

Montour County Implementation Plan For The Chesapeake Bay Tributary Strategy

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A. County Description

The County of Montour encompasses some 82,848 acres (131 square miles) in east-central Pennsylvania and is the second smallest county within the Commonwealth. The County is predominately rural; comprised of two boroughs (Danville and Washingtonville) and nine townships (Anthony, Cooper, Derry, Liberty, Limestone, Mahoning, Mayberry, Valley and West Hemlock). Bordering counties include; Lycoming County to the north, Northumberland County to the south and west, and Columbia County to the east.

The entire county lies within the Chesapeake Bay watershed; just east of the North Branch and West Branch Susquehanna confluence (approximately 131 river miles from the Bay). The northern half of the county drains to the West Branch Susquehanna via Chillisquaque Creek, while the central and southern portions of the county drain to the North Branch Susquehanna via Mahoning and Roaring Creeks and smaller tributaries. Physiographically, Montour County is in the upper Appalachian Mountain section of the Valley and Ridge Province; where most of the terrain is moderately rolling with a few ridge intrusions and extensively weathered uplands.

Montour County's population, according to the U.S. Census Bureau was 18,236 in 2000 (139.5 people per square mile), and was estimated to be 18,083 in 2003. The most populated area in the county is in and around Danville Borough and Mahoning Township (approximately 10,000 people). Washingtonville Borough has less than 300 residents, while the remaining 8,000 people live throughout the rural areas of the county.

Despite the semi-agricultural region in which the county lies, manufacturing and health care services employ a considerable portion of the population in and around Montour County (Montour County Cooperative Extension web site). Manufacturing provides a substantial employment base in the county, and industries such as Merck Pharmaceuticals and others continue to thrive in the Danville area. The service industry is also strong in the county, with Geisinger Medical Center and related services providing a major portion of the employment base (Columbia Montour Visitors Bureau website). According to Penn State Cooperative Extension and Center for Economic and Community Development, Montour County farms directly employed 475 workers in 2000, while indirectly generating an additional 112 jobs (through economic multiplier effects) within the County.

Historically, like many regions of the state, agriculture played a large roll in early settlement and continued growth of Montour County. Today, much of the land (approximately 48-50%) is still in agricultural production – despite the encroaching pressures of land development, population growth and economic progress. Nearly 18,000 acres (21%) of Montour County meet requirements for prime farmland – with these areas being mostly found in Watson-Alvira-Weikert and Hagerstown-Elliber-Edom soil associations (Montour County Soil Survey, 1983). Approximately 30% (24,854 acres) of total land cover consists of Pasture/Hay Lands, while 20% (16,570 acres) are in Row Crops. Forested lands account for approximately 36% (29,825 acres) of total land cover, while developed lands (residential, commercial, transportation) cover approximately 8-10% of the county's land mass. The remaining 4-6% of land cover consists of open waters and wetlands (Figure 1).

Montour County crop lands are primarily used to support livestock, for cash grain crop production, or are rented to other farmers for grain crops (MCCD 1987). Table 1 is a quick summary of agriculture in Montour County and focuses on major products – adapted from PA Agricultural Statistics 2003-2004.

Table 1. Montour County Agriculture Profile

	2004	2003	2002	2001	2000	1999	1998	1997
Number of Farms		305	305	310	320	325	335	345
Acres in Farms		39,500	39,500	41,000	41,500	43,500	43,500	43,000
Average size of farms (acres)		130	130	132	130	131	130	125
Number of Cattle Farms		130	140	140	140	140	140	
Number of Commercial Dairy Farms		45	45	45	40	40	40	
Number of Hog Farms		15	15	15	15	15	15	
Number of Sheep Farms		10	10	10	10	10	10	
Number of Poultry Farms			35					40
Number of <u>All</u> Cattle & Calves	9,000	6,400	6,100	5,600	5,900	5,600	6,000	6,500
Number of Milk Cows	2,100	2,100	2,000	1,900				
Annual Milk Production (1,000lbs)		32,400	31,300	31,300	30,100	29,800	29,300	30,700
Number Commercial Broilers		637,000	400,000	400,000	400,000	400,000	400,000	400,000
Number of Hogs and Pigs		700	1,200	1,100	2,300	2,400	2,500	2,200
Corn for Grain (Acres Planted)		6,900	6,800	9,200	9,900	9,400	11,000	10,700
Corn for Grain (Acres Harvested)		5,400	5,400	8,300	9,200	8,500	9,800	8,500
Corn for Silage (Acres Harvested)		1,500	1,400	800	700	800	1,100	2,000
Dry Alfalfa Hay (Acres Harvested)		2,000	2,800	2,500	2,500	2,900	3,100	3,500
Dry All Hay (Acres Harvested)		5,100	6,300	6,500	7,100	7,600	7,400	7,800
All Forage (Acres Harvested)		6,700	7,800	7,900				
Soybeans (Acres Planted)		5,900	6,300	5,400	5,300	5,000	6,000	6,300
Soybeans (Acres Harvested)		5,800	6,100	5,400	5,100	4,900	6,000	6,200
Oats (Acres Planted)		1,100	1,300	1,400	1,600	1,400	1,600	1,700
Oats (Acres Harvested)		900	1,100	1,100	1,400	1,200	1,400	1,400
Wheat -All (Acres Planted)		1,500	1,500	1,300	1,600	1,600	1,600	1,700
Wheat - All (Acres Harvested)		1,400	1,500	1,200	1,500	1,500	1,600	1,600
Winter Wheat - All (Acres Planted)		1,500	1,500	1,300	1,600	1,600	1,600	1,700
Winter Wheat - All (Acres Harvested)		1,400	1,500	1,200	1,500	1,500	1,600	1,600

Summary from: *Pennsylvania Agricultural Statistics 2003-2004 (Including 5-year County Revisions)*

Overall, Montour County was ranked 38th against all other counties in the state for Total Value of Agricultural Products Sold in 2002. In terms of value of crops sold (including nursery and greenhouse products), Montour County was ranked 15th; while being ranked 50th for the value of sold livestock, poultry and their products for the same period of time. Market value of production for crop sales accounted for \$19,524,000 of total value in 2002, while livestock sales accounted for \$7,890,000 of total value in 2002 (collectively down 6% from 1997). Average market value of production per farm in 2002 was \$90,178, up 8% from 1997 (US Dept. of Agriculture, National Agricultural Statistics Service Website).

Currently, there are only three regulated Concentrated Animal Operations in Montour County. This number only reflects those operations that have certified nutrient management plans and that the State Department of Agriculture is aware of – this number does not take into account the unregulated CAOs (or CAFOs) that possibly exists (especially on non-English farms). There are also three “volunteer farms” that have certified nutrient management plans; all as a result of having participated in a combination of one or more cost-share programs (Chesapeake Bay Program, Act 6, EQIP).

B. Water Resources and Quality

Montour County is divided between two State Water Plan Watersheds: The Upper Central Susquehanna; Catawissa - Roaring Creeks (5E) and The Lower West Branch Susquehanna; Muncy - Chillisquaque Creeks (10D). The northern half of the county drains to the West Branch Susquehanna via Chillisquaque Creek and its tributaries (Beaver Run, Mud Creek, East Branch, White Hall Creek, Middle Branch, West Branch, McKee Run, and County Line Branch). Mahoning Creek and its tributaries (Indian Creek, Kase Run, Mause Creek, and Sechler Run) drain lands in the central portion of the county, which empty into the North Branch Susquehanna. The southern pan-handle of the county (Mayberry Township) is drained via a portion of Roaring Creek and Little Roaring Creek and their tributaries – also emptying into the North Branch Susquehanna.

Throughout the county, Chapter 93 stream classifications include Cold Water Fisheries, Warm Water Fisheries, and Trout Stocking Fisheries (Table 2). Overall, Montour County contains some 332 stream and river miles and 82 “major” bodies of water (farm ponds and private impoundments greater than approximately ½ acre in size) (PA DEP eMapPA website).

Table 2. Designated Water Uses and Water Quality Criteria In Montour County

Susquehanna River Basin in Pennsylvania			
<i>Susquehanna River – Drainage List K (§93.9k)</i>			
Stream	Zone	County	Water Use
Mahoning Creek	Main Stem, PA 54 Bridge to Mouth	Montour	WWF
Mahoning Creek	Main Stem, Source to PA 54 Bridge	Montour	TSF
Unnamed Tributaries to Mahoning Creek	Basins, Source to PA 54 Bridge	Montour	CWF
Unnamed Tributaries to Mahoning Creek	Basin, PA 54 Bridge to Mouth	Montour	CWF
Sechler Run	Basin	Montour	CWF
Kase Run	Basin	Montour	CWF
Mause Creek	Basin	Montour	CWF
Toby Run	Basin	Montour	CWF
Roaring Creek	Main Stem, Lick Run to Mouth	Columbia-Montour	TSF
Unnamed Tributaries to Roaring Creek	Basins, Lick Run to Mouth	Columbia-Montour	CWF
Little Roaring Creek & Unnamed Tributaries	Basin	Montour - Northumberland	CWF
<i>West Branch Susquehanna River– Drainage List L (§93.9l)</i>			
Stream	Zone	County	Water Use
Chillisquaque Creek	Basin	Northumberland	WWF
Limestone Run	Basin	Northumberland	WWF

CWF – Cold Water Fishery; WWF – Warm Water Fishery; TSF – Trout Stocking Fishery
Adapted from Chapter 93. Water Quality Standards – The Pennsylvania Code website

The two major watersheds within the county include Chillisquaque Creek and Mahoning Creek watersheds (Figure 2). The Chillisquaque Creek Watershed accounts for approximately 56%

(46,401 acres) of Montour County (the largest watershed in the county). Watershed-wide, it covers more than 78,973 acres and has more than 260 miles of streams in Montour, Northumberland, Columbia and Lycoming Counties (about 185 stream miles in Montour County alone) and empties into the West Branch Susquehanna south of Milton. The Mahoning Creek Watershed, covering some 25,393 acres (about 30% of Montour County) and having approximately 92 stream miles empties into the North Branch Susquehanna at Danville. The Mahoning Creek watershed is almost entirely within Montour County lines (about 90 miles of stream) – draining only a small area of Columbia County.

There are two established and active watershed associations within the county; the Chillisquaue-Limestone Watershed Association and the Mahoning Creek Watershed Association. Both groups have conducted preliminary watershed assessments (including visual, biological and chemical assessments) and continue monthly water quality monitoring with the assistance of local universities and the Montour County Conservation District. In addition, both associations are in the process of developing watershed restoration plans that will prioritize and address major areas of concern within their respective watersheds. These two groups have also conducted various outreach and educational programs, and are a valuable resource for disseminating conservations efforts and their benefits.

In their watershed assessment, the Chillisquaue Watershed Association found that a large portion of the streams in their watershed are heavily impacted by agriculture (assessment report in progress – Higgins, et al. 2005). Reductions in water quality have resulted from the heavy use of agricultural lands within the watershed. Cropping practices in the past had encroached upon stream corridors and destroyed wetland areas. Also, many livestock operations (milking and beef) allowed animal access to streams and wetland areas; which to date still degrade water quality, especially on the non-English farms. In addition, many of the streams in this watershed are 305B listed as not attaining their intended use as Warm Water Fisheries (Table 3).

The Mahoning Creek Watershed Association, in their watershed assessment, found that their streams suffer from urban and agricultural run-off, high stormwater flows, sedimentation, riparian buffer encroachment, and loss of fish habitat (MCW Assessment Report prepared by Lycoming College’s Clean Water Institute). The impairments afflicting this watershed have only resulted in a small portion of streams being 305B listed as “not attaining” their intended use as Cold Water Fisheries / Trout Stocking Fisheries (Table 3). In comparison to the Chillisquaue Creek Watershed, Mahoning Creek is in “better environmental shape” to some respects, but is troubled by its own basket of impairments. Even though a large portion of the County’s lotic resources are impaired and 305B listed as “not attaining”, they still offer recreational opportunities and hold aesthetic and intrinsic values that need to be conserved and rehabilitated.

Other water resources in the county consist of ponds, lakes / reservoirs and ground water. There are approximately 82 bodies of water in Montour County ranging in size from approximately 0.6 acres to the largest of about 190 acres. The largest body of water is Lake Chillisquaue (190 acre reservoir) located on the Middle Branch Chillisquaue Creek in Anthony Township. The lake is owned by PA Power and Light and is used as an emergency cooling water source for the steam electric plant. It also serves as a recreational resource for fishing and boating (restricted to non-power and electric powered crafts). Water supply for the county comes from wells, springs

and the Susquehanna River. Rural areas in the county draw water from private wells; Danville borough (largest urban area) draws water from the Susquehanna River; while Mahoning Township (most populated township) receives its water from deep wells (Montour County Soil Survey, 1983 & Pennsylvania Science Office of The Nature Conservancy, 2005).

C. Trends of Significance to Water Quality:

Despite Montour County's small stature in land size, it is not limited in its scope of degraded water quality. Land development and urbanization has and continues to take its toll on streams and creeks within the county. Manufacturing has also left its mark on the County – as a 15-acre US EPA Superfund Site (currently under remediation for groundwater and soil contamination). Other areas of concern (as expressed in the 1987 Agricultural Non-Point Source Pollution Assessment Report for the Chesapeake Bay Program) include the area around Pennsylvania Power and Light's coal fired steam electric plant; where water had been discharged [untreated] from ash and fly ash basins and greenhouse operations into Middle Branch Chillisquaque Creek. In large, agriculture and related activities have degraded and impaired water quality in a significant manner throughout the county.

Residential development has been occurring most rapidly in Mahoning and Valley Townships – both located within the Mahoning Creek Watershed. Of the two major watersheds in Montour County, Mahoning Creek (the most populated and prone to continued development) has an Act 167 Stormwater Management Plan, which was adopted in 1995. Despite the presence of the Act 167 Plan and its role in land development, it is not enforced by all encompassing municipalities in an effective manner. As a result, continued land development and resulting stormwater flows place additional environmental stresses on natural drainage ways – not to mention the negative effects that had taken place prior to Act 167 adoption. Typical symptoms of excessive stormwater flows in Montour County consist of; unstable stream beds and banks, sever stream bank erosion, flashiness of stream flow, reduced biological diversity, heavy sediment deposits, dewatering of stream channel after storm flows, localized flooding, and so on. All these symptoms collectively contribute to the already established sediment and nutrient problems that plague the Chesapeake Bay.

In an attempt to educate municipality supervisors on the negative effects of current stormwater management practices, the Montour County Conservation District in partnership with the Pennsylvania Environmental Council and Cahill and Associates held a “Better Stormwater Management” workshop in spring 2004. Despite limited attendance the workshop was a success for those who attended; shedding a bright light on the resulting trends of current stormwater management schemes (or lack there of). A continuation of similar efforts is not out of the question, and will be considered for future outreach opportunities.

The US EPA Superfund Site in Montour County, Valley Township is located in an area with a mix of agricultural and residential lands. The site was the former location of a scrap wire recovery operation. “The recovery process, which changed the PVC insulation around the wire into granular black carbon sludge, also helped dissolve heavy metals such as lead, zinc, and copper into the waste materials...the copper wire was then treated with chlorinated solvents...and spent solvents were apparently dumped on site.” (US EPA, Mid-Atlantic

Superfund Website). As a result, soils and ground water became contaminated with various volatile organic compounds. The site is currently under a remediation and clean-up process, where soils and ground water are being treated to remove contaminants.

To the best of the Conservation District's knowledge, the Pennsylvania Power and Light's Montour Power Plant (PPL Montour), constructed in the 1970's, has been and continues to be in compliance with PA DEP and Federal regulatory guidelines. Environmental issues that have arisen, such as fly ash management, have been innovatively dealt with. "Where more than 90 percent of the ash is processed and beneficially used as construction material instead of being disposed of as waste" (Pennsylvania Power Light Montour Website & Personal Correspondence). The PPL Montour Preserve has and continues to offer environmental education and outreach programs to all ages of students (elementary through college) and other public and private groups. It is also important to note that PPL Montour Plant and Preserve have been involved with various conservation efforts on there Montour Project Lands (some 6,000 acres).

Following is a highlight of the PPL Montour's commitment to natural resource conservation efforts and environmental stewardship in Montour County. PPL Montour (with assistance and partnerships with PA Game Commission, USDA NRCS and Pheasants Forever) has enrolled and converted about 377 acres of farmland to habitat conducive for pheasant and wildlife enhancement. The North Central Pennsylvania Conservancy and PPL Montour have also begun to install stream riparian buffers through the Conservation Reserve Enhancement Program (CREP) on 128 acres. They also have a completed design and plan to stabilize 2,300 feet of stream channel on the Middle Branch Chillisquaque Creek – employing Natural Stream Design techniques to correct large sections of stream bank erosion (Larson Design Group, Inc., 2004). PPL Montour has also formed a strong partnership with the Chillisquaque Limestone Watershed Association; providing meeting space, monetary donations, and allowing interested employees to participate in watershed activities. On the agricultural end of the conservation spectrum, PPL Montour leases 3,300 acres of farmland; where each tenant farmer agrees to follow a 5-year conservation plan (crop rotations, cover cropping, etc.) on the parcels they farm. Interestingly, according to PPL Montour Preserve representative, a majority of these farmable acres are no-tilled.

Agriculture, as stated earlier, has played a significant role in land use and water quality reductions in Montour County – particularly in the Chillisquaque Creek Watershed. According to Pennsylvania's 208 Study in 1979, the Chillisquaque Creek Watershed was identified as a high priority watershed, having potential for water quality problems from agricultural non-point source pollution (MCCD, 1987). Following PA DEP's assessment of the watershed in 1998 (through the Unassessed Waters Program), along with an independent assessment conducted by a Bucknell University group in 2003, it became very apparent that agricultural non-point source pollution has taken its toll on the watershed. Of the 260 miles of streams in the watershed, 215 miles (about 83%) are 305B listed as "not attaining" their intended use as Warm Water Fisheries (PA DEP eMapPA website). In comparison, about 15 miles of streams (17% of watershed total) in Mahoning Creek Watershed are 305B listed as "not attaining" their intended use as Cold Water Fisheries. Assessment results through PA DEP's Unassessed Waters Program also coincide with a watershed assessment conducted in 2004 by the Clean Water Institute at

Lycoming College. Both assessments identified major impairments in this watershed to be related to agricultural, stormwater and land development impacts.

Table 3. Summary of 305B Stream Listings as "Not Attaining" in Montour County Watersheds

Streams of the Chillisquaque Creek Watershed				
	Total Stream Miles	Miles Not Attaining	% Not Attaining	Impairments*
Chillisquaque Creek	63.24	38.7	61.2	Agriculture / Siltation, Organic Enrichment, Low D.O., Surface Mining Siltation, Industrial Point Source, Habitat Alteration
East Branch Chillisquaque	18.38	18.38	100.0	Agriculture / Siltation
Middle Branch Chillisquaque	14.35	12.86	89.6	Agriculture / Siltation, Hydromodification / Flow Alterations, Other Habitat Alterations
West Branch Chillisquaque	23.52	17.36	73.8	Agriculture / Siltation
Countyline Branch Chillisquaque	23.31	23.21	99.6	Agriculture / Siltation
Whitehall Creek	5.43	5.43	100.0	Agriculture / Siltation
McKee Run	5.84	5.84	100.0	Agriculture / Siltation, Removal of Vegetation
Mud Creek	46.06	45.38	98.5	Agriculture / Organic Enrichment, Low D.O., Agriculture / Siltation
Beaver Run – South	24.6	12.16	49.4	Agriculture / Siltation
Beaver Run – North	16.85	16.85	100.0	Agriculture / Siltation, Agriculture / Organic Enrichment, Low D.O.
Limestone Run	18.98	18.98	100.0	Agriculture / Siltation
Total in Entire Watershed	260.56	215.15	82.6	
Streams of the Mahoning Creek Watershed				
	Total Stream Miles	Miles Not Attaining	% Not Attaining	Impairments*
Mahoning Creek	30.29	2.309	7.6	Agriculture / Siltation, Urban Runoff, Stormwater, Siltation
Mauses Creek	20.54	6.185	30.1	Agriculture / Siltation, Urban Runoff/Storm Sewers/Siltation, Agriculture / Organic Enrichment, Low D.O.
Kase Run	18.67	1.617	8.7	Agriculture / Siltation
Sechler Run	18.16	5.324	29.3	Agriculture / Siltation, Channelization
Indian Run	4.3	0	0.0	None noted under DEP's Assessment
Total in Entire Watershed	91.96	15.44	16.8	

*Noted impairments are listed from most to least frequent - from PA DEP's Emappa web site.

(Summary for entire watershed areas (beyond County Boundaries) adapted from PA DEP's Emappa web site and AVStrEAMS software)

In total, about 163 miles (50%) of Montour County streams are 305B listed as “not attaining” their intended use (out of about 332 total miles). Figure 3 highlights impaired streams in Montour County and their impairments. Again, it is very apparent that agriculture has impaired a large portion of the County’s streams – primarily resulting from cropland impacts.

With a quick windshield-survey through northern Montour County, one is able see just how widespread crop farming and agriculture is – while also noticing the extent of environmental impacts. In some portions of this area, levels of impacts are quite severe; resembling conditions typically found only in high intensity agricultural areas of south-central Pennsylvania (MCCD, 2005). The impairments to streams and creeks in the County were also noted in the 2005 Montour County Natural Areas Inventory (produced by the PA Science Office of the Nature Conservancy); pointing out the potential benefits from restoration of forested buffers.

As part of the 1987 Agricultural Non-Point Source Pollution Assessment of Chillisquaque Creek Watershed in Montour County (for the Chesapeake Bay Program), a survey was conducted on 15% of farms within the Chillisquaque Watershed portion of the county. The results of these surveys shed light on some of the possible reasons for the current environmental conditions in the Chillisquaque Creek Watershed.

Of the surveyed farms:

- About 60% indicated that 31-70% of their farms were adequately protected against erosion.
- About 90% had conservation plans on owned lands; while 38% of rented lands did not have conservation plans (50% of rented lands had lease agreements). Of the lands with conservation plans, 50% did not reflect current operations and 62% needed revision. The major reason for not having a conservation plan, or not implementing a plan was the high costs to do so and low farm prices (indicated by 80% of surveyed farms). Other reasons included too little time, leased/rented land, limited cost-share funds.
- About 83% of interviewed farms used excessive amounts of commercial fertilizers and/or manure for crop production; with only 23% using soil tests.
- About 62% of the farms had streams running through their properties. 45% of the farms with streams also had livestock. About ¾ of these livestock operation (on streams) allowed animals free access to the streams.
- About 85% reported crop residue left on corn fields over winter, and 50% reported crop residue left on soybean fields over winter. 7% planted winter cover crops on corn field, while 0% planted winter cover crops on soybean fields.
- Estimated soil losses extrapolated for entire watershed within the County were:
 - 15,827 acres with losses of T to 3T
 - 9,275 acres with losses of 3T or greater
- Annualized loss of sediment, nitrogen and phosphorous were calculated to be:
 - 225,918 tons of sediment loss per year (38,406 tons delivered to Susquehanna River).
 - 104.5 tons of nitrogen loss per year.
 - 4.8 tons of phosphorous loss per year.
- Conservation practices commonly used included: 55% used strip cropping, 20% used no-till farming, 20% used subsurface drainage, 15% used diversions, 5% used open ditches, 17% used minimum-till, 83% used conventional tillage, and 100% of those using no-till were satisfied with results.

This assessment also concluded that farms with cash grain crops appeared to have the greatest problems in terms of erosion and soil loss. The lack of hay in crop rotations, or complete lack of crop rotations was identified as major reasons. Also, it was noted that livestock farms with streams (in the Montour County portion of the Chillisquaue Watershed) allowed free access by animals to those streams.

Even today, a good portion of what was initially found in the 1987 Assessment holds true and continues to plague water quality in this region – not to say that natural resource conservation efforts and environmental stewardship has not been taking place. In recent years, many farmers and land owners alike have been actively participating in conservation programs, especially when incentives are available.

D. Sediment & Nutrient Source Reductions

Soil and water conservation efforts have been ongoing in Montour County for some time, especially in the agricultural arena. In recent years, state and federal cost-share conservation

programs have grown in popularity and have had notable successes. Even though there have been numerous strides in resource conservation within Montour County, there are ample opportunities and real needs for continued efforts.

In summary, major impairments to water quality in Montour County, which negatively impact the Chesapeake Bay, to be addressed through this Implementation Plan include, but are not limited to the following.

- Agriculture:
 - Cropping practices and their location to streams and wetlands
 - Cropping up to streams and wetland areas (cropping in drained wetlands)
 - Limited use of cover cropping and crop residue management
 - Limited use of continuous no-till operations
 - Soil erosion and loss to surface waters
 - Livestock manure management and access to streams
 - Unmanaged access to streams or fenced into stream / wetland areas
 - Animal concentration areas (barnyards, paddocks) with manure build-up and runoff to surface waters
 - Outdated or absence of Conservation Plans & Nutrient Management Plans
 - Applying manure and fertilizers at rate greater than crops can utilize
 - Conservation plans not reflecting current operations
 - Instability of streams and excessive bank erosion
 - Streams disconnected from floodplain / wetland areas
 - Loss of stable in-stream habitat
- Urban / Developed Areas:
 - Stormwater management (associated with new and existing land development)
 - Outdated Act 167 – inefficient use of current plan
 - A need for a progressive county-wide stormwater management ordinance
 - Instability of streams and excessive bank erosion
 - Heavy stormwater pulse resulting in excessive stream bank erosion (property loss / damage)
 - Loss of stable in-stream habitat
 - Erosion and Sediment control practices

Conservation programs of popularity in the County include: NRCS’s Conservation Resource Enhancement Program (CREP / CRP) and Environmental Quality Incentives Program (EQIP), the State’s Dirt and Gravel Roads Program, Agricultural Land Preservation Program, Chapter 102 - Erosion Control Program, National Pollutant Discharge Elimination System, Chapter 105 - Water Obstruction / Stream Encroachment Permitting, Watershed Development, the Chesapeake Bay Program, and most recently the utilization of the Pennsylvania Department of Agriculture’s Act 6 grant program. A brief synopsis of these and other program accomplishments are noted in Table 4.

Table 4. Partial Summary of Conservation Efforts in Montour County

NRCS CREP & CRP Accomplishment Summary
 5,949 Acres of warm and cool season grasses planted

Agricultural Land Preservation Program
 8 easement purchases, preserving 634-acres at \$488,247

822 Acres of Riparian Forest Buffers installed

80 Acres with Fencing (25,720 Lft of fence)

1,415Lft of animal trails and walkways

264,200Lft of stream banks buffered (50 miles)

800 acres of CRP CRP-REX

On average, for every 400 ft of stream buffered, about 1 acre of riparian areas are established

(Information provided by CBF and NRCS staff - Bloomsburg NRCS)

Chesapeake Bay Program Accomplishments**11**-Projects totaling \$493,385.99 (\$294,161CBP Cost-Share)

Brief Summary of Projects

6 Waste Management Systems

18,325ft Diversions & Waterways

138 Acres Strip cropping

3,301ft Fencing

83 Acres Contour Farming

1,800ft Roof Runoff Management

84 Acres Cropland Protection System

13,175ft of Terrace Systems

33,900sqft of Heavy Use Area Protection (Conc. & Gravel)

12.1 Acres Vegetative Cover

459 acres cover crops planted

Amongst Others

Planned easement purchase of 90-acres at \$90,000 in 2005

Erosion & Sedimentation Program

Approximately 81 E&S Plans and 78 waivers reviewed in 2008

Dirt & Gravel Roads Program

6 projects totaling nearly \$152,100.08

11,107 ft. of road improvements

National Pollutant Discharge Elimination Program

10 NPDES permits processed in 2008

Water Obstruction / Stream Encroachment Permitting

Approximately 21 General Permits processed in 2008

(GP - 1, 3, 4, 5, 7, 8, 9)

Watershed Association Development

To Date: two established and active watershed associations

Both having completed watershed assessments and in progress of developing watershed restoration plans

Streambank Stabilization Project funded By Growing Greener

Mahoning Creek Total cost \$52,284.54

Dave Beachel Jr. fish structures buffer and fencing project

Funded by Growing Greener \$25,000

Dave Beachel Jr. Manure Storage funded by 319 Grant**To be installed in 2009 \$63,354****PA Department of Agriculture Act 38 Grant Program**

1 farm project in combination with CBP Project

~ \$75,000

1 farm just Act 38 \$50,627.00 Total \$125,627.00

NMPs 5 CAOS

This is not a comprehensive listing of all conservation accomplishments / efforts -
it only representing what data and information that could be collected within time constraints

Additionally, as previously stated the Montour County Conservation District in partnership with the Pennsylvania Environmental Council (PEC) held a "Better Stormwater Management" workshop for municipality officials in spring 2004. An outcome of this workshop was the decision to pursue the development of a progressive County-Wide model stormwater ordinance for municipalities to adopt. This came through the collaborative efforts of the PEC,

Conservation District, Mahoning Creek Watershed Association, and Montour County Commissioners. To date, this is still a work in progress.

Currently, the “Chillisquaque-Fishing Creeks Buffer Restoration Project” is a project that is being submitted for grant funding through the Chesapeake Bay Small Watersheds and PA DEP’s Growing Greener grant programs. This project will be a collaborative effort by Montour, Northumberland and Columbia Conservation Districts, with assistance from the Chesapeake Bay Foundation, USDA’s Farm Service Agency and Natural Resource Conservation Service (Conservation Reserve Enhancement Program), Project Grass, and local Watershed Associations. The project is planned to restore riparian forest buffers mostly on agricultural operations where livestock presently have unmanaged access to creeks; placing concentrated efforts on plain-sect farms in the two watersheds.

Project objective include but are not limited to: increased use of stream bank fencing, building in-roads with Amish and Mennonite farms, implementing rotational grazing systems in conjunction with stream / riparian buffers, restore functionality to wetlands impacted by grazing practices, empower watershed organizations to restore forested buffers, build relationships/connections with multiple partners.

Final products of this effort are to include: 36-miles of riparian forest buffers, 72-acres of wetland restoration, outreach effort to landowners on stream bank fencing/buffer restoration benefits, data collection at on-going CBF trials of buffer restoration methods in area, and at least two buffer projects where watershed groups are integral to implementation. Expected outcomes of this project address the following Chesapeake 2000 priorities: C2K expressly calls for 10,000 miles of riparian forest buffers; Riparian forest buffers are a key habitat that enhances system resiliency; Forested buffers are a key strategy for improving water quality, with critical links to the bay’s living resources; This project will build local restoration capacity, also a C2K goal.

The above outlined proposal takes the existing relationships among partners to a new, heightened level, while fostering the potential to develop new partnerships. Potential benefits aren’t all clear, but should involve improved effectiveness on shared priorities as partners become more familiar with needs/opportunities in the area and relative roles of each partner.

E. County Bay Tributary Strategy

For the successful execution of this plan, the Montour County Conservation District proposes the below program goals and objectives as guidance for implementation. The summaries of major water quality impairments outlined on page 10 are the focus of the Conservation District's Implementation plan at this time, and are subject to refinement as problems are further defined and understood. Table 5 highlights Best Management Practices, recognized by the Chesapeake Bay Program, which the Montour County Conservation District recommends for reduction of nutrient and sediment loading to surface waters of the County and Chesapeake Bay (See Appendix A for further information). Most of the identified "Resources / Assistance" are agencies, organizations and programs that can have been utilized during past projects and where applicable engaged in future conservation efforts – there is a multitude of other opportunities that can be developed.

Overall County Implementation Plan Goal:

- Protect and enhance natural resources throughout Montour County's landscape while reducing sediment and nutrient loads to the Chesapeake Bay ecosystem; through education, research, program development and implementation of best management practices that focus on soil and water conservation.

Four Year Objectives: 2009-2012

- Reduce soil erosion and nutrient loss on 1,000-acres of cropping and grazing fields, through the implementation of agricultural Best Management Practices. (i.e covercrops, conservation planning, buffer installation, diversions, waterways, strip cropping, no-till farming, ect).
 - Resources / Assistance: MCCD, NRCS (CREP / CRP, EQIP, Project Grass), DEP CBP, Watershed Associations, Penn State Cooperative Extension, PDA
- Establish or enhance 25 acres of wetland areas that were formerly connected to adjacent streams.
 - Resources / Assistance: MCCD, CBF, NRCS (CREP, CRP, EQIP WRP), DEP (CBP, Wetland Reserve Program), PDA, Watershed Associations
- Develop eight (8) Nutrient Management Plans including Nutrient Balance Sheets) that meet PA Department of Agriculture certification requirements along with updating or developing Farm Conservation Plans for agricultural operations that participate in state and federal cost-share / financial assistance conservation programs.
 - Resources / Assistance: MCCD, PDA , NRCS (CREP, CRP, EQIP, REAP), DEP CBP, neighboring conservation districts private sector planners
- Evaluate necessary livestock operations with significant non-point source pollution potential and assist them with enrolment in conservation program(s) and implementation of Best Management Practices. Goal is to develop four (4) stabilized barnyard or manure storage projects, depending on availability of funding.
 - Resources / Assistance: MCCD, PDA, NRCS (EQIP, Project Grass), DEP CBP, Growing Greener Grant

- Develop trusted, working relationships with Non-English farm operations and specifically install One (1) BMP on associated farm; providing education on the importance of soil and water conservation, along with providing assistance in a manner that is constructive and acceptable to their system of beliefs.
 - Resources / Assistance: MCCD, CBF, Watershed Associations, PDA, NRCS, DEP CBP, Penn State Cooperative Extension
- Continue researching / inventorying nutrient and sediment losses throughout the County (gaining specific understanding(s) and providing direction(s) for future conservation efforts), while seeking the most appropriate mode(s) of correction.
 - Resources / Assistance: MCCD, PDA, NRCS, DEP, Watershed Associations, D&GRP, Planning Commissions
- Increase public awareness (both in the agricultural and urban communities) on the importance of soil and water conservation through outreach and education programs; develop and distribute two (2) newsletters per year and hold one (1) annual ag winter meeting
 - Resources / Assistance: MCCD, PDA, PACD, NRCS, DEP, PEC, Penn State Cooperative Extension
- Develop a progressive county-wide model stormwater management ordinance for municipalities to adopt and tailor to their specific needs, with the assistance of the Pennsylvania Environmental Council and other agencies.
 - Resources / Assistance: MCCD, PEC, County Municipalities & Planning Commission, EPA, Watershed Associations, DEP
- Continue providing assist to county's watershed associations with project development and implementation (i.e. stream and dump clean-ups, stream channel rehabilitation, tree plantings, outreach and education for public and municipalities).
 - Resources / Assistance: MCCD, DEP, CBF, SRBC, PEC, private and public businesses, multitude of other funding sources
- If awarded, administer and execute one (1) Chesapeake Bay Small Watersheds grant each year, with highest priority given to projects on impaired stretches of Chillisquaque Creek and Mahoning Creek
 - Resources / Assistance: MCCD, NCCD, CCCD, CBF, CBP, NRCS, FSA, Project Grass, PA DEP
- Seek out, apply for, and administer applicable funding opportunities for implementation of prescribed conservation projects.
 - Resources / Assistance include but are not limited to: PA DEP Growing Greener, PACD, Chesapeake Bay Small Watersheds, SRBC, US Fish & Wildlife, US EPA, etc.

Noted Abbreviations:

MCCD – Montour County Conservation District
 NCCD – Northumberland County Conservation District
 CCCD – Columbia County Conservation District
 NRCS – Natural Resource Conservation Service

EQIP – Environmental Quality Incentives Program
 CREP – Conservation Reserve Enhancement Program
 CRP – Conservation Reserve Program
 DEP – PA Department of Environmental Protection

CBP – Chesapeake Bay Program (PA DEP)
 PDA – PA Department of Agriculture
 CBF – Chesapeake Bay Foundation

D&GRP – PA Dirt and Gravel Roads Program
 PEC – Pennsylvania Environmental Council
 SRBC – Susquehanna River Basin Commission

Table 5. Recommended BMPs for County Implementation Plan

Best Management Practices	Land Use Application
Conservation Tillage	AG
Cover Cropping	AG
Forest Buffers	AG, MO, UR
Grass Buffers	AG, MO
No-Till	AG
Nutrient Management	AG
Rotational Grazing	AG
Animal Waste Management Systems	AG
Conservation Plans	AG
Wetland Restoration	Multiple
Dirt & Gravel Road Practices	MO, FO
Erosion & Sediment Control	UR
Stormwater Management	UR
Urban Nutrient Management	UR
Stream Restoration	Multiple

(AG-Agriculture, MO-Mixed Open, FO-Forest, UR-Urban, Multiple-Multiple Land Use)

(See Appendix A for BMP description and efficiency)

To accomplish these goals and objective, the Montour County Conservation District will continue utilizing its current resources and partnerships, while seeking out new funding opportunities, strengthening existing partnerships and developing new ones. To date, USDA's NRCS and FSA, PA DEP, PA DCNR, PACD, neighboring conservation districts, local watershed associations, Pennsylvania Environmental Council, Pocono RC&D, Penn State Cooperative Extension, CBF, and the County's Planning Commission have been strong and supportive partners of conservation efforts within the County. The Conservation District will continue involving these partners where appropriate; drawing on their specific expertise and resources. Further assistance and resources that may be needed will be developed where and when appropriate.

Expected results for the above plan of action will vary on project specifics. Certain expected results will not be as easily tracked (amount of nutrients/sediment retained on land, efficiency of some BMPs); where others (number of acres/miles/farms treated, number of BMPs installed) will be simpler/clearer to tracking.

Anticipated measurable results will include:

- Number of acres or stream miles and / or wetlands rehabilitated/protected
- Number and efficiency of agricultural and Best Management Practices installed / maintained
- Amount of funds contributed and spent
- Number of individuals reached
- Amount of nutrients and sediment retained on landscape

- Improved stream health and water quality
- Development and adoption of progressive stormwater management ordinance
- Number of acres under new/update conservation and nutrient management plans
- Numbers of partnerships

Note: This Implementation Plan is a “living document” and is a working draft. Revisions, additions and deletions are possible as the plan evolves.

Closing remarks and identification of brainstorm ideas for special out-of-the-box projects
Below is a listing of “special projects” for possible funding through PA DEP Chesapeake Bay Program and/or other funding sources. These projects/subjects represent possible avenues

Income / crop producing riparian buffers:

Information booklet for developers and home builders,
County contacts (Planning Commissions, Zoning Officers,

Workshops / Meeting with local municipality road masters and PennDot
Go over yearly road projects and ditch cleaning – push education (sequencing E&S controls, etc.