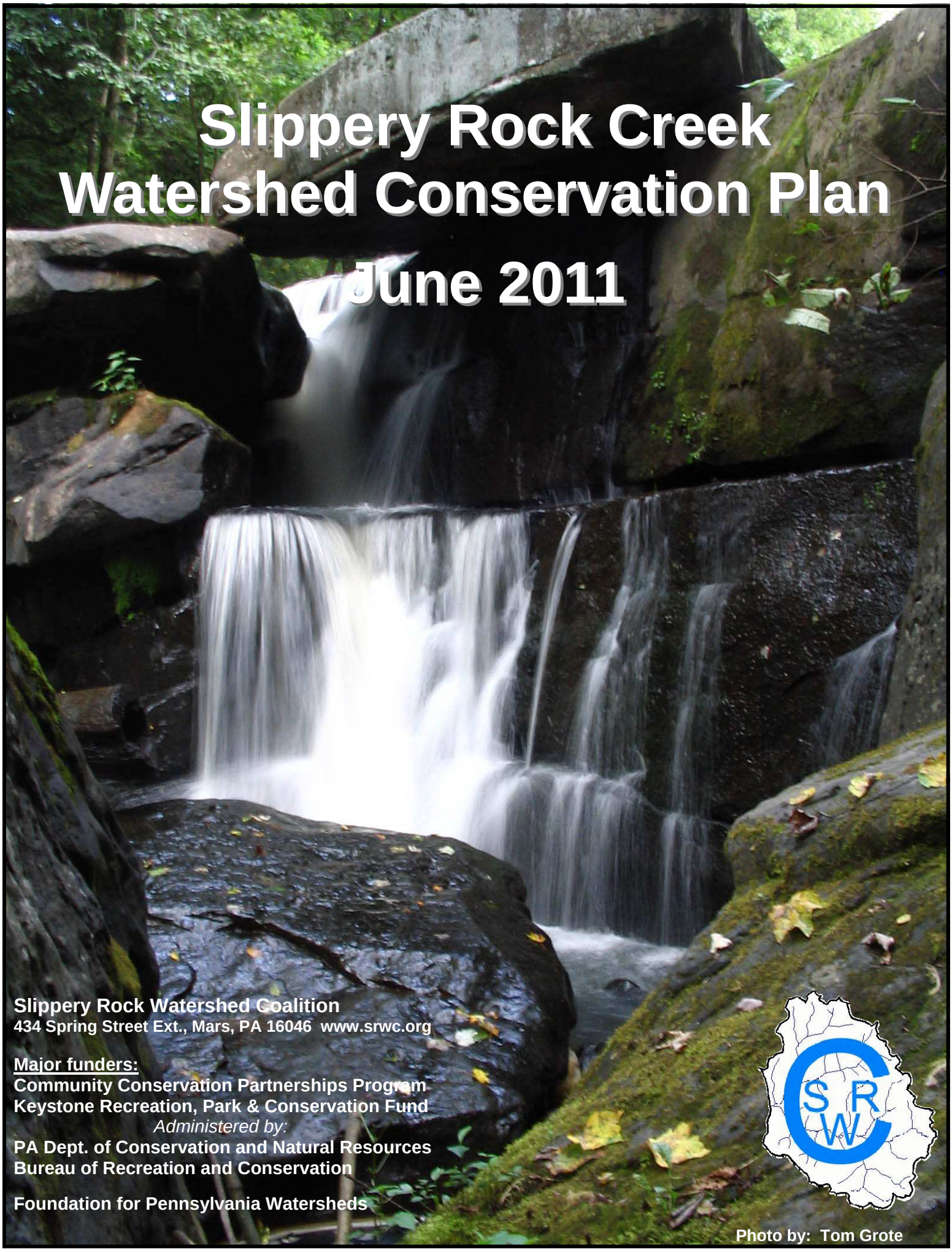
Slippery Rock Creek Watershed Conservation Plan

June 2011



Slippery Rock Watershed Coalition
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Major funders:
Community Conservation Partnerships Program
Keystone Recreation, Park & Conservation Fund
Administered by:
PA Dept. of Conservation and Natural Resources
Bureau of Recreation and Conservation

Foundation for Pennsylvania Watersheds

Photo by: Tom Grote

The Pennsylvania Rivers Conservation Program

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Foundation for Pennsylvania Watersheds

Location
Slippery Rock Creek Watershed
Ohio River Basin

Beaver, Butler, Lawrence, Mercer, Venango Counties
Commonwealth of Pennsylvania

Project Sponsor:

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Photo Acknowledgements

Acknowledgement provided beneath individual photographs.

Disclaimer

The Slippery Rock Creek Watershed Conservation Plan has not been compiled for regulatory purposes. This plan represents an effort by many to compile existing information regarding the land, water, biological, and cultural resources in the watershed. This effort is on-going and significant changes to the information contained in this plan are expected.

PROJECT SUMMARY

The Slippery Rock Creek Watershed is located in the rolling hills of beautiful western Pennsylvania in portions of Beaver, Butler, Lawrence, Mercer, and Venango Counties. As identified as in the state water plan, the entire watershed is approximately 836-square-miles and is primarily a rural area consisting of forested and agricultural lands dotted with small towns such as Slippery Rock, Grove City, Ellwood City, Prospect, Boyers, and Harrisville. Major streams within the watershed include Slippery Rock Creek, Wolf Creek, Muddy Creek, Connoquenessing Creek, and Brush Creek. For the purposes of completing watershed conservation plans, however, the watershed was divided into the Connoquenessing Creek Watershed and the 408-square mile Slippery Rock Creek Watershed.

The character of the watershed has been largely shaped by its geologic, natural, and human history. The bedrock close to the surface consists of sedimentary rocks including sandstone, shale, claystone, coal, and limestone. These rock layers formed approximately 300-320 million years ago during the Carboniferous Period when the area went back-and-forth between swamp and ocean environments which determined the types of materials deposited. In very general terms, layers of sand became sandstone, calcareous material from chemical precipitation and marine animals became limestone, and organic matter in swamps became coal. Many of these rock layers have become major contributors to the local economy for the last two hundred years including those used in the production of fuels such as coal, oil, and natural gas. In addition, limestone and sandstone are valuable building materials. The historical extraction of these resources prior to the development of laws and practices sensitive to the environment resulted in a legacy of degradation to both the land and water which are still in need of being restored today. In addition, the presence of glaciers in the relatively recent geological past (Ice Age) also greatly influenced the characteristics of the watershed. Not only did glaciers create interesting and beautiful features such as the Slippery Rock Creek Gorge (part of the popular McConnells Mill State Park) and the Jacksonville Esker, but the glaciers influenced the type of soil, which in turn influences the plant communities that live there today. Some of these glacial deposits are also mined for sand and gravel.

Prior to “European” settlement, the watershed was utilized by various Upper Woodland Native American tribes for hunting-and-gathering as well as agriculture. Archaeological investigations have determined that some sites may be up to 12,000 years old. Even though Europeans began exploring the area around the time of the French and Indian War, the first permanent American settlements did not begin until the late 1700’s, which led to clearing of the dense forests for farming. Today, over 25% of the watershed is used for agricultural purposes. Over time, various industries began to develop that utilized the rich natural resources of the watershed. Primarily in the early to mid-1800s, settlers harnessed the swift currents of the streams by building dams and constructing saw and grist mills. Some of these in-stream features, now called run-of-the-river dams, remain today; however, due to the hazardous conditions created, many have been or are to be removed. Discovery of shallow iron deposits also led to the building of several iron furnaces starting in the 1820s; those remaining are considered of historical significance. Drilling for oil began in the watershed in the 1860s just a few years after Colonel Drake drilled the first commercially-successful well in Oil City, PA in 1859. Today, there are over 300 small active oil and gas wells in the watershed. Many abandoned wells have been plugged; however, there are over 200 inactive or abandoned wells, some with drainage that negatively impact water resources. Recently, gas drilling has expanded due to the technological advances leading to natural gas production from the Marcellus Shale. Mining for coal and limestone also have historical roots which began around 1840 and continues today. The expansion of coal mining and the expansion of the railroad lines, especially the Bessemer and Lake Erie Railroad (B&LE), are interrelated. Both of which were largely in response to steel production in the region, resource needs of

World War I & II, and the development of coal-fired power plants. While farming and mining are still conducted today, education is one of the largest employers in the area in response to multiple public school districts, Grove City College, and Slippery Rock University. Various service industries, governmental agencies, construction, and some light manufacturing and packaging are also major sources of employment in the watershed.

Today, in response to historical environmental impacts and concerns about current and future impacts, a variety of watershed, conservation, and environmental groups have formed within the Slippery Rock Creek Watershed. Established in 1982, the Bartramian Audubon Society is possibly the oldest active conservation-based organization. Their focus is on education and protecting wildlife, especially birds. The work of the Slippery Rock Watershed Coalition, formed in 1994, addresses the impacts of abandoned mines including land reclamation and the installation of environmentally-friendly, passive systems to treat polluted mine water as well as providing opportunities for environmental education. The Citizens Association of the Slippery Rock Area (CEASRA) has focused its efforts for over 15 years on their concerns of the expansion of the Tri-County Landfill located near Grove City. The Wolf Creek Watershed Association was formed to monitor, protect, and enhance the water quality and natural resources of the Wolf Creek subwatershed. The Friends of McConnells Mill State Park was formed in 1999 to aid in the protection of the facilities and the natural beauty of the area, while the Moraine Preservation Fund, a non-profit volunteer organization, promotes community stewardship of natural resources within Moraine State Park, McConnells Mill State Park, and the Jennings Environmental Education Center. The recently-formed Sustainable Slippery Rock is seeking to encourage approaches with long-term minimal environmental impact such as the use of locally grown food.

As the population continues to grow, even though agricultural and forest lands cover about 80% of the current watershed, these areas are being converted to industrial/commercial use and housing developments uses while, at the same time, the demand for natural resources continues to grow. Over the last several decades, there is an awareness developing that recognizes the need to create a more sustainable way of life to protect our valuable natural resources without sacrificing our economy and standard of living. This, of course, is a delicate balance to maintain. The first step towards this goal is to document the current state of the watershed.

Project Background

In 2007, grants were received from the Pennsylvania Department of Conservation and Natural Resources and the Foundation for Pennsylvania Watersheds to develop the Slippery Rock Creek Watershed Conservation Plan (SRCWCP) to focus on 408 square miles upstream of the confluence with the Connoquenessing Creek.

The mission or purpose of the plan was to provide the general public, municipalities, watershed community, and government agencies with a concise, easily-read and -used, repository of the natural, historical, cultural, and recreational resources while emphasizing opportunities for stewardship and economic growth within the watershed. To accomplish the purpose of the plan, five goals were established.

The goals were to:

- Create a user-friendly “one-stop-shop” for information by gathering and compiling existing data and mapping;
- Engage local residents, businesses, industries, municipalities in creating the SRCWCP to reflect their issues, interests, and concerns;
- Increase public awareness through a community outreach program that includes an interactive website for information gathering as well as posting the SRCWP;

- Identify economic growth opportunities based on the watershed resources; and
- Identify positive ways to encourage and to support stewardship of the watershed resources.

An advisory committee was formed consisting of stakeholders within the watershed who represented various interests including governmental agencies, nonprofits, business/industry, educational institutions, etc. To increase public awareness of the plan and to identify the issues and interests of people who live and/or work within the watershed, four public meetings, which were announced in local newspapers, were conducted. In addition, 20 municipal (township and borough) meetings were attended in order to communicate the purpose, request input, and seek support. In addition, survey forms were made available both online and at 12 local community events such as the Ellwood City Earth Day and Harrisville Community Day. Interviews were conducted with 29 individuals that included people from a local college and university, county conservation districts, state and federal agencies, and non-profit groups. Information gathered was utilized in development of the plan and copies of the survey have been included. The Stream Restoration Incorporated website was expanded to increase public awareness, to assist in gathering information and to provide a location for posting the SRCWP, which provides the goal of a "one-stop-shop" for information and mapping related to the watershed.

A draft of the plan was uploaded to the website and a series of public meetings were held in February 2011 in order to give citizens and other stakeholders an opportunity to review and comment on the plan. Comments were accepted for 30 days following the last public meeting. The comments were considered and incorporated into the final plan. Public meetings to unveil the final plan are scheduled to be held in June. A copy of the final plan is available for viewing on the Stream Restoration Incorporated website http://www.streamrestorationinc.org/srwcp/srwcp.php.

Watershed Plan Summary

The plan was divided into seven sections. The following provides a summary of each section:

Project Area Characteristics – Section 1 provides a generalized overview of the watershed.

- The Slippery Rock Creek Watershed, as identified by Pennsylvania State Water Plan 20-C, includes the Slippery Rock Creek, Connoquenessing Creek, and Brush Creek Watersheds.
- The SRCWCP covers only the portion of SWP 20-C upstream of the confluence with Connoquenessing Creek.
- The over 261,000-acre (408-sq. mile) watershed has seven major streams and is located in the Ohio River Basin in the western Pennsylvania.
- The watershed covers portions of 5 counties (Beaver, Butler, Lawrence, Mercer, and Venango) and 38 municipalities.
- The watershed is located in the Pittsburgh Low Plateau and Northwestern Glaciated Plateau sections of the Appalachian Plateau physiographic province.
- The existing land uses include about 105,000 acres of forestland and 63,000 acres of agricultural and range land which combined account for at least 64% of the land use in the watershed. (Land use information was not available for Mercer and Venango Counties.)
- Available census data indicate the two largest population centers are Slippery Rock with 5,251 residents and Grove City with 8,024 residents. There are, at most, about 80,000 total residents in the watershed (actual number lower as some municipalities extend beyond watershed).
- Between 1990 and 2000, the population of the watershed grew about 8%.

- Major employers include public & private educational institutions, hospitals, a trucking company, asphalt producer, federal government, document storage facility, food packing facility, etc.
- There are 4 private schools, 1 private college, 1 state university, and 14 public school districts.

Issues, Concerns, and Constraints – Section 2 describes and compiles the public outreach effort and the responses to survey questions focusing on general land use, water quality issues, recreation, watershed attributes, areas of improvement, natural conditions, and issues of concern.

- The 50 responses by the general public and 16 responses by county and municipal representatives indicated that most lived in a residential area.
- Abandoned mine drainage was the most prevalent water quality issue according to the surveys completed by both the general public and the municipal and county representatives.
- The general public listed water quality improvement as the most important watershed value followed by attractive natural settings while the municipal responses indicated a tie between the same selections.
- The general public rated visiting public land (parks, forests, game lands) as the most important recreational activity while municipal representatives selected fishing followed closely by hunting.
- The public survey respondents also provided written comments indicating flooding and stream bank erosion as issues.
- Rights of landowners and concerns about mining and gas drilling (particularly the Marcellus Shale play) were also expressed by the general public.
- People interviewed noted interest in low-head dam removal, development of a water trail, riparian protection, tourism, development of partnership efforts for restoration issues, etc.

Land Resources – Section 3 provides an overview with mapping that includes the physiography, ecoregions, geology, soils, and other related land resource information.

- About 170 square miles of the watershed was covered by glaciers. Various glacial features exist in the watershed including moraines, kames, terraces, and eskers.
- About 90,000 acres of prime farmland are present in the watershed.
- About 29,500 acres or roughly 11% of the watershed consists of public lands including 5 state game lands, 1 state forest, 3 state parks, and 14 other tracts owned by local agencies.
- There are 6 residual and municipal waste sites, 2 permitted sanitary landfills, 87 documented illegal dumpsites, and a superfund site.
- There are over 250 abandoned coal mines and over 200 abandoned & over 300 active oil & gas wells.
- Streambank erosion, flooding, illegal dumpsites, and the reclamation of abandoned mine lands are land resource issues that need to be addressed.

Water Resources – Section 4 provides an overview with mapping of the water resources.

- The “Watershed Address” discrepancy is noted between the PADEP and USGS on whether the entire 836 square-mile area is the Slippery Rock Creek or Connoquenessing Creek Watershed.
- Major subwatersheds and tributaries are identified and described.

- The PADEP stream designations for individual streams are listed and discussed with two streams given the two of the highest quality classifications: Hell Run (Exceptional Value) and Muddy Creek from the source to Moraine State Park (High Quality Cold Water Fishes).
- There are approximately 9,500 acres of wetlands which comprises about 4% of the watershed.
- There are approximately 4,733 acres of lakes and ponds or about 2% of the watershed.
- Lake Arthur is the largest lake at over 3,000 acres.
- There are 8 remaining run-of-the-river dams as well as 2 active stream gauging stations that provide data directly to accessible websites.
- There are 203 miles of impaired streams: over 130 miles (65%) impaired by abandoned mine drainage.
- There are 18 environmentally-friendly (passive) systems treating about 750 million gallons annually of abandoned mine drainage.
- Public water supplies are not described due to current Homeland Security limitations.

Biological Resources – Section 5 describes biodiversity including indigenous wildlife and vegetation along with the changes associated with glaciation and European settlement.

- Numerous hunting opportunities are documented for the watershed, where in 2009 to 2010 over 30 bear, about 8000 turkey, and about 40,000 deer were harvested. (Note that the data are for the five-county area or wildlife management units which extend outside the watershed.)
- Non-game animals like species of amphibians, reptiles, and birds are also discussed.
- Invasive plants such as Japanese Knotweed, Multiflora Rose, etc., and animals such as the Emerald Ash Borer, Red-Eared Slider Turtle are also listed and discussed.
- Species of special concern are noted like the Massasauga Rattlesnake, Indiana Bat, Bog Turtle, Hellbender, etc.
- Important habitats and conservation areas for birds and mammals and biologically diverse areas are identified by the National Audubon Society totaling over 65,000 acres.
- There are 50 Bartramian Audubon Society Wildlife Sanctuaries totaling over 4,000 acres.

Cultural Resources – Section 6 focuses on recreational and historical resources.

- Public lands cover about 11% of the watershed.
- There are 3 state parks that total almost 20,000 acres: Jennings Environmental Education Center, McConnells Mill State Park, and Moraine State Park.
- Portions or all of 5 State Game Lands (# 95, 130, 151, 216, and 284) total almost 9,000 acres.
- There are 17 municipal and county recreational parks totaling almost 600 acres.
- There are also over 400 acres of publically-accessible, privately-owned, parks.
- There are miles of trails for low-impact use by the public: over 50 miles for hiking/walking, over 50 miles for bicycling, over 30 miles for horseback riding, and over 25 miles for snowmobiling.
- There are also areas designated for off-road vehicles including the Slippery Rock Dunes Outdoor Park and Switchback Raceway.

- Birding areas include Jennings Environmental Education Center, Moraine State Park, Glades Wildlife Area, Miller Woods Tract, Wolf Creek Narrows, and Bartramian Audubon Society Sanctuaries.
- There are eight campgrounds, seven golf courses, and opportunities for boating including Lake Arthur and Harbor Acres Lake.
- Public fishing lakes and streams are also described including six "PA Fishing Hot Spots" identified by the PA Fish & Boat Commission.
- Numerous Sportsmen's Clubs, scout troops, and recreational clubs also exist in the watershed.
- A brief history is discussed along with associated archaeological features including iron furnaces, railroads, the Elliott Mine Archaeological Complex, Miller Tract, and Old Stone House.
- Wendell August Forge and McConnells Mill Covered Bridge are listed on the National Register of Historic Places while 16 other features are eligible.

Management Options – Section 7 provides goals, objectives, and action items that focus on watershed restoration, maintenance, or enhancement. The options were identified using input from individuals and municipalities in addition to a review of available county and municipal plans and information. Goals and objectives along with specific action items are listed for all 4 resource categories (water, biological, cultural, land).

- Some of the action items include:
  - Reclaiming abandoned mine land sites
  - Cleanup of illegal dumpsites;
  - Expand recycling programs;
  - Posting of GIS data on state websites;
  - Development of multi-municipal plans;
  - Increasing acreage in preserved agricultural lands, PA Game Lands, and state parks;
  - Treatment of abandoned mine discharges;
  - Stream bank stabilization at the West Park Road Bridge site;
  - Stream habitat improvement projects;
  - Removal of run-of-the-river dams;
  - Expansion of the North Country Trail;
  - Development of a water trail with put-in points, etc.
  - Increase public awareness of land, water, biological and cultural resources.
- A ten-year general timeframe and preliminary estimated cost of over $30 million+ was provided.
- Selected completed projects are listed including the reclamation of about 750 acres of abandoned mine lands by PA DEP; installation of 18 passive systems to treat abandoned mine drainage through public-private partnership efforts; the removal of 3 run-of-the-river dams, education and interpretive programs, etc.
- Projects underway, some of which were initiated by the process of completing the SRCWCP, include the Slippery Rock Creek Streambank Stabilization Project, McIntire Passive Treatment System, web-based version of Accepting the Challenge, Clean Creek Products for sustainability of abandoned mine water treatment, Ohio River Watershed Celebration, Slippery Rock University long-term stream recovery research program and "Weather Observatory", Act 167 County-Wide Watershed Stormwater Management Plans for Butler and Lawrence Counties, Butler County Hazardous Waste & Electronics Collections, etc.

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SECTION 7: MANAGEMENT OPTIONS

ATTACHMENTS

PROJECT BACKGROUND

Work began in 2006 on the Slippery Rock Creek Watershed Conservation Plan **(SRCWCP)** with an application to the Pennsylvania Department of Conservation and Natural Resources **(DCNR)** for funding through the Community Conservation Partnerships Program **(C2P2)**. With receipt of the C2P2 grant in 2007 and with the generous support of the Foundation for Pennsylvania Watersheds, representatives from local communities, businesses, conservation groups, state agencies, and residents formed an Advisory Council to provide guidance in developing the SRCWCP with the following purpose:

Mission Statement

"The Slippery Rock Creek Watershed Conservation Plan is to be developed to provide the general public, municipalities, watershed community, and government agencies with a concise, easily read and used, repository of the natural, historical, cultural and recreational resources while emphasizing opportunities for stewardship and economic growth within the Slippery Rock Creek Watershed."

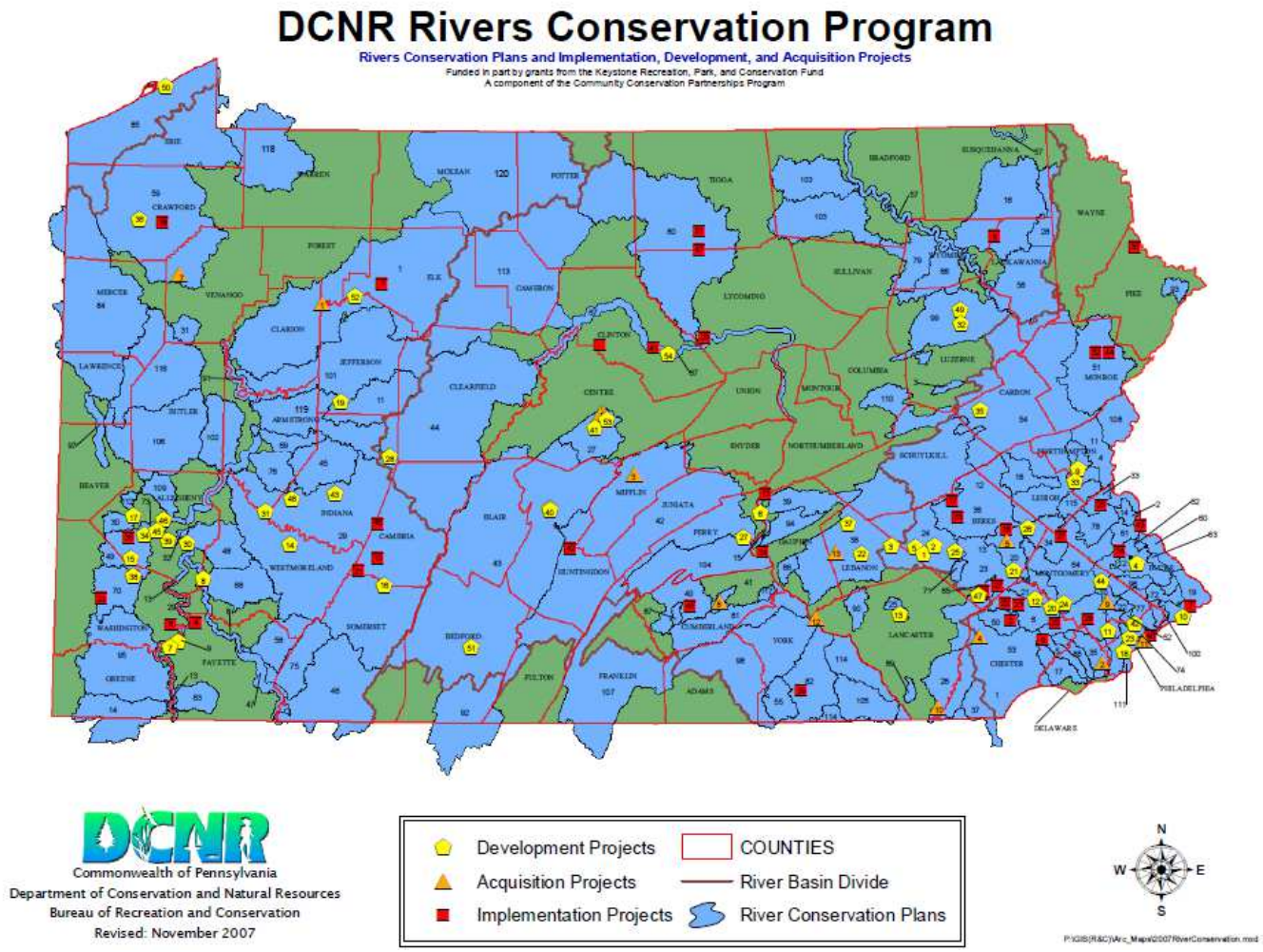
Goals

To accomplish the mission, the following five goals were established, all of which focus on the natural, historical, cultural, and recreational resources within the Slippery Rock Creek Watershed:

- Create a user-friendly "one-stop-shop" for information by gathering and compiling existing data and mapping.
- Engage local residents, businesses, industries, municipalities in creating the SRCWCP to reflect their issues, interests, and concerns.
- Increase public awareness through a community outreach program that includes an interactive website for information gathering as well as posting the SRCWP.
- Identify economic growth opportunities based on the watershed resources.
- Identify positive ways to encourage and to support stewardship of the watershed resources.

Another goal was to complement other plans completed throughout Pennsylvania which connect communities to their rivers and watersheds. If the DCNR concurs that the SRCWCP meets this goal and the standards of the C2P2, Slippery Rock Creek will be eligible for the River Registry along with the 87 rivers/streams currently listed (2007 data). (www.dcnr.state.pa.us/brc/rivers/riversconservation/registry)

The following map depicts the areas of the state covered by DCNR Rivers/Watershed Conservation Plans that have been completed or are in the process of being completed.



Rivers/Watershed Conservation Plan Coverage in Pennsylvania

(Source: Pennsylvania Water Atlas, 2010)

To meet the goals all interested stakeholders must be given the opportunity to contribute to the plan. A public involvement process was developed to encourage input through outreach activities such as public meetings, surveys, newsletters, interviews, and a website. This community outreach effort was essential in identifying watershed-specific problems, issues and concerns. An important part of the outreach effort was the public meetings held at the Grove City High School Auditorium (8/7/07), Plain Grove Township Municipal Building (8/8/07), Boyers Sportsmen's Association (8/14/07), and the Slippery Rock Township Municipal Building (8/15/07).

Stakeholders that could not attend public meetings were also able to provide input via surveys and website feedback. In addition, Tom Grote and Laurie Popeck, SRCWCP Project Facilitators, conducted key person interviews and received input from municipalities through questionnaires and follow-up phone interviews. As listed in the following table, information was also presented and input requested for plan development at township and borough meetings in 2007.

2007 Presentations by SRCWCP Project Facilitator at Township & Borough Meetings

	County	Municipality (twp.; *borough*)	Date of Meeting
1	Beaver	Franklin	05/08/07
2	Butler	Brady	06/27/07
3		Center	06/18/07
4		*Harrisville*	05/29/07
5		Marion	05/14/07
6		Muddy Creek	06/25/07
7		*Slippery Rock*	06/19/07
8		Slippery Rock	06/25/07
9		West Sunbury	07/05/07
10	Lawrence	Plain Grove	04/09/07
11		Scott	04/02/07
12		Slippery Rock	05/14/07
13		Washington	04/09/07
14		Wayne	04/05/07
15	Mercer	Findley	05/02/07
16		Pine	05/21/07
17		Sandy Lake	05/01/07
18		Springfield	05/21/07
19		Worth	05/02/07
20	Venango	Clinton	05/07/07

(Source: Advisory Council)

In turn, the information gathered was used to compile a list of specific issues of interest to the stakeholders. These issues included, but are not limited to, the following:

- Mitigation of historic impacts to water and land resources by abandoned coal mines,
- Identification of environmental stewardship goals relating to limestone, coal, sand & gravel, and oil & gas reserves,
- Development of boating, fishing, and other recreational opportunities while improving aquatic habitat by decreasing erosion, siltation, etc. for Slippery Rock Creek and major tributaries,
- Implementation of smart development along the Interstate 79 corridor, and
- Enhancement of unique natural and cultural resources such as McConnells Mill State Park, Moraine State Park, Jennings Environmental Education Center, and Pennsylvania Gamelands.

Based on the stakeholder input, the SRCWCP has focused on providing a coordinated plan for addressing challenges currently facing individual communities while providing a template for stewardship of the watershed as a whole. Successful completion of the SRCWCP goals provides critical data for stakeholders interested in the sustainability and viability of the watershed, which is vital towards integrating positive economic growth with conserving, improving, and maintaining the resources of the Slippery Rock Creek Watershed. With accessibility via the internet at www.srwc.org, the SRCWCP is readily available for use in support of future community-based projects by local groups,

municipal officials, conservation organizations, government agencies, non-profit organizations, businesses, planners, and residents.

To develop a plan to successfully address the mission statement, the SRCWCP was divided into seven major sections, as listed in the following table:

SRCWCP Sections

Sec. #	Title	Brief Description
1	Project Characteristics	Watershed location, size, topography, streams, land use, social/economic profile, employment, unique features, etc.
2	Issues, Concerns, Constraints	Items of interest as developed from stakeholder input
3	Land Resources	Soil characteristics, ownership, critical areas, landfills, hazard areas including waste sites, abandoned mines, etc.
4	Water Resources	Major streams, wetlands, floodplains, lakes, water supplies, water quality, etc.
5	Biological Resources	Wildlife (terrestrial and aquatic), vegetation (native and exotic), PNDI Species, important habitats, etc.
6	Cultural Resources	Recreational, archaeological/historical, etc.
7	Management Options	Options complementing and integrating initiatives for natural resources stewardship & sustainable economic growth
8	Appendices	Basic data including individual surveys

Note that Section 2 was developed from stakeholder surveys, which were compiled under three categories:

- Citizen Survey: for any person living or working in the Slippery Rock Creek Watershed
- Key Person Survey: list of individuals developed by the Advisory Council
- Municipal Survey: staff of local municipalities and county planning commissions

In addition, Section 7 includes management options based on the surveys as well as management options being considered or implemented by the local and county planning agencies and state agencies.