Rogues Harbor Run
Coldwater Conservation Plan

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SECTION 1.0 ACKNOWLEDGEMENTS

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SECTION 2.0 INTRODUCTION

Rogues Harbor Run is a 177-acre watershed that flows into Chest Creek south of Westover Borough, Clearfield County, Pennsylvania. The headwaters begin in Chest Township, Clearfield County and Chest Township, Cambria County and the stream flows northwest to its confluence with Chest Creek. Chest Creek is a tributary of the West Branch of the Susquehanna River. Rogues Harbor Run is Chapter 93 designated as an Exceptional Value Coldwater Fishery, and due to its lack of roads in the watershed it is also classified as a Wilderness Trout Water. In 1990, the stream was surveyed and declared unsuitable for mining.

Unfortunately, Abandoned Mine Drainage (AMD) affects Clearfield County to a great extent. There are very few streams, especially in the southern part of the county, that are High Quality let alone Exceptional Value. Therefore, Rogues Harbor Run is a resource that needs to be protected.

There are various water quality concerns within the watershed. First of all, Rogues Harbor Run is a water supply for Westover Borough, and should be protected as such. Some other possible impacts on the watershed are sedimentation and other pollutants due to improper logging practices, pipelines and trails from All Terrain Vehicles (ATVs). Concern about the ATVs was increased with the opening of the Rock Run Recreation Area in 2007. Lastly, of concern, would be the pipelines and gas wells. Damage caused by either of these could be very destructive to the watershed.

2.1 Goals and Objectives

- Identify current and potential pollution sources within the watershed
- Collect and present baseline water quality and macroinvertebrate data
- Identify possible threats to Westover water supply
- Identify concerns with Rock Run Recreation Area
- Work with the Chest Creek Watershed Alliance to help prevent future problems within the watershed

2.2 Description of the Study

The main part of this study was designed to identify and present any potential pollution problems in the watershed. This was accomplished by completing a stream reconnaissance of the entire watershed. Two interns were hired to complete the study. They were trained on how to identify pollution sources in the watershed. Concerns they were looking for included erosion from dirt roads or ATV trails, improper logging practices, agriculture issues, abandoned mine drainage and gas wells. Acid precipitation was also a possible concern; however, this was determined through water sample analysis comparing alkalinity and acidity instead of field reconnaissance.

Before walking the stream every property owner was sent a letter explaining the purpose of the study (Appendix E). Landowners were asked to contact the Conservation District if they did not wish to grant access to their property. If no responses were received, the assumption was made that permission was granted.

After training, the interns walked the main stem and every tributary in the watershed looking for the potential pollution sources listed above. When a potential problem was encountered the coordinates were found by using a GPS unit, a photograph was taken and a description was noted in a fieldbook. If a new source of water was encountered pH, conductivity and temperature readings were taken. The pH was taken with an Oakton Waterproof pH Testr 20 which takes the temperature into account when giving a reading. Conductivity was measured using an Oakton Waterproof ECTestr low (umhos). Temperature was taken using an Enviro-Safe Armor Case Pocket Thermometer (° C). The area was then walked to identify the source. This was especially important when trying to identify any possible abandoned mine drainage problems. A pH less than 4.5 and/or conductivity greater than 400 umhos was cause for concern. Measurements in these ranges indicate possible AMD issues.

Water samples were taken twice during this project. At each sample point field pH, conductivity and temperature were measured. All chemical samples were collected as grab samples to limit the possibility of cross contamination. Water samples were collected using new polyethylene bottles that were provided by Mahaffey Laboratory, LLC, the company who performed the water sample analysis. Bottles were rinsed with the sample water before the actual final sample was collected. The sample was collected at mid-stream and at mid-depth with the sampler facing upstream. The smaller bottle had 5 drops of nitric acid added to preserve the metals for analysis. The bottles were placed on ice until delivery to Mahaffey Laboratory. All water quality samples were tested at the laboratory for pH, conductivity, alkalinity, acidity, iron, aluminum, sulfates and manganese. The results can be found in Appendix A.

Data from other samples that were taken by the Bureau of Mining and Reclamation (BMR) from1975 to 1983, were also used to identify possible problems in the watershed. The results from both sources were compared to water quality parameters listed in Table 1, Appendix A. Most of the test parameters were chosen because they are indicative of abandoned mine drainage (AMD) and/or acid deposition.

Macroinvertebrates were sampled using a kick net. Two kicks were used and the organisms were preserved in Kahle's fluid and identified to Family level when possible. Each different family was considered different taxa. If the macroinvertebrate (ie. watermites or crayfish) could only be identified to Order it was also counted as a separate taxa. The results of the macroinvertebrate sampling can be found in Appendix B. Macroinvertebrates are the best indicator for identifying pollution in a watershed. They are the least mobile and are a great indicator of the degree of pollution based on presence and absence. The diversity was calculated using the Shannon Index as seen on the following page.

$$\text{Diversity} = -\sum_{i=0}^{n} p_i \ln p_i$$

$$p_i = \frac{\text{individual of species}}{\text{total of individuals}}$$

A higher number indicates a diverse population due to the presence of many different taxa with an even distribution of organisms present in each one. Low diversity can occur when there is a dominance of one certain taxa or very few different taxa due to pollution. Another benthic metric used was total number of taxa. This measures the overall variety of the macroinvertebrates and will decrease with increasing pollution. The last metric used was the EPT taxa. This is the number of taxa in the orders Ephmeroptera (mayflies), Plecoptera (stoneflies) and Tricoptera (caddisflies). This number will also decrease with increasing pollution. The results were not compared to a reference stream, only to each other.

Finally, Stream Habitat Assessments were completed at the same points that water samples were collected. The methods used were those approved for the Pennsylvania Senior Environment Corps protocol and can be found in Appendix C. The results of the Stream Habitat Assessment can be found in Appendix D. The habitat score ranges from 0 to 200, with 200 indicating the best possible habitat. This assessment also helped to determine if sediment was an issue in the watershed. It was also used to gauge the suitability of habitat for macroinvertebrates and to determine the quality of the riparian zone.

The watershed was broken into 5 sections in order to simplify the explanations in this particular study: Please see attached color coded map in Appendix F to clarify the location of the sections and sample points.

- Headwaters Section (orange): This is the section of stream from sampling point RH #5, which is located near the access road to the Rock Run Recreation Area upstream.
- Middle Section (green): This is the section of Rogues Harbor Run between RH#4 which is upstream of a major stream split, and the Headwaters Section.
- Pipeline Tributary (purple): This is the tributary that enters from the east downstream of the pipeline crossing. The mouth of this tributary is sample point RH#3.
- Bad Tributary (aqua): This is the tributary that enters Rogues Harbor Run from the south just before the dirt road crossing the railroad tracks. The mouth of this tributary is sample point RH #2.
- Lower Section (red): This is the lower part of Rogues Harbor Run from where the Pipeline stream enters down to the mouth. The bad tributary enters in this section. The mouth of Rogues Harbor Run is sample point RH #1.

SECTION 3.0 WATERSHED DESCRIPTION

3.1 Classification

Rogues Harbor Run is classified as an exceptional value (EV) stream its entire length. According to Chapter 93 of the Pennsylvania Code, an EV stream is one that has an outstanding national, state, regional or local value. It is the highest level of protection from the Department of Environmental Protection. In this case, the watershed has also been characterized by the Pennsylvania Fish and Boat Commission as a "Wilderness Trout Stream." The type of management for this classification of stream is based on the experience of fishing for wild brook trout in a remote, natural and unspoiled environment where man's activities have been minimal. This classification was established in the state in 1969 and is used to protect and promote native brook trout populations.

3.2 Land Use

The majority of the watershed, around 90%, is forested. Agriculture makes up around 8% of the land use and it is found mostly in the headwater streams of the watershed. The other 2% are roads and pipelines. The majority of the roads found in the watershed are due to resource extraction. Otherwise, the stream is relatively secluded, which supports the "Wilderness Trout Stream" classification.

3.3 Geography and Physiography

Rogues Harbor Run is located entirely in the Appalachian Plateaus Province and the Pittsburgh Plateaus Section. The headwaters are located very close to the Allegheny Mountain Section. The topography is influenced by the nature of the Pennsylvania age sedimentary units present.

Total relief in the study area is from 1360 feet near Westover to 2100 feet at the headwaters near St. Lawrence, Cambria County. The highest elevation is at 2182 feet also located neat St. Lawrence. The stream runs in a northward path in Cambria County then flows in a westward direction in Clearfield County until it empties into Chest Creek near Westover. Portions of the stream run along the Laurel Hill Anticline. This anticline is normal with equal dips on both sides. (West Branch Susquehanna River Scarlift report, 1972)

3.4 Geology

The Rogues Harbor Run watershed is located within the Main Bituminous Coal Fields of Appalachia that extend west into Ohio and south as far as Alabama. All the sedimentary exposed rocks in this area are the formations from the Pennsylvanian series. The Allegheny Formation, which contains sandstone, shale, limestone, clay and coal, and the Glenshaw Formation, which contains shale, sandstone, limestone and coal, are the two formations that are found in the Rogues Harbor watershed.

The Mahoning Coal, Upper and Lower Freeport Coal, and the Upper, Middle and Lower Kittanning can be found in the area. Coal was mined in the Rock Run watershed to the south and in the Pine Run watershed to the north but not in Rogues Harbor Run. An area "unsuitable from mining" petition was filed for the watershed. The Pennsylvania Department of Environmental Protection felt that except for the Upper Freeport coal seam, any mining on any of the other seams could degrade the watershed. Even so, there is an AMD discharge present in the watershed. It is thought to be connected to a mining operation that occurred on the other side of the hill to a small tributary to Rogues Harbor Run.

3.5 Soils

The soils in this area of Rogues Harbor Run belong to the Rayne-Gilpin-Ernest and the Cookport-Hazelton Clymer associations. The Rayne-Gilpin-Ernest soils are distinguished by well to moderately well-drained, deep, gently sloping to steep soils, on hilltops, ridges and slopes. The Cookport-Hazelton-Clymer association is deep, moderately well-drained soils found on ridges, uplands, and hillsides. Another association, the Udorthents-Gilpin-Rayne association, is also present in small amounts. These soils vary from shallow to deep, well to poorly-drained, and have level to steep slopes. The Udorthents-Gilpin-Rayne association is the one that has been disturbed the most by surface mining in the county, but fortunately not in Rogues Harbor Run (USDA, 1981).

SECTION 4.0 HISTORICAL BACKGROUND

4.1 Pennsylvania Fish and Boat Commission Information

Numerous amounts of data and information could be found for the Rogues Harbor watershed at the PA Fish and Boat Commission Office in Pleasant Gap. In the years 1933-1935, close to 1900 six to seven inch brook trout were stocked. Then over 10, 000 brook and brown trout fingerlings from 1936-1961 were placed in the stream. Of all the streams classified EV in the northcentral part of Pennsylvania, Rogues Harbor Run has the second highest biomass of brook trout (PFBC).

Unfortunately, this stream is located in the coal region and as a consequence there have been many attempts to mine the coal. In fact, in 1971, there was a permit that was issued to mine in the watershed but it apparently was never started. In 1990, the watershed was classified as Exceptional Value. At the time PADEP (then DER), was uncertain of the classification. The department thought that the lower portion of the watershed did not have good enough water quality to warrant the EV classification. The Environmental Quality Board tried to downgrade Rogues Harbor Run to a lesser classification to allow mining by K&J Mining Coal Company but this did not occur. Then in June of 1983 an "unsuitable for mining" petition was filed by the Fish Commission and the Westover Municipal Authority. This covers the Rogues Harbor Run watershed in both Cambria and Clearfield Counties. There were numerous reasons for this. First, Rogues Harbor Run is the sole source of water for Westover Borough. Also the stream supports a very healthy native brook trout population. DEP believes that any mining in this area, with the exception of the Upper Freeport coal seam, would damage the stream; therefore, no mining will occur in the watershed (PFBC).

Also of interest was some old water quality data completed by the Bureau of Mining and Reclamation (BMR) that was found at the Fish and Boat Commission office. There are some points sampled that can be compared to water quality in this report. They are located with the data that was collected for this report in Appendix A.

4.2 Mining

Although mining has not occurred in the watershed, effects from the practice are still found in the watershed. A tributary that enters Rogues Harbor Run from the south near the mouth is affected by AMD. Research that was completed for this study did not show any evidence of mining on the tributary. There could have been some deep mining that is not in historical records. There was a surface mine on the other side of the hill called the Fox Job completed and reclaimed by K&J Coal Co. Inc. and it is suspected but not confirmed that this job may have had an impact on the water quality of Rogues Harbor Run. Fortunately, the pH is high along with the alkalinity and there are very low amounts of metals present; therefore, the affect on Rogues Harbor Run is not terribly severe.

Another indirect outcome from mining is a few dirt roads that were used by the mining companies to access Rock Run. The roads cross near the headwaters of Rogues Harbor

Run. In the past the Westover Municipal Authority had some problems from excess sediment entering the stream from the roads. One road is still being used as an access for the Rock Run Recreation Area; therefore, this still remains a concern for the watershed.

4.3 Drinking Water Supply

Rogues Harbor Run is the primary source of water for Westover Borough and the surrounding area. The Westover Municipal Authority owns 4.42 acres around the reservoir. Some of the watershed is in State Game Lands 120 and the rest is privately owned. The water from the stream is diverted into a small reservoir that is off stream. In 2004, a new filtration treatment plant went online. This plant is capable of supplying more water than Rogues Harbor Run can supply; therefore, the Municipal Authority is looking at other stream and spring sources.

In July 2003, a Source Water Assessment was completed on Rogues Harbor Run. This assessment ranks the potential contaminants that may enter the watershed and affect the water supply. The potential sources of contamination were ranked on susceptibility from high priority of concern to low priority. Sources of contamination from agriculture, on-lot wastewater, pipelines, roads and powerlines were given a medium priority. Gas wells were given a slightly lower priority. According to this assessment best management practices are in place for the natural gas pipeline that crosses the watershed, and the gas wells have an emergency response plan in place (Uni-Tec Consulting Engineers, 2005).

4.4 Rock Run Recreation Area

The Rock Run Recreation Area is a multi-use motorized recreation area located in northern Cambria County and southern Clearfield County. The area was at one time owned by a coal company that mined the land in the Rock Run watershed. The Cambria County Conservation and Recreation Authority received an initial 2-million dollar grant from the Pennsylvania Department of Conservation and Natural Resources, Snowmobile/ATV Fund, to help buy the 6,000-acre property. It was matched with 2 million dollars of donated property from the owners. The Authority became official owners in June 2003.

According to the Rock Run Recreation Area website, their mission is as follows:

- Develop a first-class multi-use, motorized recreation area
- Create an economic “sparkplug” for Cambria and Clearfield Counties
- Encourage environmental stewardship
- Promote responsible trail riding

Now there are 50 miles of trails located at the park. The terrain is suited to meet all skill levels. There have been numerous organized trail rides. The hope of the authority is to bring more people into the area.

The main concern for the Rogues Harbor Watershed is ATV-riders using improper trails in the watershed. One concern is that riders will want to check out "different" trails that may lead them into the Rogues Harbor Run area. Another concern is that local ATV-riders may try to access the Rock Run Recreation Area by riding through the Rogues Harbor Watershed, thus avoiding the entrance fee for the ATV park and damaging the stream.

SECTION 5.0 CONCERNS IN THE WATERSHED

5.1 Abandoned Mine Drainage (AMD)

Abandoned Mine Drainage is a type of non-point pollution that occurs due to past mining practices. It is formed when water and oxygen are exposed to pyrite that is found in coal, refuse or the overburden of a coal operation. This reaction results in water with high acidity and dissolved metals. These metals will remain in solution until the pH rises to a level that causes them to precipitate as a solid. The most common metals found are iron, aluminum and manganese. As a solid, iron will be red in color; aluminum will be white and manganese, black. Iron and aluminum are the most lethal metals to aquatic life. While in solution, these metals can make streams with a low pH even more lethal. As solids, the metals can coat gills of fish, bury substrate used for spawning and macroinvertebrate habitat, and increase turbidity that can interrupt feeding.

Abandoned Mine Drainage is one of the largest pollution problems in Clearfield County. Mining in some form has been occurring in Clearfield County for over 100 years. The effects from this mining still haunt the county today. According to "Abandoned Mine Watershed Fact Pack" produced by Pennsylvania Organization for Watersheds and Rivers (POWR), Clearfield County leads the state in number of unreclaimed features (3,374) and acres of unreclaimed mine lands (23,715) in the state. These features include strip mines, spoil piles, mine entries, mine shafts and subsidence openings. Many watersheds in Clearfield County show the effects of AMD. Many, if not most, of the streams are devoid of any aquatic life.

Most of these abandoned mine sites are also very unsightly. Very little vegetation grows on the barren land. This increases erosion that adds excess sediment into the streams (See Sediment below). These areas attract all-terrain vehicles that can accelerate erosion. Also, numerous people lose their lives in these areas due to careless riding by trying to climb up very steep spoil piles. Some people ride or fall over highwalls that they did not know were present. In many cases, the pits left by mining are used as swimming holes. People can perish after jumping into these very deep bodies of water because of extreme temperature changes. These barren lands also attract illegal dumping. Many people dump their trash, which only increases unsightliness of the area.

5.2 Sediment

Excess sediment in the stream is another form of non-point source pollution. There are a couple of different terms to understand when talking about the effect of sediment: suspended load, also called turbidity, and siltation. The turbidity is the sediment in the water column. This is what causes the cloudy water after a rainstorm. Siltation is the settling of the fine, suspended sediment. Both forms of sediment can affect fish and macroinvertebrates. If the stream is turbid there is decreased light penetration. This affects fish abilities to see prey when feeding. Decreased light also affects the algae that grow on rocks. This alga is an important food source for the macroinvertebrates, which in turn feed the fish that live in the stream. Also, the sediment in the water can cause an

abrasive effect. This is a problem for both fish and macroinvertebrates. Excess sediment can have an abrasive action on the gills. This makes the fish more susceptible to disease and suffocation. This abrasive action of sediment along with light reduction can cause invertebrate drift. This is a term to describe the macroinvertebrates as they release their hold on the substrate and float downstream.

Siltation is when the water in the stream slows down to the point that sediment settles on the bottom. Stream substrate is then coated with fine particles. This affects the habitat for macroinvertebrates. Spaces between the larger rocks are attachment sites for macroinvertebrates. Sediment fills up these spaces and takes away areas for the macroinvertebrates to live. This change in habitat also alters the type of macroinvertebrate communities that are present. Siltation also affects fish, especially the brook trout that reside in these streams. Reproduction success will be decreased because sediment will bury the redds that contain the eggs and recently hatched trout. This siltation can take oxygen away from the trout in the redds. After the trout use all the egg sac they must exit the redd to find food. If buried due to sediment, the trout can't exit and die. Then the redd becomes a "tomb". Also, excess sediment can fill in deep holes that are used by fish as resting places or for hiding from predators.

Excess sediment can also affect waters supplies. Reservoirs used as a source for drinking water can fill up with sediment causing less capacity. This is especially a problem during droughts. Also, turbid water is more expensive to treat in order for it to be drinkable.

5.3 Acid Deposition

Acid precipitation is another form of pollution that can have devastating effects on fish and macroinvertebrates. It is the result of human-made emissions from fossil fuel burning (coal), automotive exhausts and other industrial sources that produce sulfur dioxide (SO_2) and nitrogen oxide (NO_x) gases. These gases move through the atmosphere and are deposited back to earth in the form of sulfuric and nitric acids by rain, sleet or snow. Pennsylvania is at high risk for this type of pollution due to many factors. First is that the state is a high producer of the sulfuric dioxide and nitrogen oxide gases. Also, Pennsylvania is downwind of other high producing states of these gases in the Midwest (Wilderman, PFC 7/89).

Different areas of the state are more susceptible than others. The degree of which acid deposition affects a watershed depends on the ability of the land to "buffer" or neutralize the acidity. This "acid neutralizing capacity" hinges on the dissolved mineral content of the water. The local geology controls the types of minerals in any given watershed. Especially vulnerable are areas underlain by sandstones. This type of geology will have low acid neutralizing capacity, therefore, decreasing the ability of the area to buffer the acid deposition (Wilderman, PFC 7/89).

Increased acidity lowers the pH in streams with no acid neutralizing capacity. This high acidity affects algae and aquatic plants that are a food source to the aquatic macroinvertebrates and smaller fish that live in a stream. Also, macroinvertebrates

found in the orders Ephemeroptera, Plecopetera and Tricoptera are more susceptible to acidity and begin to die, leaving more acid tolerant forms that may not be as abundant a supply of food for the fish. Also, higher acidity will affect the ability of a fish to regulate its blood chemistry. Aluminum is a metal that is increased in watersheds affected by acid deposition. Over 0.7 mg/L will kill fish by damaging their gills and decreasing sodium in their bloodstream. Fish eggs and fry are very susceptible to low pH and high acidity (Wilderman, PFC 7/89). Brook trout are the most abundant fish in this part of the watershed. Despite being one of the more tolerable species of trout, if the pH drops below 5.0 the fish become very stressed and mortality increases.

5.4 Oil and Gas Wells

Oil and gas wells can cause several non-point source pollution issues. Many of these well sites are located in remote wilderness locations so dirt roads are built to access them. These roads expose sediment to the effects of erosion by rain. If not properly built, these roads cause excess sediment to go into nearby streams.

The wells themselves can cause numerous pollution problems. Salt brines are present in oil and gas formations and are usually produced as a waste product along with the gas and oil. Brines can contaminate the groundwater and surface water by leaching through the ground. The disposal of brine in an environmental and economical manner has been difficult. Brine can raise the salinity in streams causing problems for the organisms that live there.

Another pollution concern is AMD, especially with orphaned wells. Anytime rock with pyrite is broken and exposed to water and oxygen the reaction occurs that forms AMD. Drilling into this rock for exploration and to extract the oil and gas is breaking up the rocks causing the formation of AMD. There has been a huge effort in Pennsylvania to identify these sites and plug the abandoned wells.

5.5 Agriculture

Agriculture is Pennsylvania's number one industry. Unfortunately, it can cause numerous problems with non-point source pollution. Excess sediment can enter the streams from exposed fields if not properly contoured. Improper manure and fertilizer management and storage can cause excess nutrients to enter a waterway creating havoc in the aquatic community. Too many nutrients in a waterway can cause excess growth of algae called blooms. When the algae die, the decomposition process will use the oxygen needed for macroinvertebrates and fish to survive. Also, excess bacteria can enter the stream through the animal waste. This can be a significant problem if the water is used as a drinking source.

There are many programs that farmers can become involved with to help prevent this type of non-point source pollution. Conservation Districts work with agricultural producers to install Best Management Practices (BMP's) to help prevent this type of problem from occurring in our watersheds.

5.6 Logging

Harvesting of lumber can cause numerous problems with sedimentation. Skid roads used to pull out logs will not have any vegetation needed to keep soil in place. Therefore, during rain events, water runs down these areas with no vegetation forming gullies and little streams that are full of sediment. The dirt roads and landings that are built also expose soil to erosion. This is especially true in areas of steep terrain. Also some loggers do not install the temporary bridges that are required by law whenever a stream crossing is necessary.

Another concern with the industry is timbering in the riparian zone. Removing trees that would be shading the stream causes an increase in the temperature of the water. This will change community composition in that watershed.

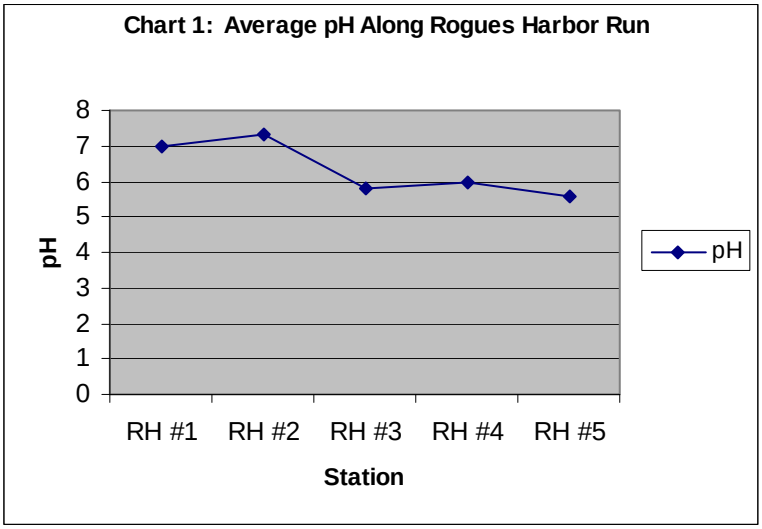
5.7 All Terrain Vehicles (ATVs)

ATV use can cause damage to streams. Improperly established trails destroy vegetation that keeps soil in place. Thus, during rain events, water runs down these areas with no vegetation, forming gullies and little streams that are full of sediment. This is especially dramatic in areas with very steep trails. Topsoil is removed permanently making it nearly impossible for vegetation to grow there. ATV crossings can erode stream banks when used for extended periods of time. As the bank becomes too steep, due to continuous use, some ATV users will move the trail further upstream or downstream of the original crossing, thus increasing the area affected by erosion. Also, some ATV users are attracted to wetlands so that they can drive through mud. This can destroy critical habitat and the high diversity of life found in these fragile areas.

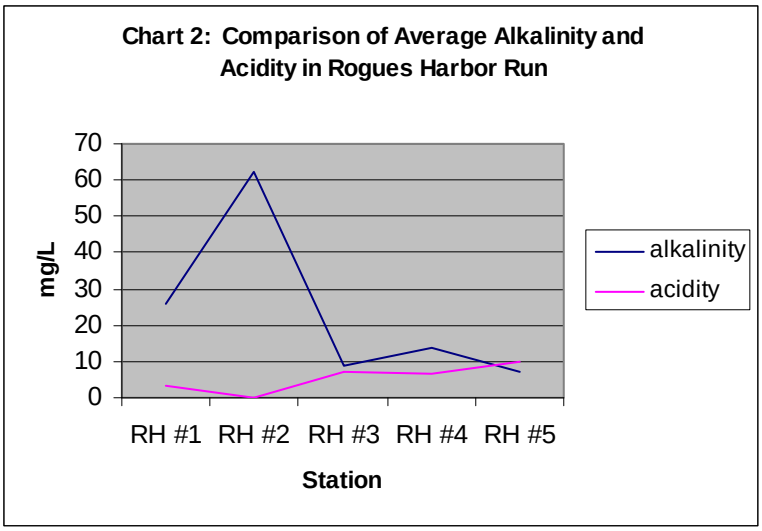
SECTION 6.0 STUDY RESULTS

6.1 Overall

Findings in each section of stream are provided in more detail on the following pages. In general, overall average water quality meets the Pennsylvania standards along Rogues Harbor Run. As shown in Chart 1 below, the average pH is within the preferred range of 6.0-9.0 in the lower sections (RH #1 and RH #2) but this is not the case for the entire stream. The locations further up in the headwaters show a lower average pH and drop below the ideal range. The bad tributary (RH # 2), has a much higher pH than the upper section (RH # 3, 4, 5) and it increases the pH in the main stream.



In a watershed it is important that alkalinity is always greater than acidity. That way the water body can buffer any changes in pH. On average as shown in Chart 2 below, all stations show alkalinity is higher than acidity throughout the section studied. Unfortunately, there were instances during the spring when acidity was the same or higher than alkalinity at individual stations. Also, there is an obvious spike of alkalinity in the bad tributary (RH #2) that affects this parameter at the mouth (RH #1). This is due to the highly alkaline AMD discharge that affects this tributary. This will be elaborated further when each section is discussed in detail separately.



As shown in Chart 3 below, iron and aluminum concentrations at all sampling locations are both below the level that would harm aquatic life. There is an unexplained amount of iron in the upper most station (RH #5). This is elaborated upon in each individual section discussion below.

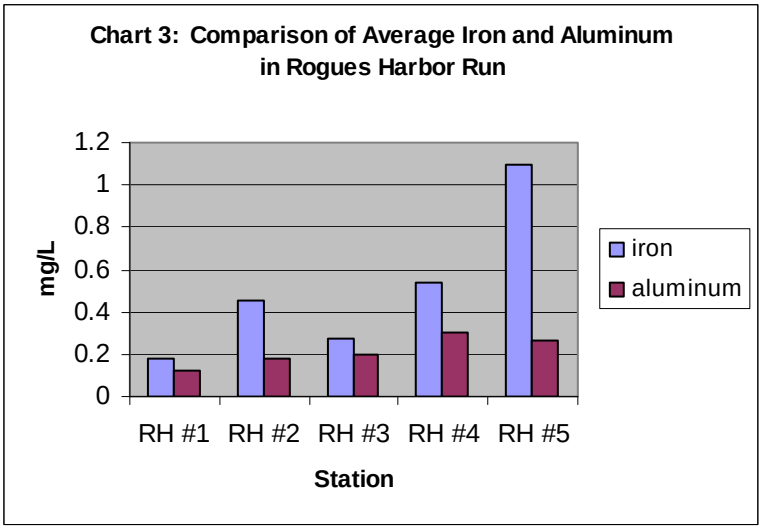
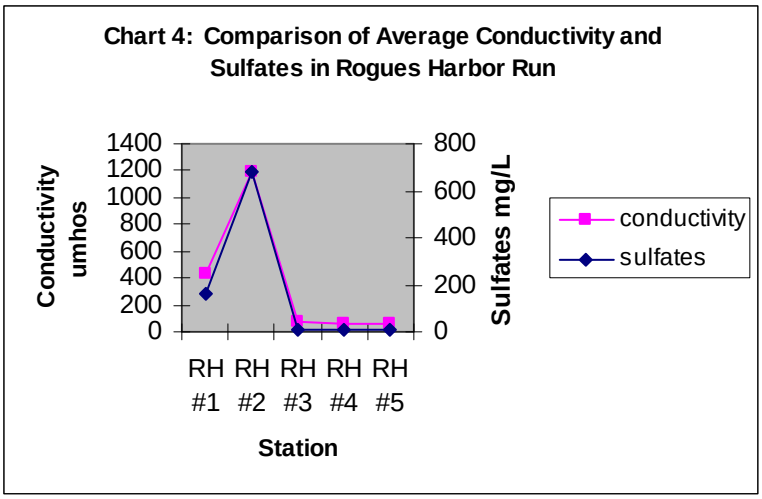
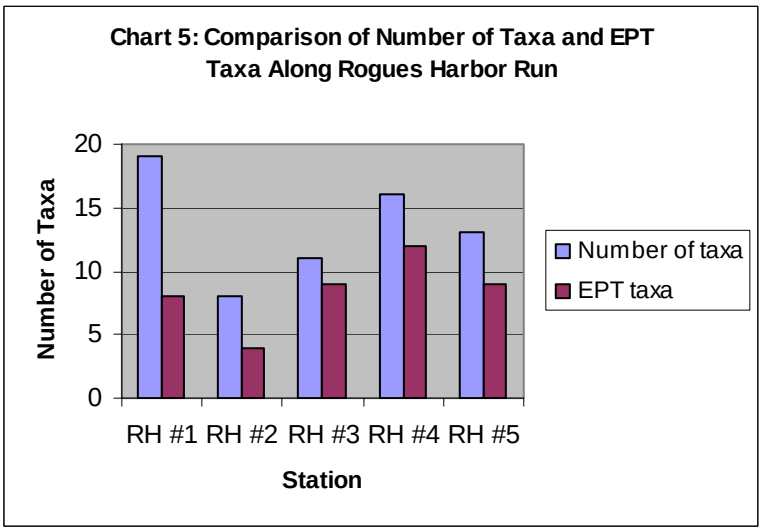


Chart 4 below shows that the bad tributary (RH #2) has a significant influence on the mouth of Rogues Harbor Run. The AMD located in this tributary causes a huge increase in conductivity and sulfates. Until that tributary enters, all readings for sulfates and conductivity are very low, which is a good indication that no mining has occurred in the watershed to that point.



Another part of the study was looking at the macroinvertebrates. There is definitely a decrease in the number of taxa as shown in Chart 5 below for the bad tributary (RH #2). It would appear that the poorer water quality found in this tributary is affecting the aquatic life. Stations RH #3 (pipeline tributary) and RH #5 (headwaters) have a lower number of taxa than RH #4. The most likely explanation is that the stream is larger at RH #4 than at the other two stations.



6.2 Headwaters Section

6.2.1 Water Quality

This sample point, RH #5, is located near the road that leads to the Rock Run Recreation Area. (See Appendix A for detailed water quality). The values for pH ranged from 5.5 to 6.0. Alkalinity was slightly higher than acidity in the summer sample (alkalinity 9mg/L, acidity 8 mg/L) but during high flows in the spring it was lower (alkalinity 5 mg/L, acidity 12 mg/L). Conductivity ranged from 50-63 umhos. Iron was .15 mg/L in

the spring sample but 2.02 mg/L in the summer sample. Since the conductivity reading taken at the same time was still very low this high reading for iron is thought to be an error. Aluminum (.25-.27 mg/L) and manganese (.11-.16 mg/L) concentrations were all below state standards. There were also little to no sulfates (10-12 mg/L), which is a good indication that no mining has occurred upstream from this sampling point. Both suspended solids (<6.2 mg/L) and total dissolved solids (31-40 mg/L) values show a non-polluted stream. This data is comparable to the BMR data collected in the 1980's (BMR). Even though there is some concern for acidity being higher than alkalinity during high flows, the overall water quality in this section of Rogues Harbor Run is excellent for aquatic life.

6.2.2 Macroinvertebrates

This section of stream had a diversity of 1.85 the only time it was sampled in this study. This point had the third highest diversity (out of 5) in the watershed, due to the high number of stoneflies in one particular family. It had the second largest total number of organisms. The number of taxa was 13 and the number of EPT taxa was 9.

6.2.3 Stream Habitat

This portion of the watershed has very good habitat. It is good for both fish and aquatic macroinvertebrates. The stream is forested below the road where this sample point is located. The Stream Habitat Assessment showed a score of 182 out of a possible 200, the highest habitat score in this study. The assessment showed suboptimal conditions for sediment deposition. The road leading to the Rock Run Recreation area and another road upstream are the most likely culprits for this excess sediment.

6.2.4 Stream reconnaissance

One of the most noticeable problems in this section of stream is the road for Rock Run Recreation Area. The road was originally used to gain access to the mining operations occurring in the Rock Run watershed. There appear to be some signs of erosion from this road that enters Rogues Harbor Run. Excess sediment may also be entering the stream from an area of exposed soil near where the road crosses the stream.

Rock Run Recreational Road

Culvert pipes under Rock Run Road. Note the lack of vegetation to stabilize area.

Above this road, there was a long series of wetlands constructed by beavers that covered about 20-30 acres, giving the water a tea color for a small section downstream. These beaver ponds were noted in a 1931 study conducted by a local group.

Beaver Dam in headwaters above Rock Run Road

There are smaller tributaries entering from the right side (facing downstream) that originate in a marshy area. The low pH and conductivity found in them follows the trend of other streams originating in wetlands in this watershed, especially in the pipeline tributary. Even though these were field pH measurements, the results were showing values below 5.0 but the conductivity measurements were still very low. These conditions could be caused by acid deposition and low buffering capacity of the watershed or the tannins in the wetlands.

Moving upstream there is another dirt road crossing. The pipe that goes under the road is rusted out but water is still flowing through. The stream bottom is extremely sandy. Further up, there is a large field on the left side (facing downstream) that is uncultivated. There is limestone dumped at an old road crossing. It appears that there is a pipeline that crosses the stream at this point. Further upstream a wetland is encountered. By hiking around the wetland and towards the headwaters, it was discovered Rogues Harbor Run flows through a large farm. The stream seems to originate at some old farm ponds.

Farm pond, Headwaters of Rogues Harbor Run

6.2.5 Explanation of Headwaters Section

One of the concerns in this portion of the watershed is that the levels of acidity are greater than alkalinity during high flows. A possible explanation could be that the watershed is affected by acid deposition during some parts of the year. The geology in the watershed is sandstone, which has very little buffering capacity. Also there are many wetlands in this section. The water exiting these wetlands had a very low pH. The tannins present in these areas may be contributing to the acidic conditions. A more thorough study would need to be completed to verify if acid deposition is a valid concern.

Another concern in this section of the watershed is the suboptimal conditions due to sediment deposition that were observed during the Stream Habitat Assessment. Many sources of sediment were found in this section of the watershed. Between the two dirt road crossings, one being the road that leads to the Rock Run Recreation Area and another road with a pipeline, there are numerous opportunities for water to flow over the roads and in the ditches, transporting excess sediment into the stream. Finally, the headwaters begin in an agricultural area. Excess sediment can enter from plowed fields and the roads leading to them. Excess nutrients could also be a concern, but they were not tested for during sampling, nor was the possibility the ponds were causing an increase in the temperature of the water in the stream.

6.3 Middle Section

6.3.1 Water Quality

This sample point, RH #4, is located upstream of where the Pipeline tributary enters. (See Appendix A for detailed water quality). The values for pH ranged from 6.2 to 6.6.

Alkalinity was higher than acidity in the summer sample (alkalinity 21mg/L, acidity 5 mg/L) but during high flows in the spring it was lower (alkalinity 7 mg/L, acidity 8 mg/L). Conductivity ranged from 56-76 umhos. Iron (.12 - .97 mg/L), aluminum (.1-.49 mg/L) and manganese (.02-.13 mg/L) concentrations were all below state standards. There were also little to no sulfates (10-12 mg/L), which is a good indication that no mining has occurred upstream from this sampling point. Both suspended solids (5.0-7.1 mg/L) and total dissolved solids (31-40 mg/L) values indicate a non-polluted stream. This data is comparable to the BMR data collected in the 1980's (BMR). Even though there is some concern for acidity being higher than alkalinity during high flows, the overall water quality in this section of Rogues Harbor Run is excellent for aquatic life.

6.3.2 Macroinvertebrates

This section of stream had a diversity of 2.30 the only time it was sampled in this study. This point had the highest diversity (out of 5) in the watershed. It had the third largest total number of organisms. The number of taxa was 16 and and the number of EPT taxa was 12. The amount of EPT taxa was the highest in the watershed, due to the number of different stonefly families.

6.3.3 Stream Habitat

This portion of the watershed shows a drop in the stream habitat. The Stream Habitat Assessment showed a score of 170 out of a possible 200, lower than the upstream point. The assessment showed marginal conditions for stream velocity and depth combinations and for channel flow status. Also, bank vegetation protection was suboptimal.

6.3.4 Stream Reconnaissance

A pipeline crosses upstream from this point. The pipeline is also used as an ATV crossing. There were pieces of limestone on this crossing, but the limestone was washed downstream. This crossing seemed to be a rather well used trail.

Pipeline erosion

Just upstream from the pipeline crossing, an interesting geological feature occurs. The stream disappears underneath extremely large boulders and rocks for about a quarter of a mile. There were large rocks around the area. The stream could be heard in some areas in the valley but was not observable below the rocks.

Large cobbles in stream channel

Rock outcrop located in Middle Section

6.3.5 Explanation of Middle Section

Besides the low score for stream habitat this section appears to be the best in the entire watershed. One of the concerns in this portion of the watershed is that the levels of acidity are greater than alkalinity during high flows. A possible explanation could be that the watershed is affected by acid deposition during some parts of the year. The geology in the watershed is sandstone, which has very little buffering capacity. Also the stream could be seeing the effects of the acidic conditions upstream. A more thorough study would need to be completed to verify if acid deposition is a valid concern.

There is a high diversity for macroinvertebrates and the highest number of EPT taxa, which is usually a good indicator for non-polluted streams. The low stream habitat score is a concern but apparently, the categories that were scored marginal, stream velocity and depth combinations and channel flow status, were not ones that adversely affected this section when compared to the others in the stream. Another category, bank vegetation protection, was suboptimal. This could be due to the close proximity of the sample site to the pipeline.

A concern for this portion of the watershed appears to be mostly any impacts from the pipeline and the ATVs that use the trail that follows it. If the trail is used to the point no vegetation can grow then excess sediment will erode off of it. Also the lack of bank

vegetation could increase the chance for bank erosion, thus also increasing the sediment entering the stream.

6.4 Pipeline Tributary

6.4.1 Water Quality

This sample point, RH #3, is located at the mouth of this tributary. The tributary enters Rogues Harbor Run just below the area that the pipeline crosses Rogues Harbor Run. (See Appendix A for detailed water quality). The values for pH ranged from 5.9 to 6.4. Alkalinity was higher than acidity in the summer sample (alkalinity 12mg/L, acidity 3 mg/L) but during high flows in the spring it was lower (alkalinity 6 mg/L, acidity 11 mg/L). Conductivity ranged from 65-82 umhos. Iron (.05 - .49 mg/L), aluminum (.06-.33 mg/L) and manganese (.02-.09 mg/L) concentrations were all below state standards. There were also little to no sulfates (10-11 mg/L), which is a good indication that no mining has occurred in this tributary. Both suspended solids (5.0-15.7 mg/L) and total dissolved solids (28-43 mg/L) values indicate a non-polluted stream. This data is comparable to the BMR data collected in the 1980's (BMR). Even though there is some concern for acidity being higher than alkalinity during high flows, the overall water quality in this tributary of Rogues Harbor Run is excellent for aquatic life.

6.4.2 Macroinvertebrates

This section of stream had a diversity of 2.12 the only time it was sampled in this study. This point had the second highest diversity (out of 5) in the watershed even though it had the lowest total number of organisms. The number of taxa was 11 and and the number of EPT taxa was 9.

6.4.3 Stream Habitat

This portion of the watershed shows a decline in the stream habitat. The Stream Habitat Assessment showed a score of 165 out of a possible 200, the second lowest figure in the watershed. The assessment showed marginal conditions for attachment sites for macroinvertebrates, stream velocity and depth combinations and for channel flow status. Also, bank vegetation protection was suboptimal.

6.4.4 Stream Reconnaissance

This stream is almost identical to Rogues Harbor Run at this point. The pipeline travels up the southern side of the stream. There are many little tributaries or "rivulets" that cross this pipeline.

Also the pipeline tributary travels through an old logging area, therefore, some of the little tributaries run down logging roads. Also an old bridge was discovered during stream reconnaissance. It appears that it had been present there for many years.

Old bridge located on the pipeline tributary.

In the headwaters of the pipeline tributary there are many other little streams entering. Most of these are coming from wetlands. It should be mentioned that even though these were field pH measurements, the results were showing values below 5.0 even though conductivity measurements were still very low. These conditions could be caused by acid deposition and low buffering capacity of the watershed or the tannins in the wetlands. These are the same conditions found in the headwaters of Rogues Harbor Run.

Another observation is that the headwaters of the pipeline tributary begins close to a road, therefore, some of the water to the stream is supplied by the road ditches.

6.4.5 Explanation of Pipeline Tributary

Water quality, once again, is excellent for macroinvertebrates. The stream habitat study shows that the limiting factor is the lack of suitable habitat. This could explain why even though the diversity was good compared to the rest of the stream, the numbers of total individuals were low.

One of the concerns in this portion of the watershed is that the levels of acidity are greater than alkalinity during high flows. A possible explanation could be that the watershed is affected by acid deposition during some parts of the year. The geology in the watershed is sandstone, which has very little buffering capacity. Also there are many wetlands in this section. The water exiting these wetlands had a very low pH. The tannins present in these areas may be contributing to the acidic conditions. A more thorough study would need to be completed to verify if acid deposition is a valid concern.

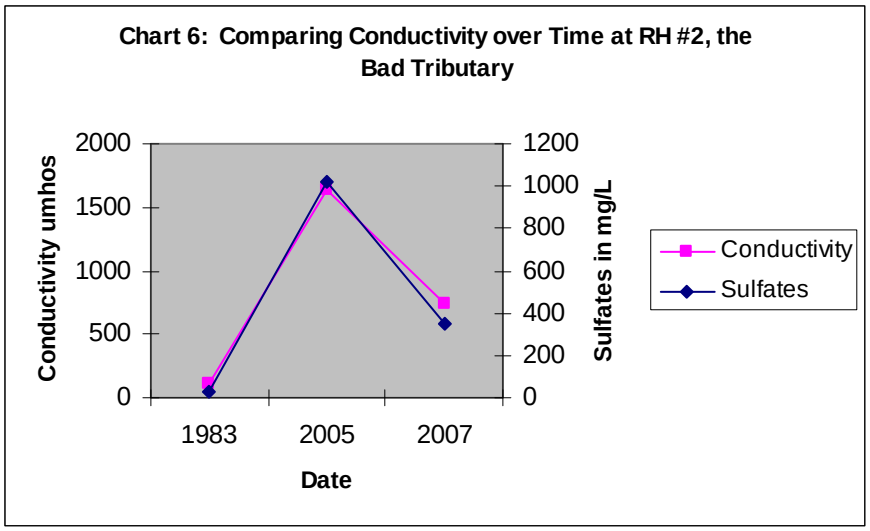
The pipeline is a big factor in this particular tributary. It parallels the stream for the majority of its length. As the pipeline travels along it is crossing many little tributaries. In fact, many of these tributaries may not have been present if it wasn't for the pipeline. This is because during the building of the pipeline and road the land was disturbed. Instead of being allowed to soak in the ground, the water from the rain starts to run along exposed areas of least resistance. This, in turn, forms these very short tributaries or rivulets. They become a concern because the greater volumes of water create a greater erosive force. This could be increasing the amount of sediment in the stream.

There are a couple other areas of less concern. First is the logging that has occurred in the watershed. Many roads left over from timbering could be causing excess sediment to enter the stream. Another concern is that the headwaters of the pipeline tributary originate close to the road; therefore, much of the water from rain can be concentrated into ditches. This also can cause an increase in erosion and in turn more sediment in the watershed.

6.5 Bad Tributary

6.5.1 Water Quality

This sample point, RH #2, is located at the mouth of this tributary. The tributary enters Rogues Harbor Run just above the dirt road crossing and railroad tracks. (See Appendix A for detailed water quality). The values for pH ranged from 7.1 to 7.5. Alkalinity (36-89 mg/L) was higher than acidity (-69 to – 17 mg/L) in both samples. It almost gave the impression that some type of treatment was occurring in this watershed. Conductivity ranged from 744-1630 omhos. Iron (.18 - .71 mg/L), aluminum (.09-.42 mg/L) and manganese (.04-.11 mg/L) concentrations were all below state standards. Sulfates ranged from 349-1021 mg/L, which is a good indication that mining impacts are occurring. Suspended solids (<6.2 mg/L) values show a non-polluted stream; however, total dissolved solids were high at 540-1483 mg/L, which indicates a pollution problem. In Chart 6 below, BMR data taken in the 1980's is compared to the sampling results in this particular study (BMR). There are definite differences over time. Both conductivity and sulfates have increased significantly. This would indicate an influence from mining.



6.5.2 Macroinvertebrates

This section of stream had a diversity of 1.33 the only time it was sampled in this study. This point had the lowest diversity in the watershed, due to the dominance of the caddisfly family *Hydropsychidae*. This family is more tolerant of pollution. It had the forth-largest total number of organisms. The number of taxa was 8 and the number of EPT taxa was 4, the lowest in the watershed.

6.5.3 Stream Habitat

No Stream Habitat Assessment was completed for this tributary.

6.5.4 Stream Reconnaissance

The bad tributary splits about halfway up the watershed. The first problem that was observed hiking up this stream was the high conductivity in the stream that was on the left (facing downstream). The headwaters start on the side of a hill where an iron mat is present as the water exits the hill. This is a great indicator of some type of mining influence in the area.

Abandoned Mine Drainage Site along Bad Tributary

Secondly, gas wells were encountered on the way up the same stream. It was first thought that excess salinity might have been raising the conductivity in the stream. Conductivity was still high above these wells so the culprit seems to be the previous mentioned mine drainage. Along with gas wells there are dirt roads that lead to the wells. The pipeline also crosses the stream. Although excess erosion from these roads was not noted at this time, this could cause a problem in the future.

Gas well located along Bad Tributary

An area that was logged was also encountered. What appears to be an old logging road crosses the tributary just after the stream splits. Each split runs through a culvert that the bottoms have rusted out. The road is grassed over and the evidence indicates it is not used very often. There is some erosion coming from the road.

In the headwaters of the tributary on the right side (facing downstream) the logging seems to have a different effect. The stream actually runs down an old logging road. This would definitely be contributing sediment to the stream. Also water running down roads is causing deeply incised channels. This is increasing erosion.

Deeply incised tributary

Lastly there is a powerline that crosses the tributary. The access road appears to be used as an ATV trail.

Powerline with road

6.5.5 Explanation of Bad Tributary

There are several concerns for the watershed health in this tributary. The alkalinity is extremely high for this area due to the mine discharge. It also has a higher pH than all the readings found in Rogues Harbor Run. It is definitely an alkaline discharge. The question is what is causing it. No mining has occurred in the watershed but there was a mining job on the other side of the hill. This could be the cause for the discharge. There is a possibility that this was a small, old deep mine used only to extract coal for a few homes that could have been in the area. Whatever the reason for it, it definitely is affecting water quality in this tributary and also in Rogues Harbor Run. Fortunately, the effect is not large enough to destroy the aquatic life located in the watershed.

The macroinvertebrates are showing the lowest diversity in the watershed. This is because of the dominance of a caddisfly from the Family *Hydropsychidae*. This family of caddisfly is very tolerant and its presence can indicate a stream that does not have the best water quality.

Erosion is a huge issue. There are so many roads dissecting this tributary from gas wells, pipelines, logging and powerlines that the chances for extra sediment making it to the stream is high. The fact that ATVs are using some of the roads does not help the situation. There were many cases of very incised channels and high eroding banks in this little tributary. Much of the excess sediment that can be found near the mouth of Rogues Harbor Run is most likely from this tributary.

Another concern would be all the gas wells located in the area. According to the Source Water Assessment best management practices are in place for the natural gas pipeline that crosses the watershed. The gas wells also have an emergency response plan in place.

Even so, an issue could arise with the wells that could have a negative affect on the stream, therefore, any major changes in conductivity should be taken seriously as they could be a sign of trouble.

6.6 Lower Section

6.6.1 Water Quality

This sample point, RH #1, is located at the mouth of Rogues Harbor Run. (See Appendix A for detailed water quality). The values for pH ranged from 6.5 to 6.8. Alkalinity (10-42 mg/L) was higher than acidity (-24 to 7 mg/L) in both samples. Conductivity ranged from 130-720 umhos. It was lowest during high flows in the spring. Iron (.15 - .2 mg/L), aluminum (.11-.12 mg/L) and manganese (.04 mg/L) concentrations were all below state standards. Sulfates ranged from 39-291 mg/L, with the lower number being recorded in the spring during high flows. The higher sulfates are the result of the bad tributary. The BMR data showed very little sulfates during the 1980's sampling (BMR). Suspended solids (<6.2 mg/L) values show a non-polluted stream. However, total dissolved solids are high during low flow conditions (68-554 mg/L), which is indicating a pollution problem from the bad tributary. Usually during drier times of the year, water from AMD sources continues to flow while in stream flows decrease. Therefore, any water that would dilute the discharge during high flows is decreased during drier times of the year.

6.6.2 Macroinvertebrates

This section of stream had a diversity of 1.83 the only time it was sampled in this study. This point had the fourth highest diversity (out of 5) in the watershed, due to the dominance in the family *Hydropsychidae*. This family is more tolerant of pollution. It had the largest total number of organisms. The number of taxa was 19 and the number of EPT taxa was 8.

6.6.3 Stream Habitat

This portion of the watershed shows a decline in the stream habitat. The Stream Habitat Assessment showed a score of 161 out of a possible 200, the lowest figure in the watershed. The assessment showed suboptimal conditions for shelter for fish and macroinvertebrates, channel alteration, sediment deposition and the condition of the left bank. It also showed marginal conditions for channel flow status.

6.6.4 Stream Reconnaissance

The Westover Municipal Authority draws their water from a dam in this area of Rogues Harbor Run. A new treatment plant was built in 2004. There are also several small springs that enter near the reservoir that have good water quality. There is an ATV path that crosses one of these small tributaries formed from the springs.

Dam in stream for Westover Municipal Authority

The pipeline crosses Rogues Harbor twice in the section. In both cases the crossings also serve as a place for ATVs to cross the stream. Above the first crossing there are smaller tributaries that enter from both sides of the stream. These have steep terrain, begin as springs and have good water quality. There are also various areas that have naturally occurring iron seeps. The water quality indicates high pH and low conductivities.

There were a couple different occurrences on the north side of the watershed. There was a rarely used ATV trail found that crosses many of the little tributaries. Also logging has occurred in the past. There is an old logging road present.

Near the mouth of Rogues Harbor there is a bridge for the railroad. Below the bridge there is large accumulation of substrate. Apparently after crossing under the bridge the stream slows down enough to deposit its sediment load. This excess sediment could be coming from the bad tributary.

Gravel bar below railroad bridge

6.6.5 Explanation of Lower Section

The protection of the Rogues Harbor Run Watershed is extremely important for Westover since the stream serves as the drinking water supply. Excess sediment in the stream can cause problems in treatment of the water. In discussions with the Municipal Authority there have been some isolated problems in the past. Fortunately, the bad tributary, which appears to have the biggest sediment concern, enters Rogues Harbor Run below the outtake for the treatment plant.

There is also concern because of the pipeline, especially due to the road that travels along it. The road and its crossings attract ATV riders to use the same path. There are also old logging roads in the area. Excess sediment could enter the stream from the roads and the crossings associated with these roads.

Water quality samples from this section show the influence of the bad tributary. Conductivity is higher than expected along with dissolved solids and sulfates. The macroinvertebrates also show the effects of the pollution. There was a dominance of a caddisfly from the Family *Hydropsychidae*. This family is very tolerant and its presence can indicate a stream that does not have the best water quality. Fortunately, the bad tributary does not enter Rogues Harbor Run until just upstream from the mouth; therefore its influence is not on the entire stream.

SECTION 7.0 NEXT STEPS

1). The main concern is working with the Rock Run Recreation Area to help educate ATV riders on environmental damage that can occur to streams with irresponsible riding. There is also a concern that riders will try to enter the Rock Run area through Rogues Harbor Run so they can ride the trails for free.

2). The watershed group may also want to work with the Rock Run Recreation Area on their access road that crosses Rogues Harbor Run. This road has caused excess sediment in the past and may continue to do so. Proper BMP's to help prevent excess runoff from the road should be installed. The size of the culvert should also be examined to confirm it is large enough for the drainage area.

3). Chest Creek Watershed Association should form a partnership with the Westover Municipal Authority. The protection of Rogues Harbor Run is important to both of these organizations. They should form a partnership to educate the various users of the timber, agricultural and natural gas resources that are located in the watershed. Educational efforts should also focus on teaching community members the importance of protecting their drinking water supply and surrounding land use.

4). The low pH and alkalinity in the headwaters is something to be looked at more closely. Like many areas in the county, sandstone is the primary rock present and offers little buffering capacity. Acid deposition may be causing the drop in the pH. The tannins present in the wetlands could be causing the drop in pH and alkalinity. A more in depth study would be needed to confirm the exact cause and solutions.

5). The pollution on the bad tributary needs to be studied more closely. According to data from BMR in 1983 the stream chemistry has worsened. It would appear to have affected the macroinvertebrate population in the tributary and possibly the population near the mouth of Rogues Harbor Run. Also, this stream should be monitored for any extreme changes in the amount of metals, acidity and alkalinity. A test for salinity would help monitor any problems with the gas wells located in this tributary.

6). Proper logging practices will help protect the stream from extra sedimentation. An educational component that concentrates on this issue is needed.

7). The Watershed group could work with the Conservation District to verify the farmer is using BMP's on the farm in the headwaters. It is possible some of the sediment issues are coming from his land.

8). Erosion from pipeline and the roads leading to the gas wells is increasing the sediment load in the watershed. The watershed group needs to look at ways to reduce this problem.

SECTION 8.0 REFERENCES

Bureau of Mining and Reclamation (BMR), Representative Water Quality Chemistry Results, Rogues Harbor Run, 1975-1983.

Pennsylvania Fish and Boat Commission (PFBC). Data from studies found in Bellefonte office.

Gwin, Dobson and Foreman, Inc. West Branch Susquehanna River Scarlift report, Commonwealth of Pennsylvania. SL 163-3. 1972

UniTec Consulting Engineers, Clearfield County Water Supply Plan 2005, Clearfield County Department of Planning, Clearfield, PA.

USDA, Soil Survey of Clearfield County Pennsylvania, 1981.

Appendix A

Parameters	Ranges looked at to make determinations of water quality in this study
pH	6.0-9.0
Conductivity	Above 400 umhos indicates possible AMD problems
Alkalinity	More than acidity
Acidity	Lower than alkalinity
Iron	Must be less than 1.5 mg/L
Manganese	Must be less than than 1.0 mg/L
Aluminum	Must be less than .75 mg/L
Sulfate	Not to succeed 250 mg/L
Suspended Solids	Less than 25 mg/L is clear water
Total Dissolved Solids (TDS)	More than 400 mg/L is considered polluted

RH #1 Mouth of Rogues Harbor Run			
	7/27/05	3/12/07	7/20/80 – BMR data
Field pH	7.1	6.8	
Lab pH	6.8	6.5	6.3
Conductivity (umhos)	720	130	
Temperature (°C)	21	2	
Alkalinity (mg/L)	42	10	14
Acidity (mg/L)	-24	7	4
Iron (mg/L)	.2	.15	.08
Manganese (mg/L)	.04	.04	.02
Aluminum (mg/L)	.11	.12	.16
Sulfate (mg/L)	291	39	5
Susp. Solids (mg/L)	<6.2	<5.0	
TDS	554	68	

RH #2 Mouth of Bad Tributary			
	7/27/05	3/12/07	8/19/83 – BMR data
Field pH	7.6	6.9	
Lab pH	7.5	7.1	6.1
Conductivity (umhos)	1630	744	115
Temperature (°C)	20	2	
Alkalinity (mg/L)	89	36	
Acidity (mg/L)	-69	-17	
Iron (mg/L)	.71	.18	.27
Manganese (mg/L)	.11	.04	.16
Aluminum (mg/L)	.42	.09	.14
Sulfate (mg/L)	1021	349	25
Susp. Solids (mg/L)	<6.2	<5.0	
TDS	1483	540	

RH #3 Mouth of Pipeline Tributary			
	7/27/05	3/12/07	5/6/83– BMR data
Field pH	6.1	5.5	
Lab pH	6.4	5.9	5.9
Conductivity (umhos)	82	65	45
Temperature (°C)	20	4	
Alkalinity (mg/L)	12	6	8
Acidity (mg/L)	3	11	4
Iron (mg/L)	.49	<.05	.01
Manganese (mg/L)	.09	<.02	.03
Aluminum (mg/L)	.33	.06	.02
Sulfate (mg/L)	10	11	5
Susp. Solids (mg/L)	15.7	<5.0	
TDS	43	28	

RH #4 Rogues Harbor Run above Pipeline Tributary			
	7/27/05	3/12/07	8/18/83– BMR data
Field pH	6.3	5.8	
Lab pH	6.6	6.2	5.8
Conductivity (umhos)	76	56	
Temperature (°C)	20	4	
Alkalinity (mg/L)	21	7	10
Acidity (mg/L)	5	8	
Iron (mg/L)	.97	.12	.06
Manganese (mg/L)	.13	.02	.01
Aluminum (mg/L)	.49	.1	.13
Sulfate (mg/L)	<10	12	20
Susp. Solids (mg/L)	7.1	<5.0	
TDS	50	31	

RH #5 Headwaters of Rogues Harbor Run			
	7/27/05	3/12/07	8/18/83- BMR data
Field pH	5.9	5.2	
Lab pH	6.0	5.5	5.7
Conductivity (umhos)	50	63	60
Temperature (°C)	22	2	
Alkalinity (mg/L)	9	5	3
Acidity (mg/L)	8	12	26
Iron (mg/L)	2.02	.15	.46
Manganese (mg/L)	.16	.11	.35
Aluminum (mg/L)	.27	.25	.26
Sulfate (mg/L)	<10	12	10
Susp. Solids (mg/L)	<6.2	<5.0	
TDS	40	31	

Appendix B

Macroinvertebrate Sampling at RH 1 – Mouth of Rogues Harbor Run	
Date sampled	No date listed but it is within the dates of the other samples
Ephmeroptera	
Baetidae	14
Plecoptera	
Capniidae	2
Leuctridae	39
Perlodidae	9
Peltoperlidae	2
Pteronarcyidae	
Tricoptera	
Hydropsychidae	100
Polycentropodidae	30
Rhyacophilidae	3
Odonata	
Aeshnidae	3
Gomphidae	2
Libellulidae	2
Diptera	
Ceratopogonidae	3
Simulidae	1
Tipulidae	4
Coleoptera	
Elmidae	2
Megaloptera	
Corydalidae	1
Hemiptera	
Veliidae	1
Crayfish	6
Scud	1
Total number of organisms	225
Diversity (Based on Family)	1.83
Number of taxa	19
Number of EPT taxa	8

Macroinvertebrate Sampling at RH 2 – Mouth of Bad Tributary	
Date sampled	7/26/05
Plecoptera	
Leuctridae	4
Peltoperlidae	3
Tricoptera	
Hydropsychidae	43
Polycentropodidae	5
Diptera	
Ceratopogonidae	2
Dixidae	3
Simuliidae	2
Coleoptera	
Elmidae	1
Total number of organisms	63
Diversity (Based on Family)	1.33
Number of taxa	8
Number of EPT taxa	4

Macroinvertebrate Sampling at RH 3 – Mouth of Pipeline Tributary	
Date sampled	6/23/05
Ephmeroptera	
Baetidae	1
Ephemerellidae	7
Heptagennidae	4
Plecoptera	
Nemouridae	3
Perlidae	1
Leuctridae	3
Peltoperlidae	1
Tricoptera	
Philopotamidae	10
Lepidostomatidae	1
Coleoptera	
Elmidae	6
Pseohenidae	1
Crayfish	3
Total number of organisms	41
Diversity (Based on Family)	2.12
Number of taxa	11
Number of EPT taxa	9

Macroinvertebrate Sampling at RH 4 – Rogues Harbor above Pipeline Tributary	
Date sampled	6/23/05
Ephmeroptera	
Baetidae	1
Leptophlebidae	4
Plecoptera	
Leuctridae	7
Perlidae	1
Perlodidae	15
Peltoperlidae	3
Pteronarcyidae	1
Chloroperlidae	2
Tricoptera	
Hydropsychidae	4
Philopotamidae	6
Leptoceridae	1
Polycentropodidae	23
Diptera	
Simulidae	2
Dixidae	2
Coleoptera	
Elmidae	9
Crayfish	4
Total number of organisms	85
Diversity (Based on Family)	2.30
Number of taxa	16
Number of EPT taxa	12

Macroinvertebrate Sampling at RH 5 – Headwaters of Rogues Harbor Run	
Date sampled	7/6/05
Ephmeroptera	
Heptagennidae	2
Oligoneuriidae	
Plecoptera	
Capniidae	13
Leuctridae	83
Perlodidae	6
Tricoptera	
Hydropsychidae	25
Leptoceridae	2
Philopotamidae	2
Polycentropodidae	22
Rhyacophilidae	1
Diptera	
Ceratopogonidae	15
Simuliidae	5
Coleoptera	
Elmidae	3
Crayfish	8
Total number of organisms	187
Diversity (Based on Family)	1.85
Number of taxa	13
Number of EPT taxa	9

Appendix C

Stream Habitat Assessment Procedure

(Adapted from Volunteer Stream Monitoring: A Methods Manual, United States Environmental Protection Agency, Office of Water, Draft Document #EPA 841-B-97-003, November 1997.)

Each time you conduct macroinvertebrate sampling you will also assess the stream habitat for fish, macroinvertebrates, and plants. Just as with macroinvertebrate sampling the type of stream habitat - rocky bottom versus muddy bottom - affects your assessment procedures.

Rocky Bottom Habitats

Conduct the habitat assessment twice a year, in the spring and in the fall, at the site that you used for your macroinvertebrate sampling.

1. **Attachment sites for macroinvertebrates** are essentially the amount of living space or hard substrates (rocks, snags, etc.) available for aquatic insects and snails. Many insects begin their life underwater in streams and need to attach themselves to rocks, logs, branches, or other sub-merged substrates. In streams unimpaired by pollution, the greater the variety and number of available living spaces or attachment sites, the greater the variety of insects the stream habitat could support. Optimally, cobble should predominate and boulders and gravel should be common. The availability of suitable living spaces for macroinvertebrates decreases as cobble becomes less abundant and boulders, gravel, or bedrock become more prevalent.

2. **Embeddedness** refers to the extent that rocks (gravel, cobble, and boulders) are surrounded by, covered, or sunken into the silt, sand, or mud of the stream bottom. As rocks become embedded, fewer living spaces are available to macroinvertebrates and fish for shelter, spawning and egg incubation. To estimate the percent of embeddedness, observe the amount of silt or finer sediments overlying and surrounding the rocks. If kicking does not dislodge the rocks or cobbles, they might be greatly embedded.

3. **Shelter for fish** and macroinvertebrates includes the relative quantity and variety of natural structures in the stream, such as fallen trees, logs, and branches; root wads; large cobble and boulders; and undercut banks that are available to fish for hiding, sleeping, or feeding. A wide variety of submerged structures means more living spaces in a stream and the more types of fish and other aquatic life the stream can support. ***Assess the stream as far as you can see.***

4. **Channel alteration** is a measure of large-scale changes in the shape of the stream channel. Many streams in urban and agricultural areas have been straightened, deepened, dredged, or diverted into concrete channels, often for flood control purposes. Such streams have far fewer natural habitats for fish, macroinvertebrates, and plants than do naturally meandering streams. Channel

alteration is present when the stream runs through a concrete channel; when artificial embankments, riprap, and other forms of artificial bank stabilization or structures are present; when the stream is very straight for significant distances; when dams, bridges, and flow-altering structures such as stormwater pipes are present; when the stream is of uniform depth due to dredging; and when other such changes have occurred. Signs that indicate the occurrence of dredging include straightened, deepened, and otherwise uniform stream channels, as well as the removal of streamside vegetation to provide dredging equipment access to the stream. ***Assess channel alteration up and down the stream as far as you can see.***

5. **Sediment deposition** is a measure of the amount of sediment that has been deposited in the stream channel and the changes to the stream bottom that have occurred as a result of the deposition. High levels of sediment deposition create an unstable and continually changing environment that is unsuitable for many aquatic organisms. Sediments are naturally deposited in areas where the stream flow is reduced, such as pools and bends, or where flow is obstructed. These deposits can lead to the formation of islands, shoals, or point bars (sediments that build up in the stream, usually at the beginning of a meander) or can result in the complete filling of pools. To determine whether sediment deposits are new, look for vegetation growing on them: new sediments will not yet have been colonized by vegetation.

6. **Stream velocity and depth combinations** are important to the maintenance of healthy aquatic communities. Fast water increases the amount of dissolved oxygen in the water, keeps pools from being filled with sediment, and helps food items like leaves, twigs, and algae move more quickly through the aquatic system. Slow water provides spawning areas for fish and shelters macroinvertebrates that might be washed downstream in high stream velocities. Similarly, shallow water tends to be more easily aerated (i.e. holds more oxygen), but deeper water stays cooler longer. Thus the best stream habitat includes all of the following velocity/depth combinations and can maintain a wide variety of organisms.

   * slow (<1 ft/sec or <0.3048 m/sec), shallow (0.4572 m or <1.5 ft);* fast, deep;
   * slow, deep;* fast, shallow

7. **Channel flow status** is the percentage of the existing channel that is filled with water. The flow status changes as the channel enlarges or as flow decreases as a result of dams and other obstructions, diversions for irrigation, or drought. When water does not cover much of the streambed, the living area for aquatic organisms is limited.

For the next three parameters, evaluate the condition of the right and left stream banks separately. Define the "left" and "right" banks by standing at the downstream end of your study stretch and looking upstream. Each bank is evaluated on a scale of 0-10.

8. **Bank vegetative protection** measures the amount of the stream bank that is covered by vegetation. The root systems of plants growing on stream banks help hold soil in place, reducing erosion. Vegetation on banks provides shade for fish and macroinvertebrates and serves as a food source by dropping leaves and other organic matter into the stream. Ideally, a variety of vegetation should be present, including trees, shrubs, and grasses. Vegetative disruption can occur when the grasses and plants on the stream banks are mowed or grazed, or when the trees and shrubs are cut back or cleared.

9. **Condition of banks** measures erosion potential and whether the stream banks are eroded. Steep banks are more likely to collapse and suffer from erosion than are gently sloping banks and are therefore considered to have a high erosion potential. Signs of erosion include crumbling, unvegetated banks, exposed tree roots, and exposed soils.

10. **The riparian vegetative zone width** is defined as the width of vegetation from the edge of the stream bank. The riparian vegetative zone is a buffer to prevent pollutants from entering a stream. It also controls erosion and provides stream habitat and nutrient input to the stream. A wide, relatively undisturbed riparian vegetative zone helps maintain a healthy stream system; narrow, far less useful riparian zones occur when roads, parking lots, fields, lawns, and other cultivated areas, bare soil, rocks or buildings are near the stream bank. The presence of "old fields" (i.e. previously developed agricultural fields allowed to revert to natural conditions) should be rated higher than fields in continuous or periodic use. In arid areas, the riparian vegetative zone can be measured by observing the width of the area dominated by riparian or water-loving plants, such as willows, marsh grasses, and cotton wood trees.

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling

(p 1 of 3)

ALL of the following data sheets MUST be completed for the web host.

Date: Year _____ Month _____ Day_____ Time: Hour _____ Minute _____

Site ID #_____ Volunteer(s) ID #(s) _____ Recorder ID # _____

Habitat Parameter	Category Optimal	Suboptimal	Marginal	Poor
1. Attachment Sites for Macro-invertebrates	Well-developed riffle and run; riffle is as wide as stream and length extends 2 times the width of stream; cobble predominates; boulders and gravel common.	Riffle is as wide as stream but length is less than 2 times width; cobble less abundant; boulders and gravel common.	Run area may be lacking; riffle not as wide as stream and length is less than 2 times the stream width; gravel or large boulders and bedrock prevalent; some cobble present.	Riffles or run virtually nonexistent; large boulders and bedrock prevalent; cobble lacking.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
2. Embedded-ness	Fine sediment surrounds and fills in 0-25% of the living spaces around and in between the gravel, cobble, and boulders.	Fine sediment surrounds and fills in 25-50% of the living spaces around and in between the gravel, cobble, and boulders.	Fine sediment surrounds and fills in 50-75% of the living spaces around and in between the gravel, cobble, and boulders.	Fine sediment surrounds and fills in more than 75% of the living spaces around and in between the gravel, cobble, and boulders.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
3. Shelter for Fish & Macro-invertebrates	Snags, submerged logs, undercut banks, cobble and large rocks, or other stable habitat are found in over 50% of the site.	Snags, submerged logs, undercut banks, cobble and large rocks or other stable habitat are found in over 30-50% of the site.	Snags, submerged logs, undercut banks, cobble and large rocks or other stable habitat are found in over 10-30% of the site.	Snags, submerged logs, undercut banks, cobble and large rocks, or other stable habitat are found in less than 10% of the site.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Total _____ (1-3)

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling *(p 2 of 3)*

Habitat Parameter	Category			
	Optimal	Suboptimal	Marginal	Poor
4. Channel Alteration	Stream straightening, dredging, artificial embankments, dams or bridge abutments absent or minimal; stream with meandering pattern.	Some stream straightening, dredging, artificial embankments or dams usually in areas of bridge abutments; no evidence of recent channel alteration activity.	Artificial embankments present to some extent on both banks; at 40 to 80% of stream site straightened, dredging, or other-wise altered.	Banks shored with gabion or cement; over 80% of the stream site straight-ened and disrupted.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from coarse gravel; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel coarse sand on old and new bars; 30-50% of the bottom affected; sediment deposits at stream obstructions and bends; moderate deposition in pools.	Heavy deposits of fine material, increased bar development; more bottom affected; pools almost absent due to substantial sediment deposition.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Stream Velocity & Depth Combinations	Slow (<1 ft/s)/deep (>1.5 ft); slow/ shallow; fast/deep; fast/shallow combinations all present.	3 of the 4 velocity/ depth combinations are present; fast current areas generally dominate.	Only 2 or the 4 velocity/depth combinations present. Score lower if fast current areas missing.	Dominate by 1 velocity/ depth category (usually slow/shallow areas).
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Flow Status	Water reaches base of both lower banks and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; <25% of channel substrate is exposed.	Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Total_____ (4-7)

Date

_____/_____/_____

Site ID # _____

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling *(p 3 of 3)*

Habitat Parameter	Category			
	Optimal	Suboptimal	Marginal	Poor
8. Bank Vegetative Protection Note: determine left or right side by facing upstream (score each bank)	More than 90% of streambank surfaces covered by natural vegetation, including trees, shrubs, or other plants; vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by natural vegetation, but one class of plant is not well-represented; some vegetative disruption evident; more than one-half of the potential plant stubble remaining.	50-70% of the streambank surfaces covered by vegetation; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height.
Score: Score:	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	2 1 0 2 1 0
9. Condition of Banks (score each bank)	Banks stable; no evidence of erosion or bank failure; little potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; up to 60% of banks in site have areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank collapse or failure; 60-100% of bank has erosional scars
Score: Score:	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	2 1 0 2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >50 feet; no evidence of human activities (i.e. parking lots, roadbeds, clear-cuts, mowed areas, or crops) within the riparian zone.	Width of riparian zone 35-40 feet; little evidence of human activities (i.e. parking lots, roadbeds, clear-cuts, mowed areas, or crops) within the riparian zone.	Width of riparian zone 20-35 feet; moderate evidence of human activities (i.e. parking lots, roadbeds, clear-cuts, mowed areas, or crops) within the riparian zone.	Width of riparian zone <20 feet; much evidence of human activities (i.e. parking lots, roadbeds, clear-cuts, mowed areas, or crops) within the riparian zone.
Score: Score:	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	2 1 0 2 1 0

Total _____ (8-10)
Total _____ (1-3)
Total _____ (4-7)
_____ **Total (out of possible 200)**

Date

Summary Table - Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling (Senior Environment Corps protocol)

Appendix D

Summary Table - Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling (Senior Environment Corps protocol)

Site	Habitat Score (Highest score is 200)
RH #1 Mouth of Rogues Harbor	161
RH #3 Mouth of Pipeline Tributary	165
RH #4 Rogues Harbor above Pipeline Tributary	170
RH #5 Headwaters of Rogues Harbor Run	182

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling (Senior Environment Corps protocol) – RH #1 –Mouth of Rogues Harbor Run

Category				
Habitat Parameter	Optimal 16-20	Suboptimal 11-15	Marginal 6-10	Poor 1-5
Attachment Sites for Macroinvertebrates	18			
Embeddedness	19			
Shelter for Fish and Macroinvertebrates		14		
Channel Alteration		14		
Sediment Deposition		14		
Stream Velocity and Depth Combinations	17			
Channel Flow Status			10	
Category				
Habitat Parameter	Optimal 9-10	Suboptimal 6-8	Marginal 3-5	Poor 0-2
Bank Vegetative Protection (face upstream to determine side)	Left bank – 9 Right bank – 9			
Conditions of banks	Right bank – 10	Left bank – 7		
Riparian Vegetative Zone Width	Left bank – 10 Right bank – 10			
Total	161 out of a possible 200			

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling (Senior Environment Corps protocol) – RH #3 –Mouth of Pipeline Tributary

Category				
Habitat Parameter	Optimal 16-20	Suboptimal 11-15	Marginal 6-10	Poor 1-5
Attachment Sites for Macroinvertebrates		14		
Embeddedness	19			
Shelter for Fish and Macroinvertebrates	20			
Channel Alteration	20			
Sediment Deposition	20			
Stream Velocity and Depth Combinations			9	
Channel Flow Status			9	
Category				
Habitat Parameter	Optimal 9-10	Suboptimal 6-8	Marginal 3-5	Poor 0-2
Bank Vegetative Protection (face upstream to determine side)		Left bank – 7 Right bank – 7		
Conditions of banks	Left bank – 10 Right bank – 10			
Riparian Vegetative Zone Width	Left bank –10 Right bank – 10			
Total	165 out of a possible 200			

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling (Senior Environment Corps protocol) – RH #4 –Rogues Harbor above Pipeline Tributary

Category				
Habitat Parameter	Optimal 16-20	Suboptimal 11-15	Marginal 6-10	Poor 1-5
Attachment Sites for Macroinvertebrates	18			
Embeddedness	19			
Shelter for Fish and Macroinvertebrates	20			
Channel Alteration	20			
Sediment Deposition	20			
Stream Velocity and Depth Combinations			10	
Channel Flow Status			9	
Category				
Habitat Parameter	Optimal 9-10	Suboptimal 6-8	Marginal 3-5	Poor 0-2
Bank Vegetative Protection (face upstream to determine side)		Left bank –7 Right bank –7		
Conditions of banks	Left bank –10 Right bank –10			
Riparian Vegetative Zone Width	Left bank – 10 Right bank –10			
Total	170 out of a possible 200			

Stream Habitat Assessment Field Data Sheet – Rocky Bottom Sampling (Senior Environment Corps protocol) – RH #5 –Headwaters of Rogues Harbor Run

Category				
Habitat Parameter	Optimal 16-20	Suboptimal 11-15	Marginal 6-10	Poor 1-5
Attachment Sites for Macroinvertebrates	18			
Embeddedness	17			
Shelter for Fish and Macroinvertebrates	20			
Channel Alteration	16			
Sediment Deposition		15		
Stream Velocity and Depth Combinations	18			
Channel Flow Status	19			
Category				
Habitat Parameter	Optimal 9-10	Suboptimal 6-8	Marginal 3-5	Poor 0-2
Bank Vegetative Protection (face upstream to determine side)	Left bank –10 Right bank – 10			
Conditions of banks	Left bank – 10 Right bank – 9			
Riparian Vegetative Zone Width	Left bank – 10 Right bank – 10			
Total	182 out of a possible 200			

Appendix E

Watershed Assessment of Rogues Harbor Run

Organization Name: Clearfield County Conservation District
Donna Carnahan- Watershed Specialist
(814) 765-8130

The Rogues Harbor Run Assessment and Conservation Plan is:

- An 18-month effort to determine the ecological condition of the water in Rogues Harbor Run.
- A project conducted by the Clearfield County Conservation District and funded by a grant from the Coldwater Heritage Partnership on behalf of the PA Department of Conservation and Natural Resources, the PA Fish and Boat Commission, the Western PA Watershed Program, and PA Trout Unlimited.

Objectives of the Assessment:

- To study the environmental condition of the Rogues Harbor Run watershed;
- To study the water quality and biological indicators of Rogues Harbor Run;
- To describe the physical characteristics of the watershed;
- To develop a plan for conserving and protecting the Rogues Harbor Run watershed.

What will ***NOT*** happen on your property:

- The study is *not* done to regulate or enforce any laws.
- The study will *not* associate any finding with property owners.
- The study will *not* degrade your property value or destroy wildlife habitat.

Watershed Facts:

- Rogues Harbor Run is designated as an Exceptional Value Coldwater Fishery.
- It supplies drinking water for the town of Westover.
- Rogues Harbor Watershed covers 177 acres and is a tributary to the Chest Creek Watershed, which spans over Clearfield County and its headwaters are located in a small portion of northern Cambria County.

- An ATV park has been proposed in the watershed next to Rogues Harbor. There is concern that ATV's would travel into Rogues Harbor, which could lead to sedimentation of the stream and degrade stream quality.

How research will be conducted:

- During the 18-month period, team members will designate sites to collect water samples.
- The site will be left in the same condition as found.
- All access will be done by foot only.
- The Clearfield County Conservation District will complete a detailed analysis of the field data and generate a final report which will be available to the public
- There will be a public meeting held to review concerns and to inform the public on the research conducted at Rogues Harbor Run.

The end result will be:

- A report that describes the overall condition of Rogues Harbor Run. The information gained will be used to develop a plan to preserve and protect the watershed, the water quality, and the wildlife in the stream.

IF YOU HAVE ANY PROBLEMS, COMMENTS OR CONCERNS WITH EMPOYEES OF THE CLEARFIELD COUNTY CONSERVATION DISTRICT ACCESSING ROGUES HARBOR RUN AND ITS TRIBUTARIES ON YOUR PROPERTY,

Please contact Donna Carnahan at (814) 765-8130.

Thanks for your support in helping clean Pennsylvania's waterways.

Date: _____

Map # _____
Parcel # _____

Appendix F