Final Report Tacony-Frankford Creek River Conservation Plan

February 18, 2004

TOOKANY TACONY FRANKFORD WATERSHED PARTNERSHIP

Philadelphia PWD Water Department

Final Report
Tacony-Frankford Creek River Conservation Plan

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Frankford
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List of Abbreviations

ATV	All Terrain Vehicle
ACOE	Army Corps of Engineers
BMP	Best Management Practice
CCR	Consumer Confidence Report
CDC	Community Development Corporation
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFS	Cubic Feet per Second
CSO	Combined Sewer Overflow
DVRPC	Delaware Valley Regional Planning Commission
EV	Exceptional Value
FGM	Frankford Group Ministry
FPC	Fairmount Park Commission
GIS	Geographic Information System
HQ	High Quality
HSG	Hydrologic Soil Group
ISTEA	Intermodal Surface Transportation Efficiency Act
LAC	Logan Assistance Corporation
NLREEP	Natural Lands Restoration and Environmental Education Program
NPL	National Priority List
NPS	Non-Point Source
NWI	National Wetlands Inventory
OARC	Ogontz Avenue Revitalization Corporation
PA DCNR	Pennsylvania Department of Conservation and Natural Resources
PA DEP	Pennsylvania Department of Environmental Protection
PEC	Pennsylvania Environmental Council
PNDI	Pennsylvania Natural Diversity Index
PCPC	Philadelphia City Planning Commission
PWD	Philadelphia Water Department Office of Watersheds
RCP	River Conservation Plan
TEA 21	Transportation Equity Act
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

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I. Tacony-Frankford River Conservation Plan Introduction

Welcome to our world – a world that includes a Tacony Creek that is beautiful and full of life. A world that boasts a Tacony Creek Park and a host of community green spaces that make the heart leap at the beauty of nature. A world that offers the residents of the watershed opportunities to bike, run and play at its recreation centers and parks. A world that recognizes that a community that values and protects its natural spaces is a community that will economically and culturally thrive.

The Tookany/ Tacony-Frankford Partnership is in the midst of developing a Watershed Managment Plan for the entire watershed. The RCP will be a major component of this larger planning effort.

The River Conservation Plan Team believes this can happen. After spending three years examining the Tacony-Frankford Watershed with the scrutiny that a caring doctor would afford an ailing patient, the Philadelphia Water Department (PWD), with its partners the Fairmount Park Commission (FPC), the Frankford Group Ministry (FGM), and our consultants the PA Environmental Council (PEC) and Heritage Conservancy, certainly found a distressing picture. Eroded parks and streambanks, a lack of aquatic habitat, culverted and concreted stream sections, trash and odors in our parks and streams, a lack of safe recreation, concerns about security and a need for environmentally sound development – all these are conditions that make one pause.

The good news – this is a watershed whose residents possess a vitality and a belief that all is possible if they can muster the support for their vision of a clean and healthy stream and park environment. The River Conservation Plan (RCP) process was fortified by the positive public response for the development of the plan, wonderfully surprising in the sense that a majority of the Philadelphia portion of the watershed includes a particularly urban area of the city that lacks significant natural space. Our Steering Committee, our team, and the members of the Tookany/Tacony-Frankford Watershed Partnership that joined us in the realization of this plan, kept our motivation stoked via the enthusiasm invested in the planning efforts. Their driver – the desire to see things begin to happen – now – even as we still work out the details of the plan. This is a watershed that is anxious and impatient for progress and we love it that way.

Our planning goal was to develop recommendations on how to best improve the health and appearance of the Tacony-Frankford Creek and its watershed. The RCP Team worked hard to create a thorough and accurate picture of the current conditions of the watershed, from the perspective of as many stakeholders as possible. Weconducted public meetings and workshops, hosted fun events, attended civic and

community meetings, in addition to writing newspaper articles and a survey, to reconnect many residents to the parks and streams or other natural and recreational sites that should be providing a benefit to individual residents and their communities. During these many interactions, we solicited public input through interviews, mapping and watershed walks and clean ups. Through this invaluable one-on-one communication, we were able to collect a host of community ambitions and concerns that colored the perspectives of the environmental quality of the watershed's neighborhoods.

To prioritize residents' concerns and recommendations, an extensive data collection effort, based in Geographical Information System (GIS) technology, was implemented during the entire process to analyze information about land and water resources, recreational, cultural and educational amenities. In addition, Heritage Conservancy, who managed the data collection portion of the plan, also inventoried a number of other planning initiatives that were or had recently taken place in the watershed. We recognized that our plan, to be valid and well received by community and government partners, needed to contain not only statistical information, but more importantly, had to respect and incorporate the time and passion invested in earlier planning efforts. We did not need to start from scratch in our goal to determine the priorities of this watershed. A strong foundation is in place for us to build upon.

Our RCP team was also blessed by the participation of the Tookany/Tacony-Frankford Watershed Partnership – a group of stakeholders that have come together to develop a watershed management plan for the entire watershed. Our team adopted the seven goals of the Partnership, as they are intricately connected with the RCP's goals, as a means to categorize the actions and visions chronicled for this watershed through our public outreach process. The Watershed Partnership's goals are as follows:

1. Improve Stream Habitat and Aquatic Life
2. Reduce the Impact of Urbanized Flow on the Stream and its Aquatic Life
3. Improve water quality and reduce pollutants to the stream
4. Protect and restore stream corridors, buffers, floodplains
5. Identify flood prone areas and decrease flooding
6. Enhance community environmental quality of life
7. Foster community stewardship and improve inter-municipal, inter-county and state and local cooperation and coordination on a watershed basis

The RCP Team and the Watershed Partnership came up with a long list of actions and programs that can truly transform this watershed into an exciting urban amenity. Many of the actions recommended in this document can be started now and we are already busy matching suggested programs with identified champions.

But much work remains, and we invite all readers of this plan to share our vision and catch the excitement that comes with the possibilities. Join the Partnership or simply pick a project to spearhead and we will be glad to work with you as we continue to move our vision forward.

II. Public Meetings

In order to gain input on the plan from the residents of the Tacony-Frankford Watershed, the RCP team plans to have four public meetings. The first and second of these meetings have already been held. These were an effort to make sure that the plan was being inclusive of all information that the residents found to be important. The third meeting, 2/18/2004, is to be a presentation of the first draft of the plan in order to get public comment. The final meeting will be in spring of 2004, and will be an opportunity to present the public the final draft of the plan.

Tree planting at Edison/Fariera High School

Meeting 1:
In 2002, the residents of the Tacony-Frankford were invited to a public meeting to be introduced to the Tacony Frankford River Conservation Plan. This meeting was held on Wednesday May 8th at Edison/Fariera High School.

Agenda:
6:00 pm – Demonstration on water quality testing
6:30 pm – Tree planting by pond
7:00 pm – Refreshments and informational display tables
7:30-8:30 pm – Public Meeting
- Presentation: "What is a River Conservation Plan"
- Breakout Groups: Mapping exercise – Map priority areas in Philadelphia

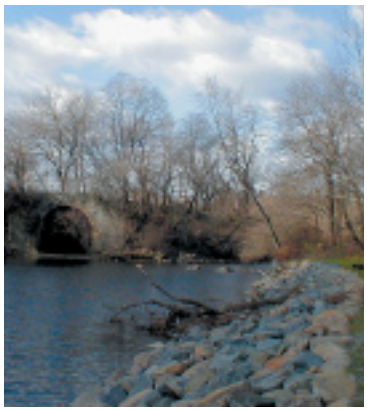
Meeting 2:
A second Public Meeting was held on November 12, 2002. This meeting was held at the Frankford Historical Society in conjunction with their monthly meeting. The meeting was an effort to draw additional residents into the RCP process.

Agenda:
7:30-8:30 pm – Presentation on the history of Frankford Creek
8:30 pm – Update on Tookany/Tacony-Frankford Watershed Partnership
8:45 pm – Update on Tacony-Frankford River Conservation Plan
9:15 – Hands-on Mapping Exercise with the community

III. Resource Inventory

Issues, Concerns and Constraints

The health of the Tacony-Frankford Creek Watershed reflects the historical, industrial and residential growth of Philadelphia. Early industrial operations used the creeks to fuel the manufacturing process and as a means to carry away waste. The creeks in the watershed were required to transport raw sewage from the increasing population who came to call the neighborhoods in the Tacony-Frankford Creek Watershed home.



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Increases in residential development in the upper portion of the watershed, combined with the level topography of the coastal plain, assured that land adjacent to the watershed's streams would experience frequent and devastating floods. Public outcry demanded that the city government address flooding from the Tacony-Frankford Creek and to do something about the deplorable state of the water quality in the stream. Response to this threat to human health and safety resulted in the encapsulation of over half of the watershed into combined sewers that would carry raw sewage and increasing stormwater run-off from the watershed. The result has been a stream system and community that is disconnected from its watershed.

Many of the neighborhoods that comprise the Tacony-Frankford Watershed are in need of revitalization and economic investment, with their future economic vitality intricately tied to efforts to improve the recreational, cultural and environmental resources of this watershed. Various city agencies, civic associations and community groups are working to improve the economic health of these neighborhoods. Several planning efforts promote redevelopment that is both aesthetically pleasing and beneficial to the watershed environment. Utilizing the Tacony-Frankford Creek and the many historical and cultural amenities to attract investment is one tool that can support these efforts.

The Tacony-Frankford RCP will focus on the watershed area that lies within the City of Philadelphia's boundaries. This section of the watershed is approximately 12,230 acres, or 19 square miles in size.

The Tacony-Frankford Watershed is almost entirely developed, with single-family residential housing dominating the landscape. There are still large tracts of natural areas to be enjoyed, however, and these islands of green are important both as habitat for wildlife and as a refuge for residents seeking a respite from the urban environment. To maximize the value of natural areas for wildlife and enhance the passive recreation opportunities created by healthy biodiversity, the management of non-native invasive plant species, such as Japanese knotweed, is critical, as these invasives will dominate a landscape and reduce the habitat value of the open spaces.

This watershed contains many resources worthy of enhancement and

protection. The study area boasts 1,210 acres of parks, recreational and wooded areas. There are 46 individual properties and three districts on the National Register of Historic Places as well as numerous cultural and social amenities within the watershed. Restoring and improving the Tacony-Frankford Creek will entail enlisting the efforts of all the stakeholders in the watershed and reconnecting them with their creek. Comprehensive watershed planning and restoration being undertaken by FPC, PWD, Tookany/Tacony-Partnership and advocated by this RCP are critical to improving the overall health of this watershed.

Philadelphia neighborhoods that comprise the study area.

Bridesburg
Cedarbrook
Crescentville
East Falls
East Mt. Airy
Fairhill
Feltonville
Fernrock
Fox Chase
Frankford
Germantown
Harrowgate
Hunting Park
Juniata Park
Lawndale
Logan
Nicetown
Oak Lane
Ogontz
Olney
Rhawnhurst
Richmond
Tioga
West Oak Lane
Westside

Study Area Overview

The Tacony-Frankford Watershed encompasses an area of 18,560 acres or approximately 29 square miles. The Tacony Creek's headwater region is located in Montgomery County. The creek is referred to as the Tookany Creek until it enters Philadelphia at Cheltenham Avenue, then as the Tacony Creek from the Montgomery County border until the confluence with the historical Wingohocking Creek in Juniata Park. The section of stream from Juniata Park to the Delaware River is referred to as the Frankford Creek, and is underlain by a concrete channel. The Montgomery County portion of the watershed represents 41.5 percent of the total watershed drainage area and is being addressed in the Tookany Creek River Conservation Plan, which was completed in 2003 by Cheltenham Township.

The Tacony-Frankford RCP focuses on the watershed area that lies within the city of Philadelphia's boundaries. This section of the watershed is approximately 12,230 acres (19 square miles) in size. The watershed is highly urbanized, with single family residential housing being the predominant land use. Commercial and industrial facilities characterize the lower reaches of the watershed where the Frankford Creek enters the Delaware River (Butler 2001). These land uses are indicated on the Zoning map (Map 4).

The main stem of the Tacony-Frankford Creek flows in a southeasterly direction and joins the Delaware River just south of the Betsy Ross Bridge. Historically the Frankford Creek took a northeasterly bend and flowed into the Delaware River in the northern part of the Bridesburg section of the city. This bend was bypassed in the 1950s and the stream was channelized into its current course.

Figure 1. Tookany/Tacony-Frankford Watershed

Metamorphic: Altered by great heat and pressure

Igneous: Formed from or by volcanic activity

Figure 2. Physiographic Regions and Fall Line

Identifying features of the fall line in Philadelphia are the boundary between the Wissahickon Schist and Trenton Gravel on the Geology Map (Map 2) or the 40-foot elevation line on a topographic map. The dam at the Castor Avenue Bridge on the Tacony Creek locates the fall line in Tacony Creek Park (Greeley 2003).

The streams in the western portion of the watershed are contained in pipes and combined sewer infrastructure. Historic streams, including the Wingohocking Creek, Rock Run and Little Tacony Creek, were encapsulated in combined sewers to facilitate the development of this watershed in the early twentieth century. Combined sewers convey sanitary waste as well as stormwater to the city's wastewater treatment facilities. The total number of stream miles in this study is 14.4 miles in the mainstem creek and approximately 31.9 miles of encapsulated tributaries.

Neighborhoods are included on the Base map along with the location of hospitals, police and fire stations, transportation centers, railroad stations and universities (Map 1).

Topography, Geology and Soils

The middle and upper reaches of the study area are in the Northern Piedmont Ecoregion (PA DEP WRAS 2002). The piedmont is characterized by ridges, hills and deep narrow valleys. Elevation can vary from 40 feet at the fall line to 400 feet at the ridge tops. The topography of the study area is level except for steep slopes along the banks of the Tacony Creek. This section of the watershed is generally underlain by metamorphic and igneous geologic formations, predominately the Wissahickon Formation with small areas of gneiss and hornblende. These formations are exposed where the Tacony Creek has eroded overlying sediments to the bedrock (PA DEP WRAS 2002).

The lower portion of the watershed lies within the Middle Atlantic Coastal Plain Ecoregion. This is an area of low relief. Historically the coastal plain in the city of Philadelphia was tidal marsh. These marshes were filled and paved over for urban development (PA DEP 2001). The topography of the coastal plain is gently sloping with elevations from zero to forty feet above sea level. The coastal plain is mainly comprised of unconsolidated sand and clay. These sands and clays are represented by the Pennsauken Formation, which was deposited in the Cretaceous period, and unconsolidated sand and clay (Trenton gravel) deposited during the current quaternary geologic period.

Geologic Formations

A map of the geologic formations within the study area is included with this report (Map 2). On the map, evidence of historic streams can be seen as these streams eroded soils away down to the bedrock of the Wissahickon Formation. These geologic formations are mostly concealed by the built environment but may be seen along the exposed banks of the Tacony Creek. The following are generalized descriptions of the geologic formations found within the study area as presented in *Engineering Characteristics of the Rocks of Pennsylvania*.

- *Wissahickon Formation*
  Typically a phyllite comprised of quartz, feldspar, muscovite and chlorite. Moderately resistant to weathering. Fractures in platy patterns.

- *Mafic Gneiss, horneblend bearing*
  Medium to fine grained, dark colored calcic plagioclase, hyperthene, augite and quartz. Highly resistant to weathering.

- *Pennsauken Formation*
  Sand and gravel yellow to dark reddish brown, mostly comprised of quartz, quartzite and chert. Deeply weathered floodplain formation.

- *Bryn Mawr Formation*
  White, yellow, and brown gravel and sand. Deeply weathered formation.

- *Quaternary Deposits (Trenton gravel)*
  Unconsolidated sand and clays deposited by the Delaware River during the current geologic period.

Soils

The soils throughout the study area are Urban Land or Urban Fill. Urban Land is created when native soils are disturbed or destroyed by the construction process of homes, industry or active recreation facilities such as golf courses or ball fields. Soil characteristics, such as erosion potential and drainage characteristics, of Urban Land are highly variable due to the disturbed nature of these soils. Urban Fill can be comprised of a variety of disturbed soils, construction materials or in some instances ash and coal cinders. These materials have been used in this watershed to fill low-lying areas to make them level and more suitable for construction purposes. Less than five percent of the watershed area is comprised of non-urban soils.

Historical streams in this watershed were in-filled with a variety of materials. Subsidence of in-fill soils has been responsible for the demolition of over 1000 houses in the city since 1931 (United States Geologic Survey (USGS) 2000). Within the watershed, a large section of the Logan neighborhood was demolished in response to the unsafe conditions caused by subsidence of in-fill soils. Location of fill soils was studied in depth by the USGS in 2000 throughout the Tacony-Frankford Watershed. The USGS compared historical topography with modern analysis to determine areas that have been filled in. Maps of possible and probable in-fill areas are available in USGS Open Report 00-224.

Any non-urban soils that are found in the study area are found along the creek within Tacony Creek Park (part of Fairmount Park) and other natural areas within the watershed. It is important to note that Fairmount Park Commission's Natural Land Restoration and Environmental Education Program (NLREEP) determined in their study that the soils within Tacony Creek Park are typically disturbed and compacted by heavy human use resulting in poorly drained conditions. Table 1. identifies the characteristics of the non-urban soils found within this watershed. Table 2. details the infiltration rates of the Hydrologic Soil Groups (HSG).

Table 1. Soils in the Tacony-Frankford Watershed

Soil Series	Symbol(s)	Hsg	Erosion Potential	Drainage Potential	Soil Location	Topography
Bowmans-ville	Bo	B/D	Low	Poorly drained	Floodplain	Nearly level
Chester	CeC	B	Slight to high	Well drained	Uplands	Nearly level to very steep
Manor	MaB, MaC, MaD	B	Moderate to high	Well drained	Uplands	Gently sloping to very steep
Mattapex	MdB	C	Slight	Moderately well drained	Coastal plain	Nearly level
Rowland	Ro	C	Low	Moderately well drained	Floodplain	Nearly level

Source: USDA

Table 2. Hydrologic Soils Group Infiltration Rates

HSG	Infiltration Rate
A	>0.3 in./hr.
B	0.15-0.3 in./hr.
C	0.05-0.15 in./hr.
D	0-0.05 in./hr.
Urban Land	Variable

Source: USDA

Planning implications

Stream Habitat and Living Resources

The Fall Line represents a transition zone between ecological regions. Historically the unique habitat created by these transition zones was rich in plant and animal diversity. Natural area and invasive species management in the fall zone should be encouraged to increase available habitat for a wide range of resident and migratory wildlife.

Water Quality and Pollutant Loads

The disturbed nature of the soils within this study area makes generalizations about the opportunities for infiltrating stormwater into the ground difficult. Individual sites where infiltration is possible may exist and should be investigated. Native soil characteristics on natural lands seem to indicate good infiltration potential (HSG B soils). Natural areas and redeveloping areas should be considered as sites for ponds and other naturalized stormwater Best Management Practices (BMP). These BMPs can enhance the landscape, reduce loading on the Combined Sewer Overflow (CSO) system and improve overall water quality in the stream.

Stream Corridors

Local opportunities may exist for daylighting portions of buried stream courses, especially on the Awbury Arboretum and LaSalle University properties. Daylighting is a complicated and potentially expensive proposition but the benefits will help to connect residents to their watershed, especially in portions of the watershed with no visible stream segments. This connection is critical to encouraging environmental stewardship of this resource.

Demographics

Demographic data included in this report was obtained using the U.S. Census Bureau's American Fact Finder, except where noted. Statistical data regarding total population, age and race are based on census block groups. Whole block groups were included in this analysis if any

The population of the watershed within the study area is approximately 331,400 people. This results in a population density within the Phila. section of the watershed of 27 people/acre or 17,350 people/square mile.

portion of that block group lies within the watershed study area. Block groups are subdivisions of census tracts and are the smallest geographic unit for which the Census Bureau tabulates sample data. A block group consists of all the blocks within a census tract with the same beginning number.

This process may result in population estimates that are slightly high for the study area but represents the best level of detail available, as watershed boundaries rarely follow political or census boundaries. Income, housing value and transportation statistics were determined using census tract data. According to the U.S. Census Bureau, census tracts are "designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time of establishment, and census tracts average about 4,000 inhabitants. They may be split by any sub-county geographic entity."

The population of the Tacony-Frankford Watershed within the study area is approximately 331,400 people (data provided by PWD). This results in a population density within the Philadelphia section of the watershed of 27-people/acre or 17,350 people/square mile. According to the 2000 Census, Philadelphia's population declined by 4.3 percent between 1990 and 2000. The study area has lost approximately 8,600 people or 2.2 percent of the 1990 population (data provided by PWD). A large portion of this population loss was in the Logan neighborhood, due to the demolition of homes. A population change map accompanies this report (Map 3). The map shows numerical change, based on census tracts, from the 1990 to the 2000 Census. This map shows that census

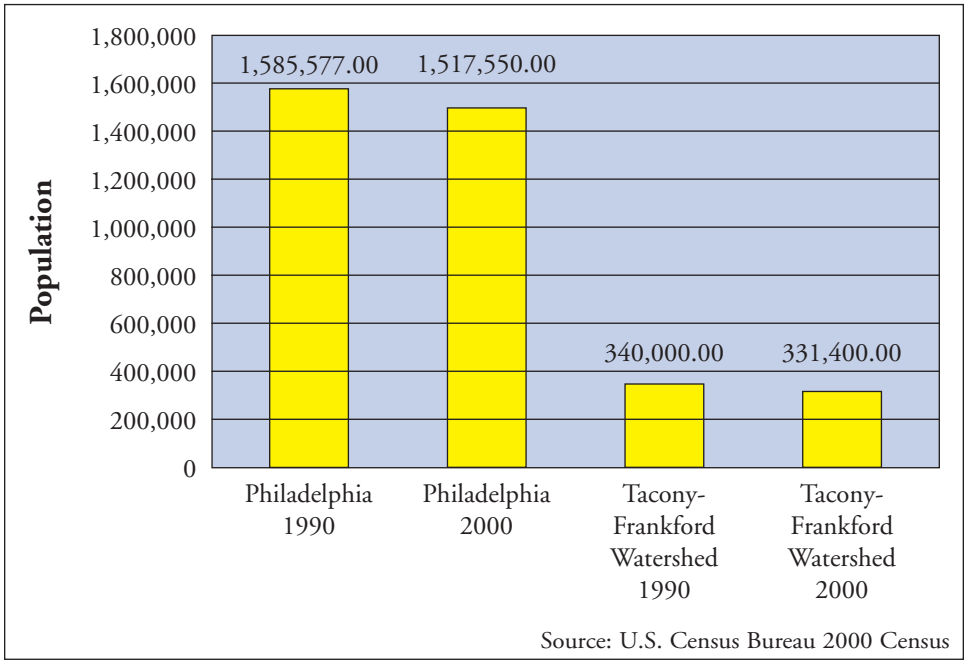


Figure 3. Population change 1990-2000

tracts in the western and northern portions of the watershed have been losing population while communities along the creek and in the eastern portion of the watershed have made modest gains.

Per capita income for census tracts in the study range from $6,495 to $36,932. Per capita income for the city is $16,509. Tracts with the highest per capita incomes are located in the East Mount Airy neighborhood, and tracts with the lowest per capita incomes, under $10,000, are concentrated in the Hunting Park and Olney neighborhoods. The median household incomes in the study area range between $30,000 and $35,000 per year. Median household incomes for the city are $30,716.

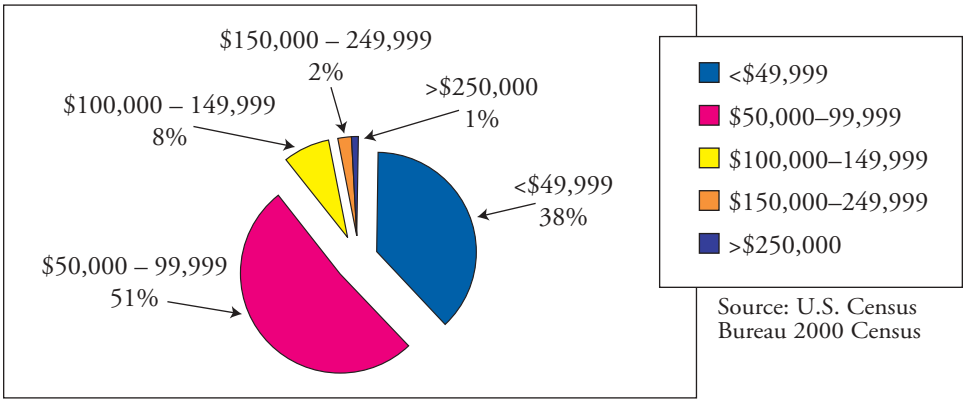


Figure 4. Owner Occupied Housing Values in the Study Area

Throughout the study area 89 percent (78,378 units) of owner occupied housing units are valued at less than $99,999 with 38 percent (33,465 units) valued below $49,999 (Figure 4.). Of the 137,569 housing units within the study area (based on census tract data), 45 percent (49,503 units) are occupied by renters. Forty one percent of housing units within the city of Philadelphia are renter occupied. Housing values in the study area are generally below the city median value of $59,700.

Housing values within the study area are generally decreasing. This is a trend that corresponds with the declining population's demand for housing. The following table shows the median home sales price in 1998 and the percent change from 1995 values (Table 3). Sales values were highest in East Mount Airy and lowest in Hunting Park. Important employers within the study area include the city, educational institutions, and the healthcare and defense industries.

Table 3. Change in Home Sales Prices from 1995-98

Neighborhood	Median home sales price (1998)	Percent change from 1995
Nicetown-Tioga	$9,500	-6%
Hunting Park-Fairhill	$6,200	-23%
Lower Kensington	$17,200	-14%
Richmond–Bridesburg	$35,000	0%
Upper Kensington	$14,950	-15%
Juniata Park-Harrowgate	$32,900	0%
East Mt. Airy	$86,000	28%
Germantown	$28,200	-3%
West Oak Lane-Cedarbrook	$59,900	7%
Oak Lane-Fernrock	$66,800	3%
Ogontz	$26,905	-18%
Logan	$20,450	5%
Olney-Feltonville	$40,500	-1%
Frankford	$38,000	6%
Lawndale-Crescentville	$52,000	2%
Rhawnhurst-Fox Chase	$84,000	-1%
City average (At time of comparison)	$53,500	11%

Source: City Stats (PCPC 2000)

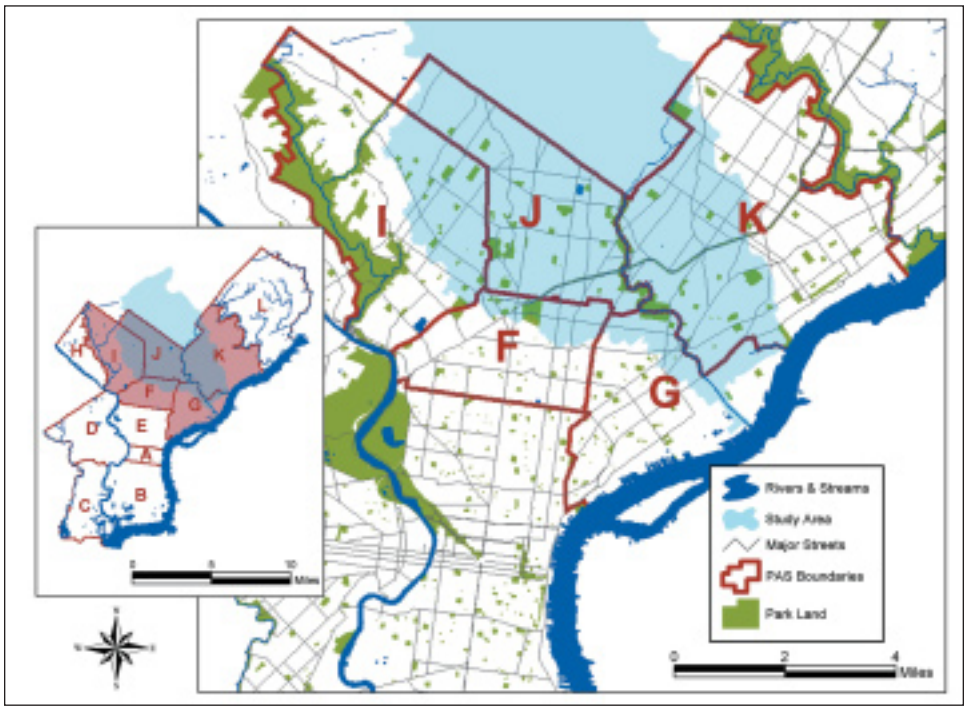


Figure 5. Planning Analysis Sections

Table 4. Major Employers Within the Study Area (>300 employees):

Employer	Number of Employees
Albert Einstein Healthcare Network	7,714
Defense Logistics Agency	3,000
Fox Chase Center	2,731
Jeanes Hospital	1,340
*St. Christopher's Hospital	1,215
Albert Einstein Medical Center	1,000
Temple University	1,000
LaSalle University	895
Simkar LLC	600
Germantown Community Health Services	550
Friends Hospital	520
Cheltenham York Nursing & Rehab Center	450
Avon Products, Inc.	400
*Philadelphia Protestant Home	350
*Sunoco Inc.	325
Northwestern Human Services	300
SEPTA	300
Brown's CH. LTD (ShopRite)	300
*Atlantic Express Transport	300
*USF Red Star Inc.	300
Mutual Pharmaceutical Company	300

*Employers located outside watershed boundary Source: PCPC

An asterisk(*) indicates an employer that is located near to but outside the watershed boundary.

Age and Race Characteristics

The median age for residents within the study area is between 30 and 39 years old. There are 114,588 persons (35 percent of the study area population) under the age of 18 years, of whom 26,942 (8 percent of the study area population) are under the age of five. There are 37,664 (11 percent of the study area population) people over the age of 65 within this study area. In the city as a whole, 25 percent of the population is under 18 years of age and 14 percent of the population is over 65.

Employment forecasts for the watershed reflect the population trends.

The Delaware Valley Regional Planning Commission predicts that employment will decrease by over five percent in the western and southern portions of the watershed (Upper North Philadelphia, Bridesburg/ Kensington/ Richmond, and Olney/Oak Lane planning analysis sections), while employment in the Near Northeast is predicted to grow by two percent (DVRPC 2002).

Black or African Americans represent the largest racial group within the study area at 61 percent of the population. Hispanic, African American and Asian populations have grown since 1990 by 52 percent, 10 percent and 18 percent respectively, while the white population has decreased by 38 percent. Figure 6. details the racial makeup of the study area.
Age and race characteristics are based on census block data.

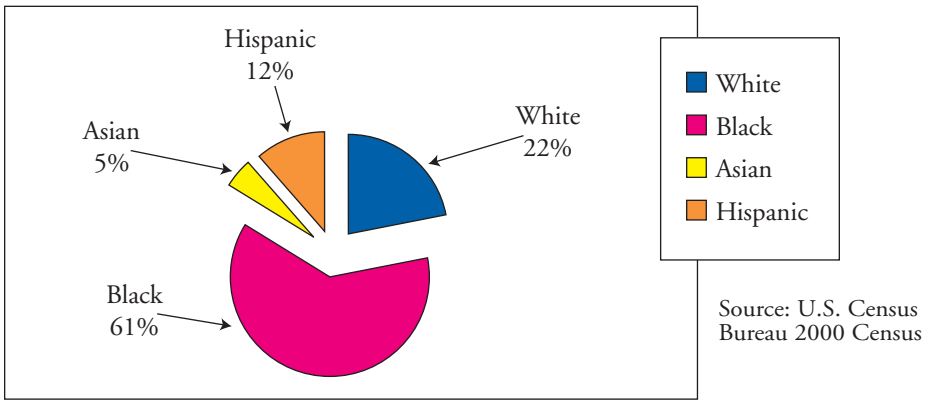


Figure 6. Racial MakeUp of Study Area

Planning Implications

Stream Habitat and Living Resources

The large population of school age children, 114,588 persons, presents an opportunity for cooperative educational programs, which can enhance habitat while addressing educational requirements for ecology and the environment. Programs such as park stewardship and arboriculture can improve natural resources while teaching occupational skills to watershed residents.

Quality of Life

Plans to revitalize economically distressed neighborhoods within this study area should incorporate practices that improve the environmental qualities, as well. Research from the Center for Watershed Protection shows that environmental protection practices, such as streambank stabilization and greenways, have positive effects on local property values as well as benefits for water quality.

Transportation Features

Roads, railroads and bike routes are indicated on Map 6; the Parks and Recreation map of the study area. There are a number of significant transportation routes through the study area linking Center City, Montgomery County, the greater Northeast and New Jersey to the neighborhoods within the Tacony-Frankford Watershed. The two major highways that cross the study area are Interstate 95 and Roosevelt Boulevard (U.S. Route 1). Interstate 95 is a four to six lane separated

highway that serves as a major transportation route from Northeast Philadelphia to Center City. I-95 has limited on and off access ramps to roadways within the Tacony-Frankford Watershed. I-95 is also a major regional highway connecting Philadelphia to Washington, D.C. and Baltimore to the south and New York City to the north (PBD&Q 2000).

The Roosevelt Boulevard (U.S. Route 1) is a six lane divided highway that serves multiple functions through the watershed. The Roosevelt Boulevard is used as an arterial route for vehicles traveling between Center City and the Bucks County line. The local lanes of the Roosevelt Boulevard serve as a collector route for neighborhoods that lie adjacent to the highway.

The transportation network that serves the study area is included on all of the GIS maps that accompany this report (Map 1).

Public transportation also plays a large role in meeting the transportation needs of the residents within the study area and is provided by the South Eastern Pennsylvania Transportation Authority (SEPTA). SEPTA operates a regional rail system, a subway and elevated train system, and fixed bus route service. Rail lines and transportation centers are included on the GIS Base map that accompanies this report (Map 1). Fixed route bus service links areas not served by the rail system. SEPTA rail service is effective conveying commuters during peak travel times; however, during off peak times one-hour gaps in regional service can make rail travel inconvenient. The Fern Rock and Frankford Transportation Centers provide important links between the bus, light rail and regional rail services.

The City Transit Division of SEPTA operates two light rail lines that serve the study area, the Frankford-Market elevated/subway and the Broad Street subway. The Frankford-Market line connects Center City with the Delaware waterfront in Frankford. This line is the most heavily used line in the entire SEPTA system (PBQ&D 2000). The Broad Street subway runs north/south from the Fern Rock Transportation Center through Center City to the stadium complex in South Philadelphia.

In 2000, the Philadelphia City Planning Commission (PCPC) released a report titled *Roosevelt Boulevard Corridor Transportation Investment Study*. The transportation study indicated that the central portion of the Roosevelt Boulevard corridor, which includes a large portion of this watershed plan's study area, is underserved by public transportation. The study identified a lack of express bus service along the entire length

of the Roosevelt Boulevard, a lack of direct route bus service to regional rail lines and inadequate parking at regional rail centers as problems facing the regional transportation system.

In 2003, PCPC released the Final Draft of the Roosevelt Boulevard Corridor Study. This study recommends the construction of a new modern subway line along Roosevelt Boulevard that would connect directly to the Broad Street subway line and the Frankford-Market elevated subway. The new subway would begin at Erie Station and travel through a combination of new bored tunnels, cut and cover structures under the boulevard and elevated rail to the vicinity of Southampton Road.

According to the study, the project would greatly reduce travel times from the Northeast to Center City, reduce automobile congestion, spur redevelopment in the city and increase neighborhood stability. This project would be the largest infrastructure project ever undertaken by the city and the estimated costs of $2.5-$3.4 billion dollars may make the project unfeasible.

An alternative to this project would be an extension of heavy rail lines, from the Broad Street subway to the Northeast, in a depressed open cut along the center lanes of the boulevard. This alternative would include extending limited access, express lanes of the Roosevelt Expressway to the Northeast. While this alternative is less expensive than the preferred alternative, the expected benefits are also significantly less than the former. Both of these alternatives will be studied further before a course of action is determined.

Before implementation of this project, it must be adopted by the Delaware Valley Regional Planning Commission's (DVRPC) Long Range Transportation Plan and Transportation Improvement Program, go through Environmental Impact Statement and Alternatives Analysis studies and be subjected to preliminary engineering studies.

According to the PCPC, the City of Philadelphia Streets Department is continuing to develop a Bike Network Plan. One of the plan's stated objectives is to provide 300 miles of interconnected bike lanes throughout the city. Streets with designated "Bike Lanes" have pavement markings indicating dedicated lane space for cyclists. Bike lanes and designated bike pathways are an alternative to the automobile in this watershed. Bike lanes are indicated on the Parks and Recreation map that accompanies this report.

There are no programmed improvements in the Roosevelt Boulevard Corridor area for pedestrians. The boulevard poses a particular problem

for pedestrian crossing. Traffic lights do not give pedestrians sufficient time to cross the twelve lanes of traffic in one signal cycle. Dangerous intersections and large retail shopping centers within the study area encourage car trips and add to the transportation inefficiencies in the study area.

The following graph details the percentage of commuters (working people 16 years and older) utilizing each mode of transportation (Figure 7). The majority of commuters travel by some form of automobile (65 percent) while 28 percent utilize public transportation. Less than 1 percent of commuters bike to work while up to seven percent work at home, walk, take taxis or utilize some other form of transportation.

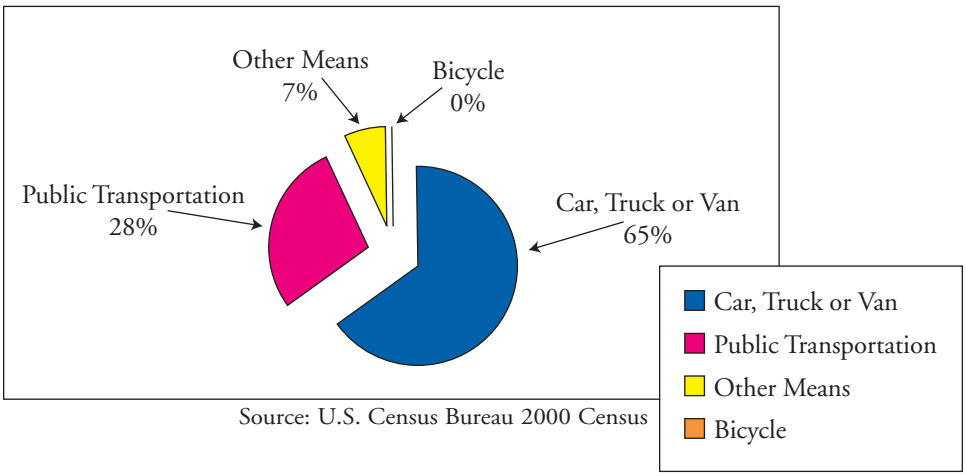


Figure 7. Commute by Transportation Type for Residents of the Study Area.

As shown in Figure 7., 28 percent of the population of the study area (based on census tracts) uses public transportation to commute to work. There are several federal programs designed to improve the transit dependent population's access to employment and better mobility. The Intermodal Surface Transportation Efficiency Act (ISTEA) provides federal funds to make resources more accessible without the need for an automobile. The Transportation Equity Act (TEA 21) provides funds for intelligent transportation programs, environmental restoration projects and habitat mitigation. Intelligent Transportation Systems are those systems that assist in the movement of commuters through the use of technology such as E-Z pass, real time traffic information systems or other technology based methods to increase travel efficiency. Given the economic and demographic conditions of this study area, improvement in access to employment seems to be an important issue.

Planning Implications

Quality of Life

Public transportation links between important regional natural areas have the potential to open these resources to more people within the watershed who may not have the opportunity to utilize these resources otherwise.

Improved pedestrian road crossings for major thoroughfares, such as the Roosevelt Boulevard, also have the potential to improve access to watershed amenities to more residents of the watershed. This RCP should support efforts to expand the bike path network and to address difficult road crossings.

Water Quality and Pollutant Loads

Increase in public transportation, pedestrian trips and bike ridership will have direct benefits on air and water quality through reduction of air emissions and NPS pollution from automobiles. These activities have the ancillary benefit of improved health for pedestrians and bike riders. Sources of funding such as the ISTEA and TEA 21 programs should be investigated to improve pedestrian and bike access to the watershed's amenities.

Land Use/Zoning

Land use within the study area is predominantly residential – over 57 percent of the total land use.

The section of Tacony-Frankford Watershed within the city of Philadelphia is dominated by urban land uses. There are no agricultural land uses in the study area. Wooded, recreational and park areas comprise approximately 1,210 acres or 9.9 percent of the land within the study area. Development within this portion of the watershed is redevelopment or in-fill development. A map of zoning categories (Map 4) accompanies this report. Zoning categories describe the general land uses that are permitted in those zoning areas. Since the study area is mostly built out, zoning categories are a good indication of actual land use.

Land use within the study area is predominantly residential (over 57 percent of total land use). Most of the residential uses are either multi-family residential or attached single-family homes. Examples of attached single-family housing are twins and row homes. Pockets of detached single-family residential homes can be found in East Mount Airy, Germantown, Northwood, Ogontz and Oak Lane.

There are sections of heavy industrial zoning throughout the watershed but the least restrictive zoning categories can be found along the Delaware River and along the lower reaches of the Frankford Creek. Table 5 details the number of acres of permitted land uses based on zoning categories and the percentage of the study area they occupy.

Table 5. Land Use Statistics for the Study Area

Land Use	Acres	Percent of Total
Attached Single-Family Residential and Multi-Family Residential	6,423.1	52.8%
Commercial\Services	1,035.0	8.5%
Manufacturing	951.1	7.8%
Transportation	726.8	6.0%
Detached Single-Family Residential	658.4	5.4%
Community Service	536.7	4.4%
Recreation	511.0	4.2%
Cemetery	457.8	3.8%
Regional Park	332.0	2.7%
Wooded	284.1	2.3%
Golf Course	83.3	0.7%
Water	83.9	0.7%
Utility	56.2	0.5%
No Data available	15.6	0.1%
Military	5.6	<1%

Source: Philadelphia Water Department

Wooded, recreational and park areas comprise approximately 1,210 acres or 9.9 percent of the land within the study area. Development within this portion of the watershed is redevelopment or in-fill development.

Vacant Property

Decline in population within the city and the watershed began in the 1950's with federal programs that encouraged suburban development. Federal programs, such as the GI Bill and the Housing Act of 1949, encouraged new construction over renovation by tying construction standards to home financing. These financing incentives made newer homes in suburban communities more financially accessible to first time homebuyers than older homes in urban centers. These incentives, ,combined with aging housing stock, loss of manufacturing and commercial employment and a desire for more private open space fueled the exodus of population to the suburbs (PCPC 1995). This decline in population has left many properties and lots within the watershed vacant and abandoned. Vacant and abandoned properties are often the target for arson or other illegal activity. The presence of the abandoned properties decreases the value of homes within the neighborhood and is a drain on city resources. Vacant properties reduce the tax base while costing the city money to seal and clean the sites or to demolish them. There are 313 acres of vacant land within the study area. Figure 8. is a map of vacant parcels within the study area. Vacant properties are also mapped on the GIS issues map included at the end of this plan (Map 8).

EPA defines a brownfield as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presensce or potential presence of a hazardous substance, pollutant or contaminant."

Brownfields

EPA defines a Brownfield as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presensce or potential presence of a hazardous substance, pollutant or contaminant."

Vacant industrial sites, in the Tacony-Frankford watershed are primarily found in Hunting Park, Frankford, Richmond and Bridesburg. Many of these sites may quality as brownfields. Potential contaminants affecting these sites can range from heavy metals to industrial solvents and organic chemicals among others. Utilizing the sites for new industry or redevelopment is a priority for the city, state and federal governments. In 2002, the Federal Government passed the *Brownfields Revitaliztion Act*. This act provides grant funds and technical assistance to clean-up existing brownfields and reduces liability of potential buyers of these properties.

Redevelopment of brownfield sites for industry reduces the demand on undeveloped land to accommodate this intensive land use. These sites are often times served by the requisite infrastructure of water, sewer, road or even rail access further reducing the development pressure on "greenfields".

Table 6 indentifies the acres of vacant land in each land use category. Acres of vacant land lying within the industrial land use category provides an estimate of the extent of brownfields located within the watershed. While not an exact indication of the acres of brownfields in the watershed, it is the best approximation made with the data available.

Table 6. Vacant Land Statistics

Vacant Land Zoning Category	**Number of Parcels**	**Total Acres Vacant**
Commercial	506	35.6
Industrial	77	71.2
Residential	4013	200.7
Total	**4596**	**307.5**

Source: Philadelphia Water Department

Economic Development

There are three state economic Enterprise Zones partly within or geographically near the borders of the Tacony-Frankford Watershed. They are the American Street, Hunting Park and Port of Philadelphia Enterprise Zones. An Enterprise Zone is a specific area targeted for

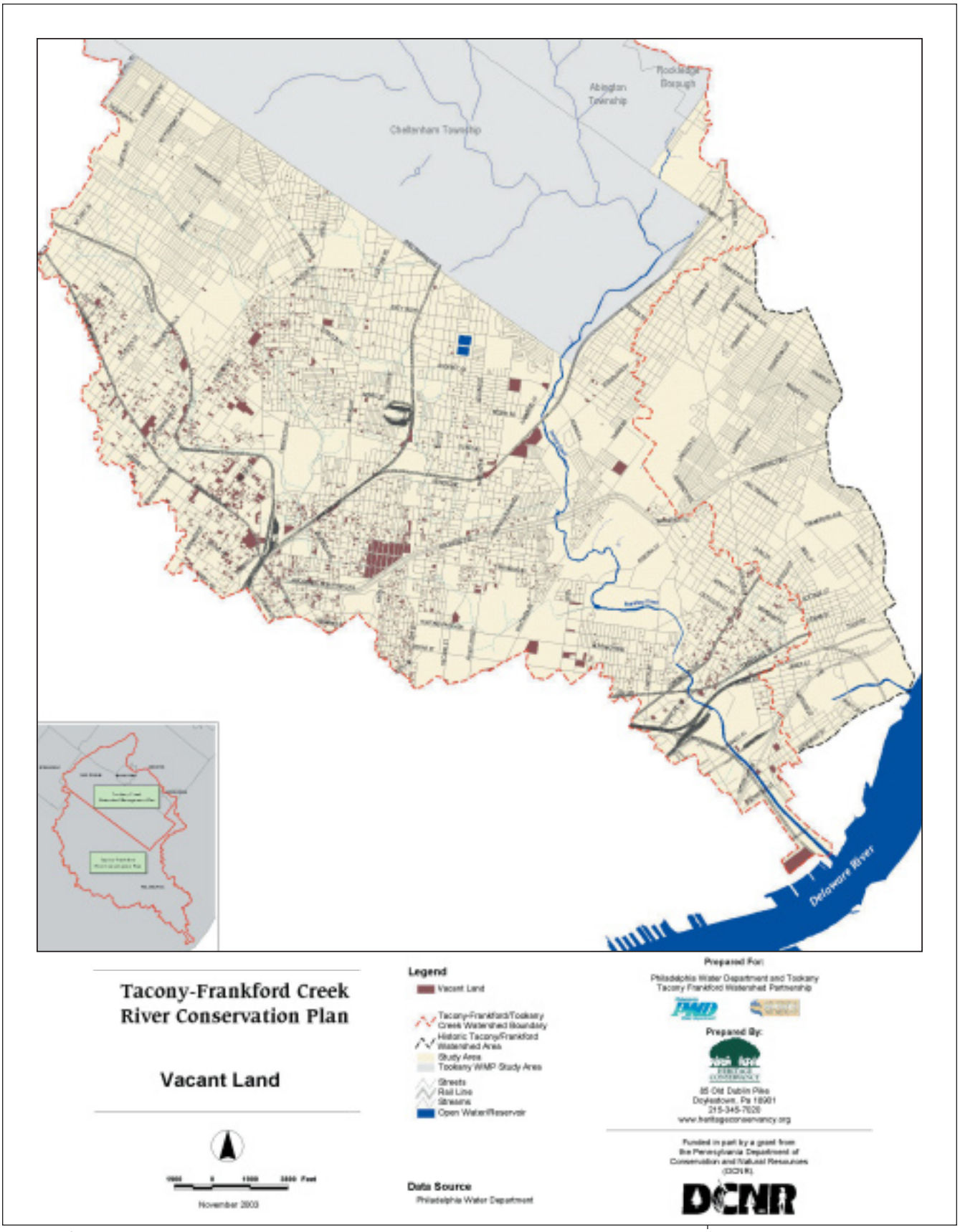


Figure 8. Vacant Property

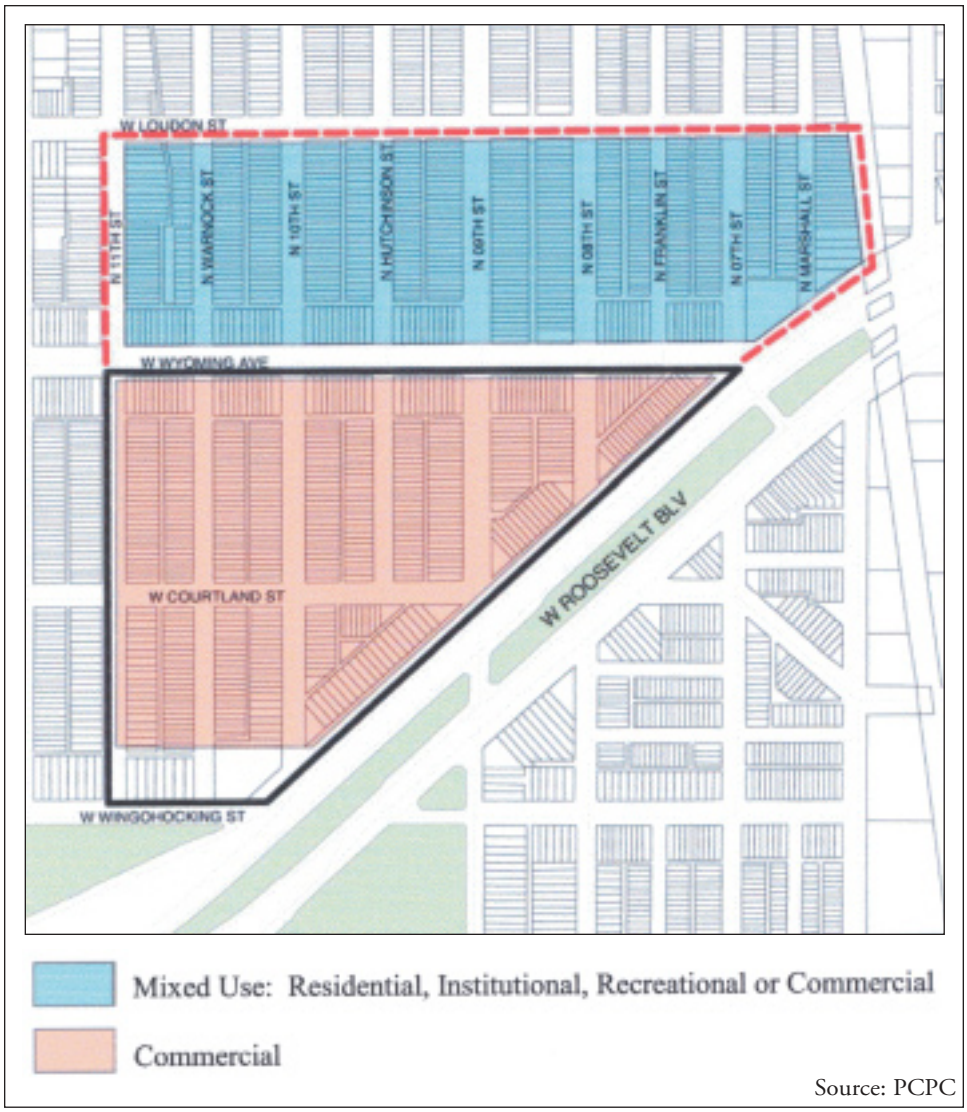


Figure 9. Proposed Logan Redevelopment Area Plan Land-use.

revitalization by the City of Philadelphia or the state. Businesses that operate in an Enterprise Zone enjoy low interest financing, tax incentives, and utility discounts in an effort to encourage growth and development in the city's older industrial neighborhoods. Enterprise Zones are included on the Opportunities map that accompanies this report (Map 8).

The PCPC released two redevelopment plans for neighborhoods within the Tacony-Frankford Watershed in 2002, the Logan Redevelopment Area Plan and the Frankford Creek Redevelopment Area Plan. Two other major redevelopment plans that affect the study area are the Ogontz Neighborhood Strategic Plan and the Greater Germantown Housing Development Corporation Neighborhood Strategic Plan.

Logan Redevelopment Area

In 1994, the PCPC began a reuse study for the area bounded by Wyoming, Wingohocking, Eleventh Streets and the Boulevard in order to improve the use of land left vacant by catastrophic sudsidence of infill soils, which displaced almost 1000 households over the past 15 years. As a result of this study, the Redevelopment Authority, on behalf of the Logan Assistance Corporation (LAC), requested that the area be designated a redevelopment area. This area's boundaries were later expanded to Louden Street. The U.S. Army Corps of Engineers (ACOE) was hired to conduct a feasibility study to determine the suitability and costs associated with redeveloping the area. The two-phase feasibility study was completed in 1999, and identified the types of buildings and the location of the subsidence area that would be most appropriate for redevelopment. The ACOE findings are reflected in the final redevelopment area plan.

In 2002, the PCPC released the Logan Area Redevelopment Area Plan. The plan listed three specific objectives:

- Eliminate the blighting influence of undesirable land uses throughout the neighborhood, thereby creating new construction opportunities.
- Foster the re-use of vacant land.
- Increase the potential for redevelopment for the area between Louden and Wyoming Streets.

The result of this plan was to encourage commercial and mixed-use land development in the area, shown in Figure 9. The proposed land development would ultimately replace 996 vacant lots, 30 vacant structures and 10 currently occupied buildings with new commercial, residential and or institutional buildings. Implementation of the plan should have a positive economic and social impact on this neighborhood. This plan is a result of cooperative efforts between various city agencies, the LAC and other community-based organizations.

Frankford Creek Redevelopment Area Plan

The Frankford Creek Redevelopment Area is bounded by Frankford Avenue, Adams Avenue, Orthodox Street, Castor Avenue, Cayuga Street, O Street, Hunting Park Avenue and the Frankford Creek (Figure 10).

The PCPC released the Frankford Creek Redevelopment Area Plan in 2002. The plan listed the following objectives aimed at improving the quality of the residential neighborhoods along the Frankford Creek:

- Encourage new residential construction, as well as rehabilitation of vacant homes around the creek, and adaptive reuse of large industrial and historic structures.
- Recognize the area around the Frankford Creek as an important community asset, thereby creating a safe and well-landscaped public right of way that is regionally connected to other greenbelt areas, local parks and open spaces.
- Remediate the environmental pollution and contamination of the Frankford Creek.
- Eliminate the blighting influence of undesirable land uses by encouraging the redevelopment of vacant or underutilized properties.
- Replace substandard or economically obsolete buildings with open space.
- Preserve the historic character of the creek and community.

The general goal of the plan is to provide a framework to guide future development of the area in the form of a road map for interested developers and investors. The proposed plan includes the construction of new residential townhouses, development of a greenway with trails along the creek, adaptive reuse of historic buildings and the redesignation of industrial zoning to better reflect the residential character of the community.

Figure 10. Proposed Redevelopment Plan for Frankford Creek Redevelopment Area

Ogontz Neighborhood Strategic Plan

The Ogontz Avenue Revitalization Corporation (OARC) was established in 1983 by PA State Representative Dwight Evans for the purpose of enhancing the economic strength of this West Oak Lane community. In 1995, the OARC released the Neighborhood Strategic Plan for the Ogontz Avenue neighborhood bounded by Cheltenham Avenue, Stenton Avenue, Broad Street and Vernon Road. The Strategic Plan was a five-year plan with four stated goals. with a series of objectives developed to support those goals. Currently, the OARC is working on a new five-year plan for the neighborhood.

The goals and objectives for the strategic plan are:

Community Economic Development

- Create entrepreneurial and employment opportunities.
- Provide technical assistance to existing area businesses.
- Restore vibrant business corridors; ensure clean, attractive streets and blocks.
- Promote workforce development.

Family/Worker Support and Community Wellness

- Deliver reliable, affordable daycare services to support working parents.
- Work to provide quality healthcare to all residents.
- Improve public safety and promote crime prevention.

Community Blight Elimination

- Acquire, rehabilitate, sell or transfer abandoned residential properties to responsible owners.
- Develop neighborhood housing preservation fund for OARC and West Oak Lane Revitalization Corporation service areas.
- Provide housing and financial counseling support services to residents in target areas.
- Provide for creative and adaptive reuse of abandoned commercial properties.

Cultural and Spiritual Value Renewal

- Instill a sense of pride and community ownership.
- Promote cultural services and provide positive youth and family activities in neighborhoods.

A number of commercial, cultural and housing projects have been accomplished as a result of the neighborhood strategic plan. Projects such as the adaptive reuse of the Erlen Theater, construction of Ogontz III, a mixed use commercial development, and the establishment of the SEPA employment and training center have had positive impacts on the neighborhood and watershed community.

Greater Germantown Housing Development Corporation Neighborhood Strategic Plan

In 1995 the Greater Germantown Housing Development Corporation (GHDC) released a strategic plan for the area bounded by Chew Avenue, Chelten Avenue, Wissahickon Avenue and the irregular boundary of Roberts Avenue/Stenton Avenue. The plan addressed the needs of three neighborhoods, Penn Area, Wister and Southwest Germantown.

Goals and objectives were developed for each neighborhood based on public input.

Penn Area

Community Organization

- Organize neighborhood area advisory committee to address land use issues.

Community Safety

- Establish community safety program, which would include townwatch program, sealing vacant properties and maintaining street lighting.

Housing Development

- Address subsidence issues in Ashmead/Bringhurst Area.
- Encourage rehabilitation of vacant properties and offer incentives for new homebuyers to purchase and rehabilitate vacant properties.

Economic Development

- Improve the Chew and Chelten Avenues commercial district.

Wister

Housing Development

- Address vacant properties and offer assistance and incentive to homebuyers purchasing new development on vacant lots.

Economic Development

- Offer job and entrepreneurial training to neighborhood residents.
- Secure tenants for vacant space at Freedom Square.
- Improve business environment along Germantown Avenue.

Neighborhood Improvements

- Improve Baynton Street Recreation Center.
- Improve pedestrian corridors from neighborhood to Germantown Avenue.

Southwest Germantown

Community Organization

- Organize neighborhood area advisory committee to address land use issues.

Marketing and Promotion

- Promote neighborhood to potential businesses and homeowners through marketing efforts.

Housing Development

- Offer financial counseling to homeowners and landlords.
- Rehabilitate vacant properties for home ownership.

Economic Development

- Improve business environment along Germantown Avenue by strengthening business associations and provide financial and technical assistance to neighborhood businesses.

Neighborhood Improvements

- Encourage local institutions to become more active in supporting neighborhood improvements.

Planning Implications

Stream Habitat and Living Resources

Vacant lands within the watershed provide a second chance to utilize the land for community open space, stormwater treatment facilities or neighborhood pocket parks or gardens. Reduction of stormwater run-off, through an increase in pervious space and vegetation, will improve neighborhood livability while addressing water quality and CSO loading.

Stewardship, Communication and Coordination

Community stewardship of vacant and open lands should be encouraged by city agencies and advocacy groups. Community involvement, such as vacant lot clean-ups, can reduce illegal uses of vacant properties and provide opportunities for neighborhood improvements.

Stream Corridors

Vacant parcels that are adjacent to Tacony Creek Park or other natural areas should be targeted for incorporation into the open space network. Conversion of vacant lands into community open space is advocated by the Frankford Creek Area Revitalization Area Plan and other revitalization plans.

Quality of Life

Economic redevelopment of the watershed's neighborhoods can have an

There are 843 acres of public park and recreational land within the study area, which includes 26 recreation centers. No resident lives more than 0.75 miles from a park, playground or recreation center.

impact on the community and environmental health of the watershed. Economic revitalization can help to increase appropriate use of Tacony Creek Park and encourage watershed stewardship as an asset to community economic health.

Parks and Recreational Resources

Park and recreation facilities are under the jurisdiction of two different city governing bodies, the FPC and the Philadelphia Department of Recreation. The FPC was established in 1867 by an act of assembly to protect and preserve city open spaces that are placed in the commission's charge. The FPC also provides recreational opportunities and maintains the parks' natural and structural resources. Sixty-three neighborhood and regional parks comprise Fairmount Park. The Philadelphia Department of Recreation, created in 1911, is charged with organizing and managing all recreation facilities not under the control of FPC or the Board of Education (Philadelphia Department of Recreation).

There are 843 acres of public park and recreational land within the study area (Map 5). This represents 6.9 percent of the total study area. There are 26 recreational centers within the city portion of the watershed. No resident lives more than 0.75 miles from a park, playground or recreation center. A matrix detailing the after school programs and activities offered by the playgrounds and recreation centers in the study area is included in the Appendix.

Tacony Creek park, a unit of Fairmount Park, is the largest park within the watershed. The park consists of 302 acres of land that form a narrow corridor of park along the Tacony Creek from the Montgomery County line to the Juniata Park golf course.

Tacony Creek Park, a unit of Fairmount Park, is the largest park within the watershed. The park consists of 302 acres of land that form a narrow corridor of park along the Tacony Creek from the Montgomery County line to the Juniata Park golf course. One hundred fifty two acres of the park are considered natural lands. The park is used by residents for picnicking, running, walking, horseback riding and fishing. FPC noted two popular sledding hills within the park. Although an illegal activity, people do swim in the creek in Tacony Creek Park. Unsanctioned uses of the park include all terrain vehicle (ATV) use, dumping, graffiti and drug activity. These illegal uses will be addressed in the issues section of this report.

The upper end of Tacony Creek Park, which is above Adams Avenue, is wooded and contains the best wildlife habitat. The section of the park between Adams and Whitaker Avenues is characterized by landscaped areas and recreational facilities. Below Whitaker Avenue the park contains grassy meadows and woods on the plateau on the west side of the stream. The Juniata Park golf course forms the southern boundary to Tacony Creek Park.

Burlholme Park and Tacony Creek Park offers residents the opportunity to walk trails along the creeks in the watershed. Burlholme's trails parallel an unnamed tributary to the Tookany Creek as it flows into Cheltenham Township. Tacony Creek Park has an extensive trail network along the Tacony Creek, including a trail that extends the length of the park. These trails are the most tangible connection that city residents have to this watershed. Other parks that have walking trails include Awbury, Fern Hill, Wister Woods, Kemble and Fisher Park.

There are 43.8 miles of bike paths within the study area. Most of the bike paths follow major thoroughfares.

Schools, universities and institutions provide additional open space that is available for public use. The most notable of these open spaces are located at LaSalle University, Friends Hospital and Awbury Arboretum. The Friends Hospital property is wooded and may be an important wildlife habitat in the watershed. A small spring on the Awbury Arboretum property is the last unburied vestige of the historical Wingohocking Creek. The arboretum is currently working towards improving this resource.

Schools, universities and institutions provide additional open space that is available for public use. The most notable of these spaces are located at LaSalle University, Friends Hospital and Awbury Arboretum.

The Parks and Recreation map (Map 5) that accompanies this report details bike trails, walking trails, park and recreational facilities as well as schools and institutions that contribute to the open spaces within the watershed.

Planning Implications

Stream Habitat and Living Resources

Programs for habitat restoration set forth by the NLREEP-Tacony Creek Park Master Plan should be implemented through park and natural lands in the watershed. Habitat restorations, where relevant, and invasive species control are important on all city park and recreational land. The utilization of city land provides good opportunities to partner with local universities doing research on urban habitat or invasive plant control.

Water Quality

The 843 acres of park and recreational land can serve as initial places to attempt innovative stormwater controls and improvements. Recreation centers and parks can participate in rain barrel programs, utilize porous pavements or serve as sites for treatment wetlands and ponds. These BMP's would create educational opportunities for visitors to parks as well as have positive effects for the Instream Flow Conditions goal by reducing the amount of stormwater entering combined sewers from these sites.

Riffle: A shallow area of a stream in which water flows rapidly over a rocky or gravelly stream bed.

Riparian: Area alongside a water course.

Macroinvertebrate: Animals that have no backbone and are visible without magnification

Flooding

Abandoned or vacant land in flood prone areas should be targeted for conversion to public open space to reduce property damage and improve waterfront resources.

Stewardship, Communication and Coordination

The majority of recreation centers in the watershed have after-school programs. These programs should be supported to include some environmental stewardship and education.

Biological Inventory

Stream Ecology

The biological community of the Tacony-Frankford Watershed is heavily impacted by its urban surroundings. The impaired state of the creek is a result of habitat deterioration and water quality degradation. High levels of urbanization, poor stream bank stability and flood control deeply influence the lower portion of the creek and watershed. These factors have resulted in a channelization of the creek, further inducing erosion and sedimentation problems. The upper portion of the study area has lost most of its first order streams and its wetlands to development. These natural water flows have been redirected to storm sewers and replaced by block after block of impervious surfaces. Due to the changes in the hydrologic profile of the stream and watershed, storm events are more dramatic and cause more damage than they once did. Instead of percolating into the ground, stormwater is collected and rushed into an already unstable creek where it scours banks, fills pools, and covers riffles. The rushing water strips soil from the banks and deposits some of it over the embedded cobbles and takes the rest to sea, all the while holding on to the chemicals and pathogens it collected on the city streets and in the sewers.

Habitat assessments of the Tacony-Frankford Watershed have determined much of the area to be non-supporting of a biological community. Eight sites within the watershed were assessed based on environmental features such as available vegetation and vegetative cover, riparian zones, stream bank stability, stream flow, riffles, pools and other factors. Of these eight sites, six were determined to be lacking the attributes needed to support aquatic communities of organisms, while the other two were determined to be capable of partially supporting aquatic communities.

Benthic macroinvertebrates rely heavily on stream riffles for at least part of their life cycle. Clinging to life in a riffle requires various adaptations, and most macroinvertebrates are not prepared for the extreme hydrologic fluctuations that can occur in a channelized creek such as the Tacony-

Frankford. Increased stream velocities and sediment loads from eroding stream banks disrupt the benthic environment by alternately scouring the stream bottom of appropriately sized cobble substrate and burying those cobbles in sediment. Storm events lead to decreased species richness and evenness, which in turn changes the dynamics of feeding groups within the communities. Specialized feeders are greatly diminished, and generalists such as gatherer/collectors dominate the feeding community. Organisms well adapted to hydrologic extremes and to pollution also begin to dominate the communities. Chironomids (Family: *Chironomidae*) and hydropsychid caddisflies (Family: *Hydropsychidae*) are the most prevalent macroinvertebrates in the Tacony-Frankford creek and are excellent examples of well-adapted organisms. Of the eight sites evaluated for macroinvertebrate life, five were found to be severely impaired, and three were classified as moderately impaired. Only two of the sites were categorized as partially supporting of macroinvertebrate habitats, while the other six are non-supporting.

Species richness: Total number of species present

Eveness: Degree to which species are represented in total number of species collected

Like the benthic invertebrate community, fish communities rely heavily on various habitats within a stream reach. An altered hydrologic profile in the stream leads to fewer offspring and decreased diversity in the fish community. The extreme flow conditions disrupt nesting habitats and routines for many species. Fish are also unable to rely on the presence of the calm pools and runs they often inhabit. A fish assessment of the Tacony-Frankford stream collected a total of 14 taxa, all of which being at least moderately tolerant of pollution. One of the sites evaluated only had three species of fish present. The low diversity and species richness is indicative of poor habitat and stream health.

Students performing macroinvertebrate sampling

The Tacony-Frankford Watershed is faced with many challenges. Stormwater outfalls (SWOs) and combined sewer overflows (CSOs) have also exacerbated problems within the watershed. Poor water quality and lack of dissolved oxygen are added stresses on local fauna. Insufficient habitat combined with the highly variable stream flow makes it difficult to establish a diverse and healthy biotic community. An urban watershed must overcome many obstacles to establish meaningful habitat within and alongside a stream.

Natural Areas/Wildlife Diversity

Awbury Arboretum, Burholme Park, Fisher Park, Friends Hospital, Wister Woods and Tacony Creek Park represent the most significant natural areas within the city portion of the watershed. These areas contain the only natural habitats (woodlands, wetlands, meadows and streams) within the study area. Species diversity of birds, mammals and other taxa are directly related to the quality and size of available habitat.

Benthic: Bottom of stream, lake or ocean

Holarctic: Inhabiting northern regions of the earth

Fish sampling

Icfithyfaunal: Pertaining to fish communities

NLREEP's Tacony Creek Park Master PLan found 39 bird species within the park, 36 of which are probable breeders.

These natural areas are islands of habitat in the built environment. It is important to note that these habitats have been disturbed and are greatly affected by non-native invasive plant species. These areas are indicated on the Parks and Recreation map that accompanies this report (Map 5).

The biological resources of Tacony Creek Park were extensively studied by the Academy of Natural Sciences in 1998. The results are detailed in the Tacony Creek Park Master Plan that was published by the Fairmount Park Commission Natural Land Restoration and Environmental Education Program Master Plan (NLREEP) in 1999. Results of this study indicate that Tacony Creek Park contains a diversity of species that are widespread and typical of disturbed areas. Since the park encompasses a variety of habitats including upland forest, shrubland, meadows and wetlands, wildlife within the park most likely represents the majority of species found within the study area. NLREEP maps of proposed restoration projects, vegetation and significant wildlife are included at the end of this report as well. Species inventories of birds, reptiles, fish, mammals and plants can be found in Appendix A of the NLREEP *Tacony Creek Park Master Plan*.

A summary of these inventories reveals 39 bird species within the park, 36 of which are probable breeders. Low bird species diversity is attributed to the narrow nature of the park. Large woodlots, such as Friends Hospital, may contain more bird species diversity. Five species of mollusk were found within the park, two native Holarctic, two introduced and one native North American species. The native North American mollusk seemed restricted to habitat where larger forest remnants were present. Only three reptile species were found within the park. Green and Bullfrogs are reported as common. Fish diversity within the study area is limited, although some species are present in high numbers. The mainstem of Tacony Creek is the only fish habitat within the study area. NLREEP and the *Biological Assessment of the Tacony-Frankford Watershed* reports 15 species of fish found within the non-tidal portion of the watershed. Species composition is variable with sampling location but no sampling location contained greater than 12 species of fish at any one sampling event. Angling is practiced within the park but with the exception of Bullhead Catfish, no large sport species were reported. Fish Consumption Advisories are in effect for the tidal portion of the Frankford Creek.

Terrestrial ecosystems of Tacony Creek Park are greatly affected by invasive plant species and habitat fragmentation. Large land areas dominated by Japanese Knotwood and other invasive vegetation is considered a major threat to native species biodiversity (FPC Vol.2). Proposals to restore native vegetations were included in the *Tacony Creek Park Master Plan*.

Aquatic macroinvertebrate and Ichthyfaunal studies are detailed in the NLREEP study and the Philadelphia Water Department's *Biological Assessment of the Tacony-Frankford Creek Watershed*. Results of the studies indicated aquatic communities with low species diversity and an absence of pollution sensitive species.

The *Tacony Creek Park Master Plan* identifies the following habitats within the park and offers specific restoration activities for each of them:

Forested Uplands

Forested uplands occupy the plateau above Tacony Creek. These upland forests were historically dominated by oaks, hickories and beech trees. Habitat fragmentation and encroachment of human activities on the forests have allowed exotic species to become established. Norway maple (*Acer platanoides*), tree-of-heaven (*Ailanthus altissima*), paper mulberry (*Broussonettia papyrifera*) and sycamore maple (*Acer pseudo-platanus*) are a few examples of non-native exotic species that have invaded the park. Notable areas of forested uplands found in the park are the northern section of the park above Adams Avenue and the wooded/natural area within Juniata Park golf course.

Non-forested Uplands/Meadow

Upland meadows are those areas adjacent to forests that are dominated by grasses, shrubs and forbs. As with the forested uplands, these meadows are subject to invasion by exotic species where the site has been disturbed or lacked a management strategy. Goutweed (*Aegepodium pedagraria*), garlic mustard (*Alliaria petiolata*), Canada thistle (*Cirsium arvense*), purple loosestrife (*Lythrum salicaria*) and lesser celandine (*Ranunculus ficaria*) are identified as invasive exotic forbs that are found in the park's meadows. The largest tract of open meadow within the park can be found north of Wyoming Avenue. Meadows in the park suffer from illegal dumping of trash and automobiles.

Slopes

Slopes between the upland plateau and the creek channel in Tacony Creek Park suffer from severe erosion and disturbance due to human activity, most notably ATV and mountain bike trails. Illegal dumping and exotic invasive plants are also issues for the slopes along Tacony Creek.

Riparian Zones

The riparian zone is the area along the stream corridor. Natural riparian zones are important in accommodating floodwaters, reducing erosion and providing important habitat for wildlife. Riparian areas within the park are experiencing an overgrowth of Japanese knotweed (*Polygonum cuspidatum*). Natural riparian zones can be found along the length of the Tacony Creek until the channelized Frankford Creek.

Wetlands

There are several small wetlands in Tacony Creek Park. Wetlands form important habitat for wildlife and provide benefits for water quality and groundwater recharge. The majority of wetlands in the park are dominated by skunk cabbage (*Symplocarpus foetidus*) while some are dominated by the invasive common reed (*Phragmites australis*). The largest wetland area in the park can be found between Tabor Road and Rising Sun Avenue. An important wetland that is home to three native sedges can be found above Adams Avenue.

The NLREEP map of habitats within Tacony Creek Park can be found in the Appendix to this report.

PNDI

The Pennsylvania Natural Diversity Inventory (PNDI) was established in 1980 as a cooperative project between the PADCNR, Nature Conservancy and Western Pennsylvania Conservancy. The inventory identifies species or habitats that are endangered, threatened or have special concern and prioritizes the conservation of those resources. Historical PNDI species and habitats within the study area are listed in Table 7:

Invasive plant species such as Japanese Knotweed and Kudzu as well as habitat fragmentation appear to be the major threats to native biodiversity within the park.

Table 7. PNDI Species in the Tacony-Frankford Watershed

Scientific Name	**Common Name**
Andropogon gyrans	Elliott's Beardgrass
Baccharis halimifolia	Eastern Baccharis
Cuscuta campestris	Dodder
Cuscuta pentagona	Field Dodder
Ilex glabra	Ink-Berry
Lycopus rubellus	Bugleweed
Vernonia glauca	Tawny Ironweed
Woodwardia areolata	Netted Chainfern

Source: PNDI

It is important to note that none of these species was listed in the NLREEP inventory from 1998; however, they may be present within the other listed natural areas such as Friends Hospital Property or Wister Woods. There are no federally or state threatened or endangered species found within the watershed.

Wetlands

Wetlands are areas that are seasonally or perennially wet. This situation can be due to replenishment of water from a groundwater source or the pooling of water due to poorly drained soils. Wetlands are often charac-

terized by soil types, the presence of standing water for parts of the year and the plant communities that they support.

Wetlands are a unique landform. Wetlands are often called bogs, swamps, marshes, seeps or springs. They provide habitats for wildlife, often serving as breeding areas for amphibians and fish and can serve as important passive recreational areas for bird and wildlife viewing. Wetlands provide an additional benefit of improving water quality by filtering nutrients and other pollutants from the water and they can serve as a storage area for floodwaters and reduce the velocity of stormwater run-off. There are still several small wetlands remaining in the Tacony-Frankford Watershed and can be found along the creek, mostly within Tacony Creek Park. FPC reports that these wetlands are disturbed by stormwater runoff, invasion of exotic species, such as Japanese knotweed and phragmites, and proximity to landscaped facilities. (FPC Vol. I)

Wetlands in this watershed are included on the Water Quality map that accompanies this report (Map 6). The approximately four acres of wetlands within the study area were identified by the National Wetland Inventory (NWI), which is a service provided by the U.S. Fish and Wildlife Service. The NWI identifies wetlands from aerial photographs and is not field verified. As a result, data may be inaccurate or incomplete, and more formal verification is required for regulatory purposes.

Floodplains/Riparian Buffers

Floodplains are the land areas adjacent to a stream channel that are subject to periodic inundation. Floodplains are usually categorized by the frequency of this inundation. For instance, a 100-year floodplain is that land area that has a one percent chance of being flooded in a given year.

Riparian buffers are the areas of vegetation that grow along the stream banks. Riparian buffers serve as natural filters of stormwater and help stablize stream banks and reduce erosion.

Hundred year floodplains are commonly used to delineate land that has a significant risk of being inundated during any given year. The 100-year flood is the basis for regulations restricting development and construction activities in the floodplain. The 100-year floodplain is delineated on the water quality map that accompanies this report (Map 6).

In order to qualify for the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program, communities must enact ordinances that regulate construction and certain human activities in floodplains in order to prevent loss of life and property due to flooding. Much of the development in this watershed, including land upstream of the study area, occurred before regulations limiting development in

floodplains were enacted. Historically, this watershed suffered from frequent flooding, especially in areas where the stream meandered. The lower Frankford Creek, below Juniata Park golf course has been straightened and the meanders have been eliminated in an attempt to mitigate this flooding.

In 1915, the city of Philadelphia purchased the land that is now Tacony Creek Park which resulted in the protection of much of the floodplain in the upper portions of this study area. The portion of the park above Adams Avenue is wooded and connects the park to the Tookany Park corridor in Cheltenham. The next section downstream, between Adams and Whitaker Avenues, consists mainly of landscaped and recreational areas on the plateau above the creek. There are 413 acres within this floodplain boundary.

Riparian buffers are the areas of vegetation that grow along the stream banks. They serve as natural filters of stormwater and help to stabilize stream banks and reduce erosion. Table 8 reports the results of miles of stream in the Tacony-Frankford Watershed that are lacking a well forested riparian buffer (Heritage Conservancy 2002). For the purposes of this study, a forested buffer is defined as an area of trees that is fifty feet wide with at least fifty percent canopy cover. It should be noted that only forested buffers were indicated in this study and that meadow or wetland buffers were not included in the analysis.

Table 8. Forested Riparian Buffers

Miles Assessed	Lacking Buffer On One Bank	Lacking Buffer On Both Banks	Total Miles Lacking Buffer	Percent Lacking Buffer
27.3	5.4	3.1	8.5	31.1%

Source: Heritage Conservancy 2002

Undeveloped floodplains and forested riparian buffers have many benefits for stream water quality, wildlife and recreation. Natural floodplains serve as storage areas for stormwater, allowing sediment to settle out of the water column and water to infiltrate back into the ground. This sediment often makes floodplain and alluvial soils very fertile. Forested floodplains and riparian corridors also serve as corridors between open spaces for wildlife to travel.

Vegetated riparian areas reduce in-stream temperatures and fallen vegetation can provide food and shelter for the organisms that live within the stream. Natural floodplain and riparian areas often provide access to a waterway for recreational activities such as fishing or nature watching. The floodplain/riparian area of the mainstem Tacony Creek

"varies from a mix of trees and mowed lawns to scrubby woods and old fields to a narrow band of riparian forest" (FPC vol. 2).

Planning Implications

Stream Habitat and Living Resources

Efforts to restore floodplains, riparian areas, wetlands and other natural areas should be continued. NLREEP has developed and prioritized many actions to support this goal in the Tacony Creek Park Master Plan. The RCP should support those efforts and where possible expand them to other natural areas within the watershed. Habitat restoration and invasive plant control in areas such as Awbury Arboretum and Wister Woods can increase watershed habitat quality.

Instream Flow Conditions

Improving instream flow conditions is critical to improving aquatic diversity and habitat. PWD's efforts controlling CSOs and stormwater management are a monumental effort and can be supported by site specific BMPs that promote infiltration, retention/detention and natural processing of NPS pollution.

Flow conditions also directly impact wetland quality and riparian vegetation. Extreme flows strip vegetation and erode stream banks. Stormwater flows must be addressed to ensure long-term viability of restorations.

Water Quality

Numerous studies on the biological and chemical water quality have been conducted in the Tacony-Frankford Watershed. The three most recent comprehensive assessments that analyzed water quality were the 1999 PA DEP Unified Watershed Assessment Report, the 1999 NLREEP Tacony Creek Park Master Plan, and the 2001 Philadelphia Water Department's Tacony-Frankford Creek Watershed Assessment.

Section 303d of the Clean Water Act requires that states assess the quality of surface waters biannually. Streams considered impaired or not meeting their designated use are included on the "303d list." States must then prepare Total Maximum Daily Load (TMDL) plans for those stream's watersheds. The TMDL is designed to reduce the sources of impairments in the watershed by identifying specific causes of impairment and setting targets for the reduction of those inputs to the stream system. The Tacony-Frankford Creek is designated a warm water fishery and also designated to support migratory fishes such as the American eel. Other regulatory stream designations include cold water fishery (CW), exceptional value (EV) and high quality (HQ) streams. EV and HQ designations offer special provisions for water quality protection in land use regulations.

Hydromodification: Changes in the physical characteristics of the stream such as channelization.

Fecal Coliform: Bacteria used as an indicator for potential sewage pollution.

The DEP and EPA treat storm water as a point source of pollution. When that runoff interacts with a municipality's storm water system.

Biological monitoring indicates that the whole Tacony-Frankford Watershed suffers from impaired aquatic habitat and does not meet its designated use as a warm water fishery. As a result, the whole length of the Tacony-Frankford Creek and its tributaries were listed on PA DEP's 303d list of impaired waters in 1999. The tidal portion of the Frankford Creek remains unassessed as the biological assessment protocol is not applicable to tidal stream segments. This impairment is due to severe water flow fluctuations, habitat alteration, point and non-point source (NPS) pollution from urban development, hydromodification and combined sewer overflows (PA DEP WRAS 2002).

PA DEP performed biological monitoring at eight locations within the Tacony-Frankford Watershed in 1999 as part of the Unified Watershed Assessment Program. This study yielded low aquatic macroinvertebrate diversity indicating aquatic habitat impairment. This study points out that due to the severity of habitat and water flow alteration, it is probably not possible to determine the "relative importance of stormwater pollutant loading versus the habitat disruptions caused by urbanization" (PA DEP 2002).

In the winter of 2001, the Philadelphia Water Department conducted a Biological Assessment of the Tacony-Frankford Creek Watershed. This assessment will be repeated as part of the department's Five-Year Biomonitoring Cycling Program. In this study biologists monitored eight sites in the watershed, three of which were in the city limits. Benthic macroinvertebrate and ichthyfaunal assessments reflect the DEP findings of impaired aquatic habitat in the creek. Limited, discrete chemical sampling was performed at the eight monitoring sites during a five-month period in 2000. The report addresses Biological Oxygen Demand, Dissolved Oxygen (DO), pH, Temperature and Fecal Coliform. Trends for these parameters, except Fecal Coliform, within the study area are within acceptable limits. There is evidence for chronic reduced DO levels below Frankford Avenue. Fecal Coliform levels were above acceptable standards in all but one sample. These results would indicate that swimming, an illegal activity in the Tacony-Frankford Creek, should be discouraged due to health as well as other safety reasons. It is important to note that the samples in this chemical monitoring were discrete grab samples. Important chemical trends will be better confirmed through continuous chemical sampling conducted in 2003 and 2004 (DO, pH, temperature and conductivity).

Non-Point Source Pollution

Non-point source (NPS) pollution occurs when by products of our daily lives wash into streams and waterways. Polluted run-off is another way of describing this condition. NPS pollution includes litter, chemicals from roadways, pet wastes, run-off from lawn treatments and erosion.

Non-point source pollution in this watershed poses a threat to the water quality in the Tacony-Frankford Creek because of the volume of stormwater run-off and the pollutants that the stormwater carries. This type of pollution is particularly harmful in the built environment that lacks vegetated open spaces where stormwater is allowed to infiltrate back into the ground and pollutants can be processed by soil and vegetation.

Gains in reducing NPS pollution can be made through public education and municipal good housekeeping measures such a street sweeping and innovative stormwater BMPs. Examples of innovative stormwater BMPs are vegetated detention ponds, bioretention islands and porous walkways and parking lots. Generally, innovative BMPs are those practices that promote open and vegetated stormwater control practices that encourage infiltration or biological methods to improve water quality over methods that simply detain or pipe stormwater off site.

Dischargers

Excluding storm sewer and CSO outfalls, there are no permitted discharges to the Tacony-Frankford Creek within the study area. The accompanying water quality map shows outfalls of stormwater discharge pipes and CSOs (Map 5).

Combined Sewer Overflows

Combined sewer systems convey both sanitary waste and stormwater in a common pipe. An intercepting sewer then carries these flows to a wastewater treatment plant. Combined sewers in the Tacony-Frankford Watershed convey sewage to the Northeast Wastewater Treatment Plant. In time of heavy rainfall, the capacity of the intercepting sewer can be overwhelmed, resulting in the discharge of untreated sanitary sewage directly into the Tacony-Frankford Creek. Historically, combined sewer systems were developed before water quality regulations prohibited the discharge of raw sewage into the water bodies of the United States. Retrofitting these combined sewers and separating the stormwater from sanitary sewer systems represents a monumental capital investment that would take the City of Philadelphia years to implement.

In order to address the CSO issue throughout the city, PWD has developed a Combined Sewer Overflow Long Term Control Plan (CSO LTCP). The CSO LTCP was submitted to the PA DEP in 1997 and is being implemented in three phases. The phases involve immediate implementation of a “Nine Minimum Controls” program, design and construction of 17 capital projects (five of which are within this study area) to improve performance of the CSO system and comprehensive watershed based planning and stream water quality analysis and monitoring.

The Nine Minimum Control Measures Program utilizes practical, cost-effective measures that can be implemented in a relatively short timeframes. The program is meant to address actions that can be taken without requiring further study or major construction activities:

- Review and improvement of ongoing operation and maintenance programs.
- Measures to maximize the use of the collection system for storage.
- Review and modification of PWD's industrial pretreatment program.
- Measures to maximize flows to wastewater treatment facilities.
- Measures to detect and eliminate dry weather flows.
- Control of the discharge of solid and floatable materials.
- Implementation of programs to prevent generation and discharge of pollutants at the source.
- Measure to ensure that the public is informed about the occurrence, location and impact of CSOs.
- Comprehensive inspection and monitoring programs to characterize and report overflows and other conditions in the combine sewer system.

Capital projects in the Tacony-Frankford Watershed include:

- Solids and floatables control plan.
- Targeted inflow/infiltration reduction programs.
- Establishing a Real Time Control (RTC) center in Tacony Creek Park.
- Upgrading the Frankford Syphon.
- Water Pollution Control Plants Wet Weather Treatment Maximization program.

PWD has encouraged improved watershed based planning through the formation of the Tookany/Tacony-Frankford Watershed Partnership and Tacony-Frankford RCP process. PWD has completed baseline water quality monitoring in the Tacony-Frankford Watershed and is currently working with the partnership to develop management strategies for improving water quality in the creek.

Since implementation of this program began in 1995, these measures have had immediate beneficial impacts to water quality in the streams within the city by reducing the volume of CSO discharges by over two billion gallons per year (citywide). (PWD)

There are 31 CSOs on the mainstem Tacony-Frankford Creek. Improvements to the CSO system are 100 percent financed by the city. While CSOs contribute to the water quality problems in the Tacony-Frankford Creek, the stream would still not meet water quality standards should the CSOs be completely eliminated due to the large pollutant input from NPS of pollution.

Hydrologic Modification

Aquatic habitat in the Tacony-Frankford Creek suffers from severe hydrologic modification typical of a heavily urbanized watershed. The major tributaries of the Tacony Creek were encapsulated in combined sewers in the early 1900s and the stream valleys were filled in to facilitate the development of this area. Today, the historical Wingohocking, Rock Run and Little Tacony Creeks are completely encapsulated.

The encapsulation of these historic streams has created a large fluctuation in the flow regimen of the Tacony Creek. These combined sewers can add large volumes of water to the creek shortly after storm events but because they are generally disconnected from the groundwater cycle, they contribute little or no base flow during dry weather. The age and condition of the sewer infrastructure indicates that leaks and cracks in the sewer pipes does allow for inflow and infiltration of water, from the creek into the sewer system and leaking of sewage into the stream, where aging pipes flow under the creek. In the cases where there is low water pressure within the sewer pipe, water can infiltrate the pipe from the stream. In cases when a leaking sewer pipe is full and subject to higher internal water pressures, sewage can leak into the stream. Both of these events can occur throughout the course of the day as potable water use (and sewer demand) fluctuates.

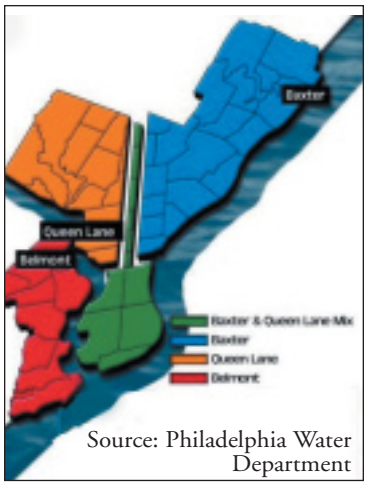
In order to deal with the flooding that was associated with a large influx of stormwater, the Frankford Creek was channelized and straightened in concrete. Historically, the Frankford Creek took a 90 degree bend on its way to the Delaware River in the Bridesburg neighborhood. In the late 1940s and early 1950s, this bend was bypassed to allow water to flow more quickly to the river just south of the Betsy Ross Bridge. This channel prevents interaction between the Frankford Creek and the groundwater system and eliminates streambed habitat needed to support aquatic life.

Hydrologic modifications, especially the in-filling of streams in the western portion of the watershed, have disconnected residents from their watershed. These residents can no longer see the water resources in their community and are often unaware that these historical streams exist.

Dams

According to the Tacony Creek Park Master Plan, there are four dams within the park. The dams are located above Adams Avenue (Crescentville Dam), at Rising Sun Avenue and two dams within Juniata Park.

Dams interrupt the natural sediment transport of stream systems, encouraging sedimentation and filling of areas immediately upstream of



Source: Philadelphia Water Department

Figure 11. City of Philadelphia Water Supply (PWD)

the dam while creating downstream hydraulic conditions that pose a danger to swimmers. Dams also effectively reduce the amount of habitat available to migratory fish by creating a physical obstacle to upstream migration.

Planning Implications

Stream Habitat and Living Resources/Instream Flow Conditions

Dam removal programs can be investigated to improve stream flow downstream of dammed areas during dry weather. Removal of dams will improve fish migration upstream and may reduce sedimentation of streambeds upstream of dams.

Dam removal may also help to address illegal swimming in the park by removing areas of deep water and pools that form behind dams.

Water Supply

Water supply for the study area is provided by the Philadelphia Water Department (PWD). PWD uses two surface water sources, the Delaware and Schuylkill Rivers. The western portion of the watershed receives drinking water that is treated at the Queen Lane Water Treatment Plant. The Queen Lane Treatment Plant, located in East Falls, draws water from the Schuylkill River and treats 70 million gallons (mgd) of water per day. The eastern portion of the watershed receives water from the Baxter Water Treatment Plant in Torresdale, which treats 200 mgd of water from the Delaware River. The central portion of the watershed receives treated drinking water from a combination of these two sources (PWD 2001 CCR).

There are no significant groundwater withdrawals within the watershed.

Philadelphia Water Department is also responsible for managing the city's stormwater and sanitary sewage treatment. Sewage and stormwater runoff in the Tacony-Frankford Watershed are treated at the city's Northeast Wastewater Treatment Plant. The Northeast Wastewater Treatment Plant is located in Richmond and discharges its effluent directly into the Delaware River.

Historical and Archaeological Resources

Introduction

Prior to European settlement in the early 1600s, the area that is now Philadelphia was inhabited by the Lenape Indian tribe. The Lenape people, referred to as Delaware Indians by European settlers, considered themselves the "original people". Lee Sultzman, in his *History of the Delaware*, indicates that there was a widespread belief among native peoples that the Lenape were the original tribe of Algonquin speaking peoples to inhabit the area.

Frankford Creek at Adams Avenue and Church Street ca. 1932.

The Unami band of Lenapes occupied the territory of Pennsylvania and New Jersey from Staten Island to just south of Philadelphia. The Unamis were not a politically cohesive group but shared common language and cultural characteristics.

The Lenape people lived in villages and depended on agricultural crops such as squash and corn as their primary source of sustenance. Men of the tribe supplemented the tribe's diet through hunting and fishing. Tribal government consisted of three sachems, or captains, that represented the three matrilineal clans that comprised Lenape society. The head chief was always from the Turtle clan, although the position was elected and not strictly hereditary. The other two clans were the Wolf and Turkey clans.

First contact between the Lenape and Europeans (primarily Dutch explorers) occurred in the early 1600s. The Tacony-Frankford Watershed was colonized in the mid seventeenth century by different groups of immigrants. Swedes and Finns traveling up the Delaware River were the first European inhabitants of the Tacony Creek Valley, while Germans fleeing religious persecution settled in the western portion of the watershed in what is now Germantown. In 1664, the land that is southeastern Pennsylvania was surrendered to the English by the Dutch. In 1681, King Charles II of England granted William Penn 40,000 acres of land in the Delaware Valley as repayment for a debt owed to Penn's father. The entire Tacony-Frankford Watershed lies within the area of this land grant. With the establishment of Penn's colony, English settlers flocked to the region, establishing homesteads, plantations and towns.

The Tacony Creek and surrounding valley was primarily developed as an area of agriculture and milling operations. The Tacony Creek was dammed several times for mills and became a center for industrial operations during the late eighteenth and early nineteenth centuries. Expansion of the city in the late 1800s converted farmland into residential neighborhoods. Active agriculture flourished in the upper

Frankford Creek at Rowlandville Avenue ca. 1932.

watershed until the early 1900s (FPC Vol.2). Land for Tacony Creek Park was purchased by the city in 1915, while land was being consumed by the need for new housing. The park was enlarged in 1939, and now occupies 302 acres (FPC vol.2). High-density housing characterizes the development of the area after the 1940s.

Historical Overview of Tacony-Frankford Creek

According to Adam Levine, historical consultant to PWD, it is safe to assume that by 1820 or earlier, the majority of the woodland in the watershed had been cut down, due to both the need for the wood as fuel and construction material, and to open up new land for agriculture. Such changes are difficult to document, but this development has likely increased sediment loads in the streams.

Early industrialists built in the flood plains of the main streams and the tributaries, their mills sometimes encroaching directly on the stream channels. They further altered the flows by building dams that backed up water in large ponds. Millraces were dug to carry water from the ponds to the factories, where it was used to power machinery as well as for industrial processes such as bleaching and dyeing. So-called "tail races" carried this used process water, often laden with chemicals, back into the streams.

Philadelphia became world-renowned for its textile production in the 19th century, and the Tacony-Frankford had a concentration of this industry. An 1849 map that encompasses only part of the watershed includes more than 30 factories, about half of them related to some aspect of textile work. Expansion of textiles and other industries in the watershed continued through the 19th and early 20th centuries, increasing the pollution load in the streams.

Sewage Pollution and Stream Encapsulation

Following standard practice for sewer design in the 19th and early 20th century, sewers serving built-up areas dumped their wastes directly into the nearest stream. In the Tacony-Frankford Watershed, this continued until at least the 1930s in some sections, and had the effect of making "open sewers" out of these streams. Instead of providing alternate channels for the sewage in so-called "interceptor sewers," city engineers decided to turn three major tributaries into combined sewers: Wingohocking Creek, which drained most of Germantown and Mount Airy; Little Tacony Creek, which had an extensive watershed northeast of Frankford; and Rock Run, which ran though the present sections of Olney and Fern Rock. These three streams, in projects that began in the late 1880s and continued through the 1930s, were completely obliterated from all but the city's sewer maps. Once the streams were put into pipes, their valleys were leveled (as much as 40 feet of fill was

used along some sections of the Wingohocking). Streets were laid on top of this fill, and water and gas mains were installed, providing landowners with a ready-made infrastructure that sped up the sale of their house lots. The tax revenues provided by the new real-estate in these quickly-growing neighborhoods sometimes paid for the cost of these massive creek-to-sewer projects within as little as five years.

While these projects alleviated the problem of sewer-laden creeks running through developing neighborhoods, the new sewers simply moved the problem further downstream, as they emptied their raw wastes into the Tacony and Frankford Creeks. It was not until 1923 that the sewage-laden flow of the Wingohocking was diverted from Frankford Creek into an interceptor that carried it to the newly constructed Northeast Sewage Treatment Works. Unfortunately, other interceptors were delayed by the economic downturn of the Great Depression, and sewage continued to flow into the Frankford Creek through the 1930s and beyond. It was not until the Northeast plant was completely revamped in the early 1950s, and the interceptor system completed in the 1960s, that the city stopped polluting its streams and rivers with raw sewage.

Frankford Creek boathouses ca. 1914.

Jurisdiction Over the Lower Frankford

In 1799 the Pennsylvania legislature declared that Frankford Creek, from the mouth to about where Frankford Avenue crosses today, was a navigable stream. This meant that a channel deep enough for the use of small craft and barges had to be maintained, and that drawbridges had to be provided for any stream crossings in that stretch. The "navigable" designation put the jurisdiction over the creek in the hands of the U.S. War Department (specifically, the Army Corps of Engineers), which seriously hampered the city's ability to maintain the channel for either navigation or flood control.

From 1884 on, the city made repeated requests to have the channel dredged, all of which the War Department turned down. The city itself dredged parts of the channel several times, but by 1929, it was unusable for navigation. A 1931 city engineering plan for flood control in the watershed stated that the creek's "condition is such that it can be used only by small boats at advantageous stages of the tide." Photographs from the period reveal that at low tide, mud flats were exposed for much of the supposedly "navigable" stretch. A 1932 report from a city sanitary engineer further expounded on the condition of this mud: past Duncan Street, the inspector stated, the waters of the creek "are almost black, foul smelling and greasy, and at low tide heavy deposits of slimy mud are visible."

The cost of the dredging and bulkheading called for in a 1931 plan was estimated at $2 million, but during the Great Depression the city had no funds available for this or many other badly needed projects. In 1938, the War Department again refused to deal with the problem, but by 1940, pressure from local congressmen finally resulted in the relinquishing of federal control over the creek. A similar move by the Pennsylvania legislature in 1941, relinquishing any state control, finally gave the city jurisdiction to implement its own flood control plan. But with the outbreak of World War II these plans, along with most public works projects, were again put on hold.

Flooding and Flood Control

Frankford Creek flood 3/18/56.

The Tacony-Frankford Watershed was probably prone to flash floods even before its lands were developed, since the upper part of the stream runs in a steep valley, dropping about 400 feet in its run from Montgomery County through Philadelphia to the Delaware River. But these floods certainly became more frequent and sudden in the 20th century, as the upstream areas began to be developed into residential neighborhoods (encouraged by the creek-to-sewer projects described in "Sewage..." above). This intensive row house development greatly increased the amount of impervious surface in the watershed. By 1931, of the 15,500 acres of the watershed within Philadelphia, 6,700 acres were fully developed, 5,500 acres partially developed, with the remaining 2,300 acres either unimproved or set aside as parkland. Converting the tributary streams into sewers also served to convey stormwater to the creek much more quickly, further intensifying the peak levels of flash floods.

More than a dozen major floods affected the lower part of the watershed, from Juniata Park downstream, from the 1920s through the middle of the 1940s. Floods were also frequent in the Logan neighborhood, in the valley of the former Wingohocking Creek, where sewers proved inadequate to the task of carrying off waters during heavy rains.

In Frankford, the problem was exacerbated by the removal of several dams, after which years worth of ponded-up silt washed downstream and clogged the channel; by the deposition of solid wastes from sewers and industrial discharges; and by numerous narrow, low-slung bridges, which constricted the flow in flood stage. Individual property owners built levees to protect their buildings, but with no coordinated plan these structures, if they worked at all, tended only to divert the problem downstream. Adding to the problem was the tortuous route of the stream's lower reaches, with wide horseshoe-like meanders typical of a creek in the flatlands of the coastal plain.

The city's 1931 flood control plan found that the existing channel of Frankford Creek could only accommodate a flow of 2,300 cubic feet per

second (cfs), while storm flows were commonly measured at 5,000 cfs and, with future development, were estimated to possibly reach as high as 10,000 cfs. Since many factories were located in the flood plain (or, as previously mentioned, in the creek channel itself) damage from the frequent floods added up to hundreds of thousands of dollars by the mid-1930s. Under the umbrella of the Northeast Philadelphia Chamber of Commerce, local industrialists lobbied for improvements in the creek to reduce the frequency of flooding. No comprehensive plan was possible due to the lack of funds, but token efforts were undertaken. A pick-and-shovel-and-wheelbarrow project, paid for by the Federal Works Progress Administration, employed more than 1,000 men to cut a new channel through a constricting horseshoe bend in the creek just above Bridge Street. At the request of several business owners, junked cars and other trash was removed from the creek a few times in the mid-1930s. But these piecemeal projects did little to alleviate the stream's frequent propensity to overflow its banks.

Frankford Creed Wakeling Street Sewer 1914.

Not until the city regained jurisdiction over the creek in 1941 (see "Jurisdiction..." above) could any comprehensive plan be implemented, and then the curtailment of most public works during World War II set the plans back again.

Finally, in 1947, the Frankford Creek Flood Control Project began, based on a report from Knappen Engineering Company of New York City. The first step was to create a concrete cut-off channel across a constricting horseshoe bend south of Juniata Park, with a dammed "stilling basin" above this point to settle out sediment in times of high flow. Work on the concrete channel continued downstream over the next several years, with the creek boxed in completely through one stretch near Leiper Street. In the final phase of the project, completed in 1956, the creek's flow was diverted into a channel that went straight to the Delaware, bypassing the long bend in the natural course that had carried it through Bridesburg and past the Frankford Arsenal. While the original mouth of the creek still remains, after the construction of a new storm sewer and a new intercepting sewer in the old bed, most of the channel above Bridge Street was filled in.

Channel Changes Unrelated to Flood Control Work

In 1902, between Kensington Avenue and Frankford Avenue, the channel was moved about 400 feet to the west to accommodate changes in the city plan, including the creation of Torresdale Avenue.

Around 1907, below the main line of the Pennsylvania Railroad, approximately 2,500 feet of channel was relocated to avoid constructing a bridge for the Pennsylvania-Reading Seashore Lines leading to New

Jersey. The new railroad embankment adversely affected flooding conditions, by blocking part of the natural valley that had been available for the accommodation of peak flood discharges.

Around 1910, to make room for the extension of Adams Avenue between Leiper and Church Streets, the channel was moved 100 feet to the east, and the old channel was filled in to accommodate the new section of Adams Avenue.

Historical Resources

Accompanying this report is a map of sites that are listed on the National Register of Historic Places (National Register) (Map 7). The National Register was authorized by an Act of Congress in 1966 and serves as the nation's official list of cultural resources worthy of protection. The National Register is administered by the National Park Service of the U.S. Department of the Interior.

There are 46 individual properties listed on the National Register of Historic places found within the study area. In addition to the individual properties there are three National Register Historic Districts, Awbury, Germantown and Tulpehocken. The Awbury Historic District is bounded by Chew Avenue, Avonhoe Street, Devon Place, and Haines and Ardleigh Streets. The Germantown Historic District is bounded by Germantown Avenue, Windrim and Upsal Streets and the Tulpehocken Historic District is bounded by McCallum Street, West Walnut Lane, the Penn Central Railroad and W. Tulpehocken Street. The Philadelphia Historical Commission maintains a local list of historic properties. That list is included in an Appendix to this report.

The Awbury Historic District is comprised of the Victorian country estates of the Cope family. Built in the mid nineteenth century, these estates are surrounded by English Romantic gardens. The Historic District includes the Awbury Arboretum grounds. The arboretum is open to visitors during daylight hours and the Francis Cope House serves as the arboretum's headquarters and visitor's center. The arboretum also offers educational programs to adults and children.

Germantown was settled in 1683 by immigrants who were invited to live there by William Penn. Germantown formed an important town outside of Philadelphia and was later incorporated into the city in the mid 1800s. By 1854, expansion of Philadelphia had incorporated the six largest townships north of the city to include the land that is now Philadelphia County (FPC Vol. 2).

The Germantown Historic District was home to important figures in early American history such as James Logan and Benjamin Chew.

Historic Stenton, home to James Logan, at 4601 N. 18th Street, and Cliveden, home of the Chew family, at 6401 Germantown Avenue, were both involved in the Battle of Germantown in 1777. Cliveden and Stenton are open to the public.

The Deshler-Morris House, also located in the Germantown Historic District, served as George Washington's headquarters and center for the nascent U.S. government during a yellow fever outbreak in Philadelphia in 1793. The "Germantown White House" is now owned by the National Park Service and is open to the public (ushistory.org).

The Tulpehocken Historic District is an area of Germantown that grew during America's first suburban housing boom in the 1850s. The historic district is exemplified by well-preserved, Victorian houses. The Maxwell Mansion, at 200 West Tulpehocken Street, is open to the public as a museum.

Philadelphia was an important destination for fugitive slaves seeking freedom in the North and Canada. There are numerous important Underground Railroad sites within the study area. Two sites that are listed in Charles Blockson's *Hippocrene Guide to the Underground Railroad* are the John Johnson House in Germantown and the Campbell AME Church in Frankford. These sites are indicated on the Historic Resources map (Map 7).

In order to protect archaeologically significant sites, their locations will not be listed in this study. There are two archaeological sites within the study area identified by the Pennsylvania Historical and Museum Commission. They are identified by the state as Pennsylvania Archaeological Site Survey numbers 36Ph38 and 36Ph47.

Planning implications

Quality of Life

The Tacony-Frankford Creek Watershed is rich in history. Programs to connect the watershed with its history should be advocated. Residents should be made aware of the watershed's role in the American Revolution and the Underground Railroad. Historic resources can serve as sources of civic pride and resources to attract economic investment. Adaptive reuse of historical buildings can revitalize community economies and prevent the loss of those resources.

Additional Issues and Constraints

Throughout the RCP process, the RCP team has been collecting information from residents, city officials and other watershed stakeholders regarding major concerns for the watershed. The following issues were identified as concerns through the public meeting process,

key person interviews and a residents' survey. Public concerns for the watershed reflect the findings of the NLREEP public outreach efforts revealed in the Tacony Creek Park Master Plan.

A preliminary map of issues and constraints within the study area has been created. This map includes superfund sites and vacant lots (Map 8). A map of community issues within Tacony Creek Park was created for the NLREEP study with community input, and is included at the end of this report. NLREEP Tacony Creek Park Master plan identifies the following issues as concerns for the park.

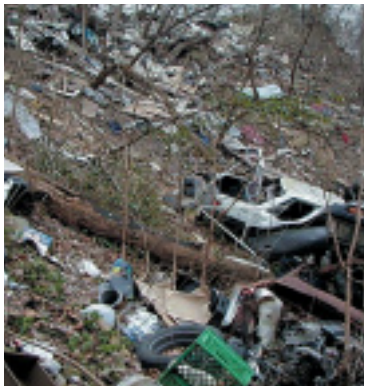
Invasive/exotic vegetation

Disturbed areas throughout the park and study area are susceptible to invasion by non-native exotic vegetation. Japanese knotweed, kudzu, purple loosestrife, Japanese honeysuckle, porcelain berry, Asiatic bittersweet and multiflora rose are identified as issues within this watershed.

Illegal trash dumpsites

Dumping of trash, cars and other appliances is an issue for Tacony Creek Park and vacant land. Secluded open areas are especially susceptible to dumping. Sites of abandoned cars often become targets for fire. Illegal dumping was identified anywhere there was a major road crossing over the Tacony Creek. Sights specifically identified include:

- Adams Avenue
- Adams and Newtown Avenues
- driveway connecting Adams Avenue to Godfrey Avenue
- Castor Avenue near Wyoming Avenue
- I and Ramona
- F Street and
- Awbury Arboretum



Dumping at "F" Street.

Illegal dumping ranges from trucks dumping construction materials and appliances to residents throwing trash directly into the creek. Public survey respondents ranked trash and litter as the primary source of pollution affecting the creek, and dumping was ranked third.

Graffiti

Graffiti is a problem throughout Tacony Creek Park.

All Terrain Vehicle Use

ATV use, while illegal in Tacony Creek Park, has had a detrimental effect on the health of the park. Illegal trails disturb native vegetation and open habitat for invasives while contributing to erosion on slopes of the creek banks. ATV use was identified as a problem throughout Tacony Creek Park and especially at Awbury Arboretum.

Illegal/Unsafe Use

These sites in the park are used for parties, drug activities or other unsafe uses. Respondents of the public survey ranked Public Safety as the third most important task for improving community enhancement and enjoyment of the Tacony-Frankford Creek.

Flooding

Flooding and associated sewage smells were identified as problems at Wissahickon Lane under the R7 Bridge and at Juniata Park golf course.

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Sites within the Study Area

The US Environmental Protection Agency (EPA) administers the Superfund program to identify and mitigate sites that, because of land uses in the past, present a danger to public health and the environment. When a potentially contaminated site is reported to the EPA, the site is listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). Through site investigation, the EPA will determine whether the site is listed on the National Priority List (NPL). Sites listed on the NPL become eligible for Superfund cleanup. There are eight sites on the CERCLIS list within the study area. None of these sites is on the NPL, and according to the EPA's Web-site, no federal remediation action is planned. This designation indicates that an entity other than the federal government is performing the remediation of the site or that the site contamination has already been addressed.

The following table identifies the CERCLIS (Superfund) hazardous waste sites that are found within the study area.

Table 9. CERCLIS hazardous waste sites (U.S. EPA)

Name of Site	**Location**	**National Priority List (Y/N)**
Belfield Avenue	5238 Belfield Avenue.	N
Belfield Avenue & Penn Street	5200 Belfield Avenue.	N
Belfield Paint	5250 Belfield Avenue.	N
Conrail	4500 Germantown Pike	N
Logan Contamination Site	Hutchinson and Wyoming Streets	N
Philadelphia Sludge Lagoon	3900 Richmond Street	N
SMS Automotive	4819 Langdon Street	N
USPCI E. R.	4105 Whitaker Avenue.	N

Source: U.S. EPA

Site-specific issues regarding the Tacony-Frankford Creek can be found in the stream visual assessment section of this report.

Ongoing Watershed Efforts

Ongoing efforts by various city agencies have created many opportunities for improving and enhancing the quality of life and environment in the Tacony-Frankford Watershed. This process presents an opportunity to encourage implementation of projects that accomplish objectives of many different organizations and city agencies. The following description of watershed opportunities is not comprehensive but identifies significant efforts to improve the watershed community.

Fairmount Park Commission (FPC), through the NLREEP, continues its efforts to restore the natural lands in Tacony Creek Park through invasive plant removal and stream bank stabilization efforts. FPC has continued to restore native wetland and meadow habitats. and these efforts offer many educational and volunteer opportunities for watershed residents. Continued success will be dependent on public involvement and participation to support FPCs goals. The Tacony-Creek Park Master Plan details many natural land restoration activities directed to improving the ecology of Tacony Creek Park. Practices advocated by this plan provide good guidance for the management of other natural lands within the watershed.

Philadelphia Water Department has undertaken a variety of measures with the purpose of improving water quality in the Tacony-Frankford Watershed. The long term CSO Control Plan has implemented measures that have had immediate benefits to water quality in the Tacony-Frankford Creek. The Office of Watersheds has developed many public outreach events with the purpose of reconnecting residents to their watersheds and becoming better stewards of this resource. Additional projects such as the residential rain barrel programs have positive water quality impacts while educating and involving the community in watershed stewardship.

The **Tookany/Tacony-Frankford Watershed Partnership** provides a vehicle for interested individuals and organizations to affect positive change in the watershed. The partnership brings together a wealth of expertise and manpower to address the issues facing the watershed and encourage collaborative efforts between Montgomery County communities and those around the city.

Philadelphia City Planning Commission has completed a number of revitalization plans for neighborhoods within the Tacony-Frankford Watershed. Revitalization plans provide a road map to improve the

economic vitality of an area. Economic health directly affects the resources and attention that can be directed to environmental and public safety concerns for vacant, natural and open spaces. Economic revitalization often encourages a neighborhood to use its natural amenities to encourage interest in business and homeowner investment. Plans such as the Frankford Creek Area Redevelopment Plan and the Logan Area Redevelopment Plan have the potential to have very real environmental benefits for this watershed.

Awbury Arboretum and the recent grants that the arboretum has received from the state, provide opportunities to connect residents in the western end of the Tacony-Frankford Watershed with the creek itself. Since this section of the watershed has no visible connection to the Tacony-Frankford Creek, the Awbury Arboretum property provides a unique opportunity to educate people about the history of the watershed and the natural functions of a watershed.

IV. Residents Survey

A comprehensive survey of residents of the Tacony-Frankford Watershed, created by our RCP Team members, has been conducted and completed. The surveys were created with several goals in mind, 1) to provide baseline information on resident knowledge of watershed issues, 2) to get a grasp of the residents' hopes and concerns for the Tacony-Frankford Creek, and 3) to educate these residents about the impacts of their actions on the creek. (A copy of the survey will be attached as an appendix.) The analysis of the survey results are below.

The survey is composed of sixteen questions, including inquiries about basic watershed awareness, an inventory of opinions and behaviors of watershed residents as well as observations about the watershed. These were designed as tri-fold, self-mailer brochures with return postage paid. The distribution of this survey was broad, with roughly 800 surveys placed within 16 libraries, 600 surveys distributed through our community contacts, 150 distributed at community presentations, and an additional 275 sent to high school teachers at 11 Philadelphia high schools, for a rough total of 1,875 surveys disseminated throughout the watershed area. The timeframe for the surveys to be completed and returned was from April to October of 2002.

Although we experienced a low response rate for our surveys with only 71 completed surveys returned, the surveys did cover a broad area of the watershed. Of the returned surveys, 18 Zip codes spanning 31 neighborhoods were represented. We see this low response rate as indicative of the need for environmental outreach and education within the watershed.

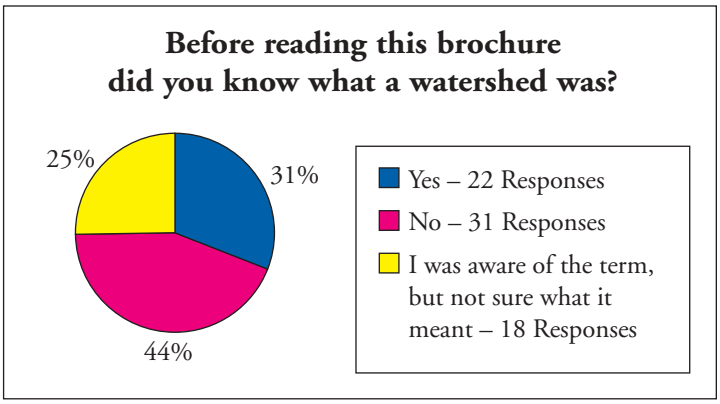


Figure 12. Survey Response

Results indicate that the majority of residents responding to these surveys did not have prior knowledge of the definition of the term "watershed" before reading the brochure. Additionally, only 30% of respondents (21 total responses) thought of themselves as residents of the Tacony-Frankford Watershed.

Sixty four percent of the survey responses (43 respondents) indicate that these residents rarely, if ever, spend recreational time along the creek. Also, more than half of our respondents perceive the water quality of the Tacony-Frankford Creek as poor. The surveyed residents have identified trash and litter in the streams as the most significant source of pollution to the watershed area. Sedimentation was ranked as the second most significant pollutant source and illegal dumping ranked third. When asked where money should be directed for the purpose of enhancing the greater community, the answer most frequently rated as most important was the "cleaning of the water in the creek." The removal of trash from the creek area ranked second, and increased safety and security in parks ranked third.

Once the survey results were broken down into two age groups, respondents 18 years and over, and respondents under the age of 18, additional interesting results emerged. Of the 48 individuals surveyed that were 18 years and over, 35 % responded that they knew what a watershed was, and 23% had at least heard the term before. While on the other hand, only 6% of the 17 respondents in the category of under the age of 18 years knew what a watershed was, although 35% of them claimed to have at least heard the term before.

When asked about the amount of recreational time spent along the creek, of those under the age of 18, only 12% (2 of the respondents) claimed to spend any time at all along the creek, and of those few that do it is only a few times a year. It seems that residents in the 18 years and over category have been more likely to make use of the areas along the creek; 39% (19) of them having visited the area at least a few times a year.

However, the RCP team is a bit leery of using the survey results to provide a real sense of residents' knowledge and uses of the watershed due to the low number of responses. Based on our experience, we would caution the use of surveys as a principal means to engage the public.

Table 10. Survey Response

How much time do you spend along the Tacony-Frankford Creek?	
Under 18: (17 total)	**18 and Over: (48 total)**
Few times a week: 0%	Few times a week: 4%
Once a week: 0%	Once a week: 6%
Once a month: 0%	Once a month: 6%
Few times a year: 12%	Once a month: 6%
Rarely or never: 88%	Rarely or never: 61%

V. Key Person Interviews

Background and Purpose

In order to try to be inclusive of the many varied points of view of residents and employees within the Tacony-Frankford Watershed, the RCP team has added an innovative section to the public outreach portion of the River Conservation Plan. This new section consists of what are called "Key Person Interviews," which involve individuals who are able to give in-depth and on-the-ground accounts of the watershed. The RCP Team set out to complete at least twenty-five of these in an attempt to involve residents in the Plan and to ensure that local concerns are fully identified and addressed. These interviews also serve to help reflect the character of the watershed from the many points of view of its residents by encouraging anecdotal accounts and personal experiences to be included.

Taking into account that the knowledge base of the interviewees would vary broadly, the RCP Team created a comprehensive script for individuals conducting the Key Person Interviews to use as a reference. This script supplied them with a description of the RCP program and process as well as a brief description of "what a watershed is" and some specifics about the Tacony-Frankford Watershed. Interviewees were also presented with a colorful map of the Tookany/Tacony-Frankford Watershed in order to illustrate the vast area covered by the River Conservation Plan.

Team members conducting the interviews explained goals of the RCP, and what sorts of beneficial information can be gained through this process. The interviewer also took the opportunity to explain the types of benefits that this process could bring to the interviewee, specifically identifying areas of need and getting them listed in the goals section of the RCP. The team also explained the goal of creating and enhancing partnerships through this process.

Interviews were conducted by teams of two; one person led the interview while the other transcribed the notes. Whenever possible, interviewees were presented with a copy of the questions in advance. The script included seven questions, each of which allowed the interviewee to use his or her own knowledge and experiences within their responses.

Our RCP team chose the candidates for these interviews. The pool of candidates came from many sources; civic and community leaders, business owners, residents, active neighborhood participants. In addition, individuals from federal, state and local agencies with involvement in the watershed, and in the position to help make change

Table 11. Key Person Interviews

Name	Title	Affiliation
Mike Groman	Director, Philadelphia Green	Pennsylvania Horticultural Society
Carmen Zappile	Project Manager	US Army Corps of Engineers
David Lange		National Park Service Rivers & Trails
Fred Lewis	Senior Environmental Corps	Center in the Park
Henry Bart	Department Chair of Geology & Environmental Science	LaSalle University
Mark Focht Stephanie Craighead Sam Curry	Program Administrator Deputy Director for Planning District Manager	Fairmount Park Commission – NLREEP
Grace Muller	President	Northwood Civic Association
Steve Culbertson	Executive Director	Frankford Community Development Corporation
Mark Hankin	President	Hankin Management – Arsenal Business Center
Jackie Olson	Volunteer Coordinator	Fairmount Park Commission – NLREEP
Charles Younger	President (Former)	Friends of Tacony Creek Park
Andy Toy	Program Officer	Philadelphia LISC
Brenda Frazier Pat Trinkle	Philadelphia City Councilwoman Marian Tasco's Office	9th District
Frank DiCicco	Philadelphia City Council	1st District
Richard T. Mariano	Philadelphia City Council	7th District
Donna Reed Miller	Philadelphia City Council	8th District
David Michael	Arborist	Philadelphia Horticultural Society
Gerald Kaufman	Executive Director	Awbury Arboretum
Stan Zakrzewski	Retired Police Officer	35th Police District
Alan Hunter	President/Owner	Urban Strategies Inc.
Lauren Bornfriend	Executive Director	Friends of Philadelphia Parks
Mona Gold	Volunteer Coordinator and Horticultural Therapist	Friends Hospital
Sonya Bryant	President	Love Logan Civic Association
Susan Philips	Senior Environmental Corps Coordinator	Center in the Park
Mike Atwood	Director, Environmental Engineering	Cardone Industries

possible were interviewed. Frequently, an interview with one person would lead us to another. The goal was to cover as many perspectives as possible. On the previous page is the list of interviewees, their titles and affiliations. Brief excerpts of the responses to the interview questions have been included below. (The full transcripts of interviews will be held on file.)

Interviewees were asked to provide a general description or characterization of their neighborhood, district or the entire watershed (scaled as appropriate to the interviewee). They were instructed to base their opinions on the condition of the water, parks and open space, as well as the built environment and streetscape of their neighborhood/watershed area.

Most interviewees found it difficult to characterize the "watershed" as a whole because of the size and different characteristics of the neighborhoods and areas within it. One did say "the Tacony-Frankford is a 'typical urban watershed,' with a mostly channelized creek area used to control flooding rather than to provide any sort of a natural environment." It seems that many of the people we interviewed feel that the broader community is unaware of the local open space that exists in their neighborhoods. Our interviewees noted that because of the "hardened, urban and industrial areas" that are so prevalent within the watershed, the residents often feel disconnected from the natural environment. Additionally, interviewees noted that the area is overdeveloped and lacks a welcoming atmosphere or streetscape to give it any sort of a natural appeal.

Most of our interviewees perceived the water quality of the Tacony-Frankford Creek as poor. The team heard such descriptions as "used" to describe the way that water is thought of within the watershed area, rather than enjoyed or respected. Interviewees described some areas with water appearing clear and very serene – while in other spots (especially near the outfalls) the creek is full of trash and is unsightly. Ironically, while most people describe the areas in the worst condition with littered areas and odors as those near the outfalls, these are the same areas noted as having created "pools" swimmers tend to flock to in the summertime. (A site that has been noted several times as a haven for swimmers is at Adams Avenue near the dam.)

Regarding the parks within the watershed, the overarching theme is underutilization. One interviewee notes that there are wonderful parks within the watershed, including Tacony Creek Park, Wister Woods, Juniata and more, many of which have beautiful natural springs within them. The problem is that most of the residents do not even know they are there.

Being an older urban watershed area, most interviewees mentioned the "built environment." Several described the watershed as a "built environment experiencing decay." Abandoned homes and industrial buildings near their residences and businesses are a source of concern for many within the watershed. Several interviewees mentioned the many redevelopment opportunities emerging in the watershed.

The team inquired about what interviewees perceive as the major outdoor amenities in their watershed. (Examples included parks, playgrounds, recreation centers, golf courses, waterways, streetscapes, quasi-public space, historic, cultural, etc.)

The Tacony Creek Park has emerged as the most recognized amenity and area of open space within the watershed. This park is most often noted for the fact that it has both the sprawling natural areas for passive recreation as well as the opportunity for athletics within its tennis courts and ball fields. However this park has also emerged as a source of concern, as several interviewees noted that many local residents view this area as unsafe. The park has been the site of some violent crimes over the past few years, as well as other illegal activities. There is a call for a stronger police presence in this area.

A note regarding the park system in Tacony-Frankford Watershed is the very disjointed nature that has been created by having the park areas split up by large, heavily traveled roads cutting through them. Many interviewees feel that the parks are much nicer than people think they are, with many beautiful attributes, but they still need work. Interviewees also noted the many libraries within the watershed, as well as the plethora of smaller recreational parks, golf courses and Awbury Arboretum as representative of the communal open spaces that they see as amenities. Interviewees were given the opportunity to identify the organizations (private or public) they feel are in the best position to help make changes and improvements a reality within the watershed. This question identified for us some wonderful resources within the community that we had not tapped, such as the local civic organizations and community development corporations, schools and churches. Many of our interviewees also suggested that we make a stronger effort to reach out to the business community within the watershed area. Nearly all of our interviewees mentioned the need to look for an active and involved community base. (Full list of suggested "partners" inserted below:)

- Pennsylvania Horticultural Society
- "Campus Boulevard"
- NE Catholic Boys HS
- East Frankford Civic Association
- Northwood Civic Association
- Nueva Esparanza CDC
- Korean Social Services

- Philadelphia Interfaith Action
- Mt. Airy USA CDC
- Crescentville Baptist Church
- Ogontz Revitalization CDC
- Bridesburg Business Association
- Council Woman Krajewski
- PA Representative John Taylor
- Wissonoming Civic Association
- Cardone Industries
- Fairmount Park Commission
- Local Police
- City Planning Commission
- Lawncrest Civic Association
- Olney Council
- Friends of Tacony Creek Park
- Philadelphia Parks Alliance
- Tacony Business Association
- Tacony CDC
- Home Depot (on Roosevelt Blvd.)
- Greater Germantown Housing CDC
- PECO
- Love Logan Civic Association
- Whitaker Mills Civic Association
- Frankford CDC
- Frankford Group Ministry
- Friends Hospital
- Neighborhood Transformation Initiative
- Frankford Hospital
- University of Pennsylvania
- Bridesburg Civic Association
- Center in the Park

The question that elicited the most interest from the interviewees was regarding what they see as particular problems (including site specific) within their communities. This later became known as the "Major Issues" section.

The question was presented in such a way that it allowed the opportunity for the interviewee to identify what he or she saw as the major issues facing the watershed, their neighborhood and their own street. The range of responses was broad, from economic distress and blight, to violence and safety concerns in the parks, as well as apathy and lack of environmental awareness among the residents. Many common themes also emerged in the responses, including issues such as short dumping, flooding, graffiti, swimming in the creeks, etc. We have broken down the major issues by topic and included some of the specific concerns that had been expressed during the interviews.

Short dumping

One interviewee noted that Adams Avenue is a major entrance to the park. This is a site that sees a lot of swimming, dumping, and graffiti. The intersection of Adams and Newtown Avenues has been described as a "driveway," right next to the entrance of the park, and a convenient place for dumpers to get into the park. Another interviewee believes that short dumping is an issue at all spots where the roadways cross the creek.

Awbury Arboretum also tends to be a site for lots of short dumping. We are told that people will drive right up Chew Street and dump their trash, tires and cement.

It has been noted that in the Wingohocking area, the company Metro Readi Concrete is located along the creek near Castor Avenue. An interviewee notes that there is a "huge pile of rubble that can be seen falling into the creek." This interviewee also notes "illegal dumping of asbestos and other things can be observed behind the Radio Shack and other stores on the strip along Castor Avenue by Wyoming Avenue."

The intersection of I and Ramona has been mentioned several times as a frequent short dumping site, as well as "any other place where trucks can gain access to the park." The section of the creek that abuts the Roosevelt Boulevard next to Friends Hospital has become overrun with trash due to this type of dumping. Also, F Street has been identified as a real problem area within the community. This is a site of frequent short dumping often by the residents themselves. The homes on F Street abut an extremely steep slope leading down to the creek, and residents and others tend to throw their garbage right over the fence and into the creek.

Flooding

Interviewees have noted several areas that are prone to flooding. It has been a problem at Washington Lane under the R7 Bridge. Many residents living along the street that abuts Awbury have complained of frequent basement flooding following heavy rain.

Flooding is also a problem in Juniata golf course area and cemetery. When it rains, residents complain that water with a bad "sewage smell" accumulates on the golf course. One interviewee claims, "They tape off that area because it smells so bad."

Safety Concerns

Several interviewees note that there is an insufficient police presence in the parks, and as residents do not see them as safe places to bring their families, they are unlikely to utilize them very often. Also, illegal activity such as prostitution and drug use has been noted at Ardleigh Avenue.

Playground Refurbishment

Several playgrounds have been noted as being in need of some refurbishment, including the playground at Garland Street and Simpson playground. It was also noted that many of these playgrounds lack functional water fountains.

ATV Use

ATV use is a problem in all of the park systems. Guide rails have been installed in parts of the park system and have been successful in keeping riders out; this practice needs to be more widely used. It has been noted that there is heavy ATV use from Rising Sun Avenue down to the Roosevelt Boulevard, which has destroyed a lot of the NLREEP plantings.

Awbury Arboretum has also seen a great deal of ATV usage on the property.

ATVs in Tacony Creek Park

Swimming in the creek

Several interviewees have noted this issue. We have been told that the outfall structures tend to create a deep undercut within the creek area, which in turn tends to draw swimmers to the area. This has been observed just north of Adams Avenue behind the golf course.

Additional issues

One interviewee noted that programs are needed to educate contractors and raise awareness of how to do more environmentally sensitive redevelopment. Also, dog waste has been noted as a problem in the parks and in the watershed area. Graffiti has been noted as a problem in several parts of the watershed, and especially prevalent on the walls of the channelized portion of the creek.

The last question from the interview script encouraged interviewees to suggest what sorts of projects they would like to include in the RCP. A common theme that emerged among responses was the need for public education-related programs aimed at raising awareness of these environmental issues. It was also suggested that we expand on that notion, and that educational programs aimed at raising historical awareness of neighborhoods, streams, and the entire watershed area be created.

Along similar lines, another common suggestion was to create a media campaign to generate interest in watersheds and nonpoint source pollution issues. We were told "people need to be sold on these issues in order to care about them." Local forums could be created following the example set by the White Dog Café. Creating a documentary on the watershed area for a local cable access channel or WHYY was also suggested.

Better signage throughout the watershed area was another commonly repeated project suggestion. It was suggested that multi-lingual signage be created and posted to tell residents that swimming in the creeks is

prohibited, that short dumping is illegal, and that a fine would be levied if dog waste is not picked up. Interviewees have mentioned both a cultural and language barrier within these communities that the public education process must try to bridge in order to reach out to a diverse audience.

After-school programs and opportunities for children are in demand within this watershed. Many interviewees noted that there are not enough cultural opportunities for young people within the area as well as activities to occupy young people during those few critical after school hours. A one day program run through the LaSalle University Department of Geology and Environmental Sciences, brings close to 200 local elementary students to the campus to learn about nature and water issues. The program has been run for several years, but is in need of funding in order to continue.

Additional suggestions include:

- Connect the disjointed park areas, create of a "Greenway"
- Protect open space/open areas within the neighborhoods
- Several development plans for the triangular area bordered by Caster Avenue, Wingohocking Avenue, and Adams Avenue.
- Create of more parks and passive recreation areas
- Streetscape tree plantings on Olney Avenue, Tampa Avenue, and I St.
- Place additional restroom facilities within park areas
- Use of more Best Management Practices to alleviate some of the effects of imperviousness of the watershed
- Create an environmental education center within the watershed
- Create additional programs to assist with invasive species removal
- Create a new landscape design for Awbury Arboretum
- Establish an ATV trail (perhaps using the Conrail Line) in order to keep them out of the parks
- Add more patrol vehicles to the parks
- Expand the number of rangers and give them more equipment

VI. Public Outreach

Summary of Outreach Methods

The RCP Team developed a presentation for use in workshops and community meetings, which explained the watershed concept, the purpose of the RCP and sought to engage the community in future efforts to reclaim and restore the Tacony-Frankford Creek.

Lists of civic associations, community development corporations, elected officials and churches active in the watershed community were compiled by the RCP team under the leadership of Frankford Group Ministry (FGM). An introductory letter about the RCP presentation was mailed out to this list, with a request to present to the group(s), and the letters were followed up by phone calls to set dates for presentations. We found that there was some initial interest, but little inclination to commit to scheduling. Eventually, we found that the most effective method to secure inclusion on the agenda was to attend a group's meeting and, at that meeting, pass out information and request inclusion on a future meeting agenda.

Volunteer workdays and tours of the creek were exploited as opportunities to inform and build community awareness about the Tacony-Frankford Watershed and the RCP.

Summary of Responses & Highlights

The size of the watershed itself and the wide range of elements included in the Plan were daunting to most people, and difficult to present. Community feedback was sought on the condition of the parks and recreation opportunities and needs, city services and community needs (i.e. trash pickup and enforcement, police response, abandoned buildings, youth programs), local history and traditions, and community improvement priorities. It was difficult to convey what results could be expected from participation in the Plan or the Watershed Partnership while discussing such a wide range of issues.

As shown by the 2000 Census, there was a substantial shift in ethnic populations in some neighborhoods within the watershed. In some of those neighborhoods, the community and civic organizations did not always reflect those changes, revealing possible splits or lack of communication between all members of the community. Some community groups showed evidence of successful inclusion, or strong efforts to promote unity and inclusion.

Difficulty in "getting the word out" is a common problem across the watershed. Community groups, service agencies, civic associations, recreation facilities and daycare centers all expressed the same difficulty

in finding ways to let residents know about their meetings, services and programs. Even those neighborhoods that are fortunate to have local newspapers find there are many people who don't read the local newspaper. This difficulty in communicating across the neighborhood may be related to the failure of old neighborhood business districts. All residents of a neighborhood used to frequent the same banks, drug and grocery stores creating a "word of mouth" network that could spread news quickly. Efforts to revitalize those corridors could be important for community building. For now, many of the community and business groups are developing websites which we could use as a vehicle to disseminate local information.

Language barriers are another problem. The newspapers which serve specific language/ethnic communities seem to cover city-wide issues and services, but lack the capacity to include all of the local information. In order for these community residents to use the parks, create community gardens, plant trees and participate in the environmental issues of the watershed, there needs to be a means to translate basic information for them. Involving ethnic community centers and newspapers might be possible and funding might be needed to make the effort feasible.

A common and major concern voiced by many individuals and groups was the inability and/or perceived unwillingness of the city to prevent criminal activity in the park and along the creek. The concern that police presence will not be increased produced caution about expanding access, or in investing either capital or personal effort into improving the parks and the creek. Foot, bicycle or horseback patrolmen are necessary to patrol high risk areas. Formation of a park town watch or park patrol groups was suggested by a number of people as a possible alternative solution. Improved lighting would also help in many places, both in the park and in the neighborhoods.

When discussing any open or green space, whether in a park or when transforming vacant lots, across all of the watershed, opinion splits concerning both the appearance and the use of the open space. Those who favor a more "traditional" look of grass lawn with trees, suitable for picnics and games, differ with those who favor a more "natural" look (meadows of wildflowers, forest and shade plants) suitable for wildlife habitat and pursuits such as bird watching and hiking. As there is so little open and park land available in this watershed, it becomes a more pronounced issue. This split can be acrimonious at times, and the Fairmount Park Commission struggles with it daily, striving to satisfy both sides.

Wildlife is another issue causing division. To many city residents, all wildlife is unwanted and considered dangerous. To others, it is thrilling to see wildlife like raccoons or blue herons right here in the city. The Philadelphia Health Department has some very useful literature on how to be safe around animals (both wildlife and pets) as well as how to reduce problems with unwanted wildlife in residential areas. This literature should be more widely available, but it needs to be balanced by accurate information on the benefits of wildlife for the parks and for the city as a whole. Wildlife can be a real attraction for the community. Bird feeding and bird watching are growing in popularity around the country, and this watershed is a great area to see a wide range of birds.

Overall, most people were optimistic about the possibility of improvements, and showed real interest in increasing (at a minimum, visual) access to the creek, and improving its appearance.

Some further recurring comments heard at meetings, in the parks, etc.

Problems

- Short dumping, at many places where creek intersects highway I and Ramona (old Snake Road by the Juniata golf course) and F Street, behind the shops on Castor Avenue by Wyoming Avenue
- Park and creek used as escape route for criminals / fugitives from police
- Lack of police/patrol presence in parks
- ATV use in the parks
- Not enough legal places to use ATVs
- Tacony-Frankford Creek reputation of being polluted and contaminated – reinforced by bad smell and visible trash
- Minimal visibility; many people not aware of where the Creek is, how to get to it
- Little awareness of area's history
- Illegal/hazardous material dumped into creek – (i.e. auto oil & transmission fluid)
- "Overgrown" areas (high plants, dense growth) look scary to many people
- Fears that increased access could lead to more drownings (there are currently several drownings per year in the Tacony-Frankford Creek)
- Abandoned houses/properties are a major concern; they are dangerous and become crime magnets and/or wildlife habitats (raccoons, rats, opossums)
- Too much crime in general (from nuisance to serious crime)
- Language barriers
- Fear of wildlife, whether in parks or in more residential areas

CSO outfall at Crescentville Road

Suggestions/remedies

- More legal and free (or at least affordable) ways to dispose of non-commercial trash
- More legal opportunities (and publicity) for disposing of hazardous materials
- More stringent city enforcement of dumping laws
- PWD assistance in removing large objects (like cars) from creek
- Return of the Fairmount Park Rangers
- Create a Townwatch specifically for the park and creek areas
- More and better lighting at heavily used areas and high risk areas
- More safe access to Creek (with lighting)
- Signs for the creek and the watershed to raise awareness & attention
- Markers to raise historical awareness
- Grants or other assistance are needed to maintain the old housing stock to prevent abandonment and fire
- Recycle old factory buildings into apartments, lofts, stores
- Start more local newspapers
- Open an environmental education center
- Increase educational opportunities across ages and languages to learn about the local natural environment
- Publicize (and translate) the gardening and tree planting information available from PHS and the Pennsylvania State University Cooperative Extension Urban Gardening Program
- Publicize (and translate) Philadelphia rules about vacant lot abatement and urban gardening agreements

Positives

- Community members who live near or pass by the creek daily expressed a feeling of ownership of the area
- People expressed great interest in seeing increased access to the creek, including walkways or scenic viewing spots along the many bridges
- Some people were very excited to hear about the varied wildlife found in and along the creek (especially the birds and aquatic life)
- Community groups expressed interest in supporting recommendations from the Partnership for measures such as new and improved storm water management methods for parking lots – some were eager for these measures
- The watershed has some very active and effective recreation centers and Free libraries which offer welcoming public space for all members of the community

Other Suggestions

- Translator services for community issues which would be available for city agencies and community groups
- A creek community group to work on common issues faced by those who live directly adjacent to the creek
- Change the police district borders so that the creek and park fall within fewer districts
- Diversity training for civic associations, town watches and other community groups
- More public venues, both events and locations, where opportunities arise for public interaction of different parts of the community

VII. Workshops and Events

Watershed-wide Clean up

October 2001

On Saturday, October 27, 2001, the Tacony-Frankford RCP Team and the Tookany Creek RCP Steering Committee joined to create a watershed-wide clean-up effort. Of the four sites chosen for clean up, two were in Montgomery County and two were in Philadelphia. This event drew more than 92 residents; 58 adults and 34 children out on a cold day to help clean up their local creek areas. These volunteers helped fill over 95 bags of trash, as well as car parts, sinks, shopping carts and other large items from the creeks.

Self-Guided Tour of the Tacony Creek

Initiated September 2002

RCP and Partnership members participated in an early evening tour along a one-mile stretch of the Tacony Creek, beginning at Ashdale and Bingham Streets in September 2002. The tour was developed by the Friends of Tacony Creek Park, PWD and Fairmount Park with the goal of creating a walking tour via a map and text that points out the urban and natural elements of the Tacony Creek. Participants were asked to critique the draft tour to ensure that it was appropriate for the general watershed resident.

Watershed walk with Councilman Marriano

Wingohocking Mystery Tour

October of 2002 and 2003

PWD and the RCP Team developed a historic tour of the now sewered Wingohocking Creek (east and west branches), the largest tributary to the Tacony-Frankford Creek. The goal of the tour is to educate watershed residents who live many miles away from the Tacony Creek that their homes and neighborhood have a direct impact on the water quality of the creek. Many of these residents live closer to the Wissahicken Creek, although they are geographically located in the Tacony-Frankford Watershed. The tour, co-sponsored by the Mt. Airy Learning Tree, is a half-day bus tour, which begins its journey in the headwaters of the Wingohocking in Mt. Airy. The bus follows the historic path of the Wingohocking Creek, which closely parallels the Wingohocking sewer and travels through the neighborhoods of Mt. Airy, Chestnut Hill, West Oak Lane, Olney, Logan, Feltonville and Juniata. The tour stops at historic locations where there is still evidence of the stream's once above-ground existence. These stops include: natural ridges, e.g., Germantown Pike; Awbury Arboretum and LaSalle University, where historic homes in preserved areas of the watershed still exist as they once did over a hundred years ago; the Logan triangle,

where a thousand homes were demolished due to subsidence of the filled stream bed; and the "I" and Ramona combined sewer outfall on Tacony Creek, which once was the confluence of the Wingohocking and Tacony Creeks. The tours were hosted in October 2002 and October 2003 and will likely be an annual event.

Return of the Blue Heron Watershed Celebration

May 2003

Return of the Blue Heron

On May 17, 2003, the Watershed Partnership organized their first watershed festival. This event partnered with Philadelphia Cares about Fairmount Park Day, an annual clean up event. Under the guise of the Spiral Q Puppet Theater, several AmeriCorps CityYear Volunteers worked with the youngsters from the Centro Nueva Creación after-school program in order to create two puppets of our watershed's new mascot, the Great Blue Heron. Our mascots were constructed of fabric and paper mache, and stood over 12 feet tall. Each puppet (mascot) visited six clean-up/restoration sites throughout the watershed. Our community celebration and environmental fair at Ferko Playground was complete with wonderful entertainment, including talented singer/songwriter Dan Collins, and "Cocoa," a DJ with Power 99 FM. Our event also drew the interest of some local politicians, including Philadelphia's Managing Director Phil Goldsmith, Karen Borski of the Fairmount Park Commission, Councilman Marriano and Joe Piotrowski of EPA.

Rain Barrel Workshops

Seven Workshops in June 2003

Rain barrel workshop

The Tookany-Tacony-Frankford Watershed Rain Barrel Implementation project is currently underway in the watershed. The project consisted of the implementation of 215 rain barrels to homes in the Tookany/Tacony-Frankford watershed and surrounding areas as a method of reduction of stormwater runoff. This project enlisted members of the communities in and around Philadelphia, as well as several environmental organizations to host a rain barrel(s) on their personal property or on the property of their organization. A main component of the project was the educational workshops that participants in the rain barrel project attended. The workshops included an educational component that consisted of instruction on the assembly and maintenance of the rain barrel, as well as the uses and benefits. The workshops focused on defining the range of uses of the rain barrel to conserve water usage and how to maintain the barrel in a manner to preserve it's stormwater control function without adversely impacting local home drainage. Volunteer team leaders from each partner agency attended workshops and coordinated installation logistics for their participating members. Each team leader then held a workshop for the

participants from their partner agency. Once the participants had received the educational workshop and instructions, the rain barrels were distributed. The participants took the rain barrels home and installed them in the instructed method.

Native Plants Workshop

July 2003

The RCP Team and the Fairmount Park Commission (FPC) hosted a Native Plants Workshop in Tacony Creek Park. FPC recently published two brochures – *Selected Native Plants of Philadelphia – Herbaceous Plants and Selected Native Plants of Philadelphia – Woody Plants* – in its goal to educate citizens about the value of protecting and planting native plant species to preserve the natural integrity of the City's parks and natural areas. Invasive plant species have been identified as one of the top threats to the health of the city's natural ecosystems. Workshop participants were provided an opportunity to learn about both native and invasive plant species by FPC staff who pointed out a variety of examples along a quarter mile stretch of Tacony Creek. Participants viewed, touched, smelled and talked about the benefits of native plants and the horrors of invasive species and how to remove them.

VIII. Stream Visual Assessment

The streambank assessments provide the public with an opportunity to participate and learn about the stream problems first-hand and about those sections of the stream that are in good shape and need further protection. Also, these assessments assist with prioritizing the locations of restoration projects once the plan is completed. Lastly, they will provide a baseline (a snapshot of existing conditions) that can be used to measure against the Watershed Management Plan, when in place, to determine where efforts have improved conditions or whether there is a need to adopt different strategies for improvement.

Volunteer Stream Visual Assessment

There were nine assessment areas beginning at the Cheltenham/Philadelphia border and ending at the Delaware River. Each segment was 3/4 to 1 1/2 miles long and the assessments were done by two or more volunteers (the average group size was four). The volunteers were asked to complete a three-page form detailing what they saw and if there were any odors detected. In addition, they were asked to write down any pertinent information on a detailed map of the assessment area. Photographs were taken to document the conditions and then linked to the general location on a map of the area. The volunteers received training on how to identify trees and invasive plants, how to determine if there is streambank erosion, and how to determine the use of the stream by the public.

A total of 18 volunteers were involved in the assessments. Although the general reaction from the volunteers was a negative one, they were also hopeful of the positive impact that such a study and public awareness could have on the stream's future. They want this work to be a catalyst for the stream's improvement. They were disappointed with the condition of the streambank, the abundant amounts of debris, and the inaccessibility of the stream in many areas.

Cheltenham Avenue to Adams Avenue 10/17/2003

The northernmost section of the Tacony-Frankford Creek begins at the Cheltenham/Philadelphia border and travels south to Adams Avenue for a total streambank length of 800 feet.

The adjacent land uses along this stretch are park land (abutting the stream), transportation (railroad and arterial roads), and residential. Generally, the water appeared to be clear in the lower depths of the creek and green or brown in the deeper areas. A series of riffles, pools and runs are present throughout the entire reach. The underlying geology consists of boulders, bedrock and silt.

The depth of the water within this unchannelized segment was approximately one to three feet. There were no odors detected nor was there any algae in the creek. There was a moderately abundant amount of fish, amphibians, and reptiles. Sunnys and other small fish, box turtles and frogs were observed.

There is a walking path that weaves along both sides of the creek about 10 feet from the creek banks. A pedestrian bridge, about 250 feet downstream from Cheltenham Avenue, connects the east and west banks and is in good condition. Various exercise stations are in place along this segment of the trail, but are not maintained. The trash receptacles are overflowing and the benches concrete frames are exposed, indicating erosion along the trail.

There is one dam and two bridge barriers along the creek, as well as woody debris. One pipe was observed discharging into the creek with no odor detected on the day of the assessment. The creek has a decent buffer of grass, tall grasses, trees and shrubs. Several areas of extreme erosion on the right bank and the streambank varied from 4 to 10 feet throughout this segment. Some native trees were documented, but invasives such as Japanese knotweed, kudzu, mulberry, and Tree of heaven were abundant.

There was an abundant amount of trash, such as bottles, cans, plastic bags, and paper. It is likely that this debris washed down from upstream or blew into the park from its bordering streets.

Recommendations

- Restore creek banks where there is severe undercutting
- Clean debris from creek, especially woody debris at the bridge
- Remove invasives and replant these areas with native vegetation
- Repair trail erosion at the benches
- Look into the repair or complete removal of the exercise stations
- Evaluate trash pick-up schedule with Fairmount Park
- Check railroad area for possible chemical run-off

Crescentville and Adams Avenues to Rising Sun Avenue 10/17/2003

This segment of the creek starts at Cresentville and Adams Avenue and extends approximately one mile to the Rising Sun Avenue overpass.

There is a popular illegal swimming spot used by young boys and teens at the beginning of this segment. There is a walking path on the west bank side that varies from 1 to 10 feet from the creek's bank. About 200 yards from the park's entrance, off to the right of the path, there is a discharging CSO outfall.

The water appeared clear and had no odor. A brown algae was attached to the rocks and the composition of the creek bottom was sand, gravel and boulders. The approximate depth of the creek was 6 inches to 2 feet. Fish were moderately abundant, but only one species was noted, while there were no amphibians or reptiles viewed on this day. This section of the creek is not channelized and has an even percentage of pool, riffle, and run.

From the creek edge to 25 feet from the creek, 70 to 100 percent of the bank is covered with vegetation on both left and right banks. The streambank goes from being non-existent to 3 feet high. Exposed roots can be seen indicating erosion. Tree of heaven was covering the whole bank and there were some areas of Japanese knotwood.

A boulder restoration project has already taken place about 200 yards past the train bridge. A small waterfall is at this site.

There was very little trash, but previous assessments have shown this segment to typically have quite a lot of debris. This assessment was conducted after some very large storms, which may have washed the debris downstream.

Walking downstream towards Rising Sun Avenue an outfall was located after the train bridge. The outfall is possibly a piped creek. and the discharge was exiting into the creek at a rate of 10 gallons per minute.

Recommendations

- Restore creek banks where there are exposed roots
- Remove invasives and replace with native plants
- Conduct regular trash clean ups
- Research and implement swimming deterrents

Rising Sun Avenue to Roosevelt Boulevard 10/17/2003

This segment begins at Rising Sun Avenue and ends at Roosevelt Boulevard. Due to the amount of area to be covered this assessment was broken down into two segments, Rising Sun Avenue to Tabor Road and Tabor Road to Roosevelt Boulevard for a total length of 3000 feet. The same team assessed both segments on the same day.

Segment A: Rising Sun Avenue to Tabor Road

The adjacent land uses along this stretch are parkland, residential and industrial (car recycling shop). The water appeared muddy, brown, and milky and the composition of the creek bottom is all silt. Ninety percent of this segment is run (no riffles) due to the creek being channelized, thus causing an undercut bank along the entire length. There is erosion at the toe of the slope also.

There is an exposed metal pipe at Tabor Road, which appears to be for street run-off. There was no discharge at the time of the assessment, but there was a persistent sewage odor for the length of the segment. Trash was moderately abundant and consisted of bottles, cans and plastic bags.

A walking path weaves along with the creek on the west bank. There are also numerous benches that face the creek, but the view is blocked by brush and Japanese knotweed. Some dominant tree species include, willow, maple, and sycamore trees. Japanese knotweed covers 95 percent of the left bank for approximately the first 40 feet.

Segment B: Tabor Road to Roosevelt Boulevard

The water was clear in spots and brown in others. The creek bottom consisted of sand, gravel and boulders. Two or three species of fish were sited as well as large turtles (in the pool at Rockhill Run), a heron (near Roosevelt Blvd. bridge), and a pair of mallard ducks.

There is a lingering odor of sewage in the air and an abundance of trash, such as shopping carts, vehicles, bottles, cans, and plastic bags. Across the creek, above the left bank, is an illegal dumpsite. The whole bank, which is behind F Street, has been a dumpsite for years and consists of appliances, garbage, cars, construction debris, furniture, etc.

Only 30 to 70 percent of the banks have coverage from plants, rocks, and logs, although there were more native species, such as maple, sycamore, and oak trees and less invasives, such as Japanese knotweed.

Recommendations

- Conduct a massive trash removal, especially at F Street site
- Educate residents on the environmental implications of illegal dumping
- Erect a barricade to deter illegal dumping
- Locate cause of sewage smell and rectify
- Cut down vegetation along path to create a clear view of the creek from the existing benches
- Remove invasives and replant with native plants
- Repair streambank where it is undercut
- Investigate exposed pipe at Tabor Road
- Examine car-recycling shop for possibility of run-off and determine if it is a legal operation

Roosevelt Boulevard to Whitaker Avenue 10/17/2003

This segment begins at Roosevelt Boulevard and ends at Whitaker Avenue for a total length of one mile.

The water was generally clear on this day and there was no odor except the smell of rotting nutrients, such as leaves, mud and bark. The creek bottom consisted of sand, gravel, and silt. Algae were present in some areas, attached to rocks, and had a dark green and brown color. The creek was mainly riffle and run with almost zero percent pooling. There were not many signs of wildlife along this segment, but some minnows were seen in parts of the creek.

Most of the creek was fully shaded by walnut trees, red mulberries, and other native species. There was an extreme amount of invasive species in this area too. The Japanese knotweed was everywhere, some of it up to 10 feet high. Other invasives were blue thistle, chicory, smartweed, garlic mustard, goutweed, and Tree of heaven.

The height of the bank went from stream-level to 25 feet (at Whitaker Avenue). There is some erosion along the whole section but there is severe erosion on the east bank (near Roosevelt Boulevard Bridge). Two outfalls were seen, one at Ruscomb Street and one under the Whitaker Avenue bridge. Also seen was what appears to be an unconnected sewer line.

Trash and debris were found everywhere along the banks. Bottles, cans, plastic bags, paper, cars, appliances, tires, milk crates, asphalt, and a large amount of cut concrete were seen. A large amount of this debris was located near or under the Whitaker Avenue bridge. It appears that illegal dumping is occurring at this site. Also, this seems to be a "party" site. Drug paraphernalia, beer bottles, broken glass and graffiti were prevalent.

Recommendations

- Conduct massive trash removal of the whole segment
- Install some type of a barrier to stop dumping at Whitaker Avenue bridge
- Remove invasives and replant with native species
- Restore creek banks where there is severe erosion
- Investigate outfalls and possible disconnected sewer line

Whitaker Avenue to Wyoming Avenue 10/17/2003

This segment began at Whitaker Avenue and ended at Wyoming Avenue for a total length of one mile.

The water was clear with a green hue and the creek bed consisted of silt, bedrock and boulders. Some algae were attached to rocks and were light green or white in color. No smell was detected. A few species of fish were seen but no other wildlife except for one frog. Only the beginning of the creek is channelized, but the whole creek segment is 50 percent riffle and 50 percent run. There was not a pooling area.

The creek was well shaded and the banks had good ground coverage; however, there is severe erosion on the creek bank area for the whole segment. The invasives located along this segment were honey suckle, Tree of heaven, Japanese silt grass, and garlic mustard.

The creek and the banks were littered with loose trash, cars, shopping carts, a motorcycle, a washing machine, and an old railroad trestle. A trash island has developed in the creek. An exposed manhole cover was also noted as well as graffitied areas.

A restoration site along the creek has been vandalized. The site's goal was to stop illegal ATV use in that area. Cut logs were strategically placed to stop ATV users from entering and destroying the park. The vandals have moved the logs and have left obvious ruts from their ATVs. The ground is all dirt and all signs of vegetation are gone.

Recommendations

- Restore creek banks
- Investigate if there is an illegal dumping site
- Create barriers to stop illegal dumping and ATV use
- Repair restoration site
- Remove invasives and replant native species

Wyoming Avenue to Castor Avenue 10/17/2003

This segment was not easily accessible from Wyoming Avenue. Therefore the assessment was executed from Castor Avenue. going upstream towards Wyoming Avenue. It is approximately three quarters of a mile long and runs between Ferko Playground and the Juniata golf course.

The adjacent land use is park land, a playground, a golf course, and residential. Neighborhood children, teens, dog walkers and golfers utilize the area the most. The water appeared clear with a slight green tinge. The depth of this channelized stream is one to five feet and is ninety percent run.

Light and dark green algae were present in spots and attached to rocks. There was a moderately abundant amount of fish with two to three species recognized and a large number of turtles at the I and Ramona Streets outfall.

The creek went from partially exposed, near Castor Avenue, to fully exposed at the Juniata golf course. The streambank height ranged from two to fifteen feet. There is extreme bank erosion throughout this whole segment. A manmade restoration project at the golf course (I & Ramona Streets) is also eroding away. The length of the golf course's streambank is mowed to the edge.

There is decent streambank coverage of plants, rocks, and logs with swamp maple, beech, Solomon seal, and oak trees noted. An abundance of invasives were present, such as, mulberry, Japanese knotweed, Japanese silt grass, garlic mustard, Tree of heaven, multiflora rose, and kudzu.

There are two outfalls along this segment. A combined sewer outfall that is located about midway into this assessment and a large combined outfall pipe (largest in the city) at I and Ramona Streets. There was a sewage odor present at both of these sites.

Trash was moderately abundant all along the creek. Plastic bags and paper were hanging off of exposed tree roots. A trash island consisting of plastic bags, bottles, cans and paper was observed at the beginning of the assessment and a large amount of concrete debris surrounded the first outfall. A bird was found with its feet stuck to a mouse trap. The volunteers were able to free the bird and it safely flew away.

Volunteer Stream Assessment Team

Recommendations

- Repair streambank where it is undercut and exposed
- Repair manmade restoration project
- Meet with Juniata golf course representatives to discuss creating a "no mow" zone
- Conduct a trash cleanup
- Contact Ferko Playground regarding trashcans and trash removal
- Remove invasives and replace with native species
- Investigate sewage smell at outfalls

Castor Avenue to Erie Avenue 10/17/2003

Torresdale Avenue between Hunting Park and Frankford Avenue

The area surrounding the creek is completely urbanized, making a full assessment difficult. These two segments were conducted looking upstream and downstream from the overpass. The two site locations were the Wingohocking Street overpass (between Castor and Adams Avenues) and the Frankford Avenue overpass (between Hunting Park and Torresdale Avenues).

This channelized section is approximately six inches to two feet deep and is ninety-five percent run. The water's color was a greenish gray and had an odor of sewage and fish. Brown algae were observed attached to rocks and matted on the streambed.

An abundant amount of large white fish were observed from the Frankford Avenue overpass. The only other wildlife observed were two ducks and a finch.

The streambank went from zero to twenty feet high and was a combination of natural landscape to concrete walls. There was some evidence of exposed soil along the bank. A long section of concrete wall was defaced with graffiti. The east and west banks, from the bank to 25 feet back, were 70 to 100 percent covered by plants and trees. There is no natural coverage after that twenty-five feet radius. The creek is fully exposed to the sun. Some Japanese knotweed was present.

The adjacent land uses along these segments consisted of stores, car lots, Northeast Catholic School for Boys, and factories. There are no apparent local uses for the stream.

Some of the trash observed was bags, cans, bottles, spray paint cans and tire scraps. There are dams and overpasses acting as barriers in the creek.

Recommendations

- Detect reasons for sewage and fish odors
- Remove graffiti from walls and secure access areas
- Educate local business owners near the creek on ways to manage the land around them to better affect the health of the creek and to protect their property
- Educate teachers and students at the local High School on the affects of polluting the street and/or the creek
- Remove Japanese knotweed

Richmond Street between Wheatsheaf Lane and Bristol Street 10/17/2003

These urbanized areas were assessed looking upstream and downstream from the accessible overpasses. Each section will be reported on separately due to the differences in assessments.

Aramingo Avenue between Wheatsheaf Lane and Church Street

The depth of the water in this channelized segment was six inches to one foot deep and was 90 percent run. The water appeared muddy and oily. The adjacent land use of this segment was scrap yards. There is no local use of the stream.

The composition of the creek bottom was silt. Brown algae was attached to rocks and matted on the streambed. There were not many fish seen but two to three species were noted.

The height of the streambank was three feet and had minimal coverage. The stream was fully exposed to the sun. Exposed soil and bank erosion was noted both up and downstream. Some Japanese knotweed was present.

Trash and possible dumping seems to be a major problem here. The area was littered with bottles, cans, plastic bags, shopping carts, car parts, paper, tires, and oil drums. There was a chemical film on the water surface and surrounding puddles. An awful smell of rotting garbage and sewage permeated the area.

Richmond Street between Wheatsheaf Lane and Bristol Street

This channelized segment was very murky and had a greenish-gray coloring. Due to the murkiness, it was impossible to determine the depth of the creek as well as the presence of algae, the composition of the creek bottom, or the presence of fish. No odor was detected.

The land uses for this segment are industrial, highway and railway. There are no local uses for this segment of creek.

An outfall pipe was discharging at a rate of a gallon per minute with no odor present. No trash or signs of dumping were seen at this site. This is probably because an eight-foot fence was erected on each side of the overpass.
The creek is fully exposed to the sun. The bank had adequate coverage from the creek to about 25 feet back before it is all commercial businesses. There were signs of extreme bank erosion.

Recommendations

- Install fence barrier at Aramingo Avenue. overpass to stop illegal dumping
- Clean creek of all debris
- Restore creek banks
- Investigate discharge from outfall pipe
- Educate local business owners on ways to manage the land around them so as to better affect the health of the creek
- Remove Japanese knotweed

Rohm & Haas Company, 5000 Richmond Street 10/17/2003

This segment is part of the original mouth of the Tacony-Frankford Creek (original confluence with the Delaware River). This piped segment daylights close to Ash Street and continues to the Delaware River. The three-quarter of a mile assessment was conducted with the guidance of Frank Jackson, Environmental Health and Safety Manager, Rohm & Haas.

The adjacent land use for this segment is industrial and the creek is used as cooling water by Rohm & Haas. Weather conditions were very cloudy so the water appeared brown and it was difficult to assess the composition of the creekbed. There was no presence of fish (although Mr. Jackson has seen them). The water had no odor but a chemical smell seemed to be coming from the neighboring Sunoco Plant. One hundred percent of this segment is tidal.

The embankment is mostly concrete with a five foot divider of natural covering between it and an asphalt covering which continues up to Rohm & Haas and from the embankment to the arsenal on the North bank. There is little evidence of invasives until arriving at the embankment at the mouth of the Delaware River. Rohm & Haas periodically clears the brush for safety reasons, which explains the lack of invasives upstream. An abundant amount of Japanese knotweed, some Tree of heaven, and a large quantity of debris were sited at the mouth. Where the embankment is not concrete there is some exposed soil and some rip rap (bank stabilization made up of rocks and wire mesh). The type of trash observed included bottles, cans, shopping carts and paper.

Recommendations

- Keep open contact with Frank Jackson, Rohm & Haas
- Conduct invasive and trash clean-up at mouth of embankment

IX. Management Options/Goals

The Tacony Frankford RCP's Management Options were identified and selected through a number of public forums and through the data collection efforts of the RCP and the Watershed Partnership's Watershed Management Planning problem identification process. Management options were then placed under the appropriate watershed management plan goals developed in conjuction with our partnership stakeholders. Although the RCP team felt that all of the management options were important, the team sought additional public feedback at its February 18 Public Meeting, during which the initial draft of the RCP was presented. Following the presentation, meeting participants were asked to note the goals that they personally felt passionate about by placing dots on the poster-sized print outs of the management options, which were taped to the walls of the room. Participants were given 15 dots and were allowed to place as many dots as they wanted on any set of (or single) management option. The team plans to use the same exercise during its final public meeting. The team will then perform its own final ranking, taking into account the public rankings.

1. Improve Stream Habitat and Living Resources
   - Routine stream cleans-ups*
   - Shopping Cart Program*
   - Support efforts of "non-public" landowners to preserve green land*
   - Support Awbury Master Plan
   - Work with watershed management plan to address water quality issues*

2. Improve Instream Flow Conditions
   - Protect open space in communities*
   - FGM follow up to ACOE study
   - Enforce building and zoning codes (stream buffers minimum 40 feet)*
   - Rain Barrel program expansion*
   - Demonstrate BMP projects for education and new ordinances*
   - Encourage development of vacant land/brownfields (work with PIDC)*

3. Water Quality and Pollutant Loads
   - Reduce Combined Sewer Overflows (CSOs) and repair leaking sewers*
   - Remediate environmental pollution and contaminants*

4. Improve and Protect Stream Corridors
   - ACOE Floodplain Study
   - Invasive species removal program*
   - Confiscate ATVs – use fines toward park restoration activities
   - Start "Weed Warrior" program provides training to adopt a stream and remove invasives*
   - Get ATVs out of park areas – evaluate ATV trail establishment
   - FPC Master Plan Recommendations
   - Encroachment enforcement (backyards/business)*
   - Upstream Floodplain buffering

5. Flooding
   - Address "inappropriate" industrial land use – code enforcement/ re-evaluate zoning of past use
   - Implement more stormwater Best Management Practices (BMPs) in development*
   - Protect open space in neighborhoods (evaluate per location to planning initiatives and stream protection)*
   - Address localized flooding issues*
   - Streetscape plantings*
   - Identify vacant land where available to incorporate floodplain management*

6. Recreation
   - Renovate playground areas
   - Add restrooms to park
   - Increase police/"Park Watch" presence
   - Create connection between parks, streams, recreation centers and schools
   - Enforce "No Swimming" in creek*
   - More park rangers

7. Quality of Life
   - Improved lighting and well landscaped public right of way
   - Support cultural/historical organizations like Frankford Historical Society
   - Adaptive reuse of large industrial/historic structures
   - Hazard and toxic wastes legal disposal program*
   - "No Dumping" enforcement*
   - Preserve historic character of creek/community
   - Gid rid of sewage odors along the stream*
   - Build barriers to stop dumping*
   - Construction and landscaper debris program*

8. Stewardship, Communication and Coordination
   - Funding for a dedicated staff person to oversee plan implementation, coordination and funding (for staff position too)
   - Meet with CDCs (Germantown, Frankford, Logan, etc) to encourage green development*
   - Create a media campaign to raise awareness of issues*
   - Better signage
   - Partnership between schools and large "green" property owners
   - Involve political "gatekeepers"*
   - Coordinate studies with universities*
   - Develop school programs connected to creek*
   - Develop model BMP ordinances
   - Encourage citizen monitoring*
   - Businesses – Adopt a Stream Program*
   - Complement actions of Tookany RCP
   - Develop Master Plan for Tacony Creek*
   - Create education center in watershed
   - Establish a Watershed Wide Consortium*
   - Education programs focused on history of watershed*
   - Host public/celebratory events to get people into parks and streams
   - Creation of a civic/community group of residents who live along park border

*= can begin this work now. Don't need to wait for registry!

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