
Coldwater Conservation Plan

for the

Wyomissing Creek Watershed

*Prepared by Berks County Conservation District for
the Wyomissing Creek Watershed Coalition*

2013

*This project was funded by a planning grant from the
Coldwater Heritage Partnership*



BERKS COUNTY
CONSERVATION DISTRICT



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The Berks County Conservation District prepared this plan in order to provide a road map for the conservation of the Wyomissing Watershed's coldwater characteristics. The Municipalities of West Reading, Wyomissing, Shillington, Spring, Mohnton, Cumru, Brecknock and the City of Reading are to be commended for their willingness to plan for the conservation and enhancement of the Wyomissing Creek and surrounding lands. The Berks County Conservation District wishes to recognize these municipalities for their partnership, planning efforts, and active participation.

The Berks County Conservation District also wishes to acknowledge the Berks County Conservancy, as the nonprofit completed a 2004 Watershed Conservation Management Plan. Much of the historical data in this report can be attributed to that report.

Lastly, Great Valley Consultants has been a gracious and willing partner in the planning process. The Berks County Conservation District acknowledges the technical assistance, guidance, field work, and partnership that this company provided that aided in the completion of this plan.

Thank you.

Introduction & Objectives of the Coldwater Conservation Plan

The main objective of this Coldwater Conservation Plan is to assist the Municipalities of the Wyomissing Watershed in conserving the cold water characteristics and resources of the Wyomissing Watershed by providing a road map that will outline how to reduce the impacts of nonpoint source water pollution.

In 2012, the Berks County Conservation District applied for and received a grant from the PA Coldwater Heritage Partnership to create an overview of suggestions that would assist the Municipalities of the Wyomissing Watershed in reducing nonpoint source pollution inputs into the Wyomissing Creek and its tributaries. Formed in 1946, the Berks County Conservation District (BCCD) is dedicated to the encouragement of and education in the wise stewardship of soil and water, so that present and future generations in Berks County may have healthy land on which to live and work, and clean water for drinking and recreating. The BCCD has a long, successful history of partnering with local and state organizations to implement Best Management Practices (BMP) that reduce the amount of nonpoint source water pollution from entering Berks County streams.

In 2010, the Municipalities of Reading, West Reading, Wyomissing, Shillington, Spring, Mohnton, and Cumru began meeting regularly to discuss various concerns regarding the Wyomissing Watershed. The concerns addressed such issues, including but not limited to, how to comply with the proposed changes in the PA Department of Environmental Protection's (PA DEP) Municipal Separate Storm Sewer System (MS4) program and how to comply with a 2004 Sediment TMDL. In 2013, Brecknock Township joined the seven other municipalities that make up the Wyomissing Watershed in the existing cooperative partnership.

The Municipalities that are located within the Wyomissing Watershed have been working together in a cooperative effort to investigate the current conditions of the Watershed as well as plan for ways in which the Watershed would be able to meet TMDL and/or MS4 requirements. The municipalities collectively realize that surface water pollution from nonpoint sources cannot be resolved nor addressed by one entity alone, but rather needs to be addressed by working together in a joint intergovernmental and municipal partnership. This initiative represents a growing, beneficial trend in natural resources management as various municipalities in Berks County often partake in joint comprehensive planning processes that work to better plan growth, conserve natural resources, and comply with MS4 requirements. The project partners meet monthly to assess the Watershed's needs and plan for present and future actions.

The BCCD has supplied aid to the Watershed and its Municipalities by applying for assistance from PA DEP's Division of Water Quality Standards and the Coldwater Heritage Partnership. The goals of these two grants was to first assess the current conditions in the Wyomissing Watershed and second to begin planning opportunities for BMP implementation. While the Coldwater Heritage Partnership Grant was awarded, the Surface Water Assessment proposal was not awarded due to federal and state budget cuts. Thus, the interested Wyomissing Watershed Municipalities (hereafter referred to as the Wyomissing Creek Watershed Coalition or WCWC), requested that the Berks County Conservation District supply a proposal and budget that would outline the tasks and costs related to carrying out a surface water assessment. The WCWC approved of the proposal that the BCCD provided to complete the surface water assessment. In the fall of 2012, an assessment of nine stream sites in the Wyomissing Watershed was conducted by EcoAnalysts. In this assessment, a stream site's chemical parameters,

biological life, and habitat present was assessed in accordance with the PA DEP's Instream Comprehensive Evaluations Protocol.

Although the Surface Water Assessment and the Coldwater Heritage Grant are two separate projects that were funded by separate entities, the surface water assessment, along with field work, helped to shape the recommendations in this Coldwater Conservation Plan. Both the Coldwater Conservation Plan and the Surface Water Assessment documents are to serve as guiding documents for the BCCD, WCWC, and the public in addressing stormwater concerns and nonpoint source water pollution.

Background

Watershed Description

The Wyomissing Creek Watershed is located in Berks County, Pennsylvania; it originates in Brecknock Township, just north of Knauers and flows in a northeasterly direction for approximately 8.4 miles before its confluence with the Schuylkill River in the Reading area. The 15.7 square mile watershed contains a total of 20.8 miles of streams. According to United States Geological Survey-StreamStats and the 2004 TMDL Report, approximately 38% of the land is covered by forest and approximately 37% is urban landuse. Also, approximately 4.4 miles of streams in the Wyomissing Creek Watershed flow through agricultural land use. Municipalities in the watershed include Brecknock, Cumru, Mohnton, Reading, Shillington, Spring, West Reading, and Wyomissing.

In Pennsylvania, streams or stream reaches are classified under water quality standards regulated by the Pennsylvania Department of Environmental Protection. There are five protected use designations assigned to streams that support the maintenance and propagation of fish species and suitable habitat for flora and fauna. The two highest designations, High Quality (HQ) and Exceptional Value (EV) mandate special water quality protection, as they embody outstanding ecological resources that are required to be maintained at existing quality. The majority of the Wyomissing Creek is listed as a High Quality – Cold Water Fishery under its Pennsylvania Chapter 93 Designated Use. There is a 2.5 mile stretch of the Wyomissing Creek Watershed located from the State Route-222 Bridge to the Museum Road Bridge in Reading, PA that is listed as Class-A Wild Trout Waters by the Pennsylvania Fish and Boat Commission. Protected uses of the Wyomissing Creek Watershed include aquatic life, water supply, and recreation. However, the Wyomissing Creek watershed was surveyed under the PADEP's Statewide Surface Water Assessment Program, which resulted in 6.1 miles being determined as impaired with sediment and not meeting its Designated Use. In 2004, a Total Maximum Daily Load (TMDL) was developed for Wyomissing Creek, which set a sediment load allocation. The TMDL has since been approved by the United States Environmental Protection Agency. Also in 2004, the Berks Conservancy, along with the PA Department of Conservation and Natural Resources (DCNR) and the William Penn Foundation completed a comprehensive Wyomissing Creek Watershed Conservation Plan.

The stream corridor includes the stream and adjacent land along the stream. Stream characteristics and water quality are greatly dependent upon the natural features of this land, as well as the modifications that have occurred over time. Most of the land closest to the Wyomissing Creek and its tributaries is subject to periodic flooding during rainstorms. It is in these floodplain areas where many residents have built homes. This land is usually flat and contains alluvial soils that may be wet a portion of the year. It often supports wetland vegetation that can serve as excellent areas for wildlife habitat. Floodplain areas vary with topography and the size of the stream, increasing with stream order and drainage area. The

floodplain serves as a natural buffer area along the creek. This greatly aids in the impact of runoff and nutrient loading. The Wyomissing Creek’s floodplain lies in both low-density residential area and wooded areas. The residential areas have shorter grass and lawns and normally do not feature natural wetland vegetation.

Land uses in a watershed directly affect the quality and quantity of both surface and groundwater. Uses such as agriculture, timber harvesting, and urban and suburban development can impact water quantity by changing runoff amounts, timing and infiltration rates. These uses can also change water quality by contributing sediment and nutrients to runoff and groundwater. Below is a table summarizing the major land uses in the watershed. (This table is not an exhaustive table of the land uses that exist in the Wyomissing Watershed. Rather, this table is meant to show the relative nearness of values in both the percentage forested land and urban land uses.)

Table of Wyomissing Creek Watershed Land Use

Parameter	Value
Area in square miles	15.713 sq mile
Total stream length in miles	20.1 miles
Percent of area covered by forest	38.5563%
Percent of area covered by lakes, ponds, reservoirs and wetlands	0.3094%
Percent of area covered by urban uses	37.4293%

Data provided from United States Geological Survey-StreamStats

Many of the Wyomissing Creek’s tributaries flow through forested habitats, which enhance the water quality of the stream system as a whole. Much of the land along the mainstem of Wyomissing Creek is developed as residential housing. Residential housing can create serious water-related problems associated with earth moving activities and increased impervious surfaces. These changes increase runoff, which carry sediment, nutrients and chemicals to streams, degrading the water quality. In areas where natural buffering cannot handle these impacts or a buffer is lacking, non-point source pollution is the result.

Previous Studies

The Berks County Conservancy created a Watershed Conservation Management Plan for the Wyomissing Watershed in 2004, funded by the Department of Conservation and Natural Resources (DCNR) and the William Penn Foundation. The goal of the 2004 plan was to provide local governments, nonprofits, and Watershed residents with recommendations to restore and conserve the resources of the Wyomissing Watershed.

The Berks County Conservancy Plan addressed overall Watershed health such as native and invasive plants, critical areas for conservation (Agricultural, Historical, Ecological etc.). This Coldwater Heritage Plan seeks to build upon what the Berks County Conservancy created in 2004 by specifically addressing nonpoint source surface water pollution and municipal stormwater concerns. The following is a list of recommendations that were listed in the 2004 Berks County Conservancy Watershed Conservation Management Plan (items that are italicized with a check mark have been completed):

- Erosion Remediation: Erosion along the banks of the Wyomissing Creek is a prevalent problem. Grading the stream bank on an angle and placing appropriate stabilization along the edges of

the stream bank in problem areas can be helpful in preventing erosion. The stream would also benefit from seeding the banks to establish a riparian buffer.

- Livestock in the Creek: When livestock access to streams is not controlled, a sizable portion of sediment pollution comes from the unprotected stream banks caused by livestock grazing and trampling. Fencing stream banks and limiting livestock access with stream crossings promotes the establishment of a healthy vegetative cover. Vegetation binds soil particles together creating a stable bank that reduces erosion. Stream bank vegetation helps trap sediment and absorbs some nutrients that may run off of adjacent cultivated fields and feedlots.
- Dam Removals: There are a number of dams within the watershed that serve no purpose anymore. These dams disrupt the natural flow of the water in the creek and have no positive impacts on the ecosystem. Removal of these dams is a possible project.
- Channelization: In combination with the dam removal, another way to restore streams to a more natural state would be de-channelization. By de-channelizing the stream the flow will return to natural condition. Doing this would also enhance the aesthetics of the area. De-channelization of the stream within the park and near the Wyomissing Public Pool would not only create a more pleasing look aesthetically but it would also increase the health of the stream.
- Other less specific projects which can be done
 - ✔ *Encourage municipal ordinances to require retention of riparian buffers in developments along the stream banks.*
 - ✔ *Develop a prioritized list of Wyomissing Creek Watershed municipalities to contact and provide education and information to encourage the development or amendment of ordinances to protect the resources of the watershed.*
 - ✔ *Partner with organizations and agencies to hold public educational meetings for the residents and municipal officials in the Wyomissing Watershed.*
 - Upgrade headwater streams within the Wyomissing Creek watershed to HQ or EV status.
 - Hold public workshops on the management of invasive species as part of the “Natural Habitat Workshop Series.”
 - ✔ *Partner with DEP and the County Planning Commission on educating the municipalities about stormwater management issues.*
 - ✔ *Encourage townships to develop projects to increase and /or improve recreational facilities in the Wyomissing Creek Watershed.*
 - Work to develop a conservation easement program for stream buffers, either through donation of easements or the purchase of easements.

Unique and Outstanding Values in the Watershed

The Wyomissing Creek is listed as a High Quality – Cold Water Fishery stream under its Pennsylvania Chapter 93 Designated Use. There is a 2.5 mile stretch of the Wyomissing Creek Watershed located between the State Route-222 Bridge to the Museum Road Bridge in Reading, PA that is listed as Class-A Wild Trout Waters by the Pennsylvania Fish and Boat Commission. While Pennsylvania has over 83,000 miles of streams, only 25% are considered high-quality coldwater fisheries. Of that, less than 2% are designated as highly productive waters that contain naturally reproducing wild trout. The Wyomissing Creek is one of those waterbodies that are considered to be in the elite 2% of the streams in PA that can support reproducing trout.

Also, there is a County-wide effort in Berks County to collaboratively address MS4 requirements. The Wyomissing Watershed Municipalities are members of this County-wide effort. In 2013, the group, along with Berks County Planning Commission, the BCCD, and the Berks Conservancy, formalized into a Berks County MS4 Steering Committee. This committee is a cooperative cost sharing initiative to share ideas and maximize educational outreach to the public, municipal employees, and students on stormwater pollution.

Finally, the Wyomissing Watershed is fortunate to have a vast amount of parkland located within its boundaries. Particularly the park land that exists along the creek in the municipalities of West Reading and Wyomissing provide opportunities for the public to have access to the stream while providing a low intensive land use and vegetated stream bank. Not only do parks provide areas for recreation, (some areas have access to the stream for fishing), parks can also be a place to educate Watershed Residents. Parks are an ideal place for demonstration projects that both prevent pollution and then educate the public on the importance of preventing nonpoint source pollution within the park. A list of the park land that was listed in the 2004 Berks Conservancy Watershed Conservation Management Plan is below:



Ice skating pond at Wyomissing Park in early spring

Public and Private Parks within Wyomissing Watershed	
<u>Mohnton Borough</u>	<u>Wyomissing Borough</u>
Community Park	Berkshire Heights Playground
Mobic Courts	Happy Hollow Playground
<i>Mohnton Family Swimming Assoc.</i>	Wyomissing Park
<u>West Lawn Borough</u>	<i>Berks County Tennis Club</i>
West Lawn Playground	<i>Mid Atlantic Fitness Center</i>
Kerry Irwin Field	<i>Berks Gymnastics Academy</i>
<i>Kidsports Fun and Fitness</i>	Community Playground
<u>West Reading Borough</u>	Fountain Park
Bicentennial House	Wyomissing Hills Park
Municipal Playground	<i>Wyomissing Hills Swimming Assoc.</i>
<i>The Body Shoppe</i>	
<u>Cumru Township</u>	
Montrose Manor Park	<i>Italicized = Privately Run</i>
<i>JR's Skateaway</i>	
<i>Mohnton Fish and Game</i>	

(Taken 2004 Berks County Conservancy Watershed Conservation Management Plan)

In addition to the parks listed above, the below parks have been established:

- **City of Reading**
 - Reading Public Museum
 - Yarnell Park
- **Wyomissing Borough**
 - Museum Park
 - Lauers Run Park
- **Spring Township**
 - Klines Creek Park
- **Mohnton Borough**
 - Mohnton Memorial Park
- **Cumru Township**
 - Montrose Manor Playground
 - Pennwyn Playground

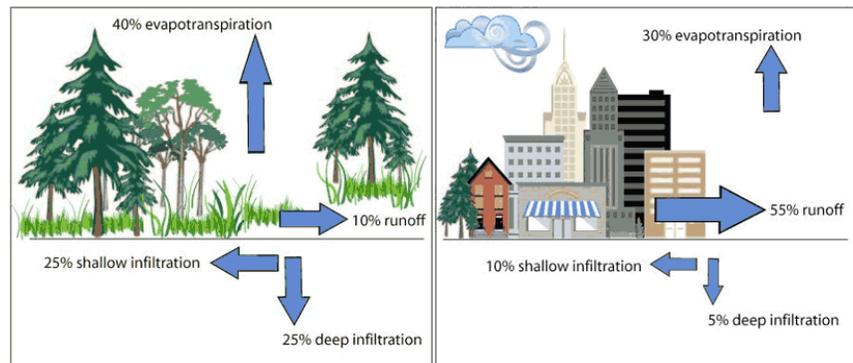
Impairments and Total Maximum Daily Load

Land development can dramatically alter the hydrologic cycle of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw on the water that has infiltrated into the ground and return it to the atmosphere through evapotranspiration.

Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall.

Construction activities may also compact the soil and diminish its infiltration ability, resulting in

increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time can cause flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is often eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for shallow and deep infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on baseflows.



Water Cycle in undeveloped areas versus urbanized areas.
Illustrations taken from Clean Water Education Partnership

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development

often results in the accumulation of pollutants on the land surface that runoff can then transport to streams. New impervious surfaces and cleared areas can accumulate a variety of pollutants such as fertilizers, animal wastes, and vehicle fluid. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients. In addition to increased pollutant loading, various land use changes can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Specifically, the Wyomissing Creek was sampled under PADEP’s Statewide Surface Water Assessment Program, which resulted in segments of the Wyomissing Creek being determined to be impaired with sediment and not meeting its Designated Use. In 2004, a TMDL was developed for Wyomissing Creek, which set a sediment load allocation. The TMDL has since been approved by the United States Environmental Protection Agency. The goal of any TMDL is to calculate the maximum amount of a pollutant that a water body can receive and still meet its water quality standards. This means that to achieve its designated use as a High Quality-Cold Water Fishery, the Wyomissing Watershed must reduce the amount of pollution that it receives. Below is a breakdown of the Sediment TMDL for the Wyomissing Creek Watershed:

Component	Sediment (lbs./yr.)
TMDL (Total Maximum Daily Load)	6,329,495.48
MOS (Margin of Safety)	632,949.55
WLA (Wasteload Allocation)	3,747,238.13
LA (Load Allocation)	1,949,307.80

(Taken from the 2004 Wyomissing Creek Sediment Total Maximum Daily Load)

2012 Wyomissing Creek Surface Water Assessment

In November of 2012, an assessment of the Wyomissing Creek’s Mainstem and tributaries was authorized by the WCWC and performed by EcoAnalysts, Inc. The BCCD provided in the field assistance during the two day assessment process. The Surface Water Assessment evaluated the stream’s physical habitat, water chemistry, and biological life (macroinvertebrates) according to PA DEP’s Instream Comprehensive Evaluations Protocol. The results of this assessment was processed by utilizing the Index of Biotic Integrity (IBI), which PA DEP uses to determine if a stream is attaining its Designated Use or is impaired. A summary of the findings of the Stream Assessment are below (*charts and tables were directly taken from the 2012 Surface Water Assessment document*):

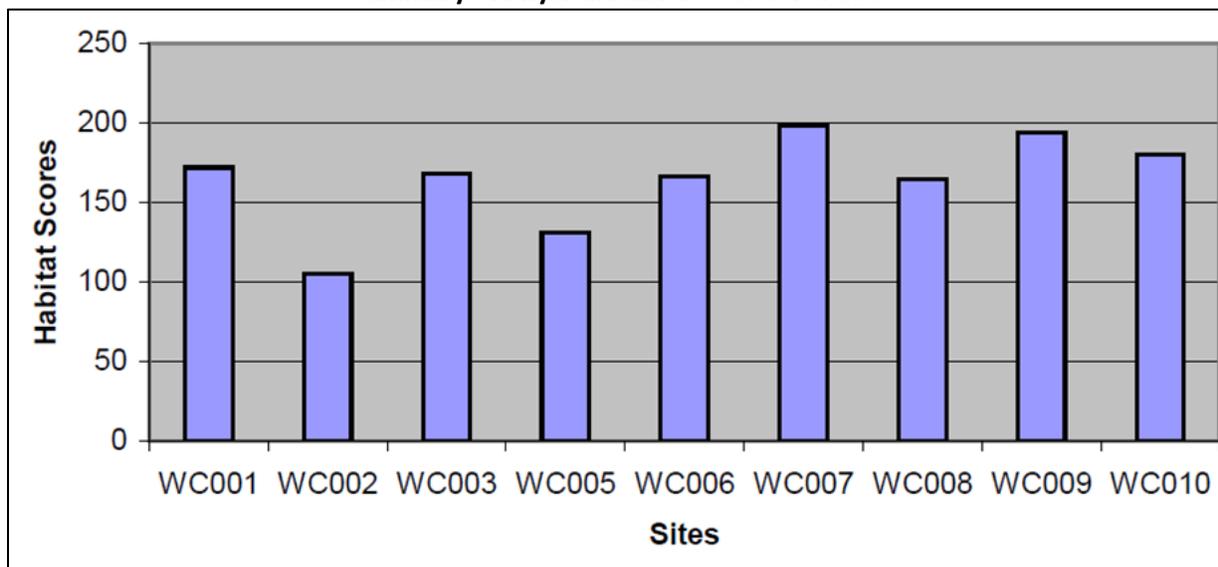
Table of Wyomissing Watershed Stream Assessment Sites

Site	Latitude/Longitude	Description
WC001	40.32698N/-75.94689W	Mainstem Wyomissing Cr., above JMA, next to playground
WC002	40.32207N/-75.96923W	Off Old Mill Road Bridge
WC003	40.31627N/-75.96807W	Off Old Wyomissing & Lauers Ln. below bridge
<i>WC004 (site was dry-not sampled)</i>	<i>40.30385N/-75.97854W</i>	<i>UNT 01839</i>
WC005	40.29510N/-75.97954W	Off Wyomissing Ave. & Mohnton Blvd.
WC006	40.29502N/-75.97932W	Mainstem upstream UNT 01840 off Wyomissing Ave.
WC007	40.28261N/-75.99653W	Off gravel lane-Rudloff Ln.
WC008	40.27548N/-75.99754W	Off Wyomissing Road
WC009	40.26788N/-76.00564W	Off Yorkshire Road
WC010	40.26925N/-76.00060W	Off Wyomissing Road

Summary of Water Quality Results Per Site

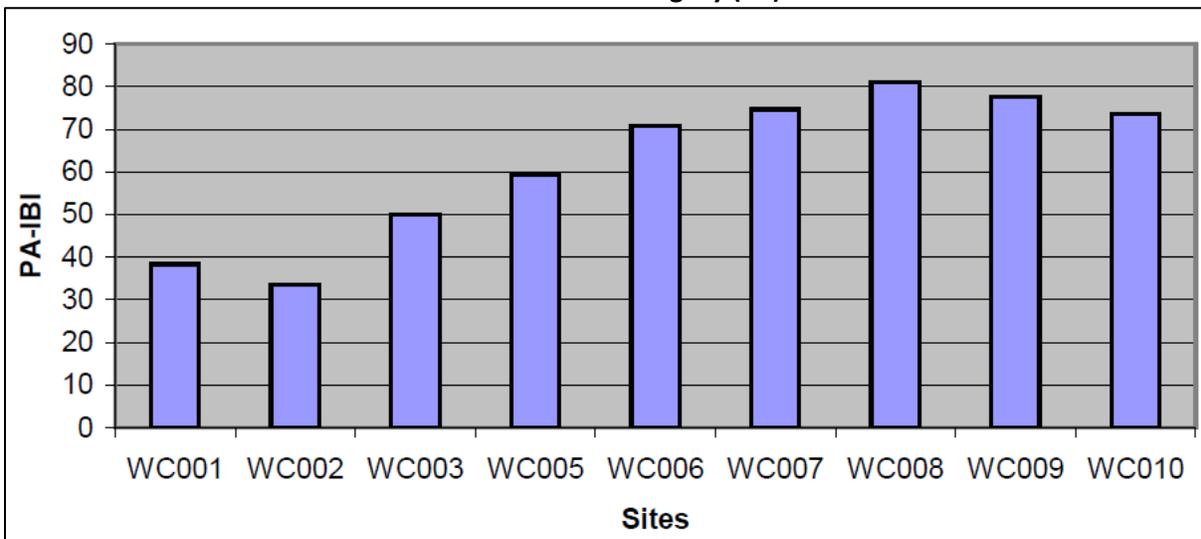
Sites	Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/l)	% Oxygen Saturation	pH (standard units)	Alkalinity (mg/l)	Total Diss. Solids (g/l)
WC001	10.57	568	12.48	112.2	7.99	200	0.369
WC002	12.98	879	12.98	110.8	8.01	280	0.571
WC003	10.85	391	11.79	106.7	7.64	140	0.254
WC005	11.81	466	11.50	106.1	7.75	140	0.304
WC006	11.87	260	11.11	102.8	6.95	80	0.169
WC007	9.75	324	11.02	97.1	7.36	100	0.211
WC008	10.31	169	10.75	95.9	7.31	60	0.110
WC009	10.63	189	10.62	96.0	7.22	60	0.123
WC010	9.80	136	10.56	93.2	7.07	60	0.088

Summary of Physical Habitat Scores Per Site



The Habitat scores were ranked in this study as follows: optimal: 240-192; suboptimal: 180-132; marginal: 120-72; and poor: ≤ 60 . Gaps between these scoring ranges were ranked based on best professional judgment.

Table of Index of Biotic Integrity (IBI) Per Site



In summary, the Stream Assessment that was conducted in 2012 indicates that impairment status of the Wyomissing Watershed has remained unchanged. In other words, the segments that were attaining their Designated Use as determined before the study maintained their attaining status. Furthermore, the segments of the stream that were not attaining their Designated Use and in need of a TMDL also remained the same.

Specifically, the chemical water quality data showed no specific item of concern that would affect the biological community. The Habitat Analysis revealed 2 sites that were considered optimal, 6 suboptimal, and 1 marginal (WC002).

The overall results showed that sites WC001, WC002, WC003, and WC005 did not meet the criteria to be deemed attaining. The remaining sites, WC006, WC007, WC008, WC009, and WC010 were considered attaining. Because of the relatively high habitat scores that all of the sites (except for WC002) received, the stream assessment report does indicate that a likely cause of impairment in the watershed is the effects of scour and deposition due to stormwater. The assessment report states that although the bottom substrate appears stable between storm events, the macroinvertebrates are not present due to instability during storm events because of stormwater scour.

The findings of the 2012 Stream Assessment of the Wyomissing Watershed have helped shape this Coldwater Heritage Plan. This plan now addresses a merged approach to addressing the water quality concerns in the Wyomissing Watershed that take into consideration both sediment issues and effects of increased stormwater runoff. It should be noted that site WC002, which received the lowest habitat score, was the one site that did show that sediment may be a contributing factor to its marginal status.

Recommendations and Next Steps

Based upon the Surface Water Assessment performed by EcoAnalysts and the field investigations done by the BCCD, three general recommendations are put forth in this plan that will aid in the conservation and enhancement of the Wyomissing Watershed's Coldwater Characteristics. Appendix A includes a map of the Wyomissing Watershed that highlights particular land uses that may be amenable to implementing the three types of recommendations provided by this plan. These types of lands include schools; parks, County and Municipal owned land (referred to as "Public Land"); and the Reading Hospital. The three general recommendations are listed below and are expanded upon in the following sections.

Recommendation #1 Inventory and Pursue Stormwater Retrofit/Disconnection Opportunities

Recommendation #2 Actively Educate Watershed Stakeholders

Recommendation #3 Inventory Stream Corridor Restoration Opportunities

#1 Inventory and Pursue Stormwater Retrofit/Disconnection Opportunities

While the headwaters of the Wyomissing Watershed are mainly rural areas, the mouth of the stream and up to Mohnton Borough is mainly urbanized residential and commercial areas. Most of the urbanization in this portion of the Watershed took place before modern stormwater regulation/practices were implemented. As is common in most of these older communities, there is an opportunity to introduce stormwater retrofits. Stormwater retrofits often involve updating, changing, or enhancing current, onsite stormwater management practices and converting them into practices that address a pollutant or issue of concern. Retrofits include but are not limited to: wetland plantings and removal of low flow channels in stormwater basins to decrease the amount of water entering the stream during storms; installation of rain gardens or other bioinfiltration practices; and decreasing the amount of impervious surfaces. These types of practices should be installed where it is feasible and practicable as the specific site permits. Often times utilizing stormwater retrofits in a “treatment train,” where stormwater flows through several types of practices is an effective way of addressing stormwater runoff related concerns.

This plan identifies areas where various stormwater retrofits could be feasible while providing education to Watershed residents through demonstration projects and preventing stormwater associated pollution from entering the Wyomissing Creek. However, a more in-depth investigation in each municipality may be warranted to better investigate a watershed-wide stormwater retrofit plan, which would examine the areas where presently uncontrolled runoff could be treated and infiltrated back into the ground, or taken up by plants.

Table of Best Management Practices and Possible Locations

Best Management Practice	Potential Location in Watershed	Photo Example of Practice
<p>Rain Gardens Rain gardens are shallow depressed gardens designed to capture and soak up stormwater flows</p>	<ul style="list-style-type: none"> • West Wyomissing Elementary • Berks Catholic High School • Wyomissing Junior Senior High School • Lincoln Park Elementary • Governor Mifflin Middle School • Reading Public Museum • Museum Park • Lauers Run Park • Yarnell Park • Montrose Manor Playground • Mohnton Memorial Park • Gouglersville Fire Company 	
<p>Permeable Pavers Replacing hard, impermeable surfaces with materials such as permeable pavers allows rainwater to soak into the ground. This reduces the amount of runoff that leaves the property.</p>	<ul style="list-style-type: none"> • West Wyomissing Elementary • Berks Catholic High School • Wyomissing Junior Senior High School • Lincoln Park Elementary • Governor Mifflin Middle School • Lauers Run Park • Yarnell Park 	
<p>Rain Barrels/Cisterns Rain barrels and cisterns collect and store rainwater from roofs. Often this water is directed to garden or landscaped areas.</p>	<ul style="list-style-type: none"> • West Wyomissing Elementary • Berks Catholic High School • Wyomissing Junior Senior High School • Lincoln Park Elementary • Governor Mifflin Middle School • Reading Museum 	
<p>Green Roof Green roofs are covered with a waterproof membrane and then planted with a special vegetation system to absorb rainfall.</p>	<ul style="list-style-type: none"> • Wyomissing Junior Senior High School • Berks Catholic High School • Reading Museum 	
<p>Dry Wells A dry well is a small, excavated pit filled with stone or gravel that temporarily stores stormwater from roofs until it soaks into the soil.</p>	<ul style="list-style-type: none"> • GAI-Tronics • Gouglersville Fire Company • West Wyomissing Elementary • Berks Catholic High School • Wyomissing Junior Senior High School • Lincoln Park Elementary • Governor Mifflin Middle School 	

Best Management Practice	Potential Places in Watershed	Photo Example of Practice
<p>Wetlands or Permanent Pools Shallow excavations can be carved into the bottom of dry ponds to create wet micro-pools or wetlands.</p>	<ul style="list-style-type: none"> • The Highlands Residential Community • Basin at Kendal & Frederick St. (Whiskey Ditch) • Basin at Thomas Drive @ Rt 222 (Montrose) 	
<p>Modifying the Outflow Stormwater basins have outflows that are sized to restrict storm flows and allow only a certain volume of water to flow through at a certain rate. Retrofits of the outflow often allow ponded runoff to be stored for longer periods to better mimic the predevelopment flows downstream.</p>	<ul style="list-style-type: none"> • The Highlands Residential Community • Basin at Kendal & Frederick St. (Whiskey Ditch) • Basin at Thomas Drive @ Rt 222 (Montrose) • Park Terrace Basin (Mohnton) • Northridge Development Basin (Mohnton) 	
<p>Increasing time of travel Older stormwater ponds often routed water quickly through stormwater facilities with concrete channels and direct flow paths to outflow structures. Retrofit projects, often removes such low flow channels and carves out a winding path through the stormwater facility. This allows more time to remove pollutants from the stormwater.</p>	<ul style="list-style-type: none"> • GAI-Tronics • The Highlands Residential Community • Basin at Kendal & Frederick St. (Whiskey Ditch) • Basin at Thomas Drive @ Rt 222 (Montrose) • Montrose Blvd & Lancaster Pike • Park Terrace Basin (Mohnton) • Northridge Development Basin (Mohnton) 	

#2 Actively Educate Watershed Stakeholders Landowner/Public Education**

Streamside Landowners and Public Education

Private landowners control nearly all the land within the Wyomissing Creek watershed. Private landowners fall into a number of categories: residential, commercial, agricultural, and industrial. It is the practices that landowners carry out on their land that has the greatest influence on water quality in the Wyomissing Creek and its tributaries. For that reason, it is essential that effective outreach and education target this group, ensuring that they have the appropriate information to properly manage their land, and put in place conservation and best management practices that will protect water resources. While creating this Coldwater Conservation Plan, a public meeting was held to inform residents about the process to create the Plan and to garner their suggestions as to how to improve the Wyomissing Watershed. Appendix C outlines the public input that was received while creating this plan. Various opportunities exist to educate streamside landowners and the general public:

Recommendation	Means to Achieve Recommendation
Inventory and outreach to streamside landowners	Outreach to all streamside landowners informing them of the appropriate ways to care for streamside property and giving them opportunities to seek technical advice should they need it.
Educate Watershed landowners about a wide variety of best management practices that affect residential and commercial properties	Watershed municipalities should carry out informational workshops for their residents to promote a sense that everyone has a stake in the health of the watershed, and that individuals can make a difference. (Topics include, but are not limited to: care of septic systems, proper use of lawn and garden chemicals, managing stormwater, understanding various BMPs- such as rain gardens and swales that may be on their property, how to dispose of household hazardous waste, washing vehicles on lawn areas and not on driveways, and the benefits of native vegetation, and pet waste).
Ensure that all residents are aware of and have opportunities to connect with the Wyomissing Creek Watershed Coalition	Incorporate Wyomissing Creek Watershed Coalition materials into the municipal newsletters, water bills, trash bills, and municipal websites. Investigate the potential need for a website for the group. Also, stream signage or “entering the watershed” signage may be a way to connect residents with the Coalition.
Inventory and outreach to “other groups”	There are numerous groups within the watershed carrying out a range of missions related to the community. These groups include social clubs, church groups, girl and boy scout troops, and historical societies. With outreach, these entities have the chance to assist with natural resource protection projects while meeting their own objectives.

*** The Berks County MS4 Steering Committee may be able to aid in the coordination and execution of the educational recommendations given in this report.*

Government Elected and Appointed Officials

This group includes township supervisors, council members, planning commission, and zoning board members. These decision-makers must be well-informed in order to put in place sound regulations, and then implement those regulations to appropriately protect our natural resources. Future education and outreach efforts to reach this group can include:

Recommendation	Means to Achieve Recommendation
Outreach to Township Supervisors	Presentations at Supervisor and Council meetings to present the results of this report, and to determine where additional educational resources might be needed.
Establish Watershed-wide Environmental Advisory Council (EAC) Network	Working on the recommendations from this document could provide a jumping-off point for municipal environmental advisory councils. This could also establish a watershed-wide elected official network that would bring together Township Supervisors and Borough Council members to discuss issues concerning zoning, regulation, and development. Regulatory consistency across municipal boundaries could be a goal of this network (if not already being addressed)
Outreach to Municipal Boards and Commissions	Meet with Municipal Zoning Boards and Planning Commissions to discuss natural resources conservation and environmental protection

Municipal Public Works, Roads, and Utility Staff

Municipal staff has responsibility for a number of activities that can have a profound effect on water and natural resources. Among these activities are: mowing of municipal owned properties and roadsides, spraying of herbicides and pesticides, maintaining and upgrading of infrastructure and any installed BMPs. Ensuring that Municipal employees are trained to maintain newly installed BMPs will help ensure the success of the practice.

Recommendation	Means to Achieve Recommendation
Offer trainings to Municipal Staff	General educational outreach program should be developed for municipal staff to keep them informed about the best management practices that affect the activities they carry out.

#3 Inventory Stream Corridor Restoration Opportunities

Stream corridor enhancement and stream bank restoration are important practices that maintain stream functionality and improve stream health. There are many opportunities in the Wyomissing Watershed to implement these “on the stream bank” practices. It is important to note that when considering these practices, one should begin in the headwaters of the Watershed and work down to the Mainstem. This ensures that the stream is able to adapt to the ever changing circumstances of the land that drains to it. Also, educational opportunities should be considered when determining where to start these practices. Parks, schools, and other public lands lend themselves well to a streambank restoration project that restores a healthy stream bank and educates residents about it.



Potential site for riparian buffer project at Lauers Lane

Type of Best Management Practice	Potential Places in Watershed	Photo of Practice
<p>Riparian Buffer Restoration By planting trees along stream banks, we can help prevent stream bank erosion, prevent nonpoint source pollution and cool stream temperatures.</p>	<ul style="list-style-type: none"> • Lauers Lane Stream Segment • Old Fritztown Road Development-Walking Path • Gottschall Property • West Reading Playground • Reading Public Museum • Museum Park Riparian • Wyomissing Park • Pennwyn Playground • Mohnton Memorial Park • Klines Creek Park Area 	
<p>Streambank Restoration Streambank restoration not only seeks to stabilize the bank, but to reconnect the stream to its floodplain where possible</p>	<ul style="list-style-type: none"> • Montrose Blvd & Lancaster Pike • West Reading Playground • Pennwyn Playground • Klines Creek Park Area 	
<p>Agricultural Best Management Practices These BMPs include, Manure Management Plans, Ag Conservation Plans, Livestock/Stream bank Fencing, Livestock Crossing, & Manure storages</p>	<ul style="list-style-type: none"> • The BCCD has performed Agricultural Outreach visits to various Agricultural Landowners in the Wyomissing Watershed. These areas may benefit from BMP assistance. See Map in Appendix B . 	

Summary/Conclusion

The Wyomissing Watershed is a historical watershed that has urbanized over the past century. While it shares urban characteristics with its neighbors of Reading, West Reading, Mohnton, and Shillington, the Wyomissing Watershed has a rural headwater area in Brecknock and Cumru Townships. The rural characteristics, such as forested areas, serve the stream well. Despite its less densely urbanized headwaters, portions of the Wyomissing Creek are impaired. Furthermore, the Municipalities of the Wyomissing Watershed include urbanized areas that are regulated MS4 areas. The Municipalities of the Wyomissing Watershed have been collaboratively working together to address various regulations and concerns and have formed the Wyomissing Creek Watershed Coalition. This plan was composed to aid the WCWC in addressing MS4 and TMDL requirements and improve the health of the Wyomissing Watershed.

While this Coldwater Conservation Plan provides a list of possible restoration and/or best management practice installation recommendations, it should be noted that the list is not an exhaustive list. The project ideas put forth in the plan are to aid and guide municipal officials in determining and examining project location. Furthermore, the Wyomissing Watershed is a watershed in which land uses are changing daily; thus, it is the goal of the BCCD to have the recommendations and suggestions put forth in this plan be fluid and flexible to better aid the Watershed Stakeholders that are addressing watershed health. There are various other practices that the WCWC could pursue that would address MS4 regulations and improve stream quality; however, after investigating this particular Watershed, the recommendations outlined below are the more effective ways to prevent surface water pollution and to restore the stream corridor to a healthy state.

Recommendation #1 Inventory and Pursue Stormwater Retrofit/Disconnection Opportunities

Recommendation #2 Actively Educate Watershed Stakeholders

Recommendation #3 Inventory Stream Corridor Restoration Opportunities

Other practices not focused on in this particular plan, but could aid in general stormwater pollution prevention include increasing the amount of tree plantings across the watershed (not just along stream banks) and street vacuuming to prevent sediment, cinders and litter from entering the stream.

It is the recommendation of the BCCD, that the WCWC begin a dialogue with PA DEP in how the various municipalities have been working together to holistically address stormwater regulations, TMDLs, and stream impairments. The BCCD also recommends that the Schuylkill Action Network (SAN) be included in the WCWC dialog as the group has various state and federal government partners that may be of technical assistance to this group and the Watershed. The efforts that the WCWC are undertaking are a true watershed based planning approach to solving stream quality issues in the Wyomissing Watershed.

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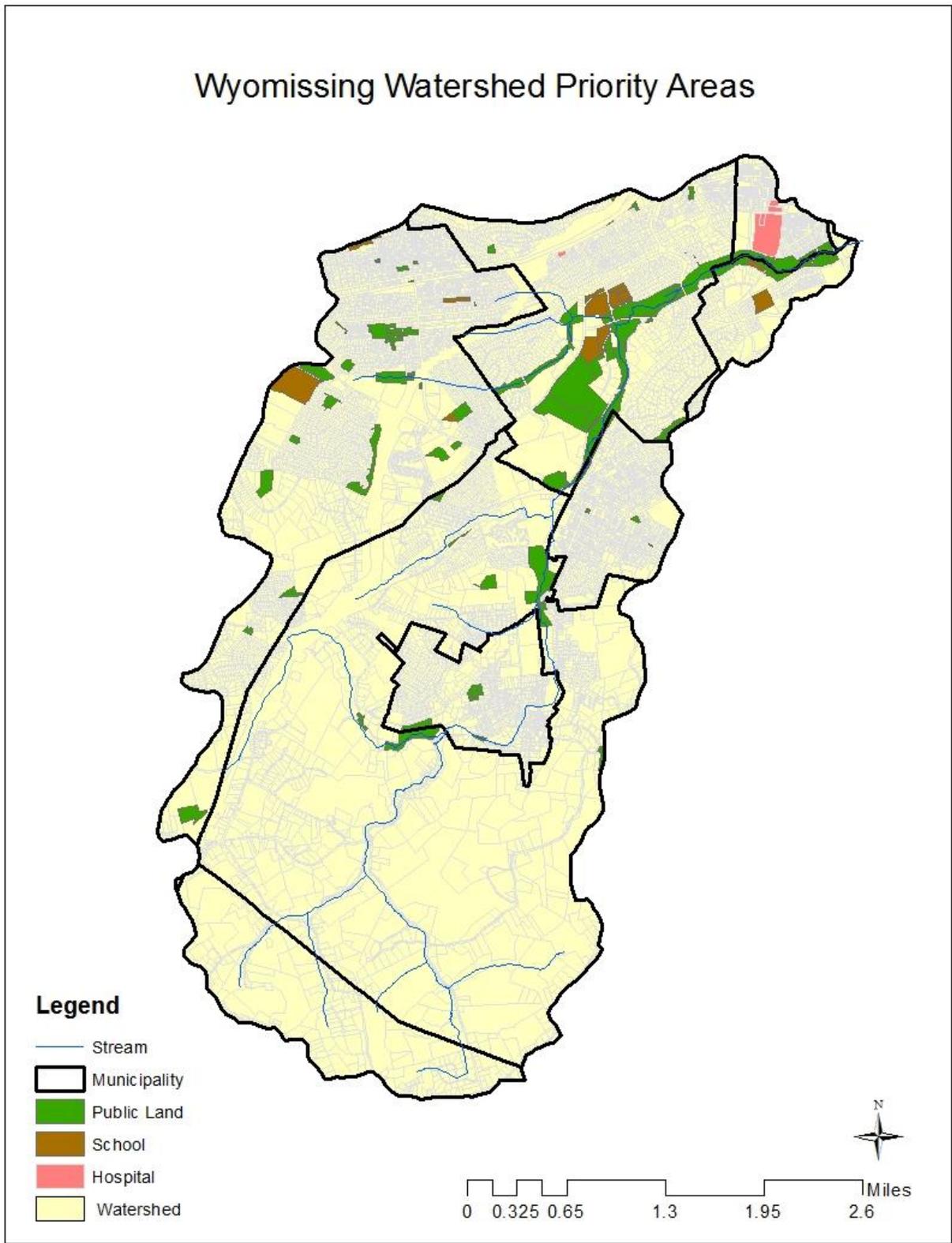
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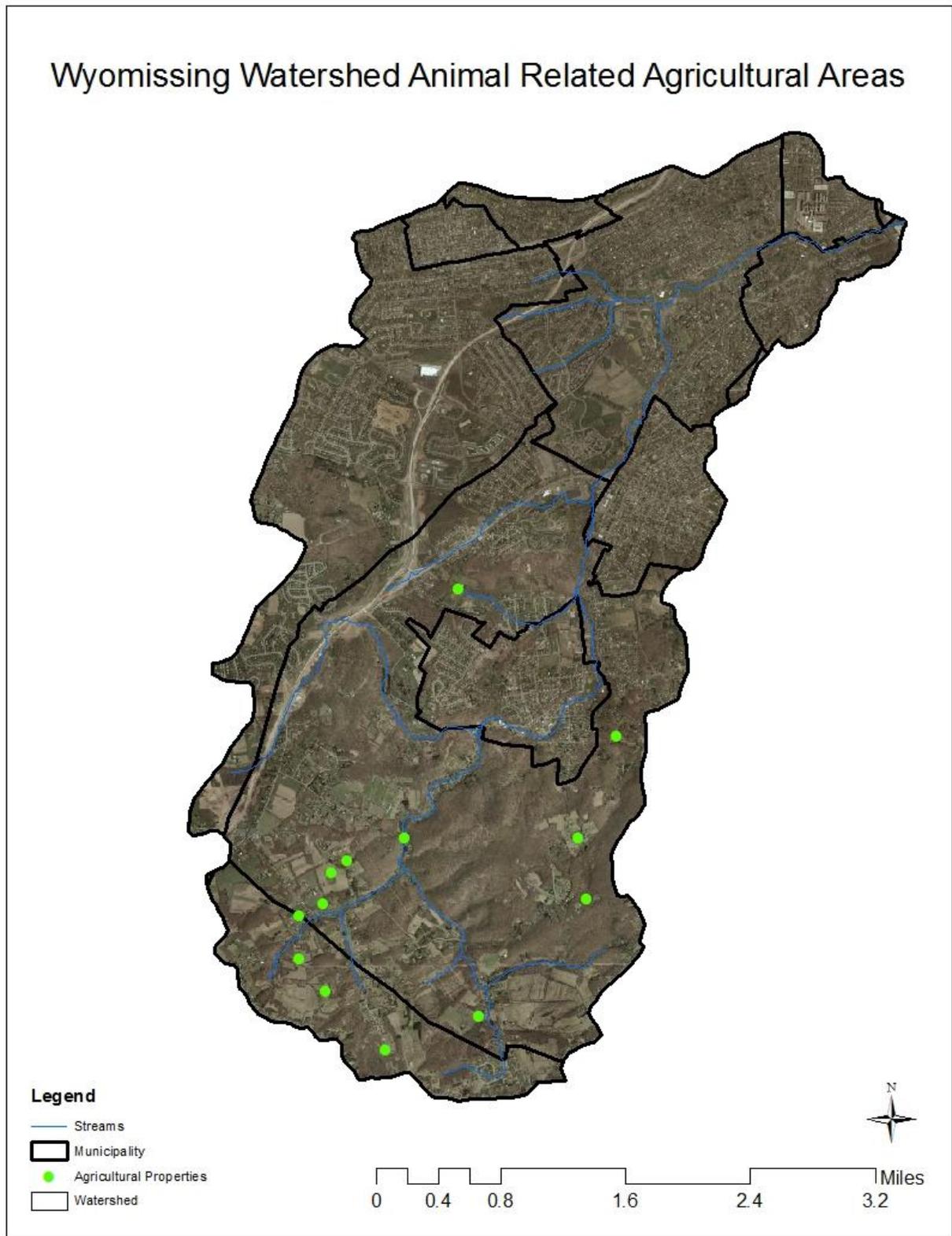
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Appendix A - Map of Potential Priority Areas for Projects



Appendix B - Map of Animal Related Agricultural Areas



Appendix C – Summary of Public Input

The public input listed below was collected via public input sheets and/or phone correspondence while the Coldwater Conservation Plan was being created. When possible (if contact information was provided), the BCCD followed up with the person who submitted the comment/question. Public Input was imperative in this process as it helped shape the recommendations that are put forth in this Plan.

- Investigate to see if the Reading Public Museum would be interested in projects. Work with the Museum on educational projects.
- Organize stream clean-ups that concentrate on picking up litter along streams.
- Concerned that the extremely large number of starling flocks may create pollution in the stream and concerned for public health.
- Poll the people who use Wyomissing Park for fishing and recreation to see if they would be interested in assisting in stream clean-ups. Utilize those with common interests to help projects.
- Is there a website about this effort to get more information?
- Are Schools and Municipalities involved in this process?
- Please visit my property, I would like to see what I can do for this effort.



**BERKS COUNTY
CONSERVATION DISTRICT**

Conserving Natural Resources for Our Future

1238 County Welfare Road, Suite 200 • Leesport, PA 19533 • 610-372-4657 • Fax 610-478-7058 • www.berkscd.com