Berks County Conservation District
Chesapeake Bay Program
County Implementation Plan
(2009-2010)

I. COUNTY DESCRIPTION

Berks County is located in the southeast section of Pennsylvania. In 1752, Berks County was incorporated from parts of Lancaster, Chester, and Philadelphia Counties, and named for Berkshire, England, home of William Penn's family. In 1772, Berks gave up territory for the formation of Northumberland County, and again in 1811, for the formation of Schuylkill County.

Berks is close to both the Philadelphia and Harrisburg Metropolitan areas, but is also considered part of Pennsylvania Dutch Country. Through numerous federal and state highways and turnpikes, the county is also linked to other major cities such as New York (125 miles) and Baltimore (97 miles). The county is a diamond-shaped area of approximately 864 square miles. The county's physical geography, combined with a moderate climate, is favorable for an agricultural industry, especially for dairy and poultry products. The county has over 1,800 farms, which account for 243,260 acres. Annual receipts from field crops, fruit, livestock, and livestock products is close to $168 million, making Berks the third leading county in PA in agricultural production (The History And Government of Berks County, Pennsylvania, 4th edition 1993).

Because of its proximity to other large cities, the population of Berks County has been increasing over the last 15 years. The Berks County website lists the1990 census with 336,523 persons, the 2000 census with 373,638 persons, and the 2003 census reports 385,307 persons: a 14% increase in residency since 1990. Because of the increasing residential population, Berks County has been purchasing agricultural easements off of landowners since the early 1990's. As of January 2005, Berks has 37,250 acres and 316 farms permanently preserved for agricultural production. This makes Berks County the number one county in Pennsylvania with preserved acres (Beef Roundup, January 3, 2005).

While the county is predominantly in the Schuylkill River watershed, the Chesapeake Bay drainage area is approximately 56,000 acres, or about 10% of the county. This drainage area consists of two separate lobes: one area located in the northwest section of the county, and the other located in the southwest area. The population in the northwest section is approximately 5,850 and the population in the southwest part of the county is approximately 9,050. The economy in the two areas is primarily agriculture and small businesses based (food stores, gas stations, restaurants, trucking companies, farm implement dealers, lawn and garden stores, welding shops, etc). The land use in the two areas is primarily agriculture, small businesses usage, woodland, and housing. The culture in the area is predominately influenced by the descendants of German/Swiss immigrants. Nearly the entire farming community in this area is made up of these German/Swiss descendants. A large portion of the farms located in the Chesapeake

Bay watershed are owned and operated by the plain sects (Mennonites and Amish). The types of agriculture in the areas are very diverse. There are numerous types of farms that include dairy, beef, poultry (broilers, pullets, layers), hogs, and cash grain. Dairy is the most popular farming operation. Dairy is also the dominant type of operation for the plain sect farmer.

The following table outlines production values for several Berks County operations, as reported in the 2006-2007 Pennsylvania Agricultural Statistics:

Berks County Agricultural Statistics Year: 2006	
Comodity	Value of Production
Milk	$59,162,374
Hogs and Pigs	$4,139,500
Cattle and Calves	$68,376,000
Sheep and Lambs	$321,300
Corn for Grain	$20,306,000
Corn for Silage	$4,807,000
Dry Alfalfa Hay	$9,305,800
Dry Other Hay	$9,984,000
Barley	$622,710
Oats	$420,000
Soybeans	$6,900,000
Winter Wheat	$2,049,120

II. COUNTY WATER RESOURCES AND QUALITY

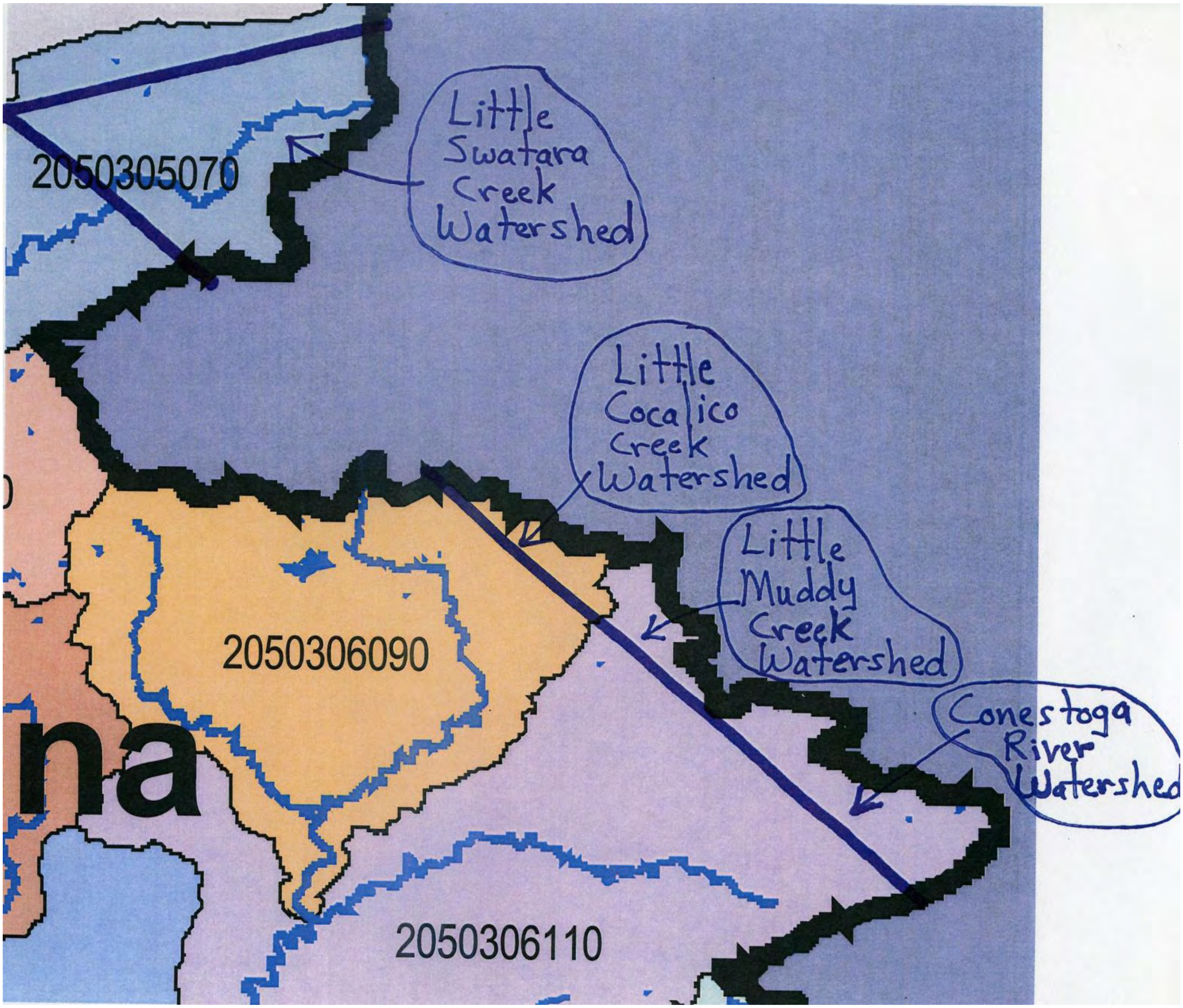
There are two major watersheds located in the Chesapeake Bay region of Berks County. These two major watersheds are the Little Swatara Creek Watershed and the Conestoga Creek Watershed. The Little Swatara Creek Watershed is located in the northwest area of the county. There are several named streams in Bethel Township that flow into the Little Swatara Creek and include: *Meck Creek, Crosskill Creek, Mill Creek, and Stone Creek*. All the named creeks and unnamed tributaries make up the Little Swatara Creek Watershed. The Conestoga River Watershed is located in the southwest area of the county. The actual Conestoga River itself originates in the southern most section of the county. There are two sub-watersheds located in the Conestoga River Watershed. These two sub-watersheds are located north of the Conestoga River and flow into the Conestoga River in Lancaster County.

The following is a listing of the two major watersheds and the municipalities in which they are located.

- ***Little Swatara Creek Watershed*** (HUC #: 2050305070) consists of four municipalities: Bethel Township (in its entirety), Marion Township, Tulpehocken Township, and Upper Tulpehocken Township. This watershed contains 37,000 acres within the county.
- ***Conestoga River Watershed*** (HUC #: 2050306110) itself contains two municipalities: Caernarvon Township & New Morgan Borough. This watershed contains 19,000 acres within the county – this acreage includes the two sub-watersheds.
  The two Conestoga River sub-watersheds and their municipalities:
  - ***Little Muddy Creek Watershed*** (HUC #: 2050306110) consists of two municipalities: Brecknock Township, and Spring Township
  - ***Little Cocalico Creek Watershed*** (HUC #: 2050306090) consists of one municipality: South Heidelberg Township.

The Little Swatara Creek is a Cold Water Fishery from the source to the Berks/Lebanon County line. The Conestoga River and its tributaries is a Warm Water Fishery. The Little Muddy Creek is a Warm Water Fishery from the source to the Berks/Lancaster County line. The Little Cocalico Creek basin is a Trout Stocked Fishery. According to the 303(d) List of Impaired Streams, the water quality in the watersheds differ from watershed to watershed. The Little Swatara Creek watershed in Berks County is negatively affected by agriculture through both suspended solids and excess nutrients. The Conestoga River watershed in Berks County is negatively affected by agriculture through excess nutrients. The Little Muddy Creek watershed is negatively affected by agriculture through siltation and excess nutrients. The Little Cocalico Creek watershed is negatively affected by agriculture through excess nutrients. According to Bob Schott, chief biologist in the PA-DEP Water Management division the 303D list assessment was done in 1996. There were no water samples taken, it was just a visual assessment on three factors that consist of: 1) macro-invertebrate presence, 2) habitat, and 3) land use. An example was given that if an assessor noted there were a lot of algae present in the water that nutrients were noted to be the pollution problem.


11-DIGIT HYDROLOGIC UNIT CODES
FOR THE
SUSQUEHANNA RIVER BASIN
Upper Susquehanna
Chemung
Middle Susquehanna
West Branch Susquehanna
Juniata
Lower Susquehanna


2050305070
Little Swatara Creek Watershed
Little Cocalico Creek Watershed
Little Muddy Creek Watershed
Conestoga River Watershed
2050306090
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2050306110

III. SIGNIFICANT TRENDS IN THE COUNTY

The population in all the municipalities located in the Chesapeake Bay drainage area is increasing. According to the Berks County web page, *Demographics and Statistics*, the population estimates are as follows:

Chesapeake Bay area Municipal Populations			
	Year		
Municipality	**1990**	**2000**	**2003**
Bethel Township	3,676	4,166	4,311
Brecknock Township	3,770	4,459	4,649
Caernarvon Township	1,933	2,312	3,045
Marion Township	1,415	1,573	1,581
South Heidelberg Township	4,382	5,491	6,099
Spring Township	18,899	21,805	22,934
Tulpehocken Township	2,843	3,290	3,414
Upper Tulpehocken Township	1,289	1,495	1,579

The main land use in the Chesapeake Bay region of the county is agriculture. Agriculture is by far the main land use in the Little Swatara Creek Watershed. This watershed is also the Chesapeake Bay watershed in which the majority of the agricultural preservation is taking place. Numerous conservation plans and nutrient management plans (NMPs) have been written, and best management practices (BMPs) have been installed through the years in the Little Swatara Creek Watershed. The following chart is a profile of the economic characteristics of the municipalities in the four watersheds. This chart demonstrates that the Little Swatara Creek Watershed is the most active watershed in agriculture out of the four Chesapeake Bay watersheds.

Industry Type -vs- Number of Jobs in Each Industry				
Industry Type	WS1	WS2	WS3	WS4
Agriculture, forestry, fishing and hunting, and mining	433	31	53	40
Construction	482	149	725	89
Manufacturing	1,215	592	2,707	286
Wholesale trade	231	69	500	48
Retail trade	614	282	1,690	158
Transportation and warehousing, and utilities	134	180	771	60
Finance, insurance, real estate, and rental and leasing	139	360	1,048	56
Professional, scientific, management, administrative, and waste management services	233	165	1,231	100
Education, health and social services	805	498	3,060	206
Arts, entertainment, recreational, accomodation and food	355	169	748	75

Legend

WS1 are the Little Swatara Creek Watershed Municipalities: Bethel Township, Marion Township, Tulpehocken Township, Upper Tulpehocken Township

WS2 is the Little Cocalico Creek Municipality: South Heidelberg Township

WS3 are the Little Muddy Creek Municipalities: Brecknock Township, Spring Township

WS4 is the Conestoga Creek Municipality: Caernarvon Township

Source: U.S. Bureau of the Census, Census 2000

The following table represents agricultural trends for the Number and Value of several different livestock types in Berks County as a whole:

Livestock on Farms and Value in Berks County			
	Livestock type, number and value		
Year of Statistical Summary	Hogs and Pigs	Cattle and Calves	Sheep and Lambs
1990-1991	52,000 $4,386,000	75,000 $55,875,000	4,700 $413,600
1995-1996	64,000 $4,544,000	69,000 $49,355,000	2,600 $260,000
2003-2004	55,700 $3,843,300	63,300 $61,401,000	1,550 $220,100
2006-2007	48,700 $4,139,500	61,600 $68,376,000	2,100 $321,300

Source: Pennsylvania Agricultural Statistics

The following table represents agricultural trends for crop production and its value in Berks County as a whole:

Crop Production and Value in Berks County			
	Crop type, production and value		
Year of Statistical Summary	Corn Grain	Corn Silage	All Hay
1990-1991	6,636,000 Bu $16,258,200	240,500 Tons $5,627,700	194,900 Tons $19,879,800
1995-1996	5,123,000 Bu $18,955,100	202,500 Tons $4,758,700	151,300 Tons $14,193,200
2003-2004	4,092,700 Bu $11,868,800	381,100 Tons $10,022,900	106,700 Tons $14,617,900
2006-2007	5,720,000 Bu $20,306,000	174,800 Tons $4,807,000	134,600 Tons $19,289,800

Source: Pennsylvania Agricultural Statistics

According to the above two tables, the number of livestock and crop production in Berks County is generally decreasing with time. This trend is applicable in three of the four Chesapeake Bay watersheds. The trend has occurred through the removal of numerous farms out of agricultural production and into housing and industrial developments. The watershed that has not been hard hit by development and is continuing to thrive with agriculture is the Little Swatara Creek Watershed. As stated earlier, many of the farms in this watershed are preserved through the Ag Land Preservation Program and many more landowners want to get into the program. This program will be responsible for the areas agricultural stability for many years to come.

IV. SEDIMENT AND NUTRIENT SOURCE REDUCTIONS

Some strategies for sediment and nutrient reductions have already been implemented in the Chesapeake Bay portion of the county. Numerous cost share programs have been partly responsible for attaining these reductions. Currently, project implementation cost sharing has been offered through local, state, and federal agencies and non-profit organizations. The following chart lists the funding source, types of BMPs installed by the funding source, and the total monies spent by the funding source.

Tally of Cost Share Monies Spent In Berks County In The Chesapeake Bay Region from January 1, 1990 to June 30, 2005		
Funding Source	BMP	Money Spent
PA-DEP Chesapeake Bay Program	manure storages, grassed waterways, soil samples, etc.	$1,202,825.55
PA-DEP Streambank Fencing Program	streambank fencing and crossings	$17,239.15
Berks County Conservation District	streambank fencing and crossing	$6,311.65
Ducks Unlimited, Inc.	streambank fencing, streambank and shoreline protection, crossings	$18,419.30
Chesapeake Bay Foundation	streambank fencing	$2,986.00
Trout Unlimited, Inc.	streambank fencing	$274.10
National Fish and Wildlife Foundation	streambank fencing and crossings	$9,995.86
PA-PDA Nutrient Management Grant Program (Act 6 funding)	manure storage, barnyard runoff controls	$45,852.00
USDA-NRCS Environmental Quality Incentive Program	liquid manure storage, two manure stacking pads, no-till	$74,284.00
USDA-NRCS Conservation Reserve Enhancment Program	streambank fencing, stream crossings, grassed waterways	$97,961.08
USDA-NRCS Long Term Agreement	multiple field practices	$43,700.00
USDA-NRCS Rural Clean Water Program (RCWP)	manure storage, field practices	$102,995.00

Two of the above funding source options no longer exist in Berks County. These two funding sources consist of: LTA, and RCWP.

There are at least seven farms in the Little Swatara Creek Watershed that had streambank fencing and crossings installed through one or a combination of streambank fencing funding sources. RCWP, Act 6 Program, EQIP, and the Chesapeake Bay Program are responsible for installing numerous types of BMPs on farms in all the Chesapeake Bay Watersheds. In the early 1990's RCWP had installed a manure structure (dairy) in the Conestoga Creek Watershed (this federal program is no longer in existence). In the mid-1990's, EQIP had installed one manure storage (hogs) and two concrete manure stacking pads (pullets) in the Little Swatara Creek Watershed. In the late 1990's the Act 6 Program had installed a manure storage, manure transfer line and concrete barnyard (dairy) in the Little Cocalico Creek Watershed. Also in the late 1990's, CREP installed numerous grassed waterways in both the Little Swatara Creek Watershed, and the Little Cocalico Creek Watershed. In all four watersheds, the Chesapeake Bay Program had installed numerous other BMPs, including but not limited to: grassed waterways, diversions, cropland terraces, field stripcropping, concrete barnyards, and manure storages.

The following chart lists the funding source, the township and road on which the projects are located, types of BMPs installed by the funding source, and the total amount of monies spent by the funding source.

Tally of Environmental Quality Incentive Program (EQIP) Cost Share Monies Spent In Berks County In The Chesapeake Bay Region from January 1, 2006 to the present		
Funding Source & location	BMP	EQIP Money Spent
EQIP 2007 (Tulpehocken Twp) Temple Road	3,300' of perimeter fence (382)	$6,000
EQIP 2008 (Bethel Twp) Bashore Street	waste storage structure (313)	$127,000
EQIP 2008 (Bethel Twp) Lancaster Avenue - 501	waste storage structure (313)	$68,000
EQIP 2008 (Bethel Twp) Lancaster Avenue – 501	structure for water control – drop box (587)	$1,700
EQIP 2008 (Bethel Twp) Lancaster Avenue - 501	Underground outlet (620)	$600
EQIP 2008 (Bethel Twp) Lancaster Avenue - 501	(2) manure transfer systems (634)	$4,400

Through the numerous funding sources there have been numerous installed conservation practices credited to the Berks County Chesapeake Bay area from 1985 through 2002:

Cumulative total of Chesapeake Bay Program Credited Practices Reported From 1985 Through 2002		
Practice	**Unit**	**Amount**
Abandoned Mine Reclamation	Acres	2
Animal Waste Management – AEUs	AEUs	3,572
Conservation Plans	Acres	8,470
Conservation Tillage	Acres	2,141
Erosion and Sediment Control	Acres	69
Forest Buffers	Acres	22
Grass Buffers	Acres	1
Land Retirement	Acres	338
Nutrient Management	Acres	8,725
Off-stream Watering With Stream Fencing	Acres	62
Off-stream Watering Without Fencing	Acres	12
Rotational Grazing	Acres	43
Septic Connections	EDUs	12
Tree Planting	Acres	80
Wetland Restoration	Acres	4

The Chesapeake Bay Technician will write conservation plans as part of the priorities in the Technician Contract. The conservation plan level will either be RMS or Progressive to address the resource concerns on a farming operation. A conservation plan will be considered applied when all of the conservation practices that make up the system have been installed according to Conservation Practice Standards in Section IV of the USDA-NRCS PA Technical Guide. The NMPs will all be written to PA Act 38 standards. The complexity of both the conservation plans and NMPs vary on the size and type of the operations. Many BMPs have already been installed in which some of the BMPs include: grassed waterways, grassed diversions, streambank fencing and crossings, cropland terraces, field stripcropping, concrete barnyards, and manure storages.

Experienced Conservation District staff have worked on getting to know the land and many of the farmers in the designated Chesapeake Bay watersheds. There are numerous farmers that have cooperated with the conservation district but yet there are many farmers that have not cooperated. Many of these non-cooperating farmers are of the plain sect and have stayed away from government intervention. Of the farmers that have cooperated with the Conservation District in the past there are still many BMPs to be installed. With the limited amount of funds offered by the numerous programs in the past there were many farms in which only a couple of the needed BMPs were installed on any certain farm. The lack of cost share funds prevented the installation of all the necessary BMPs that needed to be installed on any certain farm. On many of the plain sect farms there is little if any BMP installation. Overall there is a great need of conservation practices to be installed on almost all the farms in all the watersheds. If enough money can be obtained for cost sharing there are many BMPs that can and will be installed. With every farm that BMPs are installed, conservation plans and P-based nutrient management plans will be written to document the BMPs that already exist on the operation, plan the BMPs that yet need to be installed on the operation, and balance the nutrients that are spread on the operation. The traditional BMPs that need yet be installed on the farming operations include but are not limited to: grassed waterways, subsurface drainage, field stripcropping, streambank fencing and crossings, concrete barnyards, and manure structures. There is also a need and appears to be a desire to install numerous of the agricultural BMPs desribed on the list of Chesapeake Bay Program Best Management Practices dated 7/26/04. These BMPs include but are not limited to: rotational grazing systems, no-till farming, and cover crops.

The most effective way to approach and address the conservation needs for the farms in the two major watersheds and the two sub-watersheds is a complex matter. This is based on numerous items:

1) Overall lack of cost share money available to be allocated and/or divied out to the farming operations interested in obtaining cost share funding,
2) amount of cost share money able to be spent on a particular farming operation,
3) having existing farmers interested in installing BMPs to obtain the RMS or Progressive level conservation plans and P-based NMPs written and followed,
4) convincing reluctant plain sect farmers to install BMPs, having conservation plans and P-based NMPs written and followed,
5) the amount of time it takes to faithfully and accurately follow the USDA-NRCS Planning Process in generating a RMS or Progressive level conservation plan, and to write P-based NMPs to Act 38 standards,
6) the amount of time it takes to design and construction check the numerous BMPs to be installed by the standards and specifications set forth in the USDA-NRCS PA - Technical Guide,
7) ensure that all structural BMPs installed function as intended for their 5 year minimum lifespan.

There are numerous possible solutions to address the above items. The Chesapeake Bay Programs cap of $30,000 per farm has been removed however the amount of Special Project Funding that can be obtained is minimal. Thus additional funding sources need be obtained to install BMPs. One potential funding source is the Capital Region Conservation and Development (RC&D) Area Council Regional Riparian and Ag BMP Initiative Program. The Chesapeake Bay Technician will be applying for rotational grazing BMP funds through this RC&D program. Overall it is very important to have a cost share program and/or programs that have a dependable supply of easily accessible funds that are able to cost share all the BMPs that need to be installed. Of the farmers that are already willing to enter into the Chesapeake Bay Program to have a RMS or Progressive level conservation plans and Act 38 equivalent P-based NMPs created and BMPs installed, funding and time devotion will be a priority. Over the next several years some farms in which the BMPs have been installed will be used to exhibit as many of the installed BMPs listed in the Chesapeake Bay Program Best Management Practices dated 7/26/04 (this list is included in section V). These cooperating farms must be willing to allow the Chesapeake Bay Technician to show the BMPs installed on the farms during numerous times throughout any given year.

On January 19, 2005 a meeting was held with several local farmers, accompanied by Elwood Blake of PA-DEP, to get ideas and opinions regarding the BMPs listed on the Chesapeake Bay Program Best Management Practices dated 7/26/04. The committee was made up of four farmers: two dairy farmers, one beef farmer, and one dual beef and layer operator. The following table contains the ideas and opinions the farmer committee had on the 7/26/04 list of BMPs, along with several BMPs that are not on the list:

Results From The Farmers Meeting held on 1/19/05
The BMPs are assigned a value from 1 through 10 (10 is highest value)

Best Management Practice	Value	Comments
Animal Waste Management System – Livestock	10	These are still a priority. Must address manure issues from these operations
Animal Waste Management System - Poultry	2	Some poultry farmers immediately export the manure
Barnyard Runoff Controls	8	continue to implement
Cover Crops	9	continue to implement
Conservation Plans	10	doing plans will document need for cost share funds from Harrisburg
Conservation Tillage (no-till)	10	If only get $10,000 - $15,000 in cost sharing may want to put all in this BMP
Nutrient Management Plans	10	important to implement although most plans should be done by TSPs
Offstream Watering with Streambank Fencing	8	with 12'-15' wide buffers
Offstream Watering with Streambank Fencing	1	with 35' wide buffers
Offstream Watering without Streambank Fencing	1	Offstream watering alone will not keep the livestock out of the stream
Rotational Grazing	10	great for erosion control reasons
Rotational Grazing	2	not financially feasible
Precision (Intensive) Rotational Grazing	10	great for erosion control reasons
Precision (Intensive) Rotational Grazing	2	not financially feasible
Tree Planting	5	inside streambank fencing
Tree Planting	1	to convert cropland to trees
Wetland Restoration	1	low priority to farm community
Precision Feeding – Dairy	1	for feed companies
Ammonia Emission Control – Dairy	1	limited resources and do not understand
Phytase Feed Additive – Swine	1	for feed companies
Ammonia Emission Control – Swine	1	limited resources and do not understand
Grassed Waterways	8	cannot be neglected
Cropland Terraces	5	must do if absolutely neccesary
Stripcropping	8	cannot be neglected
Subsurface Drainage	8	must be done with another BMP

V. COUNTY BAY IMPLEMENTATION PLAN

There are numerous activities the Chesapeake Bay Technician will strive to accomplish. One important activity is to continue to educate the Chesapeake Bay Technician on the new BMPs that exist on the Chesapeake Bay Program Best Management Practices list dated 7/26/04. The list and the value of importance to implement the BMPs in the immediate future (i.e. next two years) is listed on the following table. The value of importance was determined by using the information obtained from the results of the farmers meeting and conversations with DEP and NRCS personnel:

Berks County Best Management Practices Value of Importance - The BMPs are assigned a value from 1 through 10 (10 is highest value)		
Best Management Practice	Value	Comments/Obstacles and Constraints
Abandoned Mine Land Reclamation	1	Not Applicable
Alternative Use Of Manure/Manure Transport	3	there is a need for better understanding; education opportunity
Animal Waste Management Systems	10	continue to implement as funding permits
Carbon Sequestration	2	there is a need for better understanding; education opportunity
Conservation Plan/Plan Implementation	10	continue to implement as funding permits
Conservation Tillage (no-till)	10	will be a great opportunity to implement
Conservation Tillage (other than no-till)	7	will focus on no-till system
Cover Crops (cereal)	2	most farmers will take for feed
Cover Crops (commodity)	10	will be implemented with no-till system
Dirt and Gravel Road Practices	10	no documented improvements although E&S staff will do when opportunity arises
Erosion and Sediment Controls	10	will continue with E&S Staff
Forest Buffers	2	will encourage to install where applicable
Forest Harvesting Practices	2	will encourage to practice where applicable
Grass Buffers	2	will encourage to install where applicable
Horse Pasture Management	4	will encourage where applicable
Land Retirement	2	will encourage where applicable
Managed Precision Agriculture	3	need a better understanding
Mortality Composters/Manure Composters	10	continue to implement as funding permits
Non-Urban Stream Restoration	3	Done with streambank fencing BMP
Nutrient Management Plan Implementation	10	will encourage on all operations
Off Stream Watering With Stream Fencing	2	35 foot wide buffers not practicle for local farming community
Off Stream Watering W/out Stream Fencing	10	implement where funding and desire exist
Rotational Grazing	10	implement where funding and desire exist
Precision (Intensive) Rotational Grazing	10	implement where funding and desire exist
Septic Dentrification (family units)	1	municipality responsibility
Street Sweeping	1	municipality responsibility
Tree Planting	2	Done with streambank fencing BMP

Urban Growth Reduction	10	AgLand Preservation Program
Urban Nutrient Management	1	municipality responsibility
Wetland Restoration	1	low priority to farm community
Yield Reserve	3	there is a need for better understanding; education opportunity
Precision Feeding – Dairy	1	opportunity for feed companies
Phytase Feed Additive - Swine, Poultry	1	opportunity for feed companies
Ammonia Emission Controls - Dairy, Swine, Poultry	2	there is a need for better understanding; education opportunity

Over the next 3-5 years Conservation District personnel realize the ranking of importance of the numerous BMPs on the list may fluctuate.

The farms in the two major watersheds and the two sub-watersheds have the same identified agricultural needs. This County Implementation Plan will focus on trying to obtain Special Project Funding for BMPs, in these watersheds, which have identified importance in the above chart and where Special Project Funding can be obtained. A farmers meeting will be held at least one time every three to four years to determine if adjustments need to be made to the above chart. Also recommendations from PA-DEP Chesapeake Bay Program personnel will also help determine the BMPs to be focused on.

Existing farmers that are interested in implementing the high priority BMPs will be focused on first. Due to the shortage of funding in the Chesapeake Bay Program, farmers may have to use programs such as the Capital Resource Conservation and Development (RC&D) Area Council Regional Riparian and Ag BMP Initiative Program and EQIP to install the following BMPs in the immediate future: Animal Waste Management Systems, Rotational Grazing Systems, Precision (Intensive) Rotational Grazing Systems. There are numerous technical personnel that can assist in both technical assistance and engineering on the government funded programs and BMPs. These personnel consist of: 1) Greg Stricker who is an agricultural engineer that is employed by USDA-NRCS, 2) Daniel P. Ludwig who is a grazing specialist that is employed by the USDA-NRCS, 3) Mena M. Hautau who is a Penn State Extension Educator.

In the immediate future Chesapeake Bay Program funding will focus on funding several of the BMPs that are on the list dated 7/26/04. These BMPs are as follows: No-Till Farming, Cover Crops - early (commodity), Precision Agriculture, and Conservation Plan – Implementation of Erosion Control BMPs (such as grassed waterways, grassed diversions and subsurface drainage). All BMPs installed under the Conservation Plan – Implementation of Erosion Control BMPs will be installed according to the standards and specifications set forth in the USDA-NRCS PA Technical Guide. The Chesapeake Bay Technician will write conservation plans as part of the technical assistance contract. All farms that have Chesapeake Bay Program Special Project Funding contracts will have both Conservation Plans (either RMS or Progressive) and P-based NMPs (if the operation is a CAO) created. An important part of making conservation plans and P-based NMPs are to implement all listed BMPs in a timely fashion. As time progresses (i.e. 3-5 years from now) it will become a higher priority to promote and implement the other new BMPs on the 7/26/04 list. This can only be accomplished by first having the conservation district personnel proficiently trained in the new BMPs. The proposed accomplishments over the next 5 years will gain momentum by having additional farmers wanting to install the targeted BMPs. The need of cost share funds will ultimately remain a high priority.

Educating the farmers in all the watersheds will be a priority. The farmers will be educated on the condition of the Chesapeake Bay and what BMPs they can install and actions they can carry out to reduce sediment and nutrient loads. As stated in section IV, of the farms in which the targeted BMPs are installed, field visits will be arranged on some of these farms for the new BMP promotion. This will be an important step in the process to thoroughly explain and show the effectiveness of the targeted BMPs. This is why the optimum amount of cost sharing that can be obtained will be obtained for the installation of BMPs. As part of this education and BMP promotion, the Chesapeake Bay Technician and farmers will on occasion make farm visits to neighboring counties to view the success and discuss the targeted BMPs. Farmer meetings will continue to occur one time every three to four years. These meetings will be used to rank the importance of BMPs to be installed and to discuss strategies on how to most efficiently implement the BMPs.

Over time an inventory and evaluation will be made of all the farms in the Chesapeake Bay region of the county. Four steps will be done to accomplish this:

1) Look at the tax parcel maps to find out how many landowners are in the Bay – vs - how many district cooperators – vs – who needs help
2) Make a list of conservation plans that are currently in place and determine what level each conservation plan is written to: ACS, Progressive, RMS
3) Determine the % of each type of conservation plan: ACS, Progressive, and RMS levels
4) Rank the farms using the above three items to determine who is in greater need of help.

As stated earlier in this section, there are four BMPs in which Chesapeake Bay special Project Funds will be used: 1) No-Till farming as a Systems Approach, 2) Cover Crops – early (commodity), 3) Precision Agriculture BMP, 4) Conservation Plan – Implementation of Erosion Control BMPs (such as grassed waterways, field strips and subsurface drainage). Tracking of the BMPs installed using Chesapeake Bay and non-Chesapeake Bay funds will be done with quarterly reports using the CBP-23 as instructed in the PA-DEP Administrative Manual for the Chesapeake Bay Program, dated January 2000. The following explains how the four BMPs will be implemented, payments set and/or cost shared.

No-Till Farming BMP:

Goal:

To Implement the No-Till Farming BMP as a Systems Approach. This No-Till BMP will be administered using both the No-Till Systems Approach as taught at the No-Till Workshops which have been sponsored by the South Central DEP Region and the PA-DEP Technical Guidance For the implementation of No-Till and Cover Crop Agricultural Best Management Practices, dated August 2005.

A total of eighteen farmers with 828 acres have active contracts with this BMP. Four of the original contracts have expired on June 30, 2008. The following is a listing of the farmers in which contracts exist.

- Jesse R. Alspaugh, 50 acres, Bethel Township (expired contract)
- Glenn Z. Brubacher, 50 acres, Caernarvon Township
- Elvin Z. Brubaker, 50 acres, Bethel Township (29 ac. expired)
- Leroy E. Daub, 32.3 acres, Bethel Township (expired contract)
- W. Ray Hershey, 50 acres, Bethel Township
- Todd J. Kurtz, 49.4 acres, Caernarvon Township (expired contract)
- Glenn Z. Musser, 50 acres, Bethel Township
- Eugene W. Sensenig, 50 acres, Tulpehocken Township (expired contract)
- Steven J. Wenger, 50 acres, Bethel Township (lost 27 ac.)
- Dalton R. Zimmerman, 50 acres, Tulpehocken Township (12.5 ac. expired)

2007 No-Till Contracts

- Dennis S. Bross, 50 acres, Bethel Township
- Nevin J. Brubaker, 47 acres, Bethel Township
- Joann L. Ebling, 50 acres, Bethel Township
- Jay W. Good, 50 acres, Bethel Township
- Warren Z. Good, 50 acres, Bethel Township
- Rufus H. Martin, 49.5 acres, Tulpehocken Township
- James E. Manbeck, 50 acres, Tulpehocken Township
- Jason S. Newswanger, 50 acres, Tulpehocken Township

2008 No-Till Contracts

- Oscar J. Manbeck, 50 acres, Bethel Township
- Brian L. Blouch, 50 acres, Bethel Township
- Triple R. Farms, 50 acres, Tulpehocken Township
- Randall L. Brubacher, 50 acres, Caernarvon Township

Steps or Procedure:

The key components of a sustainable no-till farming system are: not tilling, crop rotation, cover crops and compaction management. There are numerous items that were explained at the No-Till Workshops that will be incorporated into the Berks County No-Till Systems Approach. Some of these items consist of:

1) The soil needs to be tested and the pH stabilized before the No-Till System actually starts – if lime is required it needs to be incorporated throughout the entire plow layer,
2) Deep Tillage (subsoiling) may need be done before the system is started (if the farmer stays in the No-Till Farming System, Deep Tillage may be needed at least one time throughout the crop rotation cycle). On the Special Project contracted acres a penetrometer will be used at the spring of the year to determine the compaction level of the soil. Agronomy Facts 63 "Diagnosing Soil Compaction Using A Penetrometer (Soil Compaction Tester)" will be followed on how to properly use the instrument. According to the fact sheet if Penetration Resistance is 50 PSI or greater, deep tillage (subsoiling) will be recommended.
3) When converting a farmer into the No-Till Systems Approach – the farmer should only start on a portion of the fields as an experiment because if it fails there will not be a total crop loss,
4) The manure can be injected with special no-till implements,
5) The field structural BMPs will still need be installed – such as grassed waterways. The time period of when the field structural BMPs will be installed will be according to the farmers Conservation Plan BMP implementation schedule.

Soil Samples will be taken in the spring or fall of every year to determine the nutrient, acidity and organic matter levels of the soil. The season on which the soil samples are taken will be noted and repeated for each operation to maintain consistency. If the soil pH is low, a recommendation of adding Lime will be made to neutralize the pH in order to neutralize the acidity. A Cornell pH Test Kit will be used on all cropped contracted acreage in order to determine the existence of an "Acid Roof". The addition of lime will be recommended on all operations that have an "Acid Roof". A Chlorophyll Meter will be purchased with Special Project Funding and used on all acreage contracted with this No-Till BMP in which corn has been planted. Agronomy Facts 53 "The Early-Season Chlorophyll Meter Test for Corn" will be followed to provide best results. The Cover Crop BMP will be done with this No-Till Farming BMP. A maximum of 50 acres can be enrolled per participant.

The following is a list of set payments associated with its No-Till practice:

(a maximum of $50.00 per acre will be allowed to be paid per participant during any given year for any combination of the following No-Till practices)

Crop Scouting: $7.50 per acre
Deep Tillage (Subsoiling): $18.00 per acre
Cover Crop – early (commodity): $20.00 per acre
No-Till Planting: $20.00 per acre
Manure Injection: $10.00 per acre

Soil Samples must be taken for all contracted acres:

(soil samples will not be part of the $50.00 per acre maximum payment)

Soil Samples (with organic matter test): $14.00 per sample

The farmer will decide the combination of No-Till Farming practices that will be paid with the Special Project Funding. Special Project Funding will be used to subsidize Soil Samples (with organic matter test) at $14.00 per sample. Soil samples will be mandatory for all acreage contracted in the No-Till System BMP. Before any special project funds are paid to the farmer for the completion of a BMP, it must first either meet the NRCS practice standard and/or meet the guidance taught at No-Till Meetings/Trainings.

There will be an understanding between the Conservation District and the farmers participating that the No-Till Farming System BMP will be implemented over a three-year term for the farmers that signed contracts dated no later than February 28, 2006. All other contracts that will be signed as of March 1, 2006 need be five-year contracts. The contracts have addressed the possibility of Chesapeake Bay Program funding for this BMP could be reduced or unavailable. When the revision of the Chesapeake Bay Program Manual is completed, the revised manual will be used for all new Chesapeake Bay Program contracts that use Special Project Funding. Payments will be made in full in both the spring and fall of every year when the components of the No-Till Farming System have been implemented. In the first Chesapeake Bay Program Special Project contract year (July 1, 2005 – June 30, 2006) the acreage of six farmers were contracted in the No-Till Farming System. The number of farms converted will be determined by the number of acres each participating farmer is willing to enroll and the amount of cost share funds available for use.

Possible Resources:

- other government personnel such as USDA-NRCS, PA-DEP.
- Berks County Cooperative Extension personnel.

Obstacles or Problems Anticipated:

- Chesapeake Bay Program Funding may not be available to fund the first three years of the contract. Other funding may be limited.
- compaction.
- availability of deep tillage equipment (subsoiler).
- availability of a manure hauler with special No-Till injectors.
- manure odor or potential runoff if manure is not injected.
- if manure is injected to get a uniform distribution of nutrients throughout the entire root zone.
- slugs.
- poorly drained soils or soils with springs.
- getiing the cover crops out in time to qualify for early sowing.

Measurable Results:

- The number of acres to be able to convert with the contracted dollars into the No-Till Systems Approach.
- The additional amount of acres to be able to convert to the No-Till Systems Approach above and beyond the contracted acres. This will be able to be accomplished if the contracted No-Till Systems Approach is successful.
- Improved soil organic matter.
- Improved water infiltration and retention.
- Decreased surface water runoff.
- Decreased soil erosion.
- Improved biodiversity.
- Weed suppression.

Cover Crops – early (commodity) BMP:

Goal:

To continue promoting the use of cover crops on farms with Special Project Funding. To continue with the existing Chesapeake Bay Program contracts.

Steps or Procedures:

This BMP will be implemented using the USDA-NRCS PA-Technical Guide Section IV, Cover Crop conservation practice standard, component # 340. Payments will be paid at $20.00 per acre and they will be made after all farmers participating have completed the installation.

Possible Resources:

- other government personnel such as USDA-NRCS, PA-DEP
- Penn State Cooperative Extension personnel

Obstacles and Problems Anticipated:

- timing issues – vs - crop harvest

Measurable Results:

- reduced erosion from wind and water
- increased soil organic matter
- increased biodiversity
- weed suppression
- improved soil structure

Precision Agriculture BMP:

Goal:

This BMP is for the purchase of a Chlorophyll Meter. Once purchased the Chlorophyll Meter will be used on all the existing contracted No-Till System BMP corn fields to do the Early Season Nitrogen Test for Corn. One of the fears that farmers have about No-Till farming is the lack of incorporation of manure that will lead to Nitrogen volitalization. Using this meter on the contracted No-Till fields will give the farmer a better sense of security that Nitrogen levels will be known thus enabling the farmer to apply additional Nitrogen to meet the corn needs. This meter will also decrease the chances of over application of Nitrogen.

Steps or Proceedure:

The Agronomy Facts 53 “The Early-Season Chlorophyll Meter Test for Corn” will be used to ensure proper timing and use of the Chlorophyll Meter.

- fields contracted in the No-Till System BMP that are planted in corn will receive this test.
- nitrogen fertilizer will need to be purchased to calibrate the Chlorophyll Meter for each corn variety tested.

Possible Resources:

- other government personnel such as USDA-NRCS, PA-DEP
- Penn State Cooperative Extension personnel

Obstacles and Problems Anticipated:

- initial expense of meter is high
- will take time to calibrate the meter from one corn variety to the next

Measurable Results:

- improved No-Till System by application of Nitrogen to test results
- will prove to farmers that manure volatilization from surface application will not cause a decrease in crop production

Conservation Plan – Implementaion of Erosion Control BMPs:

Goal:

This BMP is for 80% cost sharing of Erosion Control BMPs that are needed to implement practices in a Conservation Plan. Erosion Control BMPs in which special project cost sharing will be used consist of BMPs such as grassed waterways and subsurface drainage.

Steps or Procedure:

Farms that obtain Erosion Control BMP funding are those that are or become cooperators with the Conservation District. A RMS or Progressive conservation plan will need to be created for the farm in which Special Project Funding will be paid. If the farmer is an existing cooperator and a conservation plan has already been created it can be used however the plan will need to be updated if it is outdated. Special Project funding will be used for but not limited to the Implementation of Erosion Control BMPs such as:

- installing Grassed Waterway BMP and Subsurface Drainage BMP to address gully erosion issues.
- installing Subsurface Drainage to dry up field springs before the No-Till Farming BMP is implemented.
- Grassed Diversion BMP
- Structure For Water Control BMP

All accompanying BMPs, such as Obstruction Removal BMP, needed to install the desired BMPs will be 80% cost shared. All BMPs installed under this BMP will be designed and constructed according to the standards and specifications set forth in the USDA-NRCS PA Technical Guide.

Possible Resources:

- other government personnel such as USDA-NRCS, PA-DEP.
- Berks County Cooperative Extension personnel.

Obstacles and Problems Anticipated:

- shortage of Chesapeake Bay Program funding; other funding may be limited.

Measurable Results:

- decreased erosion
- increased nutrient buffer potential

Accomplishments
Using Special Project Funding
(July 1, 2005 – March 31, 2009)

Contractee	Municipality	Acres or Units Contracted
No-Till System BMP		
Jesse R. Alspaugh	Bethel Township	50 Acres (expired)
Glenn Z. Brubacher	Caernarvon Township	50 Acres
Elvin Z. Brubaker	Bethel Township	50 Acres (29 ac. expired)
Leroy E. Daub	Bethel Township	34.8 Acres (expired)
W. Ray Hershey	Bethel Township	50 Acres
Todd J. Kurtz	Caernarvon Township	49.4 Acres (expired)
Glenn Z. Musser	Bethel Township	50 Acres
Eugene W. Sensenig	Tulpehocken Township	50 Acres (expired)
Steven J. Wenger	Bethel Township	50 Acres (lost 27 ac.)
Dalton R. Zimmerman	Tulpehocken Township	50 Acres (12.5 ac. expired)
2007 No-Till Contracts		
Dennis S. Bross	Bethel Township	50 Acres
Nevin J. Brubaker	Bethel Township	47 Acres
Joann L. Ebling	Bethel Township	50 Acres
Jay W. Good	Bethel Township	50 Acres
Warren Z. Good	Bethel Township	50 Acres
Rufus H. Martin	Tulpehocken Township	49.5 Acres
James E. Manbeck	Tulpehocken Township	50 Acres
Jason S. Newswanger	Tulpehocken Township	50 Acres
2008 No-Till Contracts		
Oscar J. Manbeck	Bethel Township	50 Acres
Brian L. Blouch	Bethel Township	50 Acres
Triple R. Farms	Tulpehocken Township	50 Acres
Randall L. Brubacher	Caernarvon Township	50 Acres
There are currently a total of 828 acres of active contracts in this BMP. A total of $32,477.60 has been paid to farmers in the implementation of this BMP.		

Cover Crop – early (commodity) BMP		
Jesse R. Alspaugh	Bethel Township	50 Acres (expired)
Glenn Z. Brubacher	Caernarvon Township	50 Acres
Elvin Z. Brubaker	Bethel Township	50 Acres (29 ac. expired)
Leroy E. Daub	Bethel Township	34.8 Acres (expired)
W. Ray Hershey	Bethel Township	50 Acres
Todd J. Kurtz	Caernarvon Township	49.4 Acres (expired)
Glenn Z. Musser	Bethel Township	50 Acres
Eugene W. Sensenig	Tulpehocken Township	50 Acres (expired)
Steven J. Wenger	Bethel Township	50 Acres (lost 27 ac.)
Dalton R. Zimmerman	Tulpehocken Township	50 Acres (12.5 ac. expired)
2007 Contracts		
Dennis S. Bross	Bethel Township	50 Acres
Nevin J. Brubaker	Bethel Township	47 Acres
Joann L. Ebling	Bethel Township	50 Acres
Jay W. Good	Bethel Township	50 Acres
Warren Z. Good	Bethel Township	50 Acres
Rufus H. Martin	Tulpehocken Township	49.5 Acres
James E. Manbeck	Tulpehocken Township	50 Acres
Jason S. Newswanger	Tulpehocken Township	50 Acres
2008 Contracts		
Oscar J. Manbeck	Bethel Township	50 Acres
Brian L. Blouch	Bethel Township	50 Acres
Triple R. Farms	Tulpehocken Township	50 Acres
Randall L. Brubacher	Caernarvon Township	50 Acres
There are currently a total of 828 acres of active contracts in this BMP. A total of $17,342.00 has been paid to farmers in the implementation of this BMP.		

Conservation Plan – Implementation of Erosion Control BMPs		
Eugene W. Sensenig	Tulpehocken Township	Subsurface Drainage – 598’
Jay A. Felty	Bethel Township	Obstruction Removal & Grassed Waterway – 600’
Dalton R. Zimmerman	Tulpehocken Township	Grassed Waterway – 365’
Harold L. Miller	Tulpehocken Township	Heavy Use Area Protection – 1,560 square feet
Glenn Z. Brubacher	Caernarvon Township	Grassed Waterway – 1,835’ & (2) Heavy Use Area Protection – 4,000 square feet (combined)
2007 Contracts		
Henry Heflich Jr.	Bethel Township	Subsurface Drainage
Edna B. Bashore	Tulpehocken Township	Heavy Use Area Protection (I-78 Slab Equipment Crossing)
Quentin A. Gettel	Tulpehocken Township	Subsurface Drainage Structure for Water Control Grassed Waterway

Terry R. Batz	Bethel Township	Obstruction Removal Subsurface Drainage Grassed Waterway
Leonard R. Martin	Bethel Township	Obstruction Removal Subsurface Drainage Grassed Waterway
2008 Contracts		
Terry R. Batz	Bethel Township	Heavy Use Area Protection (I-78 Slab Equipment Crossing)
Terry R. Batz	Bethel Township	Subsurface Drainage
To date a total of $77,128.23 has been paid in the implementation of this BMP.		
Prescribed Grazing BMP: (Rotational Grazing Method)		
2008 Contracts		
Elvin Z. Brubaker	Bethel Township	(2) spring developments
Elvin Z. Brubaker	Bethel Township	Heavy Use Area Protection (two concrete pads around two tanks)
To date a total of $10,959.00 has been paid in the implementation of this BMP.		
Barnyard Runoff Control BMP		
2008 Contract		
Elvin Z. Brubaker	Bethel Township	Concrete Barnyard Retrofit and two Concrete Animal Walkways
To date a total of $12,087.50 has been paid in the implementation of this BMP.		

VII. Long Term Strategy

VII. Long Term Strategy

Draft Tributary Strategy --- nonpoint source BMP implementation split out by counties
Date of file: 10-19-04
BMP numbers based on watershed model run #3 - (s45pats03)

			Long Term Strategy				
Practice	Units	BERKS	2008	2009	2010	2011	2012
Abandoned Mined Land Reclamation	Acres	9					
Animal Waste Management Systems	AEUs	4,525					
Carbon Sequestration	Acres	2,093			per year		
Conservation (Farm) Plans	Acres	15,366	600 / yr	600 / yr	600 / yr	600 / yr	600 / yr
Conservation Tillage	Acres	7,791			cumulative		
Cover Crops (early)	Acres	7,139	600	800	950	1,100	1,250
Dirt & Gravel Road Practices	Feet	3,491					
Erosion & Sediment Controls	Acres	67					
Forest Buffers	Acres	550					
Forest Harvesting Practices	Acres	0					
Grass Buffers	Acres	376					
Horse Pasture Management	Acres	1,868					
Land Retirement	Acres	2,026			cumulative		
Managed Precision Agriculture	Acres	7,751	200	280	360	420	480
Mortality Composters	AEUs	0					
Non-Urban Stream Restoration	Feet	718			cumulative		
No-Till	Acres	3,498	650	800	950	1,100	1,250
Nutrient Management	Acres	2,679					
Off Stream Watering w/Fencing	Acres	1,129					
Off Stream Watering w/o Fencing	Acres	677			cumulative		
Precision Rotational Grazing	Acres	271	100	150	200	250	300
Rotational grazing	Acres	181					
Septic Denitrification (family units)	Units	616					
Street Sweeping	Acres	112					
SWM - Filtration	Acres	839					
SWM - Infiltration practices	Acres	839					
SWM - Wet Ponds & Wetlands	Acres	839					
Tree Planting	Acres	73					
Urban Growth Reduction	Acres	34					
Urban Nutrient Management	Acres	1,538					
Urban Stream Restoration	Feet	0					
Wetland Restoration	Acres	26					
Yield Reserve	Acres	2,679					
Dairy -Precision Feeding	AEUs	2,833					
Dairy - Ammonia Emission Controls	AEUs	944					
Swine - Phytase Feed Addditive	AEUs	1,483					
Swine - Ammonia Emission Controls	AEUs	757					
Poultry - Phytase Feed Addditive	AEUs	1,514					
Poultry - Ammonia Emission Controls	AEUs	1,287					

NOTES
1. BMP implementation is the total implementation, starting from 1985, needed to reach the agreed upon nutrient and sediment reductions. BMP implementation completed since 1985 can be credited against the numbers listed above.

1. AEU = One thousand pounds live weight of livestock or poultry animals, regardless of the actual number of individual animals comprising the unit.

2. Percent of total AEUs for which indicated practice applies:

Precision Dairy Feeding	--- 75% of AEUs
Swine Phytase	--- 98% of AEUs
Poultry Phytase	---100% of AEUs
Ammonia Emission Reductions - Dairy	---25% of AEUs
Ammonia Emission Reductions - Swine	---50% of AEUs
Ammonia Emission Reductions - Poultry	---85% of AEUs

3. Total AEUs based on projected 2010 animal units. Projected numbers were developed by Chesapeake Bay Program Office using USDA Agriculture Census data.

VIII. Conclusion

The goal of the Berks County Conservation District's County Implementation Plan is to do its part to "Save The Bay" with the limited funding it can obtain. Several years ago many new BMPs have been introduced to the Chesapeake Bay Programs list of BMPs. This list of BMPs has made some of the older BMPs less of a priority to implement. Not all of the new BMPs are understood by many of the government personnel participating in the Chesapeake Bay Programs tributary strategy approach. As time progresses these government personnel will get a better understanding of these new BMPs. This better understanding will ultimately lead to the inclusion of these new BMPs into future revisions of the Berks County Conservation District's County Implementation Plan.

Addendum (March 2009)

Prescribed Grazing BMP: (Rotational Grazing Method)

Goal:

To promote the use of the Prescribed Grazing BMP on farms within the Chesapeake Bay area of Berks County. In this case, the Prescribed Grazing BMP consists of the Rotational Grazing Method. The USDA-NRCS Prescribed Grazing (code 528) conservation practice standard will be used to design and implement this BMP. Numerous farms within the watershed have pastures that are too small for existing animal numbers and/or are overgrazing their existing pastures. Many of these same farms have livestock that have open uncontrolled access to the stream. It will be the goal to install rotational grazing systems and streambank fencing and crossings on these farms.

Steps or Procedures:

The special project funds obtained for the implementation of this BMP will be used to address the environmental resource concerns in existing pastures. Funding will also be used to add more pastureland to the existing degraded pasture system (such as converting existing cropland into pastureland) to enable proper grazing time for the farmers animal numbers. Once the Prescribed Grazing BMP is implemented, the existing environmental resource concerns will be remediated.

The following USDA-NRCS conservation practice standards will be used as needed to design and install the Prescribed Grazing BMP:

1) Fence (code 382)
2) Animal Trails and Walkways (code 575)
3) Brush Management (code 314)
4) Forage Harvest Management (code 511)
5) Heavy Use Area Protection (code 561)
6) Nutrient Management (code 590)

7) Pasture and Hayland Planting (code 512)
8) Pest Management (code 595)
9) Pipeline (code 516)
10) Spring Development (code 574)
11) Stream Crossing (code 578)
12) Watering Facility (code 614)
13) Water Well (code 642)
14) Streambank and Shoreline Protection (code 580)

The following principles will be used when designing and implementing this BMP:

1) The removal of grazed vegetation will be in accordance with the site production limitations, rate of plant growth, and physiological needs of forage plants.
2) The frequency of defoliation and season of grazing will be based on the rate and physiological conditions of plant growth, not calendar dates.
3) Grazing duration and intensity will be planned according to plant health and productivity of the dominant forage species. The rest period (recovery time between grazing) will be based on the season of the year and weather conditions.
4) The suggested grazing stubble heights for species grazed rotationally, listed in Table 2 in the Prescribed Grazing practice standard, will be used to determine the livestock turn-in and removal controls. For example, for a pasture in which the dominant forage species is Kentucky bluegrass, the livestock will be turned into a particular paddock when the forage height is 4-6 inches tall and removed when grazed down to 1-2 inches tall.
5) It is important to allow the forages to re-grow to reach a height that allows the replenishment of carbohydrate reserves thereby helping to ensure the long term productivity of the pasture. Table 2 in the Prescribed Grazing practice standard ensures the carbohydrate reserves will be replenished.
6) Streambank fencing and stream crossings will be installed in all pastures containing streams that have Prescribed Grazing BMPs installed in them using special project funding. The streambank fencing will be installed at an average of 20 feet from the edge of the streambank and the stream crossings will be installed using pig-slat seconds.
7) Soil Samples will be taken in all pasture paddocks installed through this BMP. The soil sample costs will be reimbursed in full when the results are into the Chesapeake Bay Technician.

Educating farmers about the Prescribed Grazing BMP will be a high priority. For example, the Chesapeake Bay Technician will conduct pasture walks on farms in which special project funding and/or other obtained funding sources are used to install this BMP. To further the education of this BMP the Chesapeake Bay Technician will write a newsletter article about the newly installed BMP in which special project funding was used.

Possible Resources:

- other government personnel such as USDA-NRCS, PA-DEP.
- Berks County Cooperative Extension personnel.
- other funding sources such as the Capital Resource Conservation and Development (RC&D) Area Council Regional Riparian Ag BMP Initiative Program.

Obstacles and Problems Anticipated:

- Chesapeake Bay Program special project funding may not be available or severely limited to install the needed BMPs.
- Other funding sources may be limited.

Measureable Results:

- The number of acres to be able to convert with special project funding into the Prescribed Grazing BMP.
- Improved soil organic matter.
- Improved water infiltration and retention.
- Decreased surface water runoff.
- Decreased soil erosion.
- Improved biodiversity.
- Weed suppression.

Riparian Corridor Protection/Restoration – Tree Planting BMP:

Goal:

To promote the planting of trees in riparian areas on farms within the Chesapeake Bay area of Berks County. In this case, the special project monies obtained will be used to plant trees inside of Elvin Brubaker's newly installed streambank fencing system on his home farm in Bethel Township. Elvin's newly created 4.8 acre riparian corridor is currently grassed. The trees planted will be varieties that are suitable to be grown in wet areas such as: black locust, honey locust, silver maple, pin oak, red oak, american elm, slippery elm, winged elm, and sycamore. It will be the goal to plant a substantial number of trees in the riparian area. These trees, over time, will shade the stream, filter out nutrients that are flowing off the above slope pastures and fields, and create shade for the grazing livestock.

Steps or Procedures:

The special project funds obtained for the implementation of this BMP will be used to address the environmental resource concerns along stream riparian corridor areas. Trees that are 4-5 high will be planted in the riparian corridor so the existing grasses do not shade out the newly planted trees. The BMP will be designed by the Chesapeake Bay Technician and the installation will be monitored by both the Chesapeake Bay Technician and the PA-DEP Field Representative.

The following USDA-NRCS conservation practice standard will be used as needed to design and install the Riparian Corridor Protection/Restoration – Tree Planting BMP:

1) Tree/Shrub Establishment (code 612)

The following principles will be used when designing and implementing this BMP:

1) Tree varieties that are suitable to be grown in wet areas will be planted. These trees will be at least 4-5 feet tall so the surrounding grass vegetation does not choke out the trees.
2) The location of every tree to be planted will be flagged in the riparian corridor and marked in the design. The trees will be strategically placed, for example: they will not be planted directly next to a fence post (so as to over time the tree will not heave the fence post out of the ground as the tree matures).
3) There are two times during the year in which the trees will be planted, this will be during the two dormant seasons (in the fall after leaf drop or in the early spring before budbreak).
4) It will be noted in the design, stressed at the pre-construction meeting, and reminded during construction to avoid the most common tree planting mistake. This most common mistake is digging a hole which is both too deep and too narrow.

Educating farmers about this BMP will be a high priority. For example, the Chesapeake Bay Technician will conduct small group pasture walks on this farm in which special project funding and/or other obtained funding sources are used to install this BMP. To further the education of this BMP the Chesapeake Bay Technician will write a newsletter article about the newly installed BMP in which special project funding was used.

Possible Resources:

- other government personnel such as USDA-NRCS, PA-DEP.
- Berks County Cooperative Extension personnel.
- PA Department of Conservation and Natural Resources personnel.

Obstacles and Problems Anticipated:

- Chesapeake Bay Program special project funding may not be available or severely limited to install the needed BMP.

Measureable Results:

- The number of acres planted with trees in the riparian corridor system.
- Improved wildlife habitat.
- Long term erosion control.
- Improved water quality.
- Reduction of air pollution.
- Sequestration of carbon.
- Improved biodiversity.
- Weed suppression.
- Shade for livestock in adjacent pastures.