CHESAPEAKE BAY
TRIBUTARY STRATEGY PLAN

Nutrient and Sediment Reduction Activities
for
Cambria and Indiana Counties

Prepared by the Cambria County Conservation District

February 2005

"The Bay starts here!"

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I. INTRODUCTION

A. County Description (Bay Portion)

Demographics

The Clearfield Creek Watershed encompasses 161.63 mi^2 or 103,442.93acres **(Figure 1.)** in Cambria County and has an approximate population size of 16,500. The watershed contains 13 municipalities of which most are rural. The land use characteristics are mainly mining and farming both livestock and cash crop. In the headwaters, the dairy industry is predominant, while the middle and confluence sections, are influenced by mining. For the agricultural profile see the attached map **(Figure 2.)**.

The Chest Creek Watershed encompasses 73.42 mi^2 or 46,987.54 acres **(Figure 1.)** in Cambria County and has an approximate population size of 21,700. The watershed contains 12 municipalities of, which most are rural. The land use characteristics in this watershed are primarily farming livestock and cash crop and mining impacts a small portion. The watershed has a variety of agricultural farming from dairy to pig and even sheep. For the agricultural profile see the attached map **(Figure 2.)**.

The West Branch of the Susquehanna River encompasses 46.80 mi^2 or 29,950 acres **(Figure 1.)** in Cambria County and 62.70 mi^2 or 40,130.79 acres in Indiana County. The Cambria portion of the watershed populates approximately 7,900 people, while the Indiana County portion populates approximately 8,200 people. In Cambria County there are 4 municipalities and in Indiana County there are 6 municipalities. In both counties the municipalities are primarily rural. The land use characteristics primarily are mining and farming. For the agricultural profile see the attached map **(Figure 2.)**.

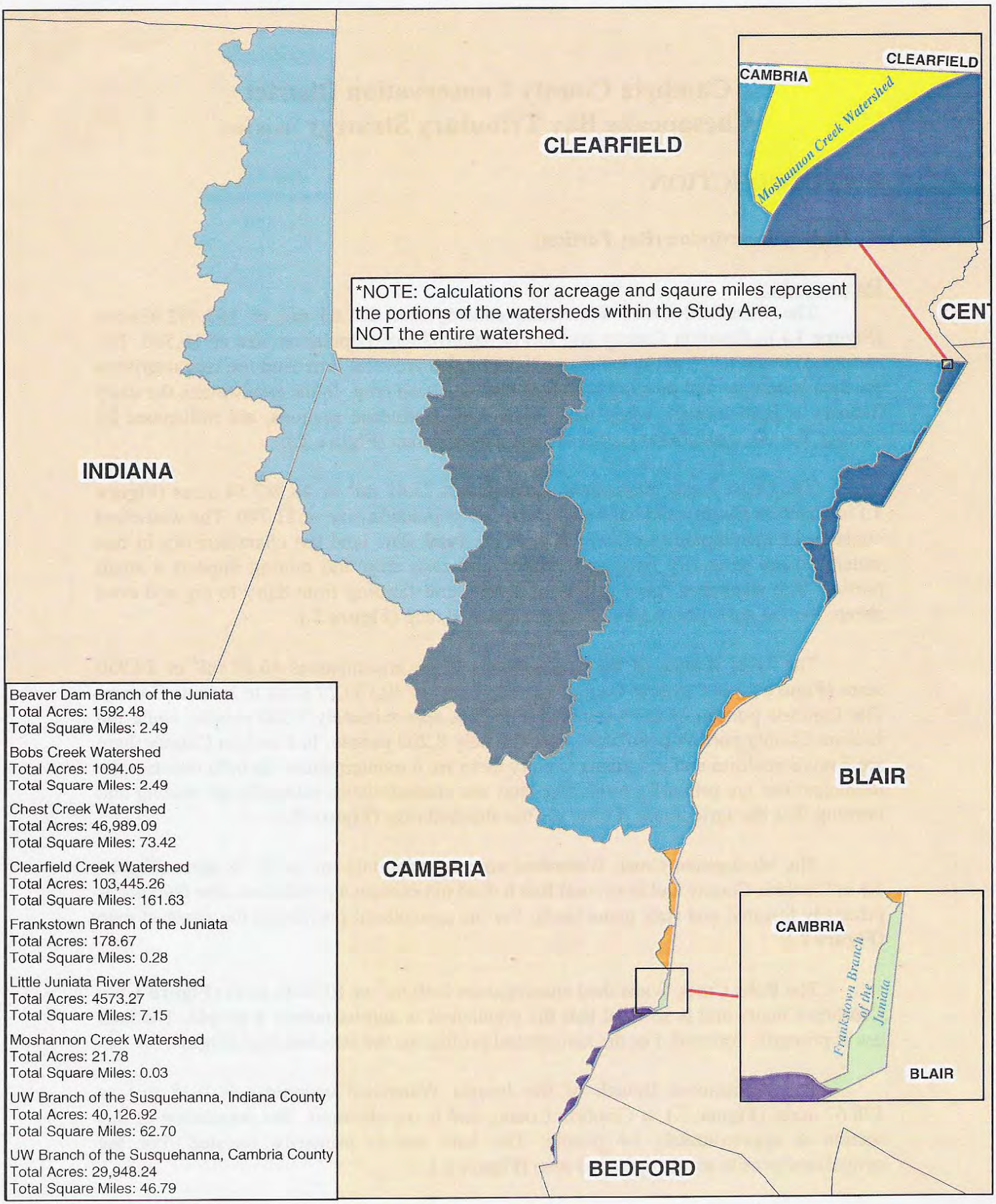
The Moshannon Creek Watershed encompasses 0.03 mi^2 or 21.78 acres **(Figure 1.)** in Cambria County and is so rural that it does not contain a population. The land use is primarily forested and state game lands. For the agricultural profile see the attached map **(Figure 2.)**.

The Bobs Creek Watershed encompasses 2.49 mi^2 or 1094.05 acres **(Figure 1.)** in Cambria County and is so rural that the population is approximately 8 people. The land use is primarily forested. For the agricultural profile see the attached map **(Figure 2.)**.

The Frankstown Branch of the Juniata Watershed encompasses 0.28 mi^2 or 178.67 acres **(Figure 1.)** in Cambria County and is mainly rural. The population in this section is approximately 14 people. The land use is primarily forested. For the agricultural profile see the attached map **(Figure 2.)**.

Chesapeake Bay Tributary Strategy

Figure 1



Beaver Dam Branch of the Juniata
Total Acres: 1592.48
Total Square Miles: 2.49

Bobs Creek Watershed
Total Acres: 1094.05
Total Square Miles: 2.49

Chest Creek Watershed
Total Acres: 46,989.09
Total Square Miles: 73.42

Clearfield Creek Watershed
Total Acres: 103,445.26
Total Square Miles: 161.63

Frankstown Branch of the Juniata
Total Acres: 178.67
Total Square Miles: 0.28

Little Juniata River Watershed
Total Acres: 4573.27
Total Square Miles: 7.15

Moshannon Creek Watershed
Total Acres: 21.78
Total Square Miles: 0.03

UW Branch of the Susquehanna, Indiana County
Total Acres: 40,126.92
Total Square Miles: 62.70

UW Branch of the Susquehanna, Cambria County
Total Acres: 29,948.24
Total Square Miles: 46.79

Legend

- Beaver Dam Branch of the Juniata
- Bobs Creek
- Chest Creek
- Clearfield Creek
- Frankstown Branch of the Juniata
- Little Juniata River
- Mosannon Creek
- UW Branch of the Susquehanna

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Data sources used:
Cambria County GIS 2
PASDA

The Beaver Dam Branch of the Juniata Watershed encompasses 2.49 mi^2 or 1592.48 acres **(Figure 1.)** in Cambria County and is mainly rural. The population in this section is approximately 147 people. The land use is primarily forested. For the agricultural profile see the attached map **(Figure 2.)**.

The Little Juniata River Watershed encompasses 7.15 mi^2 or 4,573.27 acres **(Figure 1.)** in Cambria County and is mainly rural. The population in this section is approximately 2 people. The land use is primarily forested. For the agricultural profile see the attached map **(Figure 2.)**.

Geology/Soils

The Plan area is situated within the Appalachian Plateaus Physiographic Province in Pennsylvania. The study is a major portion of the headwaters of the Upper West Branch Susquehanna River including West Branch Susquehanna River, Chest Creek and Clearfield Creek headwaters to the Cambria County line. The surface geology consists of the Allegheny Group, and the Casselman, Glenshaw, Pottsvile, Mauch Chunk, Loyalhanna and Bergoon formations.

Much of the plan area is forested. This section is underlain by sandstone and conglomerate of the Pottsville and Pocono Groups and sedimentary rocks of the Mauch Chunk and Conemaugh Groups. Streams whose watersheds are comprised mainly of the Pottsville Group sandstone have very little buffering capacity and subject to acid precipitation.

Uplands and Valleys of Mixed Land Use section is a dissected upland plateau characterized by woodlands and agriculture. Shale, siltstone, sandstone, and coal are exposed. Soils are of low to moderate fertility.

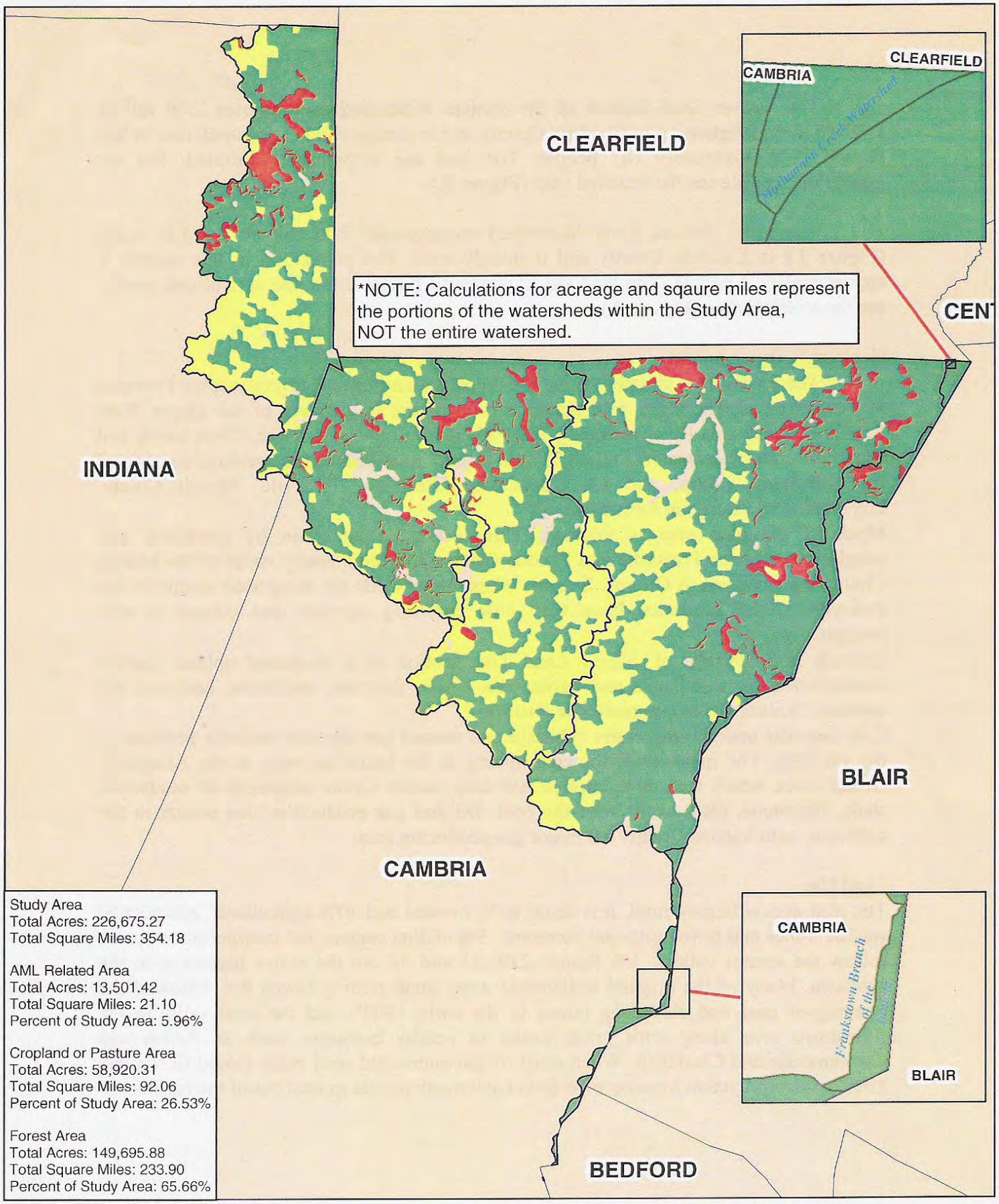
Coal deposits underlie the entire subbasin and natural gas deposits underlie portions of the subbasin. The majority of the coal mining in the basin has been in the Allegheny Group coals, which were both surface and deep mined. Cyclic sequences of sandstone, shale, limestone, clay, occur with the coal. Oil and gas production also occurs in the subbasin, with Indiana County the major gas-producing area.

Land Use

The plan area is largely rural. It is about 60% wooded and 30% agriculture. Abandoned surface mines and refuse piles are common. Population centers and transportation routes follow the stream valleys. US Routes 219, 53 and 36 are the major highways in the subbasin. Many of the original settlements were small mining towns that followed the opening of coal and clay deep mines in the early 1800's and the steel mills in the Johnstown area along with brick works in nearby boroughs such as Patton and Curwensville and Clearfield. When most of the mines and steel mills closed in the late 1900's, unemployment became widespread and many people moved out of the region.

Chesapeake Bay Tributary Strategy

Figure 2



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Natural/Recreational Resources:

1. State owned recreational or scenic lands:
    - Prince Gallitzin State Park which contains a 1,600 acres lake, a warm water fishery.
    - State Game Lands #184 on the Allegheny Ridge west of Altoona
    - State Game Lands #279 north of Cresson Borough
    - State Game Lands #108 adjacent to Prince Gallitzin State Park to the Allegheny Ridge northwest of Altoona
    - State Game Lands #158 north of Blandburg
    - State Game Lands #120 north of St. Lawrence
    - State Game Lands #198 south of Cresson on the Allegheny Ridge
    - State Game Lands # 26 east of Beaverdale on the Allegheny Ridge
    - State Game Lands #174 northwest corner of Indiana County
2. Federal Recreational Areas:
    - Allegheny Portage Railroad National Historic Site (Lemon House and Plane #6)
3. Cambria County Conservation and Recreation Authority owned recreational area:
    - Rock Run Recreation Area a 6000 acre tract on the Clearfield/Cambria County line east of US route 36.

Fisheries: - PA Fish & Boat Commission Data

1. Approved Trout Waters

Cambria: Beaverdam Run, Chest Creek, Clearfield Creek (confluence with Beaverdam Run near Ashville downstream to T-510 Bridge at Condron), Killbuck Run, Laurel Lick Run, Little Killbuck Run.

Indiana: Cush Creek, Cush Cushion Creek.

2. Class A Wild Trout Streams

Cambria:

Sandy Run 308C Wild Brook Trout Sec 01
Limits: From hdwtrs dwnst to mouth
Length: 3.5 km; 2.2 mi. T-Alk: 40
Owner: 86% Public Nearest Town: Frugality 14% Pvt. Open

Indiana: -none

3. Delayed Harvest Areas

Cambria:

Chest Creek - *Delayed Harvest Artificial Lures Only* - 1.8 miles; From northern Patton Borough line downstream to SR 4022 bridge at Thomas Mills.

Indiana: - none

4. Stream Sections Supporting Natural Reproduction of Trout Revised - February 2002

Cambria:

Beaverdam Rn Clearfield Ck 2 08 C Sr1011 Mouth
Duclos Rn Chest Ck 1 08 B Headwaters Mouth
Killbuck Rn Glendale Lk 1 08 C Headwaters Conf Ltl Killbuck Rn
Killbuck Rn Glendale Lk 2 08 C Conf Ltl Killbuck Rn Mouth
Killbuck Rn Ltl Killbuck Rn 1 08 C Headwaters Mouth
Laurel Lick Rn Chest Ck 1 08 B Headwaters Inflow Veterans Dm
Laurel Rn Clearfield Ck 2 08 C 550m Upstrm Sgl #184 Boundary Mouth
Sandy Rn Clearfield Ck 1 08 C Headwaters Mouth

Indiana: - none

5. PA Wilderness Trout Waters

Cambria/Clearfield:

Rogues Harbor Run 308B Wild Brook Trout Sec 01
Limits: From hdwtrs dwnst to mouth
Length: 5.4 km; 3.3 mi DER WQ Class: EV
Biomass Class: B ST = 25.94 kg/ha
Surveyed: 1990

Indiana: - none

<u>DEP Chapter 93 Exceptional Value (EV) and High-Quality (HQ) Stream Listings:</u>

- EV: Rogues Harbor Run (Chest Creek - Cambria Co.)

.

- HQ-CWF: Chest Creek Basin, Patton Water Supply (Cambria Co.)
  Cush Cushion Creek (Chest Creek - Indiana Co.)

B. Forest Management

Timber Harvesting and the primary processing of hardwood lumber are an active part of the local economy in the planned area. The study area has a rich history of logging. Because of that, it is included in Pennsylvania's Lumber Heritage Park. There are many second and third generation operators in the region. Cambria County is 60% forested and Indiana County portion, about the same.

The cutting of the trees does not create erosion and sedimentation problems, but the creation of roads and log landings can, if not done properly. A current "National Water Quality Inventory" reports that forestry activities contributes to approximately 90% of the water quality problems in surveyed rivers and streams nationwide. Sources of sediment pollution include removal of streamside vegetation, road construction and use, and mechanical preparation for the planting of trees (a southern and western practice). Road construction and road use are the primary sources of non-point source pollution contributing up to 90% of the total sediment from timber harvesting operations. Cutting of trees in the area beside a stream can elevate water temperature and destabilize streambanks. These changes can have a negative effect on aquatic life by limiting shade, food and shelter.

The two conservation districts involved with this plan have recognized both the economic importance of the forest industry and the impacts that this industry can have on the environment. The Cambria County Conservation District board has a retired Bureau of Forestry District Forester and a sawmill owner as directors. There is another sawmill owner as an associate director. Indiana County has a Consulting Forester as an associate director. They all understand forest ecology, silvaculture and the nature of the logging industry with regard to the extraction of trees from the forest and what it takes to get the logs to the mill in an environmentally friendly way.

The Cambria County Conservation District developed the first Erosion and Sediment Pollution Control Manual for Timber Harvesting in Pennsylvania over thirty years ago. Today the "Timber Harvester's Action Packet" used by the forest industry across PA still contains many of the same principles of the original manual. Joint Workshops have been conducted in cooperation with the forest industry to educate the logger as to the latest and most effective best management practices (BMP) that work in the region.

Pennsylvania's Tree Farm Program and the Forest Stewardship Program are also active parts of the conservation district program goals. Landowners have a responsibility for forest activities on their property too. The two programs promote many BMPS' to assist landowners in making sound management choices for their woodlot. M. K. Goddard Forest Management Award nominees are selected annually by the counties. Cambria County had the state winner in 2003 with the Respet Tree Farm.

C. Trends of Significance to Water Quality

Agriculture Specific

- Farms located in our Bay Watershed are usually 130 to 150 acres in size. There a number of dairy and beef operations while there are also a large number of potato farms located in Cambria County.

- Best Management Practices – The BMP's installed from different programs (Bay, EQIP, Growing Greener) were ag waste storages, heavy use area protection, stripcropping, contour farming, rotational grazing, conservation tillage, spring developments, diversions, sod waterways, crop residue management, stream crossings, streambank fencing, water control structures, barnyard & parlor wastewater filter areas, and roof runoff management systems.

Other Significant Sediment and Nutrient Sources

- These sources are acid mine drainage from abandoned discharges and bony piles, wildcat sewers, malfunction septic systems, poor timber harvesting practices, and stream bed cutting and bank erosion.

Water Quality

- The West Branch of Susquehanna River is a Cold Water Fishery with approximately ten miles of impairment due to acid mine drainage. There are also wildcat sewers from the village of Bakerton going directly into the river.

- Chest Creek is a High Quality-Cold Water Fishery (HQ-CWF) from the headwaters to the town of Patton and from Patton to county line the stream is a Cold Water Fishery (CWF). Chest Creek has had sediment problems due to agricultural runoff and eroding streambanks. Patton Borough's potable water source is located on Chest Creek. The borough has experienced many filtration problems due sediment loading. A Stormwater Management Plan (Act 167) was completed for this watershed in 2002. It contains a water quality component.

- Clearfield Creek's main stem is a Warm Water Fishery (WWF) with several miles of impairment due acid mine drainage.

- The remaining five watersheds are small headwaters areas in Cambria County. They are wooded for the most part. The only impact to water quality would be from occasional logging or a change in land use such as surface mining.

D. Sediment & Nutrient/Source Reductions

Restoration Initiatives

- The Chesapeake Bay Program has spent over $280,000 in Cambria and close to $90,000 in Indiana County. Approximately $50,000 has been spent on BMP's with USDA's EQIP, and over $100,000 in Growing Greener for projects. Project Grass has contributed over $35,000 for rotational grazing systems. All of these monies have been spent on agricultural related projects, while other monies from Growing Greener & PA Fish & Boat Commission have contributed over $90,000 on stream restoration and streambank stabilization projects. Also, millions of dollars of private and government monies have been spent on the removal of waste coal piles on the West Branch Susquehanna River.

- The future needs of the watershed are to continue efforts on remediating the effects of acid mine drainage, to reduce agricultural runoff from barnyard and farm fields, to eliminate wildcat sewers systems, to improve timber harvesting practices to reduce sediment runoff, and to stabilize eroding streambanks.

- The most effective when to address these needs are to continue to partner with local, state and federal agencies and government as well as watershed groups, area sportsmen clubs, local farmers and private companies on innovative ideas to remediate these point and non-point sources of pollution.

E. Water Resources/Quality

Clearfield Creek has fifty-nine tributaries located in Cambria County, some unnamed and eight waterbodies. These waterbodies include Cresson Lakes, the Gallitzin Reservoirs I-V, Sandy Run Reservoir, and Glendale Lake. Out of the fifty-nine tributaries nine of them are impacted by AMD.

Clearfield Creek is classified under Chapter 93 of DEP Code as a Warm Water Fishery (WWF) mainstem. Its fifty-nine tributaries are all classified as Cold Water Fisheries (CWF).

Chest Creek has thirty-six tributaries located in Cambria County, some unnamed and no major waterbodies. Out of the thirty-six tributaries two are impacted by AMD. In the headwaters of Chest Creek to the town of Patton the water quality classification is High Quality Cold Water Fishery (HQ-CWF). This section of Chest Creek is the public water supply for Patton Borough. From the town of Patton to the confluence of Rogues Harbor

Run, Chest Creek is classified as a CWF. Rogues Harbor Run whose headwaters originate in Cambria County is classified as Exceptional Value (EV) and is the public water supply for the town of Westover, Clearfield County. The main impact of impairment on Chest Creek is the agricultural industry.

The West Branch of the Susquehanna River has eleven tributaries in the Cambria County portion and four tributaries in the Indiana County portion. The mainstem of the West Branch is classified as a WWF. Its tributaries in both counties are CWF with the exception of Cush Cushion Creek in Indiana, which is HQ-CWF. In the headwaters the mainstem is impacted heavily by AMD. Agriculturally the West Branch is slightly impaired.

The remaining five watersheds are headwaters areas and contain no named streams.

F. Future Needs

Clearfield Creek

The following areas have been selected as possessing significant criteria that overwhelmingly stand to benefit various aspects of Clearfield Creek Watershed.

Again, these areas have been divided into a Phase I and Phase II approach.

Phase I

- Brubaker Run & the Tributary 41 Discharge
- Powell Run
- Cresson Borehole

Consequent to these include:

- Little Laurel
- Turner
- Blain Run
- Amsbry Discharges

Phase II

- Morgan Run Watershed (Tributary 104)
- Long Run
- Upper Morgan
- Sanborn
- 104A

Consequent to these include:

- Roaring Run
- Sanborn Run
- Muddy Run

The following pages discuss the selection criteria, potential project issues, recommended system type, benefit of remediation, and project sequence and cost estimate.

PHASE I /BRUBAKER RUN TRIBUTARY 41

INTRODUCTION

Brubaker Run has been designated as one of the Phase I top watersheds identified for remediation. The following discussion details the selection criteria, potential project issues, project sequence, and gross cost estimate.

Discharge 41 D occurs slightly upstream of Brubaker Run and discharges directly into Clearfield Creek. This discharge should be considered for restoration, in conjunction with the efforts on Brubaker Run.

SELECTION CRITERIA

This watershed has been selected for remediation under this assessment based on the following criteria:

- Interest in cleaning up this watershed has been an objective of the Watershed Group and a project is developing between the Clearfield Creek Watershed Association and the United States Army Corps of Engineers.

- Restoration of this watershed would remediate over an 8-mile stretch of Clearfield Creek.

- Based on the mainstem macroinvertebrate study completed as part of this assessment, Brubaker Run and associated discharges eliminate aquatic life in Brubaker and within the mainstem of Clearfield Creek.

- This watershed ranked as 1st in Phase I and 3rd in the combined rankings based on water quality analysis.

POTENTIAL PROJECT ISSUES

The following discusses the sequence of treating the discharges from headwaters, downstream. Potential project issues, project sequences, and estimated costs have been developed for each of the discharges chosen for remediation.

Recommended System Type

The extent of problems within the Brubaker Run watershed, extend well beyond the water quality. Abandoned coal and clay mining have created very complicated circumstances within the watershed. The subsurface conditions, coupled with abandoned and past mining practices, have significantly altered the topographic and geomorphic regime. These issues extend beyond the expectations of this report.

At the writing of this report, the United States Army Corps of Engineers are conducting detailed feasibility studies concerning the remediation of mine drainage problems in this watershed. It is hopeful that their study, coupled with this assessment information, the remediation of the watershed comes to fruition.

Benefit of Remediation

The following benefits would be as follows:

- Restoration of an approximate 8-mile stretch of Clearfield Creek which would add water recreation to this section on the mainstem;
- Restoration of various aspects to the ecological regime within the watershed;
- Resolve of the complicated subsurface hydrologic system, which could be translated to understanding the ground water system as it potentially affects adjoining watersheds;
- Allow for the potential utilization of new mine drainage remediation technology that could produce techniques that could be utilized in other areas of the watershed

Project Sequence and Cost Estimate

Technical/ Background/ Engineering	$500,00

- Negotiations with landowner(s)
- Notification to Municipality
- Feasibility Study
- Background Study
- Survey / Mapping
- Ecological Studies
  - Wetland & Hydrologic Studies
  - Stream Restoration Studies
- Engineering /Administration Permitting

Construction / Construction Engineering/ Inspection	$4,000,000
TOTAL ESTIMATE	$4,500,000

PHASE I /POWELL RUN/ TRIBUTARY 51

INTRODUCTION

Tributary 51 (Powell Run) was selected as one of the top areas for remediation. Powell Run originates in Reade Township, Cambria County, Pennsylvania and flows southeast to northwest to the confluence with Clearfield Creek near Van Ormer.

The watershed represents the upper reaches of the Allegheny Front, which is a major recharge area for the town of Blandburg. State Game Lands No. 108 encompasses a large portion of this watershed. Large portions of the watershed have been significantly mined, however, large forested areas still exist.

SELECTION CRITERIA

This watershed has been selected for remediation for this assessment based on the following criteria:

- During the sampling period, C&K Coal Company was operating a treatment plant upstream from the confluence. Currently, the coal company has filed bankruptcy and has ceased treatment. Since remediation efforts have been initiated and monies expended, efforts should be exhausted to continue in the treatment efforts.

- Powell Run was classified in this assessment as having high metal concentrations making this watershed one of the top 10 degraded tributaries affecting Clearfield Creek. The tributary ranked 12 / 85 for water quality and 4 / 85 in metal loadings in the combination of Phase 1 and Phase 2

- It is the next major discharge after Brubaker Run, Dean Township. Therefore, Powell Run is a logical next step to be completed in conjunction or thereafter Brubaker Run.

- Public water supplies exist in the headwater area

Several AMD discharges are found in this watershed. Eight sites, which all flow into Powell Run, were sampled monthly for one year by the Clearfield Creek Watershed Association.

Water quality is improved at the mouth of Powell Run, even though the substrate is covered by precipitate. The average flow is 4200 gpm and pH of 6. Most of the aluminum and iron is in suspension and carried into Clearfield Creek. The high metal concentrations found in the headwater discharges are precipitated out before the water reaches the confluence. Therefore, some semblance of remediation is occurring

naturally. This natural process prohibits the watershed from functioning as a sustained ecological environment.

DISCHARGES

Discharge 51-1 is located near the confluence of Powell Run with Clearfield Creek. The discharge is acidic with an average pH of 5.4 and flow of 44 gpm.

Discharge 51-4 is located 700 ft. downstream from 51-5 on the opposite side of the stream. The water is acidic and has high Fe, averaging a pH of 5.1 and a flow of 27 gpm.

Three discharges, 51-5, 51-5A, and 51-5B, flow from the Frick #1 clay mine on the north side of Powell Run just downstream from the C&K treatment plant. Discharge 51-5 is acidic and high in Fe, Mn and Al, averaging a pH of 3.4 and flow of 17 gpm. Discharge 51-5A flow varies from 4.5 gpm to 98.6 gpm. It is acidic and has high Fe, Mn and Al, averaging a pH of 3.1. Discharge 51-5B has a flow of 20 gpm and the chemistry is similar to the other two discharges.

Discharge 51-8 has several sources. Flow varies from 1 gpm to 300 gpm with high metal concentrations and an average pH of 3.5.

Discharge 51-9 flows through a large spoil and seeps out into a wetland area. It also collects three small streams from this wetland and another discharge from the spoil. The water is acidic and high in Al, with an average flow of 87 gpm and pH of 3.2.

POTENTIAL PROJECT ISSUES

Recommended System Type

1.) Direct additional discharges into existing C & K Treatment Plant. The existence of the plant precludes evaluation of potential continued use.

2.) A series of passive systems utilizing vertical flow systems. These systems could be constructed in sequence to treat each discharge independently as linear systems located in areas of the valley corridor of Powell Run or collect all the discharges into one location and treat as one major discharge.

There are two choices in this recommendation. Either treat the discharges at the source, where concentrations of metals are at their highest, but flows are generally manageable. The second alternative is to treat the discharge downstream after some percentage of metals have precipitated out as a natural process as is observed in the water quality, decreasing the metal extraction in the passive systems. In this choice, however, the flows are significant.

Benefit of Remediation

The benefit of remediation would continue to enhance efforts that are currently in place in the watershed. The C & K Coal Company remediation effort needs to be explored for various options. A foreboding realization is that this plant would take significant amounts of money over time to be spent by some entity or organization to continue treatment and for maintenance.

Since treatment of discharges is in place in the watershed it is logical to at least seriously pursue how a combination of different systems could work in this watershed. As previously mentioned, monies have been expended in this watershed, and efforts to keep it in operation are realized.

Project Sequence and Cost Estimate

The following is a sequential approach to the remediation of the Powell Run discharges with a cursory estimation of cost. This is based on a passive system with a cost estimate of 1- 2 million dollars.

Recommended Approach

Feasibility study to evaluate both C&K Plant options	$25, 000
Treatment Plant Option	
Addition of discharges	
Passive Systems (8 discharges)	
Technical/ Background/ Engineering	$250,000- $300,000
➢ Negotiations with landowner(s)/legal	
➢ Background Study	
➢ Surveying/Mapping	
➢ Ecological Studies	
Wetland & Hydrologic Studies	
Stream Restoration Studies	
➢ Engineering /Administration Permitting	
Construction / Construction Engineering/ Inspection	$1.5- 1.7 Million
TOTAL ESTIMATE	$2,000,000.00

CRESSON BOREHOLE/TRIBUTARY 11

INTRODUCTION

Tributary 11, Unnamed, is located in Cresson Township, Cambria County, Pennsylvania and flows southeast to northwest until its confluence with Clearfield Creek. Two first order branches originate in the headwater area and then merge to form the main tributary. One branch originates by Penn Cambria High School and the other branch originates in and around the railroad yard in Cresson Borough. This watershed is impacted by two major acid mine drainage discharges which degrade the stream. These two discharges are identified as the Cresson Borehole (CB-11) and CB-11-2. They are the first major sources of mine drainage pollution of Clearfield Creek.

SELECTION CRITERIA

This watershed has been selected for remediation for this assessment based on the following criteria:

- The Cresson Borehole is the first major source of degradation to the Clearfield Creek headwater area. There are several factors that make treating the Cresson Borehole an advantage. These include:
  - A single point of entry to the tributary
  - Consistent water quality and flow
  - Artesian nature of flow
  - Potential in-situ tertiary treatment within the borehole

- There is natural remediation occurring in the corridor.

- There is an expected change of chemistry due to the sewage treatment plant

- The tributary flows through a widely used Cresson Sportsmen's Club recreational facility.

Several aspects were reviewed in selecting the Cresson Borehole as one of this study's top sites needing remediation. During the monitoring phase of the Assessment, the sewage from the Borough of Sankertown and associated areas flowed directly into Tributary 11. On August 6, 2003, Sankertown Borough went online with the Cresson Township Sewage Treatment Facility. Now the effluent from the treatment plant discharges into the headwaters of the Conemaugh watershed. Therefore, it is anticipated that the water quality of Tributary 11 will change in some capacity.

The sewage was an integral component in raising the pH of the water to allow much of the metals, iron and aluminum, to precipitate out within the stream, prior to the stream's confluence at Clearfield Creek. The addition of calcium carbonate, a component of sewage, provides a buffering effect that reduces the harmful nature of elevated

concentrations of aluminum and iron. The effect of iron and aluminum on macroinvertebrates is less severe in waters that have higher pH and receive a substantial calcium carbonate influence. In lower pH waters, the effects of high concentrations of iron and aluminum are more severe than in higher pH waters. Case studies have shown that certain macroinvertebrates can exist in streams that have elevated concentrations of iron and aluminum if pH and alkalinity are high (www.dep.state.pa.us/dep/deputate/minres/districts/CMDP/chap04.html, 3/5/2002). These changes are a significant factor in ranking this watershed as one of the Top 5 Phase 1 targeted areas for remediation.

DISCHARGES

The Cambria County Conservation District monitored the mouth of Tributary 11 for six quarters. Tributary 11 converges with Clearfield Creek after the effluent of the Cresson Sportsmen's Dam. The flow ranged from 840 gpm to 2239 gpm and the pH ranged from 3.9 to 6.4. Total aluminum ranged from 0.95 to 3.4 mg/L and total iron ranged from 1.8 to 8.1 mg/L. The substrate is covered with iron precipitate and there are no macroinvertebrates present.

CB-11

The borehole (CB-11) was monitored quarterly by the Cambria County Conservation District and monthly for one year by the Clearfield Creek Watershed Association. The water quality of the borehole remains consistent throughout the sampling months. The water quality constantly exceeds the state maximum contaminant levels. The borehole, with an artesian flow, discharges between 200 gpm to 500 gpm with an average pH of 4. Iron levels ranged from 47.9 mg/L to 62.9 mg/L. Aluminum levels ranged from 6.29mg/L to 8.62 mg/L.

CB-11-2

The Clearfield Creek Watershed Association monitored the CB-11-2 discharge monthly for one year. This discharge is considered to be alkaline while the CB-11 discharge is very acidic. Alkalinity ranged from 122 mg/L to 136 mg/L. Iron ranged from 14.3 mg/L to 17.4 mg/L, however, aluminum was consistently below the state MCL of 0.2 mg/L. The discharge's pH ranged from 6.6 to 7.4 with an average flow of 50 gpm.

12 INSTREAM

The Cambria County Conservation District also monitored an instream point, 12-instream, located downstream from Tributary 11. This is located after the bridge on Cresson-Loretto Road. Flow was unattainable and the pH ranged from 6.2 to 6.8. Iron levels averaged 0.52 mg/L and the aluminum levels ranged from not detected to 0.076 mg/L.

Now without the sewage entering the stream, the lack of buffering from the stream may limit the natural ability of the metals to precipitate out as documented in the water

chemistry. At the time of monitoring, a natural remediation was occurring in the stream. Based on the chemistry discussed above, it is exhibited that in the distance from the discharge to the confluence of Tributary 11 with Clearfield Creek, the iron and other metal concentrations are significantly reduced. The iron level in Tributary 11 and CB-11 decreases from 50mg/L to as low as 1.9mg/L at the confluence. Then the iron level continues to decrease to nearly 0.52 mg/L as documented by the water quality results of the 12 in-stream sample point. Should the concentrations of metals increase in the confluence and ultimately Clearfield Creek, the natural ability of the wetland system downstream could be jeopardized.

POTENTIAL PROJECT ISSUES

Recommended System Type

In conjunction with this watershed study, US Environmental Research has completed a study regarding remediation of mine drainage problems in the headwater area of Clearfield Creek. It addresses mine drainage problems within the headwater region of Clearfield Creek.

With the anticipated change in water quality, it is expected that the iron level will increase at the confluence to Clearfield Creek. Treatment of the two discharges would improve the water quality to Tributary 11and significantly improve water quality in Clearfield Creek to approximately to Amsbry.

Should water quality degrade from the lack of buffering from the sewage now treated, there is great potential downstream, which would lead to the possibility of losing stream miles that are currently only slightly impaired. The water quality degradation could migrate downstream as the concentration of metals increase inhibiting the natural remediation of the wetlands located downstream.

Therefore, a detailed study of Tributary 11 and Clearfield Creek through the Cresson Lake area to further understand changes in the water chemistry is recommended along with a study of the relationship with CB-11 and CB-11-2 in regards to the acidic nature of CB-11 and the alkaline nature of CB-11-2.

In regards to remediation, the recommendation to treat both discharges would be a series of settling ponds, oxic limestone drains and vertical flow ponds to treat the iron, aluminum and manganese. Contingent on a remediation project, the following additional factors are discussed.

Currently, metal concentrations are considerably lower from the discharge sources to the confluence area. A choice of treating the discharge at the source where metals are high or treat the discharges downstream after metal reduction can be taken into consideration. Discharge rates in this scenario are much greater and control of annual rainfall and other groundwater discharge issues would be more difficult to control.

Benefit of Remediation

Preventative remediation of the CB-11 discharge will enhance the watershed of Tributary 11 and restore an ecological system. It will also enhance the water quality of the Clearfield Creek's mainstem downstream. Ecologically, Tributary 11 watershed has been impaired by the lack of a clean water quality source. Currently, the degraded tributary flows directly through the Cresson Sportsmen's Club recreational area. Remediation of the discharges would provide another source of clean water for the sportsmen's club, enhancing the overall area.

Project Sequence and Cost Estimate

The following is a sequential approach to the remediation of the Cresson Borehole discharges with a cursory estimation of cost, $750,000 to $1.5 million.

Feasibility of desired remediation	$50,000
Technical/ Background/ Engineering	$ 75,000-$100,000

- Negotiations with landowner(s)/legal
- Surveying
- Ecological Studies
  - Wetland & Hydrologic Studies
  - Stream Restoration Studies
- Engineering /Administration/Permitting

Construction / Construction Engineering/ Inspection	$ 500,000-$750,000
TOTAL ESTIMATE	**$900,000.00**

Chest Creek Watershed

HEADWATERS

INTRODUCTION

The headwaters of Chest Creek are influenced by the agricultural industry. Due to the high nitrates and suspended solids this reach of stream has an impact on the town of Patton water supply. With several local farms in the headwaters best management practices would need to be implemented.

For this reach of stream a detailed study of the farms and tributaries on the farmer's land need to be tested for impairment along with determining the best management practice to be installed at each site.

POTENTIAL PROJECT ISSUES

Recommended System Types

Best management practices come in a variety types from fence row buffers to crop rotation to stream bank fencing to manure storage to barnyard stabilization projects etc. Each of these practices would have to be determined for the site in question.

Benefits of Remediation

By implementing the best management practices within the headwaters, the loading of nitrates and suspended solids would decreasing causing a significant increase in aquatic and fishery life, along with improving the Patton water supply.

Project Sequence and Cost Estimate

Technical/Background/Engineering	$250,000

- Negotiation with landowner(s)
- Background study
- Survey/mapping
- Engineering/Administration Permitting

Construction/Inspection	$350,000
TOTAL ESTIMATE	**$600,000**

LITTLE BRUBAKER RUN

INTRODUCTION

Little Brubaker Run is one tributary within the watershed that is impacted by two AMD discharges. The tributary is only impacted for about the last 1/4 mile.

The watershed was surfaced mined by a former mining company and backfilled. Due to poor past mining practices the site is dyer need of attention.

SELECTION CRITERIA

This watershed has been selected due to the past mining issues involved.

DISCHARGES

This individual watershed was walked from confluence to headwaters and only two discharges were identified. These two discharges do not have a name to our knowledge and known water quality data must be researched.

POTENTIAL PROJECT ISSUES

Recommended System Types

For these two discharges treatment might be possible passively. Vertical Flow Ponds are probably the best treatment type for the space involved.

Benefits of Remediation

By building passive treatment systems for these two discharges the water quality of Little Brubaker Run for the last 1/4 mile would be capable of sustaining aquatic life.

Project Sequence and Cost Estimate

Technical/Background
- Watershed Assessment $45,000

Final Report

TOTAL ESTIMATE **$45,000**

CHEST CREEK BETWEEN WESTOVER AND NEWBURG

INTRODUCTION

This stretch of stream between Westover and Newburg receives significant loadings of untreated sewage. These small towns are not hooked up to public sewage treatment plants and are discharging into Chest Creek directly.

SELECTION CRITERIA

This section of stream has been selected for remediation due to the following criteria:

- This section of stream is near the lower end of the watershed and is located in a highly rural area.

- The little towns and villages located within this watershed do not have public sewage.

POTENTIAL PROJECT ISSUES

Recommended System Types

In this section of Chest Creek the municipalities need to develop a long-term plan for sewage enforcement. Municipalities need to apply for PennVest grants to establish funding for a sewage treatment facility.

Benefit of Remediation

The benefit of developing a long-term plan for treating sewage from these municipalities will aid in lowering the amount of untreated sewage being discharged into Chest Creek. This reduction of sewage in Chest Creek will significantly increase water quality and the aquatic communities.

Potential Sequence and Cost Estimate

The following is a sequential approach to the remediation of this stream section.

Technical/Background/Feasibility Study for Sewage Treatment	$1,000,000

- Negotiations with landowner(s)legal
- Surveying
- Engineering/Administrative/Permitting

Construction/Construction Engineering/Inspection	$5,000,000 - $8,000,000
TOTAL ESTIMATE	**$6,000,000 - $9,000,000**

West Branch of the Susquehanna River

HEADWATERS

INTRODUCTION

The headwater of the West Branch located near the town of Bakerton, Cambria County, is heavily impacted by AMD. Remains of past mining such as coal refuse piles, abandoned highwalls and unclaimed discharges are located throughout the headwaters.

SELECTION CRITERIA

In September of 2001, an AMD Assessment was done on the headwaters. It identified 10 mine drainage sources and prioritized them according to pounds per day of acidity iron and aluminum.

DISCHARGES

1. WBSR-2 Abandoned deep mine (LK) discharge (pipe in stream).
2. WBSR-5A&5B Seepage zone down gradient from No. 20 mine working (LK).
3. WBSR-7 Abandoned deep mine (LK) discharge Sterling No. 6 mine.
4. WBSR -9 Seepage zone along toe of old coal refuse disposal site.
5. WBSR -11 Abandoned deep mine (LK) discharge from Victor No. 10 mine workings WBSR –12 and waterway AMD source.
6. WBSR -15 Abandoned deep mine (LK) discharge from Victor No. 10 mine workings (Sterling No. 5 mine).
7. WBSR -19A Watkins Pile - Abandoned coal refuse site. (No direct sample point or zones).
8. WBSR -23 Ditch/ravine discharge point combined flow of WBSR-20 and WBSR -22.
9. WBSR -54 Abandoned mine discharge (LK) from Victor No. 10 mine workings.
10. WBSR -52 Abandoned mine discharge (LK) from Victor No. 10 mine workings into Fox Run.

RANKING

1. WBSR-54
2. WBSR-23
3. WBSR-52
4. WBSR-9
5. WBSR-7
6. WBSR-15
7. WBSR-5A&5B
8. WBSR-11
9. WBSR-12
10. WBSR-2
11. WBSR-30
12.

The majority of the AMD sources are from one deep mine complex in the Lower Kittanning (LK) collectively referred to as the Victor No. 10 mine. The Victor No. 10 mine workings is located on the northeast side of the West Branch of the Susquehanna River valley and are generally above drainage within the local groundwater regime. Due to up dip mining water tends to flood old entries.

POTENTIAL PROJECT ISSUES

Recommended System Types

The rankings showed the discharges according to acidity iron and aluminum. Site availability for treatment systems did not accommodate the rankings numerically, so the top three discharges with the best possible site location for a system were selected.

1. WBSR -7 (Sterling No. 6 Mine - Alkaline Addition /SAPS) $800,000

2. WBSR -9 (Coal Refuse/Mine Spoil Seeps - Alkaline Addition/SAPS) $800,000

3. WBSR -5A&5B (Seepage Zone - Near B&T Ponds - Vertical Flow Ponds) $500,000

The 3 AMD sites have the best available location for treatment systems. These 3 sites are located in the upper most section of the headwaters, with treatment the longest segment of degradation should significantly decrease and improve water quality.

Addition priority ranking for the remaining AMD discharge locations:

4. WBSR-52 (No. 9 Road - SAPS) $1,000,000
This discharge is significant in acidity. Treatment site availability is accessible across Fox Run. Treating this section will restore 1.1 miles of Fox Run.

5. WBSR-23 (Near Watkins Pile - Vertical Flow Ponds) $800,000
Discharge is significant in acid and metal loadings. Treatment site exists but in the flood plain. Additional funding for treatment and permitting are needed.

6. WBSR-15 (Sterling No.5 Mine - Vertical Flow ponds) $500,000
Discharge is moderate in acidity, low in iron and high in aluminum. Treatment site availability is limited to a site along the hillside.

7. WBSR-2 (Pipe in Stream- Above Meyer Road - SAPS) $400,000
Discharge is low in acidity and moderate in iron. A small site is available for treatment

8. WBSR-54 (Behind Substation - Vertical Flow Ponds) $1,000,000
This discharge is the highest source of acid and metal loadings. Treatment site is inaccessible due to terrain. Actively treating this discharge may be possible.

9. WBSR-11&12 (Above Bakerton P.O. - Discharge/stream are low in acidity and metals and are in close proximity of each other. Treatment site not available due to housing. Piping the discharge to a potential site might be possible.

10. WBSR-30 (Moss Creek Breakout - Vertical Flow Ponds)

$300,000

This discharge is alkaline and low in iron. Treatment site availability is probable.

11. Barnes-Watkins Pile

Phase 1 of a BAMR-funded Growing Greener project is underway in the headwaters of the West Branch. The Barnes-Watkins refuse pile is being removed, with refuse either being hauled to the Seward Power Plant or to a nearby permitted refuse disposal site (depending upon the quality of the refuse), where it's mixed with alkaline coal ash prior to disposal. The pile is 17.4 acres in size, encroaches along 1,700 feet of the West Branch, and adds a tremendous pollution load to the West Branch. Phase 1 is being completed at a cost of approximately $1.2 million. Phase 2, which was submitted for Growing Greener funding this year, will cost approximately $3.2 million. BAMR has recommended funding for this application, using BAMR funds. The applicant for both phases is the Cambria County Conservation and Recreation Authority. Water quality benefits are anticipated downstream to the Curwensville Dam, a distance of more than 20 miles, upon completion of both phases of this project. $4.4 million

TOTAL ESTIMATE **$10,500,000 - $12,000,000**

II. Tributary Strategy

The CCCD will use a variety of resources and programs to account for and reduce nutrients and sediment entering the tributaries within the Chesapeake Bay watershed. The programs will include those with delegated or contracted responsibilities, programs of other conservation agencies and programs implemented by the CCCD. The CCCD will focus on implementing some core BMPs as well as secondary BMPs as needed resources become available. The following lists identify 10 core BMPs and other secondary BMPs which the CCCD feels can be implemented in Cambria and Indiana Counties.

Core BMPs
1. No-Till Plantings (Conservation Tillage)
2. Farm Plans / Conservation Planning
3. Rotational Grazing / Pasture Management
4. Retirement of Highly Erodible Land
5. Barnyard Run-off Controls
6. Nutrient Management Planning
7. Non-Urban Stream Restoration
8. Erosion & Sediment Controls
9. Dirt and Gravel Road Improvements
10. Abandoned Mine Land Reclamation

Secondary BMPs
1. Cover Crops
2. Animal Waste Storage Systems
3. Wetlands Restoration
4. Riparian Buffers
5. Forest Harvesting Practices
6. Tree Planting
7. Urban Stream Restoration
8. Carbon Sequestration

New BMPs
1. Farm Field Road Stabilization

PLANNED ACTIONS

Action 1 – Compile and account for Unreported Previously Completed Practices

One of the first steps in assisting the Department in meeting the Commonwealth's goals is to gather and compile information on installed BMPs and the conservation efforts that have been completed by the CCCD and other agencies, groups and individuals that have not been reported. The CCCD has completed projects (stream restoration for example) that can be counted toward the Commonwealth's goals but were never reported

due to the Bay programs narrow focus on Agricultural BMPs. Also, the efforts of other agencies can and should be accounted for as well.

BMPs Accounted or Implemented

All BMPs. The CCCD will account for any BMPs implemented that can be counted toward the bay restoration efforts.

Action 2 - Maintain / Expand the District's No-Till Drill Rental Program

The Conservation District purchased its first no-till grain drill in 1997. In 2003, the district purchased a second drill due to the number of requests. Historically, the program averages between 200 and 250 acres planted per year. With the purchase of a second drill and the large interest in the USDA CREP program, the no-till planted acreage has significantly increased in the past year and will continue over the next five years. The district will actively promote landowner participation in the no-till program.

BMPs Accounted or Implemented

Conservation Tillage, Cover Crops

Action 3 - Farm Plans / Conservation Plans

Farm / Conservation Plans will be reviewed, updated and even inspected for compliance. These activities are completed through administering the farmland preservation program. Farm plans are also reviewed and approved for all landowners enrolling acreage in the USDA CREP program.

BMPs Accounted or Implemented

Farm Plans, Conservation Plans, Nutrient Management Plans

Action 4 - Pasture Management / Stream bank fencing and stabilized crossings

Rotational grazing has become more and more popular as a management practice. The CCCD has been part of project grass since its origination and has promoted grazing for many years. We have installed several projects and have pasture plans developed for more cooperators for when funding becomes available.

BMPs Accounted or Implemented

Rotational Grazing, Stream Bank Fencing, Stabilized Stream Crossing, Grass Buffers, Riparian Buffers, Horse Pasture, Off Stream Watering with and without fence

Action 5 - Compile and report activities of other programs, agencies and organizations that support the bay recovery efforts

Many other organizations coordinate water quality and conservation projects, which help the bay recovery effort. These can include Abandoned Mine Land Reclamation, Abandoned Mine Drainage Remediation, Wetland / Watershed Restoration

Projects and conservation planning. We need to keep account of these projects locally to make sure that these efforts are also reported and applied to the commonwealth's goals.

BMPs Accounted or Implemented

All BMPs. The CCCD will account for any BMPs implemented locally by other agencies and organizations that can be counted toward the bay restoration efforts.

Action 6 - Continue stream bank stabilization / riparian buffer projects

There have been various projects completed in the areas of stream bank stabilization and the creation of stream buffers. Unless these projects were installed on a farm through a bay contract, they most likely were not counted toward meeting the program goals.

BMPs Accounted or Implemented

Non-urban Stream restoration, Tree Planting, Wetlands, Riparian Forest Buffers, Grass Buffers, Erosion and Sediment Controls, SWM Stream Restoration

Action 7 - Utilize Flyash for Agriculture Stabilization Projects

Cambria County has three co-generation plants. The flyash by-product from these plants has a DEP beneficial use designation for use on agriculture operations to stabilize and protect heavy use areas. This is a low cost alternative to concrete and has held up very well in the demonstration projects. Many landowners are interested in utilizing flyash to stabilize areas on their operations. However, at this time, the flyash has not been available due to commitments for its use in abandoned mine restoration projects as well as a change in ownership of the plant that provided the material for the initial demonstration projects. We anticipate this product becoming more available in the future and see a great opportunity to stabilize many erosion prone areas on agriculture operations for minimal cost.

BMPs Accounted or Implemented

Barnyard Management, Farm / Conservation Plans, Off Stream Watering with and without fencing, Erosion and Sediment Controls, Dirt and Gravel Roads Improvement

Action 8 - Erosion and Sediment Control

Chapter 102 & 105 plan reviews
Dirt and Gravel Road Projects
Ensure that the benefits of these programs get counted toward the CBP reduction goals.

BMPs Accounted or Implemented

Erosion and Sediment Control, Dirt and Gravel Road Improvements, Forest Harvesting Practice

Action 9 - Forest Management Activities

Complete the review or development of forest resource management plans through the Tree Farm program.

Promote Tree Plantings through the annual seedling sale. Incorporate tree plantings in projects where possible.

BMPs Accounted or Implemented

Forest Harvesting Practice, Tree Planting, Conservation Plan, Riparian Forest Buffers

RESOURCES NEEDED

1. Compile and account for Unreported Previously Completed Practices

The primary resource needed to complete this action is the personnel cost required to gather, compile and report the data. We anticipate dedicating 250 man hours annually for this action.

2. No-Till Program

Approximately 300 man hours per year for a total 1500 man hours over the next five years. Transportation expenses - $1,000.00 per year. Drill Maintenance - $500 per year.

3. Farm Plans / Conservation Plans

We estimate that 2800 staff hours will be required over the next five years to meet the expected acreage for conservation planning.

4. Pasture Management / Stream Bank Fencing / Stabilized Crossings

The amount of man hours will vary based on the number of projects that get implemented. We estimate that it will take 110 man hours per project.

5. Accounting of Activities of other programs, agencies and organizations

We anticipate dedicating 25 to 35 man hours per year gathering and reporting this information.

6. Stream Bank Stabilization / Stream Restoration / Riparian Buffers

The amount of man hours will vary based on the number of projects that get implemented. We estimate that it will take 110 man hours per project.

7. Use of Flyash for Agriculture Stabilization Projects

The amount of man hours will vary based on the number of projects that get implemented. We estimate that it will take 110 man hours per project.

8. Erosion & Sediment Control Activities

We expect 1000 to 1200 staff hours needed annually to meet the expected results.

9. Forest Management Activities

We estimate 50 staff hours per project / activity.

EXPECTED RESULTS OF IMPLEMENTED PLANNED ACTION

1. Compile and account for Unreported Previously Completed Practices

It is difficult to estimate results for this action. With the establishment of many local watershed associations over the past few years, there may be numerous projects completed that have not been reported or counted toward the bay restoration goals. Dedicating a small amount staff time toward surveying local groups and even private landowners for specific information that would count toward the restoration goals could be extremely cost effective. This effort could show a lot of results without needing funds to develop and complete projects. This action can be reevaluated annually and discontinued if there aren't significant results to justify the dedication of resources. Any results from this action will be above what is listed in the expected results table.

2. No-Till Program

Over the next five years, the district anticipates that its no-till drills will to get 2000 acres of use in the Bay watershed. Approximately 200 acres each year will be counted as conservation tillage and an additional 200 acres per year will be counted as advance no-till for reduction results.

3. Farm Plans / Conservation Plans

See the expected results table.

4. Pasture Management / Stream Bank Fencing / Stabilized Crossings

See the expected results table.

5. Accounting of Activities of other programs, agencies and organizations

Early Bay restoration efforts were primarily geared toward nutrient load reduction. The majority of the projects focused on incorporating Ag Waste systems along with nutrient management planning. The CCCD recognized the benefit of implementing different practices and BMPs in other areas that would benefit the bay recovery effort. Many of these efforts and installed practices were not able to be adequately reported through the bay program's reporting forms.

7. Stream bank Stabilization / stream Restoration / Ripairan Buffers

The amount of man hours will vary based on the number of projects that are implemented. We estimate that it will take 110 man hours per project.

7. Use of Flyash for Agriculture Stabilization Projects

Using this material will be extremely cost effective and can be used for a variety of agriculture stabilization projects. It has been used to stabilize heavy use areas, barnyards, and alleyways. Because of the low cost and local availability, landowners will be more receptive to address and correct areas where stabilization may be needed. We

also would like to promote its use on farm field roads to reduce sediment loading into the watershed. Since it is currently unavailable, no results have been calculated.

8. Erosion & Sediment Control Activities

Expected results are listed under the erosion control and dirt and gravel road sections of the expected results table.

9. Forest Management Activities

Minimum expected results are listed in the Forest Harvesting Practices and the Tree Planting – urban sections of the expected results table.

Some results will be reported as part of action item 5.

BMP Expected Results Summary Sheet

Implemented or Accounted BMP	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Ag BMPs							
Animal Waste System - Livestock	AEU's	140	636	130	0	0	906
Barnyard Runoff Controls	Acres/AEU's	1	1	1	1	1	5
Carbon Sequestration	Acres	700	100	0	0	0	800
Cover Crops	Acres						0
Conservation Plans (Farm Plans)	Acres	3250	750	550	450	350	5350
Conservation Tillage	Acres	200	200	200	200	200	1000
Nutrient Management - Agriculture	Acres	700	975	150	150	150	2125
Retirement of Highly Erodible Land	Acres	2200	600	400	300	200	3700
Riparian Forest Buffers - Agriculture	Acres						0
Riparian Grass Buffers - non devled	Acres						0
Rotational Grazing w/stream Fencing	Acres	153	30	25	25	25	258
Stream Fencing w/off-site Watering	Feet / Acres	1000 / 1	1000 / 1	1000 / 1	1000 / 1	1000 / 1	5000 / 5
Stream Prot, w/o fence w/ off-site water	Acres						0
Tree Planting	Acres	5	1	1	1	1	9
Wetlands - Ag	Acres	0.5					0.5
Yield Reserve	Acres						0
Urban & Mixed Open BMPs							
Erosion & Sediment Controls - Urban	Acres	800	800	800	800	800	4000
Impervious Surface Reduction	Acres						0
Riparian Forest Buffers - Urban	Acres						0
Riparian Wetlands - Mixed open land	Acres						0
Riparian Grass Buffers - devel land	Acres						0
Reduction in Urban Growth	Acres						0
SWM Wet ponds & wetlands	Acres						0
SWM Dry detention & hydrodynamic	Acres						0
SWM Dry extended retention ponds	Acres						0
SWM infiltration practices	Acres						0
SWM filtering practices	Acres						0
Stream restoration - Urban	linear feet	2000	250	2000			4250
Tree Planting - Urban & rip. Forest buf.	Acres	5	5	5	5	5	25
Other BMPs							
Abandoned Mined Land Reclamation	Acres	13	9				22
Forest Harvesting Practices	Acres	35	35	35	35	35	175
Septic System hookups	EDU's						0
Septic System Denitrification	EDU's						0
New Ag BMPs							
Advanced No-till	Acres	200	200	200	200	200	1000
Horse Pasture Management	Acres						0
Manure Transport							0
Precision Feeding of Dairy Livestock	AEU's						0
Precision Rotational Grazing	Acres						0
Other New BMPs							
Street Sweeping in Urban Areas	Acres						0
Dirt & Gravel Road E&S controls	Feet	1000	3000	1000	1000	1000	7000
Non-Urban Stream Restoration	Feet						0

Reductions needed beyond 2010

Implemented or Accounted BMP	Unit	Goal	Accomplished	Planned	Reduction needed
		By 2010	1985-2002	2006-2010	beyond 2010
Ag BMPs					
Animal Waste System - Livestock	AEU's	2700	2099	906	-305
Barnyard Runoff Controls	Acres/AEU's			5	-5
Carbon Sequestration	Acres	4601		800	3801
Cover Crops	Acres	13278		0	13278
Conservation Plans (Farm Plans)	Acres	30412	22653	5350	2409
Conservation Tillage	Acres	14715	6635	1000	7080
Nutrient Management - Agriculture	Acres	5570	11402	2125	-7957
Retirement of Highly Erodible Land	Acres	3934	892	3700	-658
Riparian Forest Buffers - Agriculture	Acres	3369	5	0	3364
Riparian Grass Buffers - non devled	Acres	108	10	0	98
Rotational Grazing w/stream Fencing	Acres	205	320	258	-373
Stream Fencing w/off-site Watering	Feet / Acres	1281	241	5	1035
Stream Prot, w/o fence w/ off-site water	Acres	769	26	0	743
Tree Planting	Acres			9	-9
Wetlands - Ag	Acres	62	39	0.5	22.5
Yield Reserve	Acres	5570		0	5570
Precision Agriculture	Acres	16710		0	16710
Urban & Mixed Open BMPs					
Erosion & Sediment Controls - Urban	Acres	145	147	4000	-4002
Impervious Surface Reduction	Acres			0	0
Riparian Forest Buffers - Urban	Acres			0	0
Riparian Wetlands - Mixed open land	Acres			0	0
Riparian Grass Buffers - devel land	Acres			0	0
Reduction in Urban Growth	Acres	45		0	45
SWM Wet ponds & wetlands	Acres	4003		0	4003
SWM Dry detention & hydrodynamic	Acres			0	0
SWM Dry extended retention ponds	Acres			0	0
SWM infiltration practices	Acres	4003		0	4003
SWM filtering practices	Acres	4003		0	4003
Stream restoration - Urban	linear feet	0		4250	-4250
Tree Planting - Urban & rip. Forest buf.	Acres	1197	1078	25	94
Urban Nutrient Management	acres	1585		0	1585
Other BMPs					
Abandoned Mined Land Reclamation	Acres	1583	286	22	1275
Forest Harvesting Practices	Acres	0		175	-175
Septic System hookups	EDU's		2102	0	-2102
Septic System Denitrification	EDU's	4166		0	4166
New Ag BMPs					
Advanced No-till	Acres	6990		1000	5990
Horse Pasture Management	Acres	2110		0	2110
Manure Transport				0	0
Precision Feeding of Dairy Livestock	AEU's	1614		0	1614
Precision Rotational Grazing	Acres	307		0	307
Ammonia Emission Controls	AEU's	553.7		0	553.7
Phytase Feed Additives	AEU's	19.3		0	19.3
Other New BMPs					
Street Sweeping in Urban Areas	Acres	442		0	442
Dirt & Gravel Road E&S controls	Feet	172591		7000	165591
Non-Urban Stream Restoration	Feet	3167		0	3167

III. Plan Development Process

The Cambria County Conservation District (CCCD) took development of this plan very seriously. A plan development team (Trib. Plan Team) was brought together by the district manager to include the assistant manager, bay technician and watershed specialist. Duties were assigned according to expertise and experience with plan writing and the knowledge of the plan area. The County GIS Center was instrumental in gathering statistics and generating maps.

A true tributary strategy was seriously considered for the upper West Branch Susquehanna River Watershed. This resulted with a meeting coordinated by the CCCD to discuss the tributary plan concept with Indiana and Clearfield Conservation Districts managers. At that time it was decided that Cambria would include Indiana County in their plan and Clearfield would prepare their own. The CCCD staff also attended the Clearfield CDs initial planning session with the Northcentral region staff. Plan development meetings with the CCCD team were scheduled regularly to review and discuss completeness and deadlines. Various DEP staff were also consulted from time to time. This included meetings with several DEP staff from both the Southcentral and Northcentral regions.

The plan draft was presented at the CCCD Land Use Committee chaired by Dave Shoemaker-farmer director, who ultimately recommended approval of the plan to the CCCD board, which they approved at their regular February 2005 meeting.

Plan Development Process Meeting List

Date	Location	Attendees
October 29, 2004	Southern Alleghenies RC& D Meeting Bedford, PA	Mark Dubin-DEP, CCCD staff CCCD directors
November 4, 2004	CCCD office	Bill Zett-DEP
November 5, 2004	Rorabaugh Lumber Company Burnside, PA (Clearfield CD assoc. director's office)	Jim Resh-Indiana CD Susan Reed- Clearfield CD Robb Piper-CCCD
November 15, 2004	NC- DEP office, Williamsport, PA	John Dryzal-CCCD Mark Stockley-CCCD NC office staff
November 16, 2004	CCCD office	Robb Piper-CCCD John Dryzal-CCCD

November 19, 2004	CCCD office telephone conversation	John Dryzal-CCCD Jennifer Means –DEP
December 9, 2004	Clearfield CD office	Clearfield CD staff Clearfield directors NC DEP staff Piper, Dryzal, Stockley
December 20, 2004	SC DEP office All Bay Mtg.	Piper
January 10, 2005	CCCD office	Trib. Plan Team Mtg.
January 12, 2005	CCCD office	Bill Zett-DEP, Piper, Stockley
January 27, 2005	CCCD office	Trib. Plan Team Mtg
January 31, 2005	CCCD office-Land Use Committee	Dave Shoemaker-CCCD director CCCD Trib. Plan Team Jennifer Means, DEP Mark Dubin, DEP-SC Jason Fallon, DEP Bill Botter, DEP Bill Zett, DEP
February 4, 2005	CCCD office-District Board Mtg. (Draft C.B. Trib. Plan Approved)	Bill Botter, DEP CCCD Board of directors CCCD staff
February 10, 2005	CCCD office	Trib. Plan Team Mtg.

REFERENCES

1. West Branch Susquehanna River Non-point Source Assessment, Clearfield County Conservation District, 1997

2. Headwaters AMD Assessment and Restoration Plan Development of the West Branch Susquehanna River, West Branch Susquehanna Rescue, October 2001

3. Upper West Branch Susquehanna River Conservation Plan, Cambria County Conservation & Recreation Authority, August 2001

4. A Community Review of the Feasibility of Shared Services Between Water and Sewer Authorities/Systems in Cambria County, Pennsylvania Economy League, June 2001

5. Chest Creek Watershed Stormwater Management Plan (ACT 167), Cambria and Clearfield County Commissioners, 2002

6. Clearfield Creek Watershed Assessment Phase I & II, Cambria County Conservation District and Clearfield County Conservation District, 2003

7. Cambria County GIS Center materials

8. PA- Department of Environmental Protection, Bureau of Abandoned Mine Reclamation GIS Inventory Data

9. PA – Department of Environmental Protection data and Materials

10. PennDOT State Highway Map

11. USGS 71/2 minute Quadrangle Sheets

APPENDIX

Indiana County Conservation District

Chesapeake Bay Program Resolution

WHEREAS the Commonwealth of Pennsylvania has developed the Chesapeake Bay Implementation Grant Program to provide financial assistance for BMP allocations, technician and engineer contracts and

WHEREAS the Pennsylvania Department of Environmental Protection has developed the Chesapeake Bay Tributary Strategy to meet the newly established Pennsylvania nutrient and sediment load allocations necessary to restore Chesapeake Bay water quality by 2010 and

WHEREAS the Indiana County Conservation District realizes that its drainage area contribution to the Bay is minimal yet worthy of attention.

NOW THEREFORE it is hereby resolved by the Indiana County Conservation District Board of Directors that;

1. Cambria County Conservation District will serve as our fiscal agent for the Chesapeake Bay Implementation Grant Program and will develop County Implementation Plans incorporating appropriate Tributary strategies.
2. The Indiana County Conservation District will provide technical assistance and clerical support in implementing Tributary strategies and BMPs.

RESOLVED AND ENACTED this 18 day of JANUARY 2005

Chairman

County of Cambria

Office of County Commissioners

200 South Center Street
Ebensburg, PA 15931
(814) 472-5440

February 14, 2005

Mr. Clair J. Dumm, Chairman
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, PA 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Mr. Dumm:

The Cambria County Commissioners are in full support the above referenced Tributary Strategy Plan as it relates to the Cambria County Conservation District's Chesapeake Bay Programming.

Improving water quality in local streams and rivers was identified as a " Destination" in the Economic Development: Infrastructure section of the Cambria County Master Plan. Also identified in this section was a specific step to "Implement recommended conservation programs of Kiski-Conemaugh River Basin and the West Branch Susquehanna River plans.

We take environmental protection and water quality very seriously and that is why the Conservation District is a county department under the Commissioners. The Chesapeake Bay Watershed is important to us and the program is beneficial to our quality of life in northern Cambria County.

Sincerely,

P.J. Stevens
President Commissioner

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
518 North Center Street
Ebensburg, PA 15931

814-472-5502 X3
814-472-5594 fax

February 16, 2005

Mr. Robert J. Piper, Jr.
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, PA 15931

RE: Cambria County Conservation District Chesapeake Bay Tributary Strategy Plan

Dear Mr. Piper:

The Natural Resources Conservation Service supports the Chesapeake Bay Tributary Strategy Plan, which will aid in reducing sediment, nitrogen, and phosphorus loading to the Chesapeake Bay. We also understand that the plan will continue to support the Cambria County Conservation District local conservation efforts through cost sharing and design of best management practices on area farms as well as abandoned mine lands, dirt & gravel roads, and stream restoration.

Sincerely,

Joseph E. Shevchik
District Conservationist

Pennsylvania Department of Conservation and Natural Resources

155 Hillcrest Drive
P.O. Box 506
Ebensburg, PA 15931
February 22, 2005

(814) 472-1862

Bureau of Forestry
Gallitzin Forest District

Mr. Clair J. Dumm, Chairman
Cambria County Conservation District
401 Candlelight Drive
Ebensburg, PA 15931

Re: Cambria Co. Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Mr. Dumm:

Gallitzin Forest District supports the concept of a tributary strategy plan for the Cambria and Indiana county area.

The majority forest land in this area is in the hands of private land owners. Their ownership includes many miles of the riparian buffers which are so important to the protection of our streams. Therefore it is the private landowner's land use practices that most influence the quality of the water in our local streams.

The Bureau of Forestry works with private and community forests to promote sound forestry and sound forest practices which, of course, benefit water quality in our local steams. Our Bureau has always worked with county conservation districts and other conservation agencies to promote forest land conservation at the local level. We very much realize that a sound tributary strategy plan would help to focus our joint efforts in this field.

Sincerely,

Robert E. Schweitzer

Robert E. Schweitzer
District Forester

WEST BRANCH
Susquehanna Rescue
400 Juniper Street
Northern Cambria, PA 15714

February 16, 2005

Robb Piper, Jr.
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, Pa 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Robb,

The West Branch Susquehanna Rescue supports the Chesapeake Bay Tributary Strategy Plan, which will aid in reducing sediment, nitrogen, and phosphorus loading to the Chesapeake Bay.

We also understand that the plan will continue to support the Cambria County Conservation District local conservation efforts through cost sharing and design of best management practices on area farms as well as abandoned mine lands, dirt & gravel roads, and stream restoration.

Sincerely,

Jack Bartock

Jack Bartock
Vice-President
West Branch Susquehanna Rescue

CHEST CREEK WATERSHED ALLIANCE

February 21, 2005

Robb Piper Jr.
Cambria County Conservation District
401 Candlelight Drive Suite 221
Ebensburg, PA 15931

RE: Cambria County Conservation District Chesapeake Bay Tributary Strategy Plan

Dear Robb,

The Chest Creek Watershed Alliance is pleased to support the above referenced plan. As a new grassroots watershed association we would like to offer our help anyway possible. In 2002 we partnered with the Cambria Co. Conservation District in forming the Chest Creek Watershed Alliance through a Growing Greener Grant. Funds through the grant allowed us to become 501(c)3 and to put up two information kiosks along the creek.

The Chest Creek Watershed Alliance would like to offer any help that is needed in this plan.

Sincerely,

Jeffery Mulligan
Chest Creek Watershed Alliance
President

CLEARFIELD CREEK WATERSHED ASSOCIATION

February 21, 2005

Robb Piper Jr.
Cambria County Conservation District
401 Candlelight Drive Suite 221
Ebensburg, PA 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Robb,

On behalf of the Clearfield Creek Watershed Association we are in full support of the above referenced plan. We understand that our watershed is one of the major watersheds that impacts the West Branch of the Susquehanna River.

As an association we have applied for grants through Growing Greener to help restore Clearfield Creek back to a sustainable aquatic ecosystem. We received money and partnered with the Conservation District to assess the watershed. The association applied for Growing Greener money in 2003 for design and permitting of two passive treatment systems on Little Laurel Run and was granted the money. We followed up with a Growing Greener grant to construct the passive treatment systems and was awarded the grant. These passive treatment systems will significantly lower the acidity in Little Laurel Run.

We would be happy to assist in any nature with your plan.

Sincerely, Earl Smithmyer

Earl Smithmyer
Clearfield Creek Watershed Association
President

Cambria County
Agricultural Land Preservation Program
Board of Directors

Phone: (814) 472-2120 Fax: (814) 472-0686

February 21, 2005

Robb Piper, Jr.
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, Pa 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Robb,

The Cambria County Agricultural Land Preservation Board of Directors supports the Chesapeake Bay Tributary Strategy Plan, which will aid in reducing sediment, nitrogen, and phosphorus loading to the Chesapeake Bay. We also understand that the plan will continue to support the Cambria County Conservation District local conservation efforts through cost sharing and design of best management practices on area farms as well as abandoned mine lands, dirt & gravel roads, and stream restoration.

Sincerely,

Richard Davis
Chairman

February 21, 2005

Robb Piper, Jr.
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, Pa 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Robb,

The Cambria County Farm Bureau supports the Chesapeake Bay Tributary Strategy Plan, which will aid in reducing sediment, nitrogen, and phosphorus loading to the Chesapeake Bay. We also understand that the plan will continue to support the Cambria County Conservation District local conservation efforts through cost sharing and design of best management practices on area farms as well as abandoned mine lands, dirt & gravel roads, and stream restoration.

Sincerely,

Marty Yahner

Marty Yahner
Cambria County Farm Bureau President

Pennsylvania Fish & Boat Commission

established 1866

Bureau of Law Enforcement
Southwest Region
236 Lake Road
Somerset, PA 15501
(814) 445-8974 Fax: (814) 445-3497

February 22, 2005

Mr. Clair Dumm, Chairman
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, PA 15931

Re: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

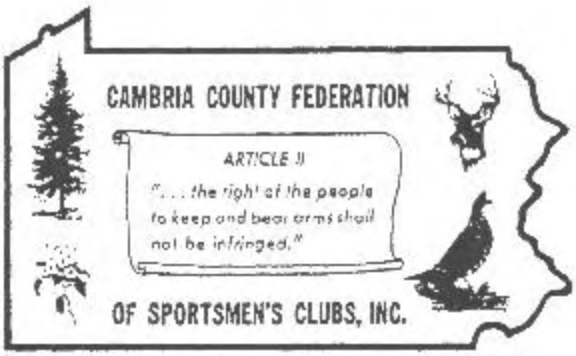
Dear Mr. Dumm

The PA FISH & BOAT COMMISSION supports the development of a Tributary Strategy Plan for Cambria County. Our agency's mission is to provide fishing and boating opportunities through the protection and management of aquatic resources. We believe such a plan would assist us in achieving that objective.

The Cambria County Conservation District has been a leader in the environmental field for decades. They have worked well with other organizations and our agency to attain and maintain a sound environmental community. This plan would lead to improved water quality in Cambria County and therefore help us to fulfill our mission.

Sincerely

Albert P. Colian Jr.
Waterways Conservation Officer



Cambria County Federation of Sportsman's Clubs, Inc.
P.O. Box 436 • Ebensburg, PA 15931

February 14, 2005

Mr. Clair J. Dumm, Chairman
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, PA 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Mr. Dumm:

The Cambria County Federation of Sportsmen Clubs, Inc., at their regular monthly meeting held February 9, 2005 voted to support the above referenced Tributary Strategy Plan.

The Conservation District is an important part of our county conservation team. We support you by being a nominating organization approved by the State Conservation Commission, for nominees for your board of directors. We have a vested interest in soil and water issues. All of the conservation district's programs address these environmental concerns. The Chesapeake Bay Watershed is important to us and the program is beneficial to our water quality.

The Cambria County Federation of Sportsmen Clubs, Inc., represents fifteen sportsmen's clubs in Cambria County that accounts for approximately 838 members. Meetings are held monthly in the Cambria County Courthouse, Courtroom #3, at 7:30pm, the second Wednesday of each month. It is the county affiliate of Pennsylvania Federation of Sportsmen Club's, Inc., a respected group of rich conservation heritage in Pennsylvania, including being instrumental in the creation and passage of the PA Clean Streams Law of 1937.

Sincerely,

Dwight E. Weaver

Dwight Weaver
President

224 Buck Road
Ebensburg, Pa 15931
(814) 344-6632

Chesquehanna Spurs Chapter - NWTF

February 15, 2005

Mr. Robb Piper, District Manager
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, Pennsylvania 15931

Dear Robb:

I'm writing to offer our local chapter's support to the Chesapeake Bay Tributary Strategy Plan in Cambria and Indiana Counties. The work being done in those areas on abandoned mine reclamation, stream restoration, and stream bank stabilization is right in line with our Chapter's goals to promote better habitat for the wild turkey. This work will ultimately pay great dividends in reducing the runoff loading in the Chesapeake Bay as well as nurturing turkey flocks in my Chapter's home area.

Please call on us if we can help in anyway with the warm season grass or tree planting

Sincerely,

Jim Panaro
Chapter President

Cambria County Conservation & Recreation Authori

401 Candlelight Drive, Suite 234, Ebensburg, PA 15931
814-472-2110 voice 814-472-0686 fax dcolumbus@co.cambria.pa.us e-mail

Delores J. Columbus
Executive Director

February 16, 2005

Robb Piper, Jr.
Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, Pa 15931

RE: Cambria County Conservation District
Chesapeake Bay Tributary Strategy Plan

Dear Robb,

The Cambria County Conservation & Recreation Authority (CCCRA) supports the Chesapeake Bay Tributary Strategy Plan, which will aid in reducing sediment, nitrogen, and phosphorus loading to the Chesapeake Bay.

We also understand that the plan will continue to support the Cambria County Conservation District's local conservation efforts through cost sharing and design of best management practices on area farms as well as abandoned mine lands, dirt & gravel roads, and stream restoration.

The CCCRA is very interested in projects such as these, please keep us informed of all future developments.

Sincerely,

Delores J. Columbus

MISSION STATEMENT FOR THE CAMBRIA COUNTY CONSERVATION DISTRICT

The Cambria County Conservation District educates and assists the public through programs, projects and leadership in the stewardship of natural resources to sustain and enhance quality of life.

Prepared by the:

Cambria County Conservation District
401 Candlelight Drive, Suite 221
Ebensburg, PA 15931
Telephone: (814) 472-2120
Fax: (814) 472-0686
Email: cccd@co.cambria.pa.us