

Schuylkill Watershed Conservation Plan

www.schuylkillplan.org

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prepared for

Pennsylvania Department of
Conservation and Natural Resources

and

The William Penn Foundation

by

THE
ACADEMY
OF NATURAL
SCIENCES
Patrick Center



**The
Conservation
Fund**

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Finally, the following organizations and individuals represent the planning team involved with the development of this project.

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

This River Conservation Plan for the Schuylkill River watershed has been produced through a partnership between The Conservation Fund (TCF), Natural Lands Trust (NLT) and the Patrick Center for Environmental Research at the Academy of Natural Sciences (PCER - ANS).

The Plan is designed to be a guidebook for municipalities, conservation groups, and citizens interested in taking steps to enhance the long-term health of the Schuylkill River watershed. However, due to the regional nature of the assessments in this project, it is likely that municipalities and nonprofits will be the primary users. Municipalities and nonprofits may, in turn, use the Plan to engage landowners and citizens in implementing the recommendations developed in this Plan.

The Plan focuses on three major areas of interest:

- An analysis of watershed lands required for ecosystem sustainability;
- A broad-scale analysis of water quality; and
- An assessment of watershed institutions (public agencies and nonprofit organizations).

While agricultural, scenic, cultural, historic and recreational resources are acknowledged as critical aspects of the watershed community and part of the comprehensive planning process, they have not been specifically addressed in this Plan due to the agreed-upon scope of work, the scale of the watershed assessment (almost 2,000 square miles) and the limited resources available. A tight focus on the three primary areas of interest was required to meet the goals of the project.

1.1.1 Project Goals

Goals for the Plan were established in the contract with the Pennsylvania Department of Conservation and Natural Resources (DCNR), as follows:

- Identify conservation issues important to local communities and governing agencies;
- Conduct a broad scale inventory and assessment of land and water resources to establish priorities;
- Make recommendations for a watershed-wide conservation agenda to guide future studies and actions at the site-specific, local community level; and
- Make recommendations for a management structure to implement the recommendations of the report.

1.1.2 Public Participation

The Plan includes a summary of findings on existing physical and institutional conditions, input from government agencies, municipal and county officials, and private citizens, solicited through public meetings, surveys, and interviews.

- A public opinion poll was conducted to assess the general public's environmental awareness and gather input on perceived watershed issues and problems. The poll was based on a random sample of 800 adults throughout the seven counties in the Schuylkill River watershed.

- A series of four public meetings were held during the summer of 1999 to solicit input on watershed issues. A second series of meetings were held in September 2000 to receive public comment on the key findings and recommendations from the draft watershed plan. Comments were solicited using breakout groups. Meetings were held in Berks, Schuylkill and Philadelphia counties. Public comments are listed at length in the Technical Supporting Documents. A third and final set of public meetings were held in March 2001 to review final plan recommendations and solicit potential Implementation Project lists from municipalities, government agencies and non-profits throughout the watershed
- Numerous reports and other documentation were reviewed. These included reports from federal and state agencies and nonprofit organizations. A list and summary of references is given in the Technical Support Document.
- The Schuylkill Watershed Conservation Plan Technical Advisory Committee (TAC) met four times prior to the issuance of this draft plan: September 14, 1998; May 25, 1999; and December 1, 1999. At these meetings, the TAC did not necessarily identify new issues but rather assisted in how they were categorized and presented. This draft plan was presented to the TAC on October 16, 2000 and is pending review by the TAC and PA DCNR. The TAC includes watershed representatives from federal, state and local government, nonprofit groups, academic institutions and industry.

1.1.3 Project Documentation

The documents produced through this planning effort for the Schuylkill River watershed, and information on where they can be found, is presented below.

- The Executive Summary to the Schuylkill Watershed Conservation Plan

An Executive Summary to the Conservation Plan is available as a separate document, and also included as Chapter 1 of the Plan. The intent of this summary is to present key issues and conditions in the watershed, and to describe the three focal analyses performed and their related recommendations. A printed copy of the Executive Summary is available to the public via the Plan's website, <http://www.schuylkillplan.org/>.

- The Schuylkill Watershed Conservation Plan

The complete River Conservation Plan for the Schuylkill River watershed is provided, by section, in PDF format online at <http://www.schuylkillplan.org>. This document can be downloaded and read using the free Adobe Acrobat™ software available on the Internet. The Plan contains 7 sections:

Chapter 1.0	Executive Summary
Chapter 2.0	Foreword
Chapter 3.0	Watershed Characterization
Chapter 4.0	Identification of Major Watershed Issues
Chapter 5.0	Water Quality
Chapter 6.0	Promoting a Sustainable Landscape
Chapter 7.0	Institutional Assessment

Maps referenced in these chapters of the Schuylkill Watershed Conservation Plan also are provided separately as PDF files on the website. A limited number of printed copies of the full Plan are available for review at the following locations.

- Planning Commissions: Berks, Montgomery and Schuylkill Counties
 - National Resource Conservation Service: Berks, Montgomery, and Schuylkill
 - Philadelphia Free Library
 - Schuylkill Resource Conservation District
 - Other locations as noted on the project website at: <http://www.schuylkillplan.org>.
- Maps
- Color and grayscale maps referenced in the Schuylkill Watershed Conservation Plan can be viewed on the website (<http://www.schuylkillplan.org>). Maps are referenced by name in the text of the Plan. Printed copies of the maps also are available with the full Schuylkill Watershed Conservation Plan at the selected locations listed above.
- Online Reference Documents
- Supplementary reference documents, such as large tables and general maps related to the water quality, landscape and institutional analyses, are compiled in the online Reference Documents. These documents are referenced in the chapters of the Schuylkill Watershed Conservation Plan. The Reference Documents are available online in PDF format at <http://www.schuylkillplan.org>. Paper copies of these Reference Documents have been distributed only to the project funders, to the Technical Advisory Committee, and along with the printed copies of the full Plan distributed at selected locations throughout the watershed as noted above.

1.1.4 Project Funding

The Schuylkill Watershed Conservation Plan was produced with financial assistance from the Pennsylvania DCNR's "Rivers Conservation Program," which awarded a planning grant to the project in 1997. A matching grant also was provided for the project from The William Penn Foundation.

When the Pennsylvania DCNR approves the final version, this Schuylkill Watershed Conservation Plan will be submitted for inclusion on the Pennsylvania Rivers Registry, providing the basis for DCNR matching grants to municipalities and nonprofits that are interested in implementing the recommendations provided in this report. Some of the watershed municipalities and nonprofits have provided a preliminary list of their proposed implementation projects in the online Reference Document [Potential Implementation Projects](#) to this Plan.

1.1.5 Project Partners

The project team drafted different sections of the Schuylkill Watershed Conservation Plan. Your comments on any sections are welcome. However, please recognize that these comments may not be addressed directly until the next updating of the Plan (assumed to be sometime between 2004-2006). Comments should be made via the project website, where full instructions will be given regarding comment procedures. Comments should be addressed to the project team as follows (complete contact information is provided below).

- Executive Summary, Foreword, Watershed Characterization, Identification of Major Watershed Issues and Promoting a Sustainable Landscape (Chapters 1- 4, and 6): Clare Billett, Natural Lands Trust
- Water Quality (Chapter 5): Tom Johnson, Patrick Center for Environmental Research, ANS
- Institutional Assessment (Chapter 7): Anne Desmarais, National Office, The Conservation Fund

Contact information for each project team member is given below, and via the project web page at <http://www.schuylkillplan.org>. In order to ensure appropriate documentation of your issues and concerns please submit written comments via the web site only.

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1.2 Watershed Characterization

1.2.1 Watershed Location

A *watershed* is defined as the land area that “sheds” or contributes water to a river or stream. The watershed of the Schuylkill River is located in southeastern Pennsylvania, and includes large parts of Schuylkill, Berks, Montgomery, Chester, and Philadelphia Counties (see the map: [Watershed Orientation](#)). Smaller areas of Carbon, Lehigh, Lebanon, Lancaster, Bucks and Delaware Counties also lie within the watershed. The Schuylkill River watershed is about 80 miles long and 25 miles wide, and encompasses an area of approximately 1,916 square miles (4,962 sq. km). The principal towns and cities

along the mainstem of the river are Pottsville, Reading, Pottstown, Phoenixville, Norristown, Conshohocken, and Philadelphia. See the map: [Cities, Townships & Boroughs](#).

The Schuylkill River travels approximately 130 miles from its headwaters at Tuscarora Springs in Schuylkill County, to its mouth at the Delaware River in Philadelphia. The major tributaries of the Schuylkill, in downstream order, are Mill Creek, the West Branch of the Schuylkill, Little Schuylkill, Maiden Creek, Tulpehocken Creek, Manatawny Creek, French Creek, Perkiomen Creek, and Wissahickon Creek (see the map: [Major Streams & Tributaries](#)).

For the purposes of this Conservation Plan, the Schuylkill River watershed was subdivided into 37 subwatersheds as shown in the map: [Subwatersheds & Municipalities](#). The Schuylkill subwatersheds were designated to facilitate the water quality, landscape sustainability and institutional analyses, and for ease of reference. Subwatersheds were defined at a scale small enough to allow meaningful comparisons, while not exceeding the resolution of the data. The approximate size of each subwatershed is 125 square kilometers or 12,500 hectares (about 31,000 acres). Attempts also were made to delineate subwatersheds so that areas with existing (or in-progress) river conservation plans remained intact. This was done to facilitate the incorporation of issues and recommendations from other plans into the broader Schuylkill Watershed Conservation Plan.

1.2.2 Watershed Population

The first settlers of the Schuylkill River valley were approximately 2,000 Lenape Indians, mostly of the Unami tribe, who settled in the lower reaches. The Dutch and Swedes arrived in the Philadelphia region in the early 1600s, and the river's name comes from the Dutch *Skokikl*, meaning hidden creek. The European population remained low until 1680, when William Penn obtained his land charter from King Charles II. From the 1680s through the 18th Century, Pennsylvania's population grew faster than the rest of the nation, with major growth in the southeast. Population projections through 2010 suggest that Berks County and other central parts of the Schuylkill River watershed will see the greatest population growth (between 30-50% increases) under the influence of continued decentralization to the suburbs, and economically induced out-migration from Schuylkill County.

1.2.3 Historic Land Uses

Primary land uses of the Schuylkill have changed over the years. Early settlers relied on agriculture and used the Schuylkill River network to transport crops to larger markets downstream. However, the vast natural resources in the watershed, including iron ore, hardwood, and river power, soon created a thriving iron industry. Later, with the discovery of vast coal sources in the northern headwaters, the Schuylkill River became a primary mode of transportation due to the Schuylkill Navigation System: a system of 32 dams and 103 locks. By the turn of the century, railroads replaced river navigation; however, numerous dams and canal features remained. The industrial growth and dams caused water pollution and habitat degradation, and created obstacles to migratory fish.

The coal industry peaked in the 1910s, and many coal lands were transferred to county governments by the 1930s. Abandoned mines leaking acid mine drainage (AMD) and sedimentation continued to affect water quality in the Schuylkill River watershed. Steps towards river renewal included dredging by the U.S. Army Corps of Engineers (US ACE) and recent environmental legislation, has resulted in laws governing the discharge of industrial and municipal sewage from point sources and is now focusing on reducing pollution from nonpoint sources (e.g. agriculture, urban runoff). The outcome of these efforts, along with the river's natural abilities to cleanse itself over time, is a river network on the rebound.

1.2.4 Physical Characteristics

The Schuylkill River flows through four major geological landscape provinces from its headwaters to its mouth: Ridge and Valley, New England, Piedmont, and the Atlantic Coastal Plain. The upper or headwaters portions of the watershed rise between steep hills in the Appalachian Mountain section of the Ridge and Valley province. Moving downstream, the mainstem Schuylkill River joins the West Branch at Cressona, the Little Schuylkill at Port Clinton, and flows into the Great Valley province. Past this area of open rolling farmlands, about 25 miles from its source, the Schuylkill River flows between the Reading Prong section and South Mountain into the Gettysburg-Newark Lowlands. At the mouth of the Perkiomen Creek, the Schuylkill River enters the Piedmont Uplands, an area of moderate relief. In Philadelphia, the river drops over the fall line into the Atlantic Coastal Plain, a region of low relief and tidal marshland. The Schuylkill River is a tidal river from the Fairmount Dam south of Manayunk to its mouth at the Delaware River.

Temperature and precipitation in the watershed vary with topography and elevation. The climate is generally humid, with a mean annual temperature of 52°F and summer and winter averages of 72°F and 31°F respectively. The rugged topography and higher elevations of the Appalachian Mountains causes greater temperature variations than in the Coastal Plain and Piedmont. Topography and elevation also affect precipitation elsewhere in the watershed. Average annual precipitation is highest in the mountainous headwaters region (45-50 in/yr) and decreases eastward to the Coastal Plains (43 in/yr).

Local precipitation is the source for water to rivers, streams, ponds and other aquatic environments within the Schuylkill River watershed. On average in Pennsylvania, about 50% of annual precipitation is evaporated or transpired by plants back to the atmosphere, about 20% runs off into rivers and streams as “stormflow” during rainfall and snowmelt events, and about 30% infiltrates the ground to recharge groundwater aquifers (Fleeger 1999; Biesecker et al. 1968). Rates of streamflow are highest in late winter and early spring due to snowmelt and low evaporation/transpiration rates, and lowest in late summer and early fall due to high rates of evaporation/transpiration from vegetation.

Except for unconsolidated deposits on the Coastal Plain, most aquifers within the Schuylkill River watershed are composed of consolidated rocks (Biesecker et al. 1968). The median water bearing capacities for aquifers in most of the Schuylkill River watershed range from about 20 to 200 gallons per minute. Median water bearing capacities of greater than 200 gallons per minute occur in the carbonate rocks of the Great Valley, and in the unconsolidated deposits of the Atlantic Coastal Plain. Median water bearing capacities of less than 20 gallons per minute occur in parts of the Piedmont in northern Chester and Montgomery Counties, where groundwater depletion may be an issue (Biesecker et al. 1968).

1.2.5 Vegetation and Wildlife

Forest is the dominant form of vegetation in Pennsylvania. A detailed list of *Terrestrial and Palustrine Plant Communities of Pennsylvania* produced by Fike (1999), documents 11 types of forest and woodland types in Pennsylvania. In general, the following forest associations characterize the watershed, as defined in the *Wissahickon Creek River Conservation Plan* (Delta Group et al. 1999).

- On dry upper elevations: chestnut oak, sweet birch, scarlet oak, red oak American beech, pignut hickory, black oak, white pine and black gum dominate the forest canopy.
- On cool north-facing slopes: hemlock, white pine, sweet birch, black cherry and red oak.
- In ravines with steep slopes: tuliptree, white oak, black cherry, American beech, red maple, shagbark hickory, ironwood, redbud, and dogwood.

- Along streams and floodplains: American sycamore, red maple, American basswood, river birch, white ash, ironwood, witch hazel, spicebush, elderberry and red-stem dogwood.
- On abandoned, cleared land: successional native plants such as red cedar, box elder, sumac, black locust, black walnut, blackhaw viburnum, red stem dogwood, goldenrod, asters and many other herbaceous perennials.

It is estimated that before colonial settlement around 97-98% of Pennsylvania was forested land cover (Schein and Miller 1995). Forest cover in the Schuylkill subwatersheds in the early 1990s ranged from over 70% forest cover in Schuylkill County and a few other isolated areas, to less than 33% in agricultural and developed sections. A wave of non-native (exotic) invasive plant species and pathogens also continues to alter the composition and distribution of Pennsylvania's natural plant communities.

There also are imbalances in the watershed's fauna, including localized increases in deer density that affect habitat quality for other animals and plants, and the invasion of exotic species such as the gypsy moth and the Asiatic earthworm. Much more is known about the Commonwealth's terrestrial resources than its aquatic resources, but there are indications that the aquatic resources are more threatened (PA Fish and Boat Commission 1995).

1.3 Key Findings

The following three sections on Water Quality, Landscape Sustainability and Institutional Assessment present an overview of the goals, analysis and recommendations for the three focal areas of interest identified by PA DCNR for the Schuylkill River watershed. The summary table of recommendations in each section lists the name, a brief description, priority areas or institutions for implementation, and the code number and page number where a detailed description of that recommendation can be found, in the corresponding chapter of the Schuylkill Watershed Conservation Plan. The code number is a unique identifier for that recommendation; anywhere the recommendation appears in the document it is referenced by this number.

1.4 Water Quality

1.4.1 Water Resource Issues

Good water quality is essential to the health and productivity of aquatic ecosystems, and to support a variety of human needs including industrial and domestic water supplies, drinking water, and recreation. Input from watershed stakeholders received from the public meetings, the results of the public opinion poll, and review of relevant literature highlighted the following water resource issues of major concern in the Schuylkill River watershed.

- Need for water quality monitoring data
- Urban/suburban development and stormwater runoff
- Non-point source pollution
- Habitat quality
- Acid mine drainage (in the Schuylkill headwaters region)

- Wastewater and other waste discharges
- Water supply

1.4.2 Water Quality Analysis

A summary of water quality in the Schuylkill River watershed has been compiled based on the Pennsylvania Department of Environmental Protection (PA DEP) water quality assessment, available monitoring data, and landscape/water quality modeling. The water quality analysis identifies data gaps and issues needing further study, and recommends ways to protect and improve water quality throughout the watershed. Data were analyzed in a Geographic Information System (GIS) and using hydrologic modeling. Data used in the water quality assessment and modeling were as follows.

- **Water Quality Monitoring and Assessment**
 Pennsylvania DEP 303(d) impaired waters list
 Existing monitoring data
- **Watershed Analysis and Modeling**
 Annual stormwater runoff modeling
 Annual non-point loading (nitrogen, phosphorus, sediment)
 Annual loading from septic systems (nitrogen)
 Annual point source loading from sewage treatment plants (nitrogen, phosphorus)
 Annual point source discharges requiring NPDES permits

Recommendations for protecting and improving water quality are summarized below. Please note that the Plan’s water quality analysis focuses on issues common throughout the watershed, and may not be inclusive of certain local-scale issues and problems. Where there are local-scale problems, recommendations are made to direct future, more detailed studies and actions to address these problems.

1.4.3 Recommendations for Water Quality

Recommendations for improving the water quality of the Schuylkill River watershed are summarized in the table below. These recommendations are based on the water quality analyses described in **Chapter 5.0 Water Quality**. Each recommendation is assigned a unique code number (e.g., **R5.1**) and name, and is cross-referenced to the key water quality issue(s) it addresses. These recommendations are described in more detail in **Section 5.6 Detailed Recommendations from the Water Quality Analysis**, and the page number of Chapter 5 where the detailed description of that recommendation can be found is listed in the *Page* column of this table.

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R5.1	Establish a Coordinated, Watershed-wide Monitoring Program with Quality Control Protocols	EPA, the state and key nonprofits should design a comprehensive watershed-wide monitoring program, providing training for citizen monitoring groups, and with certification protocols to ensure reliable data.	Water quality monitoring	5-21

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R5.2	Implement Urban Best Management Practices to Maximize the Infiltration of Water and Reduce Urban Non-point Source Pollution	Urban Best Management Practices such as reduction of impervious surfaces, infiltration and sedimentation basins, and street sweeping should be implemented to decrease water quality and other problems associated with stormwater runoff, and to increase groundwater recharge.	Stormwater runoff Non-point source pollution (nutrients, toxics, sediment/erosion) Water supply	5-23
R5.3	Encourage Homeowners and Small Businesses to Reduce Non-Point Pollution	Homeowners, small businesses, and individuals should be educated about how their actions influence water quality, and should be encouraged to clean up after pets, properly dispose of yard and household wastes, properly store cars and vehicles, and to take other measures to reduce non-point source pollution.	Non-point source pollution	5-24
R5.4	Implement Nutrient Management Practices	Sound Nutrient Management Practices such as soil and manure testing can help minimize the amount of fertilizer entering streams. These practices should also be implemented in suburban and urban areas where fertilizer is used.	Non-point source pollution (nutrients)	5-24
R5.5	Implement Agricultural Best Management Practices	Agricultural Best Management Practices such as no-till planting, contour plowing, and stream bank fencing can help reduce the amount of nutrient and sediment pollution entering streams.	Non-point source pollution (nutrients, sediment)	5-25
R5.6	Implement Timber Harvesting Best Management Practices	Timber harvesting Best Management Practices such as proper road construction and preservation of riparian buffers should be used to reduce the amount of sediment and nutrients entering streams.	Non-point source pollution (nutrients, sediment)	5-25
R5.7	Protect and Restore Riparian Forest Buffers	Riparian buffers function in a variety of ways to maintain the health of stream systems, and should be protected and restored whenever possible.	Non-point source pollution (nutrients, sediment) Habitat quality	5-26
R5.8	Protect and Restore Wetlands and Areas of Hydric Soils	Wetlands provide many benefits including the regulation of stormwater runoff, water quality improvements, and unique and important habitat. Efforts should be made to protect and restore wetlands throughout the watershed. Areas of hydric soils may offer the best potential for wetland restoration.	Non-point source pollution (nutrients, sediment) Stormwater runoff Habitat quality	5-27
R5.9	Identify and Enforce Sediment and Erosion Control Problems and Violations	Construction sites contribute a significant amount of sediment to receiving waters. Procedures for monitoring compliance with existing laws should be maintained. Volunteers can be trained to help monitor for existing and potential problems.	Non-point source pollution (sediment/erosion)	5-27

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R5.10	Establish Uniform, Watershed-wide Criteria for Permitted Discharges from Sewage Treatment Plants (STPs)	Criteria for permitted discharges of pollutants such as fecal coliforms vary among different PA DEP regions within the watershed. Uniform criteria should be developed to help regulate and reduce water quality impairment from sewage treatment plants.	Point source pollution (pathogens/nutrients)	5-28
R5.11	Monitor Nutrients from All Sewage Treatment Plants	Sewage treatment plants may not monitor all relevant nutrient levels in their effluent. Establishing uniform discharge criteria and monitoring nutrients at all sewage treatment plants would help to assess nutrient loading to receiving waters.	Point source pollution (nutrients from STPs)	5-28
R5.12	Promote Tertiary Treatment of Sewage Effluent	Less than half of the treatment plants in the Schuylkill River watershed provide tertiary treatment of sewage effluent. Where effluent is a problem, plants should be upgraded to provide higher levels of treatment.	Point source pollution (nutrients from STPs)	5-28
R5.13	Identify and Control Discharges of Untreated Sewage from "Wildcat Systems" and Combined Sewer Overflows (CSOs)	Discharges of untreated sewage from "wildcat" systems and combined sewer overflows represent a threat to human health and aquatic ecosystems. Wildcat systems should be identified and regulated, and CSOs monitored for compliance with existing regulations.	Point source pollution (nutrients, pathogens)	5-29
R5.14	Establish Septic Education, Registration, Inspection, and Maintenance Programs	Septic programs would instruct owners about proper care and maintenance of septic systems, and should provide homeowners with a method for testing their septic systems.	Non-point source pollution (nutrients)	5-29
R5.15	Size and Maintain Culverts and Bridges to Ensure Minimal Impact to Streams	Culverts and bridges should be sized and located to adequately convey both low flow and storm events. Structures must also be properly maintained and inspected to prevent obstruction, scour and erosion.	Stormwater runoff Non-point source pollution (sediment/erosion)	5-29
R5.16	Conduct Inventories and Studies to Identify and Remove Dams Where Restoration Benefits Outweigh Present Uses and Effects	Dams can provide benefits, but also cause a broad range of negative ecological impacts. Inventories and studies should be conducted to determine where dams are on the Schuylkill River and if they should be removed. The benefits of removal (restoration of stream habitat, fish passage, and water quality) may outweigh present uses and/or effects. Where dam removal does not have overall benefits, construction of fish ladders should be studied and implemented where possible.	Habitat quality Water supply	5-30

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R5.17	Identify Sources and Mitigate Effects of Acid Mine Drainage	AMD is a significant source of water pollution in the headwaters of the Schuylkill River watershed. In conjunction with other projects, undocumented sources of AMD should be identified and monitored, and a restoration program initiated.	Acid mine drainage	5-30
R5.18	Monitor and Regulate Existing and Future Groundwater Withdrawals	When groundwater withdrawals exceed the sustainable yield of aquifers, water supplies can be threatened, streamflow diminished, and aquatic ecosystems degraded. Existing and future groundwater withdrawals should be monitored and regulated to avoid groundwater depletion.	Water supply Habitat quality	5-31
R5.19	Support PEMA Removal of Structures from Flood Prone Areas	The Pennsylvania Emergency Management Agency (PEMA) has established a program, which promotes the acquisition and removal of structures from flood-prone areas. Efforts should be made to support this program.	Stormwater runoff Non-point source pollution	5-32
R5.20	Fund Studies to Document Watershed Condition and Resources	Watershed management should be based on sound scientific principles and reliable field data. Studies should be conducted to document watershed resources including detailed water budgets, water quality trends, land cover changes, extent of riparian disturbance, wetland disturbance, and other characteristics.	Stormwater runoff Non-point source pollution Point source pollution Habitat quality Water supply	5-32
R5.21	Support Studies to Assess the Impacts of Mineral Extraction on Water Quality and Quantity	For mining operations in the watershed, there may be potential metals and sediment impacts on adjacent streams; when closed down, there may be potential groundwater/hydrology impacts. In order to better understand both water quality and water quantity issues in the watershed, these impacts should be assessed.	Point source pollution Habitat quality Water supply	5-33
R5.22	Complete Comprehensive Water Budget Studies for the 37 Subwatersheds in the Schuylkill Drainage	Follow-up studies to the current source water assessment (SWA) should conduct combined surface and ground water studies to generate watershed-based water budgets, so that a prioritized strategic plan of action can be developed to preserve the watershed's water resources. The cumulative impacts of water withdrawal, discharge, transfers out of the watershed and recharge also should be considered.	Stormwater runoff Non-point source pollution Point source pollution Habitat quality Water supply	5-33

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R5.23	Support Cost-Effectiveness Studies on Treating Point Versus Non-Point Source Pollution Impacts	The current SWA, or follow-up studies, should prioritize which water pollution issues to address first in terms of cost-effectiveness. Subwatershed-based cost-benefit analysis of treating point versus non-point source pollution impacts should direct strategic action on pollution treatment in the watershed.	Stormwater runoff Non-point source pollution Point source pollution Habitat quality Water supply	5-33
R5.24	Support Cumulative Impact Assessments for Point and Non-point Source Pollution	The current SWA, or follow-up studies, should assess the cumulative impacts of point and non-point pollution, and if possible, also assess the cumulative water extraction, discharge and recharge effects on a subwatershed basis across the entire watershed.	Stormwater runoff Non-point source pollution Point source pollution Habitat quality Water supply	5-33
R5.25	Support Outreach Phase for Implementation of the Schuylkill Source Water Assessment (SWA)	The current SWA should be implemented through a follow-up outreach phase that ensures the guidelines it provides are adopted by municipalities, point-source facilities, nonprofits and citizens where necessary adopted throughout the watershed. This assessment should be done on a subwatershed basis to facilitate implementation.	Stormwater runoff Non-point source pollution Point source pollution Habitat quality Water supply	5-34

1.4.4 Water Quality Subwatershed Guide

To facilitate the use of this Executive Summary and the Schuylkill Watershed Conservation Plan, the table presented below provides key water quality recommendations and issues cross-referenced to the priority areas and subwatersheds to which they refer. While most the water quality recommendations are targeted specifically at the subwatershed scale, a few recommendations from this section are applicable watershed-wide. This table can be used as a quick geographical reference on the key water quality issues and recommendations applying in a given subwatershed of the Schuylkill River watershed. In addition, please refer to the [Reference Table 1A: Municipality Locations by Subwatersheds](#) for a cross-walked guide to which municipalities are in each subwatershed.

NOTE THAT VALUES IN THE FOLLOWING TABLES PROVIDE RELATIVE PRIORITIES ONLY. ISSUES WITH A LOW RANK MAY STILL BE OF SIGNIFICANT CONCERN IN A GIVEN SUBWATERSHED AT A LOCAL RATHER THAN REGIONAL LEVEL.

*PLEASE REFER TO COMPLETE **Schuylkill Watershed Conservation Plan** FOR FULL DETAILS.*

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)		Water Quality Monitoring	Urban Development/ Impervious Cover	Runoff as a Percent of Precipitation	Roads and Road/Stream Crossings	Dams	Nitrogen and Phosphorus from Land Cover	Nitrogen from Septic Systems	Sediment from Land Cover	Nitrogen and Phosphorus from Sewage Treatment Plants
	1 = Higher Relative Priority 5 = Lower Relative Priority									
	Section in Plan	5.4	5.5.2	5.5.3	5.5.4	5.5.5	5.5.6	5.5.7	5.5.8	5.6.9
	Recommendations Associated with Issue	R5.1	R5.2	R5.2	R5.7 R5.15	R5.16	R5.2 R5.4 R5.5 R5.6 R5.7 R5.8	R5.14	R5.2 R5.5 R5.6 R5.7 R5.8 R5.9	R5.10 R5.11 R5.12 R5.13
SUBWATERSHEDS										
U/S	East Branch Perkiomen Creek	Watershed Wide Issue - Subwatersheds Not Ranked	3	3	1	3	1	1	2	2
H	French Creek		3	5	3	1	4	2	4	-
H	Hay Creek		3	5	3	4	3	1	1	4
A	Little Northkill/Northkill Creek		5	5	4	3	1	4	2	-
H	Little Schuylkill River (Lower)		5	5	4	5	5	5	4	-
H	Little Schuylkill River (Upper)		4	2	3	2	5	5	4	2
A	Lower Maiden Creek		4	4	4	3	1	3	3	4
H	Lower Manatawny Creek		3	5	3	4	3	1	1	4
U/S	Lower Perkiomen Creek		2	3	3	2	2	1	2	1
A	Lower Tulpehocken Creek		2	4	4	3	1	2	2	3
U/S	Lower Wissahickon Creek		1	1	5	4	5	3	5	-
A	Middle Tulpehocken Creek		4	3	5	2	2	4	2	4
A	Monacacy Creek		5	5	4	4	2	4	1	-
A	Ontelaunee/Kistler Creek		5	5	1	5	2	4	1	3
H	Pickering Creek		3	5	2	1	3	3	3	-
A	Sacony Creek		5	4	1	5	1	2	1	3
U/S	Sandy Run		1	1	4	5	4	4	5	1
U/S	Schuylkill River 1		1	1	2	1	4	2	5	2
U/S	Schuylkill River 2		1	1	2	2	3	5	5	1
U/S	Schuylkill River 3		2	3	2	4	2	1	3	1
H	Schuylkill River 4	2	4	5	5	4	2	3	2	
H	Schuylkill River 5	2	3	1	1	5	3	4	2	
U/S	Schuylkill River 6	S u b	1	1	5	5	3	4	4	-

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)	1 = Higher Relative Priority 5 = Lower Relative Priority	Water Quality Monitoring	Urban Development/ Impervious Cover	Runoff as a Percent of Precipitation	Roads and Road/Stream Crossings	Dams	Nitrogen and Phosphorus from Land Cover	Nitrogen from Septic Systems	Sediment from Land Cover	Nitrogen and Phosphorus from Sewage Treatment Plants
	Section in Plan	5.4	5.5.2	5.5.3	5.5.4	5.5.5	5.5.6	5.5.7	5.5.8	5.6.9
	Recommendations Associated with Issue	R5.1	R5.2	R5.2	R5.7 R5.15	R5.16	R5.2 R5.4 R5.5 R5.6 R5.7 R5.8	R5.14	R5.2 R5.5 R5.6 R5.7 R5.8 R5.9	R5.10 R5.11 R5.12 R5.13
	SUBWATERSHEDS									
A	Schuylkill River 7		4	5	2	2	1	2	2	3
H	Schuylkill River 8		4	4	1	4	5	4	4	2
H	Schuylkill River Headwaters		3	2	1	2	5	5	5	4
U/S	Schuylkill River Tidal		1	1	5	5	2	5	5	-
U/S	Skippack Creek		2	2	1	4	2	1	3	1
H	Swamp Creek		3	5	4	3	3	1	1	3
H	Unami Creek		4	3	3	1	4	1	3	3
H	Upper Maiden Creek		5	5	2	5	3	5	1	-
H	Upper Manatawny Creek		5	5	2	3	4	3	3	4
H	Upper Perkiomen Creek		4	4	1	1	4	2	2	4
A	Upper Tulpehocken Creek		4	4	3	3	1	4	1	4
U/S	Upper Wissahickon Creek		1	2	5	1	3	5	5	1
U/S	Valley Creek		2	2	3	4	4	3	4	-
H	West Branch Schuylkill River		3	2	4	2	5	5	5	3

1.5 Landscape Sustainability

1.5.1 Landscape and Land Use Issues

An assessment of the watershed's natural resources was conducted to identify existing and proposed natural lands and biodiversity resources, assess the value of those resources, and outline a framework for conservation priorities that will facilitate planning and implementation of a sustainable watershed landscape. The goal of promoting a sustainable landscape focuses on: creation of an integrated, connected natural lands vision for the Schuylkill River watershed, incorporating existing and proposed greenspace nodes; and, recognition that protecting a quorum of natural lands will promote landscape sustainability and help preserve water quality.

The following issues related to landscape sustainability were highlighted during the public opinion poll and the public meetings.

- Loss of critical natural lands to development due to rapid urban/suburban sprawl
- Need to encourage responsible growth and offset associated losses of farmlands and wetlands
- Need for open space preservation to assist in water quality preservation
- Need to create and maintain linear parks and greenways as biodiversity connectors and riparian corridors to preserve water quality
- Lack of guidance on ecological management of protected natural lands
- Lack of strategic regional planning for identifying and conserving the watershed's ecological resources

1.5.2 Landscape Analysis

Landscape analysis is a process of considering interrelated spatial features, defining patterns, identifying regional issues and/or ecological and human processes that are likely to cause those patterns, and then recommending solutions to solve the identified problems. A *sustainable landscape* is defined in this Plan as a matrix of natural lands that function together within a defined area to maintain the essential ecological processes that support life, and to maximize and sustain natural biodiversity across a region.

The goal of the landscape analysis was to identify landscapes that will help to sustain the watershed ecosystem, by defining the pattern of greenspace and protected natural areas that can function as an interconnected network to protect the ecological and hydrological processes of the watershed. Landscape analysis within the Schuylkill River watershed was completed on the basis of the 37 subwatersheds shown in the [Watershed Orientation](#) map. Specific steps taken to achieve the goal of promoting a sustainable landscape in the Schuylkill River watershed were:

- Identification and mapping of existing greenspace components;
- Analysis and mapping of proposed greenspace components based on natural resource values;
- Mapping population projections to establish potential "threat" to watershed resources; and
- Providing recommendations and implementation tools, focusing on the need for strategic planning and institutional capacity building to ensure implementation of these recommendations.

Within the Schuylkill River watershed, a fabric of ecologically significant lands remains in a more or less natural, undeveloped condition. Maintenance of this ecological fabric can provide a critical quorum of land for preservation of good water quality, healthy functioning of the hydrological cycle and mitigation of non-point source pollution throughout the Schuylkill River watershed. However, at present growth rates many of these natural areas could disappear within the next twenty years, primarily lost to development, unless decisive, large-scale, proactive steps are taken to protect, maintain and/or restore these natural resources as soon as possible.

After analysis of the components discussed above, it was recognized that more than 200,000 acres, (i.e., approximately 15%), of the Schuylkill River watershed represent priority lands for conservation or restoration. The [Sustainable Landscape Vision](#) map shows a network of biodiversity hotspots, sensitive lands, forested lands and greenspace corridors that represents a template for promoting a sustainable watershed landscape.

A series of maps related to the landscape analysis are included in the online Reference Documents to the Schuylkill Watershed Conservation Plan. Recommendations for protecting and implementing landscape sustainability are summarized below.

1.5.3 Recommendations for Landscape Sustainability

Recommendations for sustaining the landscape of the Schuylkill River watershed are summarized in the table below. These recommendations are based on the landscape analyses described in **Chapter 6.0 Promoting a Sustainable Landscape**. Each recommendation is assigned a unique code number (e.g., **R6.1**) and name, and is cross-referenced to the key landscape or land use issue(s) it addresses. These recommendations are described in more detail in **Section 6.8 Detailed Recommendations for Landscape Sustainability**, and the page number in Chapter 6 where the detailed description of that recommendation can be found is listed in the *Page* column of this table.

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R6.1	Establish a Watershed Land Protection Collaborative (WLPC) to Proactively Protect Greenspace	More than 200,000 acres of potential greenspace across the watershed need to be protected within the next 20 years, to serve as the framework of a sustainable landscape and to ensure the health of the Schuylkill River watershed. A Watershed Land Protection Collaborative composed of watershed conservation groups working together needs to be established, to promote strategic land conservation and efficient resource use.	Loss of natural lands Need for greenspace Strategic conservation	6-23
R6.2	Refine Prioritization of Watershed Natural Lands using a Standardized Relative Assessment Tool	The watershed conservation community must take proactive steps to further prioritize high priority, sensitive lands according to their ecological value and degree of threat. Conservation groups should use established relative assessment tools to refine land prioritization and to conserve the high priority potential greenspace identified in this plan.	Loss of natural lands Need for greenspace Strategic conservation	6-24

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R6.3	Support Outreach and Education Programs Providing Landowners with Land Preservation Options	Private citizens, who may have little understanding of the land preservation and ecological management options available to them, own the vast majority of lands proposed for preservation in the watershed. Outreach and education efforts should provide landowners with viable options and guidelines for land preservation and ecological management.	Loss of natural lands Need for greenspace Guidance on ecological management	6-25
R6.4	Proactively Protect PA Natural Diversity Inventory (PNDI) Sites	Protecting these identified high-value sites will help maintain the rare species biodiversity reservoir in the watershed. Protection of PNDI areas should be implemented in order of priority and threat, and to ensure a balanced portfolio of species and community biodiversity.	Loss of natural lands Need for greenspace	6-25
R6.5	Proactively Protect Identified Greenspace Nodes	Greenspace nodes (e.g., important bird areas, wetlands, floodplains, blocks of contiguous forest cover over 500 acres, and other priority habitat subwatersheds) need to be protected since they represent the biodiversity reservoirs in the watershed. Protection should be implemented in order of priority and threat.	Loss of natural lands Need for greenspace	6-26
R6.6	Proactively Protect, Restore and Create Identified Greenway Corridors	Greenway corridors will link greenspace nodes to help maintain environmental viability and connectivity in the watershed. In many cases, they can also serve a dual purpose as riparian buffers. Action should be taken according to priority and threat, where possible.	Loss of natural lands Need for greenspace Landscape connectivity	6-26
R6.7	Develop Strategic Protection Plans for Identified Subwatersheds in Habitat Zones	Site-specific plans must be developed for each priority habitat subwatershed to identify appropriate land parcels for permanent protection. Protection should be implemented in order of priority and threat, where possible.	Loss of natural lands Need for greenspace Guidance on ecological management Strategic conservation	6-27
R6.8	Develop Strategic Restoration Plans for Identified Primary Restoration Subwatersheds	Site-specific plans must be developed for each priority restoration subwatershed to identify appropriate land parcels for riparian buffer installation and/or reforestation. These efforts should be reinforced with permanent protection where possible, and be implemented according to priority and degree of threat.	Loss of natural lands Need for greenspace Guidance on ecological management Strategic conservation	6-28

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R6.9	Develop and Adopt a Strategic Protection Plan for Watershed-wide Agricultural Land Resources	Develop a watershed-wide plan based on site-specific data (soils, agricultural security districts) and funding, to prioritize agricultural land parcels for protection. Agricultural preservation can serve a supporting role in maintaining landscape sustainability if ecological BMPs and NMPs are implemented and enforced.	Need for greenspace Guidance on ecological management Strategic conservation	6-29
R6.10	Reactively Protect Natural Resources in the Watershed as Opportunity Arises	Whenever an unsolicited, high quality, cost-effective natural land protection opportunity arises (i.e., maximum natural land acreage for minimum financial and time resources), it should be evaluated for protection regardless of greenspace and subwatershed priorities.	Loss of natural lands Need for greenspace	6-29
R6.11	Promote Development of Forest Resource Management Plans on Privately-owned Forest Lands	The majority of the watershed's forest resources are found on private lands, and owners should be provided guidance on maintaining or restoring these lands to their natural health and viability.	Loss of natural lands Guidance on ecological management	6-30
R6.12	Control Invasive Species and Deer Densities to Enhance Forest Regeneration of Native Plants	Demonstration projects, particularly at environmental education facilities, should be developed and supported to address these concerns, especially where the human community is demonstrably engaged in proposed demonstration land management projects.	Loss of natural lands Guidance on ecological management	6-30
R6.13	Develop Watershed-wide Adaptive Ecological Land Management Guidelines for Protected Lands	Provide a detailed, standardized tool-kit for adaptive ecological management plans that includes the use of BMPs and NMPs on protected lands. Make this available to the watershed conservation community through a watershed service center.	Guidance on ecological management Strategic conservation	6-31
R6.14	Establish Community-Based Programs to Implement Adaptive Ecological Management Plans on All Protected Lands by Priority	By developing Adaptive Ecological Management Plans that can be implemented by community volunteers, neighborhoods can reconnect with the local ecosystems on which they depend. A watershed-wide program should focus on the Urban/Suburban Zone.	Guidance on ecological management Strategic conservation	6-32
R6.15	Develop and Adopt a Strategic Resources Plan for Watershed-wide Land Protection, Restoration and Ecological Management	A watershed coalition of interested groups needs to build capacity (funding, personnel, expertise and leverage strategies) and develop a strategic funding plan to ensure sufficient resources to implement the land protection, restoration and management recommendations.	Strategic conservation	6-32

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R6.16	Develop an Interactive GIS Resource for the Watershed Community	Capitalize on the investment made in GIS mapping and analysis for this Plan by making these data available through an interactive tool for use by the watershed conservation community and government agencies.	Strategic conservation	6-34
R6.17	Establish a Funding Base, Schedule and Distribution Protocol for Updating and Upgrading GIS Mapping	To address data gaps identified in this Plan, ensure that critical new or updated GIS data are added to the watershed GIS data set as necessary. Mandatory annual GIS data reviews should assess and address update/upgrade needs. Ensure distribution of upgraded GIS database to the watershed conservation community.	Strategic conservation	6-34
R6.18	Develop Local-Scale Comprehensive Subwatershed River Conservation Plans	Comprehensive subwatershed plans should be completed for areas in the Schuylkill River watershed not currently covered by local-scale River Conservation Plans.	Guidance on ecological management Need for greenspace Strategic conservation	6-36
R6.19	Support the Schuylkill River Heritage Corridor Management Action Plan	The Schuylkill River Greenway Association should be supported by government and watershed nonprofits in its efforts to develop a comprehensive Management Action Plan for the Schuylkill River Heritage Corridor and the National Heritage Area, addressing a full range of cultural, historic, scenic and recreational resource needs.	Need for greenspace Strategic conservation	6-36
R6.20	Encourage Smart Growth Policies	A number of smart growth programs exist at the federal, state and local levels, to help guide the development process to ensure sound environmental and economic growth.	Loss of natural lands Need for greenspace	6-37
R6.21	Support Brownfield Redevelopment Initiatives	As the complimentary strategy to land preservation, a model redevelopment incentive ordinance with BMPs should be developed. Montgomery County Planning Department would be an ideal choice for developing this text, which could subsequently be distributed to municipalities throughout the watershed.	Loss of natural lands Need for greenspace Strategic conservation	6-38
R6.22	Support Development of Standardized Demographic, Transit, Infrastructure and Land Use “Change Indicators” for the Entire Watershed	In order to adequately characterize levels of threat in the watershed so as to better direct conservation, a collaboration of county planning agencies could address the need to develop and maintain periodic updates for critical data that will assist in tracking the development pressure and human population impacts throughout the watershed.	Loss of natural lands Need for greenspace Strategic conservation	6-38

1.5.4 Landscape Sustainability: Guide to Key Subwatershed Characteristics

To facilitate the use of this Executive Summary and the Schuylkill Watershed Conservation Plan, the tables presented below provide key landscape sustainability characteristics, recommendations and issues cross-referenced to the priority areas and subwatersheds to which they refer. While most the landscape sustainability recommendations are targeted specifically at the subwatershed scale, a few recommendations from this section are applicable watershed-wide. This table can be used as a quick geographical reference on the key landscape sustainability issues and recommendations applying in a given subwatershed of the Schuylkill River watershed. In addition, please refer to the [Reference Table 1A: Municipality Locations by Subwatersheds](#) for a cross-walked guide to which municipalities are in each subwatershed.

NOTE THAT VALUES IN THE FOLLOWING TABLES PROVIDE RELATIVE PRIORITIES ONLY – UNFAVORABLE CHARACTERISTICS WITH A LOWER RELATIVE PRIORITY RANK MAY STILL BE OF SIGNIFICANT CONCERN IN A GIVEN SUBWATERSHED AT A LOCAL RATHER THAN REGIONAL LEVEL.

PLEASE REFER TO COMPLETE Schuylkill Watershed Conservation Plan FOR FULL DETAILS.

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)	1 = Higher Relative Priority 5 = Lower Relative Priority	Estimated Population Increase	Low Habitat Value	<33% Forested Land Cover	High Habitat Value	>70% Forested Land Cover	>60% 1st Order Streams
	Section in Plan	6.6	6.5.1	6.5.3	6.5.1	6.5.3	6.5.3
	Recommendations Associated with Characteristic	R6.1 R6.2 R6.4 R6.5 R6.6 R6.7 R6.10 R6.12 R6.14 R6.20 R6.21 R6.22	R6.1 R6.2 R6.4 R6.5 R6.6 R6.8 R6.9 R6.10 R6.12 R6.14 R6.20 R6.21 R6.22	R6.1 R6.2 R6.4 R6.5 R6.6 R6.8 R6.9 R6.10 R6.12 R6.14 R6.20 R6.21 R6.22	R6.1 R6.2 R6.4 R6.5 R6.6 R6.7 R6.10 R6.11 R6.12 R6.13 R6.20 R6.21 R6.22	R6.1 R6.2 R6.4 R6.7 R6.10 R6.11 R6.12 R6.13 R6.20 R6.21 R6.22	R6.1 R6.2 R6.4 R6.7 R6.10 R6.12 R6.13 R6.20 R6.21 R6.22
SUBWATERSHEDS							
U/S	East Branch Perkiomen Creek	3	2	-	-	-	-
H	French Creek	2	-	-	3	-	-
H	Hay Creek	2	-	-	1	1	1
A	Little Northkill/Northkill Creek	2	3	-	-	-	1
H	Little Schuylkill River (Lower)	-	-	-	1	1	1

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)	1 = Higher Relative Priority 5 = Lower Relative Priority	Estimated Population Increase	Low Habitat Value	<33% Forested Land Cover	High Habitat Value	>70% Forested Land Cover	>60% 1st Order Streams
	Section in Plan	6.6	6.5.1	6.5.3	6.5.1	6.5.3	6.5.3
	Recommendations Associated with Characteristic	R6.1	R6.1	R6.1	R6.1	R6.1	R6.1
		R6.2	R6.2	R6.2	R6.2	R6.2	R6.2
SUBWATERSHEDS							
H	Little Schuylkill River (Upper)	-	-	-	1	1	-
A	Lower Maiden Creek	1	3	1	-	-	-
H	Lower Manatawny Creek	-	-	-	4	-	-
U/S	Lower Perkiomen Creek	1	3	-	-	-	-
A	Lower Tulpehocken Creek	2	2	1	-	-	-
U/S	Lower Wissahickon Creek	-	2	-	-	-	-
A	Middle Tulpehocken Creek	1	3	-	-	-	-
A	Monacacy Creek	1	3	-	-	-	1
A	Ontelaunee/Kistler Creek	3	2	1	-	-	-
H	Pickering Creek	1	-	-	4	-	-
A	Sacony Creek	-	2	-	-	-	-
U/S	Sandy Run	1	3	-	-	-	-
U/S	Schuylkill River 1	-	1	1	-	-	-
U/S	Schuylkill River 2	-	2	-	-	-	-
U/S	Schuylkill River 3	-	1	1	-	-	-
H	Schuylkill River 4	3	-	-	3	-	1
H	Schuylkill River 5	-	-	-	3	-	-
U/S	Schuylkill River 6	1	3	-	-	-	-
A	Schuylkill River 7	3	1	1	-	-	-

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)	1 = Higher Relative Priority 5 = Lower Relative Priority	Estimated Population Increase	Low Habitat Value	<33% Forested Land Cover	High Habitat Value	>70% Forested Land Cover	>60% 1st Order Streams	
	Section in Plan	6.6	6.5.1	6.5.3	6.5.1	6.5.3	6.5.3	
	Recommendations Associated with Characteristic	R6.1	R6.1	R6.1	R6.1	R6.1	R6.1	R6.1
		R6.2	R6.2	R6.2	R6.2	R6.2	R6.2	R6.2
R6.4		R6.4	R6.4	R6.4	R6.4	R6.4	R6.4	
R6.5		R6.5	R6.5	R6.5	R6.7	R6.7	R6.7	
R6.6		R6.6	R6.6	R6.6	R6.10	R6.10	R6.10	
R6.7		R6.8	R6.8	R6.8	R6.11	R6.11	R6.12	
R6.10		R6.9	R6.9	R6.9	R6.12	R6.12	R6.13	
R6.12		R6.10	R6.10	R6.10	R6.13	R6.13	R6.20	
R6.14		R6.12	R6.12	R6.12	R6.20	R6.20	R6.21	
R6.20		R6.14	R6.14	R6.14	R6.21	R6.21	R6.22	
R6.21	R6.20	R6.20	R6.20	R6.22	R6.22			
R6.22	R6.21	R6.21	R6.21					
R6.22	R6.22	R6.22	R6.22					
SUBWATERSHEDS								
H	Schuylkill River 8	-	-	-	2	-	-	
H	Schuylkill River Headwaters	-	-	-	1	1	-	
U/S	Schuylkill River Tidal	-	1	1	-	-	-	
U/S	Skipack Creek	2	2	-	-	-	1	
H	Swamp Creek	1	-	-	4	-	-	
H	Unami Creek	2	-	-	3	-	-	
H	Upper Maiden Creek	1	-	-	3	-	-	
H	Upper Manatawny Creek	3	-	-	4	-	1	
H	Upper Perkiomen Creek	3	-	-	3	-	-	
A	Upper Tulpehocken Creek	3	-	1	-	-	1	
U/S	Upper Wissahickon Creek	3	3	-	-	-	-	
U/S	Valley Creek	3	3	-	-	-	-	
H	West Branch Schuylkill River	3	-	-	3	1	-	

1.5.5 Landscape Sustainability: Geographic Guide to Subwatershed Recommendations

NOTE THAT WATERSHED-WIDE RECOMMENDATIONS ARE NOT INCLUDED IN THE FOLLOWING TABLE. ALSO, VALUES IN THE FOLLOWING TABLES PROVIDE RELATIVE PRIORITIES ONLY. RECOMMENDATIONS WITH A LOW RANK MAY STILL BE OF SIGNIFICANT CONCERN IN A GIVEN SUBWATERSHED AT A LOCAL RATHER THAN REGIONAL LEVEL.

PLEASE REFER TO COMPLETE Schuylkill Watershed Conservation Plan FOR FULL DETAILS.

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)		Proactively Protect PNDI Sites	Proactively Protect Identified Greenspace Nodes	Proactively Protect Restore &/or Create Identified Greenspace Corridors	Develop Strategic Protection Plans	Develop Strategic Restoration Plans	Develop Strategic Agricultural Protection Plan	Establish Community-Based Ecological Management Prgrams	Develop Local Scale Comprehensive Subwatershed River Conservation Plans
	1 = Higher Relative Priority								
	5 = Lower Relative Priority								
	Section in Report	6.4.2	6.4	6.4	6.5 6.6	6.5 6.6	6.5 6.6	6.4	3.6
Recommendations Associated with Issue	R6.4	R6.5	R6.6	R6.7	R6.8	R6.9	R6.14	R6.18	
SUBWATERSHEDS									
U/S	East Branch Perkiomen Creek		2	2	-	-	3	1	-
H	French Creek	1	3	3	4	-	4	-	-
H	Hay Creek	1	3	3	1	-	4	-	-
A	Little Northkill/Northkill Creek	2	1	1	-	2	1	-	-
H	Little Schuylkill River (Lower)	3	3	3	1	-	4	-	-
H	Little Schuylkill River (Upper)	3	3	3	3	-	4	-	1
A	Lower Maiden Creek	2	1	1	-	-	1	-	-
H	Lower Manatawny Creek	-	3	3	5	-	4	-	1
U/S	Lower Perkiomen Creek	2	2	2	-	-	3	1	-
A	Lower Tulpehocken Creek	-	1	1	-	-	1	2	-
U/S	Lower Wissahickon Creek	-	2	2	-	-	-	1	-
A	Middle Tulpehocken Creek	3	1	1	-	-	2	-	-
A	Monacacy Creek	3	1	1	-	-	2	-	2
A	Ontelaunee/Kistler Creek	3	1	1	-	4	2	-	-
H	Pickering Creek	3	3	3	5	-	4	-	-
A	Sacony Creek	2	1	1	-	-	1	-	-
U/S	Sandy Run	-	2	2	-	-	-	1	-
U/S	Schuylkill River 1	4	2	2	-	-	-	1	3
U/S	Schuylkill River 2	4	2	2	-	-	-	1	3
U/S	Schuylkill River 3	4	2	2	-	-	3	1	3*

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)		Proactively Protect PNDI Sites	Proactively Protect Identified Greenspace Nodes	Proactively Protect Restore &/or Create Identified Greenspace Corridors	Develop Strategic Protection Plans	Develop Strategic Restoration Plans	Develop Strategic Agricultural Protection Plan	Establish Community-Based Ecological Management Prgrms	Develop Local Scale Comprehensive Subwatershed River Conservation Plans
	1 = Higher Relative Priority 5 = Lower Relative Priority								
	Section in Report	6.4.2	6.4	6.4	6.5 6.6	6.5 6.6	6.5 6.6	6.4	3.6
	Recommendations Associated with Issue	R6.4	R6.5	R6.6	R6.7	R6.8	R6.9	R6.14	R6.18
SUBWATERSHEDS									
H	Schuylkill River 4	3	3	3	4	-	4	2	2
H	Schuylkill River 5	2	3	3	4	-	4	2	1
U/S	Schuylkill River 6	-	2	2	-	-	-	1	3
A	Schuylkill River 7	-	1	1	-	-	1	-	2
H	Schuylkill River 8	3	3	3	3	-	4	-	1
H	Schuylkill River Headwaters	2	3	3	2	-	4	-	1
U/S	Schuylkill River Tidal	-	2	2	-	-	-	1	3
U/S	Skippack Creek	4	2	2	-	3	3	1	-
H	Swamp Creek	2	3	3	5	-	4	-	-
H	Unami Creek	2	3	3	4	-	4	-	-
H	Upper Maiden Creek	2	3	3	5	5	3	-	-
H	Upper Manatawny Creek	1	3	3	4	-	4	-	-
H	Upper Perkiomen Creek	1	3	3	4	-	4	-	-
A	Upper Tulpehocken Creek	2	1	1	-	1	1	-	-
U/S	Upper Wissahickon Creek	4	2	2	-	-	-	1	-
U/S	Valley Creek	4	2	2	-	-	-	1	-
H	West Branch Schuylkill River	2	3	3	3	-	4	-	1

* For the portion in Montgomery County only, since the portion in Chester County is being completed through the Chester County Water Resources Management Plan.

1.6 Institutional Assessment

1.6.1 Institutional and Organizational Issues

Interested stakeholders, including organizations and government entities, are important resources throughout the Schuylkill River watershed. Effective watershed management and conservation action require a cooperative effort on the part of local, regional and national institutions. In particular, the water quality and open space recommendations documented in this Plan cannot be carried out without the concerted, affirmative action of the watershed's organizations and government entities.

Participants in public meetings held during the planning process highlighted the following issues related to watershed institutions in the Schuylkill River watershed:

- Improve coordination among organizations for watershed-wide management;
- Build capacity between public agencies and nonprofit organizations; especially in funding, citizen involvement, training and board development; and
- Increase education/outreach and public awareness of watershed issues.

1.6.2 Institutional Assessment

An assessment of the watershed's institutional framework was conducted to identify major activities of nonprofit and public agency stakeholders, to assess opportunities for watershed-wide coordination, to make recommendations to strengthen existing organizations, and to outline a framework for watershed leadership that will facilitate planning and implementation of projects for sustainable watershed management. This institutional assessment was conducted through a survey of nonprofit organizations and a second survey of public agencies. These surveys were used to assess the watershed's existing institutional framework, to identify watershed activities and organizational needs among institutions, and to make recommendations for effective watershed management.

Understanding that nonprofit organizations fill the vital link between citizen and government action and implementation projects, the primary purpose of the **Nonprofit Survey** was to identify geographic regions in the watershed that are potentially under-served by nonprofit activity, or that may require coordination of nonprofit services to strengthen effectiveness. With that goal in mind, a sample of 30 watershed nonprofits was selected, and these nonprofits were interviewed to determine each organization's mission, activities, geographic service boundaries, funding and organizational support, and opinion of the watershed's most pressing issues and needs. The service area boundaries were converted to digital maps for geographic gap analysis using a Geographic Information System (GIS). Maps of [Nonprofit Service Areas](#), and maps showing [Areas Served by Nonprofits](#) (for given conservation activities) that are potentially under-served or may require nonprofit coordination are found in the online Reference Documents. Please note that these maps are the result of analysis on a survey sample of 30 watershed nonprofits, and do not represent the complete range of nonprofits organizations or activities in the Schuylkill River watershed.

The primary purpose of the [Public Agency Survey](#) was to determine their agency activities, internal needs and resources available to other organizations, completed and ongoing watershed projects, opportunities for inter-agency and inter-institutional cooperation, and their opinion of critical watershed issues and needs. 64 public agencies were surveyed by interview or by mail. A majority of the responding

agencies represented the northern sections of the watershed, so issues pertinent to those regions of the watershed received more attention in this Plan.

The Public Agency Survey and Nonprofit Survey provided important information about activities, concerns and visions for the Schuylkill River watershed that have been incorporated into this Plan’s recommendations, and may be used as a planning tool for empowering local organizations to more efficiently focus and coordinate limited resources where they are most urgently needed, and provide for more effective watershed management.

1.6.3 Recommendations from the Institutional Assessment

Recommendations for improving the institutional framework of the Schuylkill River watershed are summarized in the table below. These recommendations are based on the institutional analyses described in **Chapter 7.0 Institutional Assessment**. Each recommendation is assigned a unique code number (e.g., **R7.1**) and name, and is cross-referenced to the key institutional or watershed management issue(s) it addresses. These recommendations are described in more detail in **Section 7.5 Detailed Recommendations from the Institutional Assessment**, and the page number where the detailed description of each recommendation can be found is listed in the *Page* column of this table.

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R7.1	Develop Quantitative Indicators/ Measures of Success	An effort should be made to develop model watershed-wide indicators that can be used by all organizations. Public agencies and nonprofits should develop and use indicators for each project to determine success in order to invest resources wisely and measure progress towards goals.	Improve coordination Plan implementation Resource management Strategic conservation	7-53
R7.2	Watershed Network	A watershed network of public, private and nonprofit stakeholders should provide leadership on a watershed-wide basis, and help to coordinate partner activities on a local basis in order to maximize the effect of individual nonprofits’ conservation activities.	Improve coordination Build capacity Public awareness Plan implementation Strategic conservation	7-54
R7.3	Foundation Network	Foundations should form a network to coordinate funding for watershed activities to meet needs, maximize existing resources, and encourage coordination of conservation activities among organizations.	Improve coordination Build capacity Plan implementation Strategic conservation	7-62
R7.4	Institutionalize Professional Training	Both nonprofits and agencies should attend ongoing professional training programs to optimize staff resources.	Build capacity	7-63
R7.5	Explore Nonprofit – Public Agency Partnerships	Public agencies and nonprofits should explore partnerships with one another to fill gaps in service, coordinate activities, maximize available resources and optimize staffing.	Improve coordination Build capacity	7-64
R7.6	Promote Public Awareness of Watershed Issues	Public outreach, citizen monitoring and other volunteer opportunities, education on watershed location, and watershed boundary signs could help promote public awareness and a “sense of place.”	Public awareness	7-64

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R7.7	Filling Geographic Gaps and Coordinating Service among Nonprofits	Nonprofits should coordinate to expand their geographic reach, or facilitate the formation of new watershed groups or cooperative partnerships to cover areas of the watershed that may be under-served. Nonprofits operating within the same regions should coordinate activities to leverage resources and maximize environmental benefits. Topical watershed meetings could be convened around specific activities to improve communication and cooperation.	Improve coordination	7-65
R7.8	Political verses Natural Geographic Service Area Coverage	Nonprofit groups and public agencies should consider adjusting their service area to represent natural (i.e., subwatershed) boundaries instead of political boundaries. Where possible, entities, such as local governments, that are constricted to political boundaries should coordinate with others within subwatershed boundaries.	Improve coordination	7-66
R7.9	Comprehensive Nonprofit Survey	A comprehensive survey of all nonprofits and volunteer groups in the watershed should be conducted to further determine geographic areas and groups to be coordinated.	Improve coordination	7-67
R7.10	Updated Watershed Directory	Develop an up-to-date, comprehensive directory of watershed groups and government entities with names, contact information, mission statements, resources and services offered, and geographic service areas to link citizens, nonprofits and public agencies to one another.	Improve coordination Build capacity Public awareness Data clearinghouse	7-67
R7.11	Watershed Clearinghouse	An online Schuylkill River watershed clearinghouse should be developed to link and provide resources to nonprofits, local governments, agencies, and citizens in the watershed. The site should include planning documents, the watershed directory, links to partners, GIS data access, funding resources, etc.	Improve coordination Build capacity Public awareness Data clearinghouse	7-68
R7.12	Watershed Service Center	A watershed service center with links to technical and organizational expertise should be established to help nonprofits and local governments with their organizational needs.	Build capacity Data clearinghouse	7-70
R7.13	Diversify Fundraising	Nonprofits should diversify their funding sources to support long-term organizational growth.	Build capacity	7-70
R7.14	Grant Guidelines that Support Partnerships	State agencies and private foundations should use criteria in grant guidelines to encourage proposals that establish working relationships and partnerships among watershed groups, in order to improve coordination and reduce redundancy.	Improve coordination Build capacity	7-71

<i>Code</i>	<i>Recommendation</i>	<i>Summary Description</i>	<i>Issues Addressed</i>	<i>Page</i>
R7.15	Streamlined Grant Application Process	Where practicable, state agencies and private foundations should coordinate grant programs, in order to improve nonprofit access to funding resources, increase the diversity of proposed projects, and maximize the resources and benefits of grant programs.	Improve coordination Build capacity	7-71
R7.16	Use Innovative Land Protection Mechanisms	Use innovative land conservation and funding tools, such as conservation easements, bond initiatives and purchase of development rights, to maximize options for conservation and/or acquisition.	Plan implementation Resource management Strategic conservation	7-71
R7.17	Re-poll Watershed Community	Re-poll the watershed population at intervals to survey watershed awareness and progress in education and outreach goals.	Public awareness	7-72
R7.18	Coordinate Planning Efforts	All planning efforts should be coordinated to ensure consistency among recommendations at all levels of government and nonprofit activity, and to ensure efficient use of funding, not duplication of efforts.	Improve coordination Plan implementation Strategic conservation	7-72
R7.19	Fund an Outreach and Adoption Phase to Ensure Plan Implementation	To ensure implementation of this Plan, an outreach phase needs to be funded to educate interested stakeholders about the plan, how to interpret and use the data and how to incorporate the data into local ordinances, etc. Outreach activities should target local governments, county planning commissions and nonprofit organizations in the watershed.	Resource management Strategic conservation Plan implementation	7-72
R7.20	Hold Annual or Bi-annual Watershed Summit	An annual or bi-annual watershed summit of stakeholders to facilitate networking, discussion of major activities, demonstration projects and plan implementation will improve cohesiveness of groups and coordination of conservation activities.	Improve coordination Public awareness Plan implementation	7-73
R7.21	Schuylkill River Watershed Conservation Coordinator	A Schuylkill River Watershed Conservation Coordinator should be funded through one of the local nonprofits or state agencies to work with nonprofits and government entities to implement this Plan.	Improve coordination Public awareness Plan implementation	7-73

1.6.4 Institutional Assessment: Relative Priority of Recommendations

To facilitate the use of this Executive Summary and information from the institutional assessment, the table below provides the relative priority and priority areas for implementation of the institutional assessment recommendations by subwatershed. Most recommendations from this section are applicable watershed-wide, although a few recommendations are targeted to specific areas as identified by the Nonprofit Gap Analysis. In addition, please refer to the [Reference Table 1A: Municipality Locations by Subwatersheds](#) for a cross-walked guide to which municipalities are in each subwatershed.

NOTE THAT VALUES IN THE FOLLOWING TABLE PROVIDE RELATIVE PRIORITIES FOR IMPLEMENTING INSTITUTIONAL RECOMMENDATIONS – RECOMMENDATIONS WITH A LOW

RANK MAY STILL BE OF SIGNIFICANT CONCERN IN A GIVEN SUBWATERSHED AT A LOCAL RATHER THAN REGIONAL LEVEL.

*PLEASE REFER TO COMPLETE **Schuylkill Watershed Conservation Plan** FOR FULL DETAILS.*

1 = Higher Relative Priority 5 = Lower Relative Priority	Relative Priority	Priority Area for Recommendation
Institutional Assessment Recommendation		
R7.1 Develop Quantitative Indicators/Measures of Success	1	Watershed-wide
R7.2 Watershed Network	1	Watershed-wide
R7.3 Foundation Network	1	Watershed-wide
R7.4 Institutionalize Professional Training	1	Watershed-wide
R7.5 Explore Nonprofit - Public Agency Partnerships	2	Watershed-wide
R7.6 Promote Public Awareness of Watershed Issues	2	Watershed-wide
R7.7 Filling Geographic Gaps and Coordinating Service among Nonprofits	2	See Section 7.3 Tables and maps of Areas Served by Nonprofits for potential gaps and overlaps in service. Public agencies should also implement where possible.
R7.8 Political versus Natural Service Area Coverage	2	See Section 7.3 Tables and Nonprofit Activity Maps for potential gaps and overlaps in service. Public agencies should also implement where possible.
R7.9 Comprehensive Nonprofit Survey	3	Watershed-wide
R7.10 Updated Watershed Directory	3	Watershed-wide
R7.11 Watershed Clearinghouse	5	Watershed-wide
R7.12 Watershed Service Center	3	Watershed-wide
R7.13 Diversify Funding	3	Watershed-wide
R7.14 Grant Guidelines that Support Partnerships	4	Watershed-wide
R7.15 Streamlined Grant Application Process	3	Watershed-wide
R7.16 Use Innovative Land Protection Mechanisms	3	Watershed-wide, and particularly in conservation areas identified by the Landscape Sustainability Analysis
R7.17 Re-Poll Watershed Community	5	Watershed-wide
R7.18 Coordinate Planning Efforts	2	Watershed-wide, and especially in areas where other municipal, county or regional plans are in progress
R7.19 Fund an Outreach and Adoption Phase to Ensure Plan Implementation	2	Watershed-wide
R7.20 Hold Annual or Bi-annual Watershed Summit	2	Watershed-wide
R7.21 Schuylkill River Watershed Conservation Coordinator	3	Watershed-wide

1.6.5 Institutional Assessment: Recommendations for Nonprofit Activity by Subwatershed

The second table provides an overview, based on the Nonprofit Gap Analysis, of subwatershed priority areas for potential nonprofit coordination (C), priority areas potentially underserved by nonprofits (U), and priority areas for extension of service along geographical boundaries. In addition, please refer to the [Reference Table 1A: Municipality Locations by Subwatersheds](#) for a cross-walked guide to which municipalities are in each subwatershed.

NOTE THAT AREAS IDENTIFIED IN THE FOLLOWING TABLE PROVIDE INDICATION OF POTENTIAL GAPS AND OVERLAPS IN NONPROFIT ACTIVITIES ONLY, AS BASED ON THE SURVEY OF 30 WATERSHED NONPROFITS.

PLEASE REFER TO COMPLETE Schuylkill Watershed Conservation Plan FOR FULL DETAILS.

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)	NONPROFIT SURVEY	ACTIVITIES									
	KEY: C = Priority areas for nonprofit coordination (3 or more local nonprofits working on this activity) U = Priority areas underserved by nonprofits (0 local nonprofits working on this activity) E = Priority areas for extension of service along subwatershed boundaries (areas with widely disjunct levels of service)	Education and Outreach	Scientific Research	Water Quality Testing	Water Quality Projects	Land Preservation	Historic Preservation	Recreation	Community/Urban Redevelopment	Advocacy	Park/Preservation Management
		SUBWATERSHEDS									
U/S	East Branch Perkiomen Creek	E	U	U	C/E	E	U	E		E	U/E
H	French Creek	C	C	E	C	C	C	C	C/E	C	C
H	Hay Creek	C	C	C	C		C	C			C
A	Little Northkill/Northkill Creek	C	C	C	C		C	C			C
H	Little Schuylkill River (Lower)	C	E	C	C	E		C			E
H	Little Schuylkill River (Upper)	C/E	E	C/E	C/E	U/E	U/E	C	U	U/E	E
A	Lower Maiden Creek	C	C	C	C		C	C			C
H	Lower Manatawny Creek	C	C/E	C	C		C/E	C	E	C	C
U/S	Lower Perkiomen Creek		U	U	C		U				
A	Lower Tulpehocken Creek	C	C	C	C		C	C			C
U/S	Lower Wissahickon Creek		U		C			E			
A	Middle Tulpehocken Creek	C/E	C	C/E	C		C/E	C		E	C
A	Monacacy Creek	C	C	C	C		C	C			C
A	Ontelaunee/Kistler Creek	E	E	C/E	E	E	E	E		E	E
H	Pickering Creek	C	C		C	C	C			C	C
A	Saony Creek	C/E	C	C/E	C/E	E	C/E	C/E		E	C/E
U/S	Sandy Run		U		C						
U/S	Schuylkill River 1	U/E	E	U/E	C/E	U/E	U/E	U/E		U/E	U/E
U/S	Schuylkill River 2		U	U			U				
U/S	Schuylkill River 3	C/E	C/E	E	C	C/E	C	C/E		C/E	C/E
H	Schuylkill River 4	C	C	C	C		C/E	C		C	C/E
H	Schuylkill River 5	C	C	C	C		C	C			C
U/S	Schuylkill River 6	C	C	C	C		C	C			

Zone (A=Agriculture, H=Habitat, U/S=Urban/Suburban)	NONPROFIT SURVEY	ACTIVITIES									
	KEY: C = Priority areas for nonprofit coordination (3 or more local nonprofits working on this activity) U = Priority areas underserved by nonprofits (0 local nonprofits working on this activity) E = Priority areas for extension of service along subwatershed boundaries (areas with widely disjunct levels of service)	Education and Outreach	Scientific Research	Water Quality Testing	Water Quality Projects	Land Preservation	Historic Preservation	Recreation	Community/Urban Redevelopment	Advocacy	Park/Preservation Management
		SUBWATERSHEDS									
A	Schuylkill River 7	C	C/E	C	C		C	C			C
H	Schuylkill River 8	C	E	C	C	E	E	C			E
H	Schuylkill River Headwaters	C		C	C			C			
U/S	Schuylkill River Tidal			U			U				
U/S	Skippack Creek		U	U			U				
H	Swamp Creek	C	E	C/E	C	C	C/E	C	C/E	C	C/E
H	Unami Creek	E	U	U	C/E	E	U	E	E	E	U/E
H	Upper Maiden Creek	C/E	C/E	C/E	C/E	E	C/E	C/E		E	C/E
H	Upper Manatawny Creek	C	C	C	C		C	C			C
H	Upper Perkiomen Creek	C	C/E	C/E	C	C	C/E	C	C/E	C	C/E
A	Upper Tulpehocken Creek	C/E	C/E	C/E	C/E	E	C/E	C/E		E	C/E
U/S	Upper Wissahickon Creek		U		C						
U/S	Valley Creek	C			C	C	C			C	C
H	West Branch Schuylkill River	C		C	C			C			

1.7 Municipality Locations by Subwatersheds

The [Municipality Locations by Subwatersheds](#) table is provided as a cross-reference tool to assist users in determining which of the 37 subwatersheds of the Schuylkill River watershed a particular municipality falls in. The hope is that users will then be able to better use the summary charts in this Executive Summary, which give issue and recommendation priorities by subwatershed, not municipality.

1.8 Maps

The following five maps (referenced in Sections 1.2 and 1.5) are provided at the end of the stand-alone paper-copy version of the Executive Summary. Otherwise, these maps can be found with all the other primary maps at the end of the paper-copy full report (in the Reference Documents). All maps are also available for review and download from the website: <http://www.schuylkillplan.org/>.

- [Watershed Orientation map](#)
This map presents the subwatershed boundaries, major river sections and outline of the Schuylkill River watershed. The map can be used as a visual reference for recommendations that are targeted at specific subwatersheds.
- [Cities, Towns and Boroughs map](#)
Major cities, towns and boroughs within the watershed boundary are presented on this reference map.

- [Major Streams & Tributaries map](#)
Major streams and tributaries of the Schuylkill River watershed are presented on this reference map.
- [Subwatersheds & Municipalities map](#)
The 37 subwatershed boundaries and the location of municipalities in the watershed are presented on this reference map.
- [Sustainable Landscape Vision map](#)
This map presents a vision of a network of potential greenspace, based on sensitive lands, forested lands, biodiversity hotspots and greenspace corridors, which could support a sustainable landscape and healthy watershed ecosystem. Please see Chapter 6.0 for more information.

In addition, the two sets of institutional assessment maps referenced in Section 1.6 can be found in the online Reference Documents at www.schuylkillplan.org.

- [Nonprofit Service Areas maps](#)
These maps represent the geographic service area boundaries as reported by the 30 nonprofit organizations surveyed in the Nonprofit Gap Analysis. Please see Chapter 7.0 for more information.
- [Areas Served by Nonprofits maps](#)
These maps show the results of the gap analysis on nonprofit activity in the Schuylkill River watershed, based on the geographic service areas and the activity involvement reported by the 30 surveyed nonprofit organizations. These maps were generated by overlaying service area maps of nonprofits who reported involvement in a given activity category (e.g. education and outreach activities). Please see Chapter 7.0 for more information.

1.9 References

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