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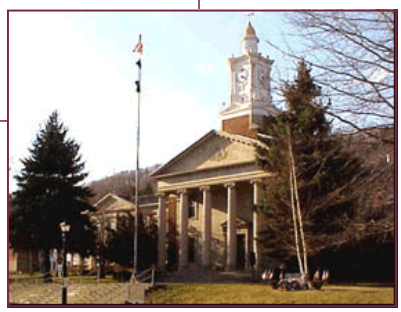
McKean County Planning Commission

Act 167 County-Wide Watershed
Stormwater Management Plan for McKean County
Phase I – Scope of Study

May 2008



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INTRODUCTION

STORMWATER RUNOFF – ITS PROBLEMS AND ITS SOLUTIONS

The water that runs off the land into surface waters during and immediately following a rainfall event is referred to as stormwater. In a watershed undergoing urban expansion, the volume of stormwater resulting from a particular rainfall event increases because of the reduction of pervious land area (i.e., natural land covered by pavement, concrete, or buildings). That is, the alteration of natural land cover and land contours by residential, commercial, industrial, forestry, and farmland uses results in decreased infiltration of rainfall and an increased rate and volume of stormwater runoff.

The need for stormwater management in Pennsylvania has been demonstrated repeatedly in the past. As the population of an area increases, land development is inevitable, and the alteration of natural ground surfaces results in decreased infiltration of rainfall. As a result of continued development, the volume and rate of stormwater runoff increases causing environmental impacts including flooding, stream channel erosion and siltation, water quality degradation, and reduced groundwater recharge. Cumulative effects of development in some areas of a watershed can result in flooding of natural watercourses with associated costly property damages.

History has shown that individual land development projects are often viewed as separate incidents and not necessarily part of the bigger picture of urbanization. This has also been the case when the individual land development projects are scattered throughout a watershed (within many different municipalities). However, it is now observed and verified that this cumulative nature of individual land surface changes dramatically affects runoff and flooding conditions. This cumulative effect of development in some areas has resulted in flooding of both small and large streams with associated property damages and even causing loss of life. Therefore, given the distributed and cumulative nature of the land alteration process, a comprehensive approach must be taken if a reasonable and practical management and implementation approach or strategy is to be successful.

PENNSYLVANIA STORMWATER MANAGEMENT ACT (ACT 167)

Recognizing the need to deal with the serious and growing problem of extensive damage from uncontrolled stormwater runoff, the Pennsylvania General Assembly enacted Act 167. The statement of legislative findings at the beginning of the Pennsylvania Stormwater Management Act (Act 167) sums up the critical interrelationship among development, accelerated runoff, and floodplain management.

Specifically, this statement points out that:

> "Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines floodplain management and flood control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety and welfare and the protection of the people of the Commonwealth, their resources, and the environment."

In past years, stormwater management had been oriented primarily toward addressing the increase in peak runoff rates discharging from individual development sites to protect property immediately downstream. Minimal attention had been given to the effects on locations further downstream (frequently because they were located in another municipality) or to designing stormwater control within the context of an entire watershed. Management of stormwater has typically been regulated on a municipal level with little or no consistency among adjoining municipalities in the same watershed regarding the types or degree of control to be practiced. Since many municipalities do not have stormwater management ordinances or controls, the impacts from stormwater runoff may be exacerbated from additional development.

Act 167 changed this approach by instituting a comprehensive program of stormwater planning and management on a watershed level. The Act requires Pennsylvania counties to prepare and adopt stormwater management plans for each watershed located in the county, as designated by the Pennsylvania Department of Environmental Protection (PADEP). Most importantly, these plans are to be prepared in consultation with municipalities located in the county, working through a Watershed Plan Advisory Committee (WPAC). Due to a recent change in PADEP Act 167 policy, in lieu of providing plans for each designated watershed, Act 167 plans are now being created on a county-wide basis. The plans are intended to provide uniform technical standards and criteria throughout the county for the management of stormwater runoff from new land development sites. The new PADEP policy also stresses the opportunity for municipalities to retrofit existing sties to improve existing water quality impairments or existing problem area flooding sources.

The types and degree of control that are prescribed in the stormwater management plan must be based on the expected development pattern and hydrologic characteristics of each individual watershed within the county. The plan, more specifically the standards and criteria, are to be developed from the technical evaluations performed in the analysis process, in order to respond to the "cause and effect" nature of existing and potential storm runoff impacts in each watershed. The final product of the Act 167 planning process will be a comprehensive stormwater management plan, to be developed and implemented with a firm sensitivity to the overall needs (e.g., financial, legal, political, technical, etc.) of the municipalities in McKean County.

ACT 167 PLANNING FOR MCKEAN COUNTY

Given the above history and information, the county-wide watershed planning process for McKean County must be designed with the individual watershed characteristics in mind, as well as the resources (technical, political, and economic) of the County. The Phase I - Scope of Study presents the concept and approach that has been developed to fully meet these requirements, as well as the specific requirements of Act 167, for this county-wide watershed stormwater management project.

BENEFITS OF THE PLAN

The purpose and benefit of the study and plan is to provide all of the municipalities in McKean County with an accurate and consistent plan implementation strategy and procedures for comprehensive stormwater management. Currently, there is a great deal of variance within the municipalities regarding implementation and enforcement of stormwater management regulations. Given the nature of storm runoff and its impacts, a critical objective of sound stormwater management planning is to provide for consistency of stormwater management requirements throughout McKean County. Therefore, the primary objective of the technical study and planning process is to develop a technical and institutional support document to

encourage and/or support the consistency of regulations based on county-wide and watershed-wide consideration.

The technical and institutional county-wide planning approach recommended by PADEP also provides the municipalities with a considerable amount of useable technical information, such as detailed watershed runoff simulation models, that can be used for other stormwater management purposes. Therefore, as a result of developing the plan, municipalities and McKean County, will realize benefits and/or products that are useable for other planning and engineering purposes. For example, land use updates and environmental data management are necessary for effective planning in a specific watershed. The technical component of the plan will provide unique environmental database management benefits for both the county and municipal use. Another example of the associated benefits of the plan relates to basic public works and/or engineering functions, primarily at the municipal level.

In addition, technical support information provided as a part of specific watershed modeling effort can be used by public works officials in the design and regulatory permitting efforts for bridge replacement and floodplain management analysis. Further, the stream encroachment permit process, which involves the need to supply detailed stream flow data as a part of the application process, can be more efficiently and cost-effectively developed using a calibrated watershed model. Therefore, the benefits of the watershed planning process are extensive, even beyond the important functions of developing comprehensive stormwater management strategies and ordinance provisions.

A new initiative from PADEP indicates that the plan may investigate and provide solutions to correct existing problems. Specifically, the plan will identify and summarize problem areas; provide much of the hydrology that will be required in the design of proposed solutions; provide potential conceptual solutions to correct these problems; and will specify possible funding streams for project implementation.

APPROACH FOR THE DEVELOPMENT OF THE STORMWATER MANAGEMENT PLAN

In order to implement county-wide comprehensive planning and management of stormwater runoff, it was necessary to take a close look at all major watersheds within McKean County during Phase I. Since the Act itself is very dependent on municipal coordination to provide for the planning and management of stormwater throughout their respective municipality, it was necessary to get "buy-in", endorsement, and involvement from each municipality early in the planning process.

In order to initiate municipal level involvement in the overall development of the plan, a Watershed Plan Advisory Committee (WPAC) was formed and consists of the McKean County Planning Commission, municipalities, the County Conservation District and other interested organizations. Two meetings with the WPAC were held during Phase I to obtain their general commitment to the project and to distribute questionnaires. A third meeting, a public awareness and educational meeting, was held to disseminate and obtain information from the general public. Discussions from these meetings and an evaluation of the questionnaires, in conjunction with in-house knowledge from McKean County and PADEP, determined to what level this plan should be created.

THE NEED FOR A COMPREHENSIVE APPROACH FOR STORMWATER MANAGEMENT

The goal of McKean County's Act 167 planning process is to provide a county-wide comprehensive program to assist in the planning and management of stormwater. With coordination of the twenty-two (22) municipalities in McKean County, the resulting stormwater management ordinance will address severe and ongoing stormwater related problems in critical areas throughout the County. Furthermore, cooperating member municipalities will be able to adopt stormwater management controls that will have a collectively beneficial impact on the waters of McKean County and those "problem" areas that presently remain unmanaged.

The Act itself is divided into two phases of which McKean County has received Phase I funding from PADEP and is highly dependent on gaining support from the municipalities in the early stages of plan development. Phase II will result in the final stormwater management plan and model ordinance. More specifically, the development process for the stormwater management plan is as follows:

Phase I - Scope of Study - Establishing procedures used to prepare the Plan. These procedures are determined by an overall survey of:

- Specific watershed characteristics and hydrologic conditions.
- Stormwater related problems and significant obstructions.
- Alternative measures for control.

Phase II - The Plan - The technical assessment and development of the model ordinance that includes:

- Watershed modeling and planning.
- Development of technical standards and criteria for stormwater management.
- Conceptual solutions to identify problem areas.
- Identification of administrative procedures for implementation of the plan.
- Adoption by McKean County.
- Approval by PADEP.
- Adoption by all twenty-two (22) municipalities.
- Municipal implementation.

PREVIOUS PLAN EFFORTS

There have been one previous Act 167 Plans prepared for McKean County. The Tunungwant Creek Watershed was studied in 1994 with the completion of the following Plan:

- McKean County Planning Commission, *Act 167 Storm Water Management Plan, Tunungwant Creek Watershed*, May 1994.

In addition, the following relevant documents have been prepared and will provide a valuable source of information for the development of the Plan:

- McKean County Planning Commission, *McKean County Comprehensive Plan*, 2008.
- McKean County Planning Commission, *Policies for the Future, McKean County Penna.,* June 1977.

GENERAL COUNTY DESCRIPTION

McKean County is located in the north-central part of Pennsylvania, bounded on the north by Cattaraugus and Allegheny Counties (New York), to the east by Potter County, on the west by Warren County and on the south by Forest, Cameron and Elk Counties. The County was settled after the American Revolution by way of the upper reaches of the Allegheny River. The first settlements were along the fertile valleys, a pattern which continues today. McKean County was formed from Lycoming County in 1804 and named in honor of Governor Thomas McKean.

The County encompasses 997 square miles and is approximately 38 miles wide by 27 miles long. The topography of the County is rolling and hilly. Elevations range from 2,460 feet on Prospect Hill to 1,280 feet where the Sinnemahoning Creek flows out of the County at Gardeau.

POLITICAL JURISDICTIONS

The County is comprised of 22 municipalities. The political jurisdictions include 15 townships, 6 boroughs, and the city of Bradford. McKean County is classified as a sixth class county and is ranked 47th in the state of 67 counties, with a population of 45,936 according to the 2000 census. The 22 municipalities in McKean County are as follows:

CITY & BOROUGHS	LAND AREA Square Miles
Bradford City	3.5
Eldred Borough	0.9
Kane Borough	1.6
Lewis Run Borough	1.9
Mount Jewett Borough	2.4
Port Allegany Borough	1.8
Smethport Borough	1.7

TOWNSHIPS	LAND AREA Square Miles
Annin Township	33.6
Bradford Township	55.8
Ceres Township	40.7
Corydon Township	73.7
Eldred Township	39.4
Foster Township	46.4
Hamilton Township	73.8
Hamlin Township	64.6
Keating Township	98.2
Lafayette Township	71.2
Liberty Township	83.5
Norwich Township	95.6
Otto Township	34.8
Sergeant Township	80.3
Wetmore Township	79
Total	**984.4**

NATURAL CHARACTERISTICS

WATER RESOURCES

McKean County lies almost entirely within the Ohio River drainage basin with a minor portion draining to the Susquehanna River through the Sinnemahoning Creek. All precipitation which falls in McKean County is channeled by gravity into nine major drainages basins.

"Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the commonwealth shall conserve and maintain them for the benefit of all the people."
--The Constitution of the Commonwealth of Pennsylvania, Article I, Section 27

WATERSHEDS
Act 167 has designated nine watersheds within the County included in this study are:

Drainage Basin	Act 167 Designated Watershed	Watershed Area (square miles)		
		Total within State	Total Within County	% of County
Ohio River	Allegheny River (Potter)	169.0	2.1	0.2%
	Allegheny River	1600.0	465.0	47.3%
	Clarion River	823.6	72.0	7.3%
	Tionesta Creek	478.4	53.9	5.5%
	Tunungwant Creek	135.4	127.9	13.0%
	Oswayo Creek	158.2	28.4	2.9%
	Potato Creek	223.1	209.8	21.4%
Susquehanna River	Sinnemahoning Creek	630.8	5.8	0.6%
	Sinnemahoning/Portage Creek	73.1	17.5	1.8%
			982.4	

LAKES & IMPOUNDMENTS

There are a number of man-made impoundments in the County. Two branches of the 12,000 acre Allegheny Reservoir extends into County along Sugar Run and Kinzua Creek. Hamlin Lake contains 17 acres on the south side of Smethport Borough. In addition, Bradford City controls several reservoirs in Bradford Township east of the City of Bradford including the 25 acre Marilla Reservoir.

SURFACE WATER QUALITY

The Pennsylvania Chapter 93 Water Quality Standards classify all surface waters according to their water quality criteria and protected water uses. Selected waterbodies that exhibit exceptional water quality and other environmental features are referred to as "Special Protection Waters", which includes High Quality and Exceptional Value designations. Certain activities in those watersheds that could adversely affect surface water are more stringently regulated to prevent degradation.

The named streams within the County with protected use classification are listed below:

SPECIAL PROTECTION WATERSHEDS		
Exceptional Value Waters		
South Branch Cole Creek		
Railroad Run		
Minard Run		
Elk Fork		
Sinnemahoning Portage Creek		
High Quality Value Waters		
Hemlock Run	Gilbert Brook	South Branch Kinzua Creek
Allegheny Portage Creek	Glad Run	Stanton Brook
Bayer Brook	Janders Run	Taylor Brook
Blacksmith Run	Libby Run	Thundershower Run
Brewer Run	Little Meade Run	Turnup Run
Briggs Run	Marilla Brook	Warner Brook
Buck Lick Run	Markham Run	Watermill Run
Bump Run	Meade Run	Wernwag Hollow
Camp Run	Morrison Run	West Branch Potato Creek
Colegrove Brook	Mud Lick Run	West Branch Tunungwant Creek
Coon Run	North Creek	White Gravel Creek
Crary Run	North Fork	Whiting Run
Daly Brook	Robbins Brook	Willis Creek
Dutchman Run	Root Run	Windfall Run
East Branch Potato Creek	Santeen Run	Wolf Run
East Branch Tunungwant Creek	Sherman Run	Yeager Brook
Fair Run	Skinner Creek	

A complete list of all the streams within the County and their Chapter 93 classifications are listed in Appendix G.

IMPAIRED STREAMS

The Stream Integrated List represents stream assessments in an integrated format for the Clean Water Act Section 305(b) reporting and Section 303(d) listing. Streams are bodies of flowing surface water that collectively form a network that drains a basin. PA DEP protects 4 stream water uses:

- aquatic life
- fish consumption
- potable water supply
- recreation

The 305(b) stream segments have been evaluated for attainment of those uses. If a stream segment is not attaining any one of its 4 uses, it is then considered non-attaining. In McKean County, the non-attainting streams all were for aquatic life and fish consumption.

The following table lists the non-attaining streams in McKean County and the source-cause of the pollution:

SOURCE CAUSE	MILES	%
Agricultural & Grazing Related - Siltation	18.308	41.7%
Abandoned Mine Drainage (pH, Organic Enrichment/Low DO; Siltation)	13.158	30.0%
Source Unknown - Mercury	5.810	13.2%
Small Residential Runoff - Nutrients & Siltation	2.252	5.1%
Road Runoff - Siltation	1.756	4.0%
Industrial Point Source - Cause Unknown ; Channelization; Remov. Vegetation	1.225	2.8%
Removal of Vegetation - Nutrients & Siltation ; Golf Courses - Cause Unknown	0.470	1.1%
Source Unknown - Nutrients & Siltation	0.430	1.0%
Petroleum Activities - Metals	0.254	0.6%
Upstream Impoundment - Nutrients	0.232	0.5%
	43.895	

A complete list of impaired streams and their causes are included in the Appendix.

CLIMATE

McKean County is situated in the Northwest Plateau Climatic Divisions and the climate is classified as humid continental. The area is mostly affected by weather systems that develop in the Central Plains or mid-west and are carried by prevailing westerly winds. Canada is the primary source of cold air and the Great Lakes is the main source of moisture. In general, the winters in McKean County are cold and the summers are warm and somewhat humid. Average highs for the summer linger below 80°F. The County's prevailing January temperature averages about 29°F while the minimum temperatures experienced often dips anywhere between 10 to 0 F. There are about 120 frost-free days during the year in McKean County. Annual precipitation varies throughout the County but is about 42" of which about 21" drains out of the County. Several weather records are held by McKean County including the World Record for a 4.5-hour rainfall of 30.8" on July 18, 1942, Smethport (NOAA) and National Record of 34.5" July 17-18, in Smethport. The average annual snowfall amounts up to 90" a year.

GEOLOGY

McKean County's present day surface forms were created through several geologic forces acting over many thousands of years. The land emerged from a prehistoric inland sea essentially as a plain comprised of water-deposited materials. Through the action of time and pressure, the earlier deposits of sand, clay, silt, and carboniferous (plant) materials were formed into the sandstone, shale, limestone, and coal strata which make up the bedrock stratigraphy of the area. Only a small portion of the northeast corner of the County was covered by glacial ice.

McKean County is located within three sections of the Appalachian Plateaus Physiographic Provinces – the High Plateau Section, the Deep Valley Section and the Glaciated High Plateau Section.

High Plateau Section – The small portion of the County lies within this Section toward the southwestern corner. The High Plateau Section consists of broad, rounded to flat uplands cut by deep angular valleys. The uplands are underlain by flat-lying sandstones and conglomerates. Local relief between valley bottoms and adjacent uplands can be as much as 1,000', but is generally in the area of half that amount. Elevations in the Section range from 980' to 2,360'. Drainage of the area has a dendritic pattern. The western boundary of the Section is the Late Wisconsinan glacial border. The area between this

border and the Allegheny River a few miles to the east was glaciated by pre-Wisconsinan glaciers. A large part of the Section is covered by trees of the Allegheny National Forest.

Deep Valleys Section – the majority of the County lies within this section which consists of many very deep, steep-sloped valleys that are separated by narrow, flat to sloping uplands. In the deepest valleys, the stream at the valley bottom is more than 1,000' below the top of an adjacent upland. At the head of a valley, the valley merges with the upland with only a few 10's of feet of elevation difference between the valley bottom and the upland. The valley slopes are always steep in the main part of the valley. In most valleys the slope is fairly uniform from top to bottom. In some valleys the slopes have a large-scale, stairstep appearance. This appearance results from erosion of sandstones and shales, rocks with different resistances to erosion. The sandstones are resistant to erosion and form very steep slopes and flat steps on the slopes. The shales are much less resistant to erosion and form sloping risers between steps.

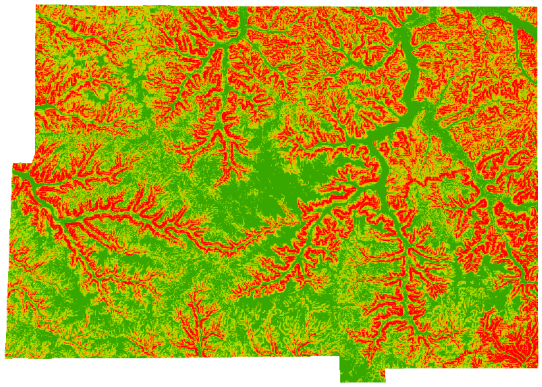
Glaciated High Plateau Section – only a small portion of the County in the northeast corner lies within this section which consists of broad to narrow, rounded to relatively flat, elongate uplands separated in most places from the adjacent Glaciated Low Plateau Section by a steep-sloped, well defined escarpment. These uplands are dissected by steep to shallow valleys. Each elongate upland corresponds to a syncline whose axis is in the approximate center of the up-land.

BEDROCK FORMATIONS

The majority of the bedrock formations in McKean County belong to the Devonian and Pennsylvanian Ages. The slopes of the higher elevations contain bedrock of the Mississipian Age with the bedrock of the highest elevations belonging to the Pennsylvanian Age. The bedrock formations are shown on the following table with specific details listed from the Pennsylvania Geological Survey, *Geologic Map of Pennsylvania, 4th series,* 1980.

Map Symbol	Formation Name	Formation Age	Geologic Description
Dch	Chadakoin Formation	Devonian	Light-gray or brownish siltstone and some sandstone, interbedded with medium-gray shale; included in Conneaut Group and "Chemung" of earlier workers; marine fossils common; includes "pink rock" of drillers.
Dck	Catskill Formation		Grayish-red sandstone, siltstone, shale, and mudstone; units of gray sandstone occur in upper part; lithologies in upper part arranged in fining-upward cycles.
Dlh	Lock Haven Formation		Interbedded olive-gray mudstone, siltstone, sandstone, and thin conglomerate; marine fossils throughout; "Chemung" of earlier workers. Laterally equivalent to Scherr and Foreknobs Formations.
Dv	Venango		Light-gray siltstone interbedded with some flaggy, gray sandstone and some bluish-gray shale; Panama Conglomerate and Woodcock Sandstone are, respectively, the lower and upper key beds defining the formation; referred to as "Cattaraugus" by some workers; includes some red shales where it interfingers to the east and south with the Catskill Formation; marine fossils present.
MDso	Shenango Formation through Oswayo Formation, undivided	Mississippian and Devonian	Greenish-gray, olive, and buff sandstone and siltstone, and gray shale in varying proportions; includes "Pocono" ("Knapp") and Oswayo of earlier workers; difficult lithologic distinction between Oswayo and "Knapp"- "Pocono" south and east of type area at Olean, N. Y.; contains marine fossils; includes lateral equivalents of Shenango Formation, Cuyahoga Group, Corry Sandstone, Bedford Shale, and Cussewago Sandstone, plus Oswayo Formation.
MDhm	Huntley Mountain Formation		Greenish-gray and light-olive-gray, flaggy, fine-grained sandstone, siltstone, and a few red shale interbeds; includes lower "Pocono" plus "Oswayo" of earlier workers. Forms transition between Catskill Formation and Burgoon Sandstone.
Pa	Allegheny Formation	Pennsylvanian	Cyclic sequences of sandstone, shale, limestone, clay, and coal; includes valuable clay deposits and Vanport Limestone; commercially valuable Freeport, Kittanning, and Brookville-Clarion coals present; base is at bottom of Brookville-Clarion coal.
Pcg	Glenshaw Formation		Cyclic sequences of shale, sandstone, red beds, and thin limestone and coal; includes four marine limestone or shale horizons; red beds are involved in landslides; base is at top of Upper Freeport coal.
Pp	Pottsville Formation		Predominantly gray sandstone and conglomerate; also contains thin beds of shale, claystone, limestone, and coal; minable coals and commercially valuable high-alumina clays present locally.

SLOPES



McKean County Slopes

The slope of the land is an indication of the developability and use of land. McKean County's land area is comprised of varying degrees of slope, ranging from nearly level plateaus to severe sloping along the rivers of the County. The general characteristics and development potentials and limitations of each category of slope are described as follows:

0-8% slope; 412 square miles; 38% of the County. Flat to moderate; capable of all normal development for residential, commercial, and industrial uses; involves minimum amount of earth moving; suited to row crop agriculture, provided that terracing, contour planting, and other conservation practices are followed.

8-16% slope; 253 square miles; 23% of the County. Rolling terrain and moderate slopes; generally suited only for residential development; site planning requires considerable skill; care is required in street layout to avoid long sustained gradients; drainage structures must be properly designed and installed to avoid erosion damage; generally suited to growing of perennial forage crops and pastures with occasional small grain plantings.

16-24% slope; 189 square miles; 18% of the County. Steep slopes; generally unsuited for most urban development; individual residences may be possible on large lot areas, uneconomical to provide improved streets and utilities; overly expensive to provide public services; foundation problems and erosion usually present; agricultural uses should be limited to pastures and tree farms.

24%->slope; 224 square miles; 21% of the County. Severe and precipitous slopes; no development of an intensive nature should be attempted; land not to be cultivated; permanent tree cover should be established & maintained; adaptable to open space uses (recreation, game farms, & watershed protection).

SOILS

A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern. Characteristics for the soil associations are described as follows:

Soil Associations:

Canfield-Ravenna Association; Gently sloping and sloping, deep, dominantly gravelly, moderately well drained and somewhat poorly drained soils underlain by glacial till; on uplands.

Alton-Monongahela-Philo Association; Nearly level and gently sloping, deep, well drained and moderately well drained soils underlain by alluvium; on terraces and floodplains.

Hanover-Alvira Association; Gently sloping and sloping, deep, well-drained to somewhat poorly drained soils underlain by glacial till; on uplands.

Hazleton-Gilpin Association; Steep and very steep, deep and moderately deep, stony, well-drained soils underlain by shale, siltstone, and sandstone; on valley sides.

Cookport-Hazleton-Gilpin Association; Gently sloping to moderately steep, deep and moderately deep, moderately well drained and well drained soils underlain by sandstone, siltstone, and shale; on uplands.

Cavode-Wharton Association; Nearly level and gently sloping, deep, somewhat poorly drained and moderately well drained soils underlain by shale and siltstone; on uplands.

Hydric Soils; The analysis of hydric soils has recently become an important consideration when performing almost any kind of development review. These soils are important to identify and locate because they provide an approximate location where wet areas may be found. Wetland areas are lands where water resources are the primary controlling environmental factor as reflected in hydrology, vegetation, and soils. Thus, the location of hydric soils is one indication of the potential existence of a wetland area. Wetland areas are now protected by the Pennsylvania Department of Environmental Protection and should be examined before deciding on any type of development activity. Refer to the McKean County Soils Survey which graphically depicts the approximate location of hydric soils throughout McKean County.

FLOODPLAIN DATA

With the exception of Kane Borough, all of the municipalities within the County participate in the National Flood Insurance Program. The following table lists the municipalities, their FEMA ID number and the date of the latest Flood Insurance Rate Map:

FEMA ID	MUNICIPALITY	FIRM DATE
421850A	ANNIN TWP	8/1/1987
420665	BRADFORD CITY	9/16/1981
422245	BRADFORD TWP	9/16/1981
421853	CERES TWP	9/18/1987
422473	CORYDON TWP	3/1/1987
420666	ELDRED BORO	9/3/1980
421854	ELDRED TWP	9/3/1980
421855	FOSTER TWP	11/18/1981
421856	HAMILTON TWP	3/1/1987
421857	HAMLIN TWP	3/1/1987
422714	KANE BORO	n/a

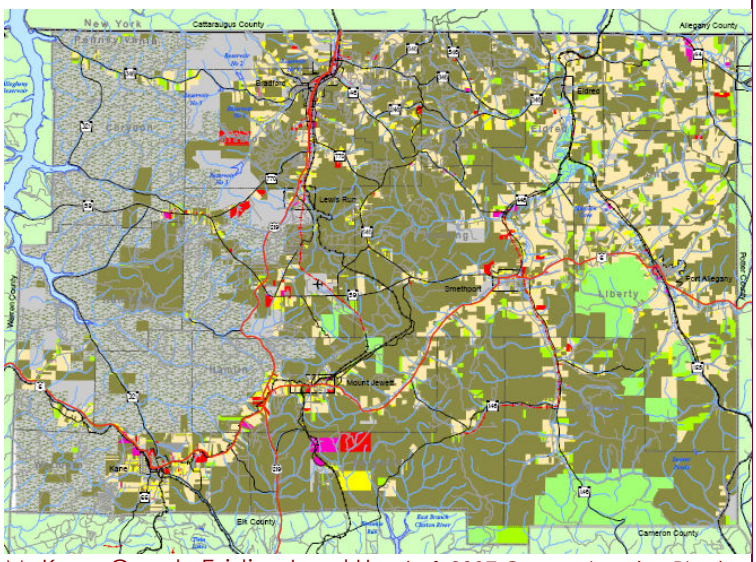
FEMA ID	MUNICIPALITY	FIRM DATE
420667	KEATING TWP	6/1/1978
421858A	LAFAYETTE TWP	6/30/1976
420669A	LEWIS RUN BORO	3/1/1987
420668	LIBERTY TWP	9/1/1977
420670	MT JEWETT BORO	6/30/1976
421859A	NORWICH TWP	7/1/1987
421860A	OTTO TWP	6/1/1987
420671	PORT ALLEGANY BORO	6/15/1979
422474	SERGEANT TWP	7/3/1985
420672	SMETHPORT BORO	4/17/1978
421861	WETMORE TWP	4/1/1987

LAND USE

EXISTING PATTERNS

The way land is used effects stormwater runoff from its rate and volume to its quality. The 2007 *McKean County Comprehensive Plan* classified all the land uses within the county as shown on the following table:

2006 McKean County Land Use		
Classification	**Area**	
	Miles²	%
Residential	32.18	3.27%
Industrial	4.62	0.47%
Public Utility	0.73	0.07%
Commercial	9.81	1.00%
Institutional	31.45	3.20%
Intensive Subtotal	78.80	8.01%
Forest	758.61	77.09%
Agriculture	146.62	14.90%
Non-Intensive Subtotal	905.23	91.99%
Total	984.03	100%



McKean County Existing Land Use (ref. 2007 Comprehensive Plan)

As shown, the vast majority (almost 92%) of the county's land is undeveloped with just under 15% is agricultural. Conversely, under one tenth of the land is developed with residential areas covering 3.3% of the land and institutional areas covering 3.2% of the land.

INDUSTRY

Although it is a relatively small portion of the County, industrial activities can be a potential source of water pollution. The main industries in McKean County are manufacturing, education and health services, and trade, transportation services. Together, these industry sectors employ almost 70% of the County's workforce. The leading County employers include Zippo Manufacturing, Bradford Regional Medical Center, Bradford Area School District, W.R. Case & Sons Cutlery, Wal-Mart, and American Refining Group, Inc.

FARMLANDS

Prime farmland, as defined by the U.S. Department of Agriculture (USDA), is the land that is best suited to producing food, feed, forage, and fiber and oilseed crops. It has the soil quality, growing season, and water supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. In 1972, the USDA assigned the Soil Conservation Service the task of inventorying the prime and unique farmlands and farmlands of state and local importance. This inventory was designed to assist planners and other officials in their decision making to avoid unnecessary, irrevocable conversion of good farmland to other uses. The inventory relied upon the soil capability classifications, with capability class I having the least limitations and capability class VIII having the most. McKean County's soils have been broken into the following capability classes:

Class	Total Acreage	Major management concerns (subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
I	3,430	---	---	---
II	142,165	113,920	27,175	1,070
III	81,150	67,640	13,510	---
IV	37,120	29,075	8,045	---
V	---	---	---	---
VI	184,175	---	---	184,175
VII	185,595	185,595	---	---
VIII	---	---	---	---

According to the USDA, prime farmland soils are usually classified as capability Class I or II. Of the McKean County's total land area, 139,605 acres (21.9 percent) are classified as Prime Farmland. Between 1977 and 2006, the County actually increased agricultural land use by 18,139 acres.

The importance of identifying these areas and planning accordingly is significant. The loss of good farmland is often accompanied by such environmental problems as surface water runoff and interference with the natural recharging of groundwater. Furthermore, when prime agricultural areas are no longer available, farmers will be forced to move to marginal lands, usually on steeper slopes with less fertile soils which are more apt to erode and less likely to produce. Clearly, decision makers must be able to make informed judgments about the development of farmland. Actions that put high quality agricultural areas into irreversible uses should only be initiated if the actions are carefully considered and are clearly for the benefit of public good.

FORESTS and PUBLICLY-OWNED LANDS

The Allegheny National Forest dominates the western portion of the County and accounts for over 135,000 acres (21.5%) of the County. Other publicly-owned forests include portions of the Elk and Susquehannock State Forests which account for almost 28,000 acres. The State also controls the 329 acre Kinzua Bridge State Park. The Pennsylvania Game Commission controls the following Game Lands:

State Game Land	Acres
30	11,572
301	842
61	9,099
62	1,334
total	22,847

The Bradford City Water Authority owns and controls the 12,000 acres of forested land in the Marilla Brook and West Branch Tunungwant Creek watersheds.

TRANSPORTATION

Transportation in the county has influenced the hydrology of the watersheds. The County is served by two important major transportation routes. Route 6, the east-west link across the northern tier of Pennsylvania, passes through the southern-middle portion of McKean County. Route 219 provides a link to Interstate 80 in the south and Route 17 in New York to the north.

Other minor transportation routes include Route 59 which provides access to the Allegheny National Forest areas in the eastern portions of the County.

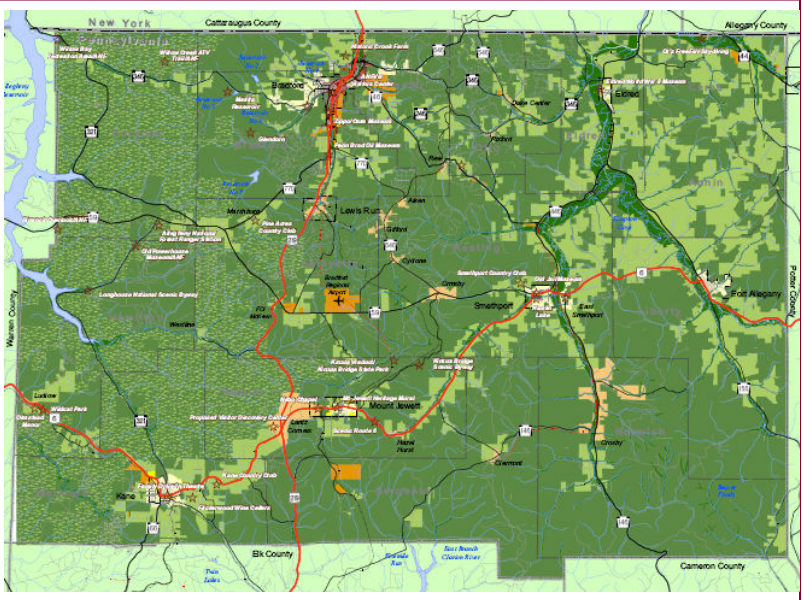
These major thoroughfares and crossroads provide a critical transportation and commuting link for County residents. However, these routes create an increase of impervious surfaces throughout the watershed. These impervious surfaces create more surface runoff and are non-point source pollution during precipitation events. This increases the stress on the drainage systems in the watershed, reduces water quality, and exacerbates streambank erosion, especially at already-known problem areas.

Two railroads and one airport also serve the County.

FUTURE GROWTH PATTERNS

As noted in the *County Comprehensive Plan*, land use trends in McKean County can be summarized as follows:

1. Changes have been gradual for the past 30 years.
2. The biggest changes in land use have been increases in agricultural, residential, and commercial land, which account for the majority of the reduction in forested land.
3. The Bradford area desires to focus development and preserve forested lands for timber harvest and overall environmental quality.
4. Keating, Wetmore, and Otto townships have seen the most subdivision activity.



McKean County Future Land Use (ref. 2007 Comprehensive Plan)

The Comprehensive Plan designated "growth" areas focusing on the urban areas around Bradford. Some industrial growth in certain sectors including information technologies, specialized manufacturing (wood, metal coatings), tourism, and natural resource extraction. Tourism growth is to be centered on ANF and Route 6 corridor. Industrial areas identified were south of Bradford along Rts. 219 & 46, along Rt. 59 in Lafayette Township, and north of Kane along Rt. 6. Residential growth is focused around the existing villages and towns throughout the County including Smethport, Port Allegheny, Kane, etc.

The vast majority (almost 98%) of the County is designated Rural Resource Area. The Comprehensive Plan developed strategies to encourage "smart" growth initiatives and provides tools for future use by the municipalities to use in managing changes in the use of land.

PHASE I PLANNING PROCESS

AGREEMENT BETWEEN PADEP AND MCKEAN COUNTY

An agreement for a Phase I Watershed Stormwater Management Plan Grant for all watersheds of McKean County was made between the Pennsylvania Department of Environmental Protection and McKean County on **June 29th, 2006**.

The agreement was made in order for McKean County to prepare a Stormwater Management Plan in two phases. The first phase (Phase I) is the preparation and submission of a Scope of Study to PADEP for their review and approval. The Scope of Study generally consists of a determination of the level of effort and cost required by McKean County to satisfactorily complete the second phase (Phase II). Phase II includes the preparation and adoption of the Stormwater Management Plan based on the level of effort identified in Phase I.

The Phase I agreement termination date is June 30th, 2008.

ENGINEERING CONSULTANT SELECTION

In order to assist in the preparation of Phase I, the McKean County Commissioners selected Herbert, Rowland & Grubic Inc. to provide stormwater planning services to McKean County and completed this Phase I report.

CREATION AND DISTRIBUTION OF A QUESTIONNAIRE FORM

HRG created the "McKean County Phase I Act 167 Stormwater Management Plan Questionnaire Form" which was distributed by the McKean County Planning Commission at various times throughout the Phase I process. All municipalities and other interested citizen groups and public organizations were encouraged to complete the form. The purpose of the 7-page Questionnaire Form was to gather various pieces of information to help determine the level of commitment from each municipality, to reveal what the major stormwater issues were that affected each municipality, and to determine the location of existing problem areas, significant obstructions, and stormwater management facilities.

ESTABLISHMENT OF A WATERSHED PLAN ADVISORY COMMITTEE (WPAC)

An additional purpose of the Questionnaire Form was to gather contact information for representatives of each of the municipalities as well as other concerned organizations, groups, or citizens that would be interested in participating in the Watershed Plan Advisory Committee (WPAC). The purpose of the WPAC is to serve as an access for municipal input, assistance, voicing of concerns and questions, and to serve as a mechanism to ensure that the inter-municipal coordination and cooperation is secured.

As part of a new initiative by PADEP, it is their position that if a representative from each municipality does not volunteer to join the WPAC, then the head of each governing body will be the appointed member to the WPAC. As an appointed member, that member will be provided all correspondence, be considered an active member, and their name will be included in a list as a member of the WPAC contained within the Plan. The head of each governing body will also be asked to assist their municipality in adoption of the provisions and requirements of the final Plan.

ORGANIZATION	WPAC MEMBER
Annin Township	David McFall
Bradford City	Ross Neidich
Bradford Township	Donald Cummins
Ceres Township	Joseph Neal
Corydon Township	Timothy Yohe
Eldred Borough	Dennis Mong
Eldred Township	Jeffrey Rhinehart
Foster Township	Cary Kaber
Hamilton Township	Brian Bastow
Hamlin Township	Thomas Kreiner
Kane Borough	Patrick Nuzzo
Keating Township	Chester Tanner
Lafayette Township	John Knox
Lewis Run Borough	Vincent Montecalvo
Liberty Township	Gary Turner
Mt. Jewett Borough	Ben Bartlein
Norwich Township	Paul Lathrop
Otto Township	Mark Palmer
Port Allegany Borough	Richard Kallenborn
Sergeant Township	James Morgan
Smethport Borough	David Ball
Wetmore Township	Roland Conklin
McKean County Cons. Dist.	Sandy Thompson
Penn State Cooper. Ext.	James Clark
PA DEP	Tim Brunno

Members - Head of Governing Body – Appointed WPAC Member

WATERSHED PLAN ADVISORY COMMITTEE MEETINGS

Two (2) Watershed Plan Advisory Committee meetings were held during the Phase I process. The purposes of the meetings were to gather information and provide education to the WPAC.

WPAC Meeting #1 was held on January 28th, 2008. The meeting provided an overview of the Act 167 process, provided expectations and potential results and outcomes of the Plan, provided an explanation of the Questionnaire Form, began the formation of the WPAC membership and concluded with a question and answer period.

WPAC Meeting #2 was held on **May 20th, 2008**. Prior to the meeting, a draft copy of the Phase I report was supplied to the WPAC for their review. The purpose of this meeting was to summarize the Phase I report, outline the tasks to be completed during Phase II, and address any comments or concerns of the WPAC from their review of the draft Phase I report.

PHASE I REPORT

The Phase I Report is a scope of study to assist McKean County in the preparation and finalization of a Phase II Act 167 Stormwater Management Plan. This Phase I Report identifies the scope and provides estimated fees to complete the identified Phase II tasks.

SUBMISSION OF PHASE I REPORT TO PADEP

The Phase I Report – Scope of Study was submitted to the Pennsylvania Department of Environmental Protection for their review and approval in May 2007. Finalization of the Phase I Report will lead to an additional contract between McKean County and PADEP for the completion of a Phase II Report.

EXISTING WATERSHED PLAN DISCUSSION

TUNUNGWANT CREEK WATERSHED

The Plan was sponsored by McKean County and was completed in 1994. The Plan covered 136 square miles and at least a portion if not all of 6 of the County's 31 municipalities:

City of Bradford	Foster Twp.	Lafayette Twp.
Bradford Twp	Keating Twp.	Lewis Run Boro

DETAILED STUDY

The watersheds were broken into 92 sub-areas averaging 964 acres and modeling was completed using Penn State Runoff Model (PSRM). The detailed PSRM model was developed and calibrated by comparison with FIS studies.

PERFORMANCE STANDARDS

After analyzing the existing and future conditions, the Plan identifies release rate method as the primary performance standard of control. The watershed was divided into 6 release rate areas each with specific release rate percentages which apply to the 2-, 5-, and 10-year design storms. Release rate percentages ranged from 75% to 100% of the pre-development peak flow. Some of the sub-areas were assigned Provisional No Detention. An optional standard also includes the basic post-development not to exceed pre-development peak discharge control standard is to be applied to the 25-, 50-, and 100-year storm for all areas, if the municipality decides.

MODEL ORDINANCE
The model ordinance contained in the Plan identifies the release rate method as the primary performance standard along with calculation methodology. The Plan also identifies techniques to address water quality and groundwater recharge through in the implementation of Best Management Practices.

PROBLEM AREAS & OBSTRUCTIONS
The Plan identified 19 problem areas which predominantly dealt with flooding.

QUESTIONNAIRE DISCUSSION

QUESTIONNAIRE RESULTS

The Questionnaire was designed to solicit input from each municipality and other interested organizations, relative to specific problem areas throughout McKean County, as well as the needs they may see for stormwater management in their particular municipality. The Questionnaire was distributed, along with an educational handout during the WPAC#1 meeting in Phase I. The Questionnaire included a map of the individual municipalities and was used to identify locations of problem areas, significant obstructions, and existing or proposed stormwater management facilities. (A copy of the Questionnaire is included as Appendix A of this document.) In addition, the information contained within the Questionnaires was instrumental in determining the scope of Phase II planning.

Because the most important part of the Act 167 planning process is the implementation of the final provisions and standards of the PLAN, another reason for utilizing this Questionnaire is to develop interest in stormwater management issues by the municipalities. Attempting to obtain municipal "buy-in" of the project was a key element during the entire Phase I process. Obtaining support from these municipalities early in the process will ensure a better end product and hopefully ease the process of adoption and implementation by each municipality within McKean County.

Questionnaires were received from 21 out of the 22 municipalities in McKean County. In addition, a Questionnaire was received from the McKean County Conservation District. Through analysis of the results of the Questionnaires it was determined that the principal stormwater problems are flooding and stream bank erosion. The most important stormwater issue to the municipalities is peak flows which, in turn, cause the problems of stream bank erosion and flooding. Support of the Act 167 project was very high (average 3.9 out of 5).

A summary of the results of the Questionnaires can be found in Appendix B.

PHASE II DISCUSSION

ITEMS TO BE ADDRESSED IN PHASE II

During Phase I, the WPAC made several decisions regarding certain specific items that should be addressed during the Phase II planning process and the Phase II Final Plan. Refer to Appendix C of this report for a detailed breakdown of the Phase II Scope of Work.

A summary of the specific tasks and subtask shall be as follows:

Task A – Data Collection/Review/Analysis
- SubTask A.1 – Data Collection
- SubTask A.2 – Municipal Ordinance Reviews/Evaluations
- SubTask A.3 – Data Preparation for Technical Analysis

Task B – Technical Analysis
- SubTask B.1 – Implement Volume Controls
- SubTask B.2 – Implement Rate Controls
- SubTask B.3 – Model Subwatersheds of Designated Watersheds
- SubTask B.4 – Provide Conceptual Solutions for Existing Problem Areas
- SubTask B.5 – Goals, Objectives, and Compilation of All Technical Standards
- SubTask B.6 – Implementation of Technical Standards and Criteria
- SubTask B.7 – Economic Analysis
- SubTask B.8 – Regulations for Activities Impacting Stormwater Runoff
- SubTask B.9 – Water Quality Impairments

Task C – Public/Municipal Participation

Task D – Plan Preparation and Implementation
- SubTask D.1 – PLAN Report Preparation
- SubTask D.2 – Model Ordinance Preparation
- SubTask D.3 – PLAN Adoption

Detailed Study
The Questionnaire respondents identified 94 problem areas and 12 obstructions. These identified areas are distributed across the County as shown below:

Act 167 Designated Watershed	Problems	Obstructions	Total	%
Allegheny River (Potter)	0	0	0	0.0%
Allegheny River	42	1	43	40.6%
Clarion River	2	0	2	1.9%
Tionesta Creek	10	0	10	9.4%
Tunungwant Creek	14	3	17	16.0%
Oswayo Creek	6	0	6	5.7%
Potato Creek	20	8	28	26.4%
Sinnemahoning Creek	0	0	0	0.0%
Sinnemahoning/Portage Creek	0	0	0	0.0%
	94	12	106	

Through analysis of these identified areas, as well as through analysis of the recent Comprehensive Plan, the following table illustrates the proposed extent of detailed study:

Watershed	Study	Extent	Notes
Allegheny River	Yes	Eastern portion of County	Contains almost ½ of the identified areas; concentrated on east side of county
Clarion River	No	None	Limited identified areas & growth identified
Tionesta Creek	No	None	Limited identified areas & growth identified
Tunungwant Creek	YES	Entire	Update ex. Plan; concentration of identified

			areas
Oswayo Creek	Limited	Tributaries to Oswayo Creek	Detailed study of areas tributary to identified areas.
Potato Creek	Limited	Marvin Creek; upper Potato Creek	Detailed study of areas tributary to identified areas.
Sinnemahoning Creek	No	None	
Sinn./Portage Creek	No	None	

As part of the Phase II work, standards will be created for inclusion in the Plan to address activities impacting stormwater runoff. Timber harvesting and gas & oil well development is noted as a leading source of stormwater problems. These standards are intended to assist in the planning of the sites. These regulations are not meant to discourage the activities, but instead make sure that they are completed in a proper manner with due regard to stormwater management.

GENERAL WORK PLAN

PHASE II AGREEMENT

Upon completion and submission of the Phase I report to PADEP, McKean County and PADEP will enter into an agreement to complete the Phase II portion of the project. Funding for the project should be allocated by PADEP prior to the beginning of any of the Phase II tasks. A 75% reimbursement procedure will be implemented between McKean County and PADEP during the Phase II project.

CONSULTANT SELECTION

It is recommended that McKean County secure an engineering consultant to assist in completing at least the technical analysis task of the Phase II project. A qualified consultant knowledgeable in the Act 167 process (including adoption and implementation procedures), stormwater issues in the County, and municipalities within the County, will benefit the County during the Phase II process.

QUESTIONNAIRE

A Questionnaire Form was distributed during and subsequent to the first WPAC meeting during Phase I. The Questionnaire (see Appendix A) solicited information on problem areas, obstructions, existing and proposed stormwater facilities, and flood control facilities. Other information requested relates to municipal ordinances, support for the plan, relative importance of various plan criteria, and interest in best management practices (BMPs). The municipalities were also asked to appoint a WPAC representative. The data collected through the Questionnaire will assist in technical and non-technical aspects of the planning process and in scoping the overall Plan. The problem areas and significant obstructions indicated in the Questionnaires will need to be analyzed during Phase II and will become the basis of required subwatershed area modeling.

WATERSHED PLAN ADVISORY COMMITTEE (WPAC)

During the Phase I portion of this project, a WPAC was formed. Many of the WPAC members indicated their willingness to volunteer to join the committee through the Questionnaire Form. In

addition, letters were mailed to each municipality requesting them to appoint at least one person from their individual municipality to become a member of the committee. This letter was in response to Section 6(a) of the Pennsylvania Management Act (Act 167), which states "The county shall establish, in conjunction with each watershed stormwater planning program, a watershed plan advisory committee composed of at least one representative from each municipality within the watershed, the county soil and water conservation district and such other agencies or groups as are necessary and proper to carry out the purposes of the committee." Also stated in the letter was PADEP's position that if a representative from a municipality was not appointed, then the head of the governing body will be appointed to the WPAC.

It is intended that the WPAC will continue to serve as the primary source of plan guidance for the overall planning process throughout Phase II. The committee members will also serve as the primary contact point for the municipalities/organizations that they represent. It is anticipated that each of these municipalities/organizations will continue to have representation in the WPAC.

Through the Questionnaire Form, the WPAC identified the following organizations as possible WPAC participants:

- The Pennsylvania Department of Transportation

These organizations and entities were contacted and invited to join the WPAC during Phase I. Additional stakeholders may be identified during Phase II. If appropriate, an invitation to join the WPAC will be extended to these entities.

MUNICIPAL ENGINEERS PARTICIPATION
Two of the WPAC meetings will focus on the more technical aspects of the Plan. These elements include modeling, technical analysis, and development of management criteria. This meeting will be encouraged to be attended by municipal engineers and will focus solely on the engineering aspects of the Plan as opposed to the more general objectives and overall contents of the Plan.

LEGAL ADVISORY PARTICIPATION
Another WPAC meeting will have a purpose to incorporate information between municipal solicitors into the Plan. This committee will focus on implementation of the Model Ordinance from a legal and regulatory framework standpoint.

STANDARDS
The Plan will include criteria for a comprehensive stormwater management strategy that includes two elements:

- Peak Rate Control Management
- Volume Control Management

Peak Rate Control Management – Implementation of Release Rates for various subwatersheds will be developed based on collected data, modeling, engineering judgment, and committee input. It is noted that Provisional No Detention areas cited in the existing Tuna Creek Plan will not be allowed in this Plan.

Volume Control Management – Implementation of Control Guidance 1 and Control Guidance 2 from the *Pennsylvania Stormwater Best Management Practices Manual*.

ROLES OF COUNTY AND CONSULTANT

The division of work and responsibilities between McKean County and the Consultant should be determined prior to the beginning of Phase II tasks. Generally, the County may serve as project coordinator and be responsible for non-technical aspects of the Plan. This may include appropriate data collection, plan composition, ordinance analysis, and assisting the Consultant with field data collection.

The Consultant would be responsible for technical aspects of the Plan. This includes data review, problem area and significant obstruction analysis, hydrologic modeling, development of technical criteria, and economic analysis. The Consultant would compose technical components of the Plan text and provide draft and final project mapping.

WORK SCHEDULE

A work schedule should be developed early in the Phase II process in conjunction with McKean County and the Consultant. The work schedule will be formulated to set target dates for various tasks with the intention of completing the project for PADEP review within the Phase II contract period.

REFERENCES

1. McKean County Planning Commission, draft *McKean County Comprehensive Plan*, October 2007.

2. McKean County Planning Commission, *Policies for the Future, McKean County Penna.,* June 1977.

3. Tuna Valley Council of Governments, *Multi-Municipal Comprehensive Plan*, June 2001.

4. United States Department of Agriculture Soil Conservation Service, *Soil Survey of McKean County, Pennsylvania*, August 1977.

5. Maryland Department of the Environment, *2000 Maryland Stormwater Design Manual Volumes I & II*, 2000.

6. Pennsylvania Association of Conservation Districts, *Pennsylvania Handbook of Best Management Practices for Developing Areas*, November 14, 1997.

7. Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, *Pennsylvania Stormwater Best Management Practices Manual*, December 2006.

8. Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, *Pennsylvania Model Stormwater Management Ordinance*, January 2007.

9. Pennsylvania Geological Survey, *Geologic map of Pennsylvania, 4th ser.,* 1980.

APPENDIX A.
QUESTIONNAIRE FORM

McKean COUNTY WATERSHEDS

Act 167 Stormwater Management Plan

QUESTIONNAIRE

PLEASE COMPLETE THE FOLLOWING AND RETURN THE QUESTIONNAIRE AND MARKED UP MAP TO:	
DOUGLAS E. WEIKEL, PE	(An addressed envelope with postage is provided for your convenience.)
Herbert, Rowland & Grubic, Inc.	
474 Windmere Drive	
State College PA 16801	

PERSON COMPLETING QUESTIONNAIRE	
Municipality	
Name	
Phone	
e-mail	

1. DOES YOUR MUNICIPALITY HAVE?			
	Yes	No	Location/Date
Comprehensive Plan	☐	☐	
Zoning Ordinance	☐	☐	
Subdivision/Land Development Ordinance	☐	☐	
Floodplain Regulations *	☐	☐	
Stormwater Management Regulations *	☐	☐	
Erosion Control Regulations *	☐	☐	
Drainage Regulations *	☐	☐	

*For the above regulations, please list where the regulation is found in the “Location” column.

Use the following abbreviations:

CP = comprehensive plan
ZO = zoning ordinance
BC = building code
SO = seperate ordinance
SL = subdivision/land development ordinance

2. IS YOUR MUNICIPALITY CONSIDERED AN MS4 MUNICIPALITY UNDER THE CURRENT NPDES PHASE II STORMWATER REGULATIONS? (PLEASE CIRCLE ONE)	
Yes	No
IF YES, IS YOUR MS4 MUNICIPALITY CURRENTLY IN COMPLIANCE WITH THE NPDES PHASE II PERMIT?	
Yes	No

3. THE WATERSHED PLAN WILL ADDRESS FIVE KEY STORMWATER CONSIDERATIONS. THESE FIVE ARE LISTED BELOW. PLEASE INDICATE HOW IMPORTANT YOU BELIEVE IT IS TO ADDRESS EACH CONSIDERATION.

CONSIDERATION		Very Important 5	4	3	2	Not Important 1
Peak Flows	Increased flows from stormwater runoff contribute to stream erosion, localized ponding and flooding, may cause damage to infrastructure (roads, sewers, etc.).	☐	☐	☐	☐	☐
Water Quality	Dissolved and un-dissolved pollutants washed off the land surface – negative impacts to recreation, aesthetics and in-stream habitat.	☐	☐	☐	☐	☐
Groundwater Recharge	Increased runoff decreases amount of rain that becomes groundwater; decreased groundwater supplies may have negative effects on well water supplies and decrease or dry up stream baseflow in dry periods.	☐	☐	☐	☐	☐
Stream Erosion	Eroding banks and beds may undercut roads and utilities, damages in-stream habitat, clog culverts and bridges.	☐	☐	☐	☐	☐
Flooding	Larger scale overbank flows such as the 100-year flood associated with extreme storm events	☐	☐	☐	☐	☐

4. WOULD YOU LIKE TO SEE INFORMATION ON ANY OF THE FOLLOWING PRESENTED AT A WATERSHED PLAN ADVISORY COMMITTEE MEETING?

	Yes	Maybe	No
Best Management Practices	☐	☐	☐
Model/Implemented Ordinances	☐	☐	☐
Information on Act 167 reimbursements	☐	☐	☐

Other topics you would like to have considered: _____

5. WHAT IS THE MOST IMPORTANT STORMWATER RELATED ISSUE TO YOUR MUNICIPALITY?

6. THE FOLLOWING LISTS THE TYPES OF STORMWATER RELATED PROBLEMS YOUR MUNICIPALITY MAY BE EXPERIENCING. FOR EACH PROBLEM TYPE, PLACE A CHECK MARK IN THE COLUMN THAT BEST DESCRIBES THE SEVERITY, FREQUENCY AND CAUSE. IF YOUR MUNICIPALITY IS EXPERIENCING A PROBLEM NOT LISTED, PLEASE LIST IT IN THE SPACE MARKED "OTHER".

PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Street Flooding	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Property Flooding	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Sediment in Streams	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Stream Bed/Bank Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Scour at Outfalls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Property/Infrastructure Damage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pollution	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Habitat/Resource Damage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

7. STORMWATER MANAGEMENT PLANS ARE REQUIRED UNDER THE PENNSYLVANIA STORMWATER MANAGEMENT ACT, ACT 167. AUTHORIZATION TO PROCEED WITH THIS PLAN AS REQUIRED BY ACT 167 HAS BEEN GIVEN BY THE COUNTY. THE LONG-TERM GOAL OF THIS PLAN WILL BE TO MAINTAIN EXISTING HYDROLOGIC CONDITIONS INCLUDING GROUNDWATER LEVELS, WATER QUALITY, STREAM BASE FLOW AND STREAM STORM FLOWS. WITH THIS IN MIND, WHAT LEVEL OF SUPPORT WILL YOUR MUNICIPALITY OR AGENCY PROVIDE FOR THIS PROJECT?

Strongly Support				Strongly Oppose
5	4	3	2	1
☐	☐	☐	☐	☐

8. WILL YOUR MUNICIPALITY/AGENCY ATTEND WATERSHED PLAN ADVISORY COMMITTEE MEETINGS? MEETINGS ARE EXPECTED TO BE HELD APPROXIMATELY 4 TIMES PER YEAR FOR APPROXIMATELY 2 YEARS. (PLEASE CIRCLE ONE)

Yes	No

If yes, who will attend meetings on behalf of your municipality or organization?

Name	
Address	
Phone	
e-mail	

9. WOULD YOU SUGGEST ANY OTHER AGENCIES OR ORGANIZATIONS THAT SHOULD BE INCLUDED ON THE WATERSHED PLAN ADVISORY COMMITTEE? IF SO, PLEASE GIVE CONTACT INFORMATION BELOW:	
Name	
Organization	
Address	
Phone	
e-mail	

10. DO YOU KNOW OF ANY EXISTING OR PROPOSED FLOOD CONTROL PROJECTS IN YOUR MUNICIPALITY? (please circle one)	
Yes	No
If yes, please describe the project(s) below:	

11. ARE EXISTING (PUBLIC OR PRIVATE) STORMWATER MANAGEMENT FACILITIES (OUTFALLS, BASINS, ETC.) BEING MAINTAINED (I.E. REMOVAL OF DEBRIS FROM OUTLET STRUCTURES, ADEQUATE CONTROL OF VEGETATION, CAPACITY MAINTENANCE, ETC.)? (please circle one)	
Yes	No
If yes, please describe the locations(s) below:	

12. PLEASE PROVIDE ANY INPUT YOU FEEL IS RELEVANT REGARDING CURRENT WATERSHED MANAGEMENT PROCEDURES.

13. THE FOLLOWING TABLE REQUESTS INFORMATION ON PROBLEM AREAS AND OBSTRUCTIONS. PLEASE PLACE A CHECK MARK IN THE "P" COLUMN IF THE SITE IS A PROBLEM AREA OR PLACE A CHECK MARK IN THE "O" COLUMN IF THE SITE IS AN OBSTRUCTION.

Problem Areas - Areas of ponding or flooding, erosion, stream channel or bank erosion, property damage, safety concerns, etc.

Obstructions - Bridges, pipes, culverts, dams or other physical barriers to stream flow that restrict the channel flow and typically cause ponding or flooding upstream of the structure.

In the "Description" column describe the type, location, & size of the Problem Area or Obstruction, (i.e. "undersized 36-inch CMP where Main Street crosses Sandy Creek". For each site listed, place the Number of the site at the appropriate location on the enclosed map of your Municipality (attached at the end of this packet). If a solution to the Problem Area or Obstruction is proposed, describe the solution in the "Solution" column. Please copy this sheet if additional space is needed.

Number	Problem	Obstruction	Description	Solution
1	☐	☐		
2	☐	☐		
3	☐	☐		
4	☐	☐		
5	☐	☐		
6	☐	☐		
7	☐	☐		
8	☐	☐		
9	☐	☐		
10	☐	☐		
11	☐	☐		
12	☐	☐		

Please copy this sheet if additional space is needed.

14. THE FOLLOWING REQUESTS INFORMATION ON EXISTING OR PROPOSED STORM SEWER SYSTEMS OR MANAGEMENT FACILITIES. THESE ARE STORM SEWER SYSTEMS, PERMANENT STORMWATER DETENTION PONDS, UNDERGROUND DETENTION FACILITIES OR OTHER SYSTEMS OR FACILITIES INTENDED TO COLLECT, CONVEY OR DETAIN STORMWATER. PLEASE LETTER EACH SITE SEQUENTIALLY AND PLACE THE LETTER CORRESPONDING TO EACH SITE AT THE APPROPRIATE LOCATION ON THE ENCLOSED MAP OF YOUR MUNICIPALITY. PLEASE COPY THIS SHEET IF ADDITIONAL SPACE IS NEEDED.

Letter	Description
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	

Please copy this sheet if additional space is needed.

PLEASE NOTE THAT THE INTENT OF QUESTIONS 15-17 IS INTENDED TO ASSESS THE EFFECTIVENESS OF THE EXISTING TUNA CREEK PLAN OF 1992. THEREFORE, THERE MAY BE SOME SIMILARITIES TO QUESTIONS ASKED ABOVE.

15. ARE ANY OF THE PROBLEMS LISTED BELOW OCCURRING IN YOUR MUNICIPALITY?		
ISSUE/CONCERN	**Yes**	**No**
A. Increased channel erosion/scour at outfalls of stormwater management facilities or storm sewer systems?	☐	☐
B. Increased general channel erosion not associated with outfalls?	☐	☐
C. Increased nuisance flooding?	☐	☐
D. Increased stream flooding?	☐	☐
E. Increased incidence of undersized bridges or culverts?	☐	☐
F. Noticeable increase in sediment deposits in streams?	☐	☐
G. Increase in sediment related problems (sediment deposits, gravel bars, clogged pipes/culverts)?	☐	☐
H. Has there been significant development within your municipality since the existing plan was completed?	☐	☐
I. Are existing stormwater management facilities being maintained (i.e. removal of debris from outlet structures, adequate control of vegetation, capacity maintenance)?	☐	☐

16. THE EXISTING EXISTING ALLEGHENY RIVER PLAN OF 1992 CONTAINS CRITERIA FOR PEAK FLOW MANAGEMENT ONLY. HOW WOULD YOU ASSESS THE EFFECTIVENESS OF THE EXISTING PLAN FOR THE WATERSHEDS IN YOUR MUNICIPALITY?		
Effective	Not Effective	Unknown
☐	☐	☐

17. PLEASE PROVIDE ANY INPUT YOU FEEL IS RELEVANT REGARDING THE EFFECTIVENESS OF THE EXISTING PLAN FOR TUNA CREEK PLAN.	
A.	
B.	
C.	

APPENDIX B.
QUESTIONNAIRE SUMMARY

Summary Table of information provided by the WPAC through the Questionnaire Form:

MUNICIPALITY/AGENCY	Q1							Q2		Q3					Q7	Q8	Q10	Q11
	Comp Plan	Zoning Ord	SALDO	Floodplain Regs	SWM Regs	E&S Regs	Drainage Regs	MS4	In compliance	Peak Flow Rates	Water Quality	Groundwater Recharge	Stream Bank Protection	Flooding	Support Project	WPAC	Flood Control Projects	Maintained SW Facilities
Bradford City	Y	Y	Y	Y	Y	Y	Y	Y	Y	5	5	3	5	5	5	Y	Y	Y
Eldred Borough	N	Y	N	Y	N	N	N			5	4	4	5	5		Y	Y	
Kane Borough	Y	Y	N		N	N	N	N		5	3	3	3	2	3	Y	N	Y
Lewis Run Borough	Y	Y	Y	Y	Y	Y	Y	Y	Y	5	5	5	5	5	4	Y	N	Y
Mount Jewett Borough	N	Y	N	N	N	N	N			4	5	3	4	5	4	Y	N	N
Port Allegany Borough	N	Y	Y	Y	N	N	N	N		3	3	3	3	5	3	Y	Y	Y
Smethport Borough	Y	Y	Y	Y	Y	Y	Y	N		5	5	5	5	5	4	Y	Y	Y
Annin Township	N	N	N	Y	N	N	N	N		5	4	4	5	5	5	Y	Y	Y
Bradford Township	N	Y	Y	Y	Y	N	Y	N		5	5	1	5	5	5	Y	Y	Y
Ceres Township	Y	N	N	Y	N	N	N	N		5	4	5	5	4	4	Y	N	N
Corydon Township	N			Y				N		4	3	3	4	4	4	Y	N	N
Eldred Township		N						N		5	3	4	3	5	3	Y	N	Y
Foster Township	Y	Y	Y	Y	Y	N	N	N		5	2	4	5	5	5	Y	N	Y
Hamilton Township	N	N	N	N	N	N	N	N		5	5	3	3	5	3	Y	N	Y
Hamlin Township	Y	N	Y	Y	Y	N	N	N		5	4	5	5	5	5	Y	N	N
Keating Township	N	N	N	Y	N	N	N	N		4	3	2	4	3	3	Y	Y	N
Lafayette Township																		
Liberty Township	N	N	N	Y	N	N	N	N	N	5	5	5	5	5	4	Y	N	N
Norwich Township	N	N	N	N	N	N	N	N	N	4	4	4	5	4	2	Y	N	N
Otto Township	N	N	N	Y	N	N	N	N		5	2	3	5	3	3	Y	N	N
Sergeant Township	N	N	N	N	N	N	N	N		4	2	4	4	2	3	Y	N	N
Wetmore Township	N	N	N	Y	Y	Y	Y	N		5	4	4	5	4	5	Y	N	Y
Conservation District										5	5	5	5	5	5	Y	Y	
Municipal Response %	**95%**									**4.7**	**3.8**	**3.7**	**4.4**	**4.3**	**3.9**			
Total Response %	**96%**									**4.7**	**3.9**	**3.7**	**4.5**	**4.4**	**3.9**			

Question 1. Does your Municipality have the following regulations?

Question 2. Is your Municipality considered an MS4? In compliance? Interested in intermunicipal cooperation?

Question 3. How important (5 - Very Important) to (1- Not Important) are the following issues?

Question 7. How much support will your Muncipialtiy provide (5- Strongly Support) to (1- Strongly Oppose)?

Question 8. Will your Municipality participate in the WPAC (Yes or No)?

Question 10. Are there existing or proposed flood control projects in your Municipality (Yes or No)?

Question 11. Are existing stormwater management facilities being maintained (Yes or No)?

MUNICIPALITY/AGENCY	Question 5. What is the most important stormwater issue?
Bradford City	Bolivar Run SW Improvments w/Seward Bridge Replacement
Eldred Borough	
Kane Borough	CSO'S
Lewis Run Borough	
Mount Jewett Borough	Route 6 Drainage
Port Allegany Borough	Major Flooding Allegheny River Basin
Smethport Borough	Education of public
Annin Township	Flooding events
Bradford Township	Local Flooding
Ceres Township	Runoff & Road Erosion
Corydon Township	Flooding & Stream Erosion
Eldred Township	Backlog in stream
Foster Township	Timber cutting & Oil/Gas Devel.
Hamilton Township	Flooding
Hamlin Township	Flooding due to logging
Keating Township	Erosion & Flooding
Lafayette Township	
Liberty Township	
Norwich Township	Flooding
Otto Township	Peak flows & Stream erosion
Sergeant Township	Flooding; stormwater runoff
Wetmore Township	Heavy rains; road flooding
Conservation District	water quality

Summary Table of Problem Areas provided by the WPAC through the Questionnaire Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION	PROPOSED SOLUTION
P1	HAMILTON	South Hillside Ave		
P2	HAMILTON	Wetmore Rd - Johnson to Niver Rds	major road washouts	more cross pipes
P3	HAMILTON	Curtis Rd (behind Ludlow Fire Dept)	flooding in heavy rain	ditch needs cleaned
P4	HAMILTON	FR 133 RR crossing	pipe silts shut	
P5	MT JEWETT	Route 6	runoff diverted to one pipe under RR's, severe erosion	channel modification
P6	WETMORE TWP	Jo Jo Road bridge	runoff from heavy rain	clean stream channel
P7	WETMORE TWP	Jo Jo Road - both sides	highwater flow - road washouts	
P8	WETMORE TWP	Old Mill Road	road flooding in low areas	
P9	WETMORE TWP	Sleepy Hollow Road	road flooding and washouts	
P10	WETMORE TWP	Dwights Road	road flooding	
P11	WETMORE TWP	Morser Hill Road	road flooding in low areas	
P12	WETMORE TWP	Reigle Road	road flooing	
P13	WETMORE TWP	Spring Street	road flooding, property flooding	increase pipe size
P14	FOSTER TWP	Foster Brook thru Derrick City		
P15	FOSTER TWP	Bolivar Run		
P16	FOSTER TWP	Lafferty trib to Kendall Creek		private property owner should clean channel
P17	FOSTER TWP	Tunaguant Creek		flood control
P18	ELDRED TWP	Derrick Road	roadway flooding	
P19	ELDRED TWP	Windfall Road	roadway flooding	
P20	ELDRED TWP	N. Branch Road	roadway flooding	
P21	ELDRED TWP	Driscoll Rd	roadway flooding	
P22	ELDRED TWP	Bells Hollow	roadway flooding	
P23	ELDRED TWP	Moody Loop Road	roadway flooding	
P24	ELDRED TWP	W. Eldred Road	stream through road	
P25	ELDRED TWP	Route 346	stream erosion & road flooding	
P26	ELDRED TWP	Canfield Creek	stream full of silt	
P27	ELDRED TWP	Carpenter Creek	stream full of silt	
P28	ELDRED TWP	Newell Creek	stream full of silt	
P29	PORT ALLEGHENY	Route 6 Bridge over Allegheny River		open flow space
P30	CORYDON TWP	Willow Creek	bank erosion & log jams	remove debris & bank restoration
P31	CERES TWP	Chapman Brook Rd	pipe under road too small	bigger pipe
P32	CERES TWP	Coon Hollow Rd	runoff from hill floods road	
P33	CERES TWP	Taylor Brook Rd	runoff from hill floods road	larger pipe
P34	CERES TWP	Church Hollow Rd	stream floods road	dike along road
P35	CERES TWP	Kings Run Rd	stream floods road	
P36	CERES TWP	Hanson Hollow Rd	runoff floods roads	larger pipe
P37	CERES TWP	Barden Brook Rd	water from driveway in road	
P38	CERES TWP	Whitetail Rd	heavy rain washes out dirt road	

ID	MUNICIPALITY	LOCATION	DESCRIPTION	PROPOSED SOLUTION
P39	CERES TWP	Austin Rd	water runs down road from connecting road	
P40	BRADFORD TWP	Browntown Rd	street flooding	
P41	BRADFORD TWP	Pear Street	undersized culvert	
P42	BRADFORD TWP	Marilla Creek	trees could block flow	
P43	BRADFORD TWP	Gates Hollow	increased flow	
P44	SMETHPORT BORO	Black Smith Brook	erosion	bank stabilization
P45	SMETHPORT BORO	Marvin Creek	ice jams, erosion	bank stabilization, channel correction
P46	SMETHPORT BORO	Potato Creek		bank stabilization
P47	SMETHPORT BORO	West Willow		control runoff, keep grates clean
P48	SMETHPORT BORO	West High School		control runoff, keep grates clean
P49	SMETHPORT BORO	East High School		control runoff, keep grates clean
P50	SMETHPORT BORO	East Rosehil		keep ditches clean
P51	SMETHPORT BORO	East High School outfall		increase pipe from 24" to 30"
P52	SMETHPORT BORO	Fulton Franklin		ditch stabilization
P53	SMETHPORT BORO	State St		keep ditches clean & stabilized
P54	SMETHPORT BORO	Upper Hamlin		keep inlets clean
P55	ANNIN TWP	Two Mile Rd	small pipes, brush & debris	larger pipes, clean debris
P56	ANNIN TWP		runoff to road, too small pipe	slow down water
P57	ANNIN TWP	Sun Valley Road	water over road	larger pipes
P58	ANNIN TWP	Champlain Hill Rd	water crossing road	larger pipes, channel water
P59	ANNIN TWP	Peich Run Rd	erosion on side of road	concrete or stone along road
P60	ANNIN TWP	Turtlepoint Park	stream bank erosion	stone along bank
P61	ANNIN TWP	Open Brook	pipes too small	larger pipes
P62	KEATING TWP	Galico Cross Rd	shoulder washout	new bridge & retaining wall
P63	KEATING TWP	Valley Cross Rd	shoulder washout	new bridge
P64	KEATING TWP	Dugout Rd	shoulder washout	new catch basin
P65	BRADFORD CITY	Bolivar Run	flooding, streambank erosion	channel improvement w/Seward Ave Bridge replacement
P66	BRADFORD CITY	Bennet Brook	erosion, minor flooding and property damage	streambank protection installed
P67	BRADFORD CITY	Kendall Creek at Melvin Ave	overbank flow - property damage	upstream sw management
P68	BRADFORD CITY	Neva Drive	property damage due to runoff	culvert being installed
P69	BRADFORD CITY	Bedford St	increased flow causing ponding	install piping to Rt 219 drainage system
P70	HAMLIN TWP	Dewey Ave	Marvin Creek flooding in park & property	ditches & ponds to slow down runoff

ID	MUNICIPALITY	LOCATION	DESCRIPTION	PROPOSED SOLUTION
P71	HAMLIN TWP	Marvin Creek	increased runoff from hills causes flooding	ditches & ponds to slow down runoff
P72	HAMLIN TWP	S. of Hazen Hurst	runoff too much for ditches	more diversions at higher levels
P73	HAMLIN TWP	Kiln Rd	runoff	diversion/retention on hills
P74	HAMLIN TWP	Guffey Rd	erosion from runoff washingout roads	diversions
P75	HAMLIN TWP	Old Bradford Rd	ponding of water	
P76	OTTO TWP	Brooklyn St	bank erosion re-routes flow	re-route stream to original channel
P77	OTTO TWP	Baker Trussel Bridge	bank erosion re-routes flow	re-route stream to original channel
P78	OTTO TWP	Clark St bridge	bank erosion re-routes flow	re-route stream to original channel
P79	OTTO TWP	Depot St bridge	bank erosion re-routes flow	re-route stream to original channel
P80	OTTO TWP	Burger Hollow bridge	bank erosion re-routes flow	re-route stream to original channel
P81	OTTO TWP	w of Old Valley Rd	bank erosion & property damage	re-route stream to original channel
P82	OTTO TWP	Kansas Branch	bank erosion & property damage	re-route stream to original channel
P83	OTTO TWP	Burger Hollow	bank erosion & property damage	re-route stream to original channel
P84	LEWIS RUN BORO	Bridge over EB Tunungwant Creek	sediment in creek both sides of bridge	
P85	ELDRED BORO	Main St (Rt 446)	storm drain unable to handle heavy rains	clean ditch along RR tracks
P86	ELDRED BORO	Elm St	storm drain unable to handle heavy rains	larger storm drain
P87	ELDRED BORO	Clif-Nel Dr	drainage problem	re-route drain lines
P88	ELDRED BORO	Railroad Ave	lack of drainage	need drains
P89	ELDRED BORO	Main St (Rt 446)	something obstructing storm drain	
P90	ELDRED BORO	Main St (Rt 446)	storm drain obstruction	remedy obstruction
P91	NORWICH TWP	Crosby Cross Road - TWP RT 375		elevate road, put in box culvert
P92	NORWICH TWP	Keystone Cross Rd - TWP RT 373		elevate road, put in box culvert
P93	LIBERTY TWP	Buchenauer Rd area	beaver dam	remove dam, change water course before bridge
P94	LIBERTY TWP	Fogel Crossing Rd	house in floodplain	relocate?

Summary Table of Obstructions provided by the WPAC through the Questionnaire Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
O1	KEATING TWP	Kent Hollow Rd	bridge too small - new bridge
O2	KEATING TWP	East Valley Rd	bridge too small - new bridge
O3	BRADFORD CITY	Seward St Bridge	replace bridge
O4	BRADFORD CITY	South Ave, Chataqua Place	timber harvesting cause overload of ex. Pipes
O5	BRADFORD CITY	Bennett/Interstate Parkway	increased runoff overloading ex. Pipes
O6	HAMLIN TWP	Orchard St	pipes too small
O7	HAMLIN TWP	Marvindale-Kaison Rd	beaver dams
O8	OTTO TWP	Grant St	30" pipe to 18" at SR 346
O9	NORWICH TWP	West Valley Road - Redmill Creek	put in new bridge
O10	NORWICH TWP	West Valley Road - Brewer Run	put in new bridge
O11	NORWICH TWP	SR 46 - White Hollow	put in new bridge
O12	NORWICH TWP	Twp RT 470 - Portage Creek	put in new bridge

Summary Table of Stormwater Facilities provided by the WPAC through the Questionnaire Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
S1	Hamilton	throughout Twp	catch basins & cross pipes
S2	FOSTER TWP	Walmart	detention basin
S3	FOSTER TWP	Lincolndale Ave	conveyance
S4	FOSTER TWP	Russell Blvd & Wildwood Ave.	conveyance
S5	BRADFORD TWP	High St	retention pond
S6	BRADFORD TWP	UPB	retention pond
S7	SMETHPORT BORO	Throughout Boro	120,000' storm sewers
S8	BRADFORD CITY	Bradford District Flood Control Project	
S9	BRADFORD CITY	Colonial Heights	stormwater system
S10	BRADFORD CITY	George G. Blaisdell School	stormwater system
S11	BRADFORD CITY	Fretz Middle School	stormwater system
S12	BRADFORD CITY	Bradford Ecumenical Home	stormwater system
S13	BRADFORD CITY	Cummins Subdivision	stormwater system
S14	BRADFORD CITY	BRMC	Detention facility (parking lot)
S15	BRADFORD CITY	Family Video	Detention facility (parking lot)
S16	BRADFORD CITY	throughout City	drainage system

APPENDIX C.
PHASE II SCOPE OF WORK

Phase II Scope of Work

The COUNTY shall prepare Phase II of the PLAN in accordance with the tasks described in this Appendix C. For the purpose of carrying out work described in this Appendix C, the McKean County Planning Commission shall be considered as the COUNTY and shall assume all responsibilities deemed to be assumed by COUNTY. The COUNTY, with the help of the consultant, will accomplish the technical and non-technical components of the PLAN.

The final Phase II Report and associated Model Ordinance shall be considered as the PLAN.

The Pennsylvania Department of Environmental Protection shall be considered as the DEPARTMENT.

The selected engineering firm shall be considered as the CONSULTANT.

The Phase II contract between McKean County and The Pennsylvania Department of Environmental Protection shall be considered as the AGREEMENT.

Project Administration

The COUNTY shall be responsible for, but not limited to, overall administration of all tasks, including the preparation of invoices and progress reports, organizing and/or attending meetings, attending to budgeting and organizational matters, and participating in teleconferences regarding the PLAN.

This task also covers the administrative work required to initiate the AGREEMENT between the DEPARTMENT and the COUNTY, and to initiate selection of a CONSULTANT and, upon selection, to initiate contracts between the COUNTY and the CONSULTANT and to lay out a framework for the critical coordination aspect with the municipalities. Activities include defining the framework for accomplishing various elements of the PLAN, scheduling of time and defining the budget, progress reporting procedures and formats, and finalizing the work schedule. It will also include the preparation for and holding the Phase II start-up meeting between the DEPARTMENT, the COUNTY, and the CONSULTANT.

This task also includes the delineation of work for Phase II between the COUNTY and the CONSULTANT.

Project Billing

The COUNTY shall complete all of the tasks (A through D) and report the progress and status of the PLAN. The COUNTY shall prepare and submit monthly invoices and report the status of work accomplished to the DEPARTMENT pursuant to the terms and conditions specified in the AGREEMENT.

TASK A - Data Collection/Review/Analysis

SubTask A.1 - Data Collection

This task will involve the necessary efforts to gather, review, and analyze the required data to complete the technical and institutional planning steps for the PLAN. The CONSULTANT and COUNTY will work jointly to collect data from county offices, municipalities, and local, state, and federal agencies that will aid in preparation of the PLAN. The data will consist of information concerning existing and future conditions throughout McKean County. All data collection activities will be accomplished by gathering available information from the WPAC or from the Questionnaire Form that was distributed to the municipalities during Phase I.

Data to be collected will include, but may not be limited to (and will be based on available information and/or questionnaire results):

1. Comprehensive land use plans.
2. Existing municipal ordinances.
3. Stormwater-related problems areas and proposed conceptual solutions.
4. Existing and proposed flood control projects.
5. Existing and proposed stormwater control facilities.
6. A listing of existing and proposed stormwater collection and control facilities, including a designation of those areas to be served by stormwater collection and control facilities within a 10-year period, an estimate of the design capacity and costs of such facilities, a schedule and the proposed methods of financing the development, construction, and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities, where this information is readily available.
7. Soils.
8. Geology.
9. Significant water obstructions.
10. Topographic and other readily available mapping.
11. Aerial photographs.
12. Previously completed engineering and planning studies.
13. Stream flow and rain gauge data and other water quality information.
14. FEMA FIS floodplain information.

Necessary field investigations will be accomplished to gather and/or confirm the data. This task also involves the review and preliminary analysis of the technical data that has been obtained for consistency and usability. It also includes the review of the institutional data collected through the Phase I Questionnaire Form process for consistency and usability in the final PLAN.

Problem Areas and Obstructions Inspection/Summary/Proposed Solutions

A detailed investigation will be performed to evaluate any problem areas and obstructions identified during Phase I. Those problem areas and obstructions recognized as "significant" would be field evaluated. Detailed modeling will be completed for the subwatershed where these "significant" problem areas or obstructions occur (SubTask B.3), then these sites shall be designated as points-of-interest, and associated design storm flows will be developed. A collection of past studies/investigations including any PennDOT hydrologic computations, if possible, will be compiled and reviewed for

proposed solutions. The PLAN will summarize these problem areas and obstructions, provide proposed solutions, and will specify possible sources of funding to pursue for implementation. The PLAN will make suggestions for other programs/activities to deal with the issues raised during the planning process. The identification of the problem areas will help in assessing the stormwater management rate controls needed for the subwatersheds.

Although the identification of the problem areas will help in assessing the stormwater management rate controls needed for the subwatersheds, the Act 167 program will not provide funds to correct infrastructure problems or implement conceptual solutions. It will however, provide for a systematic approach and help to identify potential sources of funding to correct the problems, and will, through the preparation and implementation of stormwater ordinances, provide administrative means to correct existing problems and prevent future problems from uncontrolled runoff from future development and activities that may affect stormwater.

Review of Existing Plans/Studies/Reports/Programs
A comprehensive review of related documents and/or programs will be performed and a coordinated list of goals and objectives from each of the documents will be developed.

Anticipated Product
The product will include the information listed above, gathered and organized in such a way as to be usable for both short and long term municipal and county stormwater planning (including updates). A final data summary will be prepared that will identify and/or catalogue the collected data and funding streams.

SubTask A.2 - Municipal Ordinance Reviews/Evaluations

This task will involve the detailed evaluation of the provided municipal ordinances in order to prepare a municipal ordinance comparison matrix. This matrix is intended to display (for both the actual preparation of the implementation PLAN and also for the municipal education process), the current stormwater management provisions in the various municipal ordinances for all municipalities within McKean County. The objectives and the preparation of the matrix are to easily and effectively see the similarities and differences, as well as the consistency/inconsistency, between the various municipal ordinances in the County. The matrix will be used to develop ordinance provision recommendations for the various municipalities.

Anticipated Product
The product will be a complete matrix of stormwater management ordinance provisions for the municipalities, which identify the current status of ordinance provisions as they relate to stormwater management.

SubTask A.3 - Data Preparation for Technical Analysis

This task involves the engineering work necessary to transform the information collected under SubTask A.1 into a Geographic Information System (GIS) database that can be used for the later technical tasks and map (plate) production. Included will be the preparation of "land characteristics" GIS data layers for modeling and display purposes. All data will be incorporated into the GIS database on an as needed basis.

The GIS data layers will include:

- Base Mapping – Existing base map information (roads, streams, municipal boundaries, text, etc.) will be collected and the most accurate data will be utilized to develop the County's base map. All data will be projected into the coordinate system utilized by McKean County. All data from various sources will be merged into a seamless base map.

- Land Use/Land Cover Information – Current aerial (photographic and/or digital images), available GIS land use files, and zoning maps will be collected and formatted into the format required for hydrologic modeling based on NRCS (formerly SCS) land use classifications. Land development projects completed subsequent to existing data will be added as necessary.

- Future Land Use Conditions – Future projected planning information will be overlaid on the existing land use conditions mapping to determine the future land use scenario for development at a 10-year build-out condition.

- Soils Information – The County Soils Survey maps will be modified and/or prepared to illustrate NRCS hydrologic soils groups instead of individual soil types. Overlay mapping will be necessary to prepare the hydrologic soils group map necessary for modeling.

- Digital Elevation Models – Digital Elevation Models (DEMs) will be utilized and evaluated for watershed and subwatershed delineation and to assign slope category information to the subwatersheds for which detailed modeling will be completed. The DEMs will be merged to form a seamless watershed map and projected to the appropriate coordinate system.

- Digital Raster Graphics (DRGs) – Ortho digital USGS topographical maps will be compiled and utilized to evaluate NRCS land use classifications and to determine the location of significant obstructions and problem areas.

- Geology – If available, digital geologic maps that include pertinent geologic features (limestone, sandstone, etc.) will be developed for the County and be extracted and displayed as part of the PLAN.

- Obstructions – Obstructions will be located on the appropriate base map and data or attributes will be attached or linked to the locations.

- Problem Areas, Flood Control Structures, Stormwater Management Facilities – These items will be located on the appropriate base map and data or attributes will be attached or linked to the locations.

- Floodplains – Available FEMA FIS floodplain data will be transposed to the appropriate base map and displayed with the development in McKean County.

A summary of data sources will be supplied (simplified Metadata) and will include data type (coverage, shape file, image), source, projection, and year.

Delineation of Subwatersheds

As required, the watersheds and subwatersheds will be delineated by the CONSULTANT on a base map at the scale that results in a manageable map size and adequate detail. Subwatersheds will be established based on the collected data and results of field reconnaissance. This breakdown of the watersheds by major tributary drainage courses and points-of-interest will be the basis for the hydrologic and hydraulic analyses. The CONSULTANT will determine the size of the subwatersheds; however delineations of subwatersheds smaller then three (3) square miles requires the COUNTY's concurrence.

The subwatersheds will be delineated based on the following:

1. The location of existing regionally significant stormwater management problems, as identified by the WPAC in the Questionnaire Form, during the field reconnaissance, or from data compiled in any previous studies or reports.
2. The location of significant regional stormwater and flood control obstructions such as highway bridges and culverts, or stormwater control facilities.
3. Confluence points of tributaries, as deemed appropriate and significant relative to regional stormwater management planning based on engineering judgment and good modeling practice.
4. Other points of interest, such as stream gage or water quality monitoring stations, locations of water quality concerns, potential flood control project sites, significant outfall locations downstream of existing developments, or where significant development is anticipated and projected to occur.

This task will also include mapping of relevant regional watershed planning information onto GIS data layers. This mapped information will include:

1. Floodplain Areas - The approximate floodplain limits plotted over the watershed base map or the highlighting of those stream segments for which FEMA detailed or approximate Flood Insurance Studies are available.
2. Regionally significant stormwater obstructions and their capacities - "Significant" obstructions will be those that are identified in the Questionnaire Form and/or which are confirmed by the CONSULTANT as being areas where insufficient capacity exists to pass the necessary storm flows, thereby resulting in a flooding hazard to persons or property, or those obstructions that would act as regionally significant impoundments that may affect watershed modeling and the watershed stormwater response.
3. Storm Sewer Systems - Areas where significant storm sewer systems exist will be indicated generally on the final base map.
4. Existing local, state, and federal flood protection and stormwater management facilities.
5. Proposed stormwater facilities within the 10-year planning period - Where known and confirmed by the municipalities through the Questionnaire Form completions process.
6. Regionally Stormwater Related "Problems" - Those areas indicated in the Questionnaire Form and where confirmed by the CONSULTANT through technical modeling/analysis (for example, flooding points or areas of streambank erosion).

Anticipated Product

The product will be completed GIS watershed data layers and maps. The maps completed for this task will be preliminary and will be modified and finalized as a part of the final PLAN preparation efforts.

TASK B - Technical Analysis

The technical analysis will describe the analytical processes involved with developing a strategy to regulate existing and new land development and activities that may affect stormwater runoff. Since stormwater runoff has a direct impact on flooding, water quality, and groundwater recharge, this analysis will consider the following objectives:

- Implement non-point source pollution removal methodologies.
- Preserve and restore natural stormwater runoff regimes and natural course, current, and cross section of Waters of the Commonwealth, to the maximum extent practicable.
- Preserve, protect, maintain, and restore groundwater recharge and recharge areas.
- Protect stream channel and land areas from erosion.
- Restore and preserve flood carrying capacity of streams.
- Manage extreme flood events.

These objectives will be accomplished under SubTasks B.1 to B.9.

SubTask B.1 - Implement Volume Controls

Establish the Design Storm Method (Control Guidance 1 in *The Pennsylvania Stormwater Best Management Practices Manual)* and the Simplified Method (Control Guidance 2 in *The Pennsylvania Stormwater Best Management Practices Manual)* consistent with the Department of Environmental Protection, Bureau of Watershed Management's *Pennsylvania Model Stormwater Management Ordinance*.

SubTask B.2 - Implement Rate Controls

Establish a minimum 100% release rate for all lands contained within McKean County. More restrictive release rates may be developed in subwatersheds with existing problem areas or intense development pressures.

SubTask B.3 - Model Subwatersheds of Designated Watersheds

This task involves the hydrologic modeling, quantitative computations, and evaluations necessary to analyze runoff characteristics of the subwatersheds under existing and future conditions. It will also establish the need and extent of release rates for the subwatersheds. The Tunungwant Creek, Potato Creek and Allegheny River watersheds will be modeled to determine peak flow rates. Subwatersheds chosen will be based on existing problem areas or future development pressures based on input provided by the WPAC. Existing and future land use and land cover will be used to determine existing and future peak rates of discharge. Input data including rainfall information, drainage network layouts and capacities, travel times within subwatersheds, significant obstructions, and GIS based data will be added to develop the selected hydrologic model.

Model Calibration

The individual subwatershed models will be run to get preliminary results. The models will be calibrated to verify the results. Calibration efforts will include the adjustment of the model parameters to accurately simulate natural runoff conditions of the subwatershed. Consideration will be given to all calibration techniques including, but not limited to: use of any available gaging information, comparison with rainfall and runoff information from similar watersheds, comparison with Flood Insurance Study information, and regression analyses. As necessary, calibration will be performed at multiple points within the subwatersheds to assure the most accurate modeling.

Design Storm Selection
Subsequent to calibration of the model, the model will be run for the 2-, 10-, 25-, 50- and 100-year storm events under various durations. An analysis on downstream impacts during these storms will be performed to determine the required design storm(s) based on the subwatershed hydrologic response of the five (5) storms.

Model Runs
The calibrated models will be run for the selected subwatersheds under the determined design storm(s) for both the existing and future projected land uses.

This will also involve the detailed evaluation of modeling results to perform a problem identification analysis (i.e., a "cause and effect" analysis). This will concentrate on identifying the downstream storm runoff impacts of projected future land development projects. This evaluation will consider both the increases in current downstream storm runoff problems, as well as anticipated projected downstream runoff problems.

This work step also consists of performing a technical evaluation of the hydrologic analysis for existing and future land use conditions (estimated 10-year build out) and recommending standards and criteria to regulate land development activity which impacts stormwater runoff. This subtask may also involve performing a release rate analysis and a preliminary distributed storage analysis, and developing criteria and standards for the management of both overbank flooding events (2-, 10- and 25-year storms) and the extreme flooding events (50- and 100-year storms), to be determined by the WPAC.

SubTask B.4 - Provide Conceptual Solutions for Existing Problem Areas
Based on the results of SubTask B.3, this information will be used to develop alternative conceptual solutions for the problem areas identified in the Questionnaire Form and other problems areas as identified by the WPAC. Problem areas may generally consist of flooding, stream channel or bank erosion, property damage, detention basis (retrofitting), etc. The developed solutions will be conceptual in nature (i.e. no final engineering or specification will be completed). These conceptual solutions will be presented as recommendations to the municipalities. It will be up to the individual municipality's discretion whether or not to implement the conceptual solutions to the problem areas. The municipality will also be responsible to acquire funding sources to implement the final solutions.

SubTask B.5 - Goals, Objectives, and Compilation of All Technical Standards
Stormwater problems will be restated as goals and objectives for the Act 167 planning process. The goals and objectives need to:

- Satisfy all regulatory requirements (including correcting water quality impairments related to stormwater or urbanization appearing in the EPA 303(b) and (d) lists, or impairments associated with approved TMDLs).
- Meet the purpose and policy of Act 167.
- Meet regulatory and permit requirements associated with the NPDES MS4 program.
- Meet local requirements and objectives established by the WPAC.

When restated as engineering performance standards for the PLAN, the goals and objectives become the basis for the standards and criteria for regulation and control of land development and activities that may affect stormwater.

The standards and criteria will provide a basis for the selection and application of analytical methodologies and BMPs for the implementation of stormwater controls.

The candidate stormwater management strategies that meet the identified goals and objectives (i.e. show how the proposed standards and criteria for the Final Report and Model Ordinance meet the goals and objectives set by the WPAC) will be prepared and presented to the WPAC.

The proposed standards and criteria need to address the following control requirements:

1. Apply to all areas covered by the PLAN.
2. Establish release rate percentages (if applicable) or other levels of control of runoff.
3. Specify design flood frequencies and computational methodologies for design of stormwater management measures.
4. Provide specifications for construction and maintenance of stormwater management systems (if applicable).
5. Provide conceptual solutions to both regional and local problems areas.
6. Summary and prioritization strategies for long-term potential solutions.
7. Identify funding sources for correction of existing problems related to infrastructure.
8. Maintain consistency with concurrent studies including a summary of what tasks will be completed so as to avoid duplication of effort.
9. Provide a fee schedule for: submissions of permit applications, review of permit applications, construction inspections, periodic inspections, and enforcement actions.
10. An implementation strategy, including funding, for retrofit measures, if necessary.

The recommendations will be presented in layman's language, keeping in mind that they are directed towards local municipalities and are to address solutions to stormwater management issues. The technical standards and criteria developed as a part of this task will apply to all areas covered by the PLAN.

Water quality BMP information will be presented including recommendations for the implementation of water quality BMPs for land development and activities to minimize stormwater impacts from land development and activities. This educational effort will primarily involve discussions, presentations, and handouts on BMP technology to municipal officials during regularly scheduled WPAC meetings. Information available from PADEP and other sources will be distributed.

Methods for controlling stormwater runoff quantity and quality will be evaluated and included in the Model Ordinance.

SubTask B.6 - Implementation of Technical Standards and Criteria

This subtask will involve the identification of the necessary ordinance provisions for each municipality. Included will be the modification of the Model Ordinance and/or recommendations for updating existing municipal ordinances, including but not limited to, subdivision and land development, zoning, erosion and sediment control, and building code ordinances to effectively implement the technical standards and criteria for stormwater management throughout McKean County. A design example will be provided to show how to incorporate the various aspects of the Model Ordinance into the stormwater management design process.

Anticipated Product

The product will be the charts, tables, figures, plates, and graphs needed to present the technical analysis including evaluation of both water quantity and water quality requirements. The product will also include modeling results, the technical interpretation of the modeling results, and the definition of the technical standards and criteria for use in the preparation of the PLAN. The product will also include the identification of necessary recommended municipal ordinance provisions to implement the technical standards, including a complete stormwater management Model Ordinance.

SubTask B.7 - Economic Analysis

This subtask will involve an economic analysis of implementing the technical standards and provisions of the PLAN. A design example will be created and estimated costs will be associated with the design example to demonstrate how implementation of the standards and provisions can be cost effective to developers.

Anticipated Product

The product will be the design example.

SubTask B.8 - Regulations for Activities Impacting Stormwater Runoff

This subtask will involve the research and development of standards and provisions regarding regulating activities that may impact stormwater runoff. These activities may include, but are not limited to: timber harvesting, oil & gas mining, and agriculture. The activities will only be regulated in regards to stormwater management controls and protecting water quality requirements to ensure the protection of health, safety, and property of the people and Waters of the Commonwealth.

Anticipated Product

The product will be a section in the Model Ordinance addressing activities that may impact stormwater runoff.

SubTask B.9 - Water Quality Impairments

This subtask involves the research and identification of water quality impairments throughout McKean County from the 303(b) and 303(d) lists and designated Total Maximum Daily Loads (TMDLs).

Anticipated Product

The product will be to identify how to protect the existing uses and for waters not attainting, how to improve the water quality to the designated use.

TASK C – Public/Municipal Participation

SubTask C.1 - Meetings

Coordination efforts and/or activities will continue throughout the duration of the project and will be organized to include the necessary meetings with the COUNTY, CONSULTANT, DEPARTMENT, and WPAC.

In addition to the WPAC, several meetings will focus on technical and legal issues. These meetings are to educate and solicit input and comment from the public, municipal governments (elected officials, engineers, and solicitors), and other interest groups such as watershed associations.

As previously indicated, the WPAC consists of representatives from each municipality in McKean County, as well as the Erie County Conservation District, and other interested groups. The WPAC meetings will be held to provide education on the planning process and to receive advice from the municipal officials to assure the PLAN fits the needs of the municipalities while soliciting valuable technical and institutional data and other information. The advisory role of the WPAC during the development of the PLAN is vital to the ultimate adoption and implementation process.

Two meetings of the WPAC will focus on the technical issues focusing on the municipal engineers from each municipality and any invited engineering, technical, or scientific individuals. The meetings will provide a technical forum to assist the COUNTY and CONSULTANT during the preparation of the technical portions of the PLAN by evaluating watershed modeling, water quality efforts, and the establishing of overall technical standards.

Another WPAC meeting will include the solicitors representing each municipality. This meeting will be convened to educate the municipal solicitors on the ordinance adoption and implementation requirements of the PLAN and to receive comments and direction in the finalization of the Model Ordinance.

A BMP Workshop for the municipalities and municipal engineers will be developed and conducted. The presentation of the workshop shall be based on *The Pennsylvania Stormwater Best Management Practices Manual*. The workshop will contain one or more examples showing the design and construction of BMPs, including design calculations, review procedures, and approval of permit applications.

The following describes proposed WPAC meetings and public hearing schedules including the purpose of each meeting:

Please note that WPAC #1 and WPAC #2 Meetings were held during Phase I.

Meeting	Purpose of Meeting	Meeting Schedule
WPAC 3	Review Phase I, discuss problem areas and obstructions from Questionnaire Form, present GIS maps and data, and review overall goals of Phase II.	Beginning of Phase II

WPAC 4 & WPAC-E	Review the project status, review technical aspects of the PLAN, including initial modeling runs, calibration efforts, and review of technical standards (Control Guidance 1 & 2). Purpose is to receive comments and direction in the development of the Model Ordinance.	Middle of Task B
WPAC 5 & WPAC-E	Present final technical modeling results, present technical standards and criteria; discuss water quality issues, and preliminary ordinance provisions for the municipalities. Review final modeling runs and present draft PLAN and address previous comments.	End of Task B
WPAC 7 & WPAC-L & Public Hearing & BMP Workshop	Present final draft and review municipal implementation procedures. Educate the municipal solicitors on the ordinance adoption and implementation requirements of the PLAN. Conduct the pubic hearing as required by Act 167 to present the final PLAN to the public. Educate municipalities on implementing stormwater quality through the BMP Workshop.	End of Phase II
Municipal Workshop	Municipal Implementation Workshop: Provide assistance to municipalities on implementation of the PLAN including adaptation, enactment, and implementation of the ordinances and other action items.	Within 3 months of DEP's approval of the PLAN
Public Workshop	Public Implementation Workshop: Provide introduction and overview of the PLAN to public.	Within 6 months of DEP's approval of the PLAN

This task will also involve the production and distribution of a meeting agenda and meeting minutes updating the WPAC members, municipal officials, interest groups and the public on the program, status, and issues of the PLAN. The agenda and minutes will be created for each meeting during Phase II.

Anticipated Product

The product will include correspondence and meeting notes/minutes from the individual committee meetings. In addition, the presentation materials prepared for the individual committee meetings will constitute a defined product of this subtask for the overall project.

TASK D - PLAN Preparation and Implementation

SubTask D.1 - Final Phase II Report Preparation

Components of the previous task and subtasks will be included, or at least referred to in the PLAN. In this way the PLAN shall contain such provisions as are reasonably necessary to manage stormwater such that storm runoff from land development or other activities in each municipality shall not adversely affect health, safety, property, and water quality. In addition, the PLAN shall consider and be consistent with other existing municipal, county, regional and state environmental and land use plans and local and state laws and regulations. The PLAN shall include the following:

- A description of the hydrologic characteristics of the subwatersheds; the existing and future land uses and their impacts on stormwater runoff and stormwater collection systems; the available runoff control techniques and their efficiencies in the subwatersheds; a list of significant obstructions; and available FEMA FIS floodplain information. The available floodplain information will either be included in the PLAN or their sources will be referenced.

- Based upon the results of the subwatershed modeling, the technical evaluation resulting in the criteria and standards governing the use of stormwater management controls throughout the subwatersheds. An important aspect of the technical components of the PLAN will be the delineation of subwatersheds with specific management strategies. This determination will be accomplished based upon an evaluation of any land development activities on critical drainage points throughout McKean County. Peak discharge tables will be compiled for the critical drainage points from the hydrologic model runs involved in the modeling effort. BMP tables and data on their effectiveness and applicability will be presented or referenced.

- The tables for the rainfall depths for various frequency durations which are computed as part of the hydrologic modeling.

- Approximate floodplain limits for areas where detailed FIS studies are available. Where detailed flood control engineering plans for proposed remedial measures are available from municipality, county, or private agencies, a summary analysis and evaluation of those plans will be included in the PLAN. Where detailed plans are not available, preliminary recommendations relating to such measures will be provided.

- Recommendations for solutions to the existing drainage problems will only be conceptual in nature indicating the type of approach needed and inter-municipal cooperation issues. Identification of sites for potential restoration and/or protection projects that would qualify for Pennsylvania's "Growing Greener" Funds will be identified.

- Recommendations for new drainage facilities to prevent future problems due to new land development and a discussion regarding inter-municipal arrangements for funding the projects will also be discussed.

- Priorities for Implementation. The conclusions and recommendations of the goals and objectives of the PLAN will be summarized. Recommended actions will be

listed according to agency, municipality, or individual responsible for each action. Priority of recommended actions will be based on chronological order, importance, hydrologic significance, or other factors as may be appropriate. This will include type and location of potential watershed projects that could be considered under Pennsylvania's "Growing Greener" grant program.

- PLAN Update. As a part of the implementation strategy for the PLAN, specific steps and/or procedures will be established for pursuing and completing the PLAN as required by Act 167. Specific circumstances will be identified and described in the PLAN document that will "trigger" a decision to update. For example, land development circumstances (such as major changes in the type and/or amount of proposed land development, and in excess of that which was assumed for the preparation of the original PLAN) will be identified as reasons for pursuing an update of the PLAN prior to the required 5-year time frame identified in Act 167.

  The preliminary outline for the PLAN is as follows:

Part I

Section I	-	Introduction
Section II	-	McKeanCounty Description
Section III	-	Significant Problem Areas and Obstructions
Section IV	-	Watershed Level Stormwater Management Planning
Section V	-	Technical Analysis
Section VI	-	Existing Municipal Regulations
Section VII	-	Economic Impact of Stormwater Management Standards
Section VII	-	Goals, Objectives, and Additional Recommendations
Section IX	-	PLAN Implementation and Update Procedures
Section X	-	References

Part II
Model Ordinance

Plates:
- Existing Land Use Basemap.
- Future (10-year) Land Use Basemap.
- Subwatersheds used for hydrologic analysis including information on applicable release rate management strategies.
- Hydrologic soil groups and development and floodplains.
- Stream obstructions, flooding, and problem areas.
- Areas where storm sewer networks exist (if available) and projected future storm sewer networks.

Anticipated Product
The product will be the final Phase II Report. The Phase II Report will be prepared in both digital and paper formats.

SubTask D.2 - Model Ordinance Preparation
A Model Ordinance which includes the provisions and standards developed during Phase II will be created consistent with the Department of Environmental Protection Pennsylvania Model Stormwater Management Ordinance. The WPAC will make a determination on whether drainage and construction standards will be included.

Anticipated Product
The product will be the final Model Ordinance. The Model Ordinance will be prepared in both digital and paper formats.

SubTask D.3 - PLAN Adoption
The PLAN will include the final Phase II Report and the Model Ordinance. One copy of the draft PLAN will be transmitted to the official agency and governing body of each involved municipality, each member of the WPAC, and the DEPARTMENT by official correspondence. The involved municipalities, WPAC, and DEPARTMENT will then review the draft PLAN. Their review will include an evaluation of the PLAN's consistency with other plans and programs affecting stormwater management. The reviews and comments will be submitted to the COUNTY by official correspondence. The review comments will be received, tabulated, and responded to appropriately and the draft PLAN will be revised accordingly.

Prior to final PLAN adoption, and as necessary, meetings will be held with each municipality individually as identified in WPAC meetings and municipal training schedule; to identify specific ordinance changes and method(s) of incorporation of the standards and criteria into municipalities' existing ordinance framework. In addition, the meeting(s) can also serve to provide clarification of any remaining questions or concerns that municipalities may have concerning the implementation of the PLAN.

The COUNTY will hold a public hearing concerning the PLAN. A notice for the public hearing will be published at least two (2) weeks before the hearing date. The public hearing notice will contain a brief summary of the principal provisions of the PLAN and a reference to the sites and/or website where copies of the PLAN may be examined or purchased at cost. The COUNTY will review the comments received at the public hearing and appropriate modifications in the PLAN will be made as applicable.

The McKean County Commissioners will vote by resolution on the adoption of the PLAN. The resolution will have to be carried by an affirmative vote of at least a majority of the Commissioners, and should refer expressly to the maps, charts, textual matter, and other materials intended to comprise the PLAN. Upon positive resolution, this action will then be recorded on the adopted PLAN.

The COUNTY will then submit to the DEPARTMENT a letter of transmittal, and three (3) copies of the adopted PLAN, along with a digital version and GIS data layers, the review by the official Planning agency and/or governing body of each municipality, McKean County Planning Commission, regional Planning agencies (Section 6(c) of Act 167), public hearing notice and minutes (Section 8(a) of Act 167), and the resolution of adoption of the PLAN by the COUNTY (Section 8(b) of Act 167). The letter of transmittal will state that the COUNTY has complied with all procedures outlined in Act 167 and will request DEPARTMENT to approve the adopted PLAN. The COUNTY will also submit to the DEPARTMENT a current list of all names, addresses, and phone numbers of the municipalities, municipal engineers, and solicitors located in McKean County. Subsequent to the DEPARTMENT's approval of PLAN, fifty (50) copies of PLAN will be printed and distributed.

As desired by the County, the adopted PLAN could be posted on the COUNTY's and/or CONSULTANT's websites.

All backup material including hydrologic and hydraulic analyses of the subwatersheds will be retained at the COUNTY office for future use during PLAN updates or any other reference.

Anticipated Product

The product of this subtask will include the official documentation regarding PLAN adoption and implementation process, including the necessary documentation from the COUNTY certifying the adoption of the PLAN, an adopted PLAN, and associated Plates.

The Plan will contain, at a minimum, the following items:

1. A survey of existing runoff characteristics in minor as well as large storms, including the impact of soils, slopes, vegetation, and existing development.
2. A survey of existing significant obstructions, their capacities, and associated storm return periods.
3. An assessment of projected and alternative land development patterns in McKean County, and the potential impact of runoff quantity, velocity, and quality.
4. An analysis of existing and future development in flood hazard areas, and its sensitivity to damages from future flooding or increased runoff.
5. A survey of existing drainage problems and proposed conceptual solutions.
6. A review of existing and proposed stormwater collection systems and their impacts.
7. An assessment of alternative runoff control techniques and their efficiency in the individual subwatershed.
8. An identification of existing and proposed local, State, and Federal flood control projects located in McKean County and their design capacities.
9. A designation of those areas to be served by stormwater collection and control facilities within a ten (10) year period, an estimate of the design capacity and costs of such facilities, a schedule and proposed methods of financing the development, construction and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities.
10. An identification of FIS delineated floodplains throughout McKean County.
11. Criteria and standards for the control of stormwater runoff from existing and future development which are necessary to minimize dangers to property and life and carry out the purposes of Act 167.
12. A BMP Workshop to inform engineers and local officials about enhanced water quality and groundwater recharge stormwater management techniques (information on BMPs is also to be included or referenced in the PLAN).
13. Priorities for implementation of conceptual solutions.
14. Provisions for periodically reviewing, revising, and updating the PLAN.
15. Provisions as are reasonably necessary to manage stormwater such that land development or activities in each municipality do not adversely affect health, safety, and property in other municipalities of McKean County and in drainage basins to which the watershed is tributary.
16. Consideration for consistency with other existing municipal, county, regional, and State environmental and land use plans.

APPENDIX D.
PHASE II COST PROPOSAL

Phase II Cost Proposal

The estimated cost associated with completing the Phase II work is Dollars ($.00) as per the following breakdown:

COST ESTIMATE BY TASK			
	TIME	**EXPENSES**	**TOTAL**
Task A – Data Collection/Review/Analysis			
Task B – Technical Analysis			
Task C – Public/Municipal Participation			
Task D – PLAN Preparation and Implementation			
Task E – Project Management & Administration			
PHASE II PROJECT TOTALS			

COST ESTIMATE BY FISCAL YEAR			
Fiscal Year			
2008-2009			
2009-2010			
2010-2011			
PHASE II PROJECT TOTALS			

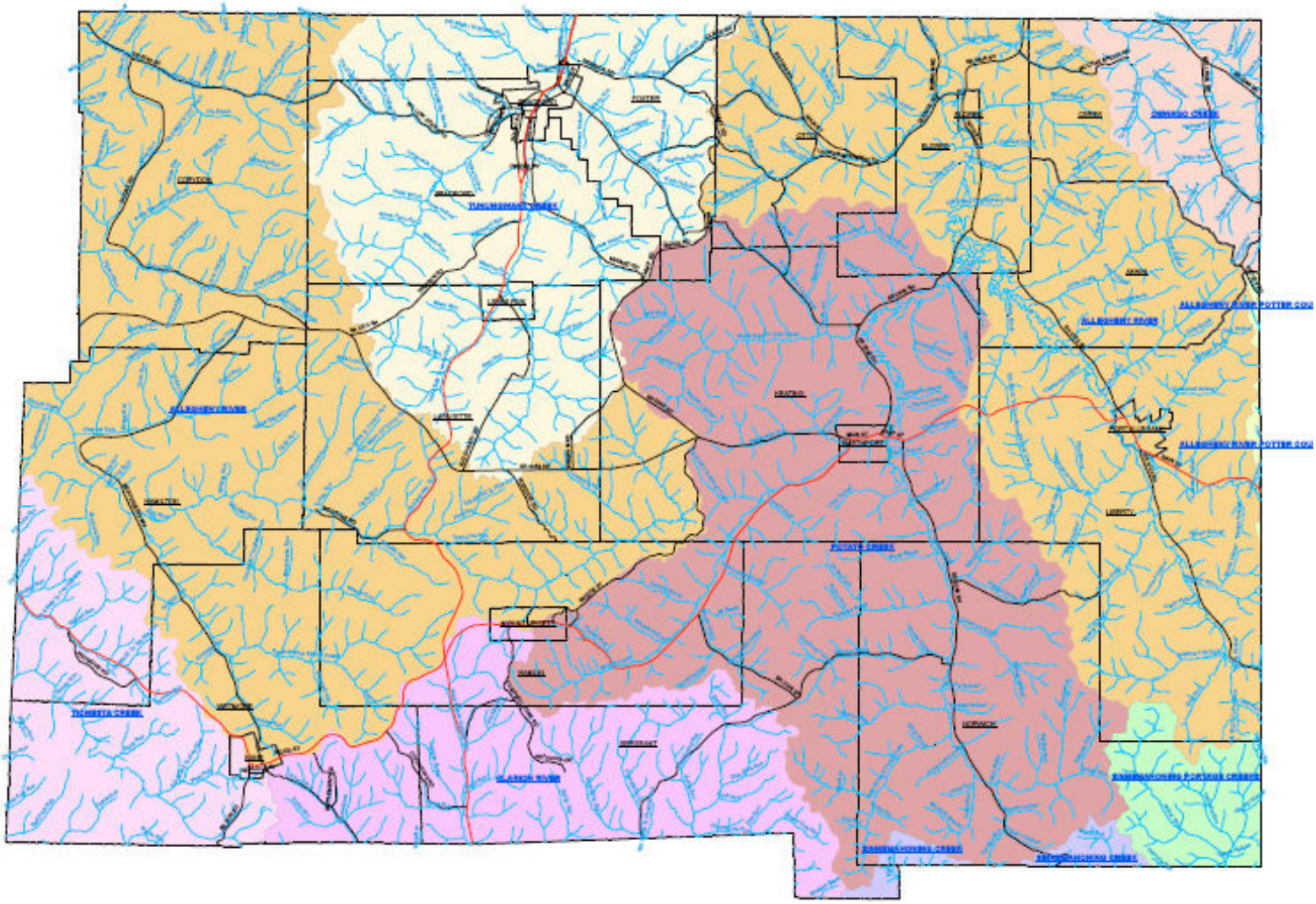
APPENDIX E.
PHASE II PROPOSED SCHEDULE

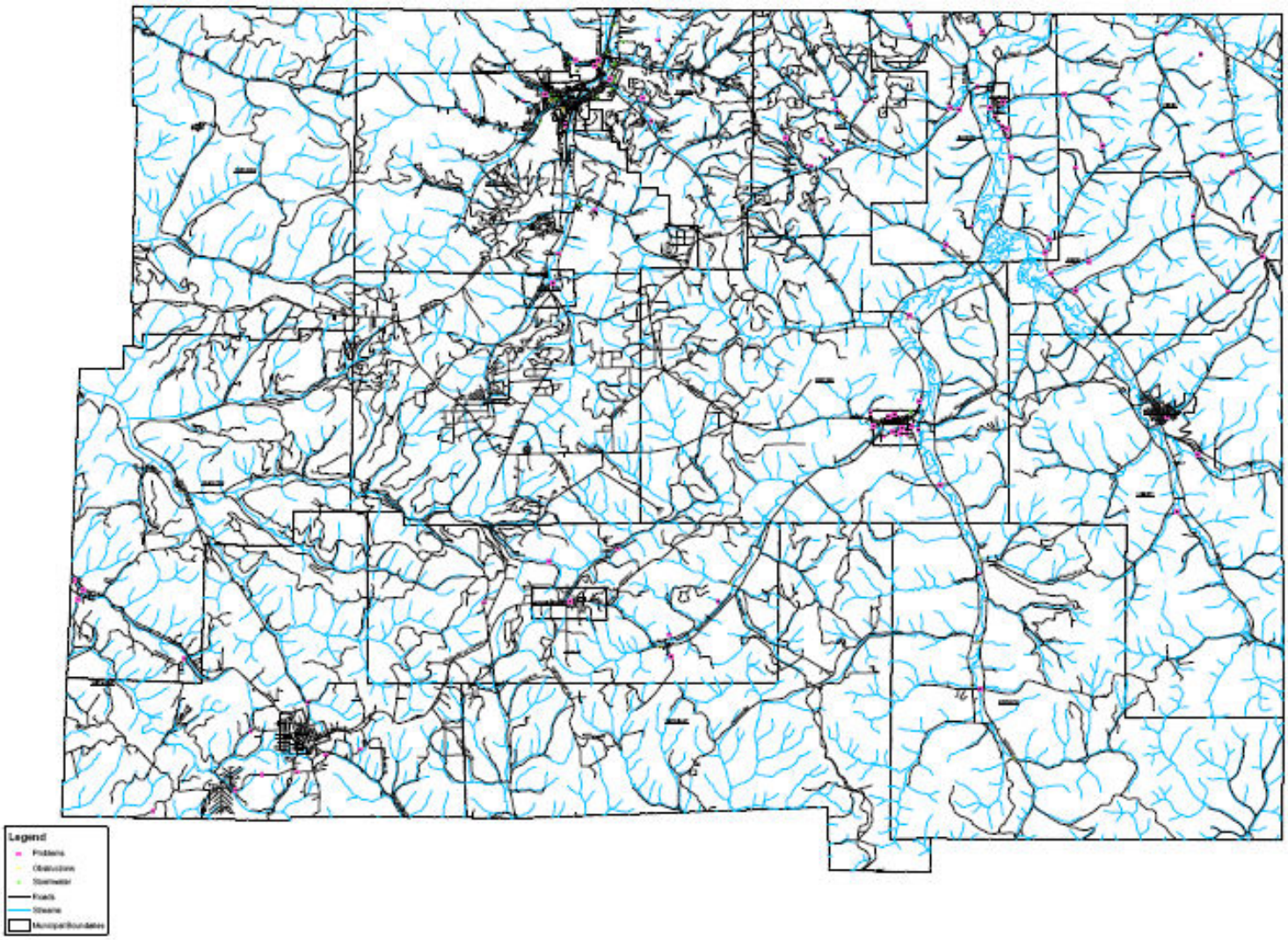
Phase II Proposed Schedule

The proposed Phase II Schedule is as follows:

ANTICIPATED DATE	MILESTONE
	PADEP and McKean County Phase II Contract Executed
	WPAC Meeting #3
	Field View of Problem Areas/Modeling
	Conceptual Solutions to Problem Areas
	WPAC Meeting #4 and WPAC-E
	Draft Phase II Report
	Draft Model Ordinance
	WPAC Meeting #5 and WPAC-E
	Finalize Phase II Report, Model Ordinance, and Plates
	WPAC Meeting #6, WPAC-L, and BMP Workshop
	Public Hearing
	Commissioners Approval of Phase II Plan
	Phase II Report Submission to PADEP
	PADEP and McKean County Phase II Contract Expiries

APPENDIX F.
MCKEAN COUNTY MAP




Legend
Problems
Obstructions
Stormwater
Roads
Streams
Municipal Boundaries

APPENDIX G.
MCKEAN COUNTY
DESIGNATED WATERSHEDS

CHAPTER 93 DESIGNATIONS

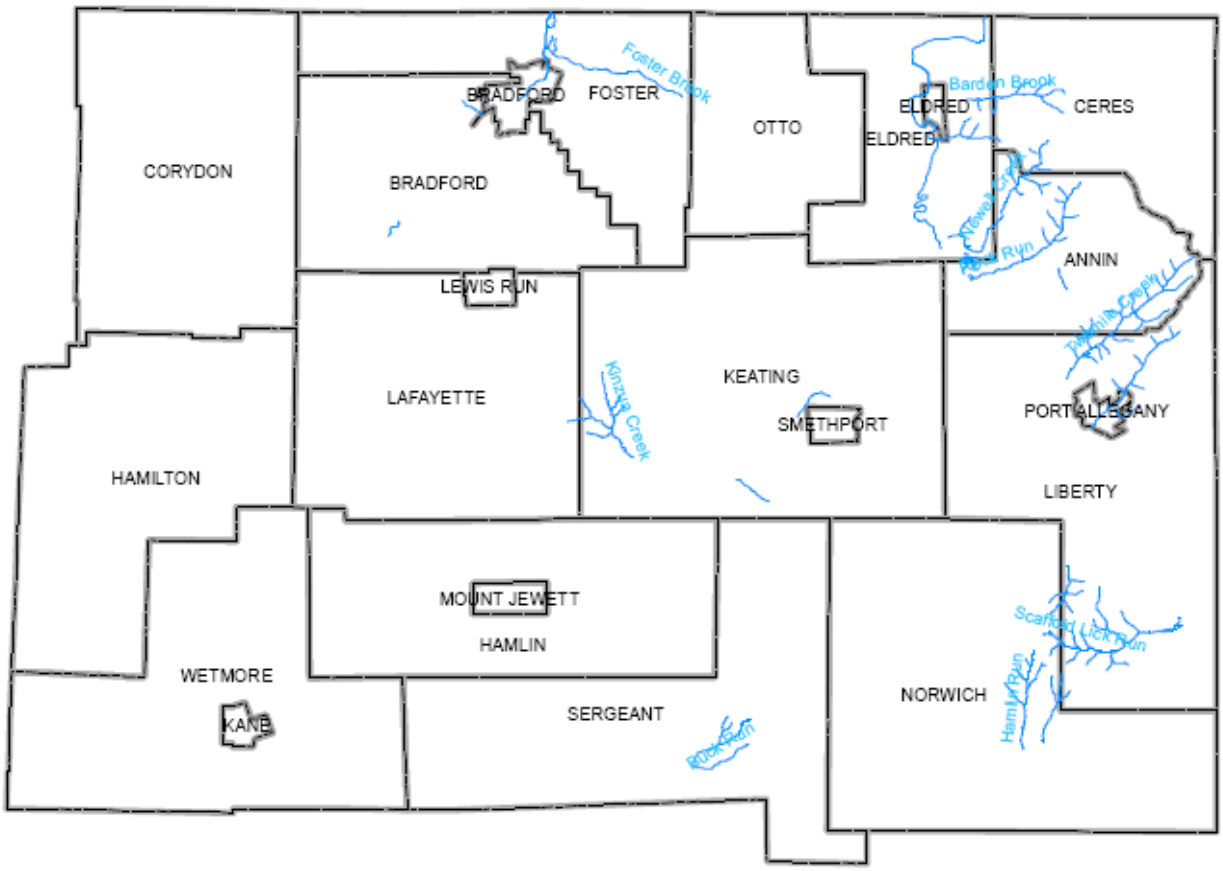
§ 93.9p. Drainage List P.	Ohio River Basin in Pennsylvania - Allegheny River	
Stream	**Zone**	**Water Uses Protected**
1—Ohio River		
2—Allegheny River	Main Stem, Source to PA-NY State Border	CWF
3—UNT to Allegheny River	Basins (all sections in PA), Source to PA-NY State Border	CWF
3—Sartwell Creek	Basin	CWF
4—UNT To Allegheny Portage Creek	Basins	CWF
3—Allegheny Portage Creek	Main Stem, Brown Hollow to Scaffold Lick Run	HQ-CWF
4—Indian Run	Basin	CWF
4—Heath Hollow	Basin	CWF
4—Fair Run	Basin	HQ-CWF
4—Rock Run	Basin	CWF
4—Scaffold Lick Run	Basin	CWF
3—Allegheny Portage Creek	Main Stem, Scaffold Lick Run to Mouth	TSF
4—Cady Hollow	Basin	CWF
4—Hamilton Run	Basin	CWF
4—Tramroad Hollow	Basin	CWF
4—Combs Creek	Basin	CWF
3—Lillibridge Creek	Basin	CWF
3—Skinner Creek	Basin	HQ-CWF
3—Twomile Creek	Basin	CWF
3—Annin Creek	Basin	CWF
3—Rock Run	Basin	CWF
3—Open Brook	Basin	CWF
3—Newell Creek	Basin	CWF
3—Potato Creek		
4—East Branch Potato Creek	Basins, Source to Confluence with Havens Run	HQ-CWF
4—Havens Run	Basin, Source to Confluence with East Branch	CWF
3—Potato Creek	Main Stem, Confluence of East Branch and Havens Run to Cole Creek	TSF
4—UNT to Potato Creek	Basins, Confluence of East Branch and Havens Run to Cole Creek	CWF
4—Indian Run	Basin	CWF
4—Frog Camp Hollow	Basin	CWF
4—Kimball Hollow	Basin	CWF
4—West Branch Potato Creek	Basin	HQ-CWF
4—Sackett Hollow	Basin	CWF
4—Brewer Run	Basin	HQ-CWF
4—Evans Hollow	Basin	CWF
4—Red Mill Brook	Main Stem	CWF
5—UNT to Red Mill Brook	Basins	CWF
5—Wernwag Hollow	Basin	HQ-CWF
5—Browns Mill Hollow	Basin	CWF
5—Combs Hollow	Basin	CWF
4—Colegrove Brook	Basin	HQ-CWF
4—Robbins Brook	Basin	HQ-CWF
4—Walcott Brook	Basin	CWF
4—Bayer Brook	Basin	HQ-CWF
4—Daly Brook	Basin	HQ-CWF
4—Marvin Creek	Main Stem	CWF
5—UNT to Marvin Creek	Basins	CWF
5—Sherman Run	Basin	HQ-CWF

5—Santeen Run	Basin	HQ-CWF
5—Wildcat Hollow	Basin	CWF
5—Warner Brook	Basin	HQ-CWF
5—Stanton Brook	Basin	HQ-CWF
5—Bloomster Hollow	Basin	CWF
5—Blacksmith Run	Basin from Source to Smethport Water Intake	HQ-CWF
5—Blacksmith Run	Basin From Smethport Water Intake to Mouth	CWF
4—Cole Creek	Basin, Source to South Branch Cole Creek	CWF
5—South Branch Cole Creek	Basin	EV
4—Cole Creek	Basin, South Branch Cole Creek to Mouth	CWF
3—Potato Creek	Main Stem, Cole Creek to Mouth	WWF
4—UNT to Potato Creek	Basins, Cole Creek to Mouth	CWF
4—Pierce Brook	Basin	CWF
3—Carpenter Creek	Basin	CWF
3—Canfield Creek	Basin	CWF
3—Barden Brook	Basin	CWF
3—Knapp Creek	Main Stem	CWF
4—UNT to Knapp Creek	Basins	CWF
4—Tram Hollow Run	Basin	CWF
4—Kansas Branch	Basin	CWF
4—South Branch Knapp Creek	Basin	CWF
3—Indian Creek (NY)		
4—UNT to Indian Creek	Basins (all sections in PA), Source to PA-NY State Border	CWF
3—Indian Creek	Main Stem, PA-NY State Border to Mouth	CWF
4—UNT to Indian Creek	Basins (all sections in PA), PA-NY State Border to Mouth	CWF
4—North Branch Indian Creek	Basin (all sections in PA)	CWF
3—Mix Creek	Basin (all sections in PA)	CWF
3—McCrea Run	Basin	CWF
3—Tunungwant Creek	Main Stem, Confluence of East and West Branches to NY	WWF
3—McCrea Run	Basin	CWF
2—Allegheny River (NY)		
3—UNT to Allegheny River	Basins (all sections in PA), NY State Border to Tunungwant Creek	CWF
3—Oswayo Creek	Main Stem, Honeoye Creek to PA-NY State Border	WWF
4—UNT to Oswayo Creek	Basins (all sections in PA), Honeoye Creek to NY	CWF
4—Janders Run	Basin	HQ-CWF
4—Horse Run	Basin (all sections in PA)	CWF
4—Bell Run	Main Stem	CWF
5—Unnamed Tributaries to Bell Run	Basins	CWF
5—Shaytown Branch	Basin	CWF
5—Chapman Brook	Basin	CWF
5—Taylor Brook	Basin	HQ-CWF
4—Kings Run	Basin	CWF
3—Oswayo Creek (NY)		
4—UNT Tributaries to Oswayo Creek	Basins (all sections in PA), PA-NY State Border to Mouth	CWF
3—Tunungwant Creek		
4—East Branch Tunungwant Creek	Basin, Source to Railroad Run	HQ-CWF
5—Railroad Run	Basin	EV
4—East Branch Tunungwant Creek	Basin, Railroad Run to T-331 Bridge	HQ-CWF
4—East Branch Tunungwant Creek	Main Stem, T-331 Bridge to SR 4002 Bridge	HQ-CWF
5—UNT to East Branch Tunungwant Creek	Basins, T-331 Bridge to SR 4002	CWF
5—Sheppard Run	Basin	CWF
5—Minard Run	Basin	EV
4—East Branch Tunungwant Creek	Basin, SR 4002 to Confluence with West Branch	CWF
4—West Branch Tunungwant Creek	Basin, Source to Marilla Brook	HQ-CWF
5—Marilla Brook	Basin, Above Bradford Water Dam	HQ-CWF

5—Marilla Brook	Main Stem, Bradford Water Dam to Mouth	CWF
6—UNT to Marilla Brook	Basins, Bradford Water Dam to Mouth	CWF
6—Gilbert Brook	Basin	HQ-CWF
4—West Branch Tunungwant Creek	Basin, Marilla Brook to Confluence with East Branch	CWF
3—Tunungwant Creek	Main Stem, Confluence of East and West Branches to NY	WWF
4—UNT to Tunungwant Creek	Basins (all sections in PA), East and West Branches to NY	CWF
4—Kendall Creek	Basin	WWF
4—Bolivar Run	Basin (all sections in PA)	CWF
4—Foster Brook	Basin (all sections in PA)	CWF
3—Tunungwant Creek (NY)		
4—UNT to Tunungwant Creek	Basins (all sections in PA) PA-NY State Border to Mouth	CWF

§ 93.9p. Drainage List Q.	**Ohio River Basin in Pennsylvania - Allegheny River**	
Stream	**Zone**	**Water Uses Protected**
1—Ohio River		
2—Allegheny River (NY)		
3—UNT to Allegheny River	Basins (all sections in PA), Tunungwant Creek to NY State Border	CWF
3—Quaker Run (NY)		
4—UNT to Quaker Run	Basins (all sections in PA)	HQ-CWF
4—Willis Creek	Basin (all sections in PA)	HQ-CWF
4—Coon Run	Basin (all sections in PA)	HQ-CWF
4—Yeager Brook	Basin (all sections in PA)	HQ-CWF
3—Wolf Run	Basin, (all sections in PA)	HQ-CWF
3—Kinzua Creek	Basin, Source to Wintergreen Run	CWF
4—Wintergreen Run	Basin	CWF
4—UNT to Kinzua Creek	Basins, Wintergreen Run to Mouth	HQ-CWF
4—Windfall Run	Basin	HQ-CWF
4—Camp Run	Basin	HQ-CWF
4—Turnup Run	Basin	HQ-CWF
4—Thundershower Run	Basin	HQ-CWF
4—Libby Run	Basin	HQ-CWF
4—Whiting Run	Basin	HQ-CWF
4—Markham Run	Basin	HQ-CWF
4—Meade Run	Basin	HQ-CWF
4—Little Meade Run	Basin	HQ-CWF
4—Root Run	Basin	HQ-CWF
4—South Branch Kinzua Creek	Main Stem	HQ-CWF
5—UNT to South Branch Kinzua Creek	Basins	HQ-CWF
5—Glad Run	Basin	HQ-CWF
5—Watermill Run	Basin	HQ-CWF
5—Hubert Run	Basin	CWF
4—Mud Lick Run	Basin	HQ-CWF
4—Chappel Fork	Main Stem	CWF
5—UNT to Chappel Fork	Basins	HQ-CWF
5—Buck Lick Run	Basin	HQ-CWF
5—Crary Run	Basin	HQ-CWF
5—White Gravel Creek	Basin	HQ-CWF
5—Bump Run	Basin	HQ-CWF
5—North Fork	Basin	HQ-CWF
5—Coon Run	Basin	HQ-CWF
5—Briggs Run	Basin	HQ-CWF
5—Hemlock Run	Basin	HQ-CWF
4—Morrison Run	Basin	HQ-CWF

4—Dutchman Run	Basin	HQ-CWF
§ 93.9p. Drainage List R.	**Ohio River Basin in Pennsylvania - Clairon River**	
Stream	**Zone**	**Water Uses Protected**
1—Ohio River		
2—Allegheny River		
3—Clarion River		
5—Windfall Run	Basin	CWF
5—Sicily Run	Basin	CWF
5—Buck Run	Basin	CWF
§ 93.9l. Drainage List L.	**Susquehanna River Basin in Pennsylvania – West Branch Susquehanna River**	
Stream	**Zone**	**Water Uses Protected**
5—Elk Fork	Basin, Source to Nichols Run	EV
5—North Creek	Basin	HQ-CWF
5—Sinnemahoning Portage Creek	Basin, Source to Cowley Run	EV



NAME	SOURCE CAUSE	Total (miles)
Allegheny River	Source Unknown - Metals	4.777
Barden Brook	Grazing Related Agric - Siltation ; Road Runoff - Siltation	1.110
Buck Run	Abandoned Mine Drainage - pH	0.703
Canfield Creek	Agriculture - Siltation	0.683
Dolly Brook	Grazing Related Agric - Siltation	0.437
EB Clarion River	Abandoned Mine Drainage - pH	0.126
Foster Brook	Small Residential Runoff - Nutrients ; Small Residential Runoff - Siltation ; Petroleum Activities - Nutrients ; Petroleum Activities - Siltation ; Road Runoff - Nutrients ; Road Runoff - Siltation ; Removal of Vegetation - Other Habitat Alterations	1.566
Gum Boot Run	Abandoned Mine Drainage - pH	0.742
Hamlin Run	Abandoned Mine Drainage - pH	1.176
Ice Pond Brook	Removal of Vegetation - Nutrients ; Removal of Vegetation - Siltation ; Golf Courses - Cause Unknown	0.470
Kinzua Creek	Abandoned Mine Drainage - Metals ; Natural Sources - Siltation ; Source Unknown - Cause Unknown	1.207
Lillibridge Creek	Grazing Related Agric - Siltation	1.438
Long Branch	Grazing Related Agric - Siltation	0.250
Newell Creek	Grazing Related Agric - Siltation ; Road Runoff - Siltation	1.729

Railroad Run	Abandoned Mine Drainage - pH	0.811
Rock Run	Grazing Related Agric - Siltation	1.836
Scaffold Lick Run	Abandoned Mine Drainage - pH ; Abandoned Mine Drainage - Organic Enrichment/Low D.O.	1.753
Tunungwant Creek	Industrial Point Source - Cause Unknown ; Channelization - Cause Unknown ; Removal of Vegetation - Cause Unknown	1.933
Twomile Creek	Grazing Related Agric - Siltation	1.894
WB Tunungwant Creek	Upstream Impoundment - Nutrients ; Other - Nutrients	0.232
Unnamed Trib	Petroleum Activities - Metals	0.254
Unnamed Trib	Abandoned Mine Drainage - pH ; Abandoned Mine Drainage - Organic Enrichment/Low D.O.	0.809
Unnamed Trib	Grazing Related Agric - Siltation	4.322
Unnamed Trib	Abandoned Mine Drainage - pH ; Abandoned Mine Drainage - Organic Enrichment/Low D.O.	2.290
Unnamed Trib	Abandoned Mine Drainage - pH	0.491
Unnamed Trib	Grazing Related Agric - Siltation ; Road Runoff - Siltation	2.312
Unnamed Trib	Road Runoff - Siltation	0.414
Unnamed Trib	Abandoned Mine Drainage - pH	1.594
Unnamed Trib	Road Runoff - Siltation	1.342
Unnamed Trib	Agriculture - Siltation	0.420
Unnamed Trib	Grazing Related Agric - Siltation ; Road Runoff - Siltation	1.030
Unnamed Trib	Abandoned Mine Drainage - Metals ; Natural Sources - Siltation ; Source Unknown - Cause Unknown	1.456
Unnamed Trib	Grazing Related Agric - Siltation	1.165
Unnamed Trib	Source Unknown - Nutrients ; Source Unknown - Siltation	0.430
Unnamed Trib	Small Residential Runoff - Nutrients ; Small Residential Runoff - Siltation ; Petroleum Activities - Nutrients ; Petroleum Activities - Siltation ; Road Runoff - Nutrients ; Road Runoff - Siltation ; Removal of Vegetation - Other Habitat Alterations	0.367
Unnamed Trib	Industrial Point Source - Cause Unknown ; Channelization - Cause Unknown ; Removal of Vegetation - Cause Unknown	0.325
	TOTAL	43.895