and the silt it carries affects stream water quality and reduces groundwater recharge. Uncontrolled in terms of quality and without requiring infiltration, stormwater runoff can lead to reduced stream flow when groundwater recharge and discharges to streams are inadequate. Left unaddressed, reduced groundwater recharge, given that groundwater accounts for more than two-thirds of annual stream flow, will result in a reduction in stream flow and water quality degradation. While sixteen of the 460 residents who responded to the Manchester and Oregon community surveys reported well contamination, there have been no reports of widespread or chronic contamination, the reported contamination being apparently temporary and related to discrete events such as flooding. Nevertheless, as development occurs, the Townships must stress the importance of groundwater quality protection.

Conservation and Protection

Methods available for local municipalities to conserve the groundwater supply and protect groundwater quality are well documented, and these methods have been successful in many areas of the Commonwealth. Details of available methods, the authority for action, and sources of assistance are detailed in *Groundwater Protection and Management in Pennsylvania*. The Report recommends the following five-step process to develop and put into place an effective groundwater protection program:

- Involve the community by organizing a committee of interested individuals from the community, and neighboring communities, if appropriate.

- Determine sources and uses of the community's water supply and define the proposed groundwater protection areas.

- Identify possible contamination sources-past, present, and future-in the groundwater protection areas.

- Establish goals and priorities based on an evaluation of the groundwater threats.

- Implement appropriate management measures, including plans for future needs.[5]

In addition to evaluating the applicability of the five-step formal planning process, other local municipal actions include:

- Zoning

  - Linking dwelling unit densities to the quality of the land by identifying environmentally sensitive areas as part of the development process.

  - Including standards for identification and protection of environmentally sensitive areas – recharge areas, floodplain, steep slopes, wetlands, riparian buffers, etc. – and update as necessary.

  - Providing incentives for conservation subdivision design where full development density is permitted, individual lot sizes are reduced, a certain percentage of open space is set aside, and sensitive natural areas are preserved.

  - Allowing planned residential development and transfer of development rights as a way to shift development away from sensitive environmental areas.

  - Requiring a hydrogeologic study for any proposed use which will withdraw large quantities of groundwater.

  - Requiring detailed water quality protection plans for any commercial or manufacturing use which have the potential for groundwater contamination.

- Sewage Enforcement

  - Continuing the strict enforcement of the on-lot sewage disposal program.

[5] *Groundwater Protection and Management in Pennsylvania, An Introductory Guide for Citizens and Local Officials*, League of Women Voters of Pennsylvania Citizen Education Fund and Water Resources Education Network Project, R. Merideth, J. R. Drohan, C. W. Abdalla, J. R. Jessen, E. D. Stevens, 2001, Third Edition., p. 13.

- Evaluating the benefit of an on-lot sewage system management program.

- Stormwater Management
  - Requiring stormwater infiltration as the option of choice to maximize groundwater recharge.
  - Addressing stormwater quality (nutrient and pollutant removal) along with quantity.

- Well Construction and Protection
  - Evaluating the need for a well siting and construction ordinances.
  - As a means of building a data base, requiring well drillers to submit copies of the state Water Well Completion Report which includes details about new wells – depth, depth to water bearing zones, static level, yield, and type of aquifer.
  - Requiring bacterial testing for all new wells with a report submitted to the municipality.
  - Sponsoring an annual well water testing program and compile and map the results.
  - Adopting well head protection standards that limit potential contaminating activities in zones around community wells.

- Agriculture
  - Encourage the use of best management practices to minimize contamination.

Land Use and Water Quality and Quantity

Surface water and groundwater quality and quantity can be affected by land use in the following ways:

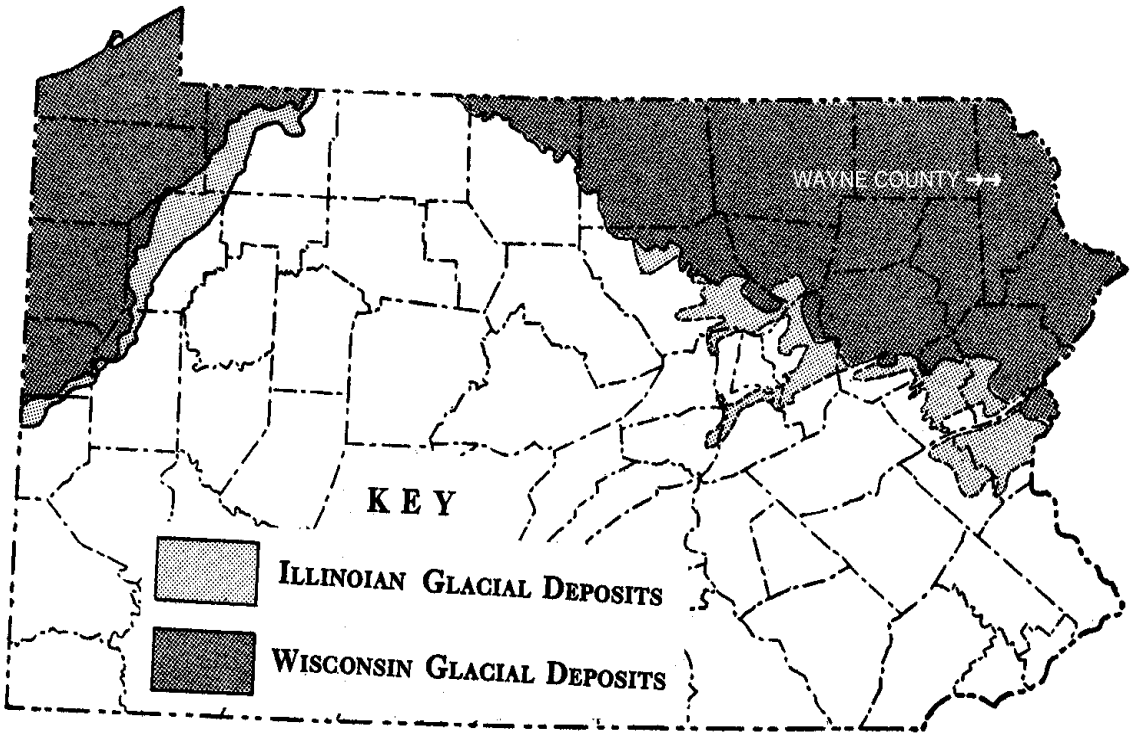
- Large amounts of sediment can enter streams from farms and construction sites, and pollutants can wash off lawns, parking lots, and industrial properties.
- Removing vegetation adjacent to streams (riparian buffers) can increase stream bank erosion, raise water temperature, and allow non-point source pollutants to enter the stream.
- Channelizing streams during development can result in stream bank erosion and increase flooding and siltation problems downstream.
- Solvents and other liquids associated with non-residential development can leak or be spilled onto the ground, and eventually reach the groundwater.
- Homeowners who dispose of toxic household cleaners, pesticides, oil and other similar products can cause surface water and groundwater contamination as well.
- Failing on-lot sewage disposal systems can allow partially treated sewage to reach surface or ground water.
- Groundwater recharge can be hindered as impervious surfaces increase with development.
- Stormwater systems that remove stormwater quickly from a site and direct it into nearby streams reduce the amount of precipitation that infiltrates the ground (and eventually the underlying aquifers) and increases stream bank erosion and downstream flooding.

Source: *Upper Hanover Township Comprehensive Plan*, 1994, Montgomery County Planning Commission.

Soil Formation

The geologic past of the ECWC Planning Area, especially glaciation, has defined the soils that would be formed, or in many cases, not formed. Variables in the formation of soils include climate (precipitation and temperature affecting weathering), biological activity and accumulation of organic material in the forming soil, the parent material (e.g., bedrock vs. glacial material) and formation and movement of clay minerals, topography (e.g., steep slopes vs. flood plain), and time. The most recent glacier to affect the Townships, called the, Wisconsin glacier, retreated about 12,000 to 14,000 years ago, after having formed some 70,000 years ago. (See Figure III-8, Glacial Deposits in Pennsylvania.)

The effect of the glaciers cannot be overemphasized. *Because of their great thickness, the pressure at the base of the ice sheets was very great. As the ice moved along with pieces of rock it had picked up, it scraped the soil off the bedrock, scoured and scratched the exposed rock, and pressed itself down into valleys, cutting them sometimes to great depths. The material picked up and carried or pushed along by the ice, later to be deposited as till or outwash, was moved in some cases for hundreds of miles. Rocks picked up in Canada were mixed with rocks picked up in New York*



Glacial Deposits in Pennsylvania

State and these in turn were mixed with rocks picked up in Pennsylvania. In deposits of glacial material in Pennsylvania, you will find many different kinds of rock and many types which do not occur in Pennsylvania. Igneous rocks, such as granite, that have come great distances, may be found. Pieces of copper ore, nickel ore, and even diamonds have been found in glacial deposits and none of these occur in the bedrock near where they were found in the glacial deposits. The ice, in moving south, overrode forests in some places and it is not unusual to find fossil wood mixed with the base of the till.[6]

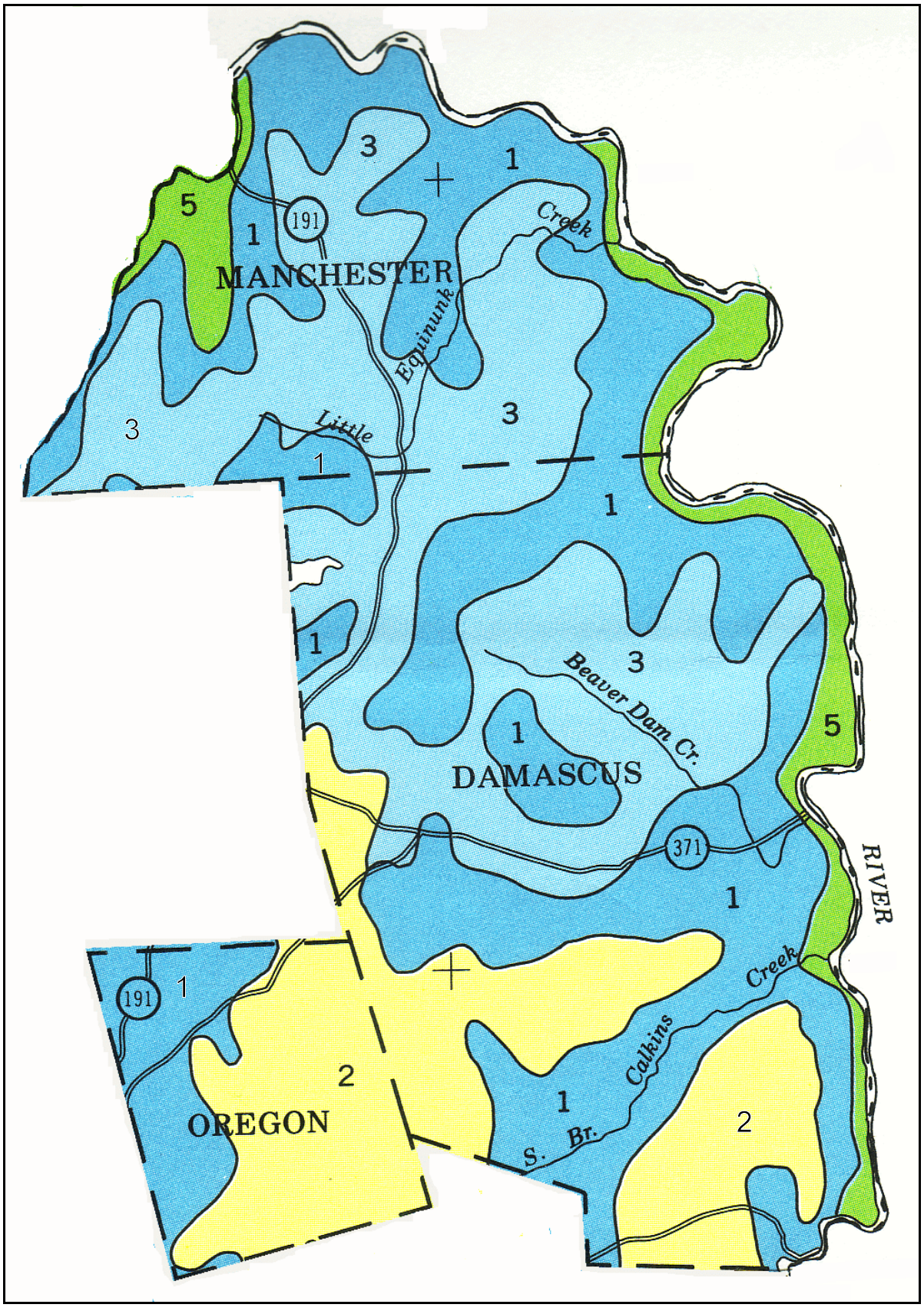
Soil Associations

Although this explanation is somewhat simplified, it is obvious that the formation of soil is a long-term, highly complex process. Given this complexity, it is understandable that a number of soil series (i.e., groups of soils formed from a particular parent material and exhibiting similar soil horizons) and many different soil types are found in the three Planning Area Townships. Four of the seven major soil associations identified in Wayne County are found in the Townships and are shown on *Soil Associations Figure,* and are described in the *Soil Association Table*.

Soil Suitability

Soil characteristics are one of the major determinants in the development process in rural areas like ECWC. Since on-lot disposal is the primary means of sewage disposal, careful, site-specific soils evaluations are essential in order to prevent possible groundwater contamination. The soils in the Planning Area have been evaluated by the U. S. Department of Agriculture, Natural Resources and Conservation Service (NRCS) for suitability for such uses as agriculture, community development, recreation, and sewage disposal, which is important to the Planning Area given the extent of agriculture and expected pressure for residential development. Soils which are most suitable for agriculture are also generally the most suitable for development. This detailed information is reported in the *Soil Survey of Wayne County, Pennsylvania*, which should be consulted for site specific information.

[6] *Pennsylvania and the Ice Age*, Commonwealth of Pennsylvania, 1962, p. 16.



Soil Associations

SOIL ASSOCIATIONS

Association 1 -- Oquaga-Wellsboro-Arnot Association (See Figure III-10, Typical Pattern of Oquaga-Wellsboro-Arnot)

- found on plateau areas that are dissected by streams
- formed in reddish glacial till
- shallow to deep, somewhat excessively to somewhat poorly drained
- sloping to steep soils on knobs and valley walls, some gently sloping areas on plateau tops
- most in woodland, potential ranges from high to low
- tree harvesting difficult due to steep slopes and extremely stony surface
- only used for farming in a few areas, too steep and stony for pasture or crop land
- development limited by steep slopes, stony surface, and shallow to moderate depth to bedrock, bedrock outcrops
- potential for wildlife habitat and recreation
- Oquaga - 30% of association, moderately deep and well drained
- Wellsboro - 20% of association, deep and moderately well drained and somewhat poorly drained
- Arnot - 15% of association, shallow, somewhat excessively drained to well drained
- 35% of association - Lordstown, Morris, Norwich, Wyoming on uplands

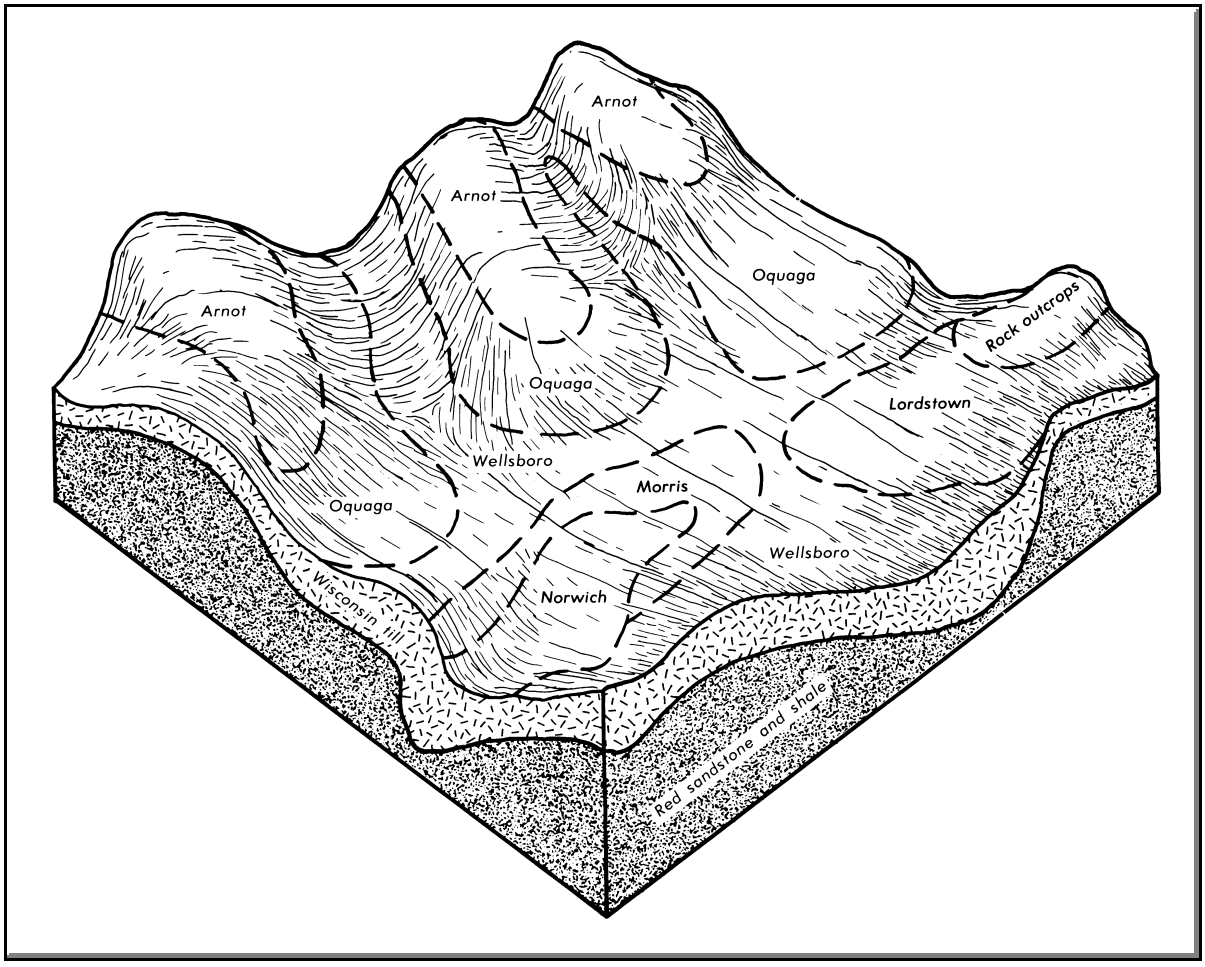
Association 2 -- Morris-Wellsboro

- found on broad plateaus dissected by drainage ways
- formed in reddish glacial till
- primarily nearly level and gently sloping, some steeper soils on side slopes
- much have been cleared of trees and stones for farming
- cleared areas have medium to high potential for crops and pasture, with seasonal high water table a limitation
- non-cleared areas have extremely stony surface
- moderately high and high potential for woodland
- development limited by seasonal high water table, slow and very slow permeability, and extremely stony surface in some areas
- Morris - 40% of association, deep, somewhat poorly drained, fragipan and seasonal high water table
- Wellsboro - 32% of association, deep, moderately well drained and somewhat poorly drained, fragipan and seasonal high water table
- 28% of association - Oquaga and Norwich on uplands, Basher and Holly on floodplain, Medihemists and Medifibrists in swamps

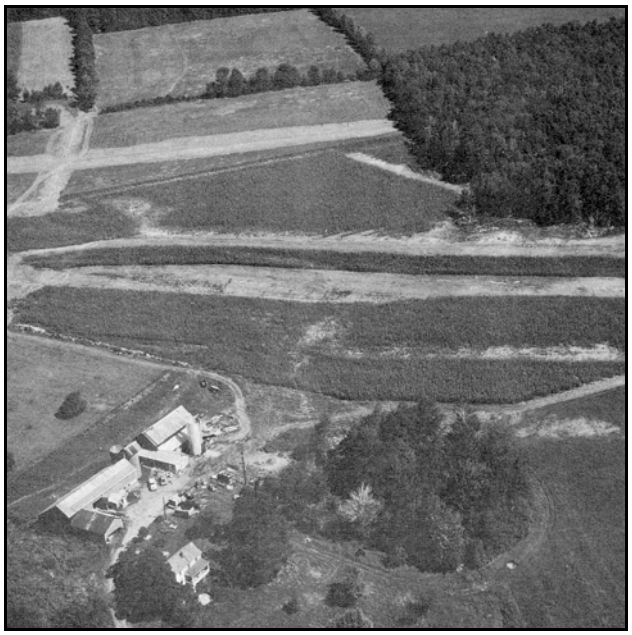
Association 3 – Wellsboro-Morris-Oquaga

- found on rounded hills and dissected plateaus
- formed in reddish glacial till
- nearly level to sloping soils on rounded hills, some steeper soils on side slopes
- small lakes common where the soils are more level
- about half woodland and half farmland
- in areas cleared of stones and trees, medium to high potential for crops and pasture, with seasonal high water table and moderate depth to bedrock limitations
- non-cleared areas have extremely stony surface
- moderately high and high potential for woodland
- development limited by moderate depth to bedrock, seasonal high water table, slow and very slow permeability, and extremely stony surface in some areas
- potential for wildlife habitat and recreation
- Wellsboro - 36% of association, deep, moderately well drained and somewhat poorly drained, fragipan and seasonal high water table
- Morris - 28% of association, deep, somewhat poorly drained, fragipan and seasonal high water table
- Oquaga - 18% of association, moderately deep, well drained
- 18% of association - Arnot, Norwich and Chippewa on uplands; Barbour and Basher on floodplain; Medihemists and Medifibrists in swamps

SOIL ASSOCIATIONS
Association 5 - Holly-Basher-Wyoming – found on floodplain and terraces adjacent to streams – formed in alluvium and glacial outwash – nearly level on floodplain and gently sloping and sloping on terraces – many areas are idle, some areas farmland, a few areas are wooded – floodplain soils which rarely flood have high potential for crops and pasture – terrace soils with low water availability have low to medium potential for crops and pasture – crop and woodland potential vary widely depending on drainage and available water capacity – development limited by high water table, moderately slow permeability, and flooding hazard – potential for wildlife habitat and recreation – Holly - 15% of association, deep, poorly and very poorly drained, high water table most of year – Basher - 12% of association, deep, moderately well and somewhat poorly drained, seasonal high water table – Wyoming - 10% of association, deep, somewhat excessively drained – 63% of association - Linden and Barbour on floodplain; Morris, Wellsboro, Norwich, Chippewa, and Rexford on uplands
Source: *Soil Survey of Wayne County Pennsylvania*, U.S. Department of Agriculture, 1985.



Typical Pattern of Oquaga-Wellsboro-Arnot (Source: *Soil Survey of Wayne County Pennsylvania*)



Typical Landscape in Morris-Wellsboro
(Source: *Soil survey Of Wayne County Pennsylvania)*

Soil and On-Lot Sewage Disposal

The Pennsylvania Department of Environmental Protection (DEP) has classified soils according to their on-lot sewage limitations in the following categories: none to slight, moderate, severe, and hazardous. Soils with no limitations are considered uniform, well-drained, sandy loam soils. Soils with slight limitations are also considered fairly uniform, well-drained to moderately well-drained soils of varying thickness, and generally well-suited for the use of standard methods of on-lot sewage disposal.

Those soils in the ECWC Planning Area considered to have moderate limitations generally have a fragipan layer at a depth below twenty inches, are moderately drained and possess a variable content of coarse rock fragments throughout. However, many soils with moderate limitations can be used for the alternate methods of on-lot sewage disposal. These soils are suitable for elevated sand mounds, sand-lined trenches and beds, shallow placement areas and spray irrigation systems.

Soils categorized as having severe limitations are generally moderately to poorly drained soils with a limiting zone at a depth of twenty inches or less, either a fragipan layer, a seasonal high water table or shallow bedrock, or which are located in swampy areas or in flood plain adjacent to streams. For these reasons, these soils would be unsuitable for conventional on-site sewage disposal systems, but may be suitable for alternative methods depending upon the soil profile and percolation rate.

The soils deemed as hazardous by DEP would be extremely well-drained, highly permeable soils with a large content of gravel, stones and boulders, which would allow the rapid infiltration of water, and, therefore, would not provide adequate treatment of infiltrating sewage effluent.

Site-specific field investigation by the sewage enforcement officer may identify more areas suitable for standard methods. In addition, the slightly to moderately suitable soils with limiting zones at depths of twenty inches or more may be suitable for alternate methods such as drip irrigation or spray irrigation as determined by field investigations. As more research is conducted on on-lot sewage disposal and new types of systems are permitted by DEP, these areas may become suitable for on-lot sewage which relies on soils. In short, the Planning Area contains many soils which can easily accommodate on-lot sewage disposal systems, and, thus, are available for development.

Agricultural Soil

In the *Soil Survey*, the NRCS has also classified soils into seven Capability Classes to generally show the suitability of soils for field crops, the risk of damage when cultivated, and the extent of management required. Class I soils are the most productive and have few limitations. Limitations and management requirements increase from Class II through Class IV soils, but these soils can be used productively for field crops. Some soils within Class I through IV may not be considered prime agricultural soils due to specific limitations such as slope. Class V through Class VII have severe limitations that should preclude cultivation and limit use to pasture, woodland or wildlife habitat.

Prime soils are the most productive for agriculture and have historically been used for crops, but are also generally the most suitable for development. The *Wayne County Agricultural Land Use/Land Cover Study* examined the change of agricultural land use and land cover in Wayne County from 1959 to 2002. As shown on the *Cropland on Prime Soil Table*, the *Study* found that more prime agricultural land reverted to pasture and brush than was converted to residential. Cropland on non-prime agricultural soil was reverted to pasture/brush and forest at a higher rate.

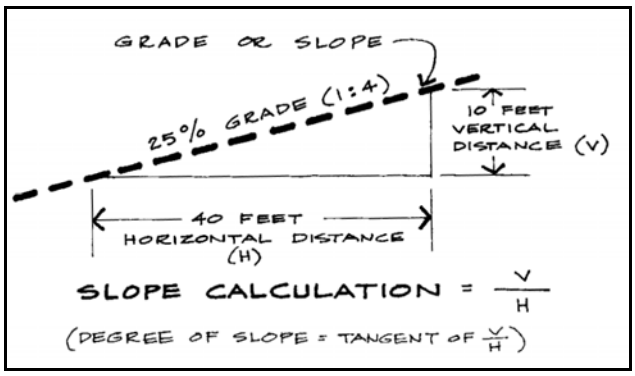
Prime Agricultural Lands
Prime agricultural lands have the soil qualities, are situated in an area with an adequate growing season, and have the moisture supply needed to economically sustain high yields of crops when treated and managed in accord with modern farming methods. Prime agricultural soils exhibit the following characteristics:

- adequate moisture supply
- a suitable soil temperature regime - a mean annual temperature higher than 32° F at a depth of 20 inches
- pH between 4.5 and 8.4 in all horizons within a depth of 40 inches (1 meter) or in the root zone if the root zone is less than 40 inches deep. This range of pH is favorable for growing a wide variety of crops without adding large amounts of supplements
- no water table or a water table that is maintained at a sufficient depth during the growing season
- lack excessive soluble salts that inhibit plant growth
- not flooded frequently during the growing season (less often than once in two years)
- do not have a serious erosion hazard
- a permeability rate of at least 0.06 inches per hour in the upper 20 inches
- less than 10 percent of the surface layer consists of rock fragments coarser than 3 inches

CROPLAND ON PRIME SOIL			
Acres			
Cropland on Prime Soil		1959-2002 Reverted to Pasture/Brush or Forest	1959-2002 Converted to Residential or Farmstead
1959	2002		
DAMASCUS			
3,057	2,365	433	245
MANCHESTER			
712	471	191	39
OREGON			
1,065	816	148	99
ECWC TOTAL			
4,834	3,652	772	383

Minerals
The primary minerals of importance extant in the Townships, and Wayne County as a whole, are crushed stone and dimensional stone produced from the underlying sandstone bedrock, sand and gravel from glacial surficial deposits, and shale. Two commercial mineral extraction operations are found in the Planning Area, with Bedrock Quarries in Damascus Township producing crushed stone and the Catskill Stone Quarry in Manchester Township which extracts bluestone and manufactures dimensional stone. The Catskill Formation sandstone, particularly given its quality for dimensional bluestone, has been mined extensively in other parts of the County and throughout the region and is a resource which holds substantial economic potential. For example, in Susquehanna County bluestone has become the primary economic activity, having surpassed agriculture. While there is currently no commercial sand and gravel operations in the Townships, there certainly is such potential as evidenced by the large operation located along Route 191 in Dyberry Township.

Slopes
Another land suitability feature which limits the use of soils in the Planning Area for agriculture, development and sewage disposal is slope. Slope is a measure of the vertical change in elevation over a given distance and is usually expressed as a percentage of the change



Slope Calculation

of elevation over a horizontal distance of one-hundred feet. For example, if the ground elevation rises fifteen feet over a horizontal distance of one-hundred feet, the slope is fifteen percent. (See the *Slope Calculation Figure for another example*.)

Given the geologic and physiographic character of the three Townships, many areas are precluded from agriculture and development by steep slopes. Steep slopes in the Planning Area are shown on the *Environmentally Constrained Lands Map* included with this *Plan*, and are found throughout the Townships on hill tops, and along drainage, stream corridors and the Delaware River.

Although, development on slopes in excess of fifteen percent is technically feasible, development costs increase dramatically as the slope increases, and the environmental concerns also escalate. For example, soil erosion control and stormwater management are more difficult on steep slopes because rainfall run-off volume and velocity increase. In addition, on-site, subsurface sewage disposal systems require special engineering design on slopes over eight percent and are entirely prohibited if the slope exceeds twelve percent. However, most of the Planning Area falls below the steep slope threshold, and steep slopes in the Townships are not significant in terms of limiting overall development to meet demand for new housing and commercial establishments.

Wetlands

Wetlands have in past times been considered wastelands, and, as a result, it is estimated that over half of all wetlands in the nation have been lost to development. In recent years the identification and protection of wetlands have surfaced as key elements of environmental protection. A wetland, as defined by the *Federal Manual For Identifying and Delineating Jurisdictional Wetlands* is any area which supports hydrophytic plants (adapted to growth in saturated soil), contains hydric soils (wet soils) or where water is present at or near the surface of the soil at some time during the growing season.

Three types of wetlands have been identified in Pennsylvania - emergent, scrub-shrub, and forested - which are classified according to vegetation type. Vegetation in emergent wetlands includes freestanding, non-woody plants such as cattails, reed canary grass, and rushes. Scrub-shrub wetlands are characterized by woody plants less than twenty feet in height. The presence of trees such as red maple, hemlock, yellow and river birch, pin oak and ash over twenty feet tall, indicate a forested wetland. Standing water, or even saturated soil, need not be present to qualify an area as a wetland.

Site specific investigations must be conducted by trained individuals to accurately delineate wetlands. Given the national interest in wetland conservation, and the overlapping jurisdiction of federal and state agencies (U.S. Army Corps of Engineers, Environmental Protection Agency, U.S. Fish and Wildlife Service, and the Pennsylvania Department of Environmental Protection) wetland delineation and protection has evolved into a complex regulatory process.

The National Wetlands Inventory (NWI) Maps, published by the U.S. Fish and Wildlife Service, are the best tools for the preliminary identification of wetlands. Wetlands are superimposed over USGS 1:24,000 scale topographic maps and are identified and classified based on vegetation, visible hydrology, and geography. The accuracy of the maps is described as being at the ninety-five percent confidence level, but local experience indicates that the maps are not accurate for detailed site planning and site specific investigations are necessary for a final wetlands determination. In addition to the NWI maps, hydric soils descriptions found in the *Wayne County Soil Survey* provide a good indication of wetland locations in the Townships.

ECWC contains a significant number of wetlands, which are shown on the *Environmentally Constrained Lands Map* included with this *Plan*. Wetlands in the ECWC Planning Area have been identified with three ecological systems: lucastrine (associated with lakes), palustrine (upland), and riverine (associated with

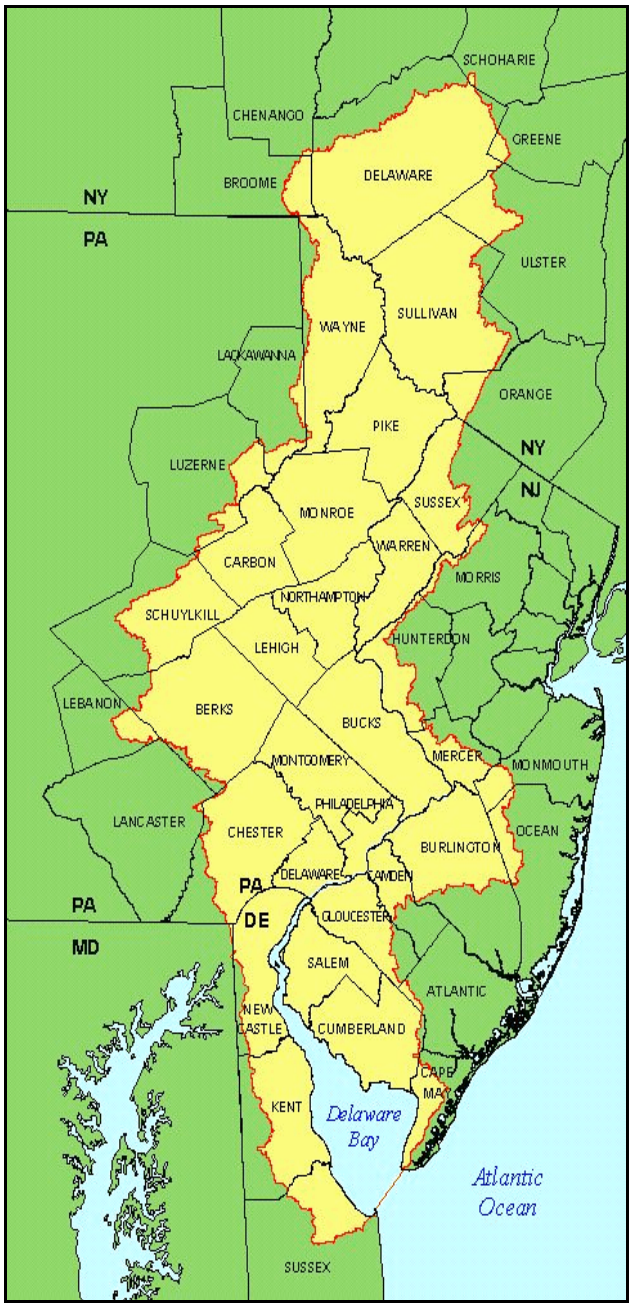
rivers or streams) wetlands. All three typical Pennsylvania upland wetland types, emergent, scrub-shrub and forested, have been identified in the Planning Area.

Although the extent of wetland areas in the Townships does not approach the proportion found in many other areas of Wayne County and Pennsylvania, the environmental value of wetlands in the three Townships is substantial. In any case, the presence of wetlands will not limit the overall development of the Townships. However, the development which does occur must provide for the conservation of wetlands which are an integral part of the environment and provide such benefits as groundwater recharge, stormwater control, surface water quality improvement and wildlife habitat.

Surface Waters

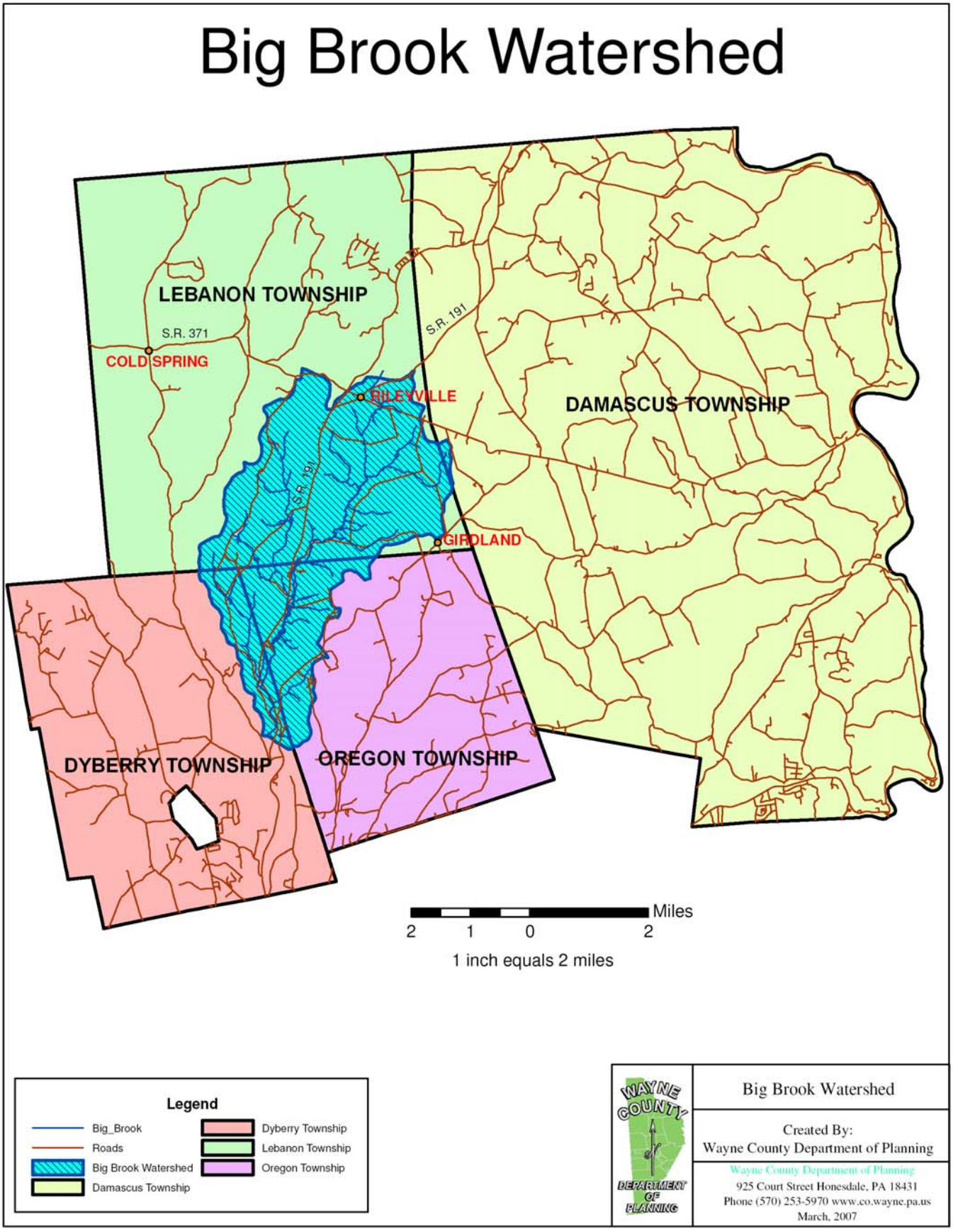
The ECWC Planning Area lies in the Delaware River Watershed with the Delaware flowing to the Delaware Bay and Atlantic Ocean. A number of sub-watersheds drain the ECWC Planning Area. Most of Oregon Township drains to the Lackawaxen River Watershed via Carly Brook, Holbert Creek and Big Brook which flows into Dyberry Creek. Other sub-watersheds include the Equinunk, Little Equinunk and Cooley Creeks in Manchester Township, and Hollister, Schoolhouse, Beaver Dam, Sunny Brook and Calkins Creeks in Damascus Township, along with numerous small tributaries draining directly to the Delaware River. The Planning Area also contains numerous ponds and lakes.

Surface water quality in the Planning Area is good with no stream segments in the three Townships considered degraded by the Pennsylvania Department of Environmental Protection. The Pennsylvania Department of Environmental Protection has developed water quality standards for all surface waters in the Commonwealth. These standards, which are designed to safeguard the streams, rivers, and lakes throughout Pennsylvania, include water quality designations and associated water quality regulations necessary to protect the water bodies and their use for water supplies and recreation. Special protection is provided for streams designated as *high quality waters* or *exceptional value waters*. Wastewater treatment plant effluent and any other discharges to streams classified as *high quality* are only permitted by DEP if the discharge is the result of necessary social and economic development, water quality standards are



Delaware River Watershed

maintained, and all existing stream uses are protected. This has the effect of requiring all wastewater treatment plants to provide tertiary treatment to meet discharge criteria. Any stream classified by DEP as *exceptional value waters* must be maintained at existing quality and may not be degraded, thereby precluding any wastewater discharge to the stream. Big Brook which drains the northwest section of Oregon Township and a small part of Damascus Township was recently designated *exceptional value* with no other streams in the Townships so classified.


Big Brook Watershed
LEBANON TOWNSHIP
S.R. 371
COLD SPRING
S.R. 191
RILEYVILLE
DAMASCUS TOWNSHIP
S.R. 191
GIRDLAND
DYBERRY TOWNSHIP
OREGON TOWNSHIP
Miles
2 1 0 2
1 inch equals 2 miles
Legend
Big_Brook
Roads
Big Brook Watershed
Damascus Township
Dyberry Township
Lebanon Township
Oregon Township
WAYNE COUNTY
DEPARTMENT OF PLANNING
Big Brook Watershed
Created By:
Wayne County Department of Planning
Wayne County Department of Planning
925 Court Street Honesdale, PA 18431
Phone (570) 253-5970 www.co.wayne.pa.us
March, 2007

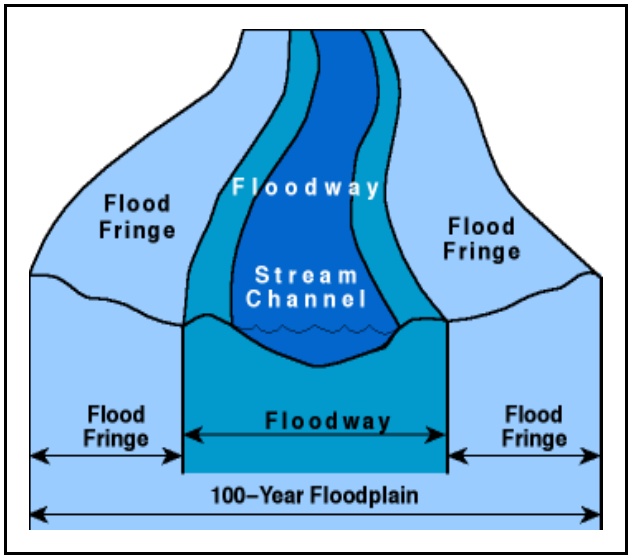
All other streams are designated as *high quality*. The Delaware River is classified as a *cold water fishery/migratory fishery* and DEP regulations prohibit any discharge which would impair the designated fishery uses. The Delaware River Basin Commission, with the inclusion of the Upper Delaware as part of *Special Protection Waters*, also has the authority to review and permit certain larger scale projects.

In order to protect water quality in the Planning Area development must be carefully managed. The balance between good water quality and future growth and development will require meticulous consideration to weigh the impact on water quality against the need for economic growth, and the added expense for water quality protection technology against the need to protect water quality. DEP plays the critical role in this effort by setting water quality standards, but the Townships already participate via the on-lot sewage enforcement program and can take other steps to protect water quality. For example, zoning can be used to establish stream buffers and stormwater standards can be included in the subdivision and land development ordinance or a special purpose ordinance.

Floodplain

During the period of early settlement and later development of most regions, waterways played a key role as transportation routes and later as a source of power for operating grain mills, sawmills, and other industries. In addition, the land located along streams and rivers was conducive to development - soils are generally fertile for agriculture and the terrain relatively level, facilitating the construction of roads and buildings. Those stream-side areas often developed into settlements and then expanded as the population grew. However, an often unanticipated problem with river/stream valley settlement is flooding. As development continued and natural drainage patterns were altered, increases in stormwater run-off heightened the potential for flooding and property damage. Both the state and federal government now administer programs for flood control and flood plain development and provide certain regulatory standards which local municipalities must adopt in order for property owners to be eligible for flood insurance.

Blessed with many miles of streams, ECWC has, when compared with other municipalities, relatively few areas where flooding is a significant threat to large numbers of improved properties. (As compared to, for example, urban communities along the Susquehanna River in Lackawanna and Luzerne Counties.) Nevertheless, this does not diminish the potential of damage and actual damage that has occurred in the floodprone areas of the three Townships. The broadest floodplain is found along the Delaware River with some lesser areas along the larger streams.



Floodplain Cross Section

Flora and Fauna

ECWC's extensive woodlands, active and reverting agricultural land, wetlands and other open spaces provide a broad range of habitat for vegetation and wildlife. The diversity of these habitats and the wetland and aquatic ecosystems give the three Townships a unique blend of natural areas and fragile ecosystems where an abundant population of wildlife and mix of vegetation typical to eastern Pennsylvania thrive. Township efforts to preserve open space and protect floodplains and wetlands will also serve to maintain wildlife habitats.