Preface

Purpose

This plan is a reference guide and an integrative tool for decision makers (i.e., municipal officials and staff, conservation organizations, businesses, planners, governmental agencies, etc.) in the Lower Chartiers Creek watershed. It incorporates critical watershed conservation information and potential implementation strategies into a single source document. This reference serves as a unifying document to bring multiple stakeholders together for a number of opportunities that are outlined within the document.

The purpose of this Preface is to identify the purpose of this RCP document and to instruct the reader on how to utilize the document. The RCP is comprised of a variety of information concerning the project area characteristics, natural, physical, and cultural resources of the Lower Chartiers Creek watershed. Additionally socio-economic information is provided to show relationships that currently exist between the various resources. Some of this information is general, while other information is more technical in its presentation. The plan also contains numerous figures and appendices to help the reader understand the planning process that led to the production of this document; potential planning and project activities; to present model codes and ordinances to communities that will assist in protecting resources and aid in improving developmental activities; to identify potential project technical and funding sources for individuals, organizations, and municipalities; and to provide a visual guide to resources within the project area.

River Conservation Plan Format - How To Use This Plan

The Lower Chartiers Creek RCP follows the format recommended by the Pennsylvania Department of Conservation and Natural Resources. The objective of the planning process is to complete a plan that is accepted on the Pennsylvania Rivers Conservation Registry. Once the plan is placed on the Registry, the various implementation activities that are outlined in the plan are eligible for Keystone Funds. This makes the plan a conduit for funding of numerous implementation activities (planning or construction activities). ***Once the plan is on the Registry, all the communities that lie within the Lower Chartiers Creek watershed are eligible for the granting dollars made available through the Keystone Grant Program. Additionally, by having a completed RCP that is on the Registry, other grant programs are more receptive to funding implementation actions. Therefore, municipal officials and staff, government agencies, politicians, non-profit organizations, and/or a partnership of these entities can work together to make improvements to the items discussed in the plan.***

The Lower Chartiers Creek RCP is structured according to the following format:

I. Introduction
II. Project Area Characteristics
III. Land Resources
IV. Water Resources
V. Biological Resources
VI. Cultural Resources
VII. Issues, Concerns, Constraints, and Opportunities
VIII. Management Options
- **Management Recommendation Matrix**
- **Potential Assistance Sources for Watershed Projects**
- **Economic Benefits to Chartiers Communities from River Conservation**

Figures
References
Glossary
Appendices
Tables

Section I Introduction: The reader is introduced to the project's history, the planning process, and the project's purpose. Additionally, it is here that the reader learns of the project steering committee's overall goals for the plan.

Section II Project Area Characteristics: The reader learns about the general project area characteristics. This section sets the stage for Sections III through VI which include more detail on the differing resources.

Sections III through VI: These sections provide the reader with an inventory of the resources reviewed in the River Conservation Planning process. Section III Land Resources, inventories and describes issues such as geology and soils, property ownership, critical areas, landfills, and hazard areas (i.e., waste sites and abandoned mines); Section IV Water Resources, inventories and describes issues such as stream characteristics, major tributaries, wetlands, floodplains, lakes and ponds, water quality (i.e., point and non-point source[s]), and water supply; Section V Biological Resources, inventories and describes issues such as wildlife (terrestrial and aquatic), vegetation, Pennsylvania Natural Diversity Index Species listings, important habitats, and Natural Heritage Areas; and Section VI Cultural Resources, inventories and describes issues such as recreation (i.e., parks, rail-to-trails, and greenways) and archaeological/historical sites.

Section VII Issues, Concerns, Constraints, and Opportunities: In this section, the main issues, concerns, constraints, and opportunities for the resources that were inventoried in Sections III through VI are clearly and concisely identified for **each resource category**. This provides the reader with the foundation for management options that are discussed in Section VIII. Topics discussed in Section VII include items that may be considered as both areas of concern (i.e., urban sprawl, sewerage, abandoned mine drainage, and white-tailed deer management), and areas of community enlightenment (i.e., adult and youth education, land conservation, and rail-to-trails). The purpose is to transition the watershed study from the resource inventory stage to the future implementation phase.

Section VIII Management Options: Here each item is given a recommended implementation strategy in attempt to solve, correct, and/or improve the item discussed. In addition, a schedule is provided for implementation of each specific item.

Section VIII contains the Management Recommendations Matrix, Potential Assistance Sources for Watershed Projects, and the Economic Benefits to Chartiers Communities from Rivers Conservation. **Section VIII is where most users of the RCP will go initially to look for action items.**

Management Recommendations Matrix is a simple tool that can be used for planning and implementing the RCP.

Potential Assistance Sources for Watershed Projects includes a comprehensive list of technical and funding programs available within Pennsylvania and from the National level. **After the Management Recommendations Matrix, this section may be the next most valuable resource and utilized portion of the plan**.

Economic Benefits to Chartiers Communities from Rivers Conservation provides an in depth economic study on the Lower Chartiers Creek watershed (project study area). This study demonstrates how application of sound conservation principles creates positive economic benefits.

Throughout these sections, references are provided to help the reader navigate between the text of the main plan, the appendices, and figures.

Figures and Appendices - What Can Be Found Here

The Figures and Appendices follow the body of the text.

Figures

The Figures (see index for listing) illustrates the characteristics and the resources of the region.

Appendices

Appendix 1, Conservation Guidelines: A variety of conservation guidelines that may be applied by local municipal officials/staff, residents, and businesses are provided. These can be utilized to reduce negative impacts to the varying resources of the Chartiers Creek watershed. As a part of Appendix 1 there are two additional sub-appendices (1A and 1B).

Appendix 1A, "Paying for Growth, Prospering from Development" (Kinsley and Lovins, 1998): This article serves as an educational tool for community planning. It deals with issues concerning sustainable development such as: 1) development and growth, 2) community encouragement of growth, 3) how communities get trapped by growth, and 4) the reasons why more development isn't always better.

Appendix 1B, Code and Ordinance Worksheet (Center for Watershed Protection, 1998): This worksheet may be copied and used by community planners at the local level to gage development priorities in your community. It is useful for comparing your local development rules to model development principles. Thus it is an excellent tool for assessing the current state of local codes and ordinances.

Appendix 1C, The Multiple Functions of Riparian Vegetation: Information is provided to educate the reader to the beneficial impact of planting riparian vegetation can have at improving water resources.

Appendix 2, Public Participation: Includes public responses and input to the survey, stakeholder visioning activities, and public meetings.

Appendix 3, Model Ordinances, Overlay Districts, and Guidelines/ Standards: Provide a number of examples of municipal planning guidelines which can promote better land use, land development, and improve water quality in receiving streams.

Closing Remarks

As the grant recipient for this project, Chartiers Nature Conservancy has been provided with the following deliverable products:

- The Lower Chartiers Creek RCP;
- The Executive Summary of the RCP;
- CD ROM disks containing the digital Geographic Information System (GIS) files that were prepared for the RCP (These files contain the digital copies of the Figures found in the RCP); and
- Hard copy large (36" X 48") maps of the figures found in the plan.

The various types of information and data that were collected and utilized to assemble the plan can be found in the technical file which has been maintained by Skelly and Loy, Inc., 240 Scott Road, Suite 1, Morgantown, WV 26508 / (304) 296-6500. Additional copies of the River Conservation Plan can be purchased by contacting Skelly and Loy.

This Preface is intended as a guide for efficient access and application of this plan by local municipal officials and organizations.

List of Acronyms

AgB	Allegheny silt loam
ALCOSAN	Allegheny County Sanitary Authority
ALD	Anoxic Limestone Drains
AMD	Abandoned Mine Drainage
BDA	Biological Diversity Area
BMP	Best Management Practice
BoB	Brooke silty clay loam
CaB	Culleoka silt loam (Washington County)
CkB	Culleoka-Upshur complex
CmB	Clymer silt loam
CNC	Chartiers Nature Conservancy
CSO	Combined Sewer Overflow
CuB	Culleoka silt loam (Allegheny County)
CVI	Canaan Valley Institute
CwB	Culleoka-Weikert shaly silt loam
DCED	Pennsylvania Department of Community and Economic Development
DCNR	Pennsylvania Department of Conservation ans Natural Resources
DER	Pennsylvania Department of Environmental Resources
EASI	Citizens Volunteer Monitoring Program
EP	Extraction Procedure
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FGM	Fluvial GeoMorphology
FHWA	Federal Highway Administration
GdA	Glenford silt loam
GdB	Glenford silt loam
GiB	Gilpin silt loam
GIS	Geographic Information System
GpB	Gilpin-Upshur complex
HaB	Hazelton silt loam
Hu	Huntington silt loam
IWL	Isaac Walton League
LDW	Limestone Diversion Well
LID	Low Impact Development
Ln	Lindside silt loam
LWV	League of Women Voters
MCL	Maximum Concentration Limit
MPC	Pennsylvania Municipalities Planning Code
NEPA	National Environmental Policy Act
NPL	National Priority List
NPS	Non-Point Source
NRCS	Natural Resources Conservation Service
OHA	Other Heritage Area

List of Acronyms (Continued)

OLC	Open Limestone Channel
PADE	Pennsylvania Department of Education
PADEP	Pennsylvania Department of Environmental Protection
PADMMI	Pennsylvania Department of Mines and Mineral Industries
PAT	Port Authority of Allegheny County
PCB	Polychlorinated biphenyls
PennDOT	Pennsylvania Department of Transportation
PGC	Pennsylvania Game Commission
PFBC	Pennsylvania Fish & Boat Commission
Ph	Philo silt loam
PNDI	Pennsylvania Natural Diversity Inventory
POWR	Pennsylvania Organization of Watersheds and Rivers
PRD	Planned Residential Development
PTC	Pennsylvania Turnpike Commission
PWWCT	Penn's Woods West Charitable Trust
RaA	Rainboro silt loam
RyB	Rayne silt loam
RCP	Rivers Conservation Plan
RCRA	Resource Conservation Recovery Act
SAPS	Successive Alkalinity Producing System
SHCOG	South Hills Council of Government
SSO	Sanitary sewer overflow
SPC	Southwestern Pennsylvania Commission
SWRC	Stroud Water Research Center
TDR	Transferable Development Rights
TIP	Transportation Improvement Plan
TMDL	Total Maximum Daily Load
UaB	Upshur silt loam
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACOE	United States Army Corps of Engineers
USDOE	United States Department of Energy
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WARMF	Watershed Analysis Risk Management Framework
WhB	Wharton silt loam
WPCAMR	Western Pennsylvania Coalition for Abandoned Mine Reclamation
WPWPP	Western Pennsylvania Watershed Protection Program

I. Introduction

The Lower Chartiers Creek River Conservation Planning (RCP) effort was initiated by the Chartiers Nature Conservancy (CNC) to help the community better understand the natural, physical, and cultural resources of the Chartiers Creek watershed, and how these resources are impacted by various factors. This information will (then in-turn) enable stakeholders to make conscious decisions regarding potential improvements, and the protection of important features within the watershed.

In 1997, the CNC was awarded a River Conservation Planning Grant for Lower Chartiers Creek from the Pennsylvania Department of Conservation and Natural Resources (DCNR). A planning grant was completed for only the lower portion of the Chartiers Creek watershed since it was believed at the time that the resources were not available to complete the entire watershed at once. The area for the current study includes the area downstream of the confluence of Little Chartiers Creek and Chartiers Creek in Washington County (approximately 139 square miles in size). The completion of the grant process helped to generate interest within the Washington County portion of the watershed. Since initiation of the project, the Washington County Watershed Alliance has not only formed, but has also submitted a RCP grant application to the DCNR. On April 6, 2000, Governor Ridge announced that the grant for the Upper Chartiers Creek RCP had been funded, thus ensuring the completion and holistic planning approach to the Chartiers Creek watershed.

In late 1998, the project stakeholders held public meetings concerning the RCP process. This not only assisted in educating local citizens, municipalities, and organizations about the RCP effort, but also aided in identifying potential steering committee members. The steering committee was formed and assisted in reviewing the draft Request for Proposal prior to its distribution to potential consultants. In March 1999, after interviewing potential consultants, CNC on the advice of the steering committee, hired a consultant. The consultant team was hired to prepare the RCP, perform the needed public participation activities, and to ensure that the RCP is approved by DCNR and listed on the Pennsylvania Rivers Conservation Registry.

A. Planning Process

The Steering Committee and the consultant team initiated the planning process in April 1999 in order to prepare this Draft Preliminary Findings Report. The approach for this plan involved collecting, analyzing, and evaluating data for natural, physical, cultural, and socioeconomic resources in the Chartiers Creek watershed, and correlating their impacts to land development activities and trends. This approach has been further analyzed at the sub-basin level to assist in ranking implementation recommendations/goals/strategies. This gives the plan the flexibility to specifically direct improvements.

Natural, physical, cultural, and socioeconomic resource data collected includes information in hard copy and digital formats. This information has been collected from citizens groups, water/sanitary authorities, planning commissions, school districts, colleges, historical societies, and local, county, state, and federal governmental agencies. Data collected includes, but is not limited to: water quality sampling, aquatic surveys, soil surveys, biological studies, flood protection projects, geographical information systems data, surface and deep mining surveys/reports, regulations and laws, natural heritage inventories, park master plans, utility mapping/data, and zoning/ordinance information.

After the data were collected, this information was analyzed and evaluated based on its importance in the planning process. The information was then evaluated to determine which specific resource items, activities, and/or processes correlated into issues, concerns, constraints, and opportunities to be addressed by this plan. This evaluation has produced a list of management options that can bring about improvements to the identified issues, concerns, constraints, and opportunities. These findings have been presented to the public and the input received has been placed into the document to reflect this input (Refer to Appendix 2).

B. Project Purpose

The purpose of this project and the River Conservation Planning process is to complete a comprehensive review of the watershed in a holistic manner. Through the planning process, strategies for improving the resources (natural, physical, and cultural) of the project area were delineated. The intent of this planning process is to provide the needed information to develop an effective River Conservation Plan for the Lower Chartiers Creek watershed; provide resource improvement recommendations that can be implemented (short-term and long-term); and to have a plan that is placed onto the Pennsylvania Rivers Conservation Registry. Once on the Registry, communities that lie within the Lower Chartiers Creek watershed are eligible for granting dollars made available through the Keystone Grant Program. The overall goals of the project in no specific order are to:

- Improve water quality and manage stormwater
- Promote land development that is compatible with a sustainable environment
- Enhance the recreational opportunities of the watershed
- Protect the natural resources, historic landscape and scenic beauty within the watershed
- Provide an environmental education program for adults and enhance existing school-based environmental education
- Encourage compatible and sustainable economic development

II. Project Area Characteristics

A. Location: Chartiers Creek watershed is located in southwestern Pennsylvania and flows north through Washington and Allegheny Counties. It discharges into the Ohio River at McKees Rocks, three miles downstream from Pittsburgh, PA. The project area (Lower Chartiers Creek watershed area) does not include the entire watershed. The project area's most upstream location on Chartiers Creek is located at the confluence of Little Chartiers Creek and Chartiers Creek in Washington County (Refer to Figure 1). Chartiers Creek was declared navigable by the U.S. Army Corps of Engineers on January 20, 1981 and is considered navigable 1.9 miles upstream from its mouth at the Ohio River (Refer to Figures 1 & 2).

B. Size: The overall size of Chartiers Creek watershed is 277 square miles and the length of Chartiers Creek is 52.4 miles. The project area (Lower Chartiers Creek portion) is 139 square miles in size.

C. Topography: The project area has a mixture of topographic features. The upper and western reaches of the watershed have mild slopes, wide valleys, and rolling hills. By comparison, the lower and eastern portion of the watershed has narrow valleys, high hills, and steep to moderate slopes (PADER, 1984). The highest stream elevation, (900 feet) in the project area is located at the confluence of Little Chartiers Creek and Chartiers Creek in Washington County. The highest land elevation is located at a point near the Village of Champion, North Fayette Township, Allegheny County and has an elevation of 1,358 feet. The lowest elevation in the project area is located at the point where Chartiers Creek discharges into the Ohio River at the Borough of McKees Rocks and the City of Pittsburgh, Allegheny County and has an elevation of 710 feet. Other topographic features can be seen at the sub-basin level (USGS, 1953 – 1993). The sub-basins located along the eastern portion and the downstream sub-basins of the project area have a steeper gradient (e.g., McLaughlin Run-71 feet per mile) when compared to the gradient of sub-basins located along the western portion and main stem Chartiers Creek (e.g., Chartiers Creek 7 feet per mile).

D. Major Tributaries: Major tributaries of Chartiers Creek in the project area are (Refer to Figure 4):

- Campbells Run,
- Robinson Run,
- North Branch Robinson Run,
- Millers Run, Coal Run,
- McPherson Creek,
- Brush Run,
- McLaughlin Run,
- Painters Run,
- Scrubgrass Run,
- Whiskey Run,
- Bell's Run, and
- Hope Hollow Run (also known as Georges Run).

E. Project Area Characteristics:

Land Use / Land Cover: Land uses in the project area vary. The eastern portion of the project area is primarily urban residential, with a few pockets of commercial and light industrial uses. The western portion of the project area is primarily agricultural and forested with pockets of rural/suburban residential and commercial uses. Along the main stem of Chartiers Creek in the valley areas, land uses tend to interweave with each other, mixing industrial and commercial uses with urban residential and agricultural/forested areas. Table 1 and Figure 3 show the major land use types in the Lower Chartiers Creek watershed (SPC, 1999):

Table 1. Major Land Use Types

Land Use Type	Acreage	Percent
Forested	37,689	43.0
Agricultural	26,385	30.0
Residential	16,871	19.0
Industrial/Commercial	2,211	3.0
Transportation	1,767	2.0
Brownfields	1,293	1.5
Strip Mines	682	1.0
Total	**86,898**	**99.5%**

Residential land use varies within the project area. High residential land use is found along the eastern portion communities. These communities consist of a mixture of single-family housing units, duplexes, condominiums, apartment buildings, and high-rise apartment buildings. Low residential land use is observed in the western portion of the project area. This area consists of some rural patch communities with higher residential use. The communities in this area consist of single family housing units with lots less than one acre in size (Refer to Figure 3).

Industrial/commercial land use and brownfield (real estate no longer being used or abandoned industrial sites) properties are located primarily along and/or near major transportation corridors such as U.S. Interstates 79 and 279 and State Routes 19, 22, 50, 60, and 980. Often in the project area, industrial/commercial and brownfield facilities are located near or adjacent to each other (Refer to Figure 3).

Agricultural land in the project area is located in the western portion of Allegheny County (west of I-79) and in Washington County. Areas located near or adjacent to significant transportation facilities or more urbanized areas tend to have less agricultural land (Refer to Figure 3).

Park properties in the project area are as diverse as they are common. The most prominent park properties are Allegheny County's Settlers Cabin Park and Upper St. Clair Towhship's Boyce/Mayview/Baker Park complex. A total of sixty-four (64) parks, parklets, playgrounds, and other recreational facilities exist throughout the project area. These allow for a variety of recreational (from passive to active) opportunities from the urban to rural, wooded setting. Most of the community park properties are located in the communities located along the eastern portion of the project area that have higher population densities. Open space is not considered a part of this category since open space is a component of a variety of land use types (Refer to Figure 9).

The project area east of the I-79 transportation corridor is dominated by residential and commercial/industrial land use. In this area, Chartiers Creek and its tributaries have been highly modified to prevent flooding and allow human activities to occur nearby. This modification is so great in places that some of the tributary streams no longer can be found in a natural condition. Streams that technically no longer exist or function as streams, have been placed in culverts underground (storm sewers). Here the streams are no longer an impediment to development. However, these storm sewers can only handle water flows that meet the culverts physical limitations. Therefore during high rain events, these storm sewers will overflow at times. In the western and more southern areas of the project area, agricultural/open space and forested land uses are dominant. In this area, these land uses are found to exist adjacent to Chartiers Creek and it's tributaries (Refer to Figure 3).

The project area shows very visible land use activities and trends. **These land use activities are spurring urban sprawl in areas of the project area that have historically not observed these types of pressures (Refer to Pages 49 and 67, and to Figures 3 and 8).** The Pennsylvania House and Senate have recently passed House Bill 14 and Senate Bill 300. These bills (Municipal Planning Code[s]) assist communities in working together in regards to planning activities (Inter-Municipal Framework). This can assist in improving the environment, reducing infrastructure expenditures, and facilitate activities (i.e., reducing the development impact of road widths). Without safeguards in place (i.e., sound zoning, planning, inter-community communication) to protect the resources of the watershed, degradation of the land and the subsequent degradation of water quality will result. Many examples of this type of degradation can be observed in the northern and eastern portions of the project area. Additionally, water quality degradation in Water Quality Management Units B, C, and D (Refer to Figure 5) will result in the southern and western portions of the project area due to urban impacted water quality and an increase in stormwater flows as

these areas continue to develop. The eastern and downstream sub-basins have experienced increasing developmental pressures due in large part to their proximity to the City of Pittsburgh. The majority of this development has come in the form of urban/suburban residential and commercial/industrial development. The western sub-basins, until recently, have been rural in nature with agricultural and strip-mining activities dominating. However, western expansion into the western sub-basins is now occurring. The western expansion of sewer and water facilities, have started the urban sprawl process but it will be followed by the construction of the Southern Expressway. The infrastructure improvements in this area will make this area attractive for residential, commercial, and industrial land uses (Refer to Figure 8). The existing and proposed transportation infrastructure is reviewed in more detail in Section F. Socioeconomic Profile (Refer to Page 14).

Climate: The Chartiers Creek watershed has a humid continental climate and is similar in Allegheny and Washington Counties. The average maximum winter temperature is 41.3° F and the average minimum winter temperature is 21.9° F. The average maximum summer temperature is 79.7° F and the average minimum summer temperature is 54.5° F. Total average annual precipitation is 38 inches of which approximately 56 percent falls between April and September. The average annual snowfall is approximately 40 inches, but is variable from the northern to southern portions of the watershed (Soil Surveys, 1981 and 1983).

Land Use Controls: Land use planning is guided on the local and regional level through adopted and enforced zoning codes and ordinances. The Pennsylvania Municipalities Planning Code (MPC) of 1968, (P.L. 805, No. 247 as enacted and amended) provides the authority for municipalities to manage land use through the enactment of zoning ordinances (Refer to Pages 48 and 67, and Appendix 3).

> **Zoning Ordinances** – Zoning Ordinances manage development by determining the type of uses (i.e., residential, industrial, commercial, etc.) that will be allowed in any given area within a municipality. This includes the specialized requirements of the development (i.e., number of buildings/density, height of structures, setback distances from property lines, amount of development/intensity of use, and open space provisions). As noted in *A Watershed Primer for Pennsylvania*, "...zoning power represents the real power of municipalities over land use" (Novak and Woodwell, 1999). The MPC denotes other key components that are important to community planning and land use development. These key provisions are discussed below.

Comprehensive Plan – While a Comprehensive Plan is not required to enforce or implement zoning ordinances it will complement future land use planning objectives. It is very important to establish a sound and rational basis for zoning regulations because a comprehensive plan must include by law the community development objectives statement. This statement sets the stage for sound and reasonable zoning and can address the goals to protect and enhance the community resources.

Official Map – An official map is not required to enforce or implement zoning ordinances, but the official map is a very important tool for notifying landowners of existing and proposed streets, public lands (i.e., parks, trails etc.), streams/waterways, and other public right-of-ways.

Subdivisions and Land Development – Subdivision and land development ordinances apply whenever a tract of land is planned to be divided into smaller tracts or developed for non-residential uses. Subdivision and land development governs activities at property level and sets standards for property plats, street design, water and sewer, and open space dedications. According to *A Watershed Primer for Pennsylvania*, nearly half of the municipalities of the Commonwealth only rely on subdivision ordinances and have not enacted zoning (Novak and Woodwell, 1999). While this would not appear to apply within the Lower Chartiers Creek watershed, these ordinances may be relied upon too heavily to achieve land use objectives. Subdivision ordinances do not provide the designation of where specific land uses can be located. The Lower Chartiers Creek Watershed includes all or portions of 28 communities with various levels of zoning ordinances for growth management. Zoning within these communities shapes the quality of life for residents and watershed stakeholders alike.

Zoning is a framework for the potentially orderly development of a community. A positive pattern of development will be self-evident when values and limitations are applied to natural areas. As noted by Ian McHarg in *Design With Nature* (1969), "nature performs work for man -- in many cases this is best done in a natural condition – further that certain areas are intrinsically suitable for certain uses while others are less so."

Applied in the Lower Chartiers Creek Watershed setting, the hierarchy of all features that have been mapped and identified can be compared for their priority use as having natural process values (i.e., streams, wetlands and floodplains) versus areas with urban land use suitability (i.e., flat land or previously developed sites). Some obvious conflicts pointed out by McHarg include the fact that

flat land which is often selected for urban development should be reviewed to assure that the consideration of prime agricultural land (flat land) be identified as intolerant to development (McHarg, 1969). Generally, all other flat land would have a lesser natural value and be more suitable for urbanization.

Who has Zoning? The application of zoning is intended to guide land use development for the best interests of the community. Data compiled by the Southwestern Pennsylvania Commission (SPC) generally identifies the zoning classifications of each of the 28 communities of the project area, which include (SPC, 1999):

- R-1: Low Density Residential
- R-2: Medium Family Density Residential
- R-3: Multi-Family/High Density Residential
- C-1: Office & Business Commercial
- C-2: Neighborhood and Rural Commercial
- C-R: Mixed Use – Commercial and Residential
- I: Industrial
- OSR: Open Space Reserve
- PI: Public Institutional
- RD: Riverfront District.

The project area municipalities have various levels of zoning enforcement and implementation (Refer to Table 2).

The level of detail, specifically relating to environmental sensitivity, varies greatly among the established municipal zoning ordinances. Additionally, beyond the actual zoning ordinances, the level of enforcement can vary greatly. ***Therefore, developing strong conservation zoning ordinances and encouraging proper enforcement are keys to providing environmentally sound development practices.*** While determining what is being accomplished through zoning by the municipalities is important, it can be a difficult process. However, it is more critical to assist in developing what happens in the future, this is the key to sensible development.

Table 2. Zoning Data

County	Municipality	Date of Most Recent Zoning Action
Allegheny	Bethel Park Borough	January 1999
	Bridgeville Borough	July 1999
	Carnegie Borough	April 1983 (update in 2000)
	Collier Township	1991 (update in 2001)
	Crafton Borough	January 1984 (update 2000)
	Green Tree Borough	April 1998
	Heidelberg Borough	1984
	Ingram Borough	1981 (update in 2000)
	Kennedy Township	March 1998
	McDonald Borough	1965
	McKees Rocks Borough	1998
	Mount Lebanon Township	December 1996
	North Fayette Township	February 1996
	Oakdale Borough	January 1996
	Pennsbury Village Borough	None
	City of Pittsburgh	January 1999
	Robinson Township	January 1996
	Rosslyn Farms Borough	January 1984 (update 2000)
	Scott Township	1988 (update in 2000)
	South Fayette Township	July 1986 (update in 2000)
	Stowe Township	1998 (Follow Allegheny Co. Subdivision & Land Devel. Ord. 1998)
	Thornburg Borough	January 1984 (update 2000)
	Upper Saint Clair Township	September 1999
Washington	Cecil Township	1989 (update in 2000)
	Midway Borough	1964 (updated 1999)
	Mt. Pleasant Township	June 1982 (updated December 1992)
	Peters Township	1993 (update in 2000)
	Robinson Township	1997

Source: Municipal planning and zoning staff (1999 – 2000).

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F. Socioeconomic Profile

1. Municipalities and Populations in the Watershed

The project area includes Allegheny and a portion of Washington Counties. The municipal divisions included in the watershed are shown in Figure 2. The entire watershed includes 40 municipalities. The Lower Watershed includes 28 different municipalities. These municipalities are listed in Table 3. The large number of independent governing units in the watershed makes management a real political challenge.

The 1990 and estimated 1998 populations (US Census Bureau, 1999) of municipalities in the Lower Watershed are shown in Table 3. While 599,898 persons lived in municipalities associated with the watershed in 1990, only an estimated 568,189 persons lived in associated municipalities in 1998. This represents a decrease of 5.3% below the 1990 population. Several municipalities, notably Cecil, Peters, South and North Fayette, had substantial increases in population (Refer to Figure 7).

The boundaries of the municipalities shown in Table 3 are either partially or entirely within the watershed. Column 4 of Table 3 shows the estimated land area of the municipality that lies within the watershed. For example, an estimated 30% of Bethel Park lies within the watershed. Using these land area percentages, we estimated the populations in each municipality lying within the watershed. These estimates are shown in Columns 5 and 6. Overall, an estimated 189,054 persons and 184,919 persons lived within the Lower Watershed in 1990 and 1998, respectively, using municipalities as the basis for estimation. This represents an estimated 2.2% decrease in population in the watershed over this 8 year period.

Table 3.
Population and Population Densities in the Lower Chartiers Creek Watershed

Municipality	1990 Population	Estimated 1998 Population	Percentage Change	Percent of Land Area in Lower Watershed	Estimated 1990 Pop. in Lower Watershed	Estimated 1998 Pop. in Lower Watershed	Persons per square mile 1998
	1	2	3	4	5	6	7
BETHEL PARK	33823	32869	-2.8%	30%	10147	9861	2809
BRIDGEVILLE	5445	5116	-6.0%	100%	5445	5116	4726
CARNEGIE	9278	8499	-8.4%	100%	9278	8499	5231
COLLIER	4841	4817	-0.5%	100%	4841	4817	351
CRAFTON	7188	6550	-8.9%	100%	7188	6550	5710
GREEN TREE	4905	4588	-6.5%	80%	3924	3670	2210
HEIDELBERG	1238	1147	-7.4%	100%	1238	1147	2286
INGRAM	3901	3561	-8.7%	90%	3511	3205	8166
KENNEDY	7265	7275	0.1%	50%	3633	3638	1318
MCDONALD (Alleg)	443	438	-1.1%	100%	443	438	2311
MCKEES ROCKS	7691	7007	-8.9%	50%	3846	3504	6255
MT LEBANON	33362	31009	-7.1%	50%	16681	15505	5103
NORTH FAYETTE	9537	11177	17.2%	90%	8583	10059	445
OAKDALE	1752	1667	-4.9%	100%	1752	1667	3742
PENNSBURY VILLAGE	774	765	-1.2%	100%	774	765	12750
PITTSBURGH	369879	340520	-7.9%	10%	36988	34052	5825
ROBINSON (Alleg)	10830	10885	0.5%	40%	4332	4354	725
ROSSLYN FARMS	483	442	-8.5%	100%	483	442	800
SCOTT	17118	16300	-4.8%	100%	17118	16300	4202
SOUTH FAYETTE	10329	11663	12.9%	100%	10329	11663	575
STOWE	7681	7054	-8.2%	10%	768	705	3084
THORNBURG	461	467	1.3%	100%	461	467	1081
UPPER ST CLAIR	19692	18919	-3.9%	100%	19692	18919	1937
CECIL	8948	10582	18.3%	70%	6264	7407	398
MCDONALD (Wash)	1809	1748	-3.4%	100%	1809	1748	5338
MIDWAY	1043	1002	-3.9%	100%	1043	1002	2010
MOUNT PLEASANT	3555	3653	2.8%	20%	711	731	101
PETERS	14467	16287	12.6%	50%	7234	8144	844
ROBINSON (Wash)	2160	2182	1.0%	25%	540	546	102
Total	**599898**	**568189**	**-5.3%**		**189054**	**184919**	**1955**

Population densities in each municipality are shown in Column 7, Table 3. They are calculated using 1998 populations in each municipality and total land area in each municipality. Overall, the population density in 1998 of municipalities associated with the watershed was 1,955 persons per square mile. Population densities varied considerably across municipalities. For example, Cecil, Mount Pleasant, and Robinson townships in Washington County, and Collier, North Fayette, and South Fayette, townships in Allegheny County had densities below 600 persons per square mile. However, Carnegie, Crafton, Ingram, McKees Rocks, Mt.

Lebanon, Pennsbury Village, and Pittsburgh in Allegheny County, and McDonald in Washington County had densities exceeding 5,000 persons per square mile (Refer to Figure 6).

The US Bureau of the Census has established Census Tracts for purposes of organizing information on population and housing censuses. Census Tracts are defined based on a combination of political, geographic, and population count factors. They typically include many blocks and several block groups. Tract designations change somewhat over time. Tract sizes differ substantially across the watershed, being the smallest on the eastern edge of the watershed. There are approximately 60 Census Tracts in or intersecting the Lower Watershed.

While most of the tracts fall entirely within the watershed boundary, several of the larger tracts are only partially within the watershed boundary. The socioeconomic analysis of the watershed's census tracts includes all tracts within and crossing the watershed boundary. A total of 182,290 persons reside in the census tracts within or crossing the watershed boundary in 1990 (US Census Bureau, 1990). If we apportion populations in each census tract based on the percent of the tract area within the watershed, an estimated 163,833 persons lived in the watershed in 1990, based on census tract data. This estimate is 13% lower than the 189,054 persons estimated to live in the watershed using municipalities as the basis for estimation. Assuming estimated population growth between 1990 and 1998 was –2.2%, as the municipality-based estimates above suggest, we estimate that 160,229 persons lived in the Lower Watershed in 1998 based on the census tract estimation procedures. So we have a range of estimated 1998 population in the Lower Watershed, 160,229 to 184,919 persons, depending upon whether we use census tracts or Municipalities as the basis of estimation. The methodologically most plausible estimate is the one using census tracts as the basis, or 160,229 persons.

The distribution of population within the watershed can be viewed on the basis of population density. Density is a driving factor in determining human impacts on the landscape. The average estimated density in these census tracts across the watershed in 1990 was 969 persons per square mile. This is less than half the density of the municipalities. However, this can be explained by that fact that ALL of Pittsburgh was included in the municipalities, with a density of 5,825 persons per square mile, while only several census tracts within Pittsburgh are included in the census tract density estimates. The estimated 969 persons per square mile in 1990 is a more accurate density than densities based on the municipal data. Assuming a 2.2% population decline between 1990 and 1998 across the watershed, we estimate an average density in 1998 of 948 persons per square mile. This is a

more methodologically plausible density estimate than the density using municipalities as the basis.

Figure 6 shows these estimated population densities by Census Tract. Clearly the most densely populated areas are on the eastern edge of the watershed, particularly in the northeast portion near McKees Rocks.

Population growth varied considerably across the watershed. Figure 7 illustrates these growth rates between 1980 and 1990 by Census Tract. (Unfortunately, the Census Tract estimations were not calculated by the US Bureau of the Census after 1990, although estimates for municipalities were). The northeast portion of the watershed shows primarily Census Tracts with falling populations, while the southwest portion shows primarily increasing populations. Generally, population is declining in municipalities in the eastern side of the watershed, while population is increasing quite dramatically on the western side.

2. Income in the Lower Watershed

Household income in the Lower Watershed was estimated for 1997 using reported 1990 census information (US Census, 1990). Incomes in 1990 were inflated to 1997 levels using a Wage and Income inflator for the Pittsburgh region (*source...Bureau of Economic Analysis, 1999)*. Median household income in the Lower Watershed was $37,900 per household in 1990. Inflating this average to 1997, median household incomes across the watershed in 1997 were $51,317 per household. While the majority of the area had median incomes between $30,000 and $60,000, the northeast portion of the watershed was the poorest while the southeast portion was the wealthiest.

A slightly different picture of household wealth in the watershed is observed when poverty rates are considered for the area. Poverty rates are defined as the percent of households with income levels below federally determined poverty standards. Only 1990 poverty rates are available by Census Tract. The vast majority of the area has poverty rates less than 10%. However, there are several pockets of high poverty, particularly in the northeast portion of the watershed, with two tracts having poverty rates in excess of 40%. A tract between Oakdale and Bridgeville, and one near Canonsburg also show high poverty rates. The high poverty rates are consistent with low incomes in the northeast portion of the watershed.

3. Future Population Growth in the Watershed

The historic analysis of population change in the watershed presents a very clear picture of the spatial distribution of those

changes. It is clear that population growth has been concentrated in the western and southern regions of the watershed; while population decline has been concentrated on the eastern and northern regions. There are many reasons to expect this trend to continue. Increased regional incomes and the resulting desire for more rural, low density residential areas will propel populations away from the more urbanized area of the eastern and northern regions of the watershed. This is classic urban sprawl of the type seen in many urban areas in the U.S., including Pittsburgh.

However, there are several factors that could significantly impact settlement patterns. These include the availability of transportation, sewage, and water supply infrastructure in the potential high growth areas. These are control variables that can be used to determine settlement patterns in receiving regions. In addition, increasing development costs in newly settled areas to reflect full cost burdens placed on public infrastructure and the environment would also be control variables. The outward migration of populations from the higher density, urbanized areas will depend partially upon the quality of life, taxes, economic opportunities, amenities, educational quality, crime, etc. of the sending regions. Predictions concerning population change in the watershed are complicated by the policies that local and regional governments enact (e.g., infrastructure, taxes, environmental restrictions, etc.). However, in the absence of rather dramatic changes in the types of governmental policies we have seen in the past, it is most likely that the population trends observed in the watershed over the past decade will continue through the next decade. If these general population growth trends continue without appropriate land use policy in place, negative effects on environmental resources will be observed in a similar manner to the northern and eastern communities of the watershed. There is a high correlation in the study area between increased human population and developmental pressures, and a reduction in the quality of environmental resources (e.g., greenspace, erosion and sedimentation, reduced water quality, etc.).

4. Transportation Facilities

Roads: The Lower Chartiers Creek watershed has an extensive roadway network. This network includes a full range of roadways from major interstate highways to small, rural, dirt roads. The most prominent of these existing roads is Interstate 79. This interstate highway runs almost directly through the center of the watershed in a north/south direction. Most other major roads within the watershed interchange with this roadway at some point. Other important roads in the watershed include the Parkway West (Interstate 279) in the northern portion of watershed, Route 50 which runs through the middle of the watershed, and Route 19 which travels through the eastern portion of the study area. In

addition to these major roadways, the overall existing travel network provides access to almost any area within the watershed (Refer to Figure 8).

While the existing roadway network provides access to almost all areas of the watershed, expanding development and growth within the western and northwestern portions of the project area continues to necessitate improvements to the transportation system. The present Pennsylvania Department of Transportation (PennDOT) Transportation Improvement Plan (TIP) includes a large number of projects anticipated for study, design, and construction over the next twelve-year period. A significant number of these projects include upgrading of existing interchanges with I-79 such as the Kirwan Heights Interchange at Route 50 and the I-79 Parkway West Interchange. In addition, numerous roads under state control are slated for upgrades and widening (SPC, 1996). While these improvements are necessary to provide safe travel for the general public, they also increase access to areas that are prone to developmental pressure. The need to develop a strong conservation plan, as well as working with PennDOT during development of their transportation plans, becomes essential in the long-term health of both the socioeconomic features and ecological aspects of the watershed. *While these projects are presently being planned, because of the extensive political and bureaucratic nature of roadway development, it is extremely difficult to detail exactly when or if these projects or others will actually be constructed.*

A prime example of this is the proposed Southern Beltway Project. This project being administered by the Pennsylvania Turnpike Commission, proposes a four-lane, limited access highway between the Pittsburgh Airport to I-79 and on to the Mon-Fayette Expressway (PTC, 1997 and PTC, 2000). The project is being advanced in several sections with connections at other roadways. All or portions of four sections of the project run through the southern section of the Lower Watershed. This project is both a major threat and opportunity in the project area. One of the main objectives of the project is to provide improved access for economic development through a corridor east of the airport and south of the City of Pittsburgh. While economic development is needed through this corridor, planning to provide this development in an environmentally conscious manner is important. Working with the transportation agency can reduce impacts of the roadway construction, properly direct mitigation efforts, and can assist in working with local governmental entities to ensure long-term, conservation-minded development. The following are the three interchanges currently being planned for the proposed Southern Beltway Project (Refer to Figure 8) and the local communities that will most directly be affected (PTC, 1997 and PTC, 2000):

1) The Route 980/Noblestown Road area: Robinson (Washington Co.), McDonald, Mount Pleasant, and Cecil;

2) The Route 50 area: Cecil and South Fayette; and

3) The Interstate 79 area: Cecil.

Other nearby communities may be indirectly affected by this proposed project. Currently this proposed project is having an Environmental Impact Statement study being performed and thus the proposed interchanges may change location within the study corridor and possibly even be eliminated. Therefore the above communities that are directly affected may not be when the proposed Southern Beltway project has been completed.

Rail: Norfolk Southern, Norfolk and Western, and Montour rail facilities and right-of-ways exist along various waterways and bisect in the project area (USGS, 1953 – 1993). Norfolk Southern (previously Conrail) has an active rail line that follows along Chartiers Creek and an inactive line that follows Robinson Run. Additionally, Norfolk –Southern (previously Conrail) has rail facilities along the Ohio River in the Borough of McKees Rocks at the lowest portion of the project area in the watershed. The Panhandle Trail, rail-to-trail facility is now being developed on the Norfolk Southern (previously Conrail) right-of-way along Robinson Run. Norfolk and Western also has an active line that follows Millers Run into Bridgeville, where it then follows parallel to the Norfolk Southern (previously Conrail) line along Chartiers Creek (Norfolk Southern Corporation, 2000). It then moves towards the City of Pittsburgh and exits the project area in Green Tree. The Montour Trail, rail-to-trail facility has been and continues to be developed on the Montour right-of-way that bisects the project area through Robinson, Cecil, and Peters Townships in the Washington County portion of the project area (Refer to Figure 8).

Rail-to-Trail Facilities: Refer to Section VI. Cultural Resources, Rail-to-Trails (Refer to Figure 9).

Public Transportation: Public transportation in the project area involves the Port Authority of Allegheny County (PAT) (railcars and buses), and private bus, limousine, and taxi service companies. The PAT rail facilities (the "T") operate through the eastern communities of the project area and connect to downtown Pittsburgh. PAT's buses operate throughout all of the project area in Allegheny County, connecting users to downtown Pittsburgh, the Pittsburgh International Airport, and other local destinations (e.g., shopping malls, commercial districts, industrial parks, etc.). Most of PAT's bus routes currently are in the eastern and northern developed communities with fewer bus routes in more rural portions of the project area. The Airport Busway project was recently

completed as well. This Airport Busway aids in the movement of patrons from the Pittsburgh International Airport and nearby communities through a corridor that extends to downtown Pittsburgh. The Airport Busway utilizes existing roadways as well as newly constructed facilities. Park-n-Ride facilities assist the public commute in southwestern Pennsylvania via carpooling. Park-n-Ride locations assist in reducing the amount of vehicles that need to utilize the transportation system, reduce the need for parking, and also assist in reducing air pollution. Currently there is a planned park-n-ride facility for Collier Township. As the Southern Expressway is constructed and more development activities occur in the southern and western project area, more of a need will develop for public transportation here. As this area develops in the future, expanding public transportation opportunities via a light railcar system and buses would assist in reducing air pollution and decreasing fuel consumption by cars, trucks, and motorcycles. The use of clean energy sources such as electricity and natural gas in public transportation vehicles is a very good way of reducing not only air pollution, but also noise and water pollution by reducing the number of vehicles operating daily.

III. Land Resources

A. Geology and Soils

The watershed is located in the Appalachian Plateau physiographic province. Sandstone, shale, claystone, limestone, dolomite, and coal are the exposed geologic formations. The plateau is noted for its narrow and dissected, steep-sided valleys. These rocks are from the Permian and Pennsylvanian Age of the Paleozoic era. Twenty coal seams are exposed in Allegheny County, however, only the Pittsburgh coal seam is of significant economic importance.

The project area has numerous soils and soil associations. Soil associations in the watershed include (Soil Surveys, 1981 and 1983):

Allegheny County:

- Gilpin-Upshur-Atkins,
- Culleoka-Weikert-Newark,
- Dormont-Guernsey-Culleoka,
- Urban land-Philo-Rainsboro,
- Urban land-Rainsboro-Allegheny variant,
- Urban land-Dormont-Culleoka, and
- Strip mines- Guernsey-Dormont.

Washington County:

- Dormont-Culleoka,
- Guernsey-Dormont-Culleoka,
- Dormont-Culleoka-Newark, and
- Udorthents-Culleoka-Dormont.

The prime farmland soils in the project area include:

Allegheny County:

- Allegheny silt loam (AgB),
- Clarksburg silt loam (CkB),
- Clymer silt loam (CmB),
- Culleoka silt loam (CuB),
- Culleoka-Weikert shaly silt loam (CwB),
- Gilpin silt loam (GiB),
- Gilpin-Upshur complex (GpB),
- Hazelton loam (HaB),
- Huntington silt loam (Hu),
- Lindside silt loam (Ln),
- Philo silt loam (Ph),
- Rainboro silt loam (RaA),
- Rayne silt loam (RyB),
- Upshur silty clay loam (UaB), and
- Wharton silt loam (WhB).

Washington County:

- Allegheny silt loam (AgB),
- Brooke silty clay loam (BoB),
- Culleoka silt loam (CaB),
- Culleoka-Upshur complex (CkB),
- Glenford silt loam (GdA and GdB), and
- Huntington silt loam (Hu).

The soil associations are well drained to somewhat poorly drained, very shallow to deep, and nearly level to very steep soils. These soils are found on floodplains, hilltops, ridges, benches, and hillsides. These soils were formed in residuum of weathered sandstone, shale, siltstone, limestone, and colluvium (Soil Surveys, 1981 and 1983). Some of the limitations of the soils and the parent rock in the Chartiers Creek watershed are that the soils are derived from very landslide prone rock. When the soils and parent rock material are found on steep slopes, landslides can be and often are a by-product of developmental activities. Another limitation is that some of the soils located in valley bottoms have previously been altered by man and are located adjacent to floodplains. This has increased the limitation of these and associated soils by reducing their ability to allow water to effectively drain an area with little or no flood related impacts. An additional limitation to some soils is that in general, septic systems do not work effectively here, which lead to some of the water quality pollution issues in the watershed. For specific site conditions, and soil uses and limitations (in regards to engineering, planning, recreation, wildlife [conservation applications], and crop estimated yields) please review the county soil survey.

B. Ownership

Public Property: Sixty-four public parks/recreational facilities along with numerous municipal, state, and federal facilities are the only publicly owned facilities in the project area.

Private Property: The majority of the property in the project area is privately held as residential, agricultural, forested, and open space.

C. Critical Areas

Critical areas in the project area include 1) riparian forest buffers, 2) wetlands, 3) forests (Refer to Section V Biological Resources, Section 4, Important Habitats for 1 through 3), 4) stream access points, and 5) stream visibility areas.

4) **Stream Access**: Stream Access points and the accessibility to these areas is critical. This is because having access to the watershed's streams is the main way that people have to interact with the natural and physical resources of the watershed. Without this accessibility to the streams, the watershed inhabitants become uninvolved and unconcerned about its resources and thus its health. Recreation is the main way we interact with these resources and therefore, having public access points at logical locations is critical to people gaining knowledge and respect for these places. Stream access could involve boat launch facilities, a greenway or trail along a stream, constructed observation

decks, or other means of permitting people access to the streams of the watershed.

5) **Stream Visibility Areas**: Another opportunity for increasing accessibility is through re-orienting how areas are developed near the watershed's streams. Stream visibility and the areas that can be developed to appropriately allow citizens to interact with the natural and physical resources of the watershed can have a positive impact. Currently many areas that are highly developed in the watershed have buildings oriented away from the streams and other natural areas. By re-orienting how structures and sites are planned for future development, we can reconnect or reestablish the link of man to the local environment. This establishes that these areas have value in our lives. It also provides a focal point for the structure or site that can act as a buffer for the stream or natural resource. These areas can then be linked via trails and the stream.

D. Landfills

No sanitary landfills exist within the project area, however the William H. Harris, Inc. sanitary (Arden) landfill is located in the Washington, PA portion of the Chartiers Creek watershed. There is one demolition landfill that is located within the project area, the Deep Valley Coal and Disposal landfill located in North Fayette Township (PADEP, 2000).

E. Hazard Areas

What is a Hazardous Waste? A hazardous waste is any solid, liquid, or contained gaseous material that you no longer use, and either recycle, throw away, or store until you have enough to treat or dispose of. A waste is considered hazardous if it appears on any one of the four lists of hazardous wastes contained in the Resource Conservation Recovery Act (RCRA) regulations. Even if a waste is not listed, it is considered hazardous if it is ignitable, corrosive, reactive, and or is found to be toxic through EP (extraction procedure) toxicity testing. Examples are solvents, acids/bases, heavy metals, inorganic waste, pesticides, ignitable waste, reactives, formaldehyde, dry cleaning residues, and cyanide waste (Environmental Institute, 1991).

Waste Sites: The National Priorities (Superfund) List (NPL) is EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remediation under the Superfund program (Environmental Institute, 1991). There are no NPL sites within the boundaries of the Chartiers Creek watershed. The industrial/commercial sites in the project area can be locations for historic or abandoned waste site locations.

Some of the industrial facilities along mainstream Chartiers Creek are currently not operating and could contain hazardous or non-hazardous industrial waste issues such as asbestos, lead based paint, under or above ground storage tanks, polychlorinated biphenyls (PCBs), and pesticides. However, none of these facilities have been identified by PADEP as being waste sites.

Captive processing facilities perform waste processing at their facilities (e.g., boilers, incinerators, waste water treatment, etc.) thereby not delivering a waste product to be disposed of or controlled at a landfill. The following are the waste handling facilities located in the project area that are listed in PADEP's document, *Waste Management Program Permitted Sites for the Southwestern Region* (PADEP, 2000):

- No Sanitary Landfills
- Two Residual Waste Processing Facilities (Petromax Residual Waste Oil Processing Facility in Collier Township and Tri-State Petroleum Recovery Residual Waste Transfer Station – Kennedy Township)
- One Demolition Landfill (Deep Valley Coal and Disposal – North Fayette Township)
- No Fly Ash/Industrial Waste Sites
- No Municipal Waste Processing Facilities
- No Commercial Hazardous Waste Facilities
- One Captive Hazardous Waste Facility (General Electric Company, Bridgeville Glass – Collier Township)
- No Processing Facilities
- One Transfer Station [Infectious Waste] (Weavertown Transfer Facility – Cecil Township).

Unregulated waste and brownfield sites (i.e., dumps, junkyards, and abandoned coal tailing piles [gob piles]) exist within the project area. Gob piles have been broken out with waste sites (separated from abandoned mine topic category) due to the fact that these areas are often associated with each other (Refer to Pages 56 and 68, and Figure 3). These areas also usually are located near streams. The project area has many examples of barren land/gob piles associated with riparian zones and streams (e.g. Robinson Run, North Branch of Robinson Run, Millers Run, McPherson Run, Campbells Run, Scotts Run, and Painters Run). Gob piles can be a significant cause of degraded water quality (e.g., AMD, sedimentation, suspended solids, etc.).

All commercial and industrial properties must have a Phase I Environmental Site Assessment performed in order to complete real estate transactions. A Phase I Environmental Site Assessment (ESA) evaluates a specific site and its environmental liability issues. A Phase I ESA is performed to protect potential property owner and banking institution from environmental liability. If environmental waste issues are

identified through an assessment, potential remediation actions can then be completed if warranted.

There are two sites located in the Chartiers Creek watershed that are regulated by the Uranium Mill Tailings Radiation Control Act (UMTRCA). The UMTRCA controls any activity that has to do with the mining and milling of radioactive materials. The two sites operated and milled radioactive materials during the post World War II/Cold War period. At the time, materials were cleaned up and disposed of to the standards of the day (PADEP, October 2000). The following is a description of the two UMTRCA sites (Refer to Pages 56 and 68):

Canonsburg Site: Though not in the project study area, the Canonsburg site is worth discussion. This site has been cleaned up and the radioactive materials have been disposed of on site. This facility is owned, operated, and inspected by the United States Department of Energy (USDOE). The 1999 compliance report states that the facility is in excellent condition and met all compliance requirements. This report also states that groundwater monitoring is continuing at the six wells on site as well as the surface water in Chartiers Creek. The report states that the Long Term Surveillance Plan requires water sampling of the six wells and three surface sampling locations two years following licensing of the site by the National Regulatory Commission. The site was licensed in January of 1996. This requirement was followed, but due to the concentration of uranium in some wells being above the EPA Maximum Concentration Limit (MCL), USDOE continues to monitor the wells on an annual basis. It was found that..."Uranium was detected above the MCL at two down gradient wells, however it dropped below the MCL at the cross gradient well." Additionally..."USDOE considers the risk associated with the uranium in groundwater to be negligible and insignificant in that groundwater 1) is institutionally controlled, and 2) has no detectable effect on the chemistry of water in the creek." (USDOE, 1999). More information on this issue can be found by contacting the PADEP and the USDOE.

Superior Steel (Carnegie) Site: This site has had a survey completed of the facility by USDOE. USDOE is in the process of reviewing this survey in order to determine what remediation activities are warranted for any contaminated materials. Presently no known water quality problems are known to exist concerning radioactive materials from this site (PADEP, October 2000).

Abandoned Mines: Abandoned deep mines and abandoned surface mined lands exist throughout the project area (Refer to Pages 56 and 69, and Figure 3). The vast majority of the project area was deep mined in the past 100+ years. Presently, no deep mining is occurring within the project area. Surface mining also occurred in the recent past and continues to this day within the project area (PADEP, January 2000).

Surface mining was concentrated in the western and southern portions of the project area due to the residential land use that has occurred along the eastern rim of the Lower Chartiers Creek watershed. Currently, Pennsylvania Department of Environmental Protection (PADEP) has permitted 18 mining activities within the project area (e.g., active strip mines, a stone quarry operation, a mining tipple/processor, and reclamation sites).

IV. Water Resources

A. Stream Characteristics: The streams of the Chartiers Creek watershed have a designated use as warm water fisheries (Pennsylvania Code, 1994). The Pennsylvania Fish and Boat Commission (PFBC) currently stocks Millers Run with trout in Cecil Township. This fishery is stocked as a put-and-take trout fishery. This is to provide recreational fishing opportunities in a waterway that will not support trout throughout the year due to environmental conditions. Other stocked areas exist outside the project area (e.g., Little Chartiers Creek).

A fish consumption advisory for carp (*Cyprinus carpio*) and largemouth bass (*Micropterus salmoides*) exist on Chartiers Creek and Little Chartiers Creek (Canonsburg/Canonsburg Lake to the mouth). The contaminants are polychlorinated biphenyls (PCBs) and Chlordane (PFBC, 1999). In 1969 a PCB spill occurred at the McGraw-Edison plant in Bridgeville. This spill was directly into Chartiers Creek and caused PADEP to issue the advisory throughout the watershed due to the migratory nature of some fish. The source of contamination for chlordane is believed to be from residential homes. Historically homes were treated with chlordane to eliminate insect infestations. Since no known dischargers or spills of chlordane have ever been known to occur, PADEP believes the residential treatments of chlordane (and the subsequent runoff to streams) to be the only reasonable explanation. PADEP performs fish tissue toxicology every five years (PADEP, November 2000).

B. Major Tributaries: Major tributaries of Chartiers Creek in the project area are (Refer to Figure 4) (SPC, 1999):

- Campbells Run,
- Robinson Run,
- North Branch Robinson Run,
- Millers Run, Coal Run,
- McPherson Creek,
- Brush Run,
- McLaughlin Run,
- Painters Run,
- Scrubgrass Run,
- Whiskey Run,
- Bell's Run, and
- Hope Hollow Run (also known as Georges Run).

C. Wetlands: The wetlands of the project area vary in size, complexity, and type depending on their location in the watershed. Palustrine and riverine wetlands are the dominant wetland type found within the project area. In order for an area to be considered a wetland, the area must satisfy three parameters. The area must have wetland hydrology (the presence of water), a dominance of hydrophytic (water-loving) vegetation, and hydric (wet/moist) soils. The identified wetlands on the Southwestern Pennsylvania Commission's GIS database are taken from the National Wetland Inventory (NWI) mapping and have been classified as forested and non-forested wetlands. Natural wetland systems can be found throughout the project area along stream corridors. Constructed wetlands have also been built in the project area and serve

many of the varying functions that the natural wetlands serve (e.g., provides sediment trap, nutrient filtering, wildlife habitat, and controls floodflow, etc.). The project area has numerous wetlands that can be found throughout the watershed in many different locations. However, due to the small size of the project area's wetlands, these wetlands are not observable at the scale of the project mapping and thus not depicted on Figure 3. Before proceeding with projects, please consult the NWI mapping to assist in reviewing a specific property or location.

D. Floodplains: The streams and waterways of the watershed contain numerous floodplains throughout the project area. These floodplains vary in size (width) and sinuosity (how much the stream and associated floodplain bends, turns, and meanders) as they relate to the specific stream and floodplain. A floodplains size and sinuosity is also dependent with how high in the drainage basin it is located. Generally, the higher in the watershed one goes the smaller the size (width) of the floodplain.

The Chartiers Creek valley floodplain area has been utilized over the years as the location for major commercial and industrial development. Due to the steeper slopes of the eastern rim sub-basins and the developmental limitations that exist there, the areas adjacent to Chartiers Creek have been highly developed. To protect real estate and properties along Chartiers Creek, the U.S. Army Corps of Engineers designed and later constructed the James G. Fulton Local Flood Protection project (Refer to Figure 8) from Bridgeville downstream to Crafton (USACOE, 1957). This high use and destruction of floodplain for industrial/commercial activities and for flood protection facilities has reduced the amount of floodplain that exists along Chartiers Creek. Therefore, the values and functions that floodplains serve are either eliminated or reduced. However, the James G. Fulton facility has improved the quality of life of residents and businesses by reducing the incidents of flooding in flood prone areas. The project area to the east of Chartiers Creek exhibits development right up to and often over top of a stream and its adjoining floodplain. The project area to the west and south is currently less developed and therefore has less of an impact to its floodplains.

Floodplains are an important resource because they hold storm flows back, thus reducing destructive flooding downstream (Refer to Pages 57 and 69, Figures 2, 3, 4, 5, and 8, and Appendix 3). If development is reduced or eliminated from occurring within floodplains, more intensive infrastructure (i.e., flood channels, levees, etc.) would not need to be constructed. This then reduces the financial burden of maintaining structures located in floodplains. Additionally, floodplains are the areas along a stream where rich alluvial (stream placed) soils are to be found. Nutrients and organic matter are recycled and transformed into food by bacteria, fungi, and plants that then are passed on to animals. This is one reason why farmers utilize these floodplains as cropland. Floodplains also serve as fringe or buffer areas that transition from streams and rivers to upland areas. Floodplains provide important

shading to stream habitat yet connect these areas to wetland and upland areas. Much diversity in plant and animal life can be found here due to the amount of nutrient recycling. Floodplains are very fertile areas, thus, are an important resource to enhance and protect.

The project area has numerous floodplains that can be found throughout the watershed in many different locations. However, due to the scale of the project mapping, the floodplains are not observable on the mapping and thus not depicted. Please consult the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps to assist in reviewing a specific property or location.

E. Lakes and Ponds: No lakes or reservoirs exist within the project area boundaries. Numerous farm ponds can be found throughout the rural portions of the project area and are utilized mainly for cattle water supply, soil conservation practices, fire insurance protection, and recreational purposes.

F. Water Quality: Most natural waters contain various bicarbonate and carbonate compounds, originating from sedimentary rocks. The calcium bicarbonate content of freshwaters determines the pH or acidity / alkalinity balance (Allan, 1999). Thus limestone geology can determine to what extent buffering to degraded streams occurs. The more limestone that is associated with a stream, the better the stream is able to buffer against acidic water conditions. Water quality of the Chartiers Creek watershed was good prior to man's intensive land use activities of the 19th and 20th centuries. The underlying geology of the watershed is made up of sandstone, shale, limestone, and coal. However in the Allegheny county portion of the study area, there is sandstone, shale, and coal. Limestone is found to a lesser extent here and streams are less buffered. Whereas in the Washington county portion of the study area, limestone (as well as sandstone, shale, and coal) is found which permits more buffering of degraded acidic water conditions (Soil Surveys, 1981 and 1983). This is one reason for some of the various and complex water quality problems that exist in the study area (Refer to Figure 5).

In the study area, surface water flows from land surfaces into drainage basins (via ephemeral, intermittent, and perennial streams) to the major tributaries until these streams meet Chartiers Creek. The quality of the water in these streams is directly related to the quality of the land it came from. Therefore, water coming from an urban residential area will transport one type of pollution versus water coming from an agricultural area. The quality of water is important because it directly impacts chemical, physical, and biological processes that take place in streams. Human impacts to these parameters can indicate degraded water whereas conservation measures taken to make improvements can show the opposite.

The project area is 139 square miles in size. Eighty-five miles of stream have been assessed for Non-Point Source pollution by PADEP

(PADEP, 1998). There are 79 miles (93%) of assessed streams that are not in attainment with the state's Clean Streams Act (Refer to Figures 4 and 5) in the project area. Three sub-basins in the project area are in attainment. These are Pinkertons Run, Scotts Run, and an unnamed tributary to Millers Run. The sources for non-attainment are shown in Table 5. PADEP's 1998 data distinguishes between primary and secondary/tertiary sources. This shows that a stream reach may have multiple sources of non-attainment. This makes prioritizing remediation actions difficult due to the magnitude of the NPS constraints associated with Chartiers Creek. However, a good plan that distributes responsibilities and opportunities can assist in making significant improvements to the watershed's water resources. The Water Quality Management Figure (Refer to Figure 4) compartmentalizes the varying NPS water quality issues into management units. The management units are based on sub-basins of tributaries to Chartier Creek. These allow for the municipal government and/or local grassroots organization to take responsibility for actions in their portion of the watershed with assistance from foundations and the regulatory agencies. Table 5 shows the top six sources of NPS pollution in the project area (bolded pollution source) and the amount of stream in attainment. The top pollution sources are discussed later in this section.

Systech Engineering, Inc. completed the Total Maximum Daily Load (TMDL) study of the entire Chartiers Creek watershed. This study is also referred to as the Watershed Analysis Risk Management Framework (WARMF). The WARMF reviewed all the point and non-point sources of water pollution. Data collected has been inputted into the WARMF modeling program. The PADEP 303(d) list requires that over 300 TMDLs be developed for the Chartiers Creek watershed. The WARMF project was completed in 2000. The WARMF model is able to assist in delineating where remediation actions can take place in order to meet regulatory TMDLs that will be developed.

Point Sources: A point source form of water pollution is a source of water pollution that discharges water directly into a stream or other water body. Point source forms of water pollution are regulated by state and federal environmental agencies. The project area has eighteen (18) direct and indirect dischargers of state permitted treated wastewater into Chartiers Creek and its tributaries (PADEP, October 1998 and EPA EnviroFacts Website, 2001 [www.epa.gov/enviro/html/ef_overview.html]). Thirteen (13) locations are in Allegheny County and five (5) locations are in the Washington County portion of the project area (Refer to Table 4 and Figure 8). These permitted facilities include sanitary sewer authorities, industrial, homeowners associations, individuals, commercial businesses, institutions, and the U.S. Army. Please note that fourteen (14) non-listed sites from the PADEP Direct/Indirect Dischargers list (PADEP, October 1998) were not found on EPA's EnviroFacts website.

Table 4. PADEP Direct and Indirect Discharge NPDES Permit Sites

Facility (NPDES Permit #)	Non-Listed Sites in the EPA Permit Compliance System (PCS)
1. Dynamet, Inc. (PA0205419)	**Carnegie Borough**
2. Union Electric Steel (PA0002887)	**South Fayette Twp. Municipal Authority**
3. Robinson Township Municipal Authority (PA0036293)	**Collier Township Municipal Authority**
4. Crucible Materials Corp. (PA0000647)	**James R. Rahner**
5. Pennsbury Village Borough (PA0047228)	**O. Hommel Co. (PA004260)**
6. Oakdale Municipal Authority (PA 0024619)	**Sun Refining & Marketing (PA0216232)**
7. US Army (PA0045438)	**George J. Wagner, Jr.**
8. G&G Mobile Home Sales (PA0096881)	**Independent Enterprises (PA009549)**
9. G&G Mobile Home Sales (PA0096890)	**Frank G. Mondine**
10. Pitts International Industrial Park (PA0097667)	**Parkway West Area Vo-Tech**
11. Crucible Materials Corporation (PA0096059)	**Calvin W. Charlier**
12. All American Energy SW (PA0092827)	**Wesley Institute**
13. Donald Davidson (PA0097004)	George & Marian Fleeher (PA0036331)
14. Cecil Wastewater Treatment Plant (PA0043435)	Quail Run Sanitary Corporation
15. Cecil Township Municipal Authority (PA0216178)	
16. Peters Twp. Sanitary Authority (PA0028711)	
17. Cecil Township Municipal Authority (PA0091138)	
18. Briselli, Inc. (PA0204960)	

Note: Allegheny County sites are in bold and Washington County sites are not (Refer to Figure 8).

Non-Point Sources (NPS): A non-point source form of water pollution is a source of water pollution that does not necessarily discharge water directly into a stream or other water body at one location or point. NPS water pollution is more difficult to regulate by state and federal environmental agencies. This is because the source of pollution occurred prior to its regulation, or the problem is so widespread that regulators would have an impossible task trying to regulate it (e.g., abandoned mine discharges, nutrient effluent from farms, and pesticide residue from yards). PADEP's 303 (d) list of streams in the Lower Chartiers Creek project area lists

fourteen (14) specifically named streams that are not in attainment (or meeting water quality standards for designated use) (PADEP, 1998). The PADEP 303 (d) listed streams are:

- Brush Run,
- Campbells Run,
- Chartiers Creek,
- Coal Run,
- Dolphin Run,
- Fishing Run,
- Graesers Run,
- Half Crown Run,
- McLaughlin Run,
- McPherson Run,
- Miller's Run,
- N. Branch of Robinson Run,
- Painters Run, and
- Thoms Run (PADEP, 1998).

Table 5. Sources of Non-Attainment of PA Clean Streams Act, Water Quality Standards in Lower Chartiers Creek (PADEP 1998 303[d] List) Stream Miles Effected by Pollution Source

Pollution Source	Primary Source	Secondary and Tertiary Sources	Total
Abandoned Mine Drainage	35.4	108.7	**144.1**
Urban Impacted (or Habitat Modification)	16.0	29.4	**45.4**
Agriculture	8.4	13.7	**22.1**
Construction	2.5	18.1	**20.6**
Urban Runoff/Storm Sewers	1.4	16.9	**18.3**
Source Unknown	10.1	8.1	**18.2**
On-Site Wastewater	1.9	4.1	**6.0**
Surface Mining		5.6	**5.6**
Natural Sources	0.4	2.3	**2.7**
Hydromodification	0.7	1.8	**2.5**
Combined Sewer Overflow	1.9		**1.9**
Subsurface Mining		0.5	**0.5**
Golf Courses	0.4		**0.4**
Land Development		0.4	**0.4**
In Attainment	6.3		
Total	85.4 mi	209.6 mi	**288.7 mi**

1. **Abandoned Mine Drainage (AMD):** AMD is made up of numerous water quality parameters and can differ from discharge to discharge (Refer to Pages 57 and 69, Figures 2, 3, 4, and 5, and Appendix 3). AMD typically can be either acidic or alkaline and has metals (Aluminum, Iron, and/or Manganese) associated with it. This is one of the major water quality problems in the Chartiers Creek watershed (Refer to Figure 5). This watershed has been impacted for many years because of its most valuable natural resource, the Pittsburgh Coal bed mined in the watershed since 1760. The employment opportunities created by the mining industry was one of the main reasons people settled the Chartiers Creek valley.

In the 1968, Pennsylvania Department of Mines and Mineral Industries' (PADMMI) assessment (Acid Mine Drainage Pollution Study – Phases 1 & 2) of the Chartiers Creek watershed, a total of two hundred and thirty-three pollution sources were located (PADMMI, 1968). Both major (45) and minor (188) AMD discharges were found from surface and deep mined areas (Refer to Figure 5). The major discharges contributed a significant amount of acid loading to Chartiers Creek. Of these, only six were found not to occur within the project area. Of the 45 major discharges, 17 are from deep mines, 18 are surface mine sources, and 10 are a combination of surface and deep mine sources. Streams in the project area that have been degraded due to AMD include:

- Chartiers Creek
- Campbells Run
- Millers Run
- Robinson Run
- North Branch of Robinson Run
- Brush Run
- Scrubgrass Run and
- Numerous un-named tributaries

Of these, Campbells Run, Robinson Run, and the North Branch of Robinson Run were found to be the most impacted with 1,160 lbs. and 1,280 lbs. per day per square drainage mile (PADMMI, 1968). Additionally, the streams in the western portion of the project area were, and continue to be, more highly impacted. At the time, these AMD discharges were contributing 200,000 lbs. of acid per day into Chartiers Creek.

Since the 1968 assessment, AMD discharges can now be found in the Hope Hollow Run, McLaughlin Run, Painters Run, Scrubgrass Run, Whiskey Run sub-basins, and along the east bank of Chartiers Creek main stem. Additional blowout discharges have occurred along Chartiers Creek (and possibly other unknown locations) and may possibly be due to the accidental flooding of the

Montour Deep Mine in 1980. In the PADEP 1998 assessment of Chartiers Creek, PADEP listed AMD as the number one water quality degradation parameter for the Chartiers Creek watershed (PADEP, 1998). AMD was again found to be one of the major water quality impacts in this watershed.

2. Sewage: Sewage is basically composed of wastewater, feces, and particulate matter (Refer to Pages 58 and 72, Figures 2, 3, 4, 5, and 8, and Appendix 3). In a conventional sewage treatment plant, sewage is transported to treatment facilities via an underground network of sewage pipelines from residences and businesses. At the treatment plant the sewage is then put through primary and secondary (and in some cases tertiary) treatment. This process removes solids, bacteria, viruses, and other waste material until the water is potable or drinkable for consumers. Thus sewage or wastewater is recycled for reuse by patrons of the water treatment authority. Stormwater in most municipalities in the project area has been combined with the sanitary sewers. This situation causes the combined sewers overflow situations during wet weather events.

In the 1950's, there were already severe wet weather problems in the Chartiers Creek watershed as well as in other portions of Allegheny County. Even in modest wet weather conditions the sanitary sewer overflow (SSO) control structures and the combined sewer overflow (CSO) structures were experiencing what is considered illegal discharges into local waterways (Refer to Figures 5 and 8). Currently, the Boroughs of Carnegie, Oakdale, and McDonald are experiencing the worst problems in the project area. However, these problems are not unique to these communities and the sewage pollution problems exist throughout the project area. This problem is due in part to old/poorly maintained sewer facilities and illegal connections to the sanitary sewer system (50% of these sources involve private property). Additionally, much of the infrastructure that involves the sewer system is located below groundwater levels and thus raw sewage in some cases is coming in contact with groundwater and contaminating it. This problem is being worked on with considerable effort by all levels of government (local, state, and federal). This is due to the enormous financial costs involved in retrofitting and/or replacing these systems. Allegheny County is expected to spend approximately $1 billion to correct this problem, and of these funds, approximately 40% will be spent in the Allegheny County portion of the project area (ACHD, Fall 1999).

On average, a consumer (i.e., residential, commercial, and industrial users) uses and discharges 250 gallons of water per day. During storm events, this figure soars to 3,000 gallons per person in some communities due to leaks to the system (Three Rivers Wet Weather Demonstration Program) (ACHD, June 1999). The

Allegheny County Sanitary Authority (ALCOSAN) is currently in the process of expanding their facilities to correct system problems. This corrective action is to be completed in two phases. Phase one is currently being worked on. This involves $180 million in construction funds to expand tank facilities (an increase from 200 to 250 million gallons per day) and control odors at their main treatment facility on the north shore of the Ohio River in Woods Run. Phase two will involve $220 million and will take place from approximately 2002 to 2008. Phase two will be a more complicated project because it will correct problems associated with combine sewers – sanitary and storm. This work is being completed to improve water quality in the local waterways and is being required by the Pennsylvania Sewer Facilities Planning Act 537. There are currently sixty-four (64) outfall structures that exist in the project area (Refer to Figure 8) (ALCOSAN, June 1995). ***Please note that due to the scale of the project area mapping, 50% of the existing CSOs were mapped.*** PADEP is currently reviewing information provided by ALCOSAN and other water authorities to determine whether each specific outfall structure is a legal SSO or CSO. These outfall structures are located from Bridgeville Borough downstream to the mouth of Chartiers Creek in the McKees Rocks area. From there, the sewage is piped across the Ohio River to the ALCOSAN treatment facility at Woods Run. At this time, ALCOSAN is in the planning stages for their new interceptor(s) that will serve the Chartiers Creek watershed. ALCOSAN is working with the (local municipalities and,) state and federal agencies in making improvements to their facilities (Barnes, 2000). The following is a list of sewer service providers in the project area (SPC, 1999):

- Allegheny County Sanitary Authority
- Bethel Borough Sanitary Authority
- Canonsburg-Houston Joint Authority
- Cecil Township Sanitary Authority
- McDonald Sewer Authority
- Moon Township Sanitary Authority
- Pennsbury Village Borough Sanitary Authority
- Peters Creek Sewage Authority
- Peters Township Sanitary Authority
- Robinson Township Sanitary Authority

3. **Nutrient Enrichment:** This is a water quality problem associated with the lack of agricultural conservation practices, leaking septic systems, and uncontrolled fertilizer application (e.g., golf courses, parkland, home gardens, etc.). In the project area, nutrient enrichment problems are occurring in the southwestern rural areas (Refer to Pages 59 and 72, and Figure 2, 3, 4, and 5, and Appendix 3). Streams impacted by nutrient enrichment exhibit eutrophic conditions. Under these conditions, an increased amount

of algae plant growth occurs until the algae die. The decomposition of the large amounts of algae biomass reduces oxygen levels in the stream and fish kills occur as a result. Streams impacted by nutrient enrichment problems are Millers Run and an unnamed tributary to Millers Run (PADEP, 1998). Nutrient enrichment problems increase when agricultural conservation practices are not followed; buffers are not maintained along streams; no streambank fencing exists, poorly planned/designed facilities are built; fertilizer/pesticides are not applied/used properly; and septic systems are not maintained.

4. **Urban Impacted:** This designation is given to streams that are impacted due to one or more water quality parameters. These parameters alone or together impact the habitat, stream structure, and the environment for benthic organisms and fish (Refer to Pages 59 and 72, Figures 2, 3, 4, 5, and 8, and Appendix 3). Streams that exhibit urban impacted (or habitat modification) problems are affected by high stream flows, turbidity, erosion and sedimentation, residual chemical (e.g., road salts, oils, solvents, etc.), and thermal pollution. The factors that lead to these types of water quality impacts are due primarily to areas with high developmental activities, high human population densities, high densities of residential/commercial/industrial structures, and transportation facilities. In general, urban impacted modifications occur due to a high degree of impervious surfaces (e.g., asphalt and concrete roads, structure's roofs, etc.).

In the project area, urban impacted modification problems are occurring in the southeastern suburban areas (e.g., Scott Township, Mt. Lebanon, Upper St. Clair, Bethel Park, Cecil Township, and Peters Township [Refer to Figure 5]). Streams impacted by urban impacted modification problems are Brush Run, McLaughlin Run, Painters Run, McPherson Run, a few unnamed tributaries, and a portion of Chartiers Creek (PADEP, 1998). These problems increase when vegetated buffers are not maintained along streams, stormwater management facilities do not exist, or inadequately planned/designed facilities are built, stormwater and sanitary sewer discharges are mixed, and when stormwater flow comes from warm/hot surfaces and increases stream thermal temperatures. Stormwater management involves the control of water that runs off the surface of the land from rain, melting ice, or snow (PADEP, 1997). High stream flows coming from developed areas only add to this water quality problem. Currently only one stream flow gauging or monitoring station is maintained in the Chartiers Creek watershed. This site is located in Carnegie and maintained by the USGS (USGS, 1999).

5. **Multiple Non-Point Pollution Sources:** Multiple Pollution Sources is a category that entails all of the above water pollution types as well as additional water pollution sources that PADEP was

not able to identify during their assessment of Chartiers Creek in 1998 (PADEP, 1998). The components for this type of water quality degradation can include, but not be limited to, salts, excess nutrients, chlorides, metals, siltation, and turbidity (Refer to Pages 60 and 74, Figure 5, and Appendix 3).

G. Water Supply: Water supply has been an issue in the project area for some time. Due to the high populations of people that have moved into the watershed to live and work, water supply demands are continually increasing (SPC, 1999). Also, due to water quality problems, local communities have had to expand treatment facilities in order to meet demand. This is due in part to land uses that have impacted water sources and supplies. The impacts as the result of AMD were so prolific in 1968 that the West Penn Water Company of McDonald, PA had to abandon its public water supply source. This was because treatment of the AMD was too expensive and impossible to treat (e.g., acid concentration, 100 ppm; total iron, ~40 ppm) with a conventional filtration/treatment plant (PADMMI, 1968). Due to this condition, McDonald, PA had to be connected to the Pennsylvania American Water Company in order to have a safe public water supply source (Refer to Figure 8).

The following is the list of the water service providers in the project area (SPC, 1999):

- Borough of Oakdale
- City of Pittsburgh
- Pennsylvania American Water Company
- Pennsylvania American Water Company - Pittsburgh
- Pennsylvania American Water Company - McMurray
- Robinson Township
- Western Allegheny
- West View Borough

V. Biological Resources

A. Wildlife:

Terrestrial: The Lower Chartiers Creek watershed contains a large variety of non-game and game wildlife species. The project area can be broken into two separate types of general terrestrial habitat settings - rural and urban. In the rural setting, birds, mammals, amphibians, and reptiles generally inhabit and migrate between areas of large, wooded tracts, agricultural land, edge/ fragmented habitat, riparian, and wetland habitat.

The main wildlife problem that occurs in this area involves crop damage due to white-tailed deer. In the urban setting, the same species generally have adapted and coexist with man but in a more confined atmosphere of fragmented forest, rangeland, and riparian zones. The main problem that occurs here is property/vegetative damage to ornamental plants and property damage due to automobile accidents with white-tailed deer. Most often these accidents only cause physical damage to automobiles, but at times they have caused personal injury and even death. Currently, the Townships of Upper St. Clair and Bethel Park are utilizing the services of White-tail Management to assist in reducing the herd size in specific areas (parkland) of the respective townships. Other wildlife management options have been investigated. These have included no management, wildlife contraception, private hunting, and public hunting. Some communities in the project area permit legal hunting throughout their respective municipalities, while other municipalities have not permitted hunting due to the restrictive nature of the more suburban/ urban communities.

USC-Citizens for Land Stewardship and other dedicated birders are currently involved in establishing an Audubon Society Bird Circle in the South Hills of Pittsburgh. The center of this proposed bird circle is located in the Lower Chartiers Creek watershed. Bird circles assist in regional and national surveys of bird populations (both migratory and non-migratory species). With habitat fragmentation being a major cause in bird population decline, bird circles can assist in calculating increasing or decreasing populations of bird species. Therefore if a decline in forest habitat is taking place and a subsequent increase in grassland bird populations are observed, then an unhealthy environmental shift is potentially being taking place. During the 1999 Christmas Bird count, forty (40) species of birds were observed.

Aquatic: The PFBC currently stocks Miller Run with trout in Cecil Township (PFBC, 1999). This fishery is stocked as a put-and-take trout fishery. This is to provide recreational fishing opportunities in a waterway that will not support trout throughout the year due to environmental conditions. Other trout stocked areas exist outside the project area (e.g., Little Chartiers Creek). At this time, the PFBC is not planning on stocking other stream locations within the Lower Chartiers Creek project area with

trout due to poor water quality. The PFBC has not performed any major aquatic surveys and fisheries evaluations in the project area as a result of Chartiers Creek's water quality issues. However, the PFBC does perform stream surveys periodically in order to manage the fishery for future opportunities. Additionally, the PFBC does from time-to-time stock this area of the watershed with other warmwater game fish and exotic species in order to manage other fish species (PFBC, March 2000).

B. Vegetation:

The Chartiers Creek watershed is a part of the Western Allegheny Plateau Permian Hills (70a) and Monongahela Transition Zone (70b) Level III and VI Ecoregions of Environmental Protection Agency, Region 3. Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designated to serve as a spatial framework for research, assessment, management, and monitoring of ecosystems and their components. Ecoregions are directly applicable to the immediate needs of state agencies, including the development of biological criteria and water quality standards and the establishment of management goals for non-point source pollution (Woods et al., 1999).

The project area has a great diversity of vegetation, both native and non-native species. This diversity has occurred due to both natural (physiographic) and anthropogenic (man induced) reasons. The natural geology, soils, and climate support vegetation that survive and thrive in the region. When settlers arrived in the watershed, land was cleared for agriculture and timber. From the late 1800s (during the Industrial Revolution) to the present, land has been cleared for more intensive industrial, commercial, and residential purposes, as well as for surface mining activities. These intensive land uses have not only changed the landscape, but the vegetative communities that exist. Many studies have been performed to characterize the vegetation of the region from many perspectives. In general, the Chartiers Creek watershed area can be described as being located in the Cumberland and Allegheny Plateau Section of the original Mixed Mesophytic (dry-loving) forest region. The following are the dominant hardwood and softwood species in the region (Smith, 1994 and Wagner, 1994):

- American beech (*Fagus grandifolia*)
- Tulip tree (*Liriodendron tulipifera*)
- Basswood (*Tilia sp.*)
- Sugar Maple (*Acer saccharum*)
- American chestnut (*Castanea dentata*)
- Sweet buckeye (*Aesculus octandra*)
- Red oak (*Quercus rubra*)
- White oak (*Quercus alba*)
- Eastern hemlock (*Tsuga canadensis*)

Recent investigations performed by the Western Pennsylvania Conservancy (Smith, 1994 and Wagner, 1994), involved the Natural Heritage Inventories for Allegheny and Washington counties. These inventories describe the vegetative communities as transitional in the Chartiers Creek watershed. This is because many areas in Allegheny and Washington Counties are reverting from past land uses (e.g., agricultural use) to forest. However, this does not mean that these transitional areas are reverting to historical vegetative communities, instead a hybrid or mixed composition of species that includes native, non-native, and exotic-ornamental species is developing.

C. PNDI Species:

The species of special concern (threatened and endangered species) listed below are tracked by the state and federal natural resource agencies in the Pennsylvania Natural Diversity Inventory (PNDI) program (PADCNR, 2000; PFBC, 2000; and PGC, 2000). The species listed are reported to occur in or near the Chartiers Creek watershed's boundaries in Allegheny and Washington Counties, PA (Refer to Pages 63 and 74). It is a matter of policy for the resource agencies not to provide specific site location information in order to provide a level of protection to these organisms and their critical habitats. The state natural resource agencies are to be contacted if any land disturbance activities are planned within the watershed.

Common Name	Scientific Name	Last Observed
Bird(s)		
1. Backman's Sparrow	*Aimophila aestivalis*	07/06/1937
Mussel(s)		
1. Wabash Pigtoe	*Fusconaia flava*	Pre-1919
Fish		
1. Longnose Gar	*Lepisosteus osseus*	07/03/1900
Plants		
1. Pipevine	*Aristolochia macrophylla*	05/25/1888
2. Canadian Milkvetch	*Astragalus canadensis*	08/01/1848
3. Great Indian-Plantain	*Cacalia Muehlenbergii*	09/20/1869
4. Wild Hyacinth	*Camassia scilloides*	05/28/1947
5. Wild Senna	*Cassia marilandica*	09/15/1899
6. Vase-Vine Leather-Flower	*Clematis viorna*	07/27/1873
7. Hazel Dodder	*Cuscuta coryli*	09/1897
8. Harbinger-of-Spring	*Erigenia bulbosa*	05/04/1898
9. White Trout-Lily	*Erythronium albidum*	05/04/1935
10. Prickly-Pear Cactus	*Opuntia Humifusa*	10/05/1944
11. Passion-Flower	*Passiflora lutea*	09/15/1899
12. Crepis Rattlesnake-Root	*Prenanthes crepidinea*	09/10/1933
13. Yellow Water-Crowfoot	*Ranunculus flabellaris*	05/10/1930
14. Gray-Headed Prarie Coneflower	*Ratibida pinnata*	07/17/1946
15. Snow Trillium	*Trillium nivale*	04/02/1997

D. Important Habitats and Natural Heritage Areas:

Riparian Forest Buffers and Wetlands: Riparian forest buffers and wetland habitats are very important areas in all watersheds for a number of reasons (Refer to Pages 63 and 75, Figures 3 and 4, and Appendix 3). First, these habitats are transitional areas (ecotones) between the terrestrial and the aquatic portions (the receiving stream) of a watershed. These areas have direct interaction between terrestrial and aquatic ecosystems. Riparian and wetland areas can vary in size, diversity, and complexity. Riparian zones, wetland complexes, and floodplains are found to exist together in the natural environment. Riparian zones act as transportation corridors, integral and diverse habitats for wildlife and fishes (bio-diversity), high production areas for timber and food, and are important recreational areas. Wetlands serve much the same type of function as riparian zones plus they trap sediments, nutrients, pesticides, and they regulate flood/storm events.

Second, these areas are important from the watershed and fisheries management perspectives because streamside vegetation controls erosion and sedimentation, thus controlling streambank stability/channel morphology. These areas also add large, woody debris to streams, which create habitat and microhabitat for insects, wildlife, and fishes. Riparian zones and wetlands assist in moderating environmental conditions for wildlife, fishes, and humans. These areas assist in controlling the temperature of streams; where sediments, nutrients (phosphorus and nitrogen), and pesticides are deposited; and where energy from floodwaters dissipate (American Fisheries Society, 1997; Orth and White, 1999; and Wesche and Isaak, 1999).

In all watersheds with healthy riparian zones and wetlands, the environmental health of the watershed in question will greatly improve. In the Lower Chartiers Creek watershed, less environmental problems occur in areas where healthy riparian zones and wetlands are found. This is evident in the three sub-basins that are found in the project area that are in attainment for water quality. These sub-basins have well established riparian zones and lack development that impacts these important habitats. These sub-basins have agricultural and residential land uses; however, the riparian zones and wetlands are able to filter/trap sediments and nutrients, and reduce flood damage caused by high stream flows (locally and further downstream). The restoration and protection of riparian zones and wetlands in the Chartiers Creek watershed is important in order to maintain and then improve the environmental health of the watershed. It also will assist in improving the aesthetics of the watershed and make the area more appealing to live in.

Great Blue Heron Rookeries: Two Great blue heron (*Ardea herodias*) rookeries exist in the riparian forest buffer and wetland habitats in the project area (Refer to Pages 63 and 75, and Appendix 3). These rookeries were noted by the Pennsylvania Game Commission (PGC) in their file search for "species of special concern" (PGC, 2000). Because

great blue herons are colonial nesters and land development activities near nesting habitat could have a major impact on their population in the Chartiers Creek watershed, the PGC felt that the rookeries needed reviewed in this plan. The PGC indicated that the rookeries are located within the boundaries of the Canonsburg and the Clinton USGS quad maps in the project area.

Forest: Forest systems in the project area are very important habitats as well (Refer to Pages 63 and 75, Figures 3, and Appendix 3). As was shown in a previous section of this report, the project area was part of the original Mixed Mesophytic forest region (Smith, 1994 and Wagner, 1994). Forest still is the dominant landcover type in the project area. Forest habitat helps to maintain a healthy environment by adding barriers to pollutants that runoff the land into adjacent streams. In many locations throughout the project area, upland or steep sloped forests continue downslope to riparian/wetland habitats thus adding to the ability of those important habitats in maintaining a healthy environment. Additionally, forest habitat acts as shelter and produces forage for various types of wildlife species, provides needed recreational opportunities, and provides timber to the local economy. By improving and connecting riparian and upland forest systems in the project area, the aesthetics of the watershed improve and so will the environmental health of the watershed's land, stream, and biological resources. By encouraging the restoration of the forest community in the project area, the quality of life for local citizens will also improve.

Natural Heritage Areas: The 1994 Natural Heritage Inventories (NHI) for Allegheny and Washington Counties were performed to identify and map significant natural areas that exist in Allegheny and Washington counties (Refer to Pages 64 and 75, Figures 3, 4, and 9). These investigations identified flora (plant) and fauna (animal) species and communities that are unique and/or uncommon. The NHIs also note areas of general wildlife habitat, educational value, and of scientific importance. The objective of the NHIs is to provide information that can be utilized in planning for the protection of the biological diversity and ecological integrity of the counties (Smith, 1994 and Wagner, 1994). The areas in Table 6 and shown in Figure 9 are noted for their significance in Chartiers Creek watershed as Biological Diversity Areas (BDA), as Other Heritage Areas (OHA), or as managed lands. The NHIs are designated with letters in Figure 9 that are referenced in Table 6.

Presently, no specific areas in Allegheny and Washington Counties are dedicated to the protection of their ecological systems and biological diversity (Smith, 1994 and Wagner, 1994). Boyce/Mayview Park in Upper St. Clair encompasses a significant portion of the Mayview Valley BDA. It has a designated park master plan that is consistent with protecting the resources listed in the NHI. Implementation of this plan would achieve the goals of protecting biological diversity and ecological integrity of the property. An implementation goal of this RCP is to work towards gaining "formal dedication" of the NHI areas to the protection of their ecological

systems and biological diversity. A process of gaining this formal dedication is through the designation of these areas as Natural Areas. A natural area is an area of unique scenic, historic, geologic, or ecological value that will be maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention. These areas are set aside to provide locations for scientific observation of natural systems, to protect examples of typical and unique plant and animal communities, and to protect outstanding examples of natural interest and beauty. Guidelines governing the administration of Natural Areas are as follows (PADER, 1979):

1. No human habitation, except primitive type; backpack camping in designated areas only.
2. Access restricted to foot trails.
3. Buildings and other improvements restricted to the minimum required for public health, safety, and interpretive aids.
4. Timber harvesting prohibited except that required for maintenance of public safety.
5. Right-of-way, leases and mineral development prohibited.

Table 6. Natural Heritage Inventoried Resources

Site Location	Description
Allegheny County A. Ohio River BDA	Recovering river system that provides habitat for a state listed animal species. River continues to be altered by human influences including effluent discharges, point source discharges, navigational locks and dams, and dredging of riverbed.
B. Settlers Cabin County Park	This County Park is a large tract of managed land (1,589 acres). This property was once strip mined and is in the process of recovering naturally. However, non-native invasive plant species and all-terrain vehicles are causing problems. The Pinkerton Run Valley needs to be a focus of conservation and protection efforts.
C. Painters Run Slopes BDA	Habitat for a state listed plant species.
D. Miller Run BDA	Mesic (Dry) Central Forest community and site for listed plant species.
E. Gilfilin Woods OHA	Small remnant of mature forest used by local groups for educational purposes.
F. Mayview Valley BDA	Small tributary valley and adjacent slopes along Chartiers Creek. Mesic (Dry) Central Forest and Dry-Mesic Acidic Central Forest exhibit a high diversity of plant species.
Washington County G. McPherson Run Valley BDA	Habitat for a rare plant(s) in Pennsylvania on the lower slopes of a tributary to McPherson Run.
H. Chartiers Creek Valley BDA	One of the most mature sections of forest in the Chartiers Creek Valley.

VI. Cultural Resources

A. **Recreation:** Passive recreational uses and activities available within the Chartiers Creek watershed can include, but are not limited to, hiking, biking, hunting, fishing, bird watching, photography, camping, canoeing, horseback riding, gardening, and swimming. Many of these activities are currently being enhanced due to rail-to-trail, park improvement, and water quality improvement projects. Many opportunities abound for further enhancement and/or improvement to the various natural resources in the watershed (Refer to Pages 64 and 75, Figures 9). These improvements are already occurring in the Chartiers Creek watershed and can continue to be made by watershed stakeholders utilizing various programs that are available from private organizations (e.g., foundations and trusts) and public agencies (e.g., state and federal).

The following is a list of completed or on-going recreation projects:

- Boyce/Mayview Park Master Plan
- Montour Trail
- Panhandle Trail
- Chartiers Creek Trail Feasibility Study
- McLaughlin Run Trail
- Crafton Borough Park and Recreation Master Plan
- City of Pittsburgh (Un-named park/mouth to Chartiers Creek)
- Horticultural Society of Western Pennsylvania – Settlers Cabin Park (Southwestern Pennsylvania Botanical Gardens)

Parks/Rail-to-Trails/Greenways:

Parks: Sixty-four (64) local and county parklands exist within the project area (SPC, 1999). Most of these parks are found in the municipalities located on the eastern rim of the watershed. The vast amount of these parks can be characterized as community parks that are associated with schools and have jungle gyms, basketball courts, soccer, softball, baseball, and football fields. These types of parks are geared towards school or municipal active recreation programs.

The project area does have forested parks that vary in size and are geared towards passive recreation. These areas are reverting back to a more mature forest situation. As a consequence, wildlife is utilizing these areas as refuges, whether during annual migrations or daily life activities. Therefore, these parks have become very popular with naturalists near and far (Refer to Pages 64 and 75, Figures 9). Table 7 lists the designated community parks, parklets, playgrounds, and recreational facilities of the Lower Chartiers Creek watershed and is found with Figure 9. The parks are identified with numbers and golf course locations are labeled to correspond to mapping found in Figure 9.

Rails-to-Trails and Bikeways: Abandoned railroad beds provide a unique opportunity for communities and environmental groups to develop trails for walking, biking, rollerblading, horseback riding, and even cross-country skiing (Refer to Pages 65 and 75, Figures 9). Rail trails provide an alternative to common transportation options as well as providing safer recreational opportunities due to the absence of vehicle traffic. Additionally, many abandoned rail corridors provide beautiful scenery and a relaxing atmosphere as a result of the many lengthy stretches of rural and wooded areas through which they pass. There are existing and proposed trails located within the Lower Watershed and there are several sections of trail currently under construction (Refer to Figure 9). When completed, these trails will provide an exciting opportunity for a unique recreation choice for residents of the watershed (Allegheny Land Trust, 1999).

The Montour Trail is the most developed trail within the watershed. When completed, it will be a part of a complex of trails that stretch from Coraopolis, PA to Washington, D.C. The trail covers 54 miles of abandoned railroad right-of-way from the Montour Railroad in Allegheny and Washington Counties. Of the 54 miles of trail, approximately 23 miles are located within the Lower Watershed. The trail is completed in several sections, which total approximately 24 miles, with the right-of-way secured for its overall development. Additionally, feasibility studies have been completed and major funding sources are secured to complete sections just outside of the watershed. The Montour Trail Council was just awarded additional funding from the Transportation Equity Act for the 21st Century (or more commonly known as TEA 21) for construction of 3 more sections in the project area.

The Chartiers Creek Trail is a proposed trail that would extend northward from the Montour Trail to the confluence of Chartiers Creek and the Ohio River. It will also connect to the Panhandle Trail and the Three Rivers Heritage Trail. This newly proposed trail was recently awarded funding from the TEA 21. It is in the process of having a feasibility study completed so implementation actions can then be completed. The first segment to be planned is an 8 mile segment from East Carnegie to the Ohio River. Another 1.4 mile segment has been funded for construction in Crafton Borough.

The Panhandle Trail is a trail that will extend for 29 miles beginning at Walkers Mill in Collier Township and ending at Weirton, West Virginia. The rail network (to be utilized for the trail) once connected Pittsburgh to Cincinnati, Chicago, and St. Louis. The ultimate goal is to have the abandoned corridor converted into a multi-use, non-motorized recreational trail linking Collier Township to Oakdale, Burgettstown, Midway, and McDonald. The trail will eventually extend from McDonald to Weirton, West Virginia.

The corridor acquisition process took a total of five years ending with the donation of the trail's right-of-way by Consolidated Rail Corporation (CSX) on May 5, 1999. Numerous partnering efforts were needed and involved CSX, rail-to-trail organizations, Allegheny and Washington Counties, the state of West Virginia, the Federal Surface Transportation Board, and 15 municipalities through which the corridor passes. The Panhandle trail was recently awarded funding from the TEA 21 for construction of Phase III that encompasses 17.3 miles of trail through 9 municipalities.

The McLaughlin Run Trail is a newly proposed trail that was recently awarded funding from the TEA 21. It will connect existing trails at Wiltshire Park with trails extending from the Upper St. Clair Township building (*PADEP Update*, May 26, 2000).

Aside from the many rail trails located within the Lower Watershed, many miles of bikeways exist as a recreation or alternative transportation option to local residents. These bikeways share the right-of-way with several roadways in the watershed totaling nearly 60 miles. Most notably, the Carnegie Bikeway encompasses 2.7 miles of that total. Other roadways with considerable bikeway distances are the Airport Toll Corridor (3.3 miles), PA Route 50 (3.4 miles), PA Route 3048 (3.5 miles), PA Route 3041 (3.2 miles), Washington Road (5.7 miles), and McLaughlin Run Road (3.8 miles).

Rail Trails within the watershed, either completed or proposed, total 68 miles with bikeways totaling approximately 60 miles. All together, a total of approximately 128 miles of existing, proposed, or developing trails exist within the Lower Watershed. The locations of the trails and bikeways are such that all citizens within the Lower Watershed reside within a "reasonable" vicinity of at least one of these opportunities. For this reason, efforts and funds should be placed on the completion and maintenance of current trails and bikeways prior to the acquisition of lands for the development of new facilities. However, should the opportunity for acquiring more land or abandoned railroad corridors arise, interested groups or municipalities should take steps to secure those lands for future trail development upon completion of the current trails.

Greenways: A greenway is a corridor of open space. Greenways vary greatly in scale, from narrow ribbons of green that run through urban, suburban, and rural areas to wide corridors that incorporate diverse natural, cultural, and scenic features (Refer to Pages 65 and 75, Figures 9). Greenways can be land-based or water-based, running along stream corridors, shorelines or wetlands. Some follow old railways, canals, ridge tops, or other features. They can incorporate both public and private property. Some greenways are

primarily recreational corrridors, while others function almost exclusively for environmental protection and are not designed for human passage. Greenways differ in their location and function, but overall, a greenway network will protect natural, cultural and scenic resources, provide recreational benefits, enhance the natural beauty and the quality of life in neighborhoods and communities, and stimulate economic development opportunities (Ramey, 1995 and The Pennsylvania Greenways Partnership, 1998).

The benefits of greenways have been well known and documented. These benefits can be thought of as functions. The six economic functions of greenways include: real property values, expenditures by residents, tourism, corporate relocation, public cost reduction, and intrinsic value (National Park Service, 1990). The functions help to attract people and businesses to an area because it is an attractive area to live and work. The natural functions of a greenway can also assist in reducing community infrastructure expenditures, thus reducing maintenance to facilities. Thus greenways also improve the economic conditions in an area that has an established greenway. The six natural functions of greenways include (J.M. Labaree, 1992):

- Habitat,
- Conduit,
- Barrier,
- Filter,
- Source, and
- Sink.

These functions help to maintain the environmental health of an area by creating habitat for organisms, travel corridors for wildlife, barriers that prevent migration, filters that purify water quality, sources of purified water/food for organisms, reducing flood water impacts, and sinks to trap sediments, nutrients, and toxins. Greenways help to connect fragmented developed areas/habitats and are associated with stream/river corridors.

In this decade, both Allegheny County and the City of Pittsburgh have moved toward improving the natural/aesthetic aspects to local communities by completing and establishing greenway programs to aid in developing greenways (Allegheny Land Trust, 1999 and City of Pittsburgh, 1999). These programs were started with the hope that the county and city would see the economic, environmental, recreation, transportation, and educational benefits of greenways. Proposed greenway corridors would utilize existing, public, parkland, openspace, and forested areas in the watershed that are currently reverting to a dominant forest. Much of the identified greenway areas from the Allegheny County Greenways Plan are found along steep slopes (that are difficult or expensive to develop), Campbells Run, Chartiers Creek, McLaughlin Run, Millers Run, Painters Run, and Robinson Run.

The Chartiers Valley District Flood Control Authority (CVDFCA) has properties along portions of Chartiers Creek and its tributaries. These properties were purchased to assist in reducing the negative impacts caused by flood events. These properties though found along the stream corridors in the watershed should not be interpreted as being intended as greenway or streamside buffer areas. The CVDFCA is willing to work with local communities and organizations to further make improvements to the watershed's resources (Gateway Engineers, 2000).

The following is a list of properties that are held in trust by local Land Conservation Organizations:

- Ingram Property (8 Acres) – CNC,
- Oakwood Property (5 Acres) – CNC,
- Idlewood (Crown) Property (9 Acres) – CNC, and
- Windgap Property (75 Acres) – CNC.

EcoTourism: Ecotourism is an activity that is not being promoted in the project area and is therefore an opportunity. Local environmental educational activities take place mainly in communities that have a conservation organization or strong school program. However, non-educational activities related to recreation and the environment that would draw non-residents or tourist is not actively being marketed. The active marketing of the project area's ecological treasures and cultural highlights, and development of a watershed activity that can link or connect the Allegheny and Washington County portions of the watershed is needed.

B. Archaeological/Historical:

Archaeological: Archaeological sites exist within the study area boundaries. These sites involve the location of past human activity, marked by the presence of artifacts or cultural features. Archaeological sites can date from as early as 10,000 B.C. to as late as the 20th Century. It is the policy of the Pennsylvania State Historic and Museum Commission (PHMC) to not disclose the location of sites for their own protection.

History: Chartiers Creek is the first major watershed that exists downstream of the City of Pittsburgh. The confluence of the Allegheny and Monongahela Rivers forms the Ohio River. These rivers were and are important transportation corridors. The greater Pittsburgh area was an attractive location for Native Americans for the past 12,000 years. The Chartiers Creek drainage saw intermittent use as hunting and gathering territory from at least 10,000 B.C. to 1,000 B.C. After that point, burial mounds and more substantial residential sites began to appear, culminating in the large fortified villages of the horticulture-based Monongahela culture, ca. A.D. 1000-1650. In the mid-1700s, the

Chartiers Creek drainage was traversed by the Catfish Path, which ran from present day Washington to the Forks of the Ohio River. The trail crossed the creek near present day Canonsburg and again near Bridgeville. The camp of a Delaware chief named Catfish (Tingoocque) had been established by 1769 near the present location of Washington, PA. In this period, the region was occupied by a mixture of Delaware, Shawnee, Seneca, Susquehannock, and other, less known tribes of the interior (Wallace, 1987). Chartiers Creek is named after Pierre Chartiers, a trapper of French and Indian parentage, who spied for France while living in Philadelphia. After leaving Philadelphia, he established a trading post at the mouth of Chartiers Creek in 1743 (City of Pittsburgh, 1999). Much of the Chartiers Creek watershed was settled by Anglo-Europeans prior to and after the American Revolution. At that time, the watershed had an agrarian-based economy. In 1760 the first mining of coal occurred in the watershed, with the mining of the watershed's most valuable natural resource, the Pittsburgh Coal seam. Washington County, in 1977, led Pennsylvania coal-producing counties with a total production of approximately 11 million tons. Major industries in the watershed's recent past were steel manufacturing, mining, wholesale and retail trade, transportation, agriculture, and construction. Today, steel manufacturing and mining are no longer major industries.

Historical: Historic resources are, or can include, standing structures (e.g., houses, barns, factories, mills, etc.) and other remnants of other built environments (e.g., dams, bridges, railroads, etc.). These resources are generally over fifty years old (Refer to Pages 66 and 76, Figures 9). There are a total of fifty-two (52) historic properties listed in the project area. Of these historic properties, forty-nine (49) are in Allegheny County and three (3) are in Washington County (SPC, 1999). Other potential historic properties may exist within the study area boundaries but have yet to be identified and listed by their owners for such a designation. Table 8 lists the historic properties in the Lower Chartiers Creek watershed and is found with Figure 9. The historic properties are identified with numbers and are labeled to correspond to mapping found in Figure 9.

C. Educational:

Adult and Youth Education: Adult and youth environmental educational opportunities exist in the project area through school districts, volunteer activities, and local and regional conservation organizations (Refer to Pages 66 and 76, Figures 9). Many of these opportunities are currently linked to the school districts and the conservation organizations. These activities consist of, but are not limited to water quality monitoring, bird identification hikes, and community planting projects to promote community spirit. Many school districts have made volunteer activities a mandatory component in the educational experience. Therefore, participation has been greatly expanded due to the need of educators to find volunteer activities for students. Due to this increased need, local conservation groups are assisting in aiding the school districts in

environmental education. Two environmental education centers are currently in the planning stage in Crafton and Upper St. Clair. Once completed these will be excellent facilities to further educate adults and youth.

Community Education/Public Relations Activities: Continued promotion of the activities in this plan and other activities being accomplished by organizations and communities of the watershed is important. Utilizing the media as an educational resource in educating the general public of the watershed is important.

Educational Facilities: The following fourteen Public School Districts and one Parochial High School are located in the study area:

- Bethel Park School District
- Canevin Catholic High School
- Canon-McMillan School District
- Carlynton School District
- Chartiers Valley School District
- City of Pittsburgh School District
- Fort Cherry School District
- Keystone Oaks School District
- Montour School District
- Mount Lebanon School District
- Peters School District
- South Fayette School District
- Sto-Rox School District
- Upper St. Clair School District and
- West Allegheny School District

Table 7. Community Parks and Recreational Facilities (Denoted by Black Numbers and Green Park Facility)

Municipality	Park or Other Recreational Facilities
Allegheny County	16. Settler's Cabin Park
Bethel Park	40. Village Green Park and 44. Oak Tree Park
Bridgeville	4. Chartiers Playground and 25. Chartiers Park
Carnegie	12. Carnegie Park
Cecil	54. Hendersonville Park, 55. Cabana Beach Park, 60. Cecil Township Ballfield, and Valleybrook Country Club
Collier	14. Webb Park and Nevillewood Golf Course
Crafton	7. Crafton Municipal Park
Green Tree	10. Wilson Park and 11. Nature Center
Heidelberg	63. Ellsworth Avenue Park and 64. Raceway Plaza Soccer Field
Ingram	62. Foster Park
Kennedy	None Listed in Project Area
McDonald (Allegheny Co.)	61. East End Park
McDonald (Wash. Co.)	None Listed in Project Area
McKees Rocks	1. Third Street Park
Midway	52. Midway Borough Park
Mt. Pleasant	53. Southview Ballfield and Fort Cherry Golf Course
Mt. Lebanon	29. Robb Hollow Park, 30. Main Park, 31. Bird Park, 33. Iroquois Park, 34. Hoodridge Park, and 59. Twin Hills Trails Park
North Fayette	None Listed in Project Area
Oakdale	17. Oakdale Borough Park and 18. Ballfield
Pennsbury Village	None Listed in Project Area
Peters	45. Peter Page Park, 56. Peters Township School Ballfield, 57. McMurray Park, 58. Peterswood Park, Rolling Hills Golf Course, and Valleybrook Country Club
City of Pittsburgh	2. Sheraden Park, 3. McGunnagle Playground, 5. Broadhead Manor Park, 6. Broadhead Fording Park, and 8. Oakmont Playground
Robinson (Allegheny Co.)	15. Robinson Township Park and Chartiers Country Club
Robinson (Wash. Co.)	20. Ballfield and Quicksilver Golf Course
Rosslyn Farms	9. Parish Park
Scott	13. Scott Township Municipal Park
South Fayette	21. East End Park, 22. Sturgeon Park, 23. Ballfield/Open Space, 24. Morgan Park, 46. Fairview Park, 47. South Fayette Ballfield, Frosty Valley Golf Course, and Hickory Heights Golf Course
Stowe	None Listed in Project Area
Thornburg	Crafton Golf Course
Upper St. Clair	19. Municipal Open Space, 26. McLaughlin Park, 27. Municipal Park, 28. Brywick Park, 32. Township Soccer Field, 35. Trotwood Hills Park, 36. Ravine Park, 37. Tustin Park, 38. Municipal Park & Recreation Center, 39. Gilfillan Park, 41. Boyce/Mayview Park, 42. Baker Park and Morton Soccer Fields, 43. Brookside Park, 48. Boyce Park, 49. Municipal Park, 50. Wiltshire Park, 51. Hays Park, Frosty Valley Golf Course, and St. Clair Country Club

Table 8. Community Historical Properties (Denoted by Pink Numbers and House Character)

Municipality	Historical Properties
Bethel Park	45. 3215 Kennelee Road
Bridgeville	36. 804 Hickory Grade Road, 37. Murray House, 38. Pennsylvania Railroad Station, 39. Property #02 10 0108 0 017176, and 40. Alfred & Sandra Barzan Property
Carnegie	12. Property at 200 Walnut Street, 13. Andrew Carnegie Free Library, 14. Property at 300 Beechwood Avenue, 15. Mansfield Brown House, and 16. 221 Doolittle St.
Cecil	46. Property #62 2 0 0014 0 076700
Collier	17. Ewing Road near Route 79, 18. Noblestown at St. John's Road (NW), 20. Washington Pike (Route 50), 21. Holy Souls Conference, 23. Neville House, 24. Universal Cyclops & Vanadium Corporation, 25. Noblestown at Columbia Avenue (SW), 26. Gabriel Walker House, and 27. Walker-Ewing Log House
Crafton	7. 50 West Crafton Avenue, 8. Campbell Building, 9. Creighton House, and 10. The Frew House
Green Tree	11. Union Electric Steel
Heidelberg	None Listed
Ingram	None Listed
Kennedy	None Listed
McDonald (Allegheny Co.)	None Listed
McDonald (Washington Co.)	None Listed
McKees Rocks	1. Pittsburgh & Lake Erie Railroad Complex, 2. McKees Rocks Bridge, 3. St. Mary's Roman Catholic Church Complex, 4. Thompson Avenue South of Kennedy Street, and 5. Mann's Hotel
Midway	None Listed
Mt. Pleasant	48. L. R. 62169 over Miller's Run
Mt. Lebanon	None Listed
North Fayette	28. Box 435 Pinkerton Run Road, 30. Scratchwell Farm, 31. Wilson House, 32. Noblestown Road over North Branch Robinson Run, and 51. Morrow Farm
Oakdale	29. Oakdale Avenue Bridge
Pennsbury Village	None Listed
Peters	47. Property #62 2 0 0191 0 013829
City of Pittsburgh	None Listed
Robinson (Allegheny Co.)	None Listed
Robinson (Washington Co.)	None Listed
Rosslyn Farms	None Listed
Scott	19. Samuel Nixon House, 22. St. Luke's Episcopal Church, and 49. Wabash Railroad Bridge
South Fayette	33. Donleavy-Campbell House, 34. R. D. Potter Well, 35. National Hill Plan Bridge over the Norfolk & Western Railroad, 42. Hickman House, and 43. Property #02 20 0046 0 017059
Stowe	None Listed
Thornburg	6. Thornburg Historic District
Upper St. Clair	41. Gilfillan Farm, 44. Boyce Station, and 50. 1830 Log House

VII. Issues, Concerns, Constraints, and Opportunities

The Lower Chartiers Watershed contains an extremely varied combination of environmental concerns, and ecological and recreational opportunities. During the data collection and analysis portion of the River Conservation Plan, several of the concerns and opportunities stood out as appearing to be the most significant. Some of these items were also found to be important to the stakeholders who completed a survey for the RCP planning process. While the survey procedure did not solicit a broad population for their opinions, the public meetings and watershed conservation organization focus of the surveys does provide useful information from those persons who appear to have strong interests in river conservation. Several points emerged from the analysis of the survey responses:

- Interest was greatest in physical features of streams and streamside landscapes, rather than the water quality per se;
- Development and municipal storm and sewer discharges were seen as the most major contributors to stream quality problems;
- Fees on polluters and developers were strongly supported for funding necessary remediation programs, in contrast to the lack of support for traditional funding instruments such as income, sales and property taxes;
- Aesthetics and recreational opportunities dominated visions of the desirable future, while job opportunities, development and commercial activities ranked very low as vision elements;
- Municipal coordination, using wetlands for water quality treatment, restrictions on municipal and industrial discharges, and managing development were seen as policies that would make the most difference to water quality;
- Enactment of environmentally sensitive zoning ordinances, development of older, settled areas rather than pristine areas, and the development of trails were strongly supported policies; and
- People would prefer using resources on cleaning up a larger, but less polluted set of streams, rather than focusing on a smaller number of the most polluted streams.

The following outlines the significant issues and opportunities.

A. Project Area Characteristics

Encompassing Conservation Organization: An issue that has been identified during the study is the lack of a strong, encompassing organization to promote conservation for the entire watershed. This holds true both within the lower portion of the watershed as well as for the watershed as a whole. Presently, there is a large amount of interest and action by a number of individual groups to promote conservation within the study area, but these groups generally work within small geographic areas and/or concentrate on specific issues. The ability to unify these efforts to improve the entire watershed could have exponential effects. Identifying common goals and abilities of the different groups can assist in both

providing potential expertise and an increase in efficiency for future efforts throughout the watershed.

Urban Sprawl: An area of concern identified by the study is the general issue of urban sprawl. Socioeconomic data and analysis shows a distinct trend of development in the large open spaces of the western portion of the study area. Combined with this is a general decrease in the population and economy in the northeastern portion of the study area. This issue will need to be approached by a combined effort of promoting sound development throughout the watershed while at the same time providing for economic stability. Without safeguards in place (sound zoning, planning, inter-community communication) to protect the area's resources, degradation of land and water resources will result. This type of degradation can be observed in the northern and eastern portions of the project area. Water quality degradation, as observed in Figure 5 in Water Quality Management Units B, C, and D, will result in the southern and western portions of the project area. Without proper safeguards in place, uncontrolled development activities will occur. Working with organizations such as the Southwestern Pennsylvania Commission (SPC) and other regional planning organizations would assist in facilitating improved planning activities.

Zoning: Appropriate zoning and comprehensive planning is an important issue and opportunity for sound land management and development activities. The level of detail, specifically relating to environmental sensitivity, varies greatly among the established municipal zoning ordinances. Additionally, beyond the actual zoning ordinances, the level of enforcement and the granting of variances from reasonable zoning requirements can vary greatly. Developing both strong zoning ordinances and encouraging proper enforcement are the keys to providing environmentally sound development practices.

Assessment of Options

Examples of zoning and land use planning measures, which can be used to address growth through quality zoning and land use management methods could include, but not be limited to:

> **Overlay Districts** – Are defined as: special zoning districts which form a second layer over an underlying residential, commercial or industrial zoning in order to protect floodplains, wetlands, steep slopes, and other areas. Riverfront overlay zoning districts can also be made a part of the second layer of zoning in order to allow compatible development while protecting from flood hazards and enhancing riverfront recreational opportunities. A copy of model ordinances for a *riverfront overlay district* and *floodplain overlay district*, are included in Appendix 3. Additional details can be obtained from *Improving Local Development Regulations: A Handbook for Municipal Officials* (ACPD, May 1993).

Conservation Zoning – The intent of conservation zoning is to actively and legally encourage subdivisions that set aside at least 50% of the land as permanently protected open space. Several model ordinances that can be applied to conservation zoning include: site capacity analysis, whereby a percent of each kind of land type is reserved as open space. A cluster development option involves compact development through variations in lot sizes in order to preserve open space and sensitive natural resources. Randall Arendt, noted landscape planner, makes reference to the virtues of cluster development in *Rural by Design* (Arendt, 1994). Another example of conservation zoning would be riparian buffer ordinances. Copies of the model ordinances have been included in Appendix 3 along with the aforementioned model ordinances (ACPD, May 1993).

Conservation zoning allows for future growth with a balance between community goals and private landowner interests. Conservation zoning has several distinct advantages.

- Development can occur with the preservation of "valuable" open space and farmland;
- New development is given incentives to group or cluster homes in order to promote ease of access to local businesses and public services;
- A greenway and streamside buffer system can be encouraged along Chartiers Creek and major tributaries; and
- Other sensitive features and habitats, such as older tracts of forested land, can be identified and protected. Additional details can be obtained by reviewing the *Growing Greener* manual.

Conservation zoning has sometimes been mistaken as a measure that could result in "a taking of land without compensation." This is not true for two reasons according to site specific research conducted by the Natural Lands Trust, Inc. for *Growing Greener,* that found:

1. Conservation zoning allows full density development, but just requires the conservation of open space. This is constitutional because there is no right to sprawl.

2. No land is taken for public use unless landowners or developers want the land to be open to the public. The municipality must negotiate with the developer to provide municipal recreation facilities on a willing buyer/seller basis. Conservation ordinances can be written with density incentives to encourage parts of

their lands be made available for public ownership, access, or use.

Conservation Easements – The conservation easement concept allows a landowner to give away certain rights to a qualified conservation organization. The landowner would grant conservation easements in order to protect important natural features (farmlands, forested tracts, wetlands, etc.) from inappropriate development and to assure long term conservation of the features that they value. Conservation easements can qualify a donor for income tax, property tax, and estate tax benefits. An example of a conservation (preferential tax assessment program) easement program for farmland in Pennsylvania can be seen in the Pennsylvania Farmland and Forest Land Assessment Act of 1974 (Clean and Green)(Act 319) programs or the Act of January 13, 1966 (1965)(P.L. 1292, No. 515)(16 P.S. §§ 11941 – 11947)(Act 515) programs (PennDOT, 1998). Examples of this program are evident in areas of the watershed with increased agricultural activity in Washington County and South Fayette in Allegheny County.

Transferable Development Rights – Transferable Development Rights (TDRs) enable a community to reduce development in rural and sensitive resource areas and encourage development within areas served by public infrastructure. The system of compensation is set-up to allow landowners in rural or sensitive resource areas to sell their development rights to individuals interested in developing predetermined locations in the municipality suitable for more intense development. The seller of the TDRs retains title to the land and the rights to use the land as farmland or other open space; however, the owner cannot develop the site for other uses (i.e., housing plans, strip malls, etc.). The purchaser of the TDRs has purchased the rights to develop another parcel more intensely than would have otherwise been allowed.

Planned Residential Developments – Planned Residential Developments (PRDs) combine elements of zoning, subdivision, and land development ordinances into one package. Builders are given the flexibility to combine greater housing densities in return for the preservation, construction, or dedication of agreed upon public recreation areas/open space.

In conclusion, zoning is a tool to be used to ensure that the land uses of today are not taking away the future rights of generations to enjoy our communities. Even the most up-to-date zoning does not always account for the long-term interests of the public. Several communities in the Lower Chartiers Creek Watershed have very modern zoning codes, but land use preservation of farmland and open space are not being applied as part of their zoning ordinances, and unbridled sprawl is taking over the landscape. All of the municipalities of the Lower Chartiers

Creek watershed that include flood-prone areas have flood plain regulations. Short-sighted zoning is often applied as a means to define the land's profit-making potential with *land development* as the goal rather than *quality open space*. Planning through progressive zoning can ensure that private property is maintained with farmland and open space as the norm rather than the exception. Open space does not have to be a temporary use until a land development plan is randomly built.

Transportation Facilities: While the existing roadway network provides access to almost all areas of the watershed, expanding development and growth within the western and northwestern portions of the project area continues to necessitate improvements to the transportation system. The Southern Beltway project is the major on-going activity in the project area that will have socioeconomic and environmental issues and opportunities related to it (Refer to Figure 8), (PTC, 1997 and PTC, 2000). It is very important for the communities in this area to have appropriate zoning ordinances in place, in order for sound land management and development activities to take place. Additionally, as this area develops in the future, expanding public transportation opportunities via a light railcar system and buses would assist in reducing air pollution and decreasing fuel consumption by cars, trucks, and motorcycles.

Roadway construction is one of the major impacts on environmental resources. Mitigation for these impacts consequently becomes one of the most significant contributors to natural resource creation and restoration efforts. Federal and state regulations provide specific guidance on how impacts are calculated, avoided, minimized, and ultimately mitigated. In addition, the sometimes arduously long process of roadway development and design can make it difficult for local conservation groups to track PennDOT projects and effectively cooperate with them to most efficiently protect and conserve natural resources. Working with PennDOT can assist in reducing project impacts and it can be very beneficial in developing effective mitigation for the impacts incurred.

Most major roadway projects are funded at least in part by the Federal Highway Administration (FHWA). Because this funding is provided by a federal agency, these projects must adhere to the *National Environmental Policy Act* (NEPA). This Act generally requires any project funded by the federal government to give full consideration to impacts to the "quality of the human environment." The basic concept of NEPA includes evaluating a range of alternatives to determine the alternative which best satisfies project needs while minimizing environmental impacts. Also, NEPA requires mitigation efforts to be undertaken to compensate for unavoidable impacts. In addition to NEPA, federal legislation authorizing FHWA funding generally includes language regarding environmental mitigation. The present transportation act, commonly known as TEA 21 includes general guidance stating that wetland mitigation should utilize active banking sites for mitigation if

possible. In addition the act includes direct funding for "enhancement projects." These funds are predominantly used for trail work but may be available for other projects. State laws, most significantly PADEP Chapter 105 Regulations, also govern roadway construction and mitigation of impacts. Chapter 105 Regulations cover any impact to streams and wetlands and require a permit for these impacts. The permit application process also requires the applicant to evaluate the project's impacts on vegetation and cultural resources. In order to abide by these laws, PennDOT must not only study and calculate impacts to natural resources but it must coordinate with the public regarding the project.

Roadway construction projects can result in a number of widely varying impacts to the environment. The most significant natural resource impacts are to wetlands, streams, and vegetation and wildlife. Wetland impacts can involve direct impacts by filling or excavation. Indirect impacts predominantly involve changes to supporting hydrology. Direct and indirect impacts to wetlands are evaluated by both the size of the impact and the loss of functions and values. Stream impacts include culverting, relocation, and loss of stream length. Stream impacts are evaluated largely by a qualitative determination of the loss of stream value and stream length. Vegetation and wildlife impacts include the direct loss of vegetative cover types and disruptions to wildlife movement patterns as well as direct and indirect impacts to endangered species. Following the final determination of project related impacts, studies and coordination are undertaken to determine mitigation requirements for the project. Generally, these studies include evaluations of potential sites for mitigation projects and determining an appropriate compensation rate. Compensatory mitigation can include creation, restoration, enhancement, and preservation. The extent to which any of these options is utilized assists in determining the compensation rate required. Coordination is conducted with the regulatory resource agencies to obtain recommendations and ultimately approval. An example of a wetland mitigation area in the project area is the Mayview State Hospital, PennDOT Mitigation Areas 1-4.

Wetland mitigation is generally the most "straight forward" mitigation of natural resources. Wetland laws generally require a minimum replacement of wetlands at a one-to-one ratio. This is commonly equated to area lost to area replaced, but is also evaluated by functional replacement. Additional requirements include replacement of wetland impacts as close to the impacts as practicable and generally within the same watershed. Traditionally, DOTs have conducted wetland replacement projects on their own. They select a site, design the replacement wetland, purchase the property, and construct the site.

Traditional wetland replacement siting would be conducted by reviewing existing mapping (project related, U.S. Geological Survey [USGS] topographic) and field reconnaissance to identify areas that are favorable to wetland creation. Those sites are then reviewed for potential constraints such as archaeology, ownership, and utilities. A preferred site

is selected and built. Recently other information sources such as wetland replacement programs through USFWS and the PADEP have added to potential siting opportunities. In addition, some DOTs and their contractors have added local conservation groups to the list of potential site sources. Following construction, the site is maintained by the DOT or turned over to a local interested party with some type of conservation agreement placed on the site. Options to individual wetland construction activities include wetland banking and in-lieu of replacement. Different USACOE Districts, as well as different states, have wide ranging policies on implementation of these options.

Stream mitigation is less predictable than wetland mitigation. To start with, the evaluation of impacts includes a qualitative assessment of lost value. This equates to a qualitative determination of replacement requirements. Additionally, laws pertaining to stream impacts and mitigation requirements are generally not as specific as those for wetlands. Stream mitigation has traditionally involved enhancement and/or restoration work on streams adjacent to the project. The extent of work is informally negotiated with the regulatory agencies. Because stream mitigation is less defined, it can be easier to work with in a partnering agreement.

Vegetation and wildlife mitigation efforts which are not associated with endangered species impacts are very similar in nature to stream mitigation. Generally laws are not specific to the type of mitigation required. Extensive mitigation efforts for habitat impacts are usually only undertaken for large roadway projects such as highways on new alignment or major upgrades to long sections of existing roadways. Defining compensation rates is extremely qualitative. Mitigation often times involves land acquisition for preservation or enhancement of existing preserved land.

Working with PennDOT to achieve their required mitigation can be a win-win scenario. The benefits to be realized by both sides can be significant. By providing mitigation through a local group, DOTs generally see large reductions in costs due to lower administrative efforts and less stringent design standards. Local groups obtain significant funding with generally reduced efforts over standard grant writing requirements. The following items are important factors to keep in mind when trying to coordinate with PennDOT.

Timing - Roadway projects involve a tremendous amount of development and evaluation due to numerous laws and policies and are also subject to intense political and public scrutiny. These factors create project schedules that can change often and erratically. Timing a local conservation project with DOT mitigation can become at best difficult and at worst impossible. The best option for local groups is to have several projects staged and available to partner with the DOT. This allows for some flexibility.

Project Compatibility - Due to laws and policies of both the regulatory agencies and PennDOT, not all impacts associated with roadway projects can be mitigated through a local conservation group. Likewise, not every conservation project is suitable mitigation for roadway impacts. Mitigation must justifiably replace the lost functions and values of the impacted resource. For example, AMD treatment wetlands cannot replace high quality forested wetlands. Impacts to a high quality trout stream cannot be replaced on a degraded warm water fishery. Knowing the types of impacts incurred on a project and the benefits to be obtained from a mitigation project are crucial to identifying potential mitigation options.

Regulatory Consensus - Ultimately the final decision on the success of a partnering opportunity lies in the hands of the regulatory agencies. These agencies must concur that the agreements set up between the local group and PennDOT will compensate for project related impacts. This includes not only the direct association of impact with replacement project, but also the confidence that the replacement project will be successfully completed.

Project Organization - Having options available by way of several projects can significantly enhance the possibility of successfully completing a partnership agreement. In addition, having a strong plan that demonstrates a potential for long-term success to both PennDOT and the regulatory agencies can improve the likelihood of obtaining the necessary approvals. The planning and organization of each individual project are also important issues. In many circumstances, PennDOT is not the only funding source needed to complete a project. Other funding sources such as grants, endowments, and in-kind services need to be identified and applied for. Many of these other sources have their own time frames that, as discussed in the timing section, may not coincide with DOT requirements.

Matching Projects to Impacts - Working together with PennDOT to document comparable environmental benefits to roadway impacts is needed to obtain regulatory concurrence. Projects that provide a variety of environmental improvement or conservation generally provide the best opportunities. Creativity and thoroughness are essential to developing documentation that clearly defines the benefits of the partnership.

B. Land Resources

Farmland and Prime Farmland Soil(s) Protection: Protection of farmland and prime farmland soils at the municipal level is very important issue. As the Southern Beltway Project moves towards the construction

phase, more developmental activities will occur adjacent to this facility. If appropriate municipal zoning ordinances and codes are not in place prior to these activities and appropriate enforcement does not take place, than these resources and the families that rely on them will be in jeopardy.

Stream Access: Development of stream access facilities and a re-orientation of how development occurs adjacent to the streams is critical to improving the environmental health and developmental attractiveness of the project area.

Unregulated Waste and Brownfield Sites: The removal and restoration of unregulated waste and brownfield sites is an important issue for improving the environmental health and aesthetics of the project area. Unregulated waste and brownfield sites (i.e., dumps, junkyards, and abandoned coal tailing piles [gob piles]) exist within the project area. These areas usually are located near streams therefore water pollution issues almost always exist at or near these sites.

Uranium Mill Tailings Radiation Control Act Sites: The continued monitoring of these sites is critical. The Canonsburg site needs to maintain its annual monitoring activities in order to ensure that radio active contamination is controlled on site. The Superior Steel site in Carnegie needs to have proper remediation and disposal activities planned for the future protection of citizens and the environment.

Abandoned Mines: The restoration of abandoned mine sites is an important issue in improving the environmental health and aesthetics of the project area. Abandoned deep mines and abandoned surface mined lands exist throughout the project area (Refer to Figure 3). Surface mining was concentrated in the western and southern portions of the project area due to the residential land use that occurred along the eastern rim of the Lower Chartiers Creek watershed.

C. Water Resources

Water quality has been a large focus within the Lower Chartiers Watershed project area. Data collected demonstrates that almost all of the streams within the study area are impaired compared to PADEP water quality standards. Moreover, this impairment is due to a large variety of interrelated causes. One good determination made during the study is that the primary causes of water pollution can be somewhat geographically defined. That is to say that the study area can be broken down into sub-basins (Refer to Figure 5), which have a common primary source of pollution. This delineation of the problem areas will assist in the long-term determination of remediation strategies. The basic question is *"What can be done to implement improvements to the impacted resources?"* As was shown in Section IV. Water Resources, 6 Water Quality, the five major water quality problems in the Chartiers Creek watershed are:

- Abandoned Mine Drainage,
- Sewage,
- Nutrient Enrichment,
- Urban Impacted (or Habitat Modification), and
- Multiple Non-Point Pollution Sources.

Impacts or degradation to water resources are caused by human manipulation of the land. It is at this point that implementation and management alternatives will be discussed for restoring, conserving, and preserving water resources. These techniques and strategies involve both better planning and use of land within the watershed for proactive results, as well as reactionary remediation alternatives and strategies to improve historic watershed problems that currently exist.

Floodplains: Floodplains are an important issue for the project area. The proper use of floodplain areas is critical to the environmental health and reduction in infrastructure maintenance by local municipalities, businesses, and homeowners. As the Southern Beltway Project moves towards the construction phase, more developmental activities will occur adjacent to this facility. If appropriate municipal zoning ordinances and codes (that include conservation and environmental codes/ordinances) are not in place prior to these activities and enforcement does not take place, then floodplain resources will be in jeopardy and an increase in infrastructure maintenance will result.

Total Maximum Daily Loads (TMDLs): TMDLs will become an important issue and regulatory tool for the state and federal agencies in protecting and improving water resources. For individuals, companies, organizations, and governmental agencies that have a need to discharge water into local streams, they will in the future have to work with regulatory agencies and water quality issues in order to attain the required permitting. Systech Engineering, Inc. completed the TMDL study of the entire Chartiers Creek watershed. This study is also referred to as the Watershed Analysis Risk Management Framework (WARMF). The PADEP 303(d) list requires that over 300 TMDLs be developed for the Chartiers Creek watershed. The WARMF project was completed in 2000. The WARMF model will be able to assist in delineating where remediation actions take place in order to meet regulatory TMDLs that are being developed.

Abandoned Mine Drainage: Abandoned Mine Drainage (AMD) is a major issue and its problems vary from site to site. AMD issues are found in management units A, B, C, D, E, and F (Refer to Figure 5 and Table 9). The source of AMD discharges can be from deep mines, surface mines, and coal refuse piles. AMD involves various water quality parameters and varying seasonal discharge flows. It is critical to have good water quality and discharge flow data in order to fully understand and thus treat a discharge properly. Additionally, AMD remediation projects can involve multiple property owners and therefore require coordination to complete. This makes each problem and solution quite unique. The different AMD

remediation alternatives that can be utilized to make improvements to problem situations are listed in Section VIII, 3. Water Resources.

Sewage: Sewage is a major issue and pollution source within the Chartiers Creek watershed. Currently, the Boroughs of Carnegie, Oakdale, and McDonald are experiencing the worst problems in the project area. However, these problems are not unique to these communities and the sewage pollution problems exist throughout the project area. Sewage issues are found in management units A, B, C, D, E, F, and G (Refer to Figure 5 and Table 9). This problem is due in part to old/poorly maintained sewer facilities and illegal connections to the sanitary sewer system (50% of these sources involve private property). Additionally, much of the infrastructure that involves the sewer system is located below groundwater levels. Thus raw sewage in some cases is coming in contact with groundwater which can cause groundwater contamination.

Sewage issues are being worked on by all levels of government due to the enormous financial costs involved in retrofitting and/or replacing these systems. Allegheny County is expected to spend approximately $1 billion to correct this problem, and of these funds, approximately 40% will be spent in the Allegheny County portion of the project area.

The Allegheny County Sanitary Authority (ALCOSAN) is currently in the process of expanding their facilities to correct system problems. This corrective action is to be completed in two phases:

- Phase One work is currently under construction. This involves $180 million in construction funds to expand tank facilities (an increase from 200 to 250 million gallons per day) and control odors at their main treatment facility on the north shore of the Ohio River in Woods Run.

- Phase Two will involve $220 million and will take place from approximately 2002 to 2008. Phase two will be a more complicated project because it will correct problems associated with combine sewers – sanitary and storm. This work is being completed to improve water quality in the local waterways and is being required by the Pennsylvania Sewer Facilities Planning Act 537.

At this time, ALCOSAN is in the planning stages for their new interceptor(s) that will serve the Chartiers Creek watershed. ALCOSAN is working with the state and federal agencies in making improvements to their facilities (Barnes, 2000).

Additionally, at this time the local watershed municipalities and ALCOSAN have been working with the county, state, and federal regulators to make improvements to their systems. Each municipality that has their own sanitary lines has to 1) to complete a Wasteload

Management Study, 2) create Corrective Action Plans, and 3) the municipalities have to adopt the plans by resolution as part of the PADEP Chapter 94 and EPA Section 308 process. The EPA Section 308 process aims at 1) 85% capture rate reduction, 2) Least Cost Alternatives through system improvements and flow reduction, and 3) expansion of treatment facility, satellite plants, and trunk sewers by ALCOSAN and local municipalities.

Sewage is an important pollution source within the Chartiers Creek watershed. Much effort is being made at all levels of government to correct this water quality problem. The financial and technical considerations involved with sewage system upgrades require these activities to be completed by local officials and regulators. It is therefore encouraged that local citizens participate in the public process in order to be educated on the issue(s), activities, and implementation plans.

Nutrient Enrichment: Nutrient Enrichment is a water quality parameter that involves water polluted by agricultural, golf course, and residential runoff (i.e., leaking septic systems, home gardens and lawns, athletic fields, golf courses, etc.). This pollutant is primarily observed in parts of the watershed associated with agricultural land uses. Nutrient enrichment issues are found in management units E and G (Refer to Figure 5 and Table 9) and golf course locations can be located on Figure 9. Of the main water quality problems in the project area, nutrient enrichment may be the simplest to correct and therefore implement conservation practices or restoration alternatives. It can be as simple as working proactively with the local farmers, golf course owners, and other property owners to make land management changes. Agencies charged in assisting with these issues and currently working with local landowners are the Allegheny and Washington County Conservation Districts, Penn State Agricultural Extension Service, and the United States Department of Agriculture - Natural Resources Conservation Service. These agencies promote the use of Best Management Practices (BMPs) for agricultural and land development activities (PADEP, 1998). The list of BMPs promoted by these agencies is found in Section VIII Management Options, C. Water Resources (Refer to Page 72).

Urban Impacted: Urban Impacted (or Habitat Modification) pollution is an important issue and involves many types of water pollution (i.e., turbidity, thermal, salinity, oil, siltation, etc.) but is primarily driven by high stream flows **(stormwater)**. This type of stream flow is associated with areas of the watershed that have been experiencing high developmental pressures and lack stormwater management facilities. Typically these areas have roads, parking lots, and structures whose impervious surfaces prevent precipitation from entering the groundwater and thus flow quickly to streams and other receiving waters. Urban impacted issues are found in management units B, C, and D, however newly developing areas in management units A, E, and G will be impacted if proper measures are not in place (Refer to Figure 5 and Table 9). These receiving waters (usually first through third order streams) are not able to transmit the high

flows to larger streams easily and thus erosion and flooding occurs readily. Urban impacted modifications thus occur to streams impacting aquatic organisms and community infrastructure alike. In order to implement restoration strategies involving urban impacts, it is critical to have a good understanding of local land use practices (planning and development) and stream flow data in order to implement potential conservation practices. Critical areas to protect include riparian forest buffers, wetlands, and floodplain areas because one of their functions is to control high flow events and flooding. The Pennsylvania legislature enacted the Storm Water Management Act (No. 167) of 1978 to authorize a comprehensive program managing stormwater at the local level (implementation and enforcement). PADEP under this program provides grant monies to counties to develop stormwater management plans on a watershed basis (PADEP, 1997). A listing of assessment, planning, and implementation (Pennsylvania Handbook of Best Management Practices for Developing Areas) activities that can improve urban impacted (stormwater) issues are listed in Section VIII, 3. Water Resources. Additionally, Potential Assistance Sources for Watershed Projects (found after the Management Recommendations Matrix), lists sources of technical and financial assistance for urban and stormwater impacted streams (PennVest loans – Pennsylvania Infrastructure Investment Authority, 1997).

> **An Example Project:** Fluvial GeoMorphology (FGM) Assessment, Design, and Construction activities are one example of NPS remediation activities that can be completed to reduce urban impacted water pollution. Currently, Bethel Park, Bridgeville, Upper St. Clair, and USC – Citizens for Land Stewardship are in the process of reducing urban impacted pollution to the McLaughlin Run sub-basin. A FGM Assessment was completed in the spring of 2000 and the design was completed during the summer. The project construction activities will be completed in 2001. Other areas to be remedied in this sub-basin are currently being reviewed. This project will assist in reducing NPS pollution to McLaughlin Run. Additionally this project should improve wildlife habitat, aesthetics, and potentially reduce flood impacts along McLaughlin Run.

Multiple Non-Point Pollution Sources: Multiple Non-Point Pollution Sources (MNPPS) involve the above stated water quality problems, as well as other parameters that are found to exist in the watershed but are less problematic (Refer to Table 5). MNPPS can be thought of as the ingredients that make up a soup of varied water quality problems. PADEP utilizes this category in streams or stream reaches where it is difficult to discern the major water quality problem. In order to implement restoration strategies involving multiple sources, it is critical to have good water quality and stream flow data in order to fully understand and thus treat the water quality problem properly. Additionally, streams impacted by multiple MNPPS are usually located downstream from other streams that add to its problems. The restoration alternatives to improve streams impacted this

way would potentially involve a combination of the alternatives in Section VIII, 3. Water Resources.

Water Supply: Water supply has been an issue in the project area for some time. Due to the high populations of people that have moved into the watershed to live and work, water supply demands are continually increasing. Also, due to water quality problems, local communities have had to expand treatment facilities in order to meet demand. This is due in part to land uses that have impacted water sources and supplies. As the Southern Beltway Project moves towards the construction phase, more developmental activities will occur adjacent to this facility and water supply will be an issue. Therefore it is very important for planning to take place in these communities (Refer to Figure 8). This will assist in meeting water supply needs and reduce impacts to the resources of the project area.

Stream Flow Gauging: Currently only one stream flow gauging station is operated within the Chartiers Creek watershed (USGS, 1999). This station provides hydraulic data that is utilized by various entities for planning and flood protection purposes. For real time stream gauging flow data for Chartiers Creek at the Carnegie, Pennsylvania USGS gauging station, visit the USGS website at http://pa.water.usgs.gov/rt-cgi/gen_stn_pg?station=03085500. Construction of additional stream gauging stations in tributaries to Chartiers Creek would greatly assist these entities in gaining further knowledge on the impacts caused by high stream flows in the watershed and for developing regional hydraulic curves.

Table 9. Municipality vs. Water Quality Management Units Matrix

Municipality	Water Quality Management Units (Refer to Section VII. Management Options, Recommendation Matrix & Figure 5)							Sub-Basin Water Quality is in Attainment
	A	B	C	D	E	F	G	
Bethel Park				✔				
Bridgeville			✔	✔				
Carnegie		✔	✔					
Cecil					✔		✔	✔
Collier	✔	✔	✔			✔		✔
Crafton			✔					
Green Tree			✔					
Heidelberg			✔					
Ingram			✔					
Kennedy			✔					
McDonald	✔							
McKees Rocks			✔					
Midway	✔							
Mt. Pleasant							✔	
Mt. Lebanon			✔	✔				
North Fayette	✔							✔
Oakdale	✔							
Pennsbury Village		✔						
Peters				✔	✔			
Pittsburgh			✔					
Robinson (AC)	✔	✔	✔					✔
Robinson (WC)	✔							
Rosslyn Farms		✔	✔					
Scott			✔	✔				
South Fayette	✔		✔		✔	✔	✔	✔
Stowe			✔					
Thornburg			✔					
Upper St. Clair				✔	✔			

Table 9 outlines the municipalities and the type of NPS pollution that exist in the respective sub-basins in the municipalities. In Figure 5 the respective management units are graphically presented. An acetate overlay containing the municipal boundaries can be placed over the figure, thus a community planner, engineer, and/or other interested person is able to identify the type of water pollution and the area in which it is prevalent. Please review Figure 5 to determine which adjoining municipalities are affected upstream and downstream to your municipality.

D. Biological Resources

The existing ecological attributes provide for numerous opportunities to the residents and municipal officials of the project area.

White-tailed Deer Management: A concern in portions of the project area has been white-tailed deer population increases and the subsequent negative interactions that occur with humans. Management options to reduce these negative interactions can include contraception, private hunting (herd culling), and public hunting. Some communities in the project area permit legal hunting throughout their respective municipalities, while other municipalities have not permitted hunting due to the restrictive nature of the more suburban/urban communities (Refer to Section V – Wildlife). The PGC should be consulted for assistance with this issue.

Aquatic and Fishery Management: Chartiers Creek and many of its tributaries are degraded fisheries. Sport fishing still takes place in areas of the watershed though these opportunities are limited. Due to this water quality degradation, the PFBC has not performed any major aquatic surveys and fisheries evaluations in the project area. This is a concern because due to the lack of water quality in areas of the project area, the PFBC does not give a high priority to performing significant fishery related activities within the watershed. Therefore the completion of an aquatic survey and fishery evaluation by the PFBC or others would be a useful tool in making strategic decisions in the future activities of improvement projects.

Riparian Forest Buffers, Wetlands, and Forest: The restoration and protection of riparian zones, wetlands, and forest in the Chartiers Creek watershed is important in order to maintain and then improve the environmental health of the watershed. It also will assist in improving the aesthetics of the watershed and make the area more appealing to live in. Another important forest related issue is that of trees as an economic resource. As forest resources in the watershed mature, these trees will become a viable economic commodity that many individuals will choose to harvest. Areas of the watershed that are currently being protected or have less impacts to water resources due to riparian forest buffers, may at some point in the future experience increased problems to local streams and infrastructure associated with erosion, sedimentation, and stormwater.

Protection of Great Blue Heron Rookeries: Two Great blue heron rookeries exist in the riparian forest buffer and wetland habitats in the project area. These rookeries were noted by the Pennsylvania Game Commission (PGC) in their file search for "species of special concern," because great blue herons are colonial nesters and land development of their nesting habitat could have a major impact on their population in the Chartiers Creek watershed. The PGC indicated that the rookeries are located within the boundaries of the Canonsburg and the Clinton USGS quad map in the project area.

Natural Heritage Areas: Presently, the project area has seven NHI areas. However, none of these NHI areas in Allegheny and Washington Counties are formally dedicated to the protection of their ecological systems and biological diversity. This is an opportunity to take a fairly easy step towards preserving good examples of the project area's natural heritage. Boyce/Mayview Park in Upper St. Clair encompasses a significant portion of the Mayview Valley BDA. It has a designated park master plan that is consistent with protecting the resources listed in the NHI. Implementation of this plan would achieve the goals of protecting biological diversity and ecological integrity of the property.

Natural Area Designation: Another implementation opportunity could be the formal dedication of these areas as Natural Areas. A natural area is an area of unique scenic, historic, geologic, or ecological value that will be maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention. These areas are set aside to provide locations for scientific observation of natural systems, to protect examples of typical and unique plant and animal communities, and to protect outstanding examples of natural interest and beauty.

E. Cultural Resources

Recreational opportunities are one of the best assets and greatest potentials within the watershed. A total of sixty-four (64) local and county parks exist within the study area. In addition, seven recreational trail projects are in place, under construction, or being studied. The mainstream of Chartiers Creek also provides opportunities for boating and fishing (though limited). These recreational opportunities provide the chance for everyone to experience and gain a stronger appreciation and understanding of the importance of nature within the watershed. Protecting, enhancing, and promoting the existing opportunities will help build support within the watershed. Efforts should be maintained and expanded to add to the existing facilities as well as coordinate the opportunities that exist. Things such as linking trail segments and developing trails that connect with other amenities within the watershed can greatly broaden the recreational experience for those using the resources. This will, in turn, add to overall understanding and long term viability of the watershed.

Recreational Planning Activities: For a park to satisfy its patron's needs, it is important to have a "master plan" completed. The following recreational facilities have planning activities currently occurring (Refer to Appendix 2, Newsletter 2):

- Montour Trail,
- Panhandle Trail,
- Chartiers Creek Trail,

- McLaughlin Run Trail,
- Boyce/Mayview Park,
- Crafton Borough Park and Recreation Master Plan,
- Settlers Cabin Park,
  Horticultural Society of Western PA, and
- City of Pittsburgh (Un-named park: mouth Chartiers Creek).

Linking Community Facilities: This can be accomplished by Rail-to trail and bikeway facilities, as well as by the network of streams throughout the watershed via a "blueway" and adjacent greenways and openspace.

Rails-to-Trails and Bikeways: Abandoned railroad beds provide a unique opportunity for communities and environmental groups to develop trails for walking, biking, rollerblading, horseback riding, and even cross-country skiing. Rail trails provide an alternative to common transportation options as well as providing safer recreational opportunities due to the absence of vehicle traffic. The following recreational opportunities need to be completed:

- Montour Trail,
- Panhandle Trail,
- Chartiers Creek Trail, and
- McLaughlin Run Trail.

Greenways: Another opportunity for linking resources is through an established greenway. Allegheny County and the City of Pittsburgh have moved toward improving the natural/aesthetic aspects to local communities by completing and establishing greenway programs. Proposed greenway corridors would utilize existing, public, parkland, openspace, and forested areas (Refer to Figure 9).

EcoTourism: Ecotourism opportunities will be created in the project area. Marketing of ecological treasures and recreational facilities will occur as additional segments of rail-to-trail facilities are completed, water and in-stream habitat quality improves, environmental education centers are completed, greenways are established, the horticultural garden facility is constructed, and many other activities established. The establishment and promotion of a Chartiers Creek watershed triatholon (e.g., biking, running, and canoeing) would serve many purposes in promoting the restoration activities on-going. The project area will observe increased revenue from ecotourism from birders, fishermen, hunters, boaters, hikers, horticulturalists, educators, and many others.

Land Purchase for Conservation: Another opportunity for controlling or ensuring that conservation activities do occur in a strategically identified area is the outright purchase of the property by a land trust, conservation organization, and/or municipality (Refer to Pages 49-52). In this way a property can be utilized for the treatment of a water quality issue, green/openspace, or to prevent land development in critical areas.

Historical Property Preservation: The preservation of historical properties in a community helps to give the community its character. It is an important opportunity that can help improve communities in the project area. People like to be located near historic properties and areas because it helps to attract business and improves one's lifestyle. The preservation of historic districts or communities in the northeast portion of the project area is important in helping to restore the economic health of those communities. A certain pride can be seen as one drives through areas of Carnegie, Crafton, Ingram, McKees Rocks, etc. These areas attract people who wish to live and work in more urban area and want to be located near other people who have what they consider attractive properties. However, there are other areas (residential and commercial) in these communities that are in need of improvement to the structures. By completing historical preservation work to properties, these buildings remain an integral part of the community, thus attracting people and business. Therefore identifying properties and property owners who wish to preserve their historic property is an important tool in improving the economic and population flight of these areas.

F. Educational Resources

Adult and Youth Education: An abundance of environmental educational opportunities exist in the project area. These opportunities abound for youth, adult, youth/adult and lifetime education activities. These can be with school districts, volunteer activities, and local and regional conservation activities.

Community Education/Public Relations Activities: As part of continued promotion of the activities in this plan (by organizations and communities), it is important to utilize the media in educating the general public of the watershed. This plan discusses numerous implementation activities that can be moved forward by numerous organizations and communities, and performing public relations activities with these activities will assist in making improvements and educating people.

VIII. Management Options

In Section VIII, the proposed management options are reviewed for the identified issue, concern, constraint, and opportunity. Additionally, these items are found in a simplified Management Recommendations Matrix at the end of this section.

A. Project Area Characteristics

Encompassing Conservation Organization: Establish a strong, encompassing organization to promote conservation for the entire watershed. This organization would be made up of individuals from throughout the watershed and from numerous organizations. It would identify and give direction to overall restoration, maintenance, and enhancement activities (2001-2002).

Urban Sprawl: This issue will need to be approached by a combined effort of promoting sound development throughout the watershed while at the same time providing for economic stability. This can be accomplished through a variety of tools that are discussed in Appendix 3 (Model Ordinances, Overlay Districts, and Guidelines/Standards), the Pennsylvania Land Conservation Handbook (Allegheny Land Trust, 1999), the Pennsylvania Smart Growth philosophy, the Growing Greener guidance document (Natural Lands Trust, 1997), establishment of Environmental Advisory Councils (EACs) at the local level, and through an Inter-Municipal Framework (2001-2002). Potential tools include:

- Envisioning the Future through completion of Community Audits,
- Protecting Open Space Networks via Conservation Planning,
- Implementation of Conservation Zoning, and
- Utilization of Conservation Subdivision Design.

An Inter-Municipal Framework is a process where municipal governments and local organizations work together to improve local conditions such as infrastructure, environment, and education. To solve a common problem throughout the entire length of a sub-basin, communities and organizations must work together to address the situation. For example, Bethel Park, Bridgeville, and Upper St. Clair municipalities have teamed with USC-Citizens for Land Stewardship and Upper St. Clair School District to alleviate Urban Impacted conditions that exist in the McLaughlin Run sub-basin. By working together, these communities and organizations are improving McLaughlin Run's water quality and fish habitat, as well as correcting infrastructure problems, such as undercutting of roadways, bridge impacts and collapsing walls, to name a few. This framework process also occurs in other portions of the watershed, where coalitions such as the Lower Chartiers Valley Alliance and the Washington

County Watershed Alliance combine municipal, community, and organizational resources.

Zoning: Developing strong conservation zoning ordinances and encouraging proper administration of existing zoning ordinances (i.e., enforcement, variance activities, etc.) are keys to providing environmentally sound development practices (Refer to Appendix 3). This could be done through an Inter-Municipal Framework (2001-2002).

Transportation Facilities: The Southern Beltway project is the major on-going transportation planning activity in the project area that will have socioeconomic and environmental issues and opportunities related to it. Therefore it is very important for the communities in the western and northwestern portions of the project area to have appropriate zoning ordinances in place, in order for sound land management and development activities to take place (Refer to Appendix 3). Additionally, as this area develops in the future, expanding public transportation opportunities via a light railcar system and buses would assist in reducing air pollution and decreasing fuel consumption by cars, trucks, and motorcycles. This could be done through an Inter-Municipal Framework (2001-2002).

B. Land Resources

Farmland and Prime Farmland Soil(s) Protection: Protection of farmland and prime farmland soils at the municipal level is very important. If appropriate municipal zoning ordinances and codes are not in place prior to these activities and appropriate enforcement does not take place, than these resources and the families that rely on them will be in jeopardy. This could be done through an Inter-Municipal Framework along with including Model Zoning Ordinances into municipal code (2001-2002).

Stream Access: Development of stream access facilities and a re-orientation of how development occurs adjacent to the streams is critical to improving the environmental health and developmental attractiveness. This could be done through community comprehensive planning and Model Zoning Ordinances into municipal code (No final implementation date. This can be an on-going activity).

Unregulated Waste and Brownfield Sites: Complete an inventory of unregulated waste and brownfield sites (i.e., dumps, junkyards, and abandoned coal tailing piles [gob piles]) that exist within the project area (2005) and participate in the "Ohio River Sweep Program" (Summer 2001).

Uranium Mill Tailings Radiation Control Act Sites: The continued monitoring of these sites is critical. The Canonsburg site needs to maintain its annual monitoring activities in order to ensure that radio active contamination is controlled on site. The Superior Steel site in Carnegie

needs to have proper remediation and disposal activities planned for the future protection of citizens and the environment (On-going).

Abandoned Mines: Complete an inventory of the abandoned mine sites of the project area (2002).

C. Water Resources

Floodplains: Complete an inventory and management plan of the floodplains in the project area utilizing FEMA – FIRM maps (2002).

Total Maximum Daily Loads (TMDLs): Utilize the WARMF model to assist in delineating where remediation actions can take place in order to meet regulatory TMDLs (2002+).

Best Management Practices (BMPs) are a series of practices and management techniques designed to control point and non-point pollution. To rectify water quality pollution sources, BMPs can be utilized in a number of different ways in order to attain the desired effect.

Abandoned Mine Drainage: Abandoned Mine Drainage (AMD) is a major issue and its problems vary from site to site. Strategically identify remediation projects for project area with overview and guidance from the yet to be established Chartiers Creek Watershed organization (2002). From the recently released Draft Coal Remining BMP Guidance Manual, the following are the different BMPs that can be utilized to make improvements to problem situations involving AMD and AML sites (USEPA, 2000).

1) **Hydrologic and Sediment Control BMPs:** The following hydrologic and sediment control BMPs can assist in reducing groundwater, erosion and sedimentation pollution or both.

   - Regrading of mine spoil – Is utilized to establish positive drainage, facilitate revegetation, and reduce surface water infiltration of the mine spoil.
   - Revegetation - Is utilized to revegetate areas that were previously mined and left devoid of vegetation thus exposing coal spoil material to the atmosphere. Bio-solids are often utilized to assist in fertilization of re-vegetated areas and to assist in soil formation.
   - Diversion ditch installation – Is utilized to direct clean surface water away from contamination (mine spoil) sources.
   - Installation of low-permeability caps – Is utilized on gob piles and other areas that need to have a synthetic or clay-lined cap placed over the material to reduce or eliminate ground and surface water pollution.

- Stream sealing – Is utilized to prevent clean surface water from entering an underground mine or surface mine spoil.
- Underground mine daylighting - Eliminates coal that had been partially mined by historic mining practices and left coal exposed underground. This exposed coal continues to degrade ground and surface waters but if removed through daylighting activities, water pollution sources can be reduced or eliminated.
- Mine entry and auger hole sealing – Refers to dry or wet seals. These seals prevent (dry seals) or control (wet seal) discharge of waters from mine entries.
- Highwall and pit floor drains – Horizontal or vertical highwall drains and pit floor drains are used to collect groundwater entering the spoil and work to minimize contact with contaminants.
- Grout curtains – Is utilized to prevent or divert the flow of groundwater from one location to another. One example would be to utilize a grout curtain between a stream and an underground mine opening..
- Ground water diversion wells – Is utilized to intercept and collect groundwater prior to its entrance into a backfill area or underground mine where contaminants exist.

2) **Geochemical BMPs:** The following geochemical BMPs function to inhibit pyrite oxidation, reduce the contact of water with acid-producing materials, inhibit iron-oxidizing bacteria, or increase the amount of alkalinity generated within backfilled areas.

- Alkaline addition – Provides alkalinity to an acidic water source to enhance precipitation of metals.
- Alkaline redistribution – Is utilized to add alkalinity to one location (an area deficient of alkalinity) from another alkaline addition source.
- Induced alkaline recharge – Is utilized to add alkalinity to water prior to it entering a spoil area or underground mine.
- Special handling of acid-forming materials – Segregate acid forming materials and handle them in a manner to minimize water contact. One example is to place acid forming materials (spoil) above the water table and then placing a cap over the reclaimed area.
- Special handling of alkaline materials – Segregation of alkaline materials and encourage contact of these materials with water so dissolution takes place.
- Use of bactericides – Use of bactericides is utilized to inhibit or eliminate certain bacteria from becoming established in a reclamation site. Some bacteria species can increase the acidic conditions thus reduce water quality.

3) **Passive Treatment Methods or BMPs:** The following passive treatment methods or BMPs entail a number of engineered treatment systems that require minimal maintenance after construction is completed and the systems become operational. These systems can be used by themselves and/or in combination to passively treat mine discharges. These systems vary in technical/engineering complexity and thus cost. This is because each site brings its own specific water quality (chemistry), discharge flow (gallons per minute, etc.), and engineering requirements (i.e., grading, materials, specific system type, permitting requirements, etc.). Thus it is impossible to give specific cost information to a general site, because each site can vary greatly.

- Successive Alkalinity Producing Systems (SAPS) – Is utilized for sites with dissolved oxygen, iron (ferric or ferrous) and aluminum as components of the water quality.
- Anoxic Limestone Drains (ALDs) – Is utilized for sites with low dissolved oxygen, ferric iron and aluminum laden water quality.
- Oxic Limestone Drains – Is utilized for sites with a variety of AMD types, however the dissolution of limestone and the generation of alkalinity is somewhat limited.
- Limestone Diversion Wells (LDWs) - Is utilized for sites that are relatively inaccessible and therefore difficult to treat. This type of system needs active (weekly to bi-weekly) maintenance to maintain treatment of the stream or discharge. This system can treat a variety of AMD types.
- Open Limestone Channels (OLCs) – Is similar to oxic limestone drains and is utilized for a variety of AMD types too. However they are found to be most effective on relatively steep slopes.
- Limestone Sand – Is utilized for treatment of marginally acidic streams. The sand is actually dumped along the stream bank and as flood flows wash the sand into the stream, the sand helps to increase stream alkalinity and can help to reduce dissolved metals. This treatment improves water quality in stream but does not treat the source of the AMD discharge.
- Constructed Wetlands (Aerobic Wetlands and Compost Wetlands) – Is utilized for treatment of sites with alkaline and acidic, laden with iron. These wetland systems can add alkalinity through sulfate reduction and in some cases dissolution of limestone that is present or added.
- Pyrolusite® systems – This type of system is a patented biological process. It utilizes alkaline addition of limestone where the limestone bed is injected or inoculated with bacteria. This bacteria assists in

increasing the oxidation process thereby reducing the metal concentration in AMD.

Sewage: Sewage is an important pollution source within the Chartiers Creek watershed and much effort is being made at all levels of government to correct this water quality issue. Due to its high financial and technical aspects, the sewage issue will continue to be resolved by local governmental officials and regulators. It is therefore encouraged that local citizens participate in public meetings and forums in order to be educated on the issue(s), activities, and implementation plans (On-going).

Nutrient Enrichment: Strategically identify remediation projects for project area that would utilize BMPs. These projects would involve overview and guidance from the yet to be established Chartiers Creek Watershed organization (2002). Many BMPs are relatively simple and inexpensive practice(s) and/or management techniques. BMPs involve conservation practices and management techniques that assist in improving water quality. A listing of BMPs and what each BMP entails can be found in the Soil and Water Conservation Technical Guide for Pennsylvania (USDA Technical Document – Consult your local County Conservation District or USDA office). The following is a list of BMPs promoted by the resource agencies:

- BMP-1 Permanent Vegetative Cover
- BMP-2 Animal Waste Management System
- BMP-3 Strip cropping and Contour Farming Systems
- BMP-4 Terrace System
- BMP-5 Diversion System
- BMP-6 Grazing Land Protection System
- BMP-7 Waterway System
- BMP-8 Cropland Protection System
- BMP-9 Cropland Tillage System
- BMP-10 Stream Protection System
- BMP-11 Permanent Vegetative Cover on Critical Areas
- BMP-12 Sediment Retention, Erosion, or Water Control Structures
- BMP-13 Soil and Manure Analysis
- BMP-14 Management of Excess Manure
- BMP-15 Fertilizer Management
- BMP-16 Barnyard Runoff System
- BMP-17 Composting

Urban Impacted: Strategically identify remediation projects for project area with overview and guidance from the yet to be established Chartiers Creek Watershed organization (2005). The following permanent and temporary vegetative and structural BMPs can assist in reducing water pollution to urban impacted/developing areas (CH2MHill, 1998). The BMPs are described in further detail in Section 8 of the Pennsylvania

Handbook of Best Management Practices for Developing Areas that can be purchased through the PA Association of Conservation Districts (**www.pacd.org/products/bmp/bmp_orderform.htm**) (CH2MHill, 1998).

- Bioretention
- Constructed Treatment Wetland
- Critical-Area Planting
- Diversion
- Energy Dissipator
- Filter Bag
- Filter Strip (Level Spreader - Alternative BMP)
- Grass Swale
- Infiltration Trench & Dry Well (Dry Well, Below-Grade Detention Basin, Seepage Bed/Recharge Bed - Alternative BMP)
- Inlet Protection, Block and Gravel
- Inlet Protection, Excavated Drain
- Inlet Protection, Fabric Insert
- Interim Stabilization
- Lined Channel
- Outlet Stabilization Structure
- Permanent Vegetative Stabilization
- Permeable Paving System (Seepage Bed or Recharge Bed - Alternative BMP)
- Pond, Dry (Below-Grade Detention Basin, Dry Well or Detention Basin - Alternative BMP)
- Pond, Wet (Detention Basin - Alternative BMP)
- Portable Sediment Tank
- Riparian Corridor Management
- Riparian Forested Buffer
- Rooftop Runoff Management
- Sand Filter, Closed
- Sand Filter, Open
- Sediment Basin
- Sediment Trap
- Silt Curtain
- Silt Fence
- Slope Drain (Chute - Alternative BMP)
- Stabilized Construction Entrance (Tire Cleaning Strip – Alternative BMP)
- Straw Bale Barrier
- Stream Bank Stabilization
- Temporary Stream Crossing
- Tree Preservation and Protection
- Trench Plug
- Water Quality
- Inlet

The following assessment, planning, and implementation activities can also improve urban impacted areas, and can involve many of the above BMPs as components of these activities.

- Fluvial GeoMorphology Assessment and Design,
- Pennsylvania's Stormwater Management (Planning) Program (PA Act 167),
- Pennsylvania Handbook of Best Management Practices for Developing Areas (see above), and
- Local Community Zoning and Planning.

Multiple Non-Point Pollution Sources: Strategically identify remediation projects for project area with overview and guidance from the yet to be established Chartiers Creek Watershed organization (2002+). In order to implement restoration strategies involving multiple sources, it is critical to have good water quality and stream flow data in order to fully understand and thus treat the water quality problem properly. Therefore the establishment of a watershed wide volunteer water quality program is critical.

Additionally, streams impacted by multiple MNPPS are usually located downstream from other streams that add to its problems. Thus, treating upstream sources can improve MNPPS impacted stream areas with potentially minimal restoration activities in the MNPPS impacted stream. The restoration alternatives to improve streams impacted this way would potentially involve a combination of the alternatives outlined above in the other water quality issues.

Water Supply: It is very important for appropriate planning to take place to both meet need but also to reduce impacts to the various resources of the project area. By reducing sprawl related issues and managing growth, water supply impacts can be controlled (On-going).

Stream Flow Gauging: Planning and construction of additional stream gauging stations in tributaries to Chartiers Creek should be coordinated with the PADEP, USGS, and USACOE to assist in specific site location determination (2002).

D. Biological Resources

The existing ecological attributes provide for numerous opportunities to the residents and municipal officials of the project area.

White-tailed Deer Management: Management options include contraception, private hunting (herd culling), and public hunting. The PGC should be consulted for assistance with this issue (On-going).

Aquatic and Fishery Management: The completion of an aquatic survey and fishery evaluation by the PFBC or others would be a useful tool in making strategic decisions in the future activities of improvement projects (2001-2002).

Riparian Forest Buffers, Wetlands, and Forest: Complete an inventory and management plan for the restoration and protection of riparian zones, wetlands, forest, and floodplains in the Chartiers Creek watershed (2002).

Protection of Great Blue Heron Rookeries: Work with the PGC, local conservation organization, and municipal officials to protect the habitats of the two Great blue heron rookeries (On-going).

Natural Heritage Areas: Work with the PADCNR, local conservation organization, and municipal officials to establish specific areas in Allegheny and Washington Counties that are formally dedicated to the protection of their ecological systems and biological diversity (i.e., Boyce/Mayview Park and BDA, etc. [On-going]).

Natural Area Designation: Work with the PADCNR, local conservation organization, and municipal officials to establish specific areas in Allegheny and Washington Counties that are formally dedicated natural areas (i.e., Boyce/Mayview Park and BDA, etc. [On-going]).

E. Cultural Resources

Holistic Watershed Recreational Plan: Complete a holistic park/recreational "master plan" that includes facilities currently being planned (2005).

Linking Community Facilities: In the a holistic park/recreational "master plan" form linkages which include both Rail-to trail and bikeway facilities, as well as by the network of streams throughout the watershed via a "blueway" (2005).

Rails-to-Trails and Bikeways: Complete needed feasibility studies and construction activities on the existing and proposed rail-to-trail and bikeway facilities (On-going).

Greenways: Develop a greenway from Allegheny County and the City of Pittsburgh greenway programs or past activities. This could possibly be a part of the Rail-to-Trail/Bikeway Feasibility study (2005).

EcoTourism: Ecotourism and marketing activities will expand in the project area. The establishment and promotion of a Chartiers Creek watershed triatholon (e.g., biking, running, and canoeing) would serve many purposes in promoting the restoration activities on-going. As additional facilities are constructed or established, the project area will observe increase venue from ecotourism. To assist in the development of

ecotourism in the project area, the local chamber of commerce, municipal officials, businesses, and conservation organizations need to work together to assist in spawning this type of activity (2001+).

Land Purchase for Conservation: Strategically identify areas for the outright purchase of the property by a land trust, conservation organization, and/or municipality so it can be utilized for the treatment of a water quality issue, green/openspace, or to prevent land development in critical areas (No final implementation date. This can be an on-going activity).

Historical Property Preservation: Identification of properties and the owner's who wish to preserve their historic property. This is an important tool to improving economic development and reducing population flight of communities (on-going).

F. Educational Resources

Adult and Youth Education: An abundance of environmental educational opportunities exist in the project area. These opportunities abound for youth, adult, youth/adult and lifetime education activities. These can be with school districts, volunteer activities, and local and regional conservation activities (2001+).

Community Education/Public Relations Activities: As part of continued promotion of the activities in this plan (by organizations and communities), it is important to utilize the media in educating the general public of the watershed. This plan discusses numerous implementation activities that can be moved forward by numerous organizations and communities, and performing public relations activities with these activities will assist in making improvements and educating people (2001+).

Management Recommendations Matrix

Management Issue	Management Recommendation	Responsible Entity	Potential Assistance Sources	Implementation Schedule
A. Project Area Characteristics				
1. Holistic Watershed Planning (Refer to Section II/Page 4, Section VII/Page 48, and Section VIII/Page 67)	Establish a Chartiers Creek Watershed Conservation Organization. This organization is the responsible organization for the whole of the watershed and implementation of the Rivers Conservation Plan. Have this organization be represented by individuals from throughout the watershed in both counties. This will assist by allowing conservation activities to be prioritized in a strategic manner.	Watershed Stakeholders and Conservation Organizations.	Pennsylvania Department of Conservation and Natural Resources (PADCNR) circuit rider for funding Executive Director position and Keystone Funds.	2001-2002
2. Inter-Municipal Framework (Refer to Section II/Page 5, Section VII/Page 49, and Section VIII/Page 67, and Figures 3 & 8)	Promote an inter-municipal framework necessary for coordinated or unified comprehensive plans, zoning codes, and subdivision and land development ordinances in the watershed to assist in curbing urban sprawl.	The county's and 28 municipal planning officials, the future Chartiers Creek Watershed Conservation Organization, and the local conservation organizations.	South Hills Council of Governments (SHCOG), Washington County Department of Planning, Allegheny County Department of Economic Development, and PADCNR: Keystone Funds.	2001-2002
B. Land Resources				
1. Model Zoning Ordinances (Refer to Section II/Page 6, Section VII/Page 49, and Section VIII/Page 68)	Develop example zoning and ordinances that are protective of agricultural soils, steep slopes, land, riparian, and floodplain resources. These are especially important in the communities that are developing at a higher rate along the county line and Southern Beltway corridor.	Local municipal officials and conservation organizations.	Pennsylvania Department of Community and Economic Development (DCED) and PADCNR: Keystone Funds. Potential Assistance Sources Section. Appendix 1 and 3.	2001-2002
2. Brownfield Sites (Refer to Section III/Page 21, Section VII/Page 56, and Section VIII/Page 68, and Figure 3)	Complete an inventory of brownfield sites for potential redevelopment opportunities.	PADEP, county planning departments, municipal officials, and conservation organizations.	Pennsylvania Department of Environmental Protection (PADEP), PADCNR: Keystone Funds, and local chamber of commerce.	2005
3. Abandoned Mine Land (AML) Sites (Refer to Section III/Page 22, Section VII/Page 56, and Section VIII/Page 69, and Figures 3 and 5)	Complete an inventory of AML sites for potential reclamation and development opportunities (e.g., mine tailing piles, tipple sites, abandoned un-reclaimed sites, etc.).	PADEP, local municipal officials and conservation organizations.	PADEP (Abandoned Mine Land [AML] 10% Set Aside, Growing Greener, and WRAP Programs), PADCNR: Keystone Funds, US Environmental Protection Agency (EPA) 104 and 319 Programs, and Western Pennsylvania Coalition for Abandoned Mine Reclamation (WPCAMR) Funds.	2002
4. Unregulated Solid Waste Sites (Refer to Section III/Page 21, Section VII/ Page 56, and Section VIII/Page 68)	**4A**. Complete an inventory of unregulated waste sites for potential reclamation and development opportunities (e.g., dump sites). **4B.** Participation in the "Ohio River Sweep Program."	PADEP, local municipal officials and conservation organizations.	PADEP, PADCNR: Keystone Funds, and EPA.	**4A.** 2005 and **4B.** Summer 2001
5. UMTRCA Sites (Refer to Section III/Page 22, Section VII/Page 56, and Section VIII/Page 68)	Continued monitoring of the two sites by the USDOE and PADEP. Monitor the progress of the remediation planning activities for the Superior Steel site in Carnegie.	USDOE and PADEP for monitoring and remediation activities. Local municipal leaders to be updated of changing circumstances.	USDOE and PADEP.	On-going
6. Farmland Protection (Refer to Section III/Page 18, Section VII/ Page 55, and Section VIII/Page 68)	Complete a comprehensive plan by inventorying watershed farmland (active/inactive), prime soils, farmland of statewide importance, PA Acts 43 (Agricultural Security Areas), 71 (water and sewer assessment exemption), 100 (Agricultural Land Condemnation Approval Board- reviews transportation & solid waste issues related to farmland), and 319 (Clean & Green) properties as it relates to farmland protection.	USDA-Natural Resources Conservation Services, county conservation districts, local municipalities, and conservation organizations.	US Department of Agriculture (USDA) Public Law 566 Program, PADEP, PADCNR: Keystone Funds, and county conservation districts.	2002
7. Land Conservation Activities (Refer to Section V/Page 38, Section VII/Page 65, 8 & Sec. VIII/Page 75, and Figure 9)	Complete an inventory of property ownership along Chartiers Creek for potential enhancement opportunities. Also utilize conservation easements as an option for keeping open/greenspace from becoming developed land.	PADEP, local municipal officials and conservation organizations.	Southwestern Pennsylvania Commission (SPC), Allegheny and Washington counties, Pennsylvania Organization of Watersheds and Rivers (POWR), and PADCNR: Keystone Funds. Potential Assistance Sources Section. Appendix 1 and 3.	2002
8. Riparian Forest Buffer and Floodplain (Refer to Section V/Page 38, Section VII/Page 63, and Section VIII/Page 75)	Complete an inventory/management plan of the watershed's riparian forest buffer and floodplain areas for future streambank stabilization, riparian zone, and floodplain implementation opportunities (Refer to Figures 3 and 9).	PADEP, county planning departments, municipalities, and local conservation organizations.	PADEP, USACOE, USGS, USDA Public Law 566 Program, USDA and EPA.	2002

Management Recommendations Matrix

Management Issue	Management Recommendation	Responsible Entity	Potential Assistance Sources	Implementation Schedule
C. Water Resources				
1A. Water Quality and 1B. Flow Monitoring (Refer to Section IV/Page 26, Section VII/Page 56, and Section VIII/Page 69, and Figures 2, 3, 4, 5, 8 and 9)	**1A.** Develop a watershed wide volunteer water quality monitoring program with established sampling points. Sample for chemical and biological (e.g., macroinvertebrate [insects] and fish) parameters. **1B.** Establish additional stream gauging (flow monitoring) locations on tributaries to Chartiers Creek to assist in gathering hydraulic data that can be utilized for a variety of planning activities.	1A. Washington County Watershed Alliance (WCWA) and Chartiers Creek Watershed Association (CCWA). 1B. PADEP, USACOE, and USGS.	**1A.** PADCNR: Keystone Funds, League of Women Voters (LWV) - Citizen Education Fund, PADEP, Canaan Valley Institute (CVI), Isaac Walton League (IWL) - Save Our Streams program, Senior Citizens Volunteer Monitoring program (EASI), local colleges/universities, & local school districts. **1B.** PADEP, USACOE, and USGS	**1A.** On-going **1B.** 2002
2. Water Quality Strategic Plan (WQSP) (Refer to Section IV/Page 26, Section VII/Page 56, and Section VIII/Page 69, and Figures 2, 3, 4, 5, 8 and 9)	As part of the watershed wide volunteer monitoring program, develop a strategic plan that assists in prioritizing restoration, enhancement, and protection activities to make improvement to the watershed which include management units A, B, C, D, E, F, and G.	The yet to be established Chartiers Creek Watershed Conservation Organization working with PADEP and the Systech Engineering, Inc. WARMF TMDL Model.	EPA (104 & 319 programs), USDA PL 566 Program, PADCNR: Keystone Funds, PADEP (Growing Greener), Western Pennsylvania Watershed Protection Program (WPWPP) of the Heinz Endowments, Pittsburgh Foundation, Mellon Foundation, CVI, etc.	2002+
3. Abandoned Mine Drainage (AMD) Plan (Refer to Section IV/Page 29, Section VII/Page 57, and Section VIII/Page 69, and Figures 2, 3, 4, and 5)	This plan could be a component to the WQSP and would develop a strategic plan that assists in prioritizing restoration activities to make improvement to the watershed which include management units A, B, C, D, E, and F.	The yet to be established Chartiers Creek Watershed Conservation Organization, WCWA, CCWA, and other local conservation groups.	EPA (104 & 319 programs), PADCNR: Keystone Funds, PADEP (Growing Greener, Reclaim PA, Bond Forfeiture Program, etc.), Pennsylvania Department of Transportation (PennDOT)/ Pennsylvania Turnpike Commission (PTC) mitigation funds, WPCAMR, and WPWPP.	2002
4. AMD Remediation Activities (Refer to Section IV/Page 29, Section VII/Page 57, and Section VIII/Page 69, and Figures 2, 3, 4, and 5)	Complete remediation activities of AMD sites (e.g., Scrubgrass Run and Pinkertons Run sites).	The yet to be established Chartiers Creek Watershed Conservation Organization, WCWA, CCWA, other local conservation groups, and municipalities. (I.e., Scott Conservancy - Scrubgrass Run Site [2000]).	EPA (104 & 319 programs), PADCNR: Keystone Funds, PADEP (Growing Greener Program, Reclaim PA, Bond Forfeiture Program, etc.), PennDOT/PTC mitigation funds, WPCAMR, WPWPP, and funding from Foundations.	2002+
5. Sewage Plan (Refer to Section IV/Page 31, Section VII/Page 58, & Section VIII/Page 72, & Figures 2, 3, 4, 5, and 8)	Encourage municipal involvement in the Three Rivers Wet Weather Program. This includes not only sewer (Combine Sewer Overflows [CSOs]) upgrades but also septic system correction plans to make improvement to antiquated facilities of the watershed which include management units A, B, C, D, E, F, and G.	Allegheny and Washington County governments, PADEP, and EPA.	County, State (PA Act 537 program), PADCNR: Keystone Funds, and Federal.	On-going
6. Sewage Infrastructure Improvement Projects (Refer to Section IV/Page 31, Section VII/Page 58, & Section VIII/Page 72, & Figures 2, 3, 4, 5, and 8)	Encourage municipal and local residents to make improvements to their sewer and septic systems. Especially in watershed management units A, B, C, D, E, F, and G.	County and municipal governments, and residents.	County, State (PA Act 537 program), PADCNR: Keystone Funds, and Federal.	On-going
7. Nutrient Control Plan (Refer to Section IV/Page 31, Section VII/Page 58, & Section VIII/Page 72, & Figures 2, 3, 4, and 5)	Complete development of a nutrient control plan in rural areas of the watershed which include management units E and G.	County governments and PADEP.	EPA and PADCNR: Keystone Funds.	2002
8. Stormwater Management Plan (Refer to Sec. IV/Page 33, Sec. VII/Page 59, & Sec. VIII/ Page 72, & Fig. 2, 3, 4, 5, & 8)	Complete a PA Act 167 Stormwater Management Plan in Allegheny & Washington Counties. Priority areas in the watershed include management units D and E. However, newly developing areas in management units A and G will be negatively impacted if appropriate stormwater management facilities are not in place.	Municipal governments.	EPA, PADEP (PA Act 167 program), and PADCNR: Keystone Funds. Potential Assistance Sources Section. Appendix 1 and 3.	2002
9. Model Zoning Ordinances (Refer to Section II/Page 6, Section VII/Page 49, & Section VIII/Page 68)	Until a PA Act 167 Plan is completed at the county level, encourage local municipalities to create and/or improve local stormwater management ordinances.	Municipal governments.	PADCNR: Keystone Funds and Local. Potential Assistance Sources Section. Appendix 1 and 3.	2000-2001
10. Fluvial Geomorphology (FGM) Assessment (Refer to Section IV/Page 33, Section VII/Page 59, and Section VIII/Page 72)	Complete FGM assessments in sub-basins which are currently impacted by high stormwater flows and in sub-basins that are experiencing high development activities. Priority areas in the watershed include management units A, C, D, E, and G.	County governments and PADEP. (I.e., Bridgeville, Bethel Park, Upper St. Clair, and USC-CLS have completed an FGM assessment on McLaughlin Run [2000]).	EPA (319 program), USGS, PADCNR: Keystone Funds, PADEP (Growing Greener and Releaf Programs), PennDOT/PTC stream/wetland mitigation funds, WPWPP, McKenna Foundation, Pittsburgh Foundation, Mellon Foundation, CVI, etc.	2005
11. FGM, Riparian, and Streambank Stabilization Projects (Refer to Section IV/Page 33, Section VII/Page 59, and Section VIII/Page 72)	Utilize FGM assessments to complete project designs for remediation of stormwater impacts to streams and infrastructure.	PADEP, county & municipal governments. (I.e., Bridgeville, Bethel Park, Upper St. Clair, and USC-CLS are in the process of performing a series of FGM design/build projects on McLaughlin Run [FGM design/build to be complete in 2000-2001]).	EPA (319 program), PADCNR: Keystone Funds, PADEP (Growing Greener and Releaf Programs), PennDOT/PTC stream/wetland mitigation funds, WPWPP, McKenna Foundation, Pittsburgh Foundation, Mellon Foundation, CVI, etc.	2005

Management Recommendations Matrix

Management Issue	Management Recommendation	Responsible Entity	Potential Assistance Sources	Implementation Schedule
D. Biological Resources				
1. Degraded Chartiers Creek Fishery (Refer to Section V/Page 35, Section VII/Page 63, and Section VIII/Page 75)	Complete an Aquatic Survey and Fisheries Evaluation of the watershed.	Chartiers Nature Conservancy (CNC), Pennsylvania Fish and Boat Commission (PFBC), PADEP, US Geological Survey (USGS), US Army Corps of Engineers (Corps), regional colleges/universities, and local conservation organizations.	EPA Star Grant. PADCNR: Keystone Funds and Fish American Foundation.	2001-2002
2. Protection of Important Habitats [Riparian Forest Buffers and Wetlands, Great Blue Heron Rookeries, Forest, and Natural Heritage Areas] (Refer to Section V/Page 38, Section VII/Page 63, and Section VIII/Page 75)	Establish Natural and Protected Areas in watershed as delineated in the Natural Heritage Inventories.	County and municipal officials with assistance from local conservation organizations, land trusts, and the Western Pennsylvania Conservancy (WPC).	Property placed into conservation easements, areas designated by owner, and PADCNR: Keystone Funds.	On-going
3. Migratory Bird Count (Refer to Section V/Page 38, Section VII/Page 63, and Section VIII/Page 75)	Assist in efforts to create the Pittsburgh South Audubon Society Bird Circle and in tracking migratory bird population in the area.	USC-CLS and other local conservation organizations.	Not Applicable	Application Pending (2000)
4. Wildlife Damage Control (Refer to Section V/Page 35, Section VII/Page 63, and Section VIII/Page 74)	Hunting, herd culling, and wildlife contraception. Coordinate property damage control problems and management activities with the Pennsylvania Game Commission (PGC).	Local municipalities and PGC.	Landowner, local municipalities, and PGC.	On-going
5. Threatened and Endangered Species (Refer to Sec. V/Page 37, Sec. VII/Page 63, & Sec. VIII/Page 75)	Coordinate with state and federal agencies for regulatory guidance prior to all earth moving activities for developmental projects.	PennDOT and local developers with PADEP, PFBC, PGC, and US Fish and Wildlife Service (USFWS).	Not Applicable	On-going
6. Land Use Planning Activities (Refer to Sec. V/Page 39, Sec. VII/Page 64, and Sec. VIII/Page 75, and Figure 9, and Appendix 3)	Complete land management plans to protect land and water based biological resources. Adopt land designation uses for parks and other green space (e.g., natural areas, wild flower reserves, wild areas, etc.).	County and municipal governments, land trusts, and WPC.	National Park Service (NPS) - Rivers, Trails, and Conservation Assistance program, EPA Environmental Education Grants Program, PADCNR: Keystone Funds, county, & municipal. Potential Assistance Sources Section. Appendix 1 and 3.	2005
E. Cultural Resources				
1. Holistic Watershed Recreational Plan (Refer to Sec. VI/Page 41, Sec. VII/Page 65, & Sec. VIII/Page 75, and Figure 9)	Utilize the various recreational plans that have been completed or are being completed to enhance the varied recreational opportunities (e.g., linking parks via bikeways or trails).	The yet to be establish a Chartiers Creek Watershed Conservation Organization, WCWA, CCWA, and other local conservation organizations.	PADCNR: Keystone Funds and NPS - Rivers, Trails, and Conservation Assistance program.	2005
2. Bikeway/Trail Feasibility Study/Plan (Refer to Sec. VI/Page 42, Sec. VII/Page 65, & Sec. VIII/Page 75, & Figure 9)	Develop a bikeway/trail along Chartiers Creek. This facility could be placed possibly near the historic Catfish Trail that the many Indian tribes utilized between Pittsburgh and Washington, PA.	CNC - proposed Chartiers Creek Trail	PADCNR: Keystone Funds and NPS - Rivers, Trails, and Conservation Assistance program.	On-going
3. Trail Construction Activities (Refer to Section VI/Page 42, Section VII/Page 65, and Section VIII/Page 75, and Figure 9)	Construct Trails based on Feasibility Study/Plan.	CNC, Montour Trail Council (MTC), and local municipalities. Funded trails in project area include the Montour Trail, Panhandle Trail, Chartiers Creek Trail, and McLaughlin Run Trail (USC).	PADCNR: Keystone Funds, PADEP: Growing Greener, PennDOT TEA-21 funds, and NPS - Rivers, Trails, and Conservation Assistance program.	On-going
4. Develop Watershed Greenway (Refer to Sec. VI/Page 43, Sec. VII/Page 65, & Sec. VIII/Page 75, and Figure 9)	Develop from the various inventories, plans, and recreational construction activities. This could be a part of the Bikeway/Trail Feasibility Study.	CNC and other local conservation organizations.	PADCNR: Keystone Funds and NPS - Rivers, Trails, and Conservation Assistance program.	2005
5. Land Acquisition for Conservation Activities (Refer to Section III & V/Page 20 & 39, Section VII/Page 65, and Section VIII/Page 75, and Figure 9)	Purchasing of properties (e.g., Important Habitats, Natural Heritage Areas, Critical Areas, and Potential Remediation Sites) for conservation, preservation and/or remediation opportunities.	Allegheny Land Trust, WPC, and local conservation groups.	PADCNR: Keystone Funds and NPS - Rivers, Trails, and Conservation Assistance program. Potential Assistance Sources Section. Appendix 1 and 3.	No Final Implementation Date. This can be an on going activity.
6. Stream Access (Refer to Section III/Page 19, Section VII/Page 65, and Section VIII/Page 75, and Figure 9)	Develop stream access points to encourage recreational opportunities. Develop a "Blueway Trail" on Chartiers Creek to link it to other watersheds (Refer to Figure 9).	Streamside businesses and landowners, municipalities, and local conservation groups.	Property placed into conservation easements, donated space adjacent to the stream, PADCNR: Keystone Funds, NPS - Rivers, Trails, and Conservation Assistance program, and the American Canoe Association.	No Final Implementation Date. This can be an on going activity.

Management Recommendations Matrix

Management Issue	Management Recommendation	Responsible Entity	Potential Assistance Sources	Implementation Schedule
E. Cultural Resources (Continued)				
7. Recreational ("Passive") Activity Map and Brochure (Refer to Section VI/Page 41, Section VII/Page 64, and Section VIII/Page 75)	It would assist in further building on creating the watershed vision for the future. Also assist in building the Inter-Municipal Framework.	Community athletic associations, local chamber of commerce, Three Rivers Paddlers Club, and local sportsmen's clubs.	Penn's Woods West Charitable Trust (PWWCT), Community and Regional Foundations, NPS - Rivers, Trails, and Conservation Assistance program, and PADCNR: Keystone Funds.	2003
8. Stakeholder Buy-In and Participation (Refer to Section VI/Page 46, Section VII/Page 65, and Section VIII/Page 75)	Establish the Chartiers Creek Triathlon. This would develop relationships throughout the watershed and get people onto the creek.	Community athletic associations, local chamber of commerce, and school district athletic departments.	PADCNR: Keystone Funds, Regional hospital and business sponsorships, and community and regional foundations.	2005
9. Historical Brochure (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	It would assist in further building on creating the watershed vision for the future. Also assist in building the Inter-Municipal Framework.	Community historical societies and local chamber of commerce.	PADCNR: Keystone Funds, PWWCT, PennDOT/PTC cultural resource mitigation funds, and community and regional foundations.	2003
10. EcoTourism (Refer to Section VI/Page 45, Section VII/Page 65, and Section VIII/Page 75)	Ecotourism will increase as cultural, recreational, and educational opportunities expand. These opportunities (**Chartiers Creek Triatholon**) will be tied to the rail-to-trail networks that are developing along with the environmental educational facilities that are currently being planned.	Local conservation organizations, chamber of commerce, municipal officials, small business/facility operators.	Local chamber of commerce, municipalities, small business, PADCNR: Keystone Funds, and community and regional foundations..	2001+
11. Historical Property Preservation (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	Preserve historical properties so they are destination points for tourists.	Historic property owner(s), community historical societies, and local chamber of commerce.	PADCNR: Keystone Funds, PennDOT/PTC cultural resource mitigation funds, and community and regional foundations.	On-going
F. Educational Resources				
1. Youth and Adult Education (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	Integrate watershed wide volunteer water quality monitoring program with other local/regional activities.	WCWA, CCWA, other local conservation groups, local school districts (Envirothon Program), and local/regional colleges and universities.	PADCNR: Keystone Funds, PADEP's Citizens' Volunteer Monitoring Program, CVI, Alliance for Aquatic Resource Monitoring, LWV - Citizen Education Fund, SWRC, and EPA Environmental Education Grant program.	2001+
2. Youth and Adult Education (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	Develop watershed wide integrated local school district and adult education programs through outdoor environmental classrooms and activities (e.g., Scrubgrass Run, Settler's Cabin Park, Boyce/Mayview park, etc.).	Local school districts and conservation groups.	EPA Environmental Education Grant program, PADCNR: Keystone Funds, Pennsylvania Department of Education (PADE), Environmental Education Program, LWV - Citizen Education Fund, and school district funded.	2001+
3. Youth Education (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	Integrate watershed wide local school district curriculum with local conservation demonstration projects.	Local school districts.	EPA Environmental Education Grant program, PADCNR: Keystone Funds, Pennsylvania Department of Education (PADE), Environmental Education Program, LWV - Citizen Education Fund, and school district funded.	2001+
4. Lifetime Education (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	Provide life long environmental education opportunities to encourage conservation ethics within the watershed. This would assist in promoting the watershed as a whole with conservation in mind as local citizens grow throughout their lives. Activities could be promoted from specific learning centers such as the proposed facilities in Crafton and Upper St. Clair, amongst other possible locations.	Local school districts, communities, and conservation groups.	EPA Environmental Education Grant program, PADCNR: Keystone Funds, PADE, Environmental Education Program, Allegheny County Regional Asset District funding, LWV - Citizen Education Fund, school district funded, and community and regional foundations.	2001+
5. Public Relations (Refer to Section VI/Page 46, Section VII/Page 66, and Section VIII/Page 76)	Provide year round continuing education to watershed stakeholders through the use of various forms of the media. This can be through the use of local and regional papers, magazines, and regular, cable, and satellite television providers.	Local school districts, communities, and conservation groups.	GreenWorksChannel.org, Pennsylvania Center for Environmental Education	2001+

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS IN PENNSYLVANIA

Source of Assistance	Phone	Contact Information	Assistance Information	Planning	Const.	Other
Farm Service Agency	(T) 724-222-3060 Ms. Linda Barnett	2800 North Main Street Extension PO Box 329 Meadowlands, PA 15347 www.fsa.usda.gov www.fs.fed.us	FSA offers financial assistance for streambank fencing and crossings for farmers.	NO	YES	YES
Allegheny Co. Conservation District	(412) 241-7645 Mr. Ed Feigel	Lexington Tech Park Building Room 1 102-400 North Lexington Street Pittsburgh, PA 15208-2521	Provides technical assistance for conservation activities Small grants to non-profit organizations for clean water projects.	YES	YES	YES
Appalachian Clean Streams Initiative	(T) 412-937-2863 Mr. Milton Allen (T) 717-782-4036 Mr. David Hamilton	Office of Surface Mining 1951 Constitution Ave. NW Washington, DC 20240 mallen@osmre.gov	Assists with restoration activities involving abandoned mine drainage issues throughout Appalachia.	YES	YES	YES
DCNR: Rivers Conservation Program	(T) 717-788-8526 Mr. Jim Mays (T) 412-880-0486 Ms. Tracey Robinson	1405 State Office Building 300 Liberty Avenue Pittsburgh, PA 15222 www.dcnr.state.pa.us	Offer technical and financial assistance for planning, implementation, development, and acquisition grants. Applications: Late August Proposals: Early February	YES	YES	YES
DEP: Stormwater Management Program	(T) 717-772-4048 Mr. Durla Lathia	400 Market Street Harrisburg, PA 17105 www.dep.state.pa.us	Watershed planning for stormwater control and implementation of programs at local levels.	YES	YES	YES
Dirt and Gravel Road Maintenance State Conservation Commission	(T) 717-787-8821 Mr. Woody Colbert	2301 North Cameron Street Harrisburg, PA 17110-9408	Financial assistance through participating conservation districts.	YES	YES	YES
PA Association of Conservation Districts: Educational Mini-Projects Program	(T) 717-545-8878 Education Specialist	4999 Jonestown Road Suite 203 Harrisburg, PA 17109	Small grants for PA based grassroots educational projects that address non-point source watershed concepts.	NO	NO	YES

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS IN PENNSYLVANIA

Source of Assistance	Phone	Contact Information	Assistance Information	Planning	Const.	Other
Environmental Protection Agency: Region III	(T) 215-814-5756 Mr. Bernie Samoski	Water Protection Division 3WP10, 1650 Arch Street Philadelphia, PA 19103-2029 www.epa.gov	Grants awarded to small non-profit groups for various projects in Region III	YES	YES	YES
EPA - Region III Environmental Education Grants	(T) 215-814-5546 Ms. Nan Ides	3G00, 16th Floor 1651 Arch Street Philadelphia, PA 19103 www.epa.gov	Grants awarded to small non-profit groups for various projects in Region III	YES	YES	YES
Natural Resources Conservation Service (NRCS)	(T) 724-222-3060 Mr. Tom Sierzega (T) 724-774-7090 Mr. Robin Moyer (T) 814-445-8979 Mr. Dan Seibert	2800 North Main Street Extension PO Box 329 Meadowlands, PA 15347 www.nrcs.usda.gov	Technical and funding assistance to farmers for planning, design, construction, and maintenance activities. These involve many programs (i.e., fencing and stream crossings, farmland protection).	YES	YES	YES
NRCS PL 83-566, Watershed Protection and Flood Prevention Act	(T) 717-782-4429 (T) 814-445-8979 Mr. Dan Seibert	North Ridge Building, Suite 105 1590 North Center Avenue Somerset, PA 15501	Plan development for natural resource concerns within a watershed area: cost-sharing available to carry out plan.	YES	YES	YES
Office of Surface Mining Reclamation and Enforcement	(T) 717-782-4473 Mr. David Hamilton	415 Market Street Transportation Building Suite 3C Harrisburg, PA 17101	Provides funds to Appalachian Clean Streams Initiative for Abandoned Mine related activities.	YES	YES	YES
PA - Growing Greener	(T) 717- 705-5400 1-877-PAGREEN Ms. Patricia Grim	Rachel Carson St. Office Bldg. 9th Floor, 400 Market Street PO Box 8776 Harrisburg, PA 17109-8776 www.dep.state.pa.us	Funds for PennVest, PA Department of Agriculture, Department of Environmental Protection and Department of Conservation and Natural Resource activities.	YES	YES	YES
PA DEP - Nonpoint Source Management Program (Section 319 & WRAP)	(T) 717- 787-5259 Ms. Jane Earle	400 Market Street PO Box 8555 Harrisburg, PA 17105-8555 www.dep.state.pa.us	Provide funding for improving Non-point source water pollution.	YES	YES	YES

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS IN PENNSYLVANIA

Source of Assistance	Phone	Contact Information	Assistance Information	Planning	Const.	Other
PA Organization for Watersheds and Rivers	(T) 717-234-7910 Mr. Walt Pomeroy wpomeroy@aol.com	PO Box 765 Harrisburg, PA 17108	POWR assists river and watershed organizations in Pennsylvania.	YES	NO	YES
PADEP Southwest Regional Office	(T) 412-442-4149 (F) 412-442-4194 Ms. Rita Coleman (T) 412-442-4049 Ms. Karen Crowley	400 Waterfront Drive Pittsburgh, PA 15222-4745 www.dep.state.pa.us	Grants for various environmental, conservation, and educational activities.	YES	YES	YES
PA Stream ReLeaf Program	(T) 717-236-8825 Ms. Susan Richards	Alliance for the Chesapeake Bay 600 North Second Street Harrisburg, PA 17101	Grants for riparian buffers along streams. For the purchase of trees, seed and planting mats. Grants between $500-$1000.00 Application: January Begin: Spring Complete: July	YES	YES	YES
Penn's Corner RC&D	(T) 724-834-9063 Mr. Nevin Ulery	Donhoe Center RD 12, Box 202B Greensburg, PA 15601	Provides technical assistance and small financial grants to non-profit organizations in 9 southwestern PA counties.	YES	YES	YES
Pennsylvania Fish and Boat Commission	(T) 814-359-5185 (T) 412-341-0370 Mr. Bob Wheeler	Adopt-A-Stream Program 450 Robinson Lane Bellefonte, PA 16823 www.fish.state.pa.us	Offers technical assistance on design and construction of stabilized stream crossings.	YES	YES	YES
Pennsylvania Game Commission	(T) 717-787-6400 Mr. Dennis Neideigh	2001 Elmerton Avenue Harrisburg, PA 17110-9797 www.pgc.state.pa.us	Streambank fencing financial and technical assistance to farmers who participate in one of the commission's cooperative public-access programs.	YES	YES	YES
Pennsylvania Senior Environment Corps: Environmental Alliance for Senior Involvement	(T) 717-787-9580 Mr. Christopher Allen	400 Market Street Harrisburg, PA 17105 www.dep.state.pa.us	EASI provides technical assistance numerous environmental and education issues amongst many more.	YES	NO	YES

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS IN PENNSYLVANIA

Source of Assistance	Phone	Contact Information	Funding Information	Planning	Const.	Other
The Leo Model Foundation	(T) 215-546-8058 Extension 3021 Ms. Margaret Stridick	ICO - Model Entities 310 South Juniper Street Philadelphia, PA 19107-5818	Grants for habitat, conservation, watershed conservation, and species preservation.	YES	YES	YES
The Pittsburgh Foundation	(T) 412-391-5122 Mr. Alfred Wishart, Jr.	The Pittsburgh Foundation One PPG Place - 30 th Floor Pittsburgh, PA 15222-5401	Funding grants to organizations located in Allegheny County for special projects, seed money for new programs, or grants which would leverage additional funding. Submit proposals Jan. 1, March 15, June 1, and Sept. 15	YES	YES	YES
The William Penn Foundation	(T) 215-988-1830 Ms. Hollister Knowlton	Two Logan Square 11th Floor 100 North 18 Street Philadelphia, PA 19103-2757	Grants to preserve natural areas, including environmental education and planning, within the foundation's geographic area.	YES	YES	YES
US Army Corps of Engineers	(T) 412-395-7210 Dr. Ed Smith	1928 Federal Building 1000 Liberty Avenue Pittsburgh, PA 15222 www.usace.army.mil/	Provides funding and technical assistance through a variety of planning and construction programs for environmental improvement, flood protection, and other projects.	YES	YES	YES
US Geological Survey	(T) 717-730-6916 Mr. John Nantz jmnantz@usgs.gov	840 Market Street Lemoyne, PA 17043 http://pa.water.usgs.gov	Provides technical assistance through planning programs for environmental improvement, flood protection, and other projects.	YES	YES	YES
Vira I. Heinz Endowment	(T) 412-281-5777 (F) 412-281-5788 Mr. Andrew McElwaine	30 CNG Tower 625 Liberty Avenue Pittsburgh, PA 15222-3115 www.heinz.org/low/environment/	Funds to implement ecosystem programs in selected western PA watersheds. Small matching grants are provided to the DCNR for the Coldwater Heritage program.	YES	YES	YES
Washington Co. Conservation District	(T) 724-228-6774 Mr. Gary Stokum	602 Courthouse Square 100 West Beau Street Washington, PA 15301-4402 WCCD@COBWEB.NET	Provides technical and financial assistance to farmers, developers, and conservation organizations.	YES	YES	YES

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS IN PENNSYLVANIA

Source of Assistance	Phone	Contact Information	Assistance Information	Planning	Const.	Other
Waterways Conservation Grant Program (Conserve 2000 Fund) Commonwealth of PA PA Fish and Boat Commission	(T) 717-657-4515 717-657-4540 (F) 717-657-4033 (T) 814-445-3454 Mr. Rick Lorson	PA Fish and Boat Commission PO Box 67000 Harrisburg, PA 17160-7000 www.fish.state.pa.us	Grants support activities directed at restoring and protecting watersheds; including acquisition, and enhancing riparian habitat. Application Deadline: June.	YES	YES	YES
Western PA Watershed Protection Program	(T) 814-869-4847 Mr. John Dawes	RD #1, Box 152 Alexandria, PA 16611	Provides funding to grassroot organizations and watershed associations for site specific watershed remediation in western PA.	YES	YES	YES
WPCAMR: Western PA Coalition For Abandoned Mine Reclamation	(T) 724-837-5271 (F) 724-837-4127 Mr. Mark Killar	Donohoe Center RD # 12 - Box 202-B Greensburg, PA 15601 wpcamr@westol.com	Grants through the Regional Watershed Support Initiative Applications -December Received - January Complete - June	YES	YES	YES
Canaan Valley Institute	(T) 814-768-9584 Ms. Janie French (T) 304-866-4739 1-800-922-3601 Ms. Emily Grafton	650 Leonard Street Clearfield, PA 16830 www.canaanvi.org	Promotes the development and growth of local organizations committed to improving or maintaining the natural resources of their watersheds, in the Mid-Atlantic Highlands portions of PA. MD. VA and all of WV.	YES	YES	YES
Penn State Cooperative Extension	(T) 412-473-2540 Mr. Dino De Ciantis	400 North Lexington Street Pittsburgh, PA 15208 www.allegheny.extension.psu.edu	Provide technical assistance to homeowners, farmers, and others concerning agricultural issues.	YES	NO	YES
League of Women Voters: Citizen Education Fund and Water Resources Education Network	(T) 724-465-2595 (T) 724-465-4687 1-800-692-7281 Ms. Sherene Hess	226 Forester Street Harrisburg, PA 17102 http://www.pa/lwv.org/wren	Grants up to $3000.00 Application: January Begin: Spring Grants are available for community education or outreach projects pertaining to water resource issues.	YES	YES	NO

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS
NATIONAL ORGANIZATIONS

Source of Assistance	Phone	Address	Assistance Information	Planning	Const.	Other
American Canoe Association	(T) 703-451-0141 Mr. David Jenkins	7432 Alban Station Boulevard Suite B232 Springfield, VA 22150	May provide funding for various watershed related projects including starting groups and lobbying.	YES	NO	YES
National Park Service: Rivers, Trails, and Conservation Assistance Program	(T) 215-597-1581 Mr. Jody Bellows	200 Chestnut Street, 3rd Floor Philadelphia, PA 19106	Provide technical, administrative, public facilitation and other services for a variety of projects.	YES	NO	YES
Charles A. and Anne Morrow Lindburgh Foundation	(T) 763-576-1596	2150 Third Avenue North, Suite 310 Anoka, MN 55303-2200 www.lindberghfoundation.org	Grants awarded fro the conservation of natural resources and water resource management.	YES	NO	YES
American Sportfish Association and Foundation	(T) 703-519-9691 Mr. Thomas Marshall	1033 North Fairfax Street, #200 Alexandria, VA 22314 www.fishamerica.org www.asafishing.org	Grants awarded for: stream bank stabilization materials, instream habitat improvements, contracted heavy equipment, and stream morphology work.	NO	YES	NO
Scenic America	(T) 202-543-6200 Ms. Debra Myerson	801 Pennsylvania Avenue, SE Suite 300 Washington, DC 20003 www.scenic.org	Technical assistance for improving community visual quality assessments, sign control, cellualr tower location, amonst other visual pollution issues.	YES	YES	YES
Wildlife Forever	(T) 612-936-0605 (F) 612-936-0915 Ms. Andrea Stoffregen	12301 Whitewater Drive Suite 210 PO Box 3404 Minnetonka, MN 55343 www.wildlife forever.org	Provides technical and financial assistance for habitat enhancement projects.	YES	YES	YES
USEPA: Five Star Restoration Program	(T) 202-260-8076 Mr. John Pai	Office of Wetlands, Oceans, and Watersheds (4502F) Ariel Rios Building 1200 Pennsylvania Avenue Washington, DC 20460 www.epa.gov/owow/wetlands/restore/5star/	Clean Water Act Section 104 (b)(3) Program Applications - Jan./Feb.	YES	YES	YES

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS
NATIONAL ORGANIZATIONS

Source of Assistance	Phone	Contact Information	Assistance Information	Planning	Const.	Other
North American Wetlands Conservation Council	(T) 413-253-8269 Attention: Small Grants Coordinator	Atlantic Coast Joint Venture US Fish and Wildlife Service 300 Westgate Center Drive Hadley, MA 01035-9589 www.fws.gov/r9nawwo	Program promotes long-term wetland activities through encouraging participation by new partners who may not be able to compete in the standard grant program. Grants no larger than $50,000. Application: December	YES	YES	YES
WalMart/Sam's Club: Environmental Clean Air and Water Grant	See Local WalMart/Sam's Club	Grants are administered through the local stores. Talk with Store Manager for applications. Washington and Robinson Town Center, PA Stores.	Funding distributed on a first come first serve basis. Funding Distribution: February	YES	YES	YES
National Tree Trust	(T) 202-628-8733 Ms. Joanne Miller	1120 G Street, NW Suite 770 Washington, DC 20005 www.nationaltreetrust.org/	Grants awarded: Tree plantings, education, administration, and national/regional programs.	YES	YES	YES
The Foundation Center	(T) 212-620-4230 (T) 412-622-1917	4400 Forbes Avenue Pittsburgh, PA 15213 http://fdncenter.org	An independent national service organization established by foundations to provide an authoritative source of information about private philanthropic giving.	NO	NO	YES
National Audubon Society	(T) 412-963-6100	614 Dorseyville Road Pittsburgh, PA 15238 www.audubon.org	Inspire and educate people of southwestern PA to be respectful of the natural world.	NO	NO	YES
Wildlife Habitat Council	(T) 301-588-8994 (T) 412-433-5900 Ms. Marsh Mazlavic	1010 Wayne Avenue, Suite 920 Silver Springs, MD 2-910 http://www.wildlifehc.org	Provide technical assistance to corporate and community organizations to improve wildlife habitat.	YES	NO	YES
National Wildlife Federation: Community and Backyard Wildlife Habitat Programs	(T) 703-790-4434 1-800-822-9919	8925 Leesburg Pike Viena, VA 22184-0001 http://www.nwf.org/habitats	Provide technical assistance to corporate, communities, and organizations to improve wildlife habitat.	YES	NO	YES

POTENTIAL TECHNICAL & FUNDING ASSISTANCE FOR WATERSHED PROJECTS IN PENNSYLVANIA

Source of Assistance	Phone	Contact Information	Assistance Information	Planning	Const.	Other
PennVest (Pennsylvania Infrastructure Investment Authority): V.A. Johnson. 1997. *A Water, Sewer and Stormwater Utility's Guide to Financial and Technical Assistance Programs.* Harrisburg, PA. A 56 page guidance document that provides telephone numbers, addresses, Internet and email addresses, and contacts for a variety of infrastructure grant programs. These include sewer, septic, and water systems, stormwater, floodplain management, community planning, municipal training, Appalachian Regional activities, and rural development activities. For assistance and to receive a copy of this guidance document, please call Ms. Vickie Johnson at 717-783-8618.						
Pennsylvania Department of Community and Economic Development (DCED): *DCED Funding Source Directory.* 2000. A 15 page guidance document that provides sources of information concerning a variety of funding programs to assist in community and economic development. Please contact the DCED for assistance in attaining this guidance document at 1-800-379-7448.						