# Beaver River Conservation and Management Plan

FINAL

August 2008

pennsylvania environmental council

DCNR

# Table of Contents

Executive Summary …….1-11

Chapter 1: Introduction ……....12-14

Chapter 2: Conservation Strategy …….15-45
General Planning Process
Analyzing Conservation Issues
Modeling the Impacts of Flood Events
Conservation Strategy Analysis

Chapter 3: Action Plan …….46-50

Chapter 4: Study Area Characteristics …….51-128
Study Area
Land Cover
Water Resources
Biological Resources
Recreational Resources

Chapter 5: Public Participation ……..129-136

Appendices …….137

# EXECUTIVE SUMMARY

## Purpose of the Plan

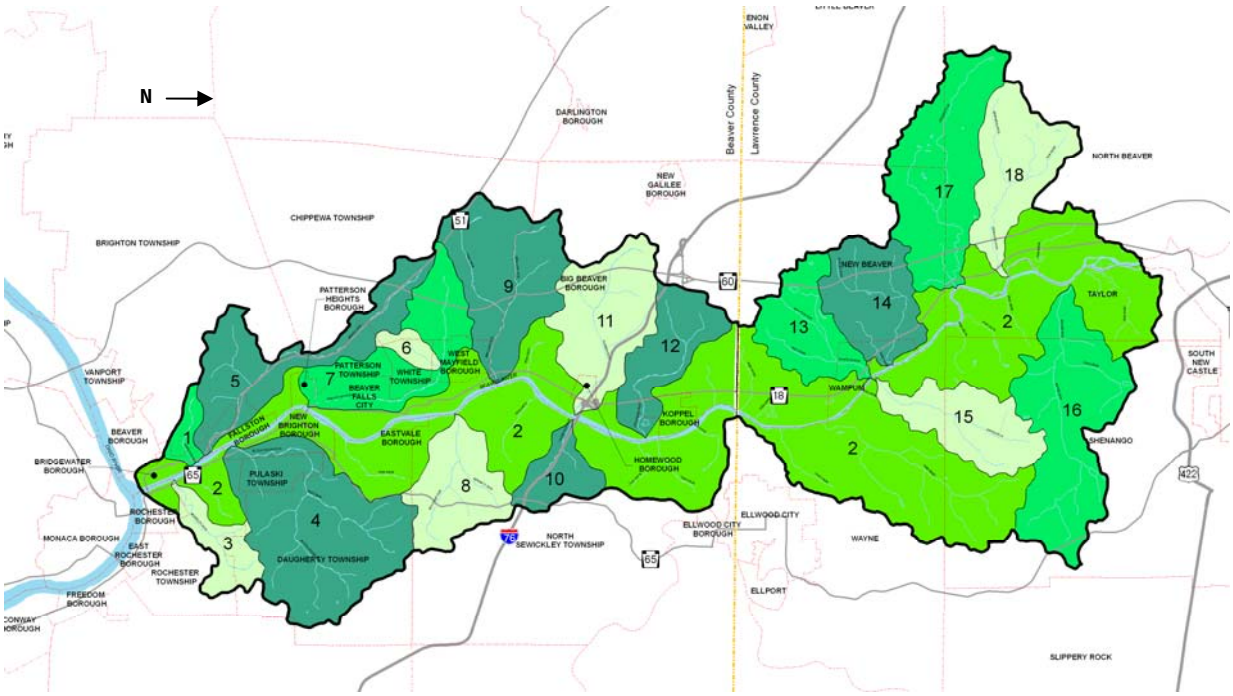
The Beaver River Conservation and Management Plan (Plan) presents mechanisms to promote natural resource conservation and enhancements in more than two dozen western Pennsylvania communities. The Plan addresses local and regional conditions and concerns while embracing state-wide conservation initiatives.

Assessments of the area's sensitive natural resources, land use and infrastructure patterns, historical flooding, and public policies form the basis of the Plan. From this information, a range of projects and policies are outlined for county, regional, local and other community stakeholders to implement. The Plan expands upon the fundamental conservation elements encouraged by the Pennsylvania Department of Conservation and Natural Resources (DCNR) as the foundation for identifying potential resource management recommendations.

The Beaver River Conservation and Management Plan was produced with financial assistance from DCNR's Community Conservation Partnership Program. Matching funds were provided by the Mellon Foundation and The Beaver County Community Development Program. The Plan was prepared by the Pennsylvania Environmental Council with analysis and planning completed by Environmental Planning and Design, LLC.

## Overview of the Beaver River Watershed

The 22-mile Beaver River is formed by the confluence of the Mahoning and Shenango Rivers just south of New Castle, Lawrence County. The river flows south through Beaver County until it empties into the Ohio River.



From its beginnings, this Plan was intended to be innovative and far-reaching. This study's boundary reaches beyond a standard river setback prescribed in many similar types of studies in the state to include the full extent of 17 tributaries draining into the Beaver River. Being both land- and water-based, the Plan increases environmental stewardship of our natural assets while allowing for continued economic growth.

The entire Beaver River Watershed consists of 58,000 acres in a diverse mix of urban and rural lands. Urban communities dot the watershed's southern end, approaching the Beaver's confluence with the Ohio while more rural landscapes characterize the watershed's central and eastern sections.

The watershed is home to a wide range of natural resources, including waterways, steep slopes, biological diversity areas, and riparian areas. Many of these resources are considered to be "sensitive" based upon their rarity or location relative to development. Initial mapping of these sensitive resources found many to be in areas where population currently exists or could grow in the future.

## Development of the Plan

An Advisory Committee comprised of representatives from local and county government, environmental and community organizations, and recreation interest groups had primary responsibility for development of the Plan. Working in conjunction with the Pennsylvania Environmental Council and Environmental Planning and Design LLC, the project manager and consultant, respectively, the Committee provided overall direction, reviewed draft analyses and recommendations, and acted as a liaison to the region's communities and interest groups.

Substantial amounts of public input were gathered throughout the creation of the Plan. Ideas and feedback from individuals and community groups were gathered through public and committee meetings and municipal surveys.

The Plan's overall goals emerged from this process. The goals include:

- Identify locations of sensitive resources in the Beaver River Watershed;
- Catalog the extent of existing water and sanitary sewer service infrastructure in environmentally sensitive areas;
- Evaluate the relationship between existing communities' development and potential build out patterns;
- Assess potential flood implications (normal and severe conditions) based on future development;
- Present opportunities for public education and awareness about conservation; and
- Provide information to aid in municipal and regional decision making and planning.

The Advisory Committee, project manager, and consultants used these goals, together with data collected in the first part of the process to identify challenges facing the Beaver River Watershed and opportunities for action.

## Key Issues within the Watershed

After collecting pertinent data, the Advisory Committee and community stakeholders analyzed the information and suggested a set of issues and opportunities to be considered. The key issues that the counties and communities explored were:

- The extent, significance, and relationship of environmental, historical, and cultural resources;
- Flood prone areas;
- Expansion of public infrastructure into naturally sensitive areas; and
- Potential growth and changes permitted by existing zoning affecting existing sensitive resources.

The relationship between environmentally significant habitats and potential recreational opportunities are highlighted on the Conservation Strategy Analysis Map, which appears after the following section.

## Key Recommendations and Actions

Public comments were integrated into the Plan's technical analyses to develop a series of recommendations and actions. These recommendations are related to public policies, programs, and activities. Multiple stakeholders, including government agencies, non-profit conservation/ community organizations, educational/cultural institutions, business interests and property owners, will be involved in implementation. The Plan also advocates that the watershed's counties and municipalities adopt resolutions that endorse the general and specific recommendations set forth for implementation.

The following recommendations and actions are considered to be those of highest priority. Additional projects, policies, stakeholders, and timeframes are outlined in the Action Plan.

1. *Identify or form a conservation and management advisory body to implement the recommendations of the Conservation and Management Plan*

   The watershed's communities should identify or form a conservation and management advisory body that would assist in identifying on-going challenges to conserving the region's natural resources, promote environmental programming, lead the preparation of ordinances and detailed inventories, make recommendations for the use of available open spaces, and advise government agencies on conservation issues. One possible example is the creation of an Environmental Advisory Council.

2. *Create a River Corridor Management Ordinance*

   Representatives of the two counties should work together with local municipalities to develop and adopt a River Corridor Management Ordinance as part of their Act 167 Plans. This Ordinance would address potential development, implementation, and enforcement of programs related to management of stormwater from new development and redevelopment.

3. *Adopt impervious surface provisions as part of the River Corridor Management Ordinance to minimize negative impacts of stormwater run-off*

Communities within the Beaver River Study Area should coordinate to adopt impervious surface provisions. Impervious surface provisions can be adopted on either a local or watershed-wide basis.

4. *Advocate for the creation and adoption of a Steep Slope Ordinance*

   Currently, several communities within the watershed limit the amount of disturbance permitted to occur on steep slopes. Based on the Plan's findings, the ordinance provisions should be adopted to limit the amount of disturbance that should occur on slopes greater than or equal to 25 percent and prohibit any additional development on slopes greater than or equal to 40 percent.

5. *Evaluate the feasibility of other watershed-wide ordinance updates that coordinate development and infrastructure opportunities*

   Beaver and Lawrence Counties should evaluate the feasibility of potential ordinance language and/or mapping updates which encourage the coordination of potential development and infrastructure.

6. *Promote development that respects the landscape's character and capacity*

   Counties and communities should encourage development patterns in urban, suburban, and rural areas of the Beaver River Watershed that are compatible with existing character and infrastructure service while minimizing negative impacts to sensitive natural resources.

7. *Establish consistent review procedures for identification of conservation need*

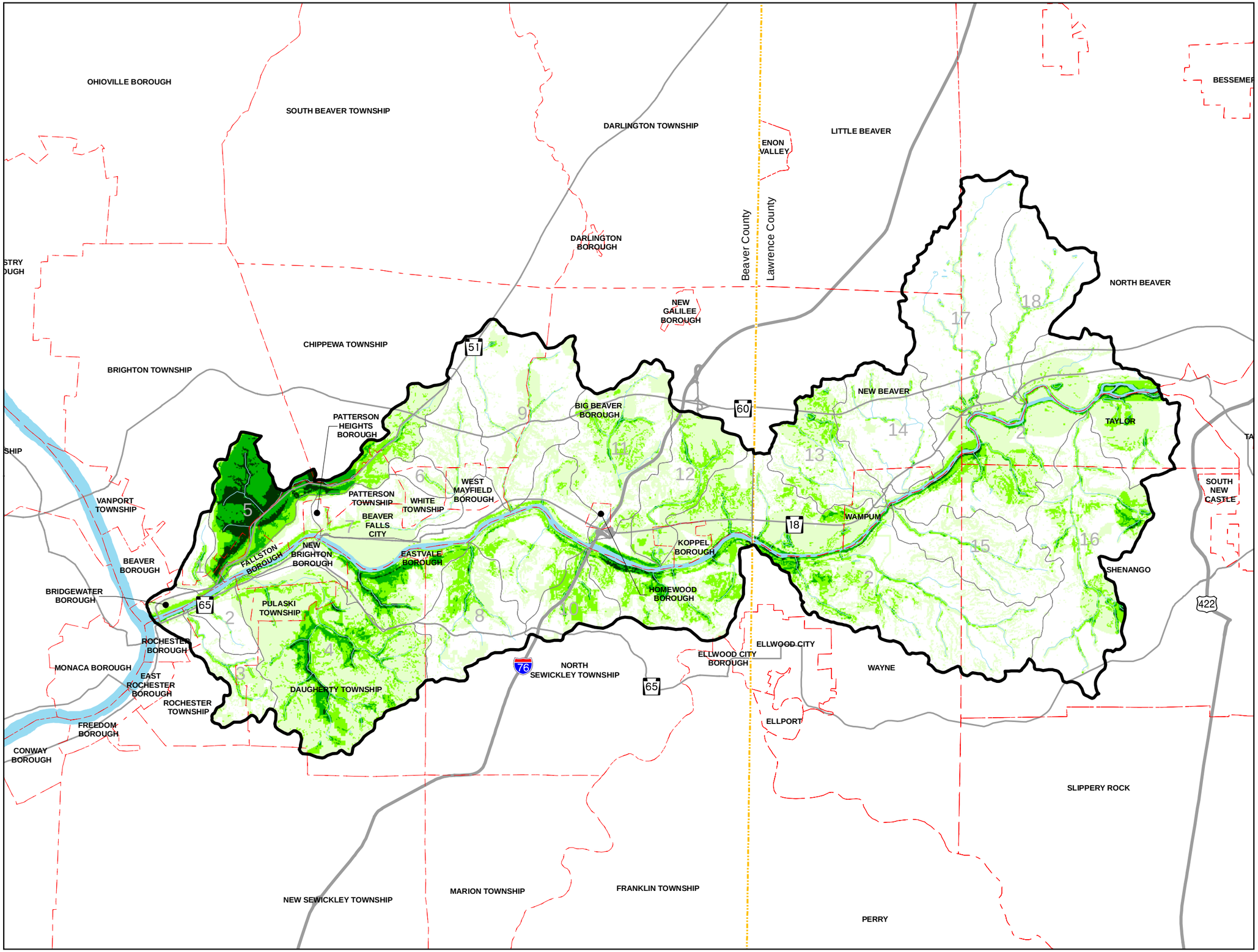
   County and regional stakeholders should work with local municipalities and the development community throughout the Study Area to establish a formal, consistent review process to identify how existing natural resources could be conserved.

8. *Coordinate conservation with other county open space and greenway efforts*

   The counties and identified stakeholders should continue to work to coordinate how projects, policies and funding opportunities can be optimized and implemented succinctly.

9. *Initiate discussions with local land trusts and conservancies to conserve lands located in the River Corridor*

   The leaders and residents of Beaver and Lawrence Counties should initiate discussions with local land trusts and conservancies to identify how existing scenic, recreational, education and environmental landscapes within the watershed could offer opportunities for land conservation and promote a healthier watershed environment.




## Legend

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads
- Rivers/Streams/Lakes

## TOTAL SCORE

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 28

**Conservation Matrix**

| | | Resource | Weighted Value |
|---|---|---|---|
| Environmentally Sensitive Lands | a | Exceptional/High Quality Watersheds (Presence of Exceptional/High Quality Streams. Includes streams with trout stock potential.) | 5 |
| | b | Wetlands | 5 |
| | c | Steep Slopes (>25%) | 4 |
| | d | Stormwater Filtration | 4 |
| | e | Floodplains | 2 |
| | f | Groundwater Recharge | 1 |
| Habitat | a | BDAs | 5 |
| | b | Habitable Woodlands | 5 |
| | c | Warmwater Gamefish Habitats | 3 |
| | d | Important Bird Areas | 3 |
| Recreation | a | Trails | 3 |
| | b | Non-motorized Boating/Fishing Access (combines flatwater, whitewater and sail boating) | 3 |
| | c | Primitive Camping | 2 |
| | d | Hunting | 2 |
| | e | Motorized Boating/Fishing Access | 1 |
| | f | Non-Primitive Camping | 1 |
| | g | ATV areas | 0 |

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# CONSERVATION STRATEGY ANALYSIS
# BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.25r1

0 1/2 1 MILE

NORTH

| ACTION PLAN | | |
|---|---|---|
| **Recommendations** | **Participant Groups** | **Project Initiation Timeline** |
| ***1. Management*** | | |
| A. Identify or form a conservation and management advisory body to implement recommendations of the Conservation and Management Plan (referred to in the recommendations as "river advisory body"). | County Governments, municipalities | Immediate |
| B. Encourage communities to participate in the Act 167 Process | County Governments, municipalities, river advisory body | Immediate |
| C. Create a Watershed Management Ordinance that promotes watershed conservation principles and techniques | County Governments, municipalities | High Priority |
| D. Preserve the scenic quality of the Beaver River Corridor including biological diversity areas, natural heritage areas, steep wooded slopes, riparian (streamside) areas, wetlands, islands and other similar characteristics | County Governments, municipalities, conservation organizations, river advisory body | High Priority |
| E. Preserve or enhance contiguous forests in identified sensitive landscapes by developing a Forest Management Plan for the region | County Governments, municipalities, land owners, Bureau of Forestry, conservation organizations, river advisory body | High |
| F. Conduct an Agricultural Practices Assessment to identify appropriate farmland conservation and runoff management opportunities | Conservation Districts, County Governments, river advisory body | Long Term |
| G. Clean up old dock posts from washed out docks | Dock owners, municipalities | Medium Priority |
| H. Develop, in cooperation with stakeholders, an annual report updating key indicators of watershed health and describe recent progress in preserving and enhancing watersheds, new findings, and study results | River advisory body, Conservation Districts | On-going |
| I. Gauge and build public support for water conservation and recycling | County Conservation Districts, County Governments, river advisory body, conservation organizations, schools | Medium Priority |
| J. Conduct a thorough plant and wildlife inventory | Conservation organizations, educational institutions | Medium Priority |

| | | |
|---|---|---|
| K. Clean up illegal dumpsites and litter along the River | Municipalities, conservation or environmental organizations | On-going |
| L. Study the water quality of the Beaver River watershed | PA DEP, Conservation Districts | High Priority |
| ***2. Development and Infrastructure*** | | |
| A. Encourage redevelopment and in-fill of brownfields (previously developed sites) | County Governments, Municipalities, Development Organizations/Corporations, Authorities, Utilities | On-Going |
| B. Promote development within existing infrastructure service areas | County Governments, Municipalities, Development Organizations/ Corporations, Authorities, Utilities, river advisory body | On-Going |
| C. Align new development and future infrastructure expansion to minimize impacts on sensitive natural resource areas | County Governments, Municipalities, Development Organizations/Corporations, Authorities, Utilities | High-Priority |
| D. Build collaboration between the public and private sectors to update aging and/or under-serviced stormwater management systems | County Governments, Municipalities, Development Organizations/Corporations, Authorities, Utilities, Conservation Districts, river advisory body | On-Going |
| E. Consider repair and reestablishment of riparian (streamside) vegetation in impacted watersheds | Conservation Districts, river advisory body | Medium Priority |
| F. Sponsor septic system education for residents of unsewered portions of the Beaver River Corridor | PA DEP, Conservation Districts, river advisory body | High Priority |
| G. Reduce accumulation of sediment in infrastructure systems by addressing point and nonpoint pollution sources | County Governments, Municipalities, Conservation Districts, river advisory body, PADEP | Medium Priority |
| H. Address stormwater issues and sedimentation problems within the Beaver River corridor in context of existing and future Act 167 and MS4 plan recommendations | County Governments, Municipalities, PA DEP, Conservation Districts, river advisory body | Medium Priority |
| I. Remove invasive plant species in public riparian (streamside) areas and in private lands where possible. Continue to monitor riverfront lands for invasive species | Conservation Districts, river advisory body, conservation organizations | On-going |
| J. Promote planting of native species in newly developed riverfront areas | Municipalities, Conservation Districts, river advisory body, conservation organizations | High Priority |

| | | |
|---|---|---|
| K. Promote use of pervious pavements, gravel access roads, and other means to encourage stormwater infiltration into the water table | Conservation Districts, Municipalities, river advisory body | Medium Priority |
| L. Implement riverfront development strategies identified in other studies including the area's Riverfront Development Plan | County Governments, Municipalities, Development Organizations/Corporations | Medium Priority |
| ***3. Outreach, Education, and Public Awareness*** | | |
| A. Pursue funding to support regional-oriented staff for the river advisory body in its coordination and implementation of this Plan's recommendations | County Governments | High Priority |
| B. Create a Beaver River Watershed Website related to the projects outlined in the Conservation and Management Plan | County Governments, river advisory body, Conservation Districts | Medium Priority |
| C. Coordinate conservation and management initiatives with local schools and institutions of higher education to promote research/implementation opportunities including development of primary and secondary school education curricula related to the natural resources of the Beaver River Watershed | Conservation Districts, local non-profits, schools, river advisory body | Medium Priority |
| D. Work with the railroads, municipalities, and the PA Fish and Boat Commission on designating safe active and passive river access locations | Trail Groups, local non profits, Conservation Districts, PA Fish and Boat Commission, County Governments, Municipalities, river advisory body, railroads | Medium Priority |
| E. Establish scenic driving tours of the River valley, including stops for train viewing, scenic river views, and historic/cultural attractions | Conservation Districts, local non-profits, historical societies, river advisory body | High Priority |
| F. Help to coordinate input to, and distribution of, outreach newspapers published by agencies and community groups | Conservation Districts, local non-profits, river advisory body | Medium Priority |
| G. Encourage and assist local and regional agencies to incorporate interpretive and educational features as part of recreational facilities and other public works projects | Conservation Districts, Municipalities, river advisory body, local non-profits | On-going |

| | | |
|---|---|---|
| H. Promote active stewardship among commercial and residential stakeholders; bring this message/updates to advisory boards, environmental commissions, planning commissions, and other venues for public input to agency decision making | Conservation Districts, local non-profits, conservation organizations, river advisory body | High Priority |
| I. Sponsor semi-annual hazard and toxic disposal collection programs | Conservation Districts, local non-profits | Medium Priority |
| J. Establish an Adopt-A-Creek program | Conservation Districts, local non-profits | Long Term |

## Next Steps

Upon DCNR's and local municipal approval, the Beaver River Conservation and Management Plan will be submitted for inclusion on the Pennsylvania Rivers Registry, qualifying it for DCNR matching grants to municipalities and nonprofits for implementing the recommendations provided in this report. Communities are encouraged to update the Action Plan regularly to chart progress on achieving recommendations.

If you are interested in implementing projects listed in the Action Plan, here are several steps that may help you.

1.) Contact other potential partners, including local municipal officials, to find out if there is an interest in collaborating on the project. You do not have to be listed as a potential partner or stakeholder to initiate or implement a project. There are probably many other people who are interested in working on a project than are listed. Also, make sure that no one else is working on the same or similar project.

2.) Brainstorm with other partners on how you might implement the project. Develop goals, objectives, and a list of tasks that will take you to your desired outcome.

3.) Determine your funding needs and research potential funding sources. DCNR provides grants for planning and technical assistance, development, and acquisition. The Department of Environmental Protection (DEP) offers grants that address non-point source pollution. If you are thinking about applying for funding from one of these agencies, please contact the local agency representative to discuss the potential for your project as soon as possible. Many other funding sources are available. The Pennsylvania Organization for Watersheds and Rivers (POWR) has several options listed on their website (www.pawatersheds.org).

4.) Prepare and submit grant applications, paying careful attention to the grant requirements and deadlines.

5.) If a grant is awarded, convene local partners and notify the media.

*Left: View of the Beaver River from Geneva College.*

*Cover: View of the Beaver River below Townsend Dam.*

Copies of the entire Beaver River Conservation and Management Plan can be found on the Pennsylvania Environmental Council's website: www.pecpa.org.

This project was completed by the Pennsylvania Environmental Council (PEC). PEC protects and restores the natural and built environments through innovation, collaboration, education, and advocacy. Comments or questions about this Plan can be directed to PEC at 412-481-9400 or 22 Terminal Way, Pittsburgh, PA 15219.

This project was financed in part by a grant from the Community Conservation Partnership Program, Keystone Recreation, Park and Conservation Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation. For more information about DCNR's programs, visit their website: www.dcnr.state.pa.us.

Matching funds for this project were provided by the Richard King Mellon Foundation and the Beaver County Community Development Program.

# CHAPTER 1: INTRODUCTION

The Pennsylvania Department of Conservation and Natural Resources' (DCNR) Rivers Conservation Program was developed to conserve and enhance river resources through preparation and accomplishment of locally-initiated plans. All plans contain a summary of available information about the water resource, which makes the document a useful educational tool. However, the substantive sections of these plans are the recommendations developed through the analysis and the action steps that will move the recommendations forward. The plans are an important tool for local governments, organizations, and businesses to aid in decision making and municipal planning.

The Beaver River was selected for study because of its potential as a recreational amenity, the current development pressures in the watershed, and a lack of a significant watershed group in the area with which to address conservation issues and opportunities.

## About the Authors

The Plan was completed by the Pennsylvania Environmental Council (PEC), a statewide, non-profit organization devoted to promoting the protection of watersheds, the sustainable uses of land, and the implementation of environmental innovations. Since its founding in 1970, PEC has been centrally involved in a broad range of issues affecting the region's environmental recovery and ever-improving quality of life. More information about PEC can be found at www.pecpa.org.

The Plan was prepared by PEC staff member Janette M. Novak and former staff member Beth Brennan Fisher with analysis and planning completed by Environmental Planning and Design, LLC.

## Support and Funding

DCNR's Community Conservation Partnership Program, administered by the Bureau of Recreation and Conservation, awarded a Keystone, Recreation, Park and Conservation Fund grant to PEC in 2004 to complete the Beaver River Conservation and Management Plan. Matching funds were provided by the Richard King Mellon Foundation and the Beaver County Community Development Program.

The next step in the planning process is to obtain local support to seek admission of the Plan for inclusion on the Pennsylvania Rivers Registry. This registry was created to promote river conservation and recognize rivers or river segments in communities that have completed River Conservation Plans. Once registry status is achieved, municipalities and non-profits are able to apply for DCNR implementation, development, or acquisition grants based on the Plan's recommendations.

Visit www.dcnr.state.pa.us for more information about DCNR grants and to view maps and Conservation Plans from around the state.

## Frequently Asked Questions about River Conservation Plans

Some communities and residents who are not familiar with the Rivers Conservation Program and the planning process have concerns about the implications of having a Rivers Conservation Plan. Following are three common questions about the program.

*1. How will this project impact private property?*

The Plan itself will not encroach upon private property and will not dictate what landowners can and cannot do. The Plan is an opportunity to work towards a vision for the future of the River; it is not focused on specific property owners. Recommendations may be made within the plan for general care of lands adjacent to waterways; however, it will be up to local landowners and municipalities if they want to follow these recommendations or not. Property owners are encouraged to participate in terms of developing the greater vision for the area.

*2. Are you proposing land use restrictions in the viewshed of the river corridor?*

A Plan may encourage updating county and municipal plans and ordinances to include things like natural resource protection zoning. Such zoning often affects new development only and such actions would then need to be adopted by county and local governments. The Plan in itself cannot require land use restrictions – only local governments can carry out such actions. If local governments pursue such zoning amendments or changes, it is required by the Municipalities Planning Code to be a public process.

*3. Can the Plan enable new environmental regulations that could affect riverfront property owners or river-side industry?*

The Plan itself cannot enable or force any government agency to enact new legislation. What it can do is provide information and public comments about the Beaver River that could be used as a guide in creating or amending legislation. Those types of actions generally would require a public process.

## Acknowledgements

An Advisory Committee, comprised of government representatives, environmental and community organizations, and recreational interest groups identified data sources, reviewed draft Plans, and acted as liaisons to and for their community or interest group. Public input was gathered through public meetings, key person interviews, stakeholder meetings, and municipal surveys.

PEC gratefully acknowledges the following people who served on the advisory committee or contributed to the development of the Plan:

Charles Camp, Steve Craig, Matthew Cucinelli, Alan DeSanzo, Dan Donatella, Jack Erath, Bill Evans, Jim Gagliano, Megan Gahring, Tom Hamilton, Donald Inman, Helen E.

Jackson, Thomas Ketterer, Frank Mancini, John Martino, Kathryn McClure, Amy McKinney, Shirley Mesing, Larry Morley, Pashek Associates, Ed Piroli, Greg Powell, Jeanne Rarick, Laura Rubino, Tom Scuoteguazza, Joe Spanik, Todd Stevenson, Lisa Troiani, Carolyn Verszyla, Donald Wachter, Dan Woodske, Doniele Andrus.

## Supplemental Information

Additional information can be found in the following documents, which are valuable resources and can be considered supplemental resources for this Plan.

- Beaver County Comprehensive Plan (1999), Gannet Fleming
- Beaver County Comprehensive Recreation and Parks Plan (2003), Pashek Associates
- Beaver County Greenways and Trails Plan (2007), Pashek Associates
- Inventory and Assessment of Historic and Heritage Sites in Beaver County (1998)
- Beaver County Riverfront Development Plan (1993), Beaver County Corporation for Economic Development
- Bridging the Confluence Communities: Building a Shared Vision for Riverfront Development (2005), Beaver Initiative for Growth, Beaver County Corporation for Economic Development
- Natural Heritage Inventory for Beaver County (1993), Western Pennsylvania Conservancy
- Rivers of Destiny (1999)
- Natural Heritage for Lawrence County (2002), Western Pennsylvania Conservancy
- Lawrence County Comprehensive Plan (2004), Lawrence County Planning Commission
- Lawrence County Recreation Study (c. 1975), Lawrence County Planning Commission
- Natural Infrastructure (2005), Southwest Pennsylvania Commission, The Heinz Endowments, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Environmental Council, Environmental Planning & Design
- Lawrence County Greenways and Open Space Plan (2008), Lawrence County Planning Department
- North Central Beaver County Southern Lawrence County Regional Economic Development Study

# CHAPTER 2: CONSERVATION STRATEGY

The Beaver River Conservation and Management Plan (Plan) seeks to outline a realistic and effective approach for implementing future conservation-oriented efforts for 58,000 acres in Southwestern Pennsylvania. Similar to the format of many River Conservation and Management Plans that Pennsylvania communities are developing, this Plan inventories the various ecological and historical factors that have influenced the formation of the landscape surrounding the Beaver River.

As development patterns change, policy decisions within a community or a region can influence a watershed's characteristics. Consequently, this study of the Beaver River and its surrounding lands enhances the typical components of a River Conservation and Management Plan. This Plan:

1. Evaluates the potential development impacts of existing community zoning ordinances;
2. Assesses the relationship of historical flooding patterns and development patterns; and
3. Outlines a broad range of project and policy recommendations for county, regional, and local governing bodies as well as other community stakeholders to implement and effectively manage future conservation efforts.

The key components of developing a conservation strategy for this area include defining the study area, completing mapping analyses, and evaluating opportunities and challenges. These activities have shaped the ways in which strategy alternatives were evaluated. From these components, the Plan's series of project and policy recommendations for implementation have been created.

## General Planning Process

The Beaver River Conservation and Management Plan presents a series of recommended policies and projects aimed to optimize the impacts of future conservation efforts on the lands adjacent to the Beaver River. The overall approach of analyzing conservation opportunities and challenges stems from an evaluation of existing and planned land use patterns, river-related natural resource inventory data, historic flooding activity, development ordinance provisions, infrastructure patterns and aerial photography. As mentioned above, the primary steps in preparing the overall conservation strategy include: defining the study area; completing inventory and analysis; and evaluating opportunities and challenges.

### *Defining the Study Area*

The Plan encompasses more than 58,000 acres of Beaver and Lawrence Counties. In addition to the two counties, twenty-seven (27) municipalities have jurisdiction within the land studied as part of this Plan.

The boundary of a watershed is based upon topography with ridge tops and highpoints in the landscape forming the watershed's perimeter. Typically, as found throughout most of Southwestern Pennsylvania, municipal lines and watershed boundaries do not coincide with one another.

For the purpose of this Plan, the areas studied have been defined as the Study Area Watershed, Principal Watershed, and Tributary Watershed. This Plan's Study Area Watershed refers to the overall extent of land to which the proposed conservation and management strategies apply. The Study Area Watershed begins at the confluence of the Shenango and Mahoning Rivers – the two rivers which meet to form the body of water known as the Beaver River. The southern end of the

Study Area is where the Beaver River meets the Ohio River. The Study Area also includes land on both sides of its banks until reaching the nearest highest points in the landscape. The Beaver River flows generally through the middle of the Study Area.

The two sub-sets of the Study Area are its Principal Watershed and its Tributary Watersheds. Based upon topography, there is land along the river's banks where water drains directly into the river. This portion of the Study Area is known as the Principal Watershed.

Other portions of land in the Study Area drain into one of the river's tributaries, or "feeder" streams. There are 17 tributaries that flow into the Beaver River. The land surrounding each of the individual tributaries is known as a Tributary Watershed. There is one tributary of the Beaver River which is not included in the Plan - Connoquenessing Creek. Connoquenessing Creek flows into the Beaver River from the east and drains lands within Beaver, Lawrence, Allegheny and Butler Counties. A Watershed Conservation Plan was completed by the Western Pennsylvania Conservancy in February 2008. The entire plan, including its recommendations for that watershed, can be found at www.paconserve.org.

Diagrams illustrating the general relationship of the Study Area Watershed, Principal Watershed and Tributary Watersheds follow.

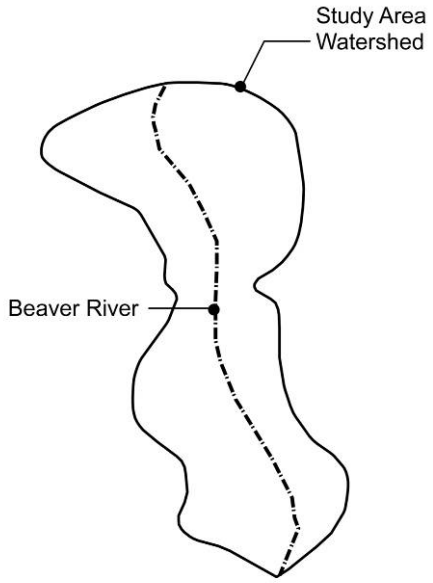



Figure 1: The Study Area Watershed represents all land included within the Conservation and Management Plan. The Beaver River is located in the middle of the Study Area.

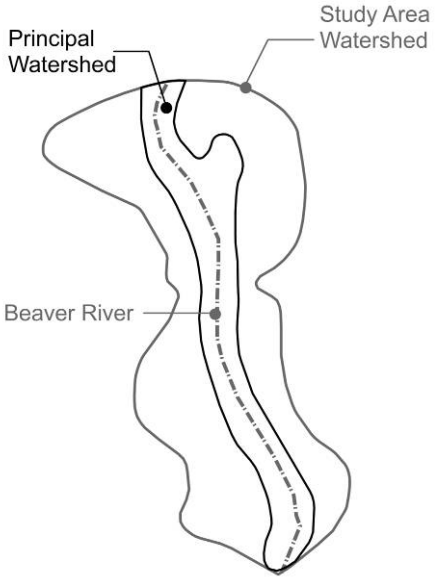



Figure 2: Water that flows directly into the Beaver River is within the Principal Watershed.

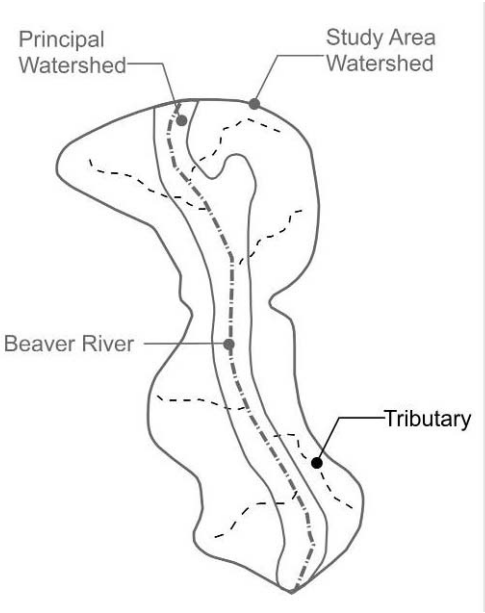



Figure 3: Tributaries of the Beaver River bring additional water into the Principal Watershed.

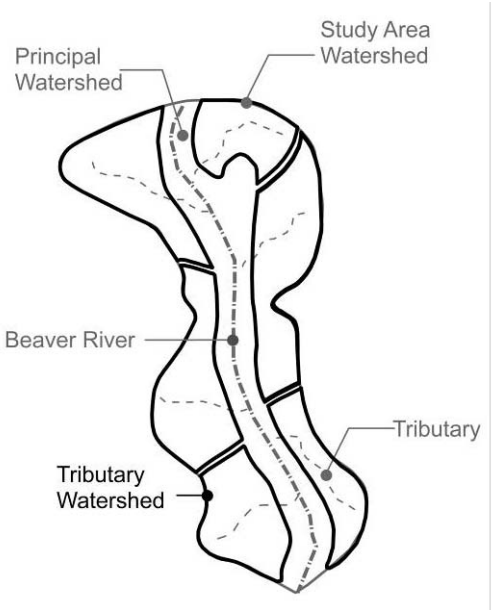



Figure 4: Land that slopes toward each tributary is known as a Tributary Watershed.

*Description of Watersheds*

The Study Area Map, following this section, identifies the specific locations and relationship of the River's Principal Watershed and its Tributary Watersheds. The Study Area's 18 watersheds include:

1.) Hamilton Run

Located primarily in Brighton Township and running through Bridgewater, the 363-acre Hamilton Run tributary watershed is one of the project's smallest drainage areas in the southern portion of the Study Area. Although there are areas of notable forest cover, a majority of the watershed is covered by low and high density urban land. Approximately half of the watershed is serviced with sewer and water infrastructure.

2.) Beaver River

In contrast to Hamilton Run, the Beaver River watershed is one of the Conservation and Management Plan's largest in geographic size, encompassing more than 21,000 acres and all communities bordering the waterway. A majority of land in the southern portion of this Principal Watershed, which does not possess steep slopes, is developed; more sparsely developed areas exist in the north. Communities situated along the Beaver River include Rochester Township, Rochester Borough, Bridgewater, Fallston, New Brighton Borough, Eastville Borough, North Sewickley Township, Big Beaver, West Mayfield, Koppel Borough, Wayne, Shenango, Taylor, North Beaver, Wampum, New Beaver and Homewood Borough. Infrastructure service along the River is generally concentrated to urbanized lands. Due to topography and historical development patterns, there are significant portions of this watershed that remain without sewer and water service.

3.) McKinley Run

Flowing through portions of Daugherty and Rochester Townships and the northern portion of Rochester Borough, the McKinley Run watershed is located at the southern portion of the Study Area near the confluence of the Beaver at the Ohio River. At nearly 930 acres in size, the McKinley Run watershed contains both extensive areas of developed land as well as landscapes supporting sensitive natural resources. Sewer and water service is generally limited to the watershed's western half.

4.) Block House Run

Block House Run drains stormwater and other run-off from land within portions of Daugherty Township, Pulaski Township and New Brighton Borough. Based upon existing land use patterns, areas of both developed and undeveloped landscapes exist in this 4,700-acre watershed. The presence of good warm water fish habitat is a notable characteristic of this watershed. Similar to McKinley Run, infrastructure service is generally accessible to development in the western portion of the Block House Run watershed.

5.) Brady's Run

This 2,700-acre watershed encompasses the eastern portions of Brighton and Chippewa Townships as well as the western sections of Patterson Township and Fallston Borough. The Brady's Run watershed is distinguished by the presence of a biological diversity area and its designation as an exceptional/high quality watershed. It is recognized in previous and current planning efforts, including the Beaver County Greenways Plan and the Western Pennsylvania Conservancy's Natural Heritage Inventory. Water and sewer service is generally not available within this watershed.

6.) Grimm's Run

Portions of White Township, Patterson Township, West Mayfield Borough, and Chippewa Township are situated within the 315-acre watershed. Infrastructure service is accessible to most land. Steep slopes are a common characteristic of the Grimm's Run watershed.

7.) Walnut Bottom Run

This 2,390-acre watershed encompasses Patterson Township, Beaver Falls, and White Township. Infrastructure service is accessible to most land surrounding Walnut Bottom Run. Similar to Grimm's Run and other smaller drainage areas, steep slopes are found in various portions of this watershed.

8.) Bennett Run

Primarily within North Sewickley Township and a small portion of Daugherty Township, the Bennett Run watershed contains 1,800 acres of urban land with existing infrastructure service as well as non-urban land (sparsely developed and/or undeveloped land). These non-urban lands are notable for the presence of sensitive environmental resources.

9.) Wallace Run

Two communities comprise the majority of the 3,060-acre Wallace Run watershed: Big Beaver and Chippewa Township. The northernmost portion of West Mayfield Borough is also included where Wallace Run flows into the Beaver River. Generally characterized by flatter topography than the rest of the Study Area this watershed contains prime warm water game fish habitat. Based on regional infrastructure mapping, approximately two-thirds of the land in the Wallace Run watershed has access to sewer and/or water service.

10.) Thompson Run

Located entirely in the mid-western section of North Sewickley Township, Thompson Run is the Study Area's third smallest watershed. The 891-acre drainage area generally parallels the Pennsylvania Turnpike (Interstate 76). With little existing development and no known access to water and sewer service, numerous natural resources including habitable woodlands and steep slope areas, are present.

11.) Clarks Run

Before intersecting with the Beaver River, Clarks Run flows through the mid-eastern portion of Big Beaver Township as well as a small section of Homewood Borough. There is a minimal amount of existing development and a considerable presence of natural resources within this 2,571-acre watershed

12.) Stockman Run

The 1,665-acre Stockman Run watershed is located in the northeastern section of Big Beaver and also encompasses a portion of Koppel Borough. Development currently within this area is minimal and of general low intensity throughout the drainage area. Infrastructure service is primarily concentrated to the easternmost portion of the watershed.

13.) Wampum Run

The Wampum Run watershed encompasses the southeastern section of New Beaver Township and the central part of Wampum, where Wampum Run meets the Beaver River. Nearly one-half of this 1,719-acre watershed is characterized as forested land. Based on the analysis of aerial photography, the remaining portion of the watershed possesses lower intensity residential and agricultural land coverages.

14.) Eckles Run

This 2,021-acre watershed lies primarily in the northeastern section of New Beaver and also in the southern end of Wampum. The general boundary of infrastructure service mirrors the limits of existing development. Development can be characterized as low intensity urban land coverage and woodlands.

15.) Snake Run

Encompassing lands both in Wayne and Shenango Townships, the 1,900-acre Snake Run watershed contains a limited amount of developed residential and non-residential land. The predominate land coverage of the watershed is classified as woodlands.

16.) McKee Run

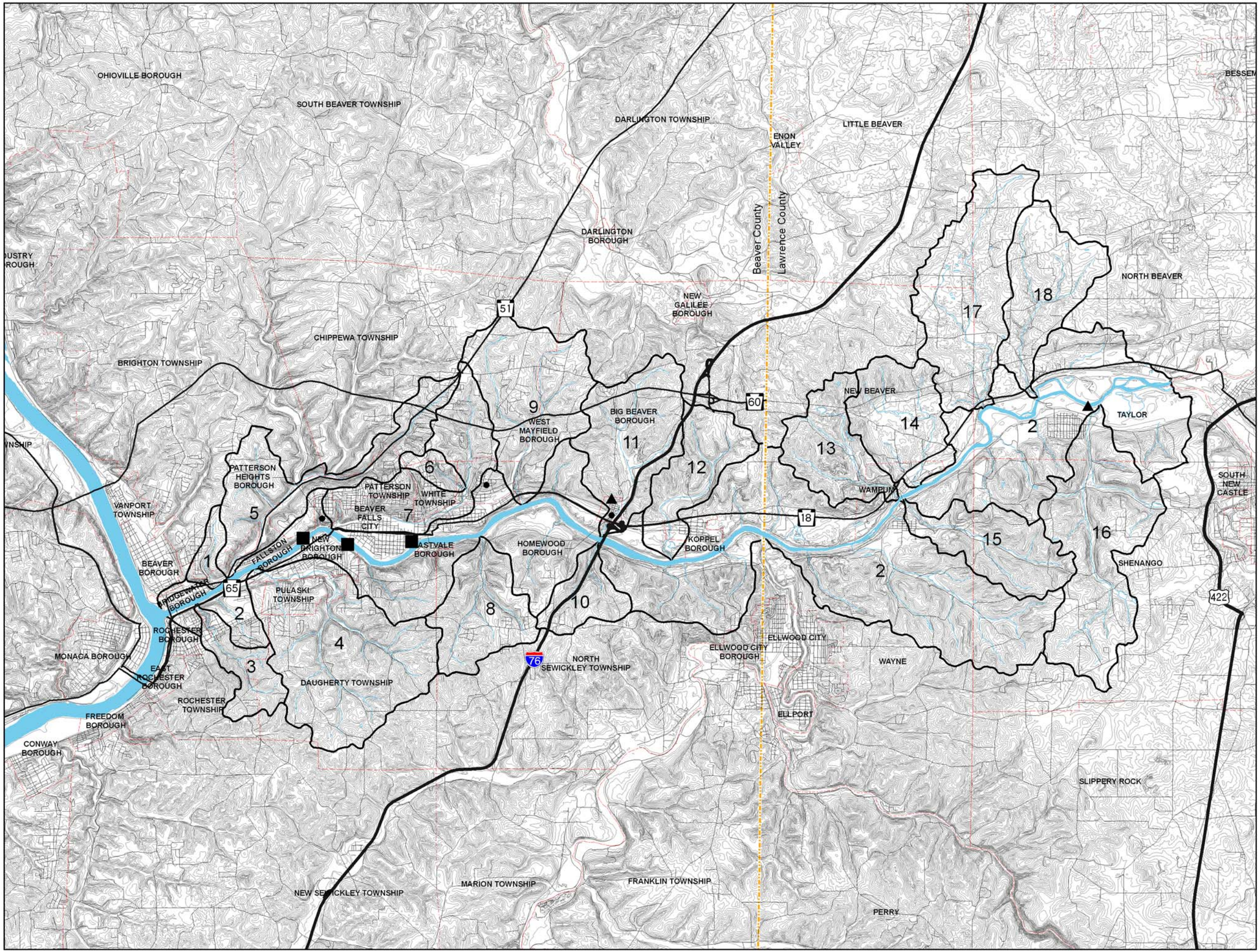
This watershed covers a small section of central and eastern Taylor Township with a majority of its land in Shenango Township. Most of the 3,965-acre McKee Run watershed is forested and agricultural land cover; land utilized for residential and non-residential development is both limited and scattered throughout the watershed. Water infrastructure, along with a limited amount of sewer service, can be found in the western portion of the watershed.

17.) Jenkins Run

The Jenkins Run tributary watershed lies in portions of North Beaver, Little Beaver and New Beaver Townships. This 3,590-acre watershed is almost entirely undeveloped characterized by the presence of agricultural and open space.

18.) Edwards Run

The Edwards Run tributary watershed lies in the southcentral portion of North Beaver Township. A limited amount of development exists within these 2,215 rural acres.




**Legend**

- Watershed Boundary
- County Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Minor Roads
- Existing 20' Contours
- Hydroelectric Dams
- Other Dams

**Sub-watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres

500 Acres

250 Acres

# STUDY AREA MAP

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council

Prepared by: Environmental Planning and Design, LLC

0 1/2 1 MILE

NORTH

### *Completing Inventory and Analysis*

As part of understanding the physical composition of each watershed, a series of detailed inventories and analyses were completed. These mapping and data efforts provide the foundation for establishing the Study Area's opportunities and challenges. The Study Area's resources were mapped using computer-based Geographic Information System (GIS) data available through the Southwestern Pennsylvania Commission's (SPC) Natural Infrastructure of Southwestern Pennsylvania database, Beaver County, Lawrence County, and other government-based agencies.

The full range of inventory and analyses completed as part of this Conservation and Management Plan is presented in detail in Chapter 4 of this Plan. In general:

- One series of analyses evaluated the presence of man-made patterns in each of the communities within the Corridor. Infrastructure, land coverage, and population density are examples of these patterns.
- Another series of analyses examined natural resource patterns. These analyses included those related to slopes, riparian (streamside) buffers, and sensitive habitats. Sensitive habitats identified include features such as floodplains, biological diversity areas, and general watershed quality.

### *Evaluating Opportunities and Challenges*

From the completed analyses, a series of planning and policy opportunities and challenges emerge. These opportunities and challenges are influenced by patterns of natural resources and existing development, the potential impact of future growth as permitted by the communities' zoning ordinance provisions, and past flooding occurrences.

To optimize the positives that opportunities offer and minimize the negatives that challenges present, it will be necessary for county, regional and local entities to maintain on-going coordination of planning and policy efforts.

## Analyzing Conservation Issues

The effectiveness of proposed conservation strategies is dependant on a comprehensive understanding of the historical and current landscape as well as local and regional planning and policy efforts. The Beaver River Conservation and Management Plan's strategies build upon several components including:

- Determining the presence and sensitivity of natural resources,
- Assessing impacts of existing municipal zoning; and
- Identifying resources most susceptible to man's use.

### *Determining the Presence and Sensitivity of Natural Resources*

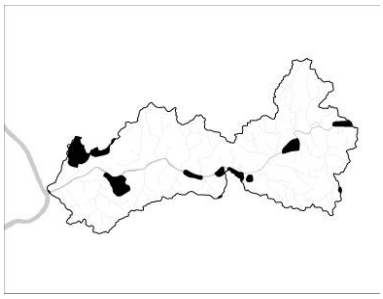
Using background mapping and input from the steering committee, public meetings and other stakeholders, the Plan identified several sensitive natural resources within the Study Area Watershed, which are relevant to potential conservation and management efforts. These resources include:

- Biological Diversity Areas;
- Wetlands;

- Flood Prone Areas;
- Slopes greater than 25 percent;
- Prime and Good Warm Water Fish Habitats; and
- Exceptional/High Quality Watersheds.

The significance and sensitivity of these natural resources were evaluated based upon a review of county, regional and state environmentally-based mapping and planning studies. After an inventory of each resource's specific location was mapped, it was important to develop an understanding of the relationship between these resources.

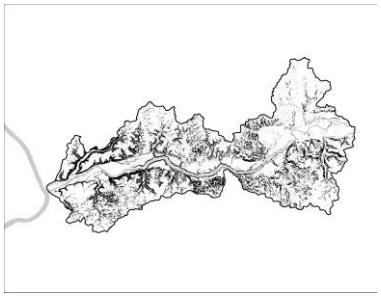
A sampling of these resources include:



Biological Diversity Areas (BDAs)

Definition: Areas (habitats) that contain significant or exceptional species, relatively large diversity of species, or entire communities or ecosystems.

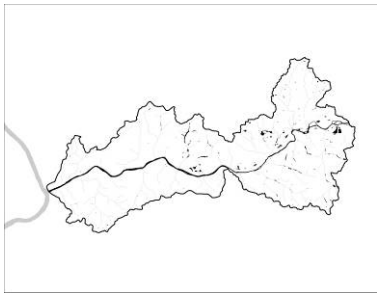
Importance: BDAs encompass the most critical habitat areas for a wide range of species in the area and represent opportunities for conservation or protection from development because they are currently relatively undisturbed by human activity.



Steep Slopes (greater than 25 percent)

Definition: Area of the landscape whose gradient is greater than 25%.

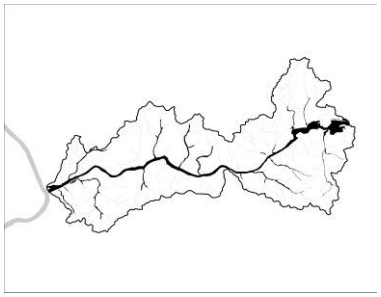
Importance: Steep Slopes, especially after human disturbances, are highly susceptible to landslides and erosion, and the ensuing loss of vegetation, aquatic habitat, water quality and property that can take place.



Wetlands

Definition: Areas of land that are frequently covered by ground or surface water that support vegetation and aquatic life.

Importance: Many species can only survive in the precise balance of a wetland ecosystem. Wetlands filter pollutants from runoff water and balance the discharge of rainwater into streams and rivers.



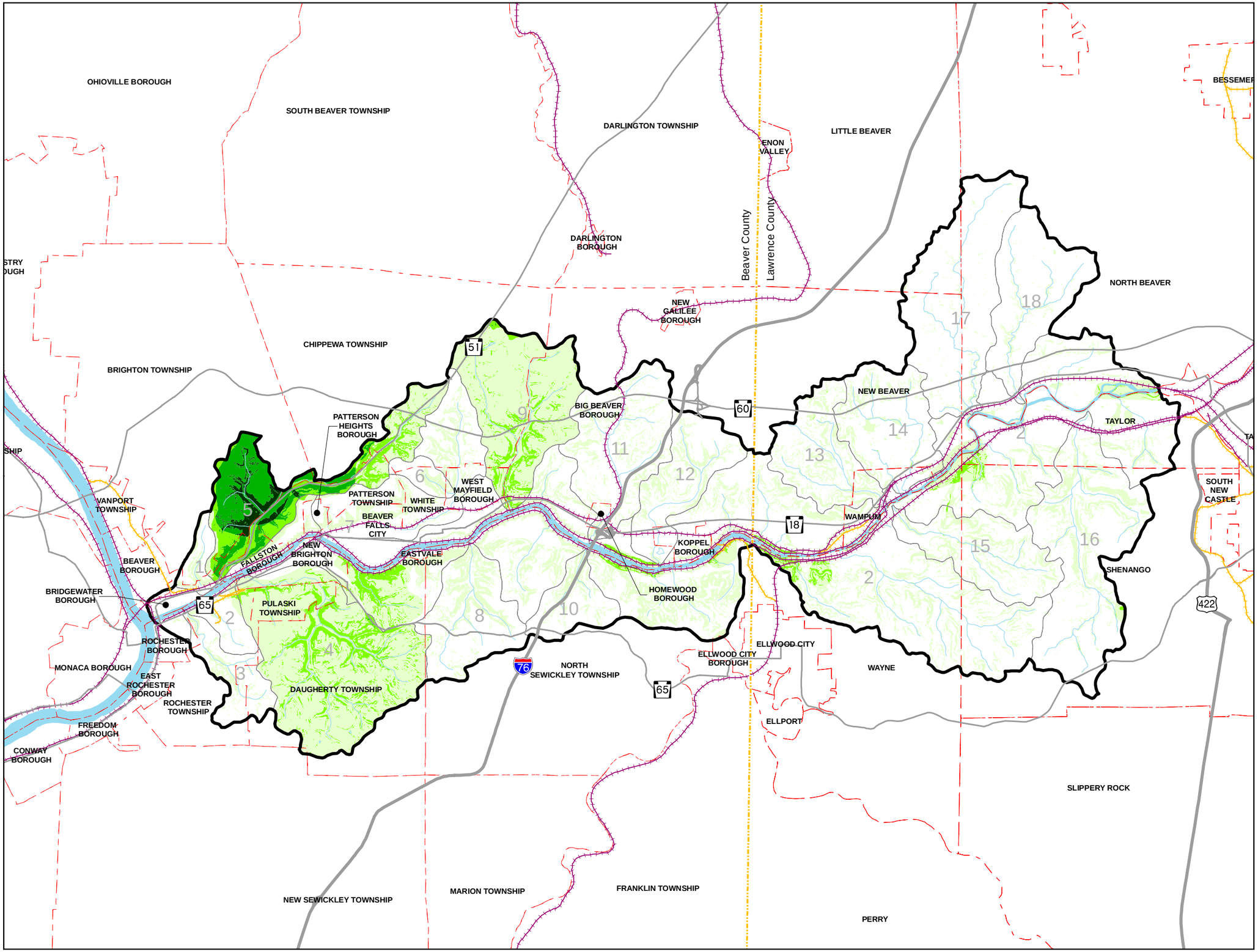
Flood Prone Areas

Definition: Areas of land that have a one-percent chance of being flooded in any given year.

Importance: Flood prone areas hold a river's natural overflow in the event of heavy rain. They allow the river to maintain its overall health by spreading temporarily. Human settlement in these areas risks being inundated.

The actual relationships of these resources within the Study Area are illustrated on the following Environmentally Sensitive Resources Composite Map.

The map presents these environmentally sensitive resources as a series of layers where each layer is given an equal value, or “weight,” of importance. When more than one resource exists in the same location, darker shading is illustrated. Consequently, the map’s lighter areas contain fewer overlapping resources while darker areas represent overlaps between a greater number of resources.




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads
- Rivers/Streams/Lakes

**Environmentally Sensitive Resources**
(Total Number of Features)

- 0
- 1
- 2
- 3
- 4

**Environmentally Sensitive Resources**

1. Biological Diversity Areas
2. Wetlands
3. Flood Prone Areas
4. >25% Slopes
5. Prime Warm Water Fish Habitat
6. Good Warm Water Fish Habitat
7. Exceptional/High Quality Watersheds
   (Presence of Exceptional/ High Quality Streams. Includes streams with trout stock potential.)

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# ENVIRONMENTALLY SENSITIVE RESOURCE COMPOSITE ANALYSIS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.13r1

0 1/2 1 MILE

NORTH

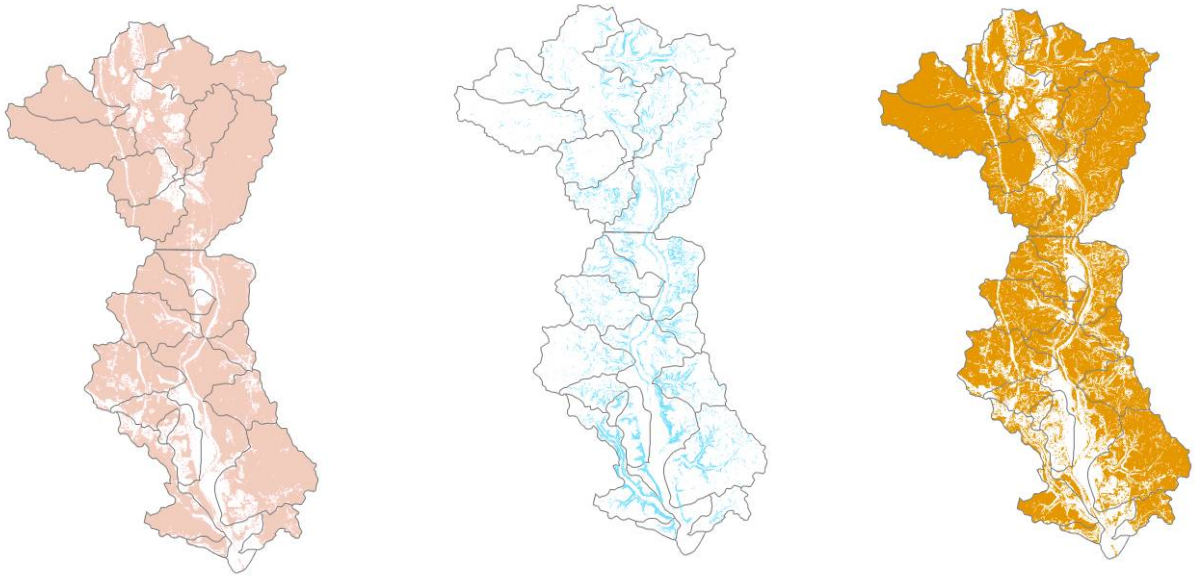
### *Impacts of Existing Municipal Zoning*

In addition to assessing the patterns of existing resources, each community's general zoning designations were overlain with existing land coverage information to determine what the potential results of "build-out" on the Beaver River Study Area could be. In communities where zoning does not exist, a general assessment of existing intensity of development has been evaluated in context of undeveloped land in order to study such impacts of build out. Build-out refers to the point in time when a community reaches the development threshold it is willing to sustain. A Build-out Analysis serves as the tool for exploring and evaluating potential development implications and defining objectives for future development and conservation. Several elements are part of the Build-out Analysis equation. Specific to the Beaver River Conservation and Management Plan, these elements include:

Element 1: Existing Developable Land
Element 2: Environmental constraints (e.g. steep slopes, floodplains) regulated by code/ordinance
Element 3: Buildable acres

Simply, the analysis takes Element 1 (Study Area watershed) and subtracts Element 2. The total is the amount of buildable land. The acreage of buildable land is multiplied by the ordinances' permissible densities (or by the general assessment of community development intensity, if no ordinance exists). The result is the potential number of additional dwelling units that could be developed in the watershed. A graphic representation of this process as it applies to the Beaver River Study Area is illustrated in the following diagram.

Buildable Area Diagram



**Existing Developable Land - Environmental Constraints = Buildable Acres**

Approximately one-fourth (14,000 acres) of land in the Study Area Watershed is currently developed and contains 35,000 dwelling units. That translates to an average density of just over 2.5 dwelling units per acre of existing development. The build-out analysis examines the question "if all remaining land were developed at the density currently permitted by each of the communities' individual zoning ordinances or the continuation of the past density trends, what could the impact of population and development patterns be?"

Based upon the range of permissible development intensities applicable to the remaining undeveloped land in the Study Area Watershed, four categories of future development could occur:

Rural dwelling areas – 2-acre minimum lot size;
Suburban dwelling areas – 1-acre minimum lot size;
Low urban dwelling areas – ½-acre minimum lot size; and
High urban dwelling areas – ¼-acre minimum lot size.

The build-out analysis accounts for more than 5,000 acres of land on which environmental constraints (steep slopes, floodplains and the like) exist. In considering these factors, the analysis identified that existing zoning could permit approximately 28,000 additional households to be constructed in the Study Area. One example of working through this calculation can be seen in North Sewickley Township. Based on available general land use data and aerial photography, approximately one-third of the community is currently developed with 2,300 homes. About 5,300 acres within the community remain undeveloped. However, in considering environmental constraints, the total buildable area becomes 4,600 acres. Based upon general planning regulations and the current patterns of development, the analysis identifies that approximately an additional 2,300 homes could be constructed – identifying that the population of North Sewickley has the potential to essentially double if the community were to be built-out.

Notably, the communities which permit the greatest amount of growth based on existing zoning include the following six communities. These communities contribute nearly 70 percent of the Study Area Watershed's potential number of units.

| | |
|---|---|
| New Beaver Township | Daugherty Township |
| Shenango Township | North Sewickley Township |
| Big Beaver Township | North Beaver Township |

However, in looking at the potential scale of growth, the communities which could be most intensely developed include the following four communities.

| | |
|---|---|
| Beaver Falls | Koppel Borough |
| New Brighton Borough | Patterson Heights Borough |

Table 2-1 presents the build-out analysis' results per community and for the overall Study Area.[1]

[1] Chapter 4 has more information about land use regulations by municipality.

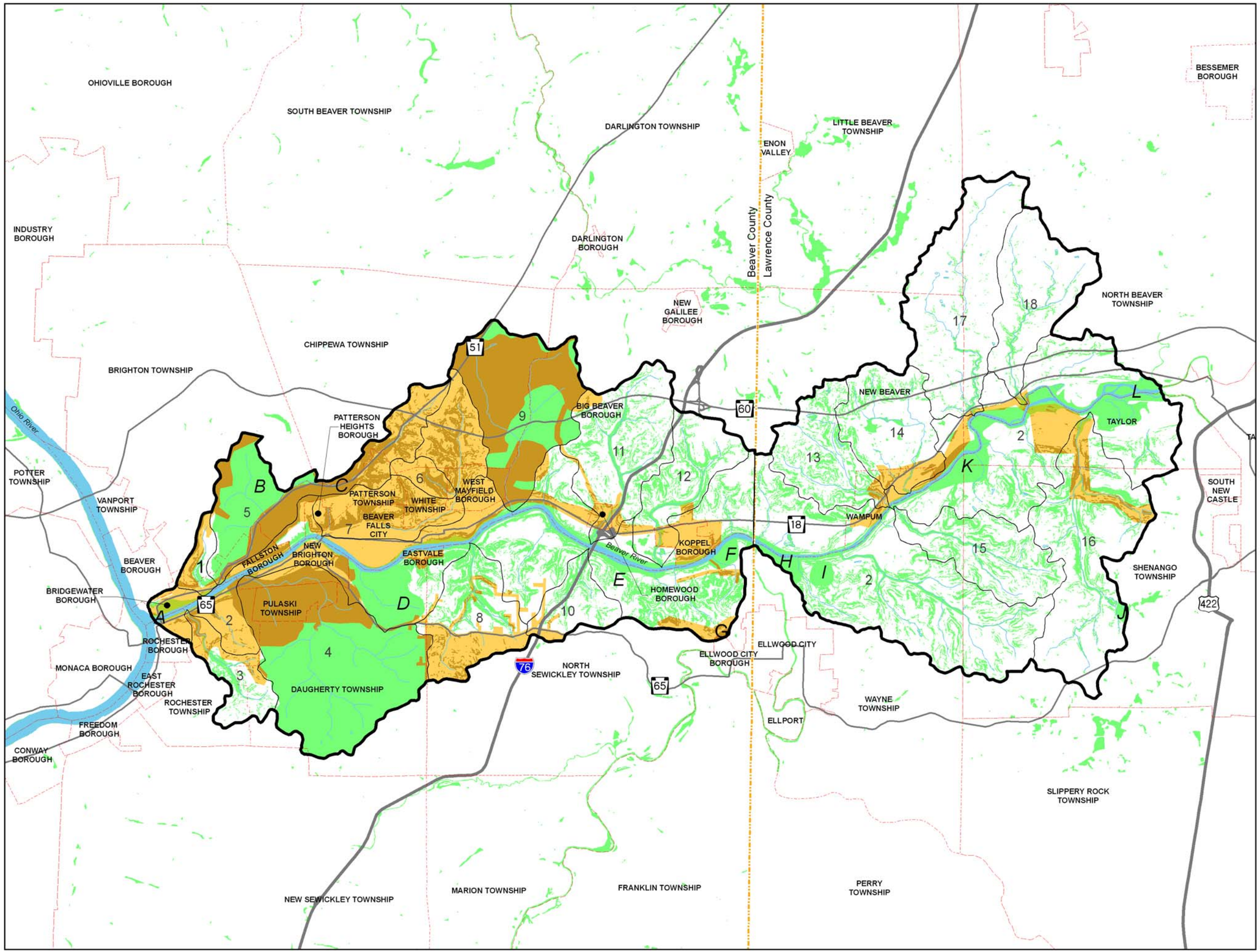
**Table 2-1: Build-out Analysis based on Generalized Zoning**

| | EXISTING | | | BUILDABLE AREA | | | PROJECTED |
|---|---|---|---|---|---|---|---|
| Communities | Developed Watershed Acres | Existing Dwelling Units | Total Undeveloped Watershed Acres | Undeveloped Watershed Acres with Environmental Constraint | Total Buildable Acres | Total Projected Dwelling Units for Buildable Acres | Total Dwelling Units at Buildout of Watershed Acres |
| 1 BEAVER BOROUGH | 19 | 2,297 | 1 | 1 | 0 | 0 | 2,297 |
| 2 CITY OF BEAVER FALLS | 1,183 | 4,380 | 275 | 93 | 182 | 728 | 5,108 |
| 3 BIG BEAVER TOWNSHIP | 1,162 | 905 | 6,099 | 780 | 5,319 | 2,660 | 3,565 |
| 4 BRIDGEWATER BOROUGH | 270 | 335 | 140 | 76 | 64 | 132 | 467 |
| 5 BRIGHTON TOWNSHIP | 185 | 2,875 | 1,223 | 180 | 1,043 | 1,043 | 3,918 |
| 6 CHIPPEWA TOWNSHIP | 1,265 | 2,933 | 2,034 | 205 | 1,829 | 1,829 | 4,762 |
| 7 DAUGHERTY | 769 | 1,317 | 4,268 | 443 | 3,825 | 3,825 | 5,142 |
| 8 EASTVALE BOROUGH | 65 | 133 | 13 | 5 | 8 | 15 | 148 |
| 9 FALLSTON BOROUGH | 175 | 136 | 142 | 94 | 48 | 48 | 184 |
| 10 HOMEWOOD BOROUGH | 68 | 62 | 42 | 16 | 26 | 13 | 75 |
| 11 KOPPEL BOROUGH | 292 | 409 | 49 | 17 | 32 | 130 | 539 |
| 12 LITTLE BEAVER TOWNSHIP | 1 | 502 | 612 | 4 | 608 | 304 | 806 |
| 13 NEW BEAVER TOWNSHIP | 791 | 696 | 5,265 | 314 | 4,951 | 4,951 | 5,647 |
| 14 NEW BRIGHTON BOROUGH | 673 | 2,999 | 43 | 28 | 15 | 60 | 3,059 |
| 15 NORTH BEAVER TOWNSHIP | 757 | 1,580 | 4,994 | 461 | 4,533 | 2,266 | 3,846 |
| 16 NORTH SEWICKLEY TOWNSHIP | 1,042 | 2,326 | 5,351 | 713 | 4,638 | 2,774 | 5,100 |
| 17 PATTERSON HEIGHTS BOROUGH | 92 | 268 | 67 | 41 | 26 | 103 | 371 |
| 18 PATTERSON | 558 | 1,332 | 531 | 197 | 334 | 668 | 2,000 |
| 19 PULASKI TOWNSHIP | 304 | 764 | 223 | 59 | 164 | 196 | 960 |
| 20 ROCHESTER BOROUGH | 168 | 1,900 | 1 | 1 | 0 | 0 | 1,900 |
| 21 ROCHESTER | 754 | 1,268 | 536 | 123 | 413 | 254 | 1,522 |
| 22 SHENANGO TOWNSHIP | 770 | 2,996 | 6,458 | 454 | 6,004 | 3,002 | 5,998 |
| 23 TAYLOR TOWNSHIP | 1,044 | 506 | 1,637 | 473 | 1,164 | 1,433 | 1,939 |
| 24 WAMPUM BOROUGH | 605 | 310 | 141 | 65 | 76 | 84 | 394 |
| 25 WAYNE TOWNSHIP | 441 | 946 | 3,800 | 510 | 3,290 | 1,645 | 2,591 |
| 26 WEST MAYFIELD BOROUGH | 327 | 499 | 174 | 27 | 147 | 209 | 708 |
| 27 WHITE TOWNSHIP | 299 | 667 | 165 | 71 | 94 | 254 | 921 |
| Totals | 14,079 | 35,341 | 44,283 | 5,451 | 38,832 | 28,625 | 63,966 |

### *Susceptible Resource Area Map*

Within the Study Area, lands examined as part of the build-out analysis were further evaluated to determine where there are overlaps between known sensitive resources and existing access to infrastructure systems. Without strategic planning, this relationship could create the potential for resources to be at risk, or susceptible to unwanted impacts. The Susceptible Resource Areas Map illustrates instances where these overlaps occur.

Extensive areas of susceptibility include the portions of Brady's Run watershed, a majority of the Wallace Run watershed, the western section of the Block House Run watershed and various sections of the Walnut Bottom Run watershed. The manner in which the potential impacts of human use, development and/or infrastructure expansion could be managed are identified in Chapter 3.




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Public Service Area (Sanitary Sewer/ Water Service)
- Environmentally Sensitive Resource
- Threatened Resource Areas
  Environmentally Sensitive Resource in Public Service Area

**Environmentally Sensitive Resources**

1. Biological Diversity Areas
2. Wetlands
3. Flood Prone Areas
4. >25% Slopes
5. Prime Warm Water Fish Habitat
6. Good Warm Water Fish Habitat

**Biological Diversity Areas**

A. Ohio River BDA
B. South Branch Valley BDA
C. North Branch Valley BDA
D. New Brighton Valley BDA
E. Beaver River Island BDA
F. Beaver River Confluence Slope BDA
G. Steifel Park Mine BDA
H. Rock Point BDA
I. CS & M Mine BDA
J. Gardner Swamp BDA
K. Beaver River Flood Plain BDA
L. Beaver River Islands BDA

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# SUSCEPTIBLE RESOURCE AREA MAP

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

0 1/2 1 MILE

NORTH

## Modeling the Impacts of Flood Events

A unique aspect of the Beaver River Conservation and Management Plan is the use of computer modeling to identify the extent to which flooding may impact or may be impacted by future growth. The two primary variables within the Study Area which potentially influence the effects of future flood events are:

1) The amount and intensity of development; and
2) The nature and extent of policies regulating this development.

Outlined below are the model's assumptions, base conditions, and findings.

### *Assumptions and Base Conditions*

As part of the analysis process, general stormwater impacts were assessed by incorporating available existing regional land coverage data within a flood model program (HEC-RAS®) developed through the US Army Corps of Engineers. Historical flood data were mapped to establish the scale and extent of past flooding events. This modeling incorporates the land coverage data with the flood data (including severe weather/hurricane events of 2004 [i.e. Hurricane Ivan]) to establish the basic relationship between existing development and stormwater run-off in the Study Area's various watersheds. For portions of the Study Area where background data were unavailable, a series of hydrological factors replicating patterns of development intensity and known storm event water levels were integrated into the flood model.

Future land use information was also examined and "tested" to evaluate if and how potential development at build-out[2] could contribute to future flooding levels. Build-out information was not available for communities upstream of the Study Area or within the Connoquenessing Creek watershed (which flows from the east into the Beaver River). Consequently, impacts of any additional development beyond the Study Area have not yet been evaluated as part of this modeling.

As part of the background analysis efforts, known conditions were identified at seven sample locations along the Beaver River and along selected tributaries. Each location possesses a slightly different character in terms of the water's known width, depth, and the type and intensity of existing surrounding development. For each location, four critical components were examined:

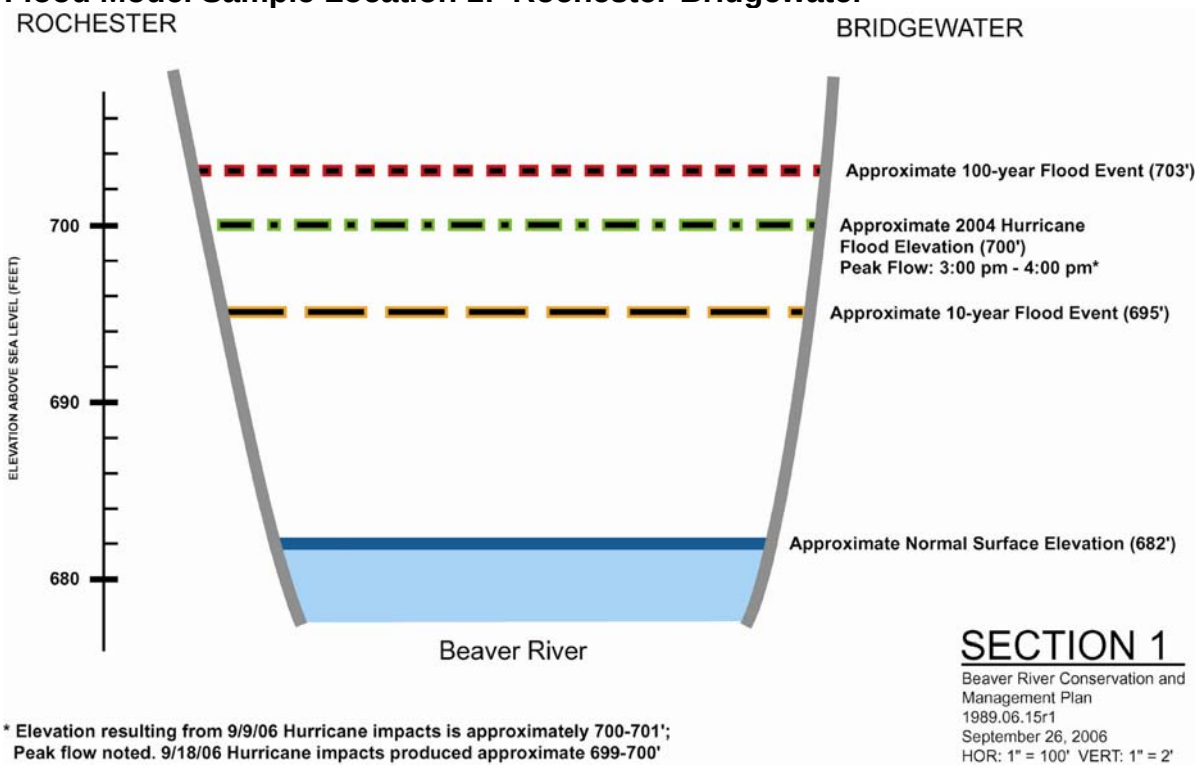
a. Normal (water) surface elevation;
b. Approximate 10-year flood event elevation;
c. Approximate 100-year flood event elevation;
d. Approximate 2004 hurricane flood elevation.

To compare each location's similarities and differences, a "cross section," or imaginary "slice," of the river and selected tributaries was prepared. These sections are found on the following pages. Each critical component is represented by a line of varying pattern and color. Normal surface elevation represents the typical daily water elevation, or existing surface water conditions. 10-year and 100-year flood events typify occasions when an area will be inundated by a flood event that has a 10 percent chance or one percent chance, respectively, of being equaled or exceeded in any given year. The line illustrating the 2004 hurricane flood elevation represents the average elevation the water reached during the series of hurricane-related flood events impacting southwestern Pennsylvania in the Fall of that year. Elevations provided are based upon existing development

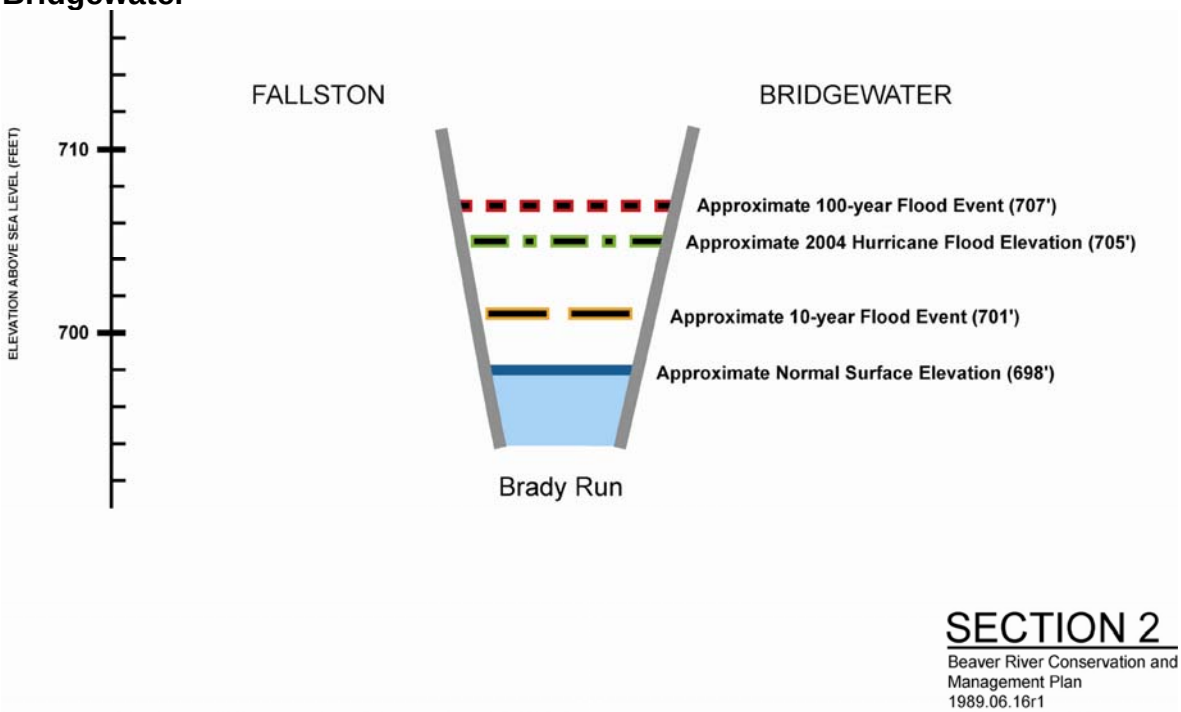
[2] all development which is permitted to occur by the Study Area communities' Ordinance provisions

patterns and intensities. Notably, in several studied locations, impacts of the 2004 hurricane-related floods produced effects which fall between 10-year and 100-year flood stages.

**Flood Model Sample Location 1: Rochester-Bridgewater**

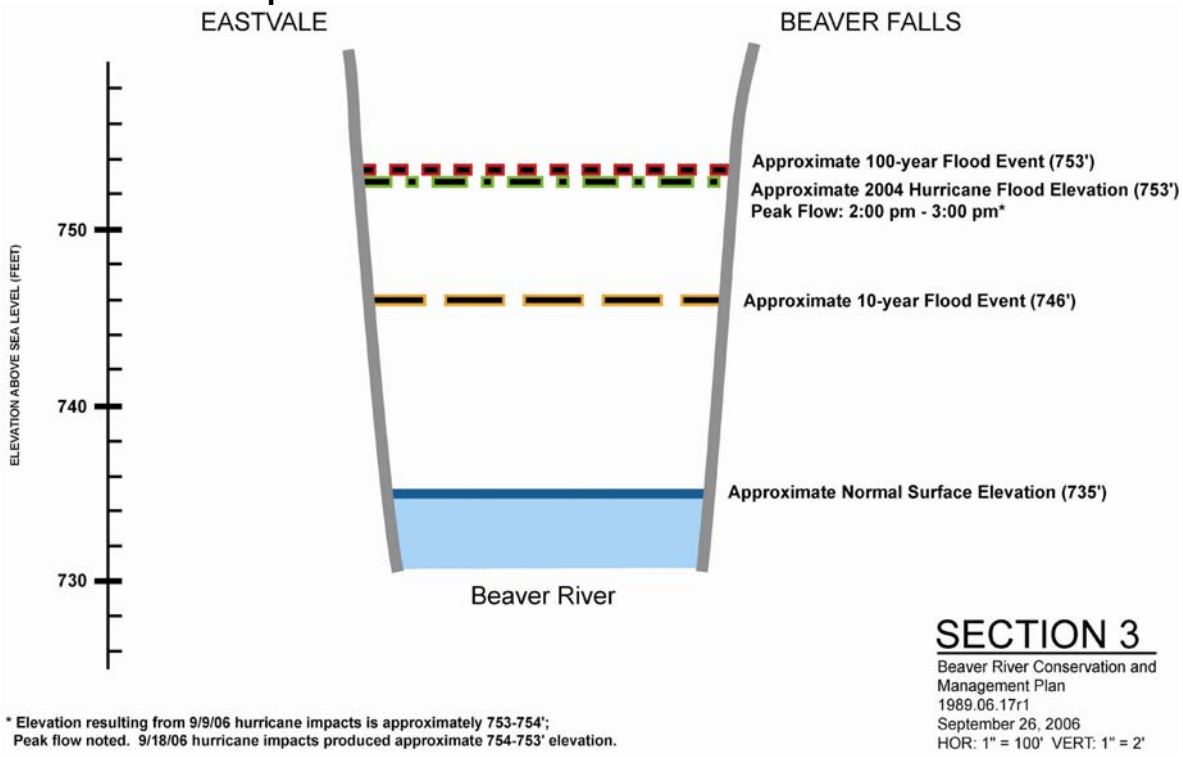


## Flood Model Sample Location 2: Fallston-Bridgewater



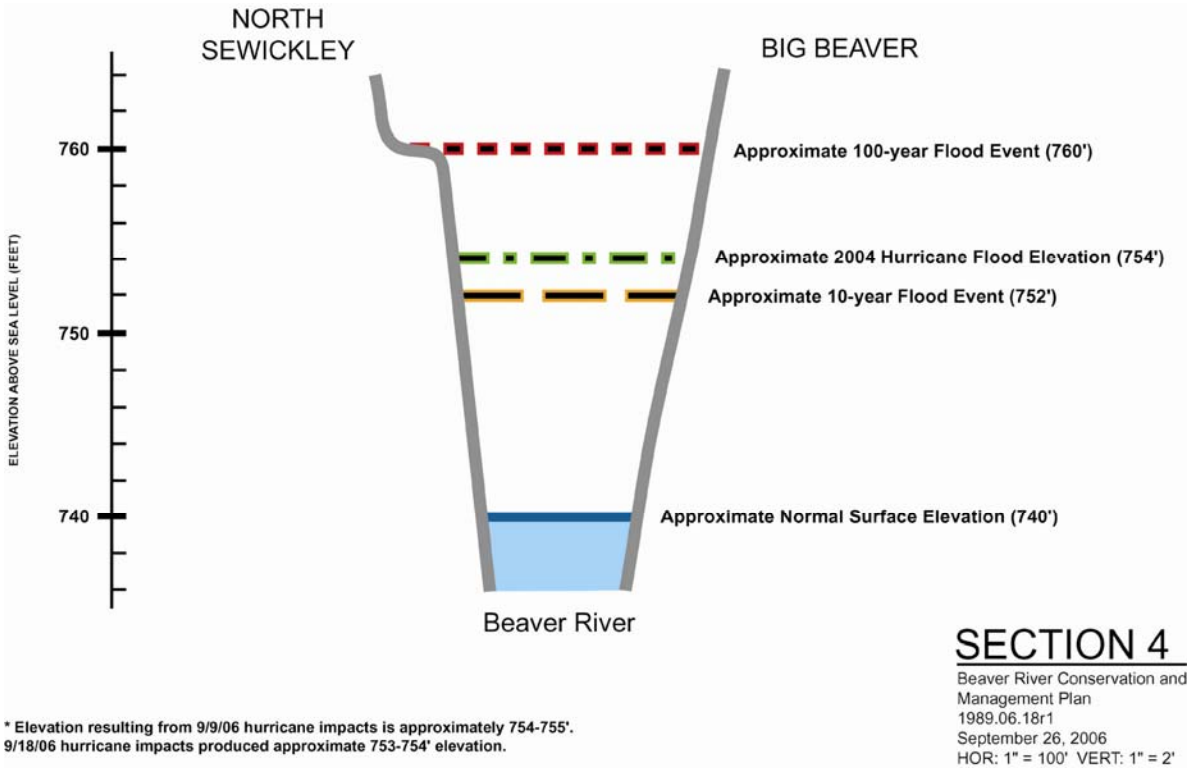

* Elevation resulting from 9/9/06 hurricane impacts is approximately 705-706'.
9/18/06 hurricane impacts produced approximate 704-705' elevation.

## Flood Model Sample Location 3: Eastvale-Beaver Falls

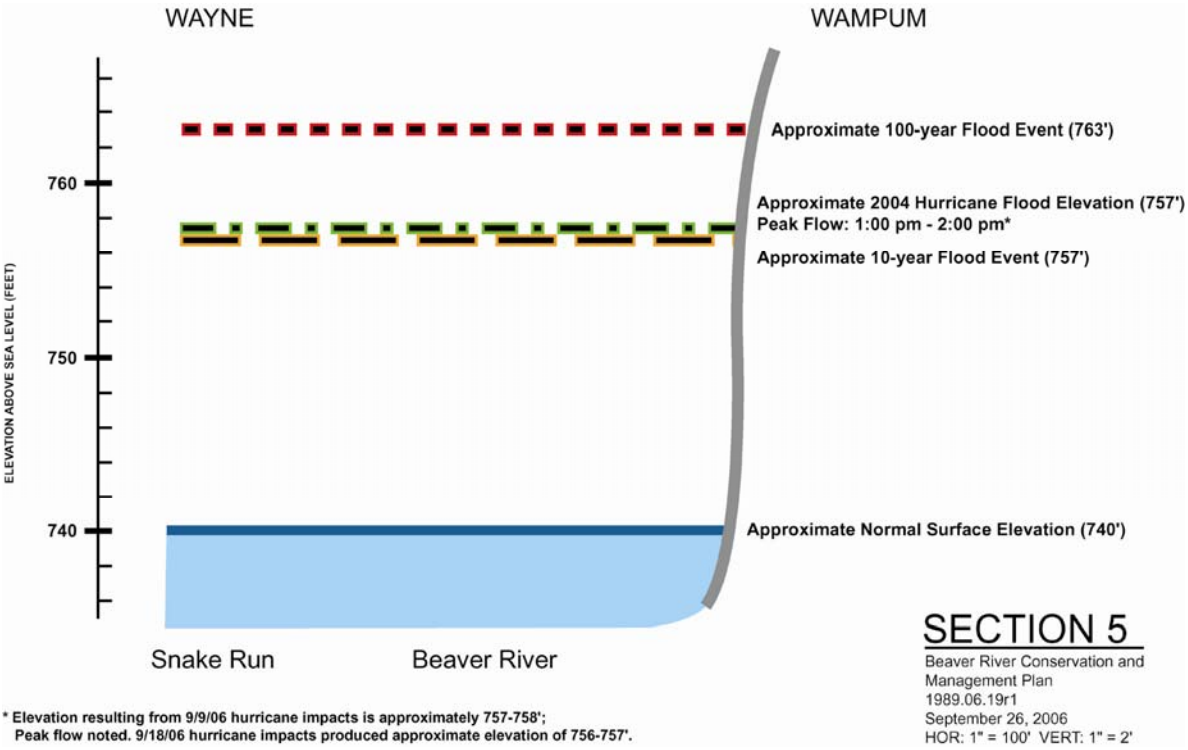



* Elevation resulting from 9/9/06 hurricane impacts is approximately 753-754';
Peak flow noted. 9/18/06 hurricane impacts produced approximate 754-753' elevation.

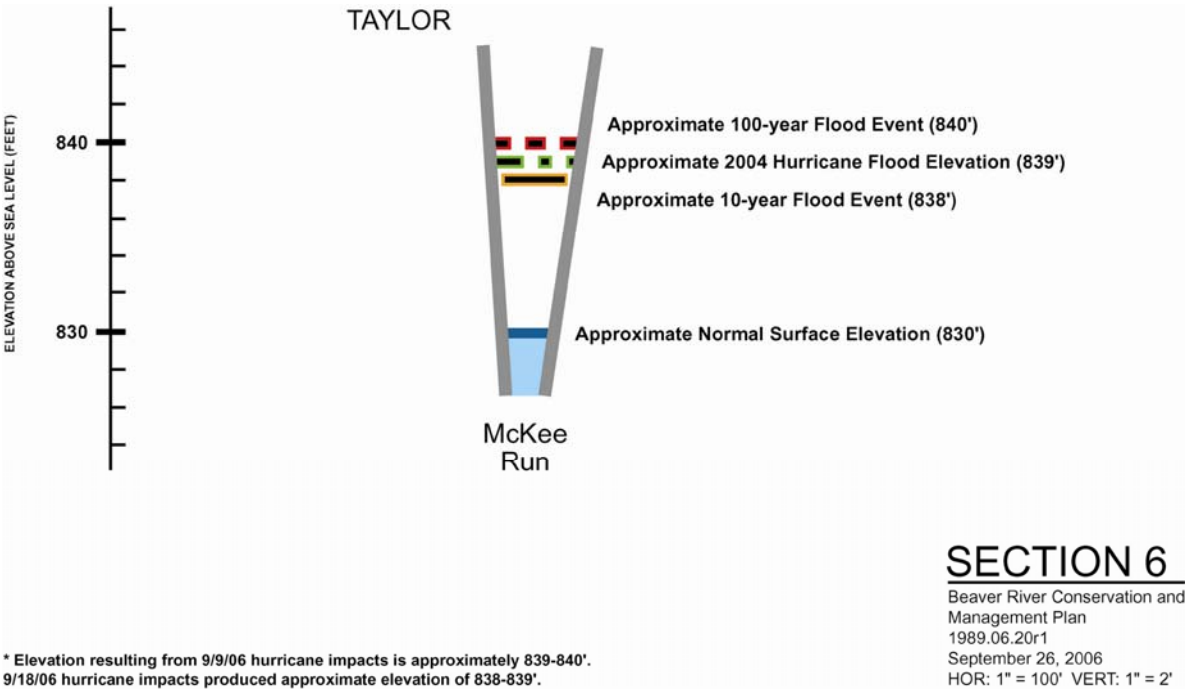
## Flood Model Sample Location 4: North Sewickley-Big Beaver



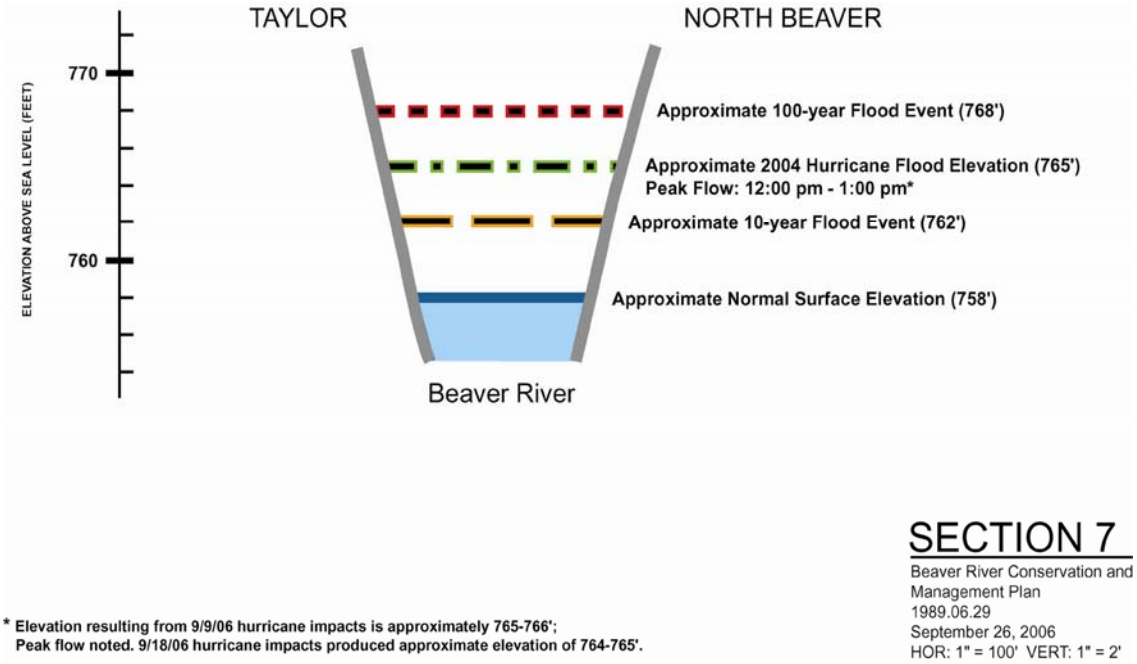

## Flood Model Sample Location 5: Wayne-Wampum



## Flood Model Sample Location 6: Taylor




## Flood Model Sample Location 7: Taylor-North Beaver



### *Findings*

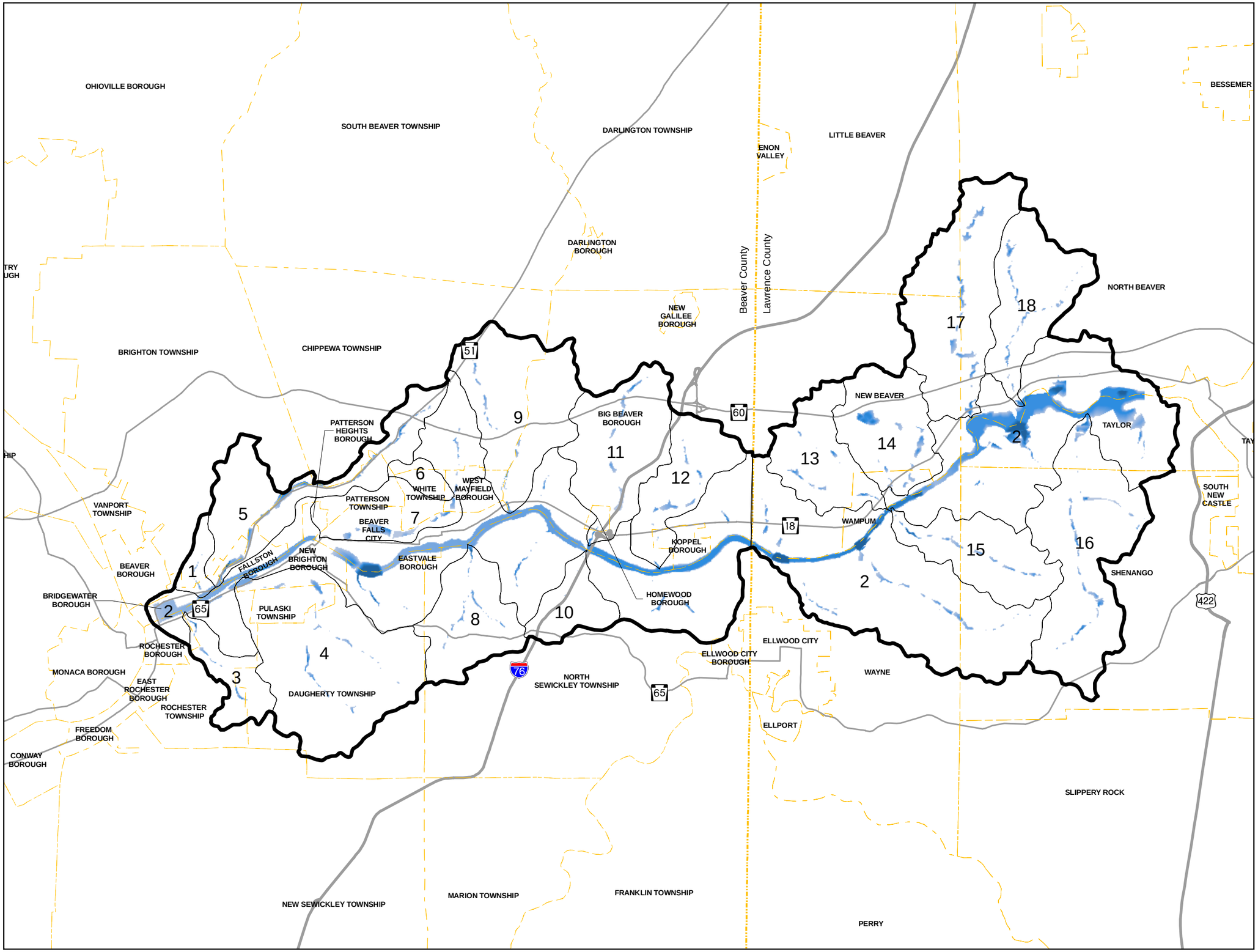
If future growth within the Beaver River Study Area were to reach build-out based upon the communities' current permitted development intensities and existing policies (or absence thereof) guiding it, the model anticipates flooding levels will increase from those experienced today. Looking at the overall Study Area, it is likely that build-out could raise typical flooding events by a minimum of 1 to 2 feet. In watersheds currently approaching build-out, minimal change to flooding patterns is anticipated. In portions of the Study Area where the amount and intensity of development may be more substantial, it is most likely that greater rises in future flooding could also result.

During severe weather events, more intense impacts will also likely occur in streams which are generally narrow, shallow and/or are comprised of steeper slopes. Also, increases in flooding are more likely in bodies of water which are in watersheds north of the Pennsylvania Turnpike.

To further illustrate analysis results, a series of diagrams were generated. The Base Flood Condition Map depicts typical seasonal flooding levels at build-out. Where darker shading occurs in a water body, flooding is anticipated to be more extensive. Factors such as future development intensity and topography along the stream's/river's boundary contribute to this result.

The Severe Event Flooding Conditions Map illustrates the change in potential flooding during a severe weather event such as 2004's Hurricane Ivan. Coupling additional water flow with additional development results in broader areas of the watershed being inundated with higher water. This is evidenced through more extensive portions of darker shading (high and moderate inundation) than as seen on Base Flood Map.

Both scenarios assume existing development regulations (e.g. impervious coverage, permitted densities, etc.) remain as currently permitted. As identified in later portions of this Plan, opportunities to reduce the extent and/or impacts of potential flooding may be seen through the introduction and adoption of alternative resource management techniques and development provisions.




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads

**FLOOD INUNDATION (Feet Above Existing Pool)**

- High
- Low

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

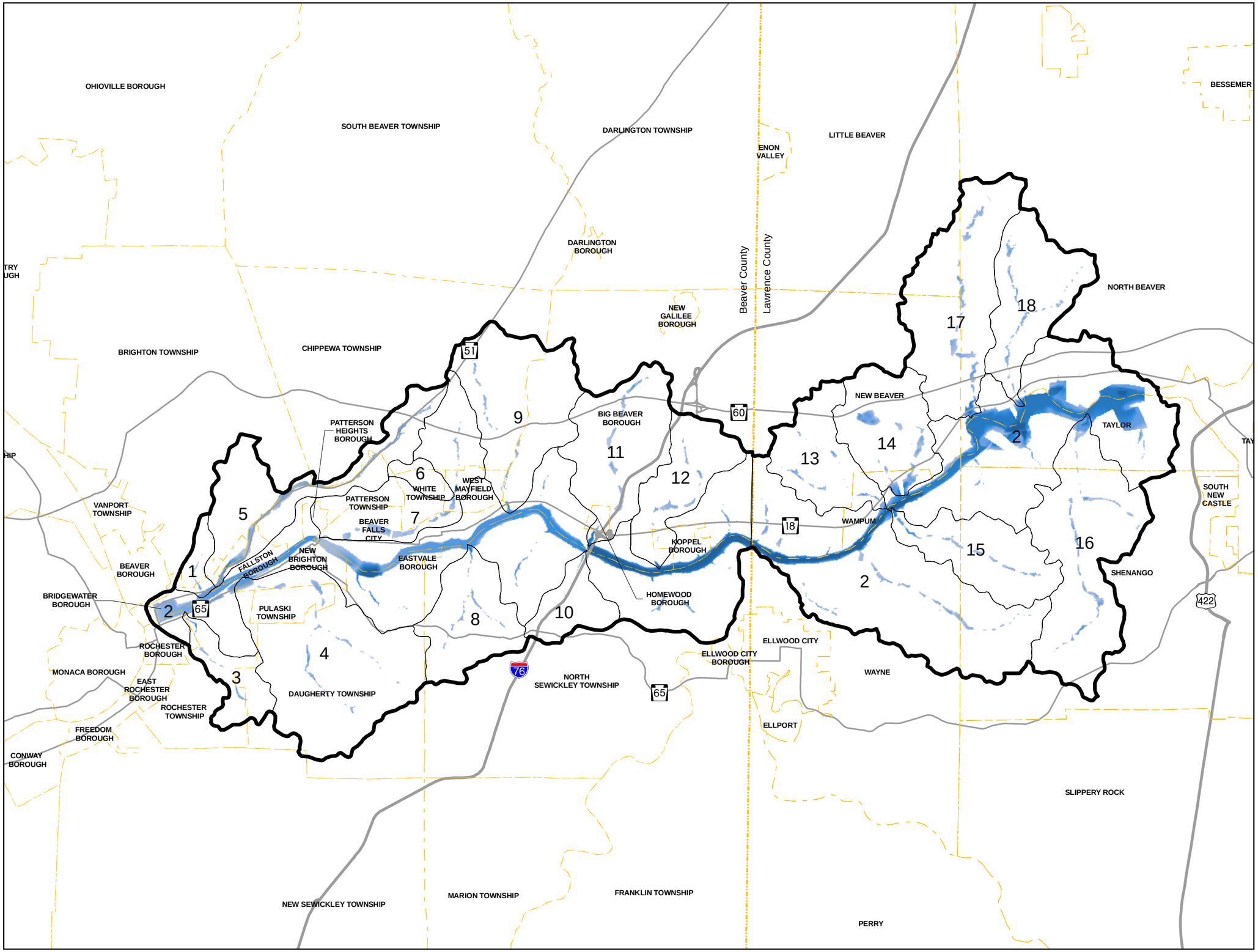
# BASE FLOODING CONDITIONS
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: February 2008
1989.08.01

0 1/2 1 MILE

NORTH




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads

**FLOOD INUNDATION (Feet Above Existing Pool)**

- High
- Low

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# SEVERE EVENT FLOODING CONDITIONS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: February 2008
1989.08.02

0 1/2 1 MILE

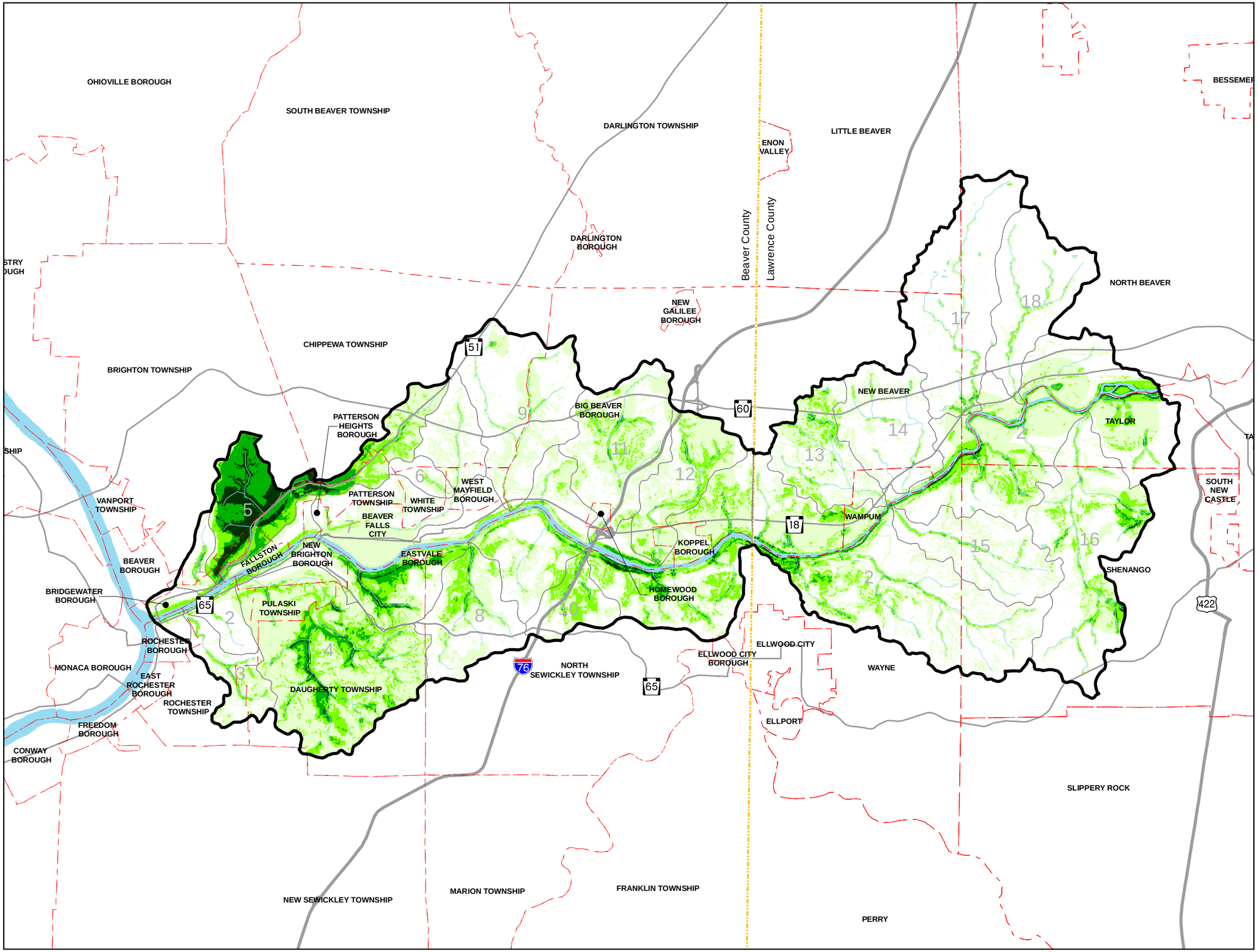
NORTH

## Conservation Strategy Analysis

The compilation of all project background work comes together in the Conservation Strategy Analysis. The Conservation Strategy Analysis Map identifies the location and intensity of resources which residents and leaders of Beaver and Lawrence Counties have identified to be most significant for future recognition as related to conservation and/or management. A matrix on the right hand side of the map includes three general resource categories: Environmentally Sensitive Lands, Habitat and Recreation. Each category contains a series of specific resources. For example, trails are categorized under Recreation and woodlands are categorized under Habitat.

For each resource recognized on the matrix, its significance and sensitivity were determined by the Pennsylvania Environmental Council with input from the Advisory Committee. These were then "weighted" based on perceived importance, resulting in a "score" for each resource. The resource was assigned a corresponding shade of green. A resource with greater sensitivity to potential impacts of man-made activities and/or development is assigned a higher score. The sum of the resources' scores, as many overlap, affects the map's patterns of shading. As the sum increases, the shading darkens. It is important to note that an area's sensitivity is measured by the sum and not the quantity of resources. For example, one resource with a weighted sum of 4 is more sensitive than three resources each with a weight of 1, summing to a score of 3.

Based on this analysis, areas with the greatest identified significance and sensitivity include portions of eastern Brighton Township, the northern Bridgewater Borough and a small section of southeastern Chippewa Township. These municipalities are generally within the Brady's Run tributary watershed.




## Legend

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads
- Rivers/Streams/Lakes

## TOTAL SCORE

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 28

**Conservation Matrix**

| | | Resource | Weighted Value |
|---|---|---|---|
| Environmentally Sensitive Lands | a | Exceptional/High Quality Watersheds (Presence of Exceptional/High Quality Streams. Includes streams with trout stock potential.) | 5 |
| | b | Wetlands | 5 |
| | c | Steep Slopes (>25%) | 4 |
| | d | Stormwater Filtration | 4 |
| | e | Floodplains | 2 |
| | f | Groundwater Recharge | 1 |
| Habitat | a | BDAs | 5 |
| | b | Habitable Woodlands | 5 |
| | c | Warmwater Gamefish Habitats | 3 |
| | d | Important Bird Areas | 3 |
| Recreation | a | Trails | 3 |
| | b | Non-motorized Boating/Fishing Access (combines flatwater, whitewater and sail boating) | 3 |
| | c | Primitive Camping | 2 |
| | d | Hunting | 2 |
| | e | Motorized Boating/Fishing Access | 1 |
| | f | Non-Primitive Camping | 1 |
| | g | ATV areas | 0 |

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# CONSERVATION STRATEGY ANALYSIS
# BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.25r1

0 1/2 1 MILE

NORTH

### *Observations*

1.) Development and Infrastructure
The Beaver River Study Area Watershed is characterized by a combination of developed and undeveloped land. Sewer and water infrastructure services both of these landscapes. Consequently, the potential exists for some undeveloped or very low intensely developed areas that possess environmentally sensitive resources and the availability of infrastructure to incur pressures of development. Through assessing the relationships between existing development, existing zoning ordinance provisions and potential build-out patterns, it is possible that if and/or when all land within the communities of the Beaver River Study Area Watershed develop, the Corridor's population and number of dwelling units could nearly double. A key consideration in this matter is in the understanding that the communities' current ordinance development-related provisions permit this type of growth. Considerations of growth also should be evaluated in context of the communities' and region's overall planning objectives.

Another consideration of existing development and infrastructure patterns is the implication of flooding, both normal and severe conditions. Flooding is typically a response to a combination of factors including development patterns and impervious conditions, the presence and adequacy of stormwater management controls, and climatic changes. Impervious conditions are those in which water cannot freely flow into the ground. Through the assessment of these characteristics, as related to the Beaver River Study Area Watershed, there are notable times in history in which flooding has impacted both lands along the Beaver River's banks as well as in other portions of tributary watersheds. The potential patterns of development in the Study Area provide the opportunity to alter these types of patterns in the future. Depending upon the stormwater management mechanisms and policies promoted and implemented within the Corridor in the future, the impacts from instances of flooding could either improve or become more significantly impacted than the patterns of today.

2.) Management and Outreach
Currently, most municipalities within the Beaver River Study Area Watershed are charged with evaluating and approving/denying development and resource impacts within the confines of their individual borders. There is limited, if any, coordination between neighboring local government entities as related to watershed management. Some regions in Pennsylvania and in other states utilize a watershed organization to fulfill such an advisory and/or regulatory role. No such organization currently exists within the Beaver River Study Area Watershed or in the greater geographic region.

### *Recommendations and Policies*

From the analyses and observations, recommendations and policies for future conservation and management strategies can be formulated. Each of the following recommendations for implementation has been evaluated related to current projects and policies. Each recommendation has been assessed based on its potential to enhance the physical, ecological and/or economic well-being of the Beaver River Study Area Watershed. The Plan's recommendations, outlined in the following list, are generally related to one of three categories:

(1) Management
(2) Development and Infrastructure
(3) Outreach, Education and Public Awareness

Local, regional, and county-wide entities currently serve the communities of the Study Area in a variety of ways. It is recommended that the key stakeholders initiating implementation efforts associated with this Rivers Conservation and Management Plan be identified from groups leading land use planning efforts in both Beaver and Lawrence Counties and to form partnerships to leverage resources in implementing effective policies at the local or county level. These groups should work cooperatively with local and regional leaders and organizations to identify, draft, present and implement the Plan's recommended conservation and management strategies, policies, and projects.

Consequently, to promote consistency between policies and implementation, it is recommended that Beaver and Lawrence Counties take a lead role in establishing and promoting consistent standards for resource management. Specifically, the Counties should collaborate to pursue the following as listed in order of recommended priority. Priorities have been identified based upon project analysis findings and feedback gained throughout the preparation of this plan.

1.) *Identify or form a conservation and management advisory body to implement the recommendations of the Conservation and Management Plan*

This advisory body can:

- Identify environmental problems and recommend ordinances, plans, and programs to the appropriate municipal agencies for the promotion and conservation of natural resources and for the protection and improvement of the quality of the environment within its municipal boundaries;
- Promote community environmental programming;
- Keep an index of all open space, publicly and privately owned, including flood-prone areas, swamps, and other unique natural areas, for the purpose of obtaining information on the proper use of such areas;
- Make recommendations for the possible use of open land areas;
- Advise the appropriate government agencies, including but not limited to planning commissions and elected governing bodies on the commitment of suitable property, both real and personal, for conservation;
- Assist communities in pursuing grant money for improvement projects, including those initiatives offered through the Department of Community and Economic Development (www.newPA.com).

One example of such an advisory body is an Environmental Advisory Council (EAC), authorized by Act 148 of 1973. An EAC can assist local governments in identifying natural resource opportunities and challenges and recommending plans and programs to protect and improve the quality of the community's environment. Contact the EAC Network for more information (http://www.greentreks.org/eacnetwork/index.asp).

2.) *Create a River Corridor Management Ordinance*

As part of their Act 167 Plans, County representatives should work with local municipalities to develop and adopt a River Corridor Management ordinance that addresses development, implementation, and enforcement of programs to manage stormwater from new development

and re-development. In managing stormwater, watershed communities can minimize/reduce potential flooding problems, erosion, and loss of or damage to natural resources. Both counties have begun to look at stormwater management issues in the Act 167 Plans that are under development.

3.) *Adopt Impervious Surface provisions as part of the River Corridor Management Ordinance to minimize negative impacts of stormwater run-off*

Impervious surfaces are constructed areas or soils compacted by urban development which seal surfaces, repel water and prevent precipitation and melt water from infiltrating soils. Provisions which control the intensity and/or percentage of impervious surface as part of development can be utilized to decrease large volumes of runoff generated by storms as well as non-point source water pollution problems attributed to impervious surfaces. Impervious surface provisions can be adopted on either a local- or watershed-wide basis. As part of these efforts, one example that could be referenced is the City of Austin's Barton Creek Watershed Ordinance. (www.epa.gov/safewater/sourcewater/pubs/techguide_ord_tx_austin_zoningnewdiv4.pdf).

4.) *Advocate for the creation and adoption of a Steep Slope Ordinance*

Steep slopes are defined as areas that exceed a certain percentage slope and are often associated with certain types of soils. In western Pennsylvania, steep slopes are often those that are greater than 25 or 40 percent gradient. Steep slopes are valuable resources and sensitive landforms where a diversity of organisms can thrive. Excavations or building construction can promote instability by loading the slope, removing vital support, and increasing porosity.

Some communities within the Beaver River Study Area Watershed currently limit the amount of disturbance that is permitted to occur on steep slopes. It is recommended based on the characteristics of the Beaver River Study Area Watershed, that ordinance provisions be adopted to limit the amount of disturbance that should occur on slopes greater than or equal to 25 percent and eliminate development on slopes greater than or equal to 40 percent. While the designation of different slope categories exist, one example of the range of provisions that can be addressed in a Steep Slope Ordinance include East Nantmeal, Chester County, PA. (http://dvrpc.org/planning/community/ProtectionTools/ordinances)

5.) *Evaluate the feasibility of other watershed-wide ordinance updates which coordinate development and infrastructure opportunities*

Based upon the patterns and locations of existing environmentally sensitive areas in the Beaver River Study Area Watershed, Beaver and Lawrence Counties should evaluate the feasibility of potential ordinance language and/or mapping updates which encourage the coordination of potential development and infrastructure. This relationship can promote that infrastructure investments are optimized while undesirable disturbances to existing sensitive natural resources are minimized. Based upon identified and a general evaluation of existing and known planned development opportunities, consideration for such updates should occur in many communities throughout the Corridor, specifically:

1. Brighton Township
2. Chippewa Township
3. Daugherty Township

4. New Brighton Borough
5. Patterson Township
6. Pulaski Township
7. Rochester Township

*6.) Promote the development that respects the landscape's character and capacity*

Counties and communities should encourage development patterns in urban, suburban, and rural areas of the Beaver River watershed that are compatible with existing character and infrastructure services while minimizing negative impacts to sensitive natural resources. Updates to land use and/or development regulations should be considered at local and regional levels to ensure implementation of coordinated best management practices at both the local and regional scales. On-going review and analysis of potential development build-out impacts, as shaped by zoning and subdivision regulations, should be completed through coordination of the County Planning Department and the newly formed river advisory body to promote coordinated conservation and development efforts throughout the region.

*7.) Establish consistent review procedures to identify potential conservation needs*

Based on the evaluation of potential build-out and analysis of resources potentially susceptible to disturbance, approximately 75 percent of the Beaver River Study Area Watershed could be developed. As proposals for development come about, county and regional stakeholders should work with local municipalities and the development community throughout the Corridor to establish a formal, consistent review process to identify if, when and/or how existing natural resources could be conserved. Uniform criteria for identifying such lands should also be prepared, inclusive of sensitive natural resources identified as part of this Rivers Conservation and Management Plan. Designation of conserved lands could be in the form of private and/or public open space for natural heritage or historic sites. As part of a larger regional and state-wide initiative, Illinois currently manages a series of programs including the Natural Heritage Database, the Nature Preserves System and the Natural Heritage Landmarks program which evaluate and classify lands suitable for conservation based upon a series of such criteria.

*8.) Coordinate conservation with other County open space and greenway efforts*

The Rivers Conservation and Management Plan presents a series of natural resource data which should be utilized as future Beaver and Lawrence County recreation and conservation greenway planning efforts are pursued.

The Beaver County Greenways Plan identifies twelve potential greenways. Of these, the Brady's Run watershed area and the southern portion of the Beaver River Study Area Watershed possess areas of sensitive natural resources that are commonly identified in both plans.

The Lawrence County Greenway Plan identifies eight potential conservation greenways. Included among these eight are the Beaver/Mahoning River Greenway, which includes corridors along Jenkins Run and Edwards Run, and the McKees Run Greenway. These areas have been identified in the Beaver River Conservation and Management Plan as having sensitive natural resources, particularly areas of dense forests.

Based upon the resources' identified significance and sensitivity to recreation and conservation, the Counties and identified stakeholders should work to coordinate how projects, policies, and funding opportunities can be optimized and implemented succinctly. Already, the Counties have a joint Greenways coordinator to help facilitate this process.

9.) *Initiate discussions with local land trusts and conservancies to conserve lands located in the River Corridor*

The leaders and residents of Beaver and Lawrence Counties should initiate discussions with local land trusts and conservancies to identify how existing scenic, recreational, educational and environmental landscapes within the Beaver River Study Area Watershed could offer opportunities for land conservation and promoting healthier watersheds.

Building on these priorities, the following Action Plan provides the full range of recommendations for Beaver and Lawrence Counties, local municipalities and regional organizations to pursue in enhancing conservation and management efforts within the Study Area. The recommendations were developed based on input from the Advisory Committee, public meetings, surveys of stakeholders, and reviewed by the Pennsylvania Environmental Council and their consultant, Environmental Planning and Design.

# CHAPTER 3: ACTION PLAN

The Action Plan is a summary of the implementation steps, or actions, necessary to complete the Plan's major recommendations. Actions vary from recommendation to recommendation with some being more project-oriented and others being more policy driven. Each recommendation and its related actions are organized based on topical categories such as management, development and infrastructure, and outreach and education. For each recommendation and its subsequent actions, potential participant groups are listed. Participant groups can fulfill several roles, including those who are primarily coordinating activities to those who most often will provide support through time and/or resources to realize the Plan's recommendations. Throughout different phases of the implementation, it is recognized that these roles and groups may change depending upon the expertise that an action may require.

Another component of the Action Plan is implementation timeframe. Some recommendations and related actions could be completed in the next few years, while others may likely take a decade. It is anticipated that physical, policy, and economic influences will impact the feasibility and priorities of the recommendations. Consequently, the Action Plan is intended to respond to opportunities that emerge, issues that arise, and projects that are completed from year to year. Based upon these aspects, the Action Plan should be reviewed and updated on a yearly basis. New actions can be added and assignments of stakeholders refined. Each recommendation can be classified into one of five timeframes:

- Immediate Action –needed to create momentum to move other actions forward;
- High Priority Action – some urgency exists to warrant attention in the short term;
- Medium Priority Action – moderate urgency, can address when resources are available;
- Long-term Priority Action – can be addressed sometime in the future;
- On-Going Action – may start now and continue in the future.

Many of these actions are considered to be building blocks to achieve the recommendations outlined in the conservation strategy and will have to be completed in progression. Items marked as immediate are necessary to create momentum to move the other actions forward. Other actions will be completed as resources and participation become available.

| ACTION PLAN | | |
|---|---|---|
| **Recommendations** | **Participant Groups** | **Project Initiation Timeline** |
| ***1. Management*** | | |
| A. Identify or form a conservation and management advisory body to implement recommendations of the Conservation and Management Plan (referred to in the recommendations as "river advisory body"). | County Governments, municipalities | Immediate |
| B. Encourage communities to participate in the Act 167 Process | County Governments, municipalities, river advisory body | Immediate |
| C. Create a Watershed Management Ordinance that promotes watershed conservation principles and techniques | County Governments, municipalities | High Priority |
| D. Preserve the scenic quality of the Beaver River Corridor including biological diversity areas, natural heritage areas, steep wooded slopes, riparian (streamside) areas, wetlands, islands and other similar characteristics | County Governments, municipalities, conservation organizations, river advisory body | High Priority |
| E. Preserve and enhance contiguous forests in identified sensitive landscapes by developing a Forest Management Plan for the region | County Governments, municipalities, land owners, district forester, conservation organizations, river advisory body | High Priority |
| F. Conduct an Agricultural Practices Assessment to identify appropriate farmland conservation and runoff management opportunities | Conservation Districts, County Governments, river advisory body | Long Term |
| G. Clean up old dock posts from washed out docks | Dock owners, municipalities | Medium Priority |
| H. Develop, in cooperation with stakeholders, an annual report updating key indicators of watershed health and describe recent progress in preserving and enhancing watersheds, new findings, and study results | River advisory body, Conservation Districts | On-going |
| I. Gauge and build public support for water conservation and recycling | County Conservation Districts, County Governments, river advisory body, conservation organizations, schools | Medium Priority |

| | | |
|---|---|---|
| J. Conduct a thorough plant and wildlife inventory | Conservation organizations, educational institutions | Medium Priority |
| K. Clean up illegal dumpsites and litter along the River | Municipalities, conservation or environmental organizations | On-going |
| L. Study the water quality of the Beaver River watershed | PA DEP, Conservation Districts | High Priority |
| ***2. Development and Infrastructure*** | | |
| A. Encourage redevelopment and in-fill of brownfields (previously developed sites) | County Governments, Municipalities, Development Organizations/Corporations, Authorities, Utilities | On-Going |
| B. Promote development within existing infrastructure service areas | County Governments, Municipalities, Development Organizations/ Corporations, Authorities, Utilities, river advisory body | On-Going |
| C. Align new development and future infrastructure expansion to minimize impacts on sensitive natural resource areas | County Governments, Municipalities, Development Organizations/Corporations, Authorities, Utilities | High-Priority |
| D. Build collaboration between the public and private sectors to update aging and/or under-serviced stormwater management systems | County Governments, Municipalities, Development Organizations/Corporations, Authorities, Utilities, Conservation Districts, river advisory body | On-Going |
| E. Consider repair and reestablishment of riparian (streamside) vegetation in impacted watersheds | Conservation Districts, river advisory body | Medium Priority |
| F. Sponsor septic system education for residents of unsewered portions of the Beaver River Corridor | PA DEP, Conservation Districts, river advisory body | High Priority |
| G. Reduce accumulation of sediment in infrastructure systems by addressing point and nonpoint pollution sources | County Governments, Municipalities, Conservation Districts, river advisory body, PADEP | Medium Priority |
| H. Address stormwater issues and sedimentation problems within the Beaver River corridor in context of existing and future Act 167 and MS4 plan recommendations | County Governments, Municipalities, PA DEP, Conservation Districts, river advisory body | Medium Priority |
| I. Remove invasive plant species in public riparian (streamside) areas and in private lands where possible. Continue to monitor riverfront lands for invasive species | Conservation Districts, river advisory body, conservation organizations | On-Going |

| | | |
|---|---|---|
| J. Promote planting of native species in newly developed riverfront areas | Municipalities, Conservation Districts, river advisory body, conservation organizations | High Priority |
| K. Promote use of pervious pavements, gravel access roads, and other means to encourage stormwater infiltration into the water table | Conservation Districts, Municipalities, new advisory body | Medium Priority |
| L. Implement riverfront development strategies identified in other studies including the area's Riverfront Development Plan | County Governments, Municipalities, Development Organizations/Corporations | Medium Priority |
| ***3. Outreach, Education, and Public Awareness*** | | |
| A. Pursue funding to support regional-oriented staff for the river advisory body in its coordination and implementation of the Conservation and Management Plan's recommendations | County Governments | High Priority |
| B. Create a Beaver River Watershed Website related to the projects outlined in the Conservation and Management Plan | County Governments, river advisory body, Conservation Districts | Medium Priority |
| C. Coordinate conservation and management initiatives with local schools and institutions of higher education to promote research/implementation opportunities including development of primary and secondary school education curricula related to the natural resources of the Beaver River Watershed | Conservation Districts, local non-profits, schools, river advisory body | Medium Priority |
| D. Work with the railroads, municipalities, and the PA Fish and Boat Commission on designating safe active and passive river access locations | Trail Groups, local non profits, Conservation Districts, PA Fish and Boat Commission, County Governments, Municipalities, river advisory body, railroads | Medium Priority |
| E. Establish scenic driving tours of the River valley, including stops for train viewing, scenic river views, and historic/cultural attractions | Conservation Districts, local non-profits, historical societies, river advisory body | High Priority |
| F. Help to coordinate input to, and distribution of, outreach newspapers published by agencies and community groups | Conservation Districts, local non-profits, river advisory body | Medium Priority |

| | | |
|---|---|---|
| G. Encourage and assist local and regional agencies to incorporate interpretive and educational features as part of recreational facilities and other public works projects | Conservation Districts, Municipalities, river advisory body, local non-profits | On-going |
| H. Promote active stewardship among commercial and residential stakeholders; bring this message/updates to advisory boards, environmental commissions, planning commissions, and other venues for public input to agency decision making | Conservation Districts, local non-profits, conservation organizations, river advisory body | High Priority |
| I. Sponsor semi-annual hazard and toxic disposal collection programs | Conservation Districts, local non-profits | Medium Priority |
| J. Establish an Adopt-A-Creek program | Conservation Districts, local non-profits | Long Term |

# CHAPTER 4: STUDY AREA CHARACTERISTICS

The Beaver River, with its steep slopes and wooded hillsides, is a notable natural and recreational amenity within western Pennsylvania. As part of this environment, there are many characteristics both on the river's banks and on surrounding higher ground that make this area an important consideration for future conservation and watershed management efforts in Beaver and Lawrence Counties.

These characteristics were evaluated as part of this Plan utilizing a series of data organized as part of a Geographic Information System (GIS). Data were compiled from available county mapping files as well as other general resource databases available through the Southwestern Pennsylvania Commission. As part of this compilation, most, but not all, resources were available for both counties. Additional information was compiled from a variety of different sources, including published and personal communication, and noted accordingly within each section.

## Study Area

### *Study Area Location and Size*

The composition of the Beaver River Study Area includes more than fifty thousand acres of the lower Beaver River watershed in western Pennsylvania. Specifically, the Study Area includes all lands adjacent to the Beaver River between its formation south of New Castle where the Shenango and Mahoning Rivers merge to its confluence with the Ohio River. The Study Area also includes eighteen individual watersheds. All Study Area lands fall within Beaver and Lawrence Counties and include a significant portion of each, if not all, of the following municipalities:

**Beaver County**
Beaver Falls City
Big Beaver Borough
Bridgewater Borough
Brighton Township
Chippewa Township
Daugherty Township
Eastvale Borough
Fallston Borough
Homewood Borough
Koppel Borough
New Brighton Borough
North Sewickley Township
Patterson Township
Patterson Heights Borough
Pulaski Township
Rochester Borough
Rochester Township
West Mayfield Borough
White Township

**Lawrence County**
Little Beaver Township
New Beaver Borough
North Beaver Township
Shenango Township
Taylor Township
Wampum Borough
Wayne Township

A map of the Study Area and descriptions of the subwatersheds appear in Chapter 2.

***Socioeconomic Profile***

*Population*

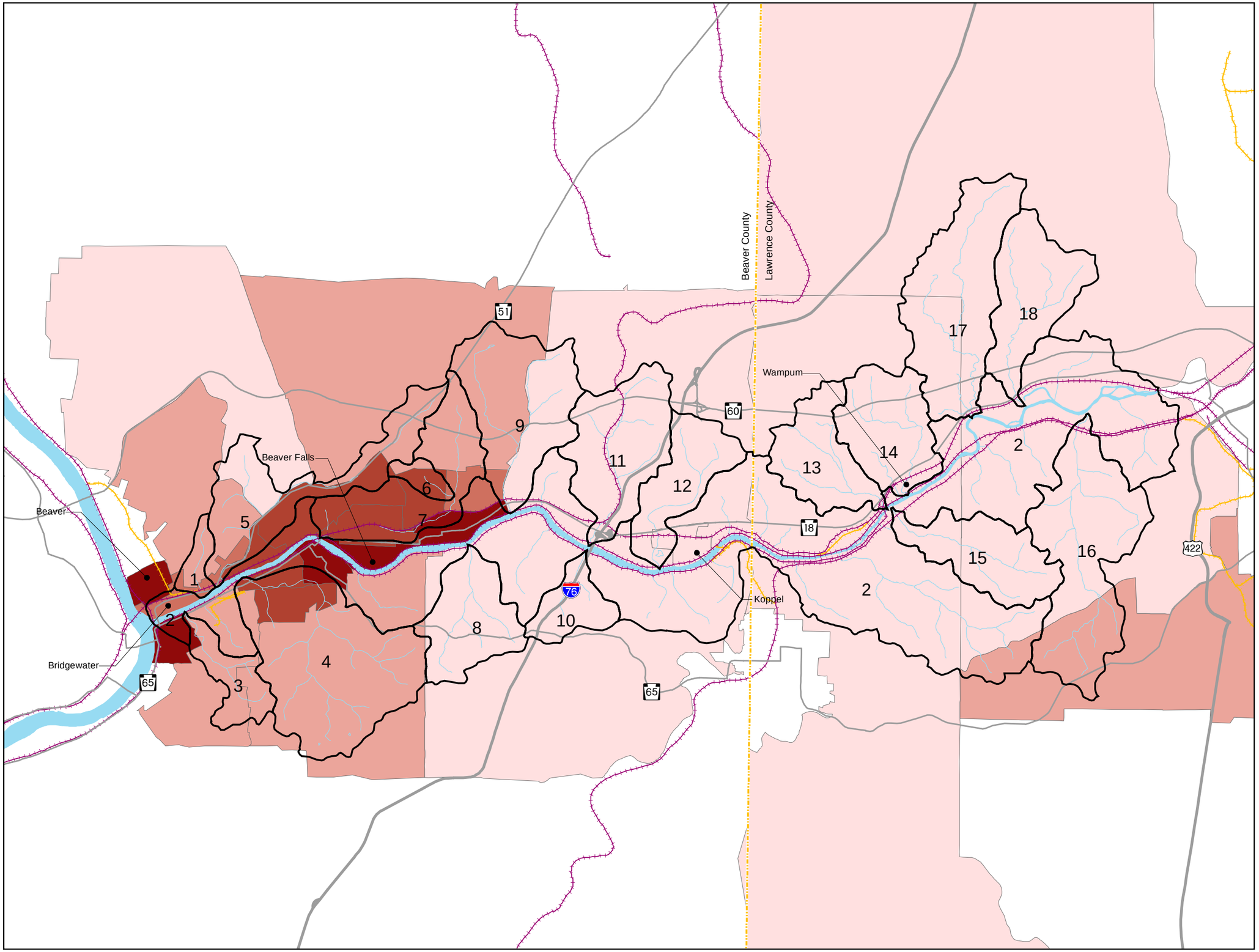
The Beaver River was an ideal location for industry in the early 1900s because of abundant water and rail service. By the late 1900s, however, industry declined in these river communities, accompanied by declines in populations. Some communities have lost a third or more of their population since 1970 as illustrated in Table 4-1. As a result, many communities are seeking new opportunities to lure businesses and residents to the area.

**Table 4-1**
**Municipal Populations**

| Municipality | 2000 Population | 1990 Population | 1980 Population | 1970 Population | % Change 1970 to 2000 |
|---|---|---|---|---|---|
| | | | | | |
| ***Beaver County*** | | | | | |
| Beaver Borough | 4775 | 5028 | 5441 | 6100 | -21.7 |
| Beaver Falls City | 9920 | 10687 | 12525 | 14375 | -31.0 |
| Big Beaver Borough | 2186 | 2298 | 2815 | 2739 | -20.2 |
| Bridgewater Borough | 739 | 751 | 879 | 966 | -23.5 |
| Brighton Township | 8024 | 7489 | 7858 | 7532 | 6.5 |
| Chippewa Township | 7021 | 6988 | 7245 | 6613 | 6.2 |
| Daugherty Township | 3441 | 3433 | 3605 | 3719 | -7.5 |
| Eastvale Borough | 293 | 328 | 379 | 421 | -30.4 |
| Fallston Borough | 307 | 392 | 312 | 571 | -46.2 |
| Homewood Borough | 147 | 162 | 188 | 212 | -30.7 |
| Koppel Borough | 856 | 1024 | 1146 | 1312 | -34.8 |
| New Brighton Borough | 6641 | 6854 | 7364 | 7637 | -13.0 |
| North Sewickly Township | 6120 | 6178 | 6758 | 6048 | 1.2 |
| Patterson Heights Borough | 670 | 576 | 797 | 777 | -13.8 |
| Patterson Township | 3197 | 3074 | 3288 | 3442 | -7.1 |
| Pulaski Township | 1674 | 1697 | 1998 | 2126 | -21.3 |
| Rochester Borough | 4014 | 4156 | 4759 | 4819 | -16.7 |
| Rochester Township | 3129 | 3247 | 3427 | 4089 | -23.5 |
| West Mayfield Borough | 1187 | 1312 | 1712 | 2152 | -44.8 |

| | | | | | |
|---|---|---|---|---|---|
| White Township | 1434 | 1610 | 1870 | 1747 | -17.9 |
| | | | | | |
| ***Lawrence County*** | | | | | |
| New Beaver Borough | 1677 | 1736 | 1426 | 1885 | -11.0 |
| North Beaver Township | 4022 | 3982 | 3475 | 4367 | -7.9 |
| Shenango Township | 7633 | 7187 | 7798 | 7937 | -3.8 |
| Taylor Township | 1198 | 1326 | 1152 | 1519 | -21.1 |
| Wampum Borough | 678 | 666 | 1189 | 851 | -20.3 |
| Wayne Township | 2328 | 2785 | 3130 | 3130 | -25.6 |
| | | | | | |
| Source: http://www.pasdc.hbg.psu.edu/ | | | | | |

The Population Density Map illustrates the current number of people living in each acre of the Study Area. The densest population is generally concentrated within the southern portions of the Beaver River valley. The Boroughs of Beaver Falls, Beaver, and Rochester all indicate a level greater than six people per acre and represent the highest densities in the Study Area. These boroughs are characterized by an environment that has been significantly manipulated to accommodate housing and commercial uses and are typically considered to be “urban.” A population density of less than half a person per acre indicates an area that is primarily rural with minimal infrastructure. These rural areas are generally in the northern portion of the Study Area.




**Legend**

- Watershed Boundary
- County Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads

**Population Density per Acre**

- < 0.5
- 0.5 - 1.5
- 1.5 - 3.0
- 3.0 - 6.0
- > 6.0

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# POPULATION DENSITY
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.05.16r1

0 1/2 1 MILE

NORTH

*Employment*

Although agricultural land and forested land comprise 71 percent of the total land area in the study area, the occupational profiles for farming and forestry are minor, accounting for less than one percent for each municipality. The majority of employment opportunities fall within management and professional, service, sales, construction, and production industries. See www.pasdc.psu.edu for the US Census 2000 data on occupational profiles for the Beaver Corridor Municipalities.

*Ownership and Control*

According to Pennsylvania Common Law, navigable rivers, streams, and lakes are public property. The public has a right to use them for transportation and other purposes without the permission from the owners of streamside properties through which the waters flow. The Beaver River was declared to be navigable by acts of the Pennsylvania legislature during the eighteenth and early nineteenth centuries. Therefore, the Beaver River is public property surrounded mostly by private property (e.g. industrial, residential). Public access areas are needed to allow those who do not own property along the river a means to reach it.

The Commonwealth holds the bed of a navigable waterway in trust for the public in order to protect the public's right to use the waters. The Commonwealth may permit private parties to use the bed of a navigable river for various purposes, for example the dredging of sand and gravel. The Commonwealth also owns the islands in the waterways and can convey them to a private landowner.

*Infrastructure*

*Railroads*

Historically, railroads supported the booming industrial communities along the river. While some of those rail lines have been abandoned due to the decline in industry, many are still in use along the river corridor, including rail lines along each bank of the Beaver River. Railroads can be found on the Impoundments Map

Some groups and municipalities are working with the railroad companies to use abandoned rail beds or the space along active rail beds for trails and other recreational uses. This topic is described later in this Chapter.

*Highways*

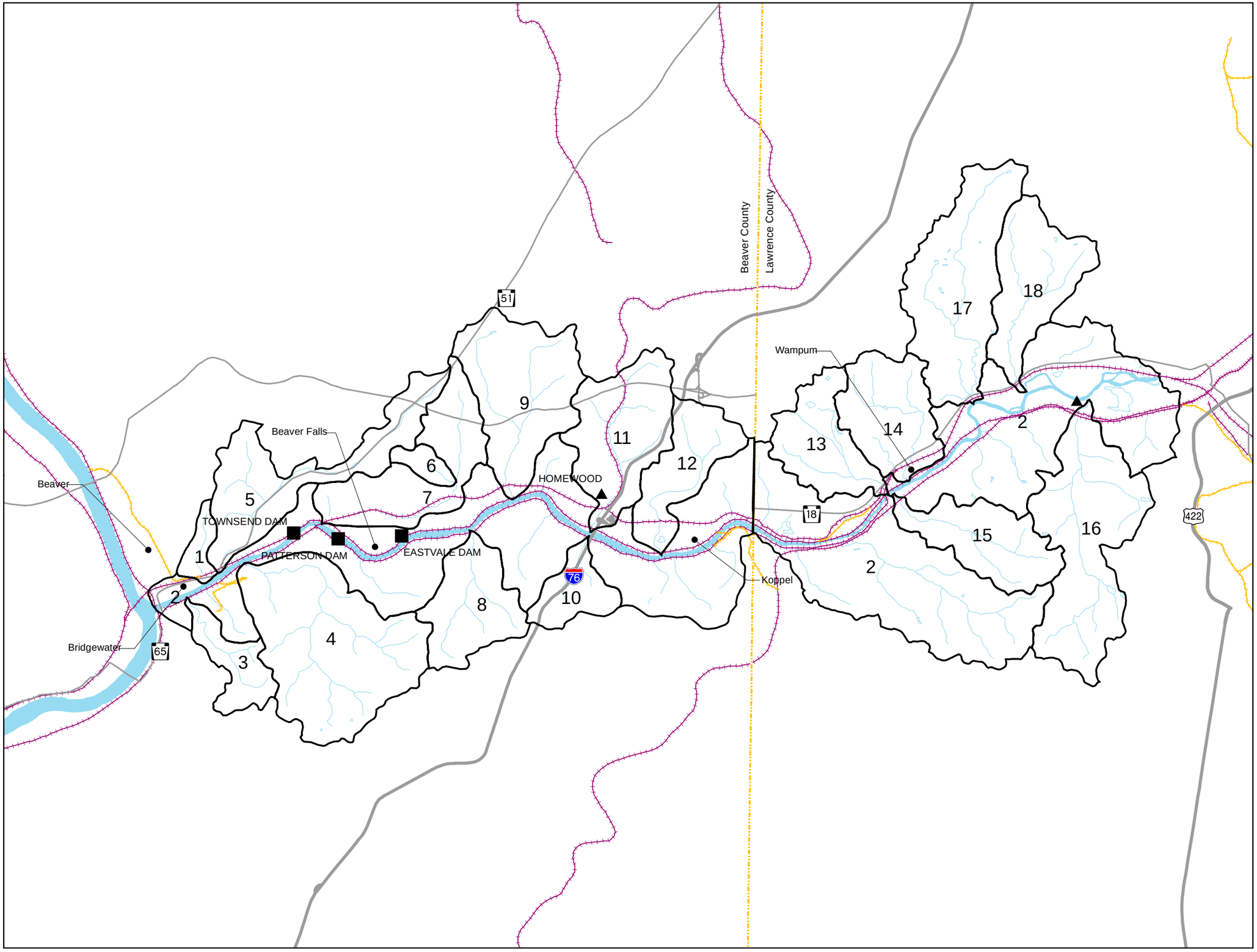
The major highways in the study area include State Routes 18, 51, and 60, and the Pennsylvania Turnpike. Turnpike reconstruction and bridge replacement is occurring west of the Beaver River from milepost 0 at the Ohio border to milepost 10 at the New Castle/Beaver Falls exit. For more information on the construction, visit www.paturnpike.com/constructionprojects/mp0to10/.

The Veteran's Memorial Bridge connecting State Route 51 and Routes 65/18 is slated for construction during 2007-2008. The bridge will use existing bridge piers from the former Sharon Road Bridge that connected Bridgewater and Rochester Township. The bridge will include a pedestrian walkway that may eventually connect with future trails along the east riverbank south to Rochester and along Route 65 to New Brighton in the north.

*Dams and Impoundments*

The Impoundments Map highlights all human-made reservoirs that currently exist within the Study Area. Most often formed by damming a natural watercourse, an impoundment may be created for a number of practical and/or aesthetic reasons, including hydroelectric power production, water supply, flood control recreation purposes, etc.

Impoundments and the process of damming rivers and streams can have significant environmental impacts. Older dams not equipped with a fish ladder or other means of passing through the structure may disrupt fish migratory patterns. In addition, impoundments often reduce downstream water temperatures, endangering species that are unable to adapt and/or altering species' natural life cycles. The Beaver River is currently dammed in three locations.




**Legend**

- Watershed Boundary
- County Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads
- Hydroelectric Dams
- Other Dams

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# IMPOUNDMENTS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: August 2005
1989.05.09

0 1/2 1 MILE

NORTH

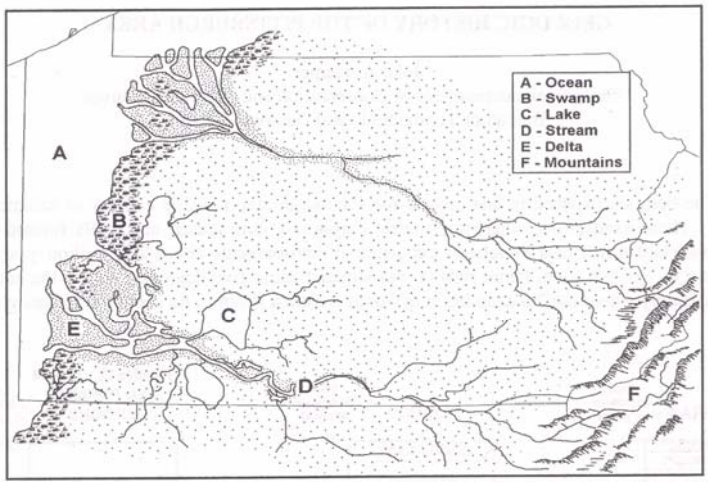
## Land Resources

### *Topography and Geology* [1]

Physiographic Provinces, or landforms, are defined by geologists to describe the terrain of large regional landscapes. For instance, landforms differentiate mountainous terrains with steep valleys from plateaus flattened under the oppressive weight of ancient glaciers. The Beaver River watershed spans two sections: the Northwestern Glaciated Plateau and the Pittsburgh Low Plateau.

*Formation of the River Valley*[2]

About 300 million years ago, western Pennsylvania was the coast of a western inland sea. Two great rivers flowed west across the state, the southernmost one draining at what is now Pittsburgh. Here, a delta formed with deposits of mud, sand, and vegetation, all of which later became shale, sandstone, and coal, respectively. The result is that much of western Pennsylvania now rests on the Main Bituminous coal field.

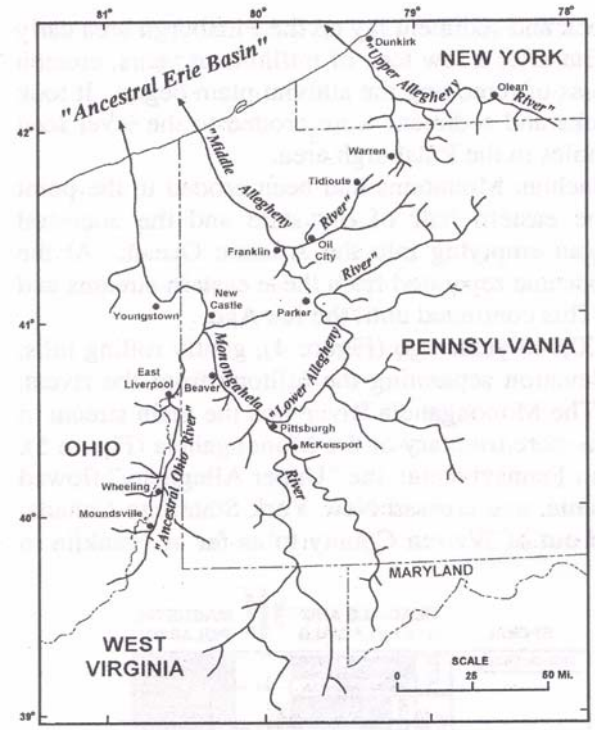



Eventually, millions of years later, the earth's plates began shifting, and the Allegheny Mountains began to form, severing the rivers and forcing new river and stream systems to flow downhill and erode the mountains. Over the centuries, the eroded material was deposited and formed the hills of our landscape that we see today.[3] (See Figure 4-1)

***Figure 4-1.*** *Pennsylvania's geography during the Pennsylvanian Period. Taken from John Harper's Geologic History of the Pittsburgh Area, Department of Conservation and Natural Resources (DCNR).*

Approximately one million years ago, the drainage system of western Pennsylvania was vastly different. At that time, the rivers flowed north toward Canada. The Monongahela River was the dominant river in the system; it flowed along its present day channel, more or less, to Pittsburgh, then along the present channel of the Ohio River to the Beaver River. At that point, the Monongahela River flowed northward along the present day Beaver River Valley, eventually draining into an 'ancestral Erie basin.' The Ohio River was a tributary of the Monongahela, entering it just south of New Castle, Pennsylvania. The Allegheny River was three separate, unrelated rivers with the lower Allegheny River as a tributary of the Monongahela, and the middle and upper Alleghenies flowing directly into the Ancestral Erie Basin. The lower Allegheny River followed the present channel of the Clarion River and flowed south, joining the Monongahela River at Pittsburgh. (See Figure 4-2)

[1] www.dcnr.state.pa.us/topogeo
[2] Harper, John. The Formation of the Allegheny River. Network Notes, December 1996. Volume 1, Issue 1. and April 1997, Volume 1, Issue 2.
[3] Kidney, Walter C. 1982. The Three Rivers. Pittsburgh History and Landmarks Foundation.




During the latter part of the Ice Age, about a half million years ago, the Illinoian glacier moved into northwestern Pennsylvania and blocked the flow of water of the northern flowing rivers. Water flowed over the ridges between the systems and carved out new valleys, took over existing channels, and reversed the flow of the rivers. As a result, the Monongahela River flowed northwest to Pittsburgh where it joined the Allegheny River – now one large river instead of three separate ones. The Allegheny, Monongahela, and the Beaver Rivers became tributaries of the Ohio River, which now drained into the Mississippi River. (See Figure 4-3)

***Figure 4-2.*** *The rivers of western Pennsylvania once flowed north to an ancestral Erie Basin. Taken from John Harper's Geologic History of the Pittsburgh Area, DCNR.*

The retreat of the glaciers provided the river systems with additional water and energy to transport silt, sand, and gravel that had been brought to Pennsylvania by the glacier. This glacial sand and gravel would be extracted many years later as industry along these rivers developed. The land in western Pennsylvania, which had been depressed by the weight of the glaciers, rose after their retreat. Rivers were forced to cut new channels as old river valley floors were now high above the streams.

The next major glaciation, the Wisconsinian, advanced into Pennsylvania 75,000 years ago. This glacial event added silt, sand, and gravel to the Allegheny and Ohio River valleys and caused the Monongahela River and its tributaries to build up their channels with sediments. By the time the Ice Age ended 10,000 years ago, the volume of water and the sediments in the rivers had declined. The rivers cut new, shallow channels in the sand and gravel, ultimately creating the river system seen today.

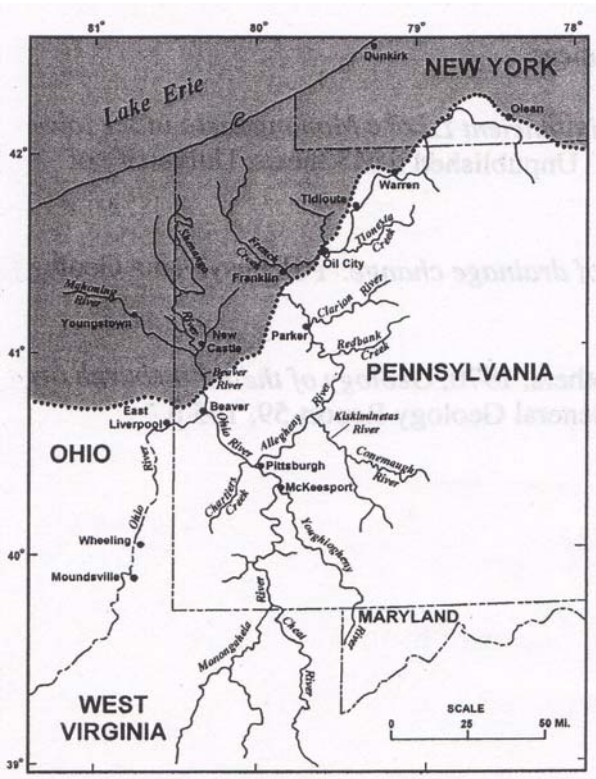
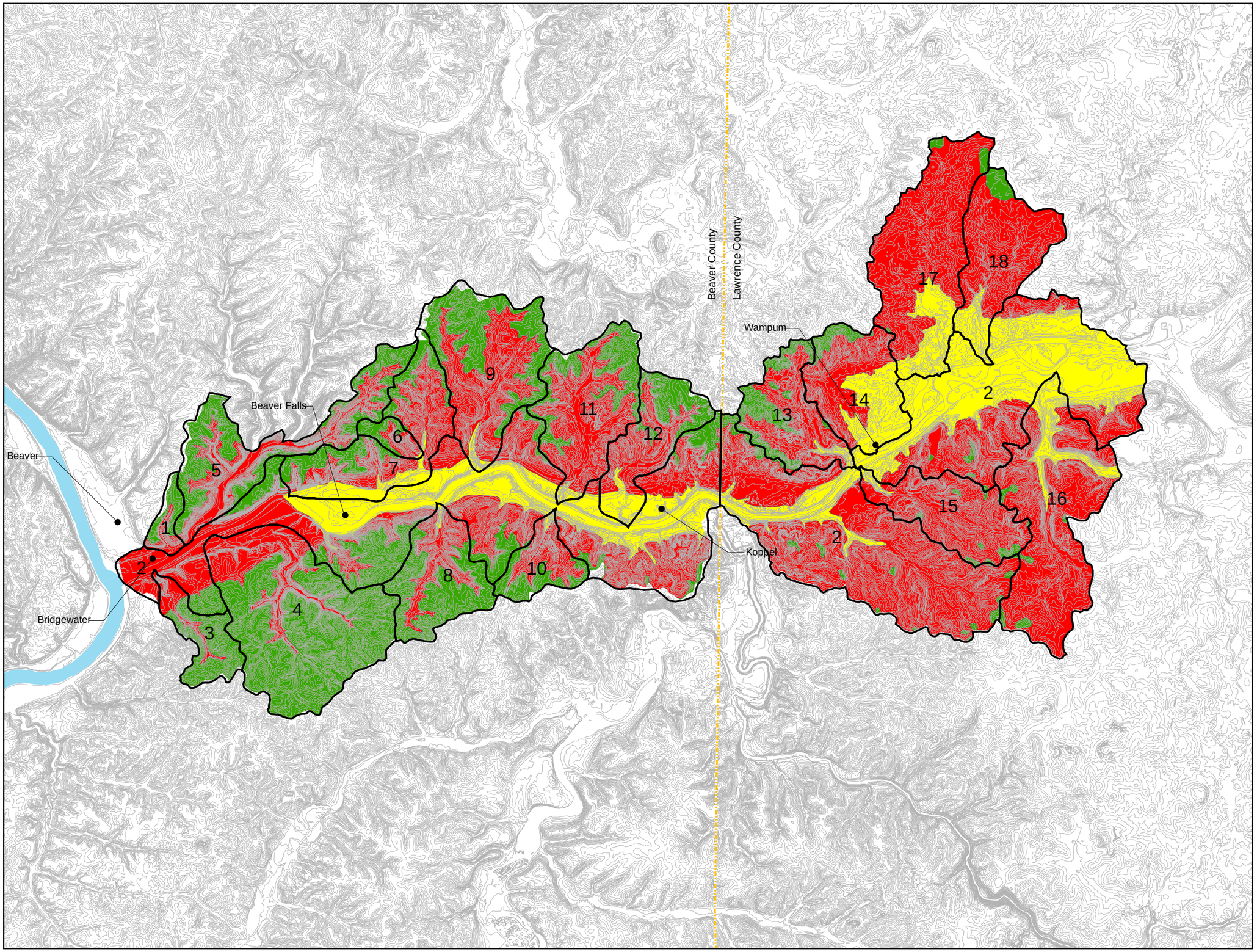



***Figure 4-3.*** *The formation of today's rivers by the southward flow of the glaciers (represented by the shaded area). Taken from John Harper's Geologic History of the Pittsburgh Area, DCNR.*

*Geology*

Within the Study Area Watershed, there are three types of geologic formations as shown on the Geology Map: sandstone, shale-sandstone (predominately shale) and sandstone-shale (predominately sandstone). Sandstone-shale geologic material characterizes approximately 75 percent of the Study Area, and is therefore the major geologic formation in the Study Area. Sandstone is a sedimentary rock composed mainly of quartz and/or feldspar. Some types of sandstone are resistant to weathering. Sandstone is a common building and paving material. Rock formations that are primarily sandstone usually allow percolation of water and are porous enough to store large quantities of water. This type of material typically filters out pollutants from the land surface.




**Legend**

- Watershed Boundary
- County Boundary
- Rivers/Streams/Lakes

**Primary - Secondary Lithology**

- Sandstone - Conglomerate
- Sandstone - Shale
- Shale - Sandstone

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# GEOLOGY

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: August 2005
1989.05.07

0 1/2 1 MILE

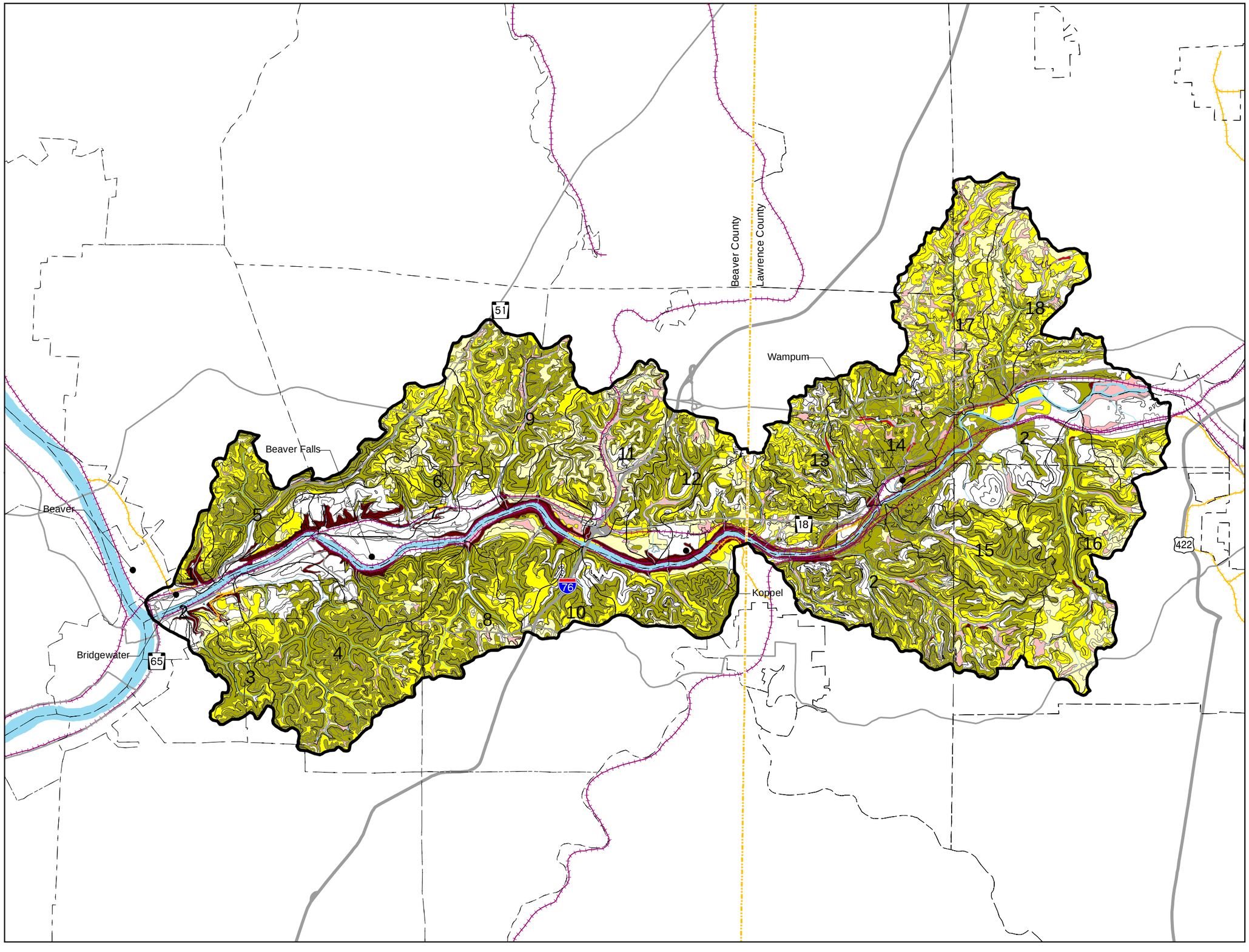
NORTH

*Soils*

Soils reveal important characteristics of the land with regard to soil composition, dampness, and susceptibility to erosion. Frequently, soils play an important role in determining a site's ability to support development. Soils vary widely in texture and hue, and more than 10 unique soil types exist in the Beaver River Study Area. These are shown on the Soils-Drainage Map.

It is generally regarded that a number of these soil types are suitable for construction, while others are considered unsuitable for development entirely. A majority of the soils in the Study Area are either moderately to well drained. However, most of the Study Area is characterized by a water table that is between 0 and 15 feet deep, signifying that bedrock and/or the presence of water is generally close to the surface and making the feasibility of development in certain areas potentially more challenging.

More detailed information about the soils can be found in each county's soil survey, produced by the U.S. Department of Agriculture Soil Conservation Service.




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads
- 100' Topographic Contour

**SOIL DRAINAGE CLASSIFICATION**

- Information not available
- Very poorly drained
- Poorly drained
- Somewhat poorly drained
- Moderately well drained
- Well drained
- Somewhat excessively drained

Note:
Soil drainage information is based on the Soil Survey Geographic Data Base, United States Department of Agriculture, 2005.

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# SOILS - DRAINAGE

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: August 2006
1989.06.09

0 1/2 1 MILE

NORTH

## Land Cover

The Land Cover Map shows the many land uses that exist within the Study Area. Based on a variety of remote sensing techniques, land coverage is depicted using a colored map indicating urban areas of varying densities, open water, vegetative types, and more. High density urban areas are concentrated along the Beaver River within a number of municipalities, including the City of Beaver Falls, Rochester Borough, Rochester Township, New Brighton Township, Pulaski Borough and Wampum Borough, and occupy less than one percent of the Study Area. Daugherty Township, Big Beaver Township, Shenango Township, and North Beaver Township – all in the northern part of the Study Area – have significantly more land devoted to agricultural uses. Finally, despite relatively significant areas of coal mining activity in Shenango Township, Taylor Township, Koppel Borough, West Mayfield Borough, and the City of Beaver Falls, coal mining areas as a whole represent less than four percent of the Study Area. The characteristics of the watershed's land coverage patterns are outlined in the following table:

**Table 4 – 2 : Land Coverage in Study Area**

| Land Cover | Acres | % of Total Area |
|---|---|---|
| Water | 892 | <2 |
| Emergent and Woody Wetlands | 45 | <0.1 |
| Coal Mines and Quarries | 2,175 | 3.7 |
| Row Crops and Hay Pastures | 16,428 | 28 |
| Deciduous, Coniferous, and Mixed Forests | 25,310 | 43 |
| Low Density Urban | 8,164 | 15 |
| High Density Urban | 2,760 | 4.7 |
| Transitional | 2,535 | 4.3 |

Land Coverage Category Descriptions:

*Deciduous, Coniferous, and Mixed Forests* account for 43 percent of the Study Area, the most acreage of all land coverage categories. This category includes forests found in large, continuous swaths, but also includes smaller stands punctuating or bordering open, agricultural areas.

*Row Crops and Hay Pastures* represent the majority of agricultural land, amounting to approximately 28 percent of the Study Area. While agricultural lands appear to be relatively well-dispersed, it is worth noting that both the Jenkins Run Watershed and the Edwards Run Watershed share a significant portion of the overall total.

*Low Density Urban Areas* account for the next greatest amount of coverage, comprising roughly 15 percent of the Study Area. Low Density Urban Areas are difficult to define, but this Plan assumed it to be suburban area development.

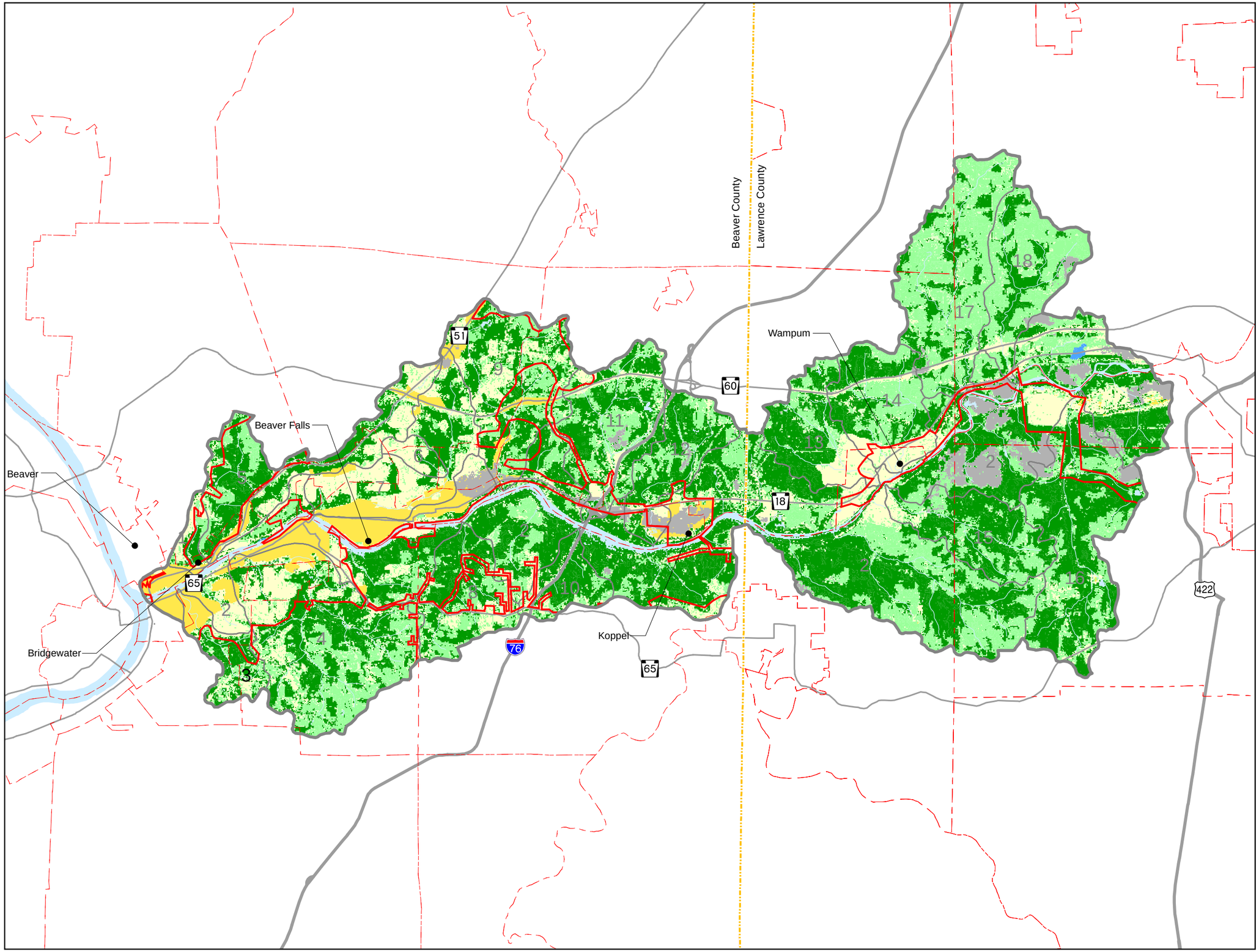
*High Density Urban Areas* account for 4.7 percent of the Study Area and are defined as having intense areas of residential and non-residential development. The areas of highest densities are generally located near old town and borough centers, where buildings are often built close together, or intensely built areas that have been

significantly improved in recent decades to provide automobile access (shopping centers, entertainment facilities, etc).

*Transitional Areas* are difficult to define using basic remote sensing techniques. This category may include old fields in the process of being reclaimed by woodlands, or, conversely, an old forest in the process of being timbered. Approximately 4.3 percent of the Study Area is characterized as Transitional.

*Coal Mines and Quarries* only comprise 3.7 percent of the Study Area despite the presence of a few significant mines and quarries highlighted on the map.

*Water, and Emergent and Woody Wetlands* combined, account for the remaining 2 percent of the Study Area.




## Legend

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Major Highways
- Major Roads
- Sanitary Sewer/Water Service

### Land Coverage

| | |
|---|---|
| Water | 892 ac. |
| Emergent and Woody Wetlands | 45 ac. |
| Coal Mines and Quarries | 2,175 ac. |
| Row Crops and Hay Pastures | 16,428 ac. |
| Deciduous, Coniferous and Mixed Forests | 25,310 ac. |
| Low Density Urban | 8,164 ac. |
| High Density Urban | 2,760 ac. |
| Transitional | 2,535 ac. |

Note:
Land coverage information was provided by Penn State University.

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# LAND COVERAGE INVENTORY

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.02r2

0 1/2 1 MILE

NORTH

## Existing Development Tools and Land Use

### *Development Tools*

In Pennsylvania, most decisions concerning land use are ceded to local governments. There are many tools available to local governments to help plan or manage their growth or to protect and maintain a quality of life.

Primary among them is the Pennsylvania Municipalities Planning Code (MPC), which outlines the controls that may be placed on private lands and how those controls are to be carried out. Four of the most prominent tools are: the Comprehensive Plans, Zoning, Subdivision and Land Development Ordinances, and Planning Commission. While these land use tools may be controversial in parts of Pennsylvania, they can protect a community's character and quality of life.

1. Comprehensive Plan
A Comprehensive Plan is an important land use development tool as it "serves as a policy guide to decision making about physical development in the community. It is an explicit statement of future goals for the community and serves as a formal vision for the planning commission, elected officials, and other public agencies, private organizations, and individuals. A community's comprehensive plan provides context and direction for a community's land use ordinances and regulations and should be updated and modified continuously in response to changes in the community." [4]

2. Zoning
Zoning regulates land use using designated districts designed to segregate incompatible uses. Municipal zoning is employed to protect a municipality's safety health and welfare as it relates to current and future land development.

3. Subdivision and Land Development Ordinance
A Subdivision and Land Development Ordinance outlines development guidelines and provisions in more detail and may provide for specific mechanisms for controlling site development patterns and design standards.

4. Planning Commission
Planning commissions "are advisors to their elected governing body on matters concerning the physical development of the community." This includes land use regulations, building structures, and developing recreation plans.

In addition to the tools outlined above, Act 148 of 1973 authorizes municipalities to form Environmental Advisory Councils (EACs). An EAC is a board of qualified individuals appointed to oversee and give advice on environmental conservation and improvement in a certain area. Many successful EACs in Pennsylvania help their respective communities with a wide range of environmental activities.[5]

[4] Definition from the document *An Inventory of Planning in Pennsylvania, Pennsylvania*, published by the State College of Agricultural Sciences, 2001.
[5] See the EAC Network website: www.greentreks.org/eacnetwork

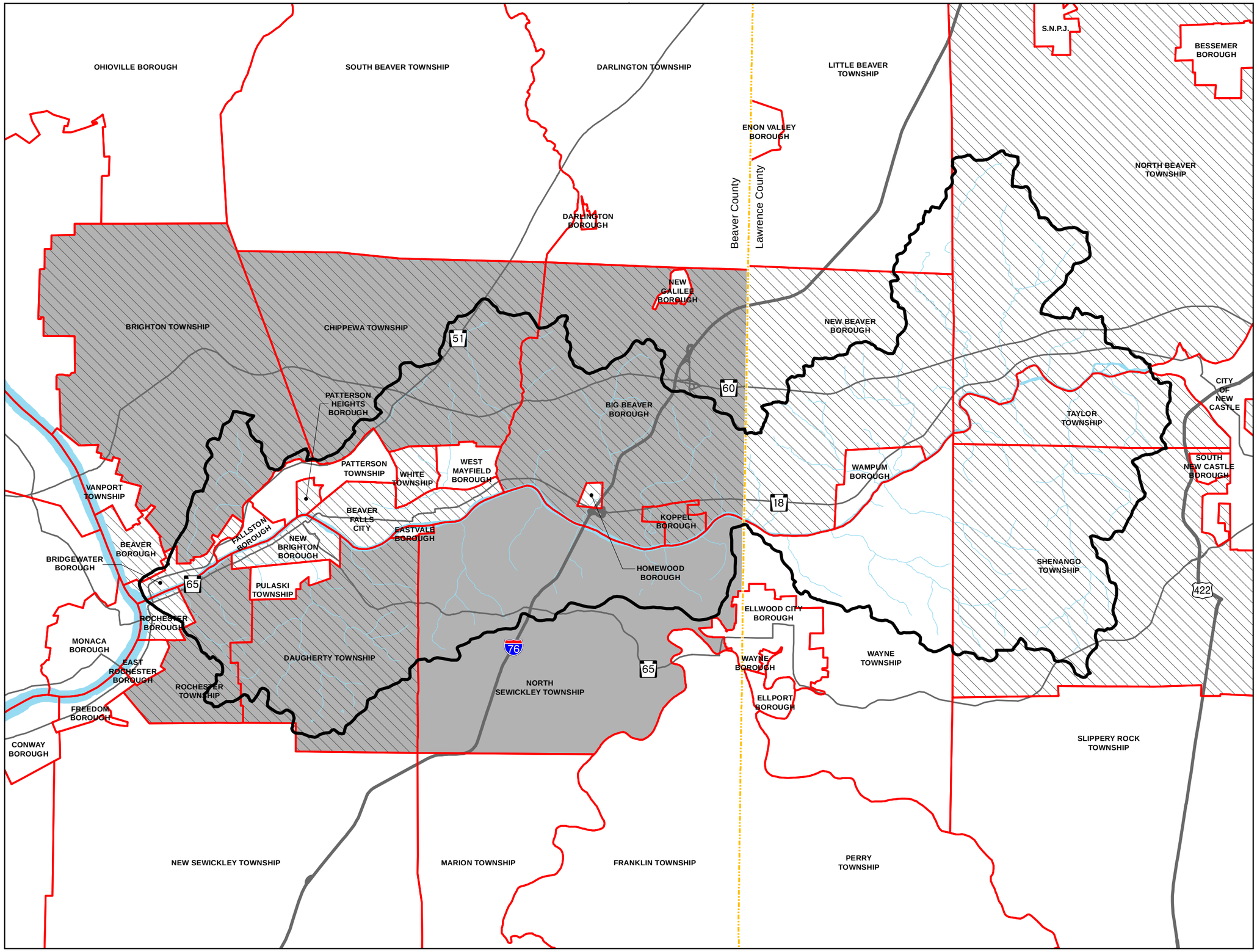
Communities may receive technical and financial assistance to implement these tools through programs offered by the Pennsylvania Department of Economic Development (www.newpa.com) or the Local Government Academy (www.localgovernmentacademy.org).

Table 4-3 and the Municipal Land Use Regulations Map identify the land use regulations that are currently in place within the Study Area's municipalities.

**Table 4.3: Municipal Ordinance Elements Analysis**

| | | Methods for Designating Sensitive Areas | | | | | | Sample Design/Review Requirements to control impacts of development in sensitive areas | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Municipality** | **Ordinance Type** | Floodplain District/Section within the Ordinance | Floodplain Section is a Zoning Overlay | Special Environmental Zoning District | Boundaries determined by the 100-yr flood from Flood Insurance Study &/or Flood Hazard Boundary Map by FEMA) | Boundaries also determined by State or Federal definitions of Wetlands | Other General Criteria | Site plan review | Setback requirements from waterways, floodplains/floodways, etc. | Maximum building coverage requirements | Maximum impervious surface requirements | Additional land use requirements | **Notes** |
| Beaver Borough | Zoning | X | | | X | | | | | | | X | General Floodplain, Floodway, and Fringe Districts |
| Beaver Falls City | Zoning | | | | | | | | | | | | Mentioned under community development objectives section, but no formal regulations |
| Big Beaver Borough | Subdivision | | | | X | | X | | | | | | Includes provisions for flood prone and mud-slide prone areas |
| Big Beaver Borough | Zoning | | X | | X | | | X | X | X | | X | No development within 50 of top bank without permit |
| Bridgewater Borough | Zoning | | X | | X | X | | | X | X | | X | |
| Brighton Township | Zoning | X | | X | X | | X | | | X | | X | Indicates a “special flood hazard area” on the zoning map; Twp has a Flood Management ordinance |
| Brighton Township | Subdivision | X | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chippewa Township | Zoning | X | | | X | | X | | | X | | X | |
| Chippewa Township | Subdivision | | | | | | | | | | | | Required to designate floodplain as part of Stormwater Management Plan |
| Daugherty Township | Zoning | | | | | | | | | X | | | |
| Koppel Borough | Zoning | | | | | | | | | X | | | |
| New Beaver Twp | Floodplain | | | | X | | | | | | | | |
| North Beaver Twp | Subdivision | | | | | | X | | | | | | Environmental Protection section addresses grading |
| North Sewickley Township | Subdivision | | | | X | | | | | | | | |
| Patterson Heights Borough | Zoning | | | | | | | | | X | | | |
| Patterson Township | Zoning | | | | | | | | | X | | | |
| Rochester Township | Subdivision | | | | | | X | | | | | | Flooding addressed in purpose statement and definitions |
| White Township | Zoning | | | | | | | | | X | | | |




## Legend

- Study Area Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Major Highways
- Major Roads

**Land Use Regulation**

- Municipal Zoning Ordinance
- Municipal Subdivision and Land Development Ordinance

Land use regulation information for municipalities within the study area is based on the Commonwealth of Pensylvania's e-library (http://www.elibrary.state.pa.us/elibpub.asp).

1,000 Acres
500 Acres
250 Acres

# MUNICIPAL LAND USE REGULATIONS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.30

0 1/2 1 MILE

NORTH

### *Act 2 and the Land Recycling Program*

Act 2, or the Land Recycling and Environmental Remediation Standards Act, was signed into law by Governor Tom Ridge in 1995. This act established the Land Recycling Program, which encourages the voluntary reuse of contaminated industrial lands. Encouraging the development of these lands, commonly referred to as brownfields, offers many benefits including cost–efficient development due to the existing infrastructure on the land and the preservation of farmland, forested areas, and open space from development.

Act 2 offers incentives for adaptive reuse of contaminated sites – they are:

- Uniform cleanup standards
- Liability relief
- Standardized reviews
- Financial assistance

Sites Completed:
Big Beaver – Special Metals OPR/Rt. 18, Koppel and Westgate Business Park
Rochester – Howard E. Stuber

Sites In Progress:
Beaver Falls – Big Beaver Falls Area School District
Beaver Falls – Republic Technologies International Facility

### *Industrial Sites for Sale*

There are several sources of information on land for sale.

- The Port of Pittsburgh lists on its website (www.port.pittsburgh.pa.us) riverfront properties for sale.
- The Pennsylvania Site Finder is a statewide program that aims to recycle properties instead of developing on greenfields (undeveloped open space). The inventory of sites is at www.pasitefinder.state.pa.us.
- The Beaver County Corporation for Economic Development lists sites on their website (www.beavercountyced.org) and maintains a database of additional commercial/industrial properties.
- The Pittsburgh Regional Alliance has a property searchable website (www.pittsburghprospector.com) with an interactive Internet mapping program.

## Waste Management

### *Landfills and Recycling*

Title 25, Chapter 271 of the PA Code lays out the general provisions for municipal waste management. Waste disposal and landfill activities must obtain the proper permits and work through the DEP. There are no active landfills in the study area. However, there is a proposed municipal waste transfer facility for 60 acres in the Boroughs of Big Beaver and West Mayfield and the Township of Chippewa. This facility will be used to consolidate waste from the local area and will accept and transfer recyclable materials to a material recovery facility for processing.

In an effort to reduce the waste stream and to promote recycling, Act 101 – the Municipal Waste Planning, Recycling, and Waste Reduction Act – was established in 1988. Act 101 mandates recycling in Pennsylvania's larger municipalities, requires counties to develop municipal waste management plans, and provides for grants to offset expenses.

The goals of the Act are to reduce Pennsylvania's municipal waste generation; recycle at least 25 percent of waste generated; procure and use recycled and recyclable materials in state governmental agencies; and educate the public as to the benefits of recycling and waste reduction. (The benefits of recycling and waste reduction include reduced pollution risks; conservation of natural resources, energy, and landfill space; and reduced disposal costs.)[6]

The counties in this Study Area each have a recycling program. Beaver County Department of Waste Management operates a recycling center and an old newsprint animal bedding program at Brady's Run Park. See www.co.beaver.pa.us/wastemanagement for more information. Lawrence County offers a Big Blue Bin Recycling Program. See www.co.lawrence.pa.us/Recycling for information about their program.

***Illegal Dump Sites***

Illegal dump sites pose numerous threats, including soil and water contamination. They threaten human and animal health and lower property values. The clean up of illegal dumpsites can be very costly. The following organizations are addressing the problem of illegal dumping areas:

- PA Cleanways is a non-profit organization whose mission is to empower people to eliminate illegal dumping and littering in Pennsylvania. Beaver and Lawrence Counties have a combined chapter, which recently completed a Lawrence County Illegal Dump Survey (2008). Several dump sites have been identified within the study corridor, see Appendix 1. Every county should be surveyed by 2012. See www.pacleanways.org for a copy of the Lawrence County Illegal Dump Survey.

- PA DEP sponsors an annual River Sweep to clean up debris along rivers and streams in six southwestern Pennsylvania counties. In 2004, approximately 600 volunteers removed more than 60 tons of trash along the rivers in Allegheny, Armstrong, Beaver, Greene, Washington, and Westmoreland Counties. See www.dep.state.pa.us for more information.

- PA Resources Council is a non-profit organization that works to reduce litter and promotes recycling throughout the state. They sponsor hard-to-dispose-items collection events for large appliances, rimless tires, latex paint, electronics, and cell phones. See www.prc.org for more information.

- Construction Junction is a non-profit business that buys and sells construction debris and materials, such as cabinets, doors, windows, and lumber. See www.constructionjunction.org for more details.

[6] http://www.dep.state.pa.us/dep/deputate/airwaste/wm/RECYCLE/FACTS/Act101.htm

### *Hazardous Waste*

Hazardous waste sites and landfills near rivers and tributaries have the potential to contaminate surface and underground water supplies via runoff and leaching through the soil into the water table or aquifer. Aside from these potential threats to surface and ground water, landfills are also a possible danger to those who live, work, or play nearby. Therefore, the U.S. Environmental Protection Agency (EPA) has promulgated the following laws to deal with hazardous waste problems.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (also known as Superfund) is a national program administered by the EPA to clean up hazardous waste sites that were contaminated before 1980. These sites are commonly abandoned industrial lands or landfills where disposal of hazardous material occurred prior to existing laws that regulated industrial activities and disposals. The National Priority List (NPL) contains those sites that are being remediated first due to the severity of their status. Table 4-4 shows the sites within this study area. None are on the NPL list.

**Table 4-4**
**CERCLA Sites in the Beaver Corridor**

| Site Name | Location | EPA ID# | NPL |
|---|---|---|---|
| Beaver Sand Company Quarry | Rte 68<br>Beaver, Pa 15009 | PAD987269982 | No |
| Hydril Co | Rochester Rd Twp Rd 04122<br>Rochester, Pa 15074 | PAD004340279 | No |
| Vermiculite Jp1 | J.P. Austin<br>Beaver Falls, Pa 15010 | PAN000305595 | No |

Source: EPA Envirofacts Warehouse <www.epa.gov>

The Commonwealth of Pennsylvania, under its Land Recycling and Environmental Remediation Standards Act, and the Hazardous Sites Cleanup Act, has the authority to order clean-ups of hazardous sites that are not normally included under CERCLA. The sites in Table 4-5 have been remediated at a cost of less than $2 million.

**Table 4-5**
**Hazardous Sites Response Action List**

| County | Facility Name | Municipality | Response Action Name | Start Date | Finish Date |
|---|---|---|---|---|---|
| | | | | | |
| Beaver | Big Beaver Falls Area Sch Dist Lrcl | Beaver Falls | Investigation | 8-Dec-00 | 1-Jun-03 |
| Beaver | Ing Rich | Beaver Falls | Waste/Soil Cleanup | 8-Apr-94 | 19-Sep-94 |
| Beaver | Marino Bros Scrap Yard | Rochester | Investigation | 6-Nov-00 | 15-Feb-01 |
| Beaver | Marino Bros Scrap Yard | Rochester | Soil Removal For Trench | 31-May-02 | 3-Jul-02 |

Source: EPA Envirofacts Warehouse <www.epa.gov>

The Federal Resource Conservation and Recovery Act (RCRA) requires the permitting of all hazardous waste handlers, including generators, transporters, treaters, storers, and disposers. States may administer their own RCRA permitting as does Pennsylvania, but still must report to EPA. There are too numerous RCRA-permitted facilities in this corridor to list in this Conservation Plan. To view those facilities, visit www.epa.gov/enviro/index_java.html

***Toxics Release Inventory***[7]

Following a fatal chemical-release accident in Bhopal, India, the Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986 to promote emergency planning, to minimize the effects of an accident such as occurred at Bhopal, and to provide the public with information on releases of toxic chemicals in their communities.

Section 313 of EPCRA established the Toxics Release Inventory (TRI), which is a database on releases and transfers of more than 600 toxic chemicals generated by industrial facilities. The Pollution Prevention Act of 1990 requires that additional information on waste management and source reduction be included in the TRI. This information is gathered yearly.

Users of TRI information should be aware that TRI data do not reveal whether or to what degree the public is exposed to listed chemicals. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures and risks. The determination of potential risk to human health and/or the environment depends upon many factors, including the toxicity of the chemical, the fate of the chemical in the environment, and the amount and duration of human or other exposure to the chemical.

For more detailed information on the TRI, visit: http://www.epa.gov/tri

[7] Summary taken from www.epa.gov/tri/

## Critical Areas

### *Flood Prone Areas*

Floodplains are the low-lying lands along a stream or river that are most prone to flooding. Building in floodplains is common, but often leads to heavier flooding due to 1) the loss of riparian (streamside) vegetation, which normally helps to absorb excess waters, and 2) the cumulative effect of runoff from impervious surfaces, such as houses, streets, driveways, and parking lots throughout the watershed.

Under the U.S. Army Corps of Engineers (ACE), Section 205 of the Continuing Authorities Program allows for funding for small local flood damage reduction projects. The money allows for the study, design, and construction of projects that protect communities from flooding. In addition, the National Flood Insurance Program provides coverage for flood victims; however, insurance is only provided if local communities enact and enforce land-use controls in flood-prone areas.[8] The Pennsylvania Flood Plain Management Act (Act 166) requires municipalities in identified flood plain areas to adopt floodplain management ordinances, codes, or regulations.

The ACE also maintains a website with timely information on the conditions of reservoirs, rivers, and streams, as well as a release forecast for its reservoirs. Daily information may be obtained from www.lrp.usace.army.mil/.

### *Landslides*

Areas of western Pennsylvania are highly susceptible to landslides due to a combination of a humid temperate climate, locally steep and rugged topography, weak rock strata, springs, and a great diversity in the weathering and erosion characteristics of near surface sedimentary rocks. In addition, landslides can be triggered by

- Addition of fill, which increases the stress on underlying materials,
- Changes in quantity or direction of water flow,
- Surface and subsurface excavations (including coal removal),
- 'Red Beds' – bedrock in hillsides composed of claystones and shales that are 40-60 feet deep. This bedrock weathers easily, especially when wet, and causes unstable slopes. Stabilization and repair can cost thousands to millions of dollars.

Because steep slopes are more susceptible to landslides, they are often not developed; therefore, they are generally better suited for woodland and wildlife habitat.

### *Natural Heritage Areas*

These are areas that are important due to the presence of high biological diversity, a rare or exemplary natural community, a species of special concern, or for a particular use, such as nature study or instruction. More information about these areas can be found later in this Chapter.

### *Abandoned Mine Lands*

Southwestern Pennsylvania's long history of coal mining and other mineral extraction has left a legacy of abandoned mines. The Abandoned Mine Land Inventory System in the Office of

[8] Flooding in Western PA. Pittsburgh Geological Society. www.pittsburghgeologicalsociety.org.

Surface Mining compiles lists of problem areas. The tables in Appendix 2 list the mine problem areas in Beaver and Lawrence Counties.

## Water Resources

## Water Quality

### *Clean Water Act*

The Federal Clean Water Act (CWA), which is carried out by the PA Department of Environmental Protection (DEP) under the Clean Streams Law, provides regulations that strive to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."[9] Regulations dealing with water quality standards of the rivers and streams in this Study Area are found in The Pennsylvania Code Title 25, Chapter 93. http://www.pacode.com/

All surface waters in Pennsylvania have been assigned *statewide water uses.* All surface waters should be able to support these *uses*: aquatic life, water supply, and recreation. In addition to meeting the standards for each of these statewide uses, some water bodies meet standards that make them eligible for other uses, or *designations*. The Beaver River and its tributaries and their designations are listed in Table 4-6.

**Table 4-6**
**Tributaries and Chapter 93 Designated Uses**

HQ = High Quality WWF = Warm Water Fishery TSF = Trout Stocking Fishery
CWF = cold water fishery N = Navigation

| Tributary Name | Designated Use |
|---|---|
| Beaver River | WWF, N |
| McKee Run | WWF |
| Edwards Run | WWF |
| Jenkins Run | WWF |
| Snake Run | WWF |
| Eckles Run | WWF |
| Wampum Run | WWF |
| Stockman Run | WWF |
| Clarks Run | WWF |
| Thompson Run | WWF |
| Wallace Run | WWF |
| Bennett Run | WWF |
| Grimms Run | WWF |
| Walnut Bottom Run | WWF |
| Blockhouse Run | WWF |

[9] Section 101 (a)(2) Clean Water Act

| | |
|---|---|
| Brady Run | TSF |
| Hamilton Run | WWF |
| McKinley Run | WWF |
| Source: http://www.pacode.com/secure/data/025/chapter93/chap93toc.html | |

***Sources and Types of Water Pollution***

Pollution entering our waterways is typically assigned to one of two categories: point or non-point source pollution. Point source pollution comes from a defined point, such as a pipe, along a waterway. Permitted point source discharges from industrial, commercial, and municipal facilities are described below. Conversely, non-point source pollution comes from non-specific areas such as agricultural runoff and parking lots and is therefore more difficult to control and regulate.

The following sections describe both pollution sources in more depth.

*Point Sources*

In order to control and regulate the amount and types of pollution entering our waterways, and to help achieve designated uses and prevent water quality degradation, point sources of pollution must have proper permits to discharge wastes into the nation's waters. The National Pollutant Discharge Elimination System (NPDES) is a permitting system that targets point source dischargers, such as industrial facilities and wastewater treatment plants. Permitted facilities must meet stringent effluent limits and are responsible for monitoring water quality and reporting to the DEP. These permits are referred to as "individual" permits. For other point discharges, such as stormwater pollution or construction site runoff, a general permit is issued. General permits usually apply to smaller operations and are less stringent in the monitoring and reporting requirements.

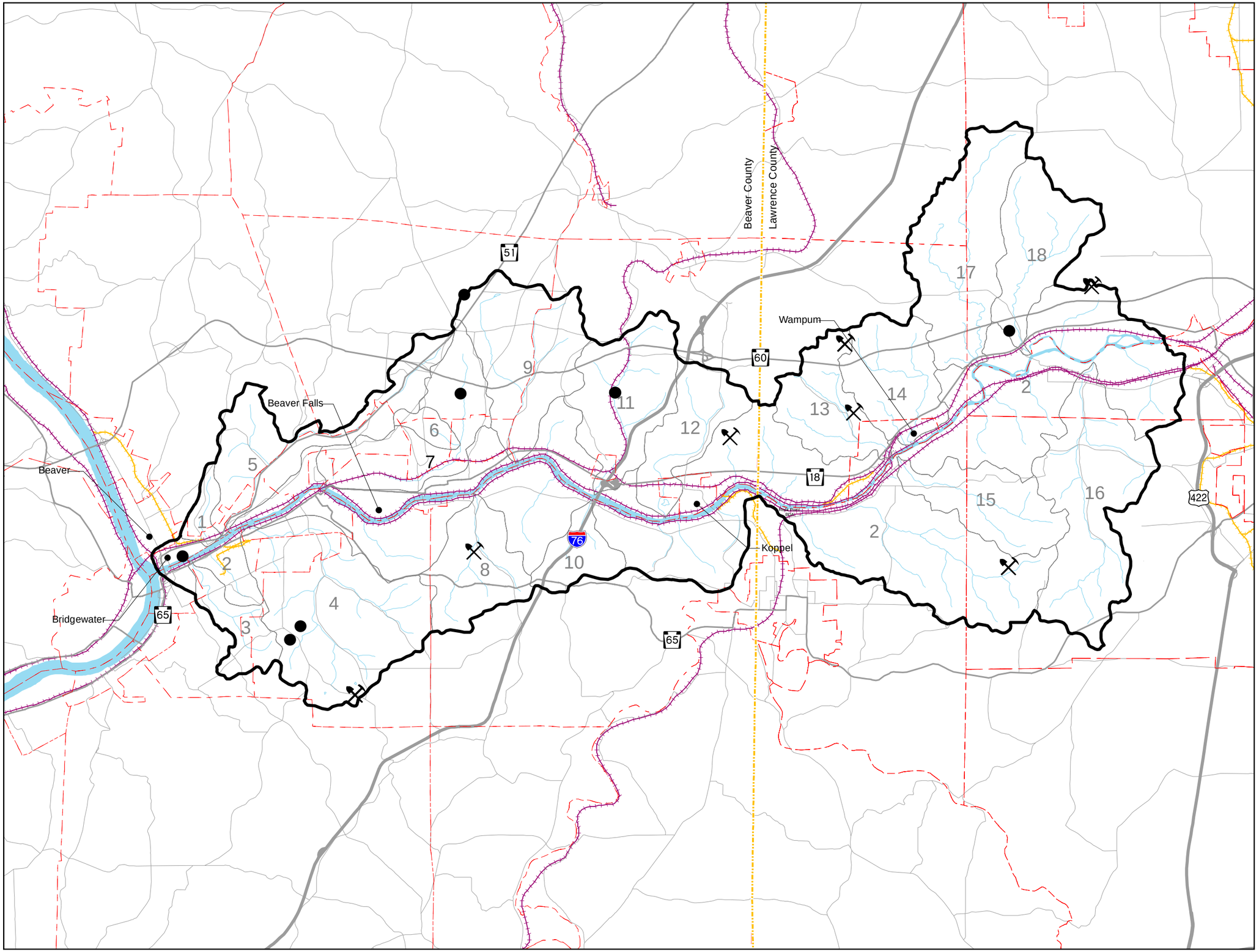
The DEP eFACTS (environment, facility, application, compliance tracking system) database provides information on all NPDES-permitted facilities in the state and allows the public to search for facilities by name, county, or municipality (www.dep.state.pa.us/efacts/).

Some types of facilities and activities with NPDES permits under the DEP Bureau of Watersheds include:

- Discharge from industry
- Discharge of stormwater associated with industrial activities
- Stormwater runoff from construction (greater than one acre disturbance)
- Discharge of stormwater from municipal separate storm sewer systems (MS4s) (see section on stormwater below)
- Publicly owned sewage treatment works
- Discharge from gasoline-contaminated ground water remediation systems
- Single residence sewage treatment plant
- Active mining operations

Examples of facilities that are not permitted, but which affect water quality are: sanitary sewer overflows and illegal sanitary sewer tie-ins to storm drains.

The Potential Sources of Pollution Map indicates the location of oil and gas wells in addition to abandoned mine sites. Any potential source of pollution located within a Susceptible Resource Area or an Exceptional Quality Watershed may have a negative impact on the resources in that area.




**Legend**

- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads
- Oil and Gas Wells
- Abandoned Mines

Note: As of 2002 there were no 303d listed waterbodies in the Beaver River Conservation and Management Plan study area.

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# POTENTIAL SOURCES OF POLLUTION
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.05.15r1

0 1/2 1 MILE

NORTH

*Non-Point Sources*

Although non-point source pollution is much more difficult to control than point source pollution, there are still efforts throughout the state to prevent and control it. The DEP Bureau of Watershed Management has set up a "Non-Point Source (NPS) Management Program," which consists of action plans that address this type of pollution across the state. Some of the common sources of NPS pollution in Pennsylvania are:

- Abandoned mine drainage (AMD) (see section below)
- Agriculture (runoff of soil that contains fertilizers and excess nutrients)
- Silviculture (soil erosion and sediment loading from forestry operations)
- Construction (runoff of soil into the water which increases chance of flooding)
- Illegal land disposal
- Urban runoff (pesticides, lawn fertilizers, oil, and other chemicals and debris deposited or littered in urban areas)

Two of the most serious types of non-point source pollution are discussed below.

*Abandoned Mine Drainage*[10]

While coal was being formed in the Earth millions of years ago, the conditions for its formation also favored the concentration of iron- and sulfur-containing materials that eventually became pyrite (fool's gold). Therefore, pyrite is commonly found along coal seams. As long as pyrite remains undisturbed underground, it generally causes no problem. However, mining can expose pyrite to water and oxygen, which break it down. When this trio reacts, sulfuric acid and a rust-like compound high in iron form "yellowboy." Streams that run orange do so because of yellowboy depositions that tend to smother small aquatic life and destroy the food chain for larger animals, like fish. The acidity formed by the pyrite reaction can also dissolve clay which in turn releases heavy metals like aluminum. Aluminum presents itself as a white deposit and is toxic to fish.

These pollutants can be formed in the underground voids left by deep mining, from the coal refuse piles (slate dumps, gob piles, boney piles) brought to the surface, or by exposing pyrite through strip mining. If sufficient acidity enters a stream, its pH may be significantly lowered resulting in a very toxic environment for aquatic life. Acidity and precipitated metals are the major threats posed by AMD. The nature of AMD contamination varies greatly from site to site, as its formation is dependent upon a variety of factors. Therefore, several parameters are measured when studying AMD:

- Low pH (high acidity), i.e., acid mine drainage
- High metal concentrations (iron, aluminum, and manganese)
- Elevated sulfate levels
- Excessive suspended solids and/or siltation

Because the AMD reaction is dependent on the specifics of the geology and hydrology of the particular site, no two AMD discharges are exactly alike chemically. Suffice it to say, there is not one set way of treating AMD to mitigate its ill effects, but rather many, each depending on the particulars of the discharge. However, a general strategy is usually followed: (1) isolate the AMD, (2) reduce its acidity (if necessary), and (3) cause the iron (and other dissolved metals) to

[10] This section taken from *Monitoring Matters* Volume VII, Number 2, August 2004. Origins of Abandoned Mine Drainage. Pages 1,4. By Deb Simko.

precipitate as a solid in a settling pond and/or wetland. The treated water is then allowed to enter the stream. Whatever the type of AMD, it is this pollution that degrades habitats, causes safety problems, destroys public and private water supplies, ruins the natural aesthetics, and has a negative economic impact.

*Stormwater*

Stormwater is water from rain or snow that flows over the land and either infiltrates into the ground or drains into nearby streams and can be characterized as both point and non-point source pollution. Natural stormwater runoff from the land or from small construction sites less than one acre is considered to be non-point source pollution because there is no discreet conveyance of the water – it runs over the land and into streams and rivers without controls.

Conversely, stormwater from construction sites larger than one acre or from municipal separate storm sewer systems (MS4s) are considered to be point source pollution, which must be managed and permitted.

Pennsylvania's Stormwater Management Program came out of the Stormwater Management Act (Act 167) of 1978. Under the Program, counties are required to develop stormwater management plans for watersheds within their boundaries. Municipalities then develop ordinances that meet the specifications of the county plans. Plans must be reviewed every five years and include an inventory of both existing and potential characteristics and problems of the area, such as run-off characteristics, soil impacts, and significant obstructions. When construction or other land disturbances take place, the developers must follow the guidelines set forth for stormwater management. Both Beaver and Lawrence Counties have begun developing Act 167 Plans. Contact the County Planning offices for current updates on their progress.

The Clean Water Act established two Phases of the federal Stormwater Program:

**Phase I** (1992) requires NPDES permits for construction activities that disturb five or more acres of land. Permitees must use best management practices (BMPs) and erosion and sediment control plans to control stormwater runoff from sites.

**Phase II** (adopted in 2002) requires NPDES permits for construction activities that disturb one to five acres of land. This permit also requires the use of BMPs and erosion and sediment control plans. In addition to the construction permits, Phase II also requires NPDES permits for municipal separate storm sewer systems (MS4s) in urban areas. As part of the permit requirements, the MS4 operators must develop and implement BMPs to manage stormwater and must conduct public outreach. Operators within municipalities that have adopted an Act 167 Plan may already meet some of the requirements of the MS4 NPDES permit if their Act 167 Plan sufficiently addresses water quality issues. Other operators must develop their own stormwater management program or develop an Act 167 Plan to meet permit requirements. These permit requirements must be completed during the five-year permit period (the five year period ends March, 2008). All 20 municipalities in the Beaver County portion of this study are MS4

**MS4s (municipal separate storm sewer system)**
Normally, sewer systems are separated into a sanitary system (sewage from homes and businesses), and a storm system (drainage from rain or snow). Water from a storm sewer system is not treated and empties into rivers. Municipalities are now required to have permits for these storm sewer discharges. See text on 'Phase II.'

communities. Wayne Township in Lawrence County is the only MS4 in that section of the study area.

Visit www.dep.state.pa.us, keyword “stormwater” for more details.

***Impaired Streams and Rivers***

While NPDES permits target point source pollution, another approach to targeting all pollution sources, especially non-point, is through the use of Total Maximum Daily Loads (TMDLs). The CWA calls for the development of TMDLs for all waterways that do not meet water quality standards.

According to the PA DEP, TMDLs:

> set an upper limit on the pollutant loads that can enter a water body so that the water will meet water quality standards. The Clean Water Act requires states to list all waters that don't meet their water quality standards even after required pollution controls are put into place. For these, the state calculates how much of a substance can be put in the stream without violating the standard and then distribute that quantity among all sources of the pollution on that water body. A TMDL plan includes waste load allocations for point sources, load allocations for non-point sources, and a margin of safety. States must submit TMDLs to the Environmental Protection Agency (EPA).

Assessed waterways that do not meet their designated use must be listed by the state every two years in accordance with Section 303(d) of the CWA, which is the list of impaired streams and rivers. Waterways listed within Section 303(d) are prioritized for TMDL development based on the severity of impairment. The DEP is incorporating them on a watershed basis where local watershed groups actually implement the TMDL Plan and do testing with DEP's assistance. A TMDL for the Beaver River below the Brighton Dam was completed in 2001 for PCB and Chlordane. PCBs (synthetic oils) and Chlordane (pesticide) were banned in 1979 and 1988 respectively. These are chemicals that persist in the environment by becoming embedded in sediment and are easily absorbed into fish tissue. Because there are no longer point sources of these chemicals, restrictions on their release cannot be controlled. It is generally recommended that low-level, spread-out concentrations of PCBs and Chlordanes be left to naturally attenuate. In other words, it is better to let them where they are than to try and remediate them. For example, if the Beaver River bed was dredged, it would most likely cause the chemicals to be disturbed and cause greater harm than if left to settle and be covered by relatively clean sediment.

The Clean Water Act also requires a water quality assessment report (305(b)) on all impaired waters every two years along with the 303(d) list. "This report provides summaries of various water quality management programs including water quality standards, point source control, and non-point source control. It also includes descriptions of programs to protect lakes, wetlands, and groundwater quality."[11] Furthermore, the 305(b) report describes the extent to which waterways are supporting their designated uses. For example, if in a particular waterway all designated uses are achieved, the waterway is listed as “fully supporting.”

[11] PA DEP www.dep.state.pa.us

In Pennsylvania, DEP has combined the 305 (b) report and the 303 (d) list into one document, "The 2006 Pennsylvania Integrated Water Quality Monitoring and Assessment Report." The 2006 report lists the following streams that were evaluated for and attained use requirements for aquatic life: Beaver River (also, parts of the river attained use requirements for fish consumption and potable water supply), Blockhouse Run, Brady Run, Eckles Run, Edwards Run, Jenkins Run, McKee Run, Stockman Run, Wallace Run, Snake Run, Bennett Run, and Wampum Run.

The list also includes the following polluted stream not needing a TMDL: Walnut Bottom Run was evaluated for aquatic life and threats to that use included habitat modification, thus causing water and flow variability.

### *Water Quality Testing*

The Army Corps of Engineers oversees the equipment and reporting of stream conditions and water quality at two stations along the Beaver River (Wampum and Beaver Falls). The United States Geological Survey also lists the Army Corps' data on their website.

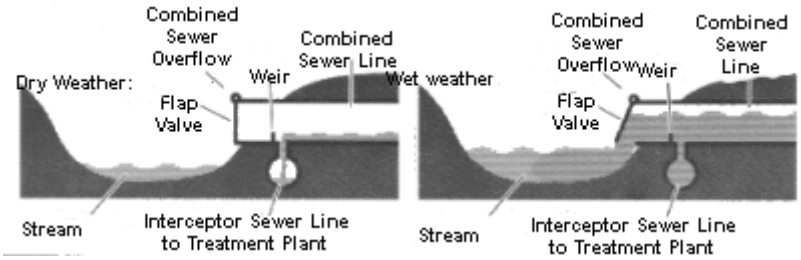
http://wmw.lrp.usace.army.mil/current/index.html
http://pa.water.usgs.gov/current.html

### *Sewer Overflows*[12]

*Combined sewer systems* are designed to carry wastewater and stormwater. These are more common in communities with collection systems built before the 1940s. Water and waste from a variety of sources come together in one sewer system and are sent to a water treatment facility. However, during wet weather, the treatment plants cannot handle the capacity of sewage and water, so the pipes overflow to waterways.

When this type of overflow occurs in a combined collection system, it is called a combined sewer overflow (CSO). These were designed with overflow structures to deliberately release excess stormwater and wastewater at capacity. These structures are legal, though they require a permit.

Dry Weather Wet Weather




Copyright © 2002 by the Louisville/Jefferson County Metropolitan Sewer District (MSD) Louisville, Kentucky http://www.msdlouky.org/programs/sso.htm

[12] The Regionalization Report: An initial study on options for regionalizing the management of sewage collection within the ALCOSAN service area, 3 Rivers Wet Weather, Inc., January 2002.

*Separate sanitary sewer systems* are designed to carry only wastewater. Stormwater is managed through a different collection system. These systems were required for any new system built after the 1940s.

Sewer pipes are rarely full when wastewater is flowing from homes to the sewage treatment plant. Therefore, groundwater or stormwater can leak into cracked or broken pipes, taking up space that should be used to carry only wastewater. In some instances, stormwater is illegally piped into separate sanitary systems to control the runoff through storm drains in streets, parking lots, and gutters. During dry weather, the sewage systems generally operate effectively. During wet weather, the additional flow exceeds the capacity of the sewers causing the sewage to overflow into creeks, streams, or rivers, creating a large-scale problem.

When this type of overflow occurs in a separate sanitary system, it is called a sanitary sewer overflow (SSO) and may occur in an overflow structure, a structure that is intentionally designed to discharge flow into nearby streams. Occasionally, the overflow can occur in a street from a manhole or in the basements of homes. The overflow structures and unintentional overflows are illegal according to the Clean Water Act. The types of overflows that occur in streets or basements also are illegal.

### *Sewage Facilities*

The Generalized Sanitary Sewer Service Inventory Map shows areas of existing sanitary sewer infrastructure by supplier within the Study Area. Sanitary sewer service utilizes an underground carriage system for transporting sewage from houses or industry to a treatment facility. Based upon county data, existing sewer service is concentrated in the southern portion of the Beaver River Valley, near its confluence with the Ohio River. In general, the development potential of an area is largely dependent on the availability of sanitary sewer infrastructure. It is therefore likely that most types of development will occur within close proximity to sewer lines or in areas where sewer extensions have been planned. At the same time, all sewer systems are limited by capacity, either within the piping system or within the sewage treatment facility. As a result, a strategic sewer service expansion program is an effective way to manage growth in a particular area.

Sanitary sewer service encompasses approximately 20 percent, of the Study Area. Colors are assigned to the nine individual municipal sanitary sewer service providers that manage public infrastructure to these communities. The majority of sanitary sewer service is located in proximity to the Beaver River and Ohio River confluence near Beaver Borough, Bridgewater Borough and Beaver Falls City. North of this area, communities have more limited access to available sanitary sewer service and smaller pockets of intense development are present as well as overall patterns of lower intensity development.

Another depiction of the relationship between existing land use and sanitary sewer service is on the Generalized Land Coverage and Sanitary Sewer Service Analysis. The map illustrates portions of the study area that have the necessary infrastructure service to support development. The specific capacity, age and adequacy of these existing systems to support any new development should be continually monitored in order to ensure development and public service planning efforts are coordinated.

The Sewage Facilities Program (Act 537) was established in 1966 to ensure proper oversight and permitting of onlot disposal systems (OLDS), which are individual or community septic

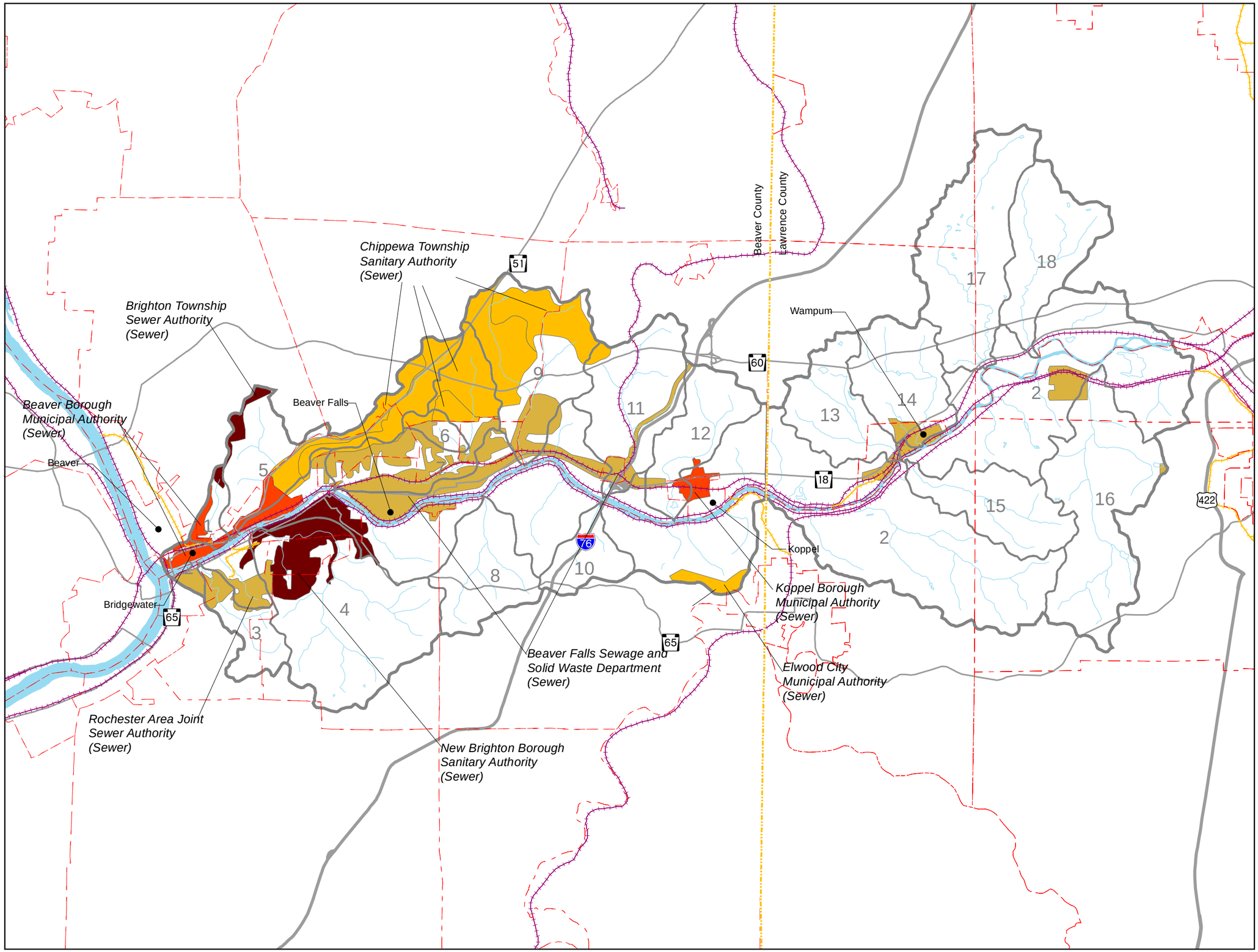
systems. The program is administered by local municipalities or county health departments, known as local agencies. Those agencies must hire a Sewage Enforcement Officer (SEO) to oversee the permitting process for OLDS (the PA DEP offers only technical and financial assistance). The local agencies must also have an Act 537 comprehensive plan that addresses current and future sewage disposal needs.

The following list shows when each municipality had their 537 Plan approved.[13]

| **Beaver County** | |
|---|---|
| Beaver Borough | 1/1971 |
| Beaver Falls City | 1/1977 |
| Big Beaver Borough | 7/2003 |
| Bridgewater Borough | 8/1971 |
| Brighton Township | 1/1971 |
| Chippewa Township | 7/1991 |
| Daugherty Township | 1/1971 |
| Eastvale Borough | 1/1971 |
| Fallston Borough | 1/1971 |
| Homewood Borough | 1/1997 |
| Koppel Borough | 7/2003 |
| New Brighton Borough | NA |
| North Sewickley Township | 7/2003 |
| Patterson Heights Borough | 1/1971 |
| Patterson Township | 4/1985 |
| Pulaski Township | 1/1971 |
| Rochester Borough | 1/1971 |
| Rochester Township | 1/1971 |
| West Mayfield Borough | 1/1971 |
| White Township | 7/2004 |

| **Lawrence County** | |
|---|---|
| New Beaver Borough | 11/1971 |
| North Beaver Township | 5/1999 |
| Shenango Township | 1/1966 |
| Taylor Township | 10/1971 |
| Wampum Borough | 9/1971 |
| Wayne Township | 7/2004 |

[13] From www.dep.state.pa.us




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads

**Sanitary Sewer Service Authorities**

| | |
|---|---|
| 1. Brighton Township Sewer Authority | 189 ac. |
| 2. Beaver Borough Municipal Authority | 642 ac. |
| 3. Rochester Area Joint Sewer Authority | 536 ac. |
| 4. Chippewa Township Sanitary Authority | 4,095 ac. |
| 5. New Brighton Borough Sanitary Authority | 1,264 ac. |
| 6. Beaver Falls Sewage and Solid Waste Department | 3,263 ac. |
| 7. Elwood City Municipal Authority | 187 ac. |
| 8. Koppel Borough Municipal Authority | 187 ac. |
| 9. Other | 626 ac. |

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

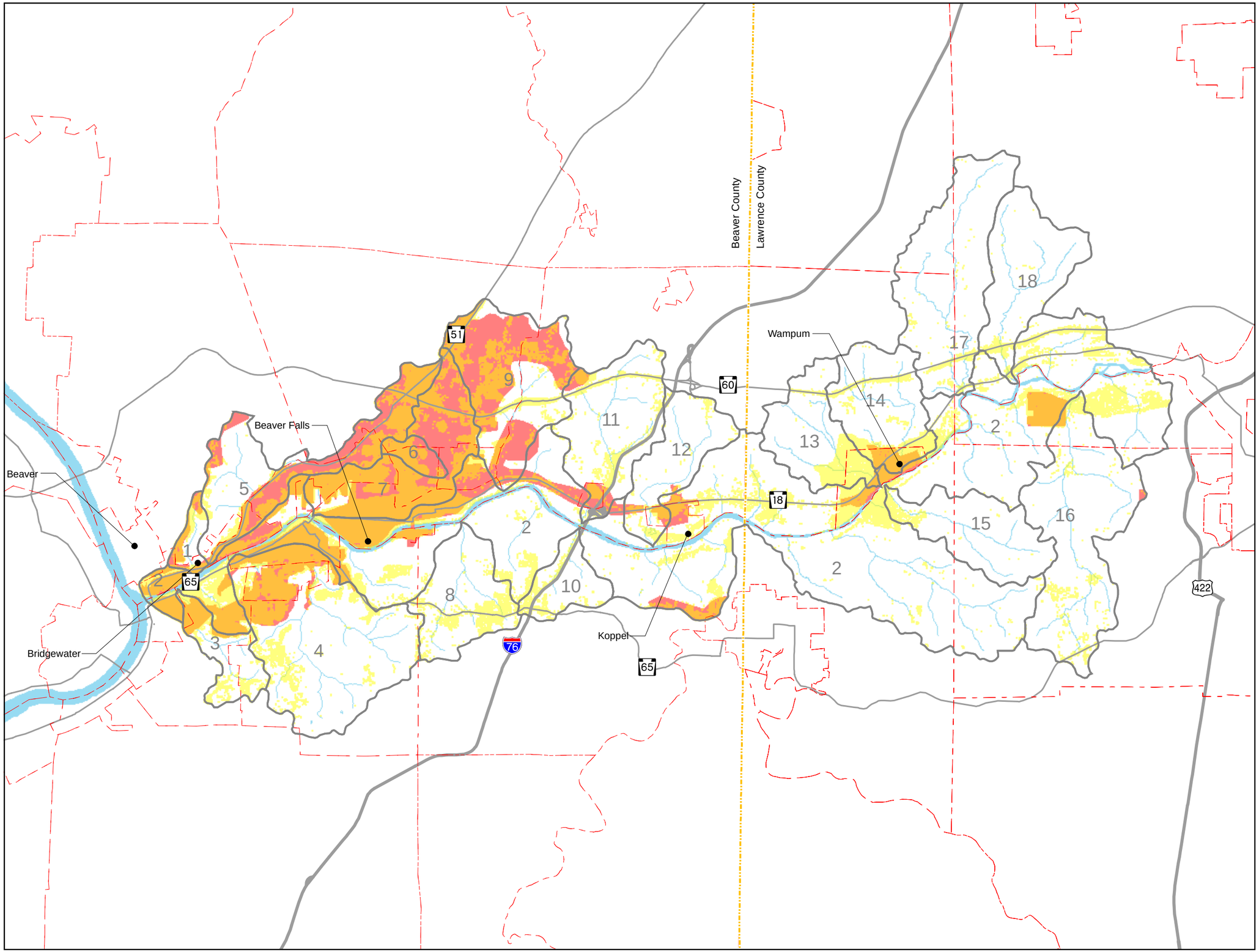
# GENERALIZED SANITARY SEWER SERVICE INVENTORY
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: July 2008
1989.05.11r2

0 1/2 1 MILE

NORTH




## Legend

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Major Highways
- Major Roads

**Land Coverage**

- Urban Area with Sanitary Sewer Service
- Non-urban Area with Sanitary Sewer Service
- Urban Area without Sanitary Sewer Service
- Non-urban Area without Sanitary Sewer Service

Note:
1. Urban land is comprised of low density urban areas and high density urban areas as classified by Penn State University.
2. Where coverage data along the study area boundary was not available, area appears as non-urban land coverage.

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# GENERALIZED LAND COVERAGE AND SANITARY SEWER SERVICE ANALYSIS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.06r2

0 1/2 1 MILE

NORTH

### *Fish Consumption Advisories*

Due to the presence of pollutants in the streams and rivers, the PA Fish and Boat Commission (PFBC) and the DEP issue fish consumption advisories each year. They provide recreational fishermen with guidelines of how many fish they may eat in a certain time period based on the severity of the pollution in fish tissue. There is also a general statewide fish consumption advisory: eat no more than one meal (1/2 pound) per week of state-caught sport fish.

**Table 4-7**
**2007 Fish Consumption Advisories**

| Water Course | Fish Species | Meal Frequency* | Contaminant |
|---|---|---|---|
| Beaver River confluence to New Brighton Dam | Carp/ Channel Catfish | 6 meals/year | PCB |
| | Smallmouth Bass | 1 meal/month | |
| Beaver River at New Brighton Dam to mouth | Carp/ Channel Catfish | Do not eat | PCB |

Source: www.fish.state.pa.us
* One meal is a half pound of fish for a 150-lb person.

### *Contact Information*

To report suspected water quality violations, contact one of the following:

In Beaver County, contact the Southwest Regional Office of the PA Department of Environmental Protection at (412) 442-4184

In Lawrence County, contact the Northwest Regional Office of the DEP at (814) 332-6816

## Water Supply

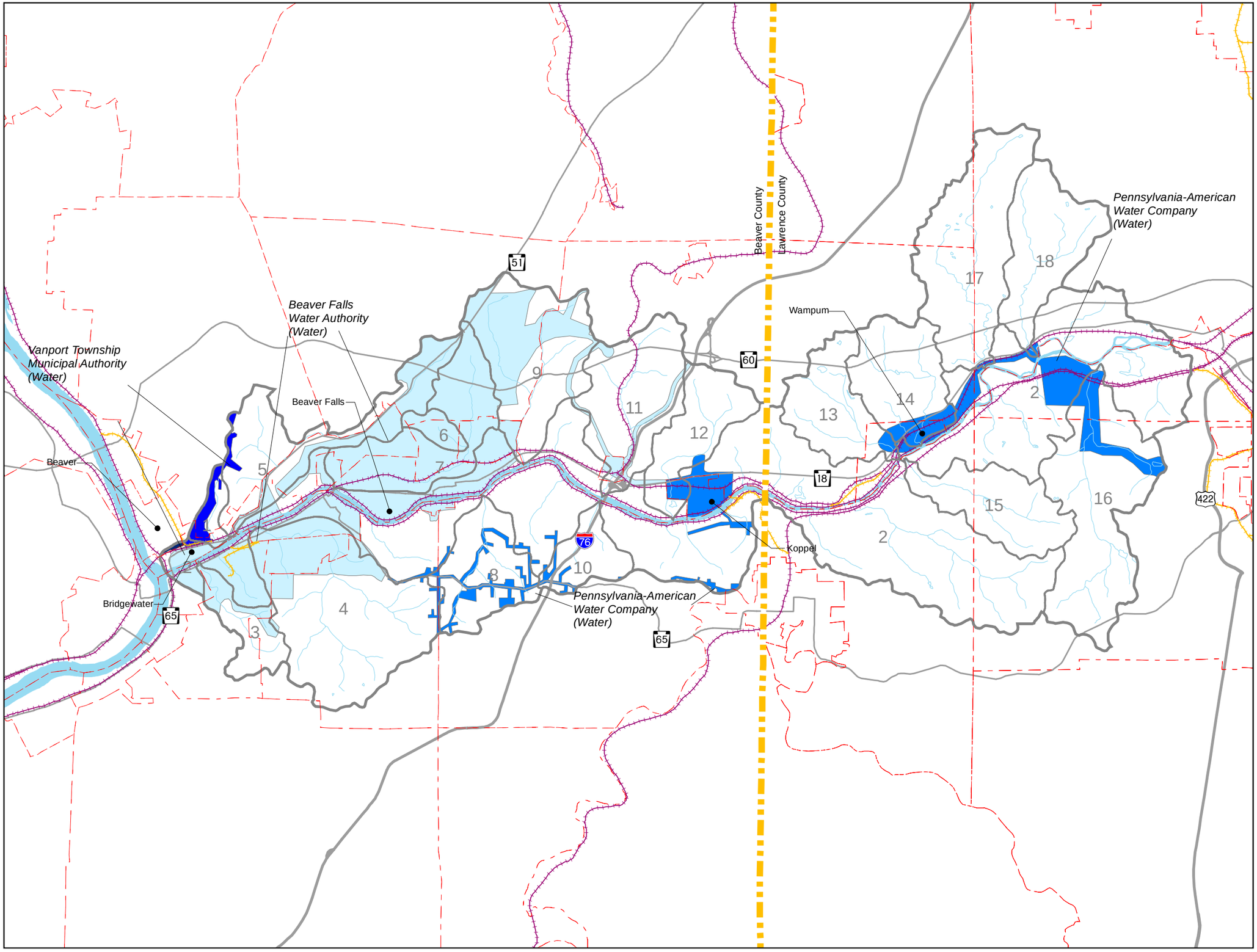
### *Water Services Inventory*

The Generalized Water Service Inventory map indicates the widespread availability of public water by provider in the southern half of the Study Area, with smaller systems scattered throughout the rest of the region. Like sewer, water plays an important role in all but the least intensive land developments and is frequently located in the same locations. Public water service is almost always available to those who live in urban and suburban areas and is rarely available in remote areas. Whereas sewer systems are usually limited by transport and treatment capacities, water systems are always dependent on an adequate supply. Thus, water quality, storage, transport and watershed protection are all important factors to consider when analyzing a pubic water system.

On the map, colors are assigned to the four individual municipal water service providers - supplying 23 percent of the Study Area with water. The Beaver Falls Water Authority supplies the majority of the water service, primarily near the confluence of the Beaver and Ohio Rivers.

Smaller service areas exist in the northern portion of the study area, but the majority of the study area north of the Ohio River and Beaver River confluence lacks a public water service provider.

Heavily populated areas in close proximity to the Beaver and Ohio River confluence are provided with water service as illustrated on the Generalized Land Coverage by Water Service Analysis Map. As the distance increases from the confluence of the Beaver and Ohio Rivers, urban areas and available water service decreases. The map illustrates which portions of the study area have the necessary infrastructure service that typically supports more intense areas of development. In some locations within the Project Corridor, existing infrastructure service is also generally accessible to lands that have minimal and/or no development, providing opportunity to readily support future development.




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads

**Water Service Authorities**

| | | |
|---|---|---|
| 1. | Vanport Township Municipal Authority | 271 ac. |
| 2. | Beaver Falls Water Authority | 9,665 ac. |
| 3. | Pennsylvania-American Water Company | 3,287 ac. |
| 4. | Beaver Borough Municipal Authority | 228 ac. |

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

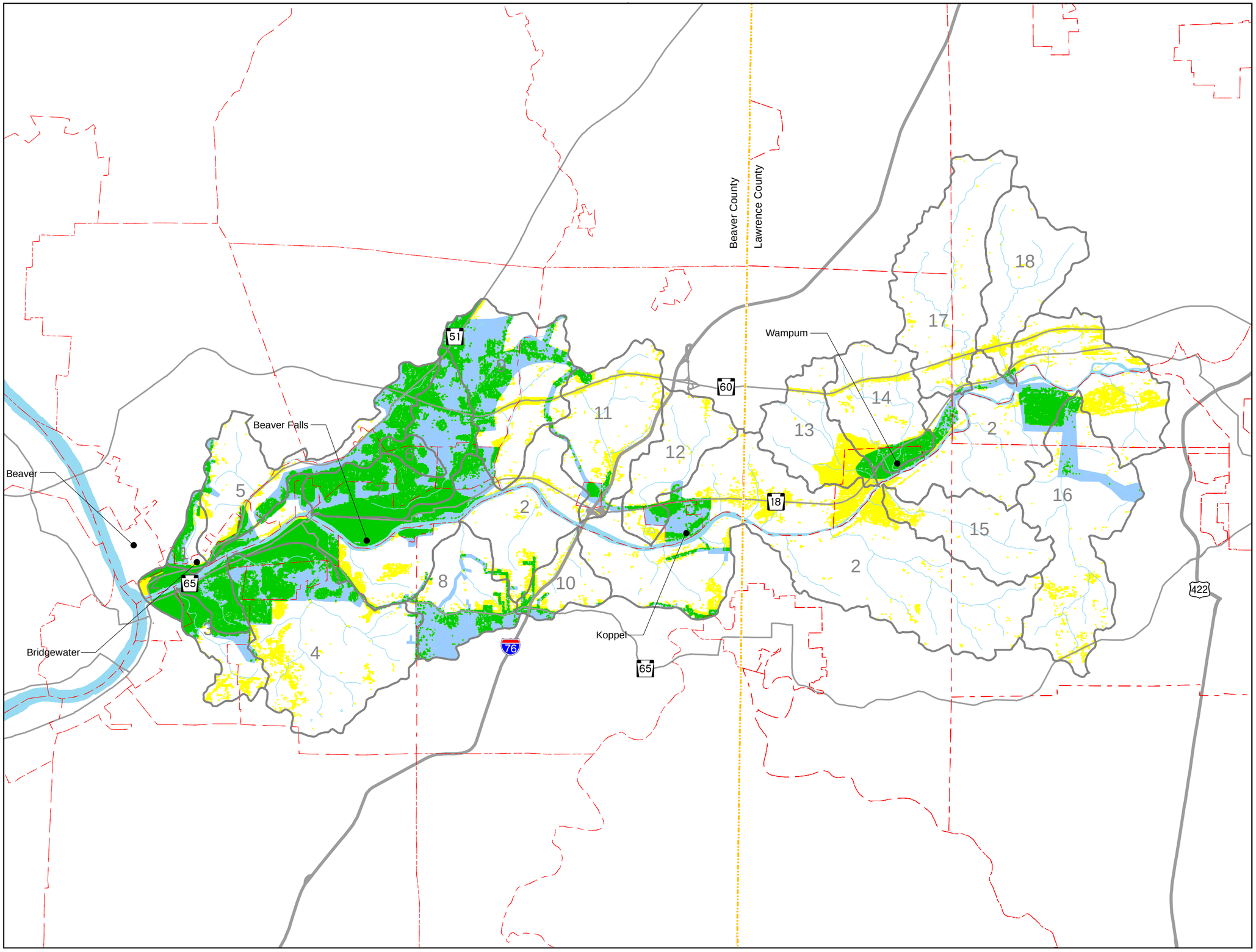
# GENERALIZED WATER SERVICE INVENTORY
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: July 2008
1989.06.12r3

0 1/2 1 MILE

NORTH




## Legend

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Major Highways
- Major Roads

**Land Coverage**

- Urban Area with Water Service
- Non-urban Area with Water Service
- Urban Area without Water Service
- Non-urban Area without Water Service

Note:
1. Urban land is comprised of low density urban areas and high density urban areas as classified by Penn State University.
2. Where coverage data along the study area boundary was not available, area appears as non-urban land coverage.

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# GENERALIZED LAND COVERAGE AND WATER SERVICE ANALYSIS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.05r2

0 1/2 1 MILE

NORTH

### *Pennsylvania Source Water Assessment Program*

In August of 1996, Congress amended the Safe Drinking Water Act to include provisions for drinking water supply assessments. One year later, the EPA issued a guidance document for states to begin their Source Water Assessment and Protection (SWAP) program, the main goals of which are the prevention of drinking water contamination and citizen involvement in the clean-up and pollution prevention process.

The DEP, along with the consulting firm Spotts, Stevens, and McCoy, assessed all the drinking water sources in the state. The assessments include one square mile surrounding all groundwater systems serving a population of 3,300 or more, small surface water systems with small, forested watersheds, and large surface water systems. The studies looked at the prime contributors to water pollution and how they affect the water quality of the drinking water source. Each of the assessments will be used to determine what preventative steps are required (by municipalities, water suppliers, and the government) to protect drinking water systems.[14]

The assessments summarized the greatest potential threats to water quality. While these threats may not be present within the boundaries of the study corridor, they still affect water quality as an upstream source. Summaries of source water facility reports are available on the DEP's website (www.dep.state.pa.us) under the Source Water and Groundwater Protection Page heading. As of June 2008, only the Beaver Falls Municipal Authority and the Beaver Borough Municipal Authority have their reports posted.

The source water reports only assess the quality of the source of water (ground or surface). To obtain information on the quality of tap water, contact the local water authority about their annual consumer confidence reports. These reports must be distributed each year to customers of water suppliers and will list the water source, average results of water quality tests, whether the tests showed that the water met appropriate standards, and how consumers can help to protect their water supply.

### *Act 220 – The Water Resources Planning Act*

Act 220 requires the state to update the State Water Plan. The update will include an in-depth look at how our water resources are being used. In other words, it will be a "water withdrawal and use registration and reporting program. This inventory will allow the DEP to determine how much water Pennsylvania has, how much is being used, and how much will be available in the future."[15] Water usage must be reported annually by all public water suppliers, hydropower stations, and individuals or businesses that withdraw more than 10,000 gallons per day (over a 30-day period). Any of those entities that withdraw over 50,000 gallons per day must meter their water use. Usages between 10,000 and 50,000 gallons must be estimated (DEP offers methods for estimating use). Homeowners are not required to monitor or report water usage (typically, households use 300 gallons per day).

Statewide Water Resources Committees have been established for the major river basins in the state (this Plan falls within the Ohio River Basin) and will "oversee the creation of water resources plans on the local level."

[14] http://www.dep.state.pa.us/dep/deputate/watermgt/wc/subjects/srceprot/sourceassessment/default.htm
[15] www.dep.state.pa.us

### *Groundwater*

Water filtering through the soil moves first through an unsaturated zone where the spaces (pores) between solid particles or rocks contain both air and water. At this stage water is called soil water and some of it will be taken up by plants. The rest of it continues, pulled by gravity, in a generally downward path and eventually reaches the zone of saturation. Here the pore spaces are completely filled with water; this is groundwater. The top of the zone of saturation is called the water table. Rock or soil layers within the zone that can readily store and transmit usable amounts of water are called aquifers.[16]

Since much of the water supply for western Pennsylvanians comes from surface water, not much thought is given to groundwater. It is important to know, however, that groundwater provides about two thirds of water to streams, lakes, and wetlands (this discharge of groundwater to surface water is called "base flow"). In fact, most of Pennsylvania's fresh water comes from groundwater, which is commonly used for agriculture, industry, mining, domestic, and commercial uses.

## Biological Resources

## Wildlife

### *Mammals*

There are 70 mammals known to live or have lived in Pennsylvania. The mammals listed in Table 4-8 can be found in Beaver and Lawrence Counties based on published data.

**Table 4-8**
**Mammals in Beaver and Lawrence Counties**

| Common Name | Scientific Name |
|---|---|
| White-Tailed deer | *Odocoileus virginianus* |
| Striped skunk | *Mephitis mephitis* |
| Mink | *Mustela vision* |
| Weasel | *Mustela spp.* |
| Raccoon | *Procyon lotor* |
| Red fox | *Vulpes vulpes* |
| Gray fox | *Urocyon cinereoargenteus* |
| Coyote | *Canis latrans* |
| Meadow jumping mouse | *Zapus hudsonius* |
| Woodland jumping mouse | *Napaeozapus insigius* |
| Bog lemming | *Synaptomys cooperi* |
| Muskrat | *Ondatra zibethicus* |
| Voles | *Microtus spp* |

[16] Groundwater: A Primer for Pennsylvanians. Water Resources Education Network.

| | |
|---|---|
| Deer mouse | *Peromyscus maniculatus* |
| White-footed mouse | *Peromyscus leucopus* |
| Woodrat | *Neotoma floridana* |
| Beaver | *Castor canadensis* |
| Southern flying squirrel | *Glaucomys volans* |
| Red squirrel | *Tamiascuirus hudsonicus* |
| Eastern chipmunk | *Tamias striatus* |
| Fox squirrel | *Sciurus niger* |
| Gray squirrel | *Sciurus carolinensis* |
| Groundhog | *Marmota monax* |
| Eastern cottontail | *Sylvilagus floridanus* |
| Eastern pipistrelle | *Pipistrellus subflavus* |
| Indiana bat* | *Myotis sodalis* |
| Little brown bat | *Myotis lucifugus* |
| Northern long-eared bat** | *Myotis septemtrionalis* |
| Hoary bat | *Lasiurus cinereus* |
| Red bat | *Lasiusus borealis* |
| Silver haired bat ** | *Lasionycteris noctivagans* |
| Big brown bat | *Eptesicus fuscus* |
| Hairy tailed mole | *Parascalops breweri* |
| Star-nosed mole | *Condylura cristata* |
| Pygmy shrew | *Sorex hoyi* |
| Smoky shrew | *Sorex fumeus* |
| Masked shrew | *Sorex cinereus* |
| Least shrew* | *Cryptotis parva* |
| Short-tailed shrew | *Blarina brevicauda* |
| Opossum | *Didelphis virginiana* |
| House mouse | *Mus musculus* |
| Norway rat | *Rattus norvegicus* |
| Source: www.carnegiemuseums.org (April 2005)<br>* Endangered<br>** Rare | |

Pennsylvania's mammals and birds are managed by the PA Game Commission (PGC). "Wildlife management is the process used to manage game and other wildlife populations and includes: monitoring wildlife populations, establishing laws and regulations, setting seasons and bag limits, making habitat improvements, providing outright protection, informing and educating the public (www.pgc.state.pa.us)." They also reintroduce species and manage endangered and threatened species. More information about threatened and endangered species and the Game Commission are found later in this chapter.

Several organizations are working toward conservation and stewardship of wildlife in the study area. The Important Mammal Areas Project (IMAP) is a "voluntary grass roots project with two goals: 1) to designate areas in Pennsylvania that are important for mammal conservation, and 2) to help people learn more about mammals and their habitats." The project is a partnership of the PA Wildlife Federation, National Wildlife Federation, Indiana University of Pennsylvania, Carnegie Museum of Natural History, PA Game Commission, PA Federation of Sportsmens Clubs, and the Mammal Technical Committee of the Pennsylvania Biological Survey.[17]

Important Mammal Areas (IMA) are geographic areas that host either game or non-game species of concern and meet one or more of several criteria: diverse or unique mammals, high density population, species listed as endangered or threatened, species that are declining or vulnerable, and/or important for public education. Currently, there are 45 IMAs in Pennsylvania.

There is one IMA in the Study Area. Because the species for which the site has been nominated is of special concern, and the property where it was found is privately owned, details about them, or the exact locations cannot be released. The IMAP partners are currently working on completing conservation assessments on all sites in western Pennsylvania. Once those assessments are complete, a conservation/stewardship plan may be written for each.

***Birds***

Information about birds that can be found in Beaver and Lawrence Counties can be found in the *Atlas of Breeding Birds in Pennsylvania*, published in 1992. The atlas is available online at www.carnegiemnh.org/atlas. Information for the atlas was collected from volunteers and experts throughout the state. The Carnegie Museum of Natural History is sponsoring an update to the atlas. The *Second Pennsylvania Breeding Bird Atlas* should be completed in 2009.

Table 4-9 contains a compilation of the birds recorded by volunteers during the annual Christmas Bird Count in the Beaver Valley.

**Table 4-9**
**Species List for Beaver Valley**
**Christmas Bird Count 1987 – 2004**

| Common Name | Scientific Name |
|---|---|
| Pied-billed Grebe | *Podilymbus podiceps* |
| American White Pelican | *Pelecanus erythrorhynchos* |
| Double-crested Cormorant | *Phalacrocorax auritus* |
| Great Blue Heron (Blue form) | *Ardea herodias* |
| White-fronted Goose | *Anser albifrons* |
| Snow Goose | *Chen caerulescens* |
| Canada Goose | *Branta canadensis* |
| Tundra Swan | *Cygnus columbianus* |
| Wood Duck | *Aix sponsa* |
| American Wigeon | *Anas Americana* |

[17] www.pawildlife.org

| | |
|---|---|
| American Black Duck | *Anas rubripes* |
| Mallard | *Anas platyrhynchos* |
| Northern Pintail | *Anas acuta* |
| American Green-winged Teal | *Anas crecca* |
| Canvasback | *Aythya valisineria* |
| Redhead | *Aythya americana* |
| Surf Scoter | *Melanitta perspicillata* |
| Common Goldeneye | *Bucelphala clangula* |
| Hooded Merganser | *Lophodytes cucullatus* |
| Common Merganser | *Mergus merganser* |
| Red-breasted Merganser | *Mergus serrator* |
| Ruddy Duck | *Oxyura jamaicensis* |
| American Bald Eagle | *Haliaeetus leucocephalus* |
| Northern Harrier | *Circus cyaneus* |
| Sharp-shinned Hawk | *Accipiter striatus* |
| Cooper's Hawk | *Accipiter cooperii* |
| Northern Goshawk | *Accipiter gentilis* |
| Red-shouldered Hawk | *Buteo lineatus* |
| Red-tailed Hawk | *Buteo jamaicensis* |
| American Kestrel | *Falco sparverius* |
| Ring-necked Pheasant | *Phasianus colchius* |
| Ruffed Grouse | *Bonasa umbellus* |
| Wild Turkey | *Meleagris gallopavo* |
| American Coot | *Fulica americana* |
| Killdeer | *Charadrius vociferous* |
| Common Snipe | *Gallinago gallinago* |
| Ring-billed Gull | *Larus delawarensis* |
| Herring Gull | *Larus argentatus* |
| Great Black-backed Gull | *Larus marinus* |
| Rock Pigeon | *Columba livia* |
| Mourning Dove | *Zenaida macroura* |
| Eastern Screech-Owl | *Otus asio* |
| Barred Owl | *Strix varia* |
| Great Horned Owl | *Bubo virginianus* |
| Short-eared Owl | *Asio flammeus* |
| Belted Kingfisher | *Ceryle alcyon* |
| Red-headed Woodpecker | *Melanerpes erythrocephalus* |
| Yellow-bellied Sapsucker | *Sphyrapicus varius* |

| | |
|---|---|
| Downy Woodpecker | *Picoides pubescens* |
| Hairy Woodpecker | *Picoides villosus* |
| Northern (Yellow-shafted) Flicker | *Colaptes auratus* |
| Pileated Woodpecker | *Dryocopus pileatus* |
| Blue Jay | *Cyanocitta cristata* |
| American Crow | *Corvus brachyrhynchos* |
| Horned Lark | *Eremophilia alpestris* |
| Carolina Chickadee | *Parus carolinensis* |
| Black-capped Chickadee | *Parus atricapillus* |
| Tufted Titmouse | *Parus bicolor* |
| Red-breasted Nuthatch | *Sitta canadensis* |
| White-breasted Nuthatch | *Sitta carolinensis* |
| Brown Creeper | *Certhia americana* |
| Carolina Wren | *Thryothorus ludovicianus* |
| Winter Wren | *Troglodytes troglodytes* |
| Golden-crowned Kinglet | *Regulus satrapa* |
| Ruby-crowned Kinglet | *Regulus calendula* |
| Eastern Bluebird | *Sialia sialis* |
| Hermit Thrush | *Catharus guttatus* |
| American Robin | *Turdus migratorius* |
| Northern Mockingbird | *Mimus polyglottos* |
| European Starling | *Sturnus vulgaris* |
| Cedar Waxwing | *Bombycilla cedrorum* |
| Yellow Warbler | *Dendroica petechia* |
| Yellow-rumped (Myrtle) Warbler | *Dendroica coronata* |
| Eastern Towhee | *Pipilo erthrophthalmus* |
| American Tree Sparrow | *Spizella arborea* |
| Chipping Sparrow | *Spizella passerine* |
| Field Sparrow | *Spizella pusilla* |
| Eastern Fox Sparrow | *Passerella iliaca* |
| Song Sparrow | *Melospiza melodia* |
| Swamp Sparrow | *Melospiza georgiana* |
| White-throated Sparrow | *Zonotrichia albicollis* |
| Dark-eyed (Slate-colored) Junco | *Junco hyemalis* |
| Snow Bunting | *Plectrophenax nivalis* |
| Northern Cardinal | *Cardinalis cardinalis* |
| Red-winged Blackbird | *Agelaius phoeniceus* |
| Common Grackle | *Quiscalus quiscula* |

| | |
|---|---|
| Brown-headed Cowbird | *Molothrus ater* |
| Purple Finch | *Carpodacus purpureus* |
| House Finch | *Carpodacus mexicanus* |
| Red Crossbill | *Loxia curvirostra* |
| Common Redpoll | *Carduelis flammea* |
| Pine Siskin | *Carduelis pinus* |
| American Goldfinch | *Carduelis tristis* |
| Evening Grosbeak | *Coccothraustes vespertinus* |
| House Sparrow | *Passer domesticus* |

***Fish***

The Pennsylvania Fish and Boat Commission protects and manages the state's aquatic resources, these include game and non-game fish, as well as amphibians, reptiles and aquatic invertebrates.

Examples of fish that have been found in the study area are listed in the following tables.

**Table 4-10**
**Beaver River Fish**

| **Common Name** | ***Scientific Name*** |
|---|---|
| Banded Killifish | *Fundulus diaphanus* |
| Black Crappie | *Pomoxis nigromaculatus* |
| Bluegill | *Lepomis macrochirus* |
| Bluntnose Minnow | *Pimephales notatus* |
| Brown Bullhead | *Ameiurus nebulosus* |
| Channel Catfish | *Ictalurus punctatus* |
| Common Carp | *Cyprinus carpio* |
| Common Shiner | *Luxilus cornutus* |
| Creek Chub | *Semotilus atromaculatus* |
| Gizzard Shad | *Dorosoma cepedianum* |
| Golden Redhorse | *Moxostoma erythrurum* |
| Goldfish | *Carassius auratus* |
| Largemouth Bass | *Micropterus salmoides* |
| Logperch | *Percina caprodes* |
| Northern Hog Sucker | *Hypentelium nigricans* |

| | |
|---|---|
| Pumpkinseed | *Lepomis gibbosus* |
| Rock Bass | *Ambloplites rupestris* |
| Sand Shiner | *Notropis stramineus* |
| Sauger | *Sander canadense* |
| Sheepshead Minnow | *Cyprinodon variegatus* |
| Shorthead Redhorse | *Moxostoma macrolepidotum* |
| Smallmouth Bass | *Micropterus dolomieui* |
| Spotfin Shiner | *Cyprinella spiloptera* |
| Walleye | *Sander vitreus* |
| White Bass | *Morone chrysops* |
| White Crappie | *Pomoxis annularis* |
| White Sucker | *Catostomus commersoni* |
| White X Striped Bass | *White x striped bass* |
| Yellow Bullhead | *Ameiurus natalis* |
| Yellow Perch | *Perca flavescens* |
| Source: Western Pennsylvania Conservancy, 1983 data | |

**Table 4-11**
**Beaver River Fish Observed While Electrofishing**
**August 24, 2004 and September 1, 2004**

| Common Name | *Scientific Name* |
|---|---|
| Longnose Gar | *Lepisosteus osseus* |
| Mooneye | *Hiodon tergisus* |
| Gizzard Shad | *Dorosoma cepedianum* |
| Common Carp | *Cyprinus carpio* |
| Spotfin Shiner | *Cyprinella spiloptera* |
| Emerald Shiner | *Notropis atherinoides* |
| Quillback | *Carpiodes carpio* |
| Smallmouth Buffalo | *Ictiobus bubalus* |
| River Redhorse | *Moxostoma carinatum* |
| Shorthead Redhorse | *Moxostoma macrolepidotum* |
| Channel Catfish | *Ictalurus punctatus* |
| Flathead Catfish | *Pylodictis olivaris* |
| Muskellunge | *Esox masquinongy* |

| | |
|---|---|
| White Bass | *Morone chrysops* |
| Striped Bass | *Morone saxatilis* |
| Bluegill | *Lepomis macrochirus* |
| Smallmouth Bass | *Micropterus salmoides* |
| Sauger | *Stizostedion canadense* |
| Walleye | *Stizostedion vitreum* |
| Freshwater Drum | *Aplodinotus grunniens* |
| Source: Southwest Regional Office DEP | |

**Table 4-12**
**Brady Run Fish**

| **Common Name** | ***Scientific Name*** |
|---|---|
| Banded Killifish | *Fundulus diaphanus* |
| Blacknose Dace | *Rhinichthys atratulus* |
| Bluegill | *Lepomis macrochirus* |
| Bluntnose Minnow | *Pimephales notatus* |
| Brown Trout | *Salmo trutta* |
| Central Stoneroller | *Campostoma anomalum* |
| Channel Catfish | *Ictalurus punctatus* |
| Common Carp | *Cyprinus carpio* |
| Common Shiner | *Luxilus cornutus* |
| Creek Chub | *Semotilus atromaculatus* |
| Fantail Darter | *Etheostoma flabellare* |
| Golden Redhorse | *Moxostoma erythrurum* |
| Johnny Darter | *Etheostoma nigrum* |
| Largemouth Bass | *Micropterus salmoides* |
| Mottled Sculpin | *Cottus bairdi* |
| Mountain Brook Lamprey | *Ichthyomyzon greeleyi* |
| Northern Hog Sucker | *Hypentelium nigricans* |

| | |
|---|---|
| Rainbow Darter | *Etheostoma caeruleum* |
| Rainbow Trout | *Oncorhynchus mykiss* |
| Smallmouth Bass | *Micropterus dolomieui* |
| White Sucker | *Catostomus commersoni* |
| *Source: Western Pennsylvania Conservancy, 1990 and 1998 data* | |

The PA Fish and Boat Commission maintains a stocking program for the Beaver River to enhance the sport fishery. Table 4-13 lists the 2006 stocking activities.

**Table 4-13**
**2006 Warm/Cool Water Stocking**

| Water body | Limits | Species | Lifestage |
|---|---|---|---|
| Beaver River, Beaver County | Connoquennessing Creek to Ohio River | Channel catfish, Sauger, Tiger Muskellunge | fingerling |
| Beaver River, Lawrence County | Mahoning-Shanango Rivers to Connoquennessing Creek | Tiger Muskellunge | fingerling |
| Source: www.fish.state.pa.us, August 2006 | | | |

In addition, the South Branch of Brady's Run is stocked with brown and rainbow trout prior to the fishing season.

***Macroinvertebrates***

Macroinvertebrates are also important to consider when discussing river health because they are a food source for other organisms. Although they are near the bottom of the food chain, their abundance indicates a healthy food supply for the rest of the chain. The presence of certain macroinvertebrates is an indicator of water quality. When pollution intolerant species are found in the rivers, it is a good sign of healthy waterways. The more pollution tolerant species present and the lack of intolerant species, mean that water quality may be degraded.

## Vegetation

A Natural Heritage Inventory (NHI) "identifies and maps a county's most significant natural places by investigating plant and animal species and natural communities that are unique or uncommon in the county. Areas important for wildlife habitat and scientific study are also

included."[18] The NHI can be used as a tool by government officials, public and private organizations, and developers who need information about the natural resources of the county. The listing of a location in an NHI does not afford it any special protection.

According to the *1993 Beaver County Natural Heritage Inventory* (NHI), prepared by the Western Pennsylvania Conservancy, there are a variety of vegetation types across the county. The majority of forests on slopes and uplands contain sugar maple (*Acer saccharum*), white oak (*Quercus alba*), red oak (*Quercus rubra*), hickories (*Carya spp*.), American beech (*Fagus grandifolia*), American basswood (*Tilia americana*), and white ash (*Fraxinus americana*). Eastern hemlock (*Tsuga canadensis*) occurs in smaller stream valleys, northern slopes and protected areas. Floodplain forests along streams support sycamore (*Platanus occidentalis*), silver maple (*Acer saccharinum*), American elm (*Ulmus Americana*), and box elder (*Acer negundo*). All of the original forests were logged, therefore these are second growth forests. In addition to the forested communities, the NHI identified the presence of wetland communities in the county.

The *2002 Lawrence County Natural Heritage Inventory* notes that dry upland areas are dominated by oaks (*Quercus spp*.) Lower slopes contain communities of red and white oak, sugar maple, beech, black birch, slippery elm (*Ulmus rubra*), basswood (*Tilia Americana*), white ash (*Fraxinus Americana*), tulip tree (*Liriodendron tulipifera*), and cucumber tree (*Magnolia accuminata*). On northern slopes or along lower sections of stream valleys are hemlock, yellow birch (*Betula allegheniensis*), beech (*Fagus grandifolia*), and rosebay (*Rhododendron maximum*).

The Forest Density Map shows the number of trees per acre for defined areas throughout the Study Area. The densest areas, indicated by darker shades of green, are characterized by thick vegetation and a continuous canopy. The least dense areas, colored in lighter greens, account for minimally planted urban areas as well as agricultural fields. Respective of a slight trend toward denser forests in the northern reaches of the Study Area, the general level of forest density remains similar throughout.

The DCNR Bureau of Forestry offers assistance to municipalities regarding planning for stewardship, conservation, and proper use of forests and other related natural resources. The Bureau employs experts in forestland conservation practices that will provide sound, impartial advice to communities wishing to conserve and enhance their natural resources and maximize the myriad benefits they provide. The Bureau also provides advice to municipalities on various forms of green space and green infrastructure, including the planting and care of trees in developed or developing areas.

The Forest Stewardship Program is a federal and state partnership that assists landowners in the completion of plans focusing on sustainable management of the forest and its related natural resources. The intention of the program is to provide sound management and continuing care for Pennsylvania's private forest resources in the future. Limiting cost share funding is currently available to offset the cost of preparing a Forest Stewardship Plan. Plans must be written by approved plan writers. Information on this opportunity can be obtained at the nearest Bureau of Forestry Field office in Clarion, PA. See www.dcnr.state.pa.us for more information.

[18] Lawrence County Natural Heritage Inventory, Western Pennsylvania Conservancy.

Both woodlands and agriculture areas serve as functional environments for humans as well as natural habitats for wildlife. The Study Area has ample woodland and agriculture areas as shown in the Woodlands and Agriculture Areas Map. The western section of the study area is primarily comprised of agricultural areas, while the eastern section of the study area is primarily comprised of woodland areas.

Habitable woodlands are those lands that contain forest cover with minimum of 300' depth from their center and where such land is a minimum of 250 acres.

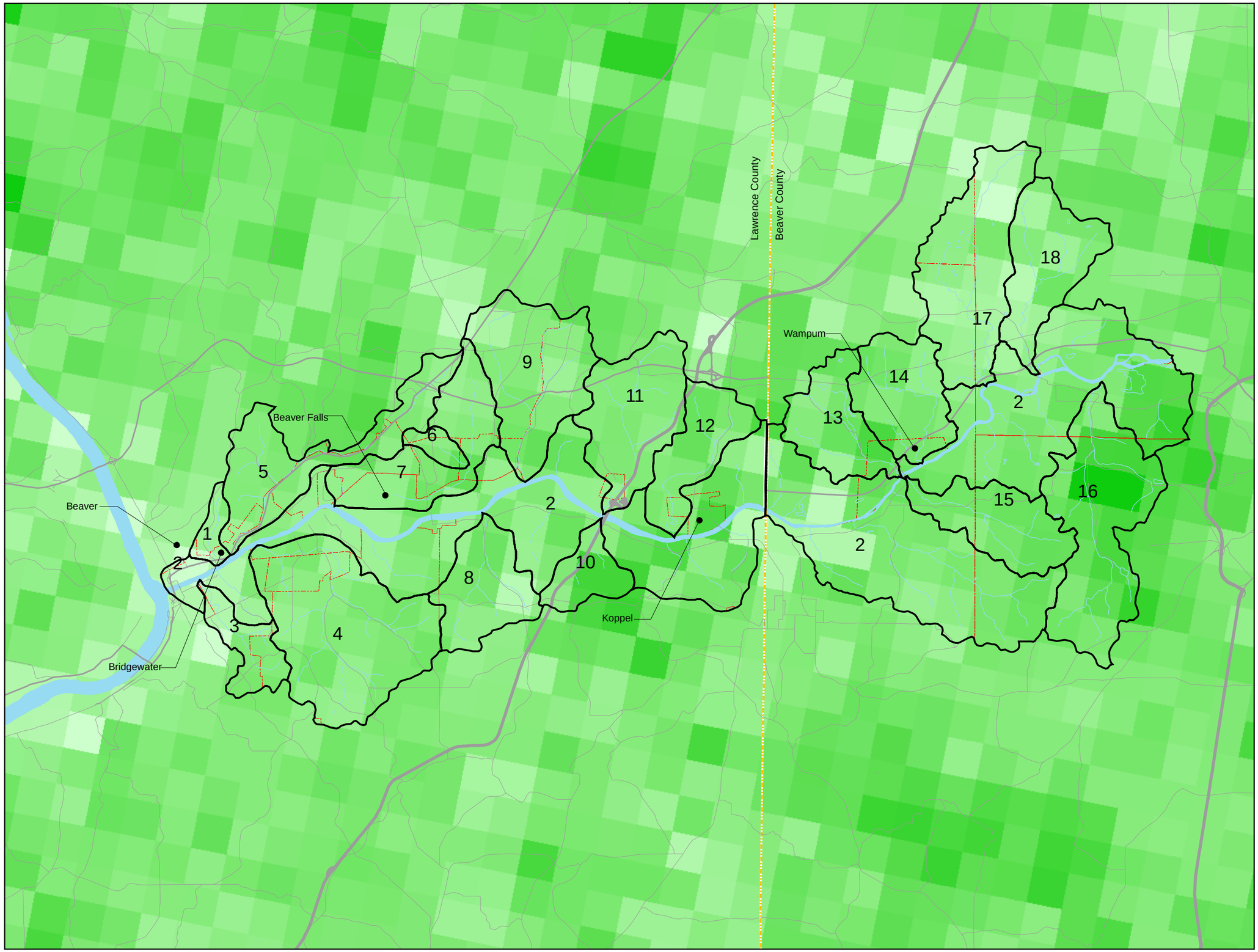
Threats to the vegetation include mineral extraction, development, utility and road right-of-ways, certain forestry practices, habitat fragmentation, and gypsy moths.

As identified by the Commonwealth of Pennsylvania agricultural security areas are:

- Noncontiguous farm parcels that are at least 10 acres in size. The farm tracts needed to create a new 250 acre or larger agricultural security area do not have to be under the same ownership or even be located in the same municipality. The Agricultural Area Security Law (Act 43 of 1981) allows for the creation of joint municipality agricultural security areas.
- The property should be viable agricultural land. Cropland, pasture, and woodland can all be included in an agricultural security area.
- At least 50% of the land should be in Soil Capability Classes I-IV, as defined by the county soil survey.
- The property must be zoned to permit agricultural uses.

Agricultural security areas are created by local municipalities in cooperation with individual landowners who agree to collectively place at least 250 acres in an agricultural security area. Another form of land classification within the Southwestern Pennsylvania region is agriculture preservation. These lands are typically recorded locally and/or on the County basis.[19]

[19] http://www.agriculture.state.pa.us/agriculture/cwp/view.asp?a=3&q=129076




## Legend

- Watershed Boundary
- County Boundary
- Rivers/Streams/Lakes
- Major Highways
- Major Roads
- Minor Roads

## Forest Density[1]

Most Siginficant Forest Density

Least Significant Forest Density

1. Represents trees per acre.

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres

500 Acres

250 Acres

# FOREST DENSITY
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council

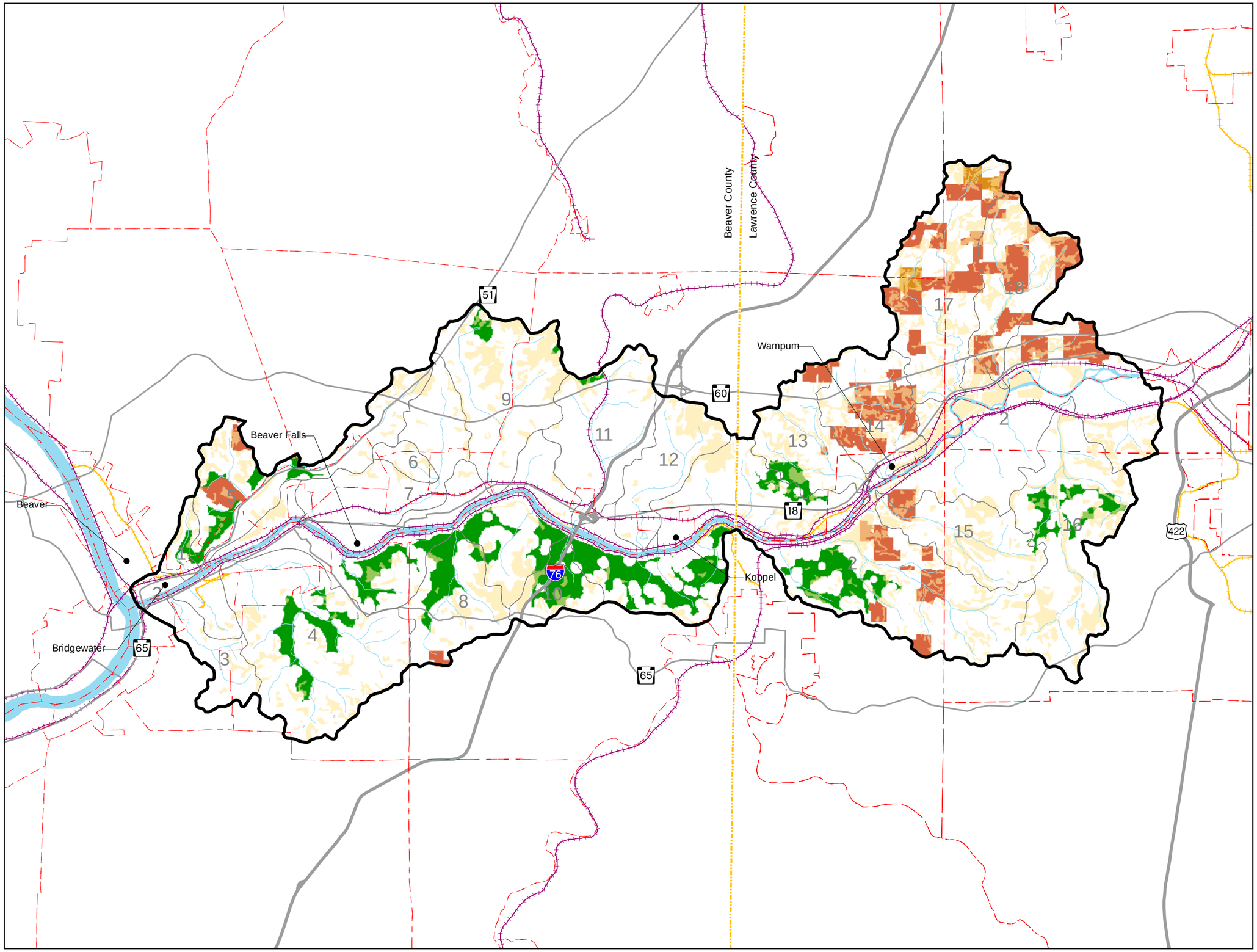
Prepared by: Environmental Planning and Design, LLC

Date: July 2008

1989.05.06r1

0 1/2 1 MILE

NORTH




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads
- Rivers/Streams/Lakes
- Prime Agriculture Soil
- Agricultural Security Area
- Agricultural Preservation Area
- Habitable Woodland Area

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# WOODLAND AND AGRICULTURE AREAS

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.28

0 1/2 1 MILE

NORTH

## Invasive Species

Invasive species are species that grow aggressively, spread, and displace other species. They are difficult and expensive to control and can dominate whole areas, thereby thereatening native plant and animal species. Most invasive species arrive from overseas; however, any that have been introduced into and thrive in an area where they were not found before (e.g. from another geographic region) is an invasive species.[20] Invasive species are some of the most precarious and unnoticed forms of environmental decline. Once established, seeds of invasives can be spread by water, wind, or animal droppings, further exacerbating the problem. Invasive species pose a threat to the biodiversity of the native flora and fauna along the Beaver River as well as across the United States. They easily overtake areas, especially where there is currently little vegetation. Once established, they grow rapidly, overtaking, for example, riverbanks, pastures, and public areas like parks and trails. They can crowd out native species that cannot survive the competition for nutrients and sunlight, thus leading to the decline of local biodiversity, and the increase in invasive monocultures.

Invasive plant species that occur in the study area include Japanese knotweed (*Polygonum cuspidatum*), multiflora rose (*Rosa multiflora*), garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergii*), purple loosestrife (*Lythrum salicaria)*, and Amur honeysuckle (*Lonicera maackii*). These species tend to invade areas that have been disturbed, or stripped of native vegetation, which allows for easy propagation of invasives.

There is no comprehensive database of invasive species sites in the study area or by county. However, County Natural Heritage Inventories, discussed later in this chapter, note when invasive species threaten specific sites.

Purple Loosestrife

Japanese Knotweed

[20] Adapted from "Invasive Plants in PA," a PA DCNR brochure.

Multiflora Rosa

Garlic Mustard

Japanese Barberry

Amur Honeysuckle

Invasive plants are difficult to eradicate, but measures can be taken to control their spread. For example, Japanese knotweed spreads by rhizomes, or shallow underground stems; therefore, knotweed should not be removed by digging because rhizomes in the soil can wash downstream and invade other shorelines. Instead, knotweed can be controlled by cutting it four times a year, by planting native trees to shade it (knotweed is shade intolerant), or by spraying the plant with an herbicide that is safe to use near water.

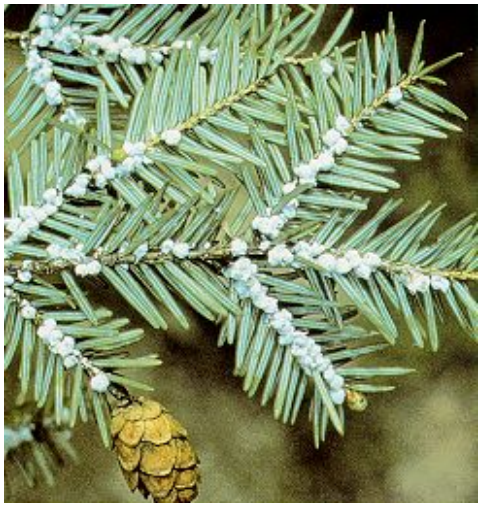
Multiflora rose is currently being controlled by a viral pathogen disease called ‘rose-rosette.’

Animals can be invasive species as well. The zebra mussel (*Dreissena polymorpha*) has been identified in the Beaver River watershed. This species is a major problem in other watersheds and has dispersed rapidly throughout the Great Lakes and major river systems. This is accomplished through ‘hitch-hiking’ on boats navigating these watercourses. Its rapid expansion into connected and unconnected waterways was probably due to barge traffic and recreational boating where it is theorized that attached mussels fell off during routine navigation. While they are not a substantial problem yet, zebra mussels can affect water treatment plants by clogging the water intake valves in the rivers. Additionally, it is noteworthy to mention that under cool, humid conditions, zebra mussels can stay alive for several days out of water; therefore boaters that utilize the river and other watercourses should take extra precautions to inspect their watercraft before and after boating, especially when transporting the watercraft to a different body of water.

Invasive pests in this region that are a threat to forested areas include the gypsy moth (*Lymantria dispar*) and the hemlock wooly adelgid (*Adelges tsugae*).

Zebra Mussel

Gypsy Moth


Hemlock Woolly Adelgid

## Pennsylvania Natural Heritage Program (PNIP)

Formerly the Pennsylvania Natural Diversity Inventory (PNDI)

The PNHP is a partnership among the Pennsylvania Bureau of Forestry, Western Pennsylvania Conservancy, and The Nature Conservancy who "conduct inventories and collect data to identify and describe Pennsylvania's rarest and most significant ecological features, which are needed for conservation, development planning, and natural resource management." [21]
See Appendix 3 for a list of those species in the corridor.

## Important Habitats

Features listed below can be found on the Sensitive Resources Inventory Map.

### *Natural Heritage Inventory*

Areas within a Natural Heritage Inventory are classified as:

- Biological Diversity Area (BDA), which contains one or more locations of plants, animals, or natural communities recognized as a state or federal species of concern and/or a high quality example of areas supporting exceptional natural diversity;
- Landscape Conservation Area (LCA), defined as a large contiguous area that is important because of its size, open space, habitats, and/or the inclusion of one or more BDAs; or
- Managed Lands, which are owned or leased properties with importance, or potential importance, to the overall maintenance of and protection of the ecological resources of the county. They can be public or private.

Lawrence County's NHI lists the following areas and recommendations in the Beaver RCMP study area.

[21] http://www.dcnr.state.pa.us

### Beaver River Island BDA

Description: Three islands and adjacent floodplains along the Beaver River below the confluence of the Shenango and Mahoning Rivers and one island upstream on the Shanango River. Islands and floodplains forested with a sycamore (river birch) box-elder floodplain forest. Area contains numerous wildflowers.

Threats: Forestry activity has occurred on the islands. Flooding cycles are important in maintaining the forest community. Exotic species (Japanese knotweed, multiflora rose) occur here.

### Beaver River Floodplain BDA

Description: A large floodplain forest of mature sycamore-box-elder and numerous wildflowers.
Threats: Habitat relies on occasional flooding from Beaver River, which is controlled by dams on the Shenango and Mahoning Rivers; exotic species (multiflora rose, garlic mustard, dame's rocket); and loss of forest regeneration due to deer browsing.
Recommendations: Maintain natural flooding cycles. Allow floodplain forests to mature without timbering. Control exotic species. Control deer herds. Avoid canopy removal.

### CS and M Mine BDA

Description: Habitat for two Pennsylvania animal species of concern. These species require cool temperatures, large spaces to hibernate, an area to forage outside of the cave, and minimal disturbance within immediate habitats.
Threats: Inadvertent blockage of the entrance; human visitation and/or vandalism; disturbance of airflow; removal of the canopy; additional mining; other activities near the mine.
Recommendations: Make landowner aware of the significance of the mine; gate the mine to limit access; evaluate activities near the mine to determine impacts to the mine and animals.

### Rock Point BDA

Description: A contiguous forest at the confluence of Connoquenessing Creek and the Beaver River that is surrounded by non-forest. It provides a corridor for migrating birds and other animals moving from the Beaver River to the Slippery Rock watershed. Steep sandstone cliffs are above the Connoquenessing Creek. The Creek itself contains whitewater rapids. Numerous wildflowers occur in the area.
Threats: Invasive species (multiflora rose, garlic mustard, Japanese barberry, and amur honeysuckle).
Recommendations: Protect the unfragmented forest; eradicate invasive species.

Beaver County's NHI shows the following areas in the Beaver RCMP study area.

**Ohio River BDA**

Description: The river is a designated BDA because it serves as habitat for several fish species of special concern. These fish have returned to the area because of water quality improvements, but there is not enough information about the extent of their range or whether they are successfully inhabiting the river.
Threats: Water pollution
Recommendations: Continued and more stringent restrictions and regulations placed on industrial, residential, and commercial development along the river and its tributaries; careful monitoring and enforcement of regulations of all activities.

**Beaver River Confluence Slopes BDA**

Description: A habitat south of the Connoquennessing Creek's confluence with the Beaver River that supports a plant species of special concern. It is located near abandoned and active railroad tracks.
Threats: Easy access and the use of ATVs and dirt bikes.
Recommendations: Discuss protection of site with landowners; limit activity to passive recreation.

**Beaver River Island BDA**

Description: A small island – the only island habitat in the Beaver County section of the Beaver River – and the river and floodplains associated with the island. A Floodplain Forest Community exists here. Also provides a resting space for bird species migrating along the river.
Threats: Potential dredging; docks and campgrounds.
Recommendations: Avoid use of island until natural qualities have recovered; develop an impact study of potential recreational uses.

**Big Beaver Boro Community Park**

Description: A 90 acre park that is mostly forested slopes along a tributary to Clarks Run.
Threats: none listed
Recommendations: Allow forested areas to recover from past disturbances; avoid development or any other activity that would impact natural qualities.

**Brady Run LCA**

Description: Encompasses two large BDAs (along the North and South Branches of Bradys Run) and the Brady Run County Park.
Threats:
Recommendations: County should acquire private lands adjacent to the park property in areas that have been identified as needing added protection.

### Brady Run County Park

Description: A 1,465 acre county park that contains wooded slopes, uplands, and stream bottoms. Managed for recreation, therefore the park has development throughout for recreational purposes.
Threats:
Recommendations: Buffer land around park by purchasing property or conservation easements.

### South Branch Valley BDA

Description: A community/ecosystem conservation area that represents some of the better county examples of a Mesic Central Forest Community.
Threats: ATVs and mountains bikes; upland development, which impacts the hydrology of surrounding slopes.
Recommendations: Restrict mountain bikes and motorized vehicles on hiking trails; educate landowners and developers about ecologically sensitive approaches to farming and development.

### North Branch Valley BDA

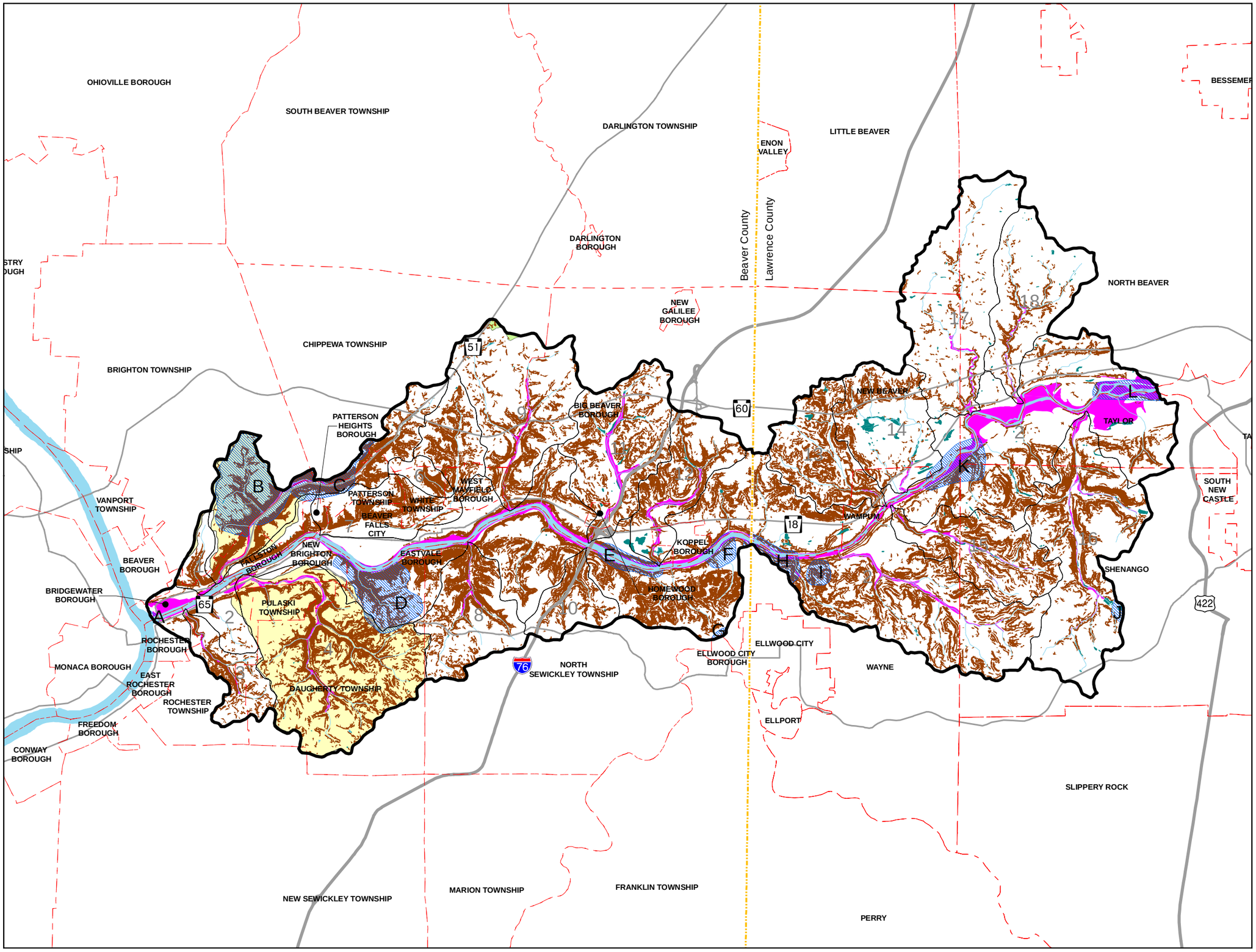
Description: Stream valley between Routes 60 and 51 of fairly contiguous forested slopes. It is a special species habitat, high diversity area, and community/ecosystem conservation area
Threats: Expansion or construction of additional parking lots and hiking trails; use of ATVs and other motorized vehicles.
Recommendations: Limit activities where the species of special concern occurs; limit activities that would further fragment natural communities.

### New Brighton Valley BDA

Description: A large river tributary that remains in a fairly natural condition along the Beaver River. A steep-sided ravine and series of waterfalls also characterize the river valley.
Threats: Residential development in the uplands; construction of railroad tracks.
Recommendations: Allow upland forests to remain intact and undisturbed; minimize disturbance at railroad tracks; maintain a buffer zone for this site.

### Homewood Falls

Description: 30 foot high waterfall along Clarks Run
Threats: none listed
Recommendations: Develop area into park




## Legend

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Highways
- Major Roads
- Rivers/Streams/Lakes
- Biological Diversity Areas
- >25% Slopes
- Flood Prone Areas
- Prime Warm Water Fish Habitat Watershed
- Good Warm Water Fish Habitat Watershed
- Marsh Related (Palustrine) Wetlands
- River Related (Riverine) Wetlands

**Biological Diversity Areas**

A. Ohio River BDA
B. South Branch Valley BDA
C. North Branch Valley BDA
D. New Brighton Valley BDA
E. Beaver River Island BDA
F. Beaver River Confluence Slope BDA
G. Steifel Park Mine BDA
H. Rock Point BDA
I. CS & M Mine BDA
J. Gardner Swamp BDA
K. Beaver River Flood Plain BDA
L. Beaver River Islands BDA

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# SENSITIVE RESOURCES INVENTORY

## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: July 2006
1989.05.21r4

0 1/2 1 MILE

NORTH

### *Wetlands*

Wetlands, commonly known as marshes, bogs, swamps, or shallow ponds, are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions.[22] Wetlands are important ecological resources; they filter runoff (and thus help to purify water quality), absorb heavy water flow (which alleviates flooding), provide habitat for many species, and promote recreation and tourism.

Most wetland location data is obtained from on-the-ground surveys, such as a County Natural Heritage Inventory (NHI). The NHI has limitations in data gathering, so it should not be considered an exhaustive list for wetlands in those counties.

### *Steep Sloped Areas and Landform*

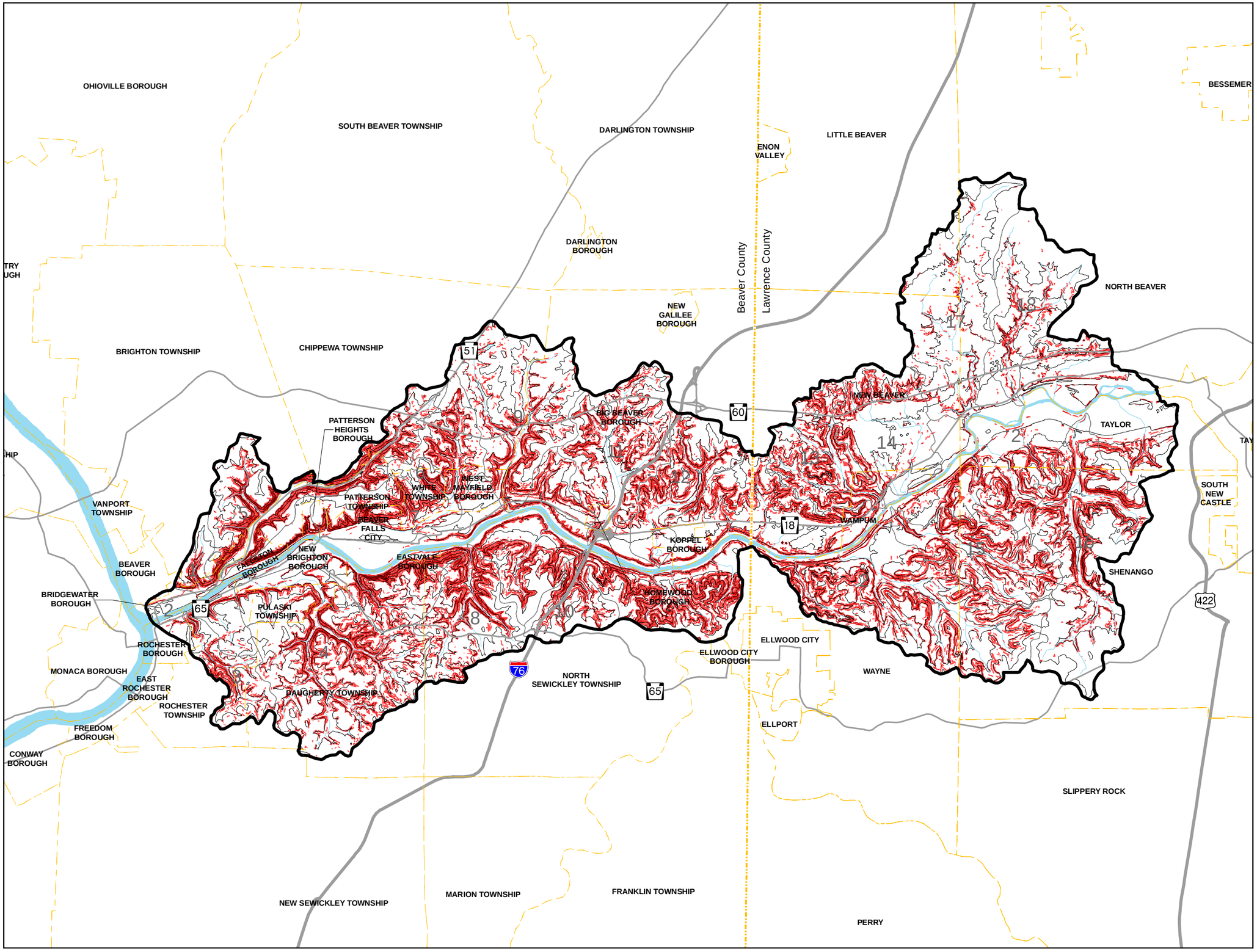
Steep forested slopes provide habitat for terrestrial species within the plan area largely due to the fact that these areas are unlikely to be developed. These areas are typically composed of pole stage and mature tree species, which contain diverse under-stratum habitats.

The Steep Slope Analysis Map identifies the locations of steep slopes. Slope grading is the percent (rise over run) expressing the steepness of a hill where zero indicates level, with respect to gradient and increasing numbers correlate to more vertical inclinations.

Slope refers the steepness of land and is usually defined as a percentage where zero percent slope indicates flat, level ground and increasing percentage represent greater vertical change. As an example of this calculation, a surface that rises 2 vertical feet over 10 feet of horizontal distance equals a slope of 20 percent. Within the Beaver River Corridor Study Area, land is generally most steep along the Banks of Beaver River and the streams that feed it. Slopes that are greater than 25 percent are typically considered “steep” and generally not suitable for intense development. Slopes between 25 and 40 percent gradient comprise approximately 12 percent of the study area. Approximately 6 percent of the Study Area’s land is characterized by slopes that are equal to or greater than 40 percent in gradient.

An analysis of the Study Area’s landform illustrates patterns of topography and elevation above sea level. Landform is shaped by geological forces and natural erosion processes caused by wind and water. The lowest point of the Study Area is the confluence of the Beaver and Ohio Rivers.

[22] DEP Wetlands Factsheet www.dep.state.pa.us




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundaries
- Rivers/Streams/Lakes
- Highways
- Major Roads
- 100' Topographic Contour

**Steep Slopes**

| | | |
|---|---|---|
| >25-40% | 7,439 acres |
| >40% | 3,580 acres |

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# STEEP SLOPE ANALYSIS
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.27

0 1/2 1 MILE

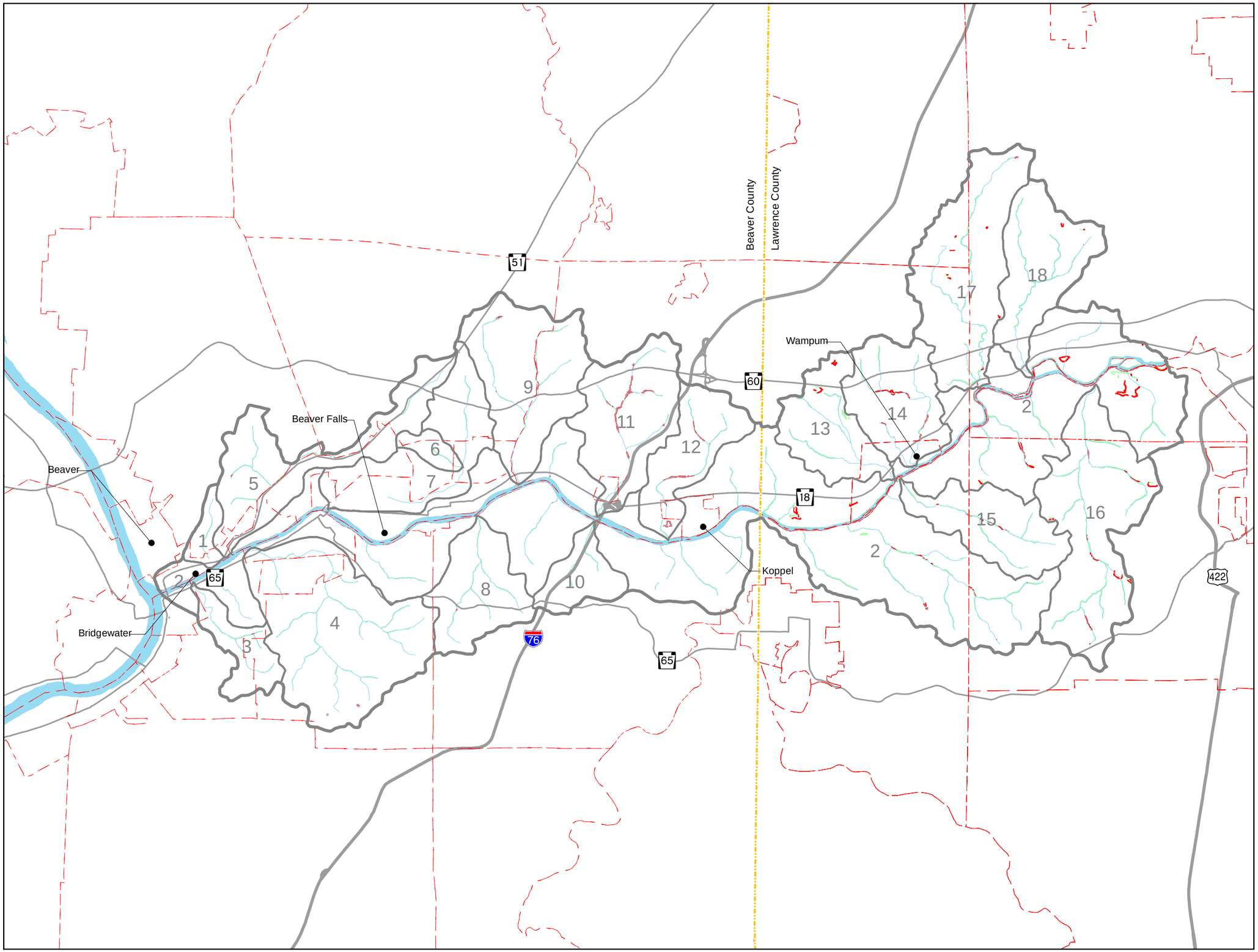
NORTH

### *Riparian (Streamside) Corridors*

Riparian zones refer to the area between the land and water along a stream, river, lake, pond, or wetland. In this region of the country, riparian buffers are typically forested and are important to the ecological health of the waterways as they stabilize the stream bank, reduce erosion, decrease nutrient loads from runoff, provide habitat, maintain water temperature, and provide a source of food for aquatic life.

Riparian buffers are vegetated areas adjacent to a watercourse that provide bank stabilization as well as aquatic and wildlife habitat protection. Riparian buffers have been shown to be effective in controlling non-point source pollution by removing nutrients, especially nitrogen and sediment. The majority of the study area riparian buffers are classified as Forested Areas. See Riparian Buffer Analysis Map.

A wealth of information can be found on-line about the importance of riparian buffers. To start, visit the PA DEP's website (www.dep.state.pa.us) and learn about the Pennsylvania Stream ReLeaf Program. Factsheets and a riparian buffer toolkit can be downloaded.




**Legend**

- Study Area Boundary
- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Minor Roads
- Forested Areas (within 50 feet of rivers or streams)
- Wetland Areas (within 50 feet of rivers or streams)

**Sub-Watersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# RIPARIAN BUFFER ANALYSIS
# BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvannia Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.06.01r1

0 1/2 1 MILE

NORTH

### *Sensitive Resource Threatened Habitat*

A compilation of the watershed's sensitive resources can be seen as part of the Sensitive Resources Inventory. This map identifies lands within the Study Area that may suffer serious environmental consequences if disturbed. Sensitive resources include steep slopes, flood-prone areas, wetlands, Biological Diversity Areas (as identified by the Western Pennsylvania Conservancy), and exceptional/high quality watersheds (as identified through Southwestern Pennsylvania Commission's Natural Infrastructure analysis). The Study Area's steep slopes and flood prone areas lie in close proximity to the Beaver River. Biological diversity areas are generally located in close proximity to the Beaver River as well as along its tributaries including the Brady's Run sub-watershed - classified as an exceptional/high quality watershed. The Wallace Run sub-watershed and Block House Run sub-watershed possess Prime and Good Warm Water Fish Habitats.

### *State Gamelands*

The Pennsylvania Game Commission has purchased land for inclusion in the State Game Lands system since 1920. Each State Game Land has an individual management plan designed to improve wildlife habitat and provide recreational opportunities. Hunters, anglers, hikers, birdwatchers and other wildlife enthusiasts are welcome on State Game Lands.[23] There is only one State Gameland within the Beaver River corridor. Gameland 148, Possum Hollow, is 369 acres and is home to pheasant, rabbits, and squirrels.

## Recreational Resources

## Trails

### *Land*

*Greenways*

Greenways are defined as dedicated corridors of open space. They vary in terms of size, purpose, and amount or quality of green. Some serve mainly as recreational corridors, as in rail trails, while others may be environmental corridors, like riparian (streamside) buffers. Greenways provide many environmental benefits, including improved air and water quality, habitat for wildlife, and the protection of environmentally sensitive areas like wetlands and steep slopes. Greenways are also economically beneficial; they increase property values, attract local businesses, connect communities, and improve the quality of life.

The Pennsylvania Greenways Partnership Commission, a coalition of government and private organizations established by Governor Tom Ridge in 1998, has produced an action plan for developing a statewide greenway network by 2020. Called *PA Greenways: An Action Plan for Creating Connections*, the document calls for connecting "hubs" of public lands with national, state, local, or regional greenways.[24] The Plan also encourages each county to apply greenways as a land use strategy and to map these important areas.

[23] www.pgc.state.pa.us
[24] www.dcnr.state.pa.us/pagreenways/index.htm

Beaver County completed a County Comprehensive Greenways and Trails Plan in 2007, and Lawrence County completed their County Greenways and Open Space Plan in 2008. The Beaver County Greenways Plan identifies twelve potential greenways. Of these, the Brady's Run watershed area and the southern portion of the Beaver River Study Area Watershed possess areas of sensitive natural resources that are commonly identified in Beaver County's Greenway Plan and in the Beaver River Conservation and Management Plan. The Lawrence County Greenway Plan identifies eight potential conservation greenways. Included among these eight are the Beaver/Mahoning River Greenway, which includes corridors along Jenkins Run and Edwards Run, and the McKees Run Greenway. These areas have been identified in the Beaver River Conservation and Management Plan as having sensitive natural resources, particularly areas of dense forests. Contact the County Planning Offices for information about these documents.

*Rails to Trails*

Rail trails are examples of recreational greenways. Abandoned rail beds provide an ideal starting point for cycling or walking trails: they are free from traffic, have a gentle grade, are close to many communities, and provide closer access to the rivers. Rail trails are made possible due to a 1983 amendment to the National Trail System Act of 1968. The amendment allows old railroad beds to be used by the public and allows for rail banking, which authorizes a railroad company to reclaim the abandoned railways if needed.

In 2006, the Beaver River Rails-to-Trails Association completed Phase 1 of the Beaver River Trail from 11th Street to 23rd Street in Beaver Falls. Phase 2 will involve Geneva College and extend from 28th Street to the northern edge of the College.

*The Railbanking Act*

In 1976, the federal government deregulated the railroads with the Railroad Revitalization and Regulatory Reform Act. The purpose of this act was to make it easier for the railroad companies to get rid of unprofitable lines freely, either by sale or abandonment, allowing it to become part of the adjacent property.

In 1983, Congress passed the National Trails System Act "to provide for the ever-increasing outdoor recreation needs…and in order to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation" through trail creation. The National Trails System Act is also known as the "railbanking act." Under "STATE AND METROPOLITAN AREA TRAILS," Section 8 (d) of the National Trails System Act, 16 U.S.C. §1247(d), the Act calls for encouraging State and local agencies and private interests to establish appropriate trails using the provisions of the National Trails System Act in administering the Railroad Revitalization and Regulatory Reform Act. Section 8 (d) spells out the "national policy to preserve established railroad rights-of-way for future reactivation of rail service, to protect rail transportation corridors, and to encourage energy efficient transportation use." The act allows rails-to-trails groups to take over the railroad land, assume responsibility for them, and promise to sell the land back to the railroads if they are ever needed again. As a way to straighten out the railroad transferring process and as a way to preserve the right-of-way for the future, Congress created the railbanking act.

*Private Landowners*

Commonly, the railroad right-of-ways are acquired through outright purchases, easements, condemnations, and land grants. Usually, it is a combination of all four types. After a railroad "abandons" the line, people may question ownership. At this point a lawyer should be retained

to do a title search to sort through the conflicting ownership claims. Many families who have owned the surrounding land for generations contend that the land was essentially borrowed subject to railroad use. When that use ceased, they believed the land would revert back to the family. This is essentially how an easement works. An easement is "the right to use the real property of another for a specific purpose." Legal title is retained by the original owner. When that specific purpose ceases, such as an abandonment of the line, the land reverts back to the original owner.

Now, however, the National Trails System Act allows the government to hold onto that land in case railroads are needed in the future, while making productive recreational use of the land in the present. The U.S. Congress was concerned about losing the existing rail network to abandonment, so now a line proposed for abandonment is preserved through interim conversion to trail use. What happened to the private landowners' rights? Sometimes, a line proposed for abandonment contains sections that are easements as opposed to the railroad outright owning the section. If an abandonment occurs, the land reverts back to the family who owns the land. However, if a line is railbanked, the line is not considered abandoned. Therefore, the land does not revert back to the family. The line can not be broken into segments. The railbanking act deposits the landowners' interests into a fictitious National Rail Bank, which holds them in public trust for future use.

*Constitutionality*
In 1990, the U.S. Supreme Court ruled that railbanking was constitutional, but it also allowed property owners to seek damage claims through the U.S. Court of Claims in Washington, D.C. Right now, seeking a damage claim seems to be the only redress for a private landowner, and the landowner can only take such action after the trail is created, because there must be an injury to the landowner in order for him or her to bring a claim in court. While private landowner groups have fought rail trails and held up the trail creation process in court, more times than not the trail wins out. The law favors productive use of the land.

***Water***

Water trails are boat routes suitable for canoes, kayaks and small motorized watercraft. Like conventional trails, water trails are recreational corridors between specific locations. Water trails are comprised of access points, boat launches, day use sites, and -- in some cases -- overnight camping areas. Each water trail is unique, a reflection of Pennsylvania's diverse geology, ecology and communities.

Pennsylvania Water Trails embrace the "Leave No Trace" code of outdoor ethics that promotes the responsible use & enjoyment of the outdoors. Contact the Pennsylvania Fish and Boat Commission (PFBC) or visit www.fish.state.pa.us for more information.

As part of the development of this Plan, the Pennsylvania Environmental Council (PEC) has conducted preliminary field work related to the development of the Beaver River Water Trail. The biggest challenge to the development of the Beaver River Water Trail is the lack of public boat access. The PFBC and PEC recommend that there be one public boat access point every ten miles and the current system does not support this.

Additionally, much of the riverfront is steeply sloped or has existing active railroads, which limits emergency access to the river. Also, there are three dams that present safety concerns (Eastvale, Beaver Falls and New Brighton). Additional work is required to identify safe portages

around these dams. Despite the challenges to the development of the Beaver River Water Trail, this river presents opportunities for recreational use.

Potential put-ins include:

- Ellwood City at the sewage treatment plant. This is along the Connequenessing Creek. The municipality controls this property; however they have interest in developing a boat access point at this location.
- Rock Creek Boat Club. This is at the confluence of the Connoquenessing Creek and Beaver River. Recently acquired by the Wild Waterways Conservancy this presents opportunities for development of a public access point.

Existing take-outs include:

- Fishing Park in New Brighton.
- Rochester Riverfront Park.
- Bridgewater Riverfront Park.
- On the Ohio River there is a boat access point in Monaca.

## Boating

### *River Access*

**Table 4-14**
**Public Boat Access Along the Beaver River**

| Access | Ownership | Location | Amenities/Comments |
|---|---|---|---|
| New Brighton | PFBC (public) | New Brighton, Beaver River | Unlimited horsepower, open 24/7, shore fishing, parking, surfaced ramp, loading dock, best for deep-draft high-powered boats |
| Rochester | PFBC (public) | Rochester Borough, Ohio River | Unlimited horsepower, open 24/7, shore fishing, parking, surfaced ramp, loading dock, best for deep-draft high-powered boats |
| Monaca | PFBC (local government) | Monaca Borough, Ohio River | Limited horsepower, large parking lot, surfaced ramp, loading dock, primary boating – deep draft, high powered recreation boats |

Source: www.fish.state.pa.us

### *Boating Registrations*

The PFBC tracks and regulates all boat and fishing registrations and related activities. Recreational traffic on the river may include motorized (pleasure boats or personal watercraft – see definition below) or non-motorized (canoes, kayaks, or sculls) craft.

Recreational boat registrations by county for 2007:
Beaver – 5,912
Lawrence – 3,573

See www.fish.state.pa.us for a list of boat registrations since 1995 for all counties.

### *Boating Safety*

Conflicts among boaters occur in public waterways. The PFBC has established regulations and educational courses to deal with the conflicts. Beaver County is within the Southwest Region PFBC Law Enforcement Headquarters, which can be reached at 814-445-8974. Lawrence County lies within the Northwest Region; that number is 814-337-0444. A complete guide to boating regulations can be found at www.fish.state.pa.us. A summary of boating regulations can be found at the end of this chapter.

Some safety problems arise when pleasure boaters are not educated about the rules of the river or when alcohol is involved. To help alleviate this problem, mandatory boating safety education for operators of motor boats became effective in February 2003. The regulation requires people born after January 1, 1982, to complete a boating education course and obtain a certificate to operate an internal combustion motor greater than 25 horsepower or to operate a personal watercraft. The certification lasts for a lifetime, and there are exemptions for the owners of private ponds. More information is available from the Pennsylvania Fish and Boat Commission.

"Personal watercraft are often referred to by their trade names such as jet skis or skidoos. PFBC regulations define "personal watercraft" as a boat less than 16 feet in length that uses an internal combustion motor powering a water jet pump as its primary means of propulsion and is operated by a person sitting, standing, or kneeling on the craft. Under proposed regulations, it is an unacceptable boating practice to:

- Cause a boat to become airborne while crossing the wake of another boat within 100 feet of the boat causing the wake.
- Weave through congested traffic.
- Follow too closely to another boat at other than slow, minimum height swell speed. For purposes of this regulation a boat is deemed to follow too close if within 100 feet of the rear of the boat or within 50 feet of the side of another boat (except in a narrow channel.)"[25]

## Fishing

### *Access*

No formal inventory of fishing spots along the Beaver River and its tributaries exists. However, there are many informal and some formal fishing areas that are known to local anglers. One popular formal area is the southern end of Big Rock Park, below the Townsend Dam.

### *Fishing Registrations*

See Table 4-13 for information on fish stocking and Table 4-7 for fish consumption advisories.

Fishing license sales/trout stamps by county for 2007:

[25] www.fish.state.pa.us

Beaver – 10,176 / 5,188
Lawrence – 7,662 / 3,716

See www.fish.state.pa.us for information on fishing registration sales per county in 2006.

***Fishing Tournaments***

During the summer months there are many fishing tournaments in the region. Most are small club tournaments with no prizes or fees and are limited to a small number of boats. While all tournaments are required to get a permit from the PFBC, a single list of the tournaments for the region does not exist. Anglers need to watch for notices in the newspaper and search the Internet for tournament notices. The PFBC is exploring ways to create a comprehensive list.[26]

## Recreation and Economics

The Recreation Map illustrates the region's diverse recreation facilities, including several hunting and camping areas in Daugherty Township and Big Beaver Township, as well as golf courses in Patterson Heights, North Sewickley Township, New Beaver Township and Wayne Township. Noteworthy is the limited number of larger-scale formal outdoor recreation facilities within the Study Area.

Advocates for a healthy environment often point to the economic benefits that outdoor recreation can bring to a community. While there are no specific estimates available for this study area, there are national and state figures that illustrate the contribution of outdoor recreation to the local economy.

In a 2001 survey, the U.S. Fish and Wildlife Service calculated that 82 million Americans age 16 and older participated in a wildlife-related activity (fishing, hunting, photography, wildlife watching, etc.) and spent 110 billion dollars on these activities.[27] For Pennsylvania, the figures and their expenditures are broken down in Table 4-15.

**Table 4-15**
**Participation in Wildlife Activities in Pennsylvania**
**U.S. Fish and Wildlife Service 2006 Survey**

| Activity | Participants | Expenditures* |
|---|---|---|
| Fishing | 982,000 | $ 1,252,380,000 |
| Hunting | 1,027,000 | $11,446,014,000 |
| Wildlife Watching | 3,503,000 (resident)<br>1,185,000 (non-resident) | $1,269,927,000 |

* Includes permits, licensing, food, lodging, trip related expenses, equipment, magazine subscriptions, land leasing, etc.

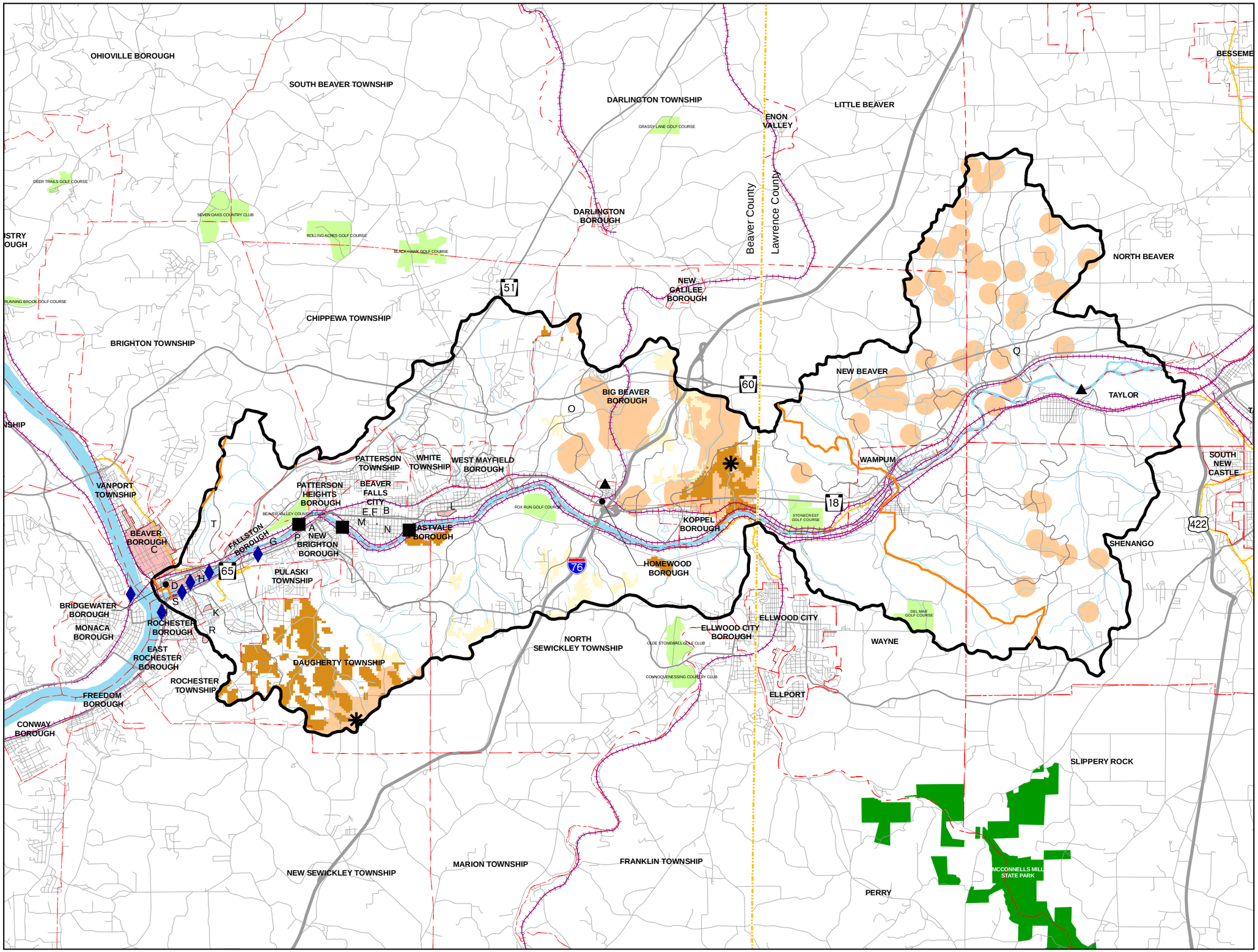
[26] Personal interview with Dennis Tubbs, PA Fish and Boat Commission, 2003
[27] 2001 Survey of Fishing, Hunting, and Wildlife Associated Recreation State Overview. July 2007. U.S. Fish and Wildlife Service.

According to the PFBC, Pennsylvania residents age 12 and over spend $1.7 billion annually on boating, including an average expenditure per recreational boater of $274.[28]

In addition to these expenditures, wildlife activities generated worker earnings, state sales taxes, state income taxes, and federal income taxes.

Similarly, trails and greenways improve local economies through tourism and recreation-related spending. A 1998 study on the economic impacts of the Great Allegheny Passage, the trail that is under construction between Pittsburgh and Washington D.C., showed that trail users spent $14.1 million near six trail heads as well as between $8.9 and $12.2 million on bikes and biking equipment.[29] Businesses predict that the completion of the trail will have an extremely positive impact on them, and nearly half of the businesses plan to expand.

[28] PA Fish and Boat Commission Fact Sheet, Economic Value of Fishing and Boating in Pennsylvania.
[29] www.atatrail.org/news/econ-study-99.htm




## Legend

- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads
- Pennsylvania Historic and Museum Commision Historical Areas
- Marinas/Boat Launches
- State Parks
- Golf Courses
- Hunting Areas
- Land Most Suitable for Primitive Camping
- Land Most Suitable for Non-Primitive Camping
- Existing Trails
- Land Most Suitable for ATV Area
- Hydroelectric Dams
- Other Dams

**Historic Sites**

A. New Brighton Armory
B. Beaver Falls Firehouse
C. Beaver Historic District
D. Broadhead Hotel/Broadhead District
E. Carnegie Free Library, Beaver Falls
F. County Bridge No. 26
G. William B. Dunlap Mansion
H. Eastvale Dam Complex
I. Farmer & Producers Market
J. H.C. Frye Glass Company
K. Geneva College
L. Granada Theatre
M. Hotel
N. Log House
O. Merrick Art Gallery
P. North Beaver Grange
Q. Passavant Memorial Homes
R. Pennsylvania Canal: Girard Locks No. 16 & No. 17
S. Wray House

1,000 Acres
500 Acres
250 Acres

# RECREATION MAP
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: September 2006
1989.05.22r2

0 1/2 1 MILE

NORTH

## Historic and Cultural Resources

### *Regional History*

The Beaver River area was originally settled by the Monongahela people, of whom little is known, except that they vacated the region by the 1600s and were replaced by members of the Delaware, Shawnee, and Iroquois Tribes. These native people called the river Amockwi-Sipu, or "Beaver Stream." They remained in the area until the late 1750s when farmers settled much of the region. Although the native people no longer lived in the area, they left behind important travel routes, or trails, along many of the major waterways. The Mahoning Trail followed along the Beaver River and was used to connect people from Pittsburgh to Akron, Ohio, and eventually Detroit, Michigan. The Sandusky Trail followed the Beaver River for a short distance before turning west toward Sandusky, Ohio. These trails eventually became the network used for roads and railroads that are used today. Route 18 follows the approximate path of the Mahoning Trail, and the Sandusky Trail is now Route 51.[30]

Then, as it became important to establish trade routes with other areas of the country, canals were established. In the 1830s, the Beaver and Erie Canal was built and became one of the more successful canals in Pennsylvania. By the 1850s, however, it was replaced by the faster, more efficient railroads, which were built on both sides of the Beaver River.

The railroads and industrial revolution fueled the increase in population as immigrants came to work in the steel mills. The turn of the nineteenth century saw the largest population in the region. By the late 1900s, much of the industry disappeared along the river. The river now is being viewed for its recreation potential as parks and waterfront developments spring up along its banks.

More history of the region can be found in the book *Rivers of Destiny*, published in 1999, and in the *Inventory and Assessment of Historic and Heritage Sites in Beaver County*, published in 1998. Local historical societies also are excellent sources of information. The website www.bchistory.org contains community histories, historical essays by subject, and a list of local historical societies.

### *The National Register of Historic Places*[31]

The Historical and Cultural Sites Map highlights important resources relating to life in the Beaver River Valley. Featuring historical residences, businesses, and institutions, these sites are almost exclusively concentrated in the more populated areas of the region. These resources can also be viewed in context of other recreation-oriented activities in the region as illustrated on the Recreation Map.

The PA Historical and Museum Commission (PHMC) manages the National Register of Historic Places for Pennsylvania. The program was established by the National Historic Preservation Act of 1966. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. National Register properties are distinguished by having been documented and evaluated according to uniform standards. These criteria recognize the accomplishments of all

[30] Rivers of Destiny, 1999, Beaver County Planning Commission.
[31] Supported and published by the Pennsylvania Historical and Museum Commission (PHMC) www.phmc.state.pa.us Summary taken from PHMC.

people who have contributed to the history and heritage of the United States and are designed to help state and local governments, federal agencies, and others identify significant historic and archeological properties worthy of preservation and of consideration in planning and development decisions. Listing in the National Register, however, does not interfere with a private property owner's right to alter, manage, or dispose of property. It often changes the way communities perceive their historic resources and gives credibility to efforts to preserve these resources as irreplaceable parts of the communities.

Listing in the National Register contributes to preserving historic properties in a number of ways:

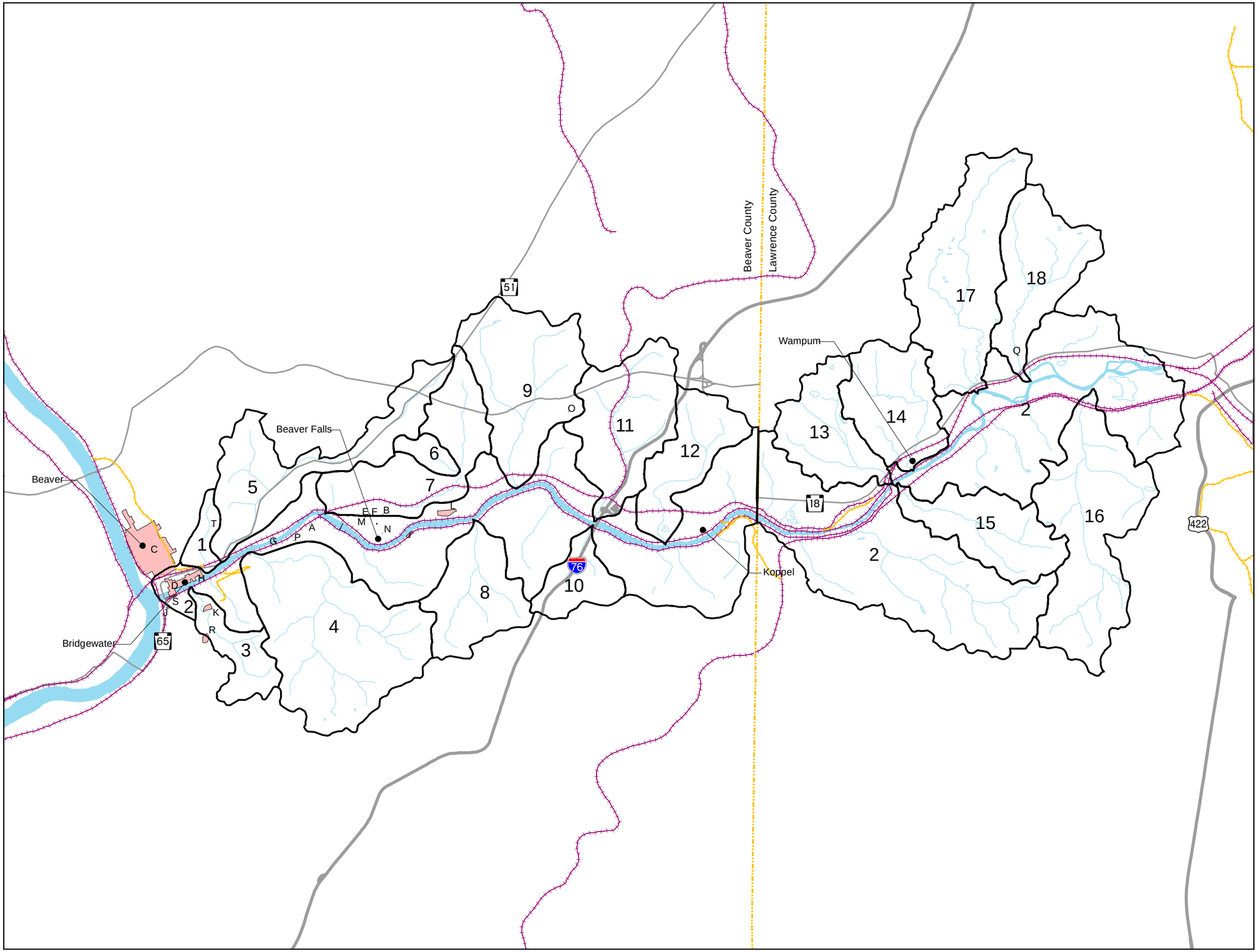
- Recognition that a property is of significance to the nation, the state, or the community.
- Consideration in the planning for federal or federally assisted projects.
- Eligibility for federal tax benefits.
- Qualification for federal assistance for historic preservation, when funds are available.

***The Historical Marker Program***[32]

The historical marker program, established in 1946, is one of PHMC's oldest and most popular programs. The blue and gold markers located throughout the state highlight people, places, and events significant in state and national history. Presently, nearly 1,800 markers recognize Pennsylvania's history - from William Penn's country home, to the bloody Homestead Strike of 1892, to the Pennsylvania Turnpike, the nation's first long-distance superhighway.

See the list of historical places and markers in Appendix 4.

[32] Summary taken from PHMC




**Legend**

- Watershed Boundary
- County Boundary
- Municipal Boundary
- Rivers/Streams/Lakes
- Highways
- Major Roads
- Active Railroads
- Inactive Railroads
- Pennsylvania Historic and Museum Commision Historical Areas

**Notable Sites**

A. New Brighton Armory
B. Beaver Falls Firehouse
C. Beaver Historic District
D. Broadhead Hotel/Broadhead District
E. Carnegie Free Library, Beaver Falls
F. County Bridge No. 26
G. William B. Dunlap Mansion
H. Eastvale Dam Complex
I. Farmer & Producers Market
J. H.C. Frye Glass Company
K. Geneva College
L. Granada Theatre
M. Hotel
N. Log House
O. Merrick Art Gallery
P. North Beaver Grange
Q. Passavant Memorial Homes
R. Pennsylvania Canal: Girardlocks No. 16 & No. 17
S. Wray House

**Subwatersheds**

1. Hamilton Run
2. Beaver River
3. McKinley Run
4. Block House Run
5. Brady Run
6. Grimms Run
7. Walnut Bottom Run
8. Bennett Run
9. Wallace Run
10. Thompson Run
11. Clarks Run
12. Stockman Run
13. Wampum Run
14. Eckles Run
15. Snake Run
16. McKee Run
17. Jenkins Run
18. Edwards Run

1,000 Acres
500 Acres
250 Acres

# HISTORIC AND CULTURAL SITES
## BEAVER RIVER CONSERVATION AND MANAGEMENT PLAN

Prepared for: Pennsylvania Environmental Council
Prepared by: Environmental Planning and Design, LLC

Date: August 2005
1989.05.08

0 1/2 1 MILE

NORTH

# CHAPTER 5: PUBLIC PARTICIPATION

Public comments are an important component of the planning process, as they help to form the basis for the watershed analysis and management recommendations. Comments were gathered from an advisory committee, the municipalities, and the general public.

## Advisory Committee

The advisory committee's role was to assist in research, guide the direction of the Plan, suggest ideas for recommendations, act as liaisons to their community/group, and to review the draft Plan and maps. Advisory committee members are listed in the introduction under acknowledgements.

At the first committee meeting in March 2005, members were asked to answer some questions about the river. The responses are found in the following survey.

***What special or important places should be recognized and protected in the Beaver River Corridor?***

- Isolated gorge between Wampum Dam and Eastvale Dam (mature growth hardwoods on steep slopes)
- Islands in Lawrence County
- West Pittsburgh swamps
- Connecting greenway from Little Beaver Creek to Beaver River
- Native American caves, paintings at Beaver/Lawrence County line
- Buttermilk Falls and Quarry in Homewood
- James Wood/Homewood Iron Furnace in North Sewickley
- Rock Point Park in Wayne Township
- Steep slopes/rock ledges in North Sewickley/Big Beaver
- Large trees located along the river
- Islands
- Natural areas on the county NHIs
- River in northern Beaver County
- Bridgewater Riverfront Park and extension
- Big Rock Park in New Brighton
- New Brighton fishing park
- Girard Lock wall in Rochester Borough
- Flag Plaza in Rochester Borough

***What are the major problems or issues affecting the natural quality and recreational potential of the Beaver River?***

- Steep slopes and railroad right-of-way prevents access
- No access between Beaver Falls and Wampum
- Hot water outfall affecting water quality – from Orion Energy
- No access on upper River
- Logging on steep slopes in watersheds
- Difficult access in Big Beaver (steep slopes and railroad)

- Potential development impacting the visual integrity of the river valley
- Uncontrolled logging practices
- Privately-owned lands in Beaver Falls
- Dams
- Blockhouse Run sediment
- Steep topography in Rochester Township
- McKinley Run sediment
- Sediment deposits at mouth of River
- Brady's Run sediment
- Privately-owned land in Fallston
- Beaver Falls/New Brighton bridge pier

***How are these problems or issues being addressed or how would you propose to address them?***

- Negotiations with railroad
- Upper Beaver Valley Region is addressing uncontrolled development and logging
- Funding
- County and municipal support
- Vision plan

***Are you aware of any current projects and studies along the river?***[1]

- Route 18 Corridor Plan
- Multi-municipal comprehensive plan for Big Beaver, New Galilee, Homewood, and Koppel
- Beaver River Rails-to-Trails from Beaver Falls to Wampum

***What projects/improvements would you like to see in the Beaver River corridor in the next 10 years?***

- Create access to the river for recreation purposes
- Conservation of the forested slopes
- Boat access
- Wetland opportunities from sand and gravel operations
- Greenway with trails
- Rails-to-trails system
- Connector trail to Buttermilk Falls Park site and other heritage sites
- Mixed use development along Route 18 with recreational linkage to the river valley
- Beautification projects and communication with industries
- Dredge lower Beaver River
- Historical and informational markers in parks and riverfronts

***How can we make the plan a useful document for you?***

- Explain how to use the river valley in Big Beaver
- Create feasible goals that can be implemented

[1] A complete list of plans, including those not mentioned at this meeting, appears in Chapter 1.

## Municipalities

Twenty-six communities are located within the Beaver River watershed study area. Nine of these communities responded to a Watershed Protection Inventory survey intended to identify existing policy and land patterns relevant to potential watershed planning and management. This Inventory was developed by the Center for Watershed Protection (www.cwp.org). A copy of the Inventory is shown in Appendix 5.

### *Issues*

In analyzing survey responses, a series of issues and observations emerge. Many of the responses confirm concerns expressed by the public that communities of the Beaver River Watershed possess few controls to manage/conserve existing natural resources. Municipal responses illuminate the following issues:

- Communities generally lack natural resource-related development controls.
- Control of stormwater run-off/erosion & sedimentation is minimal and property owners are primarily responsible for its management.
- Besides State and/or Federal controls that may apply, few local provisions exist to control impacts on stream edges.
- There are currently no formal policy mechanisms that control the ability or location of infrastructure expansion within the Study Area.
- Although oriented toward grey infrastructure, some multi-municipal planning collaboration currently occurs among communities in the Watershed.

The following observations related to development patterns/policies, environmental resources, infrastructure and outreach also emerged from the communities' responses.

### *Observations*

*Development Patterns/Regulations*

- All respondents expressed that they do not take into account (or do not know) the impacts of their land use decisions on water resources.
- Development flexibility in regard to coverage, massing (clustering), and open space preservation/conservation is generally not encouraged and most times is not permitted as part of community policy.
    a. Big Beaver Borough allows conservation developments
    b. Brighton Twp. encourages developers to design for existing conditions
    c. Patterson Twp. features open space management techniques such as consolidation of open space, minimum percentages of managed natural areas, etc.

- Several, but not all, respondents require Erosion and Sedimentation (E & S) controls as part of the site development process.

- Two of the responding communities carry the responsibility of maintaining stormwater run-off. In the remaining municipalities, land owners are responsible for such maintenance.

- Requirements for the use of porous materials (e.g. driveway paving) to reduce stormwater runoff is not widespread.
    a. Several communities permit porous materials for single-family homes' driveways.
    b. One of the responding communities allows "two track" designed driveways; nearly half of responding communities allow shared driveways in residential areas.

- No responding communities require parking lot landscaping.

*Environmental Resources*

- Only one responding community addresses open space conservation (via conservation easements) and is aware of the presence of critical habitats.

- Several, but not all, responding communities require developers to identify environmental issues before engineering and site planning is done.

- Half of the responding communities restrict development based on steep slopes or sliding soils and mining. Half also require or currently possess information related to soils and mining discharge.

- Road salt is the primary substance used for winter de-icing.

*Infrastructure*

- Almost all responding communities have a stormwater ordinance and participate in some sort of infrastructure-oriented (water/sewer) multi-municipal effort (need design years used).

- Only one community (Big Beaver) limits infrastructure extension to control development in specific areas.

*Outreach*

- None of the responding communities has GIS capabilities.

- When watershed education occurs, the primary recipients are residential land owners; no one currently aims outreach toward non-residential uses.

## General Public

The first two public meetings were held in October 2005 to introduce the public to the Beaver River Conservation and Management Plan and to gather information about the River. Questions similar to those asked in the advisory committee's questionnaire were asked, and responses are summarized below.

**Public Meeting**
**October 3, 2005**
**Beaver Falls**
**(10 people)**

- There is a siltation problem in the lower Beaver River due to silt from Brady's Run, Hamilton Run, and Blockhouse Run. Siltation impacts docks and fishing. Army Corps of Engineers did a reconnaissance study on dredging the area. The cost-benefit ration for having the Corps dredge the area was not reached. Local match money to complete the project would be needed as well. Lower 2.5 miles needs to be dredged.

- Gorge through Beaver Falls and Big Beaver should be protected. Limited access to upper river has secured its scenic quality. A trail is needed for hikers. The riverbanks are in good shape. Big Beaver has a RR bridge crossing the river, but no way to get there. There is a problem gaining access because of the railroads. Hillsides have been logged in the past, but the railroad has preserved many of the trees. Geneva College could use an access to the river to establish a rowing program (Eastvale docks – Beaver Falls Boat Club). Historic points of interest should be noted along with notable flora, fauna, and geologic features by way of informative signage. Non-intrusive overlooks are possible. A water trail is possible, but motorized boats should be kept to a minimum. Limited camping and fishing access points may be added.

- Link riverfront projects and enhance pedestrian access. Create steps to Rochester-Bridgewater Bridge or use a hill climber (mini-incline).

- Did Shenango Reservoir let water out during flood last year? Typically, flooding is caused by a backup of the Ohio River.

- Continue trail along lower part of Beaver River. (See trail plan)

- Stormwater Management is needed on tributaries (no Act 167 plans; 32 MS4 communities).

- Re-establish a crossing of the Beaver River at the former 10th St. Bridge. The landside trail can take you to the bridge.

- Study the fish and wildlife of the region and develop a curriculum for elementary, junior high, and high schools in Beaver County, especially in those schools close to the river. Voyager comes at least twice per year to serve approximately 5 school districts and conduct adult education programs in the evening.

- Clean up abandoned poles from former docks. This is a safety issue for boaters, especially at night. Area by Riverside carwash and Kelley's station is the worst. Fish and Boat Commission should mark the areas until the clean-up.

- Establish a tour boat excursion from the Beaver Falls-Eastvale area (former railroad station at Geneva College) to Rock Point.

- Not a lot of illegal dump sites because of limited access. West gate has a dump. Inactive dumps include the Beaver Falls city dump and the Koppel dump.

- Bridgewater solicitor is amenable to installing public docks at Docker's restaurant.

- Mouth of Clarks Run could be a potential site for water trail "resting site." Not accessible to roads (owned by Big Beaver).

- Section of steep slopes on west side of river just below Homewood – property may belong to Big Beaver – if so, could be a potential access site (this may be near the Turnpike Interchange).

- Motor boats' northern boundary is the county line – too hard to navigate above that.

- Rock Point and Eastvale docks have, in the past, been amenable to non-motorized users – not sure of current status.

**Public Meeting**
**October 5, 2005**
**Wampum**
**(12 people)**

- Fishing and boating access areas do exist, but many of them are on private property. There is a boat access area near Snake Run, under the bridge, where it is very shallow, on the Wayne Township side of the river. The Wampum side is very steep. Signage is needed for access areas <u>not</u> on private property. The Wampum disposal site has access to the river, but the water is deep. Potential access areas should be documented even if they are private so that landowners can be contacted about purchase or easements.

- Good water quality is needed for fishing. Do we know if the fish are safe to eat? Does the PA Fish and Boat Commission stock here? Someone (EPA?) was testing quality of Snake Run. Conservation District primarily works on water quality of Shenango River because it is a state priority. Conservation grants exist on Hell Run and North Fork of Little Beaver.

- People watch trout stocking in Volant, maybe it can be done here.

- Lawrence County is going to create a greenway and open space plan. North Country Trail cuts through Wampum.

- Water trail is a good idea.

- Does timbering disturb river? Erosion and Sedimentation plans are needed for this activity.

- PA Cleanways is active in the county. At the end of Clyde St. in Wampum, there is a little path that leads to an illegal dump site. DEP has been notified, but they cannot catch the people who are doing it.

- People come to the area and wait by the railroad tracks to watch the trains go by. Communities should create a stopping place along the river where people can take pictures of trains.

- There are 3 historic markers along Rt. 18. Old canal went through Wampum. Are there underground railroad sites here? Christine Davis did a study on the potential historic sites in Beaver County. Lawrence County has a historical society, contact Beverly Zona.

- Access to river: Will the temporary railroad crossing at the bridge be removed? Big Beaver Borough has an old road that goes to the river.

- Can the river be part of the PA scenic rivers program?

- Are there land use controls in municipalities that protect the river corridor? Maybe do an overlay district to protect areas without controls (e.g. steep slopes). The RCP should recommend language for model ordinances to protect natural resources.

- Are there scenic views? Brighton Twp. golf course. Rockpoint where Connoque. enters the river. Railroad bridge where Shenango and Connoque. confluence behind the mall.

- Turnpike expansion will occur in the next few years.

- Are drains at Universal Mills (?) emptying into Eckles Run?

- Bad erosion and flooding at the end of Glenkirk Rd. along Jenkins Run. Road is closed.

- Tributaries are getting narrower.

- Wildlife: Bald eagles nesting at UPS distribution center in Rochester, beaver, muskrats, great blue herons, white swans, bobcats, bear, cormorants. A more detailed wildlife survey is needed (beyond the NHI).

- There are no watershed groups in this corridor. How will recommendations be implemented?

- Commercial dredging occurring in river near Rt. 168

- Siltation problem in Eckles Run

- Discussion on preserving the quality of the Beaver corridor for “selling the scenic and natural beauty and diversity of the River.”

## Final Round of Public Participation

The draft plan was presented to the advisory committee and the public at separate meetings on April 1, 2008, in Beaver Falls. The public and interested parties had an opportunity to comment on the Plan in its draft form during a 30 day comment period that ended May 1, 2008. Their comments have been integrated into this plan as appropriate.

# APPENDIX 1

## LAWRENCE COUNTY ILLEGAL DUMP SURVEY MAP

# Lawrence County, Pennsylvania
# Illegal Dumpsites and Municipalities
# April 2008

Attachment 1

© 2008 PA CleanWays
Map Prepared by Andrew Aurand
UCSUR, University of Pittsburgh

N

# APPENDIX 2

# ABANDONED MINE LAND INVENTORY

## Report Selection Criteria **From the current AMLIS data files.**

| Priority | Type of Mining | State/Tribe |
|---|---|---|
| **All Priorities** | **All Mining Types** | **PENNSYLVANIA** |

| Problem Types | Program Area |
|---|---|
| **All Problem Types** | **All Program Areas** |

Additional Criteria

**County is Equal to "Beaver" and County is Equal to "BEAVER"**

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

## Problem Type Cost Detail

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| **Priority 1** | **Dangerous Highwalls (Feet)** | | | | |
| PA006922RUA | CAMP KON-O-KWEE | 0 | 0 | 64,595 | 64,595 |
| PA004467RUA | HARPERS FERRY R. | 0 | 0 | 258,318 | 258,318 |
| PA006293RUA | CO. SCHOOL EAST | 1,529,218 | 0 | 0 | 1,529,218 |
| PA001464RUA | HOYTDALE | 1,387,500 | 0 | 0 | 1,387,500 |
| PA001463RUA | GLENKIRK SCHOOL | 0 | 0 | 286,362 | 286,362 |
| PA006293SGA | COUNTY SCHOOL EAST | 0 | 0 | 132,456 | 132,456 |
| PA006638RUA | FRANKFORT SPRINGS | 40,000 | 0 | 0 | 40,000 |
| PA006920RUA | HARPERS FERRY E. | 0 | 0 | 152,637 | 152,637 |
| Total for P 1 | Dangerous Highwalls | 2,956,718 | 0 | 894,368 | 3,851,086 |
| **Priority 1** | **Subsidence (Acres)** | | | | |
| PA006293RUA | CO. SCHOOL EAST | 100,000 | 0 | 0 | 100,000 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 1,885 | 1,885 |
| PA000822EMA | BEECHWOOD AVE & ROMOOR ST | 0 | 0 | 49,241 | 49,241 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 6,554 | 6,554 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 3,622 | 3,622 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 8,995 | 8,995 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 2,450 | 2,450 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 469,511 | 469,511 |
| PA942007EMA | PA - BEAVER - FEA | 0 | 0 | 1,220,592 | 1,220,592 |
| Total for P 1 | Subsidence | 100,000 | 0 | 1,762,850 | 1,862,850 |
| **Priority 2** | **Dangerous Highwalls (Feet)** | | | | |
| PA006927SGA | HEREFORD MANOR LAKE N. | 40,000 | 0 | 0 | 40,000 |
| PA006637SGA | CLUTCH RUN EAST | 300,000 | 0 | 0 | 300,000 |
| PA006298SGA | NEW GALILEE NORTH | 3,125 | 0 | 0 | 3,125 |
| PA006288SGA | DARLINGTON ROAD | 338,000 | 0 | 0 | 338,000 |
| PA006281SGA | ISLAND RUN | 0 | 0 | 703,826 | 703,826 |
| PA000153SGA | JORDAN RUN | 0 | 344,000 | 0 | 344,000 |
| PA006280SGA | BEATTY HILL | 0 | 0 | 628,326 | 628,326 |
| PA006279SGA | MISKITA LAKE FAR SOUTHWEST | 0 | 371,250 | 0 | 371,250 |
| PA006269SGA | CANNELTON NORTH | 122,500 | 0 | 0 | 122,500 |

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

## Problem Type Cost Detail

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| **Priority 2** | **Dangerous Highwalls (Feet)** | | | | |
| PA004473SGA | ELLWOOD CITY WEST | 136,000 | 0 | 0 | 136,000 |
| PA004460SGA | HOMEWOOD SOUTHEAST | 4,500 | 0 | 0 | 4,500 |
| PA001240SGA | SHERWOOD DRIVE | 0 | 0 | 960,933 | 960,933 |
| PA004459SGA | MORADO EAST | 67,750 | 0 | 0 | 67,750 |
| PA001820SGA | DARLINGTON LAKE N.W. | 0 | 1,178,000 | 0 | 1,178,000 |
| PA001641SGA | PEGGS RUN | 30,750 | 0 | 0 | 30,750 |
| Total for P 2 | Dangerous Highwalls | 1,042,625 | 1,893,250 | 2,293,085 | 5,228,960 |
| **Priority 2** | **Hazardous Equipment & Facilities (Count)** | | | | |
| PA001263SGA | DARLINGTON LAKE | 0 | 0 | 3,800 | 3,800 |
| PA001259SGA | FALLSTON | 0 | 10,000 | 0 | 10,000 |
| Total for P 2 | Hazardous Equipment & Facilities | 0 | 10,000 | 3,800 | 13,800 |
| **Priority 2** | **Hazardous Water Body (Count)** | | | | |
| PA000153SGA | JORDAN RUN | 0 | 13,000 | 0 | 13,000 |
| Total for P 2 | Hazardous Water Body | 0 | 13,000 | 0 | 13,000 |
| **Priority 2** | **Portals (Count)** | | | | |
| PA000158SGA | BOLOGNE VALLEY | 0 | 0 | 7,602 | 7,602 |
| PA000585SGA | HODGE OPENING | 0 | 0 | 4,000 | 4,000 |
| PA001259SGA | FALLSTON | 0 | 30,000 | 0 | 30,000 |
| PA001263SGA | DARLINGTON LAKE | 0 | 0 | 3,748 | 3,748 |
| Total for P 2 | Portals | 0 | 30,000 | 15,350 | 45,350 |
| **Priority 2** | **Vertical Opening (Count)** | | | | |
| PA001237SGA | CANNELTON | 10,000 | 0 | 0 | 10,000 |
| Total for P 2 | Vertical Opening | 10,000 | 0 | 0 | 10,000 |
| **Priority 3** | **Gobs (Acres)** | | | | |
| PA000158SGA | BOLOGNE VALLEY | 86,400 | 0 | 0 | 86,400 |
| Total for P 3 | Gobs | 86,400 | 0 | 0 | 86,400 |
| **Priority 3** | **Highwall (Feet)** | | | | |
| PA006280ENH | BEATTY HILL | 0 | 0 | 0 | 0 |
| Total for P 3 | Highwall | 0 | 0 | 0 | 0 |
| **Priority 3** | **Mine Opening (Count)** | | | | |
| PA000158SGA | BOLOGNE VALLEY | 10,000 | 0 | 0 | 10,000 |
| Total for P 3 | Mine Opening | 10,000 | 0 | 0 | 10,000 |
| **Priority 3** | **Spoil Area (Acres)** | | | | |
| PA006293SGA | COUNTY SCHOOL EAST | 0 | 0 | 1 | 1 |
| PA006281SGA | ISLAND RUN | 0 | 0 | 1 | 1 |
| PA006280SGA | BEATTY HILL | 0 | 0 | 1 | 1 |
| PA006280ENH | BEATTY HILL | 0 | 0 | 0 | 0 |
| Total for P 3 | Spoil Area | 0 | 0 | 3 | 3 |
| **Priority 3** | **Water Problems (Gal/Min)** | | | | |
| PA001263SGA | DARLINGTON LAKE | 50,000 | 0 | 0 | 50,000 |
| PA000585SGA | HODGE OPENING | 0 | 200,000 | 0 | 200,000 |
| PA000158SGA | BOLOGNE VALLEY | 50,000 | 0 | 1 | 50,001 |
| Total for P 3 | Water Problems | 100,000 | 200,000 | 1 | 300,001 |

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

**Problem Type Cost Detail**

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| Total for | **PENNSYLVANIA** | 4,305,743 | 2,146,250 | 4,969,457 | 11,421,450 |

## Report Selection Criteria **From the current AMLIS data files.**

| Priority | Type of Mining | State/Tribe |
|---|---|---|
| **All Priorities** | **All Mining Types** | **PENNSYLVANIA** |

| Problem Types | Program Area |
|---|---|
| **All Problem Types** | **All Program Areas** |

Additional Criteria

**County is Equal to "Lawrence" and County is Equal to "LAWRENCE"**

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

## Problem Type Cost Detail

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| **Priority 1** | **Clogged Stream Lands (Acres)** | | | | |
| PA000003CLA | MITCHELL ROAD | 0 | 0 | 0 | 0 |
| Total for P 1 | Clogged Stream Lands | 0 | 0 | 0 | 0 |
| **Priority 1** | **Dangerous Highwalls (Feet)** | | | | |
| PA000003RUA | MITCHELL ROAD | 0 | 0 | 136,724 | 136,724 |
| PA006297SGA | NEW GALILEE FAR NORTH | 22,688 | 0 | 0 | 22,688 |
| PA004478RUA | EDINBURG ROAD | 400,000 | 0 | 0 | 400,000 |
| Total for P 1 | Dangerous Highwalls | 422,688 | 0 | 136,724 | 559,412 |
| **Priority 1** | **Dangerous Piles & Embankments (Acres)** | | | | |
| PA000182RUA | HOPE ROAD | 0 | 0 | 134,985 | 134,985 |
| Total for P 1 | Dangerous Piles & Embankments | 0 | 0 | 134,985 | 134,985 |
| **Priority 1** | **Hazardous Water Body (Count)** | | | | |
| PA000951SGA | HILLSVILLE | 0 | 48,700 | 0 | 48,700 |
| Total for P 1 | Hazardous Water Body | 0 | 48,700 | 0 | 48,700 |
| **Priority 1** | **Subsidence (Acres)** | | | | |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 9,074 | 9,074 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 1,950 | 1,950 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 1,950 | 1,950 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 8,355 | 8,355 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 3,038 | 3,038 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 2,855 | 2,855 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 1,975 | 1,975 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 13,250 | 13,250 |
| PA002856EMA | NESHANNOCK II (SHENANGO RD) | 0 | 0 | 1,985 | 1,985 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 1,976 | 1,976 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 5,284 | 5,284 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 1,705 | 1,705 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 2,381 | 2,381 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 5,976 | 5,976 |

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

## Problem Type Cost Detail

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| **Priority 1** | **Subsidence (Acres)** | | | | |
| Total for P 1 | Subsidence | 0 | 0 | 61,754 | 61,754 |
| **Priority 1** | **Vertical Opening (Count)** | | | | |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 1,795 | 1,795 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 1,560 | 1,560 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 1,999 | 1,999 |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 1,950 | 1,950 |
| Total for P 1 | Vertical Opening | 0 | 0 | 7,304 | 7,304 |
| **Priority 2** | **Clogged Streams (Miles)** | | | | |
| PA002854RUA | BOYD SCHOOL ROAD | 20,000 | 0 | 0 | 20,000 |
| PA006238SGA | NORTH EDINBURG NORTH | 0 | 0 | 5,000 | 5,000 |
| Total for P 2 | Clogged Streams | 20,000 | 0 | 5,000 | 25,000 |
| **Priority 2** | **Dangerous Highwalls (Feet)** | | | | |
| PA006238SGA | NORTH EDINBURG NORTH | 0 | 0 | 66,033 | 66,033 |
| PA006246RUA | BEIGHT ROAD WEST | 2,200,000 | 0 | 0 | 2,200,000 |
| PA006251RUA | DERRINGER CORNERS NORTHWEST | 720,000 | 0 | 0 | 720,000 |
| PA004481SGA | DUCKRUN EAST | 128,875 | 91,125 | 0 | 220,000 |
| PA004476SGA | CHEWTON SOUTHEAST | 24,000 | 0 | 0 | 24,000 |
| PA006254RMA | HONEY CREEK WEST | 0 | 0 | 522,500 | 522,500 |
| PA004489RUA | MARTIN ROAD | 360,000 | 0 | 0 | 360,000 |
| PA006245RUA | PEANUT SOUTHWEST | 111,000 | 0 | 0 | 111,000 |
| PA000185RUA | FRIDAYS HILL ROAD | 108,000 | 0 | 0 | 108,000 |
| PA002911SGA | MOORES CORNERS NORTH #1 | 0 | 0 | 24,258 | 24,258 |
| PA004485SGA | UNION VALLEY EAST | 16,000 | 0 | 0 | 16,000 |
| PA000185SGA | FRIDAYS HILL ROAD | 0 | 0 | 64,008 | 64,008 |
| PA006843SGA | GRANT CITY | 31,500 | 0 | 0 | 31,500 |
| PA006915SGA | PLEASANT HILL EAST | 56,000 | 0 | 0 | 56,000 |
| PA000141SGA | GLENKIRK SCHOOL SW. | 0 | 0 | 426,445 | 426,445 |
| PA001201RUA | MARSHALL RUN | 190,000 | 0 | 0 | 190,000 |
| PA001201SGA | MARSHALL RUN | 0 | 0 | 595,904 | 595,904 |
| PA001231SGA | BEAVERDAM RUN EAST | 0 | 44,324 | 0 | 44,324 |
| PA002854SGA | CASTLEWOOD WEST | 31,500 | 0 | 0 | 31,500 |
| PA002854RUA | BOYD SCHOOL ROAD | 400,000 | 0 | 0 | 400,000 |
| PA004489SGA | MARTIN ROAD | 1,210,000 | 0 | 0 | 1,210,000 |
| Total for P 2 | Dangerous Highwalls | 5,586,875 | 135,449 | 1,699,148 | 7,421,472 |
| **Priority 2** | **Dangerous Impoundments (Count)** | | | | |
| PA006251RUA | DERRINGER CORNERS NORTHWEST | 120,000 | 0 | 0 | 120,000 |
| Total for P 2 | Dangerous Impoundments | 120,000 | 0 | 0 | 120,000 |
| **Priority 2** | **Dangerous Piles & Embankments (Acres)** | | | | |
| PA006235RUA | NO.5 SCHOOL | 150,000 | 0 | 0 | 150,000 |
| PA006843RUA | GRANT CITY | 50,000 | 0 | 0 | 50,000 |
| PA006255RUA | MOUNT AIR | 175,000 | 0 | 0 | 175,000 |
| PA006263RUA | WILLOW GROVE | 45,000 | 0 | 0 | 45,000 |
| PA006840RUA | PRINCETON | 75,000 | 0 | 0 | 75,000 |
| PA000141RUA | COUNTY LINE | 155,000 | 0 | 0 | 155,000 |
| PA000005SGA | BEECH WOODS | 1,030,000 | 0 | 0 | 1,030,000 |
| PA001231SGA | BEAVERDAM RUN EAST | 0 | 44,322 | 0 | 44,322 |

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

**Problem Type Cost Detail**

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| **Priority 2** | **Dangerous Piles & Embankments (Acres)** | | | | |
| PA006057RUA | HONEY CREEK | 125,000 | 0 | 0 | 125,000 |
| PA004483RUA | PRINCETON ROAD | 75,000 | 0 | 0 | 75,000 |
| PA001494RUA | GAME LANDS #151 | 325,000 | 0 | 0 | 325,000 |
| PA004475RUA | WAMPUM RUN | 55,000 | 0 | 0 | 55,000 |
| PA001502RUA | CAMP RUN | 104,068 | 0 | 0 | 104,068 |
| PA001231RUA | BEAVERDAM RUN EAST | 375,000 | 0 | 191,050 | 566,050 |
| PA000951SGA | HILLSVILLE | 0 | 2,051,300 | 0 | 2,051,300 |
| PA006234RUA | FRIZZLEBURG | 400,000 | 0 | 0 | 400,000 |
| PA000305RUA | HARLANSBURG ROAD | 350,000 | 0 | 0 | 350,000 |
| Total for P 2 | Dangerous Piles & Embankments | 3,489,068 | 2,095,622 | 191,050 | 5,775,740 |
| **Priority 2** | **Hazardous Water Body (Count)** | | | | |
| PA000305RUA | HARLANSBURG ROAD | 0 | 0 | 147,025 | 147,025 |
| PA000005SGA | BEECH WOODS | 720,000 | 0 | 0 | 720,000 |
| PA001201SGA | MARSHALL RUN | 0 | 0 | 25,960 | 25,960 |
| Total for P 2 | Hazardous Water Body | 720,000 | 0 | 172,985 | 892,985 |
| **Priority 2** | **Portals (Count)** | | | | |
| PA000183SGA | PAPERMILL BRIDGE | 0 | 0 | 191,436 | 191,436 |
| Total for P 2 | Portals | 0 | 0 | 191,436 | 191,436 |
| **Priority 2** | **Subsidence (Acres)** | | | | |
| PA001493RUA | MITCHELL ROAD | 0 | 0 | 8,921 | 8,921 |
| PA002856SGA | NESHANNOCK II | 0 | 0 | 2,305,908 | 2,305,908 |
| Total for P 2 | Subsidence | 0 | 0 | 2,314,829 | 2,314,829 |
| **Priority 2** | **Vertical Opening (Count)** | | | | |
| PA004474SGA | ELLWOOD CITY NORTHWEST | 5,000 | 0 | 0 | 5,000 |
| Total for P 2 | Vertical Opening | 5,000 | 0 | 0 | 5,000 |
| **Priority 3** | **Highwall (Feet)** | | | | |
| PA002911SGA | MOORES CORNERS NORTH #1 | 212,500 | 0 | 0 | 212,500 |
| PA004489SGA | MARTIN ROAD | 0 | 0 | 0 | 0 |
| Total for P 3 | Highwall | 212,500 | 0 | 0 | 212,500 |
| **Priority 3** | **Other ()** | | | | |
| PA942073EMA | PA - LAWRENCE - FEA | 0 | 0 | 22,076 | 22,076 |
| Total for P 3 | Other | 0 | 0 | 22,076 | 22,076 |
| **Priority 3** | **Pits (Acres)** | | | | |
| PA002911SGA | MOORES CORNERS NORTH #1 | 1,500 | 0 | 0 | 1,500 |
| Total for P 3 | Pits | 1,500 | 0 | 0 | 1,500 |
| **Priority 3** | **Spoil Area (Acres)** | | | | |
| PA000141SGA | GLENKIRK SCHOOL SW. | 0 | 0 | 2 | 2 |
| PA002911SGA | MOORES CORNERS NORTH #1 | 13,500 | 0 | 1 | 13,501 |
| PA004481SGA | DUCKRUN EAST | 0 | 0 | 0 | 0 |
| PA004489SGA | MARTIN ROAD | 0 | 0 | 0 | 0 |
| PA001231SGA | BEAVERDAM RUN EAST | 0 | 0 | 45,022 | 45,022 |
| Total for P 3 | Spoil Area | 13,500 | 0 | 45,025 | 58,525 |

# Office of Surface Mining - Reclamation and Enforcement

Abandoned Mine Land Inventory System (AMLIS)

**Problem Type Cost Detail**

| State | Priority and Problem Type | Unfunded Cost | Funded Cost | Completed Cost | Total Cost |
|---|---|---|---|---|---|
| **PA - PENNSYLVANIA** | | | | | |
| Total for | **PENNSYLVANIA** | 10,591,131 | 2,279,771 | 4,982,316 | 17,853,218 |

# APPENDIX 3

## SPECIES OF SPECIAL CONCERN, PNDI LIST

| Species of Special Concern Within Five Miles of Study Area | | |
|---|---|---|
| SCIENTIFIC NAME | COMMON NAME | GROUP |
| *Thryomanes bewickii altus* | Appalachian Bewick's wren | BIRD |
| *Lanius ludovicianus migrans* | migrant loggerhead shrike | BIRD |
| *Phoxinus erythrogaster* | southern redbelly dace | FISH |
| *Ictiobus bubalus* | smallmouth buffalo | FISH |
| *Myotis sodalis* | Indiana or social myotis | MAMMAL |
| *Myotis septentrionalis* | northern myotis | MAMMAL |
| *Tachopteryx thoreyi* | gray petaltail | DRAGONFLY |
| *Cyclonaias tuberculata* | purple wartyback | MUSSEL |
| *Epioblasma triquetra* | snuffbox | MUSSEL |
| *Fusconaia subrotunda* | long-solid | MUSSEL |
| *Obovaria subrotunda* | round hickorynut | MUSSEL |
| *Plethobasus cyphyus* | sheepnose mussel | MUSSEL |
| *Pleurobema clava* | clubshell | MUSSEL |
| *Pleurobema sintoxia* | round pigtoe | MUSSEL |
| *Quadrula cylindrica* | rabbitsfoot | MUSSEL |
| *Quadrula pustulosa* | pimpleback | MUSSEL |
| *Toxolasma parvum* | lilliput | MUSSEL |
| *Tritogonia verrucosa* | pistolgrip mussel | MUSSEL |
| *Villosa fabalis* | rayed bean mussel | MUSSEL |
| *Villosa iris* | rainbow mussel | MUSSEL |
| Bat Hibernaculum | winter bat colony | FEATURE |
| *Iodanthus pinnatifidus* | purple rocket | PLANT |
| *Myriophyllum sibiricum* | northern water-milfoil | PLANT |
| *Meehania cordata* | heartleaf meehania | PLANT |
| *Salix caroliniana* | Carolina willow | PLANT |
| *Lemna turionifera* | a duckweed | PLANT |
| *Trillium nivale* | snow trillium | PLANT |
| *Botaurus lentiginosus* | American bittern | BIRD |
| *Pandion haliaetus* | osprey | BIRD |
| *Protonotaria citrea* | prothonotary warbler | BIRD |
| *Lepisosteus osseus* | longnose gar | FISH |
| *Alosa chrysochloris* | skipjack herring | FISH |
| *Moxostoma carinatum* | river redhorse | FISH |
| *Ameiurus melas* | black bullhead | FISH |
| *Lepomis megalotis* | longear sunfish | FISH |

| | | |
|---|---|---|
| *Cryptotis parva* | least shrew | MAMMAL |
| *Speyeria idalia* | regal fritillary | BUTTERFLY |
| *Argia tibialis* | blue-tipped dancer | DRAGONFLY |
| *Anodontoides ferussacianus* | cylindrical papershell | MUSSEL |
| *Cyprogenia stegaria* | fanshell | MUSSEL |
| *Ellipsaria lineolata* | butterfly mussel | MUSSEL |
| *Elliptio crassidens* | elephant ear | MUSSEL |
| *Fusconaia flava* | wabash pigtoe | MUSSEL |
| *Lampsilis abrupta* | pink mucket | MUSSEL |
| *Leptodea fragilis* | fragile papershell | MUSSEL |
| *Obliquaria reflexa* | threehorn wartyback | MUSSEL |
| *Obovaria olivaria* | hickorynut | MUSSEL |
| *Obovaria retusa* | ring pink | MUSSEL |
| *Plethobasus cooperianus* | orange-foot pimpleback | MUSSEL |
| *Pleurobema cordatum* | Ohio pigtoe | MUSSEL |
| *Pleurobema rubrum* | pyramid pigtoe | MUSSEL |
| *Potamilus alatus* | pink heelsplitter | MUSSEL |
| *Quadrula metanevra* | monkeyface | MUSSEL |
| *Truncilla truncata* | deertoe | MUSSEL |
| *Erigenia bulbosa* | harbinger-of-spring | PLANT |
| *Calycanthus floridus var. laevigatus* | sweet-shrub | PLANT |
| *Cuscuta polygonorum* | smartweed dodder | PLANT |
| *Phyllanthus caroliniensis* | carolina leaf-flower | PLANT |
| *Astragalus canadensis* | Canadian milkvetch | PLANT |
| *Lathyrus palustris* | vetchling | PLANT |
| *Swertia caroliniensis* | American columbo | PLANT |
| *Scutellaria saxatilis* | rock skullcap | PLANT |
| *Amelanchier sanguinea* | roundleaf serviceberry | PLANT |
| *Parnassia glauca* | Carolina grass-of-parnassus | PLANT |
| *Physalis virginiana* | Virginia ground-cherry | PLANT |
| *Sagittaria subulata* | subulate arrowhead | PLANT |
| *Carex alata* | broad-winged sedge | PLANT |
| *Carex sterilis* | sterile sedge | PLANT |
| *Juncus torreyi* | Torrey's rush | PLANT |
| *Erythronium albidum* | white trout-lily | PLANT |
| *Aplectrum hyemale* | puttyroot | PLANT |
| *Cypripedium candidum* | small white lady's-slipper | PLANT |
| *Cypripedium calceolus var. parviflorum* | small yellow lady's-slipper | PLANT |
| *Spiranthes romanzoffiana* | hooded ladies'-tresses | PLANT |
| *Hierochloe hirta ssp. arctica* | common northern sweet grass | PLANT |
| *Potamogeton illinoensis* | Illinois pondweed | PLANT |

| | | |
|---|---|---|
| *Equisetum x ferrissii* | scouring-rush | PLANT |
| *Vittaria appalachiana* | Appalachian gametophyte fern | PLANT |
| Data provided by the Pennsylvania Natural Heritage Program, April, 2005 | | |

# APPENDIX 4

## HISTORIC MARKERS, LANDMARKS, and ARCHAEOLOGICAL SITES

| Historic Landmarks and Archaeological Sites of the Beaver Corridor | | | | | |
|---|---|---|---|---|---|
| **Historic Name** | **Partial Address** | **County** | **Municipality** | **Status** | **Stat Date** |
| | | | | | |
| Beaver Historic District | Between 5th, Beaver & Buffalo Sts. | Beaver | Beaver Borough | Listed | 1996 |
| Fort McIntosh Site | No Data Available | Beaver | Beaver Borough | Listed | 1975 |
| Quay, Matthew S., House | 205 College Ave. | Beaver | Beaver Borough | NHL | 1975 |
| Carnegie Free Library of Beaver Falls | 1301 7th Ave. | Beaver | Beaver Falls City | Listed | 1985 |
| Bridge Water Historic District | Cherry & Elm Sts., Otter Ln. | Beaver | Bridgewater Borough | Listed | 1996 |
| Dunlap, William B., Mansion | 1298 Market St. | Beaver | Bridgewater Borough | Listed | 1980 |
| Merrick Art Gallery | 5th Ave. & 11th St. | Beaver | New Brighton Borough | Listed | 1983 |
| Clow, James Beach, House | Chapel Dr. | Beaver | North Sewickley Township | Listed | 1989 |
| McClelland Homestead | McClelland Rd. | Lawrence | North Beaver Township | Listed | 1989 |
| | | | | | |
| NHL: National Historic Landmarks | | | | | |
| Listed: National Register Listed | | | | | |

# Pennsylvania Historic Markers

**Marker Name:**
Beaver County
**County:**
Beaver
**Date Dedicated**:
1982/7/5
**Marker Type:**
City
**Location:**
County Courthouse, at park on 3rd St., Beaver
**Category:**
Government & Politics, Government & Politics 19th Century

**Marker Text:**

**Formed March 12, 1800 from Washington and Allegheny counties. The county seat, Beaver, was laid out 1792-93. County's waterways have spurred its industrial growth. At Shippingport was the world's first full-scale atomic power station devoted to civilian needs.**

**Marker Name:**
Fort McIntosh
**County:**
Beaver
**Date Dedicated**:
1946/10/31
**Marker Type:**
Roadside
**Location:**
Pa. 68 (3rd St.) at Insurance St., Beaver
**Category:**
Military, American Revolution, Forts

**Marker Text:**

**The first U.S. military post north of the Ohio. Located on River Road and occupying the area between Bank, Insurance, and Market Streets. Built in 1778 and scene of Treaty of Fort McIntosh in 1785; also a survey base. Abandoned 1790-91.**

**Marker Name:**
Ingram-Richardson Manufacturing Co.
**County:**
Beaver
**Date Dedicated**:
2001/5/4
**Marker Type:**
Roadside
**Location:**
Ing-Rich Road 24th Street Extension and 31st Street Extension, Beaver Falls
**Category:**
Business & Industry

**Marker Text:**

**During 64 years, "Ing-Rich" became one of the leading producers of porcelain enamel products in the U.S. Noted for durability, the company's output included outdoor advertising signs and "porcel panels" for building exteriors; it also made table tops, refrigerators & stove parts, and other products for the home. Founded here in 1901 by Louis Ingram & Ernest Richardson, it built plants in three other states. At its peak it employed over 1000 people.**

**Marker Name:**
King Beaver's Town
**County:**
Beaver
**Date Dedicated**:
1946/9/25
**Marker Type:**
Roadside
**Location:**
Pa. 68 (3rd St.) at Wilson Ave., Beaver
**Category:**
Government & Politics, Government & Politics 18th Century

**Marker Text:**

**Present Beaver perpetuates the name of a Delaware chief and of his village near here. Its location along the Ohio-Beaver River trails gave it importance in the fur trade.**

**Marker Name:**
Matthew S. Quay
**County:**
Beaver
**Date Dedicated**:
1949/7/22
**Marker Type:**
Roadside
**Location:**
Pa. 68 (3rd St.) at Insurance St., Beaver
**Category:**
Government & Politics, Government & Politics 19th Century

**Marker Text:**

**Home of the noted state and national political leader is near here. He rose , between 1856-87, from local and state offices to U.S. Senator. A Republican Party leader from 1887 until his death in 1904.**

**Marker Name:**
White Cottage
**County:**
Beaver
**Date Dedicated**:
1969/5/27
**Marker Type:**
City
**Location:**
1221 3rd Ave., New Brighton
**Category:**
Women, Writers

**Marker Text:**

**Home of Grace Greenwood (Sara J. Clarke Lippincott, 1823-1904), pioneer woman correspondent, poetess and authoress. While living here during the mid-19th Century, she wrote many of her popular juvenile stories.**

# APPENDIX 5

# LAND USE INVENTORY

# Watershed Protection Inventory
## Beaver River Watershed

Background Information

Municipality: _____

Name(s):_____

_____

Department(s): _____

_____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____

Municipal Population: _____

Municipal Area (square miles): _____

**It should be noted that there may be a difference between the actual municipal ordinances/regulations and the policies that are in effect. The inventory questions refer to ordinances (what is "on the books") rather than to policies ("the way things are done" – which may change over time). If there are policies that are regularly followed, please discuss these in the Notes section at the end of the survey.**

This inventory was customized for the Beaver River watershed communities from a sample version found in *The Do-It-Yourself Watershed Planning Kit*, produced by The Center for Watershed Protection based in Ellicot City, Maryland.

**Please answer the following questions:**

1. If your municipality has a *zoning ordinance*, has it been submitted to the county planning department?
☐ Yes
☐ No (please submit a copy to the county planning department)

2. If your municipality has a *subdivision and land development ordinance*, has it been submitted to the county planning department?
☐ Yes
☐ No (please submit a copy to the county planning department)

3. If your municipality has a *stormwater management ordinance*, has it been submitted to the county planning department?
☐ Yes
☐ No (please submit a copy to the county planning department)

4. If your municipality has a *floodplain management ordinance*, has it been submitted to the county planning department?
☐ Yes
☐ No (please submit a copy to the county planning department)

5. If your municipality has a *grading, excavation, and fill ordinance*, has it been submitted to the county planning department?
☐ Yes
☐ No (please submit a copy to the county planning department)

*Frank Mancini*
*Beaver County Planning Commission*
*Beaver County Courthouse*
*812 Third St.*
*Beaver, PA  15009*

*OR*

*Frank Gingras*
*Lawrence County Planning Commission*
*Lawrence County Government Center*
*430 Court Street*
*New Castle, PA  16101*

## Section 1. Watershed Planning

*Importance: Regulatory measures and/or planning techniques that are both innovative and appropriate can be designed to maintain or limit future impervious cover, redirect development where beneficial, and protect sensitive areas.*

1.01 Does your community have a comprehensive plan?

☐ Yes Latest update _____
☐ No
☐ Don't know

1.02 Is the comprehensive plan based on political jurisdictions or watersheds?

☐ Political jurisdictions
☐ Watersheds
☐ Other, please explain_____
☐ Don't know
☐ Not applicable

1.03 Does your community participate in multi-municipal planning for:

☐ Water
☐ Wastewater treatment
☐ Sewer line maintenance
☐ Road corridors
☐ Transfer of development rights
☐ Other _____

1.04 Is your community currently operating under a joint zoning ordinance with other communities?

☐ Yes – if so, which communities?_____
☐ No
☐ Don't know

1.05 Is your zoning tied to the comprehensive plan?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

1.06 How often do you typically update your comprehensive plan?

- ☐ Every 5 years
- ☐ Every 10 years
- ☐ We don't
- ☐ Other, please explain _____
- ☐ Not applicable

1.07 Does your plan evaluate and take into account impacts of future land use on water resources? If yes, in what ways?

- ☐ Yes; _____
- ☐ No
- ☐ Don't know
- ☐ Not applicable

1.08 Does your plan identify and address the most important water resource goals for your community?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

If yes, list the most important water resource goals.

_____

_____

_____

Section Comments: _____

_____

_____

_____

## Section 2. Open Space Conservation

*Importance: The preservation of open space provides the opportunity to insure rainwater and snowmelt infiltration, thus minimizing flood potential and maximizing the recharge of the water table. With proper management, riparian areas can function beneficially. Open space also preserves natural habitat niches and presents numerous recreational and educational opportunities.*

2.01 Does your community permit conservation easements *(voluntary agreement to legal transfer of development and land use rights to a piece of property to a conservation trust; easements may be temporary or permanent)*?

☐ Yes
☐ No

2.02 Does your community encourage conservation easements?

☐ Yes; How?_____
☐ No

2.03 Does your community permit land acquisition programs?

☐ Yes
☐ No

2.04 Does your community encourage land acquisition programs?

☐ Yes; How? _____
☐ No

2.05 Does your community permit transfer of development rights (TDRs) *(transfer of potential development from a designated "sending area" to a designated "receiving area")*?

☐ Yes
☐ No

2.06 Does your community encourage transfer of development rights?

☐ Yes; How? _____
☐ No

2.07 Does your community limit infrastructure extension *(a conscious decision is made to limit or deny extending infrastructure, such as public sewer, water, or roads, to designated areas to avoid increased development in these areas)*

☐ Yes
☐ No

2.08 Does your community permit infill / community redevelopment *(new development and redevelopment within existing developed areas)*?

☐ Yes
☐ No

2.09 Does your community encourage infill / community redevelopment?

☐ Yes; How? _____
☐ No

2.10 Does your community utilize zoning overlay to promote community redevelopment?

☐ Yes
☐ No

2.11 Does your community permit zoning variances for existing buildings that may not fully comply with existing codes or other types of flexibility to promote community redevelopment?

☐ Yes
☐ No

2.12 Does your community encourage zoning variances for existing buildings that may not fully comply with existing codes or other types of flexibility to promote community redevelopment?

☐ Yes; How? _____
☐ No

2.13 Does your community require developers to identify key environmental features *before* any engineering is done or site plans are designed?

☐ Yes
☐ No

Section Comments: _____

_____

_____

_____

_____

_____

_____

## Section 3. Land Conservation

*Importance: The ways in which land is used have a direct relationship to the quality and quantity of surface water and ground water. Therefore, the focus of municipal planning and ordinances can improve or impair the watershed. Programs or efforts to conserve undeveloped, sensitive areas, or areas of particular historical or cultural value are some methods that can offer improvement.*

3.01 Does your community participate in the National Flood Insurance Program (NFIP)?

- ☐ Yes
- ☐ No
- ☐ Don't know

3.02 Are your floodplains mapped?

- ☐ Yes
- ☐ No
- ☐ Don't know

3.03 Other than what is required by state and federal laws, is the preservation of cultural or historical areas (e.g., historic or archaeological sites, scenic views, and recreational areas):

- ☐ Required
- ☐ Encouraged
- ☐ Neither
- ☐ Don't know
- ☐ Other, please describe: _____

_____

3.04 Is the preservation of agricultural areas:

- ☐ Required
- ☐ Encouraged
- ☐ Neither
- ☐ Don't know
- ☐ Other, please describe: _____

_____

3.05 Are you aware of any critical habitat areas for plant and animal species in your community?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

3.06 Other than what is required by state and federal laws, is the preservation of critical habitat areas for plant and animal species:

☐ Required ☐ Encouraged
☐ Neither ☐ Don't know
☐ Other, please describe: _____

_____

3.07 Does your community have regulations or requirements, other than what is required by state and federal laws, governing the preservation of wetlands during development?

☐ Yes ☐ No
☐ Don't know
☐ Other, please describe _____

3.08 Are there development restrictions pertaining to steep slopes?

☐ Yes
☐ No
☐ Don't know

3.09 Are there development restrictions pertaining to sliding soils or mining?

☐ Yes
☐ No

3.10 Do you require developers to provide soil maps when submitting plans?

☐ Yes
☐ No

3.11 Does your municipality have information related to mining discharge or seepage?
☐ Yes
☐ No

3.12 Does your municipality have a copy of the county soil maps?

☐ Yes
☐ No
☐ Don't know

3.13 Is the conservation of forested areas:

☐ Required ☐ Encouraged
☐ Neither ☐ Don't know
☐ Other, please describe: _____

_____

3.14 Does your municipality have an ordinance on:

| Timbering? | Clear cutting? | Preservation of specimen trees? |
|---|---|---|
| ☐ Yes | ☐ Yes | ☐ Yes |
| ☐ No | ☐ No | ☐ No |
| ☐ Don't know | ☐ Don't know | ☐ Don't know |

3.15 Are there development restrictions pertaining to stream channel modification?

☐ Yes
☐ No
☐ Don't know

3.16 What information does your municipality have in a Geographic Information System (GIS)?

☐ Steep slopes
☐ All soils
☐ Sliding soils
☐ Mining activity
☐ Mine discharge or seepage
☐ Vegetation types
☐ Natural amenities
☐ Environmentally sensitive areas
☐ Don't have GIS

3.17 If you have GIS information, are your maps available to elected officials at public meetings?

☐ Yes
☐ No

3.18 If you have GIS information, are your maps available to members of the planning commissions, zoning hearing boards, Environmental Advisory Council's, etc. at public meetings?

☐ Yes
☐ No
☐ Don't know

3.19 Is staff required to attend regional or state workshops to expand their skills or knowledge of relevant subjects?

☐ Yes
☐ No

Elected officials &/or board members?

☐ Yes
☐ No

3.20 Is staff attendance at regional or state workshops to expand their skills or knowledge of relevant subjects facilitated by your municipality?

☐ Yes
☐ No

Elected officials &/or board members?

☐ Yes
☐ No

3.21 Does your municipality have specific expectations or requirements for its elected officials or members of its boards, which are outlined in writing, regarding:

☐ Prior education in specific areas
☐ Mandatory ongoing training in specific areas
☐ Optional ongoing training in specific areas
☐ Time spent in preparation for meetings
☐ Limits of authority or ability to recommend

Section 3 Comments: _____

_____

_____

_____

_____

_____

_____

## Section 4. Aquatic Buffers

*Importance:* *In natural settings, the land and vegetation adjacent to bodies of water function to slow the velocity of surface runoff, reduce erosion, filter pollutants, and absorb excess water. Consequently, the protection, restoration, creation, or reforestation of stream, wetland, and urban lake buffers offers significant improvement to problems of water quality or quantity.*

4.01 Are stream buffers required in your community?

- ☐ Yes
- ☐ No
- ☐ Don't know

4.02 What are your stream buffer width requirements?

_____

4.03 Are wetland buffers required in your community?

- ☐ Yes
- ☐ No
- ☐ Don't know

4.04 What are your wetland buffer width requirements?

_____

4.05 Are there reforestation, restoration, or riparian cover requirements or programs for buffers?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

4.06 Are native plant species encouraged for reforestation, restoration, or riparian cover requirements or programs for buffers?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

Section 4 Comments: _____

_____

_____

_____

## Section 5. Better Site Design

*Importance:* *Maximizing open space, natural terrain, and natural features preserves the ability of the land to function normally, thus assisting in flood prevention and increasing ground water supply. Local ordinances and codes that incorporate techniques to reduce impervious cover and/or redirect runoff onto pervious surfaces in the design of new development and redevelopment projects encourage this strategy.*

### Street Width

5.01 What are the minimum / maximum pavement widths allowed for streets in low-density residential developments that have less than 500 average daily trips (ADT)?

Minimum: _____
Maximum: _____

5.02 In higher density development are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?

☐ Yes
☐ No

### Right-of-Way (ROW) Width

5.03 What are the minimum / maximum right-of-way (ROW) widths for a residential street?

Minimum:_____
Maximum:_____

5.04 Does the code allow utilities to be placed under the paved section of the ROW?

☐ Yes
☐ No
☐ Not specified in codes

### Cul-de-Sacs

5.05 What are the minimum / maximum ***radii*** allowed for cul-de-sacs on *public* roads?

Minimum: _____
Maximum: _____

5.06 What are the minimum / maximum ***radii*** allowed for cul-de-sacs on *private* roads?

Minimum:_____
Maximum:_____

5.07 Can a landscaped island be created within the cul-de-sac?

☐ Yes
☐ No
☐ Not specified in codes

5.08 Are alternative turn-arounds such as "hammerheads" allowed on short streets in low-density residential developments?

☐ Yes
☐ No
☐ Not specified in codes

Vegetated Open Channels

5.09 Does your municipality allow vegetated open channels or bioswales?

☐ Yes
☐ No
☐ Not specified in codes

5.10 Are curb and gutters required for most residential street sections?

☐ Yes
☐ No

Parking Ratios

5.11 What are the minimum / maximum parking ratios for a professional office building (per 1000 $ft^2$ of gross floor area)?

Minimum:_____
Maximum:_____

5.12 What are the minimum / maximum required parking ratios for shopping centers (per 1, 000 $ft^2$ gross floor area)?

Minimum:_____
Maximum:_____

5.13 What are the minimum / maximum required parking ratio for single-family homes (per home)?

Minimum:_____
Maximum:_____

Parking Codes

5.14 Is the use of shared parking arrangements permitted or encouraged?

☐ Yes
If yes, please indicate how _____
☐ No
☐ Not specified in codes

5.15 Is a model for shared parking agreements provided to prospective developments?

☐ Yes
☐ No
☐ Not applicable

5.16 Are parking ratios reduced if shared parking arrangements are in place?

☐ Yes
☐ No
☐ Not specified in codes
☐ Not applicable

Parking Lots

5.17 What are the minimum / maximum stall widths for a standard parking space?

Minimum:_____
Maximum:_____

5.18 What are the minimum / maximum stall length for a standard parking space?

Minimum:_____
Maximum:_____

5.19 Is a percentage of the spaces at commercial parking lots required to have smaller dimensions for compact cars?

☐ Yes, please specify percentage _____
☐ No

5.20 Are there ordinances regarding trees, plantings, etc.?

☐ Yes
☐ No

5.21 Can pervious materials be used for parking areas?

☐ Yes
- ☐ Grass pavers
- ☐ Concrete lug system with gravel
- ☐ Plastic matting with gravel
- ☐ Permanent, pervious asphalt-based surface
- ☐ Other: _____

☐ No

5.22 Are pervious surfaces encouraged for use in entry and exit lanes?

☐ Yes
☐ No

Parking Lot Runoff

5.23 Is a minimum percentage of a parking lot required to be landscaped?

☐ Yes, please specify percentage _____
☐ No

5.24 Is parking lot runoff considered to be hazardous waste, which is trapped or controlled?

☐ Yes
☐ No

5.25 Is parking lot runoff considered to be an important contribution to recharging the water table?

☐ Yes
☐ No

Open Space Design

5.26 Are open space or cluster development, for single family homes – aside from PRDs designs allowed in the community?

☐ Yes
☐ No
☐ Not specified in codes

5.27 Are conservation developments, which cluster homes in a central location while leaving large areas in their natural state, encouraged in the community?

☐ Yes
If yes, please indicate how _____
_____
☐ No
☐ Not specified in codes

5.28 Are developers encouraged to design for the existing conditions?

☐ Yes
If yes, please indicate how _____
☐ No
☐ Not specified in codes

5.29 Are the submittal or review requirements for open space design greater than those for conventional development?

☐ Yes
☐ No
☐ Not applicable

5.30 Are flexible site design criteria available for developers that utilize open space or cluster design options (e.g., setbacks, road widths, lot sizes)? Minimum lot size? _____

☐ Yes
☐ No
☐ Not specified in codes
☐ Not applicable

Setbacks and Frontages

5.31 Are irregular lot shapes (e.g., pie-shaped, flag lots) allowed in the community?
☐ Yes
☐ No
☐ Not specified in codes

5.32 What is the minimum requirement for front setbacks for the following residential lot sizes?

| 1/4 acre residential lot | 1/2 acre residential lot | 1 acre residential lot |
|---|---|---|
| ☐ 20 feet or less | ☐ 20 feet or less | ☐ 20 feet or less |
| ☐ 21 feet to 30 feet | ☐ 21 feet to 30 feet | ☐ 21 feet to 30 feet |
| ☐ 31 to 40 feet | ☐ 31 to 40 feet | ☐ 31 to 40 feet |
| ☐ Greater than 40 ft | ☐ Greater than 40 ft | ☐ Greater than 40 ft |

5.33 What is the minimum requirement for rear setbacks for the following residential lot sizes?

| 1/4 acre residential lot | 1/2 acre residential lot | 1 acre residential lot |
|---|---|---|
| ☐ 25 feet or less | ☐ 25 feet or less | ☐ 25 feet or less |
| ☐ 26 feet to 40 feet | ☐ 26 feet to 40 feet | ☐ 26 feet to 40 feet |
| ☐ Greater than 40 ft | ☐ Greater than 40 ft | ☐ Greater than 40 ft |

5.34 What is the minimum requirement for side setbacks for the following residential lot sizes?

| 1/4 acre residential lot | 1/2 acre residential lot | 1 acre residential lot |
|---|---|---|
| ☐ 8 feet or less | ☐ 8 feet or less | ☐ 8 feet or less |
| ☐ Greater than 8 feet | ☐ Greater than 8 feet | ☐ Greater than 8 feet |

5.35 What is the minimum frontage distance for the following residential lot sizes?

| 1/4 acre residential lot | 1/2 acre residential lot | 1 acre residential lot |
|---|---|---|
| ☐ 80 feet or less | ☐ 80 feet or less | ☐ 80 feet or less |
| ☐ Greater than 80 feet | ☐ Greater than 80 feet | ☐ Greater than 80 feet |

Zoning designations

5.36 Please list the zoning designations in your community that fall within the watershed, their definitions, and percentages of the total land use.

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Sidewalks

5.37 Are sidewalks prohibited?

☐ Yes; Where? _____(skip to #5.43)
☐ No

5.38 Are sidewalks required?

☐ Yes; Where? _____
☐ No

5.39 If so, are sidewalks always required on both sides of residential streets?

☐ Yes
☐ No

5.40 What are the minimum / maximum sidewalk widths allowed in the community?

Minimum: _____
Maximum: _____

5.41 Can alternate pedestrian networks be substituted for sidewalks (e.g., trails through common areas)?

☐ Yes
☐ No
☐ Not specified in codes
☐ Not applicable

Driveways

5.42 What are the minimum / maximum one-lane driveway widths specified in the community?

Minimum: _____
Maximum: _____

5.43 Can pervious materials be used for single-family home driveways (e.g., grass, gravel, porous pavers, etc)?

☐ Yes
☐ No
☐ Not specified in codes

5.44 Can a "two-track" design be used at single-family driveways (a driveway with two strips of paving corresponding to wheel tracks with a vegetated area in between)?

☐ Yes
☐ No
☐ Not specified in codes

5.45 Are shared driveways permitted in residential developments?

☐ Yes
☐ No
☐ Not specified in codes

## Open Space Management

Skip to question 5.50 if open space, cluster, or conservation developments are not allowed in your community. If open space developments are allowed, please attach any pertinent information.

5.46 Are open space areas within subdivisions required to be consolidated into larger units?

- ☐ Yes
- ☐ No
- ☐ Not specified in codes

5.47 Does a minimum percentage of open space in a residential subdivision have to be managed in a natural condition?

- ☐ Yes
- ☐ No
- ☐ Not specified in codes

5.48 Are allowable and unallowable uses for open space in residential developments defined?

- ☐ Yes
- ☐ No

## Rooftop Runoff

5.49 Can rooftop runoff be discharged to yard areas?

- ☐ Yes
- ☐ No
- ☐ Not specified in codes

Section 5 Comments: _____

_____

_____

_____

_____

_____

_____

_____

## Section 6. Erosion and Sediment Control

*Importance: Topsoil is a valuable resource on land. In the water, soil, sand, clay, and other materials can smother habitats and food supplies, reduce sunlight, and abrade sensitive tissues of fish and other organisms. It also contributes to the scour of streambanks, eroding them and causing the land above to fall. The use of erosion control, sediment control, and dewatering practices at all new development and redevelopment sites can reduce these problems.*

6.01 During construction, is erosion and sediment control required for:

- ☐ All sites
- ☐ Sites greater than 1 acre
- ☐ Sites greater than 2 acres
- ☐ Sites greater than 5 acres
- ☐ No sites
- ☐ Don't know

6.02 Does your community provide guidance or set forth requirements on the types of erosion and sediment control practices that may be used?

- ☐ Yes, we refer the development community to a state document
- ☐ Yes, we have developed our own guidance and/or requirements
- ☐ No
- ☐ Don't know
- ☐ Not applicable

6.03 Check all erosion and sediment control practices that your community has required to be implemented in the past three years:

- ☐ Silt fence
- ☐ Permanent seeding/ mulching
- ☐ Construction sequencing
- ☐ Dust control
- ☐ Preservation and non-disturbance of natural vegetation
- ☐ Preservation and non-disturbance of stream or wetland buffers
- ☐ Temporary seeding/ mulching
- ☐ Straw bales
- ☐ Construction phasing
- ☐ Erosion blankets and geotextiles
- ☐ Fiber rolls
- ☐ Temporary stream crossings
- ☐ Stabilized construction entrance
- ☐ Exit tire wash
- ☐ Energy dissipation at pipe outlets
- ☐ Stair-step grading

- ☐ Check dams in natural or man-made channels
- ☐ Sand / gravel bag barrier
- ☐ Brush or rock filter
- ☐ Storm drain inlet protection
- ☐ Catch basin inlet filters
- ☐ Sedimentation basins
- ☐ Sediment traps
- ☐ Filtration of dewatering
- ☐ Secondary filtration (mechanical or sand filtration devices to filter fine sediments from runoff)
- ☐ Dikes / berms as conveyance to ESC structures
- ☐ Pipe slope drains to bypass erodible soils
- ☐ Stockpile stabilization

6.04 Is an erosion and sediment control plan required during the site plan review process?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

6.05 Are construction sites inspected for compliance with erosion and sediment control requirements?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

6.06 Who conducts inspections of construction sites for compliance with erosion and sediment control requirements?

- ☐ County / municipal inspector
- ☐ Third-party inspector (e.g. private engineer)
- ☐ Other, please describe _____
- ☐ Not applicable

6.07 How frequently does an erosion and sediment control inspector visit a construction site?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Annually
- ☐ Other, please describe_____
- ☐ Not applicable

6.08 Please describe the training or background required for erosion and sediment control inspectors.

_____
_____
_____
_____

6.09 Does your community sponsor erosion and sediment control training for:

- ☐ Developers
- ☐ Contractors
- ☐ Engineers
- ☐ Inspectors
- ☐ None of the above
- ☐ Not applicable

6.10 Are there erosion and sediment control enforcement mechanisms (e.g. fines, stop work orders, etc.)?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

6.11 Is mowing to the edge of streambanks on public lands prohibited?

- ☐ Yes
- ☐ No

6.12 Is mowing to the edge of streambanks on private lands discouraged?

- ☐ Yes
- ☐ No

6.13 Are native plants being used at the edges of streambanks on public lands?

- ☐ Yes
- ☐ No

6.14 Is the use of native plants at the edges of streambanks encouraged on private lands?

- ☐ Yes
- ☐ No

Section 6 Comments: _____

## Section 7. Stormwater Management Practices

*Importance: Conventional engineering practices have been centered primarily upon removing water as quickly as possible from a site. The incorporation of structural practices into new development, redevelopment, or the existing landscape helps to mitigate the impacts of urbanization and stormwater runoff on receiving waters. This allows the normal water cycle to occur, providing protection against both floods and drought.*

7.01 Does your community require stormwater practices on new development sites?

- ☐ Yes
- ☐ No
- ☐ Don't know

7.02 What type of exemptions do you have for these requirements?

_____
_____
_____
_____

7.03 If yes, what are the design criteria for stormwater practices?

- ☐ Control peak discharge rate (flood control)
  Design storm(s): _____
- ☐ Treat stormwater runoff for water quality
  Design storm(s): _____
- ☐ Control / reduce total volume of runoff (by means of infiltration practices, etc.)
  Design storm(s): _____
- ☐ Protect downstream channels
  Design storm(s): _____
- ☐ Other: _____
  _____
  _____
- ☐ Not applicable

7.04 Does your community provide guidance or set forth requirements on the types of stormwater practices that may be constructed?

- ☐ Yes, we refer the development community to a state document
- ☐ Yes, we have developed our own guidance and/or requirements
- ☐ No
- ☐ Don't know
- ☐ Not applicable

7.05 What are the top three stormwater practices typically installed in your community?

_____
_____
_____

7.06 Is a stormwater plan or other documentation required during the site plan review process?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

7.07 Does your community inspect stormwater practices during construction?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

7.08 Is an as-built or record drawing of the stormwater practice required after construction?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

7.09 Who is typically responsible for maintenance of stormwater practices over the life of the stormwater practice?

- ☐ Private owner
- ☐ Builder
- ☐ Homeowner's association
- ☐ Permitting agency
- ☐ Other, please explain_____
- ☐ Don't know
- ☐ Not applicable

7.10 Is there a maintenance agreement or covenant between the permitting agency and the private owner, builder, or homeowner's association in charge of maintenance?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

7.11 Are privately maintained stormwater practices inspected by a public agency for maintenance upkeep or structural integrity over the life of the facility?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

7.12 How frequently are privately owned stormwater practices inspected?

- ☐ More than once a year
- ☐ Once a year
- ☐ Every two years
- ☐ In response to complaints
- ☐ Never
- ☐ Other, please describe_____
- ☐ Don't know
- ☐ Not applicable

7.13 Are there penalties for not complying with the maintenance agreement or other applicable regulations applying to maintenance?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

If yes, please describe penalties.

_____

_____

_____

_____

_____

7.14 Does your municipality encourage ground water recharge practices?

- ☐ Grass swales
- ☐ Plantings in cul-de-sacs
- ☐ Pervious paved surfaces
- ☐ Retention ponds (as opposed to *detention* ponds)
- ☐ Other, please describe_____

Section 7 Comments: _____

## Section 8. Non-Stormwater Discharges

*Importance:* *Industrial effluents, sanitary waste water, fertilizers, petroleum products and salt on road surfaces, are just a few of the point and non-point sources of water pollution. Locating, quantifying, and controlling non-stormwater pollutant sources in the watershed are the first steps toward water quality improvement. Identifying operation and maintenance practices that prevent or reduce pollutants entering the municipal or natural drainage system is the second.*

Sanitary and Stormwater Sewer System

8.01 The best description of my community's stormwater management system is:

- ☐ Storm sewers
- ☐ Open channels
- ☐ Combination, please provide relative percentage of each
- ☐ Other, please describe_____
- ☐ Don't know

8.02 How does your community manage sanitary wastes (check all that apply)?

- ☐ Septic systems
- ☐ Aeration systems
- ☐ Package treatment plants
- ☐ Centralized wastewater treatment plants
- ☐ Other, please describe
- ☐ Don't know

8.03 Do the sanitary sewer trunk mains follow (check all that apply):

- ☐ Shortest distance
- ☐ Stream valley
- ☐ Other, please describe_____
- ☐ Don't know
- ☐ Not applicable

8.04 Is there a program for illicit connection detection?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

8.05 Does your illicit connection detection program include provisions for removal of illicit discharges?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

8.06 Within the Beaver River watershed, does your community have any involvement responding to septic system complaints?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

If yes, please explain.

_____
_____
_____
_____

8.07 Does your community conduct inspections of privately owned septic systems?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not applicable

Spill Response, Prevention and Cleanup

8.08 Does your community have a spill response plan?

- ☐ Yes
- ☐ No
- ☐ Don't know

Snow Management

8.09 What deicing compounds are applied to *asphalt* public roads?

- ☐ Sand
- ☐ Road salt (Sodium Chloride, NaCl)
- ☐ Calcium Chloride ($CaC1_2$)
- ☐ Magnesium Chloride ($MgC1_2$)
- ☐ Other, please describe _____

8.10 What deicing compounds are applied to *cinder* public roads?

- ☐ Sand
- ☐ Road salt (Sodium Chloride, NaCl)
- ☐ Calcium Chloride ($CaC1_2$)
- ☐ Magnesium Chloride ($MgC1_2$)
- ☐ Other, please describe _____

8.11 How are the deicing compounds stored?

- ☐ Within structure
- ☐ Covered, but not in structure
- ☐ Not covered
- ☐ Other, please explain _____

Household Hazardous Waste

8.12 Is there a local household hazardous waste collection program?

- ☐ Yes Where? _____ How often? _____
- ☐ Don't know

Section 8 Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

**Section 9. Watershed Stewardship Programs**

*Importance:* *Education and the understanding of any problem promotes a change in attitude, which in turn promotes a change in behavior. Stormwater and watershed education or outreach programs targeted towards modifying human behavior to prevent or reduce pollution over a range of land uses and activities will decrease the amount of municipal effort necessary to implement new regulations.*

9.1 Does your community administer or support watershed education or outreach programs targeted towards:

- ☐ Residents
- ☐ Commercial sector
- ☐ Industrial sector
- ☐ Municipal employees
- ☐ Other, please describe _____
- ☐ None of the above

9.2 Are there any stream stewardship or volunteer monitoring programs within your community?

- ☐ Yes (please identify) _____
- ☐ No
- ☐ Don't know

9.3 Are there any stream restoration programs or projects within your community?

- ☐ Yes
- ☐ No
- ☐ Don't know

If yes, please provide a copy of relevant information.

Pet Waste Management

9.4 Does your community have any restrictions on pet waste management?

- ☐ Yes
- ☐ No
- ☐ Don't know

If yes, please describe regulations or restrictions or attach any pertinent information.

_____

_____

_____

Street Sweeping

9.05 Does your community sweep public streets?

- ☐ Yes
- ☐ No
- ☐ Don't know

9.06 How often does street sweeping occur?

- ☐ Weekly
- ☐ Monthly
- ☐ Annually
- ☐ Other, please explain_____
- ☐ Not applicable

9.07 Does street sweeping vary seasonally (e.g., streets are not swept in winter)?

- ☐ Yes, please explain_____
- ☐ No
- ☐ Don't know
- ☐ Not applicable

Lawn Care

9.08 Are fertilizers used on public lands?

- ☐ Yes; What types? _____
- ☐ No
- ☐ Don't know

9.09 Are pesticides (insecticides, herbicides) used on public lands?

- ☐ Yes; What types? _____
- ☐ No
- ☐ Don't know

Section 9 Comments: _____

Inventory Notes: _____