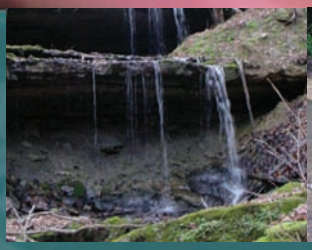
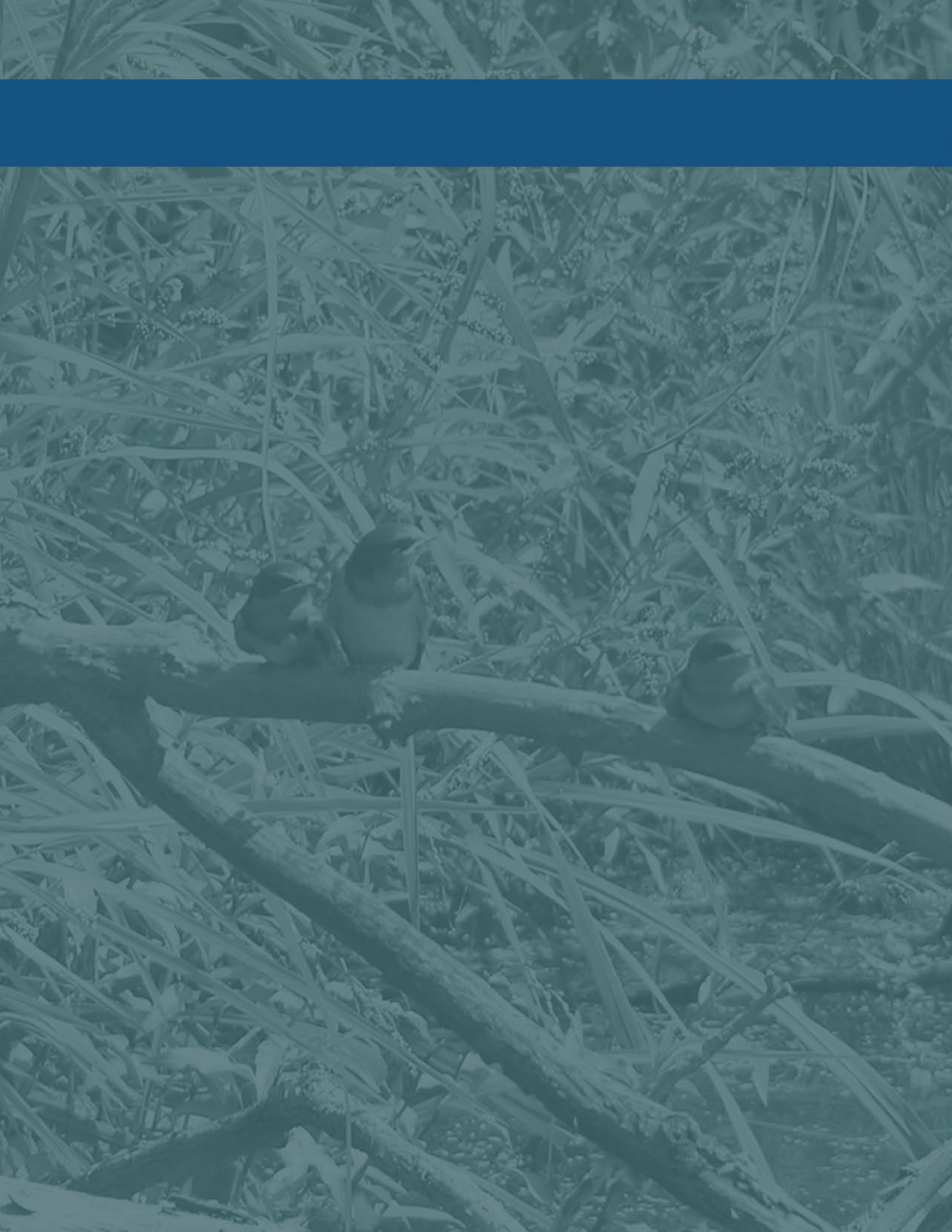
BUFFALO CREEK watershed

MANAGEMENT PLAN

Process and Criteria for Determining Threats to Watershed Resources
for the Buffalo Creek Watershed Association

Washington County, Pennsylvania





contents

Watershed Group Evaluation

Background

Buffalo Creek Watershed Association (BCWA) was formed in 2002 to preserve, restore, and improve the 164 square-mile watershed located in Washington County, Pennsylvania (Fig.1). In 2003, the BCWA contracted with Western Pennsylvania Conservancy (WPC) to complete the Commonwealth's first watershed protection plan.
The plan, completed in 2006, highlighted the region's natural features, land use characteristics, flood prone areas and regional development trends. The plan also pointed out that there has been very little information gathered about the regions high quality aquatic resources.
Since development of the plan, BCWA has continued to hold monthly meetings. Those meetings have given the group the opportunity to discuss environmental problems in an open forum. The group has been a major voice in securing funds to get Dutch Fork Lake reestablished for the community. In recent months, the group has become increasingly concerned by the amount of natural gas drilling occurring in the watershed as part of the Marcellus shale boom, as well as a pending longwall mine coming from the west. The group has attempted to gain additional members through displays, and other public events but has had limited success in garnering additional support. BCWA indicated their primary need for technical assistance is to help the group organize their thoughts and begin to tackle some of the many ideas that they have, including addressing threats to the watershed.

WPC met with the BCWA board of directors on February 18, 2010 to introduce the assistance program, explain the types of technical assistance available and gain a better understanding of their goals and expectations for the watershed. The first step of the meeting was to allow the group to voice their concerns and advance their individual vision and priorities for the group. The summary of those goals are as follows:

- Upgrade qualifying streams in the watershed from High Quality (HQ) to Exceptional Value (EV).
- Conduct public outreach to help the community better understand the value of the watershed.
- Sustain and monitor existing water quality.
- Establish biological and chemical baselines for the watershed.
- Work with the PA Fish and Boat Commission (PFBC) on the re-establishment of Dutch Fork Lake. Encourage more amenities to promote public use.
- Gather existing data.
- Reduce sediment and nutrient inputs.
- Monitor and be a "watcher of water quality" on streams where the development of Marcellus shale is occurring.

BCWA asked that WPC help with identifying and documenting past sources of water quality data.
In addition, WPC offered to analyze data to produce Geographic Information System (GIS) maps and help prioritize areas suitable for in-depth monitoring that might lead to potential classification upgrade, areas that can be targeted for restoration and areas that should be protected. The information driving this analysis is pre-existing, which will require "ground truthing" before any

action is taken. WPC is also planning to cross reference the above mentioned recommendations with the recommendations made in the protection plan. In addition, we will identify additional data sources used to develop the Total Maximum Daily Load (TMDLs) for the East Branch of Buffalo Creek, Upper Dutch Fork Creek, Sugarcamp Run, Lower Dutch Fork Creek, Lower Buffalo Creek, Dunkle Run, and Brush Run.

BCWA has a dedicated board and expressed hope that WPC will aid them in focusing their approach to restoration and protection. WPC staff will present digital data in the form of GIS to the group in an effort to further prioritize work and plan activities for the upcoming field seasons. Included with this effort will be ongoing technical assistance.

Watershed Identification...

Aquatic Resource Values, Current Conditions and Threats

a. Compilation of Existing Data

i. High Quality and Exceptional value waterways (DEP)

1. Buffalo Creek is designated a High Quality – Warm Water Fishery by the Pennsylvania Department of Environmental Protection (DEP).

ii. Threatened and Endangered Species Information (Natural Heritage Inventory)

1. Western Pennsylvania Conservancy- Natrual Heritage Program staff (WPC) identified two exceptionally ranked Biodiversity Areas within the watershed's boundaries.

iii. Aquatic Community Classification (WPC)

1. There are two significant aquatic communities found in the Buffalo Creek watershed. Brush Run,

Upper Buffalo Creek, and Dutch Fork are all examples of the Ohio Coolwater Community (ex. blacknose dace and creek chub). In addition to the fish community, a Common Large Stream Community (ex. (Dubiraphian Riffle Beetle and Little White Mayfly) are also found at the aforementioned locations.

iv. Current Condition and Threats Within the Watershed

1. In an effort to understand and quantify the types of threats and current condition of the Buffalo Creek watershed, WPC GIS staff utilized data from a variety of sources including DEP, PFBC, Pennsylvania Spatial Data Access (PASDA), and the Washington County Public Safety Department (Parcel data). Marcellus Shale drilling and shallow gas wells are becoming a major threat to the watershed as well as agriculture (Fig.2).

v. List of Impaired Waterways (DEP)

1. Very little of the 164 square-mile watershed has been identified by DEP as having some form of impairment. A total of 259.19 miles of streams flow in this watershed with only 4.3 miles are impaired from grazing related agriculture, 1.3 miles from habitat modification, 0.85 miles from municipal point source and 1.88 miles from sources unknown.

vi. Potential Point Source Pollution Including AMD (DEP)

1. The Buffalo Creek watershed has been a focal area for significant oil and gas exploration activity related to the Marcellus shale formation. Currently there are 28 Marcellus shale drilling sites in the watershed. The majority of the sites are in the mid to northern portion of the watershed (Fig.3).

vii. Landcover-Related Metrics (WPC)

1. Approximately 52 percent of the Buffalo Creek watershed is forested, 47 percent is agricultural and less then 1 percent is developed (Figs. 4 & 5).

continued on next page 6

viii. Active River Area Analysis

1. WPC staff reviewed several portions of the Active River Analysis document that The Nature Conservancy (TNC) released in July 2010. Based on the small scale nature of this project (only one watershed) versus the multi-state geographic extent of the active river area analysis, we feel that this project will not benefit from a detailed analysis utilizing this program.

b. Major Threat Identification

i. WPC recommends that the group focus on parcel-level projects including stream bank fencing and other agricultural projects because they yield results rather quickly for improving water quality and can be completed for reasonable amounts of money. This can be achieved by using GIS data that we compiled and coupled with the parcel data to identify potential landowners to work with on different restoration projects. Meeting and talking with farmers in

conjunction with the Conservation District has worked very well for WPC and we would recommend this type of collaboration for BCWA.

c. Information From Completed Assessments or Conservation Plans

i. A visual assessment was completed by WPC in 2003-2004 for Buffalo Creek and a protection plan was completed for the watershed in 2005. WPC collected data on the chemical, biological, physical aspects, and water quality of the Buffalo Creek watershed. Stream flow estimates were made within major tributaries of Buffalo Creek. Chemical sampling was conducted based on subwatershed boundaries and utilized both field test kits and laboratory analysis. Macroinvertebrate sampling was completed using EPA's rapid bioassessment protocol adapted for WPC use. A visual assessment was performed on every accessible stream within the watershed using the USDA protocol modified for use in the Buffalo Creek watershed. The visual assessment results were used to determine whether streams exhibited excellent, good, fair, or poor quality based on a minimum of 10 variables. Scores within many of the subwatersheds varied greatly, and percentage area of each stream scored was not considered in the averaging. The subwatershed with the lowest average score was Buffalo Creek East, and the subwatershed with the highest score was Lower Buffalo Creek.

The lowest scoring category was "embeddedness," an indicator of sedimentation. Of the 11 subwatersheds, six had embeddedness as the lowest scoring category and two had embeddedness as the second lowest scoring category. The most common second lowest scoring categories were "in-stream fish cover" and "bank stability."

Though visual assessments can only give a basic overview of stream health, they can be used to make general recommendations about stream improvements and can aid in the focus of restoration efforts. In nearly every subwatershed, embeddedness was one of the lowest scoring categories. Any effort to decrease sediment loads will improve this aspect of stream health. Several areas of Buffalo Creek are high priorities

continued on next page 8

under the Conservation Reserve Enhancement Program (CREP), due to the proximity to streams and steep slope. This program may provide funding for stream bank fencing or taking marginal land out of production. Other funding opportunities may be available through Natural Resources Conservation Services (NRCS).

Landowner awareness was another issue identified. Many landowners thought that removing riparian zones and straightening streams would improve conditions during flooding, when these activities usually make conditions worse by reducing the capability of the stream to handle the energy of flood events. Though mowed stream banks may look better to many people, mowing has extremely negative impacts on wildlife and contributes significantly to flooding. Municipalities could encourage maintaining riparian zones by providing some type of incentive to landowners who retain intact riparian zones.

d. Data Analysis and Map Production

i. Through this project, WPC has created numerous maps to assist BCWA with determining locations for further prioritization and restoration project locations. All of the maps have been provided to the watershed group for future use.

e. Identification of Data Gaps

i. BCWA members have been conducting routine stream monitoring since 2002. Routine monitoring is important and necessary when trying to determine if the stream is maintaining acceptable water quality standards for aquatic life and human use. Routine monitoring information can prove particularly useful when the watershed is threatened by anthropogenic activities such as Marcellus gas exploration.

Stakeholders Meeting

BCWA will be attending a partner's public meeting for all Washington County watershed groups, hosted by Chartiers Creek Watershed Association on October 28, 2010. All groups will discuss what the different groups have been doing and discuss possible future projects they can work on together.

Draft Watershed

Management Plan Developed

a. Threat Identification (Sources) and Ranking

i. Feasibility of success by group - Major threats to the Buffalo Creek watershed include impairments arising from agriculture, habitat modification, natural gas exploration, and AMD. In addition to these impairments, there are several DEP permitted discharges in the Buffalo Creek watershed that should be noted (Fig. 6). The most feasible threat for Buffalo

Creek watershed to tackle would be erosion and sedimentation issues. By working with the Washington County Conservation District, USAD-NRCS, and other regional conservation groups like WPC, BCWA can begin working with local farmers to change farming practices and install a variety of agricultural best management practices. The second most manageable issue in the watershed is habitat modification, which could be worked on jointly with PFBC's habitat biologists and WPC. Utilizing experienced contractors, numerous stream bank stabilization projects can be completed, which will result in more habitat for a myriad of aquatic species while providing stable stream banks.

ii. Overall impact on the watershed - Results support observations made by WPC and residents that faulty on-lot septic systems and agricultural runoff are the two major problems affecting water quality in the Buffalo Creek watershed. Suspended solids are largely comprised of sediment from stream bank erosion, manure and soil runoff from crop fields, and solids from faulty septic systems. Not surprisingly, areas of high total suspended solids were also some of the areas with the highest fecal coliform counts, which are symptoms of on-lot septic problems and agricultural runoff. These locations include Dunkle Run, Middle Buffalo Creek (Taylorstown), and Upper Dutch Fork Creek.

iii. Available funding - Funding is available from a wide variety of locations for stream restoration projects. By working with the Washington County Conservation District and the USDA-NRCS staff, BCWA can put projects on the ground utilizing a variety of funding sources that are available to local farmers, which include the Environmental Quality Incentive Program (EQIP) and Wildlife Habitat Incentive Program (WHIP). Additionally, the Conservation Reserve Enhancement Program (CREP) can be utilized to take marginal lands out of production while paying the farmer a rental payment. Additionally, there are numerous public and private funding sources available to support watershed restoration initiatives. Private sources include foundations, such as the Richard King

continued on next page 14

Mellon Foundation, The Foundation for Pennsylvania Watersheds, Dominion Foundation, Colcom Foundation, and others. Public sources include the Pennsylvania Growing Greener Program, and several federal sources from Environmental Protection Agency (EPA) and USDA.

iv. Available partners - Pennsylvania is home to an enormous number of non-profit conservation groups that cover a diverse range of interests. Some of these groups include Pheasants Forever, Ducks Unlimited, Trout Unlimited; and the Izaak Walton League of America. There are also several government partners that include county Conservation Districts, PFBC, Pennsylvania Game Commission (PGC), and DEP at the state level, and EPA, Office of Surface Mining (OSM), USDA, and the U.S. Army Corps of Engineers at the federal level. In addition to these partners, other non-profit conservation groups including WPC, American Rivers, and The Nature Conservancy are often available to help with identifying and implementation of conservation projects. Additional partners specific to the watershed could be from the academic community including California University of Pennsylvania and Washington and Jefferson College.

v. Impact on regional conservation - Although the Buffalo Creek watershed is not significantly impaired, effort must be taken to maintain its high quality waters, particularly given its positive influence on the Ohio River. Advancement of agricultural best management practices (BMPs), regular monitoring for impairments from new threats, continuing public outreach implementation of stream bank protection and, habitat practices will ensure that the integrity of the stream will be protected.

b. Strategies to Address Threats

Threats to the watershed have been identified through the Buffalo Creek Watershed Protection Plan and by analyzing available data using GIS. BCWA has already been addressing some of these identified threats, particularly water quality monitoring. The group will be implementing their first stream bank stabilization and fish habitat project in the spring of 2011 on Dutch Fork Creek. They will be working closely with the Pennsylvania Fish and Boat Commission, Washington County Conservation District, and WPC. BCWA will be trained to prepare the necessary permit applications for the project, and will use this initial project as a foundation for future work that will address erosion and sedimentation problems.

c. Desired Outcomes

If the actions found within this management plan are followed, sedimentation and erosion potential should be greatly decreased in the Buffalo Creek watershed. By working with local conservation partners and leveraging funding, numerous projects can be completed with modest financial resources.
All projects should benefit many different types of aquatic and terrestrial species within the watershed, while providing a critical source of clean water to the Ohio River system. Another desired outcome would be the growth of BCWA through generated interest as a result of conservation project activity and success, as well as further education and outreach to the Buffalo Creek watershed community .

d. Success Measurements and Monitoring Approach

Monitoring is an important aspect of any restoration effort. The ability to have a before and after data set allows for success measurements to be easier to quantify and describe. Monitoring can be as intensive or minimal as time and personnel allow. At a minimum, WPC recommends macroinvertebrate data be collected for a season (Fall or Spring) before a project is constructed. Post construction monitoring should be conducted in the same season that the pre-construction monitoring occurred due to changes in macroinvertebrate life cycles. Water quality monitoring should include base flow conditions as well as high water events in an attempt to determine minimum and maximum flow conditions. Parameters to monitor should include several standard measurements like pH, dissolved oxygen, total dissolved solids, conductivity, and turbidity.

Certain types of projects will also monitor other less commonly measured parameters, such as phosphate and nitrogen for agricultural BMPs and total acidity, total manganese, and total aluminum for AMD-specific projects.

Implementation

BCWA is now starting to move forward with physical project implementation. They recently completed a permit application to begin the stream bank stabilization and in-stream habitat work on Dutch Fork Creek.

The group can use their experience with this project as a foundation from which to build upon for further implementation activity. The group is also working with local municipalities and the Washington County Conservation District to identify potential dirt and gravel road stabilization and drainage projects.

BCWA should become more involved with water quality monitoring, which will allow them to better understand improvements or impairments. This will be of particular importance with the boom of the natural gas industry and the eventual exploration of the watershed.

Plan Evaluation & Evolution

This plan was developed to aid BCWA with prioritizing restoration efforts on the sources of critical threats to the watershed. As with any plan, new information will become available and it will be included in this living document. Continued scientific technical assistance will be provided by WPC in the coming years to assist with plan implementation. This version of the management plan should be relevant for the next three to five years before requiring significant revision.

Project Recommendations

In an attempt to make this plan a useful guiding document, WPC has chosen to compile a list of potential projects that BCWA could implement in the next 3 – 5 years. Projects should focus on highly visible areas that provide important benefits to aquatic resources. In addition, highly visible projects help to inform the general public that BCWA is actively completing projects throughout the watershed and not simply meeting once a month to discuss potential project implementation. Example projects include:

a. Streambank restoration at any number of farms identified in the Buffalo Creek watershed.

b. Targeted outreach involving the agricultural community.

c. Attempt to work with gas companies to implement conservation practices on parcels that have had drilling activities completed.

Overview

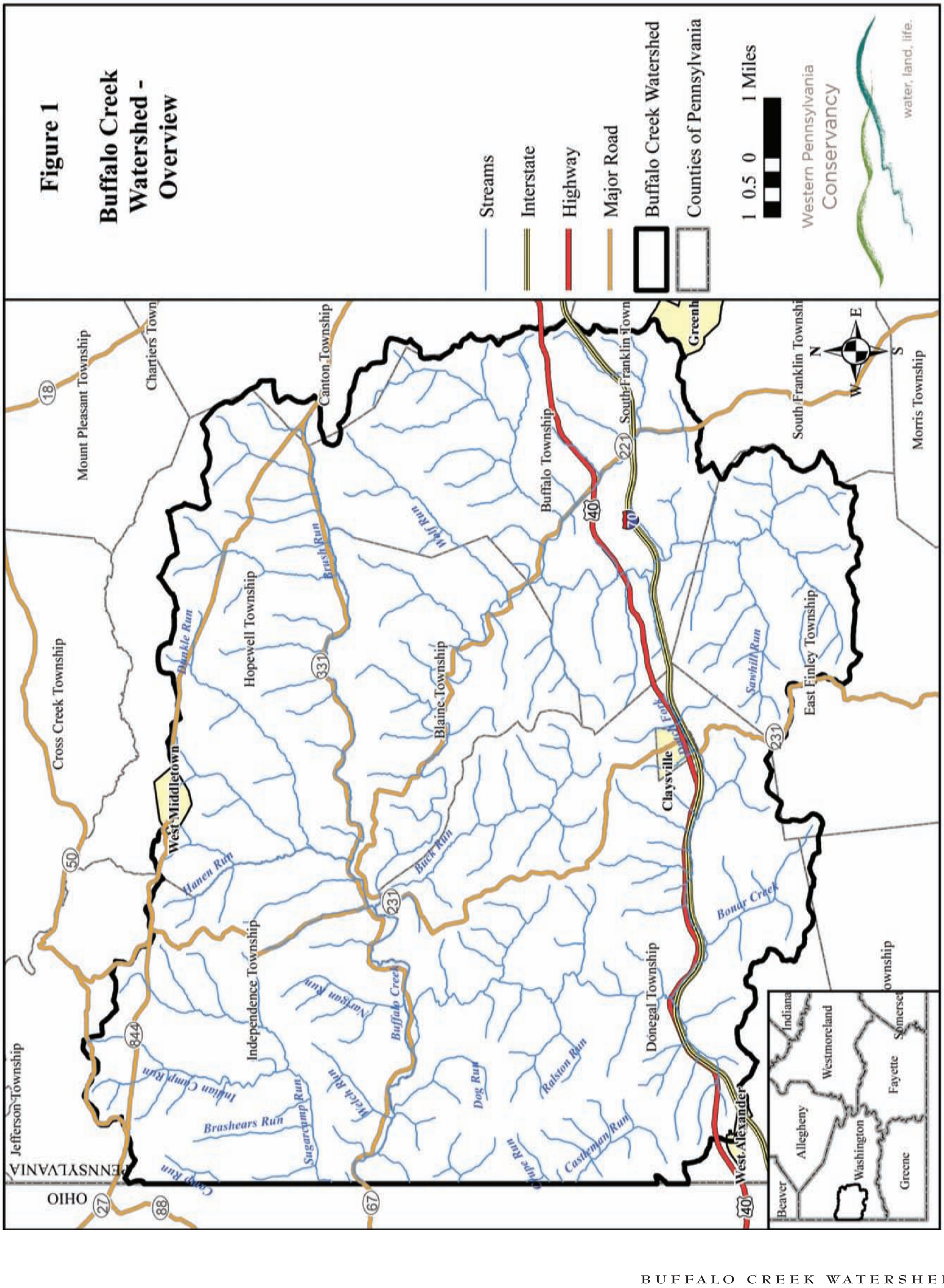
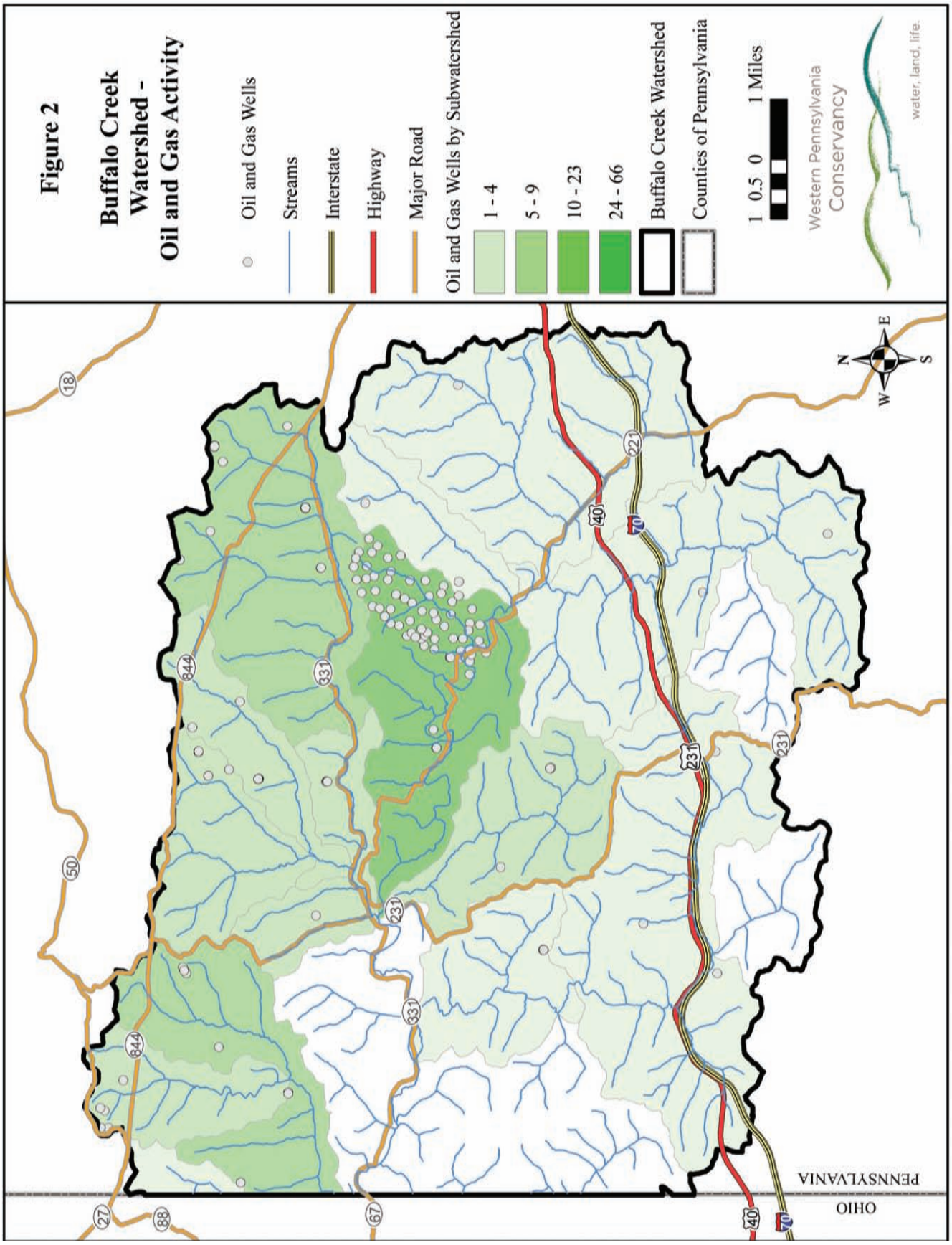
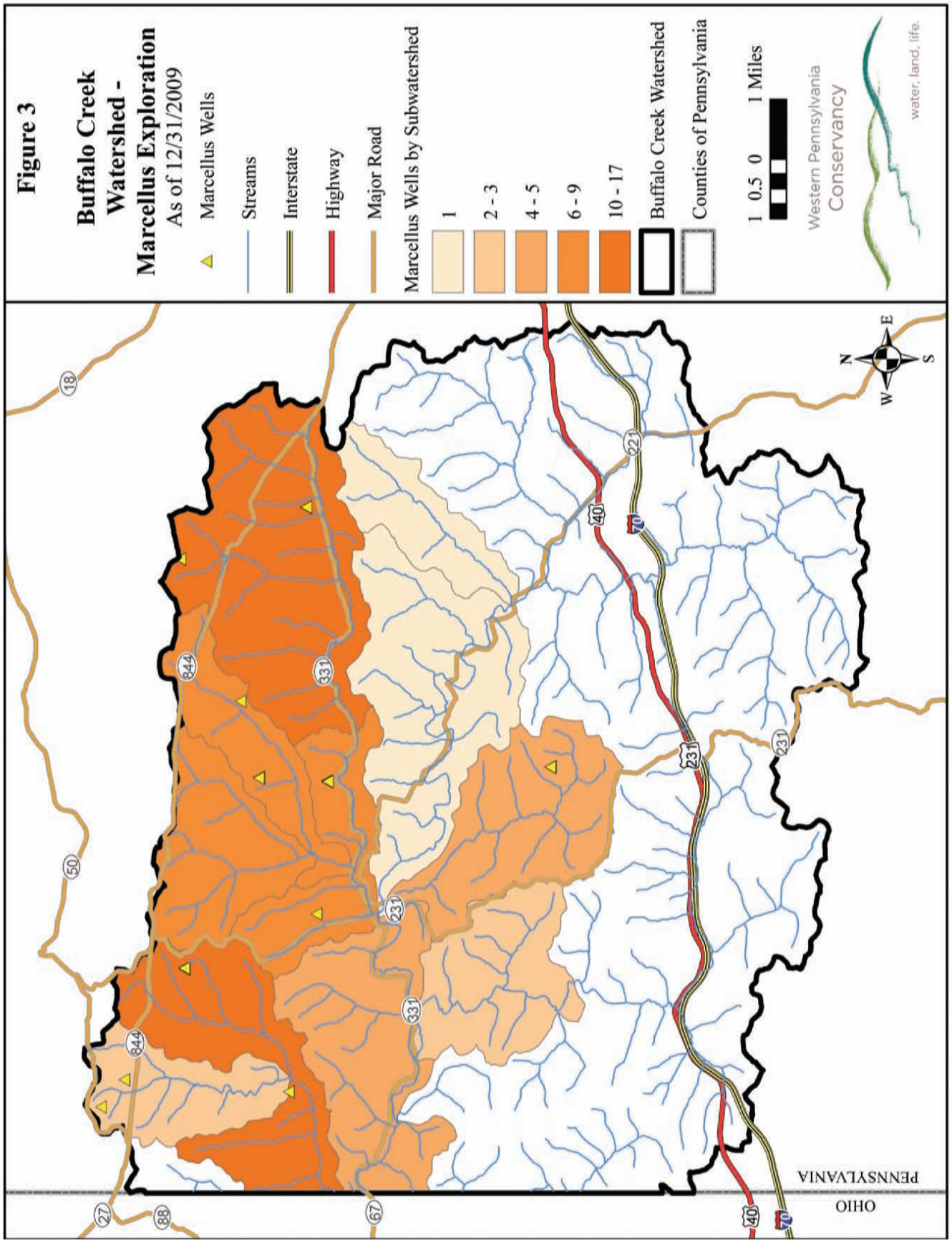


Figure 1
Buffalo Creek Watershed - Overview
Streams
Interstate
Highway
Major Road
Buffalo Creek Watershed
Counties of Pennsylvania
1 0.5 0 1 Miles
Western Pennsylvania Conservancy
water, land, life.
Mount Pleasant Township
Chartiers Town
Canton Township
South Franklin Town
South Franklin Townshi
Morris Township
Cross Creek Township
Hopewell Township
Blaine Township
Buffalo Township
East Finley Township
Independence Township
Donegal Township
Jefferson Township
West Middletown
Claysville
West Alexander
Greenh
Dunkle Run
Brush Run
Wolf Run
Hanen Run
Buck Run
Sawhill Run
Bonar Creek
Buffalo Creek
Nargon Run
Welch Run
Indian Camp Run
Brashears Run
Sugarcamp Run
Camp Run
Dog Run
Ralston Run
Castleman Run
North Fork
OHIO
PENNSYLVANIA
18
50
844
27
88
67
231
331
221
40
70
N
S
E
W
Beaver
Allegheny
Washington
Greene
Indiana
Westmoreland
Fayette
Somerset
ownship

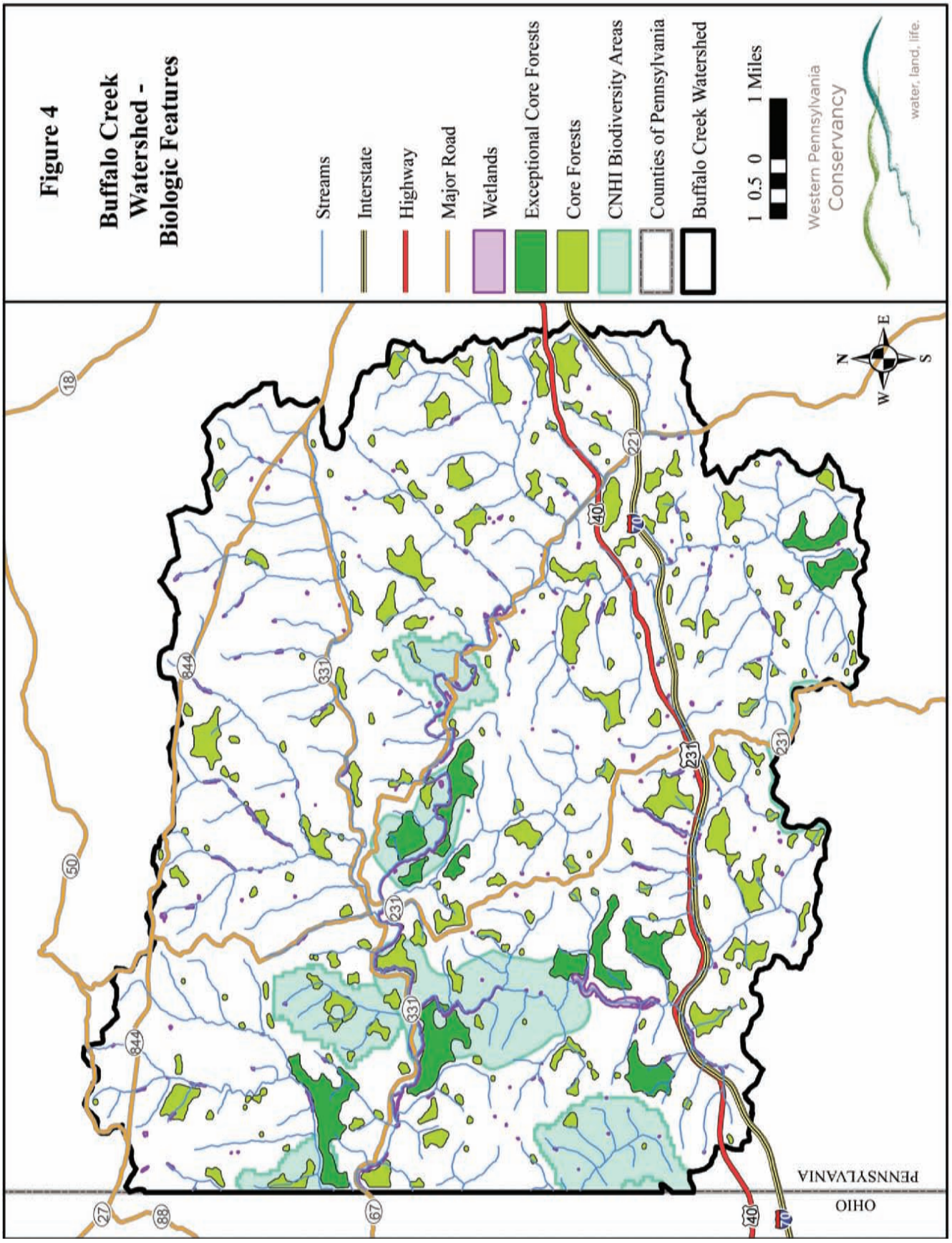
Oil & Gas Activity



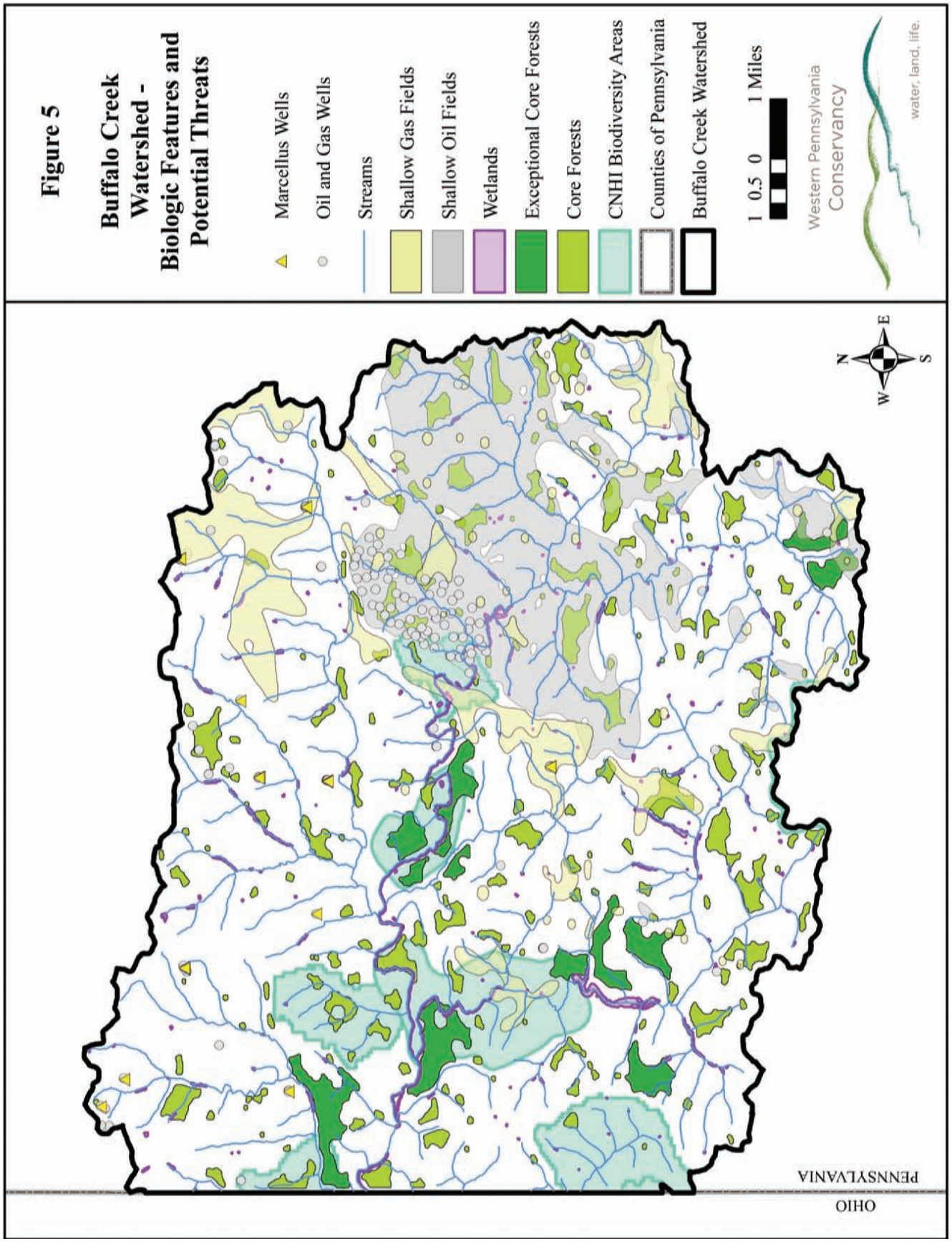
Marcellus Exploration



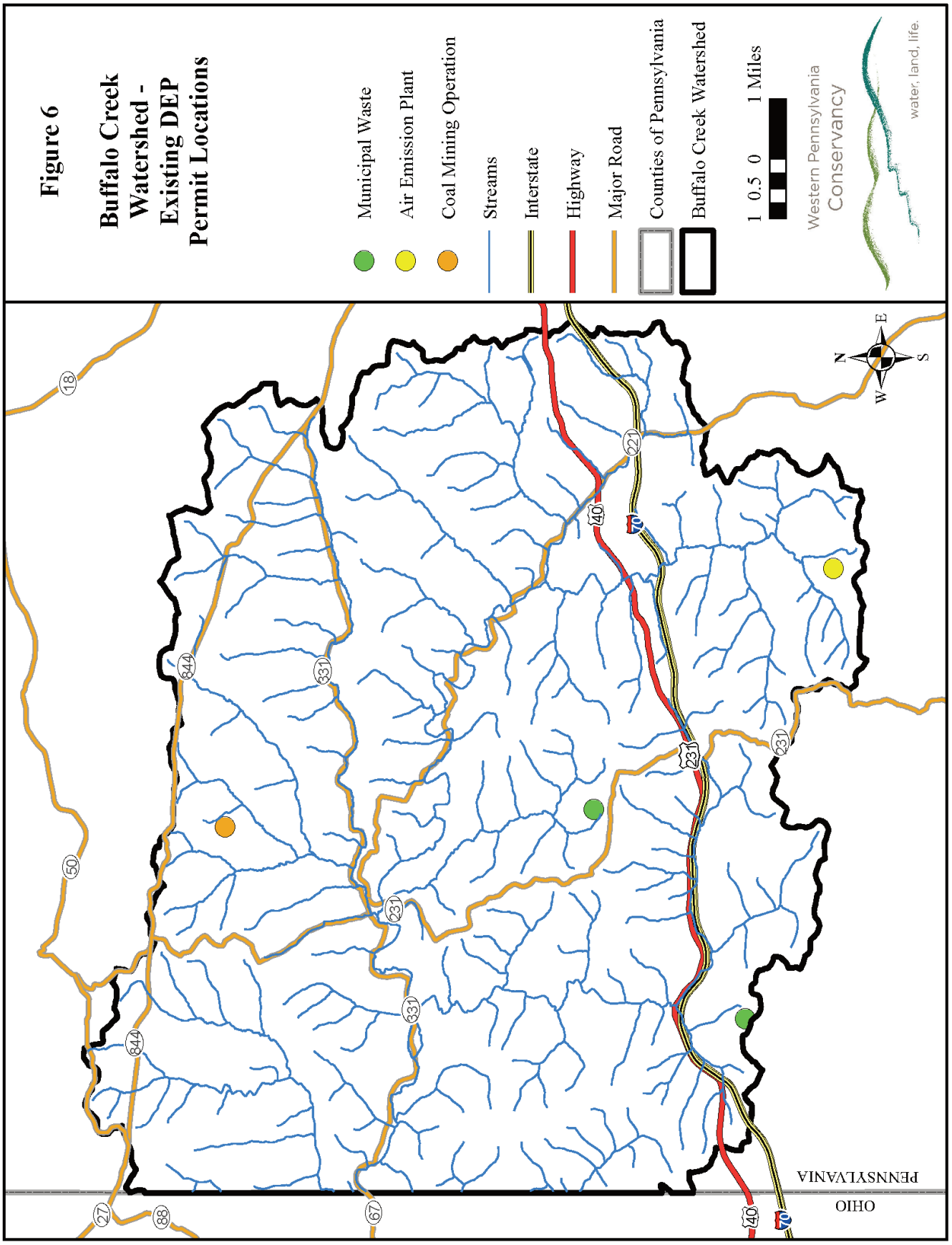
Biologic Features



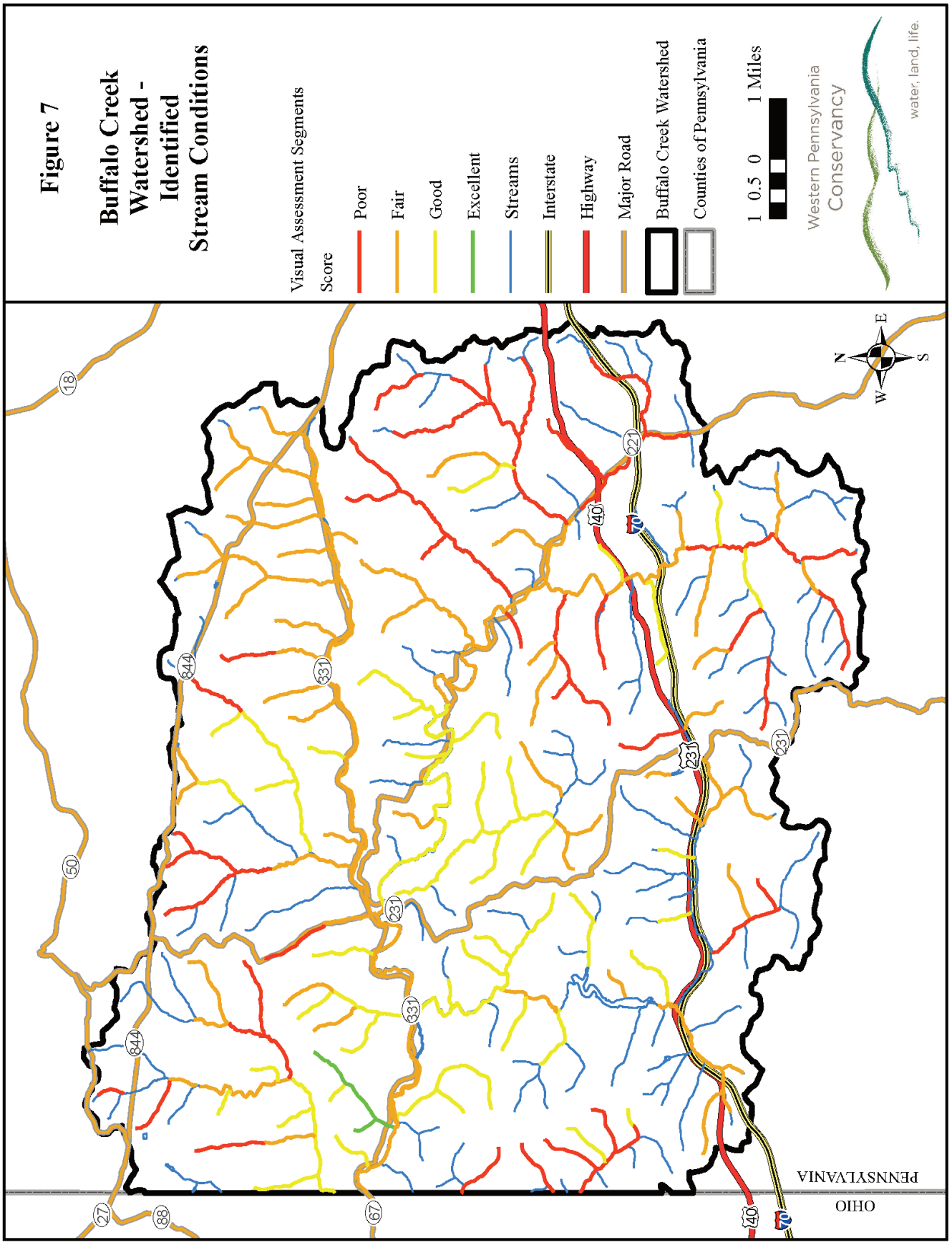
Biologic Features & Potential Threats



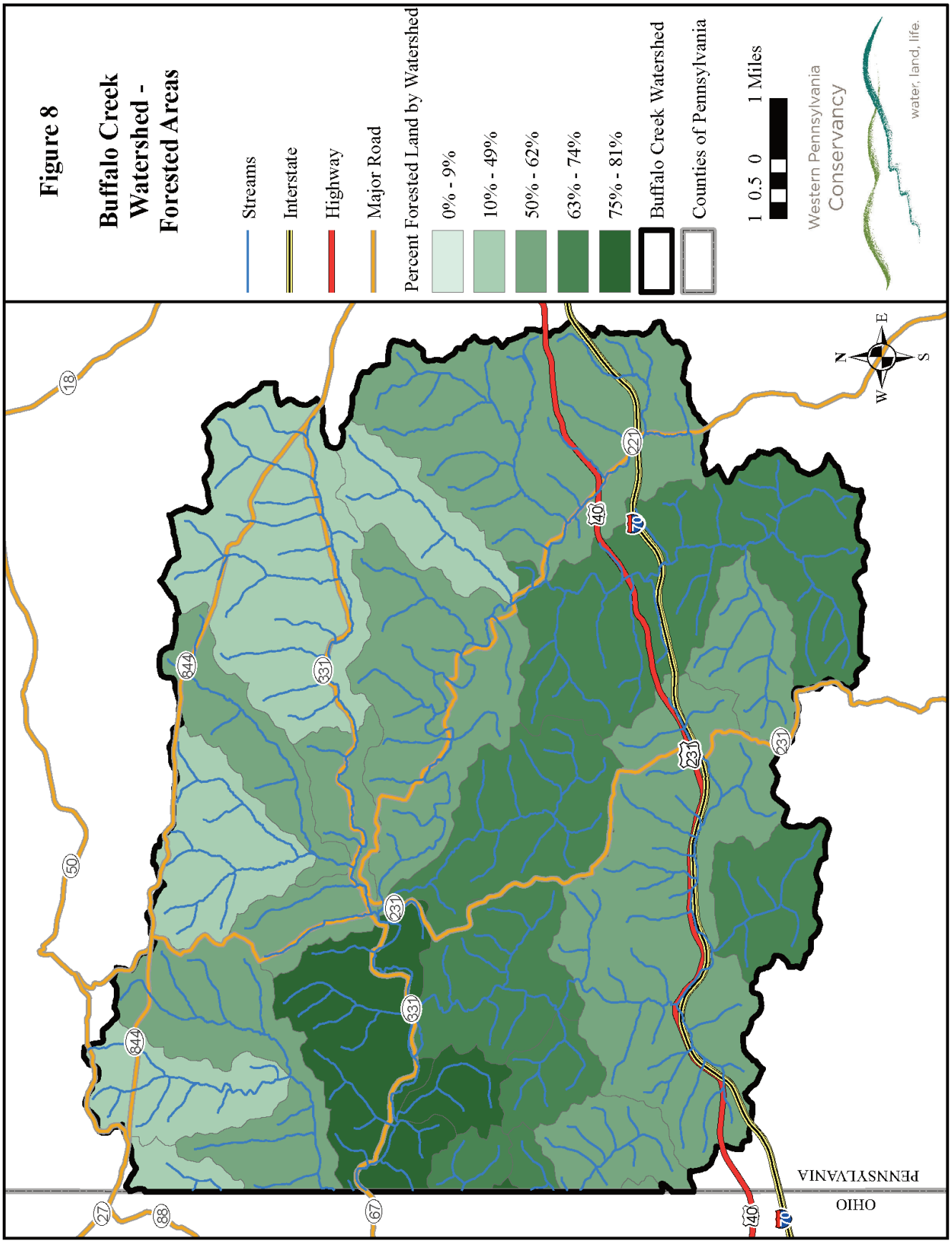
Existing DEP Permit Locations



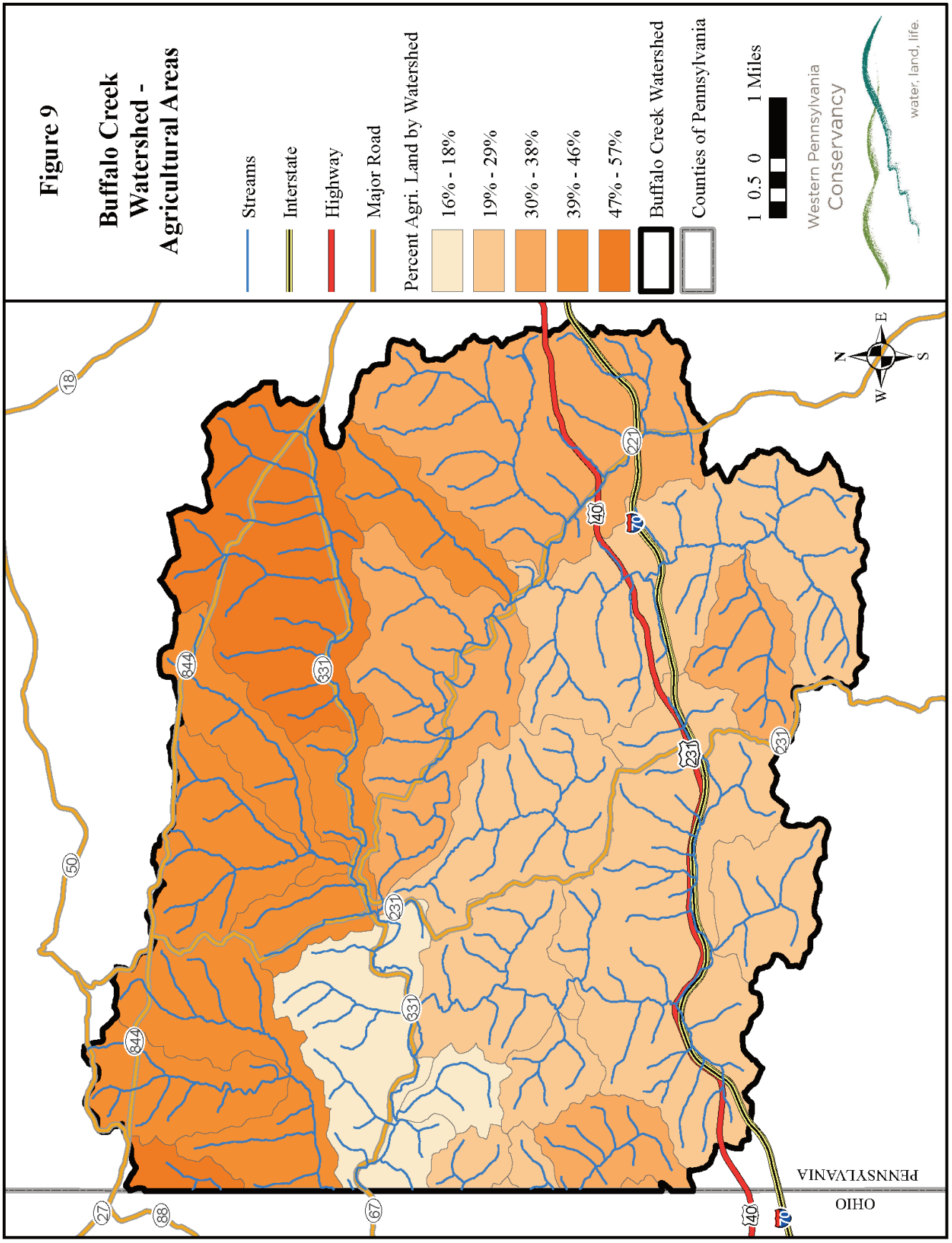
Identified Stream Conditions



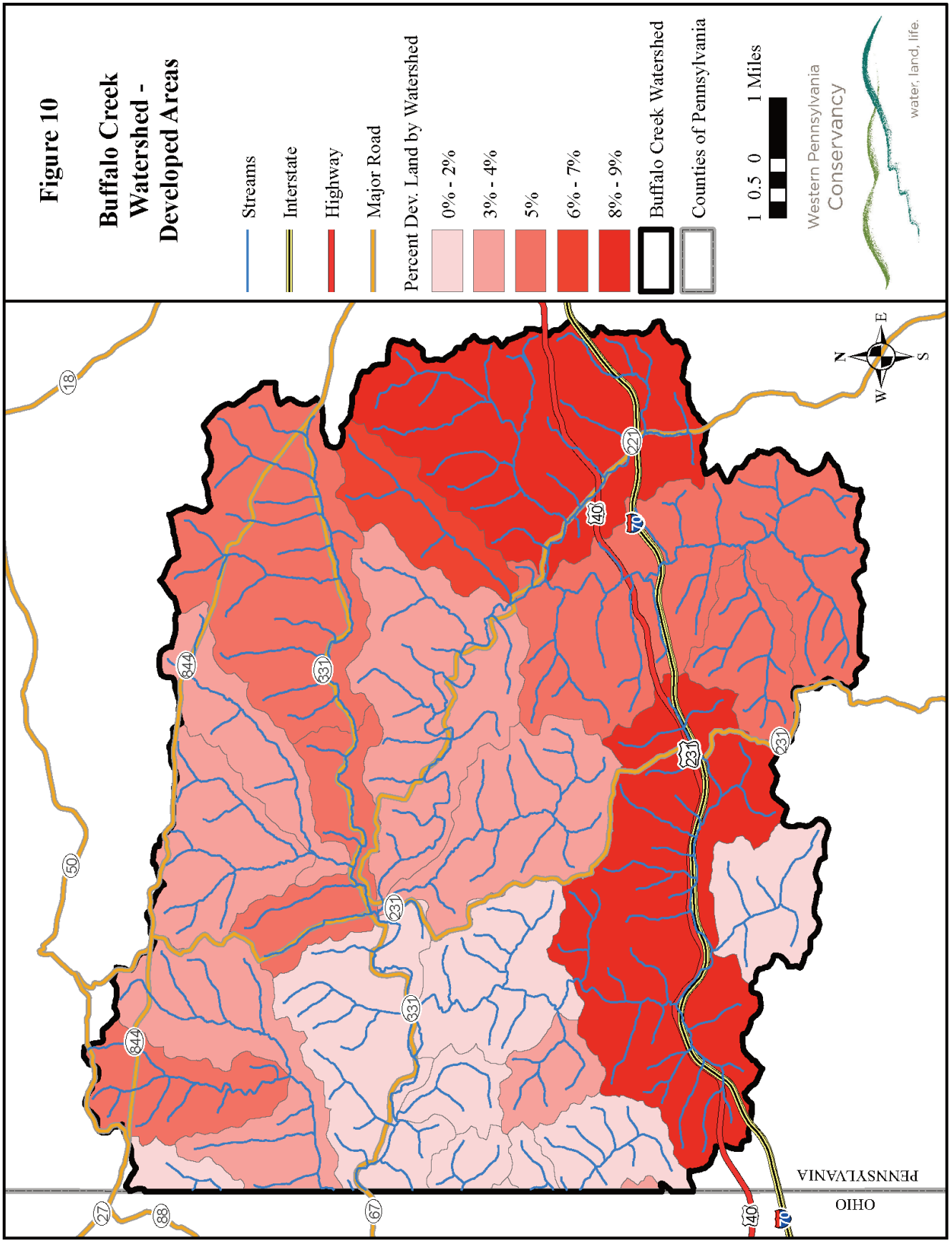
Forested Areas



Agricultural Areas



Developed Areas



BUFFALO CREEK WATERSHED

Washington County, Pennsylvania

Western Pennsylvania Conservancy

water, land, life.

Foundation for Pennsylvania Watersheds

Bayer Center for Nonprofit Management