

Acknowledgments

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The project has been sponsored by the Montour Valley Alliance, an informal coalition of community-based organizations concerned with balancing needed economic development with protection of the significant natural and cultural resources of the Montour Run Watershed.

Rivers Conservation Program Pennsylvania Department of Conservation and Natural Resources

The DCNR Rivers Conservation Program is a Keystone Grant Program specifically designed to assist municipalities and river conservation groups to restore, maintain, and enhance river resources and values. River conservation groups must be municipalities or nonprofits with a river, stream, or watershed conservation mission, who are designated to act on behalf of interested municipalities to undertake the project.

Planning grants are available to study and define significant natural and cultural resources, issues, concerns, and special opportunities and to provide recommendations for action in a watershed or stream/river corridor. Implementation grants can be obtained to carry out studies for additional resource information that would be necessary to make informed decisions. Development grants are possible to assist with the construction of projects identified during planning and appear as a management option in the plan. Acquisition grants are available to obtain conservation easements or actual purchase of those lands deemed important to achieve a conservation goal. All grants require a 50% local match, either in cash or by in-kind services, or a combination of both.

Montour Run Watershed: A Case for Conservation

A summary of the
"River Conservation and Land Use Plan for the Montour Run Watershed"
a project of the
Montour Valley Alliance
under the Rivers Conservation Program of the
Pennsylvania Department of Conservation and Natural Resources

Montour Valley Alliance

Core Organizations have included:

Coraopolis Economic Revitalization Corporation

Ducks Unlimited, West Allegheny Chapter

Forest Grove Sportsmen's Club

Hollow Oak Land Trust

Montour Trail Council

Trout Unlimited, Penn's Woods West Chapter

Hollow Oak Land Trust

The Hollow Oak Land Trust has served as fiscal agent for the project and has contributed funding and staff support.

Project Management Committee

Stan Sattinger, Chairman, Montour Valley Alliance

Mike Homza, West Allegheny Chapter, Ducks Unlimited

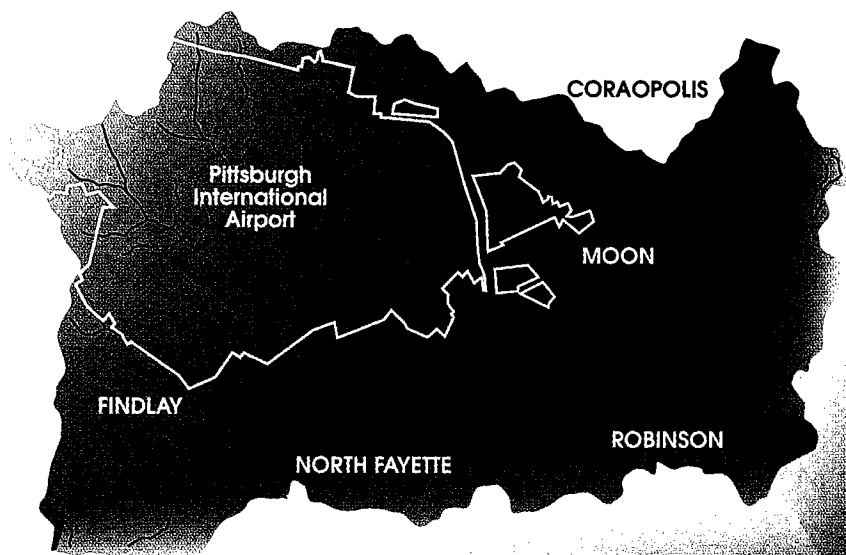
Roy Kraynyk, President, Hollow Oak Land Trust

Richard Packer, Penn's Woods West Chapter, Trout Unlimited

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January 2000



A watershed is an area in which all flowing water finds its way into a common stream or lake. The Montour Run Watershed includes portions of five municipalities: Findlay, Moon, North Fayette, and Robinson Townships and the Borough of Coraopolis. Allegheny County is in southwestern Pennsylvania.



The "River Conservation and Land Use Plan for the Montour Run Watershed" contains extensive findings and recommendations. This booklet summarizes that report.

Montour Run Watershed Planning Project

The Montour Run Watershed in western Allegheny County is being dramatically changed by land development. When it became obvious that the water quality, biological and land resources, and quality of life were being degraded, concerned individuals and agencies formed an informal coalition, the Montour Valley Alliance. The Alliance pursued state and private funding to create a conservation plan for the Watershed. A list of the core organizations of the Alliance is provided on the title page of this booklet.

An advisory council made up of residents, business people, and community leaders helped guide development of the Plan. The Alliance hired an experienced team of specialists, led by KCI Technologies, Inc., to study the Watershed and prepare recommendations for residents and their governments. The four major components of their work were to –

- Find out what the public thinks about conservation in the Watershed.
- Take an inventory of the Watershed's natural and cultural features.
- Suggest methods for making sure the features of the Watershed are protected.
- Suggest methods for using the features of the Watershed to improve the local economy.



Montour Run and the area it drains have suffered extensive damage from mining, deforestation, and increased storm water runoff. The Montour Valley Alliance, formed by concerned citizens and agencies, has created a plan that balances the varied development and conservation interests in the Watershed.

***"The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment.
Pennsylvania's natural resources are the common property of all the people, including generations yet to come."***

*Pennsylvania Constitution
Article 1, Section 27
adopted May 18, 1971*

The Public Wants Green Spaces

Public Meetings

A series of public meetings held throughout the Watershed allowed residents to voice their concerns and to make suggestions. These sessions provided essential direction to the rest of the project.

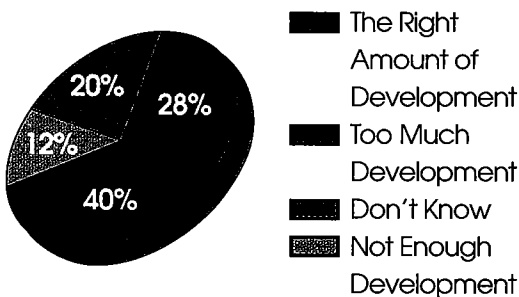
Survey Results

In January 1998 a public opinion survey was conducted of residents within and immediately surrounding the Watershed. This is the first known survey designed to find out whether area residents are aware of and understand local land use issues and also what they think about the natural resources surrounding them.

The results clearly show that residents are concerned about the environment of their communities. Although fewer than half of the respondents understood the term "watershed" or were aware of the negative impacts that result from watershed degradation, almost all supported activities such as improving water quality, halting water pollution, protecting aquatic life, and preserving natural areas. Respondents clearly were concerned about the loss of open space and want their elected officials to do more to protect the character of their communities.

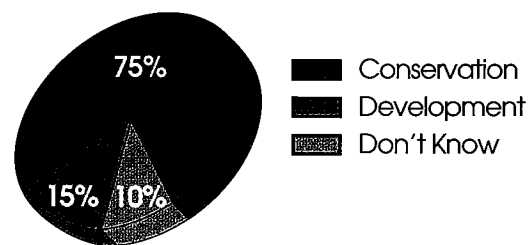
Opinions on the extent of development in the Watershed

68% feel that there has been enough development in their communities.



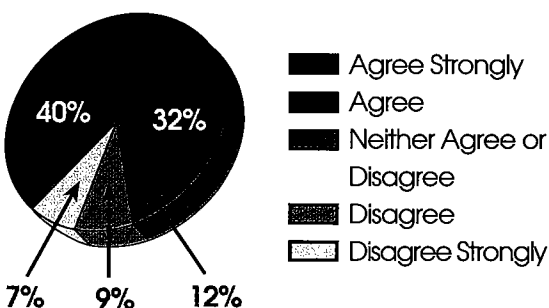
Land uses that should be emphasized

75% of the respondents feel that conservation needs to be emphasized more than development. 61% had used Watershed areas recently for activities such as hiking, biking, and fishing.



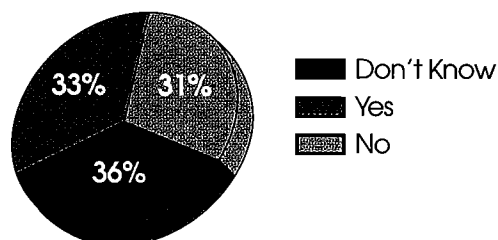
Local governments should buy land for preservation

Nearly 75% feel that their governments should buy land to preserve it for future generations.



Opinions on whether or not the local municipality is planning for the right balance of development and conservation

Nearly one-third of the respondents think that more effort needs to be put into planning for the right balance of development and conservation.

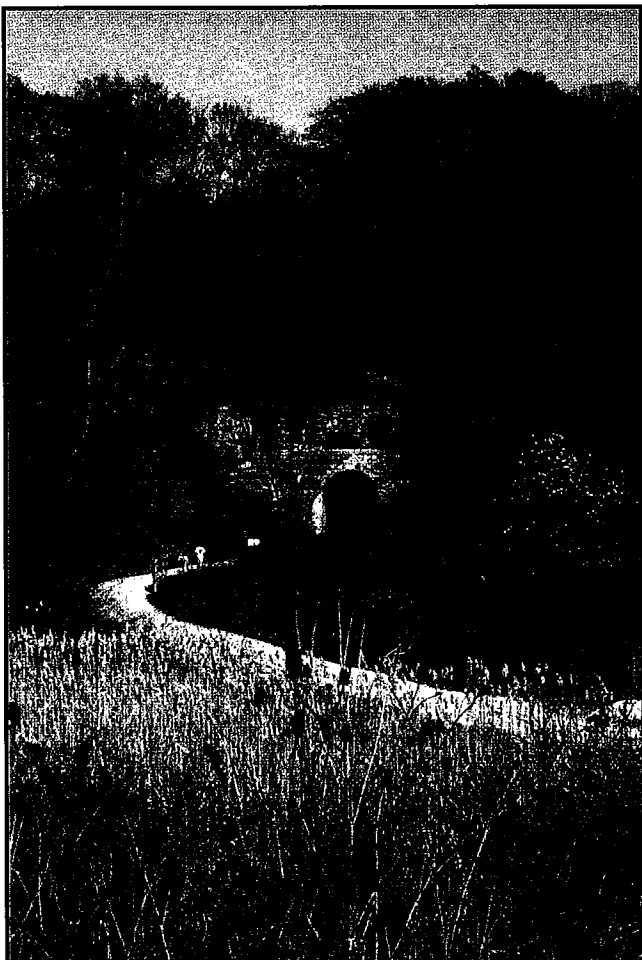
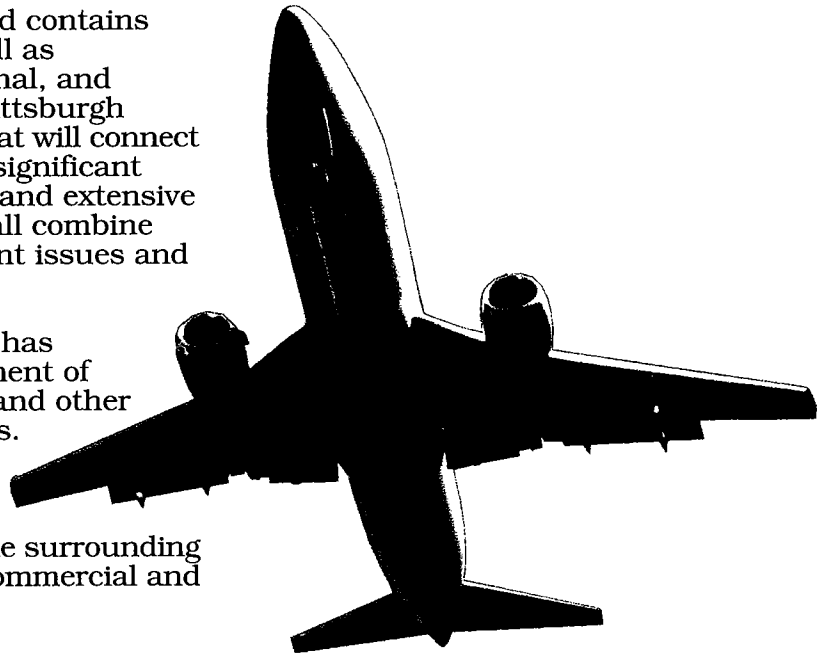


Special Features

The 37-square-mile Montour Run Watershed contains beautiful streams and wooded slopes as well as concentrations of diverse natural, recreational, and cultural resources. Features such as The Pittsburgh International Airport, a hiking-biking trail that will connect the area with Washington, D.C., regionally significant biological diversity, abandoned coal mines, and extensive commercial and residential development – all combine to create a unique microcosm of development issues and a diverse mix of land uses.

Rapid and uncoordinated economic growth has resulted in extensive deforestation, impairment of water quality, destruction of historic sites, and other degradation of the area's sensitive resources.

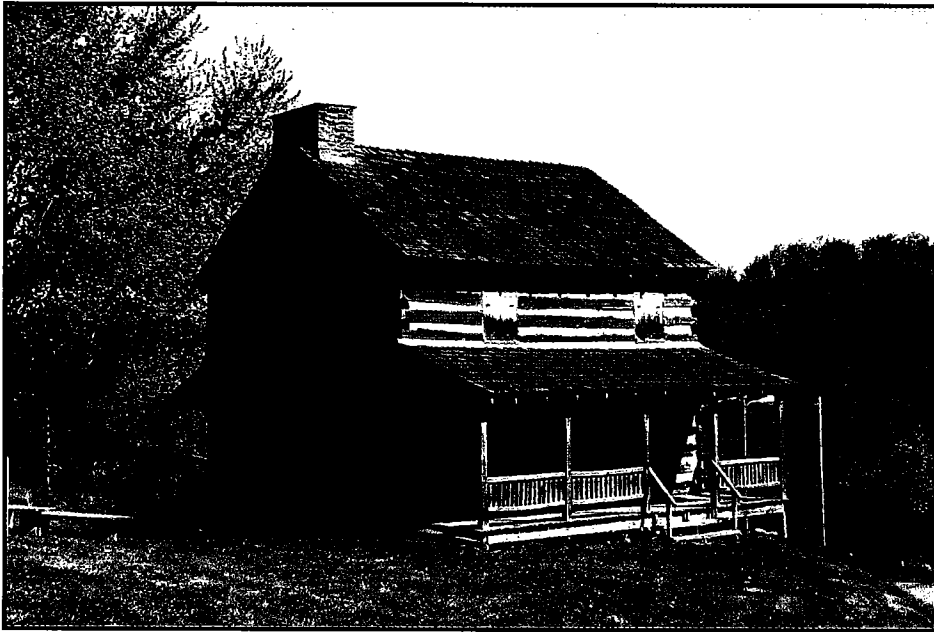
The Pittsburgh International Airport occupies a large portion of the Watershed. It has had significant economic impact on the surrounding communities and has fostered large-scale commercial and residential development.



Montour Run Watershed encompasses the Montour Trail, the Pittsburgh International Airport, abandoned coal mines, and significant commercial development as well as many homes and a few remaining farms.

Historic and Educational Resources

The Watershed has a long and varied history reflected by historic buildings dating from the 1800s. It also contains parks, golf courses, two sportsmen's clubs, and fishing sites. Montour Run is used by local school districts as part of their environmental sciences programs.



The Watershed contains historical sites such as the McAdow-McAdams log house, thought to predate 1800, and many varied educational opportunities

The mouth of Montour Run at the Ohio River across from Neville Island is a popular fishing site

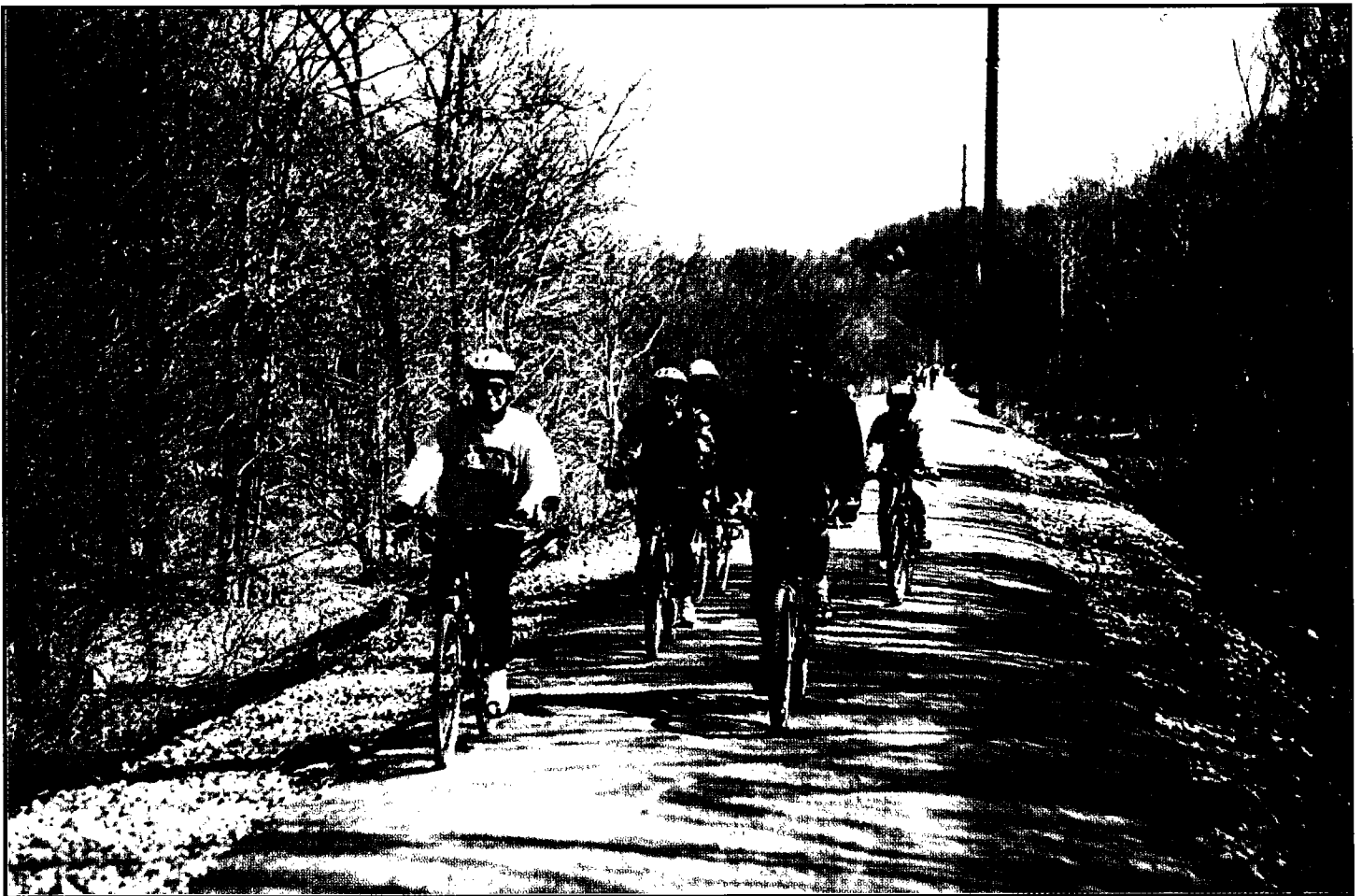


Tourism and Recreation Benefit the Economy

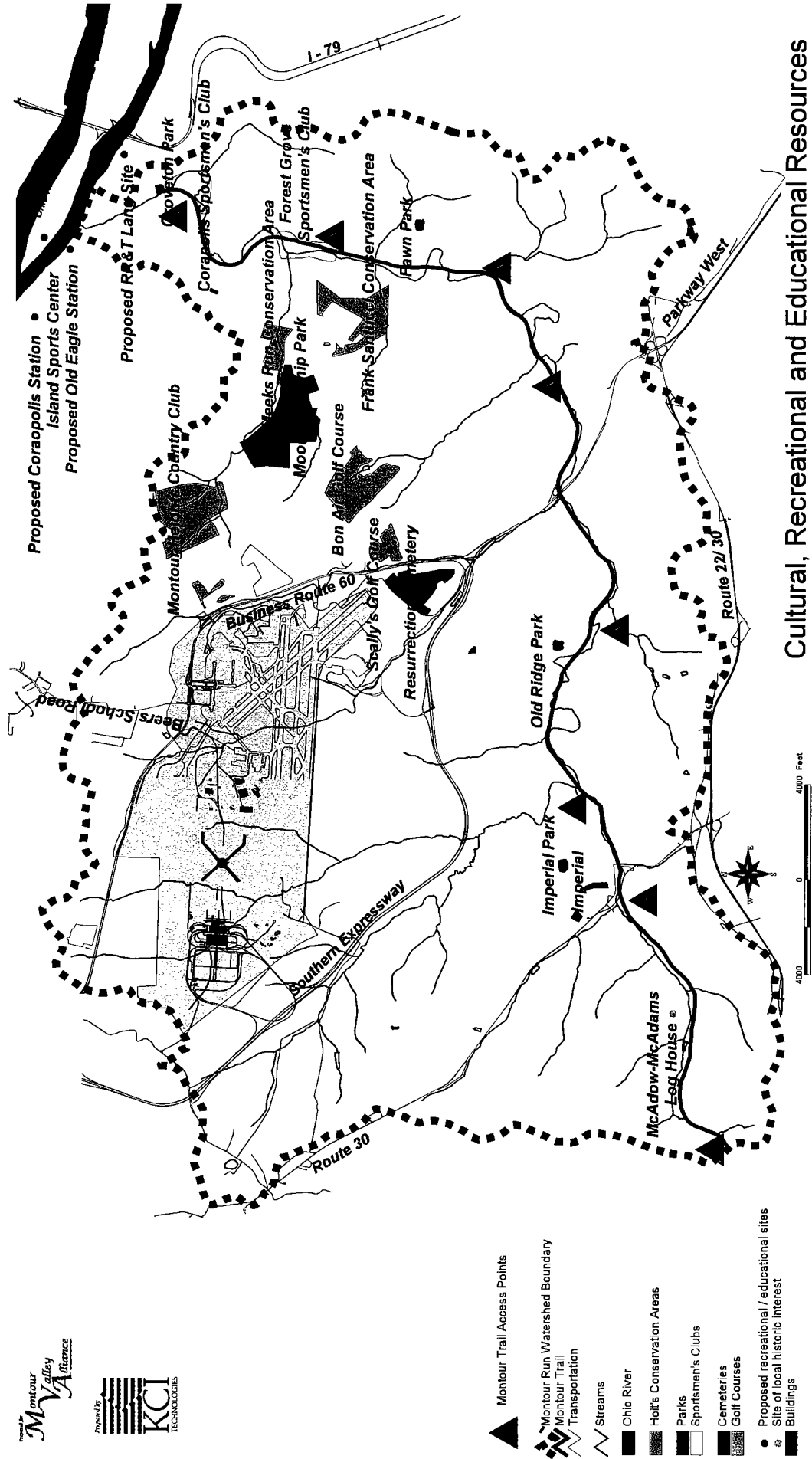
Eleven-and-a-half miles of the Montour Trail traverse the Watershed. The Trail is exceptionally popular, and the number of people using it is increasing rapidly. It will become even more popular when plans for the regional trail system are complete – within a few years a hiker or biker will be able to go from Pittsburgh to Washington, D.C., by trail.

The Montour Trail has attracted many users from beyond the boundaries of the Watershed, and new businesses that cater to them are being added to the area.

Buyers of new homes have indicated that the Trail is one of the attractions that brought them to the area. Economic impact studies of similar trails show that values increase for properties adjacent to these trails.



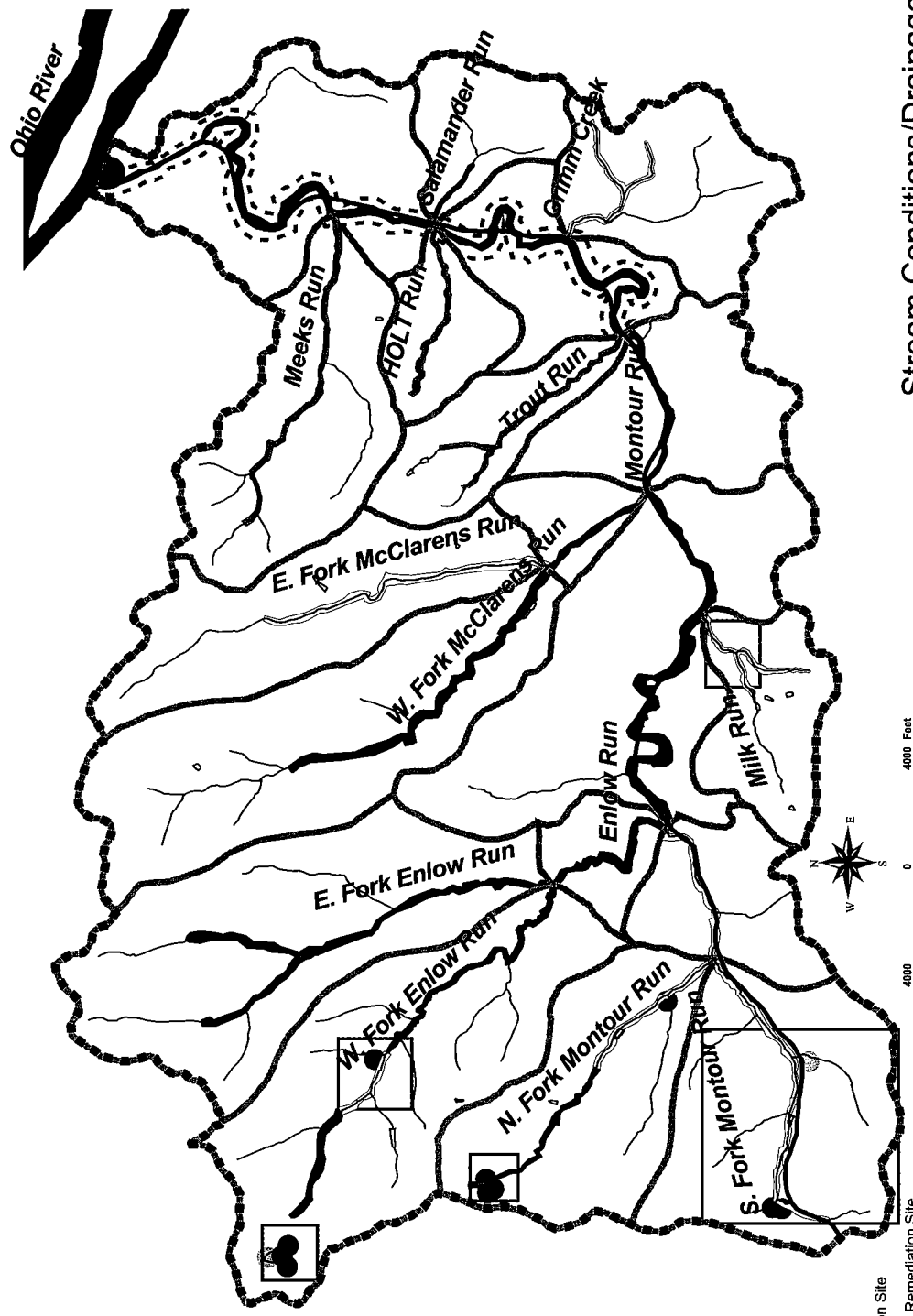
The Montour Trail has already attracted visitors and homebuyers to the area. Trails such as this one are often a deciding factor when corporations pick a location for their facilities. New businesses are created to supply equipment, food, and other services to users of the trails.



Cultural, Recreational and Educational Resources

River Conservation and Land Use Plan for the Montour Run Watershed

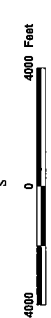
Allegheny County, Pennsylvania



- Montour Run Watershed Boundary
- Montour Trail
- Streams
- Ohio River
- Sub-watershed Boundaries
- Stream Conditions (Source: USACOE Study)
 - Severely Impaired
 - Moderately Impaired
 - Slightly Impaired
 - Non-Impaired
- The "Lagoon"
- Significant Abandoned Mine Drainage Discharge Area
- Major Stream Bank Erosion Area and Floodprone Area
- Beaver Dam on West Fork Enlow Run Remediation Site
- The Clinton Deep Mine Complex Remediation Site
- Headwaters of the South Fork of Montour Run Remediation Site
- North Fork Montour Run Headwaters Deep Mine Complex Remediation Site
- Cattail Marsh on an Unnamed Right Bank Tributary to the North Fork of Montour Run at Mile 0.4 Remediation Site
- Stormwater Drainage Facility on an Unnamed Left Bank Tributary to the West Fork of Enlow Run at Mile 2.05 Remediation Site
- Extensive Cattail Marsh along Santiago Run, below the Santiago Mine, in the South Fork Montour Run Basin Remediation Site

Stream Conditions/Drainage

River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania

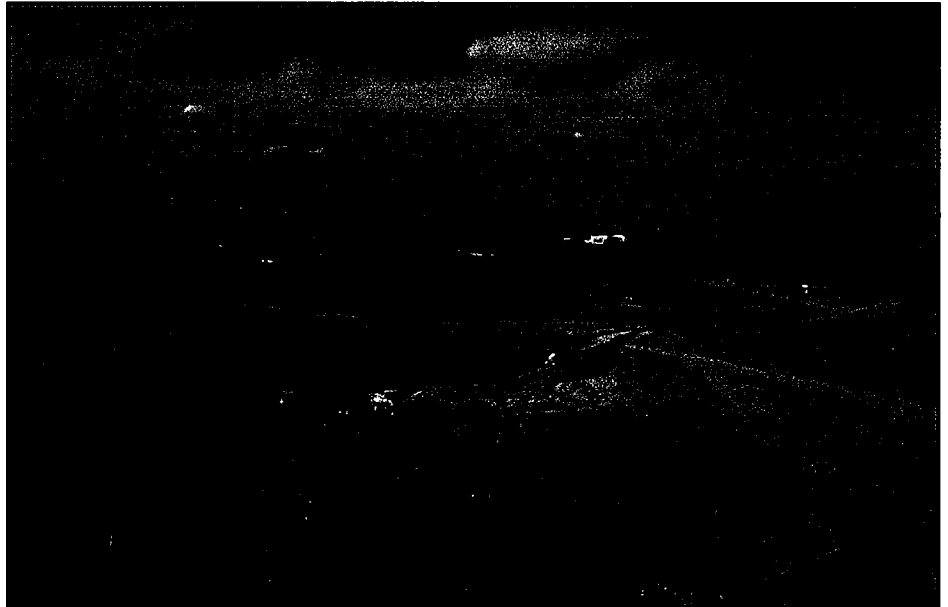


Soil Stability

Erosion and water contamination are important changes occurring in the Watershed.

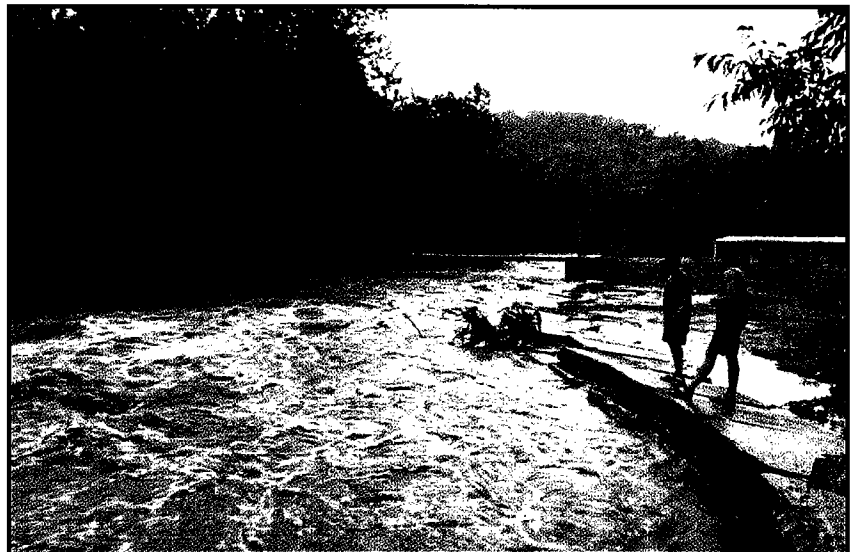
Land development has altered the topography, removed the vegetation cover, and reduced absorption capabilities of the soil. Pavement has covered large areas, preventing rain from penetrating to the groundwater level.

Now the water runs off quickly, taking along soil and debris that collect in the streams. The accumulation of soil and debris in the stream bed have reduced the carrying capacity of the streams, contributing to floods.



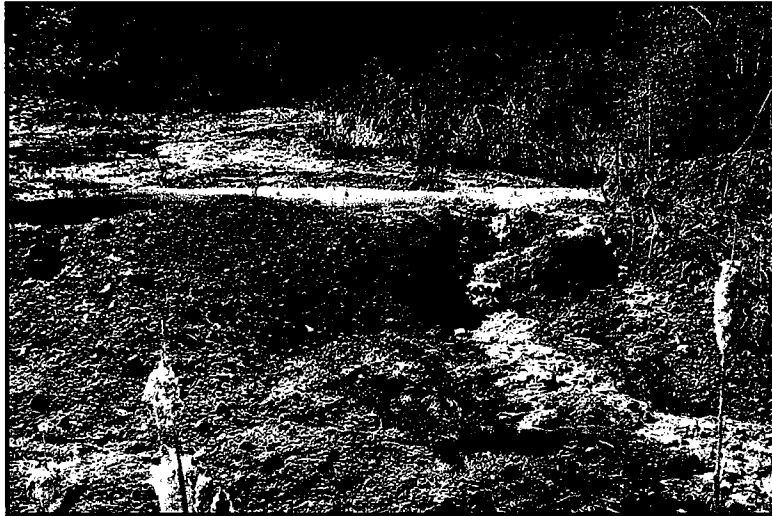
Current development practices have removed vegetation cover and increased runoff into streams.

Development is an important contributor to the economy of the Watershed. With proper planning, development can be balanced with conservation practices to protect natural resources. A protected watershed can contribute as much to the local economy as do industry and business.

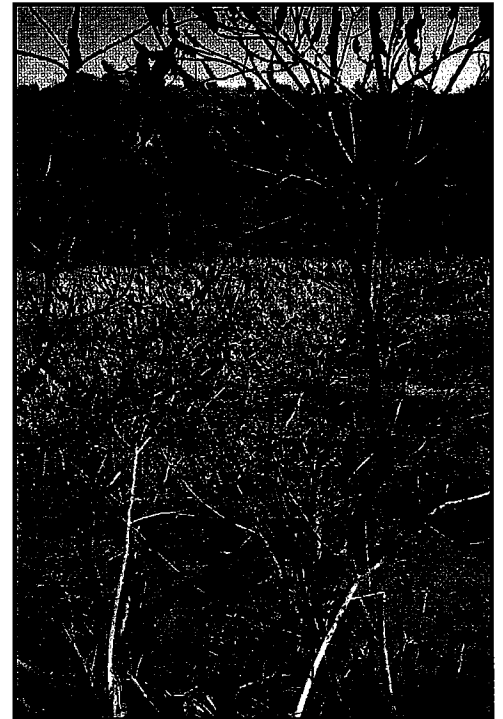


Erosion, flooding, and water quality are becoming an increasing concern.

Water Quality



Drainage from abandoned mines and deforestation have dramatically reduced aquatic life in the streams. Deicing activities and fuel spills at the airport have added to the problem. Although the airlines have facilities and procedures for collecting and recycling the deicing agents used on the planes, chemicals used on the runways have drained into the surrounding streams.

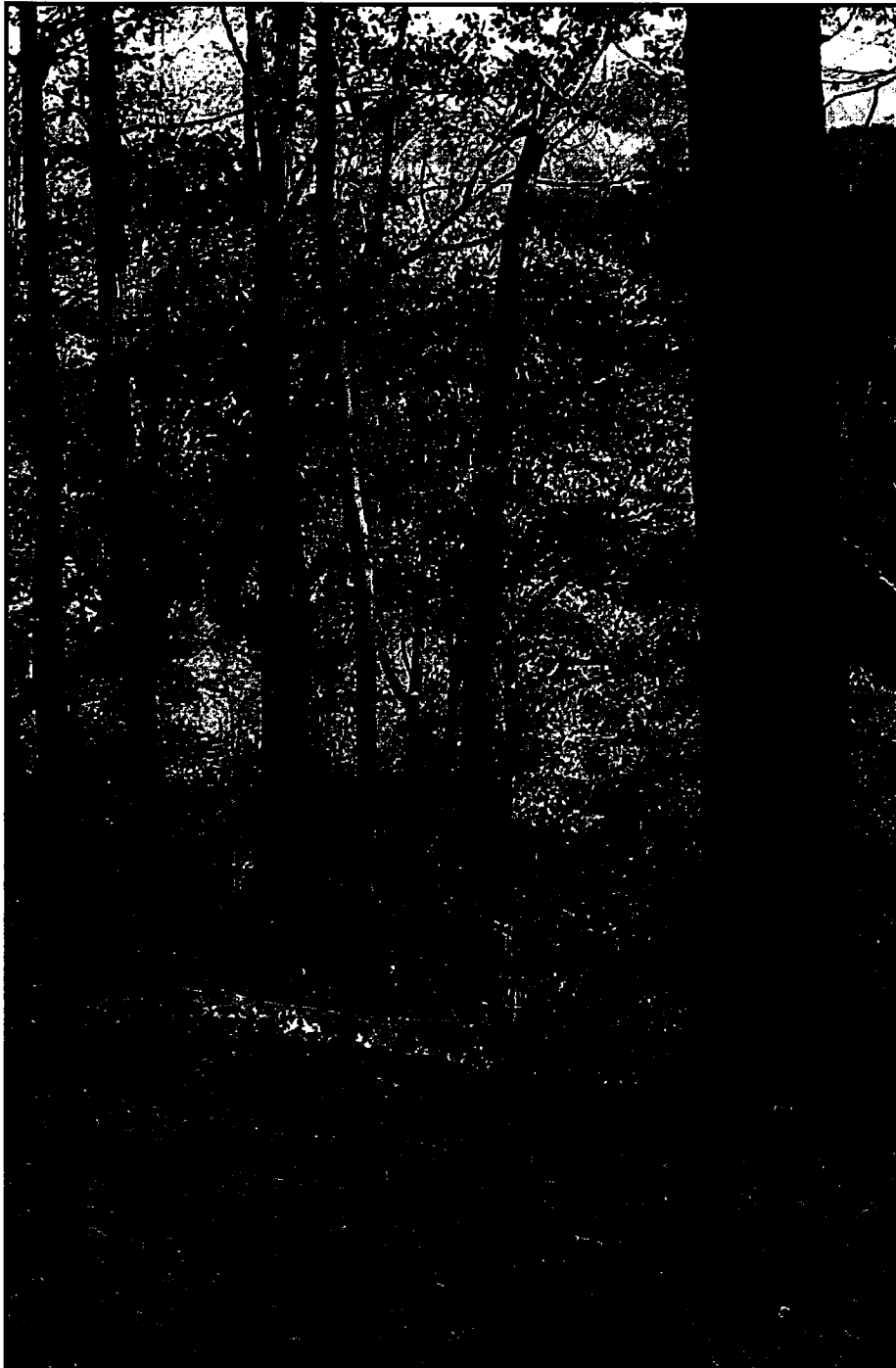


The U.S. Army, Corps of Engineers studied the water quality of Montour Run and its tributaries in 1996. The data collected documents the water quality degradation occurring in the Watershed.



Geology, Vegetation, and Wildlife

The Watershed's rock, soil, slopes, and groundwater were reasonably stable before manmade changes occurred. The character of rock formation is an extremely important factor in slope stability. Found in abundance are the Pittsburgh Red Beds, a sequence of claystones that are extremely susceptible to landslides when exposed by cuts for construction. Most of the landslides in the area have happened after a slope was over-steepened, overloaded, or modified in the course of development. The area has also been mined extensively, creating additional instabilities.



The Montour Run Watershed was originally covered by a forest of tall broadleaf trees, mostly American Chestnut and species of oak. The forest floor was covered with shrubs and decomposing vegetation. Wildlife was abundant. Many of the forested areas have disappeared because of logging, strip mining, and development. In places, the forest floor is rapidly washing away, and wildlife is disappearing. Remaining stands of forest are limited mainly to isolated tracts on steep hillsides or along stream bottoms and ravines.

Three areas identified in the Allegheny County Natural Heritage Inventory are found in the Watershed – the Montour Run Landscape Conservation Area (LCA), the Clinton Wetlands Biological Diversity Area (BDA), and the Ohio River BDA. The Western Pennsylvania Conservancy has identified these sites as some of the County's most significant natural areas.

Remaining forested areas are mostly on steep slopes and along streams.

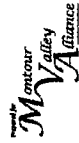
Coraopolis

Ohio River



Land Resources / Constraints

River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania



- Montour Run Watershed Boundary
- Montour Trail
- Streams
- Ohio River
- Transportation
- Landfills
- Breslube-Penn Superfund Site
- Environmental / Natural Heritage Inventory
- Clinton Wetlands Biological Diversity Area
- Montour Run Valley Landscape Conservation Area
- Steep Slopes
- Prime Agricultural Soils
- Prehistoric Landslides
- Manmade Fill
- Recent Landslides
- Soils with Conspicuous Creep
- Area of Red Beds and Associated Rock
- Pittsburgh International Airport

Land Use

The Watershed can be separated into three areas where distinctly different development characteristics predominate. All are traversed by the Montour Trail and Montour Run.

Undeveloped residentially zoned land dominates the eastern portion. It is the most ecologically sensitive portion of the Watershed and one of the most biologically diverse regions in Allegheny County. Unfortunately, increased water volume and velocities in Montour Run have caused severe streambank erosion and flooding in this area. Water quality and aquatic life are also being adversely impacted.

The central portion includes both sides of the Airport Parkway corridor, Business Route 60 corridor, and Southern Expressway corridor. It incorporates the airport property.

The western area contains the headwaters of Montour Run and is the most rural portion of the Watershed.



In rural areas, development must be carefully planned to minimize impact on the downstream section of the Watershed.



The heavily developed central portion has had a significant impact on the environment and the economy of the area.

What We Can Do

The Montour Valley Alliance study spanned almost two years of intense effort. During that time the consultants studied the current conditions of the Watershed and considered how to improve both the economy and the environment. They also put great emphasis on documenting the expressed wishes of residents and businesses.

The list of recommendations they developed is long and comprehensive. A copy appears at the end of this booklet, and a background description of the recommendations appears in the Plan.

Create a riparian conservation corridor

A primary recommendation in the Plan is to establish a riparian conservation corridor – a protected strip of environmentally sensitive land along Montour Run and its tributaries and along the Montour Trail. Protection of the steep wooded slopes and vegetation of this corridor would have the most impact on maintaining and, with certain enhancements, improving water quality.

Adopt green space ordinances

Other important recommendations include modifying and updating zoning and other land use ordinances to encourage developers to use green space subdivision practices. Coordinated planning and zoning across municipal boundaries also will result in better land use.

Conservation easements are an effective means of establishing green spaces, with much of the land remaining in private ownership.

***Those who create jobs should
remember that the land is not an
inheritance from parents - but rather
on loan from children. Simply put, a
clean environment is good business.***

Governor Tom Ridge
1999 Inaugural Address
Tuesday, January 19, 1999
Harrisburg, PA

Development Capacity Plan

The consultants created maps compiling environmental land use and geological information. By analyzing these maps they were able to show where development impacts are greatest and where environmental resources need protecting. They then created a Development Capacity Plan that shows where development can occur without adversely affecting sensitive environmental resources and popular recreation areas.

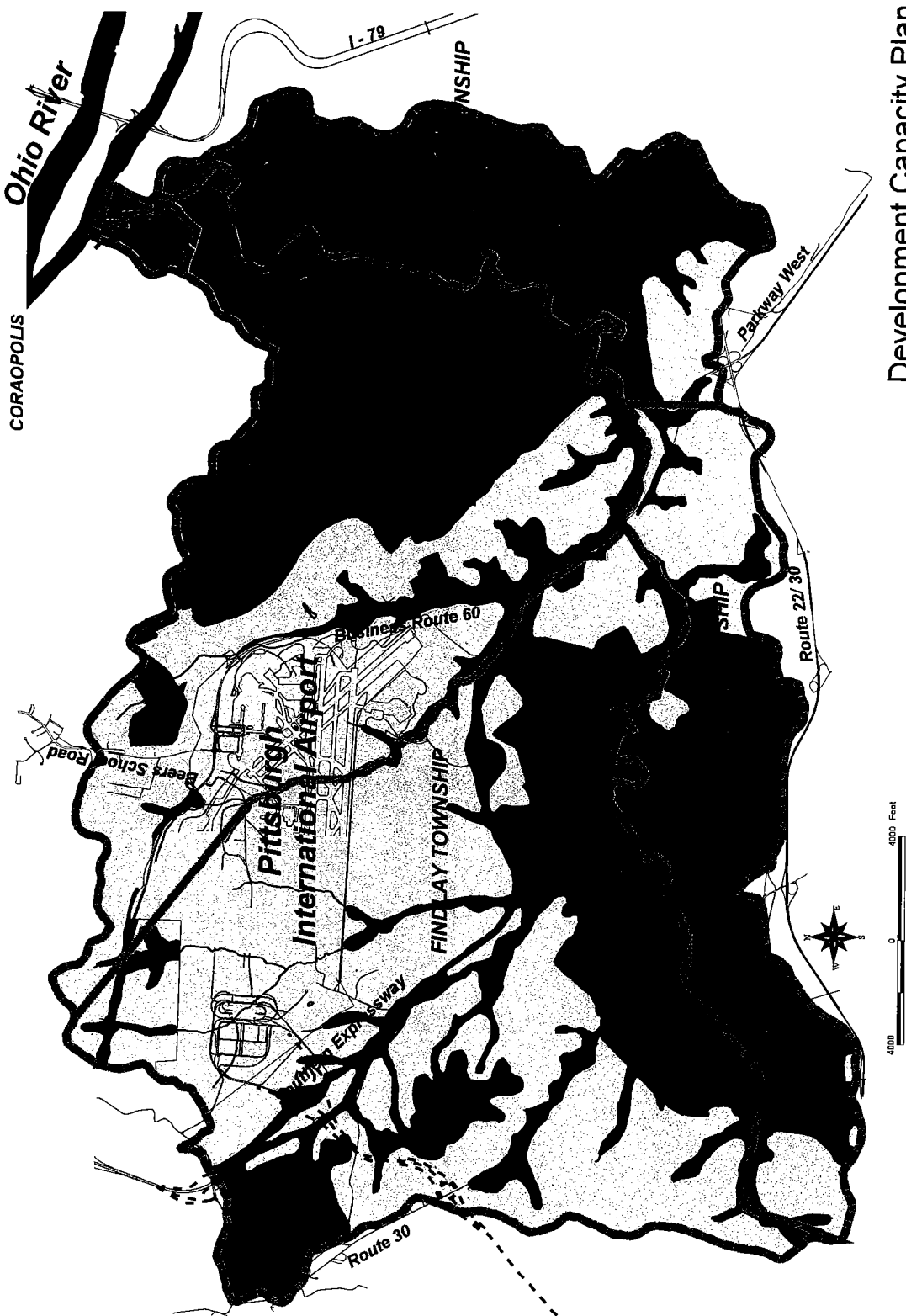
The Development Capacity Plan on the facing page takes into account both conservation of sensitive areas and the need for economic growth. Dark green areas are the most environmentally sensitive areas, such as steep slopes, water resources, and concentrations of Pittsburgh Red Beds. Lighter green areas can be developed without creating as much disturbance to water quality and other environmental resources in the Watershed.

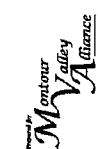



The Watershed has a unique mix of development, recreation, and natural areas. This mix can produce conflicting opinions about future land use. Local governments play a key role in resolving these conflicts.















The Ewing Interchange was built on Business Route 60 in 1998. It provides access to and encourages development of previously undeveloped land.





 Prepared by
 

-  Montour Run Watershed
-  Montour Trail
-  Possible Links to Montour Trail
-  Transportation
-  Future Findlay Connector Road
-  Streams
-  Borough and Townships
-  Pittsburgh International Airport
-  Riparian Conservation Corridor
-  Moderate Capacity Development Area
-  Higher Capacity Development Area
-  Ohio River



Development Capacity Plan River Conservation and Land Use Plan for the Montour Run Watershed Allegheny County, Pennsylvania

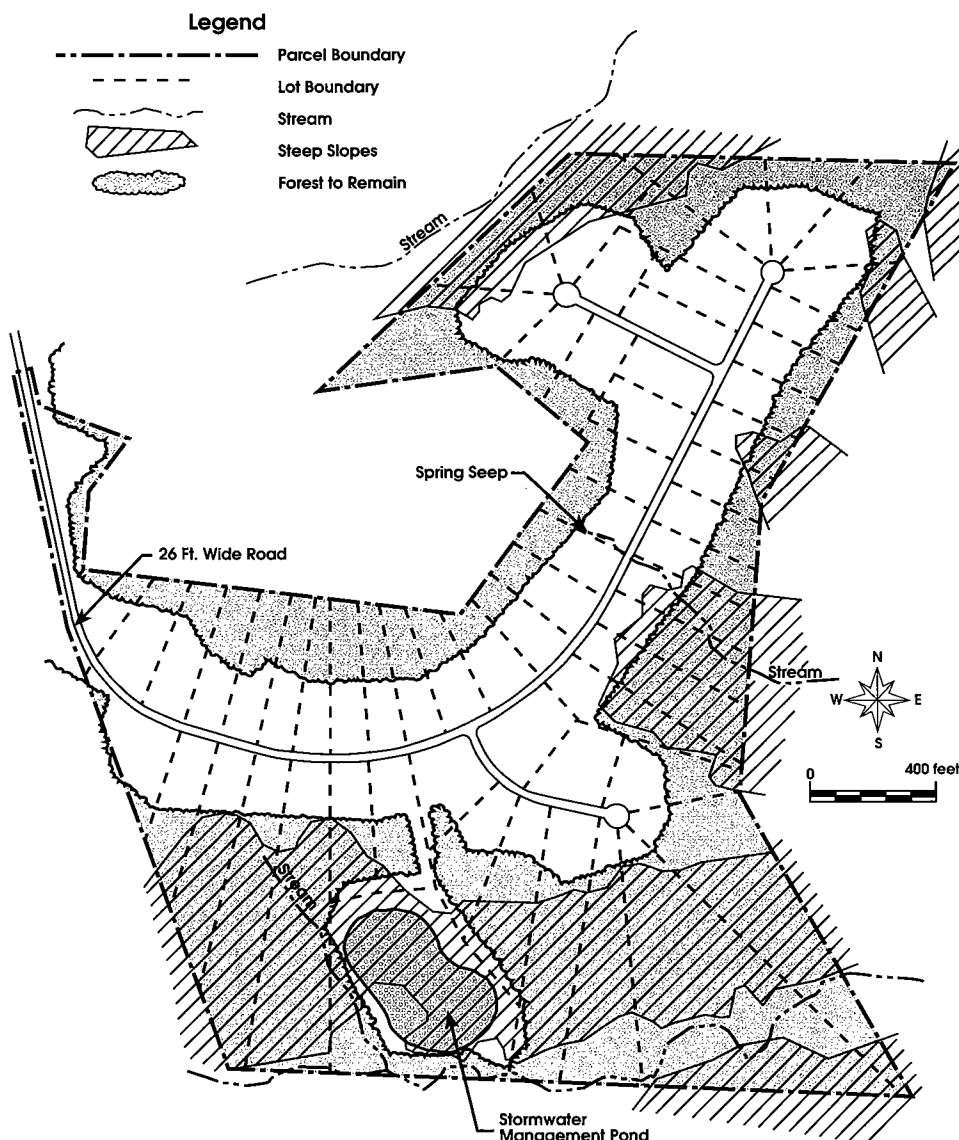
Planning and Zoning for Open Green Spaces

Municipalities in the Watershed can adopt zoning ordinances that result in developers' leaving large undisturbed green spaces. Zoning and subdivision tools that are available include –

- Performance zoning – facilitates flexibility in design for all uses.
- New village zoning – creates a walking environment, a human scale, and mixed-use communities.
- Transfer of development rights – provides an equitable way for land owners to profit while protecting important natural areas by transferring development rights from one property to another.
- Green space zoning – groups small lots and leaves large usable and attractive undisturbed lands around them.

Conventional Subdivision Plan

Conventional planning for subdivisions divides the entire parcel of land into private lots. This typical planning approach has a number of drawbacks for both the developer and the home owner. Development costs are likely to be higher, since more infrastructure is usually required in the form of roads, water mains, and sewer mains. More earthwork normally is required, resulting in extensive removal of forested areas and other sensitive vegetation areas.



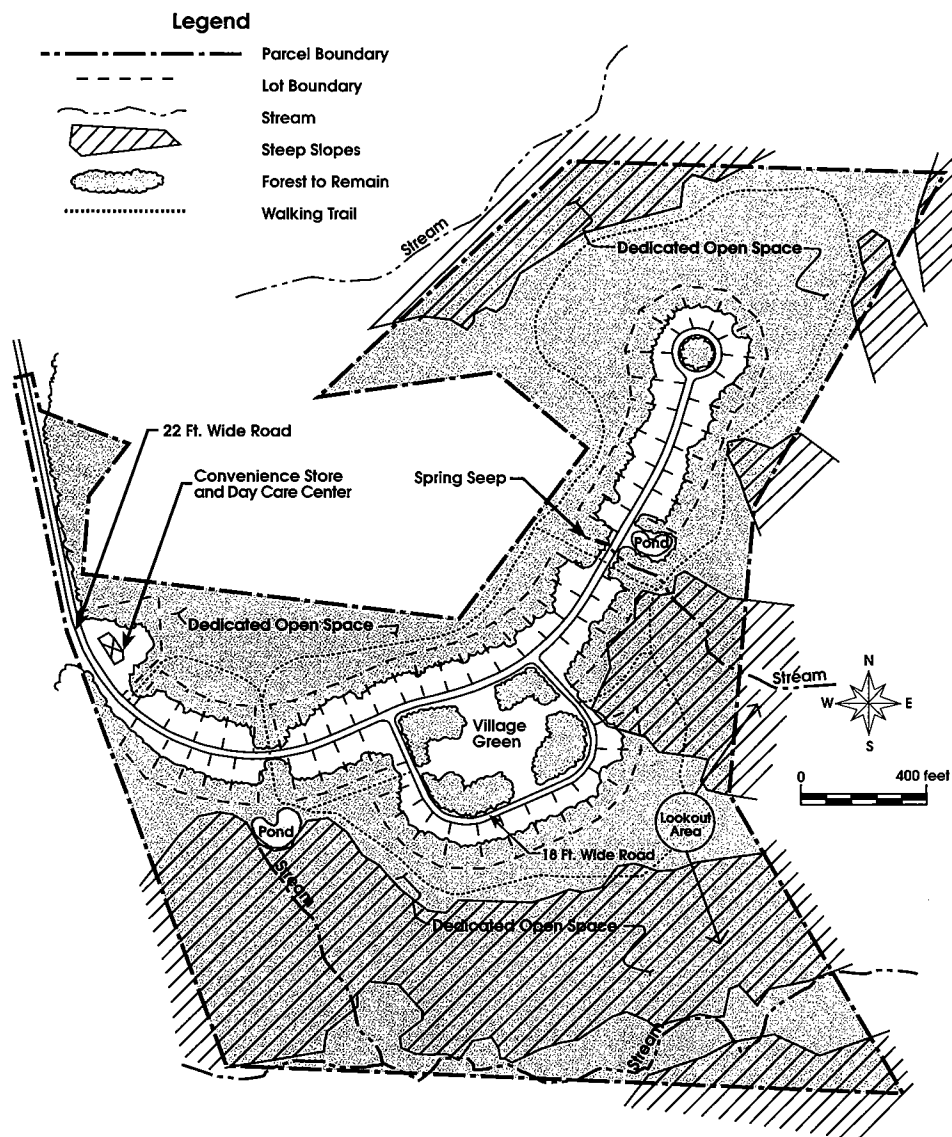
Sample Conventional Subdivision Plan: This plan, prepared for a specific parcel of land in Moon Township within the Watershed, follows the conventional approach and divides the entire parcel into private lots.

Green Space Subdivision Plan

Green space subdivision plans minimize the impact on important natural areas and create a sense of community by grouping neighborhoods together and giving them access to usable open green spaces. The preserved open spaces are considerably larger in this arrangement, which provides economic, social, and environmental benefits. Shorter and fewer roads and service lines are cheaper to build and cheaper to maintain. The homeowner exchanges control of a larger yard for access to a mini "estate" complete with woods, wildlife, and a variety of recreational spaces.

Current regulations, in some cases, allow uses that have unavoidable and significant adverse impacts on sensitive environmental resources and on recreational amenities.

Communities need to adopt zoning that provides the flexibility developers need to implement green space plans.



In this example green space subdivision planning techniques such as narrower lots and shorter roads without curbs and gutters cost the developer less in infrastructure, a savings of about \$320,000.

Infrastructure and earth work required	Quantity		Cost	
	Conventional plan	Green space plan	Conventional plan	Green space plan
Roads	5,400 l.f.*	5,290 l.f.	\$405,000	\$160,250 **
Sidewalks	10,800 l.f.	10,580 l.f.	\$102,600	\$100,510
Water main	5,400 l.f.	5,290 l.f.	\$99,900	\$97,865
Sanitary sewer main	5,400 l.f.	5,290 l.f.	\$145,800	\$142,830
Clearing and grubbing	56 acres	22 acres	\$112,000	\$44,000
Total cost			\$865,300	\$545,455

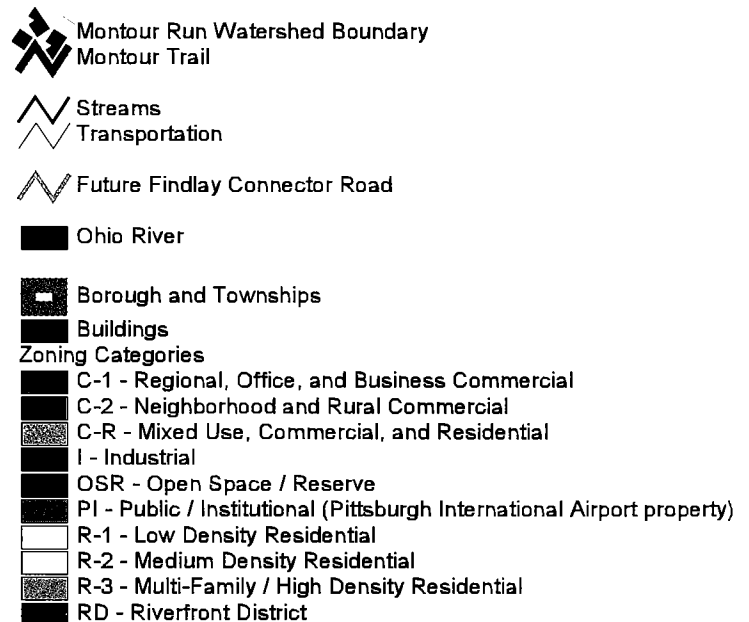
*l.f. = linear feet

** a large cost savings results from the elimination of curbs and gutters.

*Green Space Subdivision Plan:
The same parcel of land can be subdivided into the same number of private lots while leaving large green spaces undisturbed.*

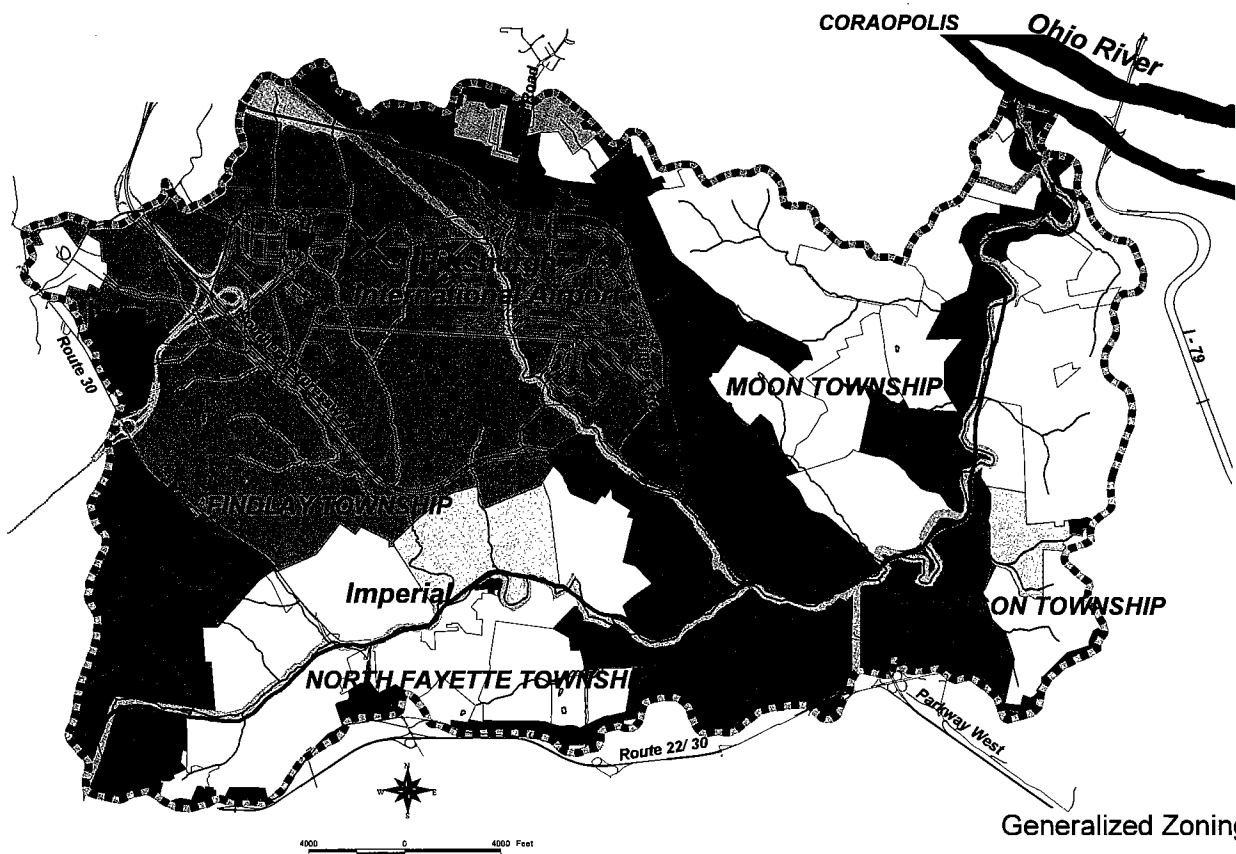
Coordinated Planning

All of the municipalities in the Watershed have some level of planning and zoning to control and direct growth. The level of environmental resource protection, however, varies among them. This can cause confusion among developers, particularly when a large development project crosses municipal boundaries. If more than one site is being considered, and the environmental protection regulations are more stringent in one municipality than another, pressure to waive those regulations may result.



Prepared for
Montour Valley Alliance

Prepared by
KCI TECHNOLOGIES



Generalized Zoning

River Conservation and Land Use Plan for the Montour Run Watershed
 Allegheny County, Pennsylvania

Implementation Strategies

Complete descriptions of these recommendations appear in the
" River Conservation and Land Use Plan for the Montour Run Watershed."

WATER RESOURCE CONSERVATION

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Formulate streambank protection plans considering the NCRC's Conservation Practice Standard for <u>Streambank and Shoreline Protection</u> and implement erosion control and streambank stabilization measures for specific sites identified; implement a public awareness program to publicize the economic, aesthetic, and flood protection benefits of streambank management.	Municipalities, U.S. Department of Agriculture Natural Resources Conservation Service, Allegheny County Conservation District, PA Fish and Boat Commission, PA Department of Environmental Protection, Cooperative Extension Service, U.S. Army Corps of Engineers, PA Cleanways; landowners, sportsmen's clubs, watershed associations, community and church groups, professional consultants	PA Department of Environmental Protection, PA Department of Conservation and Natural Resources, private foundations	Year 1-2
2) Establish an incorporated nonprofit watershed association to assist municipalities with implementing the Watershed Plan recommendations.	Montour Valley Alliance, municipalities, PA Department of Conservation and Natural Resources, landowners/developers, volunteers	Pennsylvania Department of Environmental Protection	Year 1-2
3) Enforce and enhance wetland preservation, restoration, and creation programs; encourage developers to incorporate wetland protection and enhancement measures into their planning process; and publicize the economic, aesthetic, and water quality benefits of wetlands enhancement.	Municipalities' planning commissions and zoning hearing boards, community and church groups, schools, PA Department of Environmental Protection, U.S. Department of Agriculture Natural Resources Conservation Service, schools, professional consultants	PA Department of Environmental Protection, PA Department of Conservation and Natural Resources, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, private foundations	On going
4) Determine floodplain and special flood hazard areas within the Watershed; enforce development regulations to protect floodplains.	Municipalities, Allegheny County Conservation District, Federal Emergency Management Agency, National Flood Insurance Program, U.S. Army Corps of Engineers, landowners	No additional costs	On going
5) Prioritize and remediate abandoned mine drainage sites identified in the U.S. Army Corps of Engineers' report, <u>Water Quality and Aquatic Life Resources</u> .	PA Department of Environmental Protection Bureau of Abandoned Mine Reclamation, U.S. Army Corps of Engineers, Allegheny County Department of Aviation, municipalities, landowners, watershed associations, conservation organizations	Statewide Nonpoint Source Pollution Program, Federal Clean Water Act (Section 319), Rural Abandoned Mine Program (RAMP), and the Landowner Reclamation Program (LRP) through the Western PA Coalition for Abandoned Mine Reclamation (WPCAMR); PA Department of Environmental Protection Bureau of Abandoned Mine Reclamation; U.S. Army Corps of Engineers, local corporations	On going
6) Document stream bedload accumulations of the glycols, urea and constituent products found in deicing fluids, and the impacts of the glycols and urea on the substrate and organisms of the receiving streams draining the Airport.	Allegheny County Department of Aviation, PA Department of Environmental Protection, U.S. Army Corps of Engineers	Allegheny County Department of Aviation, PA Department of Environmental Protection	Year 2-3
7) Continue investigations for identifying suitable airfield deicing substitutes to reduce or eliminate the use of toxic materials at the Airport.	Allegheny County Department of Aviation, PA Department of Environmental Protection	Allegheny County Department of Aviation, PA Department of Environmental Protection	On going
8) Continue refining and improving collection procedures for spent aircraft deicing fluids at the Airport.	Allegheny County Department of Aviation, PA Department of Environmental Protection	Allegheny County Department of Aviation, PA Department of Environmental Protection	On going
9) Continue monitoring the effectiveness of the deicing fluid collection systems at the Airport and analyze the impact of materials on the receiving streams that are not collected.	Allegheny County Department of Aviation, PA Department of Environmental Protection, U.S. Army Corps of Engineers	Allegheny County Department of Aviation, PA Department of Environmental Protection, U.S. Army Corps of Engineers	On going
10) Deicing Plans for the Airport should be updated annually based in part on knowledge gained during previous deicing seasons.	Allegheny County Department of Aviation, PA Department of Environmental Protection	Allegheny County Department of Aviation, PA Department of Environmental Protection	Year 1-2

WATER RESOURCE CONSERVATION (continued)

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
11) Develop a coordinated water quality monitoring program for the Montour Run Watershed.	PA Department of Environmental Protection, Citizens Volunteer Monitoring Program, Alliance for Aquatic Resource Monitoring, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Geological Survey, PA Fish and Boat Commission, PA Cleanways, watershed associations, schools	PA Department of Environmental Protection Bureau of Watershed Restoration and Bureau of Watershed Conservation	On going
12) Review effectiveness of Montour Run Stormwater Management Plan and determine applicability of <u>Best Management Practices for Developing Areas</u> .	Municipalities, Allegheny County Department of Economic Development Planning Division, Allegheny County Conservation District, PA Department of Environmental Protection	PA Department of Environmental Protection, Allegheny County Department of Economic Development Planning Division, private foundations.	Year 1-2
13) Encourage and support volunteer trash removal program to ensure continued maintenance along the stream corridor.	PA Department of Environmental Protection, PA Cleanways, conservation groups, sportsmen's clubs, businesses, community and church groups, youth groups, trash hauling companies	Municipalities, PA Department of Environmental Protection, community groups, volunteers	On going
14) Enhance and enforce existing land use ordinances that are intended to protect Watershed resources.	Municipalities, Allegheny County Department of Economic Development Planning Division, watershed association	PA Department of Community and Economic Development Small Communities Planning Assistance Program and PA Planning Assistance Grant Program	On going
15) Dredge the sand bar/delta at the mouth of Montour Run on the Ohio River side of the CSX culvert in order to encourage better movement of fish into the stream and to alleviate downstream siltation problems at locks and dams in the Ohio River.	U.S. Army Corps of Engineers, Moon Township Municipal Authority	U.S. Army Corps of Engineers	Year 4-5
16) Conduct a series of stream flow gauge measurements to monitor normal and flood periods.	U.S. Geological Survey, U.S. Army Corps of Engineers, schools, watershed association	U.S. Geological Survey, U.S. Army Corps of Engineers	Year 3-4

BIOLOGICAL RESOURCE CONSERVATION

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Encourage private land owners and developers to establish conservation easements; acquire properties that provide the conservation of open space, sensitive resource areas, wildlife habitats, wetlands, and riparian forest buffers.	Municipalities, Allegheny County Department of Parks, conservation organizations, landowners, PA Department of Conservation and Natural Resources, U.S. Department of Agriculture Natural Resources Conservation Service, community and church groups	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	On going
2) Establish, enhance, and maintain conservation areas to minimize further deforestation and urbanization of sensitive vegetative resources.	PA Department of Conservation and Natural Resources, U.S. Department of Agriculture Natural Resources Conservation Service, landowners/developers, corporations, municipalities, community and church groups, schools, conservation organizations	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	On going
3) Establish, enhance, and maintain habitat preservation areas to sustain and augment terrestrial wildlife populations.	PA Department of Conservation and Natural Resources, PA Game Commission, Western PA Conservancy, wildlife Habitat Council, landowners/developers, corporations, municipalities, sportsmen's clubs, garden clubs, community and church groups, schools, conservation organizations	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	On going

BIOLOGICAL RESOURCE CONSERVATION (continued)

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
4) Maintain riparian forest buffers and upgrade to 3-zone management system where possible.	U.S. Department of Agriculture, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Fish and Wildlife Service, PA Department of Conservation and Natural Resources, conservation groups, municipalities, schools, landowners/developers, community and church groups	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	Year 2-3
5) Protect and enhance sensitive biological areas, particularly those identified in the Allegheny County Natural Heritage Inventory, through acquisition, easements, and other mechanisms.	PA Department of Conservation and Natural Resources, U.S. Department of Agriculture Natural Resources Conservation Service, municipalities, landowners/developers, community and church groups, conservation organizations	PA Department of Environmental Protection, PA Department of Conservation and Natural Resources, Allegheny County Department of Economic Development Planning Division, municipalities, private foundations	On going
6) Identify rare, threatened, and endangered plant and animal species in the Watershed.	PA Department of Environmental Protection, PA Fish and Boat Commission, PA Game Commission, U.S. Fish and Wildlife Service, Western PA Conservancy, Allegheny County Department of Economic Development Planning Division, The Carnegie Museum, the National Aviary, municipalities, watershed associations, environmental advisory councils	No additional costs - donated expertise	On going
7) Initiate an aquatic habitat improvement and species reintroduction program, including the placement of rootwads where appropriate, with first priority to Meeks Run and Trout Run.	PA Department of Conservation and Natural Resources, PA Fish and Boat Commission, U.S. Army Corps of Engineers, sportsmen's clubs, conservation organizations, schools, watershed associations	PA Fish and Boat Commission, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, sport fishing organizations	Year 3-4
8) Pursue formal establishment of the Montour Greenway.	PA Environmental Council, watershed associations, conservation organizations, municipalities	PADCNR, private foundations	Year 5
9) Establish an environmental advisory council for each municipality.	Municipalities, Pennsylvania Environmental Council	No additional costs	Year 1-2

CULTURAL, RECREATIONAL, AND EDUCATIONAL RESOURCE CONSERVATION

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Identify and preserve existing local historic structures and archaeological sites; seek listing on the National Register of Historic Places.	Historical organizations, professional historians and archaeologists, schools, PA Historical Museum Commission, landowners/developers	Pittsburgh History and Landmarks Foundation, private foundations	Year 3-4
2) Wherever possible, link local historic structures and archaeological sites with the Montour Trail and local recreational activities in order to promote cultural heritage.	Historical organizations, professional historians and archaeologists, schools, PA Historical Museum Commission, Island Sports Complex	Pittsburgh History and Landmarks Foundation, private foundations, landowners/developers	Year 5
3) Municipalities should strengthen their comprehensive plans, zoning ordinances, and subdivision regulations where needed to encourage both cultural resources heritage preservation and economic growth.	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Historical and Museum Commission, professional architects/historians/archaeologists	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	Year 3-4
4) Support the efforts by the local school districts to incorporate Watershed resources into the academic curriculum as an outdoor classroom and encourage the involvement of colleges and universities.	School districts, municipalities, parent/teacher associations, conservation organizations, historical organizations, Allegheny Intermediate Unit, colleges and universities	School districts, businesses/corporations, conservation organizations, private foundations	On going

LAND RESOURCE CONSERVATION

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Enforce protective ordinances in landslide-prone areas.	Municipalities' Planning Commissions and Zoning Hearing Boards	No additional costs	On going
2) Revise ordinances to incorporate the PA Department of Environmental Protection's <u>Best Management Practices for Developing Areas</u> .	Municipalities, Allegheny County Department of Economic Development Planning Division	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	Year 5
3) Develop a Mined Land Overlay District.	Municipalities, PA Department of Environmental Protection Bureau of Mine Reclamation	PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	Year 3-4
4) Encourage continuing resource stewardship of the BFI Landfill.	Pennsylvania Department of Environmental Protection, BFI	No additional cost	On going

LAND USE/LAND COVER PATTERNS

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Establish a Riparian Conservation Overlay District to protect a defined Riparian Conservation Corridor.	Municipalities, landowners/developers, U.S. Department of Agriculture Natural Resources Conservation Service, Pennsylvania Environmental Council	PA Department of Conservation and Natural Resources, PA Department of Community and Economic Development, U.S. Department of Agriculture Natural Resources Conservation Service	Year 2-3
2) Update comprehensive plans, zoning maps, and ordinances to recognize and protect sensitive resources.	Municipalities	Pa Department of Community and Economic Development	Year 4

PLANNING AND ZONING

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Develop a regional approach to build a uniform method of protection for the sensitive environmental resources and popular recreational amenities located within the Watershed's Riparian Conservation Corridor.	Municipalities, Council of Government, PA Department of Community and Economic Development, Allegheny County Council	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	Year 1-2
2) Create a Riparian Conservation Corridor during the next cycle of updates to comprehensive plans and zoning maps/ ordinances.	Municipalities, U.S. Department of Agriculture Natural Resources Conservation Service	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	Year 4
3) Adopt a special code of voluntary or mandatory development practices for the Riparian Conservation Corridor, embodied in a Riparian Conservation Overlay District Ordinance.	Municipalities, Pennsylvania Environmental Council	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of community and Economic Development Small Communities, Planning Assistance Program, State Planning Assistance Grant Program	Year 1-2

PLANNING AND ZONING (continued)

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
4) Continue to identify natural resources and properties that should be preserved for the benefit of the community through acquisition and other mechanisms.	Municipalities, conservation organizations	PA Department of Conservation and Natural Resources, private foundations, municipal funds earmarked for land acquisition	On going
5.) Encourage green space subdivision planning for future developments.	Municipalities' Planning Commissions and Zoning Hearing Boards, developers	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	Year 4
6) Apply information gathered for Watershed study when future zoning changes are considered.	Municipalities' Planning Commissions	No additional costs	On going

EXISTING AND POTENTIAL ECONOMIC IMPACTS OF TOURISM AND RECREATION

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
1) Educate the public of the importance of Watershed resources through school programs and public relations campaigns.	Environmental advisory councils, municipalities, watershed associations, schools, Montour Valley Alliance, real estate agencies, travel agencies, Pittsburgh Airport Area Chamber of Commerce, news media, community and church groups, appropriate financial institutions Environmental City Network	Municipalities, businesses/corporations, community organizations, private foundations, Local Government Academy	Year 1-2
2) Raise awareness of the economic value of conservation, open space, and green space.	Environmental advisory councils, conservation organizations, Montour Valley Alliance, Pittsburgh Airport Area Chamber of Commerce Environmental City Network	Private foundations, PA Department of Community and Economic Development	Year 1-2
3) Quantify the economic and other impacts of outdoor recreation on local communities.	PA Department of Community and Economic Development, sportsmen's clubs, Montour Trail Council, college/university Departments of Economics, Economy League	PA Department of Community and Economic Development, businesses/corporations	Year 4
4) Protect, maintain, and enhance the Montour Trail; complete the Trail to Coraopolis; develop spur trails such as the Panhandle Trail; and where possible without compromising resource values, construct additional links from the main Trail to public parks, existing residential neighborhoods, businesses, and transportation facilities.	Montour Trail Council, municipalities, Steel Industry Heritage Corporation, Coraopolis Economic Revitalization Corporation	PA Community Development Block Grant, PA Department of Community and Economic Development, municipalities, private foundations, TEA-21	On going
5) Promote bike racks on buses and secure bike racks at critical locations.	Pittsburgh Port Authority, Airport Corridor Transportation Association, businesses/corporations, Montour Trail Council	Business/corporations, Pittsburgh Port Authority	Year 1-2
6) Enlist experts from local colleges and universities to develop marketing strategies focused on the Montour Trail and other resources of the Montour Run Watershed.	Municipalities, Pittsburgh Convention and Visitors Bureau, Airport Corridor Transportation Association, Chamber of Commerce, Allegheny Trail Alliance	Private foundations, Chambers of Commerce, municipalities	Year 1-2
7) Establish bird observation areas along the Trail, with tour books and maps.	Municipalities' parks and recreation boards, Pittsburgh Airport Area Chamber of Commerce, businesses/corporations, conservation organizations, National Aviary	Businesses/corporations, municipalities' recreation budgets	Year 2-3
8) Assist the Coraopolis Sportsmen's Association and Forest Grove Sportsmen's Club in promotion of their activities.	Travel agencies, real estate agencies, businesses/corporations, Pittsburgh Airport Area Chamber of Commerce	Coraopolis Sportsmen's Association and Forest Grove Sportsmen's Club	On going

EXISTING AND POTENTIAL ECONOMIC IMPACTS OF TOURISM AND RECREATION (continued)

Implementation Strategies	Potential Partnerships and/or Responsible Parties	Potential Funding Sources	Projected Implementation Year
9) Create tourist information centers at primary access points to the Montour Trail.	Pittsburgh Airport Area Chamber of Commerce, community and church groups, Montour Trail Council, sportsmen's clubs, conservation organizations	Businesses/corporations	Year 2-3
10) Offer resolutions and letters of support to granting authorities in support of efforts to increase protected open space.	Municipalities, businesses/corporations, real estate agencies, health organizations, user groups, schools	No additional costs	On going
11) Identify desirable parcels for open space protection.	Conservation organizations, municipal parks and recreation boards, environmental advisory councils, schools	No additional costs	On going
12) Purchase land for open space.	Municipalities, conservation organizations, community groups	PA Department of Conservation and Natural Resources, municipal funds earmarked for land acquisition, private foundations	On going
13) Enforce existing land use policies more stringently.	Allegheny County Conservation District, municipality planning commissions and zoning hearing boards	No additional costs	On going
14) Adopt new policies and standards where needed to preserve habitat for wildlife.	Municipalities	No additional costs	Year 5
15) Use tools such as conservation easements to protect undeveloped environmentally sensitive land.	Municipalities, conservation organizations, landowners/developers	No additional costs	On going
16) Adopt resolutions to support recommendations from the Governor's 21 st Century Environment Commission and other efforts to encourage sustainable development practices.	PA State Legislature, Allegheny County Executive, municipalities, economic development organizations, Montour Valley Alliance, conservation organizations	No additional costs	Year 1-2
17) Promote the development of the Rivers, Rails, and Trails project through the Coraopolis Economic Revitalization Corporation and the Steel Industry Heritage Corporation.	Municipalities, Rails-to-Trails Conservancy, Montour Trail Council, Allegheny Trail Alliance, Horticultural Society of Western PA, watershed associations, Pittsburgh Convention and Visitors Bureau, Airport Corridor Transportation Association, Pittsburgh Airport Area Chamber of Commerce, historical organizations	PA Department of Community and Economic Development, Coraopolis, private foundations	Year 1-2
18) Expand transportation links between Watershed resources and Pittsburgh, the Pittsburgh International Airport, and other area attractions; distribute information on transportation routes.	Pittsburgh Area Transit, Pittsburgh International Airport, Pittsburgh Airport Area Chamber of Commerce, Airport Corridor Transportation Association, municipalities	PA Department of Transportation, U.S. Department of Transportation, businesses/corporations, private foundations	Year 2-3
19) Apply to have important historical properties listed on the National Register of Historic Places.	Property owners, historical societies, municipalities, residents	No associated cost	Year 3-4
20) Establish "micro loans" as a form of economic development incentive related to tourism and recreation in the Watershed.	Financial institutions, municipalities, economic development agencies, human services agencies	Financial institutions, banks, grants from private foundations and economic development agencies	Year 3-4

With Appreciation

The Hon. Thomas J. Ridge, Governor,
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Officials and staff of the Borough of Coraopolis, Findlay Township,
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Members of the Montour Run Watershed Planning Project Advisory
Council

The many unnamed volunteers, without whose participation and
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More Information

Complete descriptions of the survey, the inventory, and the
recommendations are in the report called "River Conservation and
Land Use Plan for the Montour Run Watershed." This report can
be reviewed by contacting -

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I. Introduction

A. Project Background

The development of this "Rivers Conservation and Land Use Plan" (Plan) for the Montour Run Watershed is an initiative of the Montour Valley Alliance (MVA). The MVA is a coalition of community-based organizations including the Coraopolis Economic Revitalization Corporation, the West Allegheny Chapter of Ducks Unlimited, the Forest Grove Sportsmen's Club, the Hollow Oak Land Trust, the Montour Trail Council, and the Penn's Woods West Chapter of Trout Unlimited that has an interest in the stewardship of the Montour Run Watershed's natural areas. This project is in response to observation of water quality, terrestrial, and quality of life degradation in the Watershed. Development of the Plan was the first effort of its kind to address these issues in a comprehensive manner and spanned more than 2 years.

Pursuit of state funding for the Plan by the MVA was endorsed by municipal resolutions from Findlay, Moon, North Fayette, and Robinson Townships, the Borough of Coraopolis, and the Robinson Township Planning Commission. Letters of support for the goals of the Alliance have been received from the Allegheny Cycling Association, Ambridge Bike and Sports Center, the Commonwealth Business Exchange, Horticultural Society of Western Pennsylvania, Imperial Community Development Corporation, Izaak Walton League of America (Pennsylvania Division), League of Women Voters of Greater Pittsburgh, Turtle Creek Watershed Association, and David E. Williams Middle School Parent-Teachers Association.

The intent of this initiative is to develop a plan that includes an inventory of the Watershed's natural and cultural resources, determine methods that public and private entities can undertake to sustain the integrity of resources, determine the contribution that these resources have on the local and regional economy, and finally determine the public's awareness and attitude towards conservation in the Watershed.

In order to ensure that the study would truly meet community needs, the MVA formed a volunteer Advisory Council consisting of community leaders, municipal officials, business owners, agency representatives, and landowners. Advisory Council members reviewed the work of the consultant, recommended changes, and helped to publicize the Project within their own organizations and communities. There are 42 members of the Council, as well as four MVA representatives who serve as the Project Management Committee, one resource person, and a project manager. A complete list of the Advisory Council members appears in **Appendix A**.

The Plan was funded by the Pennsylvania Department of Conservation and Natural Resources (PADCNR) Rivers Conservation Program and The Pittsburgh Foundation Peaceable Kingdom Fund. Geographical Information Systems data was donated by The Allegheny County Department of Health, the Allegheny County Department of Computer Services, and the Southwest Pennsylvania Regional Planning Commission (SPRPC). Other in-kind services have been provided by the Pennsylvania Department of Environmental Protection; the U.S. Army Corps of

Engineers; the Townships of Findlay, Moon, North Fayette, and Robinson; and the Borough of Coraopolis. Hundreds of volunteer hours were contributed by members of the Project Management Committee and other MVA members.

The Montour Valley Alliance wishes to thank everyone who contributed their time to attend public meetings, participate on the Advisory Council, review and comment on drafts and to those organizations who donated data, materials, and expertise to enrich this effort.

A consultant team led by KCI Technologies, Inc. prepared the Plan. Mizerak Towers and Associates, Inc. assisted with facilitation, data collection, analysis and evaluation of resource data, and communication services; McCormick Taylor and Associates provided logistical assistance; and Campos Market Research conducted the public opinion survey.

B. Project Area/Unique Features

The 37-square-mile Montour Run Watershed (hereafter referred to as the Watershed) includes portions of five municipalities: Findlay, Moon, North Fayette, and Robinson Townships and the Borough of Coraopolis (**Figure 1 - Project Area**). A watershed is an area within which all water running downhill flows into a common stream or lake. Within the Watershed exists a concentration of diverse natural, recreational, and cultural resources. Features such as an international airport, a rail-trail corridor that will connect the area with Washington, D.C., regionally significant biological diversity, abandoned coal mines, and extensive commercial and residential development -- all combined to create a unique microcosm of development issues and an uncommon mix of land uses.

Recent rapid economic growth has resulted in extensive deforestation, impairment of water quality, destruction of historic sites, and other degradation of the area's sensitive resources. Leaders and citizens are challenged to balance large-scale development with conservation to maintain an attractive quality of life for residents and businesses.

Measures must be taken to reach a consensus balancing varied development and conservation interests in the Watershed. An objective of this Plan is to promote that consensus through creation of a Watershed-based plan for land use and river conservation.

C. Project Purpose

1. Goals

The following goals were established at the onset of the project:

- Examine the economic and quality-of-life benefits of protecting and enhancing the Watershed's many natural, recreational, educational, historic, environmental and cultural resources.

- Raise public awareness of these resources and their vulnerability.
- Identify activities that have a negative impact on the resources and provide recommendations and solutions to reduce negative impacts.
- Determine public attitudes about development trends and land conservation.
- Produce a River Conservation and Land Use Plan that will enable Montour Run to be included on the Pennsylvania Rivers Conservation Registry, thereby making it eligible for future funding for enhancements and remedial measures.
- Produce recommendations for future actions that would promote improved water quality in the Watershed.
- Recommend actions to permanently protect sensitive natural resources and popular recreational amenities.

2. Benefits

The following benefits will accrue to the community if the above stated goals are accomplished:

- Improved quality of life for residents and businesses.
- Stabilization of neighborhoods so that residents want to remain.
- Increased public awareness of the Watershed's natural and cultural resources and associated value to the community.
- Reduced flooding and flood-related costs.
- Cleaner water through eliminating or mitigating pollution sources.
- Sustained economic vitality for the region.
- Improved and protected wildlife habitat.
- Recognition of the Montour Run Watershed as a regional economic and recreational resource.

D. Public Process

In addition to having an Advisory Council to review and comment on the Plan as it was developed, every effort was made to obtain information and suggestions from residents of the Watershed communities.

1. Results from Public Meetings

A series of public meetings was held during the project to solicit public information, comments, and guidance. Residents of Findlay, Moon, North Fayette, and Robinson Townships as well as the Borough of Coraopolis attended the public meetings.

a. Public Meeting #1: February 18, 1998

The attendees participated in a visioning process that asked four questions:

- What do you like about the physical character of your community?
- What do you dislike?
- What would you like your community to look like in the year 2008?
- What is your "worst nightmare" of what your community will look like in 2008?

Through a facilitated process of answering the above questions, a number of key findings emerged:

- Residents greatly value open space, outdoor recreational opportunities, and the community atmosphere found in villages such as Sewickley, Imperial, and boroughs like Coraopolis.
- Community members are very concerned about development projects that are occurring without apparent consideration for the impacts on their communities.
- Residents are concerned about the lack of proactive municipal efforts to conserve land.
- Residents want balanced, mixed-use communities, "watershed-friendly" zoning, a multi-municipal master plan for development that includes higher standards for development, and more emphasis on outdoor recreational opportunities.
- Residents don't want to see uncontrolled development and the continuation of sprawl, and they don't want to see an expressway through the Montour Run Valley.
- There is strong interest in the future of tourism opportunities in the Watershed to bolster the local economy.

b. Public Meeting #2 - September 28, 1998

Attendees were asked to review problems faced by the Watershed and solutions proposed by the consultants and reviewed by the Advisory Council. These problems/solutions fell into the following categories: water resources; biological resources; land resources/constraints; cultural, recreational, and educational resources; and existing and potential economic impacts of tourism and recreation. Everyone was given the opportunity to add to the problems and solutions or modify them. Several problems and solutions were added and have been incorporated into the report. A complete list of the issues addressed appears in **Appendix B**.

At the conclusion of this portion of the meeting, attendees were asked to vote for the problem and/or solution in each category that they felt was the most important to them. The results are identified in **Appendix B**. The voting indicated areas where greater public education and awareness may be necessary. For instance, a number of people indicated concern for run-off from Pittsburgh International Airport deicing fluids. While this is clearly a problem, it is one that already is being addressed by Pennsylvania Department of Environmental Protection (PADEP) and the Pittsburgh International Airport (PIA).

c. Public Meeting #3 - December 3, 1998

At Public Meeting #3 the consulting team presented the draft Plan with particular emphasis on the recommendation for creation of the Riparian Conservation Corridor, the Land Use Intensity Plan (Figure 9), and a proposal for developing a regional approach to protecting and enhancing the Watershed. The public also was introduced to the matrix of implementation strategies that accompanies the Plan and was encouraged to review the entire document during the comment period, which covered December 3, 1998, to 5 p.m. on January 8, 1999. The Plan was made readily available at local libraries and municipal offices for that review.

d. Public Meeting #4 - Transcript not available at time of publication of this report. Contact MVA for a copy of the transcript.

2. Campos Market Research Survey

To acquire public comments and help guide the goals of the project, Campos Market Research, a nationally recognized market research firm based in Pittsburgh, conducted a survey to gauge opinion on relevant issues in the five municipalities comprising the Watershed. Campos interviewed 300 residents in the Watershed municipalities by telephone between March 20, 1998, and April 24, 1998. An Executive Summary of the public opinion survey appears in **Appendix C**. Key findings included:

- Only 43% of the total sample were aware of the meaning of the term "watershed." 45% were aware of one or more negative impacts that occur when a watershed becomes degraded. Among those aware of negative impacts, 63% cited contamination, 32% mentioned erosion, 30% flooding, and 28% endangered species.

- When respondents were asked unaided what they thought were the most significant land use issues facing residents of the Montour Run Watershed, over one-half were unable to provide a specific response (46% did not know, and 10% indicated none). Among those who did answer, development (28%) and environmental (15%) issues were the most frequently mentioned.

- Respondents were asked to rate their level of support for nine land use activities impacting the Watershed using a 5-point scale, where 5 = support completely, and 1 = do not support at all. Support for all nine of the following land use activities was strong, as evidenced by the fact that eight of the nine items received a mean rating of 4.0 or higher. Respondents supported the protection and conservation of natural resources more than increasing outdoor recreational activities. The nine activities and their ratings are:

- Improving water quality and stopping pollution of the stream	4.77
- Preserving Montour Trail & natural areas around it	4.65
- Protecting the stream's fish & aquatic life	4.63
- Protecting the land around Montour Run from flooding & erosion	4.60
- Preserving natural areas & open space in the Airport Area	4.31
- Protecting & preserving historic sites in the Watershed	4.27
- Avoiding disturbance of steep slopes & ravines in the Watershed	4.15
- Avoiding construction very near to the stream	4.04
- Increasing outdoor, recreational opportunities in the Watershed, including sportsmen's facilities	3.96

- 61% of the respondents had visited the Watershed in the year preceding the study for some kind of recreational activity. 77% of those who visited the Watershed for recreation were most likely to do so for hiking/walking or biking (46%). 12% went fishing in the Watershed, while 80% went jogging/running, and 2% were hunters.

- Those who indicated participation in one or more recreational activities were asked how much they would pay per visit to perform each mentioned activity in the Watershed. Biking, jogging/running, and hiking/walking were assigned a monetary price with the greatest frequency; approximately one-half of all those participating in each activity were willing to pay something to perform it in the Watershed. 38% of those who visited the Watershed for picnicking/family day were willing to pay for that activity, while 28% of the fishermen were willing to pay. Approximately one-third of the respondents for any given activity did not know what price to assign to the activity.

- 40% of all respondents felt that there was the right amount of development in the Watershed area, while 28% felt that there was too much development. Only 12% indicated that there was not enough development, while 20% did not know.
- Only one-third of all respondents indicated that their municipality was doing enough to plan for the right balance of development and conservation.
- 75% of respondents who felt that their municipality was not doing enough indicated that conservation needed to be emphasized more than development (15%).
- Nearly three-quarters of all respondents agreed that local and county governments should buy land to protect it from development and preserve it for future generations.
- When asked to identify the ideal mix of development and conservation for the Watershed area, 58% of respondents chose a balance between development and preservation; 22% chose less development and more preservation; and 10% selected complete preservation. Statements supporting more development in the Montour Run Watershed were preferred by 5% or fewer of total respondents.
- Those surveyed had lived in their municipality for an average of 23 years. As such, they represent the foundation of their communities.

Conclusions and Recommendations for the Campos Research survey:

Less than one-half of all respondents indicated awareness of the term "watershed." (The correctness of each aware respondent's definition, however, was not determined.)

Only 45% of all respondents were aware of the negative impacts that occur when a watershed becomes degraded. These awareness levels could be considered positive news for the Montour Valley Alliance, considering that the term is a technical one not frequently used by the lay public. However, nearly one-half lack awareness, and over one-half could not articulate a single land-use issue facing the Montour Valley area. These findings suggest that a conservation/environmental/education program is needed.

Although a near majority lack a meaningful understanding of watershed issues, an overwhelming majority support the conservation and preservation of natural resources in the Montour Valley area: eight of the nine attribute statements, for example, received support ratings of 4.0 or higher on a 5.0 scale. Further support comes from the fact that a substantial majority utilize the Watershed for recreational purposes, including walking, jogging, hiking, and biking, and use it often. Very few, however, indicated participation in an environmental education program in the Watershed in the year preceding the study, confirming the need for more educational opportunities.

The overwhelming support for conservation and preservation of the Watershed should not be interpreted as anti-development. Respondents were most likely to express a desire for balanced conservation and development.

Only one-third, however, felt that their local municipalities were doing enough to plan for the right balance of conservation and development. A vast majority (72%) supported the idea of having local government purchase open spaces for preservation for future generations.

3. Previous Surveys Conducted By Others

A number of surveys have been conducted over the past several years relevant to the Montour Run Watershed. Their conclusions all support what surveys nationally have concluded: people are very concerned about diminished water quality, environmental degradation in general, and development without respect for the environment. Important summary findings from each include:

Moon Township Recreational Survey Results. Moon Township Parks & Recreation Board, 1993. The Board conducted a survey of residents' recreational interests to assist in planning future recreational programs and in establishing long range goals for the development or improvement of facilities. Two sets of questions were developed. One was designed to measure the interests of high school students in grades 9 through 12, and the second measured the interests of adult residents.

- The most popular activities chosen by adults were biking and hiking. Organized sports and cultural arts followed as the second and third choices.
- The most desired facilities chosen were trails and bike paths, followed by ball fields and an outdoor theater.
- 72.7% of adults indicated willingness to pay a user fee for programs and facilities.
- In comments, many adults requested bike trails to connect residential areas to the Post Office, shopping places, the Montour Trail, Moon Park, and Robin Hill Park.
- Adults expressed a strong interest in creating neighborhood parks.
- 57.4% of teens approved of financing programs through user fees. An interpreter of the study later found in discussions with teens that many had interpreted the question to mean that they would have to pay any time they used any park facility or even entered a park rather than only for special events or programs involving instruction. Had this confusion not occurred, teen approval of user fees might well have been closer to the adult level.

Urban Residents and Open Space: A Study of Urban Values by Timothy P. Kelly, 1996. The hypothesis tested is that urban residents will express an appreciation for the sections of a rail-trail corridor that are natural in character. In other words, the research is intended to determine the relative value urban residents place upon having greenspace close to their area of residence. The designated area for this study is the Montour Trail; the majority of the 134 adults interviewed were residents of Moon and Robinson Townships, and from the western Allegheny County area in general. A few were from nearby Beaver County and other parts of Allegheny County.

- 78% expressed a preference for those sections of the Trail that are more natural in character; 22% did not have a preference.
- 75% of those interviewed supported local business in conjunction with their visits to the Trail; 25% said they had not patronized any local businesses. The dominant choice for type of business patronized was restaurants.

Public Attitude Toward the Conservation of Wildlife Diversity and the Wild Resource Conservation Fund by Paulette Johnson, Associate Professor of Environmental Education and Resource Management, Slippery Rock University, for Pennsylvania's Wild Resources Conservation Fund, 1995. Questionnaires were sent to 3,500 randomly selected residents in Pennsylvania. A sampling of results follows.

Respondents were asked six wildlife-related project questions concerning wetlands protection, preservation of wildlife diversity, protection of threatened and endangered species, environmental education, research on endangered species, and research on non-game wildlife that is not rare or endangered.

- The public was supportive of all queried wildlife-related projects in this section. 89.2% supported endangered species protection, 81.8% supported environmental education in schools, and 81.0% supported wildlife diversity. Research on non-game wildlife species that are not rare or endangered received 52.1% support.
- The public is more supportive of non-game-related than game-related recreation, and it desires, almost equally, plentiful game and non-game wildlife species.
- The public most frequently participates in gardening (53.4%), feeding birds (48.7%), visiting a national or state park (32.5%), and hiking (31.8%). The public participates least in backpacking (2.9%) and hunting (10.6%). (Note: biking was not a choice in this section.)
- Approximately one-fifth of Pennsylvanians self-reported contributing to the Wild Resource Conservation Fund over the life of the Fund.

- All of the select current wildlife-related recreational activity participants contribute to the WRCF at a higher rate than that of the general public (20.3%). Backpackers have the highest contribution rate (52.0%), and bird feeders have the lowest (23.8%).
- The most common reasons for contributing to the Fund are because contributors support the concept of wildlife conservation (80.5%) and enjoy wildlife (75.5%).
- The three most common reasons for not contributing to the Fund are: 1) not being aware of the program (36.5%), 2) not qualifying for a tax refund (35.2%), and 3) not being able to afford to donate at this time (33.0%).
- The majority of 1994 licensed sportsmen (69%) are supportive of a small portion of their hunting or fishing license fee being used for non-game wildlife conservation.
- Of the 60.9% of currently licensed sportsmen who said that they were supportive of a portion of license fees being allocated toward non-game wildlife, 69.7% of hunters and 70.5% of anglers support a designation of five cents per dollar of license for non-game wildlife conservation, and there is no significant difference between the amount willing hunters and anglers will donate.
- Of the alternative funding choices listed on the survey, the strongest support was given to an additional \$2 charge on speeding fines (57.1%). This choice was the only one of the four listed that involves penalizing an individual for breaking the law (the other three being part of gasoline tax, increase in PA sales tax, and surcharge on real estate transfer tax).
- Of the choices offered, the public will most likely support a user fee on recreational vehicles (45.0%) and camping equipment (34.7%). The public is not willing to accept, at this time, a user fee on camera film (7.4%), bird seed (18.7%), or binoculars (18.9%).
- The public was supportive of all but one of the suggested current and possible future WRCF initiatives. Those receiving the most support are: 1) providing environmental education materials to schools, youth organizations, and the public (77.3%); 2) buying land to preserve rare or declining wildlife species (70.0%); and 3) reintroducing species that were once found in Pennsylvania but are no longer present (59.5%).

4. Other Means of Soliciting Input and Distributing Information

- Public meetings were advertised to the public on television by the Moon Access Channel and Robert Morris TV.
- Approximately 6,000 copies of a flyer were widely distributed prior to each public meeting to encourage attendance. Distribution included insertion in the area's weekly newspapers, mailings to affiliated Montour Valley Alliance organizations, use as posters in schools, libraries and storefronts, municipal buildings, and handouts on the Montour Trail. The flyers contained a

coupon that could be returned to add an individual to the mailing list or to solicit further information.

- Using the same distribution methods, five newsletters were prepared and distributed containing news of the public meetings, information about key findings and recommendations, and a coupon that could be returned to add an individual to the mailing list or to solicit further information.
- Press releases were prepared and distributed prior to each public meeting, at the public meetings, and on other occasions throughout the year.
- A slide presentation was prepared and made to each of the five municipalities prior to Public Meeting #2 to encourage participation and keep municipal officials informed of the Plan's progress.

II. Project Area Characteristics

A. Location

A watershed is an area within which all water running downhill flows into a common body of water. The Montour Run Watershed is located entirely within western Allegheny County, Pennsylvania (**Figure 1 - Project Area**). The Watershed comprises portions of Moon, Findlay, Robinson, and North Fayette Townships, as well as a portion of the Borough of Coraopolis. The Watershed is located approximately between 40.43° and 40.51° north latitude and 80.13° and 80.29° west longitude (USACOE, 1997). It is roughly defined by the area bounded by: Beaver Grade Road/Coraopolis Heights Road/Montour Street to the north; Forest Grove Road/Silver Lane to the east; Route 60 and Routes 22/30 to the south; and Potato Garden Run, Route 30, and Moon-Clinton Road to the west.

B. Size of Watershed

Montour Run is formed by the confluence of its North and South Forks in the community of Imperial. From this point, Montour Run flows approximately 12.8 miles northeast to its mouth at the Ohio River at Coraopolis. Its five major tributaries are the South Fork of Montour Run, North Fork of Montour Run, McClaren's Run i.e., Trout Run, and Meeks Run. Montour Run drains 36.6 square miles of western Allegheny County. The Montour Run Watershed is roughly rectangular in shape and measures approximately 8 miles wide from east to west and approximately 4 miles wide from north to south (USACOE, 1997). Portions of the Watershed are part of the Montour Run Corridor, which is classified as a High Priority Corridor by the Allegheny County Conservation Corridor Plan, 1995.

C. Topography

The Montour Run Watershed is located within the unglaciated Appalachian Plateau physiographic province. Total vertical relief in the Watershed is approximately 600 feet, ranging from elevation 692 feet National Geodetic Vertical Datum (NGVD) at the mouth of Montour Run (the normal elevation of Dashields Lock and Dam on the Ohio River) to over 1,300 feet NGVD on the western edge of the Watershed. In its lower reaches Montour Run flows through a 350-foot deep gorge (USACOE, 1997). Surrounding hilltops are generally rounded and approximately 1,000 feet across. Valleys along the small tributaries are very narrow, but the valley along Montour Run's main channel varies in width up to 1,000 feet. Slopes can vary from very mild to those in excess of 40%. Mechanical grading for the Pittsburgh International Airport has extensively leveled the topography in portions of the Watershed. To a lesser extent, grading for Route 60, US 22/30, and the Southern Expressway, and for commercial development adjacent to Route 60 has also altered the topography.

III. Existing Conditions, Analysis, and Recommendations for Watershed Resources, Land Use, and Zoning

In the preparation of this report, existing studies pertaining to the Montour Run Watershed were compiled and reviewed. These studies included the Montour Watershed Water Quality and Aquatic Life Resources (USACOE, 1997), the History of the Montour Run Watershed, (Janderlich, 1995), and the Allegheny County Natural Heritage Inventory, (Western Pennsylvania Conservancy, 1994). Included in this review were the Allegheny County Greenways Plan and the Allegheny County Conservation Corridors Plan. Appropriate state and federal agencies having jurisdiction over the Watershed Resources were also contacted during the process of data collection for new and/or relevant data not available from other sources. In addition, the relevant open-space and recreation plans, comprehensive plans, and the subdivision and land use ordinances of the five constituent municipalities that comprise the Watershed were reviewed.

GIS databases from the Allegheny County Departments of Health and of Computer Services, and from the Southwestern Pennsylvania Regional Planning Commission (SPRPC) were also made available for use on this project. These GIS databases reflected data that was current through 1994. Land uses within the Watershed, as well as the current zoning maps of the five constituent municipalities were compiled and incorporated into a 1"=2,000' scale digital GIS mapping database. The natural, cultural, recreational, and educational resources of the Watershed were identified and incorporated into this mapping. Sources for this information included the Pittsburgh History and Landmarks Foundation, the Steel Industry Heritage Corporation, the Pennsylvania Historical and Museum Commission, federal and state agencies, and local history groups. Included in this research was information pertaining to abandoned mine drainage sites, components of a potential industry heritage park project, greenways, and Pennsylvania Natural Diversity Inventory sites. This information was also integrated into the mapping.

By preparing an inventory of the Watershed's natural, cultural, recreational, and educational resources, the opportunities and constraints within the Watershed could be better understood. These environmentally sensitive features are important because they provide wildlife habitat, migratory corridors, erosion and sediment control, flood hazard reduction, air and water purification, climate moderation, recreational opportunities, educational opportunities, and aesthetic value. For mapping and discussion purposes, these resources were divided into the following categories:

- Water Resources - General Characteristics, Major Tributaries, Wetlands, Floodplains, Ponds, Water Quality, and Water Supply.
- Biological Resources - Vegetation; Wildlife; Rare, Threatened and Endangered Species; Allegheny County Natural Heritage Inventory Areas; Riparian Forest Buffers; and Biotic Assessment in Nearby Natural Areas.

- Cultural, Recreational and Educational Resources - Archaeological and Historical Resources, Recreation, and Educational Resources.
- Land Resources/Constraints - Geology, Soil Characteristics, Prime Farmland Soils, Landslide Prone Areas, Steep Slopes, Coal, Landfills, Hazard Areas, and Ownership.

In addition to the resource inventory previously described, land use/land cover as well as existing zoning patterns were also mapped in order to establish geographical relationships between resources as well as existing land use and zoning.

A. Water Resources

1. Streams (See Figure 2 - Water Resources, and Figure 3 - Stream Conditions/Drainage)

Existing Conditions

According to Title 25, Environmental Protection, Chapter 93, Water Quality Standards, of the Pennsylvania Code, Montour Run is considered a "second order" tributary to the Ohio River and is classified as a trout stocked fishery (TSF) (PADEP, 1996). The Montour Run basin is located in what is perhaps the most rapidly developing suburban area in the Greater Pittsburgh Metropolitan Region (USACOE, 1997).

The Montour Run Watershed consists of Montour Run and its 14 recognized tributaries. Of these tributaries, Meeks Run, Trout Run, McClaren's Run i.e., and the North and South Forks of Montour Run are officially named streams and are identified on maps as such. To facilitate the identification of unnamed tributaries within the Watershed, unofficial but locally recognized names have been assigned. These streams include HOLT Run, Salamander Run, Grimm Creek, West Fork McClaren's Run i.e., East Fork McClaren's Run i.e., Milk Run, Enlow Run, West Fork Enlow Run, and East Fork Enlow Run (USACOE, 1997). The tributaries and their drainage areas are presented in **Table 1**.

Streambank erosion is one of the most common and recurring problems throughout the Watershed. A number of examples of this streambank erosion problem can be found along Montour Run, in particular between Trout Run and the mouth at the Ohio River (**See Figure 3 - Stream Conditions/Drainage**). The potential for streambank erosion is typically greatest where the slopes are the steepest, and water velocities and approach angles are severe.

Property owners of eroding streambanks may see the loss of measurable portions of their property. Those that try to halt this destruction can incur significant and continuing financial burden in an attempt to avoid further damages.

Table 1. Watershed Tributaries.

Major Tributaries to Montour Run	Drainage Area (Square Miles)	Percent of Total Montour Run Drainage Area	Confluence of Tributary with Montour Run
Meeks Run	2.3	6.3	Left bank @ mile 3.0
HOLT Run	0.7	1.9	Left bank @ mile 3.6
Salamander Run	0.8	2.2	Right bank @ mile 3.6
Grimm Creek	1.6	4.4	Right bank @ mile 5.1
Trout Run	1.0	2.7	Left bank @ mile 6.6
McClaren's Run i.e.	6.5	17.8	Left bank @ mile 8.0
<i>Below East & West Forks</i>	<i>0.6</i>	<i>1.7</i>	
<i>West Fork McClaren's Run i.e.</i>	<i>3.4</i>	<i>9.3</i>	
<i>East Fork McClaren's Run i.e.</i>	<i>2.5</i>	<i>6.8</i>	
Milk Run	1.1	3.0	Right bank @ mile 9.1
Enlow Run	7.6	20.8	Left bank @ mile 11.7
<i>Below East & West Forks</i>	<i>0.6</i>	<i>1.7</i>	
<i>West Fork Enlow Run</i>	<i>3.4</i>	<i>9.3</i>	
<i>East Fork Enlow Run</i>	<i>3.6</i>	<i>9.8</i>	
North Fork Montour Run	2.3	6.3	Left bank @ mile 12.8
South Fork Montour Run	2.6	7.1	Right bank @ mile 12.8
Montour Run Mile 0-3.6	2.5	6.8	
Montour Run Mile 3.6-6.6	1.6	4.4	
Montour Run Mile 6.6-8.0	1.7	4.6	
Montour Run Mile 8.0-11.7	2.9	7.9	
Montour Run Mile 11.7-12.8	1.4	3.8	
Total	36.6	100.0	

Source: USACOE, 1997

NOTE: Italicized entries refer to subwatersheds of the aforementioned tributaries. Their drainage areas and percent of total area are included in the value for the parent tributary. They are not included individually in the total amount. The term "right bank" and "left bank" assume the observer is facing downstream.

Streambank erosion results in sediment deposits in stream channels (siltation). Siltation comes from both streambank erosion and other sources, such as activities that leave steep slopes with insufficient vegetation to hold the soils in place during storm events. Siltation reduces the stream's stormwater holding capacity, resulting in an increase in the potential for flooding, and has an adverse impact on water quality and aquatic life.

At the mouth of Montour Run, a large sand bar has formed as a result of the deposition of sediments that have resulted from upstream erosion (**See Figure 3 - Stream Conditions/ Drainage**). Siltation results in a heavy economic burden for the taxpayer when millions of dollars are spent to dredge and clear ship channels and locks and dams in the Ohio River and downstream.

According to the Natural Resources Conservation Service's (NRCS) Conservation Practice Standard for Streambank and Shoreline Protection (Code 580), measures should be taken to "stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes:

- To prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to banks,
- To maintain the capacity of the channel,
- To control channel meander that would adversely affect downstream facilities,
- To reduce sediment loads causing downstream damages and pollution, or
- To improve the stream for recreation or as a habitat for fish and wildlife."

Recommendations

Local, county, and state officials should determine what adjustments to the stormwater management regulations may be necessary to stem the increased frequency of flooding and streambank erosion occurring in the Watershed.

A series of stream flow gauge stations should be established by the USACOE at selected points along Montour Run and its tributaries to monitor water levels during normal and flood periods.

To reduce or eliminate streambank erosion, two types of streambank protection may be employed. The first are those types of streambank protection which retard flow along the bank and thereby promote deposition. The second are those types of streambank protection which, through some form of bank cover, protect the bank from direct erosion and scouring. Permeable groins, which are rigid structures built out from banks to protect the bank from erosion, and revetments, which are facings built on or over banks to protect the bank from erosion, can be constructed of piling,

rock, tetrahedrons, concrete, trees, or other materials. Groins may be designed to deflect the current away from the bank. Revetments are placed on or parallel to the bank. Both are designed to reduce the velocity of flow adjacent to the bank so that erosion will be halted. Living vegetation, brush matting, rock riprap, concrete slabs, and asphalt lining are examples of revetment or protective bank cover. Concrete and asphalt slabs have been installed by the Forest Grove Sportsmen's Club along the streambanks abutting their property, and the Montour Trail Council has placed heavy stone in wash-out areas near bridge abutments.

According to the NRCS Conservation Practice Standard for Streambank and Shoreline Protection, some measures that may be included in a plan for streambank protection are:

- Inventory and prioritize sites needing erosion control.
- Remove debris, minor ledge outcroppings, and sand and gravel bars that may cause local current turbulence and deflection.
- Reduce the slope of streambanks to provide a suitable condition for vegetative protection or for the installation of structural bank protection.
- Place or dump heavy stone, properly underlaid with a filter blanket, if necessary, to provide armor protection for streambanks.
- Constrict deflectors of posts, piling, fencing, rock brush, or other materials that project into the stream to protect banks at curves and reaches that are subject to impingement by high velocity currents.
- Build pervious or impervious structures on or parallel to the stream to prevent scouring streamflow velocities adjacent to the streambank.
- Erect artificial obstructions, such as fences, to protect vegetation needed for streambank protection or to protect critical areas from damage from stock trails or vehicular traffic.

Because each reach of a stream channel is unique, measures for streambank protection must be installed according to a plan that is developed for the specific site. Consideration must be given to possible impacts on fish and other aquatic life. The type of protection needed for a specific case is determined largely by the characteristics of the stream, the surrounding topography, and the land use.

To minimize or prevent erosion from disturbed sites, revegetation practices that provide adequate soil stabilization should be followed.

Municipalities should encourage and support volunteer trash removal program to ensure continued maintenance along the stream corridor.

Existing land use and zoning controls intended to protect water resources should be enhanced and enforced.

The Army Corps of Engineers, Pittsburgh District should be encouraged to dredge the sand bar/delta at the mouth of Montour Run on the Ohio River side of the CSX culvert in order to encourage better movement of fish into the stream, thus extending their range. This will also serve to alleviate downstream siltation problems at locks and dams in the Ohio River. However, the Moon Township Municipal Authority (MTMA) owns the Montour Run Wastewater Treatment Plant (MRWWTP) on Hassam Road. This facility lies between Montour Run and the Montour Trail. The outfall pipeline from the MRWWTP conveys treated wastewater for discharge to the Ohio River. This outfall pipe crosses the sandbar at the mouth of Montour Run. Any proposed dredging activity must be coordinated with the MTMA to prevent damage to the outfall pipeline.

2. Wetlands (See Figure 2 - Water Resources)

Existing Conditions

Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The term "wetlands" generally includes swamps, marshes, bogs, and fens (Environmental Laboratory, 1987). Wetlands are protected by both federal and state laws.

The functions and values of wetlands in general and within the Watershed in particular, can be characterized in terms of their physical, chemical, and biological processes and attributes. Wetlands are of value to society because of their natural features, economic value, official designation (e.g., the Clinton Wetland), and strategic location. The beneficial functions of wetlands may include:

- Ground water recharge and discharge;
- Floodwater detention;
- Sediment and toxicant retention;
- Excess nutrient removal;
- Diverse habitat for breeding, migrations, and wintering of aquatic and wildlife species;
- Recreation and education.

There are many wetlands of varying sizes and types within the Montour Run Watershed. The majority of wetland types include riverine, palustrine emergent, palustrine scrub-shrub, palustrine forested, and palustrine open water. Most wetlands within the Watershed are located along or are associated with stream channels and/or hillside spring seeps.

Analysis

The large amounts of abandoned mine drainage and deicing fluid runoff from PIA have severely degraded the quality of the streams of the Montour Run Watershed. In light of the degraded water quality evident in the Watershed, wetlands are of particular importance in providing the function of sediment and toxicant retention. The wetlands serve as a filter in removing some of this pollution from the streams; however, water quality problems persist. In addition, wetlands can serve to improve groundwater recharge, diminish the destructive effects of flooding, and provide critical habitat for a diverse assemblage of wildlife.

Recommendations

Through wetland preservation, protection, and creation, wetland resources within the Watershed can be enhanced to provide the maximum benefit. By preserving, protecting, and enhancing existing wetlands, the quality of these wetlands will be improved which will, in turn, make them more efficient in providing their many benefits. This would be particularly helpful in the Montour Run Watershed, where the extremely degraded water quality in portions of the streams has been well documented.

Watershed proponents could publicize the economic, aesthetic, and water quality benefits of wetlands. Specific wetland areas could be identified in each municipality and incorporated into their GIS database or other natural resource maps. Developers should be encouraged to incorporate wetland protection and enhancement measures into their planning process. Degraded or destroyed wetland areas should be considered for restoration as part of education programs or as mitigation sites for other projects.

3. Floodplains (See Figure 2 - Water Resources and Figure 3 - Stream Conditions/Drainage)

Existing Conditions

Because steep slopes border most of Montour Run and its tributaries, the one hundred year floodplain is generally restricted to the narrow regions of the stream valley. Due to the restrictive topography, development on the floodplain of the Montour Run Watershed has been minimal. Flooding episodes are reported to be increasing in frequency, duration, and intensity particularly in the lower reaches of the Watershed.

Analysis

Contributing factors to flooding episodes are the destruction of forests and other natural vegetation, mostly in areas outside of the floodplain, and replacement of them with buildings, pavement, and grass. An impervious surface, such as a paved parking lot, prevents the ground

from absorbing precipitation, thereby increasing runoff into streams and intensifying flooding. Impervious surfaces decrease the amount of surface area in which precipitation can infiltrate and be absorbed by the ground, which results in increased volume and velocity of stormwater runoff in the Watershed's stream channels.

Another contributing factor is the culvertization, channelization, disruption, or elimination of streams and/or wetlands. These modifications serve to focus all runoff into the remaining branches of a stream, thereby intensifying its flows and contributing to the frequency of flood episodes. This increased frequency, duration, and intensity of floodflows produces the collateral effect of increased erosion, which also increases the sediment load that is transported downstream. Sediment in the stream displaces volume that otherwise would be occupied by water, resulting in greater potential for flooding.

Many properties within the Montour Run Watershed exhibit the effects of drastic changes that have occurred in the floodflow patterns of Montour Run. For example, the Forest Grove Sportsmen's Club property, Groveton Park, and the confluence of Montour Run with the Ohio River (locally known as the "Lagoon") have all experienced dramatic increases in the frequency and intensity of flooding and its associated effects. The banks of Montour Run at the Forest Grove Sportsmen's Club are severely eroded, and the Club itself is rapidly losing portions of their property to the erosional forces of Montour Run. Residents in Groveton are experiencing flooding of their properties and basements on an increasingly frequent cycle.

The Lagoon area, which is a large embayment located near the mouth of Montour Run, has formed as a result of the severe constriction caused by a now undersized culvert that channels Montour Run beneath the CSX rail embankment. The Lagoon has developed as high flows from Montour Run have gouged out a large basin at the upstream end of the CSX culvert. As flows increase in intensity, the area continues to experience drastic undercutting of its banks and of the culvert itself. Floodflows into the Lagoon area also pose a public safety hazard because of the velocity and turbulence of the water which results from the constriction of flows by the culvert.

Recommendations

To minimize the impact of development on floodplains, coordination with the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program (NFIP) should be incorporated into every floodplain development plan. This will serve to determine floodplain and special flood hazard areas within the Watershed.

Regulatory agencies and municipalities should continue to discourage encroachment on floodplains. Municipal zoning should reflect the incorporation of the 100-year floodplain (including backwater channels and areas of overbank surface ponding) into a riparian buffer corridor. Floodplain wetlands could be constructed to aid in the abatement of periodic floodflows, and undeveloped floodplain areas should be allowed to revegetate naturally. Acquisition of floodplain land for designation as privately or publicly managed conservation areas would ensure that floodplains serve their full floodwater dissipation potential into the future.

Existing floodplain development can rely on various emergency flood response resources including the National Weather Service (NWS) river forecast and the National Oceanic and Atmospheric Administration (NOAA) weather forecast. These services will allow existing floodplain development to be alerted to impending flooding events and take precautionary measures.

Areas within the Watershed that will benefit greatly from these recommendations include the Forest Grove Sportsmen's Club property, Groveton Park, and the Lagoon, as well as private properties located along Coketown Road and near the mouth of Montour Run.

4. Ponds (See Figure 2 - Water Resources)

Existing Conditions

There are numerous detention and retention ponds located within the Montour Run Watershed. The ponds are all artificial impoundments and are not considered part of the Watershed in its natural state, although they do contribute to the Watershed's water resources in general and some may provide some wildlife habitat.

The Montour Run Watershed Stormwater Management Plan, prepared by Allegheny County, has been adopted by the municipalities.

Analysis

Some stormwater management facilities may not be performing as intended in part due to inadequate maintenance. In addition, these structures may not be controlling release flows to stream valley tributaries to the extent that was intended by current regulations. The release of stormwater from these facilities during storms may be having the effect of concentrating flows that are too high toward too few outlet points. This condition can create an increase in volume and velocity of stormwater into the Watershed's stream channels, with the cumulative effect being the increase in flooding episodes now being witnessed downstream. Another cumulative effect of the increase in volume and velocity of stormwater through the Watershed's stream channels is increased erosion of the streambanks also being observed in the eastern portion of the Watershed.

Recommendations

Local, county and state officials should undertake a study of the effectiveness of stormwater management ordinances. The Montour Run Watershed Stormwater Management Plan should be reviewed and updated on a regular basis. Local, county, and state officials should determine what adjustments to the stormwater management regulations may be necessary to stem the increased frequency of flooding and streambank erosion occurring in the Watershed. A review should be made of PADEP's Best Management Practices (BMP's) to identify appropriate practices for incorporation into the Stormwater Management Plan.

5. Water Quality (See Figure 3 - Stream Conditions/Drainage)

Existing Conditions

The water quality of Montour Run and its tributaries in the past has been the most conspicuous problem facing citizens of the Montour Watershed. The past and present land use patterns within the Watershed have contributed to serious degradation of the water quality. Abandoned mine drainage and deicing fluids runoff from Pittsburgh International Airport are the two predominant sources of water quality impairment (USACOE, 1997).

The water of Montour Run can be generally characterized as moderately mineralized, hard, or alkaline. Water quality and aquatic life of tributaries draining the western portion of the Watershed are degraded by suspended metals originating primarily from extensive abandoned bituminous coal mines. Water quality and aquatic life of tributaries draining the central portion of the Watershed are impaired by high biochemical oxygen demands and elevated ammonia concentrations that result from Airport deicing operations. Water from tributaries draining the eastern portion of the Watershed, primarily residential areas, are generally not water quality impaired or are relatively only moderately degraded.

Impacts on water quality caused by sewage discharges, construction runoff, mill slag fill leachates, oil well seepage, and other sources are apparent in the Watershed; however, these are considered to be relatively minor water quality problems in comparison with the magnitude of the pollution generated from abandoned mine drainage and Airport operations (USACOE, 1997).

Several pollution complaint reports have been filled in relation to incidents which have occurred in the Montour Run Watershed. The first complaint on May 27, 1966, reported a fish kill in Montour Run with the waters having a "milky color, hydrocarbon smell, and a substantial amount of floating soap suds" originating from industrial wastes from washwaters at the PIA. The second was documented on March 3, 1969, and involved a report of Allegheny Airlines discharging paint remover and detergents into McClaren's Run i.e. The third report was of degrading conditions of high acid flows from organic pollution due to the Aloe Brothers' stripping Restoration project in 1973. The fourth report was of the Holiday Inn organic wastes discharged directly into Montour Run in 1973. The fifth report was of metals in the Montour Run headwaters from acid pickling waste treatment operations of Cenco Industrial Corporation in 1975. The sixth was a report of an oil sheen on a tributary to Montour Run on August 18, 1976. The seventh report consisted of an oil discharge into Montour Run by Industrial Waste World on June 30, 1981. The eighth report was filed on February 25, 1996, and resulted from oil and detergents being discharged into McClaren's Run i.e. after washing down airplanes. In addition, other informal complaints relating to the impacts of the deicing fluids have been made to the Airport (Jandrich, 1995).

While many of these problems were one time events and were corrected or have been mitigated, some persist, such as abandoned mine drainage and deicing fluid runoff from the PIA. In addition, new problems have emerged as disturbance of formerly undeveloped land has increased

within the Watershed. As more impervious surfaces take the place of vegetation, siltation, and flooding are becoming increasingly severe problems. At the same time, point and non-point sources of pollution in Montour Run and its tributaries persist.

In addition, five additional studies were conducted on April 16, 1973; June 10, 1975; January 26, 1976; July 8, 1982; and October 1991, in conjunction with ongoing water quality investigations for potential trout stocking. All of the studies documented varying levels and sources of water quality degradation.

Analysis - Pittsburgh International Airport

The Pittsburgh International Airport's (PIA) considerable presence in the Montour Run Watershed has had a profound impact on water quality. The most significant effects are from the activities associated with its operation and maintenance. Nearly the entire Airport facility is located within the boundaries of the Watershed, and approximately one-third of the Watershed is devoted to and influenced by Airport operations. The most significant impact to ambient Montour Run water quality has resulted from deicing aircraft and runways. The breakdown of deicing fluid agents such as ethylene glycol (which has been phased out by most carriers at the PIA over the past three years), propylene glycol, and urea has caused elevated biochemical oxygen demands (BOD) and ammonia concentrations in several of the streams within the Watershed. There are other toxic anti-foaming and anticorrosion agents within the deicing fluid formulas that also have caused degradation of water quality. Periodic cool season incidents of strong urea and glycol odors along Montour Run and its tributaries, especially the mainstem of Montour Run downstream of the confluence of Enlow Run, and along Enlow Run and McClaren's Run i.e., have been among the most apparent indicators of degradation.

Additionally, the excessive organic load of deicing materials and their constituent products have encouraged profuse growths of a type of "sewage fungi" on stream bottoms of the East Fork of Enlow Run and the West Fork of McClaren's Run i.e., and along Enlow Run and McClaren's Run i.e. downstream of the confluences of these tributaries with Montour Run. These profuse algal growths have required tremendous amounts of dissolved oxygen, thereby depleting levels available to aquatic vertebrate and invertebrate species (USACOE, 1997).

Deicing runoff studies, conducted for the Allegheny County Aviation Department by the Pennsylvania Department of Environmental Protection (PADEP), involved concentrated sampling from December 15, 1992, to March 15, 1995. Also, deicing reagent sampling was conducted by the Allegheny County Aviation Department. between November 1, 1993, and December 22, 1994. Both the PADEP and the Aviation Department's chemical analyses emphasized ethylene glycol and propylene glycol testing. Both also monitored 5-day biochemical-oxygen-demand (BOD₅), ammonia nitrogen (NH₃-N), chemical-oxygen-demand (COD), pH, phosphorous, methyl blue anionic surfactant (MBAS), and chlorine (USACOE, 1997).

According to information provided by the PADEP (fax transmission, May 1998), significant remedial actions are in place at PIA. Most deicing at PIA now takes place on dedicated deicing

pads designed to collect spent fluids and contaminated snow and ice melt for recycling. Due to operational factors and equipment problems, however, glycol capture has been incomplete. PIA is attempting to find and correct these problems to improve capture and prevent as much runoff as possible. A majority of the glycol used is being captured and recycled.

Chemical anti-icing agents are sprayed on runways, taxiways, and other paved areas when icing conditions are predicted to prevent ice from bonding to the pavement. A mixture of ethylene glycol and liquid urea (UCAR) was used until part way through the 1997/1998 deicing season. The urea component of UCAR degrades to produce ammonia, which is very toxic to fish and other aquatic life. Urea also exerts an oxygen demand and is a nutrient which encourages algal and bacterial growth in streams. UCAR has now been replaced for anti-icing by liquid potassium acetate (LPA). Although its impacts on receiving streams will not be fully known until it has been in use for some time, LPA is expected to be much more environmentally benign than UCAR. It does not produce ammonia but will exert some oxygen demand and will have a nutrient affect in the streams.

Chemical deicing agents are used to break the ice-to-surface bond once ice has already formed. Pelletized urea is used for this purpose at PIA. Several alternative chemicals including sodium formate and sodium acetate have recently been introduced and are being evaluated by PIA. Although little toxicity data is available, neither chemical produces ammonia, and both are advertised by their manufacturers as having little toxicity to aquatic life. PIA is evaluating their effectiveness and availability before making a decision on replacing urea (PADEP, May 1998).

Although of lesser importance, other activities at PIA have impacted or potentially impacted water quality. The huge expanses of pavement (approximately 500 acres) have resulted in much greater runoff and correspondingly lower groundwater recharge than would vegetated areas. Aircraft maintenance and fueling activities have resulted in spills of fuel, oil, solvents, and other chemicals from time to time. These incidents have been much less frequent in recent years as a result of improved facilities and operation (PADEP, May 1998).

A Deicing Action Plan for the PIA aircraft and airfield deicing operations was prepared by the Allegheny County Aviation Department in the mid 1990's and was amended in 1998. This amended plan, which was approved by PADEP, addresses how and where deicing operations will be performed in order to minimize degradation of water quality on the receiving streams. This plan also addresses how record keeping of deicing operations will be performed by the aviation industry. Training of County employees responsible for the operation and maintenance of the collection systems is also detailed in the plan.

In addition, the Deicing Action Plan includes a water quality sampling plan that is designed to monitor the effectiveness of the collection systems and the impact on the receiving streams of materials that are not fully collected. It includes 18 sampling stations, each of which is being sampled by the Allegheny County Aviation Department a minimum of 5 times during the 1998-1999 deicing season. These sampling stations are made up of in-stream locations as well as

stormwater discharge points located within and around PIA property. The water quality sampling plan includes the following parameters: propylene glycol, ethylene glycol, urea, acetate, ammonia nitrogen, BOD₅, COD and sodium formate. The Allegheny County Aviation Department is performing the sampling and will share the results with PADEP.

Recommendations - Pittsburgh International Airport

The drainage of deicing reagents from Pittsburgh International Airport (PIA) into the waters of the Montour Run Watershed is a persistent dilemma. Fortunately, if given sufficient time, the glycols and urea found in deicing fluids will be decomposed by the metabolic actions of various microorganisms. The PIA should consider documenting stream bedload accumulations of these chemicals and their constituent products and the impacts of the glycols and urea on the substrate and organisms of receiving streams. Additionally, investigations should continue in identifying suitable airfield deicing substitutes to reduce or eliminate the use of these toxic materials (USACOE, 1997).

The PIA should continue refining and improving its collection procedures for spent aircraft deicing fluids. The PIA should continue working with the PADEP to monitor the effectiveness of the collection systems and to analyze the impact of materials that are not fully collected on the receiving streams. Deicing Action Plans for the PIA should be updated annually based in part on the knowledge gained during previous deicing seasons.

Analysis - Abandoned Mine Drainage

Abandoned mine drainage is another major contributing factor to the degradation of water quality within the Watershed. The extensive deep and strip mining of coal that occurred throughout the Watershed now contributes metal-polluted and highly mineralized water to essentially every perennial stream within the central and western portion of the Watershed and has long degraded the water quality of Montour Run. Most of the abandoned mine drainage pollution in the Montour Run Watershed originates from old (pre-1940) deep mines, and from abandoned 1950's to 1960's strip mining operations. Acid run-off is declining in many of these old mines, and literally thousands of acres of old strip mines have been partially reclaimed as a consequence of construction of PIA and the utilization of old strip mines as landfills. Exposed alkaline limestones in lower elevations of the Conemaugh Group strata tend to neutralize the acid produced by the Pittsburgh Coal Seam mining operations. This neutralization process from alkaline minerals now totally overwhelms the abandoned mine drainage acidity, and most streams of the basin today tend to be highly alkaline (USACOE, 1997).

Consequently, the primary water quality impairment stemming from abandoned mine drainage in the Montour Run Watershed is not acidity, but residual abandoned mine drainage mineralization and metal pollution. Among the pollutant metals, aluminum oxides appear to be the most prevalent and the most detrimental. Among the ten major tributaries of Montour Run, Milk Run is the single greatest contributor of aluminum pollution to the Watershed (USACOE, 1997).

The United States Army Corps of Engineers, Pittsburgh District (USACOE) conducted a water quality study for the Watershed, and subsequently released a report entitled: Montour Run Watershed, Water Quality and Aquatic Resources (1997). A total of 18 sampling stations were designated within the Watershed. Fourteen of these stations were located on tributaries to Montour Run, and 4 were located on the main stem of Montour Run. Four rounds of sampling surveys were conducted at each station.

The first round consisted of modified rapid biological assessments, with companion field and laboratory water chemistry data collection taken from April to May 1996. The second sampling round involved only field reconnaissance and the collection of limited field data at 19 additional locations, plus 8 locations sampled during round one, to identify the sources of water quality problems documented in the first sampling round. A total of 36 priority stations were selected for a third comprehensive chemical and flow sampling survey. The fourth round of sampling involved electrofishing and quantified triplicate Surber benthic macroinvertebrate sampling of the four Montour Run proper stations, and of one relatively undisturbed tributary (Meeks Run) as a control station.

While the western peripheral portion of the Watershed contains many abandoned mine drainage discharge areas, the USACOE has identified five sites in particular that contribute significantly to the degradation of water quality. These sites are depicted on **Figure 3 - Stream Condition/Drainage** and are:

- The major deep mine drainage discharge from the Clinton Deep Mine Complex.
- The major deep mine drainage discharge from the North Fork Montour Run Headwaters Deep Mine Complex.
- The mine drainage discharge areas in the West Fork of Enlow Run subbasin.
- The mine drainage discharge areas in the South Fork of Montour Run subbasin.
- The mine drainage discharge areas in the Milk Run subbasin.

Within the Montour Run Watershed, several common fish species have been completely eliminated as a result of the extensive abandoned mine drainage pollution. Some larger extirpated fish species have managed naturally to recolonize the lower reaches of the Watershed by migrating upstream from the Ohio River. However, smaller headwater fish species (i.e. darters, sculpins, and a variety of minnows) have been unable to repopulate reclaimed portions of the upper reaches of the Watershed (USACOE, 1997).

Recommendations - Abandoned Mine Drainage

Within the Montour Run Watershed, there exist several severely degraded, high volume deep mine discharges. These deep mine discharges are generally located very high in the headwaters of Montour Run, along the outlying western portions of the Watershed where their detrimental effects influence all down gradient streams. PADEP policies for the commitment of abandoned mine drainage reclamation funds require prioritization of the most upstream sites in a watershed to maximize benefits accrued from expenditures. Therefore, prioritization of these sites for the construction of abandoned mine drainage remediation projects would improve chances of funding from the PADEP.

Abandoned mine drainage remediation projects at these sites could serve to improve water quality and aquatic life resources throughout the Watershed (USACOE, 1997). Specific candidate sites identified by the USACOE include the "Clinton Deep Mine Complex" and the "North Fork Montour Run Headwaters Deep Mine Complex" (See **Figure 3 - Stream Conditions/Drainage**). Many potential low cost, low technology abandoned mine drainage remediation sites also exist within the Montour Run Watershed. Many of these sites already contain wetlands that are currently retaining abandoned mine drainage-generated metal oxides. Through minimal grading, monitoring, and/or maintenance, many of these sites could be enhanced at minimal costs by school-sponsored or private conservation groups. The majority of these sites are also located on lands already owned by Allegheny County or waste disposal corporations. Interest in remediation project participation by these parties could also be sought (USACOE, 1997). Specific candidate sites identified by the USACOE include the "Beaver Dam on West Fork Enlow Run" site, the "Stormwater Drainage Facility on an Unnamed Left Bank Tributary to the West Fork of Enlow Run at Mile 2.05" site, the "Cattail Marsh on BFI Site on an Unnamed Right Bank Tributary to the North Fork of Montour Run at Mile 0.4" site, the "Extensive Cattail Marsh Along Santiago Run, Below the Santiago Mine, in the South Fork of Montour Run Basin" site, and the "Headwaters of the South Fork of Montour Run" site (See **Figure 3 - Stream Conditions/Drainage**).

Another significant abandoned mine drainage discharge area identified in the USACOE report, but for which no remediation recommendations were made, is the abandoned mine drainage discharge area in Milk Run. Among the ten major tributaries of Montour Run, Milk Run is the single greatest source of aluminum pollution. Remediation of this site should be investigated.

To facilitate the recolonization of the upper stream reaches of the Watershed, locally extinct fish species should be reintroduced. For example, stocks of fish that are present in nearby biologically healthy streams such as Kings Creek could be used to repopulate portions of the Watershed. Based on water chemistry, habitat, and macroinvertebrate data, two such streams, Meeks Run and Trout Run, are currently considered to be suitable for sustaining reintroduced species populations (USACOE, 1997).

Analysis - Other Contributing Factors

Other contributing factors to the degradation of water quality are associated with several highway and Airport construction projects. Many residential, light industrial, and commercial developments that have recently been completed, are under construction, or are planned for future development add to pollutant and sediment laden runoff. The increased flows and resultant erosional sediment load smother streambeds and disrupt photosynthesis in the streams of the Watershed, thereby further degrading water quality (USACOE, 1997).

Recommendations - Other Contributing Factors

A coordinated water quality monitoring program should be developed for the Montour Run Watershed. In addition, improvements to sediment and erosion controls during construction as well as to revegetation and stormwater management practices could reduce pollutant and sediment laden runoff. Airport Drainage Control, as well as the restoration of eradicated aquatic life was recommended in the USACOE report (1997) and should also be pursued.

6. Water Supply

Existing Conditions

Information regarding the groundwater supply within the Montour Run Watershed is extremely limited. According to the Water Resources Division of the United States Geological Survey, five groundwater supply wells exist within the Watershed. These wells were last investigated at least 25 years ago. Two wells are categorized as being for domestic use, one well is designated for industrial use, and the remaining two wells are associated with the Pittsburgh International Airport and as such are designated for commercial use. Partial data for the yield of these wells indicates that they produce between 5 and 40 gallons per minute (GPM). No chemical analysis data for these wells is available (USGS, 1998). However, it is worthy to note that Montour Run contributes water to a Wellhead Protection Area in the Ohio River that supplies surrounding communities.

Analysis

Due to the proximity of the Ohio River, and the reliance of the Watershed's residents on municipal water supplies, water supply within the Watershed is not considered a major issue. With the limited information available on private groundwater wells, including the limited yield data of these wells, it can only be assumed that they serve as adequate suppliers of water to the owning parties.

One issue of potential concern, however, is the disruption of the groundwater table by subsurface mining activity. Nevertheless, as the majority of subsurface mines have been played out some time ago, the potential for groundwater table disruption in the future is considered minimal.

Recommendations

While the adequate supply of water to residents is not an issue, the water quality of Montour Run should continue to be monitored since it contributes to a downstream Wellhead Protection Area, as well as because of its impacts on wildlife and recreation.

B. Biological Resources

1. Vegetation

Existing Conditions

Historically, the Montour Run Watershed has been dominated by an Appalachian Oak Forest. This association is characterized as a tall, broadleaf, deciduous forest with white oak (*Quercus alba*) and northern red oak (*Quercus rubra*) as dominant trees. Other woody species include sugar maple (*Acer saccharum*), sweet birch (*Betula lenta*), bitternut hickory (*Carya cordiformis*), beech (*Fagus grandifolia*), tulip poplar (*Liriodendron tulipifera*), white pine (*Pinus strobus*), scarlet oak (*Quercus coccinea*), scrub oak (*Quercus ilicifolia*), chestnut oak (*Quercus prinus*), and black oak (*Quercus velutina*) (Cuff, et al., 1989).

The habitat of the Montour Run Watershed is classified as Mixed Mesophytic Forest. This type commonly occurs on gentle slopes and ravine bottoms, on mesic rich soils on which leaf litter decomposes fully and becomes incorporated into the soil. It has a diverse assemblage of plant species (Cuff, et al., 1989).

The Watershed has been subject to extensive logging practices in the past, and now undeveloped areas within the Watershed consist primarily of second growth, mature, deciduous forest. With continued urbanization, forested areas are rapidly disappearing.

Analysis

Through widespread deforestation and urbanization, the vegetative resources of the Montour Run Watershed have been reduced to a mere fraction of their former abundance. Historically, the Montour Run Watershed was dominated by an Appalachian Oak Forest. However, through the extensive clearing of lands for lumber and development, remaining stands of forest are limited mainly to isolated tracts on steep hillsides or along stream bottoms and ravines.

Recommendations

Through the establishment of conservation easements, new conservation areas, habitat preservation areas, resource-friendly zoning, and riparian forest buffer corridors, existing stands of forests can be preserved, protected, and enhanced. Owners of idle tracts of land should be encouraged to allow forest species to flourish. The preservation and enhancement of present and future forests not only will enrich the wildlife habitat potential of the Watershed, but also will enhance surrounding property values, increase recreational opportunities, reduce costs of flooding and streambank erosion restoration, and improve water quality for area residents.

2. Wildlife

a. Terrestrial Wildlife

Existing Conditions

The undeveloped tracts within the Montour Run Watershed provide suitable habitats for a wide variety of game and non-game animals. Mammals which may be found within the Watershed include: marsupials such as the opossum; insectivores such as shrews, moles, and bats; rodents such as rabbits, squirrels, chipmunks, beavers, rats, mice, voles, porcupines, and groundhogs; carnivores such as foxes, raccoons, weasels, and skunks; and even-toed ungulates such as the white-tailed deer.

Bird species that inhabit deciduous forests, like those present in the Watershed, are widespread and abundant. Species typically present in the forested areas of the Watershed include: northern goshawk, red-breasted nuthatch, northern saw-whet owl, solitary vireo, magnolia warbler, broad-winged hawk, scarlet tanager, red-tailed hawk, oven bird, tufted titmouse, and the downy woodpecker. Other bird species common to agricultural and transitional areas typically include: the bobolink, killdeer, savannah sparrow, horned lark, eastern meadowlark, indigo bunting, house wren, gray catbird, chestnut-sided warbler, and the song sparrow. Bird species commonly found in wetland areas throughout the Watershed typically include: the belted kingfisher, common yellowthroat, sora, wood duck, and red-winged blackbird. Seasonal migratory patterns may alter the species composition of the Watershed. Common winter bird species include: the tree sparrow, evening grosbeak, black-capped chickadee, house finch, northern cardinal, red-bellied woodpecker, and pine siskin. Common summer bird species include: the American crow, American goldfinch, cedar wax wing, downy woodpecker, flicker, American robin, barn swallow, blue jay, chipping sparrow, common grackle, common yellowthroat, European starling, gray catbird, house wren, house sparrow, indigo bunting, mourning dove, northern cardinal, northern flicker, red-eyed vireo, red-winged blackbird, rufous-sided towhee, and song sparrow (Cuff, et al., 1989).

Analysis

The recent leveling of woodlands in the Montour Run Watershed, and the transition from forest cover to broad expanses of open pavement and short grasslands associated with mining, land filling, and construction activities, have created a noticeable change in the composition of the bird species within the Watershed. In response to the creation of these broad, open areas, a portion of the Montour Run Watershed has been inhabited by an assemblage of birds typical of treeless western prairies and often very rare or totally absent from the forests and farmlands of western Pennsylvania. Opportunistic bird species that have been observed in the Watershed include: lark sparrows; LeContes's Sparrows; breeding blue grosbeaks; horned larks; bobolinks; various shorebirds; summer tanagers; grasshopper sparrow, Henslow's sparrow, and savannah sparrow; winged harriers; and short-eared owls (USACOE, 1997).

The general reduction in forested habitat throughout the Montour Run Watershed has likely resulted in a net loss in terrestrial wildlife species. With the exception of species that adapt particularly well to urban settings, and accidental bird species that have colonized recently developed grasslands, the composition of species populations has been drastically altered from historic conditions. Nonetheless, the forested tracts that do exist within the Montour Run Watershed provide suitable habitats for a variety of game and non-game animals.

Recommendations

In order to increase the numbers and diversity of populations of terrestrial wildlife, improvements to their habitat are essential. New conservation areas, conservation easements, habitat preservation areas, and riparian forest buffer corridors should be established to provide enhanced wildlife habitat. Local conservation groups, sportsmen's groups, garden clubs and schools should be encouraged to undertake habitat improvement projects. These projects create secondary benefits in their educational and community activity opportunities.

b. Aquatic Wildlife

Existing Conditions

By assessing the presence or absence of naturally occurring aquatic species, the general health of the streams may be gauged. Fish species are good indicators of long term effects and broad habitat conditions because they are relatively long lived and mobile. Aquatic macroinvertebrates are good indicators of localized conditions, and they reflect the effects of short-term environmental variations.

i. Fish

Three studies of fish species have recently been completed within the Montour Run Watershed. The PADEP conducted a study in 1982, the Pennsylvania Fish and Boat Commission (PFBC) conducted a study in 1991, and the USACOE survey of 1996 included the aquatic life of the Watershed (USACOE, 1997). A total of 22 fish species were collected between these three sampling surveys. Species collected were: gizzard shad, rainbow trout, brook trout, carp, golden shiner, blacknose dace, creek chub, emerald shiner, sand shiner, bluntnose minnow, golden redhorse, shorthead redhorse, black redhorse, northern hog sucker, white sucker, quillback carpsucker, white bass, smallmouth bass, spotted bass, bluegill, sauger, and freshwater drum.

The most common fish collected during the studies were creek chub, blacknose dace, and white sucker, which together represented 90.6% of the total collection. Five game fish species were collected: brook trout, rainbow trout, bluegill, spotted bass, and smallmouth bass. Sport fish represented only 3.0% of the total number of fish collected. Of these, the trout were stocked by the Forest Grove Sportsmen's Club in conjunction with their annual fishing tournament, and the bass were likely transient from the Ohio River.

The Montour Run Watershed appears to have two distinct fisheries. The headwaters and tributaries fishery is dominated almost exclusively by creek chubs, blacknose dace, and white suckers. These three species are very tolerant of pollution and do well in shallow, narrow streams with relatively small pools. The second fishery, the lower Montour Run fishery, has wider streams and longer, deeper pools than the headwaters fishery. In this lower portion of Montour Run, even the highly pollution-tolerant trio of permanent-resident, reproducing fish (creek chubs, white suckers, and blacknose dace) were uncommon or totally absent. The fish population of the lower Montour Run mainstem is dominated by apparently transient Ohio River fishes and the trout stocked by the Forest Grove Sportsmen's Club. It should be noted that Ohio River backwater reaches a short distance upstream from the mouth of Montour Run, where it forms a small but deep embayment, locally referred to as the Lagoon. Beyond the embayment, a gravel bar located at the mouth of Montour Run extends out into the Ohio River in the backchannel of Neville Island. This short terminal portion of the stream provides excellent and diverse fish habitat and easy fishing access from the Ohio River. It is utilized by local anglers, who report good catches of walleye, sauger, smallmouth bass, and channel catfish from both the embayment and the edge of the gravel bar (USACOE, 1997).

ii. Aquatic Invertebrates

As mentioned earlier, the aquatic invertebrate communities are highly responsive indices of water quality. Aquatic invertebrates also possess intrinsic value in the food chain and importance as a food source for fish and other forms of aquatic life.

A modified rapid biological assessment of aquatic macroinvertebrates was conducted by USACOE at 4 stations along Montour Run and 14 Montour Run tributaries in April and May of 1996. A total of 42 different taxa of aquatic macroinvertebrates were collected and field identified at the 18 Montour Run Watershed stations sampled. The water quality and biological condition of each station was rated to obtain a condition score.

Invertebrate communities of non-degraded streams are composed of many different types of organisms, including pollution intolerant taxa such as mayflies, caddisflies, and stoneflies. Conversely, the invertebrate community of polluted streams is dominated by a small number of pollution-tolerant taxa such as sludge worms and bloodworms. Between the extremes are many organisms with intermediate tolerances. The analysis of the water of the Montour Run Watershed was complicated by the fact that organisms receive both mine drainage and organic pollution. Mine drainage pollution tends to depress both diversity and productivity, while organic pollution typically results in high productivity dominated by a small group of tolerant species (USACOE, 1997).

Additionally, a total of 31 different taxa of aquatic invertebrates were collected by the USACOE in June 1996. The Montour Run invertebrate community was overwhelmingly dominated by pollution tolerant organisms such as sludgeworms and bloodworms at four out of five of the study stations. The fifth station, the reference station, was dominated by clean water invertebrates,

particularly the crustacean *Grammarus*. Crustaceans, and *Grammarus* in particular, appear to be important species of Meeks Run and other nondegraded tributaries of Montour Run.

The invertebrate studies demonstrate that the headwaters of Montour Run are water quality degraded as indicated by a stressed invertebrate community. Montour Run below the confluence of Enlow Run and McClaren's Run i.e. is very severely impacted and grossly degraded. There is a trend toward improved water quality and biological recovery at stations further downstream as Montour Run receives better quality water and invertebrate drift from tributaries in the lower eastern portion of the Watershed. Additionally, the confluence of Montour Run with the Ohio River has a diverse assemblage of mussel species.

Analysis

The paramount threat to aquatic wildlife within the Montour Run Watershed is water quality degradation. Declines in water quality throughout the Watershed have reduced both the number of individuals and the number of species of aquatic wildlife. For example, local accounts have indicated that sauger, a warm water gamefish that was common to the eastern portion of Montour Run prior to 1992, was not found during the most recent survey conducted by the Pennsylvania Fish and Boat Commission. In addition to water quality degradation, aquatic habitat loss and/or deterioration also pose considerable threats to aquatic wildlife. To restore aquatic wildlife population to optimal levels, drastic improvements in the overall water quality of the Watershed and improvements and increases in aquatic habitat are essential.

As water quality and aquatic habitat improvements are made, aquatic invertebrates should slowly, but independently, begin to recolonize portions of streams which are currently devoid of such organisms. These organisms serve as a vital foundation component of the aquatic food chain, and their presence is essential in ensuring the recolonization of aquatic vertebrate species. The relative health of a stream can be quickly assessed by looking at its aquatic invertebrates.

Recommendations

Upon establishment of suitable water quality, aquatic habitat, and food base, fish and other aquatic vertebrates may be able to recolonize portions of streams in which they are currently not present. However, fish are susceptible to physical obstructions in streams such as waterfalls, log jams, and artificial barriers, and frequently cannot overcome such obstacles. To facilitate the recolonization of these stream reaches, locally extinct fish species should be reintroduced from stocks of fish that are present in nearby biologically healthy streams such as Kings Creek. Based on water chemistry, habitat, and macroinvertebrate data, two such streams, Meeks Run and Trout Run, are currently considered to be suitable for sustaining reintroduced species populations (USACOE, 1997).

To facilitate the establishment of aquatic species in the streams of the Watershed, a program of aquatic habitat improvement should be developed. Fortifying the banks of streams with rootwads (large tree stumps with the roots intact) creates tremendous amounts of habitat for both fish and

aquatic macroinvertebrates. A secondary benefit is that the rootwads offer excellent protection of the streambanks from erosion. Local conservation groups, sportsmens groups, and schools could partner to undertake such projects. These programs also create value in their educational and community activity opportunities.

3. Rare, Threatened and Endangered Species

Existing Conditions

To determine the presence or absence of rare, threatened, or endangered species within the Watershed, all relevant state and Federal regulatory agencies were contacted. A Pennsylvania Natural Diversity Inventory (PNDI) site file search and a United States Fish and Wildlife Service (USFWS) site file search were conducted.

PNDI is a site-specific information system that describes significant natural resources of Pennsylvania. This system includes data descriptive of plant and animal species of special concern, exemplary natural communities, and unique geologic features. PNDI is a cooperative project of the Pennsylvania Department of Conservation and Natural Resources (PADCNR), The Nature Conservancy, and the Western Pennsylvania Conservancy.

The statutory authority for Pennsylvania's animals and plants resides with three separate agencies. The PADCNR has the responsibility for management of the Commonwealth's native wild plants. The Pennsylvania Fish and Boat Commission (PFBC) is responsible for management of fish, reptiles, amphibians, and aquatic organisms within the Commonwealth. The Pennsylvania Game Commission (PGC) has the responsibility for managing the state's wild birds and mammals.

According to the PADCNR, Bureau of Forestry, five plant and one insect species of special concern which are tracked by the PNDI are reported as occurring or having occurred in or near the Montour Run Watershed. The plant species are: puttyroot (*Aplectrum hyemale*), crested dwarf iris (*Iris cristata*), heartleaf meehania (*Meehania cordata*), spotted bee-balm (*Monarda punctata*), and prickly-pear cactus (*Opuntia humifusa*). The single insect species is long-legged green darner (*Anax longipes*). In addition, the PFBC, Division of Fisheries Management has reported that Kirtland's snake (*Clonophis kirtlandii*), a Pennsylvania endangered status snake species, and the river redhorse (*Moxostoma carinatum*), a Pennsylvania candidate status fish species, have been located in the vicinity of the Montour Run Watershed.

The PGC has confirmed that no state-listed endangered or threatened species of birds or mammals are known to occur within the Montour Run Watershed. Additionally, the United States Fish and Wildlife Service has reported that no Federally-listed or proposed threatened or endangered species under their jurisdiction are known to occur within the Montour Run Watershed.

Analysis

Each of the species of special concern that occur within the Montour Run Watershed represent a distinct and fragile resource in and of themselves. These species illustrate the cumulative effects

of habitat disruption and loss, declines in water quality, and other such environmental deterioration. Utilization of these species as benchmarks for improvements in environmental quality will serve to benefit all species, rare, threatened, endangered, or not.

Recommendations

To establish goals for stabilizing or increasing these organisms' populations, it is first necessary to identify where these species do exist and in what abundance. Distributional surveys to determine the geographic range and abundance would allow identification of existing populations, and areas with high potential to support populations. The ecological factors favoring survival of these species should be determined, and habitats that provide a proper combination of factors should be protected (Carnegie Museum of Natural History, 1985).

A Watershed-wide survey of species and habitat presence should be conducted and publicized, using personnel consisting of volunteers and professionals. Consultation with resource agencies charged with the protection of these resources, such as Pennsylvania Department of Environmental Protection (PADEP), Pennsylvania Fish and Boat Commission (PFBC), and Pennsylvania Game Commission (PGC), will provide guidance on the establishment of a survey and monitoring program.

Creation of environmental advisory councils would aid municipalities in identifying existing habitat and species. These councils could recommend ordinances to ensure appropriate protection and perpetuation of these species. Habitat areas identified as important for rare, threatened, or endangered species should be acquired to ensure preservation.

4. Allegheny County Natural Heritage Inventory Areas (See Figure 4 - Biological Resources)

Existing Conditions

The Montour Run Watershed is fortunate to include three areas identified in the Allegheny County Natural Heritage Inventory, and two privately owned conservation areas are contained within them. These areas represent what are considered to be some of Allegheny County's most significant natural areas (Western Pennsylvania Conservancy, 1994). The Natural Heritage Inventory Areas contain plant and animal species and biological communities that are unique or uncommon in Allegheny County, and exhibit importance for general wildlife habitat, education, and scientific study.

a. Montour Run Valley Landscape Conservation Area (LCA)

The Montour Run Valley LCA is a Natural Heritage Inventory Area located between Route 60 and Sharon Grade/Hassam/Forest Grove Roads in Moon and Robinson Townships. It consists of minimally developed open spaces of forested slopes and tributary stream valleys and in 1994 was

recognized as being a "rarity in this rapidly developing part of the County" by the Western Pennsylvania Conservancy. The LCA exhibits a maturing example of a northern forest community, diverse herbaceous flora, and diversity of tree species, not often found in Allegheny County.

The LCA has experienced many different land uses in the past, including logging, agricultural activity, and a former railroad whose rail bed is now the Montour Trail. Farming was restricted to the floodplains along Montour Run and the flat upland areas on both sides of the Valley. The forest overall is relatively young but maturing in most cases and recovering from logging and grazing. The major cultural feature in the Valley is the Montour Trail. Other cultural features within the LCA include some upland residential development, a power line, a gas pipeline right-of-way, the Forest Grove Sportsmen's Club, and the Coraopolis Sportsmen's Association.

The Frank A. Santucci Conservation Area is located within the boundaries of the Montour Run Valley LCA. The parcel is owned and managed by the Hollow Oak Land Trust (HOLT) with the intent to protect the natural resources of the Montour Run Valley. The 113-acre tract of land near the Montour Trail was purchased in 1993 and subsequently established as a conservation area. This HOLT property is adjacent to what used to be a Federal government Nike missile site, now owned by the Moon Township Baseball Association.

The property is a beautiful example of the diverse natural environment that still can be found in the Montour Valley. Adjacent to the ruined foundation of an old house, a spring surfacing high on the hillside creates a wet, cool, rocky habitat for mosses and invertebrates and supplies drinking water for the mammals, birds, and reptiles inhabiting the site.

The parcel is covered predominantly by a second-growth mixed-hardwood forest. The larger specimens of oak, tulip poplar, butternut hickory, and sugar maple that survived logging earlier in this century, generally are found along the steep-sided ravines. Younger black cherry and tulip poplar cover much of the hilltop. Autumn brings the spectacular burst of color characteristic to hardwoods, while through the trees in the winter the expansive vista across the Montour Valley can be seen from the southeast corner of the property.

The Frank A. Santucci Conservation Area is open to the public for non-motorized recreation and educational activities. Nature lovers who visit the area will find two miles of gently sloping old logging roads and trails to explore.

The Meeks Run Conservation Area is also located within the Montour Run Valley LCA. It is a 37-acre heavily disturbed wetland site formerly slated for residential development that was purchased in 1997 by HOLT. Meeks Run is one of the cleanest streams in the Watershed. Preservation of the natural area will ensure its continued contribution to the clean water quality of Meeks Run. It is also expected that the property values for homeowners living near the natural protected area will increase, and that the area will provide recreational opportunities for neighbors as well as wildlife habitat (HOLT newsletter, Winter 1998).

b. Clinton Wetlands Biological Diversity Area (BDA)

The Clinton Wetlands BDA is located in Findlay Township, west of Pittsburgh International Airport in an area that is characterized by highly disturbed and fragmented landscape. The town of Clinton is located immediately west of the BDA, and the majority of all lands comprising this BDA are privately owned. The site encompasses a Robust Emergent Marsh Community (NC001) that is situated along a small tributary stream that forms the upper reaches of Montour Run just east of the town of Clinton. It is identified by the Western Pennsylvania Conservancy as a Community/Ecosystem Conservation Area for Allegheny County.

Obvious threats to the aquatic system of the wetlands include the use of chemical fertilizers, insecticides, and herbicides associated with residential development, as well as new development in response to the completion of the PIA Terminal buildings and the Southern Expressway (Route 60).

c. Ohio River Biological Diversity Area (BDA)

The Ohio River at the mouth of Montour Run has been designated the Ohio River BDA since it provides habitat for a fish species of special concern (SA001). The Montour Run Watershed abuts the Ohio River BDA for a distance of approximately 2,000 linear feet, centering on the location where Montour Run enters the Ohio River. The backchannel of Neville Island, which is located across from the mouth of Montour Run, is noted as having a diverse assemblage of mussel species.

Analysis

It's likely that developers avoided much of the Montour Run Valley LCA due to the difficulty and expense of developing there caused by environmental constraints and lack of access and utilities. Having not been extensively developed, this area continues to be home to flora and fauna common to Western Pennsylvania prior to European settlement. Therefore, it was designated as an LCA by the Western Pennsylvania Conservancy in 1994.

The Clinton Wetlands BDA significantly contributes to the mitigation of the "White Plastic Pipe" abandoned mine drainage site (Station 4 MTR 1 2815) as well as the two other abandoned mine drainage sites (Station 4 MTR 1 2809 and 4 MTR 1 2810) that comprise the Clinton Deep Mine Complex. A large beaver dam controlled impoundment and cattail marsh located on the West Fork of Enlow Run is very effective in filtering and capturing metal pollution discharged by the Clinton Deep Mine Complex (USACOE, 1997).

Recommendations

Public awareness of the value of the Clinton Wetland BDA, Ohio River BDA, and the Montour Run Valley LCA should be increased. The most important portions of these areas should be preserved either through conservation easements or acquisition. Educational and recreational programs that link the Montour Trail to these areas should be implemented.

5. Riparian Forest Buffers

Existing Conditions

A riparian forest buffer is an area of trees and other vegetation located adjacent to and up-gradient from water courses, water bodies, and associated wetlands (NRCS, undated). Deforestation associated with historic agricultural, industrial, and urban expansion in the Watershed has reduced the extent of streambank protected by forest. The result has been an adverse effect on the quality of water and aquatic habitats. In many streams of the Watershed, water is unfit for human consumption, industrial use, or recreation. These problems are linked, in part, to contamination from nutrients, sediment, and other pollutants associated with industrial, commercial, and urban runoff.

Analysis

The removal of riparian forest buffers has adversely affected the water quality and aquatic habitats of the Montour Run Watershed. In natural conditions, riparian forest buffers once protected most of the streams of the Watershed. Riparian forest buffers are crucial to the protection and enhancement of the water resources of the Montour Run Watershed. They are extremely complex ecosystems that help provide optimum food and habitat for stream communities. They are also useful in mitigating or controlling non-point source (NPS) pollution. Used as a component of an integrated management system, including nutrient management and sediment, erosion, and flood control practices, riparian forest buffers provide beneficial effects on the quality of water resources. Riparian forest buffers can retard stormwater runoff, remove excess nutrients and sediment from surface runoff and shallow groundwater, and shade streams to optimize light and temperature conditions for aquatic plants and animals. They also ameliorate the effects of some pesticides and directly provide dissolved and particulate organic food needed to maintain high biological productivity and diversity in the adjoining stream.

Recommendations

Measures should be taken to protect remaining riparian forest buffers in areas where development is occurring or imminent. They should be reestablished in areas where there are none and should be protected and enhanced in areas where they do exist.

Riparian forest buffers require proper maintenance, management, and integration with other river conservation techniques. Used as a component of an integrated management system, including nutrient management and sediment, erosion, and flood control practices, they produce a number of beneficial effects on the quality of water resources. Consultation with resource agencies charged with the protection of these resources, such as United States Department of Agriculture (USDA), United States Fish and Wildlife Service (USFWS), United States Department of Agriculture Natural Resources Conservation Service (NRCS), and Pennsylvania Department of Conservation and Natural Resources (PADCNR), will provide guidance on the establishment of a riparian forest buffer program. With that, appropriate local ordinances should be established where they do not already exist to aid in regulation and management programs to ensure the protection and perpetuation of these areas.

A standard for riparian forest buffers that should be considered is the 3-zone buffer (USDA, NA-PR-07-90). Each zone performs a particular function in protecting stream water quality. The following general criteria are applicable, in most cases, in establishing effective riparian forest buffers:

ZONE 1 - Undisturbed Forest

- Zone 1 would begin at the normal water line, or at the top of the streambank, and extend a minimum distance of 15 feet, measured horizontally on a line perpendicular to the water body.
- Vegetation in this zone provides shade and nutrients for aquatic organisms and stabilizes streambanks.
- Dominant vegetation should consist of existing or planted native trees and shrubs suited to the site and the intended purpose.
- Necessary site preparation and planting should be done at a time and manner to ensure survival and growth of selected plant species. Only viable, high quality, and adapted planting stock should be used. Site preparation should be sufficient for establishment and growth of selected species and be done in a manner that does not compromise the intended purpose.

ZONE 2 - Management Forest

- Zone 2 would begin at the edge and up-gradient of Zone 1 and extend a minimum distance of 20 feet, measured horizontally on a line perpendicular to the water body.
- This zone cannot mitigate concentrated stormwater flows; therefore, for the riparian buffer to be effective, only sheet flow or subsurface flow should reach this area.
- Dominant vegetation should consist of existing or planted native trees and shrubs suited to the site and the intended purpose. The removal of tree and shrub products such as timber, nuts, and fruits should be permitted on a periodic and regular basis provided the intended purpose of the buffer is not compromised by loss of vegetation or harvesting disturbance.
- Similar to Zone 1, necessary site preparation and planting should be done at a time and manner to ensure survival and growth of selected plant species. Only viable, high quality, and adapted planting stock should be used. Site preparation should be sufficient for establishment and growth of selected species and be done in a manner that does not compromise the intended purpose.
- The minimum combined width of Zones 1 and 2 should be 100 feet or 30 percent of the floodplain width whichever is less, but never less than 35 feet. In most instances, the combined width of zones 1 and 2 is closer to 100 feet than the minimum 35 feet.

ZONE 3 - Filter Strip

- Zone 3 would begin at the edge and up-gradient of Zone 2. The function of Zone 3 is to filter sediment, absorb nutrients, and convert concentrated stormwater flows from upland sources into sheet flows.
- Filter strips have highly variable widths which are dependent on individual site conditions, but should be a minimum of 20 feet wide.

6. Proposed Montour Greenway Project

Existing Conditions

Creation of a Montour Greenway has been proposed by HOLT. The objective is to preserve a natural corridor of undisturbed open space, or "greenway," along both sides of Montour Run and the Montour Trail. The proposed Montour Greenway corridor extends from Route 51 in Coraopolis through the townships of Moon, Robinson, Findlay and North Fayette to the Allegheny/Washington County line at Champion, Pennsylvania. The corridor is comprised primarily of undeveloped steep wooded slopes and ravines on both sides of Montour Run. This includes the stream's tributaries, environmentally sensitive wetlands, and areas of biological significance. The rich limestone slopes support a central mesic forest community of mature sugar maple and oak. A high diversity of plants, including trillium, hepatica, ginger, trout lily, violet woodsorrel, jack-in-the-pulpit, maidenhair fern, and bladdernut are present among bedrock outcroppings. These rocky areas provide a unique habitat and enhance the aesthetic quality of the land, offering a refreshing contrast to the highly developed suburban areas that surround some portions of Montour Run.

Analysis

Greenway projects around the country are providing environmental, recreational, educational, and economic benefits to their surrounding communities. In addition to these benefits, studies by Charles Fausold for the Lincoln Institute of Land Policy and Holly L. Thomas, Senior Planner for Dutchess County, New York, among others, have shown that protected open space can have a positive impact on adjacent property values. The concept for the Montour Greenway project has been reviewed and supported by the Allegheny County Greenways Program. Greenways are established by a combination of tools including zoning (Conservation Zone), ordinances (protection of steep slopes, floodplains, and wetlands), and acquisitions or conservation easements.

Recommendations

The Montour Greenway should be established to preserve the biodiversity of the Montour Valley, help to sustain the water quality of Montour Run (currently known to support fourteen species of fish), protect the aesthetics that enhance the Montour Trail, and secure educational and research opportunities for school programs and scientists.

7. Biotic Assessment in Nearby Areas

There are two biotic assessments occurring in areas in an adjacent watershed. The first is being conducted by Bayer Corporation on its campus in the Chartiers Watershed and is meant to guide the Corporation in developing plans for campus usage. Some cataloguing of species has already occurred; at the time this report was drafted, no completion date had been set for the study.

The second assessment is of the portion of Settler's Cabin Park under lease to the Horticultural Society of Western Pennsylvania. This location also is in the Chartiers Watershed, but because of its close proximity to Montour Run, it is likely that similar species of plants and animals will be found. This assessment is far more extensive than the one at Bayer. It began in the spring of 1998. The study was designed by the Carnegie Museum of Natural History and was led by a professional field biologist using a team of volunteers. Results of the assessment and its methodology will be made available to the public upon conclusion of the study.

C. Cultural, Recreational and Educational Resources

1. Cultural Resources - Archaeological

Existing Conditions

The area encompassed by the Watershed has a rich cultural history. The prehistoric human occupation of the area began over 15,000 years ago. Historic records document less than the last 300 years of this occupation. All earlier inhabitants of the region are known only through the archeological record. Traditionally, the regional prehistoric culture sequence has been divided into a series of periods defined by differences in artifact types and styles, settlement patterns, and economic strategies (Kent, et al. 1971). Recent research (Custer 1984; Gardner 1982) has suggested a reorganization of this scheme into phases, emphasizing adaptive responses to environmental changes as the distinguishing aspects between phases. These phases include the Paleo-Indian/Early Archaic Phase (initial occupation of the region to approximately 5000 B.C.) and the Middle Woodland/Late Woodland Phase (500 B.C. to historic contact).

There are nine previously recorded archaeological sites located within Montour Run Watershed. Pennsylvania Archaeological Site Survey (PASS) files are maintained by the Bureau of Historic Preservation (BHP), and the Pennsylvania Historical and Museum Commission (PHMC). Archaeological resources are protected by Federal and state law; therefore, exact site locations cannot be made public information.

Previously recorded sites are those that have been located and identified by local informants and/or collectors, or through a systematic survey by professional archaeologists. The sites recorded in the PASS files include: the "Wick's Bluff," "Wick's Bluff 2," "Wicks Bluff 3," and "Wicks Bluff 4" sites; the "Clinton" site; the "Airport Runway" site; the "Airport Farmstead" site; the "Hrishenko Farmstead;" and an unnamed prehistoric site. All but two of the sites are prehistoric sites; the two historic sites are both classified as farmstead sites. The prehistoric sites range in

age from the Late Archaic through the Woodland periods. The historic sites both consist of either foundations and/or artifacts related to 19th century farmsteads. None of the recorded sites were determined eligible for listing in the National Register of Historic Places.

Analysis

Through the identification of several archaeological sites, research has indicated that the Montour Run Watershed does contain evidence of prehistoric human occupation. Therefore, it can be safely assumed that the Watershed also contains additional archaeological sites that have not yet been discovered.

There are many causes of archaeological site damage, including natural forces such as erosion, weathering, and flooding; human actions such as vandalism, looting, and lack of knowledge; institutional actions such as mining, land modifications, and land development; and incompatible laws, regulations, and procedures (Henry 1993).

None of the previously identified sites within the Watershed has been determined eligible for listing in the National Register of Historic Places; therefore, there are no state or Federal regulations that legislate their protection or preservation. Additionally, unless state or Federal funds are involved in a development plan, there is very little legislation that can protect any potential archaeological sites that may be located within the Watershed.

Recommendations

The most effective tools for cultural resource preservation are education and public awareness. If the community is made aware of and develops an interest in its cultural heritage and potential archaeological resources, steps can be taken to help protect any known or potential resources at the local level. Local laws or ordinances that can protect a community's archaeological and historic heritage represent public consensus and ideally should function within the context of broader community goals for economic growth and diversity (Henry 1993).

Basically, archaeological site protection strategies limit the kinds of activities that can occur on a piece of land that contains a previously recorded site, or require that archaeological site assessments be conducted if local planning commissions determine there is a likelihood for the parcel to contain archaeological resources. Limiting development may cause tension within the community, however, and could be seen as infringing on the rights of landowners to use their land. Therefore, it is imperative that any cultural resource preservation plan is an integral part of a community's short term and long term goals, and that these goals are determined in an educated and democratic manner. Planners educated and experienced in cultural resource management should be a part of any planning committee that wants to effectively preserve and protect a community's cultural heritage.

2. Cultural Resources - Historic

Existing Conditions

The history of the Watershed can be divided into the histories of Moon, Findlay, North Fayette, and Robinson Townships and the Borough of Coraopolis. There are currently no properties within the Montour Run Watershed listed in the National Register of Historic Places. However, three resources within the Watershed have been determined eligible for listing in the National Register of Historic Places. These resources are the Greater Pittsburgh Airport in Moon Township, the Adams House in Findlay Township, and the Montour Railroad in Allegheny and Washington Counties. A portion of the Montour Railroad has since been converted to a Rails-to-Trails project within the Watershed by the Montour Trail Council. In a letter dated February 10, 1992, the PHMC determined that trail usage of the bridges, tunnels, and rail right-of-way would not constitute an adverse effect on the National Register eligible resource. In addition to these eligible structures, there are also several structures that are of local interest and significance that are discussed below for their appropriate Township.

Moon Township

Moon Township extends from Beaver County at its western border to Montour Run on the east. The Township is supposedly named because of the crescent shaped bend of the Ohio River at this point. Land surveys were conducted in the area as early as 1769 by Henry Montour, reputedly a 3/4 blood Native American Indian who served as an interpreter and was prominent in local Indian affairs. Moon Township was one of Allegheny County's seven original townships established in 1788. It has since been reduced in size through the incorporation of Findlay Township (1822), Crescent Township (1855), and Coraopolis Borough (1886). Robert Vance was probably the first white settler in the area at an undetermined late 18th Century date. He built "Vance's Fort" blockhouse for protection from Indians. Other early settlers were largely Scots Presbyterian farmers. Agriculture became the long-standing primary pursuit of Moon Township residents. Coal mining had minimal direct impact on the Township in comparison with nearby municipalities. In the early decades of the 20th Century, farms became estates.

The establishment and evolution of Airport facilities in the southwestern portion of Moon Township encouraged other large scale land developments. The original World War II era U.S. Army runways eventually became part of the Pittsburgh International Airport. The Airport generated development in the form of hotels, general commercial centers, and extensive residential development in the previously sparsely populated Township. Recent growth has brought great change to this sprawling Township which retains much open land simply because of its great expanse. The old terminal building of the Pittsburgh International Airport (formerly the Greater Pittsburgh International Airport) has been determined eligible for listing in the National Register of Historic Places (10/17/96) because of its significance in the history and development of the region.

One of the documented structures of local interest and significance in Moon Township is the Scott House located on Montour Run Road. The house is a five-bay, 2 story brick house on a stone foundation on a steep hillside and is Moon Township's most intact 19th Century farmhouse. The property has belonged to the Scott family since the late 18th Century when it was granted to them for service in the Revolutionary War. A small cemetery located on the property has one of the oldest (1786) clearly marked gravestones in Allegheny County. As of this writing, the property is being sold to a developer who has obtained subdivision rights. A decision is pending on the future of the house and cemetery.

Findlay Township

Findlay Township was established relatively early in the history of Allegheny County. Like all of the land south of the Monongahela and Ohio Rivers, Findlay Township was part of the Virginia claim until it was designated as Pennsylvania territory by a compromise in 1780. It was included in Robinson Township, Washington County, in 1781, and then Moon Township, Allegheny County, at the latter's inception in 1788. It incorporated separately from Moon Township in January 1822. During the 19th Century the Township was purely a coal mining and agricultural area. Some of the early residents were: Morgan, Steward, and the McNalls, McAdams, Maloneys, McBrides, Swearingens, and Burns. Early institutions in Findlay included a log school house (built circa 1795). A grist mill was in operation along Montour Run, south of Imperial, by 1836. There were 64 voters within the Township. The Township grew, primarily because of the rich bed of bituminous coal beneath it. Mining began in the mid-19th Century. The Imperial Coal Company operated three mines by 1889 and controlled the Montour Railroad, constructed in 1878. A coke-works was located along the Railroad near Montour Junction. The Railroad carried passengers as well as coal, thereby facilitating development along its route. The Township grew slowly as mining continued into the 20th Century. Most of Findlay's deep shaft coal mines were worked out by the 1930's, when the practice of strip mining became common, especially as the demand for coal surged prior to World War II. Further development of Findlay Township was hindered primarily by the expansion of Pittsburgh International Airport and the growing use of the Township for waste dumping.

Findlay Township contains one structure that has been determined eligible for listing in the National Register of Historic Places. This structure, the Adams House, is located on Aten Road and is presently referred to as Hill Top Farm. The house is a one-story, 5-bay brick house built from 1841-1860 in the vernacular Greek Revival style. It is one of the oldest extant houses in the Township and is the most finely detailed with bridged chimneys, embellished gable end windows, and stone lintels and sills. This house is considered perhaps the best representative of early 19th century life in Findlay Township. There are also three locally historically significant structures of particular note located within Findlay Township. The first, the McAdow-McAdams House, is the only apparent extant log house in the Township. It was built by one of the Township's earliest settlers, John McAdow, who came to the area in 1774 with his brother. The date of construction of the house is undetermined, although it is thought to predate 1800. As of October 1983, when a structure survey was conducted, the house was owned by the West Allegheny

School District and faced an uncertain future in terms of preservation. Since that time, it has been determined that the cabin is still owned by the West Allegheny School District and is on Wilson Elementary School property. The cabin is used for classroom space and for special functions such as open houses. There are no plans to further improve the interior, but a Victorian herb garden and an amphitheater classroom have been constructed outside. An action committee has been developed to construct a landscaped trail connecting the cabin to the Montour Trail as part of an environmental education program. Another early house is located on Moon-Clinton Road and, in 1983, was owned by James L. Hamilton, Jr. The house, a 5-bay brick farmhouse, is considered one of Findlay Township's few extant pre-1850 houses which retains a fair amount of architectural integrity on an undeveloped site. The third structure, the McNall House, is located on Burgettstown Road and supposedly was the residence of one of the Township's early settler families, the McNalls. Although the architectural integrity of the house has been considerably altered, it is one of the Township's oldest structures.

North Fayette Township

North Fayette Township was formed from Fayette Township, formerly a portion of Moon Township, in 1846. Early settlers included Alexander McClelland and Col. Henry Noble, for whom Noblestown Road was named in 1773. In its early days, Fayette Township was known for its flour mills and flatboats, as well as for its Indian encounters. In 1778 Fort Turner was built near what is now the intersection of Routes 22 and 30 as a protection from the Indians. North Fayette contained fertile farmland and petroleum. The Township was also one of the richest areas of bituminous coal in the Commonwealth. The majority of the coal was extracted along the Montour Railroad Line. The Township has continued to grow and develop along its railroad and roadway corridors.

Robinson Township

Robinson Township, named for Robinson Run stream, was founded in 1801 when it split from Fayette Township. The first known permanent settler in Robinson was James Bell, of Scottish origin, who was captured by Indians when he was 14. He lived with the Indians until 1768. In the late 1700's the Steubenville Turnpike and Clinton Grade Road crossed the Township from east to west, and the Pennsylvania and Lake Erie Railroad crossed the northern border. An early industry in Robinson Township was the Mansfield Coal and Coke Co., which operated mines in the late 1800's.

Coraopolis Borough

Coraopolis Borough was founded in 1886. The first permanent settler was Capt. Robert Vance, who in 1795 built a log stockade building and a stone blockade to protect the area against Indian raids. Community development in Coraopolis (known as Middletown until 1886) gradually coincided with the building of the Pittsburgh and Lake Erie Railroad in 1877. In 1892 community

development flourished with the construction of the first high speed electric street railway in the United States. Research indicates that Coraopolis took its name from the Greek word for "Maiden City."

Analysis

Historic resources within the Watershed include several structures of local historical interest and three resources that have been determined eligible for listing in the National Register of Historic Places. The eligible structures are the Greater Pittsburgh Airport in Moon Township, the Adams House in Findlay Township, and the Montour Railroad in Allegheny and Washington Counties. There are currently no resources within the Watershed that are listed in the National Register of Historic Places or the PA Museum and Historic Commission's Register of Historic Places.

Recommendations

Traditionally, historic resources inspire much more active preservation and protection plans because, unlike most archaeological resources, they are a visible and tangible part of the past to which the community can easily relate. However, similar to archaeological resources, unless state or Federal funds are involved in a development plan, there are few regulations in place to protect these resources unless they are legislated at the local level. In many local communities the major legal mechanism for protecting historic properties is an historic district ordinance. An ordinance such as this allows the local government to monitor and limit development that may result in the destruction of historic resources. Developing a comprehensive plan for the community that combines economic development, growth, and preservation is the best tool for communities to effectively manage and preserve their cultural resources.

Education and public awareness again play the most important role in any cultural resource preservation program. The best way to educate the community about their cultural heritage and resources is to use them. A perfect illustration of this method is the preservation and use of the McAdow-McAdams House in Findlay Township, currently owned and used by the West Allegheny School District. The fortuitous placement of the property on the Wilson Elementary School property makes it the perfect tool to teach and encourage historic preservation to the youngest members of the community. The development of an action committee for the construction of a trail linking the cabin to the Montour Trail as part of an environmental education program is a positive, proactive step towards educating the community and raising awareness that can and should be emulated.

3. Recreation (See Figure 5 - Cultural, Recreational, and Educational Resources)

Existing Conditions

a. The Montour Trail and Proposed Panhandle Trail.

The main recreational activity within the Montour Run Watershed involves the use of the Montour Trail. The Montour Trail is a converted hiking trail and bikeway located on the grade of the

former Montour Railroad. Within the Watershed, 11.5 miles of the Trail follows Montour Run from Route 51 near the Ohio River to the end of the Watershed and into Washington County.

Within the Watershed the main Trail access points are at Groveton (mile post 0), Hassam Road near the Forest Grove Sportsmen's Club, Beaver Grade Road, along Montour Run Road, Cliff Mine Road, Enlow Road, Imperial, and Boggs (mile post 11.5). Bike rental shops are located near the Trail access point at Imperial and Beaver Grade Road. In 1997 use of the Montour Trail within the Watershed was estimated at 70,000 people for the year. For 1998, it is projected that over 100,000 users will have used the Trail. When completed, the multi-use, non-motorized, recreational rail-trail will extend 54 miles from Coraopolis to Clairton, Pennsylvania. Ultimately, it will be the beginning link of a system of trails connecting Coraopolis with Washington, D.C.

The Montour Trail Council is exploring the possibility of developing an additional trail dubbed the "Panhandle Trail," if the Norfolk Southern Railroad relinquishes its right-of-way. It would utilize the abandoned Panhandle Division, formerly of the Pennsylvania Railroad, from Carnegie, PA to Weirton, WV. This trail project offers exciting potential for recreational and tourism development.

The Panhandle Trail would connect the Montour Trail and consequently the Montour Run Watershed region to the City of Pittsburgh. It would connect this same area with the Botanical Garden of Western Pennsylvania (and its eventual 500,000 visitors) under development in Settler's Cabin Park in North Fayette. The Panhandle Trail would also create a circle tour loop of 40 to 50 miles of trail for off-road biking and hiking.

The Island Sports Complex on Neville Island could also be linked to area resources by the Montour Trail.

b. Local Parks

Several local parks, at least five acres each in size, are located within the Watershed. These include Moon Township Park in Moon Township; Groveton Park and Fawn Acres, in Robinson Township; and Aten Park, Old Ridge Park, Westbury Township Park, and Imperial Park in Findlay Township. Facilities located in the parks generally include playground equipment, ballfields, and picnic areas.

c. Golf Courses

Golf plays an important role in the local recreational scene. Courses in the Watershed include the Montour Heights Country Club, Cherrington Golf Club, Scally's Golf Course, and the Bon Air Golf Course, all located in Moon Township.

d. Sportsmen's Clubs

Two sportsmen's clubs are located along Montour Run. They are the Coraopolis Sportsmen's Association near Groveton Park in Robinson Township and the Forest Grove Sportsmen's Club near Hassam Road in Robinson Township. Both clubs are located within the Montour Run Valley Landscape Conservation Area and have frontage on Montour Run.

e. Fishing

Montour Run supports a year-round fishery for many popular species, including carp, catfish, bass, and trout. The Forest Grove Sportsmen's Club has been stocking trout in Montour Run since 1991. While Montour Run does not meet the Pennsylvania Fish and Boat Commission's (PFBC) criteria for "Approved Trout Waters" because of continued water quality deficiencies, it has become a very popular put-and-take trout fishery. The Club also sponsors an annual trout tournament which is held at their facility adjacent to the Montour Run. In 1998 this tournament drew approximately 400 participants.

As mentioned earlier, the confluence of Montour Run with the Ohio (locally known as the Lagoon) is a popular and productive fishing area. However, in 1998 officials with the Ohio River Valley Water Sanitation Commission (ORSANCO) have recently advised area residents to use caution when consuming certain kinds of fish caught in the Ohio River. ORSANCO recommends eating Ohio River walleye, sauger, white bass, and freshwater drum no more than once a month because of PCB contamination (The Record, April 8, 1998).

Analysis

Trails and their associated usage are a popular amenity for citizens and visitors alike in the region. According to a survey conducted of Moon Township residents, the most popular activities for the adults surveyed were biking and hiking (Moon Township Parks and Recreation Board, 1993). In addition, a trail system can provide non-motorized vehicular access to various points throughout the community, an important issue in providing recreational opportunities, encouraging healthy activities, and reducing pollution by making it possible for pedestrians and cyclists to move about safely and pleasantly. Trails are proven economic generators, as demonstrated by the many small businesses that typically spring up adjacent to trail access points. The Montour Trail follows Montour Run, and in some places is being seriously eroded by flood waters. Parking areas, while currently adequate, are likely to become over crowded as the popularity of the Trail continues to grow.

There are several local parks in the Watershed that offer both passive and active recreational opportunities, but none have direct access to the Trail. Local parks are generally well maintained and most neighborhoods have access to a park, albeit primarily by automobile.

The area is well served by golf courses, three of which are open to the public.

The sportsmen's clubs serve a dedicated membership and maintain important parcels of green space, but their facilities are threatened by flooding and erosion.

Fishing is a popular activity but constrained by problems related to flooding, erosion, and contamination.

Recommendations

Presently, the Montour Trail is a primary recreational component within the Watershed. Where possible without compromising resource values, additional links should be constructed from the main Trail to public parks, existing residential, commercial and light industrial developments within the Watershed. The main Trail should also be extended northward to Coraopolis. This would provide a direct link not only to the residents and existing businesses in Coraopolis, but also to the Coraopolis Economic Revitalization Corporation's (CERC) proposed Rivers, Rails, and Trails project. Linking the Trail to a community such as Coraopolis may also serve as an economic catalyst for the opening of new restaurants, bicycle rental/sales shops, and bed and breakfast establishments. The Montour Trail should also be extended southward and eastward beyond the Watershed to interconnect with the Panhandle Trail and Youghiogheny River Trail. This would complete yet another link in the regional trail system that will ultimately connect the southwestern Pennsylvania trail system with Washington, D.C.

Local, county, and state officials should determine what adjustments to the stormwater management regulations may be necessary to stem the increased frequency of flooding and streambank erosion that results in the destabilization of portions of the Montour Trail.

Bird observation areas should be established along the Trail system with tour books and maps prepared with the support of the local municipalities.

Coraopolis Sportsmen's Association and Forest Grove Sportsmen's Club should be assisted in promoting activities ranging from outdoor shooting sports to trout fishing along Montour Run to environmental education projects.

For additional recommendations see **Section III.G. - Existing and Potential Economic Impacts of Tourism and Recreation.**

4. Educational Resources (See Figure 5 - Cultural, Recreational and Educational Resources)

Existing Conditions

a. Environmental Educational Field Programs

The three school districts within the Watershed have all shown continued interest in having their environmental sciences programs include some level of field work/research associated with Montour Run. These school districts are Moon Area, Montour, and West Allegheny, and their

research is encouraged and supported in part by the Bayer Corporation and HOLT.

The Moon Area School District has a long history of monitoring the Watershed. In the 1970's a group of students from the Moon Area High School, under the directions of the Advanced Biology Department, spent several years testing for abandoned mine drainage and coliform content in the Watershed. For the past three years the Honors Biology II students have monitored various tributaries of the Montour Run (Enlow Run, Meeks Run, McClaren's Run i.e.) and Montour Run itself for water quality. Specifically, testing was performed to monitor abandoned mine drainage, Airport deicing contaminants, and general water quality.

The Moon Area School District also has a school-wide environmental education program which uses community parks for site studies. The elementary students visit Robin Hill Park (located north of the Watershed) once a year to participate in environmental activities with a focus on habitats and recycling. The high school biology students make an annual trip to Moon Park, located at the headwaters of Meeks Run, for environmental studies and to sample and test the water in the stream and a pond for pH, water flow, and biological parameters. Moon Area High School also requires each student to complete a senior research project, and several students have chosen the Watershed as the basis for their research. They have prepared formal reports and presented their findings to local community groups.

For the 1998-1999 school year Moon Area School District hopes to offer its high school students a more in-depth study of environmental science by using the Montour Run Watershed as a classroom, instead of the current one-day types of programs. Goals of this enhanced program include providing opportunities for students to participate in significant research that relates to their community; cultivating and developing research techniques and skills in science; and documenting the biology, chemistry, and geology of the Watershed. Monitoring locations may include the Clinton Wetlands at West Fork Enlow Run; South Fork of Montour Run, near the Mazzaro Landfill and Village of Imperial; McClaren's Run i.e.; and Meeks Run near Moon Township Park. Cooperative teaching activities will be initiated between the science and mathematics departments so that the students can also develop a background in statistics. The Moon Area High School also plans to display environmental data by means of a Web page to share the information collected with other school districts as well as community groups.

The Montour School District is in the final planning stages of implementing a program that will incorporate the Watershed into their environmental science program. This program will include plant identification, geologic studies, water velocity studies correlated to stream bank erosion, and water quality analysis, with the goal of the program being to increase students' understanding of the interrelationships between the biological, chemical, and geological components of a watershed. Monitoring locations will include the Montour Run between Robinson Town Centre and Groveton.

The West Allegheny School District has also been performing water quality sampling for the past few years on a portion of the Montour Run. The West Allegheny High School Campus is located near the point at which Enlow Run enters Montour Run. The high school chemistry classes have

been performing water quality sampling on campus at a point along Montour Run, just west of where Enlow Run enters Montour Run. For the 1998-1999 school year the West Allegheny School District plans to expand the program to include high school biology classes conducting surveys of the plant and animal life surrounding this monitoring location.

b. Proposed Rivers, Rails and Trails: A Steel Heritage Journey Project

The Coraopolis Economic Revitalization Corporation's (CERC) Rivers, Rails, and Trails (RR&T) project is currently in the planning/financing stage. The proposed site is the town of Coraopolis, located at the convergence of historic transportation routes. This location offers access to the Ohio River (the region's primary route to the Mississippi River and New Orleans), the historic Pittsburgh and Lake Erie rail lines, the Montour Trail, PA Route 51, and Interstate 79. CERC hopes to include the new facilities at Coraopolis as a stop for the Rivers of Steel Heritage Program that would attract tourism to an area with a rich and illustrious place in the history of railroad and river transportation. The project was initiated to reverse the economic impacts on Coraopolis caused in part by the demise of steel making in southwestern Pennsylvania.

The RR&T will develop a premiere self-sustaining facility which interprets industrial transportation history, using tools such as videotaped personal histories and artifacts, and emphasizing the interdependency of technology as exemplified by the area's steel industry and transportation.

Proposed new transportation routes to the RR&T sites would include a one-mile extension of the Montour Trail to the Coraopolis waterfront as well as a new exit ramp off I-79. The main destinations would include:

- Coraopolis Station - This historic train station would be refurbished as a visitor center. Surrounding facilities would include an Exposition and a restored freight station.
- RR&T Lang Site - The Lang Machinery site buildings would be refurbished as the RR&T Interactive Industrial Transportation Learning Center. The 130,000 square feet of covered space would allow for the display of large artifacts and supporting interactive exhibits, as well as an area where conservators would restore large-scale vintage equipment.
- Old Eagle Station/Montour Yard Recreational Area - Facilities comprising this destination area would include an excursion train, dinner train, Montour Trail stop (for the excursion train), fairgrounds, arcades, and a sports development.

Other parallel initiatives that would tie in with the RR&T project and support the Coraopolis revitalization movement would include "Main Street" revitalization of Fifth Avenue via streetscape improvements, renovation of existing residential and commercial buildings, and the promotion of

new commercial development; building facade restoration and retail development in the vicinity of Coraopolis Station; and riverside development including a new marina/boat landing and riverview dining in Coraopolis.

The new marina/boat landing would also provide access to visitors via pleasure boats or by Rivers of Steel tour boats.

Analysis

Montour Run provides educational opportunities for people of all ages. The three school districts in the Watershed have begun utilizing this resource as an outdoor environmental classroom. An essay/poster contest addressing students' understanding of the Watershed is being considered. These programs are using the students' own communities and "backyard" to increase their understanding of the inter-relationships of biology, chemistry, botany, English, statistics, and environmental stewardship.

Coraopolis is an area with a rich and illustrious place in the history of railroad and river transportation. The CERC RR&T project would be a major tourist attraction combining many facets of interactive education and recreation. The CERC RR&T project could also be a catalyst for the creation of additional economic growth opportunities for surrounding communities.

Recommendations

Programs utilizing the Watershed as an outdoor classroom should be expanded to include local college and university programs. The CERC RR&T projects offers educational, recreational and other economic growth opportunities from Coraopolis and surrounding communities, and should therefore be supported by all communities within the Watershed.

D. Land Resources

1. Geology and Soil Characteristics

Existing Conditions

The geologic character of the Montour Run Watershed has its origins in the Permian and Pennsylvanian Periods. Rock strata encountered in the Watershed are of the Upper Conemaugh and Lower Monongahela Formations. The primary members within the Conemaugh Formation are the Morgantown, the Connellsville, and the Little Pittsburgh. The primary members within the Monongahela Formation are the Pittsburgh and the Lower Redstone. The primary rock types of the Watershed include limestone, sandstone, coal, and carbonaceous shale (PADER 1982). Unconsolidated deposits of gravel, sand, silt, and clay that typically occupy the floodplains of streams exist along the periphery of streams of the Watershed.

Within the Montour Run Watershed, the abundant and very valuable Pittsburgh Coal Seam gave rise to the intensive mining in the Watershed for most of the past two centuries. The Pittsburgh Coal Seam is encountered at elevations which vary from approximately 1,200 feet near Route 60

in the northern portion of the Watershed to approximately 1,100 feet in an area along U.S. Route 22/30 in the southern portion of the Watershed. These areas have been extensively deep and strip mined, and typical strip mine topography is evident along U.S. Route 30 (GAI 1988).

Soils characteristics information was derived from the Soil Survey of Allegheny County prepared by the United States Department of Agriculture (USDA, 1981).

Within the Montour Run Watershed, areas that have not been strip mined contain remaining residual soils. These soils are the result of *in situ* (on site) weathering of bedrock and the decomposition of organic material.

Two soil associations are found in areas are dominantly unaltered by urban development and strip mines, and three soil associations are found in areas predominately altered by these activities.

Areas predominately unaltered by urban development and strip mines contain the following soil associations: the Gilpin-Upshur-Atkins association contains moderately deep and deep, well-drained soils underlain by red and gray shale on uplands and deep, poorly drained soils on floodplains; and the Gilpin-Wharton-Upshur association contains moderately deep and deep, well-drained and moderately well-drained soils underlain by shale and limestone on uplands.

Areas predominantly altered by urban development and strip mines contain the following soil associations; the Urban land-Philo-Rainsboro association contains deep, moderately well-drained soils and Urban land of floodplains and terraces; the Urban land-Wharton-Gilpin association contains moderately deep and deep, well-drained and moderately well- drained soils and Urban land underlain by gray shale on uplands; the strip mines-Guernsey-Dormont association contains deep moderately well drained soils and strip mines underlain by shale and limestone on uplands. Prime Farmland Soils are defined as soils that have the best combination of physical and chemical properties for producing high yields of feed, forage, fiber, and oilseed crops (USDA, 1981). Within the Montour Run Watershed the following soil mapping units have been identified as Prime Farmland Soils (See **Figure 6 - Land Resources/Constraints**):

- AgB Allegheny silt loam, coarse subsoil variant, 2 to 8 percent slopes;
- CuB Culleoka silt loam, 3 to 8 percent slopes;
- GlB Gilpin silt loam, 2 to 8 percent slopes;
- GpB Gilpin-Upshur complex, 3 to 8 percent slopes;
- RaA Rainsboro silt loam, 0 to 3 percent slopes;
- RyB Rayne silt loam, 2 to 8 percent slopes;
- UaB Upshur silty clay loam, 3 to 8 percent slopes; and
- WhB Wharton silt loam, 2 to 8 percent slopes.

The Allegheny variant consists of deep, nearly level to sloping, well-drained soils on old terraces; permeability is moderate, and the available water capacity is high; slope is the only limitation for land use. The Culleoka series consists of moderately deep, gently sloping to very steep, well-

drained soils on uplands; permeability and the available water capacity are moderate; the depth to bedrock and slope in some areas are limitations for land use. The Gilpin series consists of moderately deep, nearly level to very steep, well-drained soils on uplands; permeability and available water capacity are moderate; moderate depth to bedrock and slope are limitations for land use. The Rainsboro series consists of deep, nearly level to sloping, moderately well-drained soils that have a fragipan; permeability is slow, and available water capacity is moderate; the seasonal high water table, slow permeability, and slope in some areas are limitations to land use.

The Rayne series consists of deep, nearly level to sloping, well-drained soils on uplands; permeability is moderate, available water capacity is high; slope in some areas and depth to bedrock are limitations for land use. The Upshur series consists of deep, gently sloping to very steep, well-drained soils on uplands; permeability is slow, and the available water capacity is moderate; the soils are susceptible to land slide; slow permeability, the susceptibility to landslide, and slope in some areas are limitations for land use. The Wharton series consists of deep, nearly level to moderately steep, moderately well-drained soils on uplands; permeability is slow, and the available water capacity is moderate; the seasonal high water table, slow permeability, and slope in some areas are limitations for land use.

Analysis

Due to the geologic, soil, and slope conditions, many areas within the Montour Run Watershed are particularly prone to landslide. Because the nearly horizontal rock strata of the Watershed can be highly variable, the composition of the rock, bedding planes, joint surfaces, cleavage planes, and faults are inherent variables that contribute to the potential for landslides. This condition is further complicated by the change in these variables over time, which can, for example, increase rock weathering and further reduce slope stability.

Groundwater is another variable that can affect slope stability. The force exerted by groundwater, combined with the force of gravity, can contribute to the failure of a slope. Groundwater, through its occurrence and movement in joints and bedding planes, acts as a lubricant and causes a decrease in the frictional shearing resistance by reducing the normal resistance across the walls of the joints and bedding surfaces.

The character of the rock formation is another extremely important factor in slope stability. For example, within the Watershed, Pittsburgh Red Beds can be found in abundance. Pittsburgh Red Beds are a sequence of claystones (indurated clay) that are abnormally susceptible to landsliding. This rock unit is not laminated, fractures irregularly, and when weathered breaks into small, randomly shaped fragments. Streaks, zones, and other nearly flat concentrations of expandable clay minerals which may drastically affect the formation's stability are present in most places (Geyer & Wilshusen, 1982).

There are two types of landslides that have occurred in Allegheny County: earth flow landslides and rock fall landslides. Most of the landslides in the region have occurred when a slope was over-steepened, overloaded, or modified in the course of development. Typically, landslides on

natural, undisturbed slopes are caused by unusual conditions such as extremely heavy or prolonged rainfall and naturally weak rock strata. Landslide prone conditions present a development constraint because of the potential hazards to life and property. The data source for the landslide prone areas depicted on **Figure 6 - Land Resources/Constraints** is the Pomeroy and Davies Landslide Prone Areas Study prepared in 1973 and 1974 for Allegheny County.

The landslide prone areas' categories shown on **Figure 6** are defined as follows:

- **Outcrop Areas of Red Beds and Associated Rocks** - Rock weathers rapidly on exposure. Weathered rock and related soil commonly result in soil creep and landslides. Cuts and fills in Red Beds generally are not stable.
- **Man-Made Fill** - Heterogeneous soil and rock material; variable susceptibility to slope failure depending on nature of materials, foundation conditions, design and construction. Fills in older urbanized areas were mapped by Pomeroy and Davies only where associated with recent landslides.
- **Slopes with Conspicuous Soil Creep** - Clayey soils generally less than five feet thick, commonly underlain by weathered shale; characterized by shallow, slow but distinct, downslope movement that can be greatly accelerated by overloading from fills or structures.
- **Prehistoric Landslides** - Dominantly earth slumps and earth flows characterized by hummocky topography and slump benches. These areas are relatively stable in their natural state but can be reactivated by excavation, loading, and changes in ground and surface water conditions. This category includes some probable recent landslides not covered by historic records examined by Pomeroy and Davies; however, this category generally represents landslides that occurred many thousands of years ago.
- **Recent Landslides** - Dominantly earth slumps and earth flows, historically recorded or characterized by fresh scars.
- **Debris Slides** - Slides in steep narrow valleys; primarily rock, soil, and vegetation debris.
- **Steep Slopes Susceptible to Rockfall** - Dominantly thick-bedded sandstone and limestone, one foot to over ten feet thick; subordinate flaggy sandy shale and interbedded shale, highly fractured and locally undercut by weathering of shale, in steep natural and cut slopes and cliffs, 15 feet to over 150 feet high.

Slope is a major factor in determining the suitability and capability of land for development. Subsequently, as the percentage of slope increases, the range of land use alternatives becomes more limited. Development of steep slopes increases the potential for landslides, runoff, erosion, and sedimentation. Throughout the Montour Run Watershed, the topography of the land consists

of relatively level hill tops separated by stream valleys at an elevation approximately 300 to 400 feet below the hill crests. The valley walls are relatively steep; slopes of 25% (approximately 14°) or greater occupy more than one-tenth of the land area.

The characteristics that make soils types ideal for agriculture, such as the nearly level to moderate slopes and well-drained to moderately well-drained soils, also contribute to their appeal for development. In the Montour Run Watershed the majority of the areas encompassed by prime agricultural soils either have been developed or remain vacant/undeveloped lands not used for farming activities. There is not a significant agricultural industry in the Watershed, and there are no Agricultural Security Areas in the Watershed.

The Pittsburgh Coal Seam has been extensively mined, particularly along the western and southern periphery of the Watershed. Before the 1940's the majority of coal mining consisted of deep mine operations. During the 1950's and 1960's strip mining supplanted deep mine operations. Although some limited strip mining extraction of Pittsburgh Coal is still occurring, most of the coal extraction activities now occurring in the Montour Run Watershed are secondary coal recovery operations. These are most often operated in conjunction with non-coal mining construction projects. The most recent, and by far the most extensive, mining activities in the Montour Run Watershed are concentrated toward the western half of the watershed (USACOE, 1997).

As many of the mines in the Watershed were abandoned, associated problems resulting in threats to both the public safety and the environment often included subsidence/erosion/slide prone areas, open shafts or entries, abandoned refuse and/or spoil piles (both burning and non-burning), underground mine fires and associated gasses, abandoned structures and/or equipment, highwalls, open pits, and clogged streams, as well as abandoned mine drainage (AMD) which continue to degrade water quality and aquatic life.

Recommendations

Many areas within the Montour Run Watershed are prone to landslide, particularly those areas occurring along the steep sloped banks of Montour Run and its tributaries (**See Figure 6 - Land Resources/Constraints**).

Development on landslide prone areas should be avoided due to the instability of these slopes. Disturbance of these areas increases the likelihood of landslides and erosion. Existing ordinances that protect steep slopes in some of the municipalities need to be enforced more stringently. The long term costs to local municipalities and developers for restoration of potential damages from future landslides caused by disturbing these slopes could outweigh the short term benefits of allowing development. Retaining the natural vegetative cover on landslide prone areas would preserve the water quality and wildlife benefits presently provided by these areas.

With regard to past deep mining activities, the Findlay Township Zoning Ordinance and Zoning Map includes a Mined Land Overlay District. The purposes of this Overlay District are to prevent

loss of life and property damage which might result from construction on mined parcels which are prone to subsidence and to ensure that property owners contemplating development on mined parcels are informed about past mining activities which affect the parcels (Township of Findlay 1991 Zoning Ordinance). Other municipalities that might be affected by past deep mining activities could consider the development of similar additions to its zoning ordinance and zoning map. Municipalities could work with the PADEP Bureau of Mines and Reclamation to identify areas of past mining activity.

2. Landfills (See Figure 6 - Land Resources/Constraints)

Existing Conditions

One major landfill exists within the Montour Run Watershed, the Browning Ferris Industries (BFI) Landfill, located in Findlay Township. This landfill has been constructed in areas of abandoned strip mines.

Analysis

The reclamation of abandoned strip mines as landfills has had a secondary beneficial effect in the reduction of acidic mine drainage. During construction of landfills, acid producing materials including residual coal may be removed, resulting in an exposure of the alkaline limestone rock strata. Any remaining acid-producing runoff is neutralized by the alkaline strata, resulting in a net reduction in acidic mine drainage. Landfills that are designed and constructed in accordance with current Federal and state regulations are self-contained and should not leach contaminants into the groundwater.

Recommendations

Encourage BFI Landfill to continue its resource stewardship to ensure that contaminants do not reach the groundwater.

3. Hazardous Waste Areas (See Figure 6 - Land Resources /Constraints)

Existing Conditions

The United States Environmental Protection Agency (USEPA) maintains the Superfund National Priorities List (NPL) to inform the public of uncontrolled hazardous waste sites that warrant investigation to determine if they pose risks to human health and the environment. If sites are placed on this list, they are eligible for long-term remedial action financed under the Superfund Trust Fund. A new Congressional mandate requires USEPA to receive written permission from the state Governor before a state agency can propose or finalize sites to the NPL.

One site listed on the NPL is located within the Montour Run Watershed. The Breslube-Penn Inc. site (CERCLIS No. PAD089667695) is located on Montour Road in Moon Township. The site was proposed for listing on the USEPA's NPL in September 1994. The property is approximately 5 acres in size and has been inactive since late 1991. Five sources of hazardous waste were identified at the site, which had been used as an oil recycling facility. The hazardous waste

sources included storage tanks, staged contaminated waste, a filter cake disposal area, a waste pile, and a backfilled lagoon.

Analysis

The USEPA conducted a removal action at the site in the Summer of 1994. The Pennsylvania Department of Health (PADOH) concludes that the site is no apparent public health hazard.

Recommendations

The United States Department of Health (USDOH) recommended that the storage tanks be secured or dismantled to prevent possible physical injury to trespassers. The PADOH recommended the USEPA secure the area with a fence that completely surrounds the site. PADOH further recommended that the USEPA sample onsite surface soils for PCB contamination, sample Montour Run surface water for lead, and sample Montour Run sediments for PCB's. The Agency for Toxic Substances and Disease Registry (ATSDR), Health Activities Recommendation Panel (HARP), reviewed the data and information and determined that people were not being exposed to contaminants at the site at levels that would be expected to cause illness. No follow-up health actions were recommended as of October 2, 1996.

4. Ownership

The largest single public land holding in the Montour Run Watershed is Allegheny County's Pittsburgh International Airport (PIA), which comprises approximately 6,664 acres (or approximately 29%) of the Watershed. Other lands include publicly-held parks and other recreational areas such as golf courses and swimming pools, as well as municipally owned properties such as administrative buildings and schools. An example of these publicly-held lands is the Moon Township Park, situated near the headwaters of Meeks Run and owned by Moon Township. The Park represents land that has been set aside by the Municipality for recreation and is land that has the potential to be protected for its natural qualities.

The vast majority of the remaining 16,620 acres of property within the Watershed is privately held. This constitutes approximately 71% of the total land area. The Montour Trail comprises approximately 91 acres (or less than 1%) of the Watershed. The Montour Trail consists of an abandoned rail line converted to a multi-use, non-motorized, recreational rail-trail that is open and accessible to people of all ages and physical abilities. Trail uses include bicycling, walking, running, cross-country skiing, wildlife viewing, and all forms of nature appreciation.

There are two areas within the Watershed that are recognized for their environmental significance. They are the Montour Run Valley Landscape Conservation Area and the Clinton Wetlands Biological Diversity Area. These areas are comprised of numerous small privately-owned parcels, as well as Moon Township Park, which is owned by Moon Township and considered public land. See Section III.B. - **Biological Resources** for a description of these two areas.

E. Land Use/Land Cover Patterns

Existing Conditions

Existing Land Use/Land Cover for the Watershed was determined from Geographic Information Systems (GIS) databases provided by the Allegheny County Departments of Health and of Computer Services and by the Southwestern Pennsylvania Regional Planning Commission (SPRPC). The Land Use/Land Cover patterns are shown on **Figure 7 - Existing Land Use/Land Cover**. A breakdown by category, area, and percent of the Watershed is listed in **Table 2**.

Table 2. Land Use/Land Cover in the Montour Run Watershed.

Category	Percent of Watershed	Acres
Water	< 1	7
Transportation	10.3	2,389
Forest	48.5	11,291
Grassland/Open Space	7.5	1,752
Agriculture/Pasture	12.1	2,824
Low Density Residential	11.3	2,630
Medium Density Residential	< 1	110
High Density Residential	< 1	10
Commercial	< 1	133
Light Industrial and Offices	1.2	290
Strip mines	4.0	937
Non-vegetated	3.9	911
Total	100%	23,284

Note: Agriculture/Pasture land cover includes disturbed old field vegetation that is not actively used for agricultural purposes.

Analysis

A review of the land use patterns in the Watershed revealed three distinct areas of development, all interconnected by the Montour Trail and Montour Run. These areas are discussed as the East Watershed, Central Watershed, and West Watershed and depicted on **Figure 1 - Project Area**.

1. East Watershed - Lower Watershed

The East Watershed is defined as that area between Coraopolis/Ohio River and the Airport Parkway Corridor. This area represents the lower one-third of the Watershed from the mouth of Montour Run near the Neville Island Bridge to the intersection of Hookstown Grade Road and Montour Run Road near the YMCA.

Undeveloped land dominates this section of the Watershed. Historic land uses include agriculture, industry, and a former railroad which is now the Montour Trail. It is likely that developers avoided this area due to the difficulty and expense of developing here caused by environmental constraints and lack of access and utilities. Having not been extensively developed, this section of the Watershed continues to be home to plants and animals common to Western Pennsylvania prior to European settlements. Therefore, it was designated as a "High Significance" Landscape Conservation Area (LCA) by the Western Pennsylvania Conservancy in 1994.

The Frank A. Santucci Conservation Area and Meeks Run Conservation Area are also situated within the LCA. Both of these properties are owned by the Hollow Oak Land Trust ("HOLT") and are open to the public for non-motorized recreation and educational activities. Other recreation facilities in the LCA include a portion of the Montour Trail and Montour Run, Moon Township Park, Groveton Park, Coraopolis Sportman's Club, and Forest Grove Sportsmen's Club. Public and private golf courses are also located within the East Watershed but outside the boundaries of the LCA.

With regard to developed land use, low density residential neighborhoods are the prevalent developed land use in this portion of the Watershed. These residential subdivisions are typically located on relatively flat hilltops and ridge lines. The outer boundaries of these subdivisions are often defined by environmentally sensitive areas such as steep slopes, landslide prone areas, and stream valleys. There are also medium density residential neighborhoods located in Groveton and within that portion of Coraopolis that is in the Watershed.

Flooding episodes in the lower Watershed in areas such as the Forest Grove Sportsmen's Club, Groveton Park, and the Lagoon area have increased in frequency over the past several years (See **Section III. A. Water Resources**). Factors that could contribute to increase flooding include the removal of forests and other natural vegetation and replacement with buildings, pavement, grass, and stormwater management facilities. This decreases the amount of surface area in which precipitation can infiltrate and be absorbed by the ground. Some stormwater management facilities may not be performing as intended. In addition, the stormwater management facilities required for these developments may not be controlling release flows to stream valley tributaries to the extent that was intended by current regulations. The release of stormwater from these facilities during storms may be having the effect of concentrating flows that are too high toward too few outlet points. This condition can create an increase in volume and velocity of stormwater into the Watershed's stream channels, with the cumulative effect being the increase in flooding episodes now being witnessed downstream. Another cumulative effect is increased erosion of the

streambanks resulting in siltation in stream channels that degrades aquatic habitat and reduces the stream's capacity to accommodate stormwater which increases flooding potential. (See **Section III. A. Water Resources**).

In summary, the East Watershed can be characterized as the most ecologically sensitive portion of the Watershed and one of the most biologically diverse in Allegheny County. Unfortunately, the impacts of increased water volume and velocities in Montour Run have resulted in severe streambank erosion and flooding in this portion of the Watershed (See **Figure 3 - Stream Conditions/Drainage**). Water quality and aquatic life are also being adversely impacted by upstream sources..

2. Central Watershed - Airport Parkway Corridor

The Central Watershed is defined as that area on both sides of the Airport Parkway Corridor, Business Route 60 Corridor, and the Southern Expressway Corridor, inclusive of the Pittsburgh International Airport (PIA) property. This area occupies the middle third of the Watershed and includes the RIDC Park West, The Pointe at North Fayette, Robinson Towne Center and the Pittsburgh International Airport Complex. This area was once dominated by forest and agricultural lands.

Land use changes in the Central Watershed have accelerated with the completion of the PIA Terminal Buildings and the Southern Expressway in 1991. The PIA encompasses approximately 80% of the Central Watershed. When viewing the Watershed as a whole, of the total 23,284 acres of land in the Watershed, 6,664 acres (29%) are PIA property owned by Allegheny County. Approximately 50% of the PIA property is currently in aviation use as runways, aprons, hangars, cargo areas, the Landside and Airside Terminal Buildings, and military facilities. The remaining area is comprised of the vacant terminal building/parking area, grassland, open space and forested areas. These undeveloped lands as well as the vacant terminal building/parking area are the subject of various future development proposals.

The Findlay Connector Road is the segment of the planned Southern Beltway that would connect Route 22 with the Southern Expressway (Route 60) at the PIA. This planned toll road would include a new interchange with the Southern Expressway and would lead to additional development opportunities and pressures on the Central Watershed.

The Central Watershed is the most urbanized portion of the Watershed. The Airport Parkway Corridor is dominated by commercial, light industrial, and office uses. Major commercial developments along the Airport Parkway Corridor include Robinson Town Centre and The Pointe at North Fayette. The Montour Run Road Interchange area is developing as a combination of commercial and light industrial/office uses. Commercial entities include Super K-mart, Outback Restaurant, and a new hotel. Light industrial uses, such as the RPS headquarters, the Airport Marriott, and the Regional Industrial Development Corporation (RIDC) Park West, occupy the

corridor. The light industrial/office park is essentially complete with approximately 44 industries occupying most of the 500+ acre complex.

With the completion of the Ewing Interchange currently under construction on Business Route 60, new commercial, light industrial, and office uses will continue to develop along the Parkway Corridor.

There are also low density residential developments scattered throughout the Central Watershed with concentrations along the northwest quadrant of the Montour Run Interchange as well as the Beers School Road/Beaver Grade Road area north of the PIA.

The undeveloped portion of the Central Watershed contains environmentally sensitive areas such as steeply sloped and forested stream valleys, and steep slope areas beyond the stream valleys, as well as large expanses of forest and open spaces. The Montour Trail follows Montour Run in this portion of the Watershed.

There are instances in the Central Watershed where the placement of a commercial, light industrial, or office development has required extensive grading of hilltops to create large flat topped building/parking pad areas surrounded by very steep side slopes. In some instances, the remaining steep sloped areas, once covered with forests that served to slow and absorb stormwater runoff, are left in a partially vegetated state of grass or other ground cover such as crown vetch. Eroding gullies have begun to form along some of the steep slopes because there is insufficient vegetation to hold the soil in place during storm events. The result is siltation in stream channels that degrades aquatic habitat and reduces the streams' capacity to accommodate stormwater which increase flooding potential.

In summary, the Central Watershed is the most urbanized section of the Watershed. While development in the Central Watershed has been growing at a significant pace over the past several years, environmental degradation is also occurring here and downstream.

3. West Watershed - Headwaters

The West Watershed is defined as that area situated west of the Airport Parkway Corridor and south of the Southern Expressway Corridor. This area constitutes the headwaters and occupies the upper one-third of the Watershed. This area can be characterized as the most rural portion of the Watershed.

The dominant developed land use in the West Watershed is low density residential developments. Similar to the East Watershed, these residential areas are typically located on relatively flat hill tops and ridge lines. The outer boundaries of these subdivisions are often defined by steep slopes and stream valleys. There is also a limited amount of medium density residential development within the village of Imperial.

Extensive strip mining of the Pittsburgh Coal Seam has occurred along the western and southern periphery of the West Watershed. Barren ground, brush, fields, and scrub timber now cover these areas. Several abandoned mine drainage sites have been identified in this area, all of which contribute to water quality problems in the Watershed. (See **Section III.A - Water Resources**). The Browning Ferris Industries (BFI) Landfill is also located along a portion of the western periphery of the West Watershed.

Recreation facilities in the West Watershed include Imperial Park, Aten Park, Old Ridge Park, and the Montour Trail.

In addition to vast forested areas, environmental features include stream valley tributaries, steep sloped forested areas, and the Clinton Wetland Biological Diversity Area (BDA). This BDA is located west of the Pittsburgh International Airport (See **Figure 4 - Biological Resources**) along the West Fork of Enlow Run, a tributary stream to the Montour Run. This BDA significantly contributes to the mitigation of some abandoned mine drainage that is flowing from the Clinton Deep Mine Complex (See **Section III.B - Biological Resources**).

The planned Findlay Connector Road segment of the Southern Beltway will also pass through the west reaches of this portion of the Watershed and include a new interchange with Route 30.

To summarize, the West Watershed can be characterized as the most rural portion of the Watershed. Large expanses of undeveloped lands contribute to this rural quality of life, but could easily transition to a more developed condition with improved access via the planned Findlay Connector Road.

When viewing the Watershed as a whole, it has a very unique mix of development, recreation amenities, and natural areas. This unique mix can produce conflicting opinions about future development. This study provides information that can be used to help the community make educated decisions today that will lead to a better community for future generations.

Development Capacity Plan

A Development Capacity Plan (See **Figure 8**) was prepared as part of the land use/land cover analysis to schematically illustrate where development can occur without having adverse effects on the sensitive environmental resources and the popular recreational areas within the Watershed.

Factors that were accounted for during the preparation of the Development Capacity Plan included:

- Locations of the sensitive environmental resources in the Watershed.
- Existing and planned recreational amenities and educational programs.
- Existing local, state, and federal land use and environmental regulations.

- Existing land use and zoning patterns.
- Location of infrastructure such as roads and utilities.
- The inter-relationship of these factors relative to the long term economic and social well being of Watershed communities.

An analysis of these parameters leads to three generalized land use categories which are shown on **Figure 8 - Development Capacity Plan**. They are :

- Riparian Conservation Corridor
- Moderate Capacity Development Area
- Higher Capacity Development Area

Criteria for the three categories are:

Riparian Conservation Corridor - An area that contains a diverse and concentrated amount of sensitive environmental features such as surface waters, drainage ways, floodplains, National Wetland Inventory (NWI) wetlands, landslide prone areas, unstable steep slopes, biological diversity areas, or dedicated conservation areas. This area also includes recreational features such as public parks and the Montour Trail. This area holds the potential for enhanced recreational opportunities and educational programs for local and regional high schools and secondary educational institutions, given its rich biodiversity.

In the Montour Run Watershed, the sensitive environmental and recreational areas are concentrated along the streams and are linked by nature to form riparian corridors. This contiguous area is shown on **Figure 8 - Development Capacity Plan** as the Riparian Conservation Corridor (28% of the Watershed). The Riparian Conservation Corridor simply reveals the concentrated area of the most critically sensitive lands in need of protection, many of which are currently protected by local, state, or federal laws. This area is most vulnerable to adverse impacts and has a low capacity to accommodate development. The Riparian Conservation Corridor warrants protection from adverse impacts because it provides many social, environmental and educational benefits as well as hydrological functions such as flood control and water purification.

Once the Riparian Conservation Corridor was delineated, additional analyses were performed to delineate appropriate areas that have a "Moderate" and "Higher" capacity to accommodate development. The results are also reflected on **Figure 8 - Development Capacity Plan**. This process allows a logical basis on which to make decisions regarding where to build, in an effort to minimize adverse impact to the Riparian Conservation Corridor.

Moderate Capacity Development Area - An area that does not contain a concentration of sensitive environmental resources or recreational features. Frequently this area has public utilities available at the time of development. This area has a moderate capacity to accommodate development without adversely impacting the Riparian Conservation Corridor provided it follows all applicable development regulations. This area is depicted on **Figure 8 - Development Capacity Plan** as the Moderate Capacity Development Area (29% of the Watershed).

Higher Capacity Development Area - An area that does not contain environmentally sensitive areas and recreational features; and has public utilities available at the time of development. This area has a higher capacity to accommodate development without having an adverse impact on the Riparian Conservation Corridor provided the development follows all applicable development regulations. This area is illustrated on **Figure 8 - Development Capacity Plan** as the Higher Capacity Development Area (43% of the Watershed).

Protecting the Watershed's sensitive environmental resources and popular recreational areas contained within the Riparian Conservation Corridor provides significant benefits to communities. In addition to providing open space buffers between potentially conflicting uses, the Riparian Conservation Corridor increases the cumulative effectiveness of the individual resources to provide wildlife habitat, migratory corridors, erosion and sediment control, flood hazard reduction, air and water purification, climate moderation, recreational opportunities, educational opportunities and aesthetic value.

Recommendations

A protected Riparian Conservation Corridor can help avoid future need for major commitments of public and private funds to correct streambank erosion areas, repair flood damage to public and private facilities, remove siltation from streambeds and ship channels, and compensate for other avoidable degradation to the Watershed's stream environment and water quality. The recommended alternative is to act now to retain, restore, and protect the benefits the Riparian Conservation Corridor provides to Watershed communities.

The PADEP "Best Management Practices" (BMP's) should be applied to establish new policies and standards to protect natural, recreational, cultural, and educational values within each municipality. Local ordinances should be reviewed and updated to ensure that they reflect current knowledge of the impacts that can occur in areas where steep slopes are disturbed, natural vegetation cover removed, wetlands and drainage ways destroyed, landslide-prone soils disturbed, and other damaging practices occur.

Conservation approaches such as easements, transferable development rights, acquisition, riparian buffer zones, special design guidelines for resource areas, and other tools (**see Appendix D**) should be used by public agencies and private organizations to ensure permanent protection for particularly sensitive areas.

A watershed association or other public-interest entity that encourages participation by individuals, organizations, municipalities, and developers should pursue formal establishment of a Greenway as defined by the Pennsylvania Environmental Council's "Creating Connections: The Pennsylvania Greenways and Trails How-To Manual" (1998). The resources identified in the Riparian Conservation Corridor should be included in the Greenway to the extent practical.

F. Planning and Zoning

1. Planning and Zoning Controls

Existing Conditions

All of the municipalities in the Montour Run Watershed have some level of planning and zoning controls to direct growth (Table 3).

Table 3. Planning and Zoning Controls

Controls	Findlay Township	Moon Township	N. Fayette Township	Robinson Township	Coraopolis Borough
Comprehensive Plan	✓ (1997)	✓ (1991)		✓ (1997)	***
Comprehensive Parks and Recreational Plan	✓	✓		****	
Zoning Ordinance	✓	✓	✓	✓	✓
Subdivision Regulations	✓	✓	✓	✓	
Planned Unit Development Ordinance	✓	✓	✓	✓	
Housing Code		✓	✓	✓	
Building Code	✓	✓	✓	✓	
Plumbing Code	✓*	✓*	✓*	✓*	✓*
Stormwater Management Ordinance	✓**	✓**	✓**	✓**	✓**

* Adopted the Allegheny County Plumbing Code (Allegheny County Health Department Rules and Regulations Article XV).

** Adopted the Montour Run Stormwater Management Plan prepared by the Allegheny County Department of Planning, dated October, 1988.

*** Under preparation

**** Prepared in 1991, but not adopted

Analysis

The planning and zoning ordinances listed in **Table 3** were examined to determine which sensitive environmental resources are protected. A summary of the findings is shown on **Table 4**.

TABLE 4. Available Resource Protection Ordinances

MUNICIPALITY/ORDINANCE	RESOURCES									
	Floodplain	Streams	Wetlands	Steep Slopes	Landslide Prone Areas	Forest	Greenway *	Resource Protection Overlay Districts	Historic Features	Buffer Between Conflicting Land Uses
Findlay Township										
Comprehensive Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Comprehensive Parks & Rec. Plan	✓	✓	✓	✓	✓	✓	✓		✓	✓
Zoning Ordinance	✓	✓	✓	✓	✓			✓		✓
Subdivision Regulations	✓	✓	✓	✓	✓	✓				✓
PUD Ordinance	✓	✓	✓	✓	✓					✓
Moon Township										
Comprehensive Plan	✓	✓	✓	✓	✓					
Comprehensive Park & Rec. Plan	✓	✓	✓	✓	✓		✓			
Zoning Ordinance	✓	✓	✓	✓						✓
Subdivision Regulations	✓	✓	✓	✓	✓					✓
PUD Ordinance	✓	✓	✓	✓						✓
North Fayette Township										
Zoning Ordinance				✓						✓
Subdivision Regulations	✓	✓	✓		✓					✓
PUD Ordinance				✓						✓
Robinson Township										
Comprehensive Plan	✓	✓	✓	✓	✓	✓	✓		✓	
Zoning Ordinance	✓	✓	✓	✓	✓					✓
Subdivision Regulations	✓	✓	✓		✓					✓
PUD Ordinance	✓	✓	✓	✓	✓					✓
Coraopolis Borough										
Zoning Ordinance										✓

* Greenway or Conservation Corridor

In some instances, a particular resource is mentioned as being valuable and worthy of protection in a municipality's Comprehensive Plan but not in the zoning and/or subdivision regulations. This offers little or no protection to the resources since the comprehensive plan does not regulate development.

Also, a review of the ordinances revealed a disparity in the level of protection offered to the resources listed in **Table 4**. Four of the five municipalities' zoning ordinances and/or subdivision regulations offered varying levels of steep slope and landslide prone areas protection. Four of the five municipalities' zoning ordinances and/or subdivision regulations offered some level of protection for floodplains, streams, and wetlands. Forests were protected by only one municipality's subdivision regulations. None of the municipalities provides for protection of historic features in their zoning ordinances and/or subdivision regulations. All five municipalities have provisions for buffer areas between conflicting land uses.

The analysis of planning and zoning controls revealed that the level of environmental resource protection, as well as the method of administering this protection, varies between the municipalities. This can cause hardship and confusion in the development community, particularly when a large development project crosses municipal boundaries. It can also create a precarious situation for the municipalities if the development entity is considering more than one site in the Watershed, and the environmental protection regulations in one municipality are more stringent than in another municipality. Finally, this situation has resulted in undue stress on the contiguous area of sensitive environmental resources and popular recreational amenities located within the Riparian Conservation Corridor.

Recommendations

To alleviate these problems, consideration should be given to initiating a regional (or Watershed) approach that would result in a uniform method of protection for the sensitive environmental resources and popular recreational amenities located within the Watershed's Riparian Conservation Corridor.

When the next cycle of updates to comprehensive plans and zoning maps/ordinances takes place, the municipalities should give consideration to the Riparian Conservation Corridor. Updating the comprehensive plans and zoning maps/ordinances is a long term solution.

A short-term solution is to adopt a special code of voluntary or mandatory development practices for the Riparian Conservation Corridor. This code of practices would serve to minimize or avoid adverse impacts and could be embodied in an overlay type of ordinance which only applies to projects proposed within the Riparian Conservation Corridor. The overlay area could be called the Riparian Conservation Overlay District.

Drafting of an actual Riparian Conservation Overlay District Ordinance for the Riparian Conservation Corridor is beyond the scope of this study. However, following are some guidelines and principles that one may contain, derived in part from the Center for Watershed Protection's

Site Planning Roundtable publication entitled "Consensus Agreement on Model Development Principles To Protect Our Streams, Lakes, and Wetlands". The Site Planning Roundtable was comprised of a diverse cross section of development, government, and environmental professionals.

- Create a variable width naturally vegetated buffer system along all perennial streams that encompasses critical environmental features such as the 100-year floodplain, steep slopes, landslide prone areas and wetlands.
- Preserve or restore the riparian stream buffer with native vegetation. The buffer system should be maintained through the plan review delineation, construction, and post-development stages.
- Limit clearing and grading of forests and native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Encourage incentives and flexibility in the form of density compensation, buffer averaging, property tax reduction, and open space/cluster design standards should be encouraged to promote conservation of stream buffers, forests, and other areas of environmental value. In addition, off-site mitigation consistent with a locally adopted Watershed plan could be encouraged.
- Use vegetated open channels in the street right-of-way, where density, topography, soils, and slopes permit, to convey and treat stormwater runoff.
- Reduce the overall impervious area associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in the spillover parking areas where possible.
- Provide meaningful incentives to encourage structural and shared parking to make it more economically viable.
- Wherever possible, provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into landscaping areas and traffic islands.
- Encourage landscaping requirements that would reduce stormwater runoff volumes and velocities.
- Advocate open space design development incorporating smaller lot sizes to minimize total impervious area, reduce total construction costs, conserve natural areas, provide community recreational space, and promote Watershed protection.
- Relax side yard setbacks and allow narrower frontages to reduce total road length in the community and overall site imperviousness. Relax front set back requirements to minimize driveway lengths and reduce overall lot imperviousness.

- Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together.
- Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing rooftop runoff to the roadway and the stormwater conveyance system.
- Design residential streets for the minimum required pavement width needed to support travel lanes; on-street parking; and emergency, maintenance, and service vehicle access. These widths should be based on traffic volumes.

Another alternative would be for municipal staff and officials to encourage developers to use these development principles and guidelines on a voluntary basis when proposing development within the Riparian Conservation Corridor. A watershed association should be formed to monitor closely development that could be detrimental to the sensitive environmental resources and popular recreational amenities in the Riparian Conservation Corridor. The association would work closely with municipal officials and developers.

Consideration of any of these options for protection of the sensitive resources and popular recreational amenities in the Riparian Conservation Corridor would not require the purchase of land contained within its boundaries. The Riparian Conservation Corridor identifies a contiguous area of land most in need of protection. The individual resources comprising the Riparian Conservation Corridor have already been protected in most of the municipalities' zoning ordinances and/or subdivision regulations.

There are several types of zoning and subdivision regulations that could be used by the municipalities to provide incentives to developers and property owners that will result in stewardship of the Riparian Conservation Corridor. These regulations are generally intended to provide developers increased design flexibility while protecting environmentally sensitive resources:

- Performance Zoning
- Natural Resource Protection Provisions or Net Out
- Lot Averaging
- Open Space/Cluster Zoning
- New Village Zoning
- Provisions for Narrow Sideyards and Front Yards

- Transfer of Development Rights
- Differential Assessment

Descriptions of these zoning and subdivision tools appear in **Appendix D**. Some of these regulations are already contained within the zoning ordinance of one municipality. In addition, many of these regulations are described within another municipality's Comprehensive Plan, but have not yet been prepared for inclusion in their Zoning Ordinance.

Public and private conservation interests could use the Riparian Conservation Corridor as a target area around which they could continue building a systematic program for purchasing lands or conservation easements for preservation, open space, and/or low impact recreation. Conservation easements are an effective tool for protecting resources important to the community, while lands remain in private ownership. Acquisitions could be linked to present or future local and county parks.

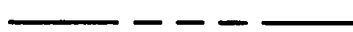




2. Green Space Compared to Conventional Subdivision Plans

The previous list of overall recommendations describes a number of things that communities can do to protect the resources in the Watershed. As the PA Department of Conservation and Natural Resources (DCNR) points out in the publication Growing Greener, "Communities can take control of their destinies so that their conservation goals are fair to all parties concerned." Using data collected during the inventory stage of this project, a residential development study was conducted to illustrate the planning strategies recommended herein. The following comparison looks at a sample Conventional Subdivision Plan and a sample Green Space Subdivision Plan (See **Figure A** and **Figure B**).

The sample Conventional Subdivision Plan was designed by using specifications typical to ordinances of the municipalities within the Watershed and divides the entire parcel of land into private lots. While this may be the simplest planning approach, it has a number of drawbacks for both the developer and for the purchaser. Development costs are likely to be higher, since more infrastructure is typically required in the form of roads, water mains, and sewer mains. More earthwork normally is required, resulting in unnecessary removal of forested areas and other sensitive vegetation areas.

The sample Green Space Subdivision Plan was designed with the intent of minimizing impact to important natural areas and creating a sense of community by integrating usable open space and support facilities such as a convenience store and daycare center. In addition to saving development costs, this approach can increase the value to homeowners by preserving natural resources and providing amenities such as trails and open space areas. Reducing infrastructure (roads, sewer, water) also decreases the lifetime maintenance costs that typically would be borne by the municipality. The municipality's tax base is potentially increased from a development with higher property values.

Legend

-  Parcel Boundary
-  Lot Boundary
-  Stream
-  Steep Slopes
-  Forest to Remain

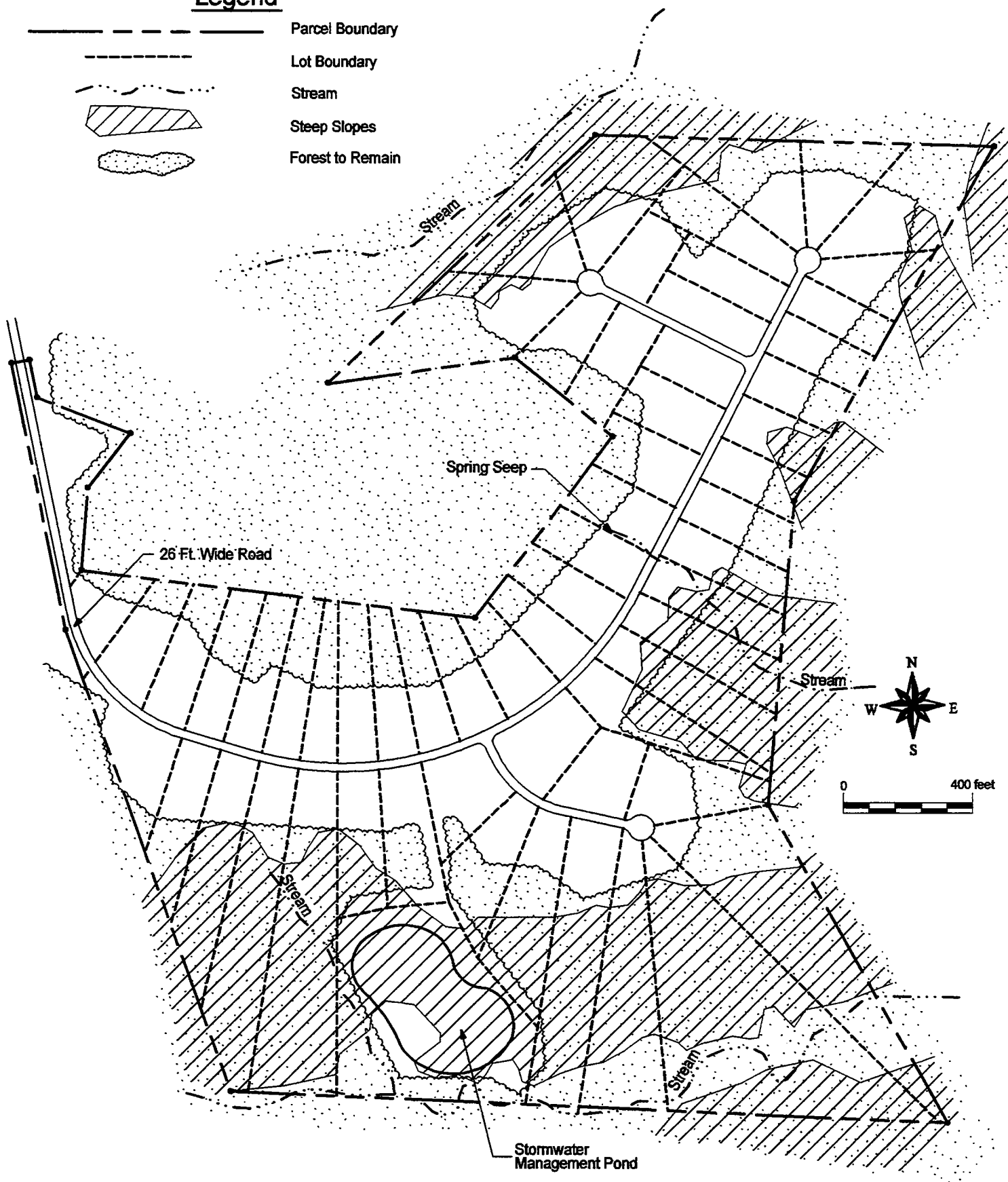
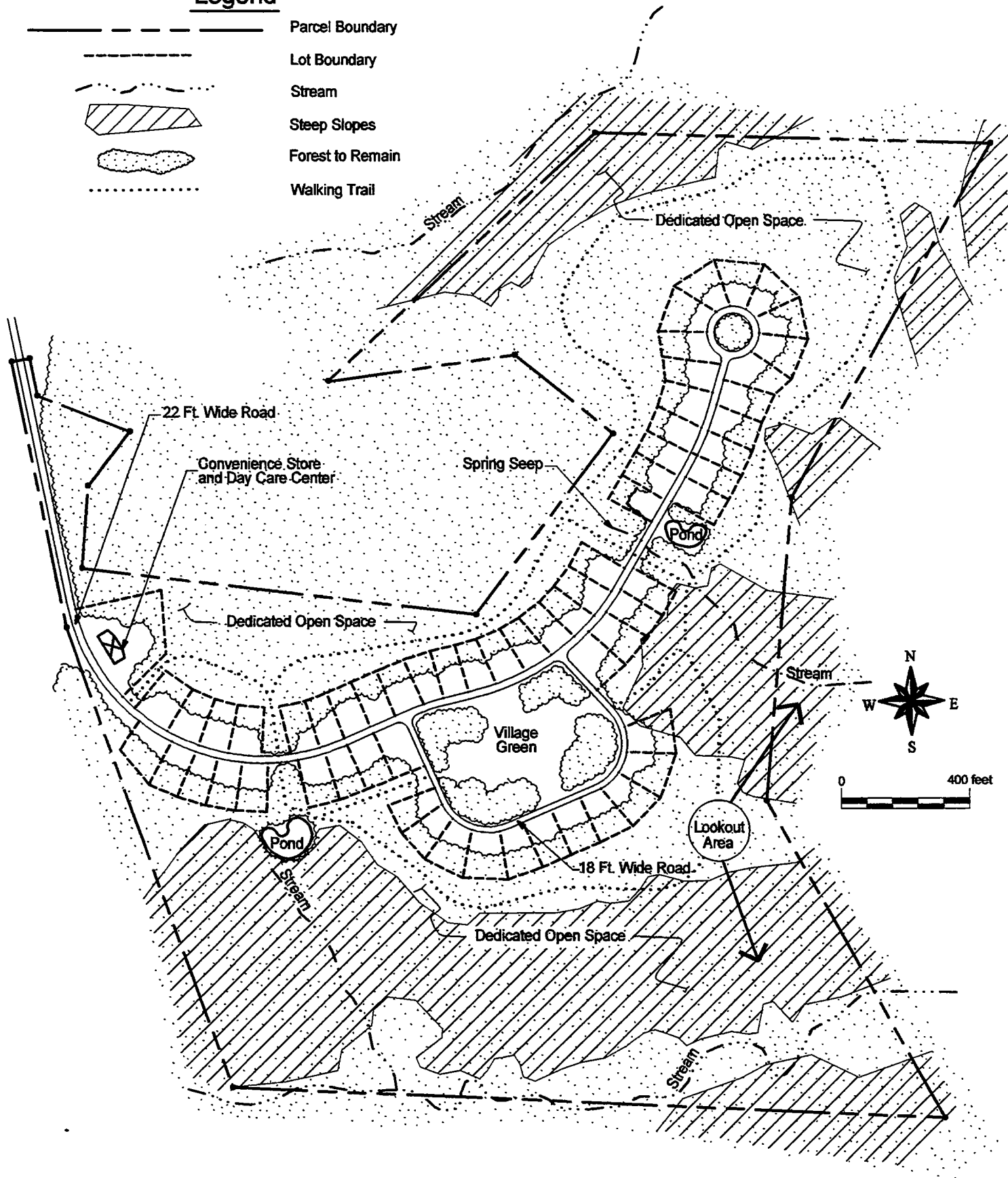


Figure A - Sample Conventional Subdivision Plan
 River Conservation and Land Use Plan for the Montour Run Watershed
 Allegheny County, Pennsylvania

Legend

- Parcel Boundary
- Lot Boundary
- Stream
- Steep Slopes
- Forest to Remain
- Walking Trail



Prepared for
Montour Valley Alliance



Figure B - Sample Green Space Subdivision Plan
 River Conservation and Land Use Plan for the Montour Run Watershed
 Allegheny County, Pennsylvania

This sample comparison looks at a 114 acre parcel within the Montour Run Watershed and how it might be subdivided according to conventional (**Figure A**) and green space (**Figure B**) planning principles. Both plans result in 61 residential lots; **Figure B** also incorporates a potential commercial space at the entrance to the plan that could accommodate such businesses as a convenience store and/or daycare center and would likely draw customers from both within and outside the subdivision.

It is important to note that similar green space planning principles could be followed for other types of zoning, such as light industrial or mixed use. These principles, as illustrated by **Figure B**, can result in:

- Lower overall development costs (See **Tables 5 and 6**).
- Less disturbance and an improved level of protection of important resources, such as steep slopes, streams, wetlands, spring seeps, forested areas, and wildlife habitat areas.
- Dramatic views that are kept available to all residents by not privatizing them on individual lots.
- Creation of special amenities such as walking trails and a village green for everyday enjoyment and special community events that can be enjoyed by all residents.
- Retention of over 50% of the parcel acreage as open space, a significant amount of which is flat to gently sloped areas suitable for a wide variety of recreational activities.

Table 5. Cost Estimate for Sample Conventional Subdivision Plan

Item	Quantity	Unit Cost	Total Cost
Roads (26 ft. wide with curb and gutter)	5,400 l.f.	\$75.00/l.f.	\$405,000.00
Sidewalks (5 ft. wide both sides of road)	10,800 l.f.	\$ 9.50/l.f.	\$102,600.00
Water Main (4 inch diameter)	5,400 l.f.	\$18.50/l.f.	\$ 99,900.00
Sanitary Sewer Main (6 inch diameter)	5,400 l.f.	\$27.00/l.f.	\$145,800.00
Clearing and Grubbing	56 acres	\$2,000/acre	\$112,000.00
Total			\$865,300.00

Table 6. Cost Estimate for Sample Green Space Subdivision Plan

Item	Quantity	Unit Cost	Total Cost
Roads (22 ft. wide without curb and gutter)	4,000 l.f.	\$32.00/l.f.	\$128,000.00
Roads (18 ft. wide without curb and gutter)	1,290 l.f.	\$25.00/l.f.	\$32,250.00
Sidewalks (5 ft. wide both sides of road)	10,580 l.f.	\$9.50/l.f.	\$100,510.00
Water Main (4 inch diameter)	5,290 l.f.	\$18.50/l.f.	\$97,865.00
Sanitary Sewer Main (6 inch diameter)	5,290 l.f.	\$27.00/l.f.	\$142,830.00
Clearing and Grubbing	22 acres	\$2,000/acre	\$44,000.00
Total			\$545,455.00

In this example, the developer is projected to realize savings of \$319,845 in site preparation costs by implementing green space planning.

There are other very important but less obvious benefits to following the green space planning principles. Road width, for instance, can be safely reduced from 26 feet to 22 feet and, in some areas, 18 feet. Narrowing roads produces a "calming" effect on traffic, making the subdivision safer for all, especially families with children.

The use of roadway curbs and gutters can be eliminated. This, combined with narrower roads, reduces initial construction costs, long term maintenance costs, and the amount of paved area, thus reducing stormwater management requirements. The curbs and gutters are replaced with vegetated open channels in the street right-of-way that serve to convey and filter stormwater runoff and to replenish underlying groundwater supplies. The reduction in paved area and suburban lawns results in a reduction in the total volume of stormwater runoff. The reduction in site clearing and grading also contributes to a reduction in stormwater runoff, allowing more of the precipitation to infiltrate into the ground within natural drainage patterns and reducing the size and cost of stormwater management ponds. This also reduces the concentration of stormwater runoff that can lead to downstream streambank erosion, scouring, and sedimentation of the streambank.

Because stormwater management needs are reduced, two ponds--smaller in total area than the one large pond in the conventional plan--can suffice. These smaller ponds are more aesthetically pleasing and can be designed to be more conducive to attracting wildlife.

Another advantage of smaller stormwater management ponds over one large pond is that newer techniques in water quality improvement, such as limestone diversion wells, can be integrated into smaller ponds when appropriate to the receiving stream. When the water quality of the receiving stream has been affected by acid mine drainage, as is true in portions of Montour Run, the water collected in stormwater retention ponds can be diverted through limestone diversion wells,

providing a significant improvement to the pH level of the water of the receiving stream. This method can, for example turn a marginal stream into a year-round trout fishery where other conditions, such as temperature, allow. Due to engineering limitations, the incorporation of limestone diversion wells is not considered feasible with higher flows from large ponds.

The sample Green Space Subdivision Plan also features walking trails, a village green for community activities, open space areas suitable for recreation, and a look out area available to all residents for experiencing dramatic views over the skyline. These public amenities all work toward fostering a more pedestrian-friendly and community-oriented neighborhood.

This Plan also provides for neighborhood commercial uses, in this example a convenience store and day care center. These facilities can serve residents within and beyond the subdivision. The location of this commercial space at the entrance of the subdivision allows for a certain level of "necessity shopping" for the neighborhood without requiring an automobile trip. Adults and children can walk or ride their bicycles to the convenience store for a snack. Parents requiring day care facilities are provided this service in a location convenient to their own neighborhood.

Finally, municipalities often express concern over ownership, protection and maintenance of the open space area. This is easily handled by dedicating the open space to a homeowner's association (HOA), township government agency, or a private land trust. It is also feasible for more than one of these entities to retain ownership of different parts of the open space within any particular subdivision. For example, the township or private land trust could retain ownership of the sensitive resource areas including streams, wetlands, and steep slopes as a part of a greenway system, while the HOA retains ownership of the flatter open space areas that could be comprised of a village green and other recreation areas. If the township retains ownership of active recreation areas, community development grants may be available for these facilities.

Open space areas set aside for conservation purposes are commonly protected by conservation easements which detail what types of activities can occur on them. Maintenance of open space areas is typically the responsibility of the owner. When the owner is a HOA, individual property owners are relieved of the care and maintenance of larger parcels, and the natural resources receive a greater level of protection than ownership by an individual would provide. A property owner exchanges control of a larger yard for access to a mini "estate", complete with woods, wildlife, and a variety of recreational opportunities.

In conclusion, green space design works in Pennsylvania and works well. It is an important option to be encouraged in the Montour Run Watershed.

3. Zoning Patterns

Existing Conditions

Each of the municipalities in the Watershed has adopted its own zoning ordinance. As is normally the case, the nomenclature used to differentiate between zoning classifications varies somewhat between the municipalities. This can make the analysis of zoning patterns across municipal boundaries a difficult undertaking. Therefore, the consultant team used earlier work by the Allegheny County Department of Economic Development (ACDED) that compiled all of the zoning maps from the individual municipalities into a county-wide GIS coverage. Since individual zoning classifications varied across the different municipalities, ACDED assigned an overall zoning code to each zoning district in every municipality. This procedure and the individual zoning types are documented in the "Documentation for the Allegheny County Municipal Zoning Database" and the "Documentation for the 1995 Update of the Allegheny County Municipal Zoning Database" (November 1994 and August 1996, respectively). The Southwest Pennsylvania Regional Planning Commission ("SPRPC") further refined this database for its own use.

The SPRPC database of generalized zoning patterns for that portion of the County encompassed by the Watershed is shown on **Figure 9 - Generalized Zoning**. A wide range of zoning classifications exist in the Watershed permitting a wide variety of uses ranging from residential to commercial and industrial. The generalized zoning classifications for **Figure 9** are:

- C-1 - Regional, Office, and Business Commercial
- C-2 - Neighborhood and Rural Commercial
- C-R - Mixed Use, Commercial and Residential
- I - Industrial
- OSR - Open Space/Reserve
- PI - Public/Institutional (Pittsburgh International Airport property)
- R-1 - Low Density/Residential
- R-2 - Medium Density Residential
- R-3 - Multi-family/High Density Residential
- RD - Riverfront District

Analysis

An analysis of permitted uses within the zoning classifications has revealed areas where certain permitted uses could have unavoidable and significant adverse impacts on already protected sensitive environmental resources and popular recreational amenities.

For example, industrial uses are permitted in the most sensitive and environmentally intact portion of the entire Montour Run Watershed. The "footprint" of a typical industrial facility is not sympathetic to the sensitive topographic conditions of this area and could also have an adverse impact on the popular recreational amenities and adjacent residential developments. There could be a conflict between the uses permitted by zoning in this area and the intent of the municipality's zoning ordinance and subdivision regulations to protect streams, wetlands, flood plain, steep

slopes and landslide prone areas. These sensitive resources are offered protection in the municipality's zoning ordinance and subdivision regulations, yet a developer or property owner may feel that he is entitled to develop these lands because of its zoning classification.

Secondly, there are instances throughout the Watershed where the integrity of the contiguous area of environmentally sensitive lands (i.e. the Riparian Conservation Corridor) could be jeopardized further if applicable development codes are not followed during design and construction.

Recommendations

Municipalities should apply the inventory and analysis contained in this report when zoning changes are next considered. Also, changes to zoning should be considered that would permit uses that are more sympathetic to the land's capacity to accommodate them.

Other possible solutions for addressing these concerns would be to establish a code of voluntary development standards that would apply in the Riparian Conservation Corridor, or municipal adoption of a Riparian Conservation Overlay District, as discussed in the previous **Planning and Zoning Controls** section of this study.

G. Existing and Potential Economic Impacts of Tourism and Recreation

Existing Conditions

Recreation in the Montour Watershed is already making a positive economic impact. Amenities such as the Montour Trail have the potential to drive further economic growth. For instance, residents of a new housing development in North Fayette are carving paths to the Montour Trail, providing evidence that people want access from their residence to the Trail. Two new bike shops have opened in Findlay and in Robinson, and a third is being planned. With thousands of people passing key points along the Trail at prime usage times, traffic is building to the point of potentially supporting numerous retail establishments.

Analysis

A review of a number of surveys and studies supports the premise that greater positive economic benefit can be derived from tourism and recreation in the Montour Run Watershed, as well as from the presence of enhanced open and green space. Examples of these are cited below. Locally, Steve Farber, Ph.D., a faculty member at the University of Pittsburgh's Graduate School of Public and International Affairs, is conducting a use and impact study of the trail system for the Allegheny Trail Alliance. That information should be available in 1999.

1. Reasons for Emphasizing Conservation, Open Space, and Green Space

a. Increased Property Values

According to information from the National Park Service (NPS), a number of studies have "revealed increases in property values in instances where the property is located near or adjacent to open spaces." These studies also demonstrated that property values increased or decreased in relation to the proximity of the property to the open space. "An analysis of property surrounding four parks in Worcester, Massachusetts, showed a house located 20 feet from a park sold for \$2,675 (1982 dollars) more than a similar house located 2,000 feet away." This example was reinforced by studies cited in Colorado (1978), Oregon (1986), Amherst and Concord, MA (1990), Dayton, OH (1985), and Philadelphia (1974).

However, the National Park Service notes that other studies "have found the potential for an increase in property value depends upon the characteristics of the open space and the orientation of surrounding properties. Property value increases are likely to be the highest near those greenways which:

- highlight open space rather than highly developed facilities
- have limited vehicular access, but some recreational access
- have effective maintenance and security

Surveys of homeowners and real estate agents have also revealed that they perceive property along existing rails-trails has an increased value. Studies cited were done in Iowa, Florida, California, Seattle, Washington, and Minnesota.

b. Increased Property Tax Revenues

Obviously, an increase in property values should translate into increased property tax revenue for local governments. The NPS cites a study in Boulder, CO that estimated that "the potential increase in property tax alone could recover the initial cost [of buying the open space] in only three years. In the study, the authors did note that this potential increase is overstated in part because actual assessments may not fully capture greenbelt benefits."

c. Construction/Development Perspectives

The NPS reports several studies indicating that "proximity to greenways, rivers, and trails can increase sales price, increase the marketability of adjacent properties, and promote faster sales. Clustering the residential development to allow for establishment of a greenway might also decrease overall development costs and result in greater profits for the developer." The NPS goes on to suggest that "Local ordinances may also provide incentives for developers to set aside open space and habitat areas. In Lee County, Florida, an ordinance gives developers incentives to preserve critical habitat. In return for preserving habitat areas, developers are permitted to

transfer development rights from the preserved area to other portions of the parcel. Habitat buffer areas can also fulfill applicable open space requirements and can be credited toward regional park impact fees."

d. Corporate Relocation

According to a study released by Cushman and Wakefield, a national real estate firm, access to recreation and open space is a top corporate relocation factor.

e. Investments in Landscape

As reported in the Wall Street Journal, investments in landscaping can do more to revitalize a community than any number of traditional inducements. According to the Journal, "Call it economic development on the cheap. But some smaller cities and towns are discovering that new trees and lush greenery can be more effective than tax breaks, abatements and other economic incentives when it comes to luring new businesses and shoppers." This not only improves the community, but leaves funds available for other purposes, including the expansion of green space for tourism and recreation.

2. Tourism and Recreation

There is potential for increased economic growth in the Watershed due to tourism and recreation. However, a tourist is typically defined as someone who comes to the area solely to visit attractions and who stays at least one night. Thus, someone who uses the Montour Trail but is visiting relatives, or someone who is in the area for a few hours but who does not stay overnight, may not be defined in that category. While this may seem like splitting hairs, it is important to those who are charged with generating and funding tourism growth, thus affecting any marketing strategies developed to attract more visitors to the Watershed.

Attractions for tourists and the businesses that serve them benefit the entire community. Protecting and enhancing green space, for instance, first and foremost serves local residents, while providing an attractive amenity for visitors.

a. Potential Impact of Tourism vs. Manufacturing

According to figures from the U.S. Chamber of Commerce, the impact of tourism can be greater than the impact of manufacturing. Following are highlights of the economic effect on a community of 100 tourists per day as compared to 100 new manufacturing jobs. According to the Greater Pittsburgh Convention and Visitors Bureau, Allegheny County hosts 10,000 visitors per day.

<u>The Impact of 100 Tourists Per Day</u>	<u>The Impact of 100 New Manufacturing Jobs</u>
140 new Households	140 new Households
\$78,000 in tax receipts or enough to support 156 school children	91 school children requiring tax support
\$770,000 increase in personal income	\$410,000 increase in personal income
\$1,120,000 in retail sales	\$331,000 in retail sales
7 more retail outlets	3 more retail outlets
11 new industry related jobs	65 industry related jobs

b. Multiplier Effect of Greenway Visitation

According to the NPS, the impact of visitors to a greenway area such as the Montour Trail has a strong multiplier effect among various economic sectors such as retail, manufacturing, agriculture and transportation. The NPS sums up this multiplier this way:

Economic Effects of Greenway Expenditures
DIRECT EFFECTS
Purchases by greenway users
+
INDIRECT EFFECTS
Purchases of supplies and materials by the producers of greenway-related products and services, and the purchases made by the producers of the suppliers and materials
+
INDUCED EFFECTS
Purchases of production supplies and materials by producers, resulting from purchases by households
=
TOTAL ECONOMIC EFFECTS OF GREENWAY EXPENDITURES

While similar data doesn't exist locally for outdoor recreation and tourism, the National Parks Service cites studies looking at the local economic multipliers of recreational spending at four Georgia State Parks. Those multipliers ranged from a low of 5.79 to a high of 7.55. In other words, every dollar spent on outdoor recreation and tourism returned a range of \$5.79 to \$7.55 to the local economy.

"The Impact of the Cultural District on the Pittsburgh Area," a study done in 1989 by the Pennsylvania Economy League for the Pittsburgh Cultural Trust stated that the arts organizations studied returned almost **eight times** their cost to the community. These do not include construction dollars generated by new facilities.

The U.S. Fish and Wildlife Service reported in a May 1995 press release, "Bird Migration Thrill Millions, Boosts Economy, But Loss of Habitat Threatens Many Popular Species," that Americans spent \$5.2 billion on birding in 1991. In comparison, Americans spent \$5.8 billion on movie tickets and \$5.9 billion on tickets to major league sporting events. They spent \$2 billion just for wild birdseed! For perspective, USFWS also referenced separate studies examining two local economies: Bird watchers are estimated to have pumped \$14.4 million into the economy of Hidalgo County, TX and spent \$9.7 million on their hobby while visiting Chincoteague National Wildlife Refuge in Virginia.

USFWS reports in a June 1998 press release that Americans spent \$29.2 billion to observe, feed, and photograph wildlife in the United States. According to USFWS Director Jamie Rappaport Clark, the multiplier effect of that number is \$85.4 billion. If wildlife watching were a Fortune 500 company in 1996, it would have ranked 23rd.

The Youghiogheny Trail has already spurred business development in towns long dormant. Bob McKinley of the Regional Trail Corporation and the Trail's manager was quoted in a Pittsburgh Post-Gazette article as saying that "formerly somnolent towns such as West Newton are having to regulate weekend traffic jams of bicycles. Two women recently opened an outdoor clothing store there - just one of many businesses opening up and down the Trail." Bed and breakfasts, trail-side restaurants and other businesses have opened in the vicinity. The same article quotes Sen. Richard Kasunic, who state that "The bike trail definitely was the shot in the arm that got people interested in coming into the west side."

c. What Do Tourists Want?

- A 1987 poll commissioned by the President's Commission on Americans Outdoors found that natural beauty was the single most important criterion for tourists in selecting outdoor recreation sites.
- According to a U.S. Fish and Wildlife Service's 1996 survey, 31% of the U.S. population were wildlife watchers.

Recommendations

There is economic value in emphasizing conservation, open space, and green space in economic development strategies.

Readers should note that recommendations concerning the economic value of green space are very dependent upon implementing the recommendations in previous categories. Those recommendations need to be understood and supported by anyone working on economic strategies.

1) Raise Awareness Among the Public, Local Officials, Economic Development Professionals, Real Estate Agents, Developers, and Others of the Economic Value of Conservation, Open Space and Green Space.

By creating partnerships with these entities, educational activities can occur throughout the community beginning at the grade school level. In addition, we recommend that the municipalities and possibly local economic development groups work with area colleges and universities to measure the current and potential economic impact of outdoor recreation and tourism in the Watershed.

2) Protection of the Montour Trail

A high priority for municipalities in the Watershed should be to protect, maintain, and enhance the Montour Trail. The Trail is the lynch pin for most future economic development in the Watershed related to tourism and recreation. Key to this will be to control erosion and contamination of the Watershed by enforcing existing land use policies more stringently and by adopting new policies and standards where needed. Education is also key so that elected officials and the public understand the importance of the Watershed and the Trail to the area's economic well being.

Extending the Trail to the Ohio will promote links to area attractions, such as those proposed in Coraopolis by the Coraopolis Economic Revitalization Council (CERC).

It is also important that the Montour Trail Council obtain and develop the so-called "Panhandle Trail" that will provide a vital link to the region's trail network, to downtown Pittsburgh, and to other area attractions such as the Botanical Garden of Western Pennsylvania.

Tourist information centers should be created at the main Trail access points.

3) Land Purchases

The five municipalities in the Watershed should support the efforts of land trusts to increase the amount of land available for greenways and open space corridors. The municipalities can help

to accomplish this by offering resolutions and letters of support to granting authorities. The municipalities should work with private land trusts to identify desirable parcels that should be acquired and encourage private land owners and developers to protect undeveloped portions of their sites with tools such as conservation easements.

Local government should also consider purchasing more land for open space, especially passive recreation. The public opinion survey conducted by Campos Market Research and referred to earlier in this report noted that almost 75% of those surveyed felt that local and county governments should buy land to preserve it for future generations. A New York Times editorial of May 31, 1998 reports that the "open space movement is broadly bipartisan...Phyllis Meyers, a specialist in conservation finance, says that this is a radical departure 'from the Contract with American mood in 1994' when governors were reluctant to offend developers and kept silent on environmental issues." The same editorial noted that communities large and small, rich and poor, all over the United States are voting to increase taxation when it is specifically earmarked for conservation purposes.

Communities can apply what is known as the "Fitch Formula" to determine where it is financially advantageous to acquire land before it is developed (NPS). Local university economists should be hired to explore use of the formula and to adapt it, if necessary, to any local circumstances that need to be taken into account.

The formula can also be adapted to provide a comparison with other types of commercial development:

Fitch Formula	
$la = \frac{Cs - (Lat + Lfi)}{t}$	
Where,	
la	is the point at which the municipal costs of servicing development equal generated tax revenues
Cs	represents the costs of providing public services to the development
La	is any decrease in the assessment resulting from the acquisition
t	represents the tax rate
Lf	is the cost of acquisition
I	is the interest rate on borrowed money

This formula was used in calculating Housing Unit Public Cost and Revenue Projections for Loudoun County, VA:

Housing Unit Public Cost and Revenue Projections for Loudoun County, Virginia (Medium Density Housing)			
Public Costs	Amount	Public Revenue	Amount
Public school capital costs	\$ 243	Real property taxes	\$ 846
Public school operating/instructional	\$2,256	Personal property taxes	\$ 240
Public school transportation costs	\$ 67	Other local taxes	\$ 276
Public road maintenance costs	\$ 38	Other local revenue	\$ 162
Water and sewer operation costs	\$ 260	Revenue from state	\$ 984
Law enforcement costs	\$ 165	Federal payments and grants	\$ 54
Fire/rescue service costs	\$ 58	Water and sewer revenues	\$ 260
Health and welfare costs	\$ 295	Road maintenance/repair	\$ 37
Government administrative costs	\$ 147		
Total Average Annual Costs (per housing unit)	\$3,528	Total Average Annual Revenues (per housing unit)	\$2,859
Net Loss per Medium-Density Dwelling = \$669			
(Source: American Farmland Trust, 1986)			

A local college or university could measure the impacts of outdoor recreation in the region. Possible partners include the economics department at Robert Morris College, the Heinz School at Carnegie Mellon University, the Graduate School of Public and International Affairs at the University of Pittsburgh, or the environmental degree program at Duquesne University. There

are a number of computerized input-output models in existence to derive multipliers; the most commonly used in recreation and tourism analysis are IMPLAN (USDA Forest Service) and RIMS-II (Bureau of Economic Analysis). The NPS suggests that these be used when analyzing a minimum of three or more counties. An analysis of Allegheny, Beaver, and Washington Counties could serve as a base.

4) Land Use Policies

Local governments should adopt land use policies that preserve habitat for wildlife. Every state has species that are in decline and, according to USFWS former Director Mollie Beattie, "Over the long run, the decline of many species will have a negative effect on the economy if we don't take action now to conserve their habitat." This is especially true of species that generate tourism.

In addition to its impact on habitat, non-sustainable development has a direct impact on homeowners. A University of Georgia study of a residential community in Beaufort, SC, for instance, found that it is "prohibitively expensive to recreate a comparably mature forest habitat once it has been cleared. Far better to preserve the original landscape." And the cost? In this study, the cost of replacing the natural habitat on the landscaped area of the development's 1/4 acre lots was \$58,500...each (Wild Garden Magazine).

Existing land use regulations should be enforced more stringently, and new policies and standards should be adopted where needed such as the creation of the Riparian Conservation Overlay District. Tools such as the use of conservation easements to protect undeveloped land should also be employed.

Local governments should support recommendations emerging from the Governor's 21st Century Environment Commission and other efforts to encourage sustainable development. The Commission's report identifies priorities as: promotion of responsible land use, conservation and sustainable use of natural resources, improvement of human health and environmental quality, and development of environmental stewardship.

The report emphasizes that "The MPC (Municipalities Planning Code) also fails to provide adequate protection for the conservation of natural areas like stream corridors and contiguous forest areas to sustain groundwater recharge and natural diversity," and should be changed to encourage protection.

In the meantime, municipalities can work more effectively under the existing code by increased enforcement of existing regulations, by greater utilization of strategies that have worked in other Pennsylvania municipalities, and by planning more effectively. Municipalities in the Watershed are encouraged to obtain three publications: "Guiding Growth: Building Better Communities and Protecting Our Countryside, a Planning and Growth Management Handbook for Pennsylvania Municipalities"; "The EAC Handbook, A Guide for Municipal Environmental Advisory Councils" and "Pennsylvania Handbook of Best Management Practices for Developing Areas." The first two

publications are available from the Pennsylvania Environmental Council, 1211 Chestnut Street, Suite 900, Philadelphia, PA 19107 (1-800-322-9214). The "Pennsylvania Handbook of Best Management Practices for Developing Areas" may be obtained by contacting Barry Frantz at the PA Association of Conservation Districts, Inc. (717-237-2216).

5) Marketing Strategies

The Montour Run Watershed is unlikely to attract visitors if viewed in an isolated way. However, as part of the larger regional trail network being created by the Montour Trail Council and other rails-to-trails organizations, it is, in a very expansive sense, the Ohio River gateway to Washington, D.C. The region's five municipalities should work with other communities, the Montour Trail Council, and the Allegheny Trail Alliance to promote the entire area surrounding the Trail.

Regions without a number of outstanding major attractions have been able to attract tourists by becoming part of "heritage corridors." The best example locally is the Steel Heritage Industry Council's Rivers of Steel. Recognizing their connection to Rivers of Steel, some of Western Pennsylvania's coal producing areas near the Youghiogheny Trail have become a part of this heritage corridor by adopting the related slogan, "Mountains of Fire." The Montour Run Watershed proponents should seek a Steel Heritage Tour project.

Another example of a planned tourism destination is the Allegheny Ridge-Heritage Park, stretching over nine counties and including Altoona and Johnstown. Municipalities should enlist the aid of local colleges and universities to further examine the marketing strategies and successes of these corridors.

There is an opportunity to jointly market several destinations in western Allegheny County, such as the Trail, the planned Botanical Garden of Western Pennsylvania, and the attractions proposed in Coraopolis. Stressing the adaptive re-use of post-industrial sites to recreational and educational opportunities can attract people interested in the outdoors, the region's history, and other cultural sites.

The Watershed's proximity to the Pittsburgh International Airport and to Downtown Pittsburgh also lends potential to attracting business visitors and conventioners who might want outdoor recreational opportunities.

Marketing efforts should be in keeping with recommendations made by McKinsey & Company in their 1997 report, "A Marketing Strategy and Action Plan to Accelerate Economic Growth in Southwestern Pennsylvania." Among the demographic and activity-based segments that make up the bulk of visitors to the region, "five deliver above-average economic impact. These five target segments are young culture-seekers, older active couples, golf/ski groups, outdoor activity families, and middle-aged culture-seekers." Of the groups most likely to be attracted to activities in the Watershed, older active couples spend an average of \$114 per day, and outdoor activity

families spend \$70. The McKinsey study emphasized the need to integrate marketing efforts, and we strongly endorse such an approach.

Any marketing strategies should be tied to larger regional efforts of the Pittsburgh Regional Alliance, Environmental City Initiative, the Pittsburgh Convention and Visitors Bureau, and Airport Corridor Transportation Authority.

The economic value of outdoor recreation should be publicized.

6) Transportation

Transportation is essential to any successful tourism strategy. Watershed communities need to expand their links to mass transportation, to the Airport, to downtown, to key sites on the Montour Trail, and to other area attractions. In addition, communities should promote bike racks being provided on buses as well as secure bike racks at critical locations. Distributing information on transportation routes is equally important.

7) The National Register of Historic Places

Communities, property owners, and local historical groups should seek to have important historical properties listed on the National Register of Historic Places.

8) Micro Loans

Smaller businesses often have difficulty starting up because they fall below the revenue level of economic development groups. Municipalities should work with banks and economic development agencies to establish "micro loans" as a form of economic development for those wanting to start small businesses that are likely to promote or serve tourism and recreation in the Watershed.

IV. Implementation Strategies

"The people have a right to clean air, pure water, and the preservation of the natural, scenic, historic and aesthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people." (Constitution of the Commonwealth of Pennsylvania, Article I, Section 27).

"A healthy environment, a dynamic economy, and the well being of Pennsylvania's communities are directly linked." (Executive Order 1999-1, Governor Thomas J. Ridge, Commonwealth of Pennsylvania). With this in mind, the implementation strategies listed on the following matrix are recommended for the Watershed.

Montour Run River Conservation and Land Use Plan Implementation Strategies

IMPLEMENTATION STRATEGIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDATIONS SECTIONS ADDRESSED	PROJECTED IMPLEMENTATION YEAR
WATER RESOURCE CONSERVATION				
1) Formulate streambank protection plans considering the NCRC's <u>Conservation Practice Standard for Streambank and Shoreline Protection</u> and implement erosion control and streambank stabilization measures for specific sites identified; implement a public awareness program to publicize the economic, aesthetic, and flood protection benefits of streambank management.	Municipalities, U.S. Department of Agriculture Natural Resources Conservation Service, Allegheny County Conservation District, PA Fish and Boat Commission, PA Department of Environmental Protection, Cooperative Extension Service, U.S. Army Corps of Engineers, PA Cleanways; landowners, sportsmen's clubs, watershed associations, community and church groups, professional consultants	PA Department of Environmental Protection, PA Department of Conservation and Natural Resources, private foundations	III.A.1 (p. 18)	2000
2) Establish an incorporated nonprofit watershed association to assist municipalities with implementing the Watershed Plan recommendations.	Montour Valley Alliance, municipalities, PA Department of Conservation and Natural Resources, landowners/developers, volunteers	No additional costs	III.F.1 (p. 72)	2000
3) Enforce and enhance wetland preservation, restoration, and creation programs; encourage developers to incorporate wetland protection and enhancement measures into their planning process; and publicize the economic, aesthetic, and water quality benefits of wetlands enhancement.	Municipalities' planning commissions and zoning hearing boards, community and church groups, schools, PA Department of Environmental Protection, U.S. Department of Agriculture Natural Resources Conservation Service, schools, professional consultants	PA Department of Environmental Protection, PA Department of Conservation and Natural Resources, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, private foundations	III.A.2 (p. 21)	On going
4) Determine floodplain and special flood hazard areas within the Watershed; enforce development regulations to protect floodplains.	Municipalities, Allegheny County Conservation District, Federal Emergency Management Agency, National Flood Insurance Program, U.S. Army Corps of Engineers, landowners	No additional costs	III.A.3 (p. 22)	On going
5) Prioritize and remediate abandoned mine drainage sites identified in the U.S. Army Corps of Engineers' report, <u>Water Quality and Aquatic Life Resources</u> .	PA Department of Environmental Protection Bureau of Abandoned Mine Reclamation, U.S. Army Corps of Engineers, Allegheny County Department of Aviation, municipalities, landowners, watershed associations, conservation organizations	Statewide Nonpoint Source Pollution Program, Federal Clean Water Act (Section 319), Rural Abandoned Mine Program (RAMP), and the Landowner Reclamation Program (LRP) through the Western PA Coalition for Abandoned Mine Reclamation (WPCAMR); PA Department of Environmental Protection Bureau of Abandoned Mine Reclamation; U.S. Army Corps of Engineers, local corporations	III.A.5 (p. 29)	On going
6) Document stream bedload accumulations of the glycols, urea and constituent products found in deicing fluids, and the impacts of the glycols and urea on the substrate and organisms of the receiving streams draining the Airport.	Allegheny County Department of Aviation, PA Department of Environmental Protection, U.S. Army Corps of Engineers	Allegheny County Department of Aviation, PA Department of Environmental Protection	III.A.5 (p. 27)	2001
7) Continue investigations for identifying suitable airfield deicing substitutes to reduce or eliminate the use of toxic materials at the Airport.	Allegheny County Department of Aviation, PA Department of Environmental Protection	Allegheny County Department of Aviation, PA Department of Environmental Protection	III.A.5 (p. 27)	Ongoing
8) Continue refining and improving collection procedures for spent aircraft deicing fluids at the Airport.	Allegheny County Department of Aviation, PA Department of Environmental Protection	Allegheny County Department of Aviation, PA Department of Environmental Protection	III.A.5 (p. 27)	Ongoing
9) Continue monitoring the effectiveness of the deicing fluid collection systems at the Airport and analyze the impact of materials on the receiving streams that are not collected.	Allegheny County Department of Aviation, PA Department of Environmental Protection, U.S. Army Corps of Engineers	Allegheny County Department of Aviation, PA Department of Environmental Protection, U.S. Army Corps of Engineers	III.A.5 (p. 27)	Ongoing
10) Deicing Plans for the Airport should be updated annually based in part on knowledge gained during previous deicing seasons.	Allegheny County Department of Aviation, PA Department of Environmental Protection	Allegheny County Department of Aviation, PA Department of Environmental Protection	III.A.5 (p. 27)	2000
11) Develop a coordinated water quality monitoring program for the Montour Run Watershed.	PA Department of Environmental Protection, Citizens Volunteer Monitoring Program, Alliance for Aquatic Resource Monitoring, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Geological Survey, PA Fish and Boat Commission, PA Cleanways, watershed associations, schools	PA Department of Environmental Protection Bureau of Watershed Restoration and Bureau of Watershed Conservation	III.A.5 (p. 30)	On going
12) Review effectiveness of Montour Run Stormwater Management Plan and determine applicability of <u>Best Management Practices for Developing Areas</u> .	Municipalities, Allegheny County Department of Economic Development Planning Division, Allegheny County Conservation District, PA Department of Environmental Protection	PA Department of Environmental Protection, Allegheny County Department of Economic Development Planning Division, private foundations.	III.A.1 (p. 18) III.A.4 (p. 23) III.A.5 (p. 30)	2000
13) Encourage and support volunteer trash removal program to ensure continued maintenance along the stream corridor.	PA Department of Environmental Protection, PA Cleanways, conservation groups, sportsmen's clubs, businesses, community and church groups, youth groups, trash hauling companies	Municipalities, PA Department of Environmental Protection, community groups, volunteers	III.A.1 (p. 19)	On going
14) Enhance and enforce existing land use ordinances that are intended to protect Watershed resources.	Municipalities, Allegheny County Department of Economic Development Planning Division, watershed association	PA Department of Community and Economic Development Small Communities Planning Assistance Program and PA Planning Assistance Grant Program	III.A.1 (p.20)	On going

Montour Run River Conservation and Land Use Plan Implementation Strategies

IMPLEMENTATION STRATEGIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDATIONS SECTIONS ADDRESSED	PROJECTED IMPLEMENTATION YEAR
15) Dredge the sand bar/delta at the mouth of Montour Run on the Ohio River side of the CSX culvert in order to encourage better movement of fish into the stream and to alleviate downstream siltation problems at locks and dams in the Ohio River.	U.S. Army Corps of Engineers, Moon Township Municipal Authority	U.S. Army Corps of Engineers	III.A.1 (p. 20)	2003
16) Conduct a series of stream flow gauge measurements to monitor normal and flood periods.	U.S. Geological Survey, U.S. Army Corps of Engineers, schools, watershed association	U.S. Geological Survey, U.S. Army Corps of Engineers	III.A.1(p. 18)	2002
BIOLOGICAL RESOURCE CONSERVATION				
1) Encourage private land owners and developers to establish conservation easements; acquire properties that provide the conservation of open space, sensitive resource areas, wildlife habitats, wetlands, and riparian forest buffers.	Municipalities, Allegheny County Department of Parks, conservation organizations, landowners, PA Department of Conservation and Natural Resources, U.S. Department of Agriculture Natural Resources Conservation Service, Western PA Conservancy, community and church groups	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	III.B.1 (p.31) III.G.3) (p. 85)	On going
2) Establish, enhance, and maintain conservation areas to minimize further deforestation and urbanization of sensitive vegetative resources.	PA Department of Conservation and Natural Resources, U.S. Department of Agriculture Natural Resources Conservation Service, Western PA Conservancy, landowners/developers, corporations, municipalities, community and church groups, schools, conservation organizations	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	III.B.1 (p.31)	On going
3) Establish, enhance, and maintain habitat preservation areas to sustain and augment terrestrial wildlife populations.	PA Department of Conservation and Natural Resources, PA Game Commission, Western PA Conservancy, wildlife Habitat Council, landowners/developers, corporations, municipalities, sportsmen's clubs, garden clubs, community and church groups, schools, conservation organizations	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	III.B.1 (p. 31) III.B.2 (p. 33)	On going
4) Maintain riparian forest buffers and upgrade to 3-zone management system where possible.	U.S. Department of Agriculture, U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Fish and Wildlife Service, PA Department of Conservation and Natural Resources, Western PA Conservancy, municipalities, schools, landowners/developers, community and church groups	PA Department of Conservation and Natural Resources, conservation organizations, municipalities, private foundations	III.B.5 (p. 40)	2001
5) Protect and enhance sensitive biological areas, particularly those identified in the Allegheny County Natural Heritage Inventory, through acquisition, easements, and other mechanisms.	PA Department of Conservation and Natural Resources, U.S. Department of Agriculture Natural Resources Conservation Service, Western PA Conservancy, municipalities, landowners/developers, community and church groups, conservation organizations	PA Department of Environmental Protection, PA Department of Conservation and Natural Resources, Allegheny County Department of Economic Development Planning Division, municipalities, private foundations	III.B.4 (p. 39)	On going
6) Identify rare, threatened, and endangered plant and animal species in the Watershed.	PA Department of Environmental Protection, PA Fish and Boat Commission, PA Game Commission, U.S. Fish and Wildlife Service, Western PA Conservancy, Allegheny County Department of Economic Development Planning Division, municipalities, watershed associations, environmental advisory councils	No additional costs - donated expertise	III.B.3 (p. 37)	On going
7) Initiate an aquatic habitat improvement and species reintroduction program, including the placement of rootwads where appropriate, with first priority to Meeks Run and Trout Run.	PA Department of Conservation and Natural Resources, PA Fish and Boat Commission, U.S. Army Corps of Engineers, Western PA Conservancy, sportsmen's clubs, conservation organizations, schools, watershed associations	PA Fish and Boat Commission, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, sport fishing organizations	III.A.5 (p. 29) III.B.2 (p. 35)	2002
8) Pursue formal establishment of the Montour Greenway.	PA Environmental Council, Montour Valley Alliance, Watershed associations, conservation organizations	PADCNR, private foundations	III.B.6 (p. 42) III.E (p. 68)	2004
9) Establish an environmental advisory council for each municipality.	Municipalities	No additional costs	III.B.3 (p. 37)	2000
CULTURAL, RECREATIONAL, AND EDUCATIONAL RESOURCE CONSERVATION				
1) Identify and preserve existing local historic structures and archaeological sites; seek listing on the National Register of Historic Places.	Historical organizations, professional historians and archaeologists, schools, PA Historical Museum Commission, landowners/developers	Pittsburgh History and Landmarks Foundation, private foundations	III.G.7) (p.90)	2002
2) Wherever possible, link local historic structures and archaeological sites with the Montour Trail and local recreational activities in order to promote cultural heritage.	Historical organizations, professional historians and archaeologists, schools, PA Historical Museum Commission, Island Sports Complex	Pittsburgh History and Landmarks Foundation, private foundations, landowners/developers	III.C.2 (p.48)	2004
3) Municipalities should strengthen their comprehensive plans, zoning ordinances, and subdivision regulations where needed to encourage both cultural resources heritage preservation and economic growth.	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Historical and Museum Commission, professional architects/historians/archaeologists, Pittsburgh Regional Alliance	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program, Pittsburgh Regional Alliance	III.C.1 (p. 44) III.C.2 (p. 48)	2002
4) Support the efforts by the local school districts to incorporate Watershed resources into the academic curriculum as an outdoor classroom and encourage the involvement of colleges and universities.	School districts, municipalities, Allegheny County Department of Economic Development Planning Division, parent/teacher associations, conservation organizations, historical organizations, Allegheny Intermediate Unit, colleges and universities	School districts, businesses/corporations, conservation organizations, private foundations	III.C.4 (p. 54)	On going

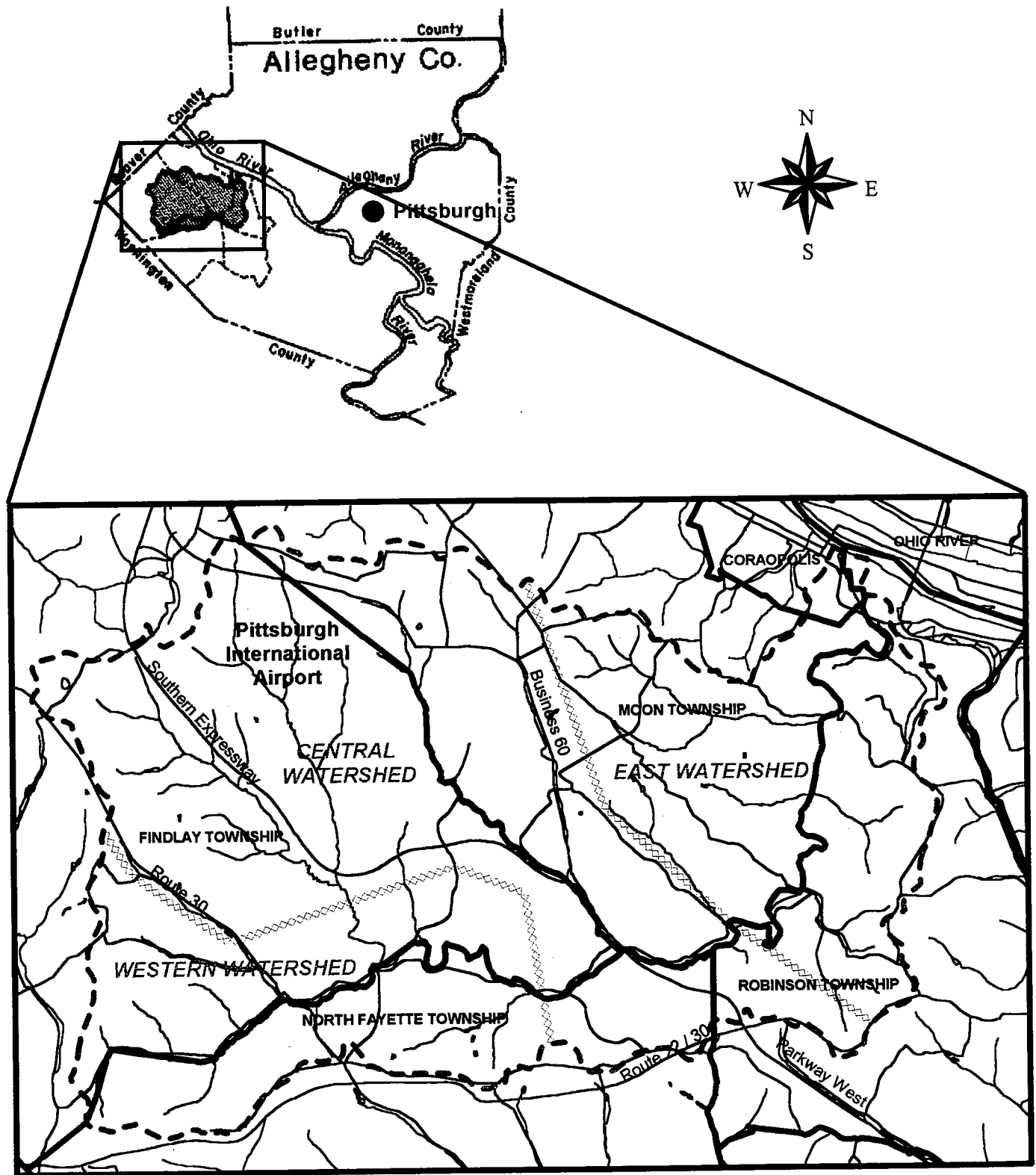
Montour Run River Conservation and Land Use Plan Implementation Strategies

IMPLEMENTATION STRATEGIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDATIONS SECTIONS ADDRESSED	PROJECTED IMPLEMENTATION YEAR
LAND RESOURCE CONSERVATION				
1) Enforce protective ordinances in landslide-prone areas.	Municipalities' Planning Commissions and Zoning Hearing Boards	No additional costs	III.D.1 (p. 58)	On going
2) Revise ordinances to incorporate the PA Department of Environmental Protection's <u>Best Management Practices for Developing Areas</u> .	Municipalities, Allegheny County Department of Economic Development Planning Division	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program, Pittsburgh Regional Alliance	III.A.4 (P. 23) III.E (p. 67)	2004
3) Develop a Mined Land Overlay District.	Municipalities, PA Department of Environmental Protection Bureau of Mine Reclamation	PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program	III.D.1 (p. 59)	2002
4) Encourage continuing resource stewardship of the BFI Landfill.	PADEP	No additional cost	III.D.2 (p. 59)	On going
LAND USE/LAND COVER PATTERNS				
1) Establish a Riparian Conservation Overlay District to protect a defined Riparian Conservation Corridor.	Municipalities, landowners/developers, U.S. Department of Agriculture Natural Resources Conservation Service	PA Department of Conservation and Natural Resources, PA Department of Community and Economic Development, U.S. Department of Agriculture Natural Resources Conservation Service	III.E (p. 67)	2001
2) Update comprehensive plans, zoning maps, and ordinances to recognize and protect sensitive resources.	Municipalities	PA Department of Conservation and Natural Resources, PA Department of Community and Economic Development	III.E (p. 67) III.F.1 (p. 70) III.F.3 (p. 80)	2003
PLANNING AND ZONING				
1) Develop a regional approach to build a uniform method of protection for the sensitive environmental resources and popular recreational amenities located within the Watershed's Riparian Conservation Corridor.	Municipalities, Council of Government, PA Department of Community and Economic Development	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program, Pittsburgh Regional Alliance	III.F.1 (p. 70)	2000
2) Create a Riparian Conservation Corridor during the next cycle of updates to comprehensive plans and zoning maps/ ordinances.	Municipalities, U.S. Department of Agriculture Natural Resources Conservation Service	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program, Pittsburgh Regional Alliance	III.F.1 (p. 70)	2003
3) Adopt a special code of voluntary or mandatory development practices for the Riparian Conservation Corridor, embodied in a Riparian Conservation Overlay District Ordinance.	Municipalities	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of community and Economic Development Small Communities, Planning Assistance Program, State Planning Assistance Grant Program, Pittsburgh Regional Alliance	III.F.1 (p. 70) III.F.3 (p. 80)	2000
4) Use the Riparian Conservation Corridor to help identify natural resources and properties that should be preserved for the benefit of the community through acquisition and other mechanisms.	Municipalities, conservation organizations	PA Department of Conservation and Natural Resources, private foundations, municipal budgeted funds earmarked for land acquisition	III.F.1 (p. 73)	On going
5.) Encourage green space subdivision planning for future developments.	Municipalities' Planning Commissions and Zoning Hearing Boards, developers	Municipalities, Allegheny County Department of Economic Development Planning Division, PA Department of Community and Economic Development Small Communities Planning Assistance Program, State Planning Assistance Grant Program, Pittsburgh Regional Alliance	III.F.1 (p. 71) III.F.2 (p. 73)	2003
6) Apply information gathered for Watershed study when future zoning changes are considered.	Municipalities' Planning Commissions	No additional costs	III.F.3 (p. 80)	On going
EXISTING AND POTENTIAL ECONOMIC IMPACTS OF TOURISM AND RECREATION				
1) Educate the public of the importance of Watershed resources through school programs and public relations campaigns.	Environmental advisory councils, municipalities, watershed associations, schools, Montour Valley Alliance, real estate agencies, travel agencies, Pittsburgh Convention and Visitors Bureau, Pittsburgh Airport Area Chamber of Commerce, news media, community and church groups, appropriate financial institutions	Municipalities, businesses/corporations, community organizations, private foundations, Local Government Academy, Environmental City Network	III.G.1) (p.85)	1999
2) Raise awareness of the economic value of conservation, open space, and green space.	Environmental advisory councils, conservation organizations, Montour Valley Alliance, Pittsburgh Airport Area Chamber of Commerce	Private foundations, PA Department of Community and Economic Development, Environmental City Network	III.G.1) (p. 85)	1999
3) Quantify the economic and other impacts of outdoor recreation on local communities.	PA Department of Community and Economic Development, sportsmen's clubs, Montour Trail Council, college/university Departments of Economics	PA Department of Community and Economic Development, businesses/corporations	III.G.1) (p.85)	2003

Montour Run River Conservation and Land Use Plan Implementation Strategies

IMPLEMENTATION STRATEGIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDATIONS SECTIONS ADDRESSED	PROJECTED IMPLEMENTATION YEAR
4) Protect, maintain, and enhance the Montour Trail; complete the Trail to Coraopolis; develop spur trails such as the Panhandle Trail; and where possible without compromising resource values, construct additional links from the main Trail to public parks, existing residential neighborhoods, businesses, and transportation facilities.	Montour Trail Council, municipalities, Steel Industry Heritage Corporation, Coraopolis Economic Revitalization Corporation	PA Community Development Block Grant, PA Department of Community and Economic Development, municipalities, private foundations	III.C (p. 51) III.G.2) (p. 85) III.G.5) (p. 89)	On going
5) Promote bike racks on buses and secure bike racks at critical locations.	Pittsburgh Area Transit, Airport Corridor Transportation Authority, businesses/corporations, Montour Trail Council	Business/corporations	III.G.6) (p. 90)	2000
6) Enlist experts from local colleges and universities to develop marketing strategies focused on the Montour Trail and other resources of the Montour Run Watershed.	Municipalities, Pittsburgh Regional Alliance, Environmental City Initiative, Pittsburgh Convention and Visitors Bureau, Airport Corridor Transportation Authority	Private foundations, Chambers of Commerce, municipalities	III.G.5) (p. 89)	1999
7) Establish bird observation areas along the Trail, with tour books and maps.	Municipalities' parks and recreation boards, Pittsburgh Airport Area Chamber of Commerce, businesses/corporations, conservation organizations	Businesses/corporations, municipalities' recreation budgets	III.C.3 (p. 51)	2001
8) Assist the Coraopolis Sportsmen's Association and Forest Grove Sportsmen's Club in promotion of their activities.	Travel agencies, real estate agencies, businesses/corporations, Pittsburgh Airport Area Chamber of Commerce	Coraopolis Sportsmen's Association and Forest Grove Sportsmen's Club	III.C.3 (P. 51)	On going
9) Create tourist information centers at primary access points to the Montour Trail.	Pittsburgh Airport Area Chamber of Commerce, community and church groups, Montour Trail Council, sportsmen's clubs, conservation organizations	Businesses/corporations	III.G.2) (p. 85)	2001
10) Offer resolutions and letters of support to granting authorities in support of efforts to increase protected open space.	Municipalities, businesses/corporations, real estate agencies, health organizations, user groups, schools	No additional costs	III.G.3) (p. 86)	On going
11) Identify desirable parcels for open space protection.	Conservation organizations, municipal parks and recreation boards, environmental advisory councils, schools	No additional costs	III.F.1 (p. 73) III.G.3) (p. 85)	On going
12) Purchase land for open space.	Municipalities, conservation organizations, community groups	PA Department of Conservation and Natural Resources, municipal budgeted funds earmarked for land acquisition, private foundations	III.F.1 (p. 73) III.G.3) (p. 85)	On going
13) Enforce existing land use policies more stringently.	Allegheny County Conservation District, municipality planning commissions and zoning hearing boards	No additional costs	III.G.4) (p. 88)	On going
14) Adopt new policies and standards where needed to preserve habitat for wildlife.	Municipalities	No additional costs	III.G.4) (p. 88)	2004
15) Use tools such as conservation easements to protect undeveloped environmentally sensitive land.	Municipalities, conservation organizations, landowners/developers	No additional costs	III.B.4 (p. 39) III.E (p. 67) III.G.4) (p. 88)	On going
16) Adopt resolutions to support recommendations from the Governor's 21 st Century Environment Commission and other efforts to encourage sustainable development practices.	PA State Legislature, Allegheny County Commissioners, municipalities, economic development organizations, Montour Valley Alliance, conservation organizations	No additional costs	III.G.4) (p. 88)	1999
17) Promote the development of the Rivers, Rails, and Trails project through the Coraopolis Economic Revitalization Corporation and the Steel Industry Heritage Corporation.	Municipalities, Rails-to-Trails Conservancy, Montour Trail Council, Allegheny Trail Alliance, Horticultural Society of Western PA, Montour Valley Alliance, Pittsburgh Regional Alliance, Environmental City Initiative, Pittsburgh Convention and Visitors Bureau, Airport Corridor Transportation Authority, Pittsburgh Airport Area Chamber of Commerce, historical organizations	PA Department of Community and Economic Development, Coraopolis, private foundations	III.C.4 (p. 54) III.G.5) (p. 89)	1999
18) Expand transportation links between Watershed resources and Pittsburgh, the Pittsburgh International Airport, and other area attractions; distribute information on transportation routes.	Pittsburgh Area Transit, Pittsburgh International Airport, Pittsburgh Airport Area Chamber of Commerce, Airport Corridor Transportation Authority, municipalities	PA Department of Transportation, U.S. Department of Transportation, businesses/corporations, private foundations	III.G.6) (p. 90)	2001
19) Apply to have important historical properties listed on the National Register of Historic Places.	Property owners, historical societies, municipalities, residents	No associated cost	III.G.7) (p. 90)	2002
20) Establish "micro loans" as a form of economic development incentive related to tourism and recreation in the Watershed.	Financial institutions, municipalities, economic development agencies, human services agencies	Financial institutions, banks, grants from private foundations and economic development agencies	III.G.8) (P. 90)	2002

V. FIGURES




Prepared for
Montour
 Valley
 Alliance

Prepared by
KCI
 TECHNOLOGIES

Figure 1 Project Area

**River Conservation and Land Use Plan for the Montour Run Watershed
 Allegheny County, Pennsylvania**

 Montour Run Watershed Boundary
 Montour Trail

 Streams

 Ohio River

 NWI Wetland Areas

 Flood Prone Areas

 Primary Hydric Soils (At, BrB)

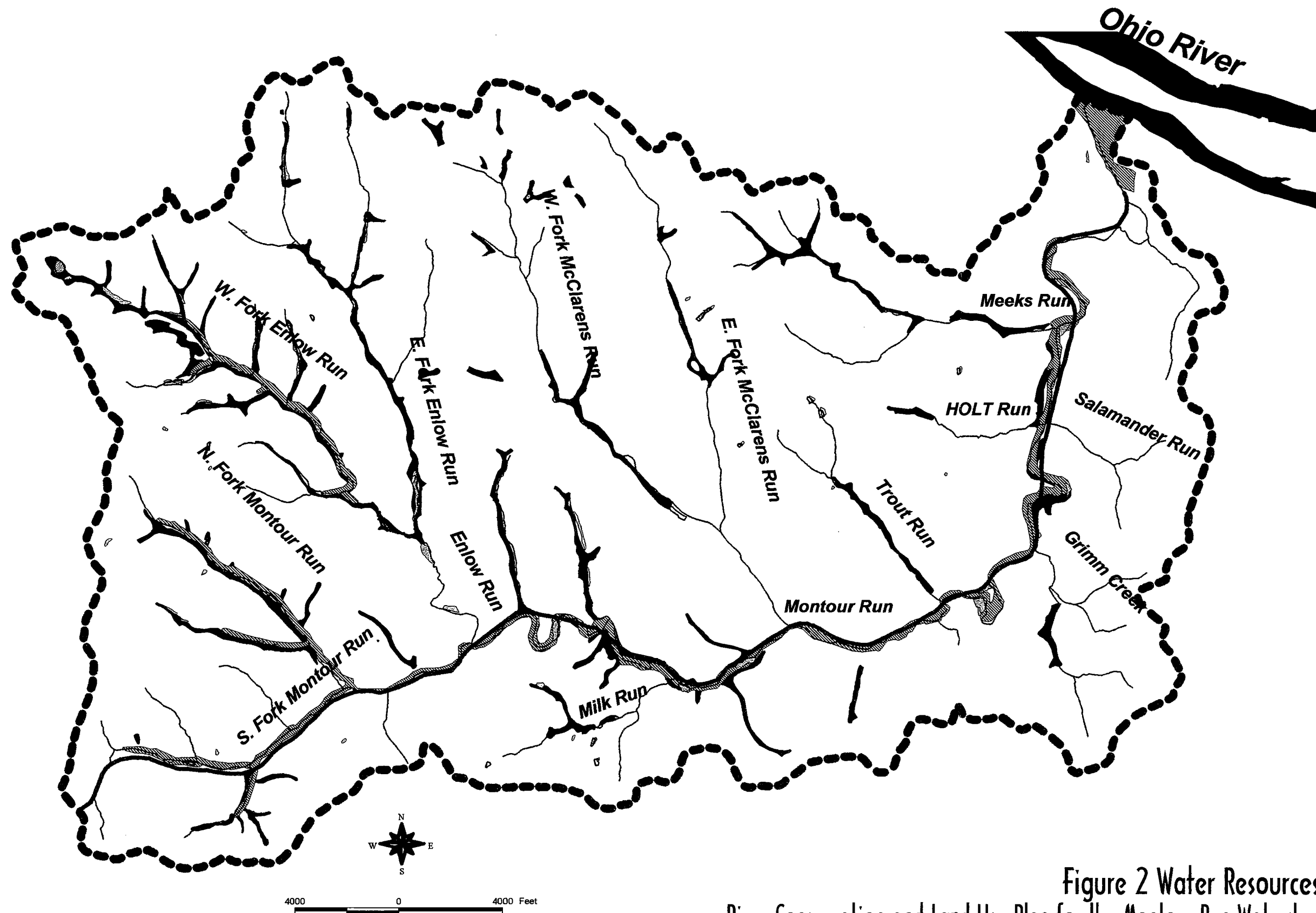
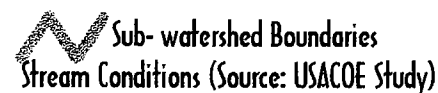
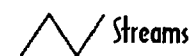


Figure 2 Water Resources
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania



- Beaver Dam on West Fork Enlow Run Remediation Site
- The Clinton Deep Mine Complex Remediation Site
- Headwaters of the South Fork of Montour Run Remediation Site
- North Fork Montour Run Headwaters Deep Mine Complex Remediation Site
- Cattail Marsh on BFI Site on an Unnamed Right Bank Tributary to the North Fork of Montour Run at Mile 0.4 Remediation Site
- Stormwater Drainage Facility on an Unnamed Left Bank Tributary to the West Fork of Enlow Run at Mile 2.05 Remediation Site
- Extensive Cattail Marsh along Santiago Run, below the Santiago Mine, in the South Fork Montour Run Basin Remediation Site

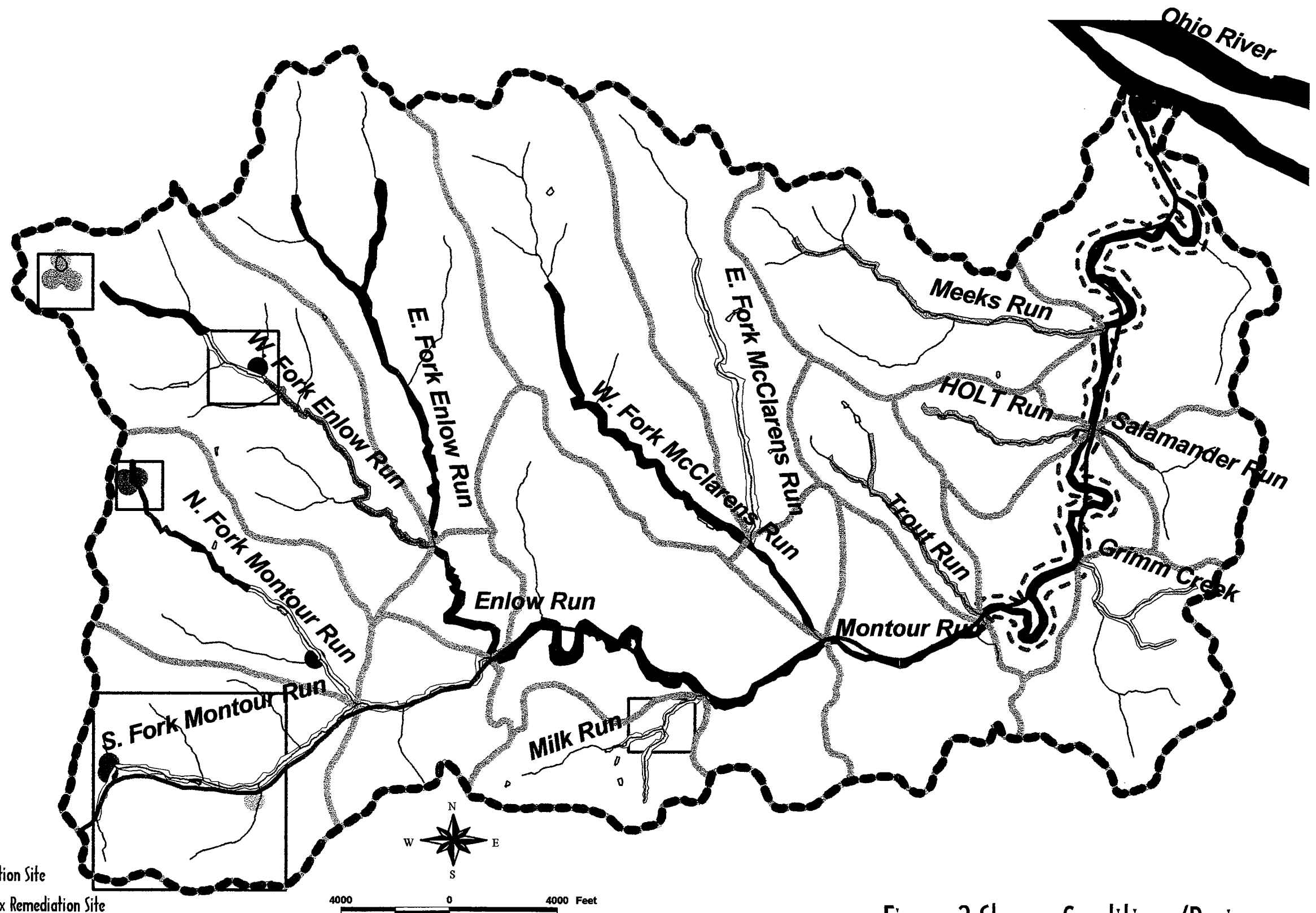












Figure 3 Stream Conditions/Drainage
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania

Prepared for
Montour Valley Alliance

Prepared by
KCI TECHNOLOGIES

-  Montour Run Watershed Boundary
-  Montour Trail
-  Transportation
-  Proposed Montour Greenway
-  Streams
-  Holt's Conservation Areas
-  Ohio River BDA
-  Clinton Wetlands BDA
-  Montour Run Valley LCA
-  Ohio River
-  Pittsburgh International Airport

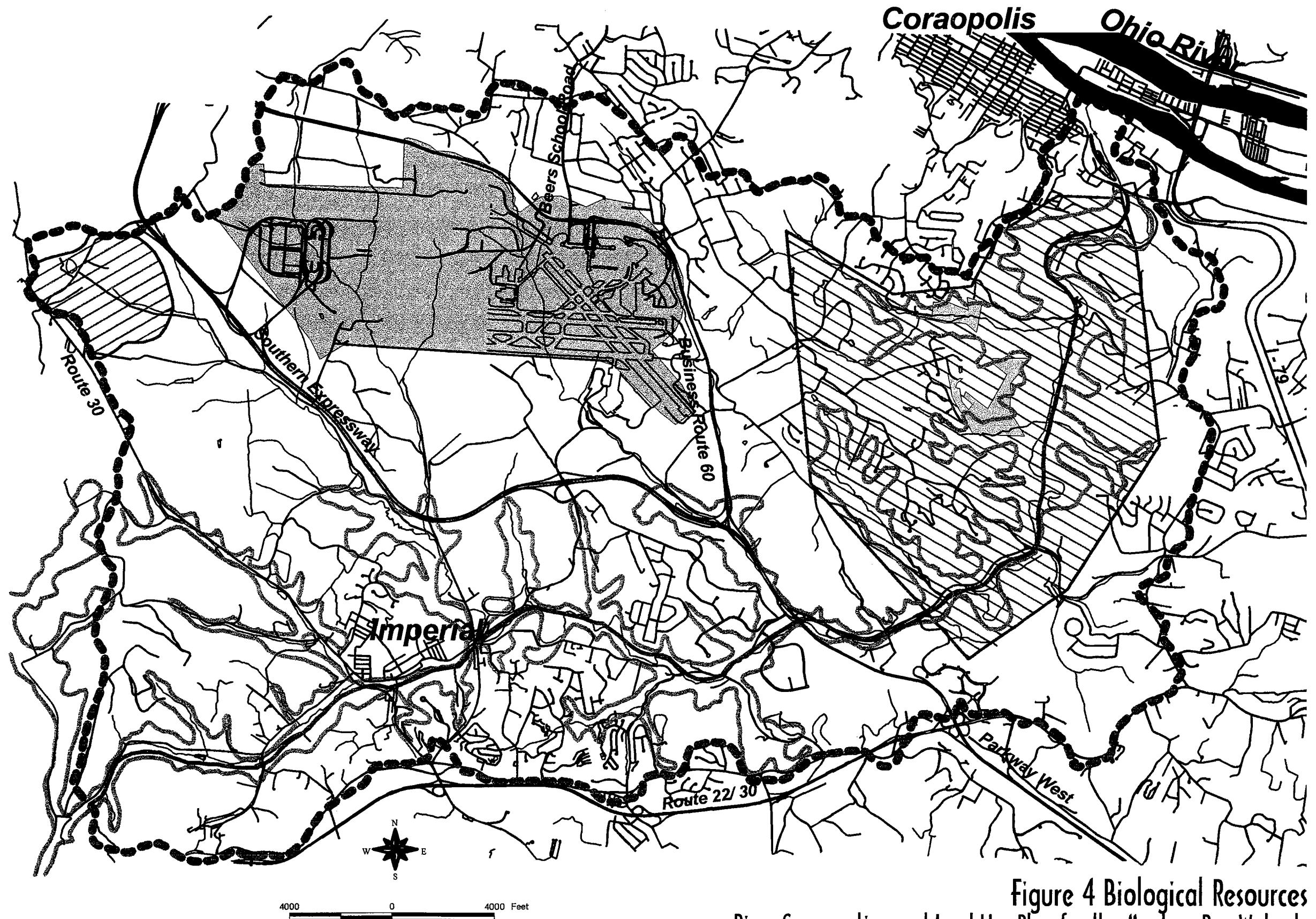
















Figure 4 Biological Resources
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania

- ▲ Montour Trail Access Points
-  Montour Run Watershed Boundary
 Montour Trail
 Transportation
-  Streams
-  Ohio River
-  Holt's Conservation Areas
-  Parks
 Sportsmen's Clubs
-  Cemeteries
 Golf Courses
-  Proposed recreational / educational sites
 Site of local historic interest
 Buildings
-  Pittsburgh International Airport

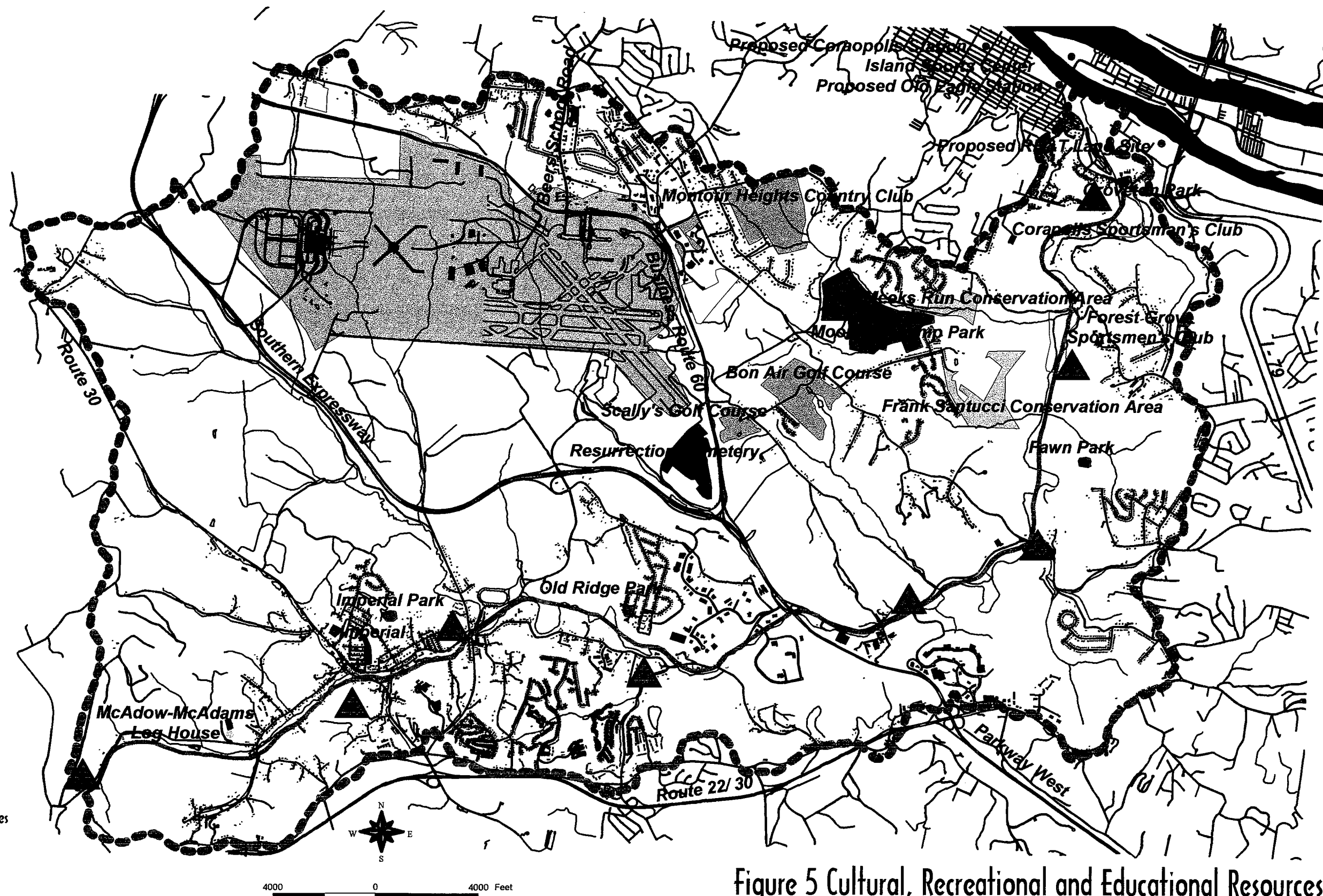


Figure 5 Cultural, Recreational and Educational Resources
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania



- Montour Run Watershed Boundary
- Montour Trail
- Streams
- Ohio River
- Transportation
- Steep Slopes
- Landfills
- Breslube-Penn Superfund Site
- Environmental / Natural Heritage Inventory
- Clinton Wetlands BDA
- Montour Run Valley LCA
- Prime Agricultural Soils
- Prehistoric Landslides
- Manmade Fill
- Recent Landslides
- Soils with Conspicuous Creep
- Area of Red Beds and Associated Rock
- Pittsburgh International Airport

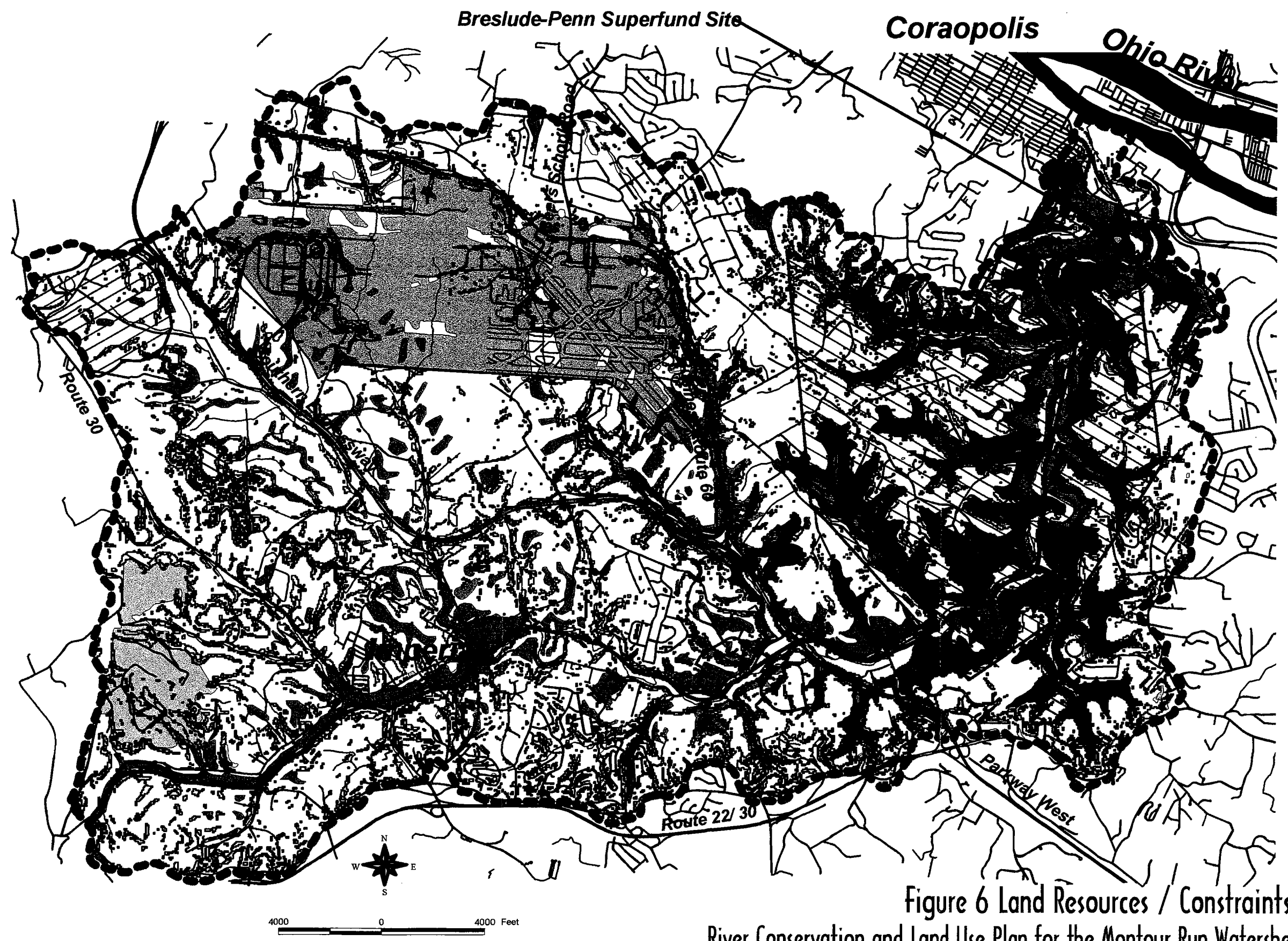
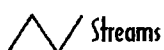


Figure 6 Land Resources / Constraints
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania



Land Use Land Cover

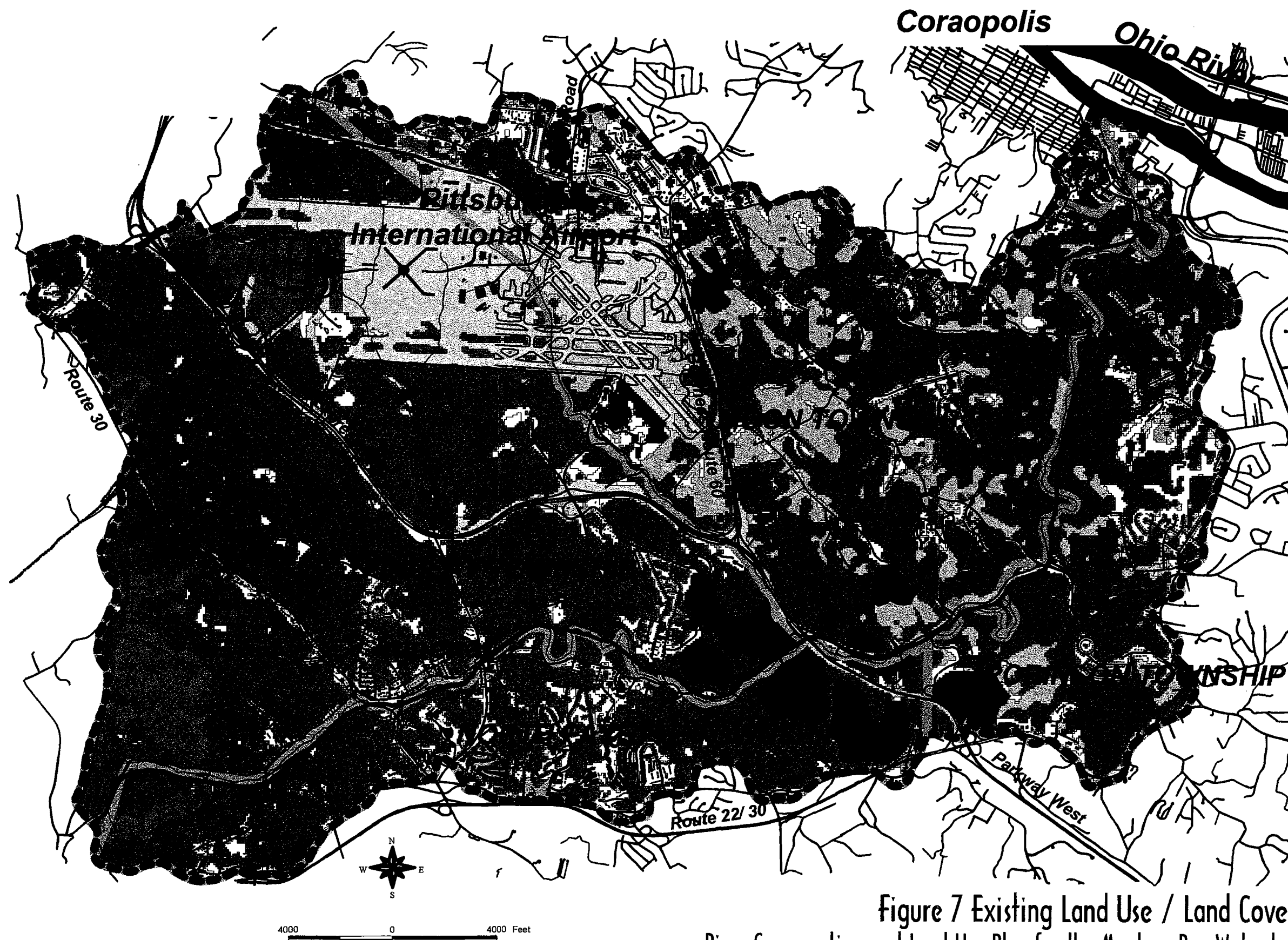
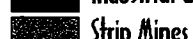
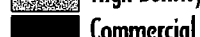














Figure 7 Existing Land Use / Land Cover
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania

-  Montour Run Watershed
-  Montour Trail
-  Possible Links to Montour Trail Transportation
-  Future Findlay Connector Road
-  Streams
-  Buildings
-  Borough and Townships
-  Pittsburgh International Airport
-  Riparian Conservation Corridor
-  Moderate Capacity Development Area
-  Higher Capacity Development Area
-  Ohio River

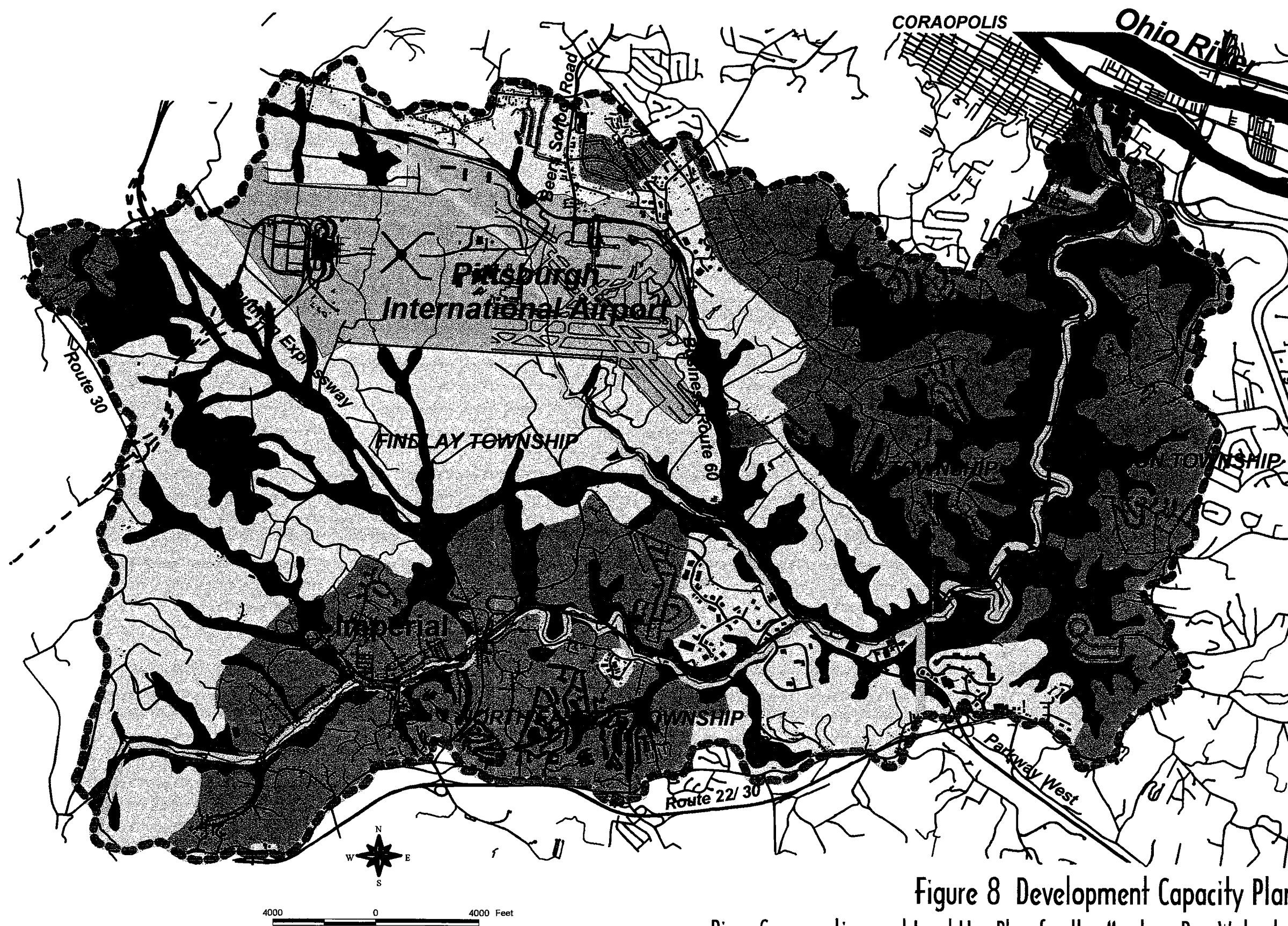


Figure 8 Development Capacity Plan
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania



Zoning Categories

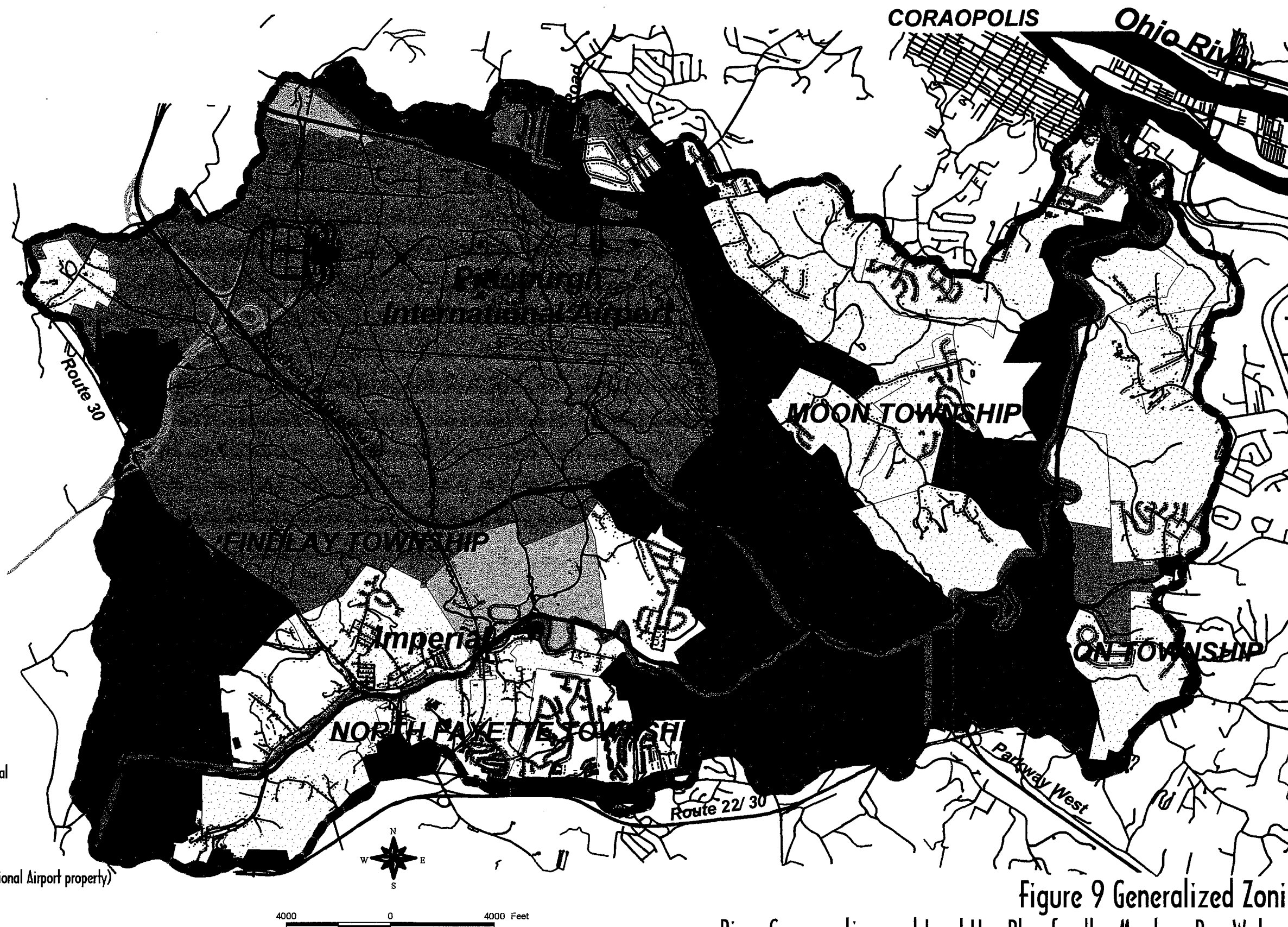
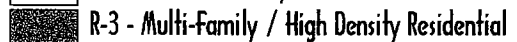
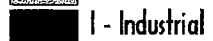


Figure 9 Generalized Zoning
River Conservation and Land Use Plan for the Montour Run Watershed
Allegheny County, Pennsylvania

VI. APPENDICES

APPENDIX A

Advisory Council Members

Advisory Council Membership

<u>NAME</u>	<u>POSITION</u>	<u>AFFILIATION</u>
Acock, Jeff	Chairman	No. Fayette Township Parks Board
Brown, Scott	Vice President and Assistant General Counsel	Bayer Corporation
Burke, Frances	Commissioner	Robinson Township
Burkholder, Lois	Chairperson	Democratic Party of Moon Township
Byron, Jack	Resident	Coraopolis Borough
Caruso, Chris	Assistant Manager	Findlay Township
Cersosimo, Joe	Treasurer	Forest Grove Sportsmen's Club
Colarossi, Lee	Realtor	Lee Realty
Dombrowski, Lora	Assistant Planning Director	Moon Township
Elek, Mark	Treasurer	Ducks Unlimited, West Allegheny Chapter
Fenton, Richard	Councilperson	Coraopolis Borough
Fife, Valerie	Market Manager and Vice President	Mellon Bank
Fredericks, Kelly	Deputy Director of Engineering, Planning, and Construction	Allegheny County Department of Aviation
French, David	Former Member of Planning Commission	Robinson Township
Griffith, Carl	Realtor	Prudential Preferred Realty
Hadfield, Bill	Resident	Robinson Township
Harper, Robert	Attorney	Moon Township
Herring, Marsha	Biology teacher	West Allegheny School District
Joseph, Jana	Biology teacher	Moon Area School District
Kavalukas, Charles	Resident	Robinson Township
Kirkpatrick, Terry	Councilperson	Coraopolis Borough
Kotik, Nick	Aide	Office of State Representative Fred Trello, 45th District
Larson, Prudence	Transportation Planner	Southwestern Pennsylvania Regional Planning Commission
McCormick, Frank	Resident	Moon Township
McShane, Rosemarie	Secretary	Coraopolis Economic Revitalization Corp.
Manion, Lynn	Executive Director	Airport Corridor Transportation Association
Muha, Eileen	Staffperson	Pittsburgh Airport Area Chamber of Commerce
Nelson, Ed	Supervisor	Moon Township
Nesterak, Steve	Vice President of Development	Forest City Enterprises
Noel, Catherine	Chairperson, Parks and Recreation Board	Robinson Township

Advisory Council Membership (continued)

Page 2

<u>NAME</u>	<u>POSITION</u>	<u>AFFILIATION</u>
Pecharka, David	Director	Hollow Oak Land Trust
Pippy, John	State Representative	44th District, Pennsylvania Legislature
Pisano, Ross	Member	Cornell School Board
Pugach, Joe	President	Trout Unlimited, Penn's Woods West Chapter
Sarachine, Steve	Member	Findlay Township Parks and Recreation Board
Schombert, John	Chief, Public Drinking Water and Waste Mgmt	Allegheny County Health Department
Scott, Leona	Board Member	Allegheny County Conservation District
Shemmer, Clara	former Supervisor	Moon Township
Siranovich, Stan	Director	Montour Trail Council
Story, Dick	Board Member	Robinson Township Historical Society
Sweterlitsch, Bill	President	Coraopolis Economic Revitalization Corp.
Viccaro, Paul	Director of Facilities	RPS, Inc.

PROJECT MANAGEMENT COMMITTEE

Homza, Mike	Member	Montour Valley Alliance
Kraynyk, Roy	Member	Montour Valley Alliance
Packer, Dick	Member	Montour Valley Alliance
Sattinger, Stan	Chairperson	Montour Valley Alliance

STAFF

Quasey, Dick	Resource Person	Montour Run Watershed Planning Project
Thorne, Janet	Project Manager	Montour Run Watershed Planning Project

APPENDIX B

Public Meeting #2 and #3

**Public Meeting #2
Prioritized Issues/Solutions**

At public meeting #2, the attendees were asked to review problems and recommended solutions that had been identified by the consulting team and reviewed by the Advisory Council. They were invited to add issues to the list.

The group was also asked to vote on the problem and/or solution that was the most important to them. Each individual was given three votes in the form of dots to register their choices.

As you would expect, the votes are scattered throughout the issues because of the number of issues involved and people present. Six issues of concern stood out (all vote counts are noted below, as are issues that were added by participants):

- the economic value of emphasizing conservation, open space, and green space is not adequately reflected in economic development strategies (12);
- development in floodplains serves to increase the frequency, duration, and intensity of flooding events (11);
- abandoned mine drainage in the Western Watershed (9)
- disturbance of steep wooded slopes and ravines results in loss of aesthetic values for users of the Montour Trail; loss of educational and research opportunities for school programs and scientists (9)
- problems continue with run-off from de-icing fluids at the Pittsburgh International Airport (7);
- and the need to establish new conservation areas, habitat preservation areas, and forested streambank buffers to maintain and enhance remaining forest cover (7).

<u>Problem</u>	<u>Water Resources</u>	<u>Recommended Solution</u>
Streambank Erosion (3)		Inventory and prioritize sites needing erosion control Implement streambank stabilization devices Update municipal/County stormwater management plans (2)
Threats to Wetlands (2)		Ensure compliance with wetlands protection laws and ordinances (1) Create new wetlands areas in conjunction with new

Development in floodplains serves to increase frequency, duration, and intensity of flooding events (11)	<p>developments (1)</p> <p>Discourage future floodplain development (1)</p> <p>Create a forested streambank buffer and/or a greenway conservation area</p> <p>Create wetlands in floodplains to reduce flooding (2)</p> <p>Acquire floodplain land as privately or publicly managed conservation areas</p>
Abandoned mine drainage (AMD) in the Western Watershed (9)	Correct AMD problems at selected sites
Airport deicing fluids run-off from the PIA (7)	<p>Create more effective impoundment of deicing fluids</p> <p>Identify and adopt more environmentally friendly deicing compounds</p> <p>Recycle deicing fluids (added)</p>
Several species of fish have been eliminated due to AMD pollution	Re-introduce locally extinct fish species from stocks of fish present in nearby healthy biological streams
Trash, dumping, chemicals in the stream (added)	

<u>Problems</u>	<u>Biological Resources</u> <u>Solutions</u>
Widespread deforestation and urbanization of sensitive vegetative resource areas (3)	Establish new conservation areas, habitat preservation areas, and forested streambank buffers to maintain and enhance remaining forest cover (7)
Reduction of wildlife populations	Establish new conservation areas, habitat preservation areas, and

	forested streambank buffers to maintain and enhance remaining wildlife habitat
	Improve wildlife habitat
Water Quality degradation threatens aquatic life	Develop a program of aquatic habitat improvements
	Identify point or nonpoint sources of sedimentation in the stream (added)
Limited information is available on the abundance and distribution of rare, threatened, and endangered species in the Watershed	Conduct and publicize a Watershed-wide survey of existing species and habitat
	Establish local ordinances to ensure appropriate protection and perpetuation of these species
Many of the most sensitive biological areas identified in the Allegheny County Natural Heritage Inventory are not adequately protected (Clinton Wetlands, Montour Valley LCA, and Ohio River BDA) (3)	Increase public awareness of existence of sensitive natural areas (2)
	Acquire land to become publicly- or privately-managed conservation areas (1)
The removal of forested streambank buffers has resulted in an adverse effect on the quality of water and aquatic habitats (7)	Re-establish forested streambank buffers in areas where there are none and protect and enhance areas where they exist
Disturbance of steep wooded slopes and ravines results in loss of aesthetic values for users of the Montour Trail; loss of educational and research opportunities for school programs and scientists (9)	Establish a Greenway to protect these resources
	Implement stricter standards for protection of steep slopes, and enforce existing ordinances
Ordinances that protect natural resources are not enforced (added)	Make those responsible for enforcement accountable (added)
Stormwater treatment systems will not contain peak runoff volumes and channelize runoff that occurs (added)	Develop stricter guidelines for stormwater control (added)

<u>Cultural, Recreational, and Educational Resources</u>	<u>Solutions</u>
<u>Problems</u>	

Recreational resources within the Watershed are not interconnected and are accessible only by car (2)

Using the Montour Trail as the major recreational component within the Watershed, construct links from the main Trail to public parks, historic resources, and schools (3)

Link Trail to residential, commercial, and light industrial developments (1)

Extend Trail to Coraopolis to help support sustainable economic development and connection with other opportunities for tourism (1)

Resources in the Watershed have not been fully utilized for educational purposes (5)

Promote instructional use of resources by educational institutions at all levels

Loss of known historic sites (2)

Raise public awareness of the cultural values of historical sites

Establish historic district and other ordinances where appropriate to prevent destruction of historic resources

Establish eligibility for National Register of Historic Places and/or the PA Museum and Historic Commission's Register of Historic Places

Public funding for the future (added)

Potential loss of undiscovered archaeological sites

Raise public awareness of the cultural values of archaeological sites

Establish ordinances to protect sites

Land Resources/Constraints	
<u>Problems</u>	<u>Solutions</u>
Potential damage from future landslides caused by disturbing steep slopes (3)	Discourage development in landslide-prone areas and enforce/strengthen current regulations
Potential for loss of life and property in previously mined areas (3)	Identify previously mined areas and provide that information to developers via appropriate zoning maps
Publicly funded infrastructure is fostering sprawl (added) (3)	Limit subsidies to projects that meet higher standards of development (added) (2)
How do we maintain the natural aspect while protecting people who use it? The remoteness can be a problem for health emergencies. (added)	

Land Use Intensity Plan	
<u>Problems</u>	<u>Solutions</u>
An effective regional approach to enhance and preserve resources, thereby promoting sustainable economic development has not occurred to date	<p>Modify zoning where needed to incorporate the recommended land use intensity plan.</p> <p>Link environmentally sensitive areas together by conservation corridors (green-ways) and connect them to public parks, golf courses, and conservation areas -- and where possible to residential, commercial, and office developments</p> <p>Require future developments to respect and integrate existing environmental resources into the site design of development plans; the adherence to appropriate land development practices would allow continued economic growth without further degradation of sensitive Watershed resources (i.e., sustainable economic development)</p>

Planning and Zoning Controls, and Zoning Patterns	Problems	Solutions
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<p>The level of environmental resource protection varies greatly among the municipalities encompassing the Watershed. The method by which this protection is administered also varies</p>	<p>Provide a uniform and logical method of enforcement/administration establishing a comprehensive Conservation Overlay District (or Greenway Overlay District) for the Watershed to prevent future problems that are likely to occur if some of the present land use practices are allowed to continue</p>
---	---

Throughout the Watershed, some zoning classifications of land within the Montour Valley LCA are not compatible with the sensitivity of resources

Areas within the Montour Valley LCA and presently zoned as Industrial, Regional, and Office and Business Commercial should be re-classified as Open Space/ Reserve with minor exceptions or, create a Conservation Overlay District (Greenway Overlay District) for environmentally sensitive and recreation areas as an alternative option to Open Space/Reserve Zones

Reclassify stream valleys and associated steep slope/landslide prone areas as part of a continu-ous Open Space/Reserve Area or Conservation Overlay District (the vast majority of these unde-veloped, sensitive resource areas are in the pro-posed Montour Greenway)

Some Zoning classifications of land are not compatible with the sensitivity of the area and pose potential conflicts for future development	Protect sensitive environmental features on Airport land by reclassification as part of a continuous Open Space/Reserve or a Conservation Overlay District Zone (Greenway Overlay District)
---	---

Reclassify environmentally
sensitive areas as Open

Space/Reserve or include them in a Conservation Overlay District Zone. Either solution should be part of a continuous area

NOTE: For practical purposes, several planning and zoning tools (land development tools) should be made available to individual property owners and developers under the auspices of offering "replacement development area" for the land area within the Conservation Overlay District (Greenway Overlay District). These tools would include: 1) Transfer of Development Rights, 2) Open space Development Standards, 3) Zero Lot Line Development Standards, and 4) Cluster Development Standards.

Existing and Potential Economic Impacts of Tourism and Recreation

<u>Problems</u>	<u>Solutions</u>
Economic value of emphasizing conservation, open space, and green space is not adequately reflected in economic development strategies (12)	Raise awareness among the public, local officials, economic development professionals, real estate agents, developers, and others of the economic value of conservation, open space and green space Protect, maintain, and enhance the Montour Trail as the central asset for generating dollars from tourism and recreation Support efforts of land trusts to increase the amount of land protected for greenways and open space corridors (1) Encourage developers to protect undeveloped portions of their sites using tools such as conservation easements Governmental acquisition of land for open space (strongly supported by public opinion survey) Determine and publicize the economic value of outdoor recreation in the region

No marketing strategy exists for deriving economic benefits from tourism and recreation (1)

Exploit the large economic impact of wildlife viewing by adopting land use policies that preserve habitat for wildlife

Actively promote the Montour Trail and other Watershed resources as generators for economic benefits from recreation and tourism (1)

Examine the marketing strategies and successes of heritage corridors and work with the Steel Industry Heritage Council

Explore marketing strategies jointly among Western Allegheny County attractions (the Montour Trail, CERC's RR&T project, the Botanical Garden of Western PA, etc.)

Target business visitors in the Airport area, downtown, and from the Convention Center as a "day market"

Develop transportation linkages that promote tourism

List important historical properties on the National Register of Historic Places

Educate larger public about the needs (added)

Smaller businesses often have difficulty starting up because they fall below the revenue level of economic development groups (3)

Establish "micro loans" as a means of means of means of development of small businesses that promote or serve tourism and recreation in the Watershed

Tax incentives (added)
Millage breaks (added)

**Public Meeting #3
Review of the
Draft Montour Run River Conservation and Land Use Plan**

The Draft Plan was presented to the public at Meeting #3 and was available for review in each of the five municipal offices in the region plus the three area libraries. Comments had to be returned to the Montour Valley Alliance by Friday, January 8, 1999 to be addressed in the final report.

Listed below is a summary of the substantive questions asked during Public Meeting #3 and responses to them:

Q: How much of the Riparian Conservation Corridor is developed already?

A: Consultant stated that less than 10% of the Riparian Conservation Corridor is developed. There is not an exact percentage available because the data was generated through satellite imagery which sometimes misses structures because of tree cover. Also, some sensitive resource areas that could have been placed in the Riparian Conservation Corridor, but have already been disturbed by construction, were not included.

Q: Have you overlayed the existing lot lines within the Conservation area to identify which lots should be avoided for development? It would help to know what has to be protected.

A. No. Consultant suggested that, because the Riparian Conservation Corridor overlaps private property in some areas, the municipalities should use such tools as the transfer of development rights to minimize or eliminate a negative economic impact on such property owners. For example, the land owner could receive tax benefits in return for being granted a conservation easement. The long-term goal of the Project is to protect the resources found in the Corridor.

Q: Is the intent of the Conservation Corridor overlay district to have common regulations across the five municipalities? Will it include land use, land density, etc.? Who will be responsible for drafting the regulations that all the municipalities will be required to use?

A: Consultant stated that the intent of the overlay district is to protect the environmental resources within the Riparian Conservation Corridor. It is hoped that a task force will be established with planning representatives and Supervisors from each municipality which would spearhead organizing the development of regulations. The task force could be established as a Watershed Association that would open the

door to many funding opportunities which would help to implement some of the strategies set forth.

Q: What is the purpose of the River Conservation and Land Use Plan?

A: Consultant responded that when the final plan is adopted after the public hearing, it will provide the mechanism to go to the State and request funding to remediate the problems identified in the Plan (e.g. abandoned mine drainage and eroding stream banks) by placing Montour Run on the Rivers Conservation Registry. The PA Department of Conservation and Natural Resources requires this type of study to be done before funds are allocated.

Comments:

The consultant noted that this plan is not intended to be anti-development, but to promote sustainable development and economic growth.

The chairman of the Montour Valley Alliance stated that the funding that will be attainable once the River Conservation and Land Use Plan is adopted and submitted to DCNR could be used for:

- Updating storm water management plans;
- Improving forest buffers; and
- Remediating stream bank erosion.

APPENDIX C

Executive Summary of Public Opinion Survey

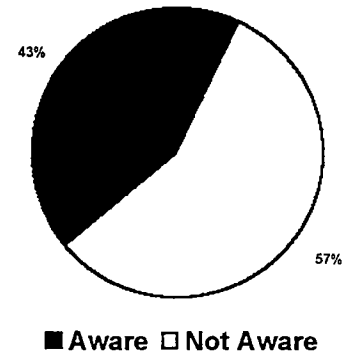
Executive Summary

Watershed Awareness

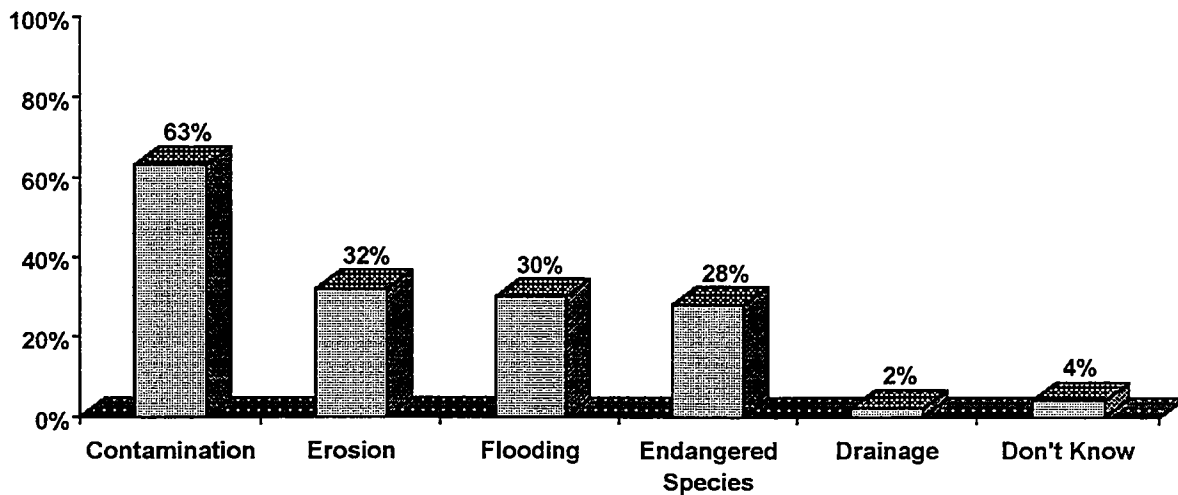
43% of the total sample were aware of the term *watershed* unaided. Similarly, 45% were aware of one or more negative impacts that occur when a watershed becomes degraded.

Among those aware of negative impacts, *contamination* was most frequently mentioned at 63%. *Erosion*, *flooding*, and *endangered species* were each mentioned by approximately one-third of aware respondents.

Watershed Awareness



Negative Impacts that Occur When a Watershed Becomes Degraded

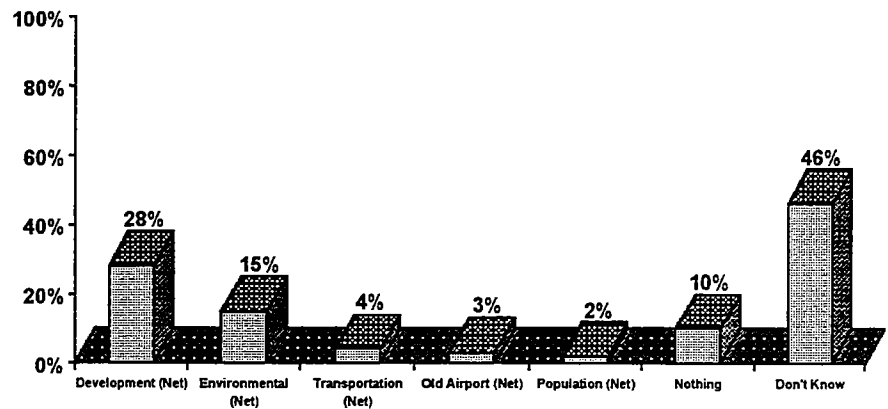


Executive Summary (Cont'd)

Land Use Issues

When respondents were asked unaided what they thought were the most significant land use issues facing residents of the Montour Run Watershed area, over one-half were unable to provide a specific response (46% *did not know*, and 10% indicated *none*). Among those who did answer, *development* and *environmental* issues were the top mentions.

Land-Use Issues Currently Facing Residents of the Montour Run Watershed



Support for Land Use Activities

Respondents were asked to rate their level of support for nine land use activities impacting the Watershed using a five-point scale, where 5 = *support completely* and 1 = *do not support at all*. Support for all nine land use activities was strong, as evidenced by the fact that eight of the nine received a mean rating of 4.0 or higher. Respondents supported the protection and conservation of natural resources more than increasing outdoor recreational activities: *Improving water quality and stopping pollution of the stream* received the highest mean rating (4.77), while *Increasing outdoor, recreational opportunities in the Watershed, including sportsmen's facilities* (3.96) received the lowest.

(Please refer to the graph on the following page.)

Land Use Issues (Cont'd)

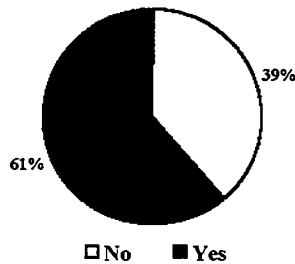
Watershed Management Action	Support Score (1-5)
Improving Water Quality and Stopping Pollution of the Stream	4.77
Preserving Montour Trail & Natural Areas Around It	4.65
Protecting the Stream's Fish & Aquatic Life	4.63
Protecting the Land Around the Montour Stream From Flooding & Erosion	4.60
Preserving Natural Areas & Open Space in the Airport Area	4.31
Protecting & Preserving Historic Sites in the Watershed	4.27
Avoiding Disturbance of Steep Slopes & Ravines in the Watershed	4.15
Avoiding Construction Very Near to the Stream	4.04
Increasing Outdoor, Recreational Opportunities in the Watershed, Including Sportsmen's Facilities	3.96

Executive Summary (Cont'd)

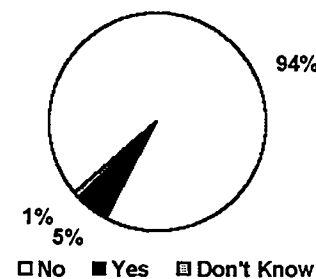
Watershed Visitation

The majority of respondents (61%) visited the watershed in the year preceding the study for some kind of recreational activity. Only 5%, however, attended a

**Watershed Visitation for
Recreational Activities in the Past
Year**



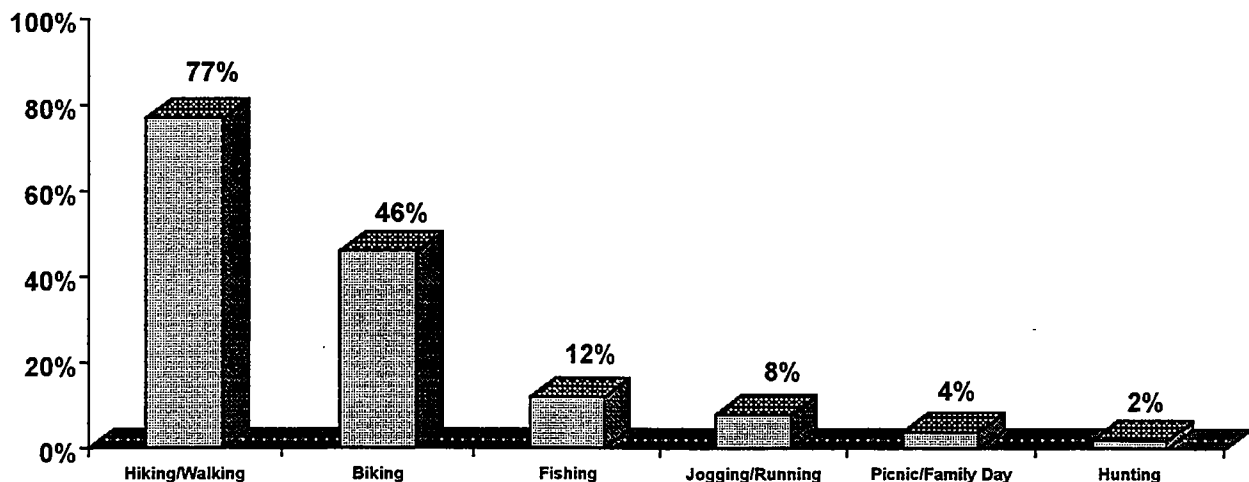
**Participation in Scientific,
Historic, or Educational
Activities in the Watershed**



scientific, historic, or educational activity in the watershed.

Those respondents who visited the Watershed for recreation were most likely to do so for *hiking/walking* (77%) or *biking* (46%). 12% went *fishing* in the watershed, while 8% went *jogging/running*.

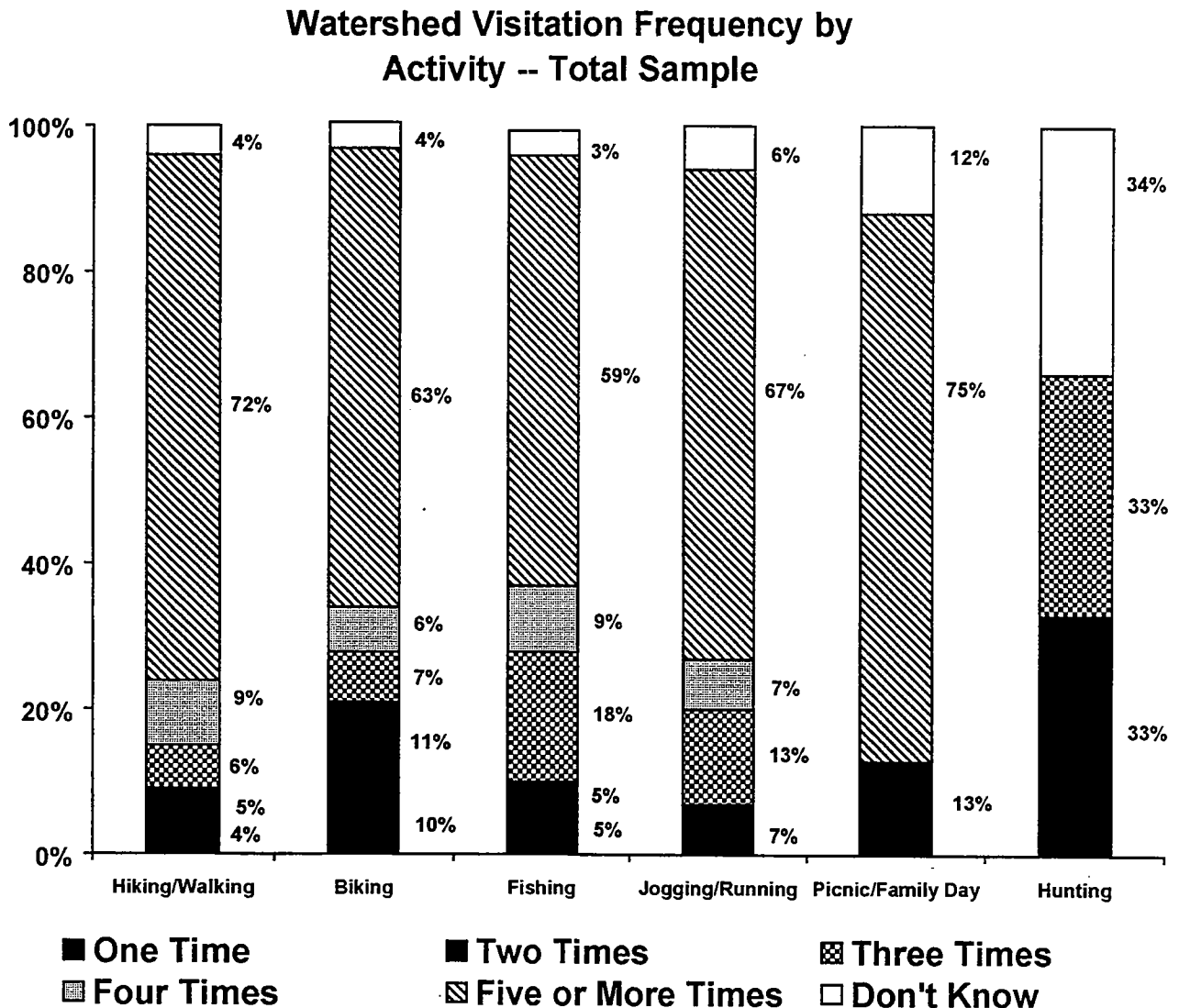
Recreational Activities in the Watershed



Executive Summary (Cont'd)

Watershed Visitation

Those participants who indicated visiting the Watershed for one or more recreational activities were asked how often they visited the Watershed for each mentioned activity in the previous year. As the graph below shows, the majority of all respondents who visited the watershed for all activities except *hunting* did so *5 times or more*.

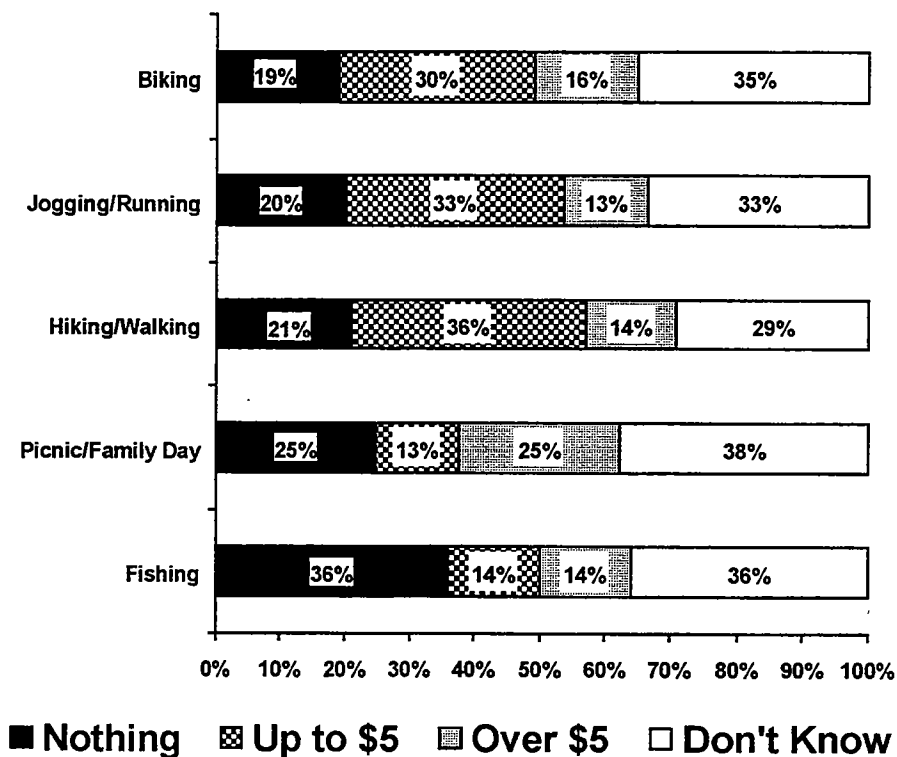


Executive Summary (Cont'd)

Consumer Specified Pricing of Watershed Recreational Activities

To determine which Watershed recreational activities were most valued by respondents, those who indicated participation in one or more recreational activities were asked how much they would pay per visit to perform each mentioned activity in the Watershed. *Biking, jogging/running, and hiking/walking* were assigned a monetary price with the greatest frequency—approximately one-half of all those participating in each activity were willing to pay something to perform each in the Watershed. 38% of those who visited the Watershed for *picnicking/family day* were willing to pay for that activity, while 28% of the fishermen were willing to pay. Approximately one-third of the respondents for any given activity did not know what price to assign to the activity.

Consumer Specified Per-Visit Pricing--Total Sample



Executive Summary (Cont'd)

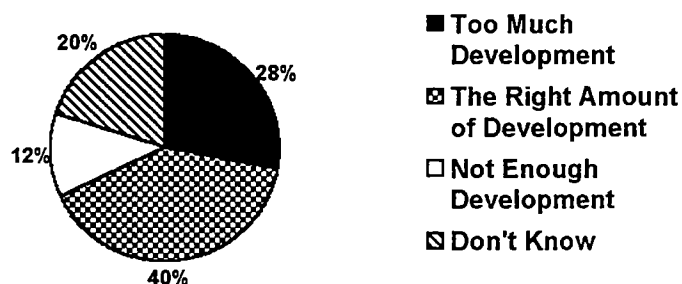
Land Use Planning

40% of all respondents felt that there was the *right amount of development* in the Watershed area, while 28% felt that there was *too much development*. Only 12% indicated that there was *not enough development*, while 20% *did not know*.

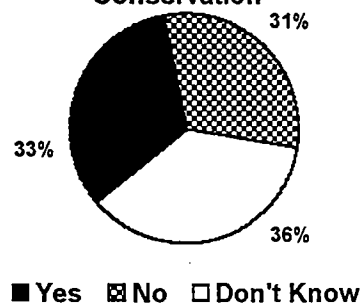
Only one-third of all respondents indicated that their municipality was doing enough to plan for the right balance of development and conservation.

The majority of respondents (75%) who felt that their municipality was not doing enough indicated that *conservation* needed to be emphasized more than development (15%). **Nearly three-quarters of all respondents agreed that local and county governments should buy land to protect it from development and preserve it for future generations.**

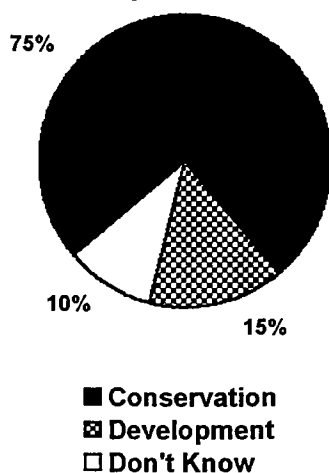
Opinions on the Extent of Development in the Watershed



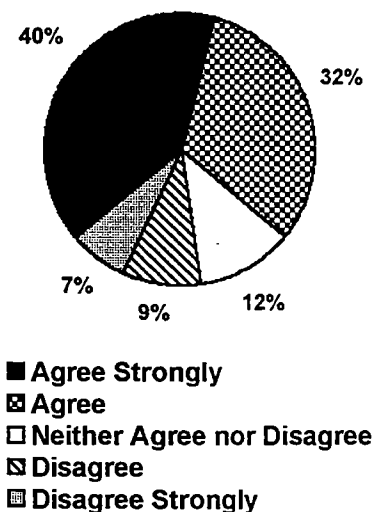
Opinions on Whether or Not the Local Municipality is Doing Enough to Plan for the Right Balance of Development and Conservation



Land-Uses That Should Be Emphasized



Local Governments Should Buy Land for Preservation



Executive Summary (Cont'd)

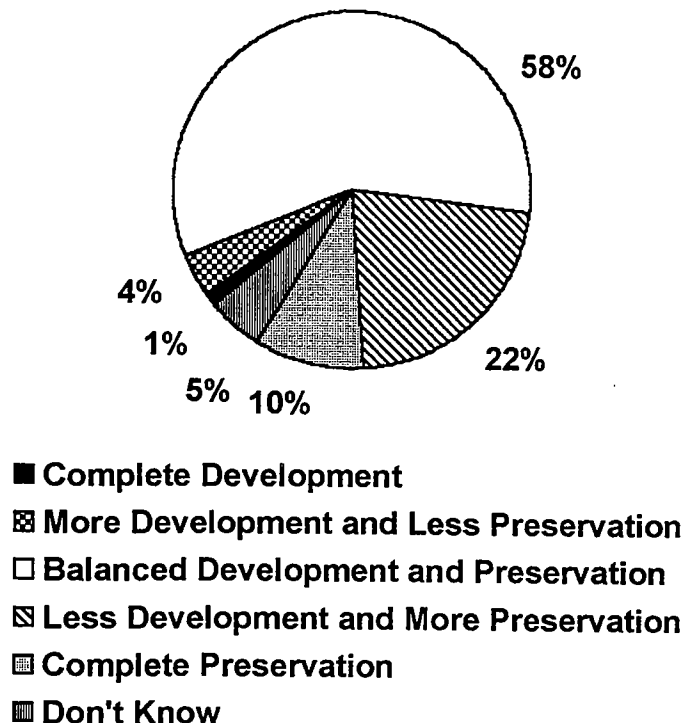
Land Use Planning (Cont'd)

Respondents were asked to identify the ideal mix of development and conservation for the Watershed area by choosing one of five descriptive phrases:

- *Complete development*
- *More development and less preservation of resources*
- *Balanced development and preservation of resources*
- *Less development and more preservation of resources*
- *Complete preservation of resources*

A balance between development and preservation was most preferred, with 58% of the total sample indicating this as the phrase of choice. *Less development and more preservation* was mentioned with the second greatest frequency (22%), followed by *complete preservation* (10%). Those statements relating to *more development* in the Montour Run Watershed were preferred by 5% or fewer of total respondents.

Preferences for the Mix of Development and Conservation



Conclusions and Recommendations

Nearly one-half of all respondents indicated awareness of the term *watershed*. (The correctness of each aware respondent's definition, however, was not determined.) One-half of all respondents, furthermore, were also aware of the negative impacts that occur when a watershed becomes degraded. These awareness levels are positive news for the Montour Valley Alliance, considering that the term is rather technical and is often relegated to the fields of environmental planning and civil engineering. However, nearly one-half lack awareness, and over one-half could not articulate a single land use issue facing the Montour Valley area. These findings suggest that a conservation/preservation education program is needed.

Although a near majority lack a meaningful understanding of watershed issues, an overwhelming majority support the conservation and preservation of the natural resources in the Montour Valley area: eight of the nine attribute statements, for example, received support ratings of 4.0 or higher on a 5.0 scale. Further support comes from the fact that a substantial majority utilize the Watershed for recreational purposes, including walking, jogging, hiking and biking, and use it often. Very few, however, indicated participation in an environmental education program in the Watershed in the year preceding the study, confirming the need for education.

The overwhelming support for conservation and preservation of the Watershed should not be interpreted as anti-development. Total respondents were most likely to express a desire for *balanced* conservation and development. Only one-third, however, felt that their local municipalities were doing enough to plan for the right balance of conservation and development. A vast majority liked the idea of having local government purchase open spaces for preservation for future generations.

APPENDIX D

Descriptions of Common Zoning/Subdivision Tools

There are numerous types of zoning and subdivision tools that could be used by the municipalities to provide incentives to developers and property owners that will result in stewardship of the Riparian Conservation Corridor. When used properly, these regulations provide increased design flexibility while protecting sensitive environmental resources. The descriptions of the zoning and subdivision tools which follow are derived from “Guiding Growth: Building Better Communities and Protecting Our Countryside, a Planning and Growth Management Handbook for Pennsylvania Municipalities” prepared with the support of the Pennsylvania Department of Community and Economic Development.

PERFORMANCE ZONING

WHAT IT DOES: Facilitates flexibility in design for all uses, protects natural resources, and can allow a variety of housing types in all residential zoning districts.

HOW IT WORKS: Performance zoning, unlike traditional zoning, relies on a list of specific quantifiable performance criteria which must be met by any use, hence the name performance zoning.

The performance criteria for **residential uses** are natural resource protection (or net-out) open space ratio, and impervious surface ratio. The natural resource protection provisions protect natural resources by putting limits on how much of various types of environmentally sensitive areas can be developed and bases allowable tract density on the remaining buildable area. The natural resource protection provisions are discussed in greater detail in the “Natural Resource Protection Provisions” contained in this Appendix. The open space ratio specifies for each zoning district, the minimum percent of the tract that must be maintained in open uses (i.e. not covered by building envelopes). If the resource protection area is less than the acreage required by the open space ratio stated for the district, then the open space ratio is controlling. The impervious surface area ratio specifies the maximum percentage of a tract that may be covered with surfaces that do not absorb water (e.g. buildings, parking areas, driveways, roads, sidewalks, and any other areas in concrete, asphalt, or other materials that do not allow water to soak into the ground). The impervious surface ratio typically is relevant only for higher density residential uses (e.g. townhouses, apartments, or condominiums) and non-residential uses.

Allowing a wide range of dwelling types in residential zoning districts makes it possible to accommodate the maximum number of dwelling units allowed by the zoning while meeting the natural resource protection requirements. It also enables a developer to respond quickly to changes in market conditions, without obtaining a zoning change (to allow town houses, for example).

Although the performance zoning concept advocates that the complete range of dwelling types be allowed in all residential districts, in practice, some municipalities have used an abbreviated list.

The performance criteria for **non-residential uses** are natural resource protection (or net-out) impervious surface ratio, and floor area ratio. The natural resource protection provisions protect natural resources by putting limits on how much of various types of environmentally sensitive areas can be developed and bases allowable impervious surface area on the remaining buildable area. The permitted impervious surface area specifies the maximum percentage of a tract that may be covered with surfaces that do not absorb water (e.g. buildings, parking areas, driveways, roads, sidewalks, and any other areas in

concrete, asphalt, or other materials that do not allow water to soak into the ground). The permitted floor area specifies the total floor area of building which may be developed on a site.

Often times, the performance zoning concept is implemented in a zoning ordinance as a permitted use in various residential and non-residential districts. This use is generally called a performance standard subdivision.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE:

Performance zoning was pioneered by the Bucks County Planning Commission in the 1970s. Ten of the county's 23 boroughs and 19 of its 31 townships have adopted some form of performance zoning. Over the years, the concept has been refined. As of late 1989, County Planning Commission staff considered the East Rockhill ordinance to be the "state-of-the-art." Performance zoning has also been used in the Town of McCandless and in Findlay Township and Penn Hills, Allegheny County.

NATURAL RESOURCE PROTECTION PROVISIONS

WHAT IT DOES: Protects natural resources by putting limits on how much of various types of environmentally sensitive areas can be developed and bases allowable tract density on the remaining buildable area.

HOW IT WORKS: Standards are set for limiting the intrusion of development into specific types of areas. For example, municipal ordinances in Bucks County typically specify that, on a given tract or group of tracts under one ownership, no more than the stated percent of the following types of areas may be altered, regraded, cleared, or built on:

- Floodplains - 0%;
- Streams, watercourses, wetlands, lakes or ponds - 0%;
- Lake or pond shorelines - no more than 20%;
- Wetlands margin - no more than 20%;
- Steep slopes of 25% or more - no more than 20%;
- Steep slopes of 15 to 25 percent - no more than 30%;
- Prime agricultural soils - no more than 20%; or
- Mature woodlands - no more than 40%.

Minimum lot size and setback requirements are set by the underlying zoning district, and in addition, a minimum building envelope is specified to provide sufficient area for the general location of the building, driveway, parking areas, patios, other improvements and site alterations. The minimum required lot may consist partly of the protected environmentally sensitive areas, but the minimum building envelopes are not allowed to intrude into them in excess of amounts specified above. For single-family detached residences, the minimum building envelope typically ranges between 8,500 and 3,500 square feet, depending on the zoning district.

A similar approach, called “**net-out**” is becoming widely adopted in Chester County. In this method, land area (such as floodplain, wetland, and steep slope areas) that cannot support development without significant negative environmental impacts are deducted from the total parcel area before determining the maximum number of dwellings that are permitted. All tracts of land and all design options (such as clustering and lot averaging) must be subject to the net-out provision. Therefore, the maximum achievable number of units must be the same for a given tract no matter what design option is proposed.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE: Natural resource protection standards are used widely in Bucks County and the netting-out procedure is used in Chester County. Natural resources zoning provisions have also been adopted in Findlay Township and Penn Hills, Allegheny County.

LOT AVERAGING

WHAT IT DOES: Enables more flexibility in site design than does conventional lot layout by making it possible to avoid destruction of natural features and to make better subdivision of oddly shaped tracts.

HOW IT WORKS: A provision in the zoning ordinance allows lots to vary in size down to a stated minimum so long as the total number of lots on the tract is not increased beyond the number allowed by the underlying zoning. Necessarily, then, lots smaller than the area stipulated for the district are offset by one or more lots larger than the district standard. Typically, the minimum size permitted by lot averaging is two-fifths the lot size stipulated for the district.

Lot averaging is usually accompanied by a provision that allows the frontage of individual lots to be less than the minimum required by the underlying zoning, so long as the average for all lots in the tract is at least as large as that required minimum. A typical provision might allow lot frontage to be two-thirds of the district standard.

Lot averaging is allowed only if a subdivision plan is presented and approved that indicates how all the lots permitted under the district standard are to be configured with lot averaging. A notice should be attached to the deed of each lot resulting from lot averaging stating that the lot may not be subdivided further.

An advantage of lot averaging as opposed to open space zoning, is that all land remains in the ownership of individuals; there is no remaining land that must be maintained by a homeowners association, the township, or a conservancy.

A disadvantage is that lot configurations are determined as much by the shape of the parent tract as by the existence of natural features. Also, land that would be common under open space zoning, and could be given over to unified use and landscaping, is divided by ownership. This would make it more difficult to assemble land for farming and would make the development of a footpath system through open land more difficult to accomplish.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE: Pennsbury Township, Chester County; Marshall Township, Allegheny County.

OPEN SPACE/CLUSTER ZONING

WHAT IT DOES: Enables more flexibility in site design than does conventional lot layout or lot averaging, making it possible to preserve configurations of natural features and to effect considerable savings in site development costs.

HOW IT WORKS: A provision in the zoning ordinance allows the total number of dwellings permitted by the zoning for the tract to be located on small lots on the most buildable portions of the site. If on-site sewage treatment is relied on, the lots could be one-half to three-quarters of an acre, depending on soil conditions. If a community system is employed, lots could be smaller.

The remaining land could be owned and maintained in a number of ways:

- Sold to a farmer or other individual who would then maintain it for open space uses;
- Donated to the township, which could subsequently maintain it for open space uses;
- Donated to a conservancy, which would subsequently maintain it in open uses. Many conservancies will require that an endowment also be donated to defray the costs of maintenance;
- Retained by the owners of one or more of the lots created from the tract and owned and maintained by them.

Open space zoning makes possible more flexibility in site design than does lot averaging. Structures can usually be sited so that they do not interrupt the traditional rhythm of the landscape or obstruct vistas. The site usually can be designed so that the remaining common land is in large contiguous units that could be farmed or devoted to other open space uses. The remaining land could be governed by conservation easements, that might, among other things, include provision for footpaths. Some ordinances require that the remaining land be mowed at least once a year.

Significant cost savings are usually experienced with open space zoning. As development is on smaller lots with smaller street frontage and is concentrated within the tract, fewer linear feet of pavement and utilities are needed. Because impervious surfaces are smaller, storm water runoff is less and more natural areas are available for storm water detention. Therefore, fewer expensive storm water sewers are necessary.

A potential problem is that if a farmer or other buyer cannot be found for the remaining land, or if the municipality or a conservancy will not take title to it, it will be necessary to form a homeowners association to ensure its maintenance.

A more complex and lengthy review process can also be an impediment to the use of open space zoning. This can be overcome by streamlining the process and being sure that sufficient expertise is available to the municipality through its staff or consultants.

Open space zoning is usually an optional alternative to conventional lot layout, but it can be mandated. Some Massachusetts towns have adopted ordinances that require a developer to submit two plans for tracts located in the Open Space Conservation District (an overlay district). One plan is for a conventional lot layout; the other is for an open space zoning layout. The town's governing body approves one of the plans with or without modifications. It is reported that the preparation of the two alternative layouts usually convinces both the developer and the town officials of the superiority of the open space layout.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE: Open space zoning (often under the name of clustering) is permitted throughout the Commonwealth. It is mandated in certain zoning districts by Lower Merion Township, Montgomery County; and West Manchester, York County.

The Montgomery County Planning Commission has developed a variety of open space zoning (the Land Preservation District) intended to preserve open land, sensitive natural areas, and rural community character while creating compact neighborhoods of single-family houses. When applied to an area with underlying 2-acre zoning, it would place houses on 10,000 square foot lots, leaving 75 percent of the tract in open space.

NEW VILLAGE ZONING

WHAT IT DOES: Incorporates design standards that typify traditional villages and towns to create an alternative to spread-out suburban development. The standards make possible a walking environment, a human scale, and higher densities.

HOW IT WORKS: The zoning differs from typical zoning provisions. A draft ordinance from Loudoun County, VA., provides most of the following examples:

- (1) It defines a village as being made up of the Village Proper, the Village Buffer (which surrounds the village), and the Village Conservancy.
- (2) It specifies the minimum and maximum size of the development in terms of both area and number of dwelling units; The Village Proper shall be a minimum of 80 contiguous acres and a maximum of 160 acres and shall contain a minimum of 150 and a maximum of 500 dwelling units.
- (3) It states that each village must be surrounded by a contiguous Village Buffer at least twice the area of the Village Proper and nowhere less than 300 feet wide.
- (4) The entire village including any Village Conservancy area must be large enough to afford the necessary number of dwelling units under existing zoning. The ordinance calls for the clustering of these units in the Village Proper.
- (5) It requires stores (2-5% of gross land area of the village proper), town houses (2-5%), civic buildings (including a community meeting hall), and parks and squares (minimum of 7% including a central green of 3/4 acres minimum).

In order to provide affordable housing and informal social policing after business hours, at least ½ of the floor space above the ground floor of store front uses must be designed for residential use.

(6) It sets many design specifications, all intended to create a village character instead of the usual suburban character. These include:

- A generally rectilinear, connected street pattern (no cul-de-sacs);
- Curb radii of 8 feet or less;
- Alleys with rear parking required on blocks with store front or narrow-frontage townhouses;

- Continuous parallel parking required along streets where storefront and townhouse uses are predominant;
- Off-street parking lots must be located at the rear of buildings;
- Human scale street lights (10-12 feet in height);
- Shallow building setbacks (4-6 feet for town houses, more allowed for detached houses);
- Encouragement of front porches (by allowing them within the setback area); and
- All lots must have access to a pedestrian path or sidewalk.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE: Although many Pennsylvania villages and towns provide prototypes for new traditional villages, comprehensive zoning provisions intended to create new villages or towns of traditional character have not yet been adopted by a Pennsylvania municipality.

PROVISIONS FOR NARROW SIDEYARDS AND FRONTYARDS

WHAT IT DOES: Provisions for one narrow sideyard and a shallow front yard yield more usable outdoor space on a given lot. Also, they can help provide more affordable housing by permitting smaller (and less costly) lots that will provide the same level of usable outdoor space as does conventional lot design.

HOW IT WORKS: Conventional requirements for front, side, and back yards place the house in the middle of the lot. The result often is two relatively narrow side yards, a deep front yard whose use is primarily ornamental, and a correspondingly limited back yard.

If the development of adjacent lots is designed simultaneously, it is possible to place the house close to or even on the lot line. Thus, instead of requiring the conventional two moderately narrow sideyards, one side yard is set at the minimum width necessary for maintenance access (3-4 feet) and the other sideyard can be correspondingly wider and more usable. An extreme variation is **zero lot line zoning**, in which houses are sited directly on the side lot line with a maintenance easement on the adjoining property. The house is designed to open onto the large side yard and the adjoining house has no windows overlooking this space. Site plan review that considers siting in relation to adjacent buildings, building design, and treatment of outdoor areas is advisable.

A setback of 20 feet is all that is needed for parking in front of a house or garage. In contrast, a 1985 study by the Montgomery County Planning Commission found that typical setback requirements in the county's municipalities range between 40 and 60 feet. Privacy and protection from hazards can be achieved with setbacks even smaller than 20 feet, if combined with proper site layout and a residential street system designed for low-volume, low-speed traffic. Some ordinances allow porches to be built in the setback area, because they provide a transition between the public area of the street and the private area of the house. The effective setback is greater than the nominal setback, because the road setback is normally measured from the road right of way, which includes the planting strip and sidewalk. Each foot the house is moved back from the street subtracts a foot of usable space in the rear. Each foot of setback from the street typically involves an extension of utility lines and therefore costs twice as much as a foot added in the rear.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE: Zero Lot Line provisions are found in Horsham Township, Montgomery County, Radnor Township, Delaware County, and Findlay Township, Allegheny County.

TRANSFER OF DEVELOPMENT RIGHTS (TDR)

WHAT IT DOES: Enables a community to protect resources and agricultural land, and concentrate development for more efficient use of infrastructure. Resource protection is achieved by allowing land uses only at intensities that are consistent with the resource, which means reducing the intensities of housing and nonresidential development in rural or resource protection areas and encouraging more intense development in appropriate areas by public investment in infrastructure.

TDRs also distribute financial gain from public investment in land development between rural and growth area landowners within a municipality. Rural landowners can participate in the development market and reap economic benefits from their land through the sale of development rights, without selling off part of the land for development. Ideally, TDRs can help keep urban and suburban development from spreading into rural areas. Finally, TDRs help mitigate the impact of land use restrictions by avoiding a “wipeout” of current reasonable development expectations held by rural landowners. Instead, those expectations are given an outlet that does not result in development of property that the community wants to protect.

HOW IT WORKS: The 1988 amendment to the MPC include provisions authorizing Pennsylvania municipalities to adopt TDR programs. Such programs may be implemented comprehensively throughout a municipality, or within a parcel, as part of a planned residential development. In either case, a TDR program must be implemented through the zoning ordinance on a voluntary basis. A 1992 amendment to the MPC allows two or more municipalities operating under a joint zoning ordinance to transfer development rights across. When a TDR program is implemented in combination with a planned residential development (PRD), the zoning ordinance must contain provisions outlining requirements for planned residential development (A PRD is an area of land developed as a single entity for residential development or for a combination of residential and nonresidential uses, where lot sizes, dwelling types, open space, lot coverage, and bulk, are not consistent with the zoning ordinance).

A TDR program is based on the principle that the development rights associated with land, can be severed from the land. It allows such rights to be transferred in fee simple to another location within a parcel of land (in the case of a planned residential development) or to another location within a municipality where development is desirable and planned for. The sale of transfer of development rights leaves the rural landowner in possession of title to the land and the right to use the property as a farm, open space, or for some related purpose. However, it removes the owner’s right to develop the property for other purposes. The transfer of development rights allows the purchaser of development rights to develop another parcel more intensively than would otherwise be allowed.

There is no single best design for a TDR program: rather a program can include a variety of elements to achieve the community's particular objectives, as specified in the comprehensive plan. However, all TDR programs have three basic elements. The first element is the allocation of some amount of transferable development rights to designated "sending" areas. These areas are parcels or portions of parcels on which the community wishes to curb more intensive development. The second element of a TDR program is the designation of "receiving" sites, and a determination of the additional amount and type of development that will be permitted at those sites through the use of TDRs. Receiving areas are designated areas, parcels, or portions of parcels that can accommodate and are otherwise appropriate for additional development. The third element of a program is the selection of a method of transferring rights from one parcel to another, or from one portion of a parcel to another portion. The methods may range from a simple recording system to use of a third-party holding entity or "bank" to hold rights for transfer to future developers.

Successful growth management programs based on TDRs have the following characteristics in common:

- There must be a resource area whose protection is a community goal;
- There must be a demand for higher density housing in the receiving areas;
- There must be infrastructure available to accommodate TDR densities in the TDR receiving area;
- There should be strict standards to ensure that the receiving area will remain compatible with nearby land uses;
- The method of transfer should be simple and grounded in existing subdivision procedures;
- There should be more opportunities to use TDRs in the receiving area than the number of TDRs allocated to sending area landowners;
- TDRs allocated to sending area landowners should reflect reasonable development expectations;
- Purchase of TDRs must be the only way to obtain densities higher than zoned in the receiving area; and
- There must be a strong commitment in the community to resource protection and the more efficient delivery of government infrastructure and services than TDR densities allow.

MUNICIPALITIES WHERE IT HAS BEEN USED INCLUDE: Several townships, such as Buckingham Township, Bucks County, have adopted TDR ordinance provisions, but little use has yet been made of them in Pennsylvania. In New Jersey, the Pinelands Commission has established a successful TDR program. The Montgomery County, Maryland, program has transferred more rights than any other program.

DIFFERENTIAL ASSESSMENT

WHAT IT DOES: Reduces a landowner's tax bill by assessing land at its value for farming, forestry, or open space use instead of its market value.

HOW IT WORKS: In Pennsylvania, two acts permit differential assessment, Acts 319 and 515.

Act 319 of 1974 (72 P.S. Sects. 5490.1 - 5490.13), also known as the Clean and Green Act, applies to land qualifying for agricultural use, agricultural reserve, or forest reserve. To qualify for agriculture use, a property must have produced an agricultural commodity for three years prior to application, and must be at least 10 acres or have a demonstrable income of \$2,000 per year from the production of agricultural commodities. Agricultural reserve land must be at least 10 acres in area and may not be used for any commercial purposes. Forest reserve land must be at least 10 acres in area and stocked with trees capable of producing 25 cubic feet of growth per acre annually. The landowner applies for use value assessment through the county board of assessment.

The PA Department of Agriculture provides a method for determining use value. In it, average farm income per acre for each county is capitalized to yield average farm use value. This average, adjusted for each soil capability class, is multiplied by the number of acres in each class to yield the average value for the tract.

If land is changed to an ineligible use, the owner must pay roll-back taxes for the seven most recent years and interest on the roll-back taxes of 6 percent. Roll-back taxes are the taxes saved under differential assessment.

Act 515 of 1966 (16 P.S. Sect. 11941 et seq.) Enables counties to covenant with owners of land designated as farm, forest, water supply, or open space on an adopted municipal, county, or regional plan for the purpose of preserving the land as open space. The landowner covenants that the land will remain in open space for a period of 10 years and the county covenants that the real property assessment will reflect the value of the land as restricted by the covenant.

Each year on the anniversary date of the covenant, it is extended for one year, unless either the owner or the county notifies the other of his intention to terminate the covenant ten years hence. If the landowner alters the use of the land to any use other than that designated in the covenant, the landowner must pay the county roll-back taxes and compound interest at the rate of 5.0 percent per year for the five most recent years (or since entering the covenant, if that is shorter).

WHERE IT HAS BEEN USED INCLUDE: Act 319 is used much more widely used than Act 515. As of 1989, participation totaled 3,021,000 acres in 41 counties.

Only five counties participate in Act 515: Bucks, Chester, Lehigh, Montgomery, and Northampton.

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OTHER SUCCESSFUL PENNSYLVANIA GREENWAY/RIVERS CONSERVATION PROJECTS

The 64 Rivers Conservation and Coldwater Heritage Grant recipients as of July 1998 were contacted by letter requesting a copy of their plans and other information. Those responding were:

- Monongahela River Conservation Plan (Brownsville)
- Susquehanna River Conservation Plan (Tri-County Regional Planning Commission)
- Allegheny, Monongahela and Ohio Rivers (City of Pittsburgh)
- Nine Mile Run (City of Pittsburgh et al.)