bends towards Ogontz Field.

This reach was walked in July 2001. The reach begins under the Church Road underpass at Chelten Hills Drive. The creek bed under the bridge is half large natural stone or granite and part sand and silt. The sand and silted areas were deeply pooled as was the area exiting the bridge. The right bank has natural large rock with some medium sized trees growing while farther down about 20 to 25 feet there is a man-made stone retaining wall and poorly maintained stone steps coming from Church Road to the wall. Beyond this area on the right bank is a large concrete culvert where Rock Creek enters the main stem of the Tookany Creek.

Beyond the junction of Rock Creek, the water becomes shallow and the creek bed is made up of stones and gravel. On the right bank, the railroad tracks appear again with little or no buffer zone until the tracks move away from the bank some 75 feet down stream. The canopy is open on the right side with Japanese knotweed growing along the track bank.

The left bank after the bridge has a 12-foot high stone wall for about 50 feet down stream. There is some wash out behind this wall from the Alison storm flood. Where the wall ends there are trees and shrubs along the bank. There is a 40 to 50 foot wide buffer zone with maple and beech trees above the left bank, and then the zone opens to the Wall Park ball fields.

The creek has an intermittent canopy as it begins to turn left, almost making a wide turn back toward Church Road but closer to Old York Road. There are many exposed tree roots and much undercutting, especially on the right bank. The left bank buffer zone thins as the creek heads towards the Wall Park playground. Along the playground, tennis courts, basketball court and then the Old York Road Skating Rink parking lot (all on the left bank) there is little or no buffer zone. In years past someone has attempted to use old stacked concrete slabs to build a retaining wall along this bank to stop the erosion, which is not very effective.

The right bank becomes steep when approaching the Old York Road Skating Rink on the right. There is a metal footbridge that crosses the creek from the parking lot to the skating rink. There is a well maintained stone retaining wall under the bridge. Beyond the skating rink building there is a professional/medical building with a parking lot that is asphalt paved right up to the steep right bank. Part of the bank is rip-rap and some of the stones are washed out. Here, the creek continues to turn left back to Church Road with no right buffer zone because the creek is running along a commercial driveway where it then goes under Church Road.

Under the Church Road Bridge there are storm water outlets that have deposited sand on a beach on the left bank under the bridge. There is little or no buffer zone on the left bank because the Yorktown Inn's parking lot comes right up to the bank. On the right bank there are also trees but above the bank it is a mowed grass lot with an electric generating station. Along this 100-foot stretch of creek there are old mill stones in the creek. The creek bed is gravel and stones.

The creek winds right under Old York Road and then heads right again to a right bank sandbar and a bridge, which connects the Township's Public Service Facility to Shoemaker Road. The banks are steep and planted here but with little or no buffer zone on either side because of the street or the Service Facility lot. The lot is fenced with a small dumping area on the other side of the fence. Under the bridge is what appears to be a large sewer pipe surrounded by deep water and sand. Beyond that, the creek widens over a cement waterfall.

Above the wall are the parking lots to the Public Facility Building and the Elkins Park Library. Past the bridge on the left bank there is a small buffer zone of shrubs and some trees, which is part of a back yard. The house is about 75 feet from the creek bank. The creek is concrete channeled on both sides after this home on the left bank, until it goes under Church Road into the Ogontz Park area. The creek also curves to the right before meeting Church Road. On the left channeled wall before Church Road, the Jenkintown Creek tributary enters the main stem of the Tookany via a cement culvert.

Flooding has increased on the Shoemaker driveway alley side (left bank) of this section. There is little or no buffer zone above the left bank wall because of this alley.

Planning Implications

- * Remove knotweed and other invasive plants from this section and replant a native buffer zone along the train track sections.
- * Develop a master plan for Wall Park and evaluate the possible relocation of playground equipment away from the stream bank to plant a healthier buffer zone.
- * Check stability of rip-rap and stacked cement retaining wall near tennis courts and skating rink areas.
- * If the area near Yorktown Inn and Elkins Park Square Plaza is redeveloped, have landscape architects design the area so there is more of a natural buffer zone along this small stretch of creek, possible augmenting the businesses by emphasizing the natural beauty of the creek. Encourage the use of BMPs such as porous paving.
- * Remove millstones for historic display at Wall House.

- * Assess upstream issues to see why Shoemaker Road area is flooding more.
- * Restore and/or stabilize some of the undercut bank and root exposed trees.

High School Park to Ashbourne Road along the Tookany Creek Parkway

(See Visual Streambank Assessment – Main Stem of Tookany Creek – New Second Street to Cheltenham Avenue) Most of the land along this 2½ -mile greenway is owned by Cheltenham Township for passive recreation. The creek has remnants of an attractive stone wall from the 1930's when it was first channelized. It has fallen into disrepair in many areas as the Tookany attempted to widen itself to hold the upstream stormwater as development ensued.

High School Park serves as the gateway to the Tookany Creek Parkway. This park was the focus of a major biotechnical streambank restoration project in 1999, funded in part by a PADEP Growing Greener grant and an EPA 319 grant. Unfortunately, in fall 2000, the high velocity and volume of stormwater from Hurricane Floyd destroyed some of the stabilized banks in the restoration directly off High School Road. It is, however, a successful restoration because it met the goals of the NPS Pollution 319 grant in that the restoration demonstrated various biotechnical BMPs in an urban watershed.

Japanese knotweed continues to be a problem along most of the banks in the restoration area and needs a consistent approach to eradicating it. It is also found in large areas downstream and is seen colonizing banks for several hundred feet.

After the main stem of the Tookany Creek passes through the small residential areas that back up to the creek, it flows through the softball fields. It appears that the township mows some of the riparian buffer area at the entrance to the park where it is not part of the playing fields. There is a good riparian buffer comprised of a mature beech and oak forest for most of the next reach until New Second Street. There is evidence that deer browse however, because the understory is very thin to non-existent in some places. This is one of the more picturesque reaches of the Tookany Creek as there is a wide buffer along both sides that is adjacent to larger older homes with mature vegetation. A greater diversity of vegetation is noted within this reach. There are some deeper pools and riffles, which are indicative of a healthy, functioning creek.

Residents have reported odors and visible discoloration in the 6 to 12 inch shallow creek flows. Some large trees have been severely undercut along the creek and eventually will succumb to the widening of the channel if the upstream stormwater is not curtailed.

Once across New Second Street and into the formal Tookany Creek Parkway, the conditions vary. At the corner there are large specimen trees that are mowed underneath and almost to the bank. The creek could benefit from a greater herbaceous and grass buffer. The steep slope on the side adjacent to the Elkins Park Middle School has a good example of a riparian buffer, providing some stabilization to the creek.

The creek is not accessible along Ashbourne Country club, a golf course. It appears to have typical mowed greens with little or no riparian buffer. It is likely that they are using heavy fertilizers in order to maintain the greens in this condition, contributing to NPS pollution.

As the creek meanders past the golf course it flows through a wooded area and exits at the confluence of the Jenkintown Creek. The pedestrian bridge area south of Jenkintown Road was one of the harder hit areas by Hurricane Floyd. Much of the stone walls that remained and the earth behind them, were washed out, scouring the downstream channel walls severely. This section down to the Kleinhentz fountain is currently being redesigned using biotechnical stabilization techniques in conjunction with the trail construction.

Heading downstream, the southwest side is mostly a steep wooded area, in contrast to the arboretum-like side with mature trees punctuating a regularly mowed flood plain area adjacent to the winding roadway. The riparian buffer is missing in some places due to fallen trees from the bank undercutting and township personnel mowing to the edge. Where trees have fallen in this greenway corridor, knotweed has succeeded in colonizing.

Over the years the trail area between the creek and the road has diminished due to the creek cutting a larger channel to accommodate the larger volume of stormwater. The township is addressing this problem in the trail implementation plan now underway, as it poses a safety issue for pedestrians who use the trails that are close to the unguarded parkway.

The parking lot area at Ashbourne Road is a PADEP Growing Greener grant project that has been under restoration since Spring 2003. There is a small riparian buffer of only 5 to 8 feet between the Tookany Creek and the parking lot, allowing NPS pollution to flow directly into the creek. This was restored using community volunteers.

Historically, the intersection south of Ashbourne Road is known to flood during high intensity rains, necessitating closing the road until it subsides. The township owns much of the next few miles along the Tookany Creek Parkway surrounding the creek to the Philadelphia line.

This lower portion of the Tookany Creek watershed is relatively flat and indicative of the Coastal Plains landscape. Hurricane Floyd has also ravaged some of the creek channel in this vicinity, eroding large gouges out of unbuffered banks. A consistent problem is that the township personnel mow close to the creek as well as under large trees creating the bygone effect of pastoral English landscapes. Many of the large trees are missing their small understory and shrub layers, decreasing the stabilizing effects an intact forest structure provides.

The Melrose Country Club, a private golf course, is fenced in denying access along this portion of the potential greenway and creek connection to Fairmont Park. They appear to manage the grounds like the usual golf course greens, with little regard to the riparian buffer. One could also suspect they are using heavy fertilizers in order to maintain the greens in this condition, contributing NPS pollution.

Visual Assessment - Main Stem of Tookany Creek – New Second Street

Planning Implications

- * Initiate a plan to study local geomorphology and sinuosity capabilities for the amount of stormwater passing through this main reach of the watershed.
- * Conduct biotechnical streambank stabilization along the Tookany Creek Parkway.
- * Eradicate invasive plants and replant with natives.
- * Educate and inform adjacent land users of infiltration BMPs.
- * Incorporate stormwater infiltration devices.
- * Conduct regular trash cleanup.
- * Educate Cheltenham Township Public Works personnel in ecological/sustainable maintenance practices, especially in reducing lawn mowing along the riparian buffer areas.
- * Encourage the two golf courses to evaluate their fertilizing regime, mowing regime and overall grounds maintenance techniques, and to consider becoming certified by the Audubon Golf Certification program, which requires the use of more sustainable practices.
- * Assess unnamed sections.

Unnamed Tributary in Glenside

(See Unnamed Tributary of Tookany Creek – Grove Park Visual Streambank Assessment Map.)

This un-named tributary enters Cheltenham Township through a small culvert on Tyson Avenue near the intersection of Tyson and Mount Carmel Avenues. The creek runs behind homes on Tyson Avenue then makes a 90 degree turn into a cement culvert, which goes under the SEPTA train track just north of the Glenside Train Station. This culvert then empties behind a business on Glenside Avenue then flows behind the building and through another cement culvert under Glenside Avenue then runs next to and behind homes where it dumps into Grove Park. It then winds under Waverly Road, under Lismore Avenue and under Harrison Road before it meets with the main stem of the Tookany Creek behind the Dunkin Donuts on Easton Road. Its length is approximately 1/2 mile.

This reach was walked on March 15, 2003 on a warm sunny day. The culvert outlet at Tyson and Mount Carmel Avenues is small and is blocked by cement slabs. The water flow is about 5 to 6 inches deep and 2 and 3 feet wide for most of the ½ mile. The creek bed is mostly sediment, gravel and large stones. There are also large patches of algae and an orange jell-like substance at the beginning of this reach. The Tyson Avenue stretch of this reach is severely littered with trash, tires, old fencing, etc. The stretch that abuts the railroad track has a sparse number of trees and shrubs and there is evidence of recent removal and cutting back of trees and shrubs on the SEPTA railroad track side. The left downstream bank has some large trees, but the ground is compacted because of neighbors parking vehicles right up to the creek. Behind homes on Tyson Avenue the tree buffer zone becomes slightly deeper behind the homes but some homes do mow their yards close to the creek. (These homes were flooded during the Allison storm event.)

The creek takes a 90 degree turn behind 340 Tyson Avenue and then flows through a culvert (approx. 3 by 4 feet), which is blocked by storm debris and trash. This culvert goes under the SEPTA track just north of the Glenside Train Station. The water then exits on the other side of

the track just behind a business on Glenside Avenue and makes another 90 degree turn to the left. It appears that a small creek branch also joins this stretch coming from the north. The businesses on Glenside Avenue have their stormwater downspouts draining directly into the creek via PVC piping along the right bank. The left bank is steep, trash littered, and covered in dried stalks of Japanese Knotweed.

Once past the building, the creek goes under Glenside Avenue, becomes channelized and flows between and behind homes. The tributary discharges into Grove Park, a passive park surrounded by a quiet neighborhood in Glenside, Cheltenham. The creek meanders through the park and shows evidence of severe flooding with undercut banks. The park is well-manicured and there is no buffer zone on either bank; in fact, the banks are mowed right up to the edges. There has been some attempt to plant small trees in the park.

The creek continues between homes and is channeled with a small buffer zone of trees and some ground cover of English ivy. This unnamed tributary of the Tookany Creek continues under Waverly Road, flows through a small channeled area and under Lismore Avenue. It widens slightly into a stretch paralleling Waverly Avenue. This small stretch of land is open space owned by the Township and has some old-growth, large trees. The left bank is mowed to the edge and the right bank is steep and has a dirt walking path along side it, which the neighbors use to walk dogs and use for recreation. The creek then flows under Harrison Avenue, becomes channeled again, and flows beside and behind homes until it meets the main stem behind the Dukin Donuts on Easton Road. This branch crosses Harrison Avenue at the site of flooding during recent heavy storm events.

Planning Implications:

- * Neighbors should be organized to clean up trash and storm debris along the Tyson Avenue and the township or SEPTA should monitor the debris that blocks the culverts.
- * Educate neighbors, businesses and SEPTA regarding BMPs especially planting riparian buffer zones and use of rain barrels.
- * Partner with SEPTA to plant native vegetation that is in keeping with their track maintenance requirements in order to reduce NPS pollution and stabilize soil to prevent erosion and downstream sedimentation.
- * Clear Japanese Knotweed as part of a larger watershed-wide invasive species eradication program.
- * Study Grove Park for possible stormwater retention as part of the larger watershed-wide hydrological study. Redesign, regrade and plant banks along Grove Park as well as creating a "No mow" zone.
- * Create a riparian buffer zone as well as restore the streambank along the open space area on Waverly Road.
- * Formally name all unnamed tributaries in the watershed.

Baeder Creek Watershed

(See Baeder Creek Visual Streambank Assessment Map.) Baeder Creek is one of the main headwater tributaries of the Tookany Creek. This 1.75 mile long, branched tributary rises in Abington Township and extends to the SEPTA railroad tracks in the vicinity of the SPS Technologies.

Visual Assessment - Unnamed Tributary of Tookany Creek – Park Grove Map

Visual Assessment - Baeder Creek Map

The visual assessment of the creek channel and its riparian area was conducted in May and June of 2001. A rough estimation from aerial photographs of the impervious surfaces of the watershed appears to indicate that at least 25 to 40 percent of the land cover is impervious surfaces. The residential land within the watershed has well-established landscaping surrounding the predominantly older developments with an estimated age range of 30 to 60 years old. Most properties have the typical suburban lots with mowed lawns, punctuated by large specimen trees and often with non-native shrubs that provide shade.

The western most segment of the creek lies on a combination of private land, the Abington Township School District's South Campus High School property, Baederwood Park and the Coates property, while the eastern portion starts on Abington High School's North Campus, traverses through residential areas and finally meets up with the western prong on the Coates property.

Western Branch of Baeder Creek

The western branch of the Baeder Creek is first visible on the Abington Township School District property behind the homes on Charles Street. The stream bank is flat and channelized with mowed lawn areas, much of which is for athletic use. A football stadium is proposed in the vicinity of the headwaters.

After exiting the school complex, Baeder Creek is piped under a residential property and then under Abington Avenue and Ghost Road. No water is visible before the pipe. However, on other side of road, water can be seen as three storm drains come together under the road. The creek continues through Baederwood Park and for a long stretch, the stream is walled on one side (wood and stone). The other side has a steep slope. A lot of brush and lawn debris from adjacent properties is thrown near the stream bed. An informal trail system made up of compacted ground follows the creek. Significant signs of erosion from runoff were observed along most of the pathway. The entire park is wooded except for a large open mowed area, which contains playground equipment.

In Baederwood Park near the foot bridge, two mallard ducks were spotted. At this point the creek widens to 15 feet. A small wetland area as indicated by obligate plant species of skunk cabbage was observed. The water appeared clear. The slope is estimated to be around 20 percent on one side, and the other side contains wetlands and then a gradual slope. Undercutting was noticeable around the foot bridge. After the bridge, the creek widens considerably in one spot. The bank is severely undercut on the side near the playground.

Downstream, an old stone wall approximately 20 feet high with 3 foot wide gaps cut into it as it crosses the creek. This wall was possibly used to slow down water flow. Several mature beech trees, maples, tulip, and oak exist. A great deal of in-channel erosion is observed. Baeder Creek then leaves the park and flows under Highland Avenue to the Coates property. There is a sewer line in the creek bed, which is undercut. Knotweed is beginning to overtake the native vegetation in this area.

A 41/2-foot diameter pipe carries stormwater under the road. Erosion and breakage of the road bed were observed to be falling down into creek. The periodic manhole covers along the creek indicate the sewer line paralleling the Baeder Creek.

The Coates property is a beautiful ten-acre property, which is leased to the Township for a passive nature area. Knotweed, tulip and beech trees are the dominant vegetation along this wide undefined edge of the creek. A sand bar is formed where the creek converges with the eastern branch.

The creek bed widens to about 20 to 30 feet with some pools about three feet deep, with noticeable undercutting on one side of stream. Some erosion was noticed under trees with large areas of multiflora rose. As the creek leaves the Coates property, it is piped under Baeder Road and several properties, where it flows out of a tunnel (about 6 feet in diameter) behind the residential properties along Baeder Road.

After flowing under Baeder Road, the creek is walled in on both sides. Walls vary in height from 6 to 12 feet in spots. The vertical wall is made of lumber most of the way. Along part of the creek, the wall is cement.

The creek travels under the Madison Apartments parking lot and then under Jenkintown Road, where it re-appears in a residential neighborhood. Gabion baskets make up the vertical walls on both sides. Native vegetation, such as willows and viburnum are found growing in the creek bed.

The rest of the creek was inaccessible due to thickets of invasive species. However, after Baeder Creek crosses under the SEPTA railroad tracks around Jenkintown Road it is piped until it reaches the main stem of the Tookany Creek in the vicinity of the Jenkintown train station.

Eastern Branch of the Baeder Creek

The eastern branch of Baeder Creek is first visible near the parking lot in front of Abington Jr. High School. It appears water is collected underground from the soccer fields and channeled into the creek. This headwater area contains a thin vegetated strip about ten-feet wide. The area beyond this narrow buffer is kept as lawn. The creek bed is badly eroded with tree roots exposed. The creek is then channeled through a residential property and across Highland Avenue. Beyond Highland Avenue, the creek winds between residential properties. It appears that most of the buffer area is kept as lawn with a thin line of trees and shrubs. The creek is piped under Canterbury Road, and then reappears along Running Brook Road in front of Jericho Manor Apartments. The creek then travels through the Coates property and converges with its western branch.

Planning Implications

- * Work with Abington Township School District to develop a land management plan, focusing on increasing on-site infiltration for all the non-athletic uses of lawn.
- * Work with Abington Jr. High School to improve and restore the riparian buffer on the school property. Establish a “no mow” zone at least 30 feet from the creek and plant native plants.

- * Incorporate the restoration of the riparian buffer with some of the mandatory environment and ecology curriculum.
- * Develop landowner education and outreach programs for better management of the riparian buffer area and creek. As part of the program organize a local group of concerned citizens to routinely monitor and clean-up the creek. Provide training and educational materials. Educate property owners along the creek as to best management practices. Monitor the long-term water quality.
- * Consider the removal of structural features such as the vertical gabion baskets and concrete walls and replace with more natural bank slopes and native plants that will function as a riparian buffer along with biotechnical streambank restoration.
- * Conduct a hydrological assessment of the Baeder Creek using the Fluvial Geomorphology methodology to correct the serious flooding and bank instability. Much of the creek's geometry such as the sinuosity and bank shape has been altered.
- * Install water bars in combination with native shrubs to prevent sediment and other NPS pollution from flowing into the creek off Highland Avenue.
- * Consider the development of a greenway along this reach after repairs and clean-up are done.
- * Educate the apartment complex owner on the importance of the creek and encourage that native plants be incorporated into the overall landscape of the property.
- * Conduct biotechnical streambank stabilization in the most severely impacted locations.
- * Eradicate invasive plants and replant with natives.
- * Develop invasive species eradication program for this entire headwater area to prevent downstream infestation. Work with the Patrick Center at the Academy of Natural Sciences and be involved in their invasive species control program especially their focus on knotweed.

Rock Creek Watershed

(See Rock Creek Visual Streambank Assessment Map.) The headwaters of the 1.97 miles of Rock Creek in Cheltenham Township comes from PWD outfall T-096-2 that empties into the frequently wet land between Cedarbrook Country Club and the Pathmark supermarket. Out of the three golf courses in the watershed, this golf course has the greatest potential to be developed. As of April 2003, conceptual development plans are under discussion. The three-foot wide stream that flows through the country club is clean despite the profusion of geese droppings in the course.

According to Hal Krieger, a volunteer has monitored the long-term water quality along the Rock Creek. The storm sewer appears to be contaminated with sanitary sewage, most likely a result of improper lateral connections. The Philadelphia Water Department has found this throughout the entire Tookany/Tacony Watershed. The odors and sanitary sewage slime are apparent to the naked eye. The Senior Environmental Corps has measured high fecal coliform levels in the recent past. PWD has been working with Cheltenham Township in their "Illicit connection" program.

A side stream enters from Cedarbrook Middle School and flows through properties that have mowed lawns to the creek banks on the western side. Many homeowners have dumped leaves

and other yard waste down the creek bank. Small fish, frogs and ducks were observed. Landowner education would be beneficial to correct these NPS pollution problems.

From Ogontz Avenue to the footbridge at Wistar Drive, the creek appears polluted. The banks are steep as a result of downcutting of the creek bed to accommodate the large volumes of water and suspended sediment that it carries which scours the channel. The creek bank shows obvious signs of erosion on the eastern side from Cheltenham Square Mall. The western side of the creek borders Cedarbrook Middle School. This entire reach is used as an informal dump; there are tires, shopping carts, construction debris as well as a grave stone. The Township should follow up and monitor the creek for illegal dumping.

The half-mile stretch of the stream from the Wistar Drive footbridge to Curtis Arboretum is Cheltenham Township parkland and has the potential to be a beautiful wooded stream and a premier park for Cheltenham Township. It is suggested that the litter be routinely removed and a trail/ greenway developed to enhance the area for increased riparian buffer function, wildlife habitat and public recreation.

At the intersection of Lorimer Drive and Rock Creek, the largest tributary enters Rock Creek. Rock Creek forms the southern border of Curtis Arboretum. The water quality appears improved as indicated by the improved appearance of the water, decreased odors and the random water samples collected by the Senior Environmental Corp.

For a half mile from Washington Lane to the Rock Lane Bridge, Rock Creek flows through a wooded valley with the lightly traveled Rock Lane close to the creek bank. The damage from Tropical Storm Alison is evident in the wooded area as several large trees were knocked down and the roots ripped and soil eroded from the stable banks. Small fish up to six inches in size frequent the pool under the bridge.

Downstream from the bridge, Rock Creek becomes contained in a stone and concrete wall for about 200 yards, in some locations on only one side and others on both sides of the banks. The creek flows through Camp Anglewood, a summer camp for children. During tropical storm Allison the creek overflowed its banks and was about two feet above Rock Lane. A spring-fed stream feeds a pond in the camp before emptying into Rock Creek and under the Serpentine Lane Bridge.

Rock Creek is again contained in a straight-sided concrete channel for another 200 yards in an attempt to control the serious flooding that occurred in the past. The houses on the north side of the creek were demolished and the creek channelized in the 1950s because of the flooding. The one to two acre mowed township-owned park would benefit from a change in management practices, perhaps to a wooded area for both habitat enhancement and increased infiltration and NPS pollution reduction.

At Widener Road, the creek is once more piped for the next 200 yards until it discharges into the main stem of the Tookany Creek just below Church Lane.

Visual Assessment - Rock Creek Map

Planning Implications

- * Continue to monitor the water quality in areas that have excessive coliform levels.
- * Continue to partner with PWD to improve the infrastructure that negatively impacts the water quality along this tributary.
- * Restore the riparian buffer in areas that have adequate land.
- * Monitor the creek in identified commercial areas for illegal dumping.
- * Plant creek banks with natives, especially in the areas where large trees have come down to prevent invasive species from dominating the plant community.
- * Develop educational programs and BMPs geared towards residents to consider in managing their land.
- * Incorporate stormwater filtration devices especially in commercial/business areas with large expanses of impervious paving.
- * Conduct regular trash removal.
- * Consider a trail or greenway along the township-owned segments.
- * Develop a master plan for the one to two acre township-owned parcel located near Widener Road that emphasizes better stewardship practices for watershed and water quality improvement than the existing mowed lawn.

Mill Run Watershed

(See Mill Run Visual Streambank Assessment Map) Mill Run has some of the poorest water quality readings in the watershed as a result of the impact of illicit connections. This watershed also receives some of the stormwater from the Philadelphia side of the watershed, some of which is very urban in its use and land cover. This is evident along the Cheltenham Avenue boundary. PWD has been working with Cheltenham Township to correct this problem for some time.

Flooding also has resulted from the extensive impervious surfaces. The visual assessment of the Mill Run clearly shows the eroded channel and undercutting from the excessive volume of stormwater, as well as the sewer pollution. Much scour is noted around failing headwalls off Cheltenham Avenue.

Many of the residential landowners mow to the creek banks due to the need to maximize their small lots, not realizing the impact this practice has on the creek and watershed.

Planning Implications

- * Restore the riparian buffer in areas that have adequate land.
- * Continue to monitor the water quality in cooperation with PWD.
- * Eradicate invasive plants and replant with natives.
- * Enforce riparian corridor and waterway regulations.
- * Educate and inform adjacent land users of BMPs.
- * Incorporate stormwater infiltration BMPs throughout the residential and commercial areas.
- * Develop homeowner education manuals on the do's and don'ts in the watershed.
- * Relocate structure or purchase then demolish structures in the floodplain to allow area to serve as a floodplain.

Leeches Run Watershed

The 1.5 mile long creek, sometimes referred to as Ogontz Creek, begins as a storm sewer outfall from the Lynnewood Gardens Apartment Complex in a wetlands behind the Elkins Park Post office near the intersection of Mather Way and Penrose Avenue. This creek was named after Toby Leech (died 1726) during his lifetime. According to an article about the Leech family in the February 17, 1911 Times Chronicle, there is a description of a spring that originates on his property and flows in the same area as this unnamed creek.

Leeches Run flows through the ornamental ponds of the Dominican Retreat (the former Elkins' estates) then passes under a block of houses. After about 0.1 miles it meets up with another branch, which originated under Latham Park. After another 0.2 miles the creek joins up with a third branch, which had originated on the old Lynnewood Estate near the corner of Ashbourne and Cedar Roads, flows under the road until emerging at Stetson and Juniper Roads, and flows in a channel behind and in front of houses along Stetson Road.

Leeches Run then flows under Old York Road and around Temple Adath Jeshurun. The entire area east of York Road and south of Ashbourne Avenue was a mill pond (Dobbins Pond) until it was filled post WWII. Leeches Run enters a tunnel behind a house at Spring and Elkins Avenues, meets up with the Spring Avenue branch (totally enclosed), flows under the railroad tracks behind the Ashbourne Market and reemerges from under an apartment building. Leeches Run's last hundred yards run in a channel between two wings of the apartment complex. It empties into Tookany Creek at Ogontz Park, where it is eight to ten feet wide.

This three quarter square mile watershed is home to about 5,000 people, downtown Elkins Park, Tyler School of Art (Temple University), the Dominican Retreat, and Temple Adath Jeshurun. It is also the home to the historical estates of Widener, Elkins, Stetson, and Jay Cooke, as well as part of Camp William Penn, the Civil War training camp for African American Union soldiers.

Planning Implications:

- * Formally have the name of this currently unnamed creek "Leeches Run" placed on all future maps and documents to celebrate the historic significance.
- * Partner with adjacent religious organizations and other landowners to implement appropriate BMPs.

Abington Country Club to Township Line Road

This segment is approximately 2,500 feet long, starting behind the apartment complex on the Abington Country Club property near Jenkintown Road. The surrounding uses of this reach are largely mixed business/ commercial and upscale older residential homes area.

The creek is channelized behind the Pavilion and the Plaza, a high-rise apartment building and therefore it is difficult to determine the initial water source. It appears that the channel gathers stormwater from the golf course, the parking lots of the apartments, Acme Complex and the Pavilion. Debris and trash are located in this channel. The concrete channel behind the Pavilion connects into the unchannelized part of the stream, located to the rear of the country club building. However, this portion of the stream is manmade and rip-rap is present on the bottom to help filter sediment. The channel is about four-feet wide.

Visual Assessment - Mill Run Map

Portions are piped underground. The area surrounding the stream is grassed for golf greens. A few trees exist along the stream. This continues to the end of the course near Lenox Road.

The stream is piped underground across Lenox and Meetinghouse Roads. The stream becomes more visible, deeper, and wider on the opposite side of Meetinghouse Road. From the presence of storm inlets on Lenox, it is assumed that other underground collection facilities are used to drain stormwater from the neighborhood, and converge at this location. The stream continues along several private residential properties. It appears that the stream width may be about 10 feet wide. There is a band of vegetation on the bank extending about 10 feet. The stream disappears under Township Line Road and reappears in Cheltenham Township. Honeysuckle is noticeable on the Cheltenham Township side of the road.

Planning Implications for Abington Township portion

- * The country club greens should be maintained in an environmentally-friendly way to help protect the water quality. Encourage involvement in Audubon Golf Program.
- * The stormwater management facilities for the parking lots should be examined to see if BMPs are being used to help reduce run-off and pollutants.
- * Re-establish some type of riparian buffer along the stream or possibly a 20-foot wide "no mow" zone to encourage meadow growth for filtering NPS pollution and dropping out sediment.
- * The channelized portion of the creek should be cleaned and maintained on a periodic basis as debris is prevalent.

Township Line Road near Foxcroft Road to Main Stem

(Unnamed Tributary) This reach starts at Township Line Road near Foxcroft Road on the Cheltenham Township side of the road. It flows about 3,000 feet through a residential area then empties into the main stem of Tookany Creek at Church Road near Ogontz Park.

This reach was walked in August 2001, about two months after the Tropical Storm Alison flooding. At the beginning of this reach the creek flows from a cement culvert under Township Line Road. The concrete culvert top is deteriorated and falling into the creek. Cement pieces block part of the opening and are washed up along the banks near the opening. Storm debris, dumped trash and yard debris collects in this area. The creek banks are steep and planted but there is little or no buffer zone beyond the banks because the residential backyards are mowed up to the creek bank. On the left bank there is evidence of cut tree trunks and branch trimmings dumped along the bank. There were also other dumped items such as tires and an air conditioner, which clogged the storm drain outlet. The creek bed is stony and there were small fish and frogs in this area. The banks have large maple trees and some knotweed and bittersweet vines

About 50 feet from the culvert downstream, there is an interesting stone well or cistern on the right bank. There is also a man-made old stone wall or small dam. The area may have been a garden connected to the property on the right bank because there is evidence of old stone stairs and wrought iron railings that lead down the bank to the creek with the wall or dam crossing the creek. The area is now overgrown and not in use.

At about 100 feet down stream the right bank flattens and is planted well. The left bank is still steep and semi-planted. There is a large fallen Palownia tree bridged across the creek. As you walk downstream the buffer zones on both sides of the creek widens and are very healthy. Here the creek flows through a peaceful canopy of tall sycamores, beech, maples and ashes with a 100 foot wide buffer zone on both sides.

Downstream, the right bank becomes steeper and the creek is dammed by storm debris caught up on downed trees. The water flows on the left flat bank to avoid the dam. Then farther down on the right bank the bank is vertical (about 12 feet) with a home above the undercut bank approximately 20 feet from the drop. The yard is mowed lawn right up to the bank. Along this section the properties are varied between mowing to the bank and providing a planted buffer. There are canopies of beech, oaks and tulip poplars, plus boxwoods, vinca and ivy with some porcelain berry vine in some areas. The bank's steepness also varies and in some areas the banks are vertical and undercut. Some yards have retaining walls and others do not. One area had a rusty sewer pipe running across the creek with a foul odor and the orange jell-like substance oozing from the bank nearby. One yard had a wooded area with the remains of an old stone building, possibly a mill (15'x 20' stone walls) along the left creek bank. In this same area there is a cement dam in shallow water and then a second one with wooden locks.

Farther downstream, the right bank is channeled with a stone wall and some sycamores with their roots exposed and bank undercut. The creek then turns right under Forest Avenue and is littered with storm debris. There is a large underpass with sewer pipes running through it, as well as stormwater outlets. It exits to a high channeled area with homes built right on the creek banks. Some banks are walled and planted, while others are planted and undercut as evidenced by home owners along this section who have tried putting up retaining walls.

The stream channel narrows to about 5 feet and the homes get closer to the creek. Upstream the creek bed was about 10 feet wide. In some spots the channeling is wood and deteriorating. Most homes on the left bank are about 50 feet from the creek with little or no buffer zone. On the right bank, the homes are higher up due to the slope. The channeling widens to about 7 feet before it comes to Shoemaker Road. At this road the creek goes into an underground culvert until it empties about 200 feet downstream into the main stem at Church Road and Ogontz Park. Before the opening to this culvert there are two storm water outlets that empty into the channeled area from Brookside Road. The properties' owners on both sides of the banks mow their grass right up to the channeled wall.

Planning Implications

- * Abington and Cheltenham Townships will be rebuilding the storm sewers along Township Line Road when the road is repaired in the near future.
- * This whole reach could use a general cleaning of storm debris especially in the dammed areas and culvert areas.
- * Resident education is needed on managing a creek-side property, especially emphasizing planting buffer zones, creating "no mow" zones, not dumping lawn debris on stream banks, bank restoration ideas and removal of invasive plants.
- * Restore and stabilize some of the undercut and eroded banks.

Jenkintown Creek

(See *Jenkintown Creek Visual Streambank Assessment Map*.) This 3.61 mile creek traverses both Abington and Cheltenham townships. The creek has four tributaries or prongs originating in Abington Township, which flow under Township Line Road and converge with the main stem of the Tookany Creek at the Parkway near the Ashbourne Country Club at Jenkintown Road. A short reach (approximately 1,000 feet in length) is visible at Fox Chase Road and joins the western prong behind Alverthorpe Manor. The western prong rises at Abington Friends School. The center prong is located on the eastern side of Alverthorpe Park at Forest Road. The forth prong lies east of Cedar Road near the Valley Glen development. This reach was not assessed by the Abington Township Committee members.

Fox Chase Road to Alverthorpe Manor Pond

This short prong of the Jenkintown Creek extends approximately 1,000 feet from Fox Chase Road to the pond behind Alverthorpe Manor where it meets with the western prong. The Pond View residential development is located along the east bank and there are several private residences on the west through which the stream runs. Varied flora, including maple trees, ferns, ash trees, multiflora rose, rhododendron and azaleas exist. The water appeared clear with no sign of erosion. The streambed was about 8 feet wide. Chunks of concrete and 2-inch diameter steel pipe were observed in the stream. Heading downstream, the creek bed widens to about 12 feet. Some green algae was seen on the bottom of stream.

A long shallow pond about 150 feet long, and about 3 feet deep was observed behind Alverthorpe Manor. There was dense multiflora rose and significant tree fall where the stream opens into the pond. At the large pond on the south shore, the homeowner has mowed to within 10 feet of the south shore.

There is a concrete dam at the southeast corner of the pond that looked fairly new. Some trash including beer cans and rock piles was spotted by the dam. There was evidence of erosion at the mouth where this reach joins the western tributary (from Abington Friends School).

Abington Friends School to Township Line Road

The westernmost prong of the Jenkintown Creek begins at the Abington Friends School complex where the land uses are mostly parking and athletic fields. Observations on this portion of the stream were performed in May 2001, a month before Tropical Storm Alison.

Water levels in the stream were generally low, from 4 to 8 inches deep at various points. Most of the stream was litter free unless otherwise noted.

Across Meetinghouse Road, this reach traverses the Alverthorpe Manor property, which is home to the Abington Arts Center. This section of the creek is wooded and well-buffered. At the pond behind the Manor the second prong converges. The creek continues to flow through woodlands to Alverthorpe Park.

In Alverthorpe Park there is a break in the fence with a well-worn path into the park. The creek flows under the park bicycle trail and empties into Alverthorpe pond. The pond area has a

geese problem as evidenced by the large amounts of droppings, which cause NPS pollution in the pond. A chip and putt golf course is located close to the pond.

The reach exits Alverthorpe Park at the pond dam and travels behind homes on Indian Creek Road. A wooden retaining wall (about 3.5 feet high) is located on the south side of the creek. Multiflora rose is abundant along this area and is overgrown on the north side. Farther downstream, two old pipes jut out from the south bank above a retaining wall and there is noticeable erosion on the north bank. The park fence supports are washed out.

A plank is placed across the creek and leads to an obvious entrance to the park under the fence. Erosion continues and concrete pieces are observed in the creek.

Jenkintown Creek turns south to parallel Forest Avenue and widens to about 8 feet. The creek exits from the culvert under Forest Avenue. Residential properties are on both sides of creek. The creek is almost entirely channelized along this residential area with either vertical concrete walls or a concrete channel bed.

Heading downstream, there are piles of asphalt on north bank and signs of erosion (exposed tree roots). The creek passes under Tulpehocken Road via a concrete culvert and continues with concrete retaining walls (about 8 feet high) on both sides. As the creek exits from the culvert under Cadwalader Road (east side) the creek widens to about 15 feet and turns to the left. There is some evidence of erosion on the south bank at the turn. This point corresponds to the northwest corner of Ethel M. Jordan Memorial Park (behind McKinley Firehouse).

The remaining 4,000-foot stretch to Township Line Road involves the creek meandering between residential properties. A thin line of trees and plants border the creek in much of this area.

Planning Implications

- * Consider restoring the natural riparian buffer and channel back along the residential areas.
- * Develop a localized neighborhood cleanup to regularly remove trash that finds its way to the creek area.
- * Repair eroded areas using more naturalized approaches such as native plantings.
- * Encourage Abington Township park maintenance staff to fortify the holes in the fence and ask residents to use the formal entrances.
- * Alter land management practices in the park to the restored pond shoreline including the BMPs for the chip and putt course.

East side of Alverthorpe Park to Serrill Road

This reach is approximately 4,000 feet in length and originates in the eastern corner of Alverthorpe Park where it is heavily wooded. The creek is piped under Forest Avenue and meanders behind Manor College in a wooded area. The creek was about 8 feet wide and 6 to 10 inches deep. There was some evidence of erosion and undercutting. A turtle was spotted on the property about 100 feet away from the creek. There was also evidence of deer in this

Visual Assessment - Jenkintown Creek Map

wooded area. An orange substance was noted in the water about midway through the property. *Mutiflora rose* was abundant throughout this section.

Another small tributary merged with this reach to the southeast, near Douglas Avenue on the School District property. It appeared to be about 500 to 1,000 feet long although due to a thick brush, it was inaccessible to explore. At this juncture, the creek is piped west across the School District property (Mckinley Elementary), which is kept as open mowed field, possibly for soccer. The creek reappears near the homes on Pinewood Avenue and connects into the main prong of the Jenkintown Creek.

Township Line Road to Tookany Creek Parkway

The Jenkintown Creek crosses into Cheltenham Township at Church Road where it flows about a half-mile before it joins the main branch of the Tookany Creek at Jenkintown Road along the Tookany Creek Parkway. Initially the creek had about 90 percent tree cover. The creek bottom is rocky and silty with concrete blocks strewn on the banks with some noticeable farther downstream. Erosion is found in the form of scouring on both sides of the creek for part of the stretch, and some exposed tree roots were observed in this area. The VFW picnic grove is in jeopardy of being lost due to eroding stream banks. It appears that the stream is increasing its channel size to accommodate the larger volume of flows from upstream.

The water had no odors and appeared clear, with average water depth of about ten inches, increasing to fifteen inches downstream, then decreasing to six inches. The tree cover also decreased to about 3 percent as the creek entered the residential areas.

At one point close to the juncture of the main stem of the Tookany, a wooden plank was observed across the stream bottom, a potential barrier to fish passage.

The containment walls of the creek got steeper toward Tookany Creek. No vegetation was observed on the bottom or on rocks.

Planning Implications

- * Work with landowner to remove the wooden plank to allow for fish and other organisms to pass through. This will also prevent build-up of sediment.
- * Enlist the support of the VFW to replant the riparian areas and be “watchdogs” for potential problems in this reach.
- * Restore the riparian buffer in areas that have adequate land.
- * Conduct biotechnical streambank stabilization.
- * Enforce riparian corridor and waterway regulations.
- * Educate and inform adjacent land users of BMPs.
- * Conduct regular trash/debris removal on a neighborhood basis.
- * Develop homeowner education manuals on the do’s and don’ts in the watershed.

V. Management Options

Goals were developed based on the outcome of the first public meeting, the completed resident survey, the resource inventory, visual streambank assessment, and summary of the planning implications and recommendations/BMPs. Five goals or “management options” were developed along with the major issues identified during the watershed management planning process. The general goals and issues were developed as general management options that can apply to all the municipalities.

The steering committee worked from a general framework of the goals or management options. Each municipal representative on the steering committee was asked to develop a list of projects specific to their municipality. The priorities, as well as the projects, vary from municipality to municipality. In addition, each municipality was asked to identify partner organizations and agencies in relation to the conservation action in the Tookany Creek watershed.

The goals or management options are:

1. Improve the Health of the Riparian Corridor Area
2. Enhance Recreation Opportunities and Economic Development
3. Develop Public Outreach and Education Programs
4. Develop and Implement Land Protection, Acquisition and Preservation Strategies
5. Improve Watershed Communication

Watershed Management Options

GOAL #1 - Improve the Health of the Riparian Corridor Area

Stream Corridor Improvements

Most critical to the conservation and protection of water-related resources and water quality is the protection and management of the adjacent land to the creek and its tributaries. Key to the buffering and protection of these land practices is having an intact riparian buffer. Efforts to retain and infiltrate stormwater are needed to reduce the pressure on these natural channels to move stormwater downstream. Important steps to achieve better management include BMPs for riparian buffer restorations, erosion and sedimentation control, stormwater management and flood management, and ordinances or “the teeth” to enforce their use. Specific actions are listed under each area.

Landscape Management

1. Protect existing native vegetation:
 - * Pass local ordinances to protect riparian areas from encroachment..
 - * Identify and remove non-native invasive plants along existing buffers.
 - * Purchase easements along the corridor for greenway. Where possible, retrofit channeled sections of the creek.
2. Plant native vegetation to restore and enhance riparian buffers
 - * Identify sections of creek lacking sufficient plant buffers.
 - * Pass ordinance to require new development along streams to provide planted buffer.
 - * Apply for funding to restore buffer on public lands (i.e., PADEP Growing Greener grants).
 - * Start a regional native tree farm for all the municipalities.
3. Develop BMPs and procedures to be implemented in the four municipal public works departments that include:
 - * Use of environmentally-friendly chemicals for road maintenance and plowing and disposal of snow.
 - * Employ stormwater BMPs to aid in water quality and quantity controls.
 - * Establish “no mow” zones in the riparian buffer throughout the watershed, and develop invasive species management program.
4. Provide training on BMPs and procedures to local, county and state public works departments where applicable:
 - * Employ BMPs for stormwater management.
 - * Use more environmentally sensitive techniques when plowing and disposal of snow.
5. Conduct a study of the headwaters of Tookany/Tacony-Frankford watershed using the Natural Stream Channel Design process and coordinate with the work under way /completed by Philadelphia Water Department (PWD).
6. Educate landowners adjacent to the creek corridor on BMPs to manage their land
 - * Specifically provide information to golf course owners and large institutional properties.
 - * Municipalities to initiate volunteer program to help with outreach.
 - * Develop/send brochure on land management for various types of properties.

- * Utilize local or regional EAC or other watershed group to conduct education programs for landowners.
7. Approach the owners of the golf courses to become certified by the National Audubon's Golf Course Program.

Erosion and Sedimentation Control Measures

1. Establish recommended BMPs to meet effective soil erosion and sediment control that use biotechnical & sustainable practices:
 - * Employ more vegetative filter strips in older developments.
 - * Establish inspection program for dams and weirs.
2. Monitor and enforce erosion and sedimentation plans during construction activity.
3. Establish/identify mandatory controls in zoning ordinances.

Stormwater Management

1. Conduct a stormwater management study under Act 167 for the entire watershed.
2. Retrofit stormwater structures with more soft engineering/biotechnical measures.
3. Develop ordinances to encourage more porous paving, bioswales, and on-site infiltration.
4. Develop ordinances to require new development to meet BMPs in PA Handbook on Best Management Practices.
5. Consider retrofitting infiltration basins upstream of known flooding areas to contain excessive stormwater runoff and treat the NPS pollution that has impacted the water quality.
6. Encourage the use of rain barrels and rain gardens in residential developments
7. Encourage the use of vegetated roof covers (or gardens) in nonresidential developments.

MS4/NPDES Phase II Stormwater Regulations

The municipalities can implement the MS4 regulations in conjunction with the establishment of the TMDLs for the Tookany Creek to properly manage the stormwater since there will be common goals.

1. Form regional partnerships to develop guidelines and meet EPA regulations.
2. Undertake an Act 167 Study with Montgomery County, Philadelphia Water Department and the affected municipalities to develop a more strategic plan to alleviate flood damage.
3. Secure a grant from DCNR for a circuit-rider program to assist in the development of a training program for the four municipal public works, businesses, and residents in the Tookany Creek watershed.

Reduce Non-Point Source Pollution

Non point source pollution (NPS) comes from a wide variety of sources and includes a diverse set of pollutants. Within the Tookany Creek watershed the specific pollutants are from sediment, nutrients, pathogens, toxic pollutants and sodium and chloride from road salt. The NPS pollution carried in the two-year storm event has a significant impact on the degraded quality of the watershed. It is this first flush that delivers the NPS pollutants to the water sources for transport downstream. Street runoff to storm sewers as well as landowner lawn

chemicals, add to the NPS pollution loads. Pet waste, albeit it small, adds to the pathogens and coliform count and can pose a health threat. Natural stream buffers and native vegetation can aid in the uptake of NPS pollution and stop damaging sediment from moving into the streams.

1. Develop new regional ordinances in anticipation of the NPDES permits that will require municipal regulation of NPS pollution.
2. Involve SEPTA, which owns large tracts of land within the watershed, to develop better, non-toxic materials and practices.
3. All municipalities should mark (stencil) stormwater inlets to decrease pollutants that are dumped into inlets.
4. Continue to promote county hazardous waste pick-up days and oil recycling centers.
5. Develop signage in all public parks and green areas regarding picking up and disposing of dog waste.
6. Enforce leach and pooper scooper ordinance.
7. Develop vegetated swales/bioswales in and around existing large parking areas and other known areas of NPS to treat/ uptake the NPS pollution that flows off in the first wash of stormwater, especially in the frequent two-year storm event.
8. Municipalities should develop alternative land management models for emulation by land owners such as decreasing lawn areas and use of native plants along all swales and riparian areas.

Flood Control

1. Study impacts of flooding on regional water level.
2. Study existing impervious surfaces in all municipalities.
3. Encourage/educate businesses, schools, SEPTA, etc. to use BMPs such as porous paving and bioswales when renovating parking lots.
4. Encourage residential and commercial landowners to use rain barrels and roof top gardens to decrease stormwater runoff.
5. Work with Temple University's Ambler Campus' Center for Sustainable Communities.
6. Use regional flood controls such as municipal parks and other large areas as detention/retention areas to reduce downstream flooding.

GOAL #2 - Enhance Recreation Opportunities and Economic Development***Greenway and Trail Development***

Floodplain areas offer many recreational opportunities in the form of linear parks, greenways, and trail systems. The benefits can go beyond the obvious opportunities to humans.

Greenways provide wildlife habitats, migration corridors, protection of significant vegetation and the restoration of important functions of riparian buffers that are sorely needed in suburban/urban areas like the Tookany Creek watershed:

1. Develop intra-municipal greenway/trail along tributaries and main creek.
2. Implement trail projects that connect communities to the natural corridors of the creek.
3. Develop new facilities, such as green roofs and porous paving in recreational facilities that promote wise use of resources and meet the needs of the population.

Economic Development

Older business districts like those in the first ring Philadelphia suburbs have difficulty competing with the regional malls. Buildings are often operating in a deferred maintenance mode and are costly to upgrade. Their presence in the community can be an eyesore and not attractive to local, potential users of services and goods. Local community support will be needed to develop alternative uses for industrial buildings and sites and a center of the communities. The healthy redevelopment of the businesses will create a healthy community.

1. Develop green plans to reuse existing industrial and shopping areas. Examples include:
 - * Less paved areas and more vegetation for attenuation of winter winds and summer heat.
 - * More on-site infiltration and treatment of NPS pollution through bioswales, porous paving, and other on-site infiltration BMPs.
 - * Enhance streetscapes with new street trees.
2. Provide incentives to attract new “green” industry and business.
3. Revitalize and rejuvenate dated shopping centers with improved BMPs.

Land Development

Proper site development can prevent increases in runoff, thereby reducing the potential for erosion and sedimentation.

1. Provide Incentives for businesses to develop green projects.
2. Utilize “Environmentally Sound Community Planning: Directory of Resources for Municipalities in Southeastern Pennsylvania.”
3. Develop minimum disturbance ordinances

Recreation Development/Creek Access

1. Provide areas with coordinated signage for more public access to the creeks within the watershed.
2. Develop a pedestrian walking trail system that will link neighborhoods safely to the creek and throughout the watershed.
3. Design and develop structures to view attractive vistas and to fish along the creek

GOAL #3 - Develop Public Outreach and Education Programs***Landscape Management***

The current accepted landscape model is one based on a horticultural model rather than a sustainable or ecological one. The typical residential property, which comprises most of the land uses within the watershed, has regularly mowed lawns with often isolated, non-native trees and shrubs. The isolated plantings and vast grass lawn patterns do not function well to provide a means to uptake NPS pollution, trap sediment or allow for onsite infiltration. These landscapes require herbicides, pesticides and fertilizers, or so the landscape companies tell the public.

Programs exist such as those of the Chesapeake Bay Foundation that have developed numerous publications to educate the general public about the BMPs they can implement on their properties. The Pennsylvania Audubon and the National Wildlife Federation distribute publications on developing habitat for both the homeowner and schools. Audubon International has a program, "The Audubon Cooperative Sanctuary System (ACSS)," which educates people about environmental stewardship and motivates them to take action in their daily lives that will enhance and protect wildlife and their habitats and conserve natural resources. Programs for homeowners, businesses, schools, and golf courses tailor information to the unique setting and needs of each member.

Although programs exist at the state, regional and federal levels, a local entity will need to coordinate the following management options:

1. Develop recommended BMPs for homeowners.
2. Develop model BMPs at municipal properties and school properties.
3. Develop recommended BMPs for industry and business.
4. Develop model BMPs at golf courses.

Establish Watershed Clean-Ups Days

1. Establish or continue stream bank clean-ups.
2. Establish "adopt-a-stream" program.
3. Coordinate with municipal PWD, local or regional EAC, and/or community groups (friends, scouts, neighborhood associations, etc.).

Monitoring

1. Establish monitoring stations and locations, and coordinate with PWD testing.
2. Organize volunteer monitoring network by tributary and reach.

Implement Model Education Projects in the watershed

1. Raise public awareness about watershed conservation and best management practices. Model demonstration projects of BMPs at schools and municipal buildings. (Examples are rain barrels, infiltration...)
2. Conduct annual watershed festival alternating with PWD.
3. Form local and regional EAC or watershed associations that could coordinate public education.

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4. Work with local school districts and colleges to develop watershed conservation in curriculum.
 5. Work with local environmental centers to build community understanding of watershed conservation issues.
 6. Develop signage in all public parks and green areas regarding picking up and disposing of dog waste, emphasizing the watershed health.
 7. Have a contest at local schools for children to design and construct signs and dog waste bag dispensers.
 8. Develop a watershed-wide signage program indicating the watershed and the name of the specific creek as it crosses major roads.

GOAL #4 - Develop and Implement Land Acquisition and Preservation Strategies

Land/Resource Protection Strategies

Conduct baseline inventories of the native flora and fauna, beyond that which was completed in the Montgomery County NAI.

1. Work with the county and state to develop an updated regional inventory of flora & fauna that goes beyond the Montgomery County NAI.
2. Work with local colleges (Acadia, Penn State, and Temple Universities) to develop database and coordinate with The Nature Conservancy.
3. Establish contact with other environmental groups or agencies to provide assistance, such as Briar Bush Nature Center.
4. Develop specific mapping of areas that need additional protection.
5. Develop strategy to acquire homes and businesses currently in the flood zoned areas.
6. Work with PECO to develop suggested native trees on its ROW's and other properties.

Conserve Major Woodlands

1. Use professional guidance (i.e., landscape architect/natural resource planner) to draft ordinances that limit removal of existing vegetation. Require standards for replanting of the same native species and size on the parcel or elsewhere in municipality whether it was native or not.
2. Implement municipal open space plan and integrate into municipal comprehensive plan.
3. Purchase properties to protect critical resources such as forested buffers.
4. Amend tree ordinances and develop tree standards.

Zoning Ordinances

The best BMP is the development of appropriate ordinances that legally have a means of enforcement.

1. Review and update natural resources protection ordinances.
2. Develop and adopt a headwater protection ordinance, especially in the municipalities of Abington, Cheltenham and Rockledge where most of the headwaters are located.
3. Promote inter-municipal reviews of development plans affecting adjacent/downstream communities.
4. Empower a regional EAC or watershed association to review development plans, public work projects, or park plans that are in the watershed.
5. Review and update municipal tree ordinances. Include information from The Tree City USA Bulletins that contain information concerning the protection of trees during construction, sidewalk building and when storms strike. (Published for the Friends of Tree City USA by The National Arbor Day Foundation).
6. All municipalities should enforce "pooper scooper" and dog leash laws ordinances.
7. Revise tree list to include only native tree and shrub species.
8. Purchase dog-waste disposal bags and place in all municipal parks.

Historic Preservation

1. Develop a written history of the municipalities in the watershed. Produce walking tour and auto tour publications.

2. Support nomination of historic structures and districts, and continue to nominate and place significant structures and designed landscapes on the National Register
3. Promote adaptive reuse of historic structures.
4. Promote historic areas through tourism.
5. Develop a formal historic and architectural review board (HARB/BHAR) in municipalities where none currently exist.
6. Develop overlays for HARB/BHAR districts by municipality.
7. Enforce HARB/BHAR guidelines.
8. Continue to nominate and place properties on the National Register.

GOAL #5 - Improve Watershed Communication

Form Local and Regional EAC or Watershed Associations

1. Elect or hire a watershed liaison who can communicate and advocate local watershed goals with Federal, state, county and local agencies. This person would also see to it that departments within agencies do not contradict each other and are working towards the same watershed goals.

Individual Municipal Management Options

Each municipal representative on the steering committee reviewed the above goals that were derived from the Planning Implications in the inventory and analysis sections of the report. From these large watershed-wide management options, each municipality prioritized the goals and implementation actions that are most critical to their particular municipality. They are as follows:

Abington

GOAL #1 – Improve the Health of the Riparian Corridor Area

Landscape Management

1. Develop management plans for all township-owned and managed properties that include an intensive analysis of the plant communities and invasives.
2. Implement measures to control geese population at Alverthorpe Park. Restore pond margin with native vegetation.

Stream Corridor Improvements

1. Establish contact for land management discussions with school district and Abington Country Club to help institute protection of the headwaters and restore the vegetated riparian buffer.
2. Restore riparian corridor wherever feasible along Baeder Creek in Baeder Park. Include bank stabilization measures and removal of invasive plant species.
3. Establish “no mow” zones along the streambed in Baeder Park that are currently kept as lawn and monitor for invasives.
4. Implement measures to reduce flooding.
5. Conduct a visual assessment of the unassessed portions of the Bader Creek as it merges with the Tookany Creek near SPS Technologies.

GOAL #2 – Enhance Recreational Opportunities and Economic Development

1. Provide more visible public access to the creek through coordinated signage.
2. Continue to pursue a coordinated trail system along streams with watershed signage.

GOAL #3 – Continue to Produce Educational Materials in the EAC

GOAL #4 – Develop and Implement Land Acquisition and Preservation Strategies

1. Update woodland and tree protection standards.
2. Develop and adopt a headwater protection ordinance.

Cheltenham**GOAL #1 – Improve the Health of the Riparian Corridor Area****Landscape Management**

1. Increase riparian buffer zone along Tookany Creek wherever possible especially in the public park areas.
2. Remove invasives and replant native species to create a buffer zone, wherever possible. (The Township should evaluate the layout of play ground equipment to facilitate the replanting of buffer zones.)
3. Develop guidelines for Public Works Department to create “no mow” zones and no leaf dumping in public park areas along the creek buffer zones and monitor for invasives.
4. Work with landowners such as Holy Sepulchre Cemetery, Cedarbrook Hill Country Club, Ashbourne Country Club, Melrose Country Club, homeowners, and businesses, especially SEPTA, along the creek to help repair and/or increase riparian buffer zones (see education goal also).
5. Continue, and increase the involvement of the public schools that are located along the creek to not only educate their students about watershed issues but to get them to participate in restoring and increasing riparian buffer zones.
 - * Activities can include general creek cleanups, removal of invasives, planting native species along creek banks and monitoring water quality. This would especially include Cedarbrook Middle School and Elkins Park Middle School.
6. Develop watershed liaison with SEPTA since the train track runs along a large part of the main stem, especially from North Avenue in Wyncote, through Ralph Morgan Park, the Edward Parry Hicks Bird Sanctuary, ending at Wall Park, to educate them on erosion issues and invasive plant species that are taking over areas where they have cleared trees. This liaison should work with SEPTA to partner to develop a plan to restore the riparian corridor.

Long-term projects should also include:

 - * Renovate the Wyncote-Jenkintown train station parking lots, especially the one that abuts the creek bank at Greenwood and Glenside Avenues.
 - * Evaluation of a bi-level parking lot that would allow a 50-foot buffer zone back to the creek should be considered.
 - * All four station parking lots should be evaluated to suggest better BMPs for handling runoff.
7. Some major intersections and cement median strips along intersections and cement median strips along Old York Road should be made into green strips. The following intersections should be considered for greening:
 - * Old York Road and Cheltenham Hills Drive
 - * Ashbourne Road and New Second Street
8. Support the Economic Development Plan and encourage the greening of the business areas as suggested in this plan.
9. Encourage private land owners to plant trees. Cheltenham Township Shade Tree Commission and/or a local EAC, if developed, should consider a program to encourage, educate and assist homeowners to plant trees, especially in the areas of the township where many older trees have been taken down and not replaced, such as Cheltenham Village, Rowland Park, etc.

Stormwater Management

1. Encourage business along the creek that is a detriment to waterways to relocate within the township away from the creek. This would pertain to the Cheltenham Public Works Facility located at Old York and Church Roads. (This facility has a drop off area, a salt holding area and Township trucks that contribute to polluted runoff directly into the creek running next to the facility. In addition, the Laidlaw school bus depot at Glenside Avenue and Rices Mill Road, all automotive businesses that have flooded out in past years, etc. should be considered. If relocation is not feasible, then develop and enforce BMPs with regard to the NPS pollution that these businesses produce. This supports the CDEP study.
2. Encourage landowners to use rain barrels and rain gardens.
3. Repair creek banks in areas as noted in visual assessments, especially along Tookany Creek Parkway, Ralph Morgan, Wall and Ogontz Parks area.
4. Follow up on PADEP's response to townships request regarding the Glenside Flood Control Project, Phase II. Residents have voiced concerns over the proposed walls and channeling.
5. Develop Renninger Park, the bird sanctuary and other large downstream sites for stormwater retention/detention.
6. Incorporate a stormwater infiltration /storage system on the undeveloped portion of Glenside Elementary, while satisfying the mandatory State Environmental and Ecology curriculum competencies.
7. Evaluate resources available to buy out businesses and homes along the flood zone and turn these areas back into vital green buffer zones.
8. When evaluating flood areas within Cheltenham Township, a watershed approach should be used as opposed to just contacting DEP's Engineering Department and channeling more of the creeks.

Improve Wastewater Treatment and Reduce Point Source Pollution

1. Inspect, repair and maintain sewage systems.
2. Develop a system of inspection. Replacing the system will increase the health and the recreational use of watershed as well as decrease the cost to clean the sewage water for reuse.
3. Develop an ordinance to address illegal hook-ups and criteria for proper installation and discharging of residential sump pumps.
4. Develop a program to install manhole sealing lids.
5. Identify existing on-lot systems and develop an on-lot disposal system (OLDS) management program to continue functioning well and protect public water quality.

GOAL #2 – Enhance Recreational Opportunities and Economic Development

Greenway and Trail Development:

1. Partner with the Audubon Society, PECO environmental department, and SEPTA, to develop and re-green the Edward Hicks Parry Bird Sanctuary. This partnership could revitalize the area near the Wyncote post office, making it part of the township greenway trail and encouraging bird watching and environmental education.

Economic Development

1. Arboretum management plan for Curtis Arboretum to increase the rentorship.

2. Green the plazas at the malls and shopping centers, Cheltenham Square, Melrose Park Shopping Center, Elkins Park Square, Cedarbrook Plaza and other plazas as indicated in the CDEP.

GOAL #3 – Develop Educational Programs and Public Outreach Program

Landscape Management

1. Develop model BMPs when planning Cheltenham’s new Police Building.
2. Educate the Cheltenham Township School District grounds maintenance personnel on BMPs to be used on all public school grounds.

Develop Ongoing Watershed Cleanup Days

1. Coordinate creek cleanups with Schools, Scouts, Friends Groups, Glenside Green and other community groups. This would be an ideal task for a local EAC.

Education

1. Continue to work in the Cheltenham School District to educate students about watershed issues (presently Earth Force is working with the teachers at Cedarbrook Middle School).
2. Develop a Summer Environmental Camp for teens. (as mentioned in GOAL # 1).
3. Educate homeowners about use of rain barrels to decrease rooftop runoff and to help recharge ground water. The Township and school buildings could be models for their use.
4. Develop ongoing workshops to educate Township officials, Public Works Department employees, creek-side homeowners and businesses about watershed issues and BMPs.
5. Provide educational written materials to homeowners and businesses, such as “25 Ways to Protect Your Stream and Streamside Property”, a brochure developed by the RiverKeeper, Morris Arboretum, NOAA and DEP.
6. Provide educational tours of the Tookany Creek restoration areas to:
 - * Local businesses and residents to encourage additional support and participation on future sections.
 - * Other watershed organizations and educational communities as a successful community project.
7. Develop program to work with businesses and higher education to redevelop Curtis Arboretum.

GOAL #4 – Develop and Implement Land Acquisition and Preservation Strategies

Conserve Woodland Areas in the Township

1. Cheltenham Township should develop a master plan and management plans for all township owned and managed properties that includes an intensive analysis of the plant communities and extent of invasives.
2. The Public Works Department should receive regular education to change its landscape management practice in the Township to one that manages the plant community.
 - * Plans should include development of “no mow” zones along all creek areas and removal of invasive plants and replacement with native species with overall goal of increasing buffer zones along the creek.

- * Have a Public Works employee certified in use of herbicides in order to cost effectively have invasive plants destroyed and removed.
 - * Have Public Works and/or community groups start a native tree, shrub and plant nursery to help develop and revitalize creek areas. Continue to apply for National Tree Trust grants to help supply and maintain the nursery.
 - * Dead or dying trees in our limited wooded areas need to be identified and cared for.
3. Start a summer Environmental Camp to incorporate watershed education, recreation and service projects that can be completed around the Township. (Example, watering all seedlings planted in parks and business areas, removing invasives and replanting, seeding and weeding in the nursery, doing minor bank restorations along the creek, completing creek assessments, water monitoring projects, and community education).
 4. Continue to maintain the Township Tree City USA status.
 - * The Township's Tree Advisory Committee should complete a township tree inventory.

Land Resource Protection Strategies

1. Seek funding sources to purchase, relocate and demolish homes and businesses in flood zones. In Cheltenham this would include homes and businesses on Brookdale , Glenside, and North Avenues. The areas mentioned would then be turned into greenways.
2. Retrofit or relocate businesses at the following locations; The Kraft property at Glenside Avenue and Rices Mill Road (the school bus depot), the Cheltenham Public Service Building at Old York and Church Roads, and the Wyncote Post Office on Glenside Avenue in Wyncote.

Historic Preservation

1. Continue to nominate and place the significant structures and designated landscapes on the National Register as indicated in the "Cultural, Historic and Archeological Resources" of this section. Nominate additional districts to National Register.
2. Formally name the "unnamed tributary" of Leeches Run to all Township documents and have it listed on other regional maps to highlight its historic significance.
3. Develop historic-designated street signs and gateway signs.

Jenkintown**GOAL #1 – Improve Stormwater Management**

1. Inspect, evaluate and upgrade stormwater catch basins within the Borough.
2. Identify impervious surfaces both private and public to consider renovations to include BMPs.
3. Develop a plan with Cheltenham and SEPTA to safely plant more native trees and shrubs at the Wyncote/Jenkintown Train Station, to decrease stormwater runoff and NPS pollution.
4. Stencil Stormwater inlets to educate local residents that only water should go down the storm drains, to decrease NPS pollution.
5. Encourage residential and commercial use of rain barrels, rain gardens and green roof gardens to decrease stormwater runoff and improve in on-site infiltration.
6. Review current snow removal practices and suggest the use of more environmentally safe materials to be used.
7. Encourage the use of more pervious paving when renovations occur within the borough to existing impervious paving for added on-site infiltration.

GOAL #2 – Enhance Recreation and Economic Development

Economic Development

1. Broaden economic redevelopment plans to include pervious paving and other BMPs.
2. Green up the streetscapes throughout neighborhoods and the business districts.

GOAL #3 – Employ BMPs and Develop Education Programs and Public Outreach

Education

1. Jenkintown Borough has little visible creek running through its neighborhoods, so educating the community about their part in the Tookany Creek watershed is important.
2. Enforce ordinances that prevent landscape debris, such as lawn cuttings and leaves, from being blown or swept into the street.

Public Outreach

1. Start a local EAC to educate and coordinate projects related to the Tookany Creek Watershed.

GOAL #4 – Develop and Implement Land Acquisition and Preservation Strategies

1. Amend local ordinances to provide criteria to encourage residents and local officials to continue to replace old street trees that have been taken down with native trees.
2. Conduct updated comprehensive historic site survey to include eligible sites.

Rockledge**GOAL #1 – Improve the Health of the Riparian Corridor**

Stormwater Management

1. Check, evaluate and upgrade stormwater catch basins within the Borough based on recent assessment.
2. Stencil stormwater inlets to decrease NPS pollution and to educate public about the watershed.
3. Identify impervious surfaces both private and public to consider renovations to include BMPs.

Landscape Management

1. Review and update tree ordinances.
2. Encourage residents and local officials to replace old street trees that have been taken down.
3. Encourage residential and commercial planting of native vegetation to increase regional plant biodiversity.

GOAL #2 – Enhance Recreational Opportunities and Economic Development

1. Broaden economic redevelopment plans to include pervious paving and other best management options.

GOAL #3 – Develop Educational Programs and Public Outreach Program

Public Outreach

1. Rockledge Borough has no part of Tookany Creek running through its neighborhoods, so educating the community about their part in the Tookany Creek watershed is important.
2. Start a local EAC to educate and coordinate projects related to the Tookany Creek watershed.

Management Options Chart

The Management Options Chart is an abbreviated list of the management options listed by goal with the conservation action, primary partners to implement the action, supporting partners and projected implementation. Under each goal are the implementation actions, and summary of the management options discussed in the report. This format summarizes most of the management options section into an implementation plan. The goal will most likely be implemented in the same manner by each municipality so it is “generic” in some ways.

Table 8 - Tookany Creek Watershed Management Options Chart				
Issues and Concerns	Conservation Actions/BMPs	Primary Partnes and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
GOAL # 1 – Improve the Health of the Riparian Corridor Area				
Stream Corridor Improvement	Plant riparian buffers using native plantings	Municipalities/EACs – planning and organization Watershed groups – planning, organization and volunteers HC/non-profits – technical, funding DEP/DCNR – funding, technical assistance Private LA/Planning consultants- technical assistance	MCNRCS - technical assistance PEC – planning, coordination, education of EAC Scout troops – volunteers SD – include as part of the curriculum. DEP – Growing Greener grants T/TFWP – Tookany/Tacony-Frankford Watershed Partnership	1-20 Years
	Protect existing riparian buffers	Municipalities – pass local ordinances, plan greenways Non-profit organizations – negotiate purchase or easement of properties Private landowners, Homeowners associations – donate easements, manage riparian areas on common land	HC – protection strategies MCPC - land management DCNR – funding DRK – protection strategies PWD – collaborate w/ upstream municipalities	2-10 Years

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Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
	Educate adjacent property owners on managing stream corridor areas	Municipalities/EACs – initiate volunteer programs NRCS – programs, materials, public awareness MCCD- education T/TFWP - education	PSCES –materials FMWP – programming, facilities DCNR – funding VFW- manpower to HC –technical expertise /education	Ongoing
Landscape Management	Protect Existing Native Vegetation:	MCPC- technical assistance Consultants: technical assistance	PEC: technical assistance	ongoing
	Develop BMPs, procedures and the necessary training to be implemented in the 4 public works department	PWD, PEC, Watershed Groups, MCCD -Technical Assistance and Training Consultants – technical assistance		1-2 years
	Conduct a watershed wide study of the Tookany using Rosgen Natural Stream channel Design process and coordinate with PWD	Consultant – conduct assessment DEP/DCNR- funding T/TFWP – technical support	PEC- funding, education T/TFWP - education	1-3 years
	Educate landowners adjacent to the creek corridor on BMPs to manage their land	MCPC,NRCS, MCCD, DRK- programs, materials, public awareness Consultants- technical assistance		ongoing
	Develop brochures and technical handouts.	MCPC,NRCS, MCCD, DRK- programs, materials, public awareness Consultants- technical assistance	EAC, T/TFWP- conduct sessions	1-3 years
Erosion and Sedimentation Control	Establish recommended BMPs to meet minimum criteria for effective soil erosion and sediment control	Municipalities – support adoption of required BMPs MCCD – determine most effective BMPs, technical	Watershed groups – provide innovative ideas and strategic sites needing attention Scout troops – volunteers	2-10 Years

Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
		assistance PWD/ municipalities – develop joint BMPs Private LA’s/PE’s/ other consultants: implement BMPs with all planning & design projects Municipalities- implement MS4 standards	DRK- technical assistance	
	Enforce erosion and sedimentation plans during new construction	Municipalities – clearly document new construction activities MCCD – plan review, provide on-site inspections, enforcement. Private LA’s/PE’s/ other consultants: implement BMPs with all planning & design projects	DRK, HC – technical assistance	Ongoing
	Identify mandatory controls in zoning ordinances	Municipalities – adopt stricter controls for new construction Consultants- develop into municipal ordinances	MCCPC – technical assistance DRG – technical assistance	2-5 Years
Stormwater Management	Study impacts of stormwater runoff on local waterways	MCCD– provide local data PWD/MCPC– initiate regional studies	MCPC MCCD – technical assistance DCNR – funding	1-2 Years
	Update retention and detention controls for new development	Municipal planners/LA’s/PE’s – adopt new controls through local zoning to achieve greater management MCCD - technical assistance MCPC - planning/technical	Engineers – design, technical assistance LA’s– design, technical assistance	2-5 Years

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Table 8 - Tookany Creek Watershed Management Options Chart				
Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
		assistance		
	Implement incentive program for volunteer homeowner BMP implementation	Municipalities – seek funding to implement a cost-share program Watershed groups – promote program and educate	T/TFWP, NRCS, MCPC, MCCD: provide technical assistance	ongoing
Sewerage Treatment	Inspect, repair and maintain old and failing sewerage systems.	Municipalities, PWD- monitor and upgrade Penvest: Funding		ongoing
Stormwater Phase II and III	Form regional partnership to develop guidelines and meet EPA regulations.	Municipalities- work collaboratively to implement PWD- offer guidance in developing strategies and collaborate with their Phase I.	Municipal planners/LA's/PE's- assist in developing proper BMPs	
	Retrofit new BMPs in existing developments, explore infiltration and filtering practices	NRCS - design/technical assistance MCCD - technical assistance Homeowners associations – implement strategies through incentive program Private landowners – implement strategies through incentive programs Consultants- design/technical assistance	Engineers – design, technical assistance Landscape Architects – design, technical assistance DRK- technical assistance	5-10 Years

Table 8 - Tookany Creek Watershed Management Options Chart				
Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
Reduce Non-point Source Pollution	Develop new regional ordinances in anticipation of the NPSDS permits.	MCCD - technical assistance Municipalities- work collaboratively to implement PWD- offer guidance in developing strategies and collaborate with their Phase I.	Municipal planners/LA's/PE's- assist in developing proper strategies that coordinate with other municipal ordinances. Involve SEPTA in developing BMPs since they are a large landowner.	
	Develop vegetated bioswales/vegetated swales in and around existing parking lots and areas of know NPS to treat and uptake NPS pollution	MCPC- technical assistance Private landowners – implement strategies through incentive programs Consultants- design/technical assistance	PA DEP- funding NRCS - technical assistance	1- 5years
Flood Control	Study impacts of flooding on regional waterways	PWD/Municipalities – initiate regional watershed study; consider regional detention basins Watershed groups – provide local knowledge and expertise of conditions	T/TFWP, NRCS - technical assistance USGS – data MCPC - technical assistance DRBC – technical assistance PA DEP- technical assistance	2-5 Years
GOAL #2 – Enhance Recreation Opportunities and Economic Development				
Greenway/Trail Development	Develop intra-municipal greenway/trail plans along tributaries and main creek.	PWD/Municipalities – initiate local studies and planning Consultants– planning, technical assistance PWD & Fairmont Park commission- collaborate on unified trail to the Delaware River	DCNR – funding T/TFWP, NPS - technical assistance DVRPC – planning, data	2-10 Years

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Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
	Implement trail projects that connect communities	PWD/Municipalities – plan and organize construction LA's- design trails	MCDPR – design, planning DCNR – funding Scout troops, school groups, EF – volunteers	3-5 Years
	Develop new facilities, such as green roofs and porous paving in recreational facilities that promote wise use of resources and meet the needs of the population	Municipalities– initiate planning, guide process PEC- funding and technical assistance Consultants- design trails, facilities	Local Residents- volunteer EACs, T/TFWP – guide process with municipalities	5-10 Years
Economic Development	Develop green plans to reuse existing industrial sites and infrastructure using BMPs.	Private enterprise – design and implement reuse plans MCPC – technical assistance DCNR- funding	Consultants – technical assistance	2-5 Years
	Provide incentives to attract new industry and business	Municipalities – implement tax credit programs DVRPC - Education County & State governments – provide grant and cost-sharing programs	State Government – grants, cost-share programs DCED – fund Chamber of Commerce- market concepts to member	5-10 Years
	Revitalize dated shopping centers	Private enterprise – work with municipalities to design facilities to meet local needs and business needs DVRPC- education	Municipalities – tax incentives Private Industry - funding Consultants – planning and design	5-10 Years
Land Development	Provide incentives to design/develop sustainable developments	Municipalities – implement innovative zoning options for design Consultants - planning and design PEC - planning	State government – funding and cost-sharing Economic Development Councils, Chamber of Commerce- business community support and funding	2-5 Years

Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
	Develop minimal disturbance ordinances	T/TFWP, MCPC- technical assistance	Local land trusts – technical; assistance.	
	Utilize “Environmentally Sound Community Planning Directory of Resources for Municipalities in Southeastern Pennsylvania”	Municipalities – utilize in all planning activities	EAC - utilize	
Recreation Development	Develop new facilities to meet needs of growing population	Municipalities/ MCCP/MCPR – plan, design and construction Consultants- planning, design and engineering	MCDPR – planning Consultants – design DCNR – funding	2-5 Years
	Design and develop structures to view attractive vistas and to fish along the creek and its tributaries.	Consultants- planning, design and engineering	Municipal EAC, planning and park and Recreation boards- oversee consultants	2-10 years
	Develop a pedestrian walking trail system that will link neighborhoods safely to the creek and throughout the watershed.	Consultants- planning, design and engineering MCPC- technical assistance		2-10 years
	Provide areas with co-coordinated signage for more public access to the creeks within the watershed.	Consultants- planning, design and engineering MCPC- technical assistance	Municipal EAC, planning and park and Recreation boards- oversee consultants	5-10 years
	Provide additional creek access	Municipalities – acquisition and construction MCPR/MCPC– acquisition and construction assistance Private landowners – allow access, easements	MCDPR – planning Consultants – design DCNR – funding PAF&BC – funding, design and construction	5-10 Years

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Table 8 - Tookany Creek Watershed Management Options Chart				
Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
GOAL #3 – Develop Public Outreach and Education				
Landscape Management	Develop recommended BMPs for homeowners	Municipalities/EACs – review and recommend new BMPs LA's- technical assistance Non-profit organizations – assist in design and implementation PSCES, USFWS – technical assistance DEP develop and update standards	Consultants - technical assistance Private landowners – implement BMPs Watershed groups – educate and raise awareness DRK- technical assistance	1-5 Years
	Develop recommended BMPs for industry and business	Municipalities/EACs – review and recommend new BMPs LA/Planners- technical assistance Non-profit organizations – assist in design and implementation	Consultants - technical assistance Private enterprise – implement BMPs Watershed groups – educate and raise awareness	2-5 Years
	Develop recommended BMPs for municipal properties	PWD/ Municipalities – adopt BMPs and implement program with public works LA/Planners- technical assistance	MCNRCS - technical assistance HC - technical assistance	2-5 Years
	Provide incentives for implementing BMP programs	PWD/Municipalities – develop program with funding assistance MCPC, MCCD- technical assistance	MCPC - grants/cost-sharing DEP/DCNR – funding US EPA, USFWS - funding	2-5 Years

Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
	Develop and distribute BMP education materials	Municipalities – promote BMP program Non-profit organizations – assist in publication PEC-	DEP/DCNR- funding PSCES – materials, technical assistance DRK– technical assistance SD- incorporate into curriculum	Ongoing
	Host workshops on BMP implementation	EAC, NRCS, MCPC – provide local expertise, workshop facilities Schools – provide workshop facilities	FMWP - technical assistance DRK– technical assistance	Ongoing
Clean Up	Organize volunteer "Clean-up Days" for the Tookany Creek and tributary watersheds	Municipalities/EACs – planning, organization Watershed groups, EF – planning, organization and volunteers	DRK - technical assistance Scout troops – volunteers SD, VFW, T/TFWP– volunteers	Annual
Monitoring	Establish monitoring stations	Municipalities/EACs – locate local stations Watershed groups – locate local stations DRBC with DRK /DRG – water quality monitoring program	DRBC - technical assistance DRK - technical assistance DCNR – funding PWD, VFW, T/TFWP – coordinate with city	1-2 Years
	Organize volunteer monitoring network	Municipalities/EACs – manage program Watershed groups – manage program DRK, MCCD– organization	DRK - technical assistance DCNR – funding Scout troops – volunteers SD– volunteers as part of curriculum	Ongoing

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Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
Non-Point Source Pollution	Educate local citizenry about impacts of non-point source pollution	Watershed groups– promote program, distribute information NRCS, MCCD – materials, expertise DRBC-NPS pollution monitoring EACs – annual baselines w/ pictures of watershed	MCD – materials, expertise SLNC - workshop planning FMWP - workshop planning PEC – expertise PSCES, EF – technical assistance	1-2 Years
	Develop NPS reduction strategies	PWD/municipalities – adopt recommended strategies LA/PE/Planner- technical assistance DRBC/DRK/DRG – technical assistance	MCCD - technical assistance MC NRCS - technical assistance HC – technical assistance	2-5 Years
	Implement model NPS projects	Municipalities/EACs – coordinate projects Non-profit organizations – plan and design projects LA's, Planners, PE's – design	MCCD - technical assistance MCNRCS - technical assistance Homeowners associations – implement projects Private landowners, Private enterprise – implement projects	2-5 Years
Education	Raise public awareness and develop education materials on BMPs and watershed conservation targeting homeowners, property managers and public works employees	Municipalities/EACs – design and implement program Watershed groups – promote program, distribute materials, provide local expertise Non-profit organizations – design program materials	NRCS – materials MCCD – materials, technical assistance HC, DRK, PSCES, EF– technical assistance	Ongoing
	Work with local schools to include watershed conservation in the curriculum	Municipalities/EACs – raise local awareness, community programs BCAS – curriculum T/TFWP – provide local knowledge	PAEE Region 6 – curriculum SD– curriculum	Ongoing

Table 8 - Tookany Creek Watershed Management Options Chart				
Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
	Develop programs at local environmental centers to build understanding of watershed conservation issues	PWD, Watershed groups – provide local expertise SLNC, FMWP – programming and facilities		Ongoing
	Organize lecture series addressing watershed conservation strategies	PWD Municipalities/EACs BHWP/ DRBC/Environmental Education centers – host lectures	HC, T/TFWP – lecture coordination	Ongoing
GOAL # 4 – Develop and Implement Land Protection, Preservation and Acquisition Strategies				
Zoning Ordinances	Review existing natural resource protection ordinances	Municipalities – solicit reviews of current ordinances MCPC - technical assistance LA's/Planners- technical assistance	DCNR – funding Consultants – technical assistance	1-2 Years
	Update necessary ordinances to implement watershed conservation	Municipalities – draft and adopt new ordinances LA's/Planners- develop ordinances	MCPC – model ordinances Consultants - technical assistance DCNR – funding	2-5 Years
Development Plan Reviews	Promote inter-municipal reviews of development plans affecting adjacent and/or downstream communities	Municipalities – respond to regional issues Planning Consultants – planning, recommendations MCPC- review and comment	State Government - incentive program Watershed groups – raise awareness of regional issues	5-10 Years

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Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
Regional Planning	Establish a committee representing regional municipalities to discuss regional concerns and address inter-municipal communication	PWD/ Municipalities - delegate representative to regional review committee Consultants– planning PEC- planning, coordination regional EAC network	State Government - incentive program DRBC – technical assistance for watershed planning DRK- technical assistance	5-10 Years
Land/Resource Protection Strategies	Work with local non-profit organizations to assess benefits of various protection strategies	Municipalities – review available strategies Private enterprise – funding, implement protection measures HC – technical assistance	MCPC - cost-sharing DCNR – funding	1-2 Years
Open Space Preservation	Utilize county open space preservation program funds to protect critical resource areas and promote watershed conservation	Municipalities – develop plans, purchase property for protection land trusts– technical assistance	MCPC - cost-sharing DCNR – funding	1-2 Years
	Implement municipal open space plans	Municipalities – prepare plan and follow recommendations	HC - technical assistance MCPC - cost-sharing	2-5 Years
Land Acquisition	Work through county open space preservation program to protect lands with significant resources and protect water quality in the watershed	Municipalities – purchase property for protection County parks – purchase adjoining lands to existing facilities Land trusts - technical assistance	BC - cost-sharing DCNR – funding	Ongoing

Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
Historic Preservation	Support nomination of historic structures and districts	Municipalities – pass resolutions supporting HP nominations HC - technical assistance prepare nominations	Private landowners – support local efforts Historic societies – provide local knowledge	Ongoing
	Promote historic areas through tourism initiatives	Chamber of Commerce – provide local funding and promotion County tourism promotion – regional distribution	Municipalities – promote resources Historic societies – provide local knowledge	1-2 Years
	Promote adaptive reuse of historic structures	Municipalities – flexibility in zoning and plan reviews Historic societies – promote preservation of structures Non-profit organizations – develop reuse alternatives	HC - technical assistance	2-5 Years
	Establish HARBs	Municipalities – adopt review boards HC, private consultants-technical assistance	MCPC - technical assistance	1-2 Years
	Perform historic site surveys	HC, private consultants-technical assistance	Historic societies – provide local knowledge	1-2 Years

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Table 8 - Tookany Creek Watershed Management Options Chart				
Issues and Concerns	Conservation Actions/BMPs	Primary Partners and Activity to Implement Action or BMP	Supporting Partners	Projected Implementation
GOAL #5 – Improve Watershed Communication				
Form Regional EAC	Work as a watershed to address the issues collaboratively	PEC- funding, support, technical assistance MCCD, MCPC- training	T/TFWP - coordination	1 year
Water Quality	Implement a water quality testing program on all tributaries to monitor long term water quality on all tributaries	PWD – technical assistance MCPC – technical assistance DRBC DEP- funding technical assistance		1-3 years
	Provide training to residents along the tributaries to conduct routine sampling.	MCPC, DEP, DVRP- technical training SD – volunteers, technology Residents- volunteers	DEP- funding MCCD- training	1-3 years

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List of Abbreviations

BHAR	Board of Historic and Architectural Review
BMP	Best Management Practice
CPW	Center for Watershed Protection
CDEP	Commercial District Enhancement Program
CRP	Community Revitalization Program
CSO	Combined Sewer Overflow
DCNR	Department of Conservation and Natural Resources
DEP	Department of Environmental Protection
EF	Earth Force
EAC	Environmental Advisory Council
EPA	Environmental Protection Agency
GIS	Geographic Information System
HARB	Historic and Architectural Review Board
HUC	Hydrologic unit code
MS4	Municipal Separate Storm Sewer System
NAI	Natural Areas Inventory
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
PEC	Pennsylvania Environmental Council
PHMC	Pennsylvania Historical and Museum Commission
PNDI	Pennsylvania Natural Diversity Inventory
PWD	Philadelphia Water Department
RCP	Rivers Conservation Plan
TCWMP	Tookany Creek Watershed Management Plan
T/TFW	Tookany/Tacony-Frankford Watershed
T/TFWP	Tookany/Tacony-Frankford Watershed Partnership
USGS	United States Geological Survey

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- Philadelphia Water Department www.phillywater.org
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Appendix A
Landowner Survey

Appendix B
Visual Assessment Form

Appendix C
Public Comments