LOWER LOYALHANNA CREEK WATERSHED

a. Overall Introduction

b. Lower Loyalhanna Creek Subwatershed

c. Union Run

d. McCune Run

e. Crabtree Creek

f. Whitehorn Creek

g. Getty Run

SECTION 3
LOWER LOYALHANNA CREEK WATERSHED

Overall Restoration Priorities for the Lower Loyalhanna Creek Section

- Remediate the Crabtree Creek Discharge located in Crabtree.
- Remediate/reclaim/remine two coal refuse piles located in the Crabree Creek Subwatershed (Forbes Road, Hannastown).
- Assess and determine a course of action for remediation of discharges within the Union Run Subwatershed.
- Assess and determine a course of action for remediation of discharges within the Getty Run Subwatershed.
- Educate community members about the importance of riparian vegetation.
- Address sewage problems in the Crabtree Creek Subwatershed.
- Install agricultural BMPs in the Whitehorn Creek and union Run Subwatersheds.
- Assess and determine course of action for the remediation of eroding stream banks in the Union Run Subwatershed and along the main stem of the Lower Loyalhanna Creek.

81.54
SQUARE MILES

Section 3 – Lower Loyalhanna Creek Watershed

General Description

The lower section of the Loyalhanna Creek Watershed extends from downstream of the main stem confluence with Saxman Run to the mouth of the creek. A majority of the section flows through property owned by the U.S. Army Corps of Engineers for the purpose of flood control. Portions of that property are leased by the PA Game Commission (PAGC) for land management, hunting, and wildlife observation. The flood control property that surrounds the lower section is forested with few areas that include residences. Portions of the Lower Loyalhanna Creek section are impacted by abandoned mine drainage (AMD). Three of the six large named tributaries that enter the Loyalhanna Creek in the lower section contain large abandoned mine discharges that impact the remaining watershed.

The lower section includes the Loyalhanna Lake and Loyalhanna Dam. The lake, in place since 1942, is a recreational area used for fishing, boating, swimming, and camping. The dam is in place to control seasonal floodwaters. The lake and dam act as a trap for sediment carried downstream. Sedimentation is a serious problem within Loyalhanna Lake.

The Lower Loyalhanna Creek section is comprised of six named tributaries and 25 unnamed tributaries. For the purpose of the assessment, each of the named tributaries was assessed separately. The main stem of the Loyalhanna Creek and its unnamed tributaries was assessed as a separate section. Serviceberry Run, a named tributary, was included with the main stem assessment due to its size. Therefore, the following reports are included within Section 3:

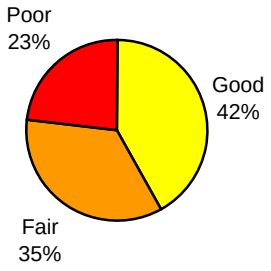
- Lower Loyalhanna Creek Main Stem and Unnamed Tributaries
- Union Run
- McCune Run
- Crabtree Creek
- Whitethorn Creek
- Getty Run

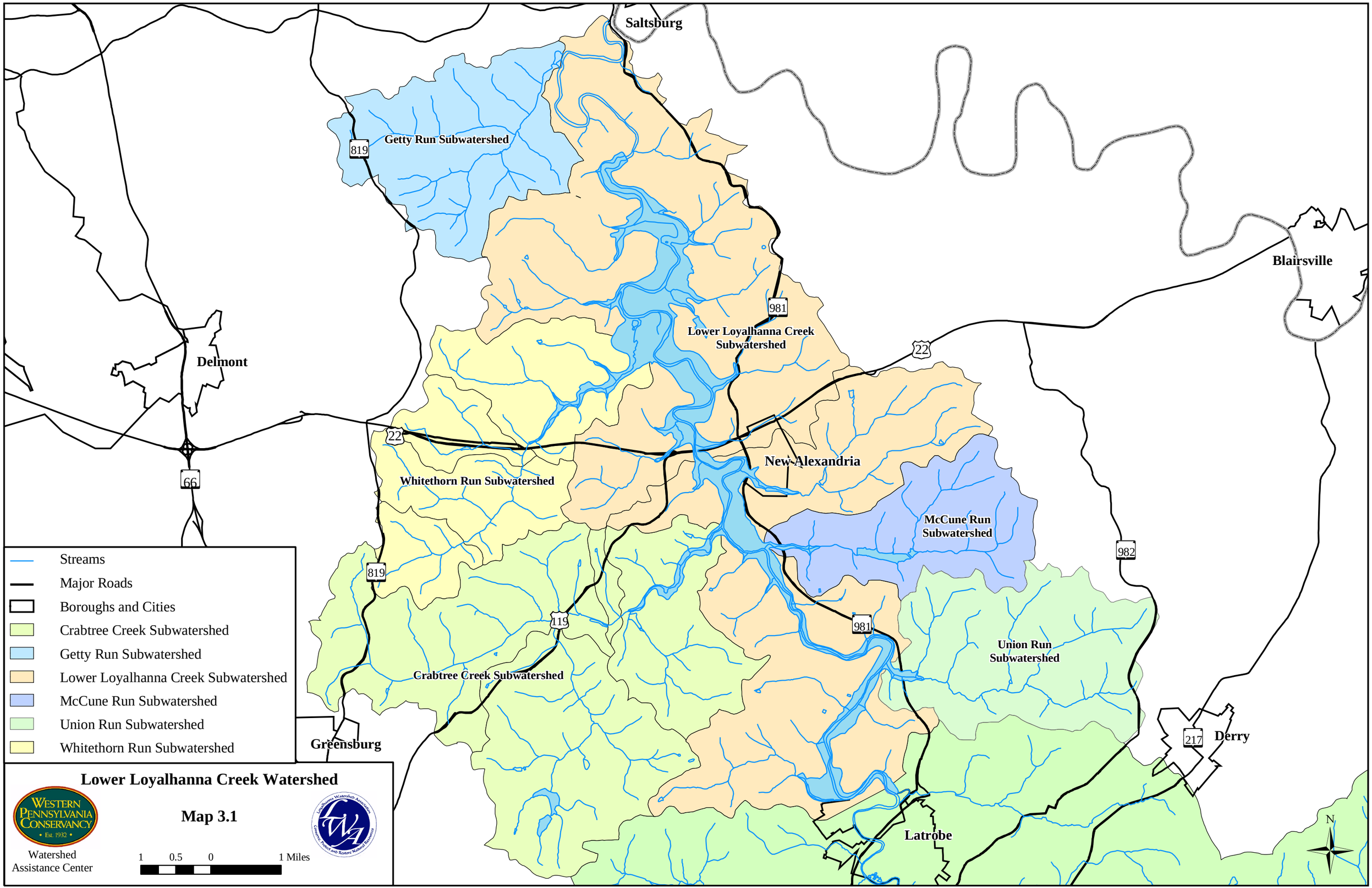
Overall Visual Assessment Summary

The visual assessment of the Lower Loyalhanna Creek section was completed in the summer of 2004. As depicted in Figure 3.1, 42% of the lower section received a good rating, 35% received a fair rating, and 23% received a poor rating. An average score of 6.85 was given to the entire lower section, which is a fair rating overall.

Assessment ratings for the Lower Loyalhanna Creek section reflect the impacts of AMD and riparian zone degradation throughout the entire section. Individual stream ratings are reflected in Map 3.2.

Figure 3.1: Lower Loyalhanna Creek Overall Ratings




Saltsburg
Getty Run Subwatershed
819
981
Lower Loyalhanna Creek Subwatershed
Blairsville
Delmont
22
66
New Alexandria
Whitethorn Run Subwatershed
McCune Run Subwatershed
982
819
119
981
Union Run Subwatershed
Crabtree Creek Subwatershed
Greensburg
217
Derry
Latrobe
N
Streams
Major Roads
Boroughs and Cities
Crabtree Creek Subwatershed
Getty Run Subwatershed
Lower Loyalhanna Creek Subwatershed
McCune Run Subwatershed
Union Run Subwatershed
Whitethorn Run Subwatershed
Lower Loyalhanna Creek Watershed
Map 3.1
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
1 0.5 0 1 Miles

Saltsburg

Getty Run Subwatershed

819

981

Lower Loyalhanna Creek Subwatershed

Blairsville

Delmont

22

66

New Alexandria

Whitethorn Run Subwatershed

McCune Run Subwatershed

982

819

119

981

Union Run Subwatershed

Crabtree Creek Subwatershed

Greensburg

217

Derry

Latrobe

N

Good
Fair
Poor
Major Roads
Boroughs and Cities
Crabtree Creek Subwatershed
Getty Run Subwatershed
Lower Loyalhanna Creek Subwatershed
McCune Run Subwatershed
Union Run Subwatershed
Whitethorn Run Subwatershed

Lower Loyalhanna Creek Watershed: Overall Rating

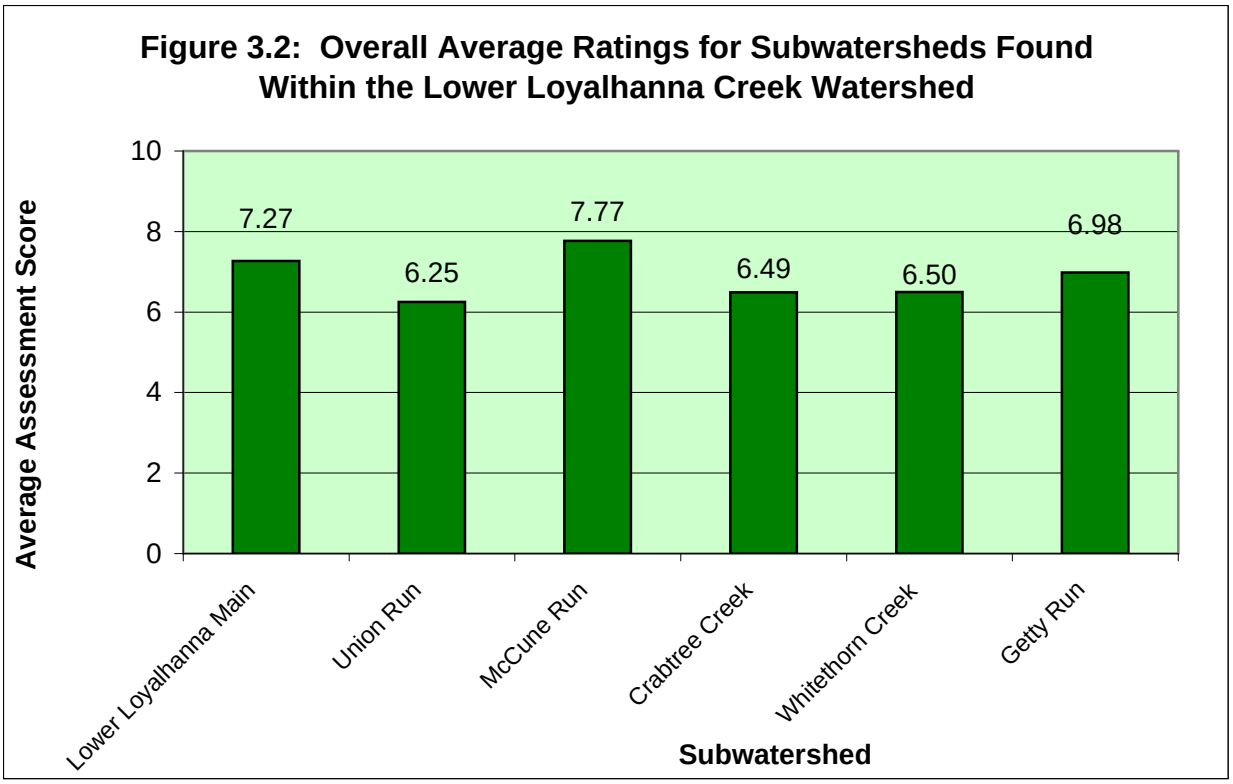
Map 3.2

1 0.5 0 1 Miles

Western Pennsylvania Conservancy • Est. 1932 •

Watershed Assistance Center

Figure 3.2 exhibits the average overall rating for each subwatershed located within the Lower Loyalhanna Creek Watershed section.

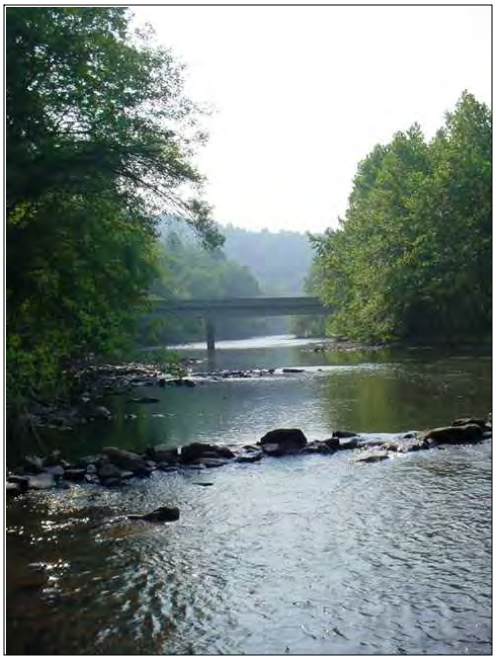


Overall Conclusions

Approximately 50% of the Lower Loyalhanna Creek main stem is impacted by AMD. The Loyalhanna Dam inhibits much of the AMD located upstream from extending beyond the dam and to the mouth of the Loyalhanna Creek. Getty Run, the last tributary to enter the Loyalhanna Creek before its mouth, adds a significant amount of AMD to the creek. It is Getty Run alone that makes the Loyalhanna Creek appear orange and white as it joins with the Conemaugh River to form the Kiskiminetas River.

In addition to impacts from AMD, tributaries throughout the lower section are affected by riparian zone degradation. These impacts are a result of agriculture and individual landowners.

It is critical in the lower section to educate communities and citizens about the watershed. There are portions of the lower section that are beautiful and ideal for recreation. Alternatively, there are portions of the section that are totally devastated and that require remediation.



The Lower Loyalhanna Creek Watershed just below the Loyalhanna Dam

SECTION 3.A
LOWER LOYALHANNA CREEK SUBWATERSHED

Section 3.A

Lower Loyalhanna Creek Subwatershed

General Description

The Lower Loyalhanna Creek Subwatershed includes the area that drains portions of Unity, Derry, Hempfield, Salem and Loyalhanna townships. This 33.95 square-mile section begins downstream from the Saxman Run confluence outside of Latrobe and it ends at the mouth of the Loyalhanna Creek in Saltsburg. The Lower Loyalhanna Creek Subwatershed is located in the north-central portion of Westmoreland County. It extends from the outskirts of the City of Latrobe and flows north through New Alexandria and on to Saltsburg, where it meets the Conemaugh River to form the Kiskiminetas River.

Loyalhanna Creek main stem upstream from the Derbytown Road Bridge outside of Latrobe

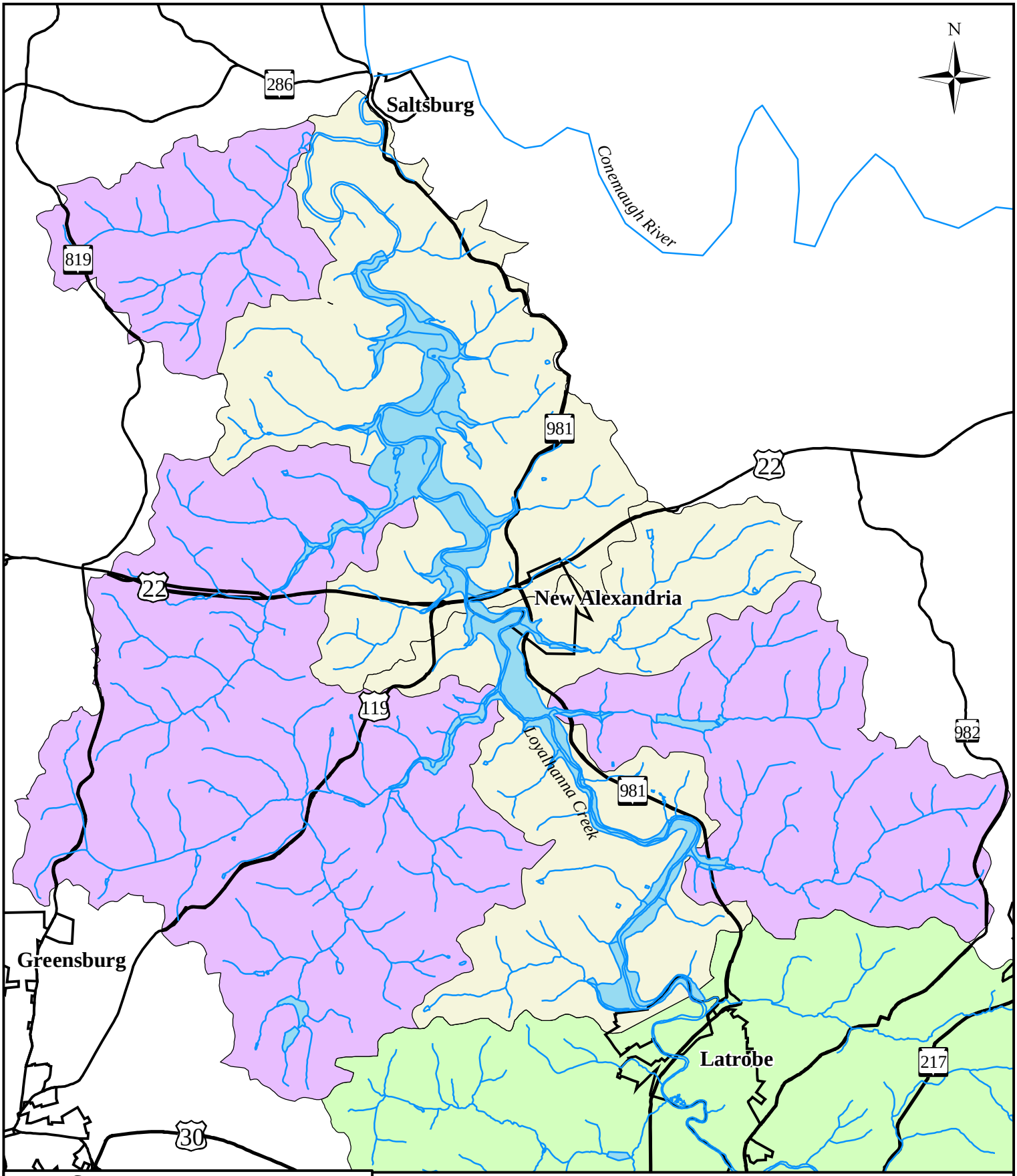
Land surrounding a large portion of the Lower Loyalhanna Creek main stem is owned by the U.S. Army Corps of Engineers (USACE) for the purpose of flood control. The Loyalhanna Dam, four miles upstream from the mouth of the Loyalhanna Creek, is a dam that has been in place since 1942 in order to protect downstream towns and cities from floodwaters. Currently, the property is leased by the PA Game Commission (PAGC) for wild game hunting and wildlife observation.

The Lower Loyalhanna Creek Subwatershed is intersected by three coal seams that were mined heavily at the turn of the 20th century. Those coal seams are contained within the Latrobe-Connellsville Syncline, Greensburg Syncline, and Elders Ridge Syncline that run southwest by northeast across the subwatershed area. As a result of extensive mining within the three coal seams, the Lower Loyalhanna Creek Subwatershed is significantly impacted by AMD.

Six named tributaries and 25 unnamed tributaries join the main stem of the Loyalhanna Creek in the lower section. The named tributaries include: Union Run, McCune Run, Crabtree Creek, Whitethorn Creek, Serviceberry Run, and Getty Run. The subwatershed is classified as a Warm Water Fishery (WWF) with the exception of Serviceberry Run, which is a High Quality Cold Water Fishery (HQ-CWF). A majority of the subwatershed is listed as an impaired waterway according to the CWA 303(d) list.

The beginning of the Lower Loyalhanna Creek Subwatershed is located immediately downstream from the confluence of Saxman Run. From that point, the Loyalhanna Creek flows west, skirting the northern boundary of Latrobe. Homes line the south bank, and intermittent fields and forest line the north bank. After passing underneath the Ligonier Street Bridge (2nd Bridge), the Loyalhanna Creek turns north to flow away from Latrobe. The landscape surrounding the stream is comprised of open fields, wetland, sycamore, and Japanese knotweed. It is in this section that the stream channel was altered to eliminate a large oxbow that had formed. The alteration was completed in the 1950s. Surrounding hillsides are a mix of agriculture and reclaimed surface mines.

As the Loyalhanna Creek passes underneath the Derbytown Road Bridge (3rd Bridge), the landscape surrounding the stream becomes more forested. Downstream of the bridge, access to the stream becomes limited and very few residences can be found. Approximately one mile downstream of the Derbytown Road Bridge, **Union Run** enters the Loyalhanna Creek main stem from the east. This subwatershed originates in the coal mining towns of Atlantic and Superior. Union Run contains iron



Streams

Major Roads

Boroughs and Cities

Lower Loyalhanna Creek Subwatershed

Lower Section

Lower Loyalhanna Creek Subwatershed: Overall Location

Western Pennsylvania Conservancy • Est. 1932 •

Watershed Assistance Center

Map 3.A.1

1 0.5 0 1 Miles

Loyalhanna Watershed Association — Conserve, Protect and Restore Natural Resources

oxide and aluminum precipitate from numerous upstream discharges. It rated fair overall during the visual assessment.

Following the confluence with Union Run, the Loyalhanna Creek main stem turns a large bend and travels very close to Route 981 North. For a short distance, the creek turns to flow west through an area with steep, rocky banks. After the main stem turns north again, it flows past the old 4th Bridge. Large bridge abutments remain in the stream where a road once crossed. Downstream of the 4th Bridge, the landscape surrounding the Loyalhanna Creek main stem flattens and **McCune Run** enters from the east. McCune Run Subwatershed includes Keystone Lake and its tributaries. It was rated good overall during the visual assessment.

Just downstream of the confluence with McCune Run, the Loyalhanna Creek main stem passes underneath the Oasis Bridge (5th Bridge). A wide, flat riparian area encompasses the stream as it continues north to a confluence with **Crabtree Creek**. At the confluence, a large plume of orange water joins with the main stem. The Crabtree Creek Subwatershed, originating in the community of Forbes Road to the west, is greatly impacted by AMD. The subwatershed was rated fair overall during the visual assessment.

Following its confluence with Crabtree Creek, the Loyalhanna Creek main stem flows west past the community of New Alexandria and underneath the Route 22 Bridge. At this point, the velocity of the water begins to slow significantly due to topography and as a result of the pool formed by the flood-control dam downstream. Below the Route 22 Bridge, sycamore, small trees, and small shrubs dominate the landscape surrounding the main stem. Watermarks on trees and surrounding banks indicate high water levels during periods of heavy rain. The riparian area is not only thick with vegetation, but is extremely muddy, wet, and not accessible.

Approximately one mile downstream from the Route 22 Bridge, **Whitethorn Creek** enters from the west. The mouth of Whitethorn Creek forms a small lake as it encounters the Loyalhanna Creek main stem. Whitethorn Creek originates north of the community of Forbes Road and was rated fair overall during the visual assessment. It is at the confluence of Whitethorn Creek and the Loyalhanna Creek main stem that the boundary of the main stem begins to expand and Loyalhanna Lake forms as a result of the flood-control dam.

The Loyalhanna Lake extends from the mouth of Whitethorn Creek to the dam located at the USACE offices. A mixed hardwood forest surrounds the entire lake. **Serviceberry Run** enters the lake approximately halfway through its length. As the only HQ-CWF within the lower section, it is frequented by anglers.

Below the dam, the Loyalhanna Creek main stem exhibits characteristics similar to main stem sections in the upper portion of the watershed. Surrounded by a hardwood and pine forest, the Loyalhanna Creek winds through an area with steep hillsides. No residences are found close to the stream, which is difficult to access. One mile upstream from the mouth, **Getty Run** enters the main stem from the west. The Getty Run Subwatershed originates in the town of Slickville and was rated fair overall during the visual assessment. Multiple upstream acidic AMD impacts make Getty Run a poor-quality subwatershed.

Loyalhanna Creek main stem downstream from the outflow of the Loyalhanna Dam

Following the confluence with Getty Run, the Loyalhanna Creek takes a large turn and flows underneath the old Penn Central railroad, which is now a rail trail. At the point where the main stem passes under Route 981, it flows into the Conemaugh River. The mouth of the Loyalhanna Creek can be seen from downtown Saltsburg. For a geographic location of this subwatershed, refer to Map 3.A.1.

Review of Historic Information

Overall Summary

Coal mining was a major industry throughout the lower portion of the Loyalhanna Creek Watershed. The communities of Atlantic, Peanut, Superior, Crabtree, Hannastown, Forbes Road, Luxor, New Alexandria, Andrico, Shieldsburg, and Slickville all contained deep coal mines. According to the 1972 Scarlift Report, 61 deep mines and countless surface mines were located throughout the lower section. Of those 61 deep mines, there were approximately 22 major deep and drift mines that were in operation during the early 1900s. Some of those deep mines remained open well into the mid-1900s. The last known operation was in Luxor, Pa. A large refuse pile, coke ovens, and outbuildings are still present at the site. The tipple was removed in 2003.

In addition to coal mining, agriculture was, and still is, a large industry throughout the lower section of the watershed. Beef and dairy operations still blanket the landscape today. The community of Crabtree is a thriving agricultural community despite a regional decline in farmlands and farming operations.

Scarlift Report

Twenty-six discharges were discovered and catalogued within the Lower Loyalhanna Creek Subwatershed during Scarlift fieldwork. Those discharges were found in Union Run, Crabtree Creek, Whitethorn Creek, and Getty Run. Please refer to the respective subwatershed reports for more information regarding the discharges.

Many water quality samples were taken during fieldwork for the Scarlift Report. Those results are significant and some are different in comparison to water quality taken today. For example, the average pH of the Loyalhanna Creek taken at the mouth between 1969 and 1970 was 3.7. This is in contrast to an average pH of 6.9 taken in 2004 and 2005. Scarlift water quality results for Getty Run and Union Run are similar to results from water quality samples taken during the assessment.

Bituminous Coal Mines of Westmoreland County – Website

A website produced by Raymond A. Washlaski, Ryan P. Washlaski, and Peter E. Starry, Jr. lists the coal mines that were once in operation throughout Westmoreland County. Referencing the website, the following deep and drift coal mines were once operational within the Lower Loyalhanna Creek Subwatershed.

Mine	Last Year In Operation	Last Known Operator	Location
Salem No. 2 Mine	1954	Keystone Coal and Coke Company	Keystone State Park. Mine offices now serve as the state park's visitor center.
Jamison No. 1	1950s	Sekora Coal Company	Luxor. Buildings and coke ovens from the mine are still intact at the mine site. Reservoirs from the mines were sold to the county and are now used as recreational sites (Twin Lakes Park).

Jamison No. 2	1949	Jamison Coal and Coke	Hannastown. Large coal waste pile located north of Hannastown was covered and partially reclaimed in 1972. Coke ovens were buried during reclamation.
Jamison No. 3	1950s	Jamison Coal and Coke	Forbes Road. Some buildings remain at the mine site. Large refuse pile still present. This mine was eventually connected to the No. 2 mine.
Jamison No. 4	1950s	Jamison Coal and Coke	Crabtree. Buildings used for mine equipment are still standing and used by the Crabtree Fire Company. Coke ovens are still intact but overgrown along Crabtree Creek. Company store was at the current site of Carbone's restaurant.
Andrico Mines No. 1-9	1940s	Keystone Coal & Coke	New Alexandria. The Andrico mines were located primarily north and east of New Alexandria. They were mostly drift mines. During WWII, open cut strips were done at all of the mine sites. In the 1970s and 1980s, all of the sites were re-mined and reclaimed.
Irwin Gas Coal No. 3 and No.4	1930-1951	Irwin Gas Coal	Slickville.
Slick No. 1 – 3	1930-1951	Cambria Steel Co.	Slickville.

PA Fish and Boat Commission (PAFBC)

There were two PAFBC survey reports that were relevant to the Lower Loyalhanna Creek Subwatershed.

1. In May of 1999, the PAFBC completed a fish survey of the Loyalhanna Lake. Using Pennsylvania-style trap nets and night electro-fishing, a wide variety of fish species were collected. That population of collected fish was evaluated. White and black crappie fish were the most abundant. The report concluded that turbidity, due to suspended flocculants such as iron oxide precipitate and upstream erosion, was impacting the growth of pan fish within the lake. Other conclusions included changes in stocking plans for saugeye.

2. In 1982, the PAFBC surveyed Serviceberry Run. Numerous invertebrates were found during the survey. Caddisflies were dominant, but mayflies achieved good levels. The PAFBC recommended that Serviceberry Run maintain its “special protection.”

U.S. Army Corps of Engineers (USACE)

The USACE completed a water quality assessment of the Loyalhanna Creek main stem in 2002. That assessment included samples taken at the Route 22 Bridge and mouths of tributaries entering the main stem. That data is consistent with other collected data and can be referenced in files held at the Loyalhanna Watershed Association (LWA) office.

PA Department of Environmental Protection (DEP)

Various reports from the DEP highlight water quality samples related to surface mines throughout the entire subwatershed. At the time of the report, there were no known active coal mines within the Lower Loyalhanna Creek Subwatershed. More complete information can be obtained at the DEP District Mining Office in Greensburg.

Loyalhanna Watershed Association

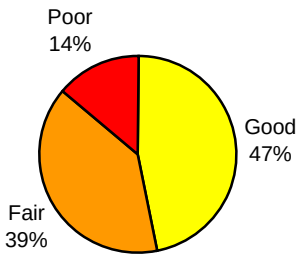
Since the summer of 2001, water quality samples have been collected from discharges located throughout the Lower Loyalhanna Creek Subwatershed. Those discharges are located within the Crabtree Creek and Getty Run subwatersheds.

Visual Assessment Summary

Visual Assessment Findings

The visual assessment of the Lower Loyalhanna Creek Subwatershed was completed in the spring of 2004. A total of 51 stream segments were assessed. As depicted in figure 3.A.1, 47% of the subwatershed received a good rating, 39% received a fair rating, and 14% received a poor rating. An average score of 7.28 was given to the entire subwatershed, which is a fair rating overall. This overall rating is a contrast to overall score percentages. This is due to the fact that the good and fair ratings were close to the separating score between the two categories. Individual stream segment ratings are depicted in Map 3.A.2.

Figure 3.A.1: Visual Assessment Ratings for the Lower Loyalhanna Creek Subwatershed

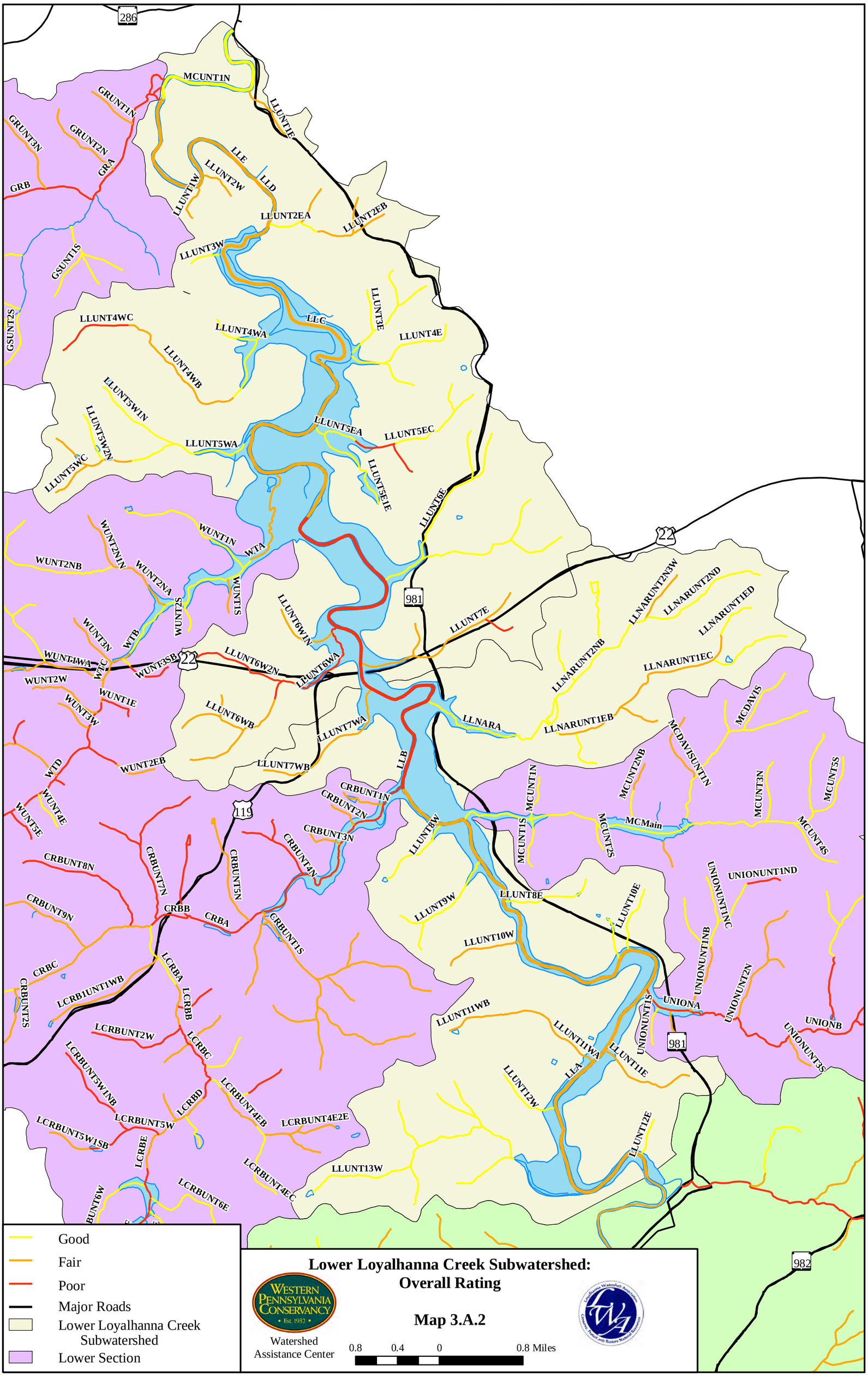


Visual Assessment Description

Lower Loyalhanna Main Stem

The Lower Loyalhanna Creek Subwatershed begins below the confluence of Saxman Run and the Loyalhanna Creek in Latrobe. Saxman Run contributes a large amount of AMD to the main stem at the confluence. Orange-tinted water flows from this point over a substrate dominated by cobble and gravel.

As the main stem winds out of Latrobe, Japenese knotweed, sycamore, and other small


286
MCUNT1N
GRUNT1N
GRUNT2N
GRUNT3N
GRA
GRB
LLUNT1E
LLE
LLD
LLUNT1W
LLUNT2W
LLUNT2EA
LLUNT2EB
LLUNT3W
GSUNT1S
GSUNT2S
LLUNT4WC
LLUNT4WA
LLC
LLUNT3E
LLUNT4E
LLUNT4WB
LLUNT5W1N
LLUNT5W2N
LLUNT5WA
LLUNT5EA
LLUNT5EC
LLUNT5WC
LLUNT5E1E
LLUNT6E
22
WUNT1N
WUNT2N1N
WUNT2NB
WUNT2NA
WTA
WUNT1S
WUNT2S
981
LLUNT6W1N
LLUNT7E
WUNT3N
WTB
WUNT1WA
WTC
WUNT3SB
LLUNT6W2N
LLUNT6WA
WUNT2W
WUNT1E
WUNT3W
LLUNT6WB
LLUNT7WA
LLNARA
LLNARUNT2N3W
LLNARUNT2ND
LLNARUNT1ED
LLNARUNT2NB
LLNARUNT1EC
LLNARUNT1EB
MCDAVIS
MCDAVISUNT1N
WTD
WUNT2EB
LLUNT7WB
LLB
CRBUNT1N
CRBUNT2N
MCUNT1N
MCUNT2NB
MCUNT5S
WUNT4E
WUNT5E
115
CRBUNT3N
MCUNT1S
MCUNT2S
MCMain
MCUNT3N
MCUNT4S
CRBUNT8N
CRBUNT7N
CRBUNT5N
CRBUNT4N
LLUNT8W
LLUNT8E
UNIONUNT1ND
CRBUNT9N
CRBB
CRBA
LLUNT9W
LLUNT10E
UNIONUNT1NC
LLUNT10W
CRBUNT1S
UNIONUNT1NB
CRBC
LCRBA
LCRBB
LCRBUNT2W
LLUNT11WB
UNIONA
UNIONUNT2N
UNIONB
CRBUNT2S
LCRB1UNT1WB
UNIONUNT1S
981
LLUNT11WA
LLUNT11E
UNIONUNT3S
LCRBC
LCRBUNT5W1NB
LLA
LLUNT12W
LCRBD
LCRBUNT4EB
LCRBUNT4E2E
LCRBUNT5W
LCRBUNT5W1SB
LCRBE
LLUNT12E
LLUNT13W
LCRBUNT4EC
LCRBUNT6E
BUNT6W
982
Good
Fair
Poor
Major Roads
Lower Loyalhanna Creek Subwatershed
Lower Section
Lower Loyalhanna Creek Subwatershed:
Overall Rating
Map 3.A.2
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
0.8 0.4 0 0.8 Miles

hardwoods are present around the stream. The surrounding landscape is a mix of residences and farmland. Streambanks are stable but show some signs of scouring and erosion due to high water flow.

The appearance of water remains cloudy and orange as the Loyalhanna Creek continues west, passing underneath the Ligonier Street Bridge (2nd Bridge). Open fields and farmland dominate the landscape. The riparian area continues to be comprised of Japanese knotweed and small hardwood trees.

Where the Loyalhanna Creek passes underneath the Derbytown Road Bridge (3rd Bridge), it is apparent that the area beyond the western bank of the stream was at one time surface mined. Multiple acidic mine drainage seeps are present on the hillside and they gather to form a single flow into the Loyalhanna Creek. Upon reaching the stream, there is little or no effect from the drainage.

Continuing to flow west, the streamside thickens with vegetation and canopy cover. The forest contains a mix of sycamore, oak, and other hardwood trees. Through this area the Loyalhanna Creek is still stained orange. The cobble substrate is embedded with sediment and iron oxide precipitate. Swirls of creamy foam float on the surface and the water emits a bad odor. This water appearance and character remains consistent until the Loyalhanna Creek encounters Union Run. This subwatershed adds additional sediment, iron oxide, and aluminum oxide. Following the confluence with Union Run, the Loyalhanna Creek winds around a bend. Velocity of the main stem increases and the stream substrate changes to boulders and large cobble. Steep banks surround the stream, and streamside vegetation includes large amounts of rhododendron and pine. The main stem emerges from this section and immediately is joined by **McCune Run**. The subwatershed contains Keystone Lake and little or no sign of upstream impacts. There is an AMD treatment system on McCune Run that is treating an acidic discharge from an old deep mine at Keystone State Park.

After the confluence with McCune Run, the landscape surrounding the Loyalhanna Creek flattens and is surrounded by large fields and wet areas. Riparian vegetation and canopy cover remain significant and is comprised of sycamore, silver maple, Japanese knotweed, shrubs, and some small hardwood trees. The substrate of the stream is again dominated by cobble and gravel. Where the main stem passes underneath the Oasis Bridge (5th Bridge), the water appearance is slightly cloudy and shows little or no sign of AMD. This appearance is brief however, because 1,000 feet downstream **Crabtree Creek** enters the Loyalhanna Creek. A large discharge in the Crabtree Creek Subwatershed adds 3,000-5,000 gallons of mine drainage to the creek each minute. Where the Loyalhanna Creek and Crabtree Creek meet, a plume of orange water mixes into the Loyalhanna Creek main stem. The discoloration is a result of the Crabtree Creek Discharge that delivers thousands of pounds of iron oxide sediment to the stream each day.

Where Crabtree Creek joins the Loyalhanna Creek, the substrate of the stream is no longer visible. Various tests showed that thick layers of sediment and iron oxide covered gravel and cobble. The streambanks are covered by mud and dirt. Streamside vegetation is primarily sycamore, silver maple, and shrubs. The water emits the odor of rotten eggs.

The confluence of Crabtree Creek and the Loyalhanna Creek main stem

The AMD impact created by the discharge on Crabtree Creek continues to affect the Loyalhanna Creek main stem as it flows west past New Alexandria and underneath Route 22. It is along this reach that the velocity of the stream decreases. Downstream of the Route 22 Bridge, the substrate remains hidden by muddy orange water. The surrounding landscape, similar to other sections, contains a mix of hardwood trees, shrubs, and Japanese knotweed. Ground surrounding the stream is increasingly wet and muddy. In times of high flow, a majority of the section downstream from Route 22 is under water.

Not until reaching a confluence with **Whitethorn Creek** does the characteristic of the Loyalhanna Creek main stem change again. It is at this confluence that the main channel of the creek widens. The stream

substrate is not visible at the mouth of Whitethorn Creek, but farther downstream, shallow water finally reveals a substrate embedded by sand and sediment. Continuing downstream, the Loyalhanna Creek widens further to form the Loyalhanna Lake.

Lake levels vary seasonally with amounts of rainfall and runoff. The summer pool of the lake covers 400 acres and is four miles long. Steep forested banks surround the main portion of Loyalhanna Lake. Vegetation is a mix of shrubs, grasses, and hardwood trees. One small campground, boat access ramp, and swimming area is located prior to the most heavily used portion of the lake. Maintained by the USACE, Loyalhanna Lake is a flood-control project used to protect downstream areas. Sediment deposits are visible in the upper and middle portions of the lake. Small peninsulas are forming where slow-flowing water is able to deposit sediment load on inside bends. Litter is a serious problem in and around Loyalhanna Lake. Styrofoam, bottles, cans, and other random trash items litter the banks, hillsides, and water within the lake. A majority of the trash is washed into the lake from upstream sources.

The Loyalhanna Dam shown from the downstream side in low water

The lake ends at the Loyalhanna Dam, which rises 114 feet from the streambed. The 960-foot long structure holds back water from the 290-square mile drainage area upstream. Four sluice gates at the bottom of the dam normally release water from the dam.

The section of stream below the dam has characteristics that are similar to sections of the upper watershed. The substrate is a mix of gravel, cobble, and boulder. Streambanks are covered with hardwood trees and shrubs. Some algal growth is present on the substrate. A small coal waste pile is located approximately 1,000 feet downstream from the dam. There are no visible signs of runoff near or around the coal waste pile, which is situated near old buildings. A small entryway was discovered at the site, the purpose of which is unknown and yet to be determined.

Approximately one-half mile downstream from the dam, the Loyalhanna Creek passes underneath Loyalhanna Dam Road. Immediately downstream from the bridge, an abandoned mine discharge flows into the creek from the western bank. The discharge is bright orange and had a field pH of 6.9. The flow of the discharge is approximately 80-120 gpm and, where it enters the main stem of the Loyalhanna Creek, iron oxide precipitate is noticeable downstream for 500 to 1,000 feet. It is assumed that the discharge is associated with the mine located upstream near the coal waste pile.

The substrate changes after the small discharge enters the main stem. Sand and gravel replace the cobble that was present upstream. As the main stem continues to flow north, the surrounding landscape remains forested with mixed hardwood and some pine. Throughout this section, several deep pools exist underneath rock cliffs and overhanging pines. In addition, the section contains steep banks making access to the creek extremely difficult. The landscape does not flatten until the Loyalhanna Creek approaches the confluence with Getty Run. Five hundred feet upstream from that confluence, coal waste piles are located on the western bank of the Loyalhanna Creek. Some runoff from the piles seeps into the Loyalhanna Creek main stem and Getty Run. Where **Getty Run** joins the Loyalhanna Creek, white precipitate is immediately visible on the stream substrate. Boulders and cobble are slippery with the aluminum oxide precipitate as the Loyalhanna Creek continues northward toward its mouth. The Getty Run Subwatershed contains numerous acidic discharges and, at its mouth, has an average pH of 2.9.

The AMD impact from Getty Run is apparent throughout the remaining length of the Loyalhanna Creek. Iron oxide precipitate, in addition to the aluminum, becomes visible further downstream. Where the main stem passes underneath the Westmoreland Heritage Trail (the old Penn Central Railroad Line), the Loyalhanna Creek is yellow-green from precipitating and suspended metals.

Where the Loyalhanna Creek joins the Conemaugh River to form the Kiskiminetas River, the Loyalhanna Creek adds considerable precipitates and sediment to the river. Staining on the rocks and

discoloration of water flowing from the Loyalhanna indicate upstream impacts from AMD and sediment.

Unnamed Tributaries to the Lower Loyalhanna Creek

Twenty-five unnamed tributaries enter the lower section of the Loyalhanna Creek main stem. A majority of the tributaries were rated moderate and showed little or no serious impacts. The impact most commonly found in the tributaries was erosion and sedimentation.

A few of the tributaries did contain AMD in small amounts. The first, UNT6W, originates in the old mining community of Shieldsburg. An acidic mine discharge seeps from what appears to be an old surface mine site. Further investigation indicated that at one time there was a deep mine and coke ovens at this location. The AMD has a pH that ranges from 3.0 to 4.7 as it flows east toward Route 22 and the Loyalhanna Creek main stem. At the mouth of the tributary, there is very little sign of the upstream mine drainage. Two small tributaries to the main stem of UNT6W also contained acidic AMD. Both were located on property owned by the Salem Rod and Gun Club. The discharges seem to emanate from areas that were surface mined.

The second tributary containing AMD is UNT10W. The tributary is located north of Latrobe on Carrs Road. The stream flows through an old surface mine site that was partially reclaimed and collects in a pond. Upon trickling out of the pond, the tributary immediately turns orange. The tributary remains orange as it flows down a steep forested hillside over large boulders. Where it meets the Loyalhanna Creek main stem, only a small amount of orange staining is visible.

The final tributary containing AMD is UNT11W. It is also located north of Latrobe close to the Derbytown Road Bridge on Barnhart Road. The tributary originates above a heavily surface-mined area. Half way through its length, an acidic discharge containing aluminum enters the stream. The aluminum dissipates quickly, but further downstream, iron oxide precipitate is visible. Where the tributary meets the Loyalhanna Creek main stem, no signs of AMD are present.

Water Quality

Four main stem samples were taken along the Lower Loyalhanna Creek. The sites were selected utilizing knowledge of the landscape, accessibility, known impacts, and major tributary location. Please refer to Table 3.A.1, Table 3.A.2, Table 3.A.3, and Table 3.A.4 for water quality data. Water quality results for the sampled sites show significant levels of total iron for a stream the size of the Loyalhanna Creek. Samples taken at the mouth in January of 2005, show moderate levels of aluminum as well.

Table 3.A.1: Sample Site LWA-F
3rd Bridge Latrobe

Date Sampled	pH	Alk. (mg/L)	TSS (mg/L)	TDS (mg/L)	Total Iron (mg/L)	Total Coliform (per 100ml)	Fecal Coliform (per 100ml)
8/25/04	7.08	226.0	17.0	179.0	<0.06	- - -	- - -
10/25/04	7.05	52.0	2.0	291.0	1.64	- - -	- - -
1/25/05*	6.9	44.8	<3	- - -	4.37	- - -	- - -

(- - -) parameter not tested

* Sample analyzed by the DEP Bureau of Laboratories

Sample Location: Sample taken from the Derbytown Road Bridge (3rd Bridge) outside of Latrobe. To access sample site, take Route 981 North from Latrobe and turn left onto Derbytown Road after the Elks. Follow Derbytown Road to stop sign. Turn right and proceed 1,000 feet to bridge.

Table 3.A.2: Sample Site LWA-G Oasis Bridge							
Date Sampled	pH	Alk. (mg/L)	TSS (mg/L)	TDS (mg/L)	Total Iron (mg/L)	Total Coliform (per 100ml)	Fecal Coliform (per 100ml)
8/25/04	6.91	43	6	173	<0.06	- - -	- - -
10/25/04	7.23	50	2	295	0.86	- - -	- - -
1/25/05*	7.1	42.4	<3	- - -	2.45	- - -	- - -

(- - -) parameter not tested

* Sample analyzed by the DEP Bureau of Laboratories

Sample Location: Sample taken from the Oasis Bridge (5th Bridge) in New Alexandria. To access sample site, take Route 981 North from Latrobe and turn left onto Oasis Road after the Oasis Bar and Grill. Proceed 1,500 feet to bridge.

Table 3.A.3: Sample Site LWA-H Route 22 Bridge							
Date Sampled	pH	Alk. (mg/L)	TSS (mg/L)	TDS (mg/L)	Total Iron (mg/L)	Total Coliform (per 100ml)	Fecal Coliform (per 100ml)
8/25/2004	6.88	42.0	9.0	209.0	<0.06	- - -	- - -
10/25/2004	6.99	55.0	6.0	375.0	2.4	- - -	- - -

(- - -) parameter not tested

Sample Location: Sample taken from the Route 22 Bridge in New Alexandria. To access sample site, pull over on the shoulder in the eastbound lane of Route 22. This is an extremely busy road and samples were only taken twice due to safety concerns.

Table 3.A.4: Sample Site LWA-I Mouth						
Date Sampled	pH	Alk. (mg/L)	TSS (mg/L)	TDS (mg/L)	Total Iron (mg/L)	Al (mg/L)
8/25/04	6.88	42	2	182	<0.06	- - -
10/25/04	7.1	43	3	343	12.58	- - -
1/25/05*	6.8	33	<3	- - -	3.77	0.916

(- - -) parameter not tested

* Sample analyzed by the DEP Bureau of Laboratories

Sample Location: Sample taken from the Penn Central Rail Trail Bridge. To access sample site, enter rail trail at water treatment facility in Saltsburg and walk across Conemaugh River and continue through tunnel underneath Route 981. Proceed 500 feet to bridge across Loyalhanna Creek.

Conclusions

The Lower Loyalhanna Creek Subwatershed is significantly impacted by AMD. Discharges located on three of the five major tributaries within the section deposit thousands of pounds of iron and aluminum to the creek each day. Despite the impact from AMD, the lower section of the main stem flows through a beautiful natural area. Land surrounding the main stem is protected by the USACE. The land that surrounds the main stem is considered flood-control property. Much of it disappears underwater during flood events or heavy rainfall.

Sediment appears more frequently and in greater amounts throughout the lower section of the watershed as well. This is due in part to the Loyalhanna Dam, which slows the velocity of the creek, allowing sediment to deposit on stream substrate and flood areas. The cumulative effect of upstream erosion and sedimentation problems is also a factor.

Recommendations

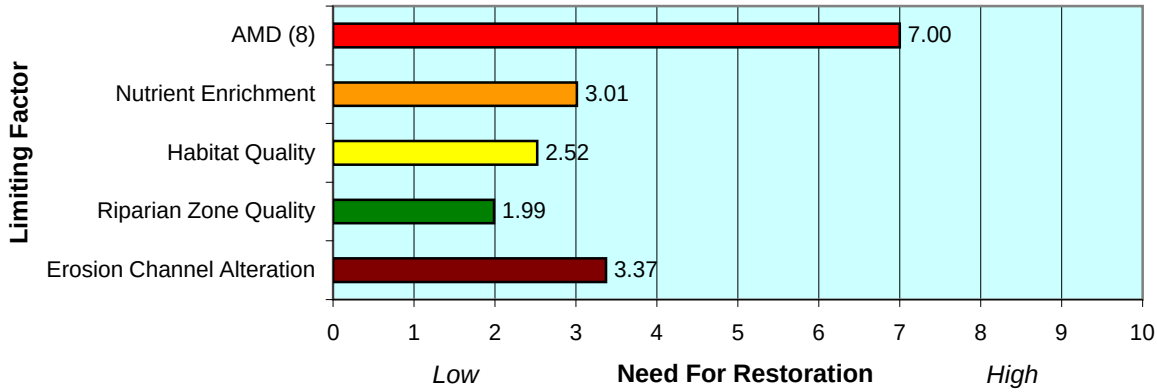
The following recommendations are made for the Lower Loyalhanna Creek Subwatershed:

- Work with the USACE to ensure continued protection and management of the flood-control property.
- Further investigate small abandonded mine discharges entering the main stem including UNT6W, UNT10W, and UNT11W.
- Address upstream erosion and sedimentation problems to reduce overall sediment load entering the lower portion of the watershed.
- Work with the USACE to educate community members about the impact of sediment upon the lake and its ecosystem. This could be accomplished with community outreach, education events, and brochures.
- Continue to assist the USACE in cleanup efforts to remove trash and debris from around the lake.
- Develop hiking/biking and water trail to encourage recreation in and around the lower portion of the watershed. Increased recreation use will help to increase community involvement.
- Monitor water quality along the Lower Loyalhanna Creek main stem. Quarterly monitoring will help to establish base data and assist in illustrating the effects of upstream efforts taking place in the future. The parameters that should be monitored are pH, alkalinity, total iron, aluminum, total dissolved solids, and total suspended solids.

Overall Restoration Priorities

Figure 3.A.2 exhibits overall restoration priorities for the entire subwatershed. As indicated, the limiting factor that received the highest restoration priority rating was AMD. AMD is present throughout 50% of the Lower Loyalhanna Creek main stem. The most seriously impacted main stem segments are downstream of Crabtree Creek and downstream of Getty Run. There are three small tributaries that are impacted by AMD and one discharge that flows directly into the main stem. Erosion and channel alteration also rated high for restoration priority. This rating reflects the presence of sediment throughout the substrate of the Loyalhanna Creek main stem.

Figure 3.A.2: Restoration Priorities for the Lower Loyalhanna Creek Subwatershed



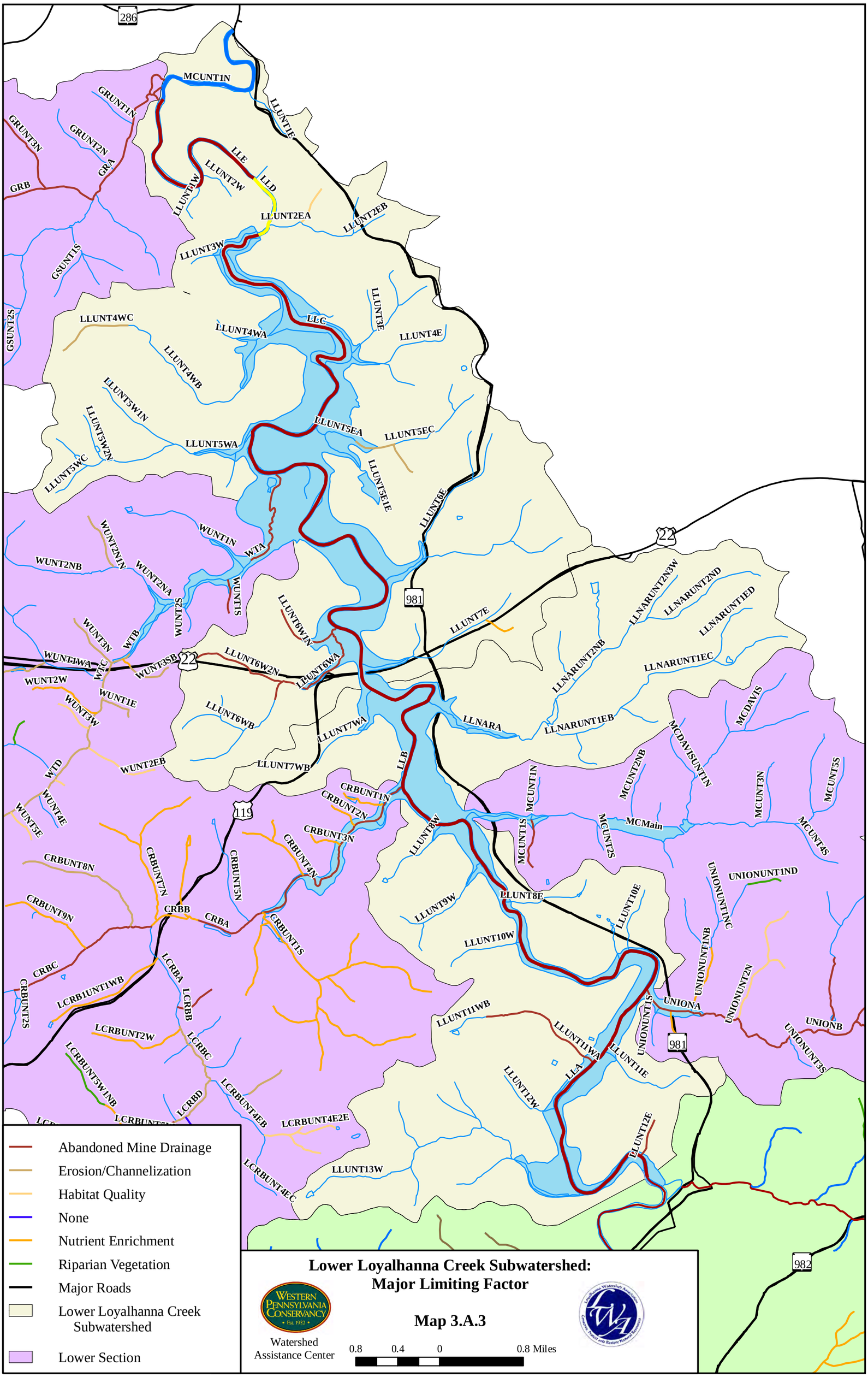
Restoration Suggestions for Individual Stream Segments

Thirteen stream segments received scores identifying limiting factors. The limiting factors identified were erosion and channel alteration, compromised fish and macroinvertebrate habitat, riparian vegetation degradation, nutrient loading, and AMD. Please refer to Table 3.A.5 and Map 3.A.3 for impact description and segment location.

Table 3.A.5: Impacted Stream Segments and Restoration Suggestions for the Lower Loyalhanna Creek Subwatershed

LIMITING FACTOR: Riparian Vegetation Degradation

Stream Segment Name	Description of Impact	Remediation Strategy	Possible Funding Sources	Priority Rating
LLUNT4WC *Main stem section of Serviceberry Run that flows through a pasture.*	Livestock have direct access to the stream. There is no riparian vegetation on more than half of the streambank through the section. There is some canopy cover present.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs in order to eliminate livestock access to the stream. This will allow riparian vegetation to return. Possible Partners: WCD, USDA, WPC	State, Federal, Private	Medium
LLUNT5EB *Tributary section that flows through the Mannito Haven Golf Course.*	Grass is mowed directly to streambank. Few shrubs and trees are located in the riparian area.	1. Educate landowner. 2. Work with landowner to plant streamside vegetation. Possible Partners: WCD, DEP	Local, State, Private	Low


286
MCUNT1N
GRUNT1N
GRUNT2N
GRUNT3N
GRA
GRB
LLUNT1E
LLE
LLD
LLUNT1W
LLUNT2W
LLUNT2EA
LLUNT2EB
LLUNT3W
GSUNT1S
GSUNT2S
LLUNT4WC
LLUNT4WA
LLC
LLUNT3E
LLUNT4E
LLUNT4WB
LLUNT5W1N
LLUNT5W2N
LLUNT5WA
LLUNT5EA
LLUNT5EC
LLUNT5WC
LLUNT5E1E
LLUNT6E
WUNT1N
WTA
WUNT2N1N
WUNT2NB
WUNT2NA
WUNT2S
WUNT1S
981
22
LLUNT6W1N
LLUNT7E
LLNARUNT2N3W
LLNARUNT2ND
LLNARUNT1ED
WUNT3N
WTB
WUNT1WA
WTC
WUNT3SB
LLUNT6W2N
LLUNT6WA
LLNARUNT2NB
LLNARUNT1EC
WUNT2W
WUNT1E
WUNT3W
LLUNT6WB
LLUNT7WA
LLNARA
LLNARUNT1EB
MCDAVIS
MCDAVISUNT1N
WTD
WUNT2EB
LLUNT7WB
LLB
MCUNT2NB
MCUNT5S
CRBUNT1N
MCUNT1N
WUNT4E
WUNT5E
CRBUNT2N
115
CRBUNT3N
MCUNT1S
MCUNT2S
MCMain
MCUNT3N
MCUNT4S
LLUNT8W
CRBUNT8N
CRBUNT7N
CRBUNT5N
CRBUNT4N
UNIONUNT1ND
LLUNT8E
LLUNT10E
CRBUNT9N
CRBB
CRBA
LLUNT9W
LLUNT10W
UNIONUNT1NB
UNIONUNT1NC
CRBUNT1S
CRBC
LCRBA
LCRBB
LCRB1UNT1WB
CRBUNT2S
UNIONA
UNIONUNT1S
UNIONUNT2N
LLUNT11WB
LLUNT11WA
UNIONB
UNIONUNT3S
LCRBUNT2W
LCRBC
981
LLA
LLUNT11E
LCRBUNT5W1NB
LCRBD
LCRBUNT4EB
LCRBUNT4E2E
LLUNT12W
LLUNT12E
LLUNT13W
LCRBUNT4EC
982
Abandoned Mine Drainage
Erosion/Channelization
Habitat Quality
None
Nutrient Enrichment
Riparian Vegetation
Major Roads
Lower Loyalhanna Creek Subwatershed
Lower Section
Lower Loyalhanna Creek Subwatershed:
Major Limiting Factor
Map 3.A.3
Western Pennsylvania Conservancy
Watershed Assistance Center
0.8 0.4 0 0.8 Miles

LIMITING FACTOR: Compromised Fish and Macroinvertebrate Habitat				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
UNT6W2N *Small tributary that flows into UNT6W. It flows adjacent to Route 22 through a field and mowed lawns.*	The substrate of the stream is embedded with silt that covers habitat and food sources. There is a large culvert that serves as a fish barrier.	1. Identify source of sediment. 2. Educate landowners. Possible Partners: WCD, DEP, Hempfield Township, Salem Township	Local, State	Low
UNT5EB *Tributary section that flows through the Mannito Haven Golf Course.*	There is very little fish cover or invertebrate habitat available due to the substrate being 100% embedded. It is comprised entirely of silt and mud. In addition, multiple culverts serve as fish barriers.	1. Educate landowner. 2. Work with landowner to plant streamside vegetation. The streamside vegetation would serve as a filter for sediment and trap it before it enters the stream. Possible Partners: WCD, DEP	Local, State, Private	Low – Medium
LIMITING FACTOR: Erosion and Channel Alteration				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
LLB *Main stem segment of that extends from the confluence with Crabtree to just before the Loyalhanna Lake is formed. This segment flows through mostly forested land, with the exception of when it passes by residences and underneath Route 22 in New Alexandria.*	Streambanks are comprised of silt, mud, and iron oxide sediment. They are partially eroded and undercut on several occasions. Passing underneath the Route 22 Bridge, the streambanks are stabilized with rip rap.	1. Elimate upstream sources of sediment that are deposited along the streambanks. 2. Work with partners to determine stabilization methods for the main stem. Possible Partners: USACE, WCD, DEP, PAFBC	Local, State, Federal, Private	Medium

LLC *Main stem segment that extends from the beginning of Loyalhanna Lake to the Loyalhanna Dam.*	Channel alteration has occurred as a result of the lake. Braiding is noticeable. Streambanks are comprised of silt, mud, and iron oxide sediment. They are partially eroded and undercut on several occasions.	1. Eliminate upstream sources of sediment that are deposited along the streambanks. 2. Work with partners to determine stabilization methods for the main stem. Possible Partners: USACE, WCD, DEP, PAFBC	Local, State, Federal, Private	Medium
LLUNT2EB *Small tributary that flows through an old field and Christmas tree nursery.*	The channel has been altered for the road. Substrate of the section is 50% embedded with sediment.	1. Identify source of sediment. 2. Work with landowners to remediate sediment source. Possible Partners: WCD, DEP	State	Low
LLUNT4WC *Main stem section of Serviceberry Run that flows through a pasture.*	Livestock have direct access to the stream. Livestock have trampled the streambank, which is heavily eroded. The substrate of the stream is 100% embedded.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs in order to eliminate livestock access to the stream. This will allow riparian vegetation to return. Possible Partners: WCD, USDA, WPC	State, Federal, Private	High *(Due to HQ-CWF stream designation)*
LLUNT5EB *Tributary section that flows through the Mannito Haven Golf Course.*	The streambank is eroding and the substrate is 100% embedded.	1. Educate landowner. 2. Work with landowner to plant streamside vegetation. The streamside vegetation would serve as a filter for sediment and trap it before it enters the stream. 3. Install streambank stabilization. Possible Partners: WCD, DEP	State	Low

LLUNT6W2N *Small tributary that flows into UNT6W. It flows adjacent to Route 22 through a field and mowed lawns.*	The channel of the stream has been straightened and there is rip rap stabilizing the streambank along the road. There is some erosion of the streambanks and the substrate of the stream is very embedded.	1. Determine reason for the channelization and use of rip rap. 2. Determine source of sediment that is gathering in the substrate. Possible Partners: WCD, DEP, Hempfield Township, Salem Township	Local, State	Low
LLUNT6WA *Main stem portion of UNT6W that flows through a forest and past a small group of homes. The tributary passes underneath Route 22 west of New Alexandria.*	The banks are eroding slightly. The substrate of the stream is heavily embedded with silt.	1. Determine source of sediment that is gathering in the substrate. Possible Partners: WCD, DEP, Hempfield Township, Salem Township	Local, State	Low
LLUNT6E1E *Small tributary that flows into UNT6E, commonly known as Tubmill Run. The tributary flows through mostly forest and residences.*	The stream appears to have been channelized in some sections. Rip rap has been utilized to stabilize the streambanks. The substrate of the stream is 40-50% embedded with sediment.	1. Educate landowner. 2. Work with landowner to more effectively manage erosion and stream course. 3. Identify source of sediment. Possible Partners: WCD, DEP, R&L Development	Local, State, Private	Low
LLUNT7E *Small tributary that flows adjacent to Route 22. It flows through a field and a group of homes.*	The stream has been channelized where it runs adjacent to Route 22. The substrate of the stream is 30-40% embedded.	1. Identify source of sediment. 2. Determine method to construct a natural meander in the stream. Possible Partners: WCD, DEP, PennDOT, New Alexandria Borough	Local, State	Low

LIMITING FACTOR: Nutrient Enrichment				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
LLC *Main stem segment that extends from the beginning of Loyalhanna Lake to the Loyalhanna Dam.*	There was a green tint to the lake and water flowing within the Loyalhanna Creek.	1. Investigate coloration of water. 2. Remediate upstream sources of nutrient enrichment. Possible Partners: WCD, DEP, USACE	Local, State	Low
LLUNT6W1N *Small tributary to UNT6W that flows through the Salem Rod & Gun Club.*	Stream substrate is covered with algae and green scum. It is suspected the algae is a result of acidic AMD upstream.	1. Remediate upstream source of AMD. Possible Partners: DEP, WCD, OSM	State, Federal, Private	Low
LLUNT6W2N *Small tributary that flows into UNT6W. It flows adjacent to Route 22 through a field and mowed lawns.*	The water is grayish in color and the substrate contains a large amount of algae. It is suspected the algae is a result of acidic AMD upstream and discharges from failing septic systems.	1. Remediate upstream source of AMD. Possible Partners: DEP, WCD, OSM	State, Federal, Private	Low
LLUNT6E1E *Small tributary that flows into UNT6E, commonly known as Tubmill Run. The tributary flows through mostly forest and residences.*	The substrate contains a lot of algae and the field pH of the stream was between 8.0 and 9.0. It is suspected that this is caused by failing septic systems upstream.	1. Encourage landowners to utilize BMPs for managing septic systems. Possible Partners: WCD, PSCE, USDA RUS	State, Federal	Low

LIMITING FACTOR: Abandoned Mine Drainage				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
LLA *Main stem section that extends from downstream of the confluence with Saxman Run to the confluence with Crabtree Creek.*	Water is tinted orange and the substrate is embedded with iron oxide sediment. The orange tint fades flowing downstream.	1. Remediate upstream AMD on Saxman Run and the middle section of the Loyalhanna Creek. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	Local, State, Federal, Private	High
LLB *Main stem segment of that extends from the confluence with Crabtree to just before the Loyalhanna Lake is formed. This segment flows through mostly forested land, with the exception of when it passes by residences and underneath Route 22 in New Alexandria.*	Water is orange. The coloration comes from Crabtree Creek which is impacted by a large abandoned mine discharge upstream. The water is extremely turbid and the bottom is not visible. Iron oxide sediment is noticeable along the streambank, as well as on trees.	1. Remediate upstream AMD on Saxman Run and the middle section of the Loyalhanna Creek. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	Local, State, Federal, Private	High
LLC *Main stem segment that extends from the beginning of Loyalhanna Lake to the Loyalhanna Dam.*	There is a slight orange tint to the water throughout this section. The coloration fades flowing downstream and dissipates by the lake.	1. Remediate upstream AMD on Saxman Run and the middle section of the Loyalhanna Creek. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	Local, State, Federal, Private	High

LLE *Main stem section that extends from the base of the Loyalhanna Dam to the confluence with Getty Run. It flows through a forested area.*	One large AMD discharge and several AMD seeps were found within this section. The discharge located just below the dam flows at approximately 80-100 gpm and had a field pH of 7.1. The discharge is visible along one bank of the Loyalhanna Creek for at least 100 yards downstream.	1. Determine source of discharge. 2. Sample discharge on a quarterly basis. 3. Remediate discharge to eliminate impact upon stream. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal, Private	Medium
LLF *Main stem section of stream that extends from the confluence with Getty Run to the mouth of the Loyalhanna Creek. It flows through a forested area.*	Where Getty Run enters the Loyalhanna Creek, white and orange precipitate is visible. The substrate is coated with both iron oxide sediment and aluminum precipitate. The impact from Getty Run is visible all of the way to the mouth of the stream and beyond.	1. Remediate multiple AMD discharges within the Getty Run Subwatershed. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal, Private	High
LLUNT6WA *Main stem portion of UNT6W that flows through a forest and past a small group of homes. The tributary passes underneath Route 22 west of New Alexandria.*	The stream is acidic (pH of 3.0) and orange in color. The substrate is covered with green algae and is littered with trash. There is a slight oily sheen on the surface of the water. The AMD source is the community of Shieldsburg and an abandoned mine area. The origin was both a deep and a surface mine.	1. Remediate origin of the AMD either through re-mining or by passive treatment. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal, Private	Medium

LLUNT6W1N *Small tributary to UNT6W that flows through the Salem Rod & Gun Club.*	The tributary had a field pH of 4.5 and the water was slightly orange in color. Origin of AMD is on the property owned by the Rod & Gun Club.	1. Remediate origin of the AMD either through re-mining or by passive treatment. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal, Private	Medium
LLUNT6W2N *Small tributary that flows into UNT6W. It flows adjacent to Route 22 through a field and mowed lawns.*	AMD discharge enters tributary at the site of an area that was surface mined. The pH of the discharge at the source was 3.9 in the field. Additional seeps enter into the stream. The discharge could be associated with those affecting the main stem of UNT6W, as well as UNT1N.	1. Remediate origin of the AMD either through re-mining or by passive treatment. 2. Increase community awareness about the challenge that exists due to AMD pollution. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal, Private	Medium
LLUNT10W *Small tributary that enters the main stem in between Union Run and McCune Run. It flows through a property that was surface mined.*	The stream is dammed to form a pond. At the base of the pond, water flowing out is bright orange. The stream cascades through a beautiful steep hollow, remaining orange until meeting the Loyalhanna Creek.	1. Remediate the surface mined area and investigate the source of the AMD. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal	Low – Medium
LLUNT11A *Tributary that enters the main stem just downstream of the Derbytown Road Bridge. The tributary originates in an area that was surface mined and is currently forested.*	The stream has an orange tint and, where a small tributary enters it, white precipitate appears. Land surrounding the stream was surface mined in the 1970s.	1. Reclaim and re-mine the surface mine surrounding the stream. Possible Partners: WCD, WPC, DEP, OSM, USACE	State, Federal	Medium

SECTION 3.B
UNION RUN

Section 3.B

Union Run Subwatershed

General Description

The 7.28 square-mile Union Run Subwatershed is located in the center of Derry Township. Union Run and its tributaries flow west toward the Loyalhanna Creek main stem through the small communities of Peanut, New Derry, Superior, and the outskirts of Latrobe.

Union Run originates from a spring located in the small town of Peanut on Route 982. The stream flows west away from Peanut along the base a forested hillside. The main stem is joined by two small tributaries that enter from the north. Both tributaries are surrounded by multiple farming operations. Union Run continues to flow west through large farms and pastures. At the intersection of Panizzi Road and Androstic Road, a large tributary enters the Union Run main stem from the northeast. The tributary originates in Atlantic and also flows through Superior. Both communities were the sites of deep coal mines in the early 1900s. AMD is present in the tributary and impacts the Union Run main stem for the remainder of its length.

LWA staff member looking downstream at the Loyalhanna Creek from the mouth of Union Run

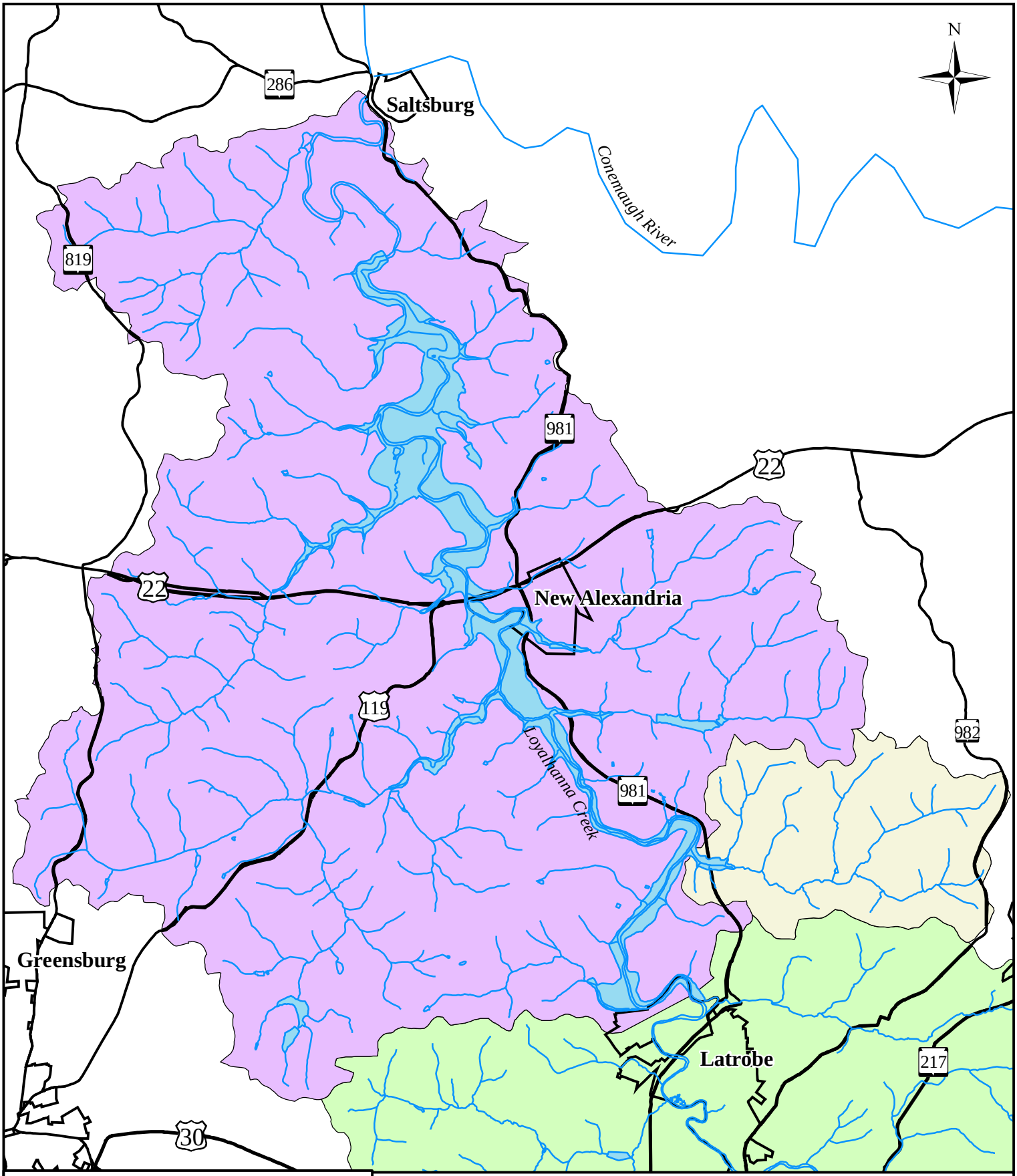
Following the intersection of Panizzi Road and Androstic Road, Union Run continues to flow through a mix of forest, field and farmland. Multiflora rose, greenbriar, and other shrubs increase in concentration around the streambank. This is the case until Union Run reaches Route 981. After passing underneath the Route 981, Union Run retreats into a forested area. This portion of stream is surrounded by property included in the USACE flood-control project. It is comprised primarily of sycamore, oak, and other hardwood trees. Union Run enters the main stem of the Loyalhanna Creek one-half mile downstream from the Route 981 Bridge.

Union Run is classified as a WWF and is currently not meeting its designation. For the geographic location of this subwatershed, please refer to Map 3.B.1.

Review of Historic Information

Overall Summary

The upper portion of the Union Run Subwatershed contains the communities of Superior, Peanut, Atlantic, and New Derry. Each of the communities were built primarily around deep coal mines that operated in the late 1800s and early 1900s. Today, limited evidence of the coal mining exists, with the exception of coal patch homes, a row of coke ovens and the abandoned railroad grade. The deep mines were shut down in the early 1900s, and later most were surface mined to remove large amounts of the remaining coal.



Streams
Major Roads
Boroughs and Cities
Union Run Subwatershed
Lower Section

Union Run Subwatershed: Overall Location

Map 3.B.1

Watershed Assistance Center

1 0.5 0 1 Miles

Scarlift Report

Six discharges were identified during fieldwork for the Scarlift Report. Each of those discharges is described in the following table. The Scarlift Report stated that the discharges located throughout the Union Run Subwatershed were possibly connected to those located in the Saxman Run Subwatershed and of the same underground mine pool. It was speculated that those discharges within the Union Run Subwatershed area act as the overflow for the entire mine pool.

Union Run Subwatershed Discharges Catalogued During Scarlift		
Scarlift Discharge Number	**Current Discharge Name**	**Description of Discharge and Location**
5301	None	Seeping discharge located along the east bank of Union Run above the intersection of Panizzi Road and Androstic Road. This is no longer a single discharge point, but rather a series of seeps that run throughout the length of the stream from Superior to Panizzi Road. In addition to the seeps, small coal refuse piles are located along the length of the stream.
5302	None	Two discharge points located at an abandoned mine mouth. The two discharges flowed at approximately 17 gpm and drained into a small pond and then into Union Run. The site is located very close to the intersection of Bonocy Road and Androstic Road. The pH of the discharges was 2.6 during Scarlift fieldwork. Samples showed high levels of iron, aluminum, and manganese. The discharges are still present today, but have a much lower flow. Field pH taken at the site was 4.5.
5303	None	Discharge coming from a caved-in mine mouth along Bonocy Road. The area had been, or was being, surface mined during the Scarlift fieldwork. The pH taken during Scarlift fieldwork was 2.4. Similar to discharge number 5302, high levels of iron, aluminum, and manganese were detected during sampling. The discharge exists today, although there is no evidence of a mine opening.
6156	None	Seasonal discharge located near the intersection of Androstic Road and Panizzi Road. The pH of the discharge was 2.8 during the Scarlift fieldwork. High levels of iron, aluminum, and manganese were present in the discharging water. Today, this discharge is a series of seeps that bubble out of a grazed pasture north of the Androstic and Panizzi roads intersection. It is uncertain whether or not this area is associated with past mining or the coal seam. Field pH taken at the site in 2004 was 3.4.

6157	None	This 3 gpm discharge flowed from a tile drain in the village of Superior. The actual source of the discharge was not determined during Scarlift fieldwork. The pH of the discharge was 2.7. It contained 78mg/L of iron, 36 mg/L of aluminum, and 22 mg/L of manganese. The discharge is still present today and is, at some points, contained within a pipe. Field pH taken at the site in 2004 was 3.8.
6158	None	This 2 gpm discharge flows from an old mine mouth in the town of Atlantic. The site is located in the headwaters of Union Run. The pH of the discharge was 2.8 when sampled during Scarlift fieldwork. It was noted that the site was used as a garbage dump. Today, there is no evidence of mine drainage at the site, but the area is still used for dumping.

U.S. Army Corps of Engineers (USACE)

The USACE completed a water quality assessment of the Loyalhanna Creek main stem in 2002. That assessment included samples taken at the mouth of Union Run. Results of those samples included the following: pH – 4.85, Total Iron – 2.89 mg/L, Aluminum – 6.65 mg/L. This data is consistent with data colleted during the assessment.

Kiski-Conemaugh Stream Team

Water quality samples were collected by Stream Team volunteers and analyzed by the DEP Bureau of Laboratories between April 2000 and February 2001. Results from those samples are shown in the table below. This data is consistent with data collected during the assessment.

Sample Date	Total Iron (mg/L)	Aluminum (mg/L)	pH
4/17/2000	3.72	4.10	5.3
7/17/2000	0.636	1.94	6.2
2/12/2001	7.90	4.27	5.4

PA Department of Environmental Protection (DEP)

Various reports from the DEP highlight water quality samples related to surface mines throughout the entire subwatershed. Two of those reports provided important information about the subwatershed and AMD sites.

Fodor Strip: Completed by North Cambria Fuels in 1985, this surface mine project file includes water quality information for waterways surrounding the active project area. Water samples taken at the site, which was located in Superior, are consistent with water samples taken during the Scarlift Report. The surface mine was located behind the Panizzi farm between Panizzi Road and Route 982. Discharge sources found around the surface mine are the same as those listed in the Scarlift Report.

V.P. Smith Strip: Completed by VP Smith in 1986, this surface mine was located very close to the Fodor Strip. Similar to the Fodor Strip, the project file includes water quality information from surrounding waterways. According to project files, the VP Smith Strip extended from Route 982 to Panizzi Road adjacent to the Superior Branch of Union Run. Water samples taken during mining were consistent with Scarlift water quality data and assessment fieldwork completed in 2003.

At the time of this report, there was active re-mining occuring within the subwatershed. The re-mining was occuring in the community of Peanut and will result in the removal of abandoned underground mine workings and remaining coal pillars.

More complete information about surface mine permits and active mining within the subwatershed can be obtained at the DEP District Mining Office in Greensburg.

DEP Union Run TMDL

The Union Run Subwatershed was assessed by the DEP in 2002. The TMDL for Union Run was completed in 2004. According the to TMDL report, 90% of the Union Run Subwatershed is impaired by high concentrations of metals, low pH, and suspended solids. The pollutants come primarily from abandoned mine drainageAMD discharges within the subwatershed. Only the headwaters of Union Run are meeting TMDLs. The remainder of the watershed is exceeding determined TMDLs.

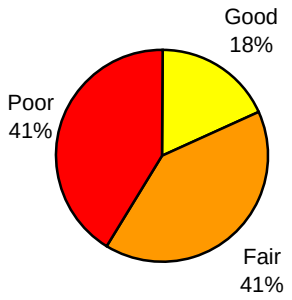
Water sampling completed during the DEP assessment of the Union Run Subwatershed is consistent with assessment fieldwork completed in 2004. In addition, that water quality information is extremely similar to information gathered during the 1972 Scarlift Report. There has been a slight overall improvement.

Visual Assessment Summary

Visual Assessment Findings

The visual assessment of Union Run was completed in the spring of 2004. A total of 22 stream segments were assessed. As depicted in Figure 3.B.1, 18% of the subwatershed received a good rating, 41% received a fair rating, and 41% received a poor rating. An average score of 6.25 was given to the entire subwatershed, which is a fair rating overall. The overall fair rating primarily reflects the impact of AMD upon a majority of the subwatershed. Individual stream segment ratings are depicted in Map 3.B.2.

Figure 3.B.1: Visual Assessment Ratings for the Union Run Subwatershed



Visual Assessment Description

Union Run Main Stem

The headwaters of Union Run are located in the small town of Peanut. They originate in an area that was deep mined in the early 1900s and was being surfaced mined at the time of assessment. The surface mine is a re-mining operation where the old mine workings were being removed. Some evidence of coal waste is present near the headwaters and the main stem.

From the headwaters, Union Run flows west from Peanut. Open fields and a few new homes surround the main

Coke ovens in the Union Run Subwatershed

MCMain
MCUNT2S
MCUNT3S
MCUNT4S
LLUNT8E
LLUNT10E
LLUNT9E
UNIONUNT1ND
UNIONUNT1NC
UNIONUNT1NB
UNIONUNT2N
UNIONUNT3NA
UNIONUNT3NC
UNIONUNT3NB
UNIONUNT4N1N
UNIONUNT4NC
UNIONUNT4NB
UNIONA
UNIONUNT1S
UNIONUNT2S
LLA
LLUNT11WA
LLUNT11E
UNIONUNT3S
UNIONUNT4S
UNIONB
UNIONUNT5N
UNIONUNT6N
UNIONUNT5S
981
981

Good
Fair
Poor
Major Roads
Union Run Subwatershed
Lower Section

Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center

Union Run Subwatershed: Overall Rating

Map 3.B.2

0.5 0.25 0 0.5 Miles

N

stem and it has a riparian zone comprised primarily of shrubs and small trees. The substrate of the stream contains cobble, gravel, and sediment. Some algal growth is present, indicating possible nutrient loading from the surrounding homes.

Where Union Run passes underneath Pandora Road, the landscape surrounding the main stem becomes dominated by agriculture. Through this section, livestock have direct access to the stream. Very little riparian vegetation is present along the streambank, which is trampled and eroded. The substrate of the stream is embedded and contains mostly silt and sediment. Algal growth is excessive, especially in areas where the water moves slowly through the stream channel.

Farms continue to surround the main stem of Union Run as it travels parallel to Panizzi Road. Livestock have access to the stream throughout this section and the substrate is embedded with silt and sediment. Streambanks are significantly eroded and streamside vegetation is limited. Algal growth is abundant through the entire section, indicating nutrient loading from surrounding agricultural operations. It is also in this section that Union Run passes a row of well-preserved coke ovens. The coke ovens are located close to the main stem of the stream and close to the railroad bed. At one time, the railroad spur would take coal from the communities of Superior and Atlantic to the coke ovens, and then to Latrobe and Derry. Small piles of waste coal are located near the coke ovens and some coal is present within the stream substrate. There is no visual evidence of impacts from the small coal waste piles.

Holstein cow lounging in Union Run near Panizzi Road

Downstream of the coke ovens, the main stem of Union Run passes underneath the old railroad bed and continues to flow through a pasture grazed by Holsteins. At the intersection of Panizzi Road and Androstic Road, a large tributary referred to as the Superior Branch, enters the main stem from the northwest. Originating from the communities of Atlantic and Superior, the tributary contains significant impacts from AMD. At the confluence of the Superior Branch and Union Run, aluminum and iron precipitate are immediately visible. Upstream of the confluence, the pH of the Union Run main stem was 8.8 and downstream of the confluence, the field pH was 4.0. Following this confluence, the Union Run main stem continues west and flows through a partially forested area parallel to Androstic Road. Some pine trees and shrubs surround the stream. The area shows evidence of past surface mining and pieces of coal are present in the stream substrate along with gravel, sediment, and metal precipitates. The water is orange and white in color.

At the intersection of Androstic Road and Bonocy Road, the main stem flows through a forested area. It is also at this point where two abandoned mine discharges enter Union Run. One originates from a suspected abandoned high wall and the second flows from a drainpipe with an unknown origin. Both discharges are acidic and both were catalogued during Project Scarlift. Continuing west, Union Run emerges from the forested area and into a large pasture. Absolutely no vegetation or canopy cover is present along the streambank. The substrate is comprised entirely of sediment and the water is still orange and white in color. A severely eroded bank is located on the downstream section of the field immediately before Union Run passes underneath Uschak Road. At the Uschak Road Bridge, the pH of Union Run was 4.7 during assessment fieldwork.

Union Run looking upstream from the Uschak Road Bridge

Downstream of the Uschak Road Bridge, the land

surrounding Union Run changes. Open fields and grazed pasture are replaced by forest. Hardwood trees, shrubs, multiflora rose, and greenbriar surround the stream, providing excellent canopy cover. The substrate of the stream remains embedded with iron oxide sediment, aluminum, and silt. As the water flows through this forested section it remains orange and white in color.

Union Run maintains a low pH and is orange and white in color throughout the forested section to where it meets Route 981. Passing underneath Route 981, the pH of Union Run was 5.0 during assessment fieldwork. Aluminum precipitate was especially visible at this point and downstream. Downstream of the Route 981 Bridge, Union Run enters USACE flood-control property. The area is forested and contains sycamore, oak, and maple. At the mouth of Union Run, large amounts of silt and sediment are present in the stream bottom. Iron and aluminum precipitate are still visible. Downstream of the Union Run mouth, the Loyalhanna Creek main stem shows little visual evidence of the Union Run AMD impact. Dilution could be a factor in the minimal appearance of AMD.

Union Run Unnamed Tributaries

Eleven unnamed tributaries enter the main stem of Union Run. Only two of the tributaries, UNT4N (Superior Branch) and UNT3N are impacted by AMD. The remaining tributaries contained impacts related primarily to agriculture. UNT5N flows directly through a barnyard with a large concentration of grazing livestock. It exhibits the most severe impacts from nutrient loading and erosion as a result of agriculture.

UNT3N is the first of the two tributaries impacted by AMD within the Union Run Subwatershed. It is a small tributary that flows parallel to Bonocy Road and enters the Union Run main stem from the north. A small abandoned mine discharge enters UNT3N from the west. The discharge originates from a hillside that is close to the intersection of Bonocy Road and Androstic Road. The hillside may have been surface mined and was deep mined in the early 1900s. The discharge is referenced in the Scarlift Report and water quality in the Scarlift Report expressed similar characteristics to those encountered during assessment fieldwork. The discharge had a field pH of 2.6 and is orange in color.

The Superior Branch of Union Run, also known as UNT4N, has multiple AMD sources. It originates in the old mining community of Atlantic. Fields and sporadic forest surround the headwaters of the Superior Branch. Coal waste is scattered and partially visible in the headwater area. Once a source of AMD, the headwaters contain a small treatment plant. That treatment plant is treating water from an assumed AMD source and outputting water that had a field pH of 7.8. Downstream of Atlantic, the Superior Branch flows under Route 982 and into the community of Superior. At this point, the stream had a field pH of 7.2.

Assessment volunteer taking notes at the seeping bank on the Superior Branch of Union Run

As the stream flows west from the Route 982 Bridge, it is surrounded by an abandoned surface mine area. Multiple acidic seeps enter the stream from both banks. The seeps immediately turn the stream orange and white. Chunks of coal litter the substrate, which contains significant algal growth. It is suspected that the algae are acid-tolerant species thriving in the low-pH water. The entire streambank continues to seep acidic water for the remaining length of the Superior Branch.

Where the Superior Branch flows into the community of Superior, a small unnamed tributary enters from the north. The tributary, SuperiorUNT1N, originates close to the old mine entry for the Superior No. 2 Mine. Deep mining at the site stopped in 1945, but the area was also surface mined throughout the 1970s and 1980s. At the headwaters of the tributary, AMD seeps up in multiple locations to form the main flow. The field pH of the headwater area was 3.8 and the substrate was

covered with filamentous algae. Small piles of waste coal can be found along the tributary as it flows through a forested area. SuperiorUNT1N passes underneath Route 982 appearing orange and white due to iron and aluminum precipitate. Finally, after flowing through a small open field, the tributary flows under the Superior Road Bridge and into the main stem of the Superior Branch. At this confluence, the field pH of SuperiorUNT1N is 4.4.

The headwaters of the Superior Branch located north of the small town of Superior

Downstream from where SuperiorUNT1N enters the main stem of the Superior Branch, the water becomes cloudy and more orange in color. Seeps continue to enter the stream from the streambanks that remain littered with waste coal. The area surrounding the streambank was surface mined in the 1970s and it appears that little was done to reclaim this section after mining was complete.

After passing by the community of Superior, the Superior Branch flows into an open pasture. Historic information and topographic maps indicate that this area was also surface mined. The pasture is located upstream from the intersection of Panizzi Road and Androstic Road. In the pasture, four acidic discharges flow out of a small hillside on the east bank of the Superior Branch. These four seasonal discharges were flowing between 200 gpm and 300 gpm at the time of the assessment. Subsequent visits in the winter have found less flow. The field pH of the discharges was 3.4 and where they entered the Superior Branch, the field pH was 3.9. With the addition of the four discharges, the Superior Branch becomes more cloudy and orange. The lack of canopy cover and riparian vegetation in the pasture allows the stream to warm. Algae and swirling foam are located along the bank, throughout the substrate of the stream, and in small pools formed by the stream. The Superior Branch enters the main stem of Union Run 20 feet downstream of the Panizzi Road Bridge. This confluence is at the intersection of Panizzi Road and Androstic Road.

Water Quality

Water quality samples were taken close to the mouth of Union Run throughout the visual assessment. Those samples reflect the presence of abandoned mine discharges located upstream. There are significant seasonal fluctuations in pH and it is suspected that, with further sampling, those fluctuations would occur in other parameters as well. Upstream discharges are currently not sampled by the LWA or any other organization. Regular sampling is reccommended in the conclusion of this report.

Table 3.B.2: Sample Site LWA-12
Union Run

Date Sampled	pH	Alk. (mg/L)	Acid. (mg/L)	TSS (mg/L)	Sulfates (mg/L)	Total Iron (mg/L)	Mn (mg/L)	Al (mg/L)
8/25/04	5.69	7	12	63	205	<0.06	<0.01	<0.04
10/25/04	3.47	<1.0	69	2	497	2.7	6.8	0.5
1/25/05*	3.90	0.0	88.4	<3	326.1	3.46	5.46	8.50
3/31/05*	5.00	9.0	46.0	20.0	255.6	4.47	3.08	3.79

* Sample analyzed by the DEP Bureau of Laboratories

Sample Location: Travel 981 North toward New Alexandria. Turn right onto Liberty Road and take an immediate right onto Nicol Road. At the bend in the road, pull off and follow trail to Union Run. Sample is taken underneath the Route 981 Bridge in the main channel of the stream.

Conclusions

The Union Run Subwatershed is significantly impacted by acidic AMD sources. These discharges, located in the upper portion of the subwatershed, impact the main stem from source to mouth. Currently, none of the discharges are sampled on a regular basis and none of the discharges are being investigated for treatment. It is speculated that the discharges are related to the underlying mine pool associated with the Saxman Run discharges. The Union Run discharges are seasonal and spring flow is much higher than winter and fall flows.

In addition to impacts from AMD, Union Run is affected by nutrient loading as a result of agriculture. A series of farms are present along the length of the main stem, and each has pasture extending to the streambank. In addition, very little streamside vegetation exists, thus enabling nutrients to pass into the stream without first encountering a vegetated buffer.

Union Run Subwatershed is one of the most impacted streams within the Loyalhanna Creek Watershed. Approximately 80% of the Union Run main stem contains mine drainage and sediment associated with precipitating metals.

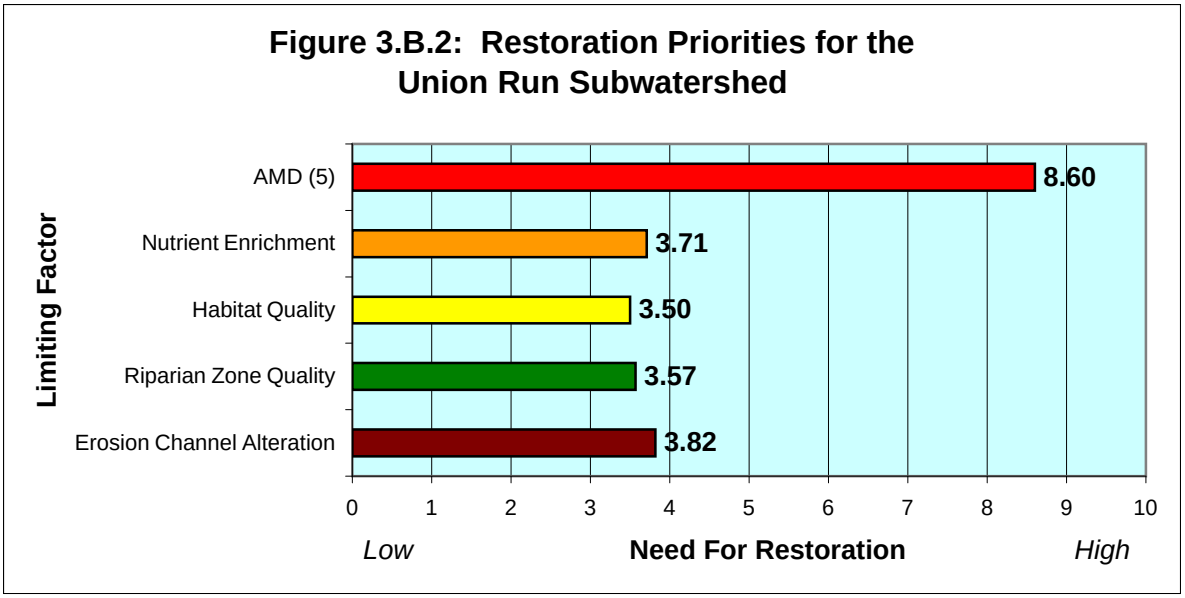
Recommendations

The following recommendations are made for the Union Run Subwatershed:

- Begin sampling known discharges quarterly. Sample sites can be determined according to current information and overall impact of each discharge.
- Educate the Union Run Subwatershed community. Increase awareness regarding the AMD and agriculture impacts.
- Monitor Union Run's overall impact upon the Loyalhanna Creek main stem.
- Determine feasibility of treating discharges within the subwatershed.
- Develop goals and timeline for treatment of AMD impacts.

Overall Restoration Priorities

Figure 3.B.2 exhibits overall restoration priorities for the entire subwatershed. As indicated, the limiting factor that received the highest restoration priority rating was AMD. There are five stream segments that are impacted by AMD. Those stream segments include a large portion of the main stem. In addition to AMD, the Union Run Subwatershed received a high priority rating for erosion and channel alteration. This is a result of erosion occurring on sections of stream impacted by grazing livestock and lack of riparian vegetation.



Restoration Suggestions for Individual Stream Segments

Fourteen stream segments received scores identifying limiting factors. The limiting factors identified included erosion and channel alteration, compromised fish and macroinvertebrate habitat, riparian vegetation degradation, nutrient loading, and AMD. Please refer to Table 3.B.3 and Map 3.B.3 for impact description and stream segment location.

Table 3.B.3: Impacted Stream Segments and Restoration Suggestions for the Union Run Subwatershed

LIMITING FACTOR: Riparian Vegetation Degradation

Stream Segment Name	Description of Impact	Remediation Strategy	Possible Funding Sources	Priority Rating
UNIONUNT1ND *Headwater section of a tributary that flows through a pasture.*	The riparian vegetation along the streambank is minimal. Very few trees surround the stream.	1. Educate landowner. 2. Remediate riparian area by planting trees, shrubs, or tall grasses. Utilize agricultural BMPs. Possible Partners: WCD, USDA, WPC	State, Federal, Private	Low
UNIONUNT3S *Small tributary that drains through a grazed pasture.*	Livestock has direct access to the stream. Very little riparian vegetation or canopy cover is present.	1. Educate landowner. 2. Remediate riparian area by planting trees, shrubs, or tall grasses. Utilize agricultural BMPs. Possible Partners: WCD, USDA, WPC	State, Federal, Private	Low – Medium

MCMain
MCUNT2S
MCUNT3S
MCUNT4S
LLUNT8E
LLUNT10E
LLUNT9E
UNIONUNT1ND
UNIONUNT1NC
UNIONUNT3NC
UNIONUNT3NB
UNIONUNT4NC
UNIONUNT4N1N
UNIONUNT4NB
UNIONUNT3NA
UNIONUNT1NB
UNIONUNT2N
981
UNIONA
UNIONUNT1S
UNIONUNT2S
LLA
LLUNT11WA
LLUNT11E
UNIONUNT3S
UNIONUNT4S
UNIONB
UNIONUNT5N
UNIONUNT6N
UNIONUNT5S
981

Abandoned Mine Drainage
Erosion/Channelization
Habitat Quality
None
Nutrient Enrichment
Riparian Vegetation
Major Roads
Union Run Subwatershed
Lower Section

Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center

Union Run Subwatershed: Major Limiting Factor

Map 3.B.3

0.5 0.25 0 0.5 Miles

N

UNIONUNT3NA *Tributary that flows through pasture.*	Livestock have direct access to the stream. No plants, shrubs, or trees are located within the riparian area. The only vegetation surrounding the stream is short grass.	1. Educate landowner. 2. Remediate riparian area by planting trees, shrubs, or tall grasses. Utilize agricultural BMPs. Possible Partners: WCD, USDA, WPC	State, Federal, Private	Low – Medium
UNIONUNT5N *Small tributary that flows through a pasture with many cows.*	Livestock have direct access to the stream. No plants, shrubs, or trees are located within the riparian area. The only vegetation surrounding the stream is short grass.	1. Educate landowner. 2. Remediate riparian area. Utilize agricultural BMPs. Possible Partners: WCD, USDA, WPC	State, Federal, Private	Low – Medium
UNIONUNT6N *Small tributary that flows through a pasture with many cows.*	Livestock have direct access to the stream. No plants, shrubs, or trees are located within the riparian area. The only vegetation surrounding the stream is short grass.	1. Educate landowner. 2. Remediate riparian area. Utilize agricultural BMPs. Possible Partners: WCD, USDA, WPC	State, Federal, Private	Low – Medium
LIMITING FACTOR: Compromised Fish and Macroinvertebrate Habitat				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
UNIONB *Main stem section of stream that extends from Uschak Road to Panizzi Road. It flows through a scrubby forest.*	Due to AMD impacts upstream, the substrate of the main stem in this section is embedded with iron oxide sediment. Habitat and in-stream fish cover are extremely limited.	1. Remediate upstream AMD impacts through re-mining, reclamation, or passive treatment. Possible Partners: DEP, WCD, OSM, WPC	State, Federal, Private	High
UNIONUNT2N *Tributary that flows through a mix of forest, field, pasture, and residences.*	There is some fish cover present, but mowed lawns eliminate cover. Stream substrate is 50% embedded and therefore invertebrate habitat is covered.	1. Identify sediment source and remediate appropriately. 2. Work with landowners to plant vegetation along the streambank to filter to sediment entering the stream and to provide fish cover. Possible Partners: WCD, DEP	State	Low

UNIONUNT3NA *Tributary that flows through pasture.*	The substrate is almost entirely covered with silt and mud. Dams, culverts, and diversions inhibit the movement of fish. Very little in-stream fish cover is present due primarily to lack of riparian vegetation.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs in order to remediate riparian vegetation. Possible Partners: WCD, WPC, USDA	State, Federal	Low
UNIONUNT4N1N *Small tributary to UNT4N that flows through a forested area in Superior.*	The substrate is partially covered with silt, mud, and iron oxide sediment. Dams, culverts, and diversions inhibit the movement of fish.	1. Educate landowners. 2. Remediate upstream AMD impact. Possible Partners: DEP, WCD	State, Federal	Medium
UNIONUNT5N *Small tributary that flows through a pasture with many cows.*	Livestock have direct access to the stream. Streambanks are trampled and sediment from the pasture and barnyard has accumulated on the substrate. The stream substrate is 50% embedded and habitat is covered.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs. Possible Partners: WCD, WPC, USDA	State, Federal	Low – Medium
UNIONUNT6N *Small tributary that flows through a pasture with many cows.*	Livestock have direct access to the stream. Substrate is 50% embedded and habitat is covered.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs in order to remediate riparian vegetation. Possible Partners: WCD, WPC, USDA	State, Federal	Low – Medium
LIMITING FACTOR: Erosion and Channel Alteration				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
UNIONA *Main stem section of stream that extends from the mouth to the Uschak Road Bridge.*	Down cutting, lateral cutting, overhanging roots, and high banks are all present throughout this section.	1. Determine strategy to remediate eroding banks in critical areas. Possible Partners: PAFBC, WCD	State, Federal	Low – Medium

UNIONB *Main stem section of stream that extends from Uschak Road to Panizzi Road. It flows through a scrubby forest.*	Eroding banks are common throughout the section, especially evident on outside bends. In the beginning of the section, a large eroding bank occurs in a pasture. The eroding bank is at least six feet high.	1. Determine strategy to remediate eroding banks in critical areas. 2. Identify upstream cause of erosion. 3. Where pertinent, plant riparian vegetation to help stabilize streambanks. 4. In pasture areas, work with landowners to install agricultural BMPs. Possible Partners: PAFBC, WCD, WPC, USDA	State, Federal	Medium
UNIONUNT3NA *Tributary that flows through pasture.*	The channel of the stream has been straightened through the pasture and to direct the stream into a dammed pond. In addition, there is some erosion along the length of the stream.	1. Work with landowner to return natural meander to the stream. 2. Where pertinent, plant riparian vegetation to help stabilize streambanks. 3. In pasture areas, work with landowners to install agricultural BMPs. Possible Partners: PAFBC, WCD, WPC, USDA	State, Federal	Low – Medium
UNIONUNT4N1N *Small tributary to UNT4N that flows through a forested area in Superior.*	The stream is piped underground for 80 yards.	1. Determine reason for piping the stream underground. Possible Partners: Derry Township	Local, State	Low
UNIONUNT5N *Small tributary that flows through a pasture with many cows.*	Livestock have trampled the streambank in multiple locations.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs. Possible Partners: WCD, WPC, USDA	State, Federal	Low

UNIONUNT6N *Small tributary that flows through a pasture with many cows.*	Livestock have trampled the streambank in multiple locations.	1. Educate landowner. 2. Work with landowner to install agricultural BMPs. Possible Partners: WCD, WPC, USDA	State, Federal	Low
LIMITING FACTOR: Nutrient Enrichment				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
UNIONC *Headwater section of the stream that flows through a mix of agriculture and residences.*	Slight presence of algae within the stream substrate. Livestock have direct access to the stream in some portions of the section. In addition, suspected leaking septic systems were discovered.	1. Encourage landowners to install agricultural BMPs to eliminate nutrient source from the stream. 2. Encourage landowners to utilize BMPs for septic systems to decrease failure. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal, Local	Low
UNIONUNT2S *Small tributary that flows adjacent to Route 981 and through a pasture.*	Algal growth is visible within the substrate of the stream. Livestock have direct access to the stream.	1. Encourage landowners to install agricultural BMPs to eliminate nutrient source from the stream. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal	Low
UNIONUNT1NB *Tributary that flows through a residential area.*	Multiple discharging pipes were located in the residential area surrounding this stream. It is suspected that the pipes were draining failing septic sytems.	1. Encourage landowners to utilize BMPs for septic systems to decrease failure. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal	Low

UNIONUNT1ND *Headwater section of a tributary that flows through a pasture.*	Algal growth is visible within the stream substrate. Cows are fenced from the stream, but the fence is not far from the streambank, so the cow manure still is an impact to the water in the stream.	1. Encourage landowners to install agricultural BMPs to eliminate nutrient source from the stream. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal	Low
UNIONUNT3NA *Tributary that flows through pasture.*	Livestock have direct access to the stream and were in it at the time of the assessment.	1. Encourage landowners to install agricultural BMPs to eliminate nutrient source from the stream. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal	Low – Medium
UNIONUNT5N *Small tributary that flows through a pasture with many cows.*	Livestock have direct access to the stream and were in it at the time of the assessment.	1. Encourage landowners to install agricultural BMPs to eliminate nutrient source from the stream. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal	Low
UNIONUNT6N *Small tributary that flows through a pasture with many cows.*	Livestock have direct access to the stream and were in it at the time of the assessment.	1. Encourage landowners to install agricultural BMPs to eliminate nutrient source from the stream. Possible Partners: WCD, Derry Township, USDA RUS, DEP	State, Federal	Low

LIMITING FACTOR: Abandoned Mine Drainage				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
UNIONA *Main stem section of stream that extends from the mouth to the Uschak Road Bridge.*	Water is tea-colored with iron oxide sediment and aluminum precipitate visible. Both have gathered on the substrate. Field pH of the stream in this section ranged from 5.2 to 4.7.	1. Remediate upstream discharges through passive treatment, re-mining, or reclamation. Possible Partners: DEP, OSM, WCD	State, Federal, Private	High
UNIONB *Main stem section of stream that extends from Uschak Road to Panizzi Road. It flows through a scrubby forest.*	Water is orange and white in color. The substrate of the stream is laden with iron oxide sediment. When tributaries enter, they create a rise in pH and the appearance of aluminum and iron precipitate. Two discharges were identified in this section. They are both located near UNT3N and both are acidic in character.	1. Remediate upstream discharges through passive treatment, re-mining, or reclamation. 2. Sample the discharges near UNT3N on a quarterly basis. Possible Partners: DEP, OSM, WCD	State, Federal, Private	High
UNIONUNT3NA *Tributary that flows through pasture.*	A small discharge enters this tributary that flows along Bonocy Road. It dissipates within the pasture and pond prior to flowing into the Union Run main stem.	1. Investigate source of discharge. 2. Remediate the discharge through re-mining or passive treatment. 3. Monitor the discharge quarterly. Possible Partners: DEP, OSM, WCD	State, Federal	Medium

UNIONUNT4NA *Large tributary to Union Run that enters the main stem at the intersection of Superior Road and Panizzi Road. The tributary originates in Atlantic and flows through Superior.*	Multiple discharges and seeps enter this stream section throughout its entire length. The most significant is close to where it joins the main stem. The discharge bubbles up out of a pasture at the intersection of Superior Road and Panizzi Road. The stream flows through an area that was surface mined on multiple occasions. Coal refuse is still present and chunks of coal are included in the substrate of the stream.	1. Investigate source of discharges and seeps. 2. Remediate the discharges through re-mining or passive treatment. 3. Monitor the discharges quarterly. Possible Partners: DEP, OSM, WCD	State, Federal	High
UNIONUNT4N1N *Small tributary to UNT4N that flows through a forested area in Superior.*	The stream originates at a discharge. The water is orange and white in color. Iron oxide and aluminum precipitate are visible within the substrate.	1. Investigate source of discharge. 2. Remediate the discharge through re-mining or passive treatment. 3. Monitor the discharge quarterly. Possible Partners: DEP, OSM, WCD	State, Federal	High

SECTION 3.C
MC CUNE RUN

Section 3.C

McCune Run (Keystone) Subwatershed

General Description

The 5.07 square-mile McCune Run Subwatershed is located in the central portion of Derry Township, south of New Alexandria. McCune Run and its tributaries flow west toward the Loyalhanna Creek through Keystone State Park. The state park contains a 78-acre lake that is a popular fishing and recreation area.

McCune Run originates east of Keystone State Park on a forested hillside. McCune Run flows south and parallel to Strawcutter Road and meets a small tributary. At that confluence, the main stem of the McCune Run turns to flow directly west. Very few residences are located near or around the stream in the headwaters.

Boaters seen from the southern bank of Keystone Lake in the McCune Run Subwatershed

Continuing through a forested area, McCune Run passes underneath Strawcutter Road and approaches Keystone Lake through a hardwood forest. Approximately 1,000 yards before the lake, the stream flows through a wetland that has formed as a result of the Keystone Lake impoundment. Where the main stem passes underneath Keystone Park Road, the main portion of Keystone Lake begins. The lake is surrounded by Keystone State Park, which includes pavilions, open lawns, cabins, campgrounds, fishing areas, a swimming area, and boat access.

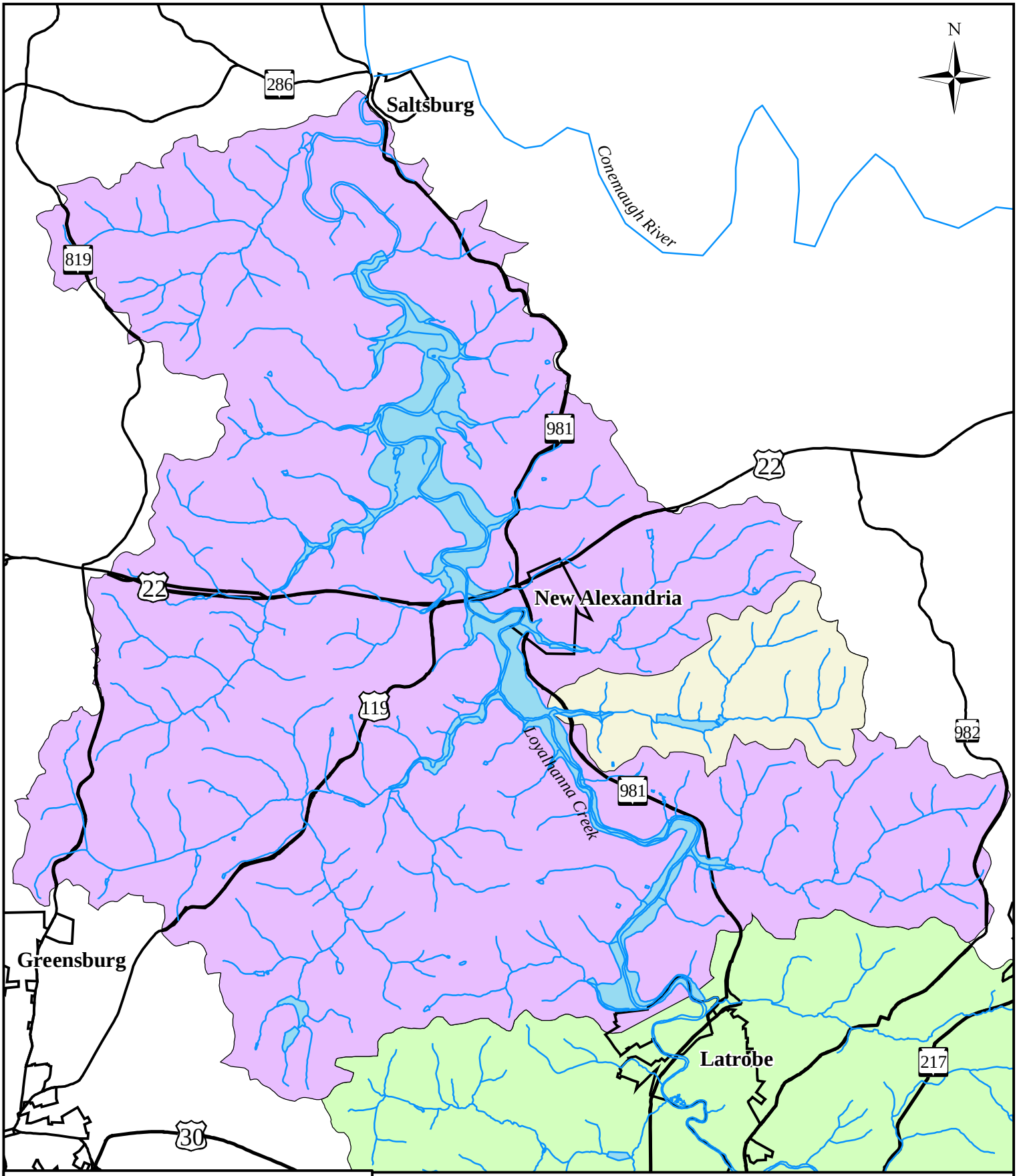
Forest surrounds McCune Run again at the outflow to the lake and the stream remains forested as it approaches Route 981. Downstream of Route 981, McCune Run enters USACE flood-control property. One thousand feet downstream of the Route 981 Bridge, McCune Run meets the main stem of the Loyalhanna Creek.

McCune Run is classified as a WWF. For geographic location of this subwatershed please refer to Map 3.C.1.

Review of Historic Information

Overall Summary

The McCune Run Subwatershed includes Keystone Lake and Keystone State Park. The lake was built in 1909 by the Keystone Coal and Coke Company which operated a deep mine, Salem No. 2, at the southeast end of the lake. Water from the lake was used to quench nearby coke ovens and for the coal-washing plant in Salemville. In 1945, the state purchased 796 acres from the coal company to turn into a state park. The deep mine operated until 1954 and, during Project Scarlift in the 1970s, the old mine entrance was sealed. That mine seal experienced a blowout not long after being sealed and DEP Bureau of Abandoned Mine Reclamation (BAMR) installed a borehole at the blowout point and piped the discharge from the mine directly into the stream. Mine drainage still flows from that entry today. The water is being collected and treated in a passive treatment system. The system was installed by BAMR.



Streams
Major Roads
Boroughs and Cities
McCune Run Subwatershed
Lower Section

McCune Run Subwatershed: Overall Location

Map 3.C.1

Western Pennsylvania Conservancy
Watershed Assistance Center

1 0.5 0 1 Miles

Loyalhanna Watershed Association
Conserve, Protect and Restore Natural Resources

Scarlift Report

One discharge was identified in the McCune Run Subwatershed during fieldwork for the Scarlift Report. That discharge is described below.

Scarlift Discharge Number	Current Discharge Name	Description of Discharge and Location
6159	Keystone	Discharge that flowed from the caved-in mouth of an abandoned mine at Keystone State Park. The discharge flowed at approximately 60 gpm and had a pH of 3.3 during Scarlift fieldwork. The discharge was located close to the outflow of Keystone Lake.

DEP Bureau of Abandoned Mine Reclamation (BAMR)

In 2002 BAMR dewatered the old Salem No. 2 deep mine. The sealed entrance to the mine was seeping acidic mine drainage into McCune Run. That drainage was decreased and improved during the dewatering process. In addition to dewatering the mine, BAMR removed the existing mine seals and conveyed the AMD to a convenient treatment area close to the park's water treatment plant.

BAMR constructed a passive treatment system in 2004 to treat the mine drainage. At the time of the report, the treatment system was functioning well and improving overall water quality within McCune Run. Information about the system can be obtained from the DEP Cambria County Office.

DEP McCune Run TMDL

The McCune Run was assessed by the DEP in 2002 and the TMDL for McCune Run was completed in 2004. The assessment was carried out below the lake because tributaries upstream were meeting designations set forth by the Clean Water Act.

According to the TMDL report, one portion of the subwatershed is impaired by high concentrations of metals, low pH, and suspended solids. That portion is directly downstream of the Keystone discharge flowing from the abandoned mine.

Water sampling completed during the DEP assessment of the McCune Run Subwatershed is consistent with assessment fieldwork completed in 2004.

PA Fish and Boat Commission (PAFBC)

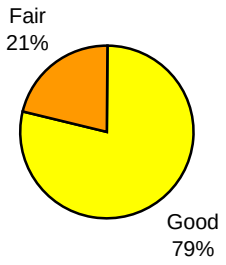
In 1993, the PAFBC completed a fish survey of Keystone Lake using PA-style trap nets and night electro-fishing. The PAFBC reported a high intensity catchable trout fishery. The abundance and size structure of bluegill, black crappie, yellow perch, and tiger muskellunge were good. Bass population was dense, but the size structure was swayed toward sub-legal. In the report, PAFBC recommended continuing current spring, winter, and fall stocking. Walleye, saugeye, and channel catfish would not be stocked due to lack of population growth. Lack of food source and habitat for these fish species was cited as a reason for their lack of success within Keystone Lake.

Visual Assessment Summary

Visual Assessment Findings

The visual assessment of McCune Run was completed in April of 2004. A total of 14 stream segments were assessed. As depicted in Figure 3.C.1, 79% of the subwatershed received a good rating and 21% received a fair rating. An average score of 7.77 was given to the entire subwatershed, which is a good rating overall. This overall rating reflects the presence of good riparian vegetation and canopy cover that surrounds a majority of stream segments within the subwatershed. Individual stream segment ratings are depicted in Map 3.C.2.

Figure 3.C.1: Visual Assessment Ratings for the McCune Run Subwatershed



Visual Assessment Description

McCune Run Main Stem

The headwaters of McCune Run are located adjacent to Strawcutter Road in Derry Township. From the headwaters, the main stem of McCune Run flows south first and then turns to flow west. The headwaters are forested with a deciduous mix of trees, including white oak and maple. Very few homes surround the headwaters and the main stem. The substrate of the stream is comprised primarily of gravel with some cobble and silt mixed in. McCune Run maintains this substrate as it flows through forest toward Keystone Lake. The main stem of the stream forms a wetland prior to the beginning of the lake. The wetland contains sedges, cattails, and other water-loving trees and plants. Silt and sediment cover the substrate of the main channel through the wetland, which acts as a sediment trap before McCune Run enters the main portion of Keystone Lake.

Where McCune Run passes underneath Keystone Park Road, the main lake begins. The lake has a mixed substrate and varies in depth from 9.0 meters to 1.0 meter. It is surrounded by forest and lawns maintained by the state park. A dam in place at the end of the lake maintains lake depth. At the dam spillway, a small wetland has formed due to varying water depths.

After leaving the lake, McCune Run retreats into a forested landscape and continues to flow west. The field pH reading taken at the outflow to Keystone Lake was 7.9. Where the stream flows away from the lake, the substrate is dominated by cobble and some gravel. Approximately 500 to 1,000 yards downstream from the lake outflow; McCune Run receives flow from the Keystone AMD treatment site. The passive treatment system is treating 60 to 100 gpm of flow from the old Salem No. 2 Mine once located at the park. Some orange and white staining is visible, but very little. In the past, the precipitate was much more visible on the substrate.

Downstream of the treatment system, McCune Run maintains a forested buffer until reaching Route 981. Where it passes underneath Route 981, there is a brief break in the forest. Forest returns downstream of Route 981 as McCune Run enters USACE flood-control property. In times of high water flow, McCune Run floods to and past the Route 981 Bridge. As McCune Run nears its confluence with the Loyalhanna Creek, the substrate becomes more embedded with sediment and silt. This is due in part to upstream addition of sediment through erosion of streambanks, and also is due to the decrease in the velocity of the water at this point.

LLNARUNT1EC
LLNARUNT1E3S
LLNARUNT2NB
LLNARUNT2NA
LLNARUNT1EB
LLNARUNT1E2S
LLNARA
LLNARUNT1EA
LLNARUNT1E1S
MCDAVISUNT1N
MCDAVISUNT2N
MCDAVIS
MCDAVISUNT1E
MCUNT1N
MCUNT2NB
MCUNT5S
MCUNT3N
981
MCUNT2NA
MCMain
MCUNT1S
MCUNT2S
MCUNT3S
MCUNT4S
UNIONUNT1ND
UNIONUNT1NC
UNIONUNT3NB
N

Good
Fair
Poor
Major Roads
McCune Run Subwatershed
Lower Section

McCune Run Subwatershed: Overall Rating

Map 3.C.2

Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center

0.5 0.25 0 0.5 Miles

At the mouth of McCune Run, the field pH was 7.6. The substrate of the stream was entirely embedded with silt and sediment. In addition, the mouth was braided due to small islands of sediment that had formed.

McCune Run Unnamed Tributaries

Nine unnamed tributaries enter the main stem of McCune Run. In general, the tributaries experience very few negative impacts as they flow through primarily forested landscapes to meet McCune Run. Some of the tributaries contain embedded sections. The embeddedness is most often concentrated to particular areas where streambank erosion is occurring. Only two tributaries received low overall ratings - UNT2N and UNT3S. Both of the tributaries enter Keystone Lake and flow through cabin areas, campgrounds, and open fields. The tributaries are embedded and had field pH readings ranging from 8.0 – 9.0. The source of high pH readings was not determined during the visual assessment.

Water Quality

McCune Run was not sampled during fieldwork for the visual assessment. No samples were taken due to extensive water quality results provided by BAMR and the DEP TMDL report. Table 3.C.1 shows water quality results taken from the TMDL report completed in 2002 and 2003. Samples were taken prior to the installation of the treatment system at the state park.

Table 3.C.1: TMDL Sample Data
McCune Run Mouth

Date Sampled	pH	Alk. (mg/L)	Acid. (mg/L)	TSS (mg/L)	TDS (mg/L)	Sulfates (mg/L)	Iron (mg/L)	Mn (mg/L)	Al (mg/L)
6/10/03*	7.0	34	0	- - -	- - -	- - -	0.449	0.155	0

* Sample analyzed by the DEP Bureau of Laboratories for TMDL

Sample Location: The sample was taken at the mouth of the stream, which can be accessed by traveling Route 981. McCune Run passes underneath Route 981 one mile past Slag Road, an entrance to Keystone State Park, if traveling north.

Conclusions

Prior to the addition of the passive treatment system at Keystone State Park, McCune Run was impacted by one abandoned mine discharge. At the time of the report, the treatment system was functioning well and removing major metals and acidity from the discharge.

The McCune Run Subwatershed is surrounded by a forested landscape. Very few farms and residences can be found streamside. The lack of human and animal impact within the subwatershed is noticeable. Keystone Lake is a popular fishery and frequented by local and regional citizens. Wetlands at the head of the lake help to trap sediment and keep it from enterring the lake. This has probably kept the lake in a healthy state.

It is important for the state and Keystone State Park to continue to maintain and manage the property surrounding the lake. The park is a nice buffer for the subwatershed, as are the upstream large forested properties surrounding the stream.

Recommendations

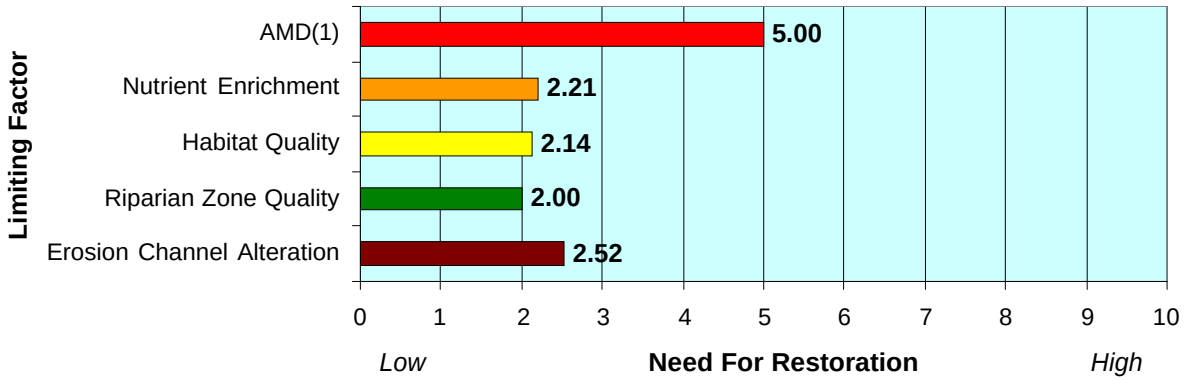
The following recommendations are made for the McCune Run Subwatershed:

- Work with Keystone State Park to educate McCune Run landowners and visitors about the value of the McCune Run Subwatershed.
- Encourage landowners to investigate land conservation options for large forested properties and old farmlands.
- Assist BAMR in maintaining the AMD treatment system located at Keystone State Park, i.e.: water quality monitoring.
- Investigate the possibility of holding community events and/or picnics at Keystone State Park to highlight the Loyalhanna Creek Watershed.

Overall Restoration Priorities

Figure 3.C.2 exhibits overall restoration priorities for the entire subwatershed. As indicated, the limiting factor that received the highest restoration priority rating was AMD. One source of AMD was noted within the subwatershed during the visual assessment. That AMD source is currently being treated passively.

Figure 3.C.2: Restoration Priorities for the McCune Run Subwatershed



Restoration Suggestions for Individual Stream Segments

Only one stream segment received scores identifying limiting factors. A small AMD seep was located on UNT1S. The impact from the seep was minimal and it dissipated quickly. Please refer to Map 3.C.3 for stream segment location.

LLNARUNT2NB
LLNARUNT1EC
LLNARUNT1E3S
LLNARUNT2NA
LLNARUNT1EB
LLNARUNT1E2S
LLNARA
LLNARUNT1EA
LLNARUNT1E1S
MCDAVISUNT1N
MCDAVISUNT2N
MCDAVIS
MCDAVISUNT1E
981
MCUNT1N
MCUNT2NB
MCUNT5S
MCUNT3N
MCUNT2NA
MCMain
MCUNT1S
MCUNT2S
MCUNT3S
MCUNT4S
UNIONUNT1ND
UNIONUNT1NC
UNIONUNT3NB
N

- Abandoned Mine Drainage
- Erosion/Channelization
- Habitat Quality
- None
- Nutrient Enrichment
- Riparian Vegetation
- Major Roads
- McCune Run Subwatershed
- Lower Section

Watershed Assistance Center

McCune Run Subwatershed: Major Limiting Factor

Map 3.C.3

0.5 0.25 0 0.5 Miles

SECTION 3.D
CRABTREE CREEK

Section 3.D

Crabtree Creek Subwatershed

General Description

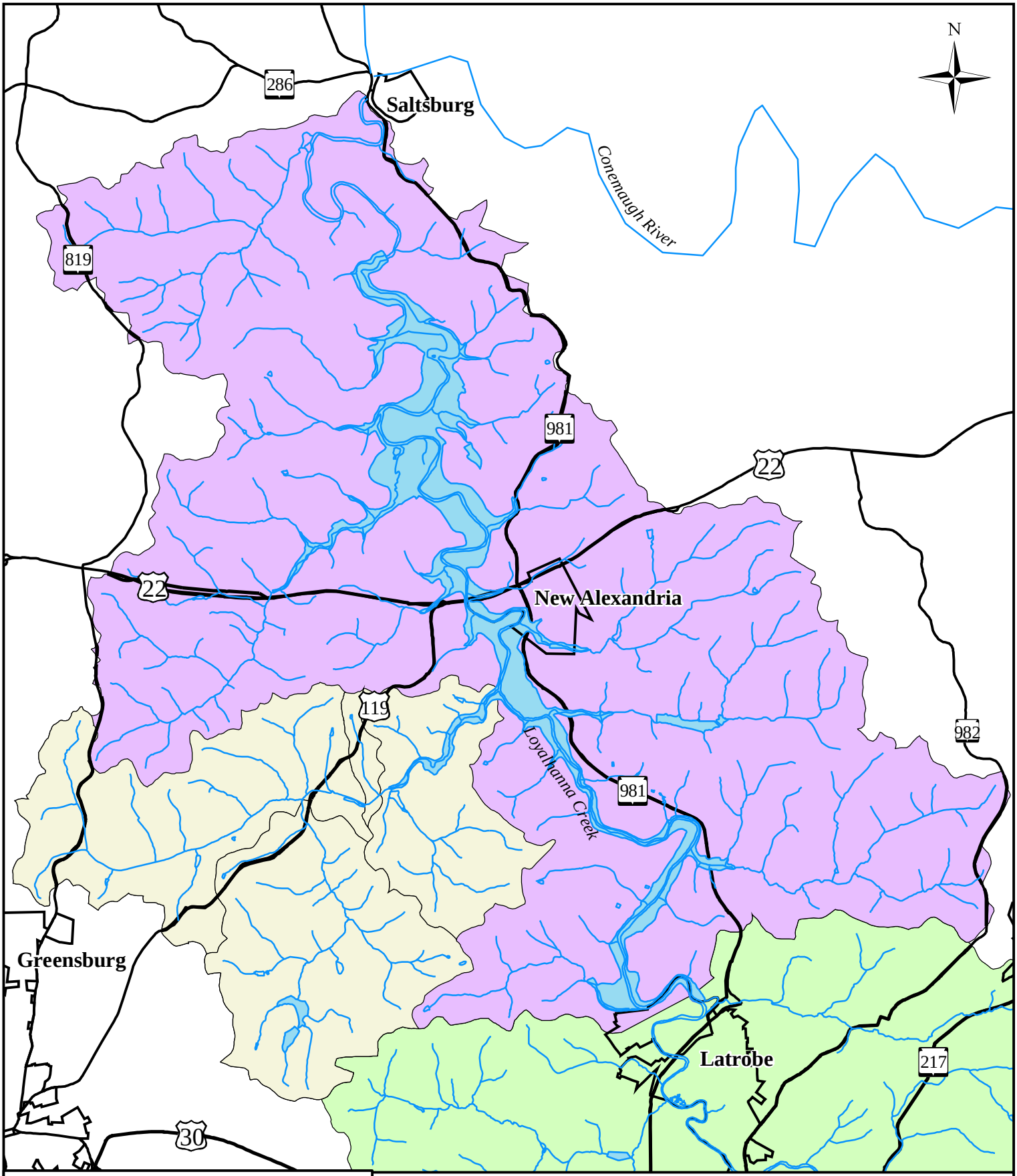
The 18.83 square-mile Crabtree Creek Subwatershed is located in the north-central portion of Westmoreland County. The subwatershed is situated south of Route 22 and is intersected by Route 119. Crabtree and its tributaries flow through the communities of Forbes Road, Hannastown, Luxor, Crabtree, and Greenwald. The Crabtree Creek Subwatershed is comprised of the **Crabtree Creek Main Stem** and **Little Crabtree Creek**, a large tributary.

Crabtree Creek main stem close to the mouth

The **Crabtree Creek Main Stem** originates in the outskirts of Forbes Road, which is part of Salem Township. The headwaters are located adjacent to Route 819 as it travels south from Route 22 toward Greensburg. The main stem of Crabtree Creek flows south, parallel to Route 819, through a mix of forest and rural homes. In downtown Forbes Road, Crabtree Creek turns to flow east. As Crabtree Creek flows toward Hannastown, streamside vegetation is comprised primarily of Japanese knotweed. Surrounding landscape includes forest, coal refuse and open fields. Just before Hannastown, Crabtree Creek flows past a newly constructed golf course, Totteridge. In Hannastown, Crabtree Creek flows parallel to the old railroad grade and Main Street. A majority of homes in Hannastown are located on the south side of Crabtree Creek. The north side of the creek is occupied by a large open hillside that is a reclaimed coal refuse pile. The pile was associated with the deep mine in Hannastown. After leaving Hannastown, Crabtree Creek flows east through an agricultural landscape. Large farms blanket the hillsides surrounding the stream as it moves into the town of Crabtree. In downtown Crabtree, a major tributary, Little Crabtree Creek, enters from the south.

Little Crabtree Creek originates in Donohoe, east of the intersection of Donohoe Road and Georges Station Road. Its headwaters are comprised of four small tributaries that collect to form Twin Lakes, two small lakes surrounded by a county park. Downstream of the two lakes, Little Crabtree Creek flows through a rural area and past the community of Luxor. For the remaining portion of its length, Little Crabtree Creek is surrounded by a rural landscape including scattered homes, farms, and pasture.

Following its confluence with Little Crabtree Creek, the main stem of Crabtree Creek winds underneath Route 119. The community of Crabtree surrounds the stream on both sides. As the creek leaves downtown Crabtree, it follows the old Penn Central Railroad grade and flows adjacent to Latrobe-Crabtree Road. Behind the Crabtree Creek Fire Hall, located on Latrobe-Crabtree Road, a large abandoned mine discharge enters the main stem of Crabtree Creek. Downstream of the fire hall and the discharge, the streamside is overgrown with Japanese knotweed and other shrubs. Surrounding hillsides are open fields, pasture, and cropland.



Streams
Major Roads
Boroughs and Cities
Crabtree Creek Subwatershed
Lower Section

Crabtree Creek Subwatershed: Overall Location

Map 3.D.1

Western Pennsylvania Conservancy
Watershed Assistance Center

1 0.5 0 1 Miles

Loyalhanna Watershed Association
Conserve, Protect and Restore Natural Resources

In the small town of Greenwald, a tributary enters the Crabtree Creek Main Stem from the south. The tributary has a small private lake at its mouth, known as Lake Dom. Downstream of the confluence with the tributary, Crabtree Creek passes into USACE flood-control property. Sycamore, silver maple, and other small hardwood trees surround the stream as it meanders northeast toward the Loyalhanna Creek. A mix of hardwood trees, Japanese knotweed, and shrubs surround the stream until its mouth. Crabtree Creek joins the Loyalhanna Creek 1,000 feet downstream from the Oasis Bridge.

Crabtree Creek is listed on the Clean Water Act (CWA) 303(d) list as an impaired waterway for pH, metals, and acidity. The entire subwatershed is classified as a WWF. Please refer to Map 3.D.1 for the geographical location of this subwatershed.

Review of Historic Information

Overall Summary

A majority of the Crabtree Creek Subwatershed is underlain by the Pittsburgh coal seam. As a result, much the area underneath the subwatershed was mined in the late 1800s and early 1900s. The communities of Luxor, Forbes Road, Hannastown, and Crabtree all contained deep mines that were operated by Jamison Coal and Coke. No deep mines operate today, but there are small remains of those deep mines left in each community. A coal refuse pile, buildings, and coke ovens are still present in Luxor, the site of the Jamison No. 1 mine. This mine operated well into the 1950s and later was a coal yard where coal was trucked in and distributed. Old mining buildings and a refuse pile are still a part of Forbes Road, the site of the Jamison No. 3 mine. A large, partially reclaimed refuse pile is located in Hannastown and an old playing field for coal miners is central to downtown Crabtree.

The mines in Crabtree, Hannastown, and Forbes Road were all connected in the years prior to closing. As a result, the water flooding the three abandoned mines discharges at the Crabtree Creek Discharge located behind the Crabtree Fire Hall. The discharge is the largest within the Loyalhanna Creek Watershed.

Surface mining, re-mining, and reclamation took place throughout the Crabtree Creek Subwatershed throughout the 1970s and 1980s. The Rural Abandoned Mine Program (RAMP) removed and reclaimed a large coal waste pile in Forbes Road. In addition, two large coal waste piles were covered and partially reclaimed in Crabtree and Hannastown.

Scarlift Report

Three abandoned mine discharges and multiple coal waste piles were inventoried during fieldwork for the Scarlift Report. The coal waste piles are referenced in Project Gobpile completed by WPCAMR. Each of the discharges inventoried are described below.

Crabtree Creek Subwatershed Discharges Catalogued During Scarlift		
Scarlift Discharge Number	**Current Discharge Name**	**Description of Discharge and Location**
5356	Crabtree	Discharge flows from underneath the Penn Central Railroad and directly into Crabtree Creek. During the Scarlift fieldwork, the average flow of the discharge was 5,100 gpm, pH was 2.4, and iron ranged from 30 mg/L to 196 mg/L. The discharge currently flows at an average of 3,500 gpm. Water quality has improved to a pH of 6.4 and the discharge contains much less acidity. Similar amounts of iron are still present.

5354		The discharge seeps from an old mine entry. The discharge flows into a tributary to Little Crabtree Creek (UNT1E). During the Scarlift fieldwork, the average flow of the discharge was 10 gpm, pH was 2.9, and iron ranged from 12 mg/L to 70 mg/L. The seep is currently flowing and, where it flows into the tributary, aluminum precipitate is visible. The field pH of the tributary was 4.6.
5355	Hannastown Seep	Surface discharge draining from the Hannastown coal refuse pile that drains into Crabtree Creek. During Scarlift fieldwork, the average flow of the discharge was 80 gpm, pH was 2.8, iron ranged from 8 mg/L to 90 mg/L, and aluminum ranged from 8.2 mg/L to 360 mg/L. The Scarlift Report recommended reclamation of the pile. It was covered and partially reclaimed in the late 1970s; however, coal waste remains. The discharge is present today, flowing at a reduced rate. The pH of the discharge has not changed. Where the discharge meets Crabtree Creek, aluminum and iron precipitates are visible in the stream substrate.

PA Fish and Boat Commission (PAFBC)

In 1994 and 1999 the PAFBC completed a fish survey of Upper Twin Lake and Lower Twin Lake at the headwaters of Little Crabtree Creek. The lakes included good populations of largemouth bass, trout, and various pan fish species. Recommendations for the lake included continued stocking of rainbow trout, brown trout, and channel catfish. In addition, the PAFBC recommended improving structure for increased growth in the largemouth bass population.

PA Department of Environmental Protection (DEP)

In September of 2002, the DEP took samples of Crabtree Creek above, at, and below the Crabtree Creek Discharge. The purpose of the sampling is unknown, but the samples provide excellent water quality data shown below.

pH	Alkalinity mg/L	Total Iron mg/L	Aluminum mg/L	Manganese mg/L	T.S.S mg/L	T.D.S mg/L
Crabtree Creek Above the Crabtree Creek Discharge at the Route 119 Bridge						
6.8	48	1.98	0.757	3.17	20	818
Crabtree Creek Below the Crabtree Creek Discharge at the Greenwald Bridge						
6.2	62	82.5	0.714	2.71	52	1482

PA Department of Environmental Protect District Mining Office

Various reports from the DEP District Mining Office in Greensburg highlight water quality samples related to surface mines throughout the Crabtree Creek Subwatershed. At the time of the assessment, there were no known active coal mines within the subwatershed. At the time of the report, a surface mine permit was being carried out in Crabtree adjacent to the Crabtree Discharge. More complete information can be obtained from District Mining Office.

U.S. Army Corps of Engineers (USACE)

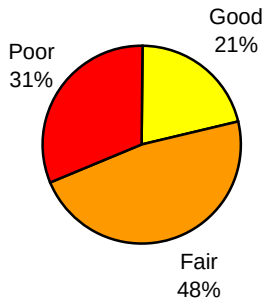
The USACE completed a survey of the Loyalhanna Creek Watershed in 2002. As a part of that survey, water quality samples were taken within the Crabtree Creek Subwatershed. Water quality results are consistent with samples collected during the visual assessment. That information can be referenced in files held at the LWA.

Visual Assessment Summary

Visual Assessment Findings

The visual assessment of the Crabtree Creek Subwatershed was completed in May of 2004. A total of 52 stream segments were assessed. As depicted in Figure 3.D.1, 21% of the subwatershed received a good rating, 48% received a fair rating, and 31% received a poor rating. An average score of 6.49 was given to the entire subwatershed, which is a fair rating overall. The overall fair rating primarily reflects the impacts of AMD and nutrient loading. Individual stream segment ratings are depicted in Map 3.D.2.

Figure 3.D.1: Visual Assessment Ratings for the Crabtree Creek Subwatershed



Visual Assessment Description

The Crabtree Creek Subwatershed is comprised of the Crabtree Creek main stem and a large tributary, Little Crabtree Creek. For the purpose of this report, Crabtree Creek is described separately from Little Crabtree Creek.

Crabtree Creek Main Stem

The Crabtree Creek main stem originates in a small, forested area behind an auto body shop. The shop is close to the intersection of Route 819 and Beaver Run Road. The stream flows away from the forested area and into a residential area where many of the homes have mowed lawns directly to the streambank. Passing through the residential area, the substrate of the stream is dominated by gravel and silt. Some algae are present on the substrate.

Crabtree Creek passes underneath Coal Hollow Road and, after continuing through another cluster of homes, it passes underneath Route 819. This occurs north of the town of Forbes Road. Upon reaching Forbes Road, the main stem of Crabtree Creek turns to flow east. In Forbes Road, an increased number of homes and small businesses surround the stream corridor. Despite the increase in residences, the riparian zone immediately surrounding the stream becomes vegetated. That vegetation, however, is comprised primarily of Japanese knotweed. The knotweed is so thick that, in some areas, it creates a closed canopy over the stream.

In Forbes Road, Crabtree Creek begins to follow the old railroad grade and Fire Station Road. As Crabtree Creek flows east out of Forbes Road, hardwood trees become mixed in with the Japanese

WUNT6WB
WUNT6WA
WUNT5W
WTD
WUNT5E
WUNT4E
WUNT3E
WUNT7WB
CRBUNT8N
CRBUNT7N
CRBUNT6N
CRBUNT5N
CRBUNT4N
CRBUNT3N
CRBUNT2N
CRBUNT1N
LLB
LLA
MCUNT1N
MCMain
MCUNT1S
981
LLUNT8W
LLUNT8E
LLUNT9W
LLUNT10W
CRBUNT1S
LLUNT11WB
LLUNT11WA
LLUNT12W
LLUNT13W
711
CRBUNT5S
CRBF
CRBUNT4S
CRBE
CRBUNT3S
CRBD
CRBUNT11N
CRBUNT10N
CRBC
CRBUNT9N
CRBB
CRBA
LCRBUNT1WA
LCRBA
LCRBUNT1E
LCRBB
LCRBUNT1WB
LCRBUNT2W
LCRBC
LCRBUNT3E
LCRBUNT2S
LCRBUNT5W1NB
LCRBUNT4E1EB
LCRBUNT4W
LCRBD
LCRBUNT4EB
LCRBUNT4E2E
LCRBUNT5W
LCRBUNT5W1SB
LCRBE
LCRBUNT5E
LCRBUNT4EC
LCRBUNT6W
LCRBF
LCRBUNT7E
LCRBG
66
819
119
66

Good
Fair
Poor
Major Roads
Crabtree Creek Subwatershed
Lower Section

Watershed Assistance Center

Crabtree Creek Subwatershed: Overall Rating

Map 3.D.2

1 0.5 0 1 Miles

N

knotweed surrounding the stream. The substrate of the stream is comprised of mostly cobble, some gravel, and many chunks of coal refuse. At the outskirts of Forbes Road, a large coal refuse pile is located on the northern bank of Crabtree Creek. It is suspected that much of the coal in the substrate has washed off this refuse pile into the stream. For approximately 500 to 700 feet, the streambank is comprised of coal refuse mixed with some organic matter and blanketed with Japanese knotweed. Runoff from the coal refuse pile seeps into the stream in multiple areas through the section. One major seep enters the stream from the middle of the pile. That seep had a field pH of 2.9 and, upon meeting the stream, turns white with aluminum precipitate. Aluminum staining is visible downstream of the seep and the coal refuse pile for approximately 1,000 feet. Downstream of the coal refuse pile and the seep, the field pH of Crabtree Creek was 6.9.

Aluminum seep entering Crabtree Creek from the Forbes Road coal refuse pile

After flowing past the coal refuse pile, the landscape surrounding the main stem of Crabtree Creek changes. The south bank is a thick hardwood forest and the north bank opens into fields and a golf course. Totteridge, a new golf course, was under construction at the time of the assessment. The substrate of the stream through this straight section of stream is comprised of primarily cobble. Pieces of coal and some silt are also present. The Japanese knotweed that crowded the streambank upstream is scaled back through this section and has been replaced by some multiflora rose and small trees.

Crabtree Creek then passes underneath Hannastown Road and continues to flow into Hannastown. As the creek flows through Hannastown, the landscape surrounding the stream is comprised of homes, small businesses, and open fields. The community of Hannastown is on the south side and a large, partially reclaimed coal refuse pile is on the north side. The coal refuse pile was covered and revegetated in the late 1970s. It extends downstream on the north side until Crabtree Creek passes underneath Front Street Road. Currently, the bony pile and property surrounding it are owned and maintained by the Keystone Rod and Gun Club. Multiple acidic seeps enter Crabtree Creek from the bony pile and from small coal refuse piles located along the streambank. The stream substrate, comprised of cobble and gravel, is coated with aluminum and iron precipitate. A large seep, with a field pH of 3.0, enters the Crabtree Creek Main Stem 100 feet upstream from the Front Street Bridge. The seep originates from the bony pile and flows at approximately 25-50 gpm. Bright white aluminum precipitate is visible within the seep and where it meets the main stem of Crabtree Creek.

Despite an increase in the number of residences in Hannastown, the stream remains surrounded by a vegetative buffer including Japanese knotweed, green briar, and multiflora rose. The substrate of the stream contains an equal mix of cobble, gravel, and silt. That substrate remains consistent as Crabtree Creek flows away from Hannastown. Surrounding hillsides are crop fields and pastureland. Through this section, as Crabtree Creek flows parallel to the railroad grade and Front Street, multiple high-pH discharges enter the stream. It is suspected that the discharges originate from failing septic systems located close to the stream. Vegetation surrounding the stream is still dominated by Japanese knotweed, green briar, multiflora rose, and some small trees. Not until flowing into the community of Crabtree does the landscape surrounding the stream change. Where Crabtree Creek passes behind Rizzo's Restaurant Banquet Hall, the streamside loses its vegetative buffer and the substrate of the stream becomes choked with sediment.

Fifty feet upstream of the intersection of Cemetery Road and Route 119, Little Crabtree Creek flows into Crabtree Creek. Downstream of that confluence, Crabtree Creek passes behind the Crabtree post office, where no canopy cover or riparian vegetation is present. Crabtree Creek then flows underneath Route 119. At the bridge, the stream substrate is entirely embedded with silt, and algae growth is present within the substrate and along the streambank. The field pH of Crabtree Creek at the Route 119 Bridge was 6.9. Past the bridge, Crabtree Creek continues to flow west adjacent to an open

The Crabtree Creek Discharge, located behind the Crabtree Fire Hall

field, homes, and small businesses. Some orange staining is visible in the substrate of the stream, but no AMD sources are visible. One thousand feet downstream from the Route 119 Bridge, Crabtree Creek passes behind the Crabtree Fire Hall. Directly behind the fire hall, a large abandoned mine discharge enters the stream. The 3,000-5,000 gpm discharge flows out of a large opening that is cut back into the streambank. Historic information indicates that the opening was, at one time, a pumping station for the deep mine located in Crabtree. The discharge emits the smell of rotten eggs and the opening is caked with iron oxide. Where it enters Crabtree Creek, the substrate is immediately covered in iron oxide sediment and the stream becomes orange in color. As it enters Crabtree Creek, the discharge doubles the size of the stream.

Downstream of the discharge, Crabtree Creek is surrounded by a forested area. Streamside vegetation is comprised of Japanese knotweed, multiflora rose, small trees, and shrubs. The substrate is not visible due to the orange appearance of the water. As Crabtree Creek flows past the small community of Greenwald, southeast of Crabtree, a large tributary enters the main stem of Crabtree Creek. The tributary and its multiple branches all flow into Lake Dom (formerly known as Lake Greenwald), and then the lake empties into Crabtree Creek. The outflow from Lake Dom is located in the community of Greenwald. Right next to the outflow, a smelly, black discharge joins the outflow. The discharge is most likely sewage from the small community of Greenwald located adjacent to Lake Dom. The outflow enters Crabtree Creek directly downstream of the Kiley Road Bridge.

Immediately downstream of the bridge, a small coal waste pile covers the ground on the northern side of the stream. The pile covers a small area and appears to be used as an ATV track and trash dump. It covers the streambank for approximately 300 feet downstream of the Kiley Road Bridge. The pile is stained orange and red where rain washes through and down to the stream.

As Crabtree Creek continues to flow east past the coal waste pile, streamside vegetation becomes increasingly thick and almost impassable. The old Penn Central railroad grade continues to parallel the streambank; it is used by ATVs, and possibly hunters, to access property downstream. A small row of crumbled coke ovens are hidden against the north bank of the stream, approximately 100 feet from the outer limits of the coal waste pile. They are extremely grown over and difficult to see.

Small coal waste pile located in Greenwald at the intersection of Kiley Road and Latrobe-Crabtree Road

Crabtree Creek crosses onto USACE flood-control property just downstream of the coke ovens. For the remaining length of stream, the flood-control property maintains an excellent forested buffer containing Japanese knotweed, sycamore, oak, varied shrubs, and some pine

trees. The stream bottom is not visible and iron oxide sediment cakes the streambanks and covers any exposed rocks.

Assessment volunteer taking a field pH at the mouth of Crabtree Creek

The mouth of Crabtree Creek is located on flood-control property approximately 500 feet downstream from the Oasis Bridge on the main stem of the Loyalhanna Creek. Where Crabtree Creek meets the Loyalhanna Creek, a large plume of orange water appears. At the mouth of the stream, the field pH was 7.1. Iron oxide sediment is collected in and around the mouth and along the streambanks making the mouth difficult to access.

Unnamed Tributaries to the Crabtree Creek Main Stem

There are 16 unnamed tributaries that enter the main stem of Crabtree Creek. A majority of the tributaries are small and, in many cases, intermittent. Those tributaries located from Crabtree to the mouth of the stream flow through similar landscapes. They each begin in hayfields or open fields and join Crabtree Creek in the excellent forest buffer surrounding the creek. The tributaries that enter the main stem upstream of Crabtree are very different. A majority of those tributaries flow through mostly active farmland that is being grazed or used for row crops and/or hay. UNT7N, UNT8N, and UNT9N are the most heavily impacted of those tributaries.

Two tributaries—UNT10N and UNT11N—originate in the new golf course, Totteridge. Along the length of both tributaries, they have been dammed or altered to make water hazards and to bypass greens and fairways.

The remaining tributaries found upstream of Crabtree originate in and flow through forested land. They are all very small and, at the time of the assessment, two of those tributaries were just barely a trickle of water entering Crabtree Creek.

None of the unnamed tributaries exhibit visible or measured signs of AMD. However, many of them did exhibit algal growth and higher field pH measurements, indicating the presence of excess nutrients as a result of human or animal waste.

Little Crabtree Creek Main Stem

Little Crabtree Creek originates in a residential area in the community of Donohoe. The headwaters of the stream flow north into Lower Twin Lake at Twin Lakes Park managed by Westmoreland County Parks and Recreation. The Lower Lake empties in the larger Upper Lake, which is located immediately north. A walking trail, several pavilions, fishing piers, forest, and open lawns surround both lakes. Twin Lakes Park is a popular recreation area where patrons can fish, boat, and picnic. A large population of geese occupies the shores of the lakes.

At the outflow of the Upper Lake, the Little Crabtree Creek continues to flow north, parallel to the road. The streambank downstream of the outflow is eroded and contains no riparian vegetation. The field pH at the outflow was 8.2. The erosion is only present for a short distance and then both forest and residences surround the stream that contains a substrate comprised of mostly cobble. A forested buffer surrounds Little Crabtree Creek until it arrives in Luxor. In Luxor, homes surround the streambank. Landowners mow lawns directly to the streambank and, in several instances, landowners have stabilized streambanks with tires, rocks, or logs. Flowing through Luxor, the substrate of the stream is comprised of some cobble, gravel, and silt. Luxor contains a large coal waste pile and the remains of a mining operation.

Little Crabtree Creek flows parallel to the road, the old railroad grade, as it leaves Luxor.

Residences and some forest surround this section of stream. It appears that the stream has been straightened where it encroaches upon the railroad bed. This entire section of stream contains areas of severe erosion. In one case, a home is very close to a high, eroded bank. As a result of excessive erosion, the stream substrate in this section is 40% embedded. Cobble and gravel in the stream are surrounded by silt and mud.

At an intersection of two roads, Little Crabtree turns to follow Cemetery Road toward Crabtree. Again, the stream channel is extremely straight, indicating that it has been altered. Grazing horses and cows have access to the stream and their movement in and out of the stream has made the banks very unstable. The substrate of the stream in this section is comprised mostly of silt and the water is very cloudy. The livestock impact Little Crabtree Creek until it passes underneath Calvary Hill Road. Downstream of the road, forest is present on one side of the stream and livestock are on the other side. Three active farming operations are stretched through this section and livestock have limited access to the stream. Despite this, the substrate is extremely embedded with silt and the water is cloudy as a result. When visible, the substrate contains algal growth.

Where Little Crabtree Creek passes underneath Route 119, it is surrounded by homes and small businesses. Downstream of Route 119, it passes through an area thick with Japanese knotweed, multiflora rose, and shrubs. The substrate of the stream is an even mix of small boulders, cobble, gravel, and silt. Fish are visible in this section of stream; habitat is abundant in downed trees, undercut banks, and in deep pools. Little Crabtree Creek flows into Crabtree Creek 50 feet upstream of the intersection of Cemetery Road and Route 119.

Unnamed Tributaries to Little Crabtree Creek

Thirteen unnamed tributaries enter Little Crabtree Creek. Livestock that have direct access to the stream impact four of those tributaries—UNT1W, UNT2W, UNT2E, and UNT3E. Each of the tributaries has an embedded substrate and eroded streambanks from the movement of livestock in and out of the stream.

UNT1E originates from an abandoned surface mine that was also a deep mine. The discharge was catalogued in Scarlift as discharge 5354. The field pH of the discharge was 3.6 and some aluminum precipitate was visible on the substrate just downstream of the discharge point. Where UNT1E flows into Little Crabtree Creek, there is no visual evidence of the mine drainage upstream. The field pH at the mouth of the stream was 4.9 and downstream of the mouth, the field pH of Little Crabtree Creek was 7.0.

UNT5W is a tributary that drains through the community of Luxor. The tributary is split into two headwater branches, both of which are impacted by agriculture and sewage. Several failing septic system discharges were located and detected along the streamside. Where the tributary flows through downtown Luxor, many houses surround the stream and practically no streamside vegetation is present. On the northern branch of the tributary (UNT5W-1N), a large coal waste pile occupies the land surrounding the stream. In addition to the coal waste pile, old buildings, coke ovens, and mining equipment are present. The coal waste pile is left from the Jamison No. 1 mining operations.

The remaining unnamed tributaries entering Little Crabtree Creek are forested and generally experience very few impacts.

Water Quality

Water quality samples were taken on Crabtree Creek throughout the assessment. Sample results reflect the large discharge located upstream behind the Crabtree Creek Fire Hall. Certain parameters are relatively consistent, with the exception of total iron. Large fluctuations could be a result of varying flow

amounts due to heavy rainfall. Regular sampling upstream of the Crabtree Creek Discharge will be recommended in the conclusion of this report.

Table 3.B.1: Sample Site LWA-13 Crabtree Creek								
Date Sampled	pH	Alk. (mg/L)	Acid. (mg/L)	TSS (mg/L)	Sulfates (mg/L)	Total Iron (mg/L)	Mn (mg/L)	Al (mg/L)
8/12/04	6.47	64	-51	50	450	18.6	1.9	0.4
10/25/04	5.61	29	64	17	605	55.3	2.3	<0.04
1/25/05*	6.10	84.4	36.0	42.0	554.0	44.60	1.91	4.77
3/31/05*	6.50	106.4	17.6	14.0	323.1	24.10	1.22	1.13

* Sample analyzed by the DEP Bureau of Laboratories

Sample Location: The samples were collected from the Kiley Road Bridge, which is located at the base of Lake Dom in Greenwald. To reach the sample point, turn onto Latrobe-Crabtree Road from Route 119 in downtown Crabtree. Drive on Latrobe-Derry Road one mile past the fire hall to Kiley Road.

Conclusions

The Crabtree Creek Subwatershed is impacted by a combination of agricultural non-point source pollution, sewage, and AMD. The scars of historic coal mining are apparent throughout the subwatershed, although less prevalent than they were just 20 to 30 years ago. Reclamation and remediation efforts by federal and state agencies have allowed the subwatershed's landscape to partially recover. Some significant AMD impacts still remain, including the Crabtree Creek Discharge.

Multiple farming operations surround the tributaries and main stem of Crabtree Creek. In many cases, animals have direct access to the stream, creating erosion, nutrient loading, and degradation of streamside vegetation. On a positive note, the farmlands included in the subwatershed landscape are valuable open space.

The Crabtree community and surrounding areas do not have a sewer system. In many cases, household sewage is piped into the stream or down into the abandoned flooded mines. In 2004, a joint sewer authority submitted an application to fund sewerage for the a majority of the subwatershed area. This will remove significant nutrient loading from the subwatershed's streams.

Crabtree Creek contains the largest discharge within the entire Loyalhanna Creek Watershed. It devastates Crabtree Creek and its impact extends down the Loyalhanna Creek for thousands of yards. Reclamation of this discharge should be a top priority in the future.

Recommendations

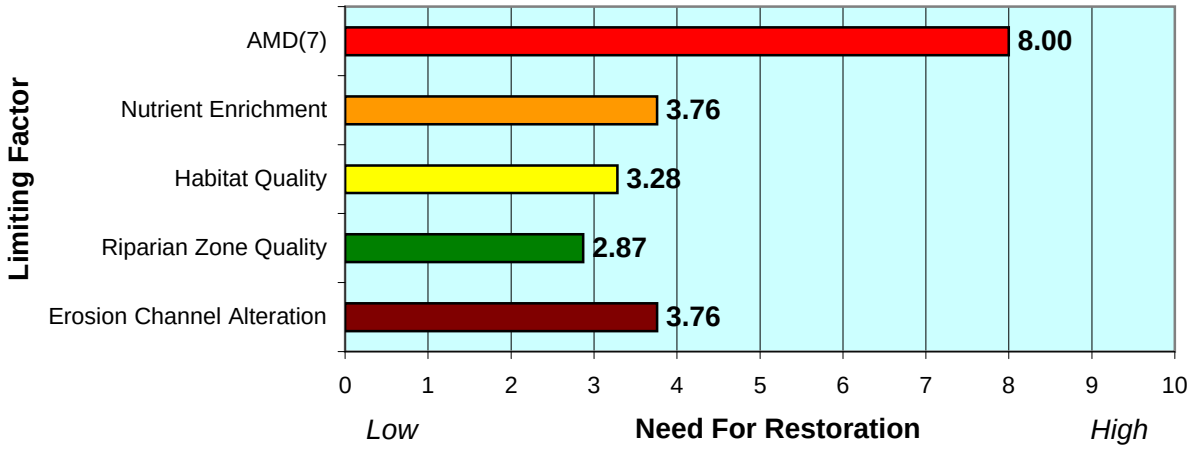
The following recommendations are made for the Crabtree Creek Subwatershed:

- Remediate the Crabtree Creek Discharge. Partner with community members, state and federal agencies, local businesses, and regional environmental organizations to design and construct an innovative treatment system.
- Encourage the protection of farmlands within the watershed. Work with Westmoreland County Agricultural Preservation and the Penn State Cooperative Extenstion to promote and educate landowners about the importance of land conservation.
- Explore total remediation and removal of the Hannastown coal waste pile and Forbes Road coal waste pile.
- Support the community as they proceed with the installation of a public sewer system.
- Sponsor a community event to share information about the subwatershed, its pollution problems, and possible solutions.

Overall Restoration Priorities

Figure 3.D.2 exhibits overall restoration priorities for the entire subwatershed. As indicated, the limiting factor that received the highest restoration priority rating was AMD. Eight stream segments showed impact from AMD sources. Approximately one-third of the Crabtree Creek main stem is impacted by one AMD discharge. In addition to AMD, restoration priority was also high for nutrient loading, as well as erosion and channel alteration. This reflects the presence of agricultural impacts throughout the subwatershed.

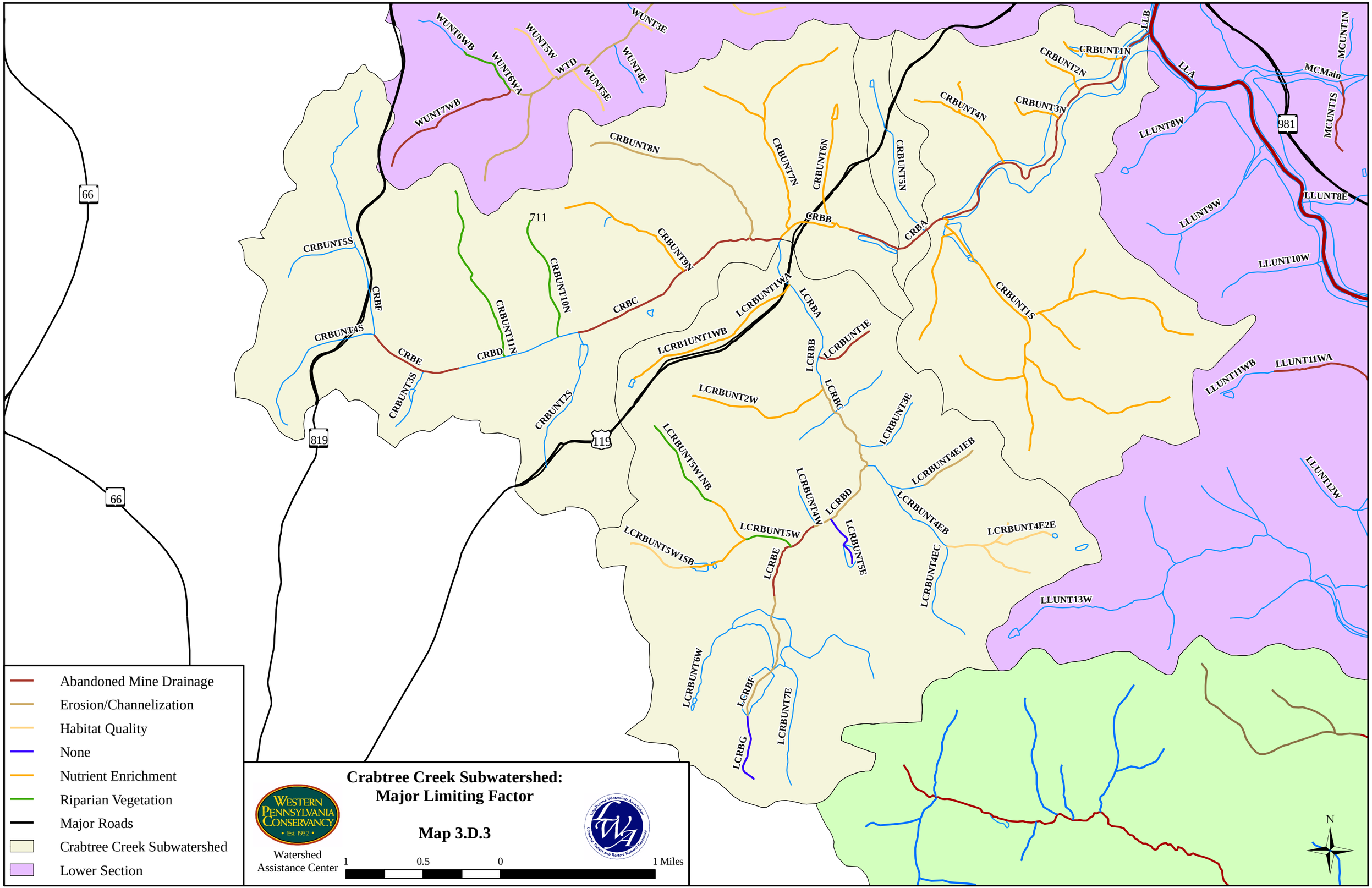
Figure 3.D.2: Restoration Priorities for the Crabtree Creek Subwatershed



Restoration Suggestions for Individual Stream Segments

Twenty-eight stream segments received visual assessment scores identifying limiting factors. The limiting factors identified included erosion and channel alteration, compromised fish and macroinvertebrate habitat, riparian vegetation degradation, nutrient loading, and AMD. Please refer to Table 3.D.2 and Map 3.D.3 for impact description and stream segment location.

Table 3.D.2: Impacted Stream Segments and Restoration Suggestions for the Crabtree Creek Subwatershed				
LIMITING FACTOR: Riparian Vegetation Degradation				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
CRBB *Main stem segment that flows from the confluence with Little Crabtree Creek to the Crabtree Fire Hall.*	The stream flows through a residential area. There is some vegetation surrounding the stream, but mostly tall grass and occasional shrubs. There are very few trees to provide shade and cover.	1. Work with the community to use trees and shrubs to shade the stream through the downtown area. Possible Partners: Crabtree Borough, WCD, Private Business Owners, Crabtree Fire Company, DEP	Local, State	Low – Medium
CRBUNT4N *Small tributary that flows through a mix of forest and pasture.*	Grazing livestock and pasture surround the upper portion of the tributary. Riparian zone is compromised in this area with very few trees and plants surrounding the stream.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
CRBUNT6N *Tributary that flows directly through the residential portion of Crabtree. It also passes underneath Route 819.*	The stream begins in a farm pasture where no riparian vegetation is present, and continues into town where it is channelized through yards and underground. In town, homeowners mow lawns directly to the streambank and very few trees are present streamside.	1. Work with the community to uses trees and shrubs to shade the stream through the downtown area. Possible Partners: Crabtree Borough, WCD, Private Business Owners, DEP	Local, State, Federal	Low


WUNT6WB
WUNT6WA
WUNT5W
WTD
WUNT5E
WUNT4E
WUNT3E
WUNT7WB
CRBUNT8N
CRBUNT7N
CRBUNT6N
CRBUNT5N
CRBUNT4N
CRBUNT3N
CRBUNT2N
CRBUNT1N
LLB
LLA
MCUNT1N
MCMain
MCUNT1S
981
LLUNT8W
LLUNT8E
LLUNT9W
LLUNT10W
CRBUNT1S
LLUNT11WB
LLUNT11WA
LLUNT12W
LLUNT13W
711
CRBUNT5S
CRBF
CRBUNT4S
CRBE
CRBD
CRBUNT11N
CRBUNT10N
CRBC
CRBUNT9N
CRBB
CRBA
LCRBUNT1WA
LCRBA
LCRBUNT1WB
LCRBB
LCRBUNT1E
LCRBUNT2W
LCRBG
LCRBUNT3E
LCRBUNT4E1EB
LCRBUNT4E2E
LCRBUNT4EB
LCRBUNT4EC
LCRBUNT5W1WA
LCRBUNT5W1NB
LCRBUNT4W
LCRBD
LCRBUNT5W
LCRBUNT5W1SB
LCRBE
LCRBUNT5E
LCRBUNT6W
LCRBF
LCRBUNT7E
CRBUNT3S
CRBUNT2S
819
119
66
66
Abandoned Mine Drainage
Erosion/Channelization
Habitat Quality
None
Nutrient Enrichment
Riparian Vegetation
Major Roads
Crabtree Creek Subwatershed
Lower Section
Crabtree Creek Subwatershed:
Major Limiting Factor
Map 3.D.3
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
1
0.5
0
1 Miles
N

CRBUNT7N *A tributary located close to town that flows through three separate farming operations.*	The headwaters are forked and originate within pastures on two farms. Both are grazed by Holsteins that have direct access to the stream. The lower portion of the stream also flows through pasture where livestock graze in and around the waterway. There is minimal riparian vegetation or canopy cover present along most of the stream's length.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
CRBUNT9N *Tributary that is surrounded by pasture and crop fields.*	The headwaters of this tributary originate in a pasture where livestock have direct access to the stream. It then flows through cropland and into the pasture of another farm. The upper portion of the tributary has very little riparian vegetation. It recovers slightly toward the mouth.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
CRBUNT10N *Tributary that flows through a portion of Totteridge Golf Course.*	Very sparse vegetation surrounds the stream. It flows through manicured areas. Some newly planted trees are present, but have not grown to be effective at providing shade or cover.	1. Work with property owner to plant riparian vegetation along the streambank. Possible Partners: Totteridge Golf Course, DEP, WCD	Local, State, Private	Low

CRBUNT11N *Tributary that flows through Totteridge Golf Course.*	This tributary flows through a small valley that intersects the golf course. It has some shrub and tall grass vegetation surrounding the streambank, but little canopy cover.	1. Work with property owner to plant riparian vegetation along the streambank. Possible Partners: Totteridge Golf Course, DEP, WCD	Local, State, Private	Low
LCRBUNT2W *Small tributary to Little Crabtree Creek that flows through a farm.*	Livestock have direct access to the stream and were actively using the stream at the time of the assessment. There is a small patch of woods located at the headwaters, but the remainder of the stream is surrounded by grazed grass.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	Local, State, Federal	Low
LCRBUNT5W T*ributary that flows through downtown Luxor. It is surrounded by residences. A coal refuse pile is located close to the stream.*	As the stream flows through the residential area, the only vegetation surrounding it is grass. One or two trees are present.	1. Work with property owners to plant riparian vegetation along the streambank. Possible Partners: WCD, DEP	Local, State	Low
LCRBUNT5W1NB *Small tributary that flows into UNT5W. It flows through a grazed pasture west of Luxor.*	Livestock have direct access to the stream. Only grazed grass surrounds the streambank. No canopy cover is present.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low

LIMITING FACTOR: Compromised Fish and Macroinvertebrate Habitat				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
CRBUNT8N *Tributary that flows through a mix of fields, pasture, row crops, and residences.*	The headwaters of the stream are located in a farm and the surrounding landscape contains very little substantial vegetation other than hay or corn. The substrate of the stream is almost entirely embedded with silt and mud, which covers available habitat and food sources.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
CRBUNT10N *Tributary that flows through a portion of Totteridge Golf Course.*	The substrate of the stream is comprised of gravel and silt. With very little riparian vegetation, there is hardly any visible food source within the stream. Habitat is nominal due to substrate type.	1. Work with property owner to plant streamside vegetation and to remediate stream channel. Possible Partners: Totteridge Golf Course, DEP, WCD	Local, State, Private	Low
LCRBF *Main stem portion of Little Crabtree Creek that is impounded to form Upper Twin Lake and Lower Twin Lake.*	The outflow of the lake serves as a large fish barrier.	1. Determine strategy to provide fish a means of traveling up and downstream. Possible Partners: WCPR, WCD, DEP, PAFBC	Local, County, State	Low

LCRBUNT1E *Small tributary that flows through a forested residential area into Little Crabtree Creek. The stream originates at an abandoned surface mine.*	The tributary is impacted by AMD and therefore contains algae, iron oxide, and aluminum precipitate within the substrate. Therefore, it is difficult for macroinvertebrates to cling to the substrate, let alone survive in the acidic water. There are also seasonal fish barriers. It appears that portions of the stream are dry during low-flow months. The AMD is not visible once the tributary meets the Little Crabtree Creek main stem.	1. Investigate AMD source and remediate through re-mining or passive treatment. Possible Partners: OSM, DEP, WPC	Local, State, Federal	Low – Medium
LCRBUNT2W *Small tributary to Little Crabtree Creek that flows through a farm.*	Livestock have direct access to the stream. The substrate of the stream is 100% embedded with silt and mud. This material is most likely washed into the stream from the pasture and active erosion of the streambanks. Habitat and food sources are covered.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
LCRBUNT4E1EB *Small tributary that flows into Little Crabtree Creek UNT4E. It passes through a grazed pasture and a few residential yards.*	In the upper portion of the tributary, livestock have direct access to the stream. The substrate of the stream is 100% embedded with silt and mud. This material is most likely washed into the stream from the pasture and active erosion of the streambanks. Habitat and food sources are covered.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low

LCRBUNT5W1SA *Lower portion of tributary to UNT5W that flows through a residential area in Luxor.*	The substrate of the stream is 30-40% embedded and there is very little cover or food source present in the stream.	1. Work with property owners to identify and eliminate source of sediment, which is mostly likely caused by a variety of factors including surrounding landscape, the road, and lack of streamside vegetation. Possible Partners: WCD, DEP	State, Federal	Low
LCRBUNT5W1SB *Upper portion of tributary to UNT5W that flows through an old pasture and residential area in Luxor.*	The substrate of the stream is 30-40% embedded and there is very little cover or food source present in the stream.	1. Work with property owners to identify and eliminate source of sediment, which is mostly likely caused by a variety of factors including surrounding landscape, the road, and lack of streamside vegetation. Possible Partners: WCD, DEP	State, Federal	Low
LCRBUNT5W1NA *Lower portion of tributary to UNT5W that flows through a residential area and old mining area. A coal refuse pile is located on the north bank of this section.*	The substrate of the stream is 100% embedded with a combination of algae, sediment, and iron oxide runoff from the coal refuse pile. There is very little in-stream fish cover and very few habitat sites available for fish or insects.	1. Eliminate upstream sources of sediment from farm. 2. Address algal growth by attending to sewage discharges into the stream. 3. Remediate and remove coal refuse pile. Possible Partners: USDA RUS, DEP, OSM, WCD, WPC, USDA	State, Federal, Private	Low – Medium

LCRBUNT5W1NB *Small tributary that flows into UNT5W. It flows through a grazed pasture west of Luxor.*	Livestock have direct access to the stream. Substrate is more than 60% embedded with silt and mud. Little to no in-stream fish cover present and habitat is covered with sediment.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low – Medium
LIMITING FACTOR: Erosion and Channel Alteration				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
CRBA *Main stem segment that extends from the mouth to the Crabtree Creek Fire Hall. Land surrounding the stream is forested. This portion is impacted by AMD.*	This portion of the stream flows through USACE flood-control property. In times of high flow, the Loyalhanna Creek backs up into the Crabtree Creek channel. This has resulted in erosion of streambanks, severe downcutting, and undercutting.	1. Work with USACE and other partners to determine a method to reduce erosion of streambanks. Possible Partners: WCD, USACE, DEP	State, Federal	Medium
CRBB *Main stem segment that flows from the confluence with Little Crabtree Creek to the Crabtree Fire Hall.*	Highly eroding banks are present and they seem very unstable through this section. The substrate of the stream is almost entirely embedded indicating upstream sediment addition through erosion and possibly other sources.	1. Work with USACE and other partners to determine a method to reduce erosion of streambanks. Possible Partners: WCD, USACE, DEP, Crabtree Borough	Local, State, Federal	Medium

CRBUNT7N *A tributary located close to town that flows through three separate farming operations.*	The headwaters are forked and originate within pastures on two farms. Both are grazed by Holsteins that have direct access to the stream. The lower portion of the stream also flows through pasture where livestock graze in and around the waterway. The livestock in all situations have trampled banks, causing erosion.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low – Medium
CRBUNT8N *Tributary that flows through a mix of fields, pasture, row crops, and residences.*	The grazing livestock in all situations have trampled banks, causing erosion.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low – Medium
LCRBC *Main stem segment of Little Crabtree Creek that flows through pasture and row crops.*	Cows have direct access to the stream and they have caused bank instability. The substrate of the stream is more than 50% embedded.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low – Medium
LCRBD *Main stem segment of Little Crabtree Creek that flows through a forested residential section along road.*	The streambanks throughout the entire section are eroding. Erosion is most significant in the straight areas. At one point, the stream is channelized next to an old railroad bed. Erosion is also occurring there.	1. Determine cause of erosion and remediate accordingly. 2. Talk with landowners and encourage them to install appropriate bank stabilization methods. Possible Partners: WCD, DEP	State, Federal	Low – Medium

LCRBF *Main stem portion of Little Crabtree Creek that is impounded to form Upper Twin Lake and Lower Twin Lake.*	At the outflow to the lake there is a large area of streambank that is severely eroded. This portion of stream also has no riparian vegetation surrounding it. The erosion continues downstream for many feet.	1. Determine cause of erosion and remediate accordingly. Possible Partners: WCPR, WCD, PAFBC, DEP	Local, County, State	Low – Medium
LCRBUNT2W *Small tributary to Little Crabtree Creek that flows through a farm.*	Cows have direct access to the stream and they have caused bank instability. The substrate of the stream is 100% embedded.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
LCRBUNT4E1EB *Small tributary that flows into Little Crabtree Creek UNT4E. It passes through a grazed pasture and a few residential yards.*	Cows have direct access to the stream and they have caused bank instability. The substrate of the stream is 100% embedded. In addition, the stream is channeled underground in a few places.	1. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. 2. Investigate reason for channelizing the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
LCRBUNT5W *Tributary that flows through downtown Luxor. It is surrounded by residences. A coal refuse pile is located close to the stream.*	Streambanks are eroding and undercut throughout the entire length of stream.	1. Work with property owners to remediate eroding streambanks and to plant riparian vegetation to prevent further erosion. Possible Partners: WCD, DEP	State	Low

LCRBUNT5W1SA *Lower portion of tributary to UNT5W that flows through a residential area in Luxor.*	Streambanks are eroding and undercut throughout the entire length of stream.	1. Work with property owners to remediate eroding streambanks and to plant riparian vegetation to prevent further erosion. Possible Partners: WCD, DEP	State	Low
LCRBUNT5W1NA *Lower portion of tributary to UNT5W that flows through a residential area and old mining area. A coal refuse pile is located on the north bank of this section.*	Streambanks are eroding and undercut throughout the entire length of stream.	1. Work with property owners to remediate eroding streambanks and to plant riparian vegetation to prevent further erosion. Possible Partners: WCD, DEP	State	Low
LCRBUNT5W1NB *Small tributary that flows into UNT5W. It flows through a grazed pasture west of Luxor.*	Streambanks are eroding and undercut throughout the entire length of stream. Livestock have access to the stream and are contributing to erosion.	1. Work with property owners to remediate eroding streambanks and to plant riparian vegetation to prevent further erosion. 2. Work with landowner to install agricultural BMPs to reduce amount of erosion and sediment movement into the stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low

LIMITING FACTOR: Nutrient Enrichment				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
CRBB *Main stem segment that flows from the confluence with Little Crabtree Creek to the Crabtree Fire Hall.*	Multiple direct sewage inputs were noted throughout this section. In addition, entering tributaries contain agricultural operations. Algal growth is present on the substrate.	1. Support community in current initiative to install a sewerage system for the community. 2. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: USDA RUS, DEP, WPC, WCD, USDA	State, Federal, Private	High
CRB1N *Small tributary that enters the creek, close to the mouth of the stream.*	The substrate of the stream is covered with brown algae. At the extreme headwaters of the tributary, a small farm is present. Manure is entering the stream channel due to grazing livestock.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Low
CRBUNT1S *Also known as the Lake Dom Tributary, it flows through a mix of residences and farms.*	Throughout the entire length of stream, direct sewage pipes were located. The most significant one was found at the base of Lake Dom where the tributary flows into Crabtree Creek. It emitted an odor that was detected from 50 feet away.	1. Support community in current initiative to install a sewerage system for the community. Possible Partners: WCD, USDA RUS, DEP	State, Federal	High

CRBUNT2N *Small tributary that flows through mostly forest. The headwaters originate at a farm.*	The substrate of the stream is covered with brown algae. At the extreme headwaters of the tributary, a farm is present. Manure is entering the stream channel due to grazing livestock.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Low
CRBUNT3N *Small tributary that flows through mostly forest. The headwaters originate at a farm.*	The substrate of the stream is covered with brown algae. At the extreme headwaters of the tributary, a farm is present. Manure is entering the stream channel due to grazing livestock.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Low
CRBUNT4N *Tributary that flows through grazed pasture and forest.*	Substrate of the stream is covered with algae. At least one-half of the stream is surrounded by pasture where livestock have direct access to the stream.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Low
CRBUNT6N *Tributary that flows directly through the residential portion of Crabtree. It also passes underneath Route 819.*	The water is murky in color and the substrate of the stream is covered with algae. The nutrient enrichment source is most likely a combination of the impact from livestock upstream and direct sewage inputs downstream.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. 2. Support community in current initiative to install a sewerage system for the community. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Low

CRBUNT7N *A tributary located close to town that flows through three separate farming operations.*	Grazing livestock add nutrients to the stream. Algal growth is present on the entire stream length.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, USDA, WPC	State, Federal, Private	Low
CRBUNT8N *Tributary that flows through a mix of fields, pasture, row crops, and residences.*	Grazing livestock add nutrients to the stream. Algal growth is present on the entire stream length.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, USDA, WPC	State, Federal, Private	Low
CRBUNT9N *Tributary that is surrounded by pasture and crop fields.*	Grazing livestock add nutrients to the stream. Algal growth is present on the entire stream length.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, USDA, WPC	State, Federal, Private	Low
LCRBUNT1WA *Lower section of small tributary that flows into Little Crabtree Creek. It flows through a residential area.*	Brown algae is present on the substrate of the stream. Although no direct pipes were found, it is suspected that the algal growth is due to leaking septic systems.	1. Support community in current initiative to install a sewerage system for the community. Possible Partners: WCD, USDA RUS, DEP	State, Federal	Medium

LCRBUNT1WB *Upper section of tributary to Little Crabtree Creek that originates in a pasture and flows through a residential area.*	Horses in pasture have direct access to the stream. Algae growth is present in stream substrate.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, USDA, WPC	State, Federal	Medium
LCRBUNT1E *Small tributary that flows through a forested residential area into Little Crabtree Creek. The stream originates at an abandoned surface mine.*	Algal growth is present on the stream substrate. The growth is most likely due to the stream's pH of 4.6. An upstream AMD discharge is acidic and contains aluminum.	1. Remediate upstream discharge through re-mining or passive treatment. Possible Partners: WCD, DEP, WPC, OSM	State, Federal	Medium
LCRBUNT2W *Small tributary to Little Crabtree Creek that flows through a farm.*	Grazing livestock add nutrients to the stream. Algal growth is present on the entire stream length.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, USDA, WPC	State, Federal, Private	Medium
LCRBUNT5W *Tributary that flows through downtown Luxor. It is surrounded by residences. A coal refuse pile is located close to the stream.*	Algal growth is present in stream substrate. Multiple discharging pipes and seeps were found through this section. It is suspected that they were from failing septic systems.	1. Support community in current initiative to install a sewerage system for the community. Possible Partners: WCD, USDA RUS, DEP	State, Federal	High

LCRBUNT5W1SA *Lower portion of tributary to UNT5W that flows through a residential area in Luxor.*	Algal growth is present in stream substrate. Multiple discharging pipes and seeps were found through this section. It is suspected that they were from failing septic systems.	1. Support community in current initiative to install a sewerage system for the community. Possible Partners: WCD, USDA RUS, DEP	State, Federal	High
LCRBUNT5W1NA *Lower portion of tributary to UNT5W that flows through a residential area and old mining area. A coal refuse pile is located on the north bank of this section.*	Algal growth is present in stream substrate. Multiple discharging pipes and seeps were found through this section. It is suspected that they were from failing septic systems.	1. Support community in current initiative to install a sewerage system for the community. Possible Partners: WCD, USDA RUS, DEP	State, Federal	High
LCRBUNT5W1NB *Small tributary that flows into UNT5W. It flows through a grazed pasture west of Luxor.*	Grazing livestock add nutrients to the stream. Algal growth is present on the entire stream length.	1. Encourage landowners to install agricultural BMPs to reduce overall nutrient loading to tributaries and ultimately the main stem. Possible Partners: WCD, DEP, USDA, WPC	State, Federal	Medium

LIMITING FACTOR: Abandoned Mine Drainage				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
CRBA *Main stem segment that extends from the mouth to the Crabtree Creek Fire Hall. Land surrounding the stream is forested.*	The stream is orange in color due to large AMD discharge (3,000-5,000 gpm) located by the Crabtree Fire Hall. The substrate of the stream is entirely embedded with iron oxide sediment. The field pH of Crabtree Creek at the mouth of the stream was 7.0. Where Crabtree Creek meets the Loyalhanna Creek, it turns the Loyalhanna Creek orange in color. That coloration remains for thousands of feet downstream.	1. Remediate the Crabtree Creek Discharge using a combination of passive and active treatment. 2. Combine treatment resources with pending sewage treatment plant. Possible Partners: Crabtree Creek Fire Company, Unity Township, Derry Township, Hempfield Township, Salem Township, USDA RUS, DEP, WPC, WCD, OSM, USACE, PSCE	Local, County, State, Federal, Private	High
CRBB *Main stem segment that flows from the confluence with Little Crabtree Creek to the Crabtree Fire Hall.*	Some orange coloration is noticeable within this segment. No discharges were located, but the coloration could be due to historic AMD flow, or small discharges located upstream.	1. Investigate source of coloration. 2. Sample this section because it is above the Crabtree Creek Discharge. 3. Remediate upstream discharges. Possible Partners: WCD, OSM, DEP, WPC	State, Federal	Medium

CRBC *Main stem segment that extends from the community of Hannastown to the confluence with Little Crabtree Creek.*	This segment contains a discharge that originates from the remains of a large, partially reclaimed, coal refuse pile in Hannastown. The field pH of the seep has been measured between 3.2 and 4.5. It contains aluminum that immediately precipitates as it meets the main stem of Crabtree Creek. The seep is located upstream of the Front Street Bridge over the creek. This bridge is located east of Hannastown.	1. Investigate the possibility of further reclaiming the refuse pile. 2. If reclamation is not an option, treat the discharge passively. 3. Monitor discharge quarterly. Possible Partners: WCD, OSM, DEP, WPC	State, Federal	High
CRBE *Main stem section of stream that flows through forested area east of the Forbes Road community. A large coal refuse pile is located on the northern bank of the stream.*	The coal refuse pile is seeping into the stream. One large seep is apparent, and other stream channels, that drain the refuse pile in heavy rains, are noticeable. The substrate of the stream through this section contains white aluminum precipitate, and the water appears milky in color.	1. Remove and reclaim the refuse pile. Possible Partners: WCD, DEP, OSM	State, Federal	High
LCRBE *Main stem segment of Little Crabtree Creek that flows through Luxor.*	In Luxor, UNT5W enters Little Crabtree Creek. It contains AMD from an upstream refuse pile. The addition of that tributary creates orange coloration in the main stem. Also, some seeps were located within the segment close to Luxor.	1. Remove and reclaim the refuse pile in Luxor. Possible Partners: WCD, DEP, OSM	State, Federal	High

LCRBUNT1E *Small tributary that flows through a forested residential area into Little Crabtree Creek. The stream originates at an abandoned surface mine.*	Aluminum discharge is located at the source of this tributary. The discharge was also noted during the Scarlift Report. The discharge has no effect upon the main stem of Little Crabtree Creek.	1. Investigate source of AMD. 2. Remediate and reclaim source area. Possible Partners: WCD, DEP, OSM	State, Federal	Medium

SECTION 3.E
WHITETHORN CREEK

Section 3.E

Whitethorn Creek Subwatershed

General Description

Whitethorn Lake, which is located at the mouth of Whitethorn Creek

The 9.95 square-mile Whitethorn Creek Subwatershed is located in Salem Township. The subwatershed is situated in the north-central portion of Westmoreland County, between Route 819 and the Loyalhanna Lake.

The headwaters of Whitethorn Creek, a WWF, originate near Route 819 and very close to the headwaters of Crabtree Creek. Surrounded by a mix of pasture and hayfields, three small tributaries meet to form the main stem. The tributaries originate from spring sources on open hillsides. Where Rosewood Road and Kennen Road intersect, the tributaries join to form the Whitethorn Creek main stem. From that point, Whitethorn Creek flows northeast parallel to Hannastown Road. The surrounding landscape is comprised of agriculture and forest until Whitethorn Creek passes underneath Route 22. At that point, the landscape surrounding the stream changes to include residences and more forest. Downstream of Route 22, Whitethorn Creek flows parallel to Whitethorn Road. Through this section, the stream is surrounded by mostly forest. The forest is comprised of an even mix of hardwood trees and mixed shrubs. On the south side of the stream, a steep hillside serves as a boundary.

Rock cliffs located on the main stem of Whitethorn Creek close to its mouth

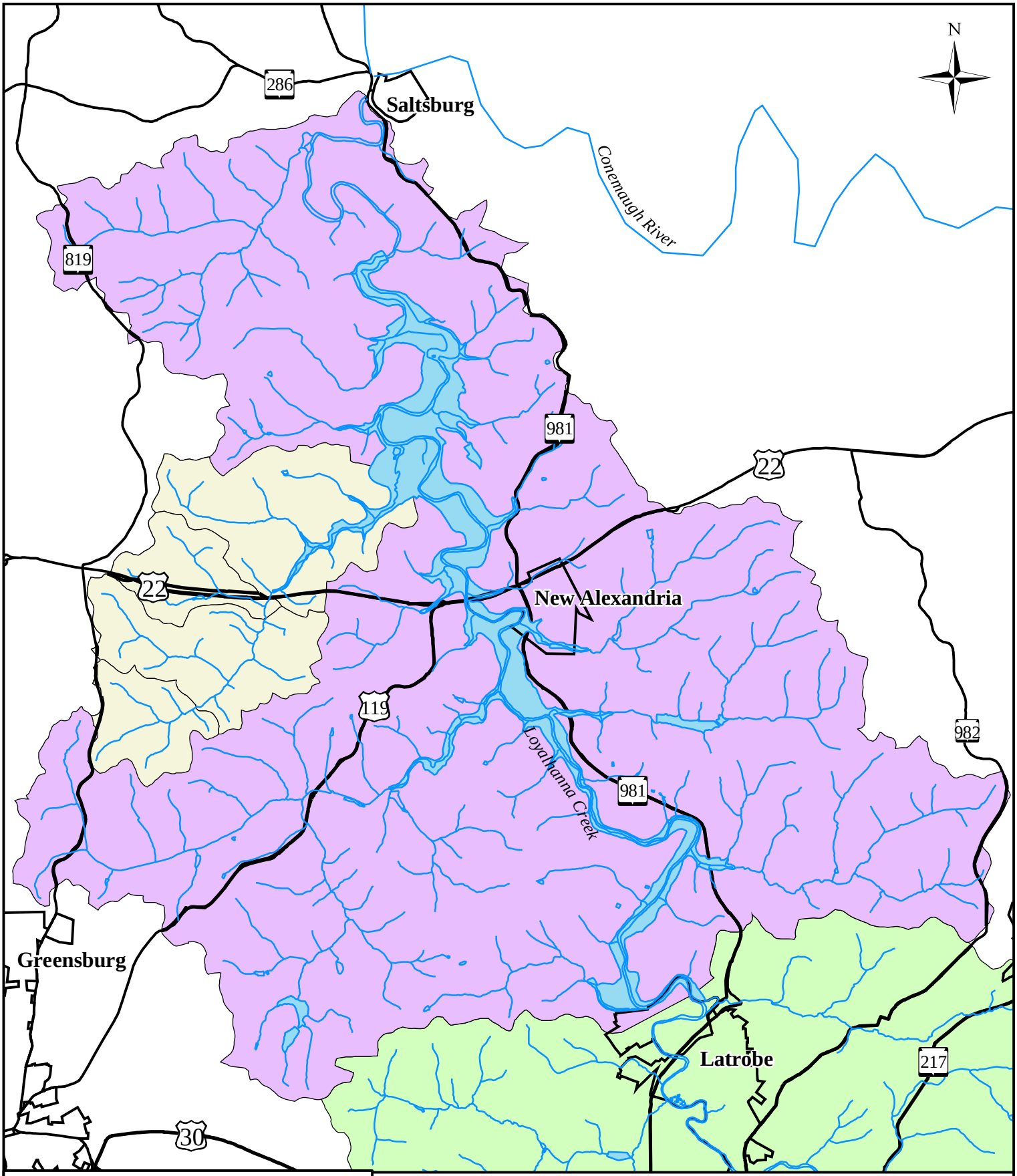
Where Whitethorn Creek passes underneath Salem Drive, the stream experiences a major change. The velocity of the water slows significantly and the stream channel widens. Small wet areas surround the stream channel, which is contained by a sloping hillside to the north and a steep hillside to the south. Approximately 500 yards downstream from Salem Drive, Whitethorn Creek flows into the USACE flood-control property. At the mouth of Whitethorn Creek, a lake has formed. The lake is part of the pool formed as a result of the Loyalhanna Dam, which slows the flow of the Loyalhanna Creek. Wetland plants and muddy areas surround the main portion of the lake indicating water levels vary greatly throughout the year.

Please refer to Map 3.E.1 for the geographic location of this subwatershed.

Review of Historic Information

Overall Summary

A limited amount of historic information was found and collected for the Whitethorn Creek Subwatershed. It is a rural area with a landscape dominated by agriculture in the headwaters and forest



Streams
Major Roads
Boroughs and Cities
Whitethorn Run Subwatershed
Lower Section

Whitethorn Run Subwatershed: Overall Location

Map 3.E.1

Western Pennsylvania Conservancy
Watershed Assistance Center

1 0.5 0 1 Miles

Loyalhanna Watershed Association
Conserve, Protect and Restore Natural Resources

close to the mouth. The headwater region shares a border with the headwaters of Crabtree Creek north of Forbes Road. There was a small amount of surface mining along that border during the 1980s.

Closer to the mouth of the stream, tributaries draining into Whitethorn Creek originate from the same hillside as a tributary that drains directly to the Loyalhanna Creek. That tributary, LLUNT8W, contains acidic mine drainage originating from old deep mines and surface mines.

Scarlift Report

There were no abandoned mine discharges located in the Whitethorn Creek Subwatershed during fieldwork for the Scarlift Project. However, several coal refuse piles and surface mines were located on the subwatershed's southern border. Most of the surface runoff from those spoil piles and strip mines drained into other streams, including Crabtree Creek and LLUNT8W, a tributary to the Lower Loyalhanna Creek. No mine drainage was reported.

Westmoreland Conservation District (WCD)

In 2001, the WCD completed a chemical and biological study of the Whitethorn Creek Subwatershed. The initial survey was completed in order to develop baseline data for an agricultural BMP initiative that would take place throughout the subwatershed over the next few years. During the first sampling, the WCD completed a fish survey, macroinvertebrate survey, and chemical water quality samples. The results showed major impacts from agricultural operations in the subwatershed's headwaters. Low numbers of fish and macroinvertebrates occurred, as well as high readings for nitrates and phosphates.

Following the initial survey, WCD began the installation of agricultural BMPs on the main stem and various tributaries. Water quality sampling was carried out on a monthly basis in order to track the overall change or improvement as a result of the BMPs. Overall results are still pending and the project is still in progress as additional farms install conservation practices.

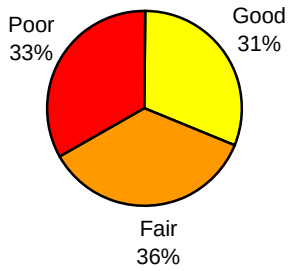
More complete information regarding the study can be obtained from the WCD.

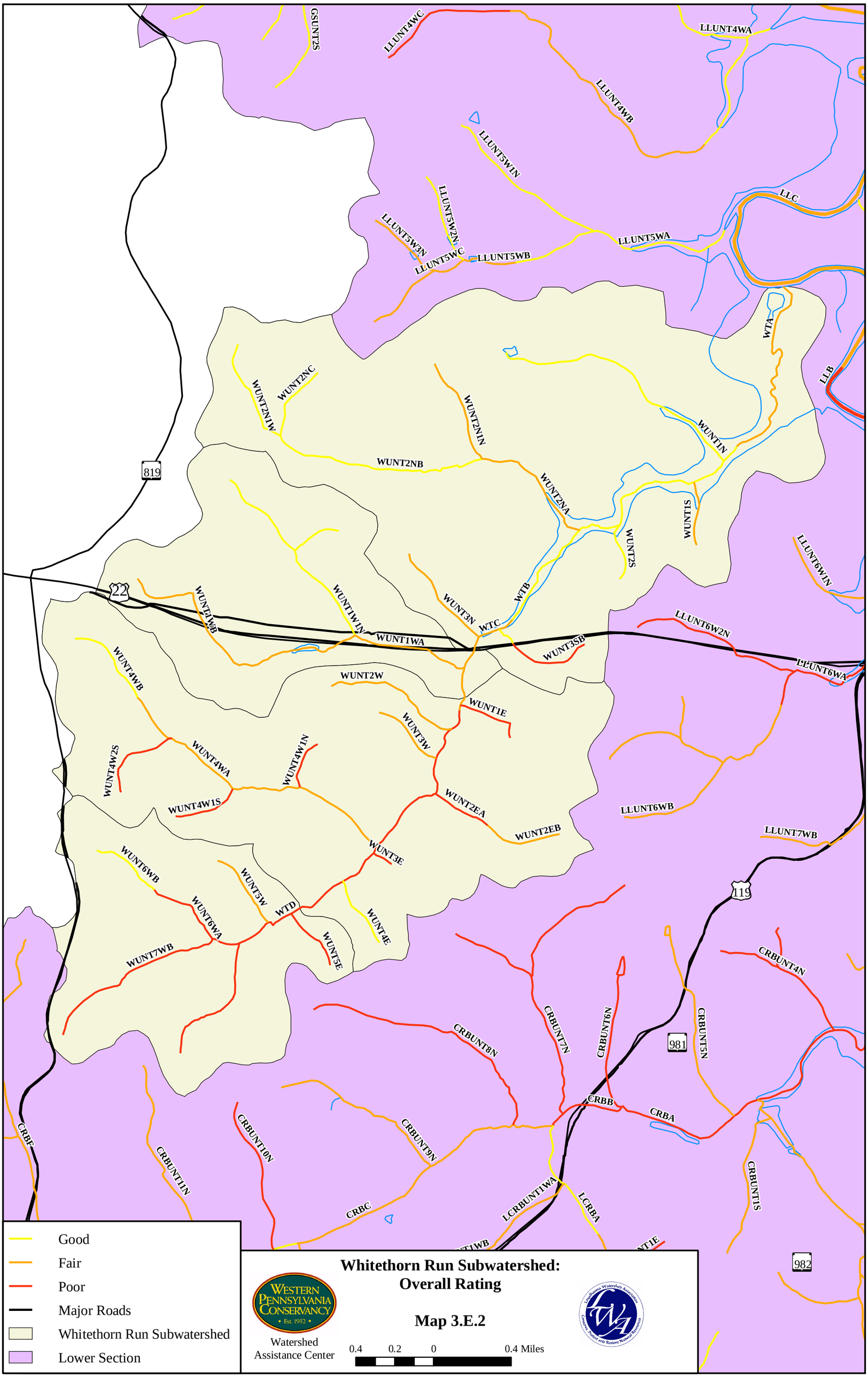
Visual Assessment Summary

Visual Assessment Findings

The visual assessment of Whitethorn Creek was completed in May of 2004. A total of 36 stream segments were assessed. As depicted in Figure 3.E.1, 31% of the subwatershed received a good rating, 36% received a fair rating, and 33% received a poor rating. An average score of 6.50 was given to the entire subwatershed, which is a fair rating overall. The overall fair rating primarily reflects the impacts of habitat quality degradation, nutrient loading, and some AMD. Individual stream segment ratings are depicted in Map 3.E.2.

Figure 3.E.1: Visual Assessment Ratings for the Whitethorn Creek Subwatershed




GSUNT2S
LLUNT4WC
LLUNT4WA
LLUNT4WB
LLUNT5W1N
LLUNT5W2N
LLUNT5W3N
LLUNT5WC
LLUNT5WB
LLUNT5WA
LLC
WTA
LLB
WUNT2NC
WUNT2N1W
WUNT2N1N
WUNT2NB
WUNT2NA
WUNT1N
WUNT1S
WUNT2S
819
22
WUNT1W2N
WUNT1W1N
WUNT1WA
WUNT3N
WTC
WTB
WUNT3SB
LLUNT6W1N
LLUNT6W2N
LLUNT6WA
WUNT4WB
WUNT2W
WUNT1E
WUNT3W
WUNT4W2S
WUNT4WA
WUNT4W1N
WUNT4W1S
WUNT2EA
WUNT2EB
LLUNT6WB
LLUNT7WB
WUNT6WB
WUNT5W
WUNT3E
WTD
WUNT6WA
WUNT4E
WUNT5E
WUNT7WB
119
CRBUNT4N
CRBUNT8N
CRBUNT7N
CRBUNT6N
981
CRBUNT5N
CRBB
CRBA
CRBF
CRBUNT10N
CRBUNT9N
CRBUNT11N
CRBC
LCRBUNT1WA
LCRBA
CRBUNT1S
982
Good
Fair
Poor
Major Roads
Whitethorn Run Subwatershed
Lower Section
Whitethorn Run Subwatershed:
Overall Rating
Map 3.E.2
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
0.4 0.2 0 0.4 Miles

Visual Assessment Description

Whitethorn Creek Main Stem

The headwaters of Whitethorn Creek are made up of three separate tributaries. The southern-most tributary was assessed as part of the main stem. It originates on a hillside in between Route 819 and Hannastown Road. Livestock have direct access to the stream as it passes through a pasture. A large amount of silt is present in the substrate of the stream at its headwaters as it flows north to join the other two headwater tributaries, UNT7W and UNT6W, close to the intersection of Hannastown Road and Rosewood Road. UNT7W and UNT6W originate close to Route 819. UNT7W seeps out of an old abandoned strip mine located at the intersection of Route 819 and Rosewood Road. The field pH of UNT7W at its headwaters was 2.6, and iron staining is visible along its gravel and silt substrate. The stream flows east, crossing under Rosewood Road, and then passes through a recently logged area and grazed pasture. UNT6W, which originates at the intersection of Kennen Road and Route 819, and UNT7W meet and together they flow into the main stem. Approximately 100 yards downstream of the convergence of the three tributaries, Whitethorn Creek passes underneath Hannastown Road. At this point, the field pH of the stream was 4.8 and iron staining is visible. In addition to iron staining, some algae is noticeable along the substrate that is comprised of gravel and silt. Not until the entrance of the next tributaries does the pH of the main stem rise.

Whitethorn Creek continues east, flowing parallel to Hannastown Road. A mixture of hayfields, pasture, and some forest surrounds the stream. A few residences are located close to the stream, most of which are associated with farming operations on the hillsides surrounding the stream. Whitethorn Creek maintains this state until it passes underneath an unnamed road very close to Route 22. It is at this point that more trees surround the stream. In addition, a few more homes are located close to the stream.

Looking upstream at a green-tinted Whitethorn Creek, close to the Salem Drive Bridge

Whitethorn Creek is conveyed underneath Route 22 in a large culvert. That culvert is a significant fish barrier and also channels the stream. Downstream of Route 22, Whitethorn Creek flows parallel to Whitethorn Road. Through this section, the amount of trees and other vegetation surrounding the stream increases. The substrate of the stream is very embedded. Some erosion is visible, mostly on outside bends of the stream. It is through this section that the southern bank of the stream becomes very steep. The bank is composed mostly of large rocks and cliffs.

As Whitethorn Creek continues to flow east, the velocity of flow decreases and the water becomes cloudy and green in coloration. Sediment and gravel line the stream bottom as it winds through a small valley that is thick with vegetation. Sycamore trees, oak, maple, and small shrubs fill the area surrounding the stream.

Where Whitethorn passes underneath Salem Drive, the substrate is almost entirely embedded. Very few rocks are visible within the stream substrate. Five hundred yards downstream of Salem Drive, Whitethorn Creek flows onto USACE flood-control property. It is also at this point that Whitethorn Creek spreads out to form Whitethorn Lake. The formation of the lake is a direct result of the slowed velocity of Loyalhanna Creek at its confluence with Whitethorn Creek. The slowed velocity of Loyalhanna

The confluence of Whitethorn Lake and the Loyalhanna Creek

Creek is due to the Loyalhanna Dam. Wet areas, wood debris, macrophyte beds, and numerous isolated pools surround the lake. It appears that the lake acts as a sediment and nutrient trap. This is apparent because of its sediment-covered banks, muddy color, and abundant algae.

Unnamed Tributaries to the Whitethorn Creek Main Stem

There are 18 unnamed tributaries in the Whitethorn Creek Subwatershed. The characteristics of the tributaries are diverse with some containing impacts from AMD and others containing impacts related to agricultural operations. In general, the tributaries contain significant amounts of sediment from a variety of sources, including farms, open fields, and roads. One tributary, UNT3E, is impacted by Route 22. Where the road crosses the stream, there is a large amount of sediment in the substrate and the stream becomes extremely stagnant.

UNT7W, a headwater tributary, contains impacts from AMD. It originates at what appears to be an abandoned deep mine and strip mine. Maps and historic information do not show a deep mine in this area. Regardless, the pH of UNT7W at its source is 2.6. The tributary flows out of the mined area and through a property that has been logged recently. Finally, UNT7W makes its way through a pasture grazed by approximately 140 holsteins. At its mouth, UNT7W had a field pH of 4.5 and visible orange staining. In addition to UNT7W, one other tributary exhibited impacts from AMD. UNT1S is located very close to the mouth of Whitethorn Creek. It originates from a mined hillside located close to New Alexandria on Salem Drive. It is also at this point that LLUNT8W, a tributary to the Lower Loyalhanna Creek main stem, originates. The tributary is also impacted by AMD. The discharge flowing into UNT1S is a seep and has a very small flow. The field pH of the seep was 5.0 and some orange staining was visible. Where the tributary flows into Whitethorn Creek, there is no visible evidence of AMD.

UNT6W, another headwater tributary, flows through a dairy cow pasture. The substrate of the stream is more than 50% embedded with sediment. As a result, there is no habitat structure or food source available for macroinvertebrates or small fish. There is absolutely no streamside vegetation through the lower portion of the tributary that is heavily grazed.

In addition to UNT6W there are three other tributaries that are impacted by agricultural operations, UNT4W, UNT2W, and UNT1E.

Water Quality

Water quality samples were taken on Whitethorn Creek throughout the assessment. Water quality samples did not provide evidence for upstream impacts discovered during the visual assessment. This data was compared to, and consistent with, water quality analysis completed by the WCD. Additional upstream data preformed by the WCD does show increases in total suspended solids, as well as nitrates and phosphates.

Table 3.E.1: Sample Site LWA-14
Whitethorn Creek

Date Sampled	pH	Alk. (mg/L)	Acid. (mg/L)	TSS (mg/L)	TDS (mg/L)	Sulfates (mg/L)	Total Iron (mg/L)	Mn (mg/L)	Al (mg/L)
8/25/04	7.49	114	- - -	1	230	- - -	<0.06	- - -	- - -
10/25/05	7.45	96	- - -	1	232	- - -	<0.06	- - -	- - -
1/25/05	Frozen over - unable to sample								
3/31/05*	7.40	43.6	-7.6	8.0	- - -	47.6	0.46	0.10	<0.50

*Sample analyzed by the DEP Bureau of Laboratories

Sample Location: The sample was taken from the Salem Drive Bridge, which can be accessed by turning onto Whitethorn Road from Route 22. Continue on Whitethorn Road bearing right until crossing over Whitethorn Creek.

Conclusions

Although surrounding subwatersheds are significantly impacted by AMD, Whitethorn Creek escapes with only minor AMD impacts. Instead, its headwaters and various tributaries are impaired by nutrient loading as a result of agriculture.

At the mouth of Whitethorn Creek, a lake has formed. The lake is a direct result of the flood-control dam that exists downstream on the Loyalhanna Creek. Where Whitethorn Creek flows into the Loyalhanna Creek, the Loyalhanna Lake is just beginning to form. As a result of high water levels, the banks of the lake and surrounding landscape are covered with sediment and silt. Small stagnant pools of water exist in areas surrounding the lake and water-tolerant vegetation grows through the lake bed and at the lake shore. Without such severely fluctuating water levels, it is speculated that the mouth of Whitethorn Creek could become a wetland consisting of cattail, sedge, and other water-loving plants.

It will be important to monitor the progress of the agricultural BMP project in the upper portion of the subwatershed. Regular water quality monitoring should be performed in conjunction with work completed by the WCD.

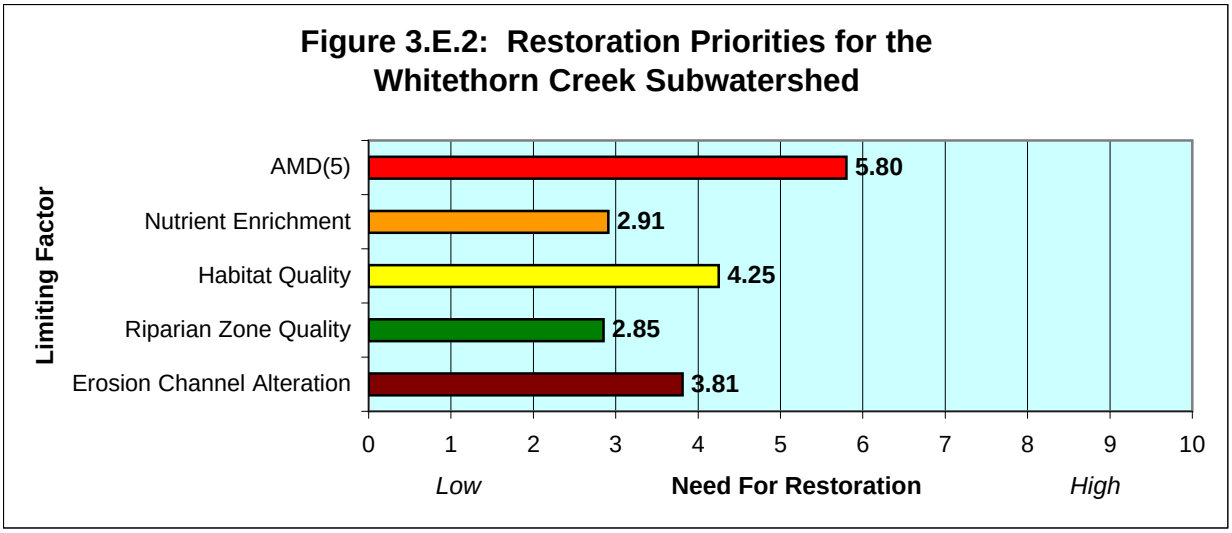
Recommendations

The following recommendations are made for the Whitethorn Creek Subwatershed:

- Investigate source of AMD at the headwaters of UNT7W. Work with DEP District Mining Office and WCD to determine a course of action for the site.
- Support the Westmoreland Conservation District in future agricultural BMP projects throughout the subwatershed. Consider continued water quality monitoring at the mouth of the stream to determine overall benefit.
- Inform and educate subwatershed citizens about the importance of riparian buffers.
- Encourage landowners with large property holdings within the subwatershed to consider conservation and preservation of their properties.
- Work with the USACE and other agencies to develop a strategy for sediment reduction within the entire subwatershed.

Overall Restoration Priorities

Figure 3.E.2 exhibits overall restoration priorities for the entire subwatershed. As indicated, the limiting factor that received the highest restoration score was AMD. Five stream segments were impacted by AMD. The most significant impact from AMD within the subwatershed is located in the headwaters. It is at that point that a discharge enters the stream, impacting water quality for close to a mile. The other AMD sources are seeps that only impact a concentrated section of stream and are quickly diluted. In addition to AMD, restoration priority was also high for compromised fish and macroinvertebrate habitat, or habitat quality, as shown in Figure 3.E.2. This reflects the common occurrence of sediment in the substrate of stream sections throughout the subwatershed.



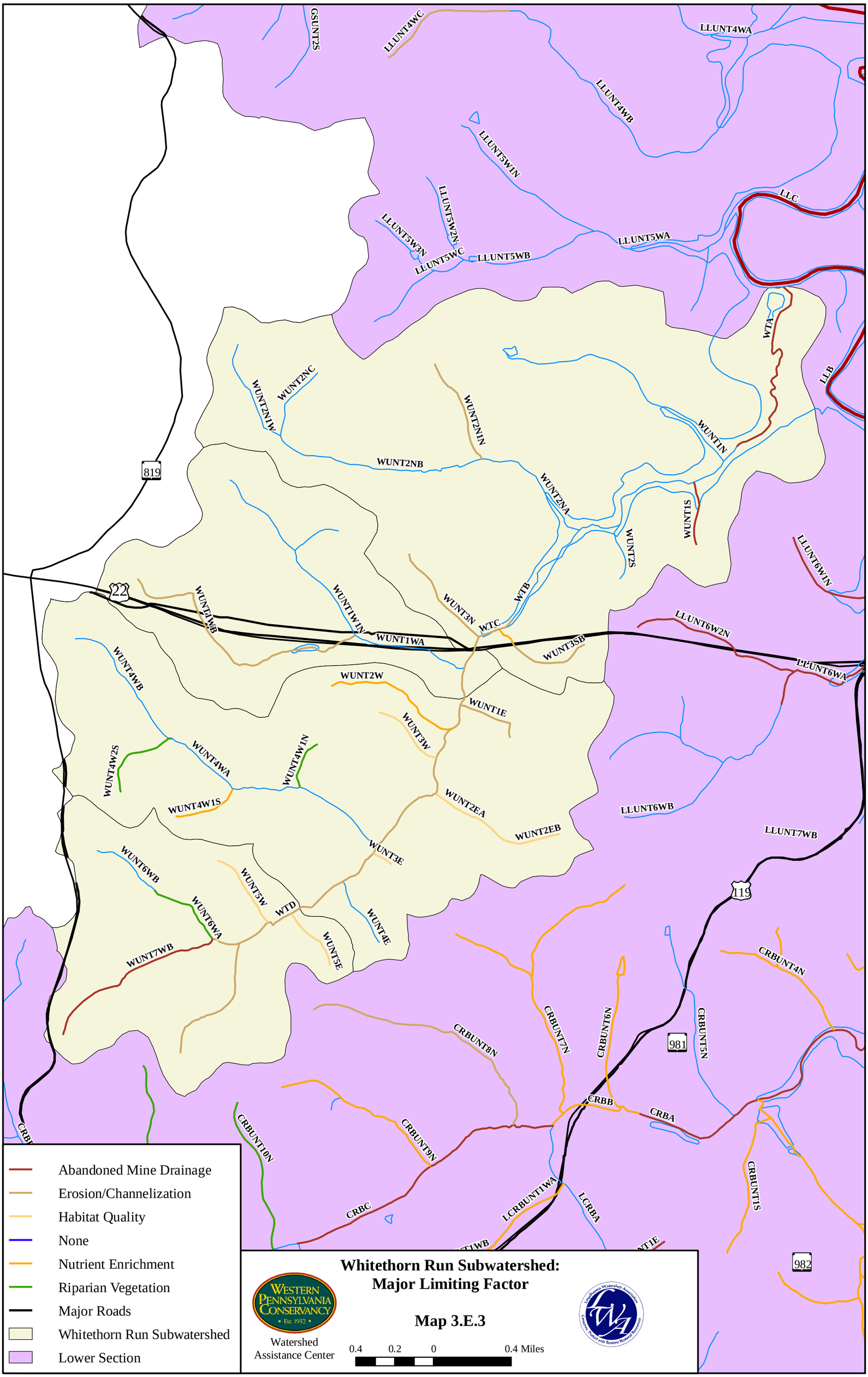
Restoration Suggestions for Individual Stream Segments

Twenty-one stream segments received visual assessment scores identifying limiting factors. The limiting factors identified included AMD, nutrient loading, compromised fish and macroinvertebrate habitat, riparian zone degradation, and erosion and channel alteration. Please refer to Table 3.E.2 and Map 3.E.3 for impact description and stream segment location.

Table 3.E.2: Impacted Stream Segments and Restoration Suggestions for the Whitethorn Creek Subwatershed

LIMITING FACTOR: Riparian Vegetation Degradation

Stream Segment Name	Description of Impact	Remediation Strategy	Possible Funding Sources	Priority Rating
WTUNT1E *Small tributary that flows into the main stem. It is located close to the Route 22 and flows through a pasture.*	Riparian vegetation is mowed grass, or grazed by livestock who have direct access to the stream. Some canopy cover is present.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal	Low


GSUNT2S
LLUNT4WC
LLUNT4WA
LLUNT4WB
LLUNT5W1N
LLUNT5W2N
LLUNT5W3N
LLUNT5WC
LLUNT5WB
LLUNT5WA
LLC
LLB
WTA
WUNT2NC
WUNT2N1W
WUNT2N1N
WUNT2NB
WUNT2NA
WUNT1N
WUNT1S
WUNT2S
819
22
WUNT1W2B
WUNT1W1N
WUNT1WA
WUNT3N
WTC
WTB
WUNT3SB
LLUNT6W1N
LLUNT6W2N
LLUNT6WA
WUNT4WB
WUNT2W
WUNT1E
WUNT3W
WUNT4W2S
WUNT4WA
WUNT4W1N
WUNT4W1S
WUNT2EA
WUNT2EB
LLUNT6WB
LLUNT7WB
WUNT6WB
WUNT5W
WUNT6WA
WTD
WUNT3E
WUNT4E
WUNT7WB
WUNT5E
119
CRBUNT4N
CRBUNT7N
CRBUNT6N
CRBUNT5N
981
CRBUNT8N
CRBB
CRBA
CRBUNT10N
CRBUNT9N
CRBC
LCRBUNT1WA
LCRBA
CRBUNT1S
982
Abandoned Mine Drainage
Erosion/Channelization
Habitat Quality
None
Nutrient Enrichment
Riparian Vegetation
Major Roads
Whitethorn Run Subwatershed
Lower Section
Whitethorn Run Subwatershed:
Major Limiting Factor
Map 3.E.3
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
0.4 0.2 0 0.4 Miles

WTUNT3E *Very small tributary that flows through a residential area.*	Landowners have mowed lawns directly to the streambank. Very little vegetation is present. The stream is also channeled underground.	1. Work with property owner to plant riparian vegetation along the streambank. Possible Partners: WCD, DEP, Salem Township	Local, State	Low
WTUNT4W1N *Small tributary that flows into UNT4W. It flows through an old pasture that is currently not in use.*	Because the area surrounding the stream was once used for pasture, the riparian vegetation is heavily grazed. No trees are present along the tributary.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area. Possible Partners: WCD, USDA, WPC, DEP	State, Federal	Low
WTUNT4W2S *Small tributary that flows into UNT4W through a field.*	The stream has very little vegetation surrounding it. The reach is 50% shaded with trees.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area. Possible Partners: WCD, USDA, WPC, DEP	State, Federal	Low
WTUNT5E *Tributary that flows through a residential area.*	Riparian vegetation is comprised of mowed grass. The stream is about 25% shaded by trees.	1. Work with landowner to plant vegetation along the streambank. Possible Partners: WCD, DEP	State	Low
WTUNT6WA *Lower portion of tributary that flows parallel to Kennen Road to join the main stem. It flows through a pasture.*	This is the site of a WCD fencing project and the livestock access to the stream has been limited. The riparian vegetation is still in recovery and very few trees are present.	1. Work with WCD to continue maintaining the fencing and encourage riparian vegetation to grow. Possible Partners: WCD, DEP, WPC, USDA	State, Federal	Low

WTUNT7WA *Lower portion of tributary that flows parallel to Rosewood Road to join with UNT6W. It flows through a pasture.*	Similar to UNT6W, streambank fencing has also been installed here. Livestock access to the stream has been limited. The riparian vegetation is still in recovery and very few trees are present.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area. Possible Partners: WCD, USDA, WPC, DEP	State, Federal	Low
LIMITING FACTOR: Compromised Fish and Macroinvertebrate Habitat				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
WTUNT1E *Small tributary that flows into the main stem. It is located close to Route 22 and flows through a pasture.*	The substrate of the stream is more than 30% embedded. Habitat and fish cover are covered by sediment.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate livestock access to stream. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low
WTUNT2N1N *Small tributary that flows into UNT2N. It flows through a mix of residences and forest.*	The substrate of the stream is almost entirely embedded with sediment. Multiple fish barriers exist. Habitat is nominal due to substrate type.	1. Work with property owners to identify and eliminate source of sediment, which is mostly likely caused by a variety of factors, including surrounding landscape, the road, and lack of streamside vegetation. Possible Partners: WCD, DEP	State, Federal	Low

WTUNT2EA *Lower portion of a tributary that flows through a grazed pasture.*	The stream is dry in some areas and where it is flowing, the substrate is 100% silt. Habitat and fish cover are embedded.	1. Determine source of sediment. 2. Work with property owner to take the steps necessary to help the stream recover. Possible Partners: WCD, DEP	State, Federal	Low
WTUNT2EB U*pper portion of a tributary that flows through a forested area.*	The streambed is entirely dry. This serves as a barrier to fish and other stream life.			Low
WTUNT3W *Small tributary that flows through a hayfield.*	The streambed is almost entirely dry. This serves as a fish barrier to fish and other stream life.			Low
WTUNT3E *Very small tributary that flows through a residential area.*	Substrate of the stream is 100% embedded. Habitat, fish cover, and food sources are covered by sediment. Large portions of the stream are channeled underground, serving as a barrier to fish.	1. Determine sediment source. 2. Work with property owner to take the steps necessary to help the stream recover. Possible Partners: WCD, DEP	State, Federal	Low
WTUNT4W1N *Small tributary that flows into UNT4W. It flows through an old pasture that is currently not in use.*	Because the area surrounding the stream was once used for pasture, the riparian vegetation is heavily grazed. The substrate of the stream is 40% embedded; therefore, habitat and food sources are covered with sediment. Due to lack of riparian vegetation, fish cover is non-existent.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate sediment source. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Low

WTUNT4W1S S*mall tributary that flows into UNT4W through a field.*	The substrate of the stream is 100% embedded and there is very little cover or food source present in the stream.	1. Work with property owners to identify and eliminate source of sediment, which is mostly likely caused by a variety of factors, including surrounding landscape, the road, and lack of streamside vegetation. Possible Partners: WCD, DEP	State, Federal	Low
WTUNT4W2S *Small tributary that flows into UNT4W through a pasture and field.*	The stream is in the process of recovering after streambank fencing was installed. Livestock access to the stream has been limited and tree plantings are in place. Substrate of the stream is 50-60% embedded.	1. Support WCD in their continued efforts to remediate the stream through agricultural BMPs.	State, Federal	Low – Medium
WTUNT5E *Tributary that flows through a residential area.*	The substrate of the stream is 100% embedded and there is very little cover or food source present in the stream.	1. Work with property owners to identify and eliminate source of sediment, which is mostly likely caused by a variety of factors, including surrounding landscape, the road, and lack of streamside vegetation. Possible Partners: WCD, DEP	State, Federal	Low
WTUNT5W *Small stream that begins in old pasture and flows through a residential area at its mouth.*	Substrate of the stream is 30-40% embedded, covering a good portion of habitat and food sources. A very large culvert in the stream acts a fish barrier because it is set higher than the current level of the stream.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate sediment source. Possible Partners: WCD, USDA, WPC, DEP	State, Federal	Low

WTUNT6WA *Lower portion of tributary that flows parallel to Kennen Road to join the main stem. It flows through a pasture.*	This is the site of a WCD fencing project and the livestock access to the stream has been limited. The riparian vegetation is still in recovery and very few trees are present. Substrate of the stream more than 50% embedded, covering significant habitat and food source.	1. Support WCD in their continued efforts to remediate the stream through agricultural BMPs.	State, Federal	Low
WTUNT7WA *Lower portion of tributary that flows parallel to Rosewood Road to join with UNT6W. It flows through a pasture.*	Substrate of the stream is approximately 40% embedded. There is no fish cover available due to lack of riparian vegetation and canopy cover. Little or no habitat is available for insects and fish.	1. Work with landowner to install agricultural BMPs in order to recover the riparian area and eliminate sediment source. Possible Partners: WCD, USDA, WPC, DEP	State, Federal, Private	Medium
LIMITING FACTOR: Erosion and Channel Alteration				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
WTC *Main stem segment that is located upstream of Route 22. The area surrounding the stream in this section is a mix of field and forest.*	Where the main stem passes underneath Route 22, it is channelized and passed through a large culvert. There is some erosion through the section on either side of the culvert.	1. Determine method to lessen the overall impact of the culvert upstream and downstream. Possible Partners: WCD, WPC, DEP	State, Federal	Low
WTD *Main stem segment that extends from the headwaters down to upstream of Route 22. It flows through a mix of row crops and pasture.*	Bank stability is compromised throughout the segment. In some cases it is directly related to grazing livestock. The stream is embedded with sediment from various sources, including upstream erosion.	1. Work with various landowners to install agricultural BMPs to reduce sediment loading and erosion of streambanks. Possible Partners: WCD, WPC, USDA, DEP	State, Federal, Private	Medium

WTUNT1S *Tributary that originates at an old surface mine and flows through forest to the main stem.*	Large amount of sediment is present in substrate indicating some type of erosion in and around the stream. Some streambanks are eroding, but most of the sediment either comes from the road or the surface mine.	1. Reclaim surface mine and plant with trees and grasses to eliminate soil loss into the stream. Possible Partners: PAGC, WPC, USDA, DEP	State, Federal, Private	Low – Medium
WTUNT1WB *Upper section of large tributary that originates in Congruity and flows parallel to Route 22. It flows through a mix of forest and residences.*	The stream is channelized due to its proximity to Route 22. Down cutting and erosion are visible throughout the entire stream segment. The substrate is 100% embedded with sediment that has washed into the stream through erosion and as runoff from the road.	1. Work with landowners to determine a method to reduce erosion of streambanks. 2. Using riparian buffers, attempt to reduce amount of sediment leaving Route 22 and entering the stream channel. Possible Partners: WCD, DEP, PennDOT	State, Federal	Low – Medium
WTUNT1E *Small tributary that flows into the main stem. It is located close to Route 22 and flows through a pasture.*	The substrate of the stream is more than 30% embedded. Grazing livestock have trampled the streambank.	1. Work with various landowners to install agricultural BMPs to reduce sediment loading and erosion of streambanks. Possible Partners: WCD, WPC, USDA, DEP	State, Federal, Private	Low
WTUNT2N1N *Small tributary that flows into UNT2N. It flows through a mix of residences and forest.*	An ATV trail has been installed and has altered the stream channel. The substrate of the stream is more than 60% embedded, indicating possible erosion upstream.	1. Eliminate ATV trail. 2. Determine source of sediment upstream and work to remediate. Possible Partners: WCD, DEP	State, Federal	Low

WTUNT3SB *Small tributary that crosses underneath Route 22 and flows through a residential area.*	The stream has been channelized due to Route 22. High eroding banks are present along the entire stream. The stream is more than 60% embedded.	1. Work with landowners to determine a method to reduce erosion of streambanks. 2. Using riparian buffers, attempt to reduce amount of sediment leaving Route 22 and entering the stream channel. Possible Partners: WCD, DEP, PennDOT	State, Federal	Low – Medium
WTUNT3E *Very small tributary that flows through a residential area.*	Substrate of the stream is 100% embedded. Approximately one-half of the stream is channeled underground.	1. Determine sediment source. 2. Work with property owner to take the steps necessary to help the stream recover. Possible Partners: WCD, DEP	State, Federal	Low
WTUNT5E *Tributary that flows through a residential area.*	Stream is dry and its substrate is 100% embedded.			Low
WTUNT6WA *Lower portion of tributary that flows parallel to Kennen Road to join the main stem. It flows through a pasture.*	This is the site of a WCD fencing project and the livestock access to the stream has been limited. The riparian vegetation is still in recovery and very few trees are present. Substrate of the stream is more than 50% embedded and eroding banks are still recovering.	1. Support WCD in their continued efforts to remediate the stream through agricultural BMPs.	State, Federal	Low

LIMITING FACTOR: Nutrient Enrichment				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
WTA *Main stem segment that flows from Salem Drive Bridge to the mouth of the stream.*	Water is green-tinted and the substrate is covered with algae. Near the mouth of the creek, a lake has formed. The shoreline of the lake is littered with algae and foul-smelling pools of water.	1. Identify upstream sources of nutrient loading and reduce or eliminate them. Possible Partners: WCD, DEP, USDA RUS, WPC, USDA FSA	State, Federal, Private	Medium
WTD *Main stem segment that extends from the headwaters down to upstream of Route 22. It flows through a mix of row crops and pasture.*	Livestock have access to many portions of this stream segment. The water is cloudy and in pools has floating globs of foam. Some algae growth is present in the substrate.	1. Work with landowners to install agricultural BMPs in order to reduce nutrient loading and eliminate livestock access to the creek. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Medium – High
WTUNT2W *Tributary that flows through a sheep farm. The tributary is located close to Route 22.*	Sheep have direct access to the stream. The substrate of the stream is covered with green algae.	1. Work with landowners to install agricultural BMPs in order to reduce nutrient loading and eliminate livestock access to the creek. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Medium – High

WTUNT4W1S *Small tributary that flows into UNT4W through a field.*	There is significant algae growth in the substrate of the stream.	1. Determine source of nutrient enrichment, which could be a number of things, including past grazing, fertilizer for the field, etc. 2. Reduce the nutrient source by working with the landowner to incorporate agricultural BMPs into property management plans. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Medium
WTUNT6WA Lower portion of tributary that flows parallel to Kennen Road to join the main stem. It flows through a pasture.	This is the site of a WCD fencing project and the livestock access to the stream has been limited. The riparian vegetation is still in recovery and very few trees are present. Substrate of the stream is more than 50% embedded, covering significant habitat and food source.	1. Support WCD in their continued efforts to remediate the stream through agricultural BMPs.	State, Federal	Low
WTUNT7WA Lower portion of tributary that flows parallel to Rosewood Road to join with UNT6W. It flows through a pasture.	Livestock have complete access to the stream and graze in and around it. There is some algae growth in the stream substrate.	1. Work with landowners to install agricultural BMPs in order to reduce nutrient loading and eliminate livestock access to the creek. Possible Partners: WCD, DEP, WPC, USDA	State, Federal, Private	Medium

LIMITING FACTOR: Abandoned Mine Drainage				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
WTA *Main stem segment that flows from Salem Drive Bridge to the mouth of the stream.*	There is a small seep that enters this segment. The iron staining dissipates upon reaching the main stem.	1. Identify source of iron seep and investigate possibilities for remediation if necessary. Possible Partners: DEP	State	Low
WTUNT1S *Tributary that originates at an old surface mine and flows through forest to the main stem.*	The tributary is tinted orange and there is some iron oxide sediment on the substrate of the stream. The effect dissipates quickly as the tributary flows to meet the main stem.	1. Investigate surface mine at the source of the tributary. Remediate or re-mine if possible. Possible Partners: DEP, OSM	State, Federal	Low
WTUNT6W *Lower portion of tributary that flows parallel to Kennen Road to join the main stem. It flows through a pasture.*	There appears to be some iron staining in the stream substrate. Landowner stated that it was from an old surface mine at the headwaters. No information was located to support this information and the source of iron is unknown.	1. Investigate source of iron staining further. Possible Partners: DEP	State	Low
WTUNT7WA *Lower portion of tributary that flows parallel to Rosewood Road to join with UNT6W. It flows through a pasture.*	There is orange staining on the substrate of the stream and the field pH of the stream in the lower section was 4.5. Source of AMD is upstream in section B. The main stem of shows no field-measured impact from the discharge.	1. Remediate upstream source of AMD, either through reclamation, re-mining, or passive treatment. Possible Partners: DEP, OSM, WCD	State, Federal	Medium

WTUNT7WB *Upper portion of tributary that flows parallel to Rosewood Road to join UNT6W. It originates in a forested area.*	Discharge originates at an area that appears to be an abandoned surface mine site. The field pH at the site was 2.6. The stream then travels through a logged area. The water is orange tinted through the section and, prior to flowing into the pasture for section A, the field pH was still acidic at 3.0.	1. Investigate source of AMD and what was done at the site to produce the acidic water. 2. Remediate source of AMD, either through reclamation, re-mining, or passive treatment. Possible Partners: WCD, DEP, OSM	State, Federal	Medium – High

SECTION 3.F
GETTY RUN

Section 3.F

Getty Run Subwatershed

General Description

Looking downstream at Getty Run from the Turtle Creek Railroad Line/West Penn Trail

The 6.46 square-mile Getty Run Subwatershed is located in the northern portion of Westmoreland County. It is the last subwatershed to enter the Loyalhanna Creek before it meets the Conemaugh River in Saltsburg. Getty Run follows the old Turtle Creek railroad as it flows west through the small community of Slickville in Salem and Loyalhanna townships. Once the site of extensive coal mining, the subwatershed is heavily impacted by AMD. The main stem of the stream maintains a pH of no greater than 3.0 for its entire length.

Getty Run originates on the west side of Slickville, north of the intersection of Route 819 and Main Street. The headwaters are located in a small wooded lot surrounded by homes. Field observations concluded that the headwaters are an AMD source. From the headwaters, Getty Run flows south through a residential area located parallel to Route 819. At the intersection of Depot Street and Route 819, Getty Run turns east and flows underneath Route 819.

Flowing east through Slickville, Getty Run is surrounded by a mix of residences and some forest. To the north of the stream, homes and small business dot the hillside. The south side of the stream is comprised mostly of forest and some coal refuse.

Following Main Street and the railroad grade, Getty Run flows out of the town of Slickville. Once outside of Slickville, the landscape becomes more forested. At the intersection of Main Street and Butz Road, a large tributary enters Getty Run from the southwest. The tributary originates on a large farm at the intersection of Cells Road and Route 819.

Downstream of Butz Road, Getty Run flows through a small farm and past several large coal refuse piles. At the mouth of the stream, the surrounding landscape is forested. In addition, Japanese knotweed occupies most of the streamside riparian area.

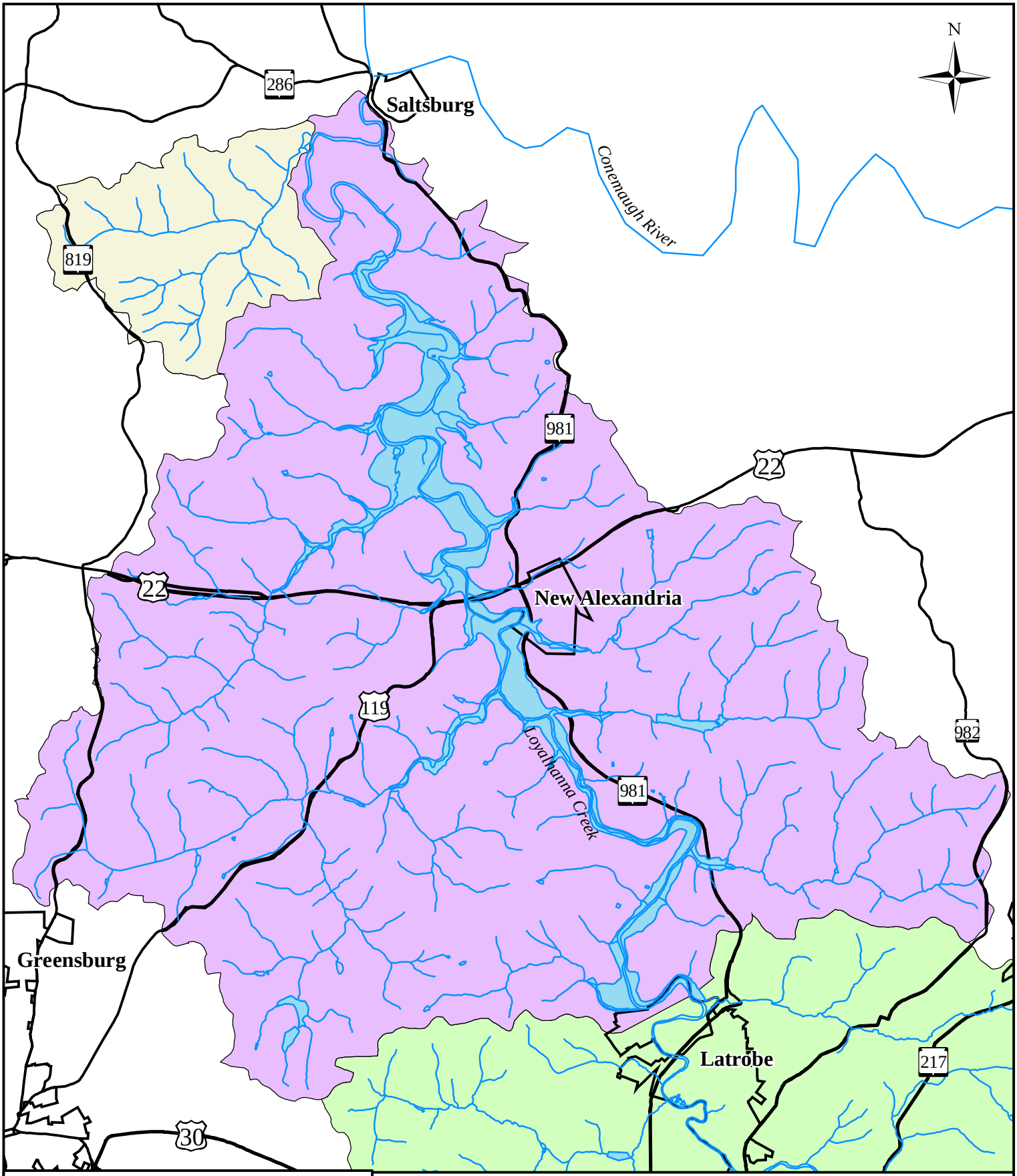
Getty Run is listed on the Cold Water Act (CWA) 303(d) list as an impaired waterway for pH, metals, and acidity. The waterway is classified as a WWF. Please refer to 3.F.1 for geographic location of this subwatershed.

Review of Historic Information

Overall Summary

The Getty Run Subwatershed is underlain by the Pittsburgh coal seam. As a result, much of the area was heavily mined throughout the early 1900s. Bethlehem Mines Corporation, Irwin Gas Coal Company, Howard Gas Coal Company, and Seehart Coal Company all operated in the Slickville Area. Unlike other subwatershed mines, very little historic information was located regarding the deep mines in and around Slickville.

The coal-bearing geologic structure in the Getty Run Subwatershed area is referred to as the



Streams
Major Roads
Boroughs and Cities
Getty Run Subwatershed
Lower Section

Getty Run Subwatershed: Overall Location

Map 3.F.1

Western Pennsylvania Conservancy
Watershed Assistance Center

1 0.5 0 1 Miles

Loyalhanna Watershed Association
Conserve, Protect and Restore Natural Resources

Elders Ridge Syncline. Unlike other synclines, its slope and dip allowed mines to be self-draining. During mining, this was advantageous becase it was not necessary to pump water out of the mined areas. Today, this feature is what makes the Getty Run Subwatershed one of the most polluted in the entire Loyalhanna Creek Watershed. Getty Run flows through a valley that is at the low point of the coal seam. Therefore the natural drainage from the coal seam is towards the outcrop line. The sealing of any or all of the discharges within the subwatershed would only serve to divert discharge flow to other points. The fragmented nature of the coal seam prevents the utilization of any single discharge point as a drainway for the area to conduct flows to a single treatment facility. [1]

Scarlift Report

According to the Scarlift Report, Getty Run Subwatershed is the most "acid mine drainage polluted tributary stream in the watershed." It was also stated that the ability to achieve water quality improvement would be difficult due to its geologic and topographic structure.

During fieldwork for the Scarlift Report, 12 discharges were inventoried. In most cases, coal waste piles were found with the discharges, as well as along the streambank. Each of the discharges inventoried is described below.

Getty Run Subwatershed Discharges Catalogued During Scarlift		
Scarlift Discharge Number	**Current Discharge Name**	**Description and Location of Discharge**
5163	None	Drainage emanating from an abandoned drift mine opening east of the headwaters of UNT3N. During Scarlift fieldwork, the average water quality data was as follows: flow – 60 gpm, pH – 2.6, total iron – 82 mg/L, and aluminum – 28 mg/L. During the assessment, this exact discharge was not found. The discharge may have been eliminated during surface mining completed after the Scarlift Report.
5164	None	Drainage emanating from an abandoned drift mine opening at the headwaters of UNT3N. During Scarlift fieldwork, the average water quality data was as follows: flow – 45 gpm, pH – 2.6, total iron – 100 mg/L, and aluminum – 25 mg/L. During the assessment this discharge was found and it was flowing from underneath a coal refuse pile. The field pH of the discharge was 3.1 when it was assessed. There was a significant amount of flow and a large amount of filamentous algae in the stream substrate.
5167	None	Discharge seeping out of an old pipe at the site of an abandoned drift mine opening and stripped area. During Scarlift fieldwork, the average water quality was as follows: flow – 8 gpm, pH – 2.5, total iron – 104 mg/L, and aluminum – 72 mg/L. This discharge was located during the assessment on Depot Street, west of downtown Slickville. The discharge creates a small intermittent tributary that enters the main stem of Getty Run right before it crosses underneath Route 819. The field pH of the discharge was 3.1 during the assessment.

[1] Operation Scarlift, Project No. SL-122, December 1972, pp. X-17

5168	None	Small seep emanating from a stripped drift mine entry. During Scarlift Fieldwork, the average water quality was as follows: flow – 3 gpm, pH – 2.4, total iron – 222 mg/L, and aluminum – 60 mg/L. The seep was not located during the assessment. However, the stream near its historic location, UNT6N, had a field pH of 2.9 at its headwaters. Additional discharges impact the tributary.
5169	None	Discharge entering UNT6N from a slumped drift mine opening. The discharge collects into a small pond and then flows into the tributary. During Scarlift fieldwork, the average water quality was as follows: flow – 3 gpm, pH 2.4, total iron – 166 mg/L, and aluminum – 56 mg/L. The seep was located during the assessment and it still collects into a small pond prior to flowing into UNT6N. Field pH of the discharge below the pond was 2.9.
5170	Getty #1	Large discharge flowing from the old drainway for the Bethlehem Mine near the Getty Run headwaters. The discharge is located close to St. Sylvester's church, just east of Route 819 and south of Main Street. During Scarlift fieldwork, the average water quality was as follows: flow – 240 gpm, pH – 2.6, total iron – 138 mg/L, and aluminum – 14.4 mg/L. The discharge was located during the assessment. It maintains a large flow volume between 150 gpm and 300 gpm. The field pH of the discharge was 3.1 during assessment fieldwork. The discharge was sampled in 2002 and 2003 by the LWA. That sample data is consistent with data collected during Scarlift.
5171	Getty #2	Drainage emanating from an abandoned drift mine opening downstream of 5170. During Scarlift fieldwork, the average water quality was as follows: flow – 45 gpm, pH – 2.5, total iron – 35 mg/L, and aluminum – 48 mg/L. The discharge was located during the assessment. It is located to the south of Sportsman's Club Road on private property. During the assessment, the field pH of the discharge was 2.7. In 2002 and 2003 the discharge was sampled by the LWA. That sample data is consistent with data collected during Scarlift.
5172	None	Discharge associated with 5171.
5173	None	Drainage flowing from an abandoned airshaft from the Irwin Gas and Coal Company. During Scarlift fieldwork the average water quality was as follows: flow – 50 gpm, pH – 2.6, total iron – 78 mg/L, and aluminum – 45 mg/L. The discharge was located during the assessment and had a pH of 3.0. It is located at the headwaters of UNT5N and flows into a small pond.
5174	None	Seep coming from a strip cut that intersected deep mine workings. This discharge was not located during the assessment and it is suspected that additional surface mining has eliminated it.

5175	None	Seep emanating from an old surface mine and drift mine opening associated with the Howard Gas and Coal Company. During Scarlift fieldwork, the average water quality was as follows: flow – 10 gpm, pH – 2.6, total iron – 15.2 mg/L, and aluminum – 27 mg/L. Evidence of the seep was found during the assessment, but not the source. The source site is now covered by a landfill. The seep is located at the headwaters of UNT4N that has a pH of 3.8 at its mouth.
5176	Getty #3	Discharge draining from a slumped mine shaft. It collects into a pond and then flows to join the flow from 5171. During Scarlift fieldwork, the average water quality was as follows: flow – 25 gpm, pH – 2.5, total iron – 100 mg/L, and aluminum – 30 mg/L. The discharge was located during the assessment and it had a field pH of 2.7. In 2002 and 2003 the discharge was sampled by the LWA. That sample data is consistent with data collected during Scarlift. This discharge and 5171 form a tributary that enters Getty Run where Sportsman's Club Road and Main Street meet.

DEP Getty Run TMDL

The Getty Run Subwatershed was assessed by the DEP in 2002. The TMDL for Getty Run was completed in 2004. According to the TMDL report, the subwatershed is exceeding designated TMDLs.

Loyalhanna Watershed Association (LWA)

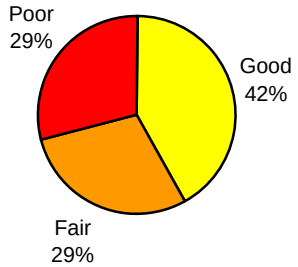
In 2002 and 2003, the LWA collected water quality samples from three discharges within the subwatershed. Those discharge sites are described and listed with water quality information in Appendix 3.

Visual Assessment Summary

Visual Assessment Findings

The visual assessment of the subwatershed was completed in June of 2004. A total of 17 stream segments were assessed. As depicted in Figure 3.F.1, 42% of the subwatershed received a good rating, 29% received a fair rating, and 29% received a poor rating. An average score of 6.98 was given to the entire subwatershed, which is a fair rating overall. The main stem of Getty Run is most significantly impacted by AMD. Other impacts do not pose a problem as significant as the AMD. Individual stream segment ratings are depicted in Map 3.F.2.

Figure 3.F.1: Visual Assessment Ratings for the Getty Run Subwatershed



MCUNT1N
GRUNT1N
GRA
GRUNT3N
GRUNT2N
GRUNT5N
GRUNT5N
GRUNT4N
GRB
GRD
GRC
LLE
LLUNT1W
819
LLUNT3W
GSUNT1S
GSUNT1N
GSUNT2N
GSB
LLUNT4WC
GSUNT3S
GSUNT2S
LLUNT4WB
N

Good
Fair
Poor
Major Roads
Getty Run Subwatershed
Lower Section

Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center

Getty Run Subwatershed: Overall Rating

Map 3.F.2

0.4 0.2 0 0.4 Miles

Visual Assessment Description

Getty Run Main Stem

The headwaters of Getty Run originate in a small, forested area adjacent to Route 819 in Slickville. From the headwaters, the stream flows south through a residential area toward the intersection of Route 819 and Main Street in Slickville. As it flows through the residential area, the substrate of the stream is comprised of gravel, silt, and mud. Most of the homeowners in the residential area mow lawns directly to the streambank. Where vegetation is left, Japanese knotweed dominates. The water has an orange tint to it and the pH of the stream at and below the headwaters is 3.0. It is suspected that the headwater source is a mine drainage discharge.

Along the stretch of stream that flows parallel to Route 819 and through the residential area, a large flowing pipe was found. The water flowing from the pipe had a bad odor, was black in color, and had a high pH. The discharging water is most likely sewage from surrounding homes.

At the intersection of Route 819 and Main Street, Getty Run turns east and passes underneath Route 819. The landscape surrounding the stream is dominated by residences to the north and forest to the south. The forest is comprised of small trees, Japanese knotweed, greenbriar, and other small shrubs. As Getty Run flows through the community of Slickville, it runs parallel to the old Turtle Creek railroad bed. The substrate of the stream is made up of mostly gravel, mud, bricks, and chunks of coal. Garbage is scattered everywhere along the streambank, in the stream, and throughout the scrubby forest surrounding the stream.

Approximately 1,000 yards downstream from Route 819, a large abandoned mine discharge enters Getty Run. With a pH of 3.0, the discharge adds additional acidity to the already acidic stream. Upstream of the discharge, the pH of Getty Run is 3.0 and the pH is the same downstream. The water in the stream remains orange in color as the stream continues to flow through Slickville.

Where Sportsman's Club Road meets Main Street, Getty Run crosses underneath Main Street and a second large discharge enters. The pH of the discharge is 3.0. Upstream and downstream of the discharge, the pH is also 3.0 indicating no overall change in pH from the discharge. After that discharge enters, Getty Run crosses underneath Main Street again. The stream substrate in this section is comprised mostly of cobble and the water has an orange tint. Similar to upstream, garbage litters the substrate, streambank, and hillside surrounding the stream. Getty Run does not change significantly until it is joined by a large tributary at the interesection of Main Street and Butz Road. It is at this point that iron and aluminum precipitate appear. Despite the appearance of the precipitates, there is not a large change in the pH of the stream. Upstream of the confluence the pH of Getty Run is 3.2 and downstream the pH is 3.4.

The confluence of the Getty Run main stem and Getty Run South Branch

At the confluence of the main stem of Getty Run and the Getty Run South Branch, the stream turns northeast and continues to follow the old railroad bed. The riparian area immediately surrounding the stream remains vegetated with small trees, Japanese knotweed, and small shrubs. As Getty Run approaches the Loyalhanna Creek, it passes through a small farm and flows around a large coal waste pile. Some runoff from the coal waste pile is noticeable.

Approximately 100 yards upstream from its mouth, Getty Run passes underneath the railroad grade, which has been converted into a hiking and biking trail. At this point the stream is still orange in color and has a pH of 2.9. The cobble substrate is covered with bright green algae. The area surrounding the stream is vegetated with small hardwood trees, shrubs, and Japanese knotweed.

Where Getty Run meets the Loyalhanna Creek, aluminum and iron precipitate are immediately visible. The most apparent precipitate however is aluminum. A white plume extends along the streambank for approximately 500 to 1,000 yards, and the rocks are covered with the slippery white aluminum precipitate.

Getty Run Unnamed Tributaries

There are seven unnamed tributaries that enter Getty Run as it flows from west to east. The largest of those tributaries is the South Branch of Getty Run. No impacts from AMD were discovered within the South Branch, which is surrounded by agriculture in its upper portion and forested in its lower portion. With a pH of 7.6, it flows into the main stem of Getty Run. The addition of water with a higher pH only makes a small and brief difference to Getty Run.

Four of the six other tributaries that enter Getty Run originate at abandoned mine discharges. At their mouths, they range in pH from 2.9 to 3.3. The remaining two tributaries entering have no AMD impacts.

Water Quality

Only one sample was taken at the mouth of Getty Run. Following the visual assessment, it was determined that further sampling would not provide any new information. Overall water quality in the Getty Run Subwatershed has not changed significantly since the completion of the Scarlift Report. Please refer to the chart below for the results of the sample taken during the assessment.

Table 3.F.1: Sample Site LWA-15
Getty Run

Date Sampled	pH	Alk. (mg/L)	Acid. (mg/L)	TSS (mg/L)	Sulfates (mg/L)	Total Iron (mg/L)	Mn (mg/L)	Al (mg/L)
8/25/04	2.86	<1.0	202	2	596	13.9	8.0	2.1

Sampling stopped at Getty Run - Will sample at mouth yearly

Conclusions

The Getty Run Subwatershed is severely impacted by AMD. Multiple discharges enter the stream from various sources within the watershed. One larger discharge, located close to St. Sylvester's church contributes approximately 40% of the total volume of AMD to the stream.

At the mouth of Getty Run, its impact to the Loyalhanna Creek is visually apparent. A plume of white and orange water extends to the mouth of the Loyalhanna Creek, thus impacting the Kiskimentas River as well. If not for the impact of Getty Run, the Loyalhanna Creek would join with the Conemaugh River relatively unscathed.

In order to remediate AMD within Getty Run, a large investment of time, resources, and money would be required.

Recommendations

The following recommendations are made for the Getty Run Subwatershed:

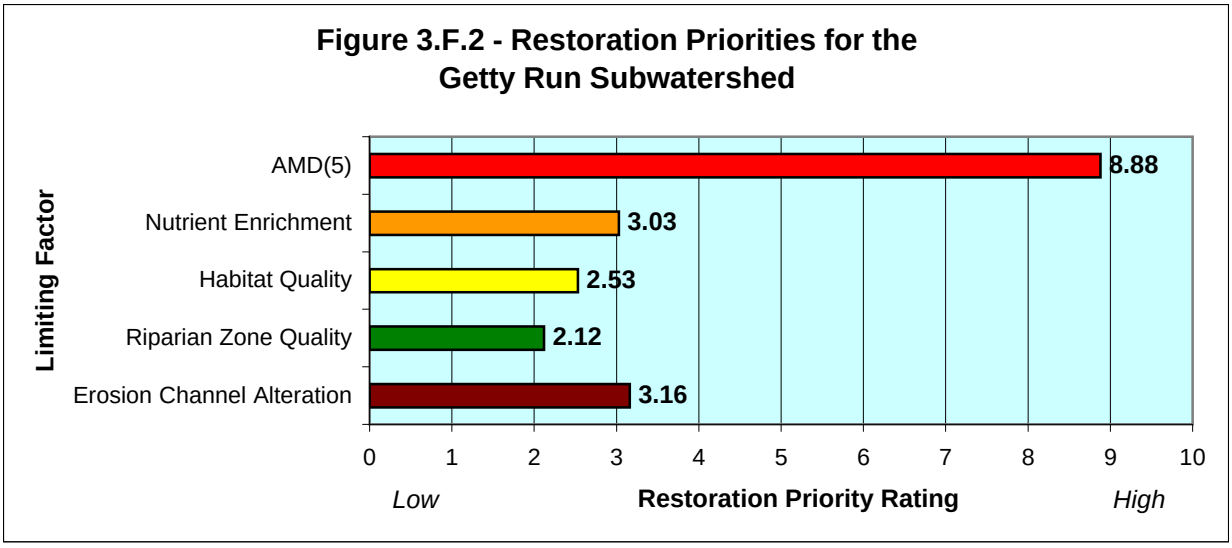
- Develop a monitoring program for the entire subwatershed in order to gather baseline and seasonal information.

- Formulate a course of action for the subwatershed using the expertise and knowledge of regional AMD experts.
- Educate residents within the subwatershed about the AMD.
- Clean up trash dumps throughout the subwatershed.

Overall Restoration Priorities

Figure 3.F.2 exhibits overall restoration priorities for the Getty Run Subwatershed. As indicated, the limiting factor that received the highest restoration priority score was AMD. Eight stream segments were impacted by AMD. Those impacted segments include the entire main stem of Getty Run.

Figure 3.F.2 - Restoration Priorities for the Getty Run Subwatershed



Restoration Suggestions for Individual Stream Segments

Eight stream segments received visual assessment scores identifying limiting factors. The limiting factors identified included AMD, nutrient enrichment, compromised fish and macroinvertebrate habitat, riparian vegetation degradation, and erosion and channel alteration. Please refer to Table 3.F.2 and Map 3.F.3 for impact description and location.

Table 3.F.2: Impacted Stream Segments and Restoration Suggestions for the Getty Run Subwatershed

LIMITING FACTOR: Riparian Vegetation Degradation				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
GRD *Headwater portion of the main stem that flows through a residential area. The source contains AMD.*	Riparian vegetation is absent; property owners mow lawns to the streambank.	1. Educate landowners. 2. Remediate riparian area. Possible Partners: WCD, DEP, Unity Township	Local, State	Low

MCUNT1N
GRUNT1N
GRA
GRUNT3N
GRUNT2N
LLE
LLUNT1W
GRUNT5N
GRUNT5N
GRUNT4N
GRB
GRD
GRC
819
LLUNT3W
GSUNT1S
GSUNT1N
GSUNT2N
GSB
LLUNT4WC
GSUNT3S
GSUNT2S
LLUNT4WB
N

- Abandoned Mine Drainage
- Erosion/Channelization
- Habitat Quality
- None
- Nutrient Enrichment
- Riparian Vegetation
- Major Roads
- Getty Run Subwatershed
- Lower Section

Western Pennsylvania Conservancy • Est. 1932 •

Watershed Assistance Center

Getty Run Subwatershed: Major Limiting Factor

Map 3.F.3

0.4 0.2 0 0.4 Miles

LIMITING FACTOR: Compromised Fish and Macroinvertebrate Habitat				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
GRC *Main stem segment that flows through forest and residential area along Main Street in Slickville.*	Due to AMD, habitat and food source is poor. In addition, the stream substrate is embedded with sediment and iron oxide.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal, Private	High
GRD *Headwater portion of the main stem that flows through a residential area. The source contains AMD.*	Due to AMD, habitat and food source is poor. In addition, the stream substrate is embedded with sediment and iron oxide.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal, Private	High
LIMITING FACTOR: Erosion and Channel Alteration				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
GRA *Main stem segment that extends upstream from the mouth. It flows through forest and fields. In addition, it passes by a large coal waste pile.*	Streambanks are very high and heavily eroded.	1. Determine remediation strategy for the erosion problems. 2. Work with landowners upstream to alleviate erosion-causing effects. Possible Partners: WCD, DEP	State	Low
GRB *Main stem segment that flows through mostly forest with some residences.*	Stream is channelized where it flows next to the road. Banks are severely eroding.	1. Determine remediation strategy for the erosion problems. 2. Work with landowners upstream to alleviate erosion-causing effects. Possible Partners: WCD, DEP	State	Low

GRD *Headwater portion of the main stem that flows through a residential area. The source contains AMD.*	Stream is channelized where it flows next to the road. Banks are severely eroding.	1. Determine remediation strategy for the erosion problems. 2. Work with landowners upstream to alleviate erosion-causing effects. Possible Partners: WCD, DEP	State	Low
LIMITING FACTOR: Nutrient Enrichment				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
GRD *Headwater portion of the main stem that flows through a residential area. The source contains AMD.*	Multiple inputs of sewage enter this stream segment from the residential area. One large pipe (8-10 inches) was located close to the intersection of Route 819 and Depot Street. It was spewing sewage.	1. Work with community to initiate plans for sewerage. 2. Encourage landowners to adopt BMPs for septic systems. Possible Partners: WCD, PSCE, USDA RUS, DEP	State, Federal	Medium
LIMITING FACTOR: Abandoned Mine Drainage				
Stream Segment Name	**Description of Impact**	**Remediation Strategy**	**Possible Funding Sources**	**Priority Rating**
GRA *Main stem segment that extends upstream from the mouth. It flows through forest and fields. In addition, it passes by a large coal waste pile.*	The field pH of Getty Run at the mouth was 2.9. The water was orange and white in color. Upstream AMD sources are visibly affecting Getty Run all the way to the mouth.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High
GRB *Main stem segment that flows through mostly forest with some residences.*	The water was orange and white in color. Upstream AMD sources are visibly affecting Getty Run all the way to the mouth.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP,WCD, WPC	State, Federal	High

GRC *Main stem segment that flows through forest and residential area along Main Street in Slickville.*	The water was orange and white in color. Upstream and other sources of AMD are visibly affecting this section.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High
GRD *Headwater portion of the main stem that flows through a residential area. The source contains AMD.*	The water was slightly tinted orange and the substrate of the stream was covered with bright green algae. The field pH of the stream in the headwaters was between 2.9 and 3.2.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High
GRUNT3N *Tributary that flows through residences and forest. The stream begins underneath a coal refuse pile.*	The water is slightly orange and filled with dead worms and millipedes. Lots of algae are growing along the stream substrate.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High
GRUNT4N *Tributary that originates in an old surface mine and flows down through a mix of forest residences.*	Field pH of the stream ranged from 3.5 to 3.9. The water was deceptively clear. Some orange staining visible close to the mouth.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High
GRUNT5N *Tributary that originates as an AMD source. AMD flows from a hillside that could have been a mine entry or airshaft. It then flows through a pond/wetland.*	The stream is orange in color with much algae growing along the gravel substrate. The pH of the stream at the mouth was 3.0.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High

GRUNT6N *Tributary that originates in an old surface mine and flows down through a mix of forest residences.*	The stream is orange in color with much algae growing along the gravel substrate. The pH of the stream at the mouth was 3.0.	1. Remediate AMD through reclamation and/or passive treatment. Possible Partners: USACE, OSM, DEP, WCD, WPC	State, Federal	High

CONCLUSION AND APPENDIX

Appendix 1 - Advisory Committee and Volunteers

Appendix 2 - Study Design and Visual Assessment Protocol

Appendix 3 - Water Quality Data and Sample Location Maps

Appendix 4 - Stream Abbreviations

Appendix 1

Appendix 1 – Committee Members and Volunteers

WATERSHED ASSESSMENT ADVISORY COMMITTEE

Drew Banas	Loyalhanna Watershed Association
Craig Barras	Westmoreland Conservation District (2002-2003)
Mike Barrik	Westmoreland Conservation District (2003-2005)
Floyd Eiseman	Loyalhanna Watershed Association Board Member
Jeff Fliss	Department of Environmental Protection
Wesley Gordon	Loyalhanna Watershed Association Board Member
Ron Horansky	Department of Environmental Protection
Mark Killar	Western Pennsylvania Conservancy
Beth Langham	Saint Vincent College
John Matviya	Department of Environmental Protection/LWA Board Member
Rosemary Reilly	U.S. Army Corps of Engineers
Carole Wright	Loyalhanna Watershed Association
Benjamin Wright	Western Pennsylvania Conservancy

WATERSHED ASSESSMENT VOLUNTEERS

Hank Balles	Trout Unlimited/Loyalhanna Watershed Association
Scott Balles	Western Pennsylvania Conservancy Summer Intern (2003)
Sam Banales	Loyalhanna Watershed Association
Hillary Bright	Western Pennsylvania Conservancy AmeriCorps Intern (2004)
Roger Brown	Loyalhanna Watershed Association
Susie Carmichael	Westmoreland Conservation District
Tammy Colt	Loyalhanna Watershed Association AmeriCorps Intern (2003)
Carly Colt	Loyalhanna Watershed Association
Melanie Holowaty	Loyalhanna Watershed Association AmeriCorps Intern (2002-2003)
Scott Minster	Forbes Trail Trout Unlimited/Loyalhanna Watershed Association
Roz Robataille	Loyalhanna Watershed Association
Alysha Trexler	Western Pennsylvania Conservancy AmeriCorps Intern (2004)
Ken Vallino	Forbes Trail Trout Unlimited/Loyalhanna Watershed Association

Appendix 2

Appendix 2 – Study Design and Protocol

Background

Founded in 1971, the Loyalhanna Creek Watershed Association (LWA) is a non-profit organization that strives to achieve its mission to protect, conserve and restore the natural resources of the Loyalhanna Creek. Originating in the limestone aquifers of Laurel Mountain and flowing to its confluence with the Conemaugh River in Saltsburg, Loyalhanna Creek drains approximately 298 square miles. From its beginning to its confluence with the Conemaugh, Loyalhanna Creek encounters a series of environmental issues. LWA has addressed some of these problems but has realized the need to clearly identify each issue. With the efforts of 400+ members, board members, staff and support of environmental partners, LWA plans to identify and characterize these issues and prioritize them in a remediation plan.

Purpose

Ultimately, LWA wants to assess the current conditions of the watershed, and with the information gathered, produce a restoration plan that LWA members, citizens and municipalities can use to guide efforts in addressing water quality challenges. The following are the objectives of the Loyalhanna Creek Watershed Assessment:

- Locate and map the location of impaired sites within the watershed
- Produce a restoration plan
- Perform watershed assessment
- Increase community awareness
- Prioritize pollution areas
- Continuous information over a period of time
- Information on worst streams, best streams
- Establish areas that should be treated (AMD) or addressed with BMP practices (AG) or investigated further with future work and partnerships (sewage, erosion control)

To fully address problems within the Loyalhanna Creek Watershed, information will need to be collected on the following issues:

- Abandoned Mine Drainage (AMD)
- Nutrient Enrichment from Agriculture
- Visual assessment of banks and riparian areas
- Cumulative effects of discharges (Sewage)

With the information that is collected LWA hopes to answer the following questions:

- Where are the impaired waters that should be a high priority for restoration? What is causing these impairments?
- What are the present ecological conditions and how do they change over time?
- What is the impact of various types of land and water use activities on ecological conditions and human uses?

Assessment Type

A visual assessment based on the USDA Stream Visual Assessment Protocol will be used to evaluate stream characteristics. This assessment will consider various physical conditions that will give an account of stream quality. The conditions are as follows:

- Channel condition
- Riparian zone
- Bank stability
- Water appearance
- Nutrient enrichment
- Fish barriers
- Embeddedness
- Fish cover
- Macroinvertebrate habitat
- AMD
- Sewage
- Canopy cover
- Manure presence
- Knotweed

In addition to the visual assessment, water samples for chemical analysis will be taken for AMD impacts.

AMD

- pH, acidity, alkalinity
- Metals
- Sulfate

Data Quality Objectives

Data quality objectives for the visual assessment include:

- Data will be collected in a consistent manner using protocol based on USDA Stream Visual Assessment Protocol
- All volunteers will be trained prior to going out in the field
- Trained volunteers will receive a certificate of completion

Sampling sites will be chosen before fieldwork begins and will be tested quarterly. Completeness goal is 70% for all samples. Other QA objectives include:

- Samples collected are representative of water being sampled
- Data analyses are precise
- Data analyses are accurate
- Samples are not contaminated from sampling equipment.
- All samples will be collected using EPA Method 814-B-97-003
- All samples will be analyzed at a DEP approved laboratory

Precision and accuracy goals:

Parameter	Accuracy	Precision	Detection Limit
pH	±10%	±10%	
Iron (Fe)	±10%	±10%	
Aluminum (Al)	±10%	±10%	
Alkalinity	±10%	±10%	
Acidity	±10%	±10%	
Manganese (Mn)	±10%	±10%	
Sulfate	±10%	±10%	
TDS	±10%	±10%	
TSS	±10%	±10%	
Nitrate	±10%	±10%	
Phosphorus (T)	±10%	±10%	
Fecal Coliforms	±10%	±10%	
Conductivity	±10%	±10%	
Temperature	±10%	±10%	

Sample Collection and Analysis Methods

Water samples will be collected for field and laboratory analyses. Water-sample preservation methods are presented in table below. Surface-water samples for analysis of concentrations of total constituents will be collected as grab samples. All field equipment will be cleaned and calibrated in the LWA office in Ligonier, PA, prior to conducting fieldwork. In the field, all water sampling and processing equipment will be rinsed with deionized water between samplings. A portion of the sample water also will be rinsed through the equipment prior to collecting final samples.

Water samples for analysis of chemical constituents will be stored in new plastic bottles at 4°C. Samples for analysis of total metals will be acidified with concentrated nitric acid (unless otherwise noted) to a pH of <2. Water samples will be delivered by car, on ice to St. Vincent College laboratory or DEP Laboratories within 24 hours of collection. Detailed collection procedures for each parameter are listed in table below.

Parameter	Preservation	Quantity of Sample to be Collected	Reference Method
General Samples			
pH	Refrigerate	25 mL	EPA-600/4-79-020
Conductivity	Refrigerate	100 mL	Standard Methods, 19 ed
Temperature	Field	------	------
Turbidity	Refrigerate	100 mL	Standard Methods, 19 ed
TDS	Refrigerate	100 mL	Standard Methods, 19 ed
TSS	Refrigerate	100 mL	Standard Methods, 19 ed
AMD Samples			
pH	Refrigerate	25 mL	EPA-600/4-79-020
Acidity	Refrigerate	100 mL	EPA-600/4-79-020
Alkalinity	Refrigerate	100 mL	Standard Methods, 19 ed
Iron	Refrigerate/Acid	100 mL	Standard Methods, 19 ed
Manganese	Refrigerate/Acid	100 mL	Standard Methods, 19 ed
Aluminum	Refrigerate/Acid	100 mL	Standard Methods, 19 ed
Sulfate	Refrigerate	50 mL	Standard Methods, 19 ed
Temperature	Field	------	------
Turbidity	Refrigerate	100 mL	Standard Methods, 19 ed
Agricultural/Sewage Samples			
pH	Refrigerate	25 mL	EPA-600/4-79-020
TDS	Refrigerate	100 mL	Standard Methods, 19 ed
TSS	Refrigerate	100 mL	Standard Methods, 19 ed
Fecal Coliforms	Refrigerate	200 mL	Standard Methods, 19 ed
Nitrate	Refrigerate	100 mL	EPA-600/4-79-020
Total Phosphorus	Refrigerate/Acidify with H_2SO_4	50 mL	EPA-600/4-79-020

Water samples will be analyzed for the physical characteristics and chemical constituents needed to characterize each site. All samples will be analyzed using methods, which employ EPA-approved techniques. Detailed analysis procedures are listed in table below.

Parameter	Max Holding Time	Reference Method	Reporting Units
General			
pH	ASAP		------
Conductivity	28 days		µS/cm
Temperature	ASAP		°C
Turbidity	48 hours		ntu
TDS	7 days		mg/L
TSS	7 days		mg/L
pH	ASAP		------
Acidity	14 days		mg/L

AMD			
Alkalinity	14 days		mg/L
Iron	6 months		mg/L
Manganese	6 months		mg/L
Aluminum	6 months		mg/L
Sulfate	28 days		mg/L
Agriculture/Sewage			
Temperature	ASAP		°C
Turbidity	48 hours		ntu
pH	ASAP		------
TDS	7 days		mg/L
TSS	7 days		mg/L
Fecal Coliforms	6 hours		cfu/100 ml
Nitrate	48 hours		mg/L
Total Phosphorus	28 days		mg/L

Quality Assurance (QA)

One or more QA samples, including blanks, duplicates, and standards for inorganic constituents, will be analyzed as blind samples with each set of samples to check for contamination, accuracy, and precision of analytical results. Approximately 10 percent of the total samples for the project will be QA samples. Field and laboratory blanks will be collected at the greater frequency of one per sampling day or per twenty samples to check for contamination resulting during sample collection and analysis. Laboratory blanks will be used to check for contamination from the sample bottle or from laboratory processing of samples, and field blanks will be used to assess potential for contamination of samples from exposure to sampling equipment. Quality control measures for each parameter are listed below.

Parameter	Internal QC	External QC	Percent QC Samples
Coliforms	Field blanks, duplicates	Positive plate, negative plate	10
Fe, Al, Mn, sulfate, alkalinity, acidity	Field blanks, duplicates	Duplicate, lab blanks, calibration standard	10
pH	Duplicates, calibration standard	Duplicate, calibration standard	10

Precision and accuracy (bias) of the analytical data and potential for contamination from sample processing will be evaluated approximately quarterly as part of data validation. Contamination will be evaluated on the basis of results for field and laboratory blanks. Standard Deviation will be used to measure precision, and Relative Percent Difference will be used to measure accuracy.

Standard Deviation

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

where x is data value, $\bar{X}$ is mean of data items and n is number of data items

Relative Percent Difference

$$\% \text{ RPD} = \frac{|X_1 - X_2|}{\bar{X}} * 100$$

where X_1 is value 1, X_2 is value 2 and $\bar{X}$ is the mean of the two values

Quality Control Response Actions

Data and data-collection activities are routinely discussed and evaluated among project personnel. Corrective action is taken immediately if the evaluation indicates a problem. Corrective action could include the following:

- Audit of field and lab procedures
- Data not meeting QC goals will not be used
- Evaluation of volunteer performance; if found unsatisfactory retraining may occur
- Field procedures may be changed if problems continue

Training

Initial field training will be taught in Spring 2003 by Western Pennsylvania Conservancy Watershed Assistance Center staff. New field monitors will either be trained by WPCWAC staff, or others deemed qualified WPCWAC. All volunteers will follow protocol set-up by WPCWAC.

Data Management

Completed field sheets will be given to LWA staff member. Analytical data, including field and laboratory analysis results and corresponding sample identification, will be entered into the LWA database by project personnel. Data for QA samples water samples will be maintained in the database. The LWA database will be maintained in Microsoft Excel 2000. Results below detection limit will be entered as "0" and missing values will be left blank. Approximately quarterly, data for the project will be retrieved from the databases and checked by project personnel to verify that data are correctly entered.

Field sheets will include the following: stream name, landowner's name, evaluators' names, certificate issue #, date, reference site, site ID#, reach location, land use, weather conditions, channel width, dominant substrate, % Japanese Knotweed, site diagram, visual assessment parameters and problem diagrams.

Project Tasks and Personnel

Major Project Tasks		
Task	**Who Will Carry Out Task**	**Contact Information**
Find a lab	LWA	(724) 238-7560
Purchase equipment	LWA	(724) 238-7560
Recruit volunteers	LWA	(724) 238-7560
Train volunteers	WPC	(724) 459-0953
Field work	LWA, WPC, volunteers	(724) 238-7560/724 459-0953
Quality Assurance	LWA, WPC	(724) 238-7560/724 459-0953
Data management	LWA	(724) 238-7560
Analyze data	LWA	(724) 238-7560
Report results	LWA	(724) 238-7560
Study design	WPC	(724) 459-0953
Monitoring protocol	WPC	(724) 459-0953
Research existing data	LWA	(724) 238-7560

Steering Committee		
Member Name	**Organization**	**Contact Information**
John Matviya	DEP	Southwest Regional Office Pittsburgh, PA 15222-4745 (412) 442-5811
Beth Langham	St. Vincent College	Latrobe, PA 15650 (724) 532-6600
Craig Barras	WCD	Greensburg, PA 15601 (724) 925-2947
Jeff Fliss	DEP	Southwest Regional Office Pittsburgh, PA 15222-4745 (412) 442-4207
Carole Wright	LWA	Ligonier, PA 15658 (724) 238-7560
Melanie Halowaty	LWA	Same as above
Drew Banas	LWA	Same as above
Ben Wright	WPC	Blairsville, PA 15717 (724) 459-0953
Mark Killar	WPC	Same as above
Floyd Eiserman	LWA Board	Ligonier, PA 15658 (724) 238-7560
Wesley Gordon	LWA Board	Ligonier, PA 15658 (724) 238-7560
Ron Horansky	DEP	Greensburg, PA 15601 (724) 925-5500
Rosemary Reilly	U.S. Army Corps of Engineers	Pittsburgh Office

Visual Assessment Protocol

The same visual assessment protocol will be used throughout the entire assessment. All completed sheets will be collected and reviewed by the Loyalhanna Watershed Association Program Director and the Watershed Assessment Advisory Committee. Information contained within the sheets will be entered into a database for future manipulation.

The following describes each page of the visual assessment and how it will be utilized to formulate the final copy of the assessment and restoration plan. The protocol is shown in pages A-10 through A-14.

Page 10: General Information

Descriptions of the surrounding landscape are critical for writing the report.

Page 11 – 13: Scoring Descriptions

There are ten different elements that will be assessed during each visual assessment. These pages describe score ranges and help assessors to determine which score to assign. The following elements are listed: channel condition, riparian zone, bank stability, water appearance, nutrient enrichment, fish barriers, instream fish cover, embeddedness, insect/macroinvertebrate habitat, and canopy cover. IF APPLICABLE, the following elements will also be assessed: AMD, sewage, and manure presence. Because all of the presence of any of these elements indicates significant stream impairment, they are only scored on a scale of 1 to 5.

Page 14: Score Sheet

Page used to record the scores received for the different items. Describing the score is critical to the report writer, who may not have seen the assessed stream segment. Total score is calculated on the bottom and given a rating.

Major Limiting Factor

Elements for the visual assessment protocol will be lumped into categories that align with the overall assessment priorities. Those categories will be called Major Limiting Factors.

Priority/Major Limiting Factor Name	Elements Included
Habitat Quality	Fish Barriers, Instream Fish Cover, Insect/Invertebrate Cover
Nutrient Enrichment	Nutrient Enrichment, Sewage, Manure Presence
Erosion and Channel Alteration	Bank Stability, Channel Condition, Embeddedness
Riparian Vegetation	Riparian Zone, Canopy Cover
Abandoned Mine Drainage	AMD

Visual assessment scores will be lumped into the above categories and averaged. Average scores falling below 5, will identify that category as a limiting factor the stream or stream segment. Those limiting factors will be shown in a map within each subwatershed report. If more than one category have scores below 5, the stream or stream segment will be labeled as having Multiple Limiting Factors.

Loyalhanna Watershed Visual Assessment

Evaluator's Names_____ Date: _____

Sub-Watershed _____ Stream Section Name _____

Common Stream Name _____ Reference Section Perfect Reach_____

Weather Conditions Today _____ Past 2-5 Days _____

Land use within drainage (%): Grazing Pasture _____Forest _____Residential _____ Industrial _____
Row Crop _____ Field _____ Conservation Reserve _____ Other _____

Dominant substrate (%): Boulder _____ Cobble _____ Gravel _____ Silt _____ Mud _____

Active Channel Width _____ Japanese Knotweed Presence _____

PLEASE DESCRIBE THE AREA THAT THE WATER FLOWS THROUGH: What type of forest? What type of farm? What type of residential?
PLEASE WRITE DOWN ANY GPS POINTS TAKEN AND WHY
SHOULD WATER SAMPLES BE TAKEN HERE? NEAR HERE?

Scoring Descriptions

Each assessment element is rated with a value of 1 to 10. Rate only those elements appropriate to the stream reach. Record the score that best fits the observations you make based on the narrative description provided.

Channel Condition

Natural channel; no structures, dikes. No evidence of down-Cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.	Altered channel; <50% of the reach with riprap and/or channelization. Excess ***aggradation***; braided channel. Dikes or levees restrict flood plain width.	Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the flood plain.
10 9 8	7 6 5 4	3 2	1

aggradation*: The process by which a stream's gradient steepens due to increased deposition of sediment.*

Keys: look for things like down cutting, lateral cutting, altered or widened sections, dykes, levees or other obstructions.

Riparian Zone

Natural Vegetation extends at least two active channel widths on each side.	Natural vegetation extends one active channel width on each side. Or If less than one width, covers entire flood plain.	Natural vegetation extends half of the active channel width on each side.	Natural vegetation extends a third of the active channel width on each side. Or Filtering function moderately compromised.	Natural vegetation less than a third of the active channel width on each side. Or Lack of regeneration. Or Filtering function severely compromised.
10 9	8 7 6	5 4	3 2	1

Keys: Related to ACTIVE channel width, an example would be a 5' wide stream. 10' = 2x active channel width.

Bank Stability

Banks are stable; at elevation of active flood plain; 33% or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately stable; at elevation of active flood plain; less than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Moderately unstable; banks may be low, but typically are high (flooding occurs 1 year out of 5, or less frequently); outside bends are actively eroding (overhanging vegetation at top of bank, some mature trees falling into stream annually, some slope failures apparent).	Unstable; banks may be low, but typically are high; some straight reaches and inside edges of bends are actively eroding as well as outside bends (overhanging vegetation at top of bare bank, numerous mature trees falling into stream annually, numerous slope failures apparent).
10 9 8	7 6 5 4	3 2	1

Keys: **All** outside bends in streams erode; even the most stable streams may have 50% of its banks bare and eroding. A stable bank would be characterized by healthy vegetative cover, and/or a gentle slope. Unstable banks, on the other hand, would have little or no vegetative cover or a steep or vertical slope.

Water Appearance

Very clear, or clear but tea-colored; objects visible at depth 3 to 6 ft (less if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.	Occasionally cloudy; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.	Considerable cloudiness most of time; objects visible to depth 0.5 to 1.5 ft; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film. Or Moderate odor of ammonia or rotten eggs.	Very turbid or muddy appearance most of the time; objects visible to depth <0.5 ft; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface. Or Strong odor of chemicals, oil, sewage, other pollutants.
10 9 8	7 6 5 4	3 2	1

Keys: Remember to look at the water, not the substrate. If you dipped a glass in the water, what would the water look like?

Nutrient Enrichment

Clear water along entire reach; diverse aquatic plant community little algal growth present.	Fairly clear or slightly greenish water along entire reach; moderate algal growth on stream substrates.	Greenish water along entire reach; abundant algal growth, especially during warmer months.	Pea green, gray or brown water along entire reach; severe algal blooms create thick algal mats in stream.
10 9 8	7 6 5 4	3 2	1

Keys: Looking for algae and other aquatic vegetation, some is good, but it should not be excessive.

Fish Barriers

No barriers.	Seasonal water withdrawals inhibit movement within the reach.	Drop structures, culverts, dams or diversions (<1ft drop) within the reach.	Drop structures, culverts, dams or diversions (>1ft drop) within 3 miles of reach.	Drop structures, culverts, dams or diversions (>1ft drop) within the reach.
10 9	8 7 6	5 4	3 2	1

Keys: You are looking for withdrawals, culverts, dams and diversions. Anything that is imposed or constructed by man that would impede fish passage.

Instream Fish Cover

>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10 9	8 7 6	5 4	3 2	1

Cover types: Logs/large woody debris, deep pools, overhanging vegetation, boulders/cobble, riffles, undercut banks, thick root mats, dense macrophyte beds, isolated/backwater pools, other:_____

Embeddedness

Gravel or cobble particles are <20% embedded.	Gravel or cobble particles are 20 to 30% embedded.	Gravel or cobble particles are 30 to 40% embedded.	Gravel or cobble particles are >40% embedded.	Completely embedded.
10 9	8 7 6	5 4	3 2	1

Keys: Embeddedness is defined as the degree to which objects in the stream bottom are surrounded by fine sediment. Only evaluate this item in **riffles & runs**. Measure the depth to which objects are buried by sediment. Be sure that you are looking at the entire reach, not just one riffle. To help better define embeddedness, picture a rock. If the average sediment in the stream covers the bottom 20% of the rock than you would check 20%. If the rock is covered 1/3rd of the way by sediment then it is 30% embedded.

Insect/invertebrate Habitat

At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.	1 to 2 types of habitat. The substrate is often disturbed, covered, or removed by high stream velocities and scour or by sediment deposition.	None to 1 type of habitat.
10 9 8	7 6 5 4	3 2	1

Cover types: Fine woody debris, submerged logs, leaf packs, undercut banks, cobble, boulders, coarse gravel, other: _____

Canopy Cover

Keys: This pertains to waterways where channel is 50' or less.

Coldwater fishery

>75% of water surface shaded and upstream 2 to 3 miles generally well shaded.	> 50% shaded in reach. Or >75% in reach, but upstream 2 to 3 miles poorly shaded.	20 to 50% shaded.	<20% of water surface in reach shaded.
10 9 8	7 6 5 4	3 2	1

Warmwater fishery

25 to 90% of water surface shaded; mixture of conditions.	>90% shaded; full canopy; same shading condition throughout reach.	(Intentionally blank)	<25% water surface shaded in reach.
10 9 8	7 6 5 4	3 2	1

Abandoned Mine Drainage (if applicable)

(Intentionally blank)	Evidence of iron staining. Or Noticeable iron precipitant.	Iron precipitant visible, muddy orange appearance.	Heavy iron precipitant, noticeable kill zone. Or White precipitant visible, rotten egg smell.
	5 4	3 2	1

If AMD found, complete AMD site diagram and mark discharge point on map.

Sewage (if applicable)

(Intentionally blank)	Noticeable odor, excess plant growth and siltation.	Noticeable odor, excess plant growth. And Questionable pipe and black stream substrate.	Visible pipe with effluent, heavy odor.
	5 4	3 2	1

Manure Presence (if applicable)

(Intentionally blank)	Evidence of livestock access to riparian zone.	Occasional manure in stream or waste storage structure located on the flood plain.	Extensive amount of manure on banks or in stream. Or Untreated human waste discharge pipes present.
	5 4	3 2	1

Assessment Score		**Explanation of Score Given**
Channel condition	❐	_____
Riparian zone	❐	_____
Bank stability	❐	_____
Water appearance	❐	_____
Nutrient enrichment	❐	_____
Fish barriers	❐	_____
In-stream fish cover	❐	_____
Embeddedness	❐	_____
Invertebrate habitat	❐	_____
Canopy Cover	❐	_____

Score only if applicable	
AMD	❐
Sewage	❐
Manure presence	❐

TOTAL SCORE: _____
(Add all scores and divide by number of scores given)

< 6.0	= POOR
6.1 – 7.4	= FAIR
7.5 – 8.9	= GOOD
> 9.0	= EXCELLENT

Appendix 3

Appendix 3 – Water Quality Information

Water quality samples were collected throughout the assessment. Maps A.1 through A.3 show the location of those sample sites. They are labeled according to their designation within each subwatershed report.

During the watershed assessment, 35 AMD discharge sites were catalogued throughout the Loyalhanna Creek Watershed. Only 12 of the discharges are sampled regularly. Table A3-1 lists all of those discharges. The table corresponds with Maps A.1 through A.3, which show the locations of the discharges. Table A3-2 lists water quality data for sampled AMD Discharges, with the exception of Friedline Mine that is listed in Table A3-3.

Table A3-1: AMD Discharges in the Loyalhanna Creek Watershed

Sampled Discharges

Discharge ID (As it appears on maps and in data)	Discharge Name	Location
AVP	Adelphoi Pipe	Middle Loyalhanna Creek - behind Adelphoi Village School complex.
LAT	Latrobe (formerly Ridilla)	Middle Loyalhanna Creek – on the Latrobe Foundation Property located behind Plants – n- More
UNT	Unity	Middle Loyalhanna Creek – behind Latrobe Fire Company building on Route 981 in the City of Latrobe.
LSAX	Lower Saxman	Saxman Run – On Lattazio Road where Saxman run crosses underneath the road.
USAX	Upper Saxman	Saxman Run – at the intersection of Route 981 and Latrobe-Derry Road.
ASAX	West Derry	Saxman Run – at the end of Valley Street, right off Route 217 North in Derry.
CRB	Crabtree	Crabtree Creek – behind the Crabtree Firehall in downtown Crabtree.
GET1	Getty #1	Getty Run – in Slickville behind the St.Sylvester Church on Route 819.
GET2	Getty #2	Getty Run – in Slickville on Sportsman's Road
GET3	Getty #3	Getty Run – in Slickville on Sportsman's Road
FRIEDLINE	Friedline Mine Input, etc.	Powdermill Run – in Powdermill Nature Reserve off Route 381 in Cook Township.

Discharges Not Sampled

Discharge ID (As it appears on maps)	Subwatershed Location	Stream Segment (can be referenced in subwatershed reports)
1	Hannas Run	HRWESTC
2	Hannas Run	HRUNT5W
3	Mill Creek	MILLUNT4N
4	Ninemile Run	NMRUNT3WA

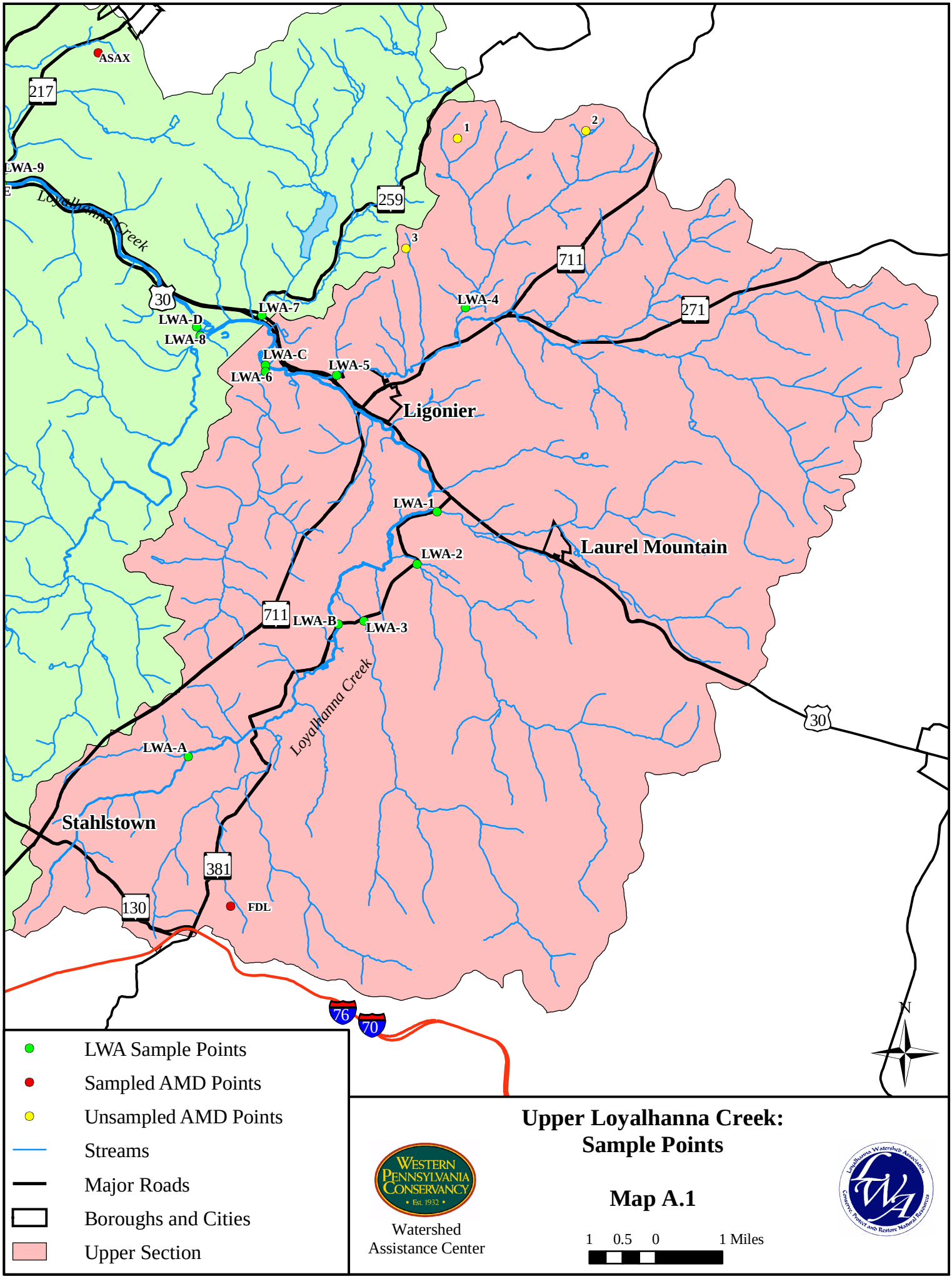
Discharges Not Sampled continued		
Discharge ID (As it appears on maps)	**Subwatershed Location**	**Stream Segment (can be referenced in subwatershed reports)**
5	Monastery Run	FMR-RTFKUNT4N
6	Lower Loyalhanna	LLUNT11W
7	Lower Loyalhanna	LLUNT10W
8	Lower Loyalhanna	LLUNT6WA
9	Lower Loyalhanna	LLUNT6W1N
10	Union Run	Banocy Road – URUNT3N
11	Union Run	Near Banocy Road on the main stem
12	Union Run	Panizzi Road – at the intersection of the two major forks
13	Union Run	UNT4N1N
14	Crabtree Creek	Seep from the Forbes Road coal waste pile
15	Crabtree Creek	Seep from the Hannastown coal waste pile
16	Little Crabtree Creek	LCRBUNT1E
17	Whitethorn Creek	WTUNT7W
18	Whitethorn Creek	WTUNT1S
19	Getty Run	Headwaters along Depot Street
20	Getty Run	Headwaters along Route 819
21	Getty Run	GRUNT6N
22	Getty Run	GRUNT5N
23	Getty Run	GRUNT4N
24	Getty Run	GRUNT3N

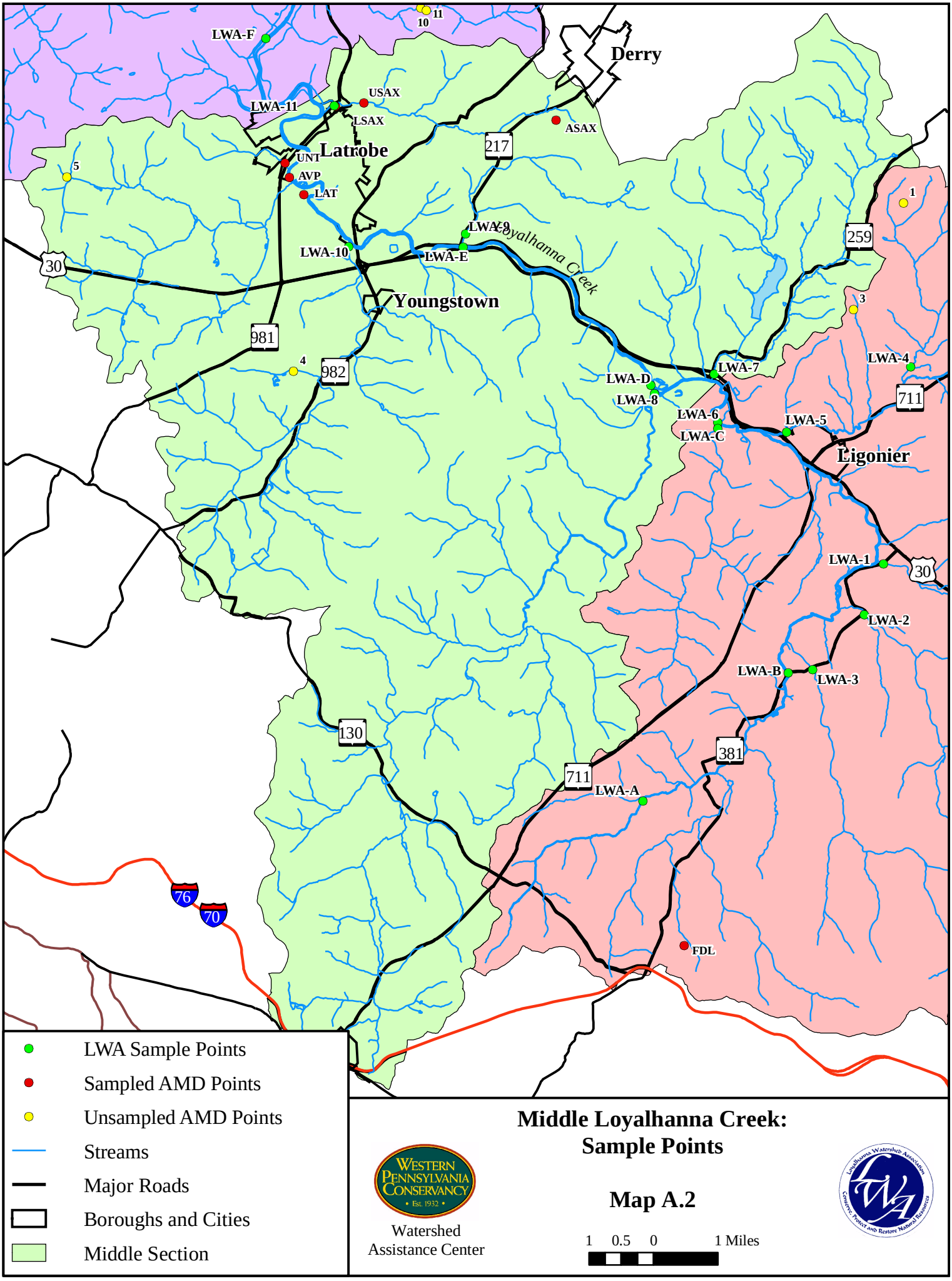
Table A3.2 Water Quality Data for Regularly Samples AMD Discharges in the Loyalhanna Creek Watershed

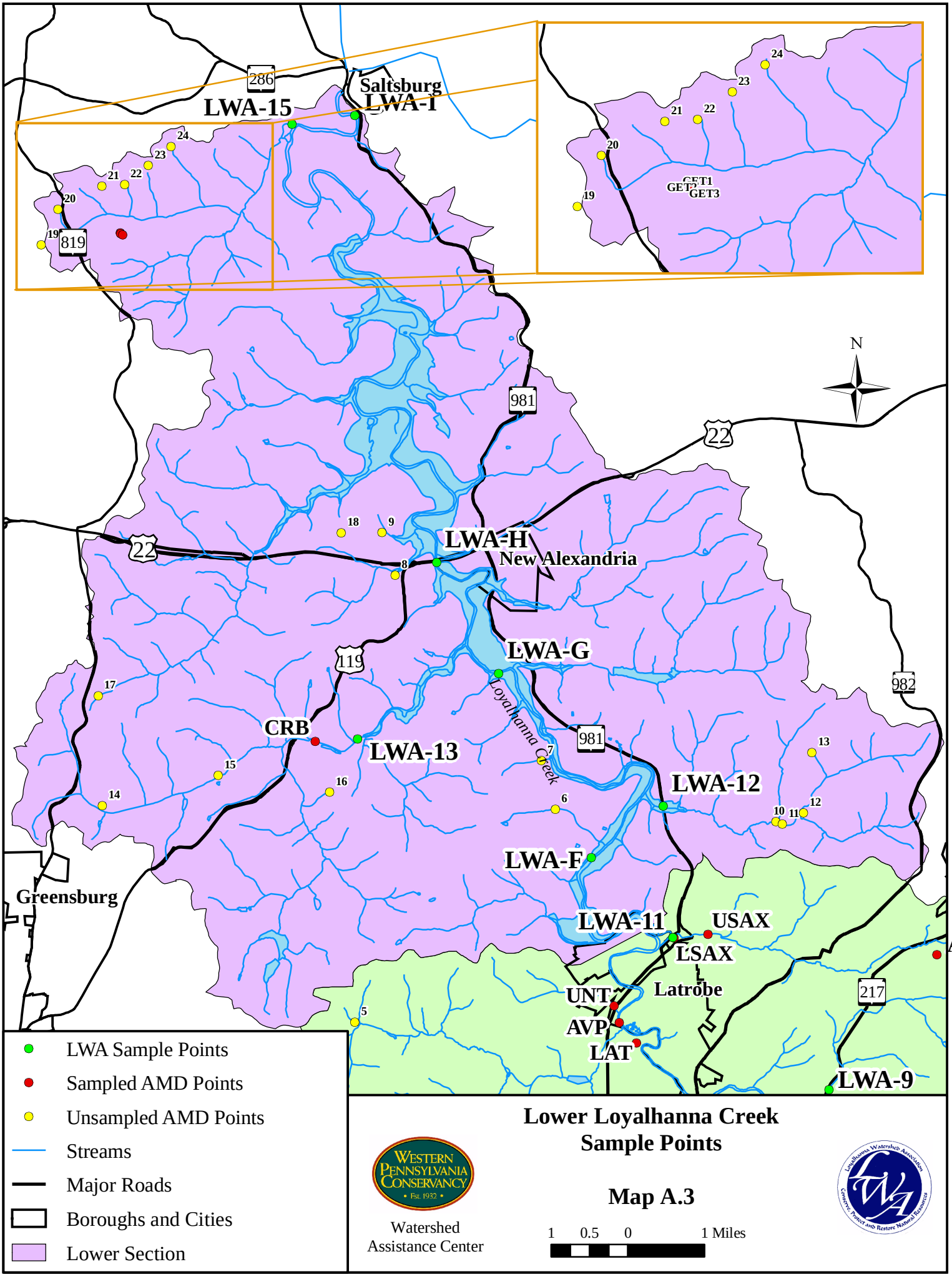
	AVP	LAT	UNT	LSAX	USAX	ASAX	CRB	GET1	GET2	GET3
Average										
Flow (gpm)	172.1	104.4	60.7	1817.5	2089.9	214.8	3668.5		140.8	75.2
pH	6.32	6.3	6.2	5.8	5.6	2.7	6.1	2.9	2.7	2.7
Alkalinity (mg/L)	159.4	154.7	103.9	56.6	39	0	147.2	0	0	0
Hot Acidity (mg/L)	-4	-4.3	3.5	72.7	91.3	966.7	45.5	476.5	557.9	605.7
Total Iron (mg/L)	42.3	51	31.1	43.7	43	129.8	75.2	42.8	35.4	57.5
Manganese (mg/L)	3.6	3.7	3.7	4.8	5.2	15.2	2.9	14.2	7.7	7.9
Aluminum (mg/L)	0.2	0.2	0.2	0.5	2	87.7	1.7	42.2	50.2	50.3
Sulfate (mg/L)	444.4	474.9	485.3	500.6	544.5	1125.3	817.4	853.5	978.3	963.4
Fe Loading (lbs/day)	73.6	57.4				3	3312.1		62.6	54.1
Conductivity (mS)	1188.7	1106.1	1055.2	1031.9	1040.9		1672.6	1972.5	1938	2032.2
DO (mg/L)	0.7	0.7	2.1	0.6	1	1	0.9	3.5	3.8	7.7
Minimum Value										
Flow (gpm)	149	73.7	3.5	1574	196	63	1216		12.7	12.7
pH	6.2	6.2	6.1	5.6	5.2	2.7	6	2.8	2.6	2.6
Alkalinity (mg/L)	146	133.4	87.8	46	22	0	128	0	0	0
Hot Acidity (mg/L)	-64	-51.4	-21.6	32.8	53.4	633.6	11.2	360	420.6	358
Total Iron (mg/L)	29.9	36.2	16.5	29.5	26.3	47.9	55.2	30	23.8	31
Manganese (mg/L)	2.8	2.9	2.8	3.3	4.1	11.4	2.3	9.7	6.1	5.8
Aluminum (mg/L)	0.2	0.2	0.2	0.3	1.3	56.8	0.6	31.5	38	28.3
Sulfate (mg/L)	384.3	410.8	405.1	385.9	431.7	790.7	592.1	166.9	696	517
Fe Loading (lbs/day)	0	0				0	1291.8		6.5	10.6
Conductivity (mS)	395	371	379	636	632	0	1046	1397	1332	1482
DO (mg/L)	0.1	0	0.7	0	0.5	0.4	0.3	0.1	0.8	0.9
Maximum Value										
Flow (gpm)	240	187	105.9	2425	5820	630	6025		362.7	135.8
pH	6.5	6.4	6.4	6.1	5.9	2.9	6.3	3	2.8	2.8
Alkalinity (mg/L)	175.2	172	120.6	67.2	53.8	0	164	0	0	0
Hot Acidity (mg/L)	0	12.8	28.6	102.2	140.6	1212.4	68.6	607.2	679.8	745.4
Total Iron (mg/L)	51.4	67.1	41	53.7	54.4	197	89.1	59.9	50.5	83.8
Manganese (mg/L)	4.4	4.3	4.8	5.9	6	18.8	3.9	15.9	8.7	10.1
Aluminum (mg/L)	0.5	0.5	0.5	0.8	3.6	115	3.5	52.5	61.6	119
Sulfate (mg/L)	530	580	627.4	616	710	1402	999	1145	1208	1173
Fe Loading (lbs/day)	116.8	111.3				4.9	5763.4	0	174.3	136.8
Conductivity (mS)	1909	1451	1322	1300	1295	0	2020	2210	2370	2420
DO (mg/L)	2.5	1.6	3.2	1.5	1.6	1.8	2.1	7.4	8.8	12.1

Table A3-3 Friedline Mine		
Average	**Input (F1)**	**Output (F2)**
pH	2.9	5
Alkalinity (mg/L)	0	22.1
Hot Acidity (mg/L)	726.6	55.4
Sulfate (mg/L)	630.2	331.7
TSS (mg/L)	14.4	11.8
Total Iron (mg/L)	212.1	3.1
Ferrous Iron (mg/L)	161.4	0.6
Manganese (mg/L)	3.5	2.1
Aluminum (mg/L)	44.8	4.5
Temperature ©	10.8	12.5
Conductivity (m/S)	1228.3	576.6
DO	1.4	5.7

Table A3 – 3 shows water quality data for Friedline Mine. The discharge at Friedline Mine is treated by a Successive Alkalinity Producing System (SAPS). Therefore, two sample points are included in the data table. The Input is the raw discharge before treatment. The Output is the discharge following treatment. The treatment system is located in the Upper Loyalhanna Creek Watershed section within the Powdermill Run Subwatershed. It is indicated on Map A.1 as FRD.


ASAX
217
LWA-9
Loyalhanna Creek
259
1
2
3
711
LWA-4
271
30
LWA-7
LWA-D
LWA-8
LWA-C
LWA-6
LWA-5
Ligonier
LWA-1
Laurel Mountain
LWA-2
711
LWA-B
LWA-3
Loyalhanna Creek
30
LWA-A
Stahlstown
381
130
FDL
76
70
N
LWA Sample Points
Sampled AMD Points
Unsampled AMD Points
Streams
Major Roads
Boroughs and Cities
Upper Section
Upper Loyalhanna Creek:
Sample Points
Map A.1
Western Pennsylvania Conservancy
Est. 1932
Watershed
Assistance Center
1 0.5 0 1 Miles


LWA-F
11
10
Derry
USAX
LWA-11
LSAX
ASAX
Latrobe
217
UNT
AVP
LAT
5
1
LWA-9
Loyalhanna Creek
259
LWA-10
LWA-E
30
Youngstown
3
981
4
982
LWA-4
LWA-7
LWA-D
LWA-8
711
LWA-6
LWA-5
LWA-C
Ligonier
LWA-1
30
LWA-2
LWA-B
LWA-3
130
381
711
LWA-A
76
70
FDL
LWA Sample Points
Sampled AMD Points
Unsampled AMD Points
Streams
Major Roads
Boroughs and Cities
Middle Section
Middle Loyalhanna Creek:
Sample Points
Map A.2
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
1 0.5 0 1 Miles
Loyalhanna Watershed Association
Conserve, Protect and Restore Natural Resources


LWA-15
LWA-1
Saltsburg
286
819
24
23
21
22
20
19
GET1
GET2
GET3
N
981
22
LWA-H
New Alexandria
18
9
8
119
LWA-G
17
982
CRB
LWA-13
Loyalhanna Creek
7
981
13
15
16
14
6
LWA-12
10
11
12
LWA-F
Greensburg
LWA-11
USAX
LSAX
Latrobe
UNT
AVP
LAT
5
217
LWA-9
ASA
LWA Sample Points
Sampled AMD Points
Unsampled AMD Points
Streams
Major Roads
Boroughs and Cities
Lower Section
Lower Loyalhanna Creek
Sample Points
Map A.3
Western Pennsylvania Conservancy
Watershed Assistance Center
1 0.5 0 1 Miles

Appendix 4

Appendix 4 – Stream Name Abbreviations

OVERALL ABBREVIATIONS

UNT	Unnamed Tributary

UPPER WATERSHED SECTION

UPLOY	Upper Loyalhanna Creek
PMILL	Powdermill Run
LINN	Linn Run
LAUGH	Laughlintown Run
MILL	Mill Creek
HR	Hannas Run
TMR	Twomile Run

MIDDLE WATERSHED SECTION

MIDLOY	Middle Loyalhanna Creek
CP	Coalpit Run
NF	North Fork, a tributary to Coalpit Run
FMR	Fourmile Run
FMRKR	Keffer Run, a tributary to Fourmile Run
MILLER	Miller Run
NMR	Ninemile Run
ICR	Indian Creek Run, a tributary to Ninemile Run
MON	Monastery Run
FMRII	Fourmile Run, a tributary to Monastery Run (located in Latrobe)
SAX	Saxman Run

LOWER WATERSHED SECTION

LOWLOY	Lower Loyalhanna Creek
UNION	Union Run
	McCune Run
CRB	Crabtree Creek
LCRB	Little Crabtree Creek, a tributary to Crabtree Creek
WT	Whitethorn Creek
GR	Getty Run

Appendix 5

Appendix 5 – New Projects Already In Place

The following projects have been initiated as a result of field work completed for the Loyalhanna Creek Watershed Assessment and Restoration Plan. Each project addresses a problem that was already identified prior to the assessment or one that was such a large impact it could not be overlooked any longer.

Saxman Run Mine Drainage Treatment and Hydroelectric Project

This $211,400 Growing Greener project proposes to generate electricity for the treatment of abandoned mine drainage (AMD). Electricity will be generated using the flow from the Upper Saxman Run Discharge in the Loyalhanna Creek Watershed. It is estimated that 6 to 15 KW of power will be generated by the water flowing from the abandoned mine discharge. The generated electricity will be used to provide power to an existing pilot AMD treatment system and proposed AMD treatment system. Both systems will eventually be increased in size and used to treat multiple abandoned mine discharges to Saxman Run, including the discharge captured to create electricity. In addition, excess generated power will be used at the Latrobe Sewage Treatment Plant, the site of proposed power generation and AMD treatment.

Crabtree Concept

As a result of the Loyalhanna Creek Watershed Assessment and Restoration Plan, LWA and partners recognized the Crabtree Creek sub-watershed in the rural town of Crabtree, Pennsylvania as the single largest impact to the Loyalhanna Creek Watershed. Pollution sources to the watershed include sewage, abandoned mine drainage (AMD), agricultural waste, and some stream encroachment and urbanization. While looking for ways to address these impacts, these collaborating organizations learned of an initiative underway by the Crabtree community to address the need for municipal sewage. Since, a sewage authority has been formed, a consultant has been hired to design a new wastewater treatment plant, and an application for plan approval has been submitted to USDA.

After nearly a year of research and discussion, a possible solution through new and existing technologies may have been found in the form of a Biogas digester plant. In an effort to ensure the ideas generated will have the needed outcomes, the Coalition is seeking a third party evaluation that will consider all known and potentially unknown aspects of this project and make recommendations to proceed accordingly. An RFP to conduct a feasibility study of this project will be sent out to prospective consultants in March of 2006. To date, the group has received $20,000 for this study.

Upper Loyalhanna Creek Agricultural Best Management Practices

LWA is committed to addressing agricultural non-point pollution sources in the upper half of the watershed. The overall goal of this project is to develop partnerships with local landowners in the Loyalhanna Creek Watershed and assist them with choosing and installing various best management practices (BMPs) to reduce agricultural non-point source pollution.

Through fieldwork related to the LWA Watershed Assessment, agriculture and agricultural land use were noted as significant contributors to sediment and nutrient loading in the upper Loyalhanna Watershed.

Several properties were recorded as potential sites for the installation of stream bank fencing, stabilized crossings and alternative watering sources. It is the goal of the LWA to provide a cost effective improvement to the sub-watersheds impacted agricultural non-point source pollution. Improvements have already been made to several farms along Hannas Run, Coal Pit Run, and the Loyalhanna Creek, with on-going projects along Four Mile Run that hope to be completed in the spring of 2006.

Conclusion

Conclusion

General Conclusion

The Loyalhanna Creek Watershed Assessment and Restoration Plan provides a comprehensive visual "snapshot" of the Loyalhanna Creek Watershed. That snapshot was taken over a three year period in which data and information were gathered from each and every inch of stream. It has enabled multiple individuals and organizations to become more familiar with the state of the Loyalhanna Creek Watershed, its impairments, and treasures. Until now, no other document provided a comprehensive look at the watershed. Today, it is anticipated that this assessment and restoration plan will afford conservation organizations the knowledge to pursue water quality improvement projects that will have a greater impact upon the entire watershed.

The largest impact to the Loyalhanna Creek Watershed discovered during the assessment was abandoned mine drainage. Large discharges in the Saxman Run Subwatershed, Crabtree Creek Subwatershed, and Getty Run Subwatershed each contribute hundreds of pounds of iron to the Loyalhanna Creek main stem each day. Prior to the printing of this report, projects were underway to address discharges in both the Crabtree Creek Subwatershed and Saxman Run Subwatershed. Innovative technology and hard work will ensure that within the next ten years, these discharges may have less of an impact on the entire watershed.

The most common impact noted throughout the assessment on each and every stream was riparian zone vegetation degradation. This impact was almost always the result of landowner choices to remove trees and other vegetation from the stream side. The cumulative effect of this impact is apparent in the lower section of the watershed. It is strongly recommended that an outreach campaign take place in order to educate community members about this impact that is so simple to reverse.

Overall Project Recommendations

➔ **Establish a regular review and update of the Loyalhanna Creek Watershed Assessment and Restoration Plan**

It is highly recommended that a process be established to continually review and update this watershed assessment and restoration plan. As organizations work to improve water quality throughout the watershed, progress should be tracked and recorded. The LWA, in partnership with the advisory committee, will develop a review process and timeline. In addition, the LWA will promote the recommendations within this plan and ensure that it serves its purpose to guide future work throughout the watershed.

➔ **Continue to focus upon AMD impacts in the watershed**

The assessment confirmed that AMD is still the largest impact to waterways within the watershed. This plan clearly states the importance of focusing upon the remediation of those large discharges.

➔ **Engage in a community outreach campaign**

Watershed community members do not know enough about the watershed or its impacts. The LWA and partners should design and implement an outreach campaign that creatively informs community members and solicits their interest in watershed issues. The use of professional services is highly recommended.

➔ **Protect the headwater region**

The headwaters of the Loyalhanna Creek Watershed are located in and around Ligonier Township. It is critical that the current forest buffer and green space remain.

Project Reflection

The Loyalhanna Creek Watershed Assessment was a large and time intensive project. Beginning in the fall of 2002 and wrapping up in the spring of 2006, the work required to complete it has spanned three and one-half years. The knowledge gained throughout the process has proven to be invaluable in determining future work for the entire Loyalhanna Creek Watershed.

Funding for the assessment was provided by Pennsylvania Department of Environmental Protection Growing Greener Program, an important funding source to organizations such as the LWA. Although this project was completed within budget, the amount of funding awarded was not entirely adequate for the project. Without the time and effort put forth by volunteers, the project would have exceeded the grant award. The work of volunteers and matching time provided by partner organizations enabled the LWA to complete the project for much less had a contractor been used.

LWA and partners made a bold choice to complete the assessment independently. That choice ensured that the LWA would complete the project with intimate knowledge of the watershed rather than just the account of a contractor. It also created a large amount of work for staff and volunteers. Without volunteers and project partneres, the project would not have been as successful.

All individuals involved with the project are proud of the final product and hope that it serves as a guide and a model to future work within the Loyalhanna Creek Watershed and other watersheds throughout the state.