Looking upstream on Huntsville Creek below The Lands at Hillside Farms

HUNTSVILLE CREEK COLDWATER CONSERVATION PLAN

Including the Lower Toby Creek Watershed

Prepared by:

EPCAMR

Eastern Pennsylvania Coalition for Abandoned Mine Reclamation

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Educational Institutions

Drone Services

Municipalities

DALLAS BOROUGH
www. dallasborough.org

Funded By

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Matching Funds Provided By:

Disclaimer

The Eastern Pennsylvania Coalition for Abandoned Mine Reclamation, (EPCAMR), its professional Staff, and work performed by students, interns, and volunteers is to be used for educational and planning purposes only and makes no warranties, expressed or implied, regarding the quality of any product produced. Sponsor agrees to indemnify and hold harmless EPCAMR against any claims arising of the Sponsor's utilization or transfer of reports developed in whole or in part by EPCAMR, its professional Staff, students, interns, and volunteers. The Huntsville Creek Coldwater Conservation Plan is to be used as a tool that will help educate and build community consensus within the watershed with various stakeholders for the conservation of the coldwater ecosystem. EPCAMR has also included additional observations and assessments for the lower Toby Creek below the confluence of Huntsville Creek to the mouth of the Susquehanna River in Edwardsville Borough to complete the full, comprehensive watershed assessment for the entire Toby Creek watershed.

Limitations

The limits of this project were determined by the number of individuals involved, their knowledge and expertise of tasks outlined in the project plan, amount of funding available for staff time, equipment, etc., the timeline of the project, prevailing weather conditions during the project period, and the amount of existing data and research for the project location. Cost estimates, engineering designs, conceptual plans, and exact measurements in the field, should be a part of the recommendations referred to in the Huntsville Creek Coldwater Conservation Plan going forward for future implementation by any number of stakeholders in the watershed, including the municipal level governments, non-profits, businesses, or educational institutions, and EPCAMR.

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EXECUTIVE SUMMARY:

Coldwater Heritage Partnership[1] (CHP) planning grants[2] provide funding to conservation organizations to create cold water conservation plans that can be used by municipalities, local businesses, state and local governments, conservation organizations and communities for the conservation and protection of Pennsylvania's coldwater resources.

The Huntsville Creek Coldwater Conservation Plan will provide a general description of the Huntsville Creek watershed that is defined as being the stream segments that are located above the confluence in Kingston Township, Luzerne County, PA with the main stem of the Toby Creek that flows past the PA American Water property along the southbound lane of the Dallas Memorial Highway (State Route 309). A first order stream also flows through the Jackson Township Municipal Park that is ponded, crosses Hardisky Road and runs parallel to Huntsville Road in Jackson Township before flowing into Brown Creek along Chase Road. The Plan includes Brown Creek, a major tributary to the Huntsville Creek, located along Chase Road, in Jackson Township.

The Plan takes into consideration the Huntsville Reservoir and the main unnamed feeder tributaries that flow into the Reservoir from the upper headwater forested streams within the watershed. It also looked at the overflow drainage from the pond from Pine Cone Lane that crosses Sutton Road that flows downstream into Toby Creek and the overflow drainage from the pond in Dallas Township between Charlie's Drive and Reservoir Road that also crossed Beaver Brook Road and Blueberry Hill Road before entering Posten Pond in Jackson Township that crosses Cross Creek Road and further downstream, Sutton Road, before coming into the confluence with Huntsville Creek just above Gross Road. Another major area of focus was the unnamed tributaries that flowed through the Huntsville Golf Course and in Lehman Township over towards Huntsville-Idetown Road.

EPCAMR had also decided to assess the lower portion of the Toby Creek watershed below Huntsville Creek to complete a full comprehensive assessment of the entire watershed to produce a plan that all of the downstream municipalities and partners could also be involved with partnering and working on implementing future recommendations from the Huntsville Creek Coldwater Conservation Plan. The remaining downstream portion of the watershed was evaluated from below the confluence of Huntsville Creek through the Gap in State Route 309 back into the Wyoming Valley where Toby Creek flows southeast through Pringle Borough in a flood detention area into an underground Luzerne County Flood Protection Authority culvert system that exits in Edwardsville Borough behind the K-Mart Plaza located along State Route 11, before flowing under the State Road and entering the Susquehanna River just south of Valenti's Junkyard. Since the majority of the lower Toby Creek was channelized through the extensive culvert and flood protection infrastructure, there was only a small

[1] Coldwater Heritage Partnership

[2] Coldwater Heritage Partnership Grant Application and Guidelines

section of the creek that we had to assess at the outlet of the culvert before it reached the floodplain area along State Route 11 in Edwardsville Borough, so we decided to add this as an addendum to the Plan.

The entire watershed is **~ 36.60** square miles and contains **190.38** river miles[3] . Currently, no stream miles on Huntsville Creek are classified as Wild Trout[4] waters of natural reproduction, according to the PA Fish & Boat Commission. The unnamed tributaries below Huntsville Creek flow off of very steep vertical rock cuts through the Gap in the Larksville Mountain range and other smaller unnamed tributaries act as stormwater drainage swales along the road system for stormwater throughout Courtdale, Luzerne, Pringle, and Edwardsville Boroughs.

There is evidence that at least through Luzerne Borough that Toby Creek does support natural reproduction of brown trout. Large trout were visually noted by the EPCAMR Staff during the culvert assessment and macroinvertebrate sampling of the watershed just below the Luzerne Borough Plaza, along Toby Creek, where an old concrete dam and possible old railroad crossing existed over the creek. However, the fish were not caught or sampled at the time. It was difficult to ascertain if the fish were introduced through a private stocking or were connected to the same school of native brown trout that were found during our survey of the Upper Toby Creek watershed with Trout Unlimited during our previous electroshocking survey in the Trucksville Area upstream.

EPCAMR had submitted a request for Technical Assistance to the PA Council of Trout Unlimited to have the Habitat Division Field Staff come out and conduct an electroshocking survey in the Huntsville Creek watershed on August 19, 2019. At that time, it was not known that there were possible native brown trout much lower in the watershed until our macroinvertebrate assessments and field surveys were completed later the next year in 2020. It will be a recommendation later in the Plan to survey those downstream areas to determine if the populations of brown trout are in fact, native, and in various age classes, to ascertain that they haven't been stocked.

The entire Huntsville Creek watershed covers areas of **5** municipalities, including: **1** Borough (Dallas) and **4** Townships (Kingston, Dallas, Jackson, and Lehman). This Huntsville Creek Coldwater Conservation Plan will cover the watershed area and will include relevant geographical, geological, historical, and other information; analysis of recent or current scientific data already available or collected during the course of the grant period; a description of the unique or outstanding ecological, economic, aesthetic, and/or recreational values of the watershed; lists of areas of concern or potential threats, impacts, problems, or opportunities in the watershed; and recommendations report or a plan of action for future conservation, preservation and/or restoration activities and implementation projects that can be undertaken by the partnership established during the course of the development of the Plan.

[3] PA Gazetteer of Streams

[4] PA Fish & Boat Commission Wild Trout Waters Reproduction Report, July 2020

The Huntsville Creek Coldwater Conservation Plan preparation included a public participation process, which served to inform stakeholders and build community consensus for the conservation of the coldwater stream and its tributaries. Two public information meetings were required to be held within the watershed during the beginning and end of the completion of the plan development. EPCAMR prepared to bring together support from stakeholders and partners within the watershed in the Fall of 2018, obtained letters of support, developed a budget, and submitted the proposal in December 2018. Every municipality was contacted and communicated with about the project proposal. State Representative Karen Boback and State Representative Aaron Kaufer were also contacted and provided Letters of Support. The Pennsylvania State University Wilkes-Barre Campus in Lehman, PA was also contacted, and the Chancellor provided a Letter of Support and allowed EPCAMR to access the University property as needed during the assessment. Letters of support are attached in Appendix D.

The Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR) was successful in obtaining the grant and was awarded **$4750** in February of 2019 and signed and mailed in an Assurance Letter to the Coldwater Heritage Partnership before beginning the development of the Plan. By late Spring in March of 2019, EPCAMR had received our fully executed grant agreement to begin working on the Plan Announcement of 2019 CHP Grant Awards. In April of 2019, EPCAMR began posting social media posts about our initial field investigations to help spread the word on what some of our scope was for the watershed, while we started in the area of the Huntsville Creek Golf Course and Maslow Family property in Dallas Borough, just below The Pennsylvania State University, Wilkes-Barre/Lehman Campus, which sits on the watershed divide between Huntsville Creek and the East Branch of Harvey Creek's headwaters.

In addition, while working on the Plan development, EPCAMR was asked to partner with Dr. Cosima Wiese, Ph.D, Misericordia University, on a grant to start an Environmental Studies Program where students could conduct investigations, research, sampling, and watershed monitoring within the Upper Toby, Lower Toby, and Huntsville Creek Watershed. With the recent completion of the Upper Toby Creek Conservation Plan and our continued efforts on the Huntsville Creek Conservation Plan, there will be plenty of opportunities for student involvement in community service, internship opportunities, and teachable moments. EPCAMR reached out to Misericordia University to inform them of our efforts on Huntsville Creek since they were supportive of our efforts around the University property in the Upper Toby Creek previously. The grant[5] was awarded and an article was written about it in the Times-Leader. We look forward to continuing to work with them as they start up their Environmental Studies Program in 2021, when they could possibly assist with the implementation of some of the recommendations from the Plan.

[5] New grant will help set up environmental studies program at Misericordia

EPCAMR held an informational meeting on January 16, 2020 at the Dallas Township Municipal Building to present and solicit comments on the final draft plan of the Upper Toby Creek Coldwater Conservation Plan where we also solicited comments and provided an update on the Huntsville Creek Coldwater Conservation Plan that was well underway. On June 23, 2020, the Stanley Cooper Chapter of Trout Unlimited[6] shared on their social media page of **286** members, information on our work on the Huntsville Creek Coldwater Conservation Plan. That same day, the PA Environmental Digest[7] shared information on our efforts to their state-wide list of **4,497** subscribers. On June 25, 2020, we informed the Luzerne Borough Residents[8] social media group of **2,200** members, and the Back Mountain Community Page[9] of over **11,000** members of our work in the watershed to help get the word out.

Our Final Draft Plan meeting was not scheduled for an in-person meeting in the Winter of 2020 due to COVID-19 restrictions for public gatherings. However, EPCAMR sent copies of the draft plan to all partners and municipalities within the watershed for comments prior to final publication and each of the earlier mentioned social media pages will have a link provided for the public and residents from within the watershed and the Back Mountain to be able to provide comments. On January 27, 2021, EPCAMR hosted a Virtual Zoom call where **30** interested people attended, and the presentation was recorded "live" through the Dallas Township Facebook Page[10], thanks to our partner and Dallas Township Manager, Martin Barry, where within a few days had nearly **200** views. Comments were noted and incorporated into the Final Plan.

The process that EPCAMR followed to develop the Huntsville Creek Coldwater Conservation Plan was as follows:

1. Notify all municipalities in the watershed about the grant award, including an explanation of the project;

2. Schedule an initial public informational meeting in a location(s) convenient for a majority of the stakeholders in the watershed to explain the project and solicit information and support from residents;

3. Gather existing information (geological, hydrological, historical, etc.) about the waterway and watershed and collect scientific data on current stream conditions;

4. Prepare a draft of Huntsville Creek Coldwater Conservation Plan for review by CHP Staff;

5. Present the results and solicit feedback of the final draft of Huntsville Creek Coldwater Conservation Plan at a second public informational meeting near the end of the grant; and

6. Prepare the final Huntsville Creek Coldwater Conservation Plan and submit to CHP.

[6] Stanley Cooper Chapter of Trout Unlimited, June 23, 2020

[7] PA Environmental Digest, June 23, 2020

[8] Luzerne Borough Residents Social Media Group Notification, June 25, 2020

[9] The Back Mountain Community Page, June 25, 2020

[10] Dallas Township Facebook Live of Draft Plan Presentation by EPCAMR Executive Director, Bobby Hughes on January 27, 2021

The Huntsville Creek Coldwater Conservation Plan includes the following:

- Introduction of the Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR)
- Background on the Coldwater Heritage Partnership Planning Grant Program
- Impetus for development of the Huntsville Creek Coldwater Conservation Plan
- EPCAMR coalition building through partnerships and stakeholder outreach
- Detailed map of the Huntsville Creek Watershed
- Detailed map of the Lower Toby Creek Watershed
- EPCAMR scope of work items
- Cursory environmental issues & problem areas within the Huntsville Creek Watershed
- Tentative timeline for the development of the Huntsville Creek Coldwater Conservation Plan
- Macroinvertebrate, water quality sampling, survey protocols & field equipment
- Historic & geomorphic description of the Huntsville Creek Watershed
- Previous and current studies-analysis of the Huntsville Creek Watershed
- Huntsville Creek Watershed description and background information
- Land use characteristics of the Huntsville Creek Watershed
- Historic land use within the Huntsville Creek Watershed
- Fishery designations by drainage within the Huntsville Creek Watershed
- General flow and drainage pattern of Huntsville Creek from headwaters to the Susquehanna River Confluence
- Historical flow and current ground-truthed detailed drainage pattern of Huntsville Creek from headwaters to the Susquehanna River Confluence
- Huntsville Creek Watershed research & field reconnaissance observations with EPCAMR Staff, volunteers, & Dallas Area Municipal Authority (DAMA)
- Huntsville Creek Watershed North Atlantic Aquatic Connectivity Collaborative (NAACC) culvert assessments
- Current biological monitoring and assessments
- Areas of concern and potential conflicts
- EPCAMR recommendations
- Future funding grant opportunities and potential partners
- Summary/conclusions
- Appendices

Coldwater Conservation Plans are available on the Coldwater Heritage Partnership webpage[11].

[11] Coldwater Heritage Partnership Website

INTRODUCTION OF THE EASTERN PA COALITION FOR ABANDONED MINE RECLAMATION

The Eastern Pennsylvania Coalition for Abandoned Mine Reclamation (EPCAMR)[12] is a regional environmental organization founded in the Wyoming Valley 25 years ago to address past mining practices throughout watersheds and communities that were impacted by resource extraction of Anthracite, Bituminous, and other mining industries throughout Northeastern and Northcentral Pennsylvania.

EPCAMR Mission

"The general purpose of EPCAMR is to encourage the reclamation and redevelopment of land affected by past mining practices. This includes reducing hazards to health and safety, eliminating soil erosion, improving water quality, [and] returning land affected by past mining practices to productive use, thereby improving the economy of the region." -from the Preamble of the EPCAMR Bylaws. Incorporation Date: January 15, 1997

We are:

- a 501 (c)(3) non-profit, educational, scientific, technical, public, charitable organization founded in 1995
- located centrally within the Coal Regions of Northeastern and North Central PA with an office in Ashley, PA co-located with the Earth Conservancy[13]
- prioritize restoring streams impacted by abandoned mine drainage (AMD), a water pollution problem that affects over 5,500 miles of PA streams
- reclaim abandoned mine lands scarred from past mining practices
- assess watersheds within the Coal Regions of PA to develop watershed conservation, coldwater conservation, and implementation plans to protect and improve existing water resources, coldwater, and warm-water fisheries
- provide technical grant writing assistance and professional services to organizations and private entities in need of assistance
- providers of environmental education opportunities, outdoor learning experiences, field tours and opportunities for youth and students to become engaged and learn about local watersheds, problems, & solutions to protecting our environment
- partners with local governments, regional environmental non-profits, historical preservation organizations, reclamation related organizations, State, Federal, County, and International organizations to improve the quality of life throughout the 16 county-service are of EPCAMR
- advocates for additional revenue sources, legislation, policies, and funding from the various forms of government to assist with leveraging other programs to reclaim abandoned mine lands and remediation streams impacted by AMD through economic development opportunities

[12] EPCAMR Website

[13] Earth Conservancy Website

Currently, there are **4** Full-Time EPCAMR Staff[14], **1** Full-Time Volunteer from the Office of Surface Mining Reclamation & Enforcement AmeriCorps Volunteer in Service to America (VISTA), and **4** Part-Time Staff, seasonal interns, hundreds of volunteers, **30** regional Board of Directors[15] of diverse community members, watershed organization representatives, Conservation District representatives, Independent Power Producers trade association, the Anthracite Industry, private consulting firm representatives that work in the reclamation and AMD remediation sector, educators, lawyers, outdoor recreationists, filmmakers, artists, and photographers.

EPCAMR administers and manages a variety of grants, contract agreements, professional service agreements, corporate donations, and foundation funds to leverage funding from multiple sources to complete our projects, programs, environmental education and outreach events and workshops, mine pool mapping, field tours and outdoor educational experiences, and abandoned mine land and AMD remediation projects. Our membership base is small, however, we are always looking for additional individual, organizational, and industry members to join our cause to support our mission, goals, and objectives. We rely heavily on our volunteer base in our communities that we serve to get our "on the ground" projects up and running.

EPCAMR has completed several Coldwater Conservation Plans for the CHP Program over the years including the Abraham Creek, Upper Toby Creek, Laurel Run, Solomon Creek, and outside of the Wyoming Valley, Bowman's Creek in Wyoming, Luzerne, and Sullivan Counties. All of the Plans can be found on the CHP website[16].

[14] EPCAMR Staff
[15] EPCAMR Board
[16] Coldwater Heritage Partnership

Technical Assistance & Provided Services

Grant Writing & Administration

Interpretation of Historic Surface & Underground Mine Maps

Building Broad Coalitions Throughout the EPCAMR Region

EPCAMR is looking to continue to build partnerships with all of the Conservation Districts in NC and NE PA that have impacts from not just abandoned coal mines but also abandoned quarries, limestone, sand and gravel, and other mines where mineral extraction has occurred. We encourage membership from other organizations and Conservation Districts to become involved with our regional organization to address the important issues associated with achieving clean water, land reclamation, economic development, job opportunities, and environmental education and outreach opportunities throughout the region.

Now, more than ever, EPCAMR would like gain the local support of community groups, local governments, educational institutions, conservancy groups, Conservation Districts, reclamation related organizations, land trusts, historical societies, cultural organizations, Trout Unlimited Chapters, co-generation plants, coal companies, and private sector industries. These partnerships will allow EPCAMR to provide the necessary resources, information, data, first-hand knowledge, anecdotal evidence, technical resources, mapping, historic mine maps (both surface and underground), and institutional knowledge from community leaders and volunteers who want to achieve the same goal of restoring our watershed impacted by past mining practices.

A large majority of EPCAMR's work has focused on areas impacted by both bituminous and anthracite coal mining. We are willing to assess and provide technical assistance in other areas. Contact us today to find out how to become a partner!

Overview of Programs

Watershed and Urban Outreach Programs

Mine Map Scanning, Georeferencing, & Digitizing for the PA Mine Subsidence Insurance Program

- Professional Services for Water Quality, Flow, Borehole Monitoring, & Maintenance & Operation of AMD Treatment Systems

- Environmental Education Program to Underserved School Districts and Environmental Justice Coalfield Communities

- Visual Habitat, Biological Fishery and Macro-Invertebrate Assessments, Trout Stream Coldwater Conservation & Watershed Assessment Plan Development

- 3D Mine Pool Mapping & Modeling of Underground Mine Pool Complexes throughout the State

Figure 1. EPCAMR Brochure Highlights

Who We Are

EPCAMR is a regional non-profit environmental organization that works throughout Northeastern and North Central Pennsylvania's Anthracite, Semi-anthracite and Bituminous Coalfields with community groups, local governments, schools, colleges and universities, as well as mining companies, conservation districts, reclamation-related businesses, watershed groups, Trout Unlimited chapters, and other regional non-profit organizations to support the reclamation of abandoned mine lands (AML) and the remediation of polluted abandoned mine drainage (AMD) rivers and streams impacted by past mining practices.

Our staff and board are interested in developing partnerships with community leaders and organizations that seek opportunities to leverage funding from various levels of government, foundations, corporate donations, and volunteer matching funds from individuals interested in becoming involved in local projects within their own coal-impacted communites.

EPCAMR creates new partnerships and builds on existing ones to raise the awareness of our mission and goals. We provide professional services to support AML reclamation, AMD remediation efforts and watershed restoration projects in our region and beyond.

The 40-ft high Harry E. Breaker Waste Coal Pile, which was on fire, continues to be a source of pollution in Swoyersville, PA.

Our Mission

"The general purpose of the EPCAMR is to encourage the reclamation and redevelopment of land affected by past mining practices. This includes reducing hazards to health and safety, eliminating soil erosion, improving water quality, and returning land affected by past mining practices to productive use, thereby improving the economy of the region."

The orange pollutant in AMD known as iron-oxide pours out of the Old Forge Borehole in Lackawanna County, Pennsylvania at an estimated 40 to 100 million gallons a day. This amount of drainage per day is equivalent to the amount of water the average person uses in an entire year!

Although AMD is often thought to be orange due to iron oxide, it has many different colors and levels of toxicity dependent on the chemistry. This form of AMD is crystal blue, which gets its hue from the high amount of aluminum. The Jeddo Tunnel of Luzerne County, Pennsylvania releases an estimated 40,000 gallons of polluted mine water every minute.

"EPCAMR prides ourselves on the professional quality of our work created by our highly skilled, passionate staff who are committed to watershed restoration, land reclamation, and providing educational awareness of our efforts to reclaim mining impacted areas in the Anthracite and Bituminous Coalfield communities that are often underrepresented."

—Robert E. Hughes, Executive Director

Figure 2. EPCAMR Organizational Description and Mission

Figure 3. EPCAMR Contact Information and Social Media Outlets

BACKGROUND ON THE COLDWATER HERITAGE PARTNERSHIP PLANNING GRANT PROGRAM

The Coldwater Heritage Partnership provides funding support for evaluation, conservation, & protection of Pennsylvania's cold water streams and is dedicated to preserving natural fisheries. The Partnership consists of:

- PA Department of Conservation and Natural Resources (PA DCNR)[17]
- PA Fish & Boat Commission (PA F&BC)[18]
- PA Council of Trout Unlimited (PATU)[19]
- Foundation for PA Watersheds (FPW)[20]

Proposals that meet the following criteria are given priority:

- Project will occur in a watershed containing streams with naturally reproducing trout populations;
- List of streams containing naturally reproducing trout[21];
- Project will occur in a watershed listed as Special Protection Waters within the PA's Chapter 93[22] or have the potential to be upgraded;
- Streams and other water bodies in project area are generally open to the public for recreational activities, including angling;
- Project demonstrates significant partnerships, volunteer involvement, and promotes opportunities for citizen science and engagement;
- Local watershed organizations, regional non-profits, TU chapters, County Conservation Districts or academic institutions take the leading role in the implementation of the project; and
- Proposed project demonstrates benefits to cold water fish species as well as to the local community's economic, recreational, aesthetic characteristics or objectives.

PA DCNR is especially concerned with the "**EPCAMR Recommendations**" portion of all final plans. In other words, they want to see a Coldwater Conservation Plan that has very specific, attainable, and fundable, shovel ready recommendations/suggested action items that can be funded either with CHP Implementation grants, can serve as possible mitigation projects in the future, or would become eligible for known and existing alternative funding programs. FPW is focused on "priority" watersheds, in other words, they want to see that a watershed has a high likelihood of being able to support native trout populations into the future if certain steps are taken to improve, restore, conserve, protect, the existing resource. We took into consideration future development pressures, potential for temperature increases, and whether or not the Huntsville Creek Watershed is where wild trout species, with a little help from habitat improvement projects, streambank

[17] PA Department of Conservation and Natural Resources
[18] PA Fish & Boat Commission
[19] PA Council of Trout Unlimited
[20] Foundation for PA Watersheds
[21] PA Fish & Boat Commission Trout Reproduction Report, July 2020
[22] PA Code-Chapter 25 Subsection 93.3

stabilization projects, riparian buffer plantings, dam removal, and culvert replacements or rehabilitation, can survive and thrive.

IMPETUS FOR DEVELOPMENT OF THE HUNTSVILLE CREEK COLDWATER CONSERVATION PLAN

In June 2017, State Representative Aaron Kaufer, 120th District[23], reached out to EPCAMR to see if we had any interest in applying for a Coldwater Heritage Partnership Planning Grant for Toby Creek to determine the state of the watershed. EPCAMR informed the Representative's Office that it was a very large watershed consisting of nearly **36.5** square miles. It was too large to assess under a single Coldwater Heritage Partnership planning grant given the limited financial resources that could be allocated to the planning project that was proposed and the necessary Staff time and technical field expertise and resources that would need to be concentrated on within the watershed in a short period of 18 months. Therefore, EPCAMR informed the State Representative Kaufer that our organization decided to break up our strategy of assessing the watershed into two planning grants, one for the Upper Toby Creek Watershed and the other for the Huntsville Creek subwatershed that drains to the larger Toby Creek at its confluence in Kingston Township at the end of Huntsville Road and the intersection of State Route 309, along the Dallas Memorial Highway. Toby Creek has cut a gap in the Larksville Mountain range that runs in a northerly and southerly direction along State Route 11.

The lower end of Toby Creek does cross the Anthracite mining impacted region in Luzerne, Swoyersville, and Pringle Boroughs, as well as when it flows in the southwesterly direction through Kingston and eventually Edwardsville Borough towards its mouth with the Susquehanna River near Valenti's Scrap Yard, near State Route 11, and the former Redner's Supermarket. As mentioned earlier, since there weren't too many more stream miles to assess in the lower end of Toby Creek, EPCAMR decided to continue to perform our assessment all the way down to towards the mouth of the Susquehanna River in the floodplain along State Route 11. The EPCAMR Executive Director pulled some of our Coalition Partners together in the Wyoming Valley and the Back Mountain to make an application for funding for $5000 (the maximum amount of funds to conduct a watershed assessment planning effort under the CHP Program.) for the Huntsville Creek in the Winter of 2018 and were awarded **$4750** in the Spring of 2019. It had been EPCAMR's intention to identify and eventually assess as many watersheds over a several year span throughout the Wyoming Valley's eastern and western flanks.

[23] State Representative Aaron Kaufer's 120th Legislative District

EPCAMR COALITION BUILDING THROUGH PARTNERSHIPS AND STAKEHOLDER OUTREACH

The following partners and stakeholders were reached out to at the very beginning of the process to develop the planning grant and additional partners were added throughout the course of the completion of the watershed assessment and development of the Coldwater Conservation Plan for the Huntsville Creek. Many of the partners provided letters of support for the grant application, while others provide meeting space, as in the case of Dallas Township for our first public informational meeting, and or local knowledge of areas of concern or for those sites in need of protection or restoration. EPCAMR felt that it was important to reach out to partners early prior to submitting our application to gain their support and benefited greatly from doing so by increasing the awareness of the CHP Program and EPCAMR's professional technical services that we were offering publicly to complete the watershed assessment and development of the Coldwater Conservation Plan.

At the public information meeting, Robert "Bobby" E. Hughes, gave an in-depth comprehensive overview presentation to the audience on behalf of EPCAMR, took notes based on comments provided by individuals who had information and knowledge to share, and marked up a draft watershed map with points of interest to visit within the entire Toby Creek watershed, including the Huntsville Creek sub-watershed. EPCAMR Staff acquired contact information and e-mail addresses from everyone who were interested in receiving our monthly volunteer newsletter, those who offered access to private properties along the creek and tributaries, and those who offered technical assistance and support.

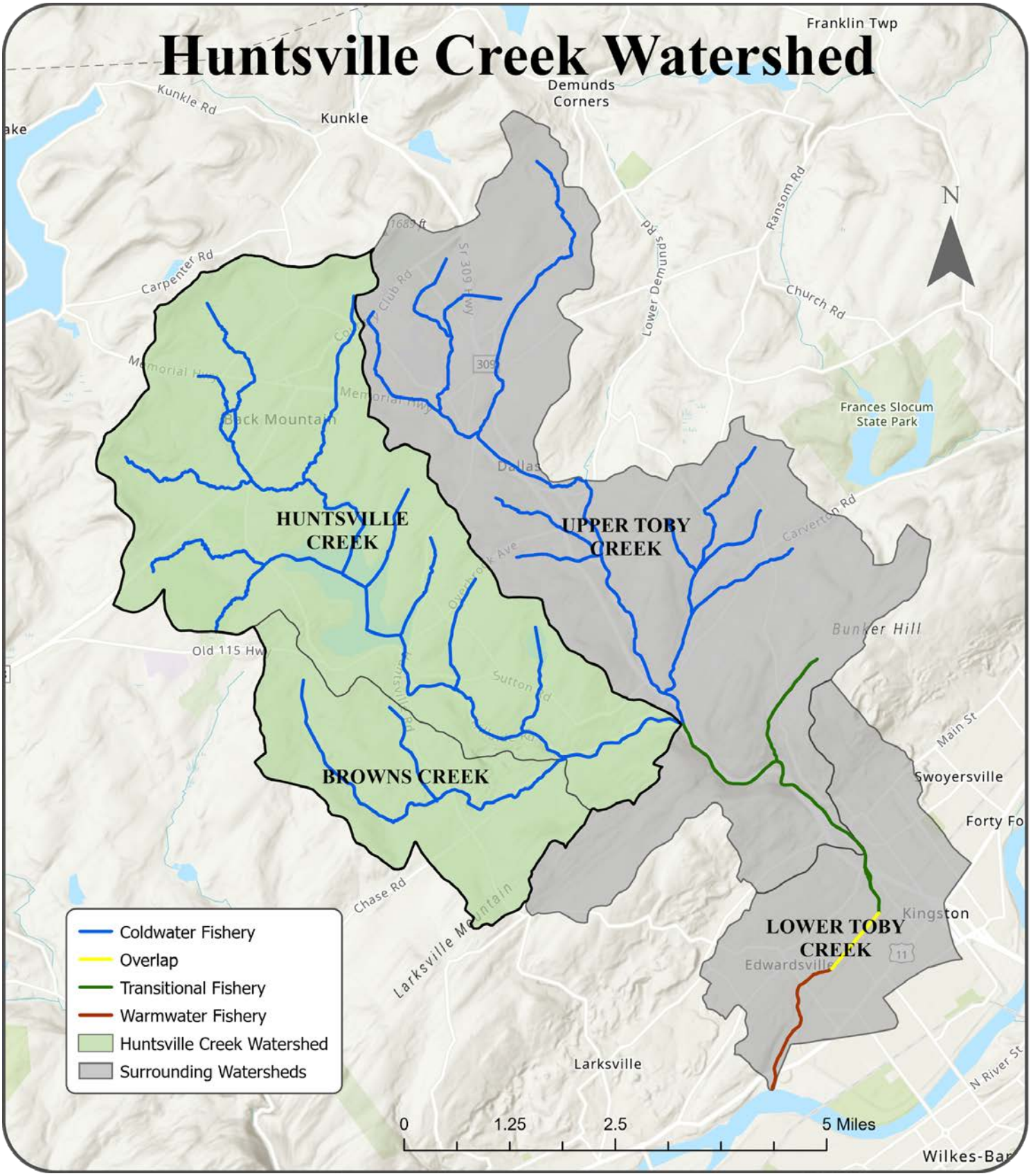
Tom Mayka, the Dallas Area Municipal Authority Stormwater Program Coordinator and John Levitsky, Watershed Specialist from the Luzerne Conservation District and EPCAMR Board Member were very helpful during the planning portion of the project.

Table 1 EPCAMR Coalition Building through Partnerships and Stakeholder Outreach in the Huntsville Creek and Lower Toby Creek Watershed

Community Partners	Municipalities in the Huntsville Creek Watershed
Stanley Cooper Chapter of Trout Unlimited	Kington Township
Pennsylvania Environmental Council NE Office	Dallas Borough
North Branch Land Trust	Lehman Township
The Lands at Hillside Farms	Dallas Township
PA Organization for Watersheds and Rivers	
PA American Water Company	**Municipalities in the Lower Toby Creek Watershed**
The Pennsylvania State University Wilkes-Barre/Lehman Campus	Luzerne Borough
Huntsville Golf Course	Swoyersville Borough
Dallas Area Municipal Authority	Kingston Borough
State Representative Aaron Kaufer	Courtdale Borough
State Representative Karen Boback	Edwardsville Borough
State Senator John Yudichak	
State Senator Lisa Baker	
Luzerne County Flood Protection Authority	Forty-Fort Borough
Luzerne Conservation District	
Wyoming Valley Sanitary Authority	
Misericordia University	

DETAILED MAP OF THE HUNTSVILLE CREEK WATERSHED

Map 1: Detailed map of the Huntsville Creek Watershed



EPCAMR SCOPE OF WORK ITEMS

EPCAMR received $4,750 grant to assess the Huntsville Creek Watershed which includes:

• Fish surveys: Assess populations of Brook Trout and Wild Brown Trout with Trout Unlimited

• Macroinvertebrate sampling: Assess populations of aquatic macroinvertebrates

• Water quality monitoring: water chemistry

• Culvert assessments for aquatic organism passage (AOP) through NAACC[24]

• Research existing plans and reports available on the Huntsville Creek Watershed or Conservation Efforts within the identified municipalities

• Visual habitat assessment

• Photo documentation

• Creation of various watershed maps using GIS available data layers and EPCAMR data

[24] North American Aquatic Connectivity Collaborative-Stream Continuity

CURSORY ENVIRONMENTAL ISSUES & PROBLEM AREAS WITHIN THE HUNTSVILLE CREEK

Prior to conducting field reconnaissance, EPCAMR listed some cursory anticipated environmental issues and problem areas within the watershed as the development of the Huntsville Creek Conservation Plan got underway. Many of these issues are common to the watersheds throughout the Wyoming Valley.

Table 2. Anticipated Environmental Issues and Problem Areas within the Huntsville Creek Watershed

Anticipated Environmental Issues and Problem Areas within the Huntsville Creek Watershed
Flooding Issues
Pipeline crossings under and over streams
Riparian corridor restoration needs
Culvert damage assessments and need for repair or replacement
Headwall failures along waterways
Streambank erosion stabilization and potential restoration areas
Stormwater management issues
Sediment accumulation in stream channels and storm drains or pipe culverts
Downed trees and major woody debris blockages
Illegal dumping issues
Private property, public property, agricultural, and urban runoff issues
Major infrastructure constriction points along waterways
Water Quality
Poor fishery habitat ecology in need of stream habitat improvement
Severely incised channels
Potential dam removal projects
Public and private infrastructure issues
Invasive Plants
Dam Removals
Failing retaining walls
Gravel bar and point bar formation and accumulation both in-stream and under bridge culverts
Unaligned culverts projecting over the stream that create scour pools and float above stream grade

TENTATIVE TIMELINE FOR THE COMPLETION OF THE HUNTSVILLE CREEK COLDWATER CONSERVATION PLAN

Project Timeline (20 months)

Mar.-Apr. 2019

a. Notify municipalities and stakeholders about the grant award. Post article to EPCAMR social media outlets.
b. Have EPCAMR Interns gather, research historical data, references, and reports on Huntsville Creek
c. Schedule initial public informational meeting within the Huntsville Creek watershed at either a local municipal building or Penn-State Wilkes-Barre Campus
d. Reach out to the local media to obtain a cover story on the grant announcing the first public informational meeting within the Huntsville Creek watershed for residents to attend

May-Sept. 2019

a. Identify potential impacts, opportunities, and problems, within the Huntsville Creek watershed through numerous field reconnaissance visits throughout the area
b. Conduct stream habitat, biological (macro-invertebrate assessment), water quality snapshot of each of the tributaries at in-stream monitoring stations to be established in the field by the EPCAMR Staff and adjusted accordingly due to access
c. Conduct an evaluation and assessment of as many culverts during low flow conditions that are publicly accessible within the watershed as a first priority and identify other culverts on private property that may need to be followed up by local municipal officials to gain access for further evaluation and assessment
d. Identify number and locations for the future electroshocking survey within the watershed

Oct. 2019-Mar. 2020

a. EPCAMR Staff begin formulating a draft for the Huntsville Creek Cold-water Conservation Plan
b. List recommendations in the DRAFT Plan for future implementation and assessment projects to provide to the municipal and community partners in the watershed and seek any comments

Apr.-June 2020
a. Conduct stream habitat, biological (macro-invertebrate assessment), water quality snapshot of each of the tributaries at in-stream monitoring stations to be established in the field by the EPCAMR Staff and adjusted accordingly due to access
b. Conduct an evaluation and assessment of as many culverts during low flow conditions that are publicly accessible within the watershed as a first priority and identify other culverts on private prop
c. Request Technical Assistance from PA Trout Unlimited to determine when is the best date to plan for conducting the fishery electroshocking and conduct the survey

Jul.-January 2021
a. Present DRAFT and recommendations online on January 27th, 2021 due to COVID pandemic and the inability to meet publicly for the second public informational meeting; Seek local media out for a positive cover story about the outcomes of the CHP and the recommendations made
b. Incorporate feedback into the DRAFT and follow up on any suggestions made by the public and modify the DRAFT Plan to make it FINAL. Prepare FINAL Huntsville Creek Cold-water Conservation Plan and submit to the CHP for FINAL approval

c. Send out electronic copies of the Huntsville Creek Coldwater Conservation Plan to all partners and post to the EPCAMR website the Final CHP Plan and a link to the CHP website for when it is posted to their site and approved

MACROINVERTEBRATE, WATER QUALITY SAMPLING, SURVEY PROTOCOLS & FIELD EQUIPMENT

The following sampling protocols were used by the EPCAMR Staff and volunteers in the field.

- EPCAMR Stream Quality and Quantity Field Sampling Data Sheets Document
- Trout Unlimited Macro Data Survey and Assessment Document
- EPA Rapid Bioassessment Protocols for sampling macroinvertebrates[25]
- NRCS Stream Visual Assessment Protocol (SVAP) for stream habitat assessment[26]
- Part 614 NRCS Stream Visual Assessment Protocol (SVAP) Version 2[27]
- North Atlantic Aquatic Connectivity Collaborative (NAACC)[28] Protocols for Aquatic Organism Passage (AOP) on road crossings and culverts

EPCAMR Staff used a Photometer, YSI Meter, 1'm Kick Screen, Telescoping Stadia Rod, 300' measuring tape, and Sampling Ice Cube Trays for sorting macroinvertebrates for identification and determination of stream health.

[25] EPA Rapid Bioassessment Protocols for sampling macroinvertebrates, 1999

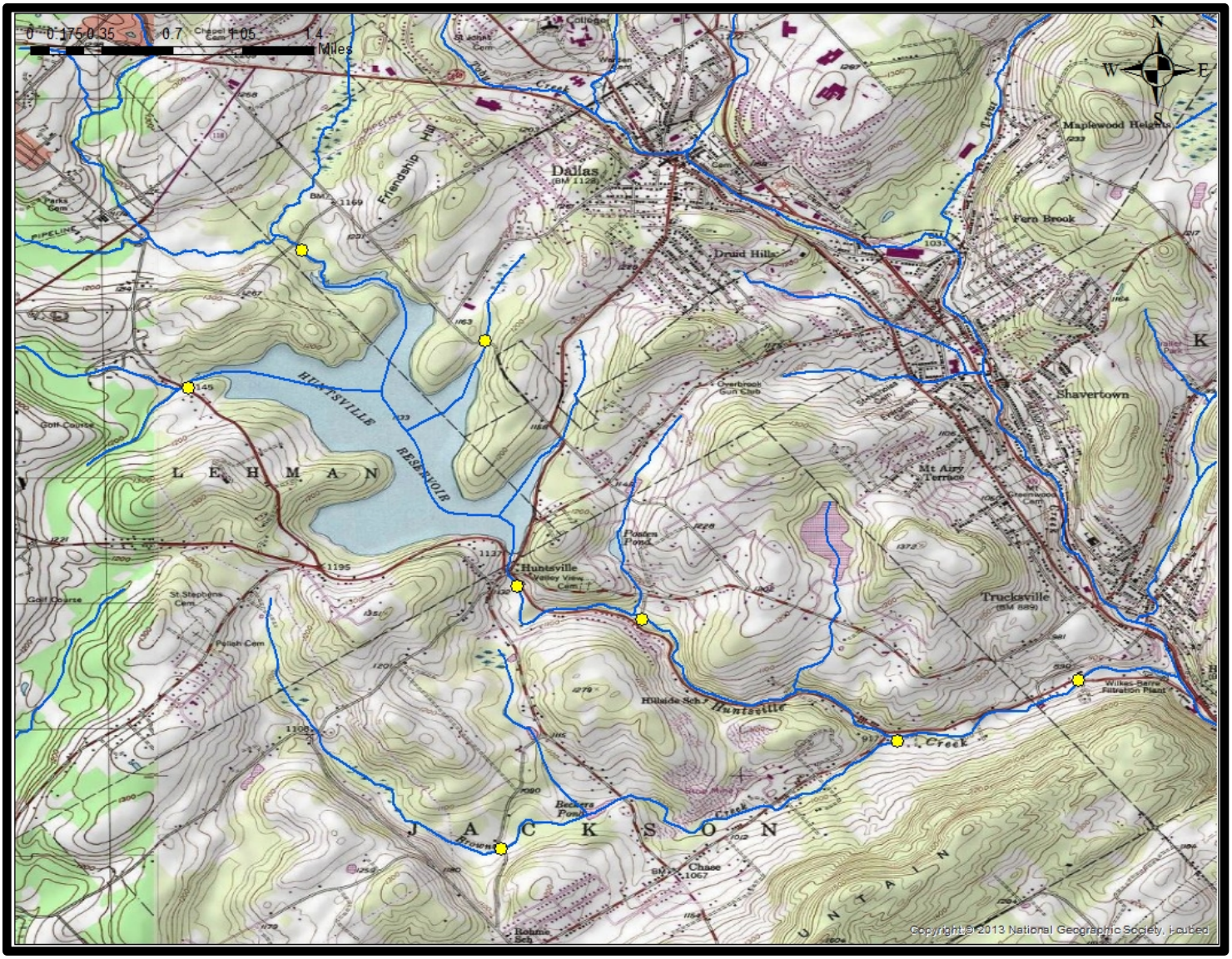
[26] NRCS Stream Visual Assessment Protocol (SVAP) for stream habitat assessment, 1998

[27] Part 614 NRCS Stream Visual Assessment Protocol (SVAP) Version 2, 2009

[28] North Atlantic Aquatic Connectivity Collaborative

HISTORIC & GEOMORPHIC DESCRIPTION OF THE HUNTSVILLE CREEK WATERSHED

Map 2: Huntsville Creek sub watershed Tributary to Toby Creek and Anticipated Monitoring Sites for Consideration on USGS Topographic Map (2020)



The Huntsville Creek Watershed is located in the Northeastern Pennsylvania Back Mountain, Luzerne County, PA. It spans Kingston Township, Jackson Township, Lehman Township, Dallas Township, Dallas Borough, and Harveys Lake Borough. The headwaters of the Huntsville Creek mainstem flow from a natural wetland spring in Dallas Twp, a quarter mile north of the intersection of Lake Street and Country Club Road. An average elevation of these headwaters are 1220’ and 1300’ as they flow downstream out of Dallas Township into Lehman Township into wetland complexes to the north and the west end of the Huntsville Reservoir. It continues to flow through a wetlands area between Country Club Road, Oval Lane, and White Birch Lane.

Crossing the Back Mountain Memorial Highway 415 below the Yalick Farms Luxury Condos and Metz Culinary Management Inc., the creek enters into marshlands, crossing beneath Reservoir Road/Yalick Road in a low level wetland. The Luzerne County Fairgrounds are in close proximity to the stream.The Fairground utilizes many of the fields for parking during the annual fair. Another unnamed tributary flows from the northeast of Meadows

Drive in Dallas Township towards E. 42nd Street before going under the Street and flowing along Welsh Lane, under Goodman Road, and then behind the Back Mountain Dance Studio.

From this area, the unnamed tributary flows under State Route 415, in a southwestern direction behind the Village at Greenbriar and below the residential development along Willow Way. West of this tributary, at the Village at Greenbriar, the headwaters of a major unnamed tributary emerge from springs and flows southeast in Lehman Township, beneath W. 42nd Street along the western end of the looping Willow Way into forested wetland area before joining up with the other unnamed tributary from the northeast of Meadows Drive in Dallas Township. At Huntsville-Idetown Rd, another small unnamed tributary contributes to it that flows under Park Road, Lehman Township, east of the Lehman Nursery, before reaching the mainstem confluence of Huntsville Creek that is the current Huntsville Reservoir. Another unnamed tributary flows from the northeast of Peaceful Valley Road beneath State Route 118 before crossing Huntsville-Idetown Road and joining with the unnamed tributary from Lehman Nursery.

Figure 4. Newly installed bridge culvert near Yalick Farms where the headwaters of Huntsville Creek flows beneath Reservoir Road before heading towards the Luzerne County Fairgrounds

Originating from two springs within the Huntsville Golf Club, two significant unnamed tributaries encircle the golf course north of Old State Route 115. These two streams meet at Huntsville-Idetown Road and flow into the west side of the Huntsville Reservoir. The northernmost tributary borders the Dallas Area Municipal Authority (DAMA) Compost facility. The unnamed tributary flows in an easterly direction towards Walnutwood Drive before flowing into a heavily forested wetland area until it crosses Huntsville/Idetown Road about 2000' north of the North Branch Land Trust Office. The second unnamed tributary that has its source in the Huntsville Golf Club through a series of ponds flows in a northeasterly direction for just under a mile until it reaches the confluence with the northern unnamed tributary just before Huntsville/Idetown Road. A pond is located along Market Street and to the northwest of Deer Meadow Lane. There are two small unnamed tributaries crossing Reservoir Road, as well. One is at the bottom of the hill to the south of Machell Avenue that flows through a wetlands area behind the Dallas Veterinary Clinic, in Dallas Borough that enters on the east bank of the reservoir. The other unnamed tributary flows south to the east of Huntsville Road through a spring and thick wetlands and west of Hickory Hill Road in the depression until it crosses Reservoir Road and enters the Huntsville Reservoir.

Water exiting the reservoir cascades over the Huntsville Dam and forms the downstream portion of Huntsville Creek. Leaving the reservoir, the creek passes under a large stone culvert at the five way intersection of Old State Route 115, Sutton Road, Huntsville Road, and Hillside Road. Huntsville Creek continues along Hillside Rd for the next 3 miles.

Figure 5. Present view of Huntsville Dam; Photo credit: Levi Sunday-Lefkowitz - EPCAMR

Another unnamed tributary connects with Huntsville Creek at the intersection of Hillside and Gross Road. This tributary originates along Overbrook Road at a headwater elevation of around 1180', about 0.5 mile from the reservoir between Sutton Farms Road. It flows beneath Charlies Drive into a private pond in Dallas Township, above Bulford Road, then beneath Bulford, Beaverbrook, and Blueberry Hill Road. It crosses several private driveways, and passes through two private ponds that were inaccessible. Posten Pond, just north of Cross Creek Road, in Jackson Township, lies within Blueberry Hill Estates and has a man-made dam which the stream must overcome before crossing Cross Creek Road and Sutton Road before coming to the confluence with Huntsville Creek.

The main stem of Huntsville Creek continues flowing southeast along Hillside Road, and takes a meander north of American Asphalt Paving. Here Huntsville Creek is met by another tributary originating from wetlands in Jackson Township, north of Pinecone Lane, east of Millington Road, and northeast of Hampton Road. This unnamed tributary originates from a forested wetland area northeast of Sutton Farms Road, alongside the housing development on Pinecone Lane and flows to the confluence with Huntsville Creek just a few hundred feet below Cobblestone Lane.

Figure 6. Posten Pond Dam on unnamed tributary to Huntsville Creek

The confluence of Huntsville Creek and Browns Creek is at the intersection of Hillside Road and Chase Road (State Route 1012). Browns Creek originates from an elevation average of 1120'-1200' wetland west of the Huntsville Reservoir, in between Jackson Road and Sara Drive, in Lehman Township before crossing Karl Drive and Follies Road. One of the major unnamed tributaries begins around the northeast area of the St. Stephens Cemetery, in Shavertown. The creek flows southeast for over a mile through primarily forested wetlands, with some residential development between Sara Drive and Jackson Road under Yolanda Road. The unnamed tributary flows through wetlands on the Harabin Taxidermy property, then beneath Follies Road. Half a mile north of the intersection of Gates Road (Township Road 712) and Hardisky Road in Shavertown, Browns Creek turns due east and soon after crosses Hardisky Road, where it continues to flow through wetlands behind the Farmer's Inn, off Huntsville Road. Browns Creek then continues to flow southeast along the American Asphalt Company quarry, in Jackson Township and crosses Huntsville Road. The quarry is an operation with **292** acres of active mining grounds. Browns Creek crosses under Newhart Road behind Zimmerman Collision Services in an easterly direction and then under a driveway before continuing east along Chase Road before entering the Huntsville Creek along Hillside Road on The Lands at Hillside Farms property.

In the wetlands alongside Huntsville Road, behind the Huntsville United Methodist Church in Jackson Township, an unnamed tributary coming from the north, also enters Browns Creek that is approximately **0.8** miles long, originating behind the Jackson Township Municipal Offices and Park. It flows through a ponded wetland area north of Hardisky Road before flowing under it and continuing on through a forested wetland area before coming to the confluence with Browns Creek behind the Farmer's Inn.

A small unnamed tributary on the Lands at Hillside Farms property runs from wetlands and headwaters above the Environmental Center Building off Church Road from an elevation at around 1160' towards their dairy cow pastures and drainage area that leads to Hillside Road. The stream then flows between Church Road and Hillside Road, in a man-made channel with small bridges over the tributary to access the animal enclosures

alongside the shops, before entering Huntsville Creek just below the greenhouses.

A quarter mile downstream of The Lands at Hillside Farms is a water collection and treatment plant owned by the Pennsylvania American Water Company. The plant sits on the northwestern side of Hillside Road, just before the road meets the Dallas Memorial Highway (State Route 309). The treatment plant was built in 1895 by the former Wilkes-Barre Water Company. It was used as the treatment system for the water flowing out of the newly finished reservoir. It is just downstream of the treatment plant that the Huntsville Creek flows into Toby Creek and under the Hillside Road bridge next to Konopinksi Brian Inc., at an elevation of around 820', before flowing down towards the Toby Creek Gorge until it flows under a very large double culvert structure beneath the Dallas Memorial Highway in the center of the rock cut, where Toby Creek then crosses under the highway and flows along the Dallas Area Municipal Authority (DAMA) headquarters in Kingston Township.

Upper Toby Creek flows alongside the Memorial Highway for nearly four and a half miles through Kingston Township and Dallas Borough. After the confluence of Upper Toby Creek and Huntsville Creek, the stream becomes Lower Toby Creek. Behind the DAMA headquarters, an unnamed tributary flows from Bunker Hill feeding into Toby Creek in a steep ravine. There are several small ponds on Bunker Hill, along Bunker Hill Road. These natural springs gave way to the unnamed tributary flowing down the mountain into Toby Creek right next to the DAMA headquarters. This stream has been nicknamed "Wildcat Falls," and flows beneath a wooden trail bridge along the Back Mountain Trail before it cascades into Toby Creek.

Figure 7. Looking upstream at the unnamed tributary from Bunker Hill, known as Wildcat Falls, just above the bridge over the Back Mountain Trail that flows into the Lower Toby Creek

Another unnamed headwater tributary that flows across Larksville Mountain in Plymouth behind the High Point Church in a northeast direction meanders along Steele Road where it becomes ponded at the bend in the road heading back down the mountain towards Courtdale Borough. The tributary locally known as Buttermilk Falls, because it eventually follows the utility right-of way along the mountain, that parallels an unimproved road

north of Hill Lane, until it reaches Corby Street, and continues to flow through a forested wetland area for **1.88** miles before cascading over the sheer rock face just above the Toby Creek Gorge directly into the Lower Toby Creek.

Figure 8. Stream Corridor flow path of an unnamed Tributary known as Buttermilk Falls, that flows across the top of Larksville Mountain down towards Courtdale Borough before cascading down to Toby Creek.

Figure 9. Shots of Buttermilk Falls that flow down over the steep series of step pools in the unnamed tributary to Toby Creek Gap that enters Toby Creek from its headwaters in Courtdale Borough along the right streambank just south of 430 S. Dallas Memorial Highway heading from the Back Mountain towards Luzerne Borough. DAMA Sewer line is exposed just before the confluence of the unnamed tributary with Toby Creek. Photo on the right taken by Paul Shaver.

As Toby Creek flows around the former Wasserot's Building along a large meander, it then crosses back under the Dallas Memorial Highway before flowing along a natural bedrock outcropping just above Luzerne Lumber, Luzerne Borough, finally running south between the business district where the Luzerne Shopping Plaza is located along Main Street. Entering Luzerne, on the opposite side of the Toby Creek to the north is the one of the trailheads to the Back Mountain Trail. The trail was constructed on the former Lehigh Valley Railroad embankment. Toby Creek flows under the bridges along Main Street, Buckingham Street, and Union Street before entering the impounding basin. It is just south of the Buckingham Street Bridge along Toby Creek, we discovered a concrete dam with a very large scour pool where several brown trout were noticed during our macroinvertebrate, habitat, and culvert assessments.

On the other side of the highway, the stream enters the Toby Creek Impounding Basin. This basin can be seen from the highway and occupies about 10.7 acres in Pringle Borough. On the south end of the basin, Toby Creek enters a flood protection culvert and travels underground for approximately 1.5 miles before resurfacing at the Woodward pump station in Edwardsville Borough that is owned, operated, and maintained as a part of the Luzerne County Flood Protection Authority. Once it outlets in Edwardsville Borough, it flows behind the former K-Mart Shopping Plaza and former Redner's Supermarket before flowing under an overpass on State Route 11. On the other side State Route 11, Toby Creek then flows through the Wyoming Valley's floodplain in a southeasterly direction, along Valenti's Scrapyard until it reaches its confluence with the Susquehanna River.

HUNTSVILLE CREEK WATERSHED DESCRIPTION AND BACKGROUND INFORMATION

Huntsville Creek is a tributary to the Toby Creek, which is a tributary to the Susquehanna River that ultimately is a part of the larger Chesapeake Bay watershed. The watershed within Northcentral Luzerne County is **25.954** square miles and an estimated **8.4** miles long at its furthest points; it comprises both the Huntsville Creek and Browns Creek watersheds. The estimated total stream length is **26.064** miles[29] (including the main stem and tributaries). The Huntsville Creek subwatershed lies within the southwestern portion of the USGS Topographic Pittston Quadrangle (1893) [30], extending slightly into the southeastern Harvey's Lake Quadrangle.[31]

[29] ArcGIS Pro

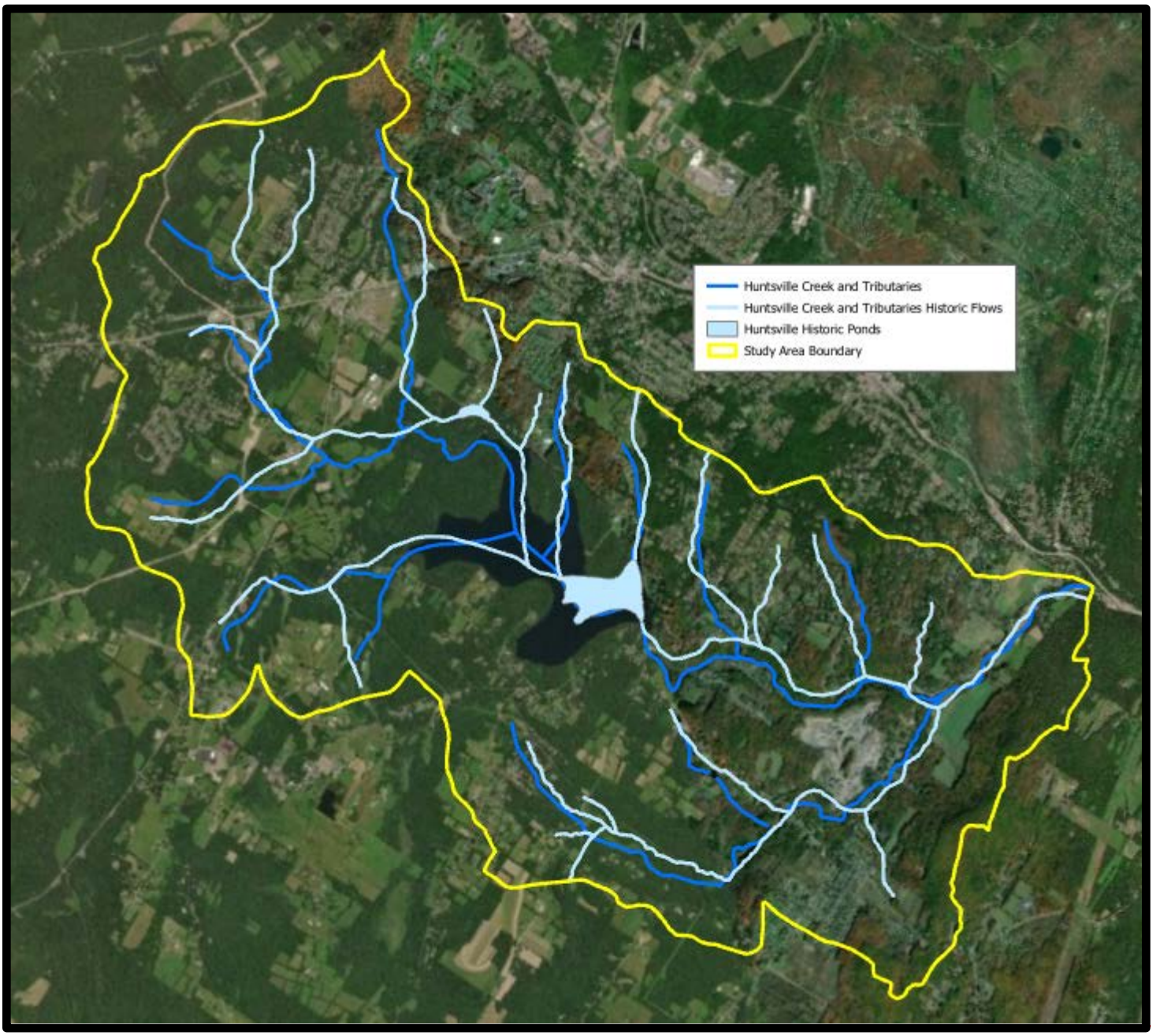
[30] USGS TopoView: Pittston

[31] Pennsylvania Spatial Data Access - The Pennsylvania Geospatial Data Clearinghouse

Map 3: USGS Historical File Topographic Division of the Pittston Quadrangle

The watershed's center is within the Huntsville Reservoir containing **2 billion** gallons of water[32] , owned by Pennsylvania American Water. Surrounding this reservoir and encapsulating the watershed are **6** municipalities. **4** of these municipalities are townships: Dallas, Kingston, Jackson, and Lehman; while 2 are boroughs: Dallas and Harvey's Lake. [31]

Map 4: Huntsville Creek Modern day (Darker Blue) and historic flows (Lighter Blue)



[32] Wilkes-Barre Sunday Independent, 1950, Page 22 - Huntsville Dam usage for the Back Mountain and aerial photo of the Huntsville Reservoir

WATERSHED LANDMARKS AND HISTORY

The Lands at Hillside Farms:

The Lands at Hillside Farms is a nonprofit dairy farm and educational center, a beloved local landmark. The farm was founded in the 19th century by the wealthy coal broker William L. Conyngham. In 1881, Conyngham purchased **100** acres of farmland from one Joseph Harper, laying the groundwork for what would become Hillside Farms. Over the next 100 years, the Conyngham family acquired more surrounding farmland, building their **412-acre** estate, including their family cottage which is still standing and can be rented out for special events. The Estate became renowned for its excellent quality of livestock, particularly their dairy cows, which is why in 1977, they opened the Dairy Store on the property, selling milk and ice cream products to the general public. Hillside has been a cultural icon, allowing patrons to walk around the grounds, peruse their dairy and mercantile shops as well as the greenhouse, and recline along the bank of the Huntsville Creek. The greenhouse is one of only a few rare Lord & Burnham still standing and was built prior to Conyngham purchasing the property, additionally being restored in 2011.[33]

In 2005, the Conyngham family elected to leave the dairy farm business and converted their over 400-acre estate into a nonprofit under a lease-to-purchase agreement. In 2009, Dr. Douglas Ayers, cofounder of the North Branch Land Trust, was able to raise $4.2 million and purchase the estate, founding it as The Lands at Hillside Farm. The estate is currently publicly owned and is still paying off a monthly mortgage.[34] Dr. Ayers had a passion for ensuring the wellbeing of the flora, fauna, and families of the area, striving for sustainability in a sense of both environmental and social consciousness.[35] Dr. Ayers was a very close colleague and dear friend and supporter of EPCAMR for nearly 20 years. His passion for conservation and the protection of the environment was second to none. He will always be remembered as one of the leading environmental conservation leaders in the Back Mountain and around Northeastern PA.

The Lands at Hillside Farms continue to expand the farm's productivity and accessibility. The nearly 200-year-old greenhouse, which had fallen into disrepair, was restored in 2011 thanks in part to volunteer work from passionate locals. In the Summer 2019, an expansive new dairy cow barn was built on the north side of Hillside Road to allow the cows easier access to their pastures. This barn was funded publicly and dedicated to the late Dr. Ayers. At the beginning of Spring 2020, they completed expanding their dairy store building on top of the former parking lot.[34] There are also examples of green infrastructure projects in the parking lot area that showcase stormwater management practices to reduce runoff from the property from reaching Huntsville Creek.

The Lands at Hillside Farms is located right along Huntsville Creek and has been very supportive of EPCAMR's efforts through our colleague and friend, Mr. Chet Mozloom, Executive Director. He wants to see the fishery improved and they are in the process of working on a solution to a small dam that was once used for a

[33] Lewith and Freeman: The Lands at Hillside Farms

[34] About: The Lands at Hillside Farms

[35] Remembering Dr. Doug Ayers

watering hole for cattle. Thousands of visitors come to the farm each year and there are many areas that could serve as educational focal points for possible future fishing for families and interpretation of any stream channel restoration or riparian restoration and invasive species removal work completed along the Huntsville Creek. Signage may be constructed, much like their improved green infrastructure best management practice forebay and rain garden contained within one of their parking lots.

Huntsville Reservoir:

The Huntsville Reservoir provides clean water for several towns in and around the Back Mountain including Dallas Borough, Kingston Township, Swoyersville Borough and Wyoming Borough. The reservoir currently spans **402** acres. Prior to the dam's construction, the acreage was made up of farmland, forests, and swamps. This area was formerly a hunting and trapping hotspot for various small game, according to an article in the *Wilkes-Barre Sunday Independent*[36] and *Citizens Voice*[37]. The Fuller family were one of the early settler estates, farming in the Huntsville area. In 1890, the farm owner, Chester Fuller sold a portion of his land, between Jackson and Lehman Township to what was then the Wilkes-Barre Water Company. The dam was completed in 1892, and within 3 months, the reservoir was filled to capacity. The reservoir has changed hands over the years. It was constructed and owned by the Wilkes-Barre Water Company, then owned by the Spring Brook Water Service Company. In the late 1970s, it was owned by the PA Gas and Water Company. In 1978, an inspection judged the dam to be in good condition. It is now owned by PA American Water. It contains **2** billion gallons. It supplies water to **30,000** people[38]

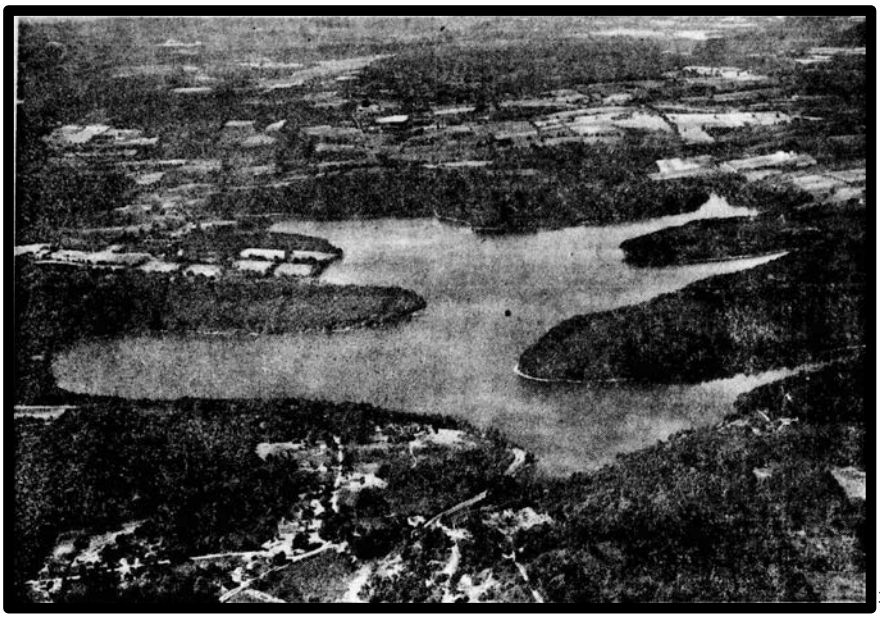
 [39]

Figure 10. Aerial view of the Huntsville Reservoir (c. 1950)

[36] Wilkes-Barre Sunday Independent (pg. 41)

[37] Citizen's Voice: "Huntsville Dam Was a Hunting Paradise"

[38] Documentary History of American Water-works: Wilkes-Barre, Pennsylvania

[39] Aerial view of the Huntsville Reservoir, Wilkes-Barre Sunday Independent (1950), pp.22

The reservoir and surrounding area is owned by the Pennsylvania American Water Company and land use surrounding the reservoir is highly scrutinized and protected. There are several large, private properties on the western shore of the reservoir. Fishing is highly regulated along the banks of the reservoir. Shoreline fishing is permitted with proper authorization by PA American Water, but only in public areas. The reservoir is known to have populations of bass, pike, carp, crappie, and panfish. According to Terry M. Maenza, Director of Communications for PA American Water, all swimming and boating activity on the reservoir is forbidden and trespassers will be reported to the police. Despite this, there have been reports of illegal fishing and trespassing as far back as the 1910s.[40]

 [41]

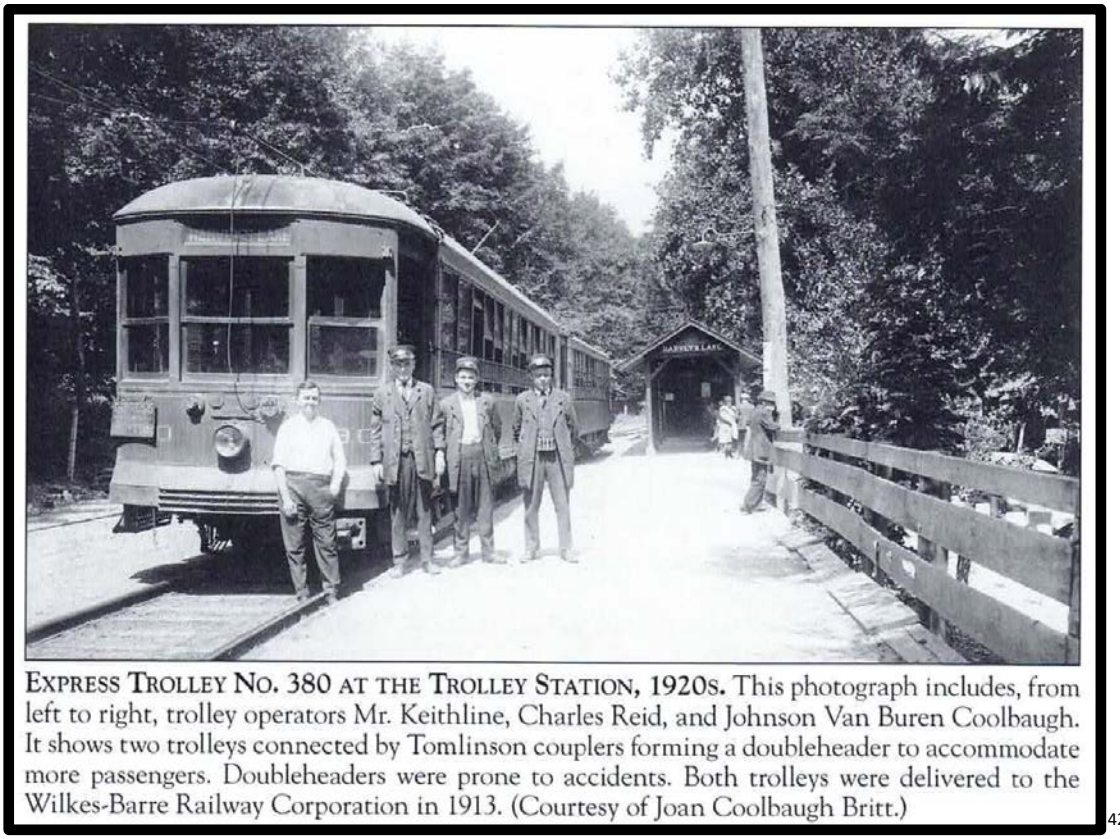
Figure 11. Google Earth image of large properties on the western shore of Huntsville Reservoir

Lehigh Valley Railroad Grade:

Running on the opposite side of Toby Creek from the Lehigh Valley Railroad was the former Back Mountain Trolley Service. The first rail line connecting Luzerne with the Back Mountain towns of Dallas and Alderson, on the north shore of Harvey's Lake, was completed on June 16, 1887. It was organized by Albert Lewis, local lumber and ice entrepreneur, as well as major Back Mountain land owner. Lewis formed the Wilkes-Barre and Harvey's Lake Railroad Co. which he later sold to Lehigh Valley Railroad in August 1887. This line was run by lightweight steam engines and, being intended as a resort line, meant it saw fairly irregular traffic throughout the year. In 1893, John Reynolds wanted to form an electric trolley service to the Back Mountain and Harvey's Lake. For three years, Reynolds struggled to lay the official groundwork, constantly being met with opposition. In 1895, Lewis, who owned a majority of the land in Dallas forbade the construction of the trolley line through the Toby Creek gorge and with no other easy way into the Back Mountain, construction was halted again.

[40] Citizens Voice: Stay out of reservoirs

[41] Google Earth



EXPRESS TROLLEY NO. 380 AT THE TROLLEY STATION, 1920S. This photograph includes, from left to right, trolley operators Mr. Keithline, Charles Reid, and Johnson Van Buren Coolbaugh. It shows two trolleys connected by Tomlinson couplers forming a doubleheader to accommodate more passengers. Doubleheaders were prone to accidents. Both trolleys were delivered to the Wilkes-Barre Railway Corporation in 1913. (Courtesy of Joan Coolbaugh Britt.)[42]

Figure 12. Express Trolley No. 380 at the Trolley Station. (1920s)

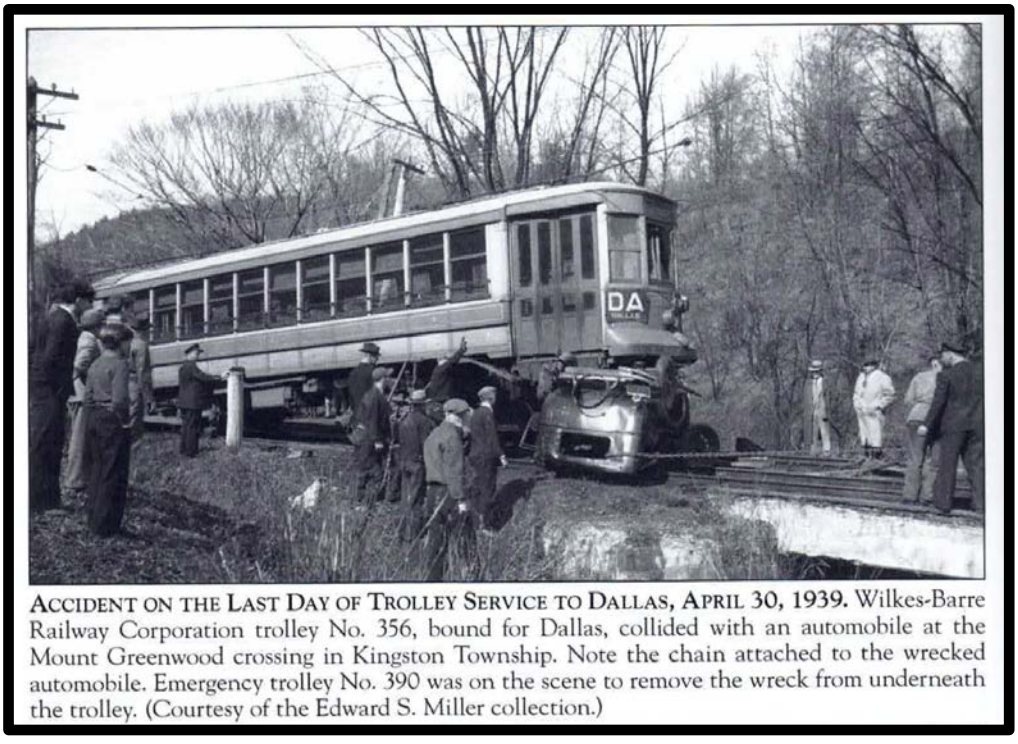
In order to lay the groundwork for his electric trolley project, Reynolds chartered the Wilkes-Barre and Northern (WB & N) Railroad in January 1896. Although he was permitted to build on Lewis' land without crossing over the Lehigh Valley RailRoad property, Lewis was displeased with another company building on his land. One night after construction of the new track, the Lehigh Valley rail gang ripped up the new rails and blocked the path by dumping two gondolas on the railbed. Reynolds immediately took them to court and that summer the WB & N purchased the property and rights of the Wilkes-Barre and Harvey's Lake RailRoad, allowing them full access to build and operate into the Back Mountain, through the Toby Creek gorge and on toward the Lake. The WB & N purchased three steam locomotives, with Reynolds vision being that they would open the line and they would transition to electric trolleys as they became more financially feasible. With the line from Luzerne to Harvey's Lake completed in 1896, there were plans to build branch lines along Harvey's Creek and from Luzerne to Plymouth. These plans would not come to fruition due to the company's constant state for financial instability.

The Luzerne-Harvey's Lake line began regular service on January 3, 1897. It ran through the Toby Creek gorge and followed Toby Creek through Dallas and then curved west toward Harvey's Lake. The WB & N did not begin service in a flattering light, with a runaway coach and subsequent collision during its opening week. The Lake Line was later extended to curve around the east bank to Idetown. There was a desire to bring another attraction to the Back Mountain to boost passengers, so the Fernbrook Amusement Park was constructed

[42] (Express Trolley No. 380 at the Trolley Station. (1920s) Images of America: Pennsylvania's Back Mountain (2009))

between Shavertown and Dallas in the summer of 1897. Financial constraints continued to slow Reynold's plan for an electrified trolley service on his line. After multiple bad dealings, Reynolds resigned as WB & N's President and was replaced by John Graham, businessman, and major shareholder for WB & N. Graham, amidst several delays reorganized the WB & N as the Wilkes-Barre, Dallas, and Harvey's Lake (WB D & HL) Railway and got the electric trolleys running regularly on December 22, 1898. The line serviced Harvey's Lake, Fernbrook Park, Hillside and extended to several local cemeteries including Mt. Greenwood in 1910 and St. Nicholas in 1914. Additionally, the Wilkes-Barre Delaware & Harvey's Lake (WB Del & HL) Line constructed a direct line from Division Street in Kingston to the terminal in Luzerne, dubbed the Short Line, beginning operation in 1912.

The WB D & HL did not seem to have better financial luck than its predecessor railway during the 1910s and 1920s. The Harvey's Lake Line continued to experience uneven passenger counts throughout the year. Accidents continued throughout its operation in the 1920s with a head on collision between two trolleys in 1921. The 1930s saw a number of closures and financial drawbacks, with the line above Idetown closing in 1931, and the Lake Line being split into two trolley services. The regular trolley to Dallas from the valley operated all year and the Dallas to Harvey's Lake line operated only in the summer that same year. Additionally, the Short Line from Kingston to Luzerne was closed on September 25, 1938. The last train from the Wyoming Valley to Dallas ran on April 30, 1939. It closed very much like the way it began, with the last trolley ride being cut short when the carriage ran over an automobile on a level crossing. Very little of the trolley line still remains along Toby Creek, but there are pieces of the concrete embankment that have fallen into the stream.



ACCIDENT ON THE LAST DAY OF TROLLEY SERVICE TO DALLAS, APRIL 30, 1939. Wilkes-Barre Railway Corporation trolley No. 356, bound for Dallas, collided with an automobile at the Mount Greenwood crossing in Kingston Township. Note the chain attached to the wrecked automobile. Emergency trolley No. 390 was on the scene to remove the wreck from underneath the trolley. (Courtesy of the Edward S. Miller collection.) [43]

Figure 13. Wilkes-Barre Railway Corporation Trolley No. 356. (1939)

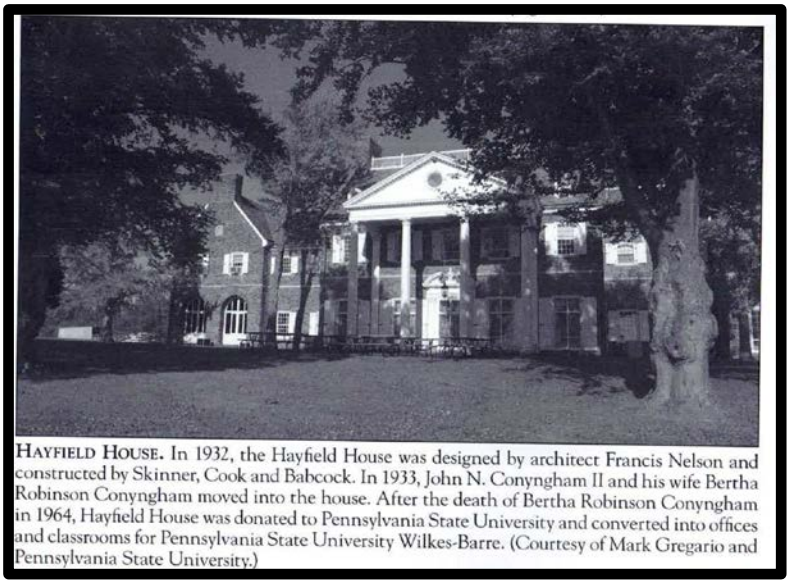
[43] (Wilkes-Barre Railway Corporation Trolley No. 356. (1939) Images of America: Pennsylvania's Back Mountain (2009))

Toby Creek continues through Luzerne following Main Street and then Union Street. Just below the crossing of Union Street and Buckingham Street there is a concrete dam spanning the stream channel. In Luzerne, Toby Creek passes under four bridges before flowing through the large culvert beneath the Memorial Highway 309.[44]

Penn State Wilkes-Barre Campus:

Another major landmark in the watershed is the Penn State Wilkes-Barre campus. The campus currently sits on the edge of two watersheds, situated between a western tributary of the Huntsville Reservoir and the majority of the property drains towards the East Fork of Harvey's Creek. It's located alongside the Huntsville Golf Course on Old State Route 115. Penn State Wilkes-Barre was founded in 1916 by former Penn State graduates, recognizing the need for more highly educated engineers and mining experts to improve the booming coal industry. For the next 50 years Penn State Wilkes-Barre didn't have a consistent home, moving between school buildings in the Wilkes-Barre area. It wasn't until the mid 1960s that Penn State Wilkes-Barre found a permanent home in the Back Mountain.[45] The wealthy Conyngham family owned a large amount of property in Lehman known as the Hayfield Farms, the centerpiece of the estate being the massive Jeffersonian Hayfield House. After the death of Mrs. Bertha Conyngham in 1964, she left the estate to her nephew Richard Robinson. Soon after, Richard gifted Hayfield House and **50** acres of surrounding farmland to Penn State Wilkes-Barre.[46] In the past 50 years, the campus has since expanded and to include 9 new academic builds, with the Hayfield House being converted into administration offices and classrooms.

In conversation with Dr. Dale Jones, Chancellor of the Campus, indicated that he was very supportive and open to allowing EPCAMR's Staff to walk around the Campus grounds to take a look at any water bodies and stream connections that could be made to the Huntsville Creek drainage.



HAYFIELD HOUSE. In 1932, the Hayfield House was designed by architect Francis Nelson and constructed by Skinner, Cook and Babcock. In 1933, John N. Conyngham II and his wife Bertha Robinson Conyngham moved into the house. After the death of Bertha Robinson Conyngham in 1964, Hayfield House was donated to Pennsylvania State University and converted into offices and classrooms for Pennsylvania State University Wilkes-Barre. (Courtesy of Mark Gregario and Pennsylvania State University.)[47]

Figure 14. Hayfield House Circa (1960)

[44] Harold E. Cox, "Harvey's Lake Trolley Line"

[45] Penn State Wilkes-Barre: Campus History

[46] History of Penn State Wilkes-Barre: Hayfield House

[47] (Hayfield House Circa 1960, Images of America: Pennsylvania's Back Mountain (2009))

Toby Creek Impounding Basin:

The decision to build the impounding basin and put a section of Toby Creek underground was a part of several flood prevention measures taken in the 1930s and 1940s. In 1935, President Franklin Delano Roosevelt and Congress developed several emergency assessment and flood prevention plans to provide local jobs and strengthen flood infrastructure. One such plan was the construction of the levees along the Susquehanna River, running through Luzerne County due to the flood prone nature of the Susquehanna River. This project was overseen by the United States Army Corps of Engineers, and allotted $3.65 million for the construction. They had been tasked with flood prevention measures in the past, mostly under the justification of improving navigation. The levee was designed to protect from a river level increase of 33 feet. Ground was broken in December of 1935 with the prospect of completing the project in November, 1936. The flood prevention levees were only two months into construction when the waters of the Susquehanna began to rise. With a large thaw occurring in Upstate New York and PA, melted snow was pouring into the river, raising water levels 2 feet and causing mild concern for what was to come. In the second week of March, a two weeklong storm surge swept across the northeast.[48]

Pennsylvania was hit particularly hard out of the surrounding states. The river was recorded at a record high crest of 33 feet. Out of the total 107 people killed in the 1936 flood, 84 died in PA. Nearly 82,000 buildings were damaged or destroyed and the major mining facilities in the area had to be shut down due to flooded mine shafts and immense water damage. The 1936 flood cost PA approximately $212 million in damages. After this year's disastrous flood, the Flood Control Act of 1936 was passed, motivating several projects other than the levees to help reduce flood damage.[49] The creek is piped by gravity into a "massive" underground culvert[50] for some distance. It resurfaces in Edwardsville Borough. There is also a pressure conduit on the creek[51]. A levee is situated on the creek in Edwardsville Borough, as are flumes and conduits.

North Branch Land Trust's Forest Echo Bird Sanctuary:

There is a **17-acre** bird sanctuary and trailhead that can be visited along W. Center Hill Road maintained by the North Branch Land Trust. The wildlife bird sanctuary encompasses a portion of a headwater tributary to the Huntsville Creek in Dallas near the Back Mountain Recreation Area. In 1907, Rachel and Dr. Sarah Wyckoff of Kingston purchased 177 acres and 48 perches of land from Johnson and Almira Reed of Dallas Borough to have a bird sanctuary and summer retreat. The Wyckoff's enjoyed and stewarded this idyllic piece of the Back Mountain up until Rachel's death in 1946. Having a long-standing relationship with Wyoming Seminary Preparatory School Rachel bequeathed her family property to the school with instructions to "*Maintain the 17 acres of wooded lands around her cottage known as Forest Echo as a sanctuary for birds and to that end to preserve and maintain the said lands*."

[48] Citizens Voice: "Memorable 1936 flood showed need for levee system along the Susquehanna"

[49] The Evolution of the 1963 Flood Control Act

[50] New flood maps mean big savings to Kingston, The Times-Leader, August 17, 2012

[51] Federal Emergency Management Agency (FEMA) Flood Insurance Study VOLUME 1 of 6, Luzerne County, Pennsylvania (All Jurisdictions), pp.32, 34.

From the date of acquisition of the property in 1946, Wyoming Seminary upheld the wishes of the Wyckoff family but realized that a greater level of protection was needed if the property was to be maintained as a sanctuary in perpetuity.

Jumping ahead to 1993 and the formation of The Back Mountain Regional Land Trust now known as North Branch Land Trust[52] (NBLT), Land Trust Board members recognized the Wyoming Seminary Forest Echo Bird Sanctuary as a priority property for protection given its proximity to the Huntsville Reservoir and encroaching residential housing developments. The property provides direct watershed protection to the Huntsville Reservoir and buffers runoff from the surrounding developments.

In 2010, the Wyoming Seminary administration and NBLT discussed strategies to permanently protect the Sanctuary. It was agreed that NBLT would purchase the property from Seminary at a fair market value. Starting in the fall of 2012 NBLT reached out to the surrounding community for donations in support of the acquisition of the Sanctuary. Community support for the project was overwhelming and by the summer of 2013, all funds needed had been raised. On August 28, 2013, North Branch Land Trust acquired the Sanctuary from Wyoming Seminary.

The **17-acre** property, located off West Center Hill road in Dallas Borough will forever be a sanctuary for birds as per the wishes of the original donors, Rachel and Dr. Sarah Wyckoff. North Branch Land Trust will maintain the property and establish a land use plan over time that will be sympathetic to the wildlife found there and to the surrounding community. The Trust would like to thank Wyoming Seminary and the Dallas Borough community members for helping to make this conservation project reality. In honor of the original donors, the property will continue to be called the *Forest Echo Bird Sanctuary*[53].

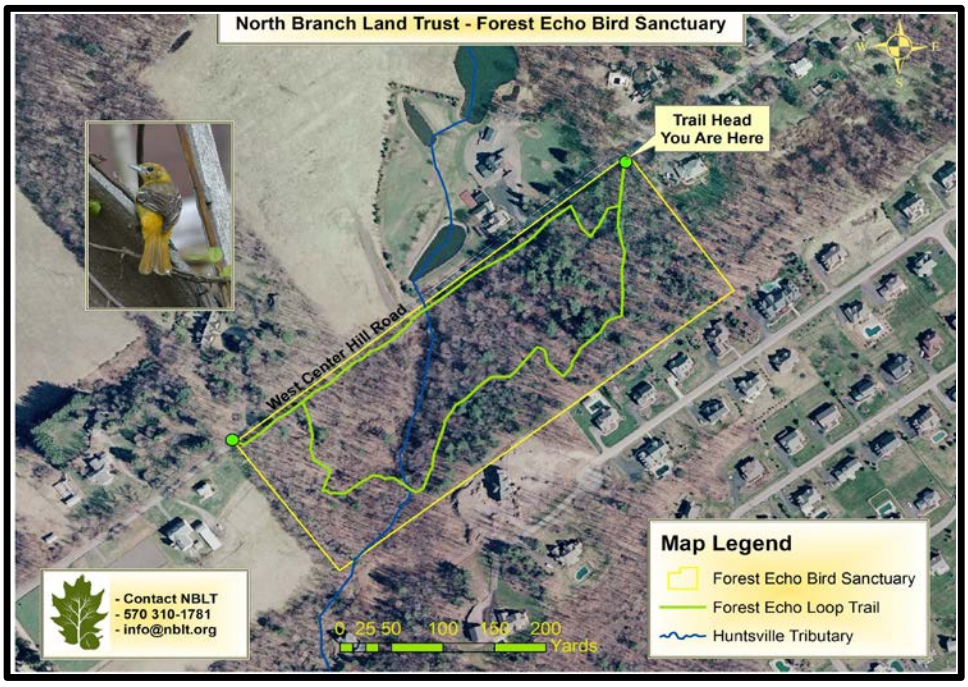


Figure 15. Forest Echo Bird Sanctuary and Loop Trail along a tributary to Huntsville Creek

[52] North Branch Land Trust

[53] North Branch Land Trust's Forest Echo Bird Sanctuary

The Lehman Sanctuary:

Located in Lehman Township, since 2006, the Millers have welcomes the community to a rare, diverse ecosystem for exploration and education. The Lehman Sanctuary[54] is a unique area of old forest, forested wetlands, natural meadow/grazing land and thriving wildlife habitat. Considered an "exceptional value" wetlands, waters flow into the natural trout producing stream of East Fork Harvey's Creek. The property is off Jackson Road and is **17.5** acres. In 2006, the PA Department of Environmental Protection Growing Greener Grant Center awarded a grant to create the foundation for a Montessori environmental education program to operate annually in this Sanctuary.

Since then, scores of schools and community groups, Wyoming Seminary, Keystone College, Wilkes University, visually impaired campers, developmentally challenged adults and many others-have connected to nature. The Lehman Sanctuary was awarded the 2016 Environmental Partnership Award from the Pennsylvania Environmental Council and the Environmental Partnership Award with Misericordia University in 2019. Recent partnerships include Misericordia University, installing custom telemetry technology in the forested wetlands to monitor in real time and stream this living science data into classrooms for S.T.E.M. study. The Sanctuary's mission is to provide immersive environmental education and recreation that engages, educates, and enlightens the community to their natural world, while preserving open space and natural areas.

Chris Miller, property owner of The Lehman Sanctuary, had a great article[55] written in The Times Leader on the 4th of July in 2016 that shared his vision and passion for the property that he and his family have opened up to the surrounding community. The natural area sits near the watershed divide between Huntsville Creek, in close proximity to The Penn-State University Lehman/Wilkes-Barre Commonwealth Campus and the E. Fork of Harvey's Creek. EPCAMR felt it was worth mentioning because of Chris's work in conservation and his support of the Huntsville Creek Coldwater Conservation Plan. He has offered to provide EPCAMR with another contact to a private landowner who owns property along one of the unnamed tributaries to the Huntsville Creek Reservoir. Chris Miller has offered up his property should EPCAMR want to utilize it for any environmental education purposes and to increase awareness of the potential for projects that are mentioned in the Final Plan for Huntsville Creek.

The Back Mountain Trail:

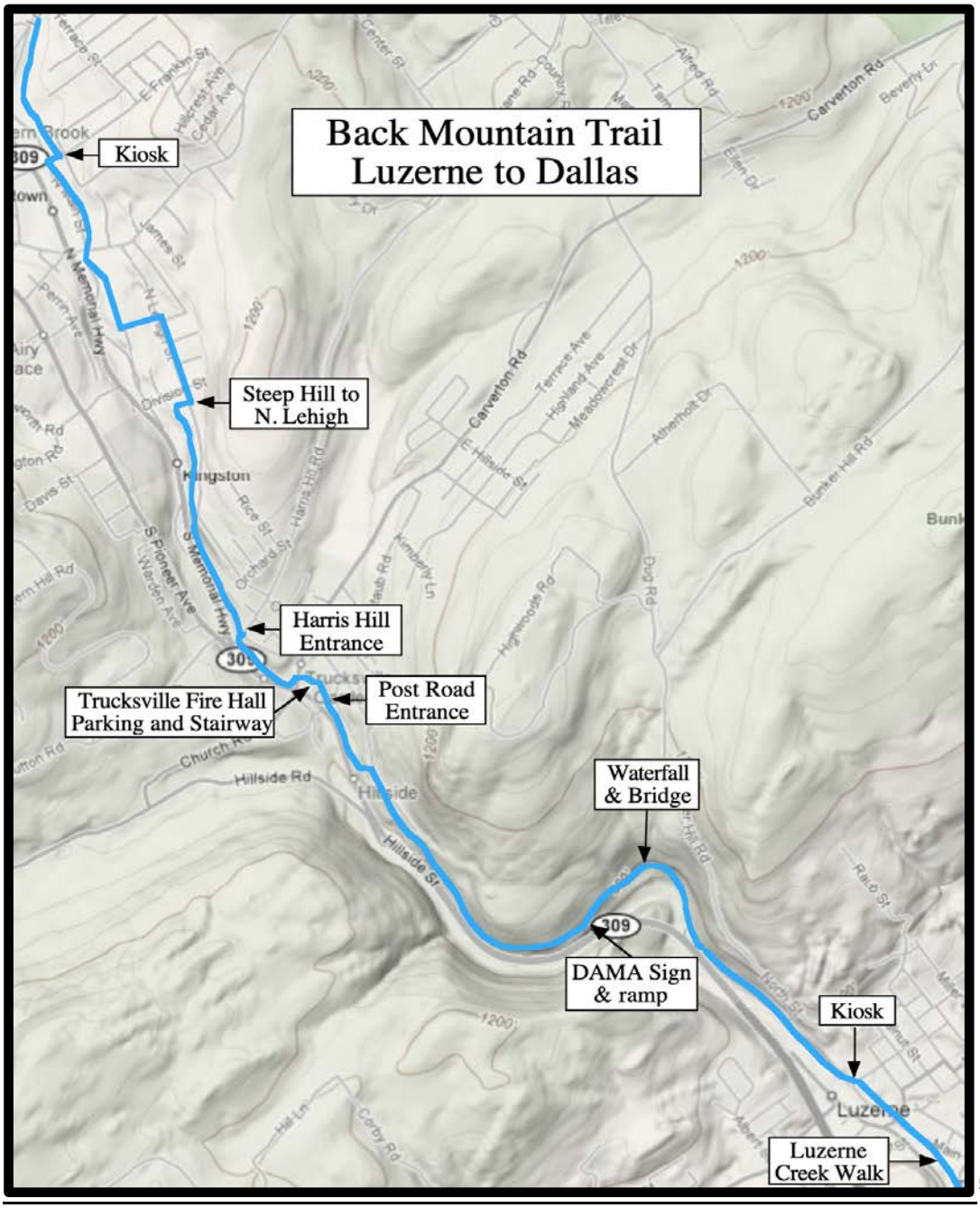
Between the 1940s and 1960s, a majority of the rail lines travelling into the Back Mountain were taken out of service. By 1963, the Wilkes-Barre, Dallas & Harvey's Lake (WB D & HL) branch line running through the Toby Creek gorge had fallen into abandonment. In 1987, the Presidential Commission on American Outdoors recommended the creation of national trails and greenways. The Rails to Trails Conservancy offered the use of former railroad corridors as the foundation for these greenways. In 1996, the Anthracite Scenic Trails Association (ASTA) began construction on the Back Mountain Trail on top of the old track bed of the WB D & HL line. The Back Mountain Trail was the first operational rail/trail in the county. Presently the trail spans **5.6** miles from Luzerne into Kingston Township. The trail begins at Buckingham and Tenet Streets, behind the Luzerne

[54] The Lehman Sanctuary

[55] Nature Unfolds at Backyard Sanctuary in Lehman Township, July 4, 2016-The Times Leader

Fire Department. It terminates on S. Lehigh Street with the remaining **2** miles of trail continuing along develop neighborhood roads. The majority of the trail traverses the former railroad lines, passing through the Toby Creek Gorge and overlooking the Dallas Memorial Highway. The ultimate goal is to complete a **14-mile** walking trail connecting Wilkes-Barre and Harvey's Lake. The trail would begin in Riverfront Park in Wilkes-Barre to the lakefront at Harvey's Lake, following the path of the former Lehigh Valley Railroad.[56]

Map 5: Back Mountain Trail Map



[57]

[56] Back Mountain Trail | Pennsylvania Trails

[57] Wilkes University: Back Mountain Trail (Maps)

American Asphalt Company:

The company was formed in 1951 with two locations, the one in Jackson Township and another in Wilkes-Barre. The Back Mountain location along Chase Road acts as a quarry for several paving and stone related products.[58] It has an active **100+** Acre permit with **246,948** Tons of production.[59]

Dallas Area Municipal Authority:

DAMA, formerly named the Back Mountain Municipal Authority, was founded in 1967 in an effort to bring public sewers to Dallas and Kingston Township. The company was renamed the Dallas Area Municipal Authority in 1969 to "more clearly define the service area." Their current headquarters, in the Toby Creek gorge connecting Luzerne to Trucksville, were constructed in 1972. Over the next 20 years, DAMA expanded their purview including Harvey's Lake in 1976, Lehman Township in 1987, and Jackson Township in 1989. In 1990, DAMA closed their sewage treatment facility in favor of connecting the Back Mountain sewers with the Wyoming Valley Sanitary Authority (WVSA). In 2000, DAMA responded to the public's desire to eliminate yard waste by searching for a secondary headquarters to house a potential composting site. It wasn't until 2014 when DAMA purchased land in Lehman Township along State Route 118 to become their base of operations for composting. This composting site is located next to an unnamed tributary of the Huntsville Reservoir. DAMA additionally does solid waste management, assembling a fleet of garbage trucks in 2012. [60] DAMA has been a vital partner with EPCAMR during our development of the conservation plans for the entire Toby Creek watershed, especially through the support and technical assistance of Tom Mayka, Stormwater Coordinator for DAMA, who has surveyed the watershed with the EPCAMR Staff on numerous occasions and assisted us with macroinvertebrate sampling and obtaining data entry points throughout the watershed.

[61]

Figure 16. DAMA Yard Waste Composting (2019)

[58] American Asphalt - About Us

[59] PA DEP - 2016 Industrial Minerals Surface/Underground Mines Reporting Production

[60] History – Dallas Area Municipal Authority

[61] Dallas Township DAMA Yard Waste Composting

Huntsville Golf Course:

In the 1980s, local businessman Richard Maslow set out to create a high-class golf course in Back Mountain. Maslow worked with several local organizations like the McLoughlin Group, Lewith and Freeman Real Estate Agency, as well as famed golf course designer Rees Jones to complete the project. After 4 years of negotiation they secured **334** acres of land in Lehman Township, adjacent to the Penn State Wilkes-Barre Campus in the headwaters of the Huntsville Creek. This land was purchased from several wealthy Back Mountain families as well and the Pennsylvania Gas and Water Company. Designer Rees Jones required significantly more land to complete the course so an additional **139** acres were purchased from the Conyngham family. The course and golf club opened in 1994 and since then has become a highly popular and respected local landmark.[62] The course houses **35** acres of protected wetlands.[63]

THE WILKES-BARRE SUNDAY INDEPENDENT ARTICLES

An article from the Wilkes-Barre Sunday Independent[64], on November 5th of 1950 stated on page 22 that, "The big need of the so-called "*Back Mountain area*" - meaning more specifically the Dallas Borough, Dallas Township, Shavertown and Trucksville area - is water." The growing population of the area was proving to be too demanding for the wells used to supply water. In fact, too many wells were existing, causing reduced flow and groundwater mining in areas. Further supply was needed, but Harvey's Lake and Bowman's Creek were too distant to effectively serve the community's needs. The already existing Huntsville Reservoir was designated as an emergency supply by its owner, the Scranton Spring Brook Company. They did not serve the Back Mountain area. The explanation was proposed that companies were not wanting to serve the area due to water lines being far too small. If there was a fire, lines would not adequately supply water to put it out. Any company deciding to supply water would have to replace lines at a price estimated over $250,000.

LAND COVER CHARACTERISTICS OF THE HUNTSVILLE CREEK WATERSHED

According to the National Land Cover Database[65], the Huntsville Creek watershed is predominantly deciduous forest *(***30.43%***)* which is scattered evenly across the landscape. It is most dense in the watershed's northern exterior. Mixed forest *(***22.25%***)* is the second most dominant land cover, primarily surrounding the Huntsville Reservoir. Evergreen forest only accounts for (**3.12%**) of land cover, having a clumped distribution, in pockets along the creek sides.

Due to the watershed's noteworthy agricultural presence, the third highest land cover is hay/pasture *(***15.84%***)*, which borders streams in numerous places. Adjacent to the hay/pasture is developed open space, accounting for *(***12.88%***)* of the area's land cover; this percentage is much higher than all other forms of development.

[62] History: Huntsville Golf Club

[63] Links Magazine: Huntsville Golf Club, Pennsylvania

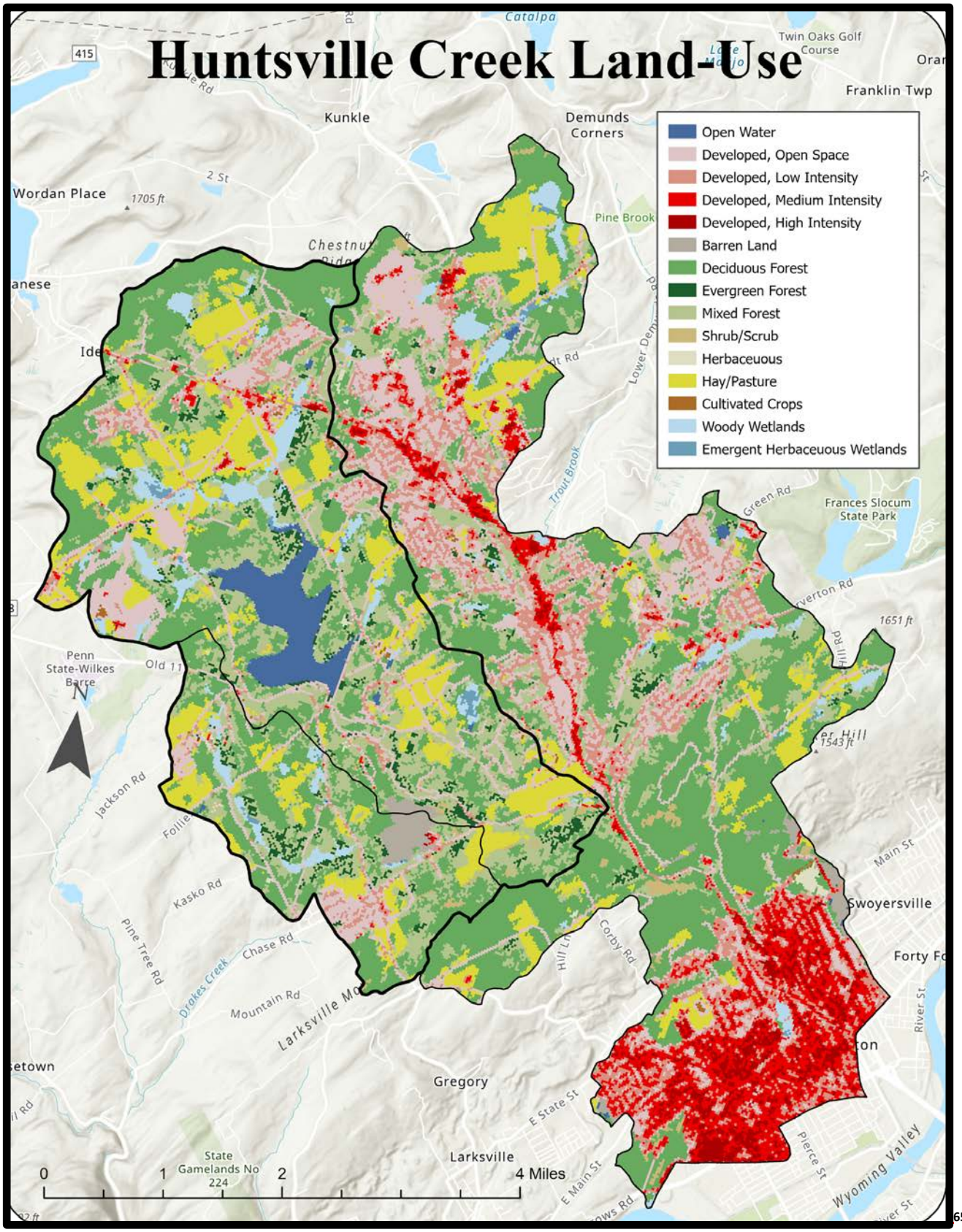
[64] Wilkes-Barre Sunday Independent, 1950, Page 22 - Huntsville Dam usage for the Back Mountain and aerial photo of the Huntsville Reservoir

[65] National Land Cover Database

Table 3. Huntsville Creek Watershed Land Cover Statistics via GIS analysis

Land-Use[65]	Count	Area (Square Meters)	Percentage of Land Cover
Developed, High Intensity	37	33,300	0.09%
Herbaceous	84	75,600	0.20%
Cultivated Crops	86	77,400	0.20%
Developed, Medium Intensity	220	198,000	0.52%
Emergent Herbaceous Wetlands	224	201,600	0.53%
Shrub/Scrub	295	265,500	0.70%
Barren Land	562	505,800	1.33%
Evergreen Forest	1,320	1,188,000	3.12%
Developed, Low Intensity	1,466	1,319,400	3.47%
Open Water	1,774	1,596,600	4.20%
Woody Wetlands	1,788	1,609,200	4.23%
Developed, Open Space	5,444	4,899,600	12.88%
Hay/Pasture	6,694	6,024,600	15.84%
Mixed Forest	9,403	8,462,700	22.25%
Deciduous Forest	12,856	11,570,400	30.43%

Map 6: Huntsville Creek Watershed Land Use



65

MAJOR NAMED TRIBUTARIES OF THE HUNTSVILLE CREEK

Huntsville Creek has one named tributary, Browns Creek. According to GIS Analysis, it is **5.6** miles long, including its unnamed tributaries. The headwater elevations of its two tributaries are **1,112.2** ft. and **1133.7** ft. [66] Browns Creek' eastern most tributary originates from woody wetlands which flow through deciduous forests before reaching the creek's mainstem. **[63]**

GENERAL IMPAIRMENTS OF HUNTSVILLE CREEK

There are *no* sections of Huntsville Creek or its tributaries that are considered non-attaining by the Department of Environmental Protection's standards. However, there are causes for concern such as stream discharge points from water pollution control facilities discharging pesticides, industrial waste, and municipal stormwater. [31] In addition to discharge points, roadways intersect or border the creek in numerous locations, some posing threats of sedimentation and nutrient pollution from surface runoff. PA American Water completed a *2019 Water Quality Report*[67] that was obtained for the Huntsville Creek Reservoir that indicated its relative health in terms of water pollution controls and monitoring that is continuous at the Reservoir.

According to Pennsylvania Department of Environmental Protection (DEP) Source Water Assessment Public Summary (2002)[68], nonpoint pollution sources such as golf courses, farms and residential areas could pose a significant risk of contamination. Stormwater runoff from these above sources was given an "A = High Priority" rating by the Pennsylvania DEP.

Although EPCAMR was not able to retrieve this particular journal article referenced, there has been some historic research in the watershed by students from Wilkes and Gannon University, entitled "*Quantifying the Source and Amount of Suspended Sediment Transported during Storm Events in Huntsville Creek, Luzerne County, Pennsylvania*". The amount of suspended sediment transported in the Susquehanna River has been well documented in recent years due to its impact on the Chesapeake Bay. Suspended sediment can be transported from headwater streams during storm events, but little is known about the quantity and source of sediment entering the larger river. They instrumented a section of Huntsville Creek to assess the amount of suspended sediment transported to the Susquehanna River during 4 storm events from June 2014 till March 2015. In addition, they utilized ortho-photographs to assess historical fluxes of sediment within their study area. They found that the sediment flux in Huntsville Creek decreased by 50% as the stream passed through their study site. The source of the sediment transported during storm events indicated remobilization of the streambed sediment. Historical analyses of the watershed showed greater amounts of stream bank erosion between 1959 and 1979.[69]

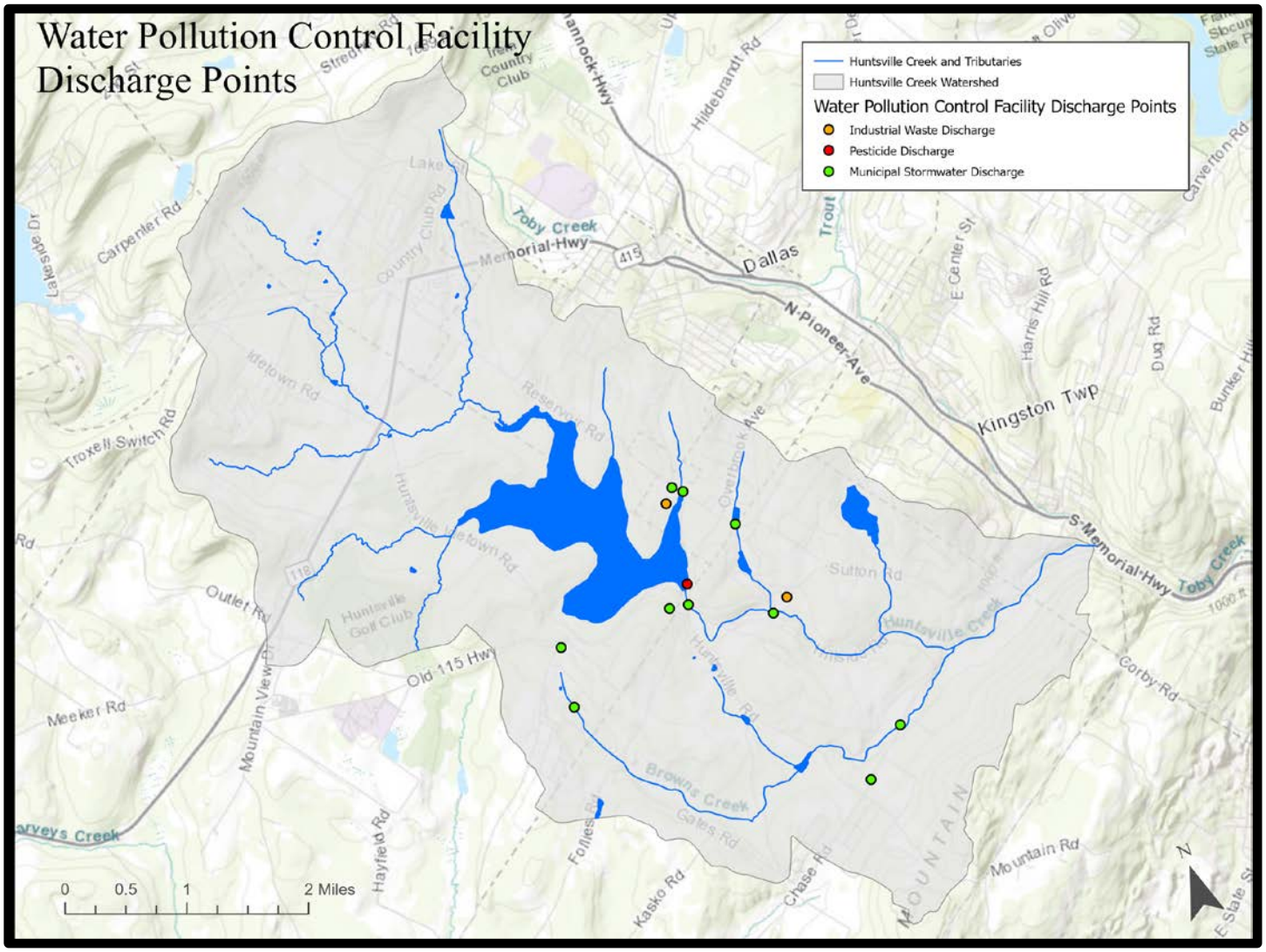
[66] USGS, The National Map - Viewer

[67] PA American Water 2019 Water Quality Report

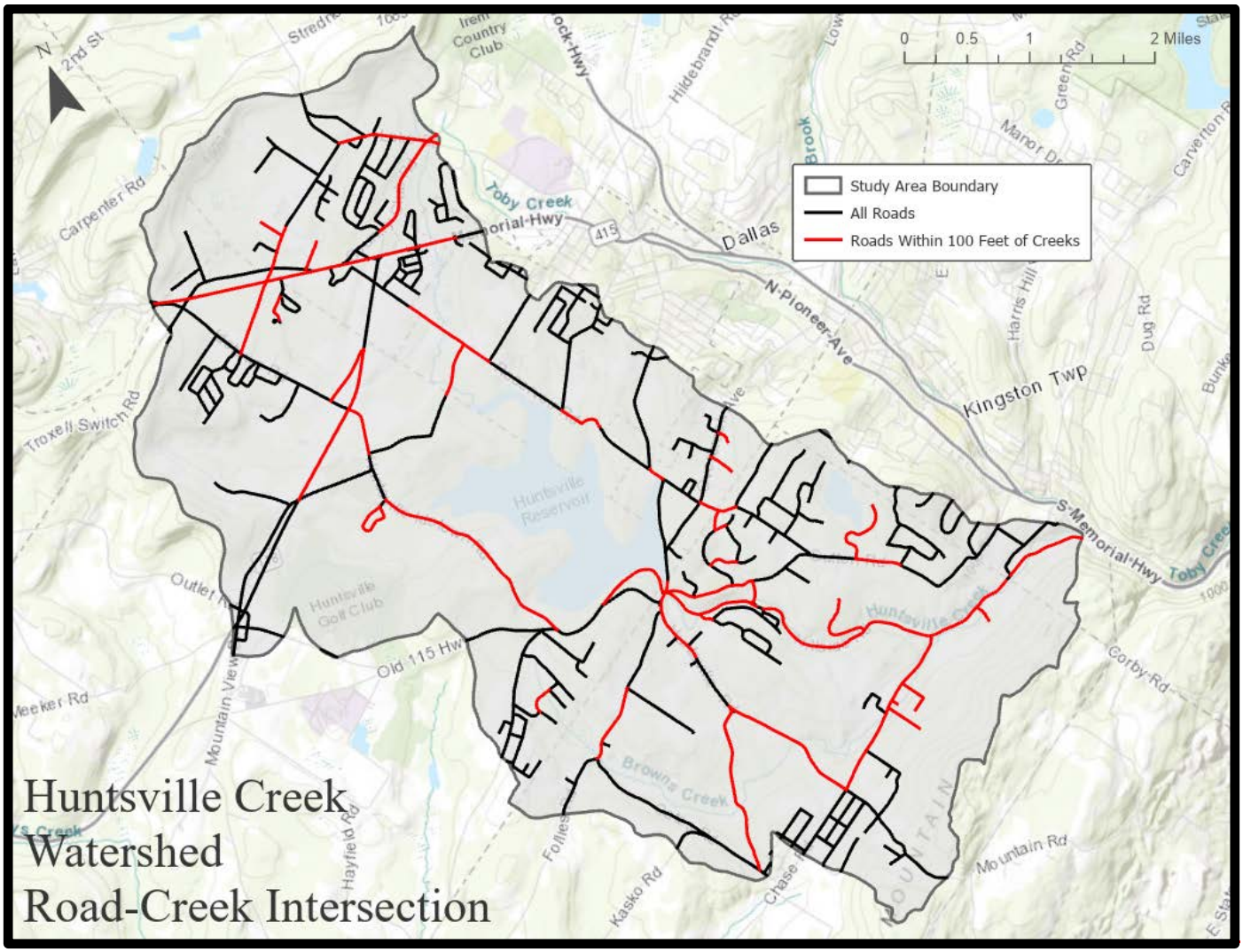
[68] Pennsylvania Department of Environmental Protection (DEP) Source Water Assessment Public Summary (2002)

[69] Quantifying the source and amount of suspended sediment transported during storm events in Huntsville Creek, Luzerne County, Pennsylvania, 2018

Map 7: DEP Water Pollution Control Facility Discharge Points



Map 8: Huntsville Creek Road-Creek Intersections



BRIDGE CONSTRUCTION AND REPAIRS OVER HUNTSVILLE CREEK

<u>Reservoir Road bridge reopens in Dallas Borough</u>

In February of 2020 , Dallas Borough saw Reservoir Road bridge finally reopened. The Bridge on Reservoir Road was ordered closed by the Dallas Borough Council following storms and localized flooding in March 2011 which caused the bridge to move, tilt and separate from the bridge deck. It was determined that it would be best to close the bridge to all traffic in the best interest of the safety and welfare of the public.

Dallas Borough sought funds from FEMA and PEMA through a disaster declaration and was denied funds to repair or replace the bridge. However, with the support of Senator Lisa Baker, Representative Karen Boback, Back Mountain Regional Fire & EMS Inc., and the Back Mountain Regional EMA, Dallas Borough obtained a Commonwealth of Pennsylvania Commonwealth Financing Authority Local Share Account Grant in the amount of $188,300 for this culvert replacement project.

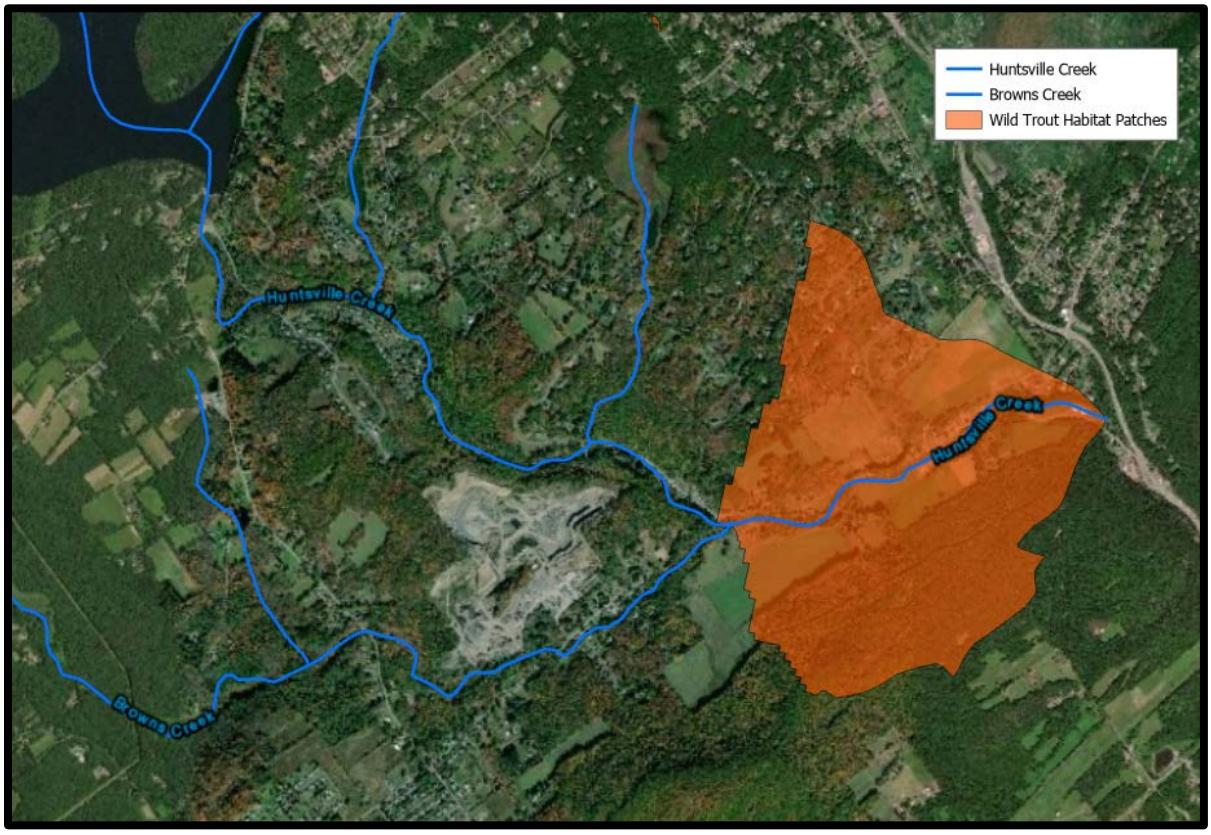
Reservoir Road Bridge Culvert Replacement Project consisted of the installation of a precast bridge structure complete with foundations, site restoration, paving and guide rail. The project was completed by Sikora Brothers Inc. in accordance with the design provided by Dallas Borough's consulting engineers Quad Three Group Inc.

Project completion allowed the road once again to be used by not only passenger vehicles but emergency response vehicles. Dallas Borough re-opened Reservoir Road Bridge on Jan. 30, 2020. The headwaters of Huntsville Creek flow under the Reservoir Road Bridge and head downstream near the Luzerne County Fairgrounds[70].

FISHERY DESIGNATION BY DRAINAGE WITHIN THE HUNTSVILLE CREEK WATERSHED

The Huntsville Creek is included in the overall Toby Creek designation for Naturally Producing Wild Trout Waters[71] from the headwaters downstream to the Susquehanna River for **10.38** miles by the PA Fish and Boat Commission.

Map 9: Wild Trout Habitat Patches within the Huntsville Creek Watershed based on the EBTJV



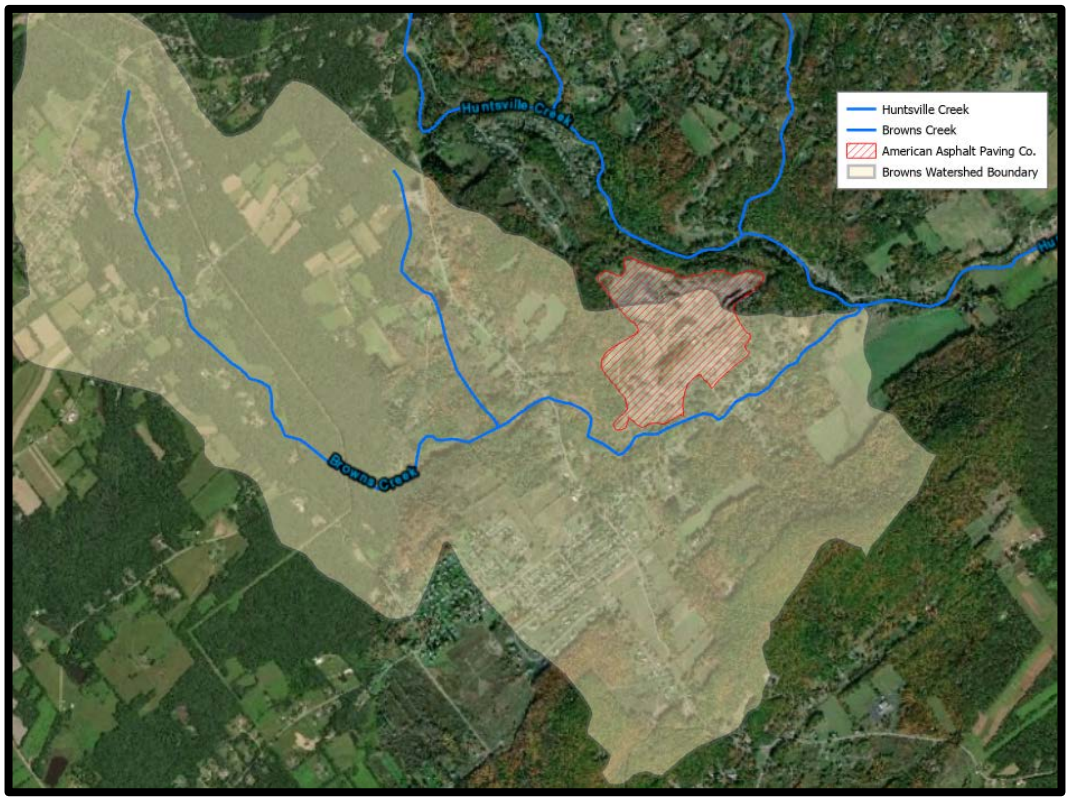
A large portion of the lower Huntsville Creek drainage below Browns Creek that mainly lies within the area of The Lands at Hillside Farms and the PA American Water Company lands is considered a Wild Trout Habitat Patch under the Eastern Brook Trout Venture model. A habitat patch is a defined area used by species for

[70] Reservoir Road Bridge Reopens in Dallas

[71] PA Fish & Boat Commission Pennsylvania Wild Trout Waters (Natural Reproduction) - December 2020

reproduction and survival. The Wild Trout Patch for Toby Creek Study Area contains **4,441.2** acres. The Wild Trout Patch for Huntsville Creek is **1237.5** Acres.

Map 10: Browns Creek Wild Trout Habitat Patch Designation by the EBTJV



Browns Creek is a tributary to Huntsville Creek containing a patch of Wild Trout Habitat, according to the Eastern Brook Trout Joint Venture. During our electroshocking survey, however, no wild brook trout were found near the confluence with Huntsville Creek along Chase Road. Future surveys would need to be conducted along the two other major unnamed tributaries to determine how many and the health of the population of wild brook trout that the model predicts are present to the south and west of American Asphalt Paving Company. Private property owners would need to be identified to access these heavily forested and wetland areas of Browns Creek headwater tributaries to make a better determination of their presence or absence.

PA CODE CHAPTER 25 Subsection 93.3 Stream Designations [72]

The Basin of Huntsville Creek is designated as a Coldwater Fishery (CWF) and Migratory Fishery (MF). Huntsville Creek to the point where the stream is piped underground at Pringle (Toby Creek Impoundment Basin) is designated as a Trout Stocked Fishery (TSF) and Migratory Fishery (MF).

GEOGRAPHY

According to the USGS National Map Viewer [73] elevation interpolation, Huntsville Creek's mainstem has an estimated mouth elevation of 794.5 ft. 4 other notable elevations were recorded at differing headwater areas. The average gradient from the 4 headwaters to mouth is .93% with an average decrease of 48.8'/mile.

Tributaries of the Huntsville Creek emerge from woody wetlands, with mixed and deciduous forests [63] bordering channels as they flow throughout the watershed. The Huntsville Reservoir, the largest waterbody within the watershed *(**1.11** square miles)* , provides a man-made base level for all streams above the Huntsville Dam. Other smaller water bodies are scattered through the watershed and cover an area of **.12** square miles. Lastly, wetlands cover **7.86** percent of the watershed.[74]

Table 4. Headwater Elevations of Huntsville Creek

Headwater Elevation (feet)	Headwater Elevation (meters)	Latitude	Longitude
1335.01	406.91	41.35025°	-76.00607°
1317.48	401.57	41.34366°	-76.00961°
1229.50	374.75	41.33324°	-76.02207°
1278.21	389.60	41.35297°	-75.98313°

Table 5. Mouth Elevation of Huntsville Creek

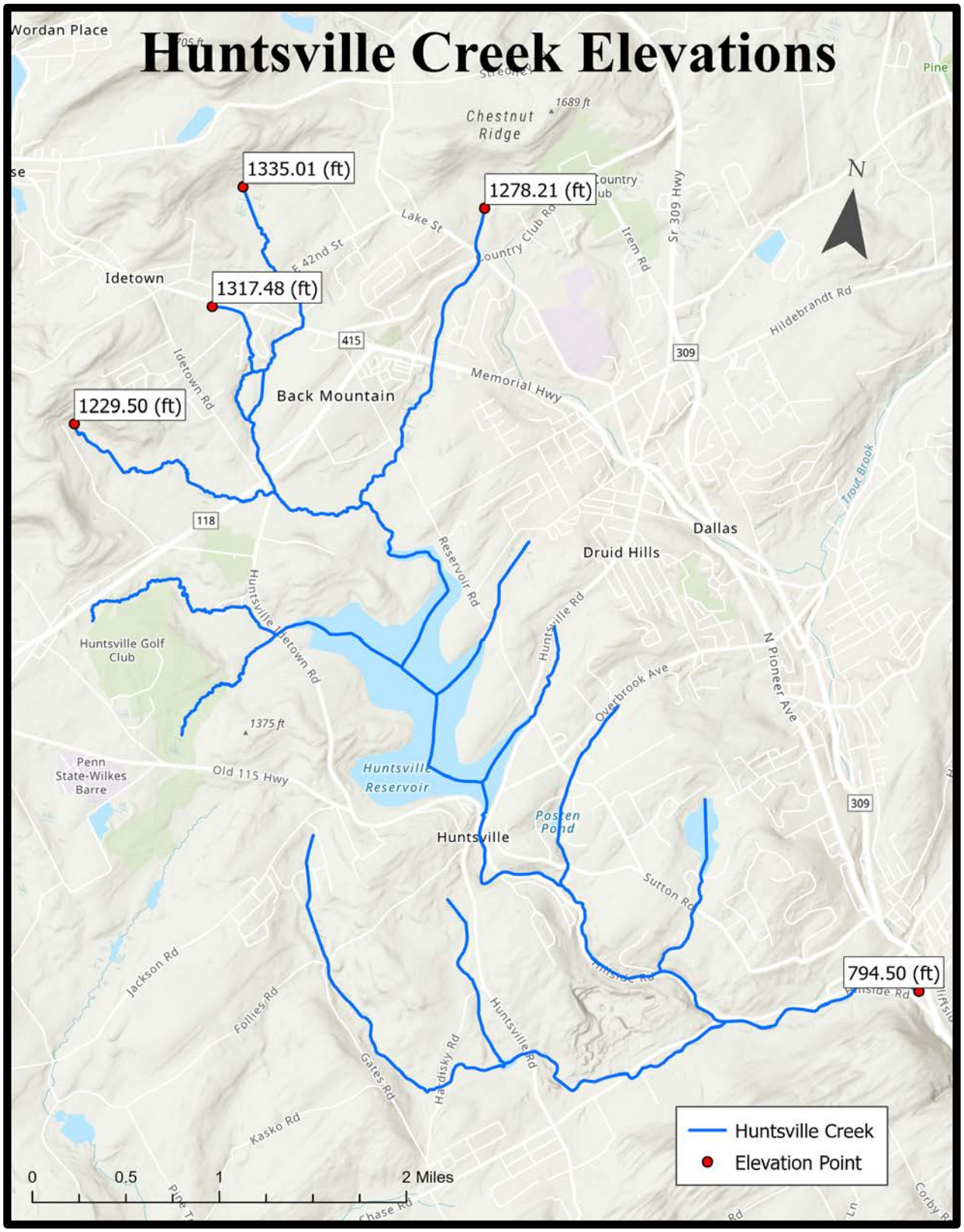
Mouth Elevation (feet)	Mouth Elevation (meters)	Latitude	Longitude
794.5	242.16	41.29869°	-75.92668°

[72] PA Code: Chapter 25: Subsection 93.3 Designations for Huntsville Creek in Drainage K

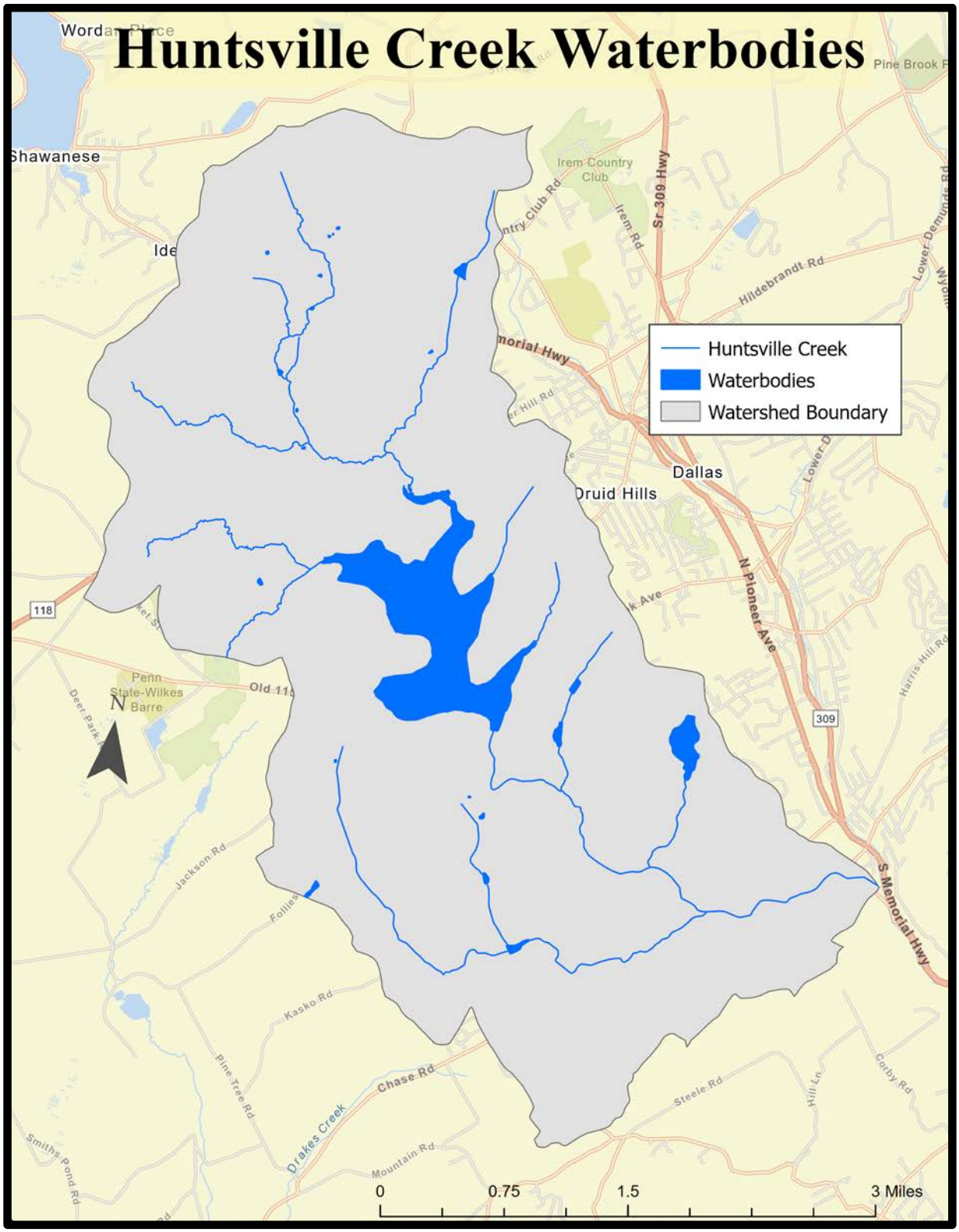
[73] USGS, The National Map - Viewer

[74] U.S. Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI), National Wetlands Mapper

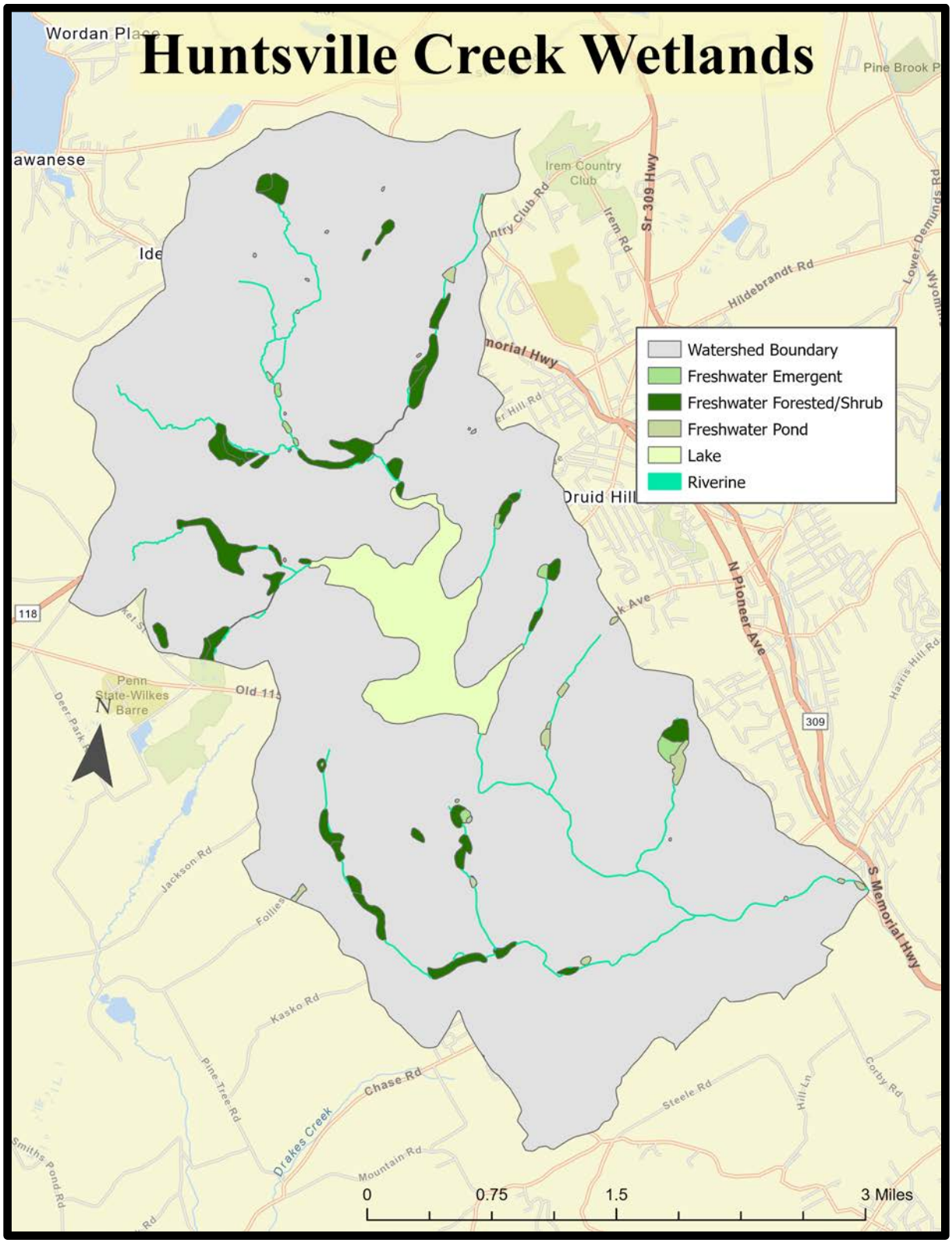
Map 11. Huntsville Creek Headwater Elevations



Map 12. Huntsville Creek Water Bodies



Map 13. Huntsville Creek Wetlands



GEOLOGY

The entirety of Huntsville and Browns Creek lie within the Devonian aged Catskill Formation consisting of red sandstone, indicating a large-scale terrestrial deposition during the Acadian orogeny; less resistant siltstones and mudstones overlay the sandstone. Huntsville Creek flows southeast connecting with Toby Creek, which cuts across the Pocono, Mauch Chunk, Pottsville, and finally the Llewellyn Formation before the creek makes its way to the Susquehanna River. [75]

The channel of Toby Creek is sinuous. Rock formations consisting of sandstone and shale occur in its vicinity. There are also coal deposits along the creek in its lower reaches.[76] Rocks of the Chemung Formation occur in the vicinity of Toby Creek.[77] The bedrock is 4.4 feet underground in some areas of the watershed.[78]

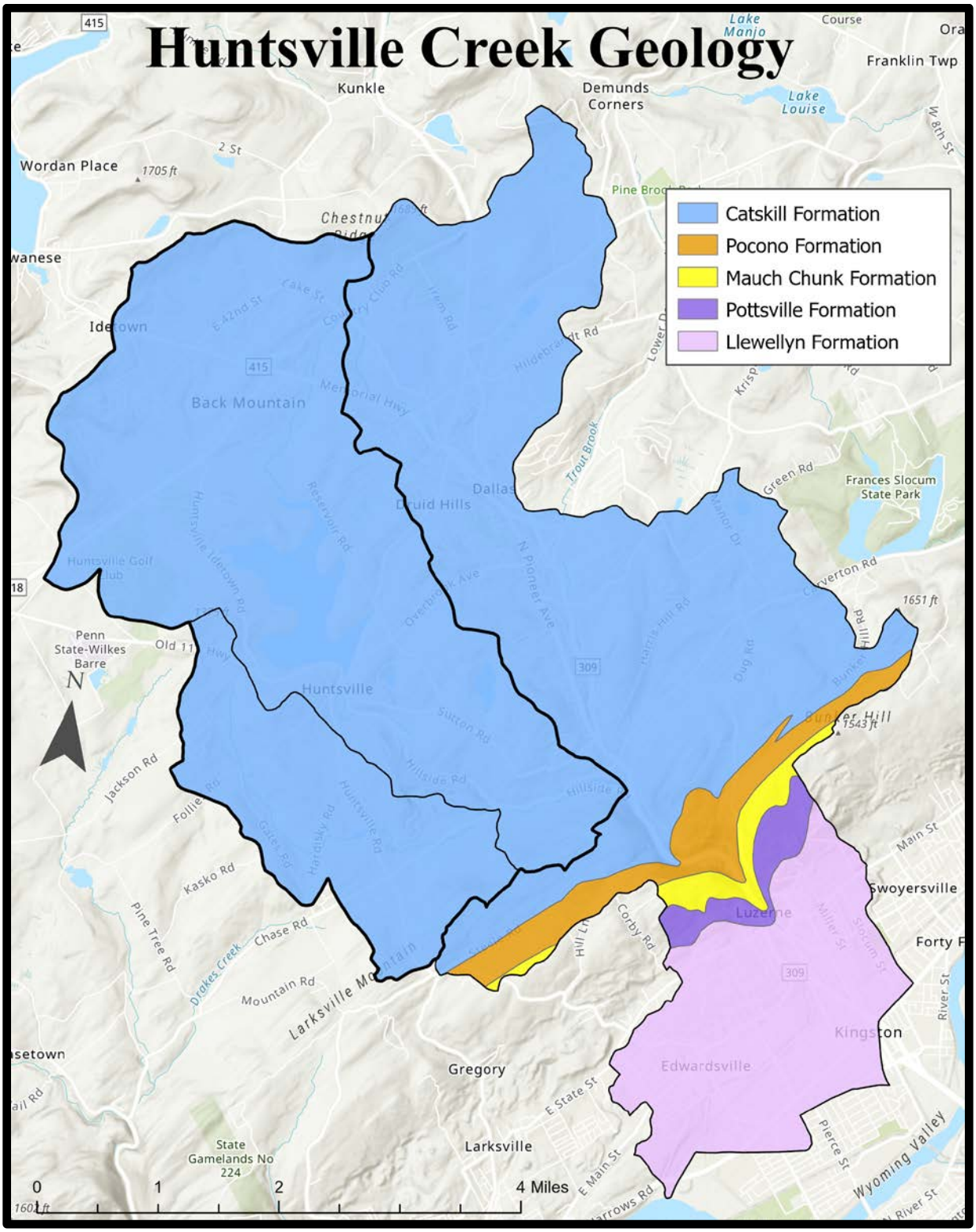
[75] DCNR, Geology of Pennsylvania

[76] Water Supply Commission of PA (1921), Water Resources Inventory Report, pp. 608-609.

[77] History of Luzerne County, Pennsylvania, Henry C. Bradsby, ed. (1893), pp. 19, 24, 468–469, 593.

[78] Toby Creek Streambank Stabilization Project, Luzerne Conservation District (November 2013)

Map 14. Huntsville Creek Geology



HUNTSVILLE CREEK WATERSHED NAACC AOP CULVERT ASSESSMENTS

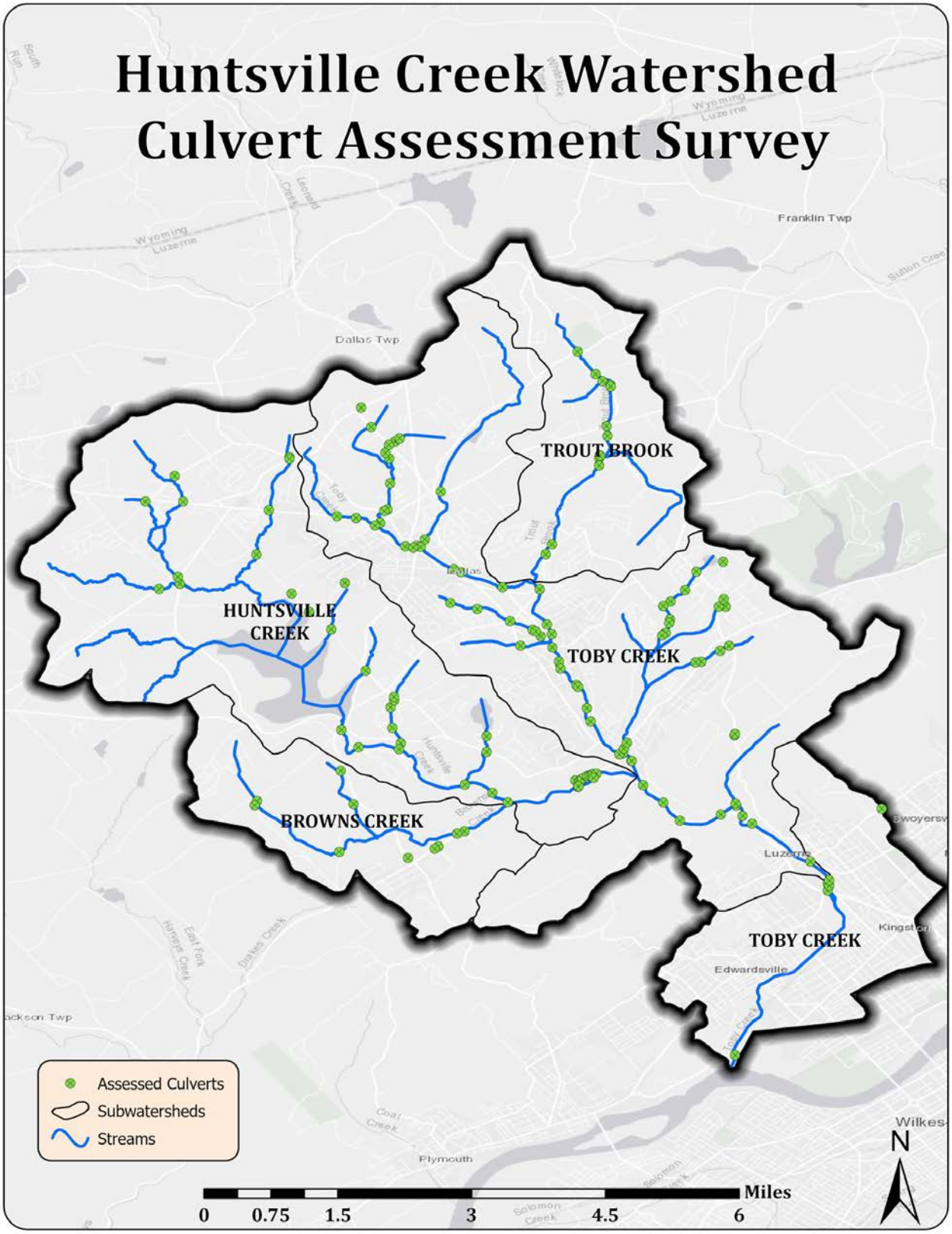
EPCAMR provided a list of the dates, number of culverts assessed, structures assessed, and the municipalities that were visited during the NAACC Aquatic Organism Passage (AOP) Culvert Assessments within the Huntsville Creek Watershed. All of the qualitative and quantitative data has been entered and approved into the online NAACC Data Center database. The website stores all the for road-stream crossings assessments. You may search, view, map and download most of the data in Excel or Shapefile format without logging on. If you are logged on, pages accessed from the navigation bar allow for entering and correcting crossing records. If logged on, you may also manage user data and download the Offline Data Manager[79]. Only certified NAACC lead observers and coordinators can log on. This is another reason EPCAMR is encouraging municipal officials and local interested residents to become interested in obtaining their AOP Culvert Assessment Protocol Training Certification and become EPCAMR Volunteers and Certified Lead Observers.

Table 6. Huntsville Creek Culvert and Structure Assessments for Aquatic Organism Passage (AOP) using NAACC Protocols

Date	Number of Culverts Assessed	Number of Structures Assessed	Municipal Locations Visited by EPCAMR Staff, Volunteers, and DAMA Staff
6-17-20	22	23	EPCAMR Staff
6-22-20	14	14	EPCAMR Staff
6-23-20	15	17	EPCAMR Staff
7-1-20	4	4	EPCAMR Staff
7-2-20	9	9	EPCAMR Staff
7-7-20	12	12	EPCAMR Staff
7-9-20	4	5	EPCAMR Staff
7-2-20	2	2	EPCAMR Staff
12-3-20	4	4	EPCAMR Staff
Total	**86**	**90**	

[79] NAACC Offline Data Manager Users Guide

Map 15. Huntsville Creek Watershed Culvert Assessment Survey



CURRENT BIOLOGICAL MONITORING AND ASSESSMENTS

Electroshocking Fishery Survey with the Trout Unlimited Eastern Conservation Program

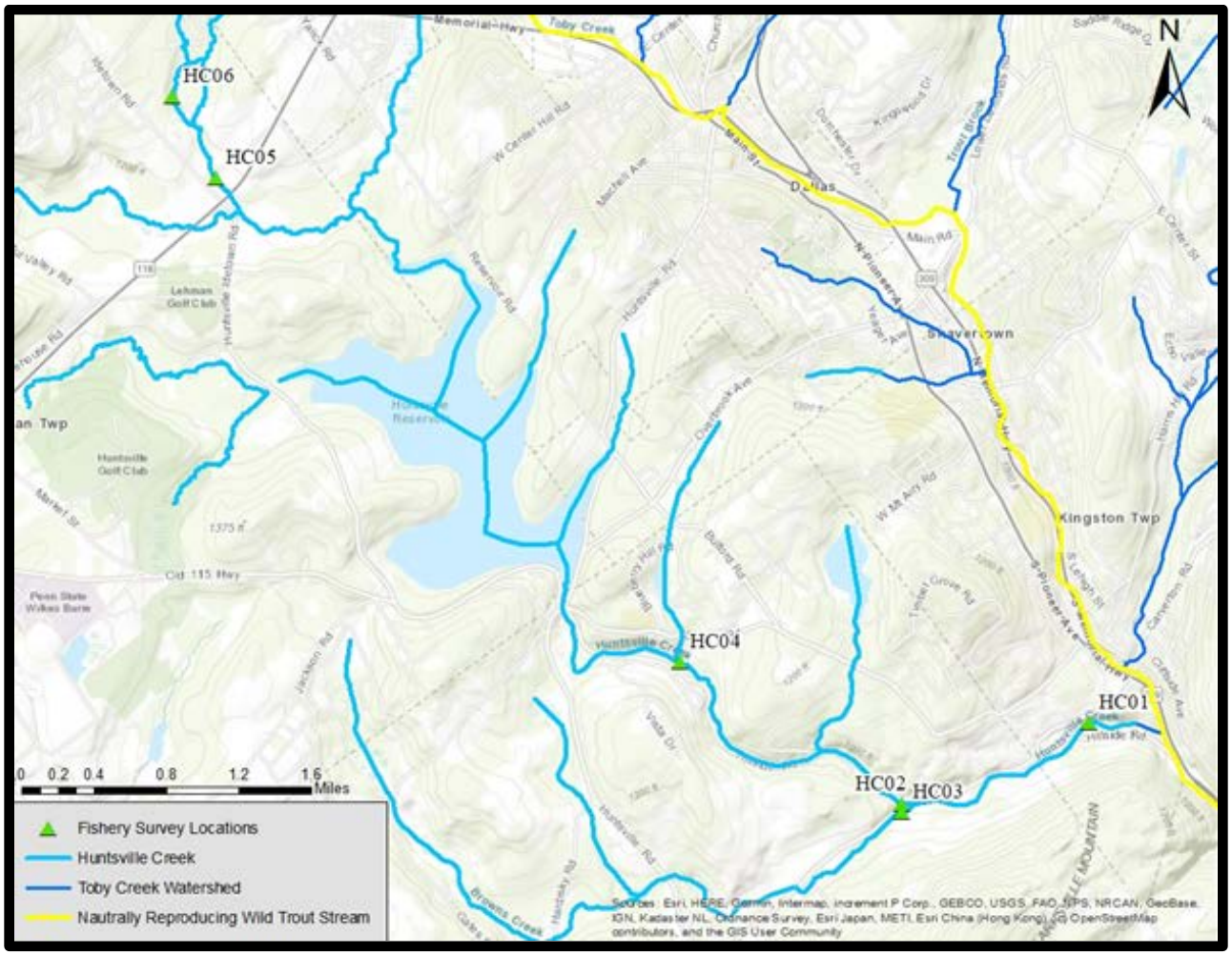
EPCAMR made an official request to Trout Unlimited's AMD Technical Assistance Program[80] (**Appendix B**) to assist us with conducting an updated Biological Survey of the fish population in the Huntsville Creek since there hasn't been any contemporary data available to indicate the presence of how healthy or prevalent the fish population might be in the watershed. EPCAMR suggested that a survey be conducted to determine the furthest downstream extent of where the fish, particularly wild trout species might be present within the Huntsville Creek watershed.

The request was forwarded to Rachel Kester, Trout Unlimited Project Coordinator at the time, and Amy Gottesfeld Wolfe, Northeast Habitat Program Director with Trout Unlimited for approval and consideration. The technical assistance was approved and EPCAMR coordinated with Kathleen Lavelle, Trout Unlimited Field Technician-Eastern Conservation Program[81] to schedule September 23, 2019 for the full day fish survey of **6** locations within the watershed. Trout Unlimited provided EPCAMR with a document of the completed survey included as (**Appendix C**) of the fishery that was conducted. Several passes were made on each segment of stream. The distances were measured by the Trout Unlimited Staff for the length of the segments to be sure that we had sampled a representative habitat coverage area. The stream width was measured in several locations to obtain an average width and identification of all species of fish were recorded and their relative abundance, absence, or presence were noted. Species of significance to EPCAMR were the native populations and or different age classes of either wild brown trout, in particular. Several fish species were measured as noted in the Report. Photos of many of the fish that were identified are included in this section of the Plan. No genetic research, fin clips, or scales were sampled during this survey.

[80] PA Trout Unlimited Technical Assistance Grant Program

[81] TU Eastern Conservation Program

Map 16. Huntsville Creek Electroshock Survey Sites



HUNTSVILLE CREEK FISHERY SURVEY PHOTO LOCATIONS

Table 7. Site locations and descriptions for surveys completed in Huntsville Creek

Site ID	Site Description	Latitude	Longitude
HC01	Downstream of Hillside Farms most downstream site	41.299429	-75.932625
HC02	Upstream of Browns Creek	41.294543	-75.947582
HC03	Browns Creek near mouth	41.29408	-75.947545
HC04	Huntsville Creek downstream Gross Road and Reservoir	41.303103	-75.965332
HC05	Huntsville Creek upstream of Lehman Nursery Route 118	41.33219	-76.002383
HC06	Headwaters of Huntsville Creek on Bernstein's property	41.337104	-76.005831

Figure 17. EPCAMR, DAMA, The Lands at Hillside Farms, Luzerne Conservation District, and Trout Unlimited conducting an electroshocking survey pass on Huntsville Creek just below The Lands at Hillside Farms at Site HC01

Figure 18. Looking upstream on Browns Creek at Site HC02 prior to running a pass with the electroshocking equipment with Trout Unlimited and our partners

Figure 19. Looking downstream on the Browns Creek riparian corridor near the mouth of Huntsville Creek at Site HC03 along Chase Road

Figure 20. Looking downstream on Huntsville Creek below Gross Road and the Huntsville Reservoir at a wide pool that was electroshocked and surveyed at Site HC04

Figure 21. EPCAMR, DAMA, and Trout Unlimited electroshock one of the headwater unnamed tributaries to Huntsville Creek above the Lehman Nursery of State Route 118 and run into a fallen root wad that is providing excellent habitat cover for the fish we surveyed at Site HC05

Figure 22. An aerial shot of the heavily forested and buffered headwaters (top center of image) of Huntsville Creek at Site HC06 on the Bernstein Property along Idetown Road, Dallas, PA

All of the fish species that were documented are contained as having been absent or present in the stream sections that were surveyed by Trout Unlimited in **Appendix C**. There were no wild trout present in the area we surveyed above the Huntsville Reservoir, although we had heard anecdotal stories from landowners that trout were present, none were encountered during the low flow period that our survey took place. It is possible that the trout moved into the Reservoir during this time period and were just not around at the time of the survey. The water quality was very suitable and hospitable for native and wild trout above the Reservoir. EPCAMR has chosen to add just a few photos into the report and will post the remainder of them online in our Huntsville Creek ArcGIS Online Story Map and include them as electronic files to submit with the final Huntsville Creek Coldwater Conservation Plan.

Figure 23. Shiner found in the headwater unnamed tributary to Huntsville Reservoir on the Lehman Nursery property

Figure 24. 12" Northern Chain Pickerel found in the headwater unnamed tributary to the Huntsville Reservoir on the Lehman Nursery Property

Figure 25. A bucolic scene of horses out at pasture at the Lehman Nursery along Idetown Road, Dallas Township, PA

Figure 26. A stream crossing on the unnamed headwater tributary to the Huntsville Reservoir looking upstream toward the concrete bridge culvert on Park Road (T-597) in Dallas Township, PA

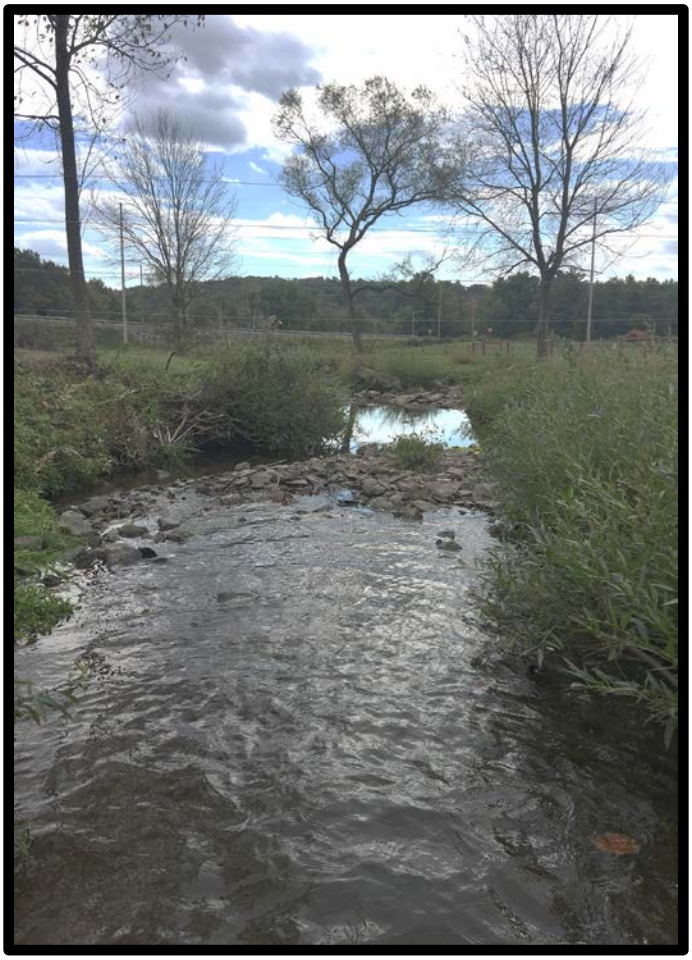


Figure 27. Looking downstream on the unnamed headwater tributary to the Huntsville Reservoir at a series of pools and a well established riparian area at the Lehman Nursery property

Figure 28. A 10” yellow catfish surveyed along Gross Road below the Huntsville Reservoir on Huntsville Creek

Figure 29. A smallmouth bass surveyed along the Huntsville Creek below Gross Road and the Huntsville Reservoir

Figure 30. A fingerling bass surveyed below Gross Road and the Huntsville Reservoir on Huntsville Creek

Figure 31. A 12" catfish surveyed below Gross Road and the Huntsville Reservoir on Huntsville Creek

Figure 32. There are no shortage of warm-water species of fish that more than likely have made their way downstream into Huntsville Creek during high water storm events when the Reservoir overflows

Figure 33. A 10" pumpkinseed surveyed below Gross Road and the Huntsville Reservoir on Huntsville Creek

Figure 34. A small yellow perch was surveyed along Huntsville Creek below Gross Road and the Huntsville Reservoir on Huntsville Creek

Figure 35. Looking upstream on Huntsville Creek during low flow period in the middle of September 2019 towards the bridge over Gross Road

Figure 36. Looking southeast towards the Larksville Mountain ridgetop behind The Lands at Hillside Farms where the Browns Creek tributary to Huntsville Creek flows along Chase Road before coming to a confluence with Huntsville Creek in front of the barns along Huntsville Road

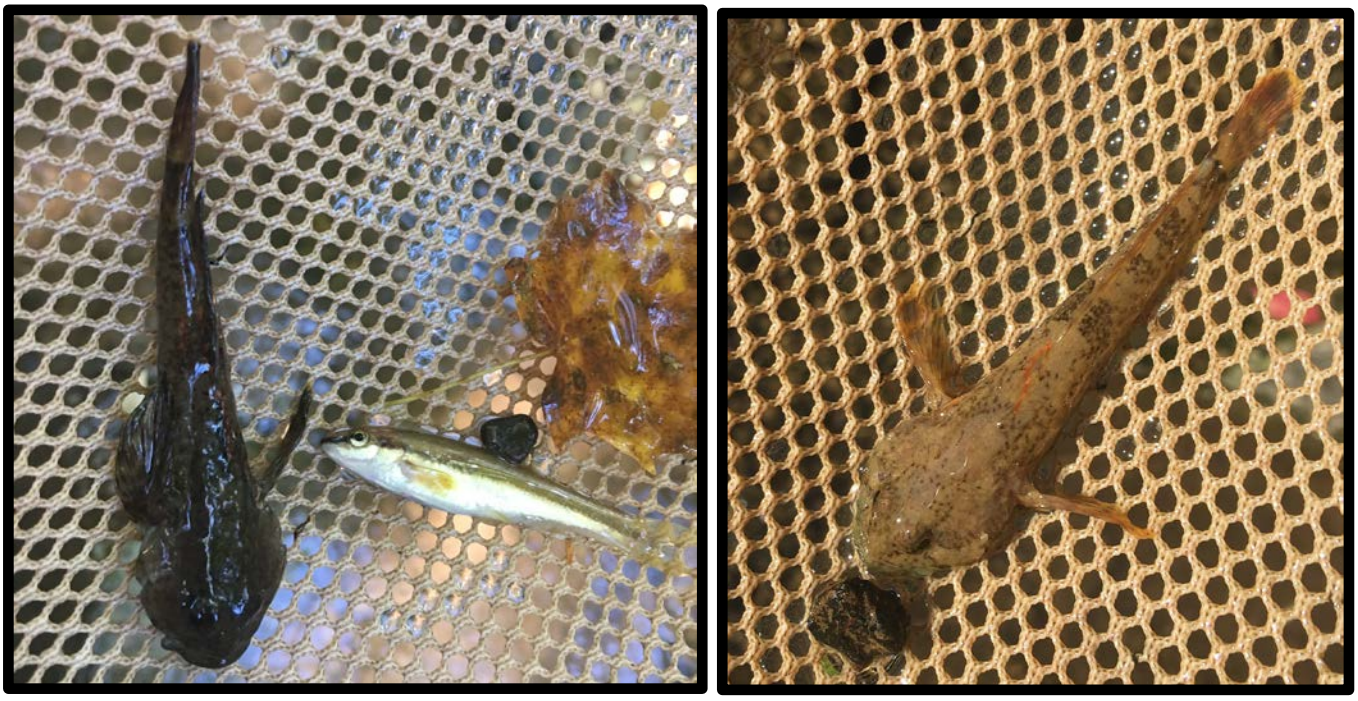


Figure 37. Several species of sculpins and long-nosed and black-nosed dace were in abundance along Browns Creek when surveyed

Figure 38. Yellow catfish and fallfish were also found to populate Browns Creek along Chase Road

Figure 39. Looking downstream on Huntsville Creek just below the confluence with Browns Creek along Huntsville Road and on the property owned by The Lands at Hillside Farms where a riparian tree planting restoration project has already been established implemented by the Luzerne Conservation District and previous efforts of the Pennsylvania Environmental Council and PA American Water

Figure 40. One of the 14" wild brown trout who didn't want to be measured easily flops around on the measuring board below The Lands at Hillside Farms on Huntsville Creek northeast of the greenhouses

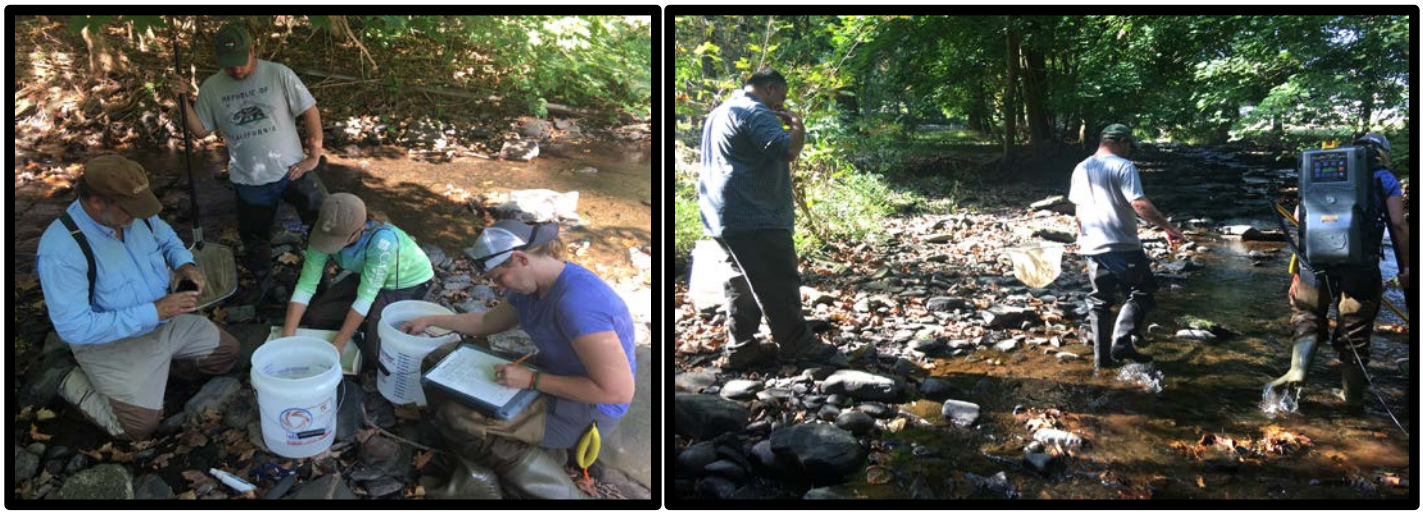


Figure 41. EPCAMR's partners, the Luzerne Conservation District, The Lands at Hillside Farms, and Trout Unlimited documenting the survey results, sizes, species, abundance, and age classes of various fish species found on Huntsville Creek below The Lands at Hillside Farms

Figure 42. A number of wild brown trout in various age classes and sizes were found in Huntsville Creek during the survey

Figure 43. Looking upstream on Huntsville Creek at a fallen tree over the stream channel and a typical riffle-pool section

Figure 44. Perch and blue catfish were also found in Huntsville Creek below The Lands at Hillside Farms along Huntsville Road

HUNTSVILLE CREEK MACROINVERTEBRATE/BIOLOGICAL/HABITAT ASSESSMENT SAMPLING LOCATIONS

Figure 45. Huntsville Creek Macroinvertebrate Biological/Visual Habitat Assessment Sampling Locations

EPCAMR Staff and Volunteers collected macroinvertebrate, biological, and chemical sampling data on 7-16-20 and 7-21-20. The results of the data collection and sampling locations are below.

Figure 46. EPCAMR Staff and Interns performing biological sampling and macroinvertebrate identification on Browns Creek in the Huntsville Creek watershed on 7-21-20

Table 8. Macroinvertebrate Sampling Data and Qualitative Designation

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Stream	Toby Creek	Toby Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Browns Creek
Latitude	**41.29650624**	**41.28226224**	**41.29929865**	**41.29488108**	**41.29480596**	**41.30508317**	**41.29405169**
Longitude	**-75.92528147**	**-75.89570685**	**-75.93304063**	**-75.94809724**	**-75.94504209**	**-75.97380691**	**-75.94771165**
Date	7/16/20	7/21/20	7/16/20	7/16/20	7/21/20	7/21/20	7/21/20

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Water Penny Larvae	3	10	1	0	1	0	8
Hellgrammites	0	2	1	0	0	0	0
Mayfly Larvae	4	0	6	0	8	0	5
Gilled Snails	0	0	0	0	0	0	0
Riffle Beetles	0	1	0	0	2	0	5
Stonefly Nymphs	2	5	21	6	29	0	21
Non-net Spinning Caddisfly Larvae	5	30	8	5	17	8	5
Beetle Larvae	1	0	2	0	0	0	0
Clams	0	0	0	0	0	0	0
Cranefly Larvae	0	0	2	2	0	2	0
Crayfish	0	0	8	5	2	0	1
Damselfly Nymphs	0	0	0	0	0	0	0
Dragonfly Nymphs	0	0	1	4	0	6	4

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Scuds	1	30	11	3	0	6	0
Sowbugs	0	0	0	0	0	0	0
Fishfly Larvae	0	0	0	2	0	0	0
Alderfly Larvae	0	0	0	4	0	0	0
Net Spinning Caddisfly Larvae	32	21	9	2	37	44	22
Aquatic Worms	2	1	24	2	1	1	3
Blackfly Larvae	0	0	0	0	0	0	0
Leeches	0	1	0	0	0	0	0
Midge Larvae	0	0	19	4	0	0	4
Snails	0	0	0	0	0	12	0
Group I Score	20	26.2	25.6	10	26.2	5	25.6
Group II Score	9.8	6.8	19.4	22.4	6.6	13	8.6
Group III Score	1.2	2.4	2.2	2.4	1.2	2.3	2.4
Total Water Quality Score	31	35.4	47.2	34.8	34	20.3	36.6

Water Quality Score Ranges: Good >40 Fair 20-40 Poor <20

Table 9. Water Quality Sampling and Visual Habitat Assessment Data

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Latitude	**41.29650624**	**41.28226224**	**41.29929865**	**41.29488108**	**41.29480596**	**41.30508317**	**41.294052**
Longitude	**-75.92528147**	**-75.89570685**	**-75.93304063**	**-75.94809724**	**-75.94504209**	**-75.97380691**	**-75.94771**
Stream Name	Toby Creek	Toby Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Browns Creek
Date	7/16/20	7/21/20	7/16/20	7/16/20	7/21/20	7/21/20	7/21/20
Water Clarity	clear	clear	Clear	clear	clear	clear	clear
Water Color	brown	none	Brown	none	none	brown	none
Odor	none	fishy	None	none	none	none	none
Surface Foam	none	none	None	none	none	none	none
Streambed Color	brown	brown	Brown	brown	brown	brown	brown
Algae Abundance	heavy	moderate	None	scattered	scattered	heavy	scattered
Algae Growth Habit	hairy	matted	None	matted	matted	even coating	hairy
Algae Color	brown	dark green	None	dark green	dark green	brown	dark green
Land Use	commercial	commercial	Forested	forested	forested	forested	pasture

Table 10. Water Chemistry Quality

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Latitude	**41.29650624**	**41.28226224**	**41.29929865**	**41.29488108**	**41.29480596**	**41.30508317**	**41.29405169**
Longitude	**-75.92528147**	**-75.89570685**	**-75.93304063**	**-75.94809724**	**-75.94504209**	**-75.97380691**	**-75.9477117**
Stream	Toby Creek	Toby Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Browns Creek
Date	7/16/20	7/21/20	7/16/20	7/16/20	7/21/20	7/21/20	7/21/20
Channel Width (ft)	22	35.5	19	12	18	16	16
Flow (cfs)	2.07	3.3	1.57	0.38	1.04	0.45	0.43
TDS (mg/l)	184	166	148	139	155	148	169
Conductivity (µS/cm)	368	330	298	280	312	298	340
Temperature (C)	20.3	26.8	20	19.9	22.4	23.9	21.5
pH	6.17	8.59	6.57	6.57	6.7	6.88	7.34
DO (%)	23.9	38.3	56.8	67.5	45.2	58	0
DO (mg/l)	2.18	3.07	5.21	6.18	3.5	4.2	4.22
ORP (mV)	42.1	10.4	31.6	30.5	52.5	29.9	22.8

Table 11. Determination of Impairment by Sediment or Bank Erosion and Channel Width of Sampling Locations

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Latitude	**41.29650624**	**41.28226224**	**41.29929865**	**41.29488108**	**41.29481**	**41.30508**	**41.29405**
Longitude	**-75.92528147**	**-75.89570685**	**-75.93304063**	**-75.94809724**	**-75.945**	**-75.9738**	**-75.9477**
Stream Name	Toby Creek	Toby Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Huntsville Creek	Browns Creek
Date	7/16/20	7/21/20	7/16/20	7/16/20	7/21/20	7/21/20	7/21/20
Instream Cover	14	15	18	12	18	5	6
Epifaunal Substrate	10	6	5	5	6	11	18
Embeddedness	17	18	18	17	18	17	18
Velocity/Depth Regimes	12	19	12	15	17	16	12
Channel Alteration	5	12	18	16	18	20	20
Sediment Deposition	16	17	18	18	15	11	16
Frequency of Riffles	18	16	18	13	18	15	19
Channel Flow	18	18	17	17	15	12	16
Condition of Banks	8	10	15	13	15	19	18

Site ID	TC1	TC2	HC1	HC2	HC3	HC4	BC1
Bank Vegetative Protection	10	11	15	17	17	20	20
Grazing or Disruptive Pressures	6	16	12	16	18	20	15
Riparian Vegetative Zone Width	4	5	18	17	16	17	18
Total Habitat Assessment Score (Impaired if < 140)	**138**	**163**	**184**	**166**	**191**	**183**	**196**
Sedimentation Score (Impaired if < 24)	**33**	**35**	**36**	**35**	**33**	**28**	**34**
Bank Erosion Score (Impaired if < 24)	**18**	**21**	**30**	**30**	**32**	**29**	**38**

EPCAMR RECOMMENDATIONS

Following EPCAMR's collection and data analysis, we have developed recommendations to serve as actions for the restoration, maintenance or enhancement of many areas within the Huntsville Creek Watershed. EPCAMR has included specific projects which can be undertaken in the future should implementation funding, funding for design, funding for construction, habitat improvement projects, sediment reduction projects, streamside cleanups, or other suggested ideas being recommended become available or pursued by any number of partners in the Back Mountain. These recommendations and next steps are as specific and tangible as possible.

EPCAMR and all partners within the watershed should keep in mind that future funding opportunities may depend on the ability of the funder to form direct links between their priorities and requirements and the specific projects recommended in this completed Huntsville Creek Coldwater Conservation Plan. EPCAMR has made **97** recommendations for efforts that will promote, support, and implement coldwater resource conservation awareness initiatives, education and outreach programs, and stewardship opportunities in the Huntsville Creek and Lower Toby Creek Watershed.

Table 12. Breakdown of Recommendation Types

Recommendation Type	Recommendation Number	Total Projects
Pipe or Bridge/Culvert Alteration/Replacement	**16, 17, 18, 20, 21, 22, 23, 24, 25, 33, 34, 35, 36, 37, 45, 51, 55, 60, 65, 70, 83, 87, 91, 92, 93, 95**	**26**
Streambank Restoration/Riparian Planting	**1, 4, 5, 15, 19, 26, 28, 29, 30, 43, 44, 58, 59, 62, 66, 74, 75, 80, 82, 89, 90**	**21**
Debris/Woody Debris Removal	**3, 27, 31, 32, 41, 49, 52, 56, 57, 64, 67, 69, 71, 76, 88**	**15**
Dam Removal/Aquatic Passage Structure Restoration	**6, 8, 40, 46, 53, 61, 63, 68, 94**	**9**

Recommendation Type	Recommendation Number	Total Projects
Invasives Removal	**7, 39, 42, 47, 48, 54, 72, 73, 77, 81**	**10**
Stream-side/Road-side Cleanups	**9, 11, 50, 78, 79, 85, 86**	**7**
Community Outreach/Assessment	**10, 12, 13, 14, 38, 84, 96, 97**	**8**
Follow-ups	**2**	**1**

1. Recommend a native riparian planting along Huntsville Creek below The Lands at Hillside Farms below the Greenhouses along areas where the streambanks have experienced some erosion, undercut banks, and a proliferation of the Japanese knotweed. (Lat: 41.29833, Long: -75.93361)

2. Recommend that the PA American Water follow up with the minor spraying of water from a pipe that crosses Huntsville Creek just above the confluence with the Toby Creek mainstem to see if a repair or further investigation into what could be a small tear from woody debris in the area that may have gotten lodged near it during a historic storm flow period. (Lat: 41.298878, Long: -75.926879)

3. Recommend the removal of a large woody debris dam below the PA American Water Treatment Plant on Huntsville Creek where a large scour pool has developed beneath it and the left streambank has become severely eroded just above the confluence with the mainstem of Toby Creek; At the Final Draft Plan Meeting, Chet Mozloom-Executive Director, The Lands at Hillside Farms offered to take a tractor and chain down near this area if there was an access point and permission granted to assist with pulling the woody debris and logs from the channel at this location. (Lat: 41.298933, Long: -75.927153)

4. Recommend further discussions with the PA American Water Company to see if additional trees can be planted along the streambank along the meander in the channel of the Huntsville Creek below The Lands at Hillside Farms property. (Lat: 41.299086, Long: -75.930825)

5. Recommend a native riparian planting along the unnamed tributary that flows along the toe of the hillside that starts up along the hill below Lantern Hill Road across from Church Road under the road to where the

animals and greenhouses are located on The Lands at Hillside Farms to keep the water cool and to serve as a refuge for fingerling fish species, including trout. (Lat: 41.298393, Long: -75.936107)

6. Continue to work with The Lands at Hillside Farms and the Luzerne Conservation District to come up with the best solution to allow for fish passage over the former milk barn dam on Huntsville Creek across from Church Road and secure additional funding, including the Eastern Brook Trout Joint Venture, for the project location that has the support of The Lands at Hillside Farms; A series of natural step pools might be an effective way to reduce the vertical drop and impediment caused by the dam that fish currently face; Either the concrete structure could be demolished or an alternative to the full removal is suggested; The area is extremely braided, has an unstable stream channel, and severe sedimentation and gravel bars above the dam; The dam will be removed hopefully in 2021, according to John Levitsky, Luzerne Conservation District Watershed Specialist, who updated EPCAMR during the Final Draft Plan Meeting that a PA Department of Environmental Protection Growing Greener Plus grant was awarded on 12-30-20 to complete permitting, engineering, and removal of the structure and impediment to aquatic fish passage. (Lat: 41.29722, Long: -75.93611)

7. Recommend the removal of invasive species such as Japanese knotweed along the left bank of Huntsville Creek on The Lands at Hillside Farms looking upstream on the opposite side of the milk barn area and then a native riparian planting restoration project. (Lat: 41.29722, Long: -75.93611)

8. Recommend the removal of sediment and gravel bars above the spillway drop over the dam at the milk barn on The Lands at Hillside Farms. (Lat: 41.29722, Long: -75.93611)

9. Recommend maintaining the open storm drain that carries a spring seep along Hillside Road opposite Chase Road clear and free of debris in order for the clean spring water to be able to drop into the drop inlet structure and flow beneath the road through the pipe culvert into Huntsville Creek instead of over the road causing slick and wet conditions. (Lat: 41.297510, Long: -75.936625)

10. Coordinate with the Stanley Cooper Trout Unlimited Chapter who would like to partner with The Lands at Hillside Farms to conduct outdoor educational fishing skills programs for families and youth along Huntsville Creek and are willing to provide volunteers for any stream habitat, stream, restoration and riparian restoration projects along the property with the consent and support of the organization. (Lat: 41.298924, Long: -75.933434)

11. Coordinate a small illegal dump site cleanup in Jackson Township, looking downstream along Huntsville Creek and opposite Vista Drive along the guide rail and right streambank. (Lat: 41.303562, Long: -75.971644)

12. Offer training to Municipal Road Department Employees within the watershed on becoming Lead Observers to assist in completing additional culvert assessments and structures under the NAACC guidelines in partnership with EPCAMR.

13. Conduct and assess any of the remaining culverts and structures in the Huntsville Creek and Lower Toby Creek Watershed to its confluence with the Susquehanna River for aquatic organism passage (AOP) and stream connectivity under the NAACC guidelines in partnership with EPCAMR.

14. Recruit community members and students from the Penn-State Wilkes-Barre/Lehman Campus and Misericordia University to become EPCAMR volunteers to educate them on how to obtain certification in aquatic organism passage (AOP) as Lead Observers through the NAACC.

15. Assist the Luzerne Conservation District with evaluating the riparian tree planting mortality and growth of a previous planting along Huntsville Creek just below Chase Road along Hillside Road and removal of any tree tubes that can be reused at another planting in the future. (Lat: 41.294720, Long: -75.946074)

16. Recommend cleaning out the 12" concrete culvert that is half-full of leaves along the Old 115 Highway on both sides of the road. (Lat: 41.308092, Long: -76.008960)

17. Recommend cleaning out the 12" concrete pipe under University Drive at intersection with Old 115 Highway carrying stormwater that is half full of leaf litter. (Lat: 41.307991, Long: -76.012117)

18. Recommend a Vac Truck to remove 2-3" of sediment that is laying in the bottom of the concrete drop inlet structure below the 18-inch HDPE pipe that is mortared into a larger concrete pipe with rocks near the intersection of Market Street and Old 115 Highway. (Lat: 41.308197, Long: -76.007207)

19. Recommend an improved grassed waterway swale in the area along Market Street and Old 115 Highway before the stormwater runoff drops into a concrete culvert with an 18-inch HDPE pipe that receives flow from both roadways then passes under Old 115 Highway into the wetlands on the Huntsville Golf Course grounds. (Lat: 41.308251, Long: -76.008135)

20. Recommend repair of the square flagstone stacked rock drop-off that holds groundwater and flow from pipe that drains through larger the HDPE pipe to the other side of the small cartway on the Huntsville Golf Course. (Lat: 41.308360, Long: -76.005759)

21. Recommend that the 24" HDPE pipe that carries flow from under Old 115 Highway and Market St. either be lowered to the level grade of the groundwater under the pipe or reconstruction of the outlet to a more cascading rock apron to dissipate any energy of storm flows to prevent a larger scour pool from developing at the outlet. (Lat: 41.308269, Long: -76.007744)

22. Recommend redirecting storm water drainage from Old 115 Highway to an existing culvert to avoid the deepening of the drainage ditch filled with rubble and rock to prevent further erosion along the road shoulder. (Lat: 41.308343, Long: -76.007493)

23. Recommend rebuilding a collapsed headwater near the HDPE pipe that is hidden across from Market Street on the Huntsville Golf Course and cleaning out the pipe that is half full of sediment and leaf litter. (Lat: 41.308422, Long: -76.007499)

24. Recommend a small rock apron at the end of the HDPE culvert passing under Hayfield Road due to the drop off to the drainage course along the road (Lat: 41.308218, Long: -76.008803)

25. Recommend the replacement of the older V-shaped concrete headwall culvert that is blocked with debris and rock and directs flow from the Penn-State Wilkes-Barre/Lehman Campus soccer fields under Old 115 Highway along Hayfield Road (Lat: 41.308114, Long: -76.008931)

26. Recommend a grassed waterway swale road shoulder improvement that runs along the Huntsville-Idetown Road right next to the pole with the "FARM FRESH EGGS" sign on the pole (Lat: 41.31805, Long: -75.99584)

27. Recommend removal of large woody debris and fallen trees that are lodged in the inlet of the 5' stone arched concrete culvert along Idetown Road just before the intersection with State Route 118 (Lat: 41.32998, Long: -76.00090)

28. Recommend a large riparian streamside restoration project on the property of the Lehman Nursery along an unnamed tributary to the Huntsville Reservoir where one of the fishery survey locations was assessed from Park Road to where the tributary flows under State Route 118. (Lat: 41.331793, Long: -76.00199)

29. Recommend a bank stabilization project that could help redirect the flow alignment under the concrete bridge on Park Road of the unnamed tributary. (Lat: 41.33293, Long: -76.00278)

30. Recommend a small riparian planting along the unnamed tributary instead of mowing it completely that flows under the concrete culvert on Idetown Road just west of 109 Idetown Road in Lehman Township and north of 114 Idetown Road; Identify property owner to see if there is interest in a future project. (Lat: 41.33697, Long: -76.00929)

31. Recommend a Vac Truck to clean out the leaf litter and trash from the square drop inlet concrete 18" culvert pipe along Idetown Road just west of 109 Idetown Road in Lehman Township.

32. Recommend a Vac Truck to clean out the leaf litter that is clogging up the 18" black HDPE pipe and 2 18" concrete pipes that are blocked with leaf litter carrying flow near 148 Vine Street beneath Idetown Road or replace the culvert with a larger one; Resident complained that it periodically fills up and overflows the road during storm events because of the continual blockage with the leaf litter and sediment. (Lat: 41.33835, Long: -76.01133)

33. Recommend a possible realignment of the large corrugated stormwater pipe that is not aligned with the unnamed tributary that crosses the road at the Village at Greenbriar below Willow Way to prevent scouring of the pool of water from the unnamed tributary that emanates from a forested wetland area above W. 42nd Street along State Route 415 across from Bryant's RV Showcase in Lehman Township. (Lat: 41.34164, Long: -76.00537)

34. Recommend the small repair of the collapsed headwall protection over the stormwater pipe in the parking lot of the Back Mountain Dance Studio off Briarcrest and Goodman Road, near State Route 415, where an unnamed headwater tributary crosses State Route 415 north of the studio that flows down from along Welsh Lane in Dallas Township. (Lat: 41.34373, Long: -76.00009)

35. Recommend possible realignment of the of black HDPE stormwater pipe to be more aligned with the unnamed tributary that is flowing downstream along Welsh Lane and E. 42nd Street in Dallas Township. (Lat: 41.34395, Long: -76.00027)

36. Recommend possible replacement of the 30" corrugated steel stormwater drainage pipe that is eroding due to corrosion below the parking lot of the Lake Lehman Early Learning Center.

37. Recommend a Vac Truck to clean out stone culvert along Idetown Road and rebuild the collapsed headwall on the other side of the road; 18" concrete pipe creates a scour pool and cascading effect on the downstream end of the pipe outlet that could be eliminated with a simple rock apron construction. (Lat: 41.30902, Long: -75.99020)

38. Recommend requesting another electroshocking survey with Trout Unlimited on Browns Creek above Chase Road into the two headwater tributaries to determine the wild trout population of the area.

39. Recommend an Invasives removal of upstream of bridge on Cobblestone Lane and Hillside Road and native riparian planting project. (Lat: 41.29776, Long: -75.95639)

40. Recommend the removal of the old stone wall upstream of inlet of bridge to allow for the creation of a wider floodplain area at the intersection of Hillside Rd, Huntsville Rd, Sutton Rd, Old Rte 115. (Lat: 41.30639, Long: -75.97472)

41. Recommend a cleanout of the debris buildup and a log obstruction below the culvert along Reservoir Road where there is a washout of the shoulder of the road across from Cameron Drive. (Lat: 41.32840, Long: -75.98270)

42. Recommend the removal of heavy knotweed Invasives on the inlet and outlet side of the dirt road along PA American Water Company property. (41.32111, Long: -75.97472)

43. Recommend additional rip rap or a grassed waterway swale along Reservoir Road to reduce the sediment at the outlet of the bridge looking downstream. (Lat: 41.33444, Long: -75.98861)

44. Recommend a streambank stabilization and rock armoring downstream of DAMA, along the left streambank, due to misalignment and severe undercutting of the streambank at the outlet of the bridge over the Dallas Memorial Highway. (SR 309) (Lat: 41.29250, Long: -75.90944)

45. Recommend replacement of the 3 metal corrugated pipe structures with one wide span bridge replacement to allow passage of high flows out of the wetland along Hardisky Road. (Lat: 41.28657, Long: -75.97501)

46. Recommend the removal of a severe barrier to brown trout migration below the Buckingham Street bridge near Pro's Produce. (Lat: 41.28194, Long: -75.89556)

47. Recommend the removal of Invasives Japanese knotweed along Main Street between Nichol's Truck and Teberio's Pizza. (Lat: 41.28500, Long: -75.89861)

48. Recommend the removal of invasive Japanese knotweed along Toby Creek near Wasserott's along the Dallas Memorial Highway (US Route 309). (Lat: 41.29111, Long: -75.90806)

49. Recommend the removal of a large fallen tree and woody debris blocking the left bridge culvert upstream of DAMA on Toby Creek. (Lat: 41.29317, Long: -75.91206)

50. Recommend a small cleanup of the tires in the stream along Newhart Road near Zimmerman's Collision Service on Chase Road. (Lat: 41.28972, Long: -75.95572)

51. Recommend a bridge inspection on Newhart Road due to a significant loss of the concrete beneath the bridge exposing rebar. (Lat: 41.28992, Long: -75.95470)

52. Recommend the cleanout of the drop inlet culvert across from Hillside Road and Chase Road that is coming from a spring. (41.29549, Long: -75.94893)

53. Recommend that The Lands at Hillside Farms to remove the small concrete dam along Huntsville Creek, behind the horse barn across from the Church Rd - Hillside Rd intersection; At the Final Draft Plan Meeting, Will Conyngham informed EPCAMR that it had been destroyed during the major flooding that occurred in the Wyoming Valley and Back Mountain during Hurricane Agnes in June of 1972. (Lat: 41.29728, Long: -75.93540)

54. Recommend removal of invasive species at stream crossing at the entrance to Stone Bridge Housing Development at the Hillside Rd, Cobblestone Ln intersection. (Lat: 41.29745, Long: -75.95463)

55. Recommend readjustment of pipe spanning Huntsville Creek tributary below crossing at Gross Rd. (Lat: 41.30278, Long: -75.96556)

56. Recommend debris removal at culvert near W 42nd and 415 intersection. (Lat: 41.34333, Long: -76.00639)

57. Recommend the removal of woody debris and brush in the channel below the bridge along E. 42nd Street. (Lat: 41.34750, Long: -76.00167)

58. Recommend a streambank stabilization project along an unnamed tributary that crosses under State Route 118 near the horse farm. (Lat: 41.33113, Long: -76.00115)

59. Recommend a small downstream streamside planting along Sutton Road and Gross Road and the safe removal of some hanging wires in the area. (Lat: 41.30417, Long: -75.96500)

60. Recommend a redesign of the stormwater along Sutton Road that is coming into a rock culvert (Lat: 41.30278, Long: -75.95111)

61. Recommend a dam inspection along the upstream side of the pipe culvert at Posten Pond along Cross Creek Road in the Blueberry Hill development since the structure seems to be losing concrete and looks weakened at the outlet of the pond. (Lat: 41.30700, Long: -75.96647)

62. Recommend a small streambank stabilization project at the inlet of the pipe on the upstream end of the tributary along Beaver Brook Road in the Blueberry Hill development. (Lat: 41.31115, Long: -75.96610)

63. Recommend a step pool or rock apron at the outlet pipes to allow for fish migration from the reservoir downstream. (Lat: 41.31167, Long: -75.96611)

64. Recommend the removal of small woody pine tree debris at the pipe to prevent blockage along Pinecone Lane. (Lat: 41.30528, Long: -75.95111)

65. Recommend the replacement of the rusted out metal corrugated culvert pipes along Reservoir Road. (Lat: 41.32537, Long: -75.97973)

66. Recommend a streamside riparian restoration project below the dam near the milk barn on The Lands at Hillside Farms to provide a cooler shaded habitat area for fish. (Lat: 41.29722, Long: -75.93639)

67. Recommend the removal of debris and heavy foliage at the inlet pipe along the bottom of the curved section of Church Road. (Lat: 41.29806, Long: -75.93694)

68. Recommend the removal of the duckweed and small dam in the unnamed tributary to Huntsville Creek east of the small duck pond near the greenhouses at The Lands at Hillside Farms that could allow for fish migration. (Lat: 41.29917, Long: -75.93389)

69. Recommend the removal of several dead maple trees that have crisscrossed one another and are leaning on live utility wires in Edwardsville Borough upstream of Valenti's Scrapyard on the inlet side of Toby Creek above US State Route 11. (Lat: 41.25361, Long: -75.91083)

70. Recommend the replacement of rusted corrugated culvert pipe at the intersection of Follies Road and Gates Road. (Lat: 41.29488, Long: -75.98830)

71. Recommend the removal of woody debris blockage at the inlet pipe and a rock apron or step-pool at the outlet pipe along Gates Road to prevent a larger scour pool from forming. (Lat: 41.29436, Long: -75.98827)

72. Recommend the removal of Japanese knotweed from Toby Creek near the impounding basin behind the Fine Wine and Spirits in the Luzerne Plaza. (Lat: 41.28028, Long: -75.89583)

73. Recommend the removal of Japanese knotweed from Toby Creek above and below the bridge on Evans Street in Luzerne Borough. (Lat: 41.28139, Long: -75.89583)

74. Recommend a major streambank stabilization project on the left bank looking downstream below the wooden deck bridge below Wildcat Falls along the Back Mountain Trail adjacent to the rear of the DAMA. (Lat: 41.29417, Long: -75.91056)

75. Recommend a streambank stabilization project along the right bank of Toby Creek looking downstream along Konopinski's. (Lat: 41.29692, Long: -75.92555)

76. Recommend the removal of large fallen trees that have created a dam on Toby Creek below the Dallas Memorial Highway (SR 309) bridge below the Trucksville Fire Company just above the confluence with Huntsville Creek. (Lat: 41.30111, Long: -75.92778)

77. Recommend the removal Japanese knotweed from Toby Creek below Hillside Road and the private driveway along the southbound lane of the Dallas Memorial Highway (US 309). (Lat: 41.29444, Long: -75.92194)

78. Recommend a streamside cleanup and removal of invasive Japanese knotweed north of W. Courtright Ave along the unnamed tributary to Toby Creek that runs along Courtdale Avenue. (Lat: 41.282096, Long: -75.907130)

79. Recommend a small streamside cleanup of trash and debris along the foundation wall and culvert that crosses over Courtdale Avenue just below the Hurricane Car Wash. (Lat: 41.282864, Long: -75.905338)

80. Recommend a small natural wood dissipators along the steep bank Paper Road that has an eroded channel that is carrying sedimentation down from the corner of Roy Street and Barry Street to a storm drain that outlets to the unnamed tributary to Toby Creek along Courtdale Avenue. (Lat: 41.283527, Long: -75.903933)

81. Recommend the removal of Japanese knotweed, trash, and a large amount of woody debris from the inlet side of a corrugated steel culvert pipe along Courtdale Avenue downstream and the hillside coming down from Valley View Drive. (Lat: 41.283156, Long: -75.903995)

82. Recommend a riparian planting along the unnamed tributary along Courtdale Avenue heading downstream from W. Courtright Street and upstream of the intersection with Cooper Street. (Lat: 41.283149, Long: -75.903989)

83. Recommend the realignment of the culvert that carries the unnamed tributary and stormwater from Courtdale Avenue to Toby's Creek beneath the Parking Lot Area of Skovish Pool & Spas to ensure the flow of the runoff is downstream instead being skewed and perpendicular to the natural flow of the stream channel. (Lat: 41.285760, Long: -75.900998)

84. Encourage the public to visit Skovish Brothers Pools & Spas, Inc. to see the wonderful artwork on the walls of the business that pay homage to the history of the Toby Creek native flora and fauna created by local artist Joanie Schooley. (Lat: 41.28590, Long: -75.90136)

85. Recommend to the Wyoming Valley Sanitary (WVSA), a large sediment removal and streamside cleanup project at the outlet to the Woodward Pump Station Flood Protection area on Toby Creek, just upstream of the K-Mart in Edwardsville, maintained by the Luzerne County Flood Protection Authority where there is a great deal of sediment deposits below the inside berm of the Luzerne County Levee Trail. (Lat: 41.259702, Long: -75.906778)

86. Recommend a roadside cleanup along the shoulder of the Dallas Memorial Highway (State Route 309) along the southbound lane right in the Toby Creek Gap just down from the large double culverts that cross under the Highway heading towards the DAMA.

87. Recommend the replacement of a broken concrete culvert filled with sediment in The Huntsville Golf Club. (Lat: 41.320072, Long: -76.015741)

88. Recommend cleaning out sediment in the drop-in culvert on The Huntsville Golf Club since the pipe is buried under the sediment on both sides of the cart path near the entrance to the Golf Course. (Lat:41.32077, Long: -76.01120)

89. Recommend a small log deflector along the cart path to keep high flows from washing over the cart path. (Lat: 41.3111, Long: -76.00944)

90. Recommend a rock apron at the unnamed tributary outlet of the concrete culvert pipe where a 6" drop is causing some minor streambank erosion at the corner of The Huntsville Golf Club. (Lat: 41.314844, Long: -76.003628)

91. Recommend the replacement of the black 3' HDPE corrugated pipe that is too small to handle the flows of the unnamed tributary to Browns Creek under Gates Road which is very constricted and causes a large scour pool and cascading waterfall at the outlet of the pipe. (Lat: 41.294018, Long: -75.98865)

92. Recommend the replacement of the steel corrugated pipe that is well above the stream channel causing a large scour pool to develop and an impediment to aquatic passage along Follies Road; A fallen tree also needs to be removed from across the channel. (Lat: 41.294784, Long: -75.988297)

93. Recommend the replacement of the two smaller black HDPE corrugated pipes with a larger wider one to prevent the scour pool that is occurring on the outlet side of the two existing pipes along the end of Hardisky Road. (Lat: 41.294298, Long: -75.972671)

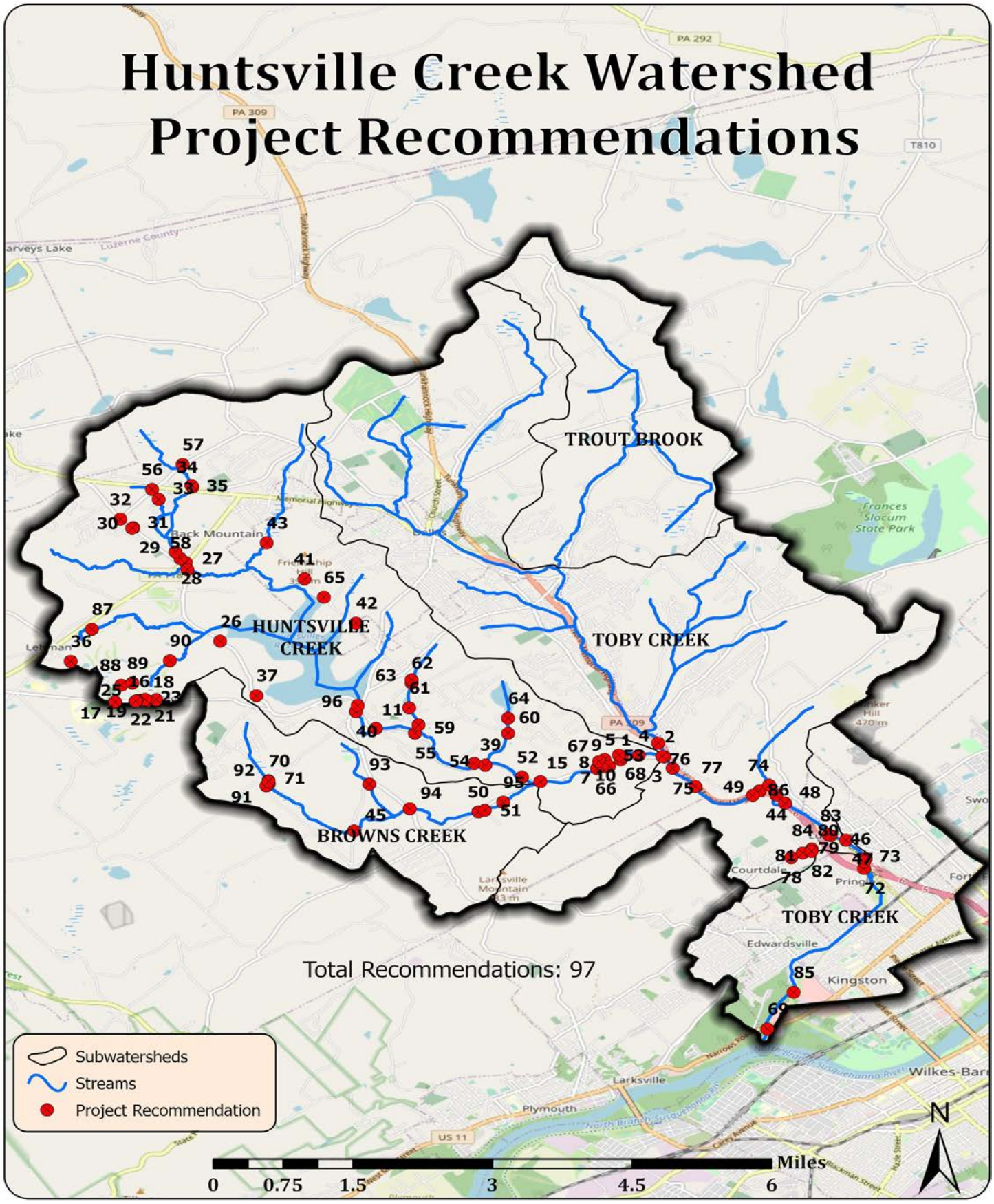
94. Recommend the construction of a small rock step pool or a log sill to allow for aquatic fish passage over the concrete drop from the bottom of the bridge below Huntsville Road. (Lat: 41.290210, Long: -75.966379)

95. Recommend the replacement of the corrugated steel culvert pipe that is much too small to handle the flows of Browns Creek at this location east of 323 Chase Road where a bridge crossing would be more suitable due to the width of the stream channel. (Lat: 41.291302, Long: -75.951866)

96. Recommend that PA American Water Company begin operating their bypass base flow valves during non-spilling periods at the Huntsville Reservoir to maintain aquatic life downstream so that the aquatic and fish life are not negatively impacted downstream on Huntsville Creek. (Lat: 41.30737, Long: -75.97443)

97. Recommend the formation of a Toby Creek Watershed Association that has been alluded many times in the past by the Luzerne Conservation District and other partners.

Map 17: EPCAMR Recommended Project Location Map



FUTURE FUNDING GRANT OPPORTUNITIES AND POTENTIAL PARTNERS

EPCAMR has provided numerous known possible funding sources for future opportunities to implement and take the Huntsville Creek Coldwater Conservation Plan one step further. Grants, fundraisers, foundations, joint-ventures, public-private partnerships, providing local in-kind matching funds and letters of support and commitment are all avenues that should be pursued by any existing partners within the entire Huntsville Creek and Toby Creek Watershed and the municipal governments. EPCAMR is just one of many partners that will undoubtedly join others in the pursuit of implementation projects recommended in the future. Local partners within the watershed that are eligible for applying for funding are encouraged to do so to help in carrying out the commendations above. EPCAMR plans on following up with our partners following the completion and approval of the Huntsville Creek Coldwater Conservation Plan to see what priorities many of them have for the next few years. A multitude of funding sources and additional partners were provided in the Upper Toby Creek Coldwater Conservation Plan[82] on pages 85-88 that are all relevant and applicable to the Huntsville Creek Coldwater Conservation Plan.

SUMMARY AND CONCLUSIONS

EPCAMR and our partners in the project over the course of the last 22 months traversed as many miles of streams that were publicly accessible or located along the major roads and bridges where stream crossings and culverts were present and good visual assessments could be obtained. Many private landowners talked to us when we were out during the assessments and provided us with great information and access to their properties to conduct the coldwater conservation assessment. Our intentions were to document any and all kinds of projects that we encountered within the Huntsville Creek Watershed as possible during the project period that were related to coldwater fisheries improvement, protection, and restoration. A number of private landowners will need to be followed up with as indicated in the Recommendations section of the report. The windshield survey that we were able to conduct based on the limited funding that we had didn't allow us to follow up with every single landowner or identify all landowners within the watershed for further discussions.

There are also partnerships within the Back Mountain that EPCAMR will continue to build on as well as a number of regional environmental non-profits, conservation groups, the local Stanley Cooper Sr. Trout Unlimited Chapter, Luzerne Conservation District, DAMA, The Lands at Hillside Farms, Wyoming Valley Sanitary Authority (WVSA), North Branch Land Trust, The Back Mountain Trail, Pennsylvania Environmental Council, and the colleges and universities including Misericordia University and The Pennsylvania State University Wilkes-Barre/Lehman Campus, in addition to the local municipalities within the watershed.

Cost estimates, engineering design, permitting, and construction costs were not a part of the coldwater conservation plan. They are to be determined as a part of the numerous recommendations in the report. It is anticipated that those costs will become a part of future grants where engineering firms, consultant firms, the municipal engineers, or other partners can work with other entities to come up with those costs specific to the projects that would be proposed. There are too many factors that are assumed to be able to give accurate cost

[82] Upper Toby Creek Coldwater Conservation Plan

estimates when in some cases, additional discussions will need to be had first with private landowners or companies that need to first allow for permission and consideration of the projects to take place to make conservation improvements throughout the watershed.

EPCAMR would like to personally thank Kathleen Lavelle, Trout Unlimited and her team for providing us technical assistance during the electroshocking trout survey at several locations within the watershed. EPCAMR would finally like to personally thank John Levitsky, Watershed Specialist for the Luzerne Conservation District for his expertise and technical assistance and advice on how to move forward on may of the projects within the watershed and providing us with contacts with landowners that were supportive of conservation efforts within the Huntsville Creek Watershed. The Luzerne Conservation District has already completed several watershed projects within the Upper Toby Creek watershed and are willing partners with additional funding and is ready to work with community partners to pursue additional funding for some of the recommendations included in the Huntsville Creek Coldwater Conservation Plan.

EPCAMR would also like to thank Tom Mayka, DAMA Stormwater Coordinator for offering assistance to us on more than one occasion while we were conducting our field monitoring and culvert assessments. EPCAMR would also like to finally thank Chet Mozloom, Executive Director of The Lands at Hillside Farms that allowed EPCAMR Staff access throughout the farm to assess the stream conditions and fishery for the development of the plan. His participation in the electroshocking survey and allowing access to the EPCAMR Staff to utilize the parking lots as our rendezvous points for conducting our field assessments throughout the watershed was greatly appreciated.

One of the biggest lessons learned is that water within the Huntsville Creek watershed has many conveyances from the headwaters, farm ponds, and wetlands, down through the more rural and agricultural areas where stormwater issues are the major cause of concern within the path of the Huntsville Creek drainage down to the confluence with the Toby Creek below the PA American Water Treatment Plant in Huntsville.

However, the watershed has excellent buffering capacity along its riparian corridors and headwater wetlands. There are **97** Recommendations in the report that could lead to positive improvements to both the watershed, private lands, public lands, and the fishery population within the watershed. All wild brown trout found in the study were only found below the Hillside dam a The Lands at Hillside Farms. EPCAMR is confident that the removal of the dam will allow for expansion of the population for several miles upstream on Huntsville Creek below the Huntsville Dam and up into the Browns Creek major tributary. Now that a baseline fishery survey has been established, it will be vital to go back following the eventual removal of the milk barn dam and see how far upstream the populations swim upstream and colonize the additional habitat. The next step will be for stakeholders to review the entire plan and get together in a forum where a prioritization of the potential projects can be reviewed and discussed in further detail to see if there are any low hanging fruit projects that can be worked on by community members on a volunteer basis and also look at larger projects that may need to be partnerships with private landowners, businesses, or corporations upon further discussion.

Since the PA DCNR is especially concerned with the " EPCAMR Recommendations" portion of all final plans, EPCAMR has tried to be recommend very specific, attainable, and fundable, shovel ready recommendations/suggested action items that can be funded either with CHP Implementation grants, can serve as possible mitigation projects in the future, or would become eligible for known and existing alternative funding programs.

The Foundation for PA Watersheds are focused on priority watersheds they want to see where it has a high likelihood of being able to support trout into the future if certain steps are taken to improve, restore, conserve, protect, the existing resource. EPCAMR took into consideration future development pressures, potential for temperature increases, and whether or not the Huntsville Creek watershed is where wild trout species, with a little help from habitat improvement projects, streambank stabilization projects, riparian buffer plantings, and culvert replacements or rehabilitation can survive and thrive.

EPCAMR looks forward to continuing to build on our relationship with our partners in the Huntsville Creek, Upper Toby Creek, and Lower Toby Creek watersheds as we look towards future implementation projects.

HUNTSVILLE CREEK WATERSHED RESEARCH AND FIELD RECONNAISSANCE OBSERVATIONS WITH EPCAMR STAFF AND VOLUNTEERS

EPCAMR recorded a brief summary account of some of the major work done for the Huntsville Creek Coldwater Conservation Plan in the watershed and the Lower Toby Creek watershed during the development of the Plan.

December 2018- EPCAMR made official requests for Letters of Support from all of the municipalities, local political State Representatives and Senators, DAMA, The Pennsylvania State University-Wilkes-Barre/Lehman Commonwealth Campus, Stanley Cooper Chapter of Trout Unlimited, and regional partners within the watershed such as The Lands at Hillside Farms, The North Branch Land Trust, and the Pennsylvania Environmental Council-NE Office, to support the submission of the Coldwater Conservation Planning Grant Application by EPCAMR for **$5000**; All Letters of Support are included in the **Appendix D**

1-9-2019 Talked with J. Scott Brady, Stanley Cooper Chapter of Trout Unlimited, who informed EPCAMR that he would be touching base with Chet Mozloom, The Lands at Hillside Farms, about doing a casting instruction clinic, educational opportunities, and supporting streambank stabilization improvement projects as necessary on the property

1-18-2019 Informed by J. Scott Brady that John Levitsky, Luzerne Conservation District Watershed Specialist had updated him on a plan that he's working on with Chet to study and determine the best approach to considering either the removal or stream improvement structure to allow for migration of fish above the small dam that is located upstream of the Dairy Store on the Dairy Barn side on Huntsville Creek. There are discussions about moving the barn taking other steps that will improve the creek. They are already working on a plan to do some riparian plantings that will take away some of the effects the cows have had on the stream historically. EPCAMR informed J. Scott Brady that we would be taking water temperature readings as a part of our water quality monitoring during the assessment of the watershed on Huntsville Creek.

2-25-2019 EPCAMR submitted our previously submitted application to PA Council of Trout Unlimited's Coldwater Heritage Program Manager, Ashley Wilmot, with a slight revision and reduction in the overall budget of only $250, leaving the total request at **$4750**

2-28-2019 Interviewed Sean Michael Asher Banul, Penn-State Wilkes-Barre student, for an internship to work with EPCAMR on developing the Huntsville Creek Coldwater Conservation Plan and brought him on board with EPCAMR for the Spring/Summer 2019

March 2019 Sean Michael Asher Banul started inventorying and investigation headwater streams and culverts initially near the Penn-State Wilkes-Barre Campus and areas surrounding the Huntsville Reservoir
3-26-2019 Reviewed the presentation, description, and locations of culverts and stream crossings within the Huntsville Creek watershed surveyed by Sean Michael Asher Banul

4-3-2019 Reviewed another presentation compiled by Sean Michael Asher Banul for the Back Mountain Tributaries Upstream of the Huntsville Reservoir where he ordered them with their photos based on their locations around the watershed

4-8-2019 Informed Sean Michael Asher Banul that Mark McCormick, Club Manager for the Huntsville Golf Course, was more than happy to allow EPCAMR to access the grounds and the course to drive around in a cart to survey and assess any streams and tributaries or culverts that run through the course

4-17-2019 Surveyed the watershed streams of Huntsville Creek around the Huntsville Golf Course lands with Sean Michael Asher Banul and Jessica Britten, EPCAMR Spring Watershed Outreach Intern from King's College

5-8-2019 Reviewed Sean Michael Asher Banul's and Jessica Britten's combined work and presentation of the photos and areas assessed within the Huntsville Golf Course of the tributaries within the Huntsville Creek watershed

5-23-2019 Reviewed Sean Michael Asher Banul's presentation of the photos and areas assessed within the Brown Creek tributary and areas along Huntsville Creek during following some precipitation events the week prior

8-14-2019 Submitted a request to Rachel Kester, Program Manager for PA Trout Unlimited's Coldwater Heritage Planning Program to apply to their TU Technical AMD Assistance Grant Program to have an electroshocking survey completed in the Huntsville Creek watershed; EPCAMR submitted it early to assist John Levitsky, Watershed Specialist with the Luzerne Conservation District to help possibly secure some funds and go after Eastern Brook Trout Venture funding and other sources for the area for a dam removal at The Lands at Hillside Farms to reconnect some additional mileage downstream of Huntsville Creek to the Toby Creek watershed along State Route 309 in the Back Mountain. John needs to have some certainty that either wild brook or brown trout are in the Huntsville Creek area and the Browns Creek area before he can pursue funding. EPCAMR had talked with Kathleen Lavelle, TU, about this area and we were initially going to hold off on the larger biological survey for the entire watershed until 2020, but John could really use the push for this year to work a few sections in the watershed.

8-15-2019 John Levitsky had informed Rachel Kester that the Luzerne Conservation District had received a Growing Greener grant in 2015 for a milk chilling dam demolition on the Lands at Hillside Farms anticipating that the costs would be much less. At present, PA DEP Dam Safety has requested more work than was originally projected. Engineering costs are consuming the funds for the extraction. The scope of work is growing and if wild brook trout were present, the partners may be able to pursue Eastern Brook Trout Joint Venture for additional funding for extraction of the dam. Another possibility is aquatic connectivity funding for all species as an alternative that he was speaking to Tom Kehler at US F&WS at Lamar about pursuing. Both approaches need a coldwater assessment. Stanley Cooper Trout Unlimited has approached EPCAMR and the Luzerne Conservation District about any coldwater enhancements that can be achieved in the Huntsville Creek area.

Presently there has been a riparian restoration for a majority of the stream area on Hillside Farms along the Huntsville Creek. The macroinvertebrate diversity is very good, anecdotally, until more official scoring is completed. EPCAMR and the Luzerne Conservation District keep getting hearsay evidence from knowledgeable fishermen indicating that both brook and brown trout are in Huntsville and Brown Creeks. The survey would help both in scheduling the demolition to avoid spawning impacts and to increase the probability of securing funds to enhance the natural coldwater spawning success. John had seen the brown trout stage at the base of the dam in September - October time frame and had seen unidentified trout in the small pond area during random times. Positive identification of presence or absence would go a long way in our protection of coldwater species in the watershed.

8-21-2019 EPCAMR explained to Rachel Kester and her TU Supervisor why we submitted the application to the AMD Technical Assistance Program and the reason why it was important to apply for the fishery survey. The downstream area of Toby's Creek no less than approximately 1.8 miles downstream from the dam on Huntsville Creek, is where the AMD impacts and abandoned mine impacts are located in the Toby Creek Watershed.

We are addressing the AMD impacts downstream and abandoned mine reclamation projects through other efforts with the Wyoming Valley Sanitary Authority and the Dallas Area Municipal Authority and looking for other BMPs and funding sources for sediment reduction projects, riparian restoration, streambank stabilization, green infrastructure, land reclamation, and mine pool work outside of both the Huntsville and Upper Toby Creek CHPs through our work with the 319 Program to identify them and recommend projects. Since the focus was on the conservation and preservation or improvement of the coldwater fishery habitat with the CHPs in both of these watersheds, we ended our study area of the CHP with the confluence of Huntsville Creek (as one CHP) with the Upper Toby Creek (the second CHP) drainage where it comes together just below the Carverton Road bridge when another bridge culvert crosses the creek before the two streams combine.

While we do not believe that there is AMD directly impacting the Huntsville Creek subwatershed, we our trying to make the case that if we could establish that there are native fish (brook or brown or both) present above the dam that is being proposed to be removed that we would in effect be able to connect up an additional estimated **1.8** miles of stream habitat for aquatic connectivity for those trout species further downstream in the watershed. Should this happen, we can then argue an even stronger case for further AMD and abandoned mine land restoration of the lower watershed to further restore additional habitat and stream miles in the lower watershed. The survey could also establish a baseline for future fishery studies when the dam is removed that would allow for the suspected browns and possible brook trout, if found, to migrate further upstream on Huntsville Creek and into Brown Creek, the only named tributary to the Huntsville Creek.

We already know from the survey on the Upper Toby's Creek that the wild brown trout population is just upstream of the Huntsville Creek confluence in abundance. John and I think that they will have no problem moving down and then upstream into Huntsville Creek once the dam is removed. While John has witnessed brown and brook trout below the dam, we really would like to have official confirmation of what is there to

help support our efforts to go after additional funding through the various funding sources that we previously mentioned.

8-28-2019 EPCAMR communicated with Kathleen Lavelle-Field Coordinator for the PA Coldwater Habitat Restoration Program-TU, who coordinates the electroshocking fishery surveys about scheduling some time to come out and assess a few sites in the Huntsville Creek watershed for the CHP. John Levitsky-Luzerne Conservation District Watershed Specialist, offered to assist with setting up the survey and participating with everyone by coordinating with Chet Mozloom-Executive Director, from The Lands at Hillside Farms.

9-4-2019 Lauren Perry, EPCAMR Summer Watershed Outreach Specialist Intern worked on a draft PowerPoint of the Huntsville Creek CHP Plan for review and comment

9-13-2019 Kathleen Lavelle-TU provided us with some dates in mid-to-late September that her crew could come out and conduct the surveys and EPCAMR coordinated with our partners after the AMD Technical Assistance request was approved; Everyone settled on September 23 for the day of field work and conducting the fishery survey starting below The Lands at Hillside Farms; Tom Mayka-Stormwater Coordinator offered to lend a hand and help out for the day with EPCAMR

9-23-2019 EPCAMR, TU, Luzerne Conservation District, The Lands at Hillside, and DAMA all participated in a day of electroshocking and surveying sites previously selected by John Levitsky and EPCAMR Executive Director

11-21-2019 EPCAMR followed up with Rachel Kester, PA TU CHP Program Manager to give her an update on the status of the work in progress for the Huntsville Creek CHP and let her know about how the electroshocking survey went with Kathleen Lavelle, her team, and EPCAMR's partners

5-11-2020 EPCAMR reviewed the culvert areas that we will continue to assess in the Summer of 2020 created by Steve Cornia-EPCAMR GIS Watershed Outreach Specialist; Some Upper Toby Creek culverts were included that we have missed or could not get to due to private landowner access and permission

5-19-2020 Steve Cornia, EPCAMR GIS Watershed Outreach Specialist took the lead on the Story Map for the Huntsville Creek CHP; Coordinated with the work the EPCAMR Interns and Executive Director have put together

5-26-2019 EPCAMR Executive Director reviewed the comments of the EPCAMR Interns and Staff on the draft plan development and presentation materials for the Huntsville Creek CHP and provided detailed comments on changes and edits that are necessary to improve the document narrative and format

6-3-2020 EPCAMR approved crossing codes and culvert assessment entries into the NAACC database

Summer 2020 EPCAMR created a postcard to send to landowners/private property owners to inform them of our work and our interest to survey culverts and bridges that are along private roads throughout the watershed that we deemed inaccessible while in the field without obtaining proper permission to enter the roads or the

streams in those areas; Postcards were mailed out to those property owners that we identified to see if they would respond positively to our request or potentially deny access for their own personal reasons

8-6-2020 EPCAMR requested a 3-month extension due to the pandemic to complete our narrative portion of the Huntsville Creek CHP; EPCAMR provided Rachel Kester with an update on the great work that the Staff and Interns were doing despite the circumstances of the pandemic and limited ability to get into the field since the Spring 2020; EPCAMR was cautiously optimistic that everything will be completed by December 31, 2020

8-14-2020 EPCAMR received approval for our extension from Rachel Kester-PA TU through Dec. 31, 2020

9-15-2020 EPCAMR received from Shawn Rummel-Lead Science Advisor for TU, the completed Huntsville Creek Fishery Survey for inclusion in the Huntsville Creek CHP included in **Appendix C**

Fall 2020 EPCAMR continued to write the draft final narrative report and prepare the Recommendations Report for the Huntsville Creek CHP

December 2020 EPCAMR continued to write the narrative report and finalize the draft final narrative report and prepare the Recommendations Report for the Huntsville Creek CHP; Sought any additional project recommendations from the WVSA and DAMA that EPCAMR could include in the Recommendations Report

January 2021 Convened a Zoom informational meeting with the public, municipal officials, and partners within the watershed on January 27, 2021, to review the draft final plan prior to adding comments and submitting the final Huntsville Coldwater Conservation Plan to PA Council of Trout Unlimited's CHP Program Coordinator, Rachel Kester

LOWER TOBY CREEK WATERSHED STUDY AREA

In addition to the Huntsville Creek Watershed, EPCAMR has conducted analysis and surveying of the Lower Toby Creek Watershed from the steep, unnamed tributary to Toby Creek, locally known as "Wildcat Falls" behind the Dallas Area Municipal Authority, through Luzerne, Pringle, and Edwardsville Boroughs, all the way to the confluence with the Susquehanna River. The purpose of including this relatively small additional study area was to cover all of the Huntsville Creek Watershed and downstream area to complete a full, comprehensive assessment of the entire Toby Creek Watershed.

WATERSHED DESCRIPTION AND BACKGROUND INFORMATION

The Lower Toby Creek study area is an area that is geographically and hydrologically still a part of the Toby Creek Watershed's main stem, which is a tributary to the Susquehanna River that comes to the confluence with the larger river system in Edwardsville Borough. It is very near its base level, being fed by the Huntsville Creek and Upper Toby Creek watersheds. Its overall stream length is roughly **10.03** miles. [31] A significant portion of the stream is channeled below ground as a flood control measure as it travels through Kingston Borough. The historical past industry that dominated the scene of the entire Wyoming Valley was Anthracite Mining. Several mine collieries existed within this study area where coal was mined, hauled, sorted, sized, processed, cleaned, and shipped to various markets around the region and State.

WATERSHED LANDMARKS AND HISTORY

Harry E. Colliery:

The Harry E. Colliery is one of the most prominent landmarks of the watershed. A major estimated $12M reclamation effort is currently underway which began in 2018 by EPCAMR, Olympus Power, Pagnotti Enterprises, Swoyersville Borough, and Keystone Reclamation Fuel Management, LLC. An aerial drone flyover created by EPCAMR is included in the reference to the project. There are an estimated **500,000** tons of waste coal to be removed from the **55** acre site; the working area is only **28** acres, however. The site contains a **55** foot culm bank, subsidence areas, spoil areas, an impacted water source, and retired equipment. [83] Approximately **7.5** acres of the first 28 acres to be reclaimed is in the process of being donated to Swoyersville Borough by Pagnotti Enterprises for a public, greenspace, recreational community athletic area. Market conditions are slowing down the removal of the waste culm during the Summer and Winter of 2020 due to the COVID-19 pandemic, however, EPCAMR has received an extension on a PA Abandoned Mine Land Pilot grant to continue working on the project through the Fall of 2020, in the hopes that the market conditions bounce back and the Co-Generation Industry plants (Panther Creek Power and Northhampton Generating), where the waste culm is going to in order to be mixed with limestone and burned in the circulating fluidized bed boilers will pick back up again. EPCAMR is working with the industry trade association, ARIPPA[70], to continue to gain support and to advocate for the waste coal industry that is vital to the continued reclamation of our abandoned mine lands in the Lower Toby Creek and Abrahams Creek Watersheds, in this particular case.

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[83] EPCAMR: Swoyersville Culm Pile Removal AML Pilot Project

[70] ARIPPA

Map 18. Harry E. Colliery Site

The Harry E. Colliery was home to the Harry E. Breaker, operational until the 1970s. According to the *Citizens Voice* [84], the breaker received coal from Forty-Fort and Harry E. mines. It produced 2,000 tons of coal daily, cost $150,000 to construct, and was quoted as being “immense”. [85]


[86]

Figure 47. Harry E. Colliery Breaker

[84] "Harry E. breaker was ahead of its time", Citizens Voice

[85] “The Black Diamond”, J.K. Dering and Dering Coal Company, 1905, Vol. 34. No. 1, pp. 244

[86] Northeast Pennsylvania Photos of Local Places: Harry E. Breaker

The Loree Colliery:

The Loree Colliery was owned by the Delaware and Hudson Canal Company [87,88]; it was opened in 1876 in Larksville Borough until consumed by a fire, and moved to different street in the same town in 1895. The colliery output 4000 tons of coal daily until yet again, it caught fire in 1919; another breaker immediately was established due to the colliery's high output. Within its first year of operation, the colliery output 1.3 million tons of coal and employed over 2,000 workers. Early construction of many of the breakers were wooden that often led to fires and accidents.


[89]

Figure 48. Loree Colliery Breaker

During the 1960s, the Loree Breaker's production slowed and eventually came to a stop as coal was produced at competing breakers. While the breaker remained idle, its site continued to be used for gathering fine coal. The breaker was finally torn down in 1993 and its remnants still remain.

Woodward Colliery:

The Woodward Colliery was constructed in 1883 by the Delaware, Lackawanna, and Western Railroad Companies. It mined into the Red Ash coal vein, the deepest vein in the Wyoming Valley. The original breaker operated until 1916 when its stakeholders tore it down to rebuild it from steel and concrete; it was purchased in 1921 by the Glen Alden Coal Company. Its production rate was on average, 700,000 tons of coal annually. [90][91]

Despite its productivity, it experienced several explosions. In 1916, a gas pocket explosion killed 3. In 1925, there was another gas explosion, killing 5, and burning 5. Lastly, 2 miners were killed in a gas explosion that

[87] Northernfield.info: Loree Colliery

[88] undergroundminers.com: Loree Colliery

[89] Northernfield.info: Loree Colliery (1976)

[90] Northernfield.info: Woodward Colliery

[91] Wikipedia.org: Coal Mining in Plymouth PA

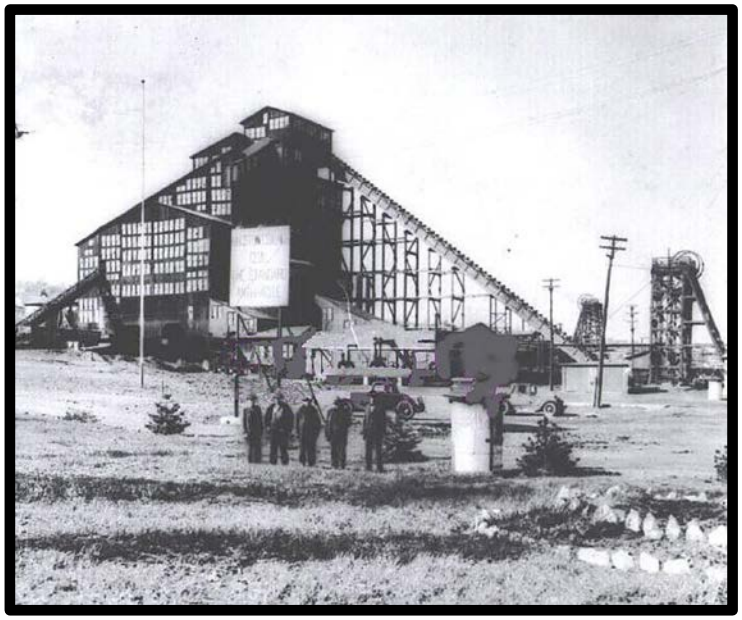
buried another 5 miners alive; this was caused by the fan house being out of commission. In 1969, the colliery closed as its production declined severely.[92]

[93]

Figure 49. Woodward Colliery: Breaker and Toby Creek

The Kingston Colliery:

In 1864 the Kingston Coal Company, began excavation of the Kingston Colliery's breaker. The company expanded and established several other collieries within the Kingston and Edwardsville area. The collieries produced nearly 500,00 tons of coal annually. In 1891, several of the collieries were destroyed in mine fires. Operation finally ceased in 1940. [94,95]



[96]

Figure 50. Kingston Coal Breaker

[92] US Mine Disasters: Woodward 1927

[93] Woodward Colliery: Breaker and Toby Creek

[94] Northernfield.info: Kingston Colliery

[95] Wikipedia.org: Coal Mining in Plymouth PA

[96] Kingston Coal Breaker

The Black Diamond Colliery:

This colliery was located in Luzerne Borough and began operation in 1880. Its ownership changed frequently. It output over **100,000** tons of coal yearly and production ceased in 1947. [97]


[98]

Figure 51. Black Diamond Breaker

East Boston Colliery:

The East Boston Colliery, location on the west bank of Toby Creek in Pringle Borough, was founded in 1870 by Consumer Coal Company. Annually it produced roughly **125,000** tons of coal. The impounding basin on Toby Creek was built in 1943, and the breaker's operation eventually came to a halt. From 1947- 1956, the site was used exclusively as a mine and the breaker never operated. [99,100]

[101]

Figure 52. Impounding basin shown (on left) with the East Boston Colliery just west of it in 1939 at the intersection of Grove and Evans Streets

[97] Northernfield.info: The Black Diamond Colliery

[98] Black Diamond Breaker

[99] Northernfield.info: East Boston Colliery

[100] History - War Department. (1943). Report of the Chief of Engineers, U.S. Army, 1942. Washington D.C.: Government Printing Office. Retrieved from: Google Books

[101] Wyoming Valley Anthracite Coal Mining: East Boston Colliery

Pettebone Colliery:

Between Kingston Borough and Forty-Fort Borough, laid the Pettebone Colliery, established in 1882. The Delaware, Lackawanna, and Western Railroad Company owned the operation before it changed hands in 1921 to the Glen Alden Coal Company. In 1925, a cave-in occurred 700 ft below the surface and killed 7. In 1931, the colliery shut down, but reopened only in 1948 for coal bank usage. In the Pettebone Colliery's most productive times, it produced 225,000 tons of coal annually.[102,103] Tom Supey, Anthracite historian, former tour guide for the Anthracite Heritage Museum's Lackawanna Coal Mine Tour, and miner, recalled that by 1939 the Pettebone was finishing up their operations. His father had told him that they had problems, with quick sand and no rock in places to help support the mine roof. It was dangerous mining with those conditions. They closed shortly after and that there was a lot of mine subsidence in the area as a result of bad roofing conditions and the quicksand. In 1984, a shaft opened up in the Green Acres development and one resident's entire basement dropped into the mines.

Figure 53. Pettebone Colliery in 1905 (on the left) and in 1939 (on the right) along Toby Creek where the Green Acres Development is now located

Toby Creek Impounding Basin:

The Toby Creek Impounding Basin is located in Pringle Borough, and is approximately **10.7** acres. There is a seemingly noticeable loss of flow entering the basin after Toby Creek flows through the Gap from Kingston Township into Courtdale and Luzerne Boroughs, where we suspect that there is some flow loss into the underground mine workings where the deeper veins that outcrop to the surface have been mined out along the flank of the Larksville Mountain range. Constructed as part of the Wyoming Valley Flood Control System along with the Woodward Pump Station and the **6,600** feet of concrete pipeline, the basin was completed by the United States Army Corps of Engineers in 1943 to prevent creek water from contributing to the Susquehanna River's flooding. A 1989 report from the United States Army Corps of Engineers reported that the

[102] Northernfield.info: Pettebone Colliery

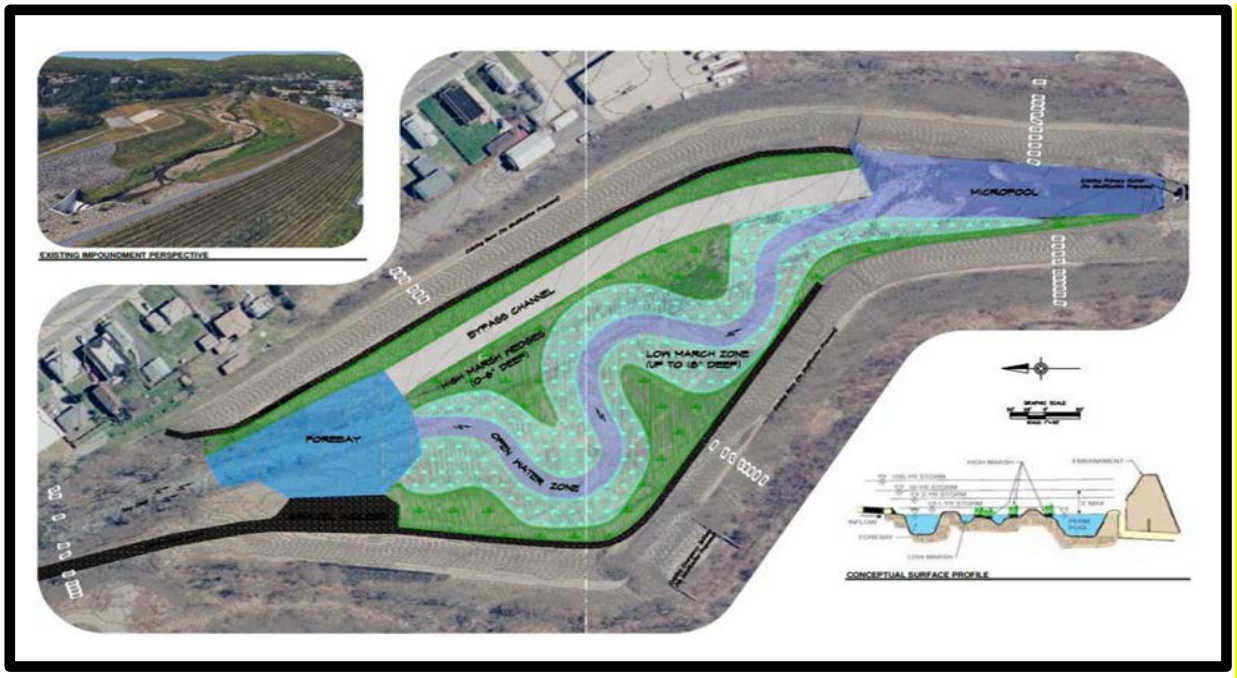
[103] Glen Alden Coal Company Pettebone No. 6 Colliery Roof Fall

basin had prevented $650,000,000 in flood damage up until that point. Many of the reports on flood control can be found on the Luzerne County Flood Protection Authority website.[104]

In 2009, a project to revitalize and elevate the basin was completed by the United States Army Corps of Engineers and KC Construction; the basin was elevated with more 100,000 cubic yards of earth and 6,500 cubic yards of rip rap. In 2010, Phase 2 of the revitalizing was complete, including installing a new concrete spillway on the west side of the basin. [91, 92, 93, 94]

[105]

Figure 54. Woodward Pumping Station



[106]

Figure 55. Toby Creek Impounding Basin Revitalization Sketch

[104] Luzerne County Flood Protection Authority

[105] Woodward Pumping Station: picryl.com

[106] HRG Engineering: Toby Creek Impounding Basin: Revitalization Sketch

Buck Mountain Quarry:

The Buck Mountain Quarry's main entrance is 500 Main St., Swoyersville, PA. It is a **86.5** Acre sand and gravel quarry which produces **106,000** tons annually. [107]

Map 19: Buck Mountain Quarry Satellite View, Swoyersville Borough

[107] PA DEP: 2018 Industrial Minerals Surface/Underground Mines Reporting Production

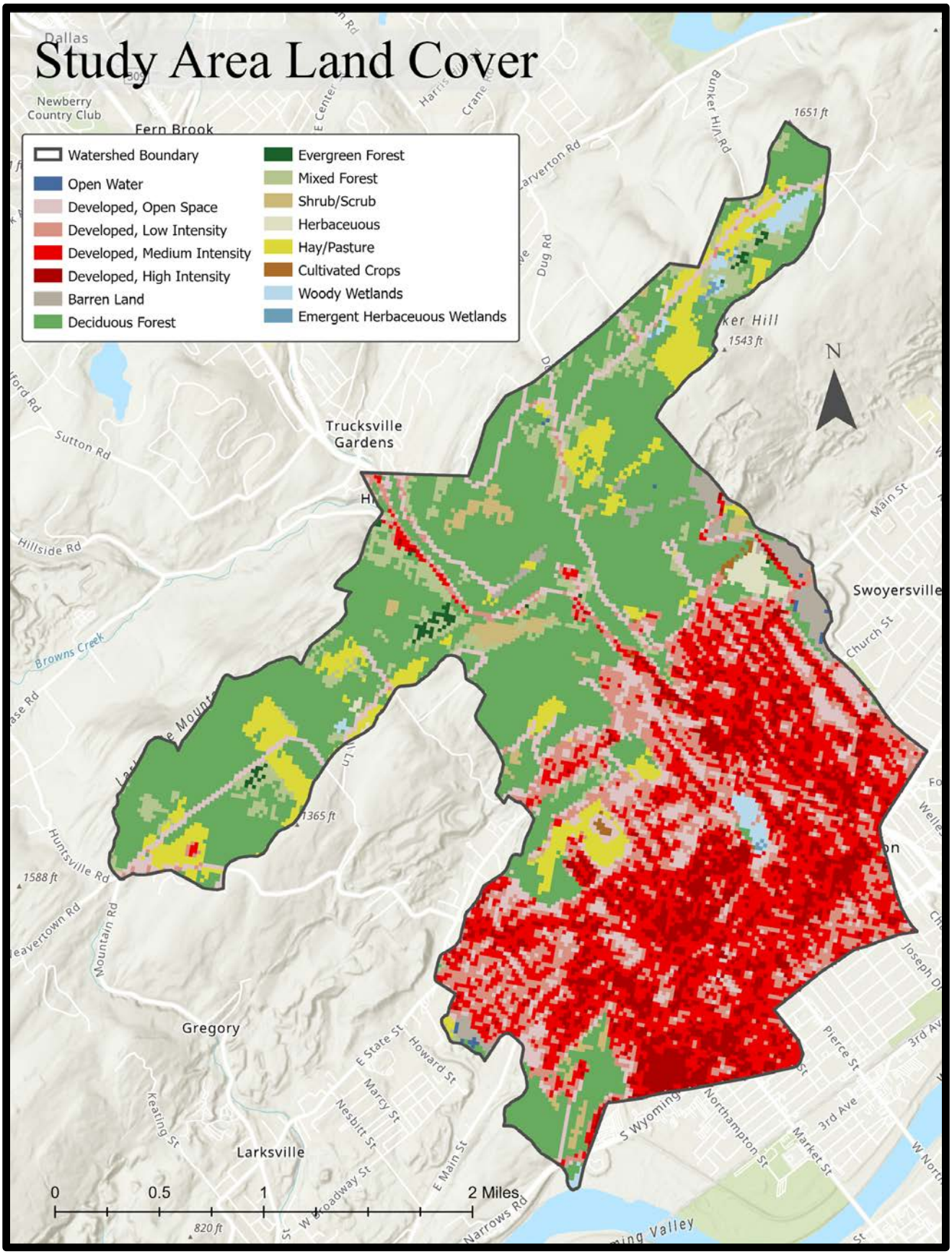
LAND COVER CHARACTERISTICS OF THE LOWER TOBY CREEK STUDY AREA

The Lower Toby Creek Study Area is covered predominantly by forest (deciduous, mixed, and evergreen) which accounts for *(40.45%) of land cover; deciduous forest is dominant*. Developed areas (low - high intensity, open space) collectively cover *(48.76%)* of the watershed. Development is concentrated near the watershed's southern half as Toby Creek approaches the Kingston, Edwardsville, and Pringle Boroughs. Agricultural lands (Cultivated Crops, Hay/Pasture) account for only *(6.13%)* of the land cover. The least pertinent land covers are open water and wetlands, collectively accounting for *(1.09%)*. [63]

Table 13. Land Cover Statistics

Land-Use	Count	Area (Square Meters)	Percentage of Land Cover
Open Water	22	19,800	0.10%
Emergent Herbaceous Wetlands	24	21,600	0.11%
Cultivated Crops	37	33,300	0.17%
Evergreen Forest	69	62,100	0.32%
Herbaceous	116	104,400	0.53%
Woody Wetlands	191	171,900	0.88%
Shrub/Scrub	312	280,800	1.43%
Barren Land	351	315,900	1.61%
Mixed Forest	956	860,400	4.40%
Hay/Pasture	1,297	1,167,300	5.96%
Developed, High Intensity	1,802	1,621,800	8.28%
Developed, Open Space	1,866	1,679,400	8.58%
Developed, Low Intensity	2,603	2,342,700	11.97%
Developed, Medium Intensity	4,334	3,900,600	19.93%
Deciduous Forest	7,771	6,993,900	35.73%

Map 20. Lower Toby Creek Study Area Land Cover



MAJOR NAMED TRIBUTARIES OF THE LOWER TOBY CREEK STUDY AREA

The two major named tributaries to our study area are the Huntsville Creek and Browns Creek, which provide the significant flow to Lower Toby Creek's mainstem in our study area. Behind DAMA headquarters within our study area is where "Wildcat Falls" feeds into the creek from Bunker Hill.

Figure 56. EPCAMR staff and partners beneath bridge above Wildcat Falls conducting a culvert assessment

GENERAL IMPAIRMENTS AND AVERAGE FLOW

None of the study area is considered non-attaining/impaired according to the Pennsylvania Department Environmental Protection. However, Lower Toby Creek within our study area flows through heavily urbanized areas and hardscape, which can pose the threat of stormwater runoff. Excluding developed open space, approximately 40.2% of the study area is developed. There are abundant road-creek intersections; 81.3 miles of local road infrastructure exist, as well as 36.1 miles of state road. In total, that is 117.4 miles of impermeable hardscape; this is concentrated within the watershed's southern half. A concrete dam exists, blocking the creek's entire width, preventing fish passage. Several wild brown trout were observed downstream of the dam. [31, 63]

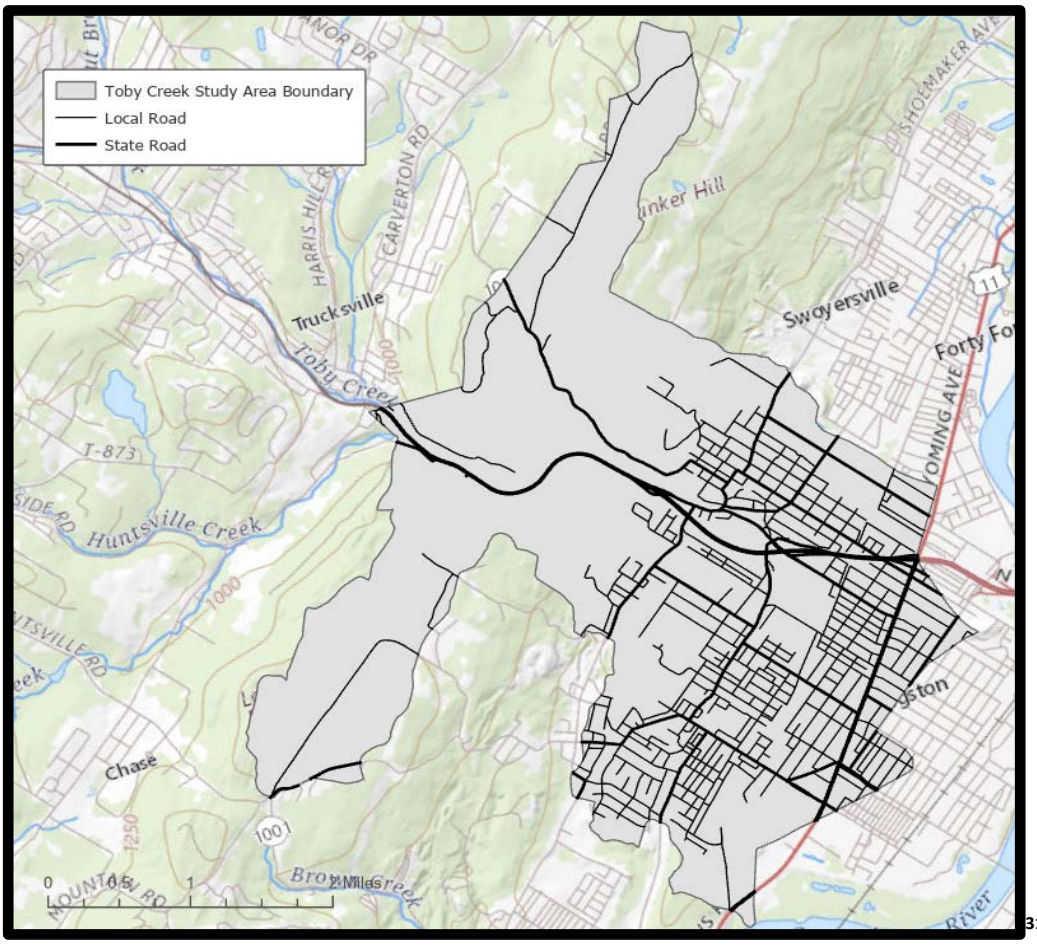


Figure 57. Study Area Road Infrastructure

Figure 58. Concrete dam on Lower Toby Creek where Brown Trout were observed in Luzerne Borough

STORMWATER MANAGEMENT

The Wyoming Valley Sanitary Authority is responsible for managing and enforcing proper stormwater practices within all of the watershed's municipalities, minus Kingston Township. In order to promote best management practices, a credit system is implemented as a part of the Stormwater Management Plan (SMP) which reduces fees charged by WVSA. Property owners with a minimum of 500 square feet of impervious area (IA) or higher, are eligible for SMP fee reduction if select best management practices are implemented. The maximum fee reduction is 30% for properties 7,000 square feet and greater (Tier 3), and 15% for properties 500 to 6,999 square feet (Tier 2). [108]

Table 14. WVSA Stormwater Credit Summary Table

WVSA Credit Code	Credit	Eligible Property Type		Max Credit
		Tier 2	Tier 3	
1	Impervious Area located outside of the Urbanized Area	X	X	15%
2	Low Impact Parcel		X	30%
3	BMP Easement	X	X	TBD
4	Existing BMP with WQ Benefit		X	15%
5	Retrofit of an Existing or New BMPs to add a WQ Benefit		X	30%
6	Riparian Buffer		X	20%
7	Stream Restoration	X	X	TBD
8	Turf and Landscape Management Program		X	15%
9	Pervious Pavement	X	X	15%
10	Separate MS4 Permit	X	X	40%
11	Education Credit	X	X	15%
12	Stormwater Partnership Credit	X	X	TBD
13	Public Participation Credit Donation		X	10%
14	Rain Barrels & Downspout Disconnection	X	X	15%
15	Green Roofs		X	15%
16	Re-Vegetate and Re-Forest Disturbed Areas, Using Native Species		X	20%

[109]

In conversation with Jeff Colella, WVSA Stormwater Division Manager, in December 2020, the Toby Creek Impounding Basin was included in their Pollution Reduction Plan for a proposed Pringle-Toby Creek Basin Retrofit (PRP)[110] under Appendix VI, Table A.

GENERAL CHEMISTRY AND WATER QUALITY OF THE LOWER TOBY CREEK STUDY AREA

The discharge of Toby Creek in its lower reaches is lowest in August and September, when it averages 15 cubic feet/second (6,732.47 gallons/minute) and 19 cubic feet/second (8,527.79 gallons per minute). In July and October, the average discharge is also relatively low, 22 cubic feet/second (9,874.29 gallons/minute) and 21 cubic feet/ second (9,425.45 gallons/minutes), respectively. The highest average discharges occur in April and

[108] Wyoming Valley Sanitary Authority: Rules and Regulations

[109] Wyoming Valley Sanitary Authority: Stormwater Credit Summary Table

[110] WVSA Regional Chesapeake Bay Pollutant Reduction Plan Amendment No. 1, September 2020

March: 83 cubic feet/second (37,252.99 gallons/minute) and 82 (36,804.16 gallons/minute) cubic feet per second, respectively. The highest average monthly discharge between 1941 and 1993 was 269.3 cubic feet/second (120,870.23 gallons/minute) in April 1993 .[111]

However, during severe floods, the discharge can top 3000 cubic feet/second (1,346,493.51 gallons/minute) [112] The lowest recorded average monthly discharge during that time, 3 cubic feet/second (1,346.49 gallons/minute), occurred in September 1951. The average discharge of the creek between 1941 and 1993 was 41.2 cubic feet/second (18,491.84 gallons/minute). The gage height of the creek between 1986 and 1993 ranged from 0.25 feet to 1.46 feet, but can be over 4 to 6 feet, during severe floods.[103,104]

GEOGRAPHY

According to the USGS, The National Map - Viewer elevation interpolation, our study area has a mouth elevation of 508.24 ft (*Table 8*).[71] Three other notable elevations were recorded at differing headwater locations (*Table 9*). The harshest gradient in the watershed, from Wildcat Falls to Lower Toby Creek's mouth, is 3.43%. From mainstem headwaters to the creek's mouth, there is a gradient of 0.82%; while from Courtdale to stream mouth is a 0.80% gradient. Excluding the gradient from Wildcat Falls, as it is an outlier, the average gradient is 0.81%; the stream decreases at an average rate of 42.62 ft/mile.

Table 15. Study Area Mouth Elevation

Mouth Elevation (feet)	Mouth Elevation (meters)	Latitude	Longitude
508.24	154.91	41.25158°	-75.91145°

Table 16. Study Area Headwater Elevation

Headwater Elevation (feet)	Headwater Elevation (meters)	Latitude	Longitude
815.73	248.64	41.30167°	-75.92765°
1386.59	422.63	41.30715°	-75.90375°
718.56	219.02	41.28004°	-75.90951°

Wetlands

The study area does not contain as many wetlands as Huntsville Creek, and most of them are in very discreet locations, covering 1.34% of the study area . Riverine wetlands comprise the stream's channels while Wildcat Falls originates in the headwaters of Bunker Hill from freshwater forested/shrub and pond wetlands.[72]

[111] USGS 01537000 Toby Creek at Luzerne, PA

[112] Federal Emergency Management Agency (FEMA) Flood Insurance Study VOLUME 1 of 6, Luzerne County, Pennsylvania (All Jurisdictions), pp.32, 34.

Geology

After the Huntsville Creek flows southeast connecting with the main stem of Toby Creek, the rock formations cuts across the Pocono, Mauch Chunk, Pottsville, and finally the Llewellyn Formation, the coal-bearing strata, before the creek makes its way to the Susquehanna River. [113]

The channel of Toby Creek is sinuous. Rock formations consisting of sandstone and shale occur in its vicinity. There are also coal deposits along the creek in its lower reaches.[114] Rocks of the Chemung Formation occur in the vicinity of Toby Creek.[115] The bedrock is 4.4 feet underground in some areas of the watershed.[116]

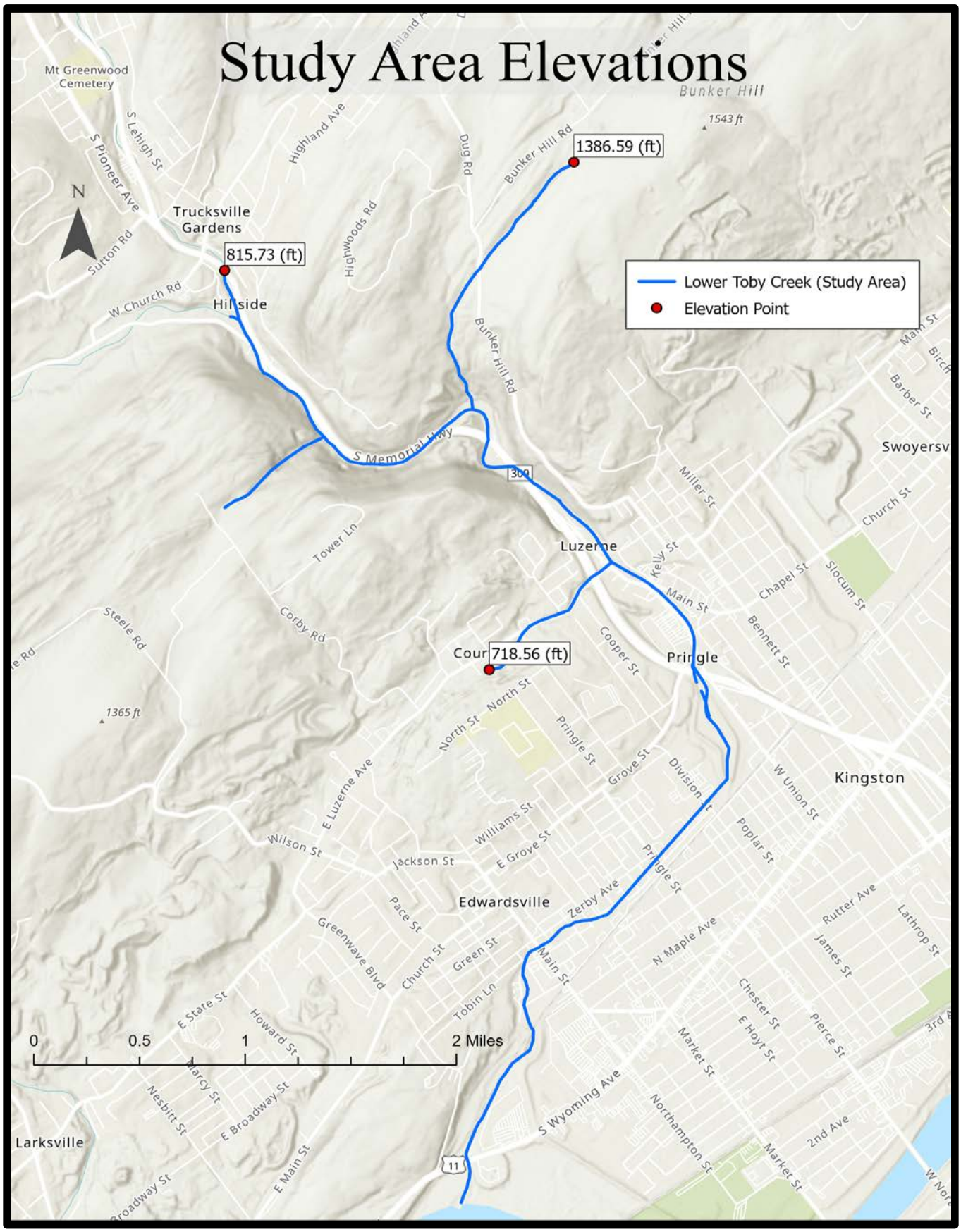
[113] DCNR, Geology of Pennsylvania

[114] Water Supply Commission of PA (1921), Water Resources Inventory Report, pp. 608-609.

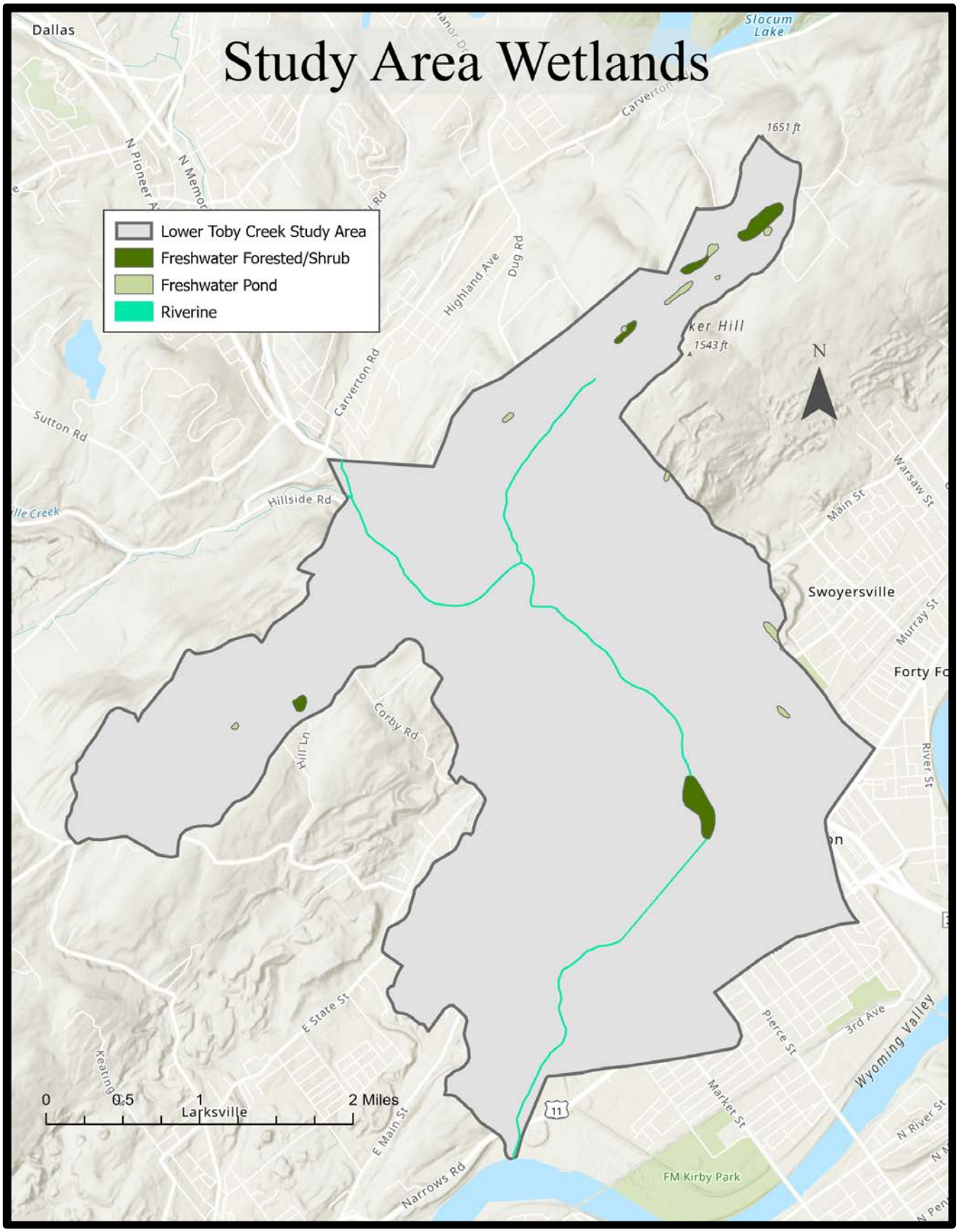
[115] History of Luzerne County, Pennsylvania, Henry C. Bradsby, ed. (1893), pp. 19, 24, 468–469, 593.

[116] Toby Creek Streambank Stabilization Project, Luzerne Conservation District (November 2013)

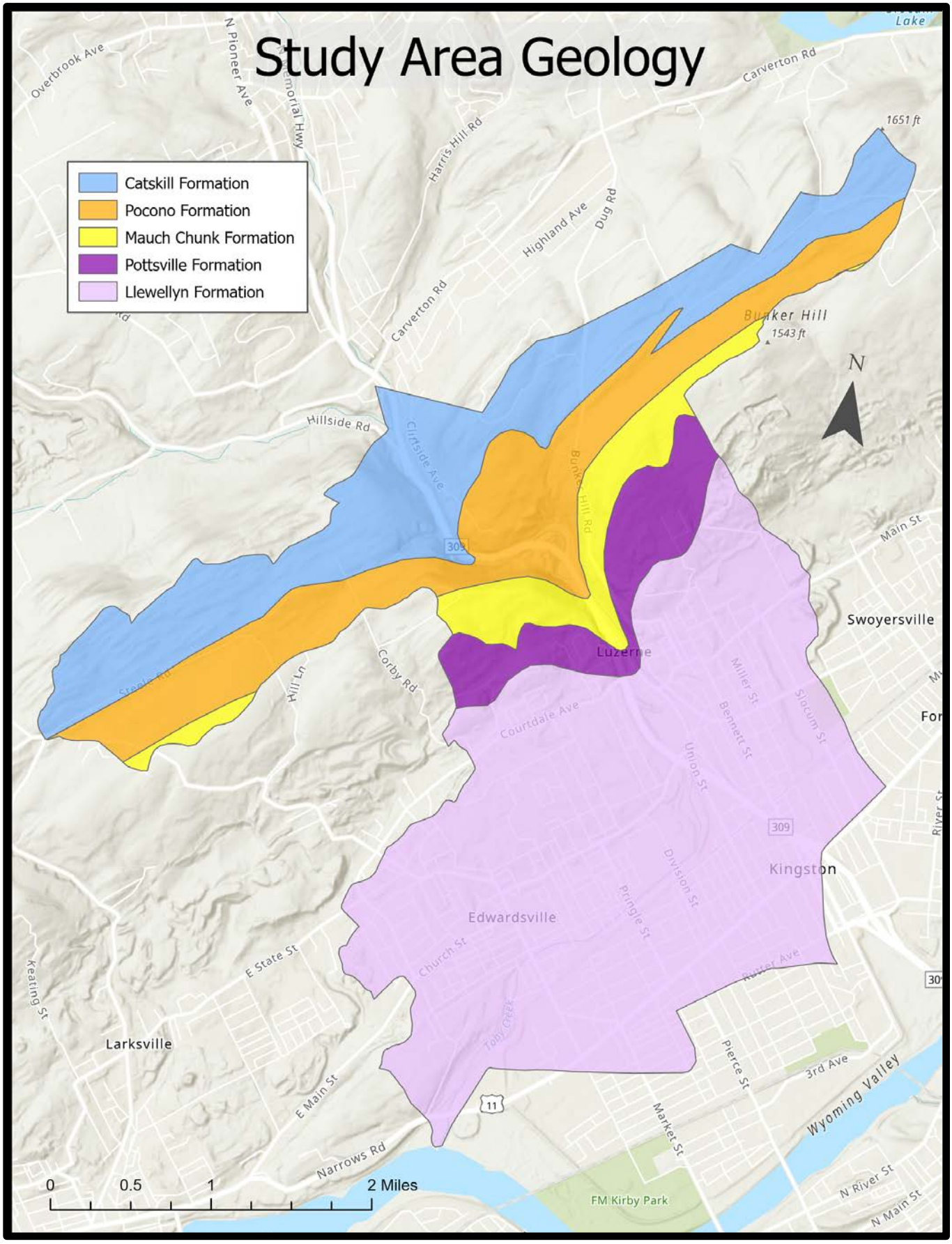
Map 21. Study Area Headwater Elevations



Map 22. Study Area Wetlands



Map 23. Study Area Geology



Appendix A: Coldwater Heritage Partnership Coldwater Conservation Plan Criteria

Coldwater Heritage Partnership planning grants provide funding to conservation organizations to create coldwater conservation plans that can be used by municipalities, local businesses, state and local government, conservation organizations and communities for the conservation and protection of Pennsylvania's coldwater resources.

Coldwater Conservation Plan Format

All plans should be submitted in one digital document (including all text, tables, figures and maps). There is no "one size fits all" Coldwater Conservation Plan format since each watershed is unique, and the goals, needs and capacities of each organization creating the plan are different. However, the basic elements of a plan, described blow, should be included in the final Coldwater Conservation Plan.

1) Introduction and Background

Provide an overview of the organization and general background information about the project area

2) Watershed/Project Area Description

a) Location- geographic location within the state including counties, townships, etc. Include latitude and longitude whenever possible.
b) Size of Watershed, Drainage Area, stream length or order
c) List of Streams containing naturally reproducing trout and Chapter 93 Stream designation
d) Land Use (farming, residential, commercial/ industry)
e) Ownership (%)- public and private (area assessed)
f) Stream impairment data- 303(d) list status (cause and source of impairment)

3) Detailed Map of Watershed with Streams Segments, etc.

Maps can show many of the above listed elements and should also include sampling and monitoring locations.

4) Previously Existing Information and Current Data Analysis

a) Characterize and discuss relevant previously existing information, data, and studies (hydrology, geology, biological, historical, etc.)
b) Current Biological Monitoring and Assessments: Data and discussion related to:
    i) Habitat assessments: In-stream and Riparian Corridor
    ii) Aquatic organism passage (stream crossings)
    iii) Aquatic life (invertebrates and fish)
    iv) Aquatic and terrestrial invasive species that impact stream or riparian corridor
c) Water quality
    i) pH, alkalinity, temperature, DO, etc.

5) Areas of Concern and Opportunity

This section shall address problem areas or unique features within the watershed or specific stream section. Include photos where possible (please use discretion when working with private landowners).

6) Recommendations

Following collection and data analysis develop recommendations to serve as actions for the restoration, maintenance or enhancement of the watershed. Include goals, clearly defined objectives and specific projects which can be undertaken in the future. These recommendations and next steps should be as specific and tangible as possible. A large-scale restoration project, for example, should be broken down into logical, attainable smaller steps. Keep in mind that future funding opportunities may depend on the ability of the funder to form direct links between their priorities and requirements and the specific projects recommended in your completed plan. General statements of need or loosely defined recommendations will make future implementation efforts more difficult. Recommendations for efforts that promote, support, and implement coldwater resource conservation awareness initiatives, education and outreach programs, and stewardship opportunities are also strongly encouraged.

Additionally, consider the opportunity for a Chapter 93 designation upgrade and what specific steps would be necessary.

7) Future Funding Opportunities and/or Potential Partners

Consider including known or possible funding opportunities (grants, foundations, donations) and partners who may be available to help implement and carry out the recommendations above. What are the organization's proposed next steps upon approval of the CHP?

8) Summary and Conclusions

A final brief summary of the process, data, lessons learned, partner recognition, recommendations, and next steps.

9) References

10) Appendices

Include maps, figures, tables, and photographs not included in the narrative

Appendix B. Trout Unlimited AMD Technical Assistance Program Request from EPCAMR

Date Received: _____ *For Office Use Only* Group Eligibility: _____

TAG Number: _____ Project Priority: H M L

Trout Unlimited's AMD Technical Assistance Program

Request Form

Please fill in the following form as completely as possible. Feel free to use the back of this page to describe the type of assistance you require. Provide as much detail as possible as it will assist us in helping you quickly.

Name of Your Organization or Municipality: EPCAMR

When was your group formed? 1996 **Approx. Membership:** 25

Name/Title of Contact Person: Robert E. Hughes

Address: 101 S. Main Street, Ashley, PA 18706

Phone: (570) 371-3523 **Fax:** (___)

Email: rhughes@epcamr.org

Do you have 501(c)(3) (incorporated non-profit) status? ☑ Yes ☐ No ☐ Don't know

What stream or watershed area requires the technical assistance (watershed, county or counties, townships, or other geographical description of your area): Huntsville Creek sub-watershed of the Toby Creek, Luzerne County, including Brown Creek, a major tributary to the Huntsville Creek, in Dallas Borough, Dallas Twp. Lehman Twp., Jackson Twp., and Kingston Twp.

1. What kind(s) of technical assistance do you require (check all that apply and describe on back)?

- ☐ Rapid AMD Characterization (characterization of a single discharge or a combination of discharges in a watershed and will evaluate the type and severity of the AMD, as well as the treatment restoration potential)
- ☐ Rapid AMD Watershed Snapshot (one-time snapshot of water quality and flow to assess metals and acidity loadings on a stream or in a specific problem area)
- ☐ Conceptual Design for AMD Treatment System
- ☐ Full Design and Permitting for AMD Treatment System (please call us first as only a limited number of projects will be considered)
- ☐ Construction Oversight of AMD Remediation Project Construction
- ☐ Existing Treatment System Evaluation and Recommendations
- ☐ Watershed Restoration Plan Development (for Qualified Hydrologic Unit approval)
- ☐ Monitoring Plan Development
- ■ Biological Survey (Fish, Macroinvertebrates) and/or Stream Habitat Survey
- ☐ Documentation of Improving Waters
- ☐ Technical Capacity Building
- ☐ Other AMD-Related Assistance (Please describe on next page or attach separate page)

Revised 4/2016

2. What information on your watershed or area of concern already exists (check all that apply)?

- ■ Stream Restoration/Management Plan
- ■ Rivers Conservation Plan
- ☐ Project Scarlift Report
- ☐ TMDL Study
- ☐ EPA Section 319 Watershed Implementation Plan
- ☐ Water Quality Data (please describe type and condition of data on back)
- ■ GIS mapping
- ■ Other (please fully describe on back)

3. Are you requesting technical assistance that is necessary to implement recommendations in your watershed restoration plan or other similar plan?

☐ No ☑ Yes (Please provide the name of the plan Coldwater Conservation Heritage Plan-Huntsville Creek)

4. Are you requesting technical assistance that must be completed in order for your group to apply for grant funds?

☐ No ☑ Yes Funding Source: Eastern Brook Trout Venture in partnership-Luzerne Conservation District-Applicant

Funding Application Deadline Date: October 4 2019

(Please describe the project you will be applying for below or on back.)

Please provide additional comments below (indicate question number from above if applicable) :

EPCAMR is currently conducting a CHP in the Huntsville Creek Watershed. We have many partners and all municipalities are supportive of the effort.

The Luzerne Conservation District is interested in applying for funding from the Eastern Brook Trout Venture Program, should we find any wild trout species in the subwatershed of the Toby Creek. Toby Creek has wild brook trout that have been assessed by Kathleen Lavelle and TU recently on 8-12-19 with EPCAMR.

The Lands at Hillside has a dam that they are interested in having removed on their property that is an impediment to fish passage.

EPCAMR and the Luzerne Conservation District, with partners, including the Stanley Cooper Chapter TU and the Lands at Hillside need to have the fish survey completed on a few sections of Huntsville Creek and Brown Creek to be able to positively determine if trout are present in this sub-watershed, as they are in the Toby Creek watershed. This positive identification would allow for additional opportunities to go after funding to assist in the habitat restoration and future implementation projects in the sub-watershed.

We are aware that Kathleen and her team are working hard in the unassessed waters program in the Northeast and the Delaware River Watershed. We would be very grateful to have them back in the Huntsville Creek sub-watershed as soon as possible to complete a few passes in this area.

EPCAMR will look to identify other sites at a much later date next year as we continue to work on the development of the Huntsville CHP following the completion of the Toby Creek CHP this Fall, early Winter.

Please email the completed form to:
rachel.kester@tu.org.

If you have any questions or concerns, please contact Rachel Kester at (814) 577-7611.

Figure 59. EPCAMR Trout Unlimited AMD Technical Assistance Program Request

Appendix C: Huntsville Creek Biological Assessment

Report Proved by Trout Unlimited
AMD Technical Assistance Program

Background

The Eastern Pennsylvania Coalition for Abandoned Mine Reclamation (EPCAMR) requested technical assistance from Trout Unlimited (TU) to identify and assess fishery communities in Huntsville Creek. Huntsville Creek is the largest tributary to Toby Creek, in the Susquehanna River drainage in Luzerne County. While Toby Creek is affected by AMD and flood control projects in the lower reaches, Huntsville Creek is not impaired by AMD according to the Pennsylvania Department of Environmental Protection.

The purpose of these assessments was to document the presence of native or wild salmonids within the Huntsville Creek watershed, particularly upstream and downstream of Huntsville Reservoir. Prior to these surveys, no portion of Huntsville Creek was listed as a Naturally Reproducing Wild Trout Stream by the Pennsylvania Fish and Boat Commission (PFBC). Land use surrounding the creek is less developed than much of the receiving watershed, Toby Creek. Most of the land is forested and with agriculture, residential developments and the Huntsville Reservoir as other land uses. The reservoir was historically used by the local dairy community to cool milk, which is no longer needed. The reservoir is being studied by Luzerne County Conservation District (LCCD) for potential removal (Figure 1, Table 1).

Methods

Fishery surveys

Fisheries data were collected using battery powered backpack electrofishing gear using pulsed direct current. A Smith-Root model LR-24 backpack electrofisher was used for each of the surveys. Electrofishing proceeded upstream from the start of each sample site. All fish observed by the field crew were identified in the field and a subjective abundance rating was assigned to each species based on Pennsylvania Fish and Boat Commission (PFBC) protocol. Salmonids (trout) were collected and held during electrofishing surveys and measured to the nearest millimeter (total length). Each individual trout was then assigned to a 25mm

size class. If trout were present, all trout were held, and removal depletion methods were used until trout were no longer being captured. All fish were released unharmed following processing.

Water chemistry was collected in the field. Parameters measured and recorded included: time of day, water temperature (oC), pH (standard units), total alkalinity (mg/L), and specific conductance (umhos). All equipment was properly calibrated and EPA protocols were followed.

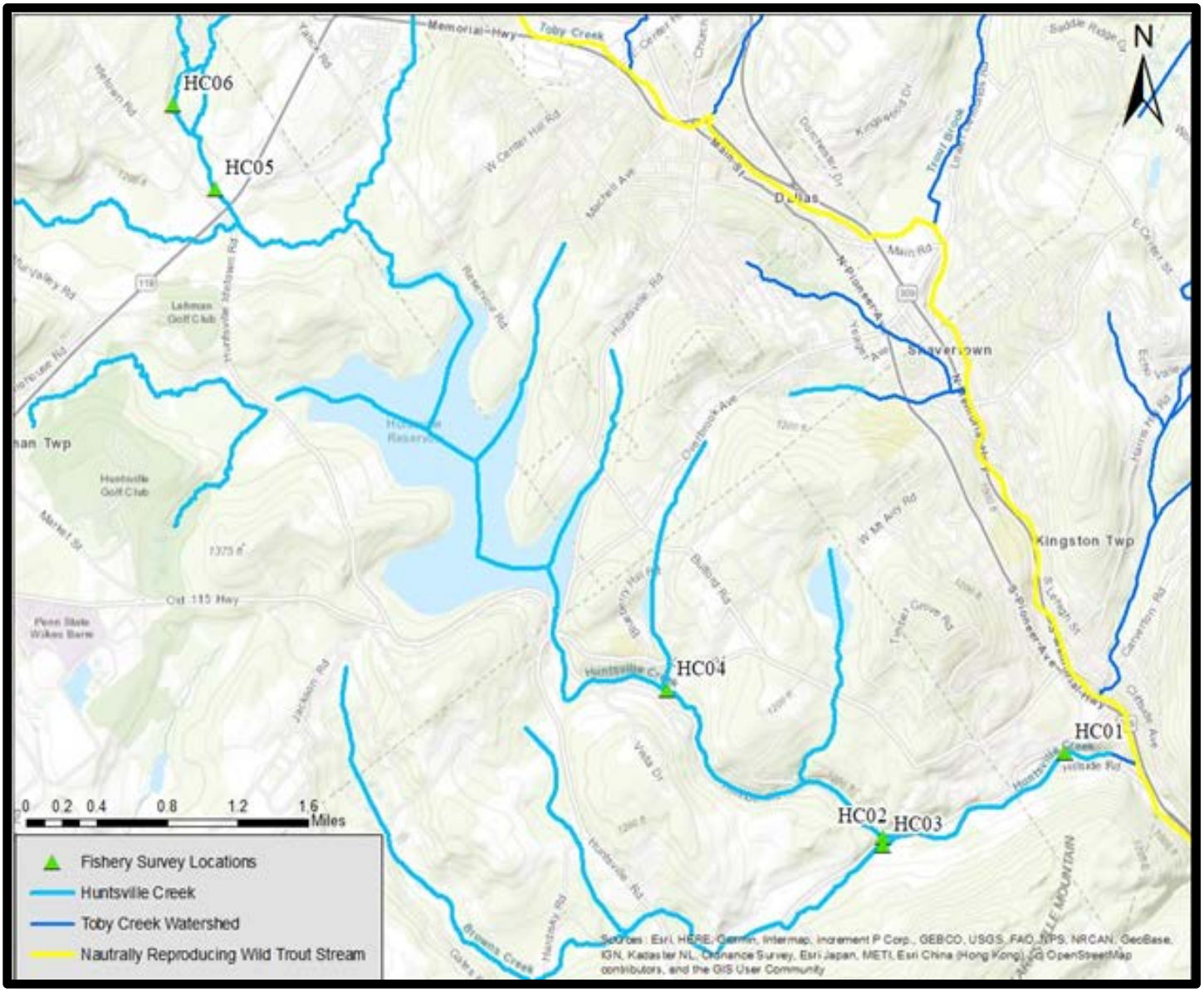


Figure 60. Huntsville Creek watershed and survey locations and current PFBC stream designations

Table 17. Site locations and descriptions for surveys completed in Huntsville Creek

Site ID	Site Description	Latitude	Longitude
HC01	Downstream of Hillside Farms most downstream site	41.299429	-75.932625
HC02	Upstream of Browns Creek	41.294543	-75.947582
HC03	Browns Creek near mouth	41.29408	-75.947545
HC04	Huntsville Creek downstream Gross Road and reservoir	41.303103	-75.965332
HC05	Huntsville Creek upstream of Lehman Nursery Route 118	41.33219	-76.002383
HC06	Headwaters of Huntsville Creek on Bernstein's property	41.337104	-76.005831

Brown trout (*Salmo trutta*) were documented at HC01, the most downstream site closest to the confluence with Toby Creek on Hillside Farms property (Figure 2). Four brown trout were captured at this site measuring 265mm, 100m, 97mm, and 99mm. No brook trout (*Salvelinus fontinalis*) were documented at any site on Huntsville Creek. Brown trout of this size distribution and abundance would warrant a Naturally Reproducing Wild Trout designation from PFBC. This data has been submitted to PFBC as part of the Unassessed Waters Initiative (UWI) conducted by the agency and partners with the goal of identifying and protecting existing wild trout streams.

Figure 61. Brown trout measuring 100mm documented at site HC01

Sixteen fish species were documented throughout Huntsville Creek (**Table 2**). Warm water species such as bullhead catfish (*Ameiurus*) and largemouth bass (*Micropterus Salmoides*) were documented downstream of the reservoir in contrast to the predominantly cool water species documented upstream of the reservoir. Site HC04 had the closest proximity to the reservoir and held the largest diversity and abundance of warm water fishes of any site.

Conclusions

In Huntsville Creek, wild trout populations of brown trout exist in the watershed and there is potential to enhance and protect those populations. The presence and abundance of brown trout on the Hillside Farm property warrant a wild trout designation from PFBC. The upstream extent of brown trout is not known at this time. There is potential for trout to exist closer to the Huntsville Reservoir, although they were not documented during this project. The reservoir is having negative impacts on the downstream water temperature for salmonid species. If the reservoir was removed there would be potential for brown trout to move upstream and populate the upper reaches currently impounded by the dam.

Table 18. Species occurrence and relative abundances for all fish documented at all sites Relative abundances are derived from PFBC protocols; <2= Rare, 2-8= Present, 8-32 = Common, >33 = Abundant..

Common Name	Scientific Name	HC01	HC02	HC03	HC04	HC05	HC06
Brown Trout	*Salmo Trutta*	Present					
Blacknose Dace	*Rhinichthys atratulus*	Abundant	Abundant	Abundant	Abundant	Abundant	Abundant
Longnose Dace	*Rhinichthys cataractae*	Abundant	Abundant	Present	Abundant	Present	
Sculpin Spp.	*Cottoidea*	Rare	Abundant	Abundant		Abundant	Present
Tessellated Darter	*Etheostoma olmstedi*		Present			Present	
White Sucker	*Catostomus commersonii*	Common	Abundant		Common	Common	Present
Bluegill	*Lepomis macrochirus*				Present		
Creek Chub	*Semotilus atromaculatus*	Common	Abundant	Common	Common	Abundant	Present
Pumpkinseed	*Lepomis gibbosus*				Present		Present
Chain Pickerel	*Esox niger*					Rare	
Yellow Perch	*Perca flavescens*	Rare			Rare		

Common Name	Scientific Name	HC01	HC02	HC03	HC04	HC05	HC06
Brown Bullhead	*Ameiurus nebulosus*	Rare			Rare		
Golden Shiner	*Notemigonus crysoleucas*		Present		Common	Common	Common
Yellow Bullhead	*Ameiurus natalis*		Rare		Rare		
Largemouth Bass	*Micropterus salmoides*		Rare		Present		
Smallmouth Bass	*Micropterus dolomieu*				Present		

Appendix D: Letters of Support for the Huntsville Creek Coldwater Conservation Plan

Appendix E: PowerPoint Presentations

Research, Assessment Work, and Culverts Assessed for Aquatic Organism Passage within the entire Huntsville Creek and the Lower Toby Creek Watershed:

Huntsville CHP Initial Research

Huntsville Golf Course Contributions to Huntsville Watershed

Browns Creek and its Tributaries

Huntsville CHP Culverts 03-19-2019

Huntsville CHP Culverts 06-22-2020

Huntsville CHP Culverts 06-23-2020

Huntsville CHP Culverts 06-24-2020

Huntsville CHP Culverts 07-01-2020

Huntsville CHP Culverts 07-02-2020

Huntsville CHP Culverts 07-07-2020

Huntsville CHP Culverts 07-09-2020

Huntsville CHP Culverts 07-13-2020

Huntsville CHP Culverts 12-03-2020

Appendix F: Drone Footage

Drone Footage by Horizon Footage and Photography of Several Areas within the Huntsville Creek Watershed (link to YouTube videos)

Horizon Footage and Photography Facebook Page

Aerial Photos from around the Huntsville Creek Watershed