# Ohio's Nonpoint Source Pollution Implementation Strategy (NPS-IS)

Captina Creek:
Piney Creek 050301060904
Version 1.0 03-30-2018

Created by:
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## Acknowledgements

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# Chapter 1: Introduction

This NPS-IS plan addresses Piney Creek HUC 12 (050301060904) within Captina Creek Watershed. Captina Creek is located in the southern portion of Belmont County, which is in east-central Ohio, near Wheeling, West Virginia. Piney Creek drains approximately 29.08 square miles and is located in the south-central portion of Captina Creek Watershed. Four of the seven named tributaries in the Piney Creek subwatershed have full attainment water quality status. It is important to Belmont SWCD and its stakeholders to maintain and improve attainment standards. Additionally, the Captina Creek mainstem is listed as an Outstanding State Water from river mile 25.42 to 0.8, and several tributaries are listed as Superior High-Quality Water. The United States EPA has also designated the creek an Aquatic Resource of National Importance based on its biodiversity and water quality values. An approved NPS-IS will allow additional sources of funding to be pursued to address sources of impairment that threaten attainment of the aquatic use designations.

## 1.1 Report Background

This NPS-IS was created to address points of concern along Crabapple Creek within the Piney Creek subwatershed. Crabapple Creek has an aquatic life use designation of Exceptional Warmwater Habitat. The goal of this NPS-IS is to address these concerns in order to maintain this use designation.

## 1.2 Watershed Profile & History

Piney Creek is a subwatershed of Captina Creek (0503010609). Captina Creek is a tributary to the Ohio River. Within Piney Creek subwatershed, there are seven named tributaries and several more unnamed.

Figure 1 depicts the location of the Piney Creek subwatershed within the Captina Creek, as well as incorporated places in proximity to Piney Creek. The majority of Piney Creek is located in south-central Belmont County. Approximately ten percent of the subwatershed is in north-central Monroe County. Only one settlement, Alledonia, falls entirely within the subwatershed. The villages of Beallsville and Wilson are located outside the southern edge of the Piney Creek subwatershed in Monroe County. The village of New Castle is on the western edge of the subwatershed in Belmont County. This is a mostly rural part of the Captina Watershed, as the topography becomes steeper and less prone to open development lands, see Figure 2.

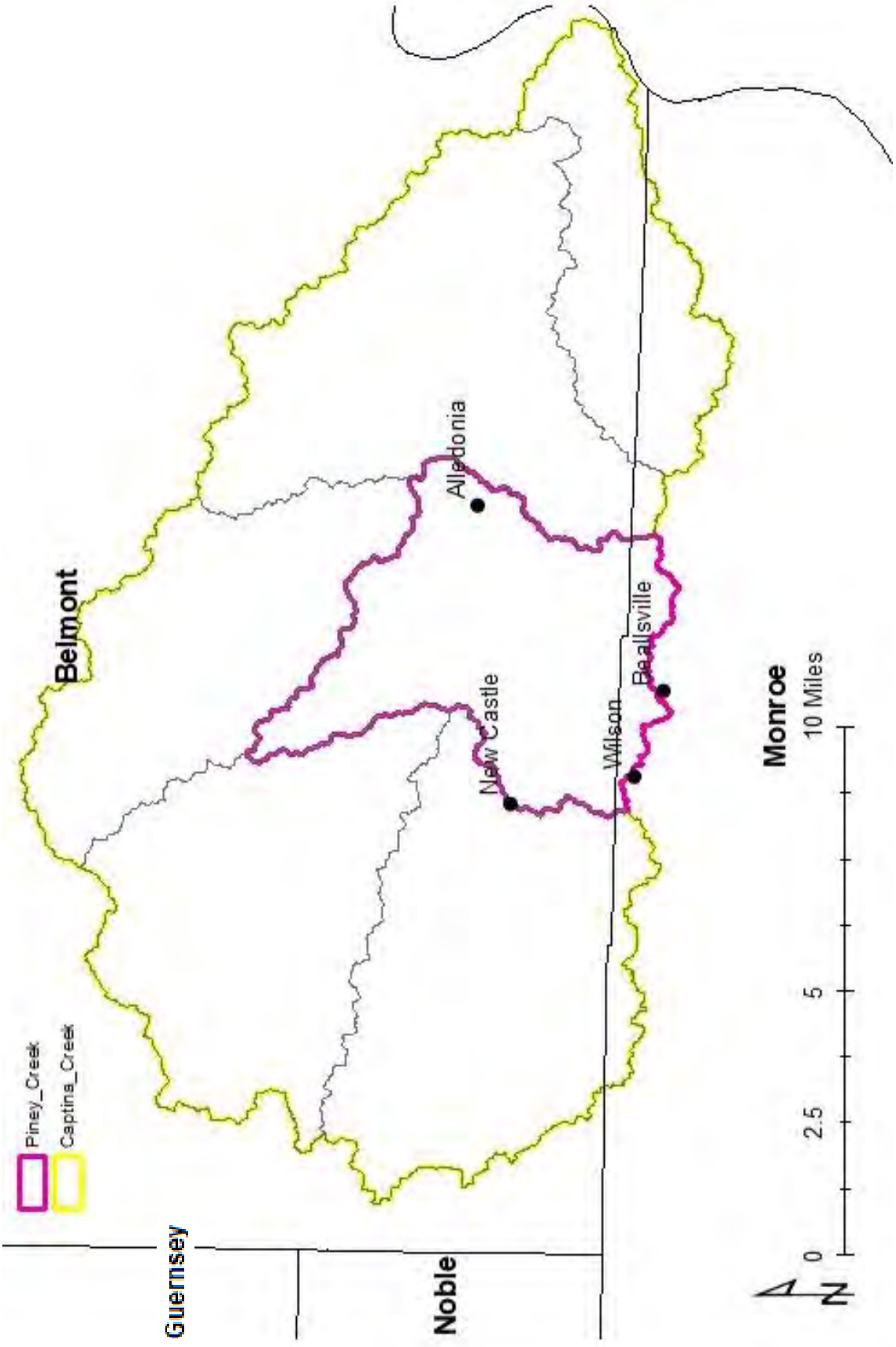


*Figure 1 Incorporated places near Piney Creek subwatershed (purple) and Captina Creek Watershed location (yellow).*

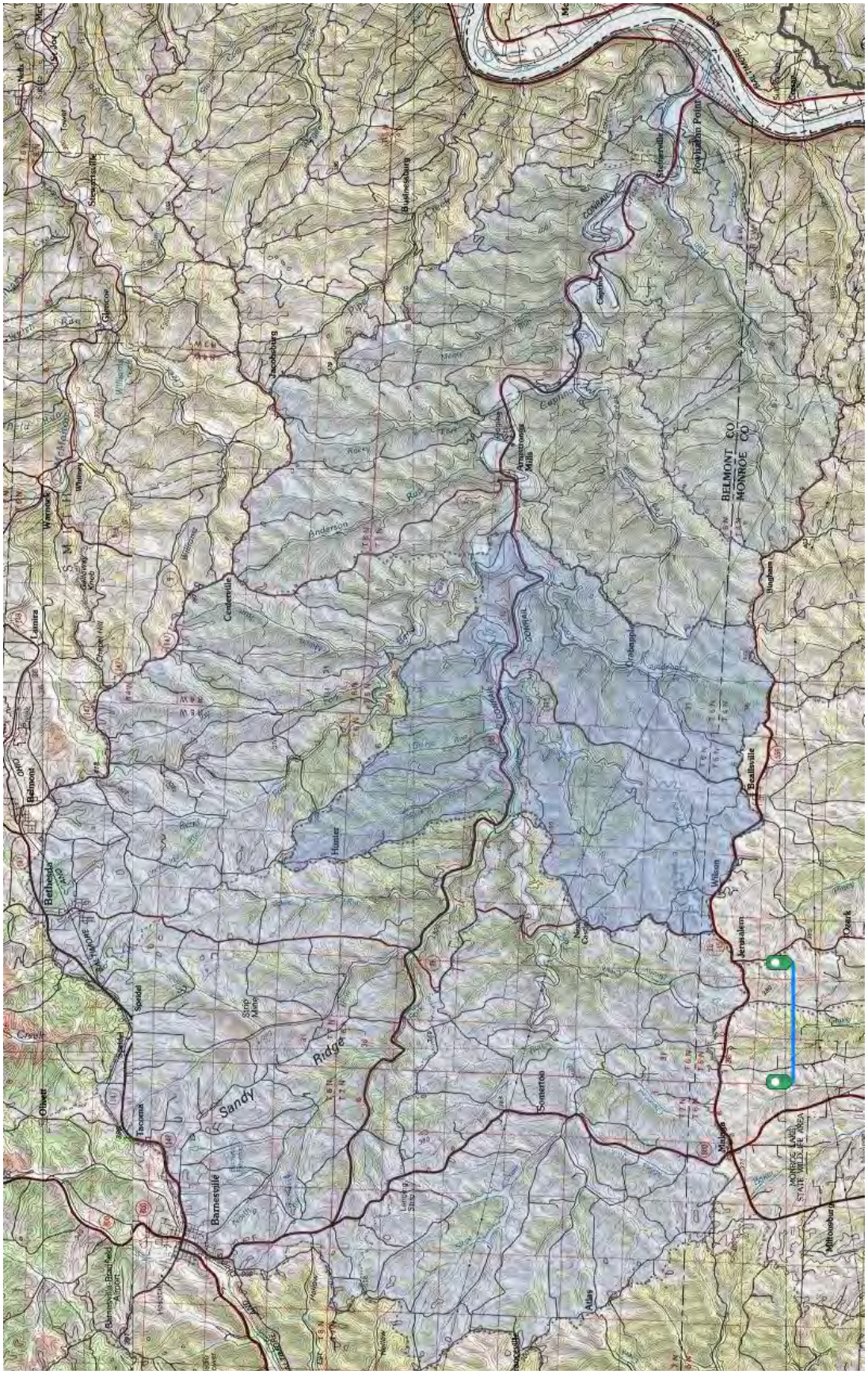


*Figure 2 Topographic Image of Captina Creek Watershed. Piney Creek subwatershed marked in darker blue shading. Blue line is 2 miles for scale.*

## 1.2 Watershed Profile & History *cont.*

Captina Creek was first referenced by George Washington during his exploration of the Ohio Valley in the 1750s. In 1794, the Battle of Captina, a skirmish between Indians and settlers occurred on its banks. Over time, the 35-mile creek remained an important source of food and water as the population settled and expanded with time. Evidence of early Native Americans utilizing resources have been documented by the Kent State University anthropology department; however, no evidence of settlements was discovered.

When coal mining moved into the region, the creek and its biological community were severely impacted. There are no records to cite the impacts from the mid-1800s through early twentieth-century coal exploration, but in the 1970s, grassroot efforts pushed for improvements to restore water quality locally. Changes in best management practices were noticeable, and the water quality improved from black flow to pristine habitats supporting a wide diversity in the biological community.

Belmont County has always been a hub of activity for the state of Ohio energy industry, see Figure 3. A leader in coal production, Belmont County is currently leading in horizontal drilling activity. Two large subsurface coal mines and dozens of fracking pads lie across the Captina Creek Watershed. Other commercial activities include three golf courses and a handful of produce operations.

In addition to the golf course, recreational opportunities include fishing, hunting, some hiking, birding, and all-terrain vehicle (ATV) use. However, ATV use remains a potential threat to be addressed in certain sections of the watershed. The streams and tributaries, in any of the subwatersheds, are not conducive to hand-powered boating as flow is often too low to support this activity.

## 1.3 Public Participation and Involvement

The Captina Creek Watershed has a Watershed Action Plan that was endorsed in 2014. Several public meetings were held during the development of that plan. No public meetings have been held for the specific development of this NPS-IS, but several meetings have taken place involving projects in the critical areas identified in this NPS-IS. These meetings have included the Belmont Soil and Water Conservation District, township trustees, USFWS, and Ohio Department of Natural Resources.

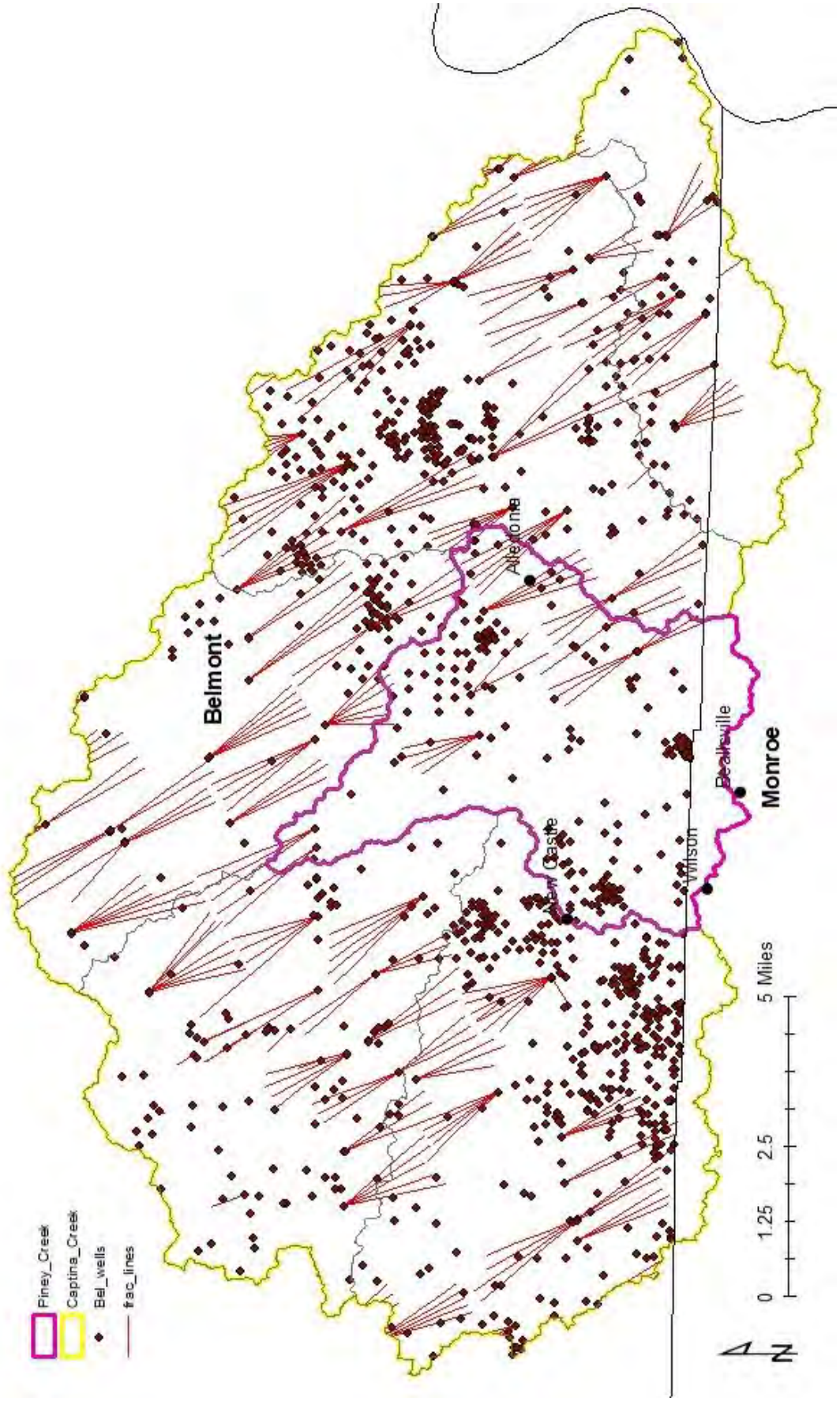


*Figure 3 Oil and gas activity within Captina Creek Watershed. Red lines are drill lines from hydrofracking pads. Red dots are known well sites, in any phase, associated with the oil and gas industry.*

# Chapter 2: Watershed Characterization and Assessment Summary

## 2.1 Summary of Piney Creek (050301060904) Subwatershed Characterization

### 2.1.1 Physical and Natural Features

Piney Creek subwatershed covers approximately 18,608 acres, of which 65% is forested. The upstream section of the subwatershed begins in Monroe County and drains in a northward direction, flowing to Captina Creek, which then flows east to the Ohio River.

Piney Creek subwatershed is comprised of seven named tributaries and various other unnamed tributaries. Table 1 lists these tributaries, as well as the attainment status of each. Long Run is a tributary of Piney Creek. All other tributaries flow directly to Captina Creek.

*Table 1. Characteristics for named streams in Piney Creek. Source: Captina Creek Watershed Action Plan, 2014.*

| Named Tributary | Length (miles) | Area (miles$^2$) | Attainment Status |
|---|---|---|---|
| Berry's Run | 2.3 | 1.42 | Unknown |
| Casey Run | 1.7 | 0.62 | Full |
| Crabapple Creek | 5.5 | 8.32 | Full |
| Long Run | 3.55 | 2.44 | Full |
| Mikes Run | 4.6 | 3.38 | Unknown |
| Piney Creek | 7.2 | 9.92 | Full |
| Reeves Hollow | 1.7 | 0.52 | Unknown |

The soils throughout Piney Creek are predominately Lowell-Westmoreland silt loam soils with varying degrees of slope. Ninety-four percent of the Piney Creek subwatershed soils are highly erodible lands based on soil type and slope. Slopes in Piney Creek subwatershed range from zero to 70 percent. The highest point, 1369 ft, is located one half mile south of New Castle.

The subwatershed is located on the unglaciated Allegheny Plateau ecoregion in Ohio. The area is dominated by Pennsylvanian Period sedimentary rocks. These 300-million-year-old rocks are brittle. The softer shales and mudstones are prone to erosion while the harder sandstones and limestones form cliffs prone to rockslides. Ridgetops are composed of shale, mudstone, and siltstone alternating with sandstone. Deeper valleys are composed of inorganic limestone and bituminous coal. Below the Pennsylvanian, lies the Devonian Period Marcellus Shale. This shale is currently being explored for gas extraction.


*Figure 4 Topographic image of Piney Creek subwatershed. Blue line is 2 miles for scale.*

### 2.1.2 Land Use and Protection

With 65% of the subwatershed forested, any remaining relatively flat land is cultivated into pastureland. These tracts are often not large enough, or are inaccessible, for housing. See Figure 5 for a land use map of Piney Creek subwatershed.

Two large subsurface coal mines (Century Mine and OVCC Powhatan No. 6 Mine (closed in 2017)) are situated within Piney Creek subwatershed, along with a coal slurry impoundment pond. There are also at least seven hydrofracking operations in the Piney Creek subwatershed. Other commercial activities include a golf course in the southwestern corner of the subwatershed near Switzerland Lake and a Christmas Tree Farm north of the AEC Century Mine. See Figure 6 for an aerial image of marked activity.

The largest acreage of protected land within the Captina Creek Watershed is located in the Piney Creek subwatershed. Raven Rocks contains 1,015 acres under a conservation easement and is upstream of the mining operations.

While residential development remains low, industrial development continues to rise. This type of development needs to be installed properly and monitored regularly as people will not be seeing the site as often as residential areas and impedances to water quality are likely to not be discovered as rapidly.

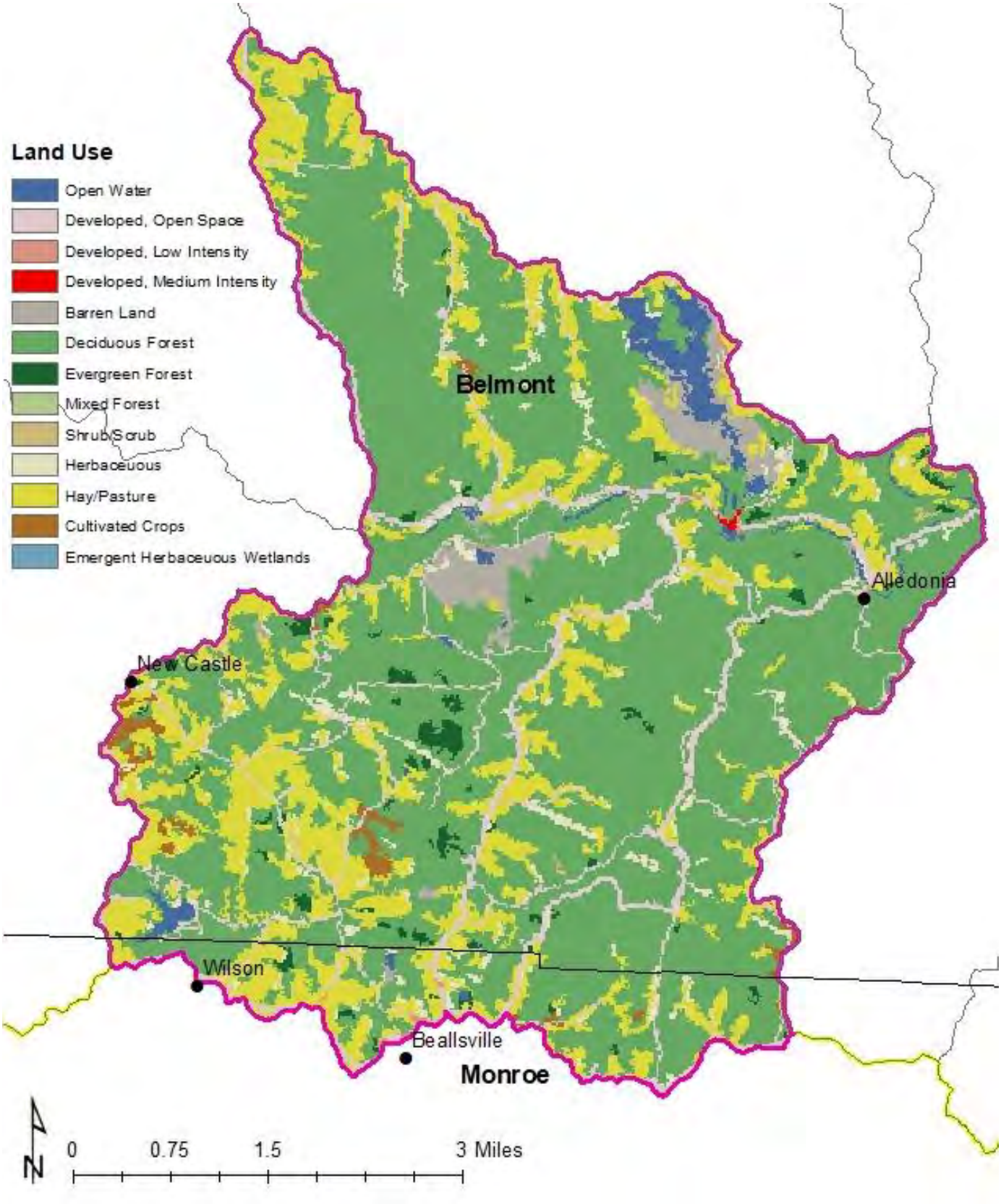


*Figure 5 Land use of Piney Creek subwatershed.*

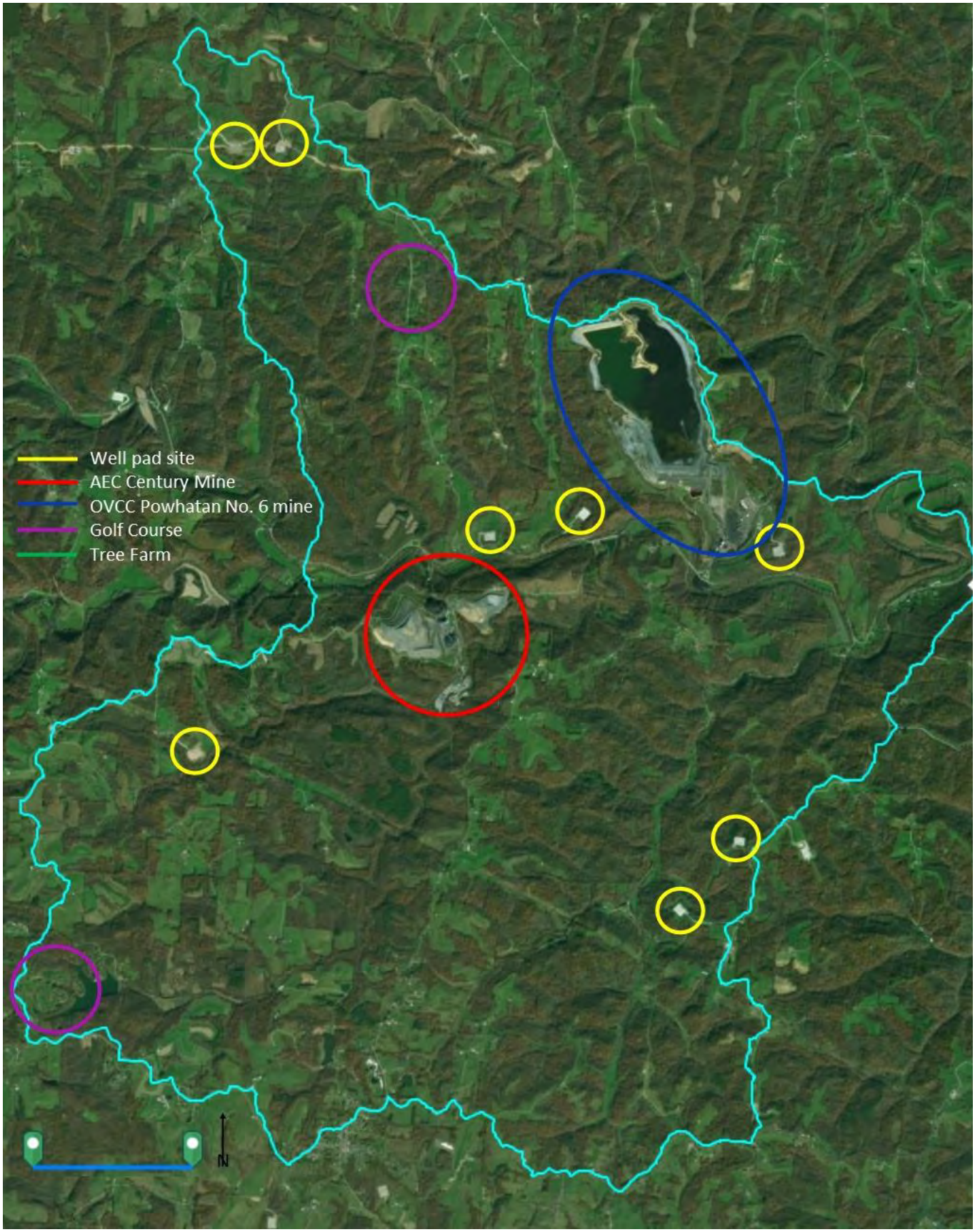


*Figure 6 Aerial view of commercial activity within Piney Creek subwatershed. Imagery is most recent on HydroVIEW website.*

## 2.2 Summary of Piney Creek HUC-12 Biological Trends

In the 2008-2009 Biological and Water Quality Study of the Captina Creek Watershed performed by the Ohio Environmental Protection Agency – henceforth referred to as the OEPA Biological Assessment – Captina Creek had a documented 56 fish species. It is also home to one of the few breeding populations of the state endangered Eastern Hellbender. This results in the highest Index of Biological Integrity score in the state of Ohio, see Table 2. The biodiversity and water quality of the Captina Creek Watershed enabled the Ohio EPA to list the Captina Creek mainstem as an Outstanding State Water and several tributaries as Superior High-Quality Water, and the US EPA to list the creek as an Aquatic Resource of National Importance.

*Table 2 Comparison of Captina Creek to other watersheds. Taken from the OEPA Biological Assessment.*

| Stream | Year | Length | IBI | MIwb |
|---|---|---|---|---|
| **Captina Creek** | **2008-09** | **RM 25 – 1** | **55.1** | **9.8** |
| Twin Creek | 2005 | RM 46 – 0 | 53.0 | 10.1 |
| Salt Creek | 2005 | RM 43 – 0 | 52.5 | 9.9 |
| Wakatomika Cr. | 2003 | RM 45 - 0 | 52.1 | 9.7 |
| Big Darby Cr. | 2001-02 | RM 76 – 30 | 50.6 | 9.1 |
| Kokosing River | 2007 | RM 55 – 0 | 49.7 | 9.4 |

The Ohio Division of Wildlife and the USFWS list 42 species of concern, threatened, or endangered as being recorded, at some point, within Belmont County. It is important to maintain the biological diversity of the area, especially with four of the seven named streams in full attainment of designations. Three of the four have high-quality designations to protect, see Table 3.

*Table 3 Aquatic life use designation and attainment status of tributaries in Piney Creek subwatershed. Jakes Run and Peavine Creek are not in the Piney Creek subwatershed. Taken from the OEPA Biological Assessment.*

| Stream | Sample Location River Mile | Sampling Type | Eco-region | Aquatic Life Use Designation | Aquatic Life Attainment Status | IBI | MIwb | ICI[a] | Stream Habitat[b] |
|---|---|---|---|---|---|---|---|---|---|
| Jakes Run | 0.1 | Headwater | WAP | EWH/CWH-R | FULL | 54 | NA | VG [ns] | 65.0 |
| Peavine Creek | 0.1 | Headwater | WAP | EWH/CWH-R | FULL | 54 | NA | E | 73.0 |
| Crabapple Creek | 0.5 | Headwater | WAP | EWH/CWH-R | FULL | 58 | NA | E | 75.0 |
| Piney Creek | 0.1 | Headwater | WAP | CWH-R | FULL | 56 | NA | G | 79.5 |
| Casey Run | 0.1 | Headwater | WAP | CWH-R | FULL | 44 | NA | E | 60.0 |
| Long Run (Trib to N. Fk) | 0.1 | Headwater | WAP | WWH | FULL | 50 | NA | VG [ns] | 92.0 |

## 2.3 Summary of Piney Creek HUC-12 Pollution Causes and Associated Sources

Potential sources of pollution identified during the OEPA Biological Assessment are found in the following table:

*Table 4 Identified causes and sources of impairment.*

| *Pollution Causes* | *Associated Sources* |
|---|---|
| Sedimentation and stream embeddedness | Stream bank erosion, hydrofracking pad construction, pipeline installation |
| Elevated organic and metal contaminates | Livestock access to stream, mine slurry discharge |
| Water withdrawal | Hydrofracking industry |
| Nutrients | Livestock access to stream |
| Pathogens | Livestock access to stream, failing HSTS |
| Barrier to fish migration | Submarine bridge |

In addressing sources, the submarine bridge and livestock access to the stream will be the easiest because these points are identifiable and essentially a one-time fix. Failing household sewage treatment systems will be the next, more difficult source to address. These systems are more difficult to specifically identify and secure funding for.

The mine slurry and the hydrofracking industrial activities are going to be the most challenging because of the regulations involved as well as the immediate, extensive water quality impacts with each of these.

At least eight mine slurry discharges from the Ohio Valley Coal Company (OVCC) slurry pond site have been documented by the Ohio EPA. Seven are referenced in the OEPA Biological Assessment:

*Since 1999, the Ohio EPA has documented at least seven slurry releases from the Ohio Valley Coal Company's impoundement to Captina Creek. The last slurry release from Ohio Valley Coal occurred on February 28, 2008 and discolored Captina Creek for over 22 river miles. Ohio Valley Coal also had a slurry release on July 10, 2007, one slurry release on January 2, 2006, two slurry releases in 2004 (July 31 and August 8), one in 2000 (April 22), and one in 1999 (July 8).*

An additional release occurred on October 1, 2010. Since this release, OVCC has installed a double-walled pipeline that will capture slurry from future breaks and redirect the slurry into containment facilities.

To put the extent of the potential for pollution relating to the hydrofracking industry in perspective, *The Allegheny Front* recently reported that the state of Ohio has issued at least 13 permits involving 66 pipeline stream crossings in the Captina Creek Watershed alone. The threat here is not in failing pipelines, but in increased sedimentation and turbid waters impacting aquatic habitats.

# Chapter 3: Critical Area Conditions & Restoration Strategies

## 3.1 Overview of Critical Areas

This NPS-IS will focus on one Critical Area. Projects are identified to address known points of concern, see Figure 7. Several of the causes of pollution discussed in Section 2.3 require monitoring of the sources, i.e. ensuring construction best management practices are followed during pipeline installation and relying on the coal companies and regulatory agencies to reduce the occurrence of slurry releases.

The Captina Creek Watershed Coordinator met with other Soil and Water Conservation District technicians, township trustees, and US Fish and Wildlife technicians to discuss creating a critical area for the project sites. The goal is to address and protect one creek at a time with known, viable projects and then move to the next creek to protect.

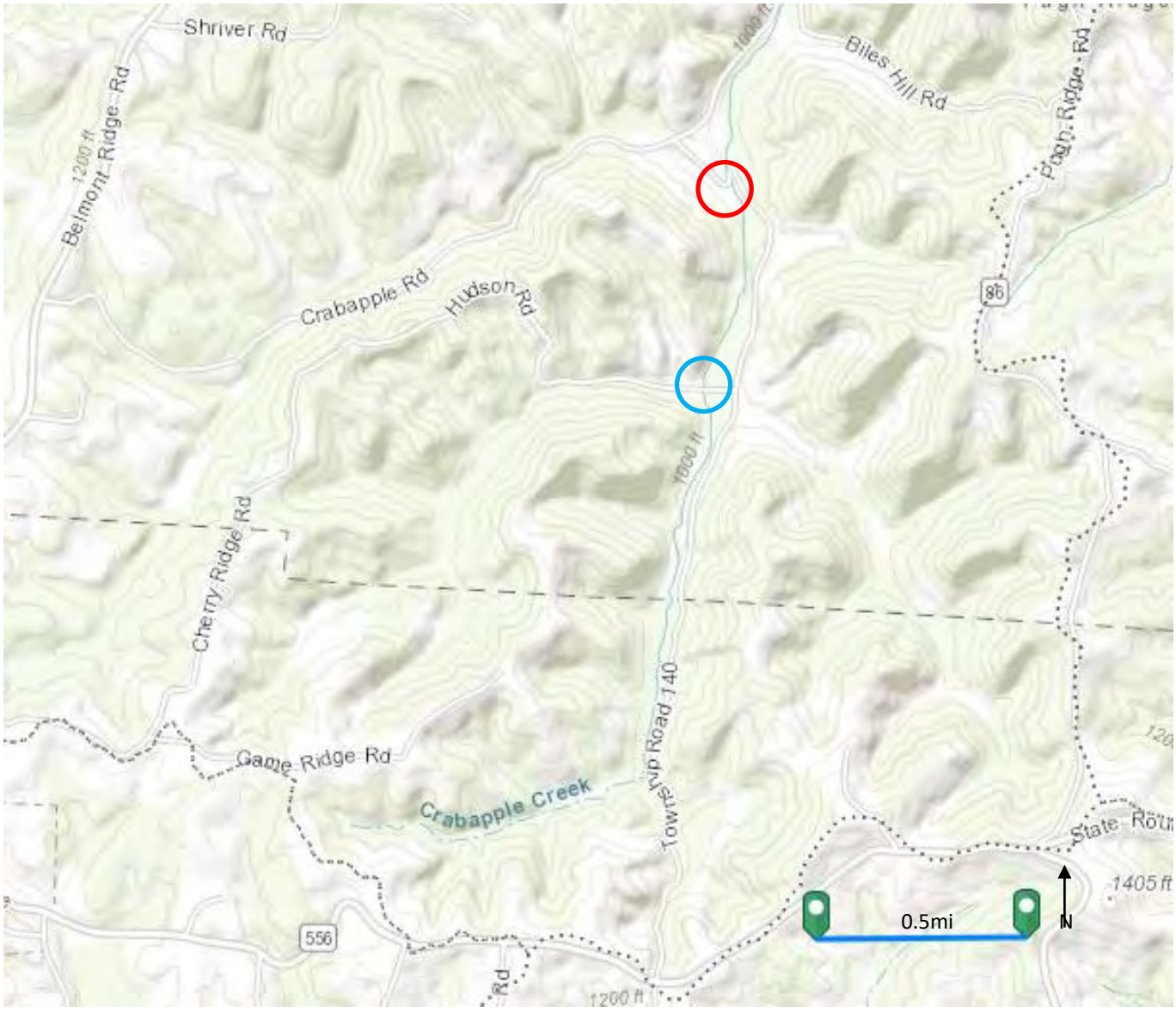


*Figure 7 Critical Area 1: Crabapple Creek. Locations of Objective 1 marked red and Objective 2 marked blue.*

## 3.2 Critical Area 1: Conditions, Goals, & Objectives

Critical Area 1 for Version 1.0 of the Piney Creek has been identified to be Crabapple Creek. There is little documentation on the quality of this creek. One point of Crabapple Creek, RM 0.5, was used during the OEPA Biological Assessment. The data collected at this point will be referenced in the next sections but are not entirely representative of the 5 miles upstream from this point. The objectives discussed in 3.2.4 will take place in these upstream reaches.

### 3.2.1 Detailed Characterization

Crabapple Creek flows north into Captina Creek, outletting east of the town of Alledonia. It has a drainage basin of 8.3 miles$^2$. The area is heavily forested with mostly intact riparian cooridors. Sources of potential impact indentifed in the Captina Creek Watershed Action Plan include sediment control, barriers to fish migration, slurry releases, and water withdrawal.

### 3.2.2 Detailed Biological Conditions

During the OEPA Biological Assessment, the Aquatic Life Use Designation for Crabapple Creek was determined to be Exceptional Warmwater Habitat/Cold Water Habitat (EWH/CWH). Reference Table 3 for the scores associated with this designation, as well as to reference other creeks within the Piney Creek subwatershed. This report will only reference the Exceptional Warmwater Habitat designation. In June of 2017, the Central Ohio Tributary Use Designations were finalized and Crabapple Creek is officially designated as an Exceptional Warmwater Habitat and is in full attainment of this designation. Not much is known about the biological conditions of Crabapple Creek, except what was determined from the OEPA Biological Assessment. See Table 5 and Table 6 for some biological data.

*Table 5 Fish community summary. Taken from OEPA Biological Assessment.*

| Stream | River Mile | Sampling Method | Fish Species (Total) | Relative Number | Relative Weight (kg) | QHEI (Habitat) | IBI | MIwb | Narrative Evaluation |
|---|---|---|---|---|---|---|---|---|---|
| Crabapple Creek | 0.5 | Headwater | 19 | 1861 | NA | 75.0 | 58 | NA | Exceptional |

*Table 6 Macroinvertebrate community summary. Taken from OEPA Biological Assessment.*

| Stream | River Mile | Data Codes | Total Taxa | Coldwater Taxa | Qual. EPT[a] Taxa | Total Sensitive Taxa | Density Number/ft$^2$ | ICI | Narrative Evaluation |
|---|---|---|---|---|---|---|---|---|---|
| Crabapple Creek | 0.5 | | 48 | 2 | 20 | 28 | Low | - | Exceptional |

### 3.2.3 Detailed Causes and Associated Sources

The Captina Creek Watershed Action Plan identifies sedimentation and barriers to fish migration as causes impacting the Crabapple Creek. Associated sources are unstable banks and a submarine bridge, respectively. This submarine bridge can be viewed in Photo 1 under Objective 1. Reviewing Ohio University's HydroVIEW, found at wwww.watersheddata.com/hydroVIEW, has also identified causes of impairment along Crabapple Creek including sediment movement and the presence of preservatives. Preservative spikes are denoted by pink pentagons in Figure 7. The associated source of these preservative detections is unknown, possibly coal mining related. The source of sediment movement is lack of riparian corridor, represented in areas of red outline in Figure 8.

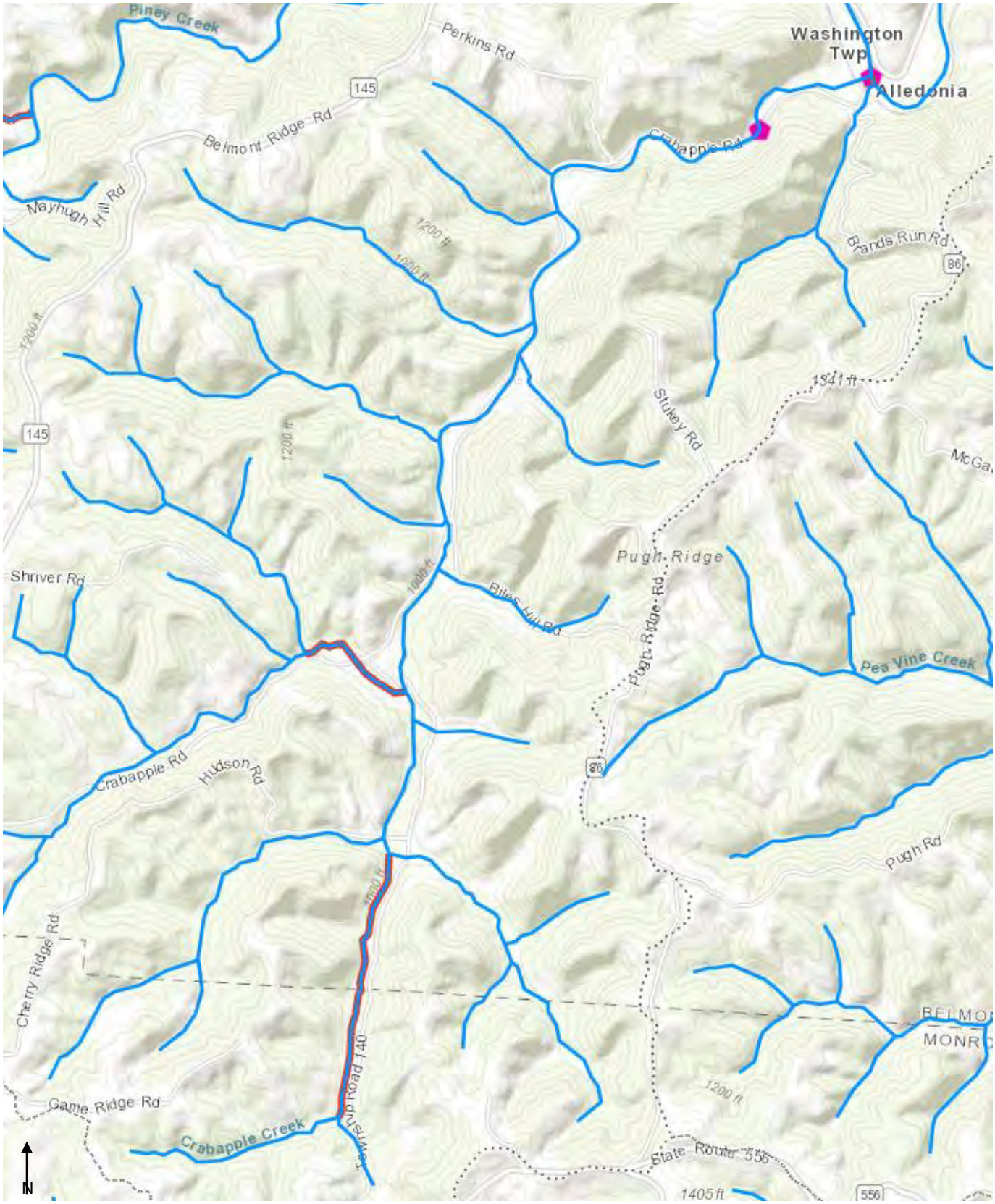


*Figure 8 HydroVIEW mapping of impairments to Crabapple Creek. Areas lacking riparian areas outlined in red. Points of preservative detection in pink pentagons.*

### 3.2.4 Outline Goals and Objectives for the Critical Area

The goal for this Critical Area is to maintain the Aquatic Use Designation of Exceptional Warmwater Habitat. This will be achieved by reducing sources of sediment loading and barriers to fish migration. Crabapple Creek's current IBI score is 58. The point of study for this score is a half mile from the mouth of Crabapple. While this is not representative, entirely, of the upstream sections, each objective below has a pre and post-assessment to reflect any improvements in IBI and habitat scores.

- **Objective 1: Remove barrier to fish migration and restore natural flow to reconnect habitat and allow movement of organisms.**
    - Crabapple Creek, RM 3.3. Remove one submarine bridge, Photo 1.

*Photo 1 Washington Township Road 84 submarine bridge on Crabapple Creek. Notice the culverts and the water level of the stream.*

- **Objective 2: Stabilize 70-100 feet of stream banks to minimize sediment movement at vehicle crossings.** Because the Belmont County Engineer will not allow a legally-defined bridge structure, options to completely avoid impact to the stream are unknown. The sites listed below will demonstrate the use of an articulated block design to maintain vehicle use of the township roads at each site.
    - Crabapple Creek, RM 3.3, once bridge is removed. See Photo 1.
    - Crabapple Creek, RM 3.8. See Photo 2.

*Photo 2 Vehicle crossing on Washington Township Road 84 through Crabapple Creek.*

## Chapter 4: Projects and Implementation Strategy

## Section 4.1 Project and Implementation Strategy Overview Table

| For *Piney Creek* (050301060904) —Critical Area #1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Applicable Critical Area** | **Goal** | **Objective** | **Project #** | **Project Title** *(EPA Criteria g)* | **Lead Organization** *(criteria d)* | **Time Frame** *(EPA Criteria f)* | **Estimated Cost** *(EPA Criteria d)* | **Potential/Actual Funding Source** *(EPA Criteria d)* |
| *Recommend that your critical areas be numbered or coded for reference.That number/code listed here comes from Chapter 3 section 3.1* | *It is recommended that your goals and objectives be numbered or coded for easy reference. The number/code listed here comes from Chapter 3 section 3.x.4.* | | *The information listed here comes from the Project Summary Sheets Chapter 4 Table 4.2.* | *The information listed here comes from the Project Summary Sheets Chapter 4 Table 4.2.* | *The information listed here comes from the Project Summary Sheets Chapter 4 Table 4.2.* | *The information listed here comes from the Project Summary Sheets Chapter 4 Table 4.2.* | *The information listed here comes from the Project Summary Sheets Chapter 4 Table 4.2.* | *The information listed here comes from the Project Summary Sheets Chapter 4 Table 4.2.* |
| **Urban Sediment and Nutrient Reduction Strategies** | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Altered Stream and Habitat Restoration Strategies** | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Agricultural Nonpoint Source Reduction Strategies** | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **High Quality Waters Protection Strategies** | | | | | | | | |
| 1 | 1 | 1 & 2 | 1 | Crabapple Creek Culvert Replacement | Belmont SWCD | Short | $40,500 | 319, CAHSP, USFWS |
| 1 | 1 | 2 | 2 | Crabapple Creek Crossing Improvement | Belmont SWCD | Short | $30,000 | 319, USFWS, LTAP |
| **Other NPS Causes and Associated Sources of Impairment** | | | | | | | | |
| | | | | | | | | |

## Section 4.2 Project Summary Sheets

| Nine Element Criteria | Information needed | Explanation |
|---|---|---|
| *n/a* | **Title** | Crabapple Creek Culvert Replacement |
| *criteria d* | **Project Lead Organization & Partners** | Belmont Soil and Water Conservation District<br>USFWS, Washington Township Trustees |
| *criteria c* | **HUC-12 and Critical Area** | Piney Creek subwatershed – 050301060904<br>Critical Area 1: Crabapple Creek |
| *criteria c* | **Location of Project** | Washington Township Road 84, Crabapple Creek RM 3.3<br>39°52'18.86" N 80°59'50.22" W |
| *n/a* | **Which strategy is being addressed by this project?** | High Quality Waters Protection Strategies |
| *criteria f* | **Time Frame** | Short-term priority.<br>Project ready to commence as soon as funding secured. |
| *criteria g* | **Short Description** | The goal of this project is to remove a submarine bridge that has been identified as impeding stream flow and acting as a barrier to fish migration to upstream sections of the stream. |
| *criteria g* | **Project Narrative** | A submarine bridge on Washington Township 84 crosses Crabapple Creek and has been identified impeding stream flow and acting as a barrier to fish migration to upstream reaches. The goal of the Crabapple Creek Culvert Replacement Project is to remove the existing submarine bridge and to stabilize the stream bank sufficiently to allow for vehicle crossing while reconnecting habitat and maintaining, perhaps improving, the aquatic use designation of Excellent Warmwater Habitat.<br>The Belmont SWCD is partnering with the Washington Township Trustees and the USFWS to complete this project, which has been a project since 2015. Upon securing remaining funding, the project will be bid out for a contractor to complete the project. The contractor will remove the bridge, regrade the area as needed, and install an articulated block mat to stabilize the banks for vehicle traffic. USFWS will complete pre and post-assessments to determine changes in IBI and habitat scores.<br>Removing the submarine bridge structure will allow for natural channel flow and for the migration of fish and other aquatic organisms. This is important in maintaining the aquatic use designation recorded downstream from this site, as well as improving habitat upstream of the site. Approximately 70 feet of stream bank will be stabilized in this project. |
| *criteria d* | **Estimated Total cost** | Estimated: $40,468, sub-contract<br>• Company site prep/cleanup: $6500<br>• Removal of ~40 cy sub. Bridge: $10,000<br>• Stream and bank regrading: $9968<br>• Erosion/sediment control: $5000<br>• Articulated Block crossing: $9000<br>Match: $16,188, committed<br>• In-kind: $1077 *watershed coordinator position*<br>• Cash: $15,111 *ODOW agreement* |
| *criteria d* | **Possible Funding Source** | Section 319; Central Appalachia Habitat Stewardship Program |
| *criteria a* | **Identified Causes and Sources** | Causes: barrier to fish migration and sedimentation<br>Sources: submarine bridge and unstable banks |

| | | |
|---|---|---|
| *criteria b & h* | **Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?** | Because the goal of Critical Area 1 is to maintain the Excellent Warmwater Habitat aquatic use designation, it is difficult to assess how much improvement will be needed. Future projects will be addressed as sedimentation hot spots arise. Crabapple Creek is a maintenance watershed instead of a restoration watershed. Improvement will also depend on initial assessment of the habitat at this project site. |
| | **Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?** | This project will improve a significant cause of impairment to Critical Area 1. The submarine bridge addressed in this project is the only know barrier to fish migration and will significantly improve habitat upstream through reconnection. In addressing sedimentation, this will be one of two known sites for improvement within the Critical Area. It will help, but the significance will be undetermined until reflected in timely evaluations. |
| | **Part 3: Load Reduced?** | Estimated 0.8 ton sediment/year |
| *criteria i* | **How will the effectiveness of this project in addressing the NPS impairment be measured?** | Belmont SWCD and USFWS will perform pre and post-assessment to determine improvements in habitat criteria and IBI scores. |
| *criteria e* | **Information and Education** | Press releases and news articles will be run before, during, and upon completion of the project in the local papers and newsletters: *The Times Leader, Barnesville Enterprise, The Intelligencer, Farm and Dairy,* and *The Cooperator.* Additionally, a tour of the site will be conducted for township trustees to compare the articulated block design to box culvert designs as possible alternatives to submarine bridges. A display and factsheet will be created as reference tools for future projects comparing the project costs, maintenance, and overall design comparisons between this project site and a project site where a double box culvert system was installed after the submarine bridge was removed. |

| Nine Element Criteria | Information needed | Explanation |
|---|---|---|
| *n/a* | **Title** | Crabapple Creek Culvert Replacement |
| *criteria d* | **Project Lead Organization & Partners** | Belmont Soil and Water Conservation District<br>USFWS, Washington Township Trustees |
| *criteria c* | **HUC-12 and Critical Area** | Piney Creek subwatershed – 050301060904<br>Critical Area 1: Crabapple Creek |
| *criteria c* | **Location of Project** | Washington Township Road 84, Crabapple Creek RM 3.8<br>39°51’52.56” N 80°59’54.39” W |
| *n/a* | **Which strategy is being addressed by this project?** | High Quality Waters Protection Strategies |
| *criteria f* | **Time Frame** | Short-term priority.<br>Project ready to commence as soon as funding secured. |
| *criteria g* | **Short Description** | The goal of this project is to stabilize stream banks at a vehicle crossing that has been identified as a potential source of sediment loading impacting the Excellent Warmwater Habitat aquatic use designation of Crabapple Creek. |

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|---|---|---|
| *criteria g* | **Project Narrative** | An open stream crossing on Washington Township 84 passes through Crabapple Creek and has been identified as a potential source of sediment erosion and subsequent loading into Crabapple Creek. The goal of the Crabapple Creek Crossing Improvement Project is to install an alternative stream crossing for vehicle transportation. This will reduce the impact to the stream banks and maintain, perhaps improve, the aquatic use designation of Excellent Warmwater Habitat on Crabapple Creek.<br>The Belmont SWCD is partnering with the Washington Township Trustees and the USFWS to complete this project, which has been a project since 2015. Upon securing remaining funding, the project will be bid out for a contractor to complete the project. The contractor will regrade the area as needed and install an articulated block mat to stabilize the banks for vehicle traffic. USFWS will complete pre and post-assessments to determine changes in IBI and habitat scores.<br>Stabilizing the banks at the point of vehicle entry and exit with an articulate block mat will reduce sediment loading thus maintaining the aquatic use designation for Crabapple Creek. An estimated 30 feet of stream bank will be stabilized in this project. |
| *criteria d* | **Estimated Total cost** | Estimated: $30,000, sub-contract<br>• Company site prep/cleanup: $6500<br>• Stream and bank regrading: $9500<br>• Erosion/sediment control: $5000<br>• Articulated Block crossing: $9000<br>Match: $14,000, committed<br>• In-kind: $1077 *watershed coordinator position*<br>• Cash: $14,000 ***Federal** support with USFWS* |
| *criteria d* | **Possible Funding Source** | Section 319 (will need to find different match); ODOT Local Technical Assistance Program |
| *criteria a* | **Identified Causes and Sources** | Causes: movement of sediment<br>Sources: unstable banks at vehicle crossing |
| *criteria b & h* | **Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?** | Because the goal of Critical Area 1 is to maintain the Excellent Warmwater Habitat aquatic use designation, it is difficult to assess how much improvement will be needed. Future projects will be addressed as sedimentation hot spots arise. Crabapple Creek is a maintenance watershed instead of a restoration watershed. Improvement will also depend on initial assessment of the habitat at this project site. |
| | **Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?** | In addressing sedimentation, this will be one of two known sites for improvement within the Critical Area. It will help, but the significance will be undetermined until reflected in timely evaluations. |
| | **Part 3: Load Reduced?** | Estimated 0.6 ton sediment/year |
| *criteria i* | **How will the effectiveness of this project in addressing the NPS impairment be measured?** | Belmont SWCD and USFWS will perform pre and post-assessment to determine improvements in habitat criteria and IBI scores. |
| *criteria e* | **Information and Education** | Press releases and news articles will be run before, during, and upon completion of the project in the local papers and newsletters: *The Times Leader, Barnesville Enterprise, The Intelligencer, Farm and Dairy,* and *The Cooperator.* Additionally, a tour of the site will be conducted for township trustees to view the articulated block design as a possible alternative to the open stream crossings. The factsheet and display created during the first project will be edited to be a reference for project cost, maintenance, and site needs for this alternative vehicle crossing. |

# Reference Information

## Acronyms

IBI – Index of Biotic Integrity
ICI – Invertebrate Community Index
MIwb – Modified Index of Well Being
QHEI – Qualitative Habitat Evaluation Index
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
WAP – Watershed Action Plan
WC – Watershed Characterization
WQS – Water Quality Standards
WRAS – Watershed Restoration Action Strategy

# Sources


Biological and Water Quality Study of the Captina Creek Watershed. Ohio Environmental Protection Agency. 2010 Apr.

Captina Creek Water Action Plan. Endorsed 2014.

Grant, Julie. Are Pipelines to Blame for Decline in Ancient Salamanders. The Allegheny Front. 2018 Feb 2