

NATURAL RESOURCES PROTECTION PLAN

INTRODUCTION

Overview

Franklin Township’s natural landscape is comprised of agricultural land, orchards and forest land interspersed with increasing numbers of residences and limited small commercial establishments. This landscape gives the Township its distinctive character and has been an integral part of its unique history attracting its early farming settlers and later residents who work primarily in nearby urban areas. The Township has long been blessed with an abundance of natural resources - agricultural soils, clean water, forests, and wildlife - providing a high quality of life for many years.

Although the farm land and forest land is extensive, the natural resources and environmental quality of the Township are very fragile. Clean plentiful water, pure air, open space, vegetation and wildlife can be irreparably damaged by development undertaken without concern for the natural environment and careful planning and land use control. As the area continues to grow, it is incumbent upon the Township to work to preserve the health, safety, and welfare of its residents, as well as the identity and heritage of the community. Natural resource protection is a necessary step in accomplishing this task.

The Plan

Protection of natural resources is an important issue as expressed by Township residents. The *Natural Resource Protection Plan* addresses concerns related to land and water resources. It is intended to introduce contemporary conservation and management practices to derive the maximum benefit for the health and safety of Township residents and visitors.

NATURAL RESOURCES GOAL AND OBJECTIVES

Natural Resources Goal:

Conserve natural resources and open space and use the resources in a way to sustain the area’s economy, including maintaining agriculture and forestry as an integral part of the local landscape and economy.

Without careful planning and management, the use of the natural resources and sensitive environmental areas in the Township can lead to the decline of community character and the quality lifestyle it affords, with eventual direct threats to the environment and public health and safety. Of special concern are lakes, streams, ground water, forest and soil resources. If the quality of the area’s natural resources are diminished, the quality of life and the local economy will suffer.

The purpose of conservation: *The greatest good to the greatest number of people for the longest time.*
- Gifford Pinchot

I recognize the right and duty of this generation to develop and use our natural resources, but I do not recognize the right to waste them, or to rob by wasteful use, the generations that come after us.
- Theodore Roosevelt

If we learn, finally, that what we need to “manage” is not the land so much as ourselves in the land, we will have turned the history of American land-use on its head.
- Gaylord Nelson, Founder of Earth Day

OBJECTIVES:

- Agriculture and Forestry** **Promote the long term sustainability of agriculture and forestry.**
- Include soil erosion and sedimentation and stormwater control provisions in the Township zoning ordinance and subdivision and land development ordinance.
 - Encourage landowners to use agricultural best management practices and use the technical service available from the Luzerne County Conservation District, the Pennsylvania Bureau of Forestry and USDA Natural Resources Conservation Service.
 - Encourage landowners to participate in the *Agricultural Security Program*, and the *Agricultural Preservation Program* for purchase of easements being developed by Luzerne County.
 - Encourage the use of *Act 319 Clean and Green* and other tax incentive programs as a means of forestalling development.
 - Do not overly restrict agriculture and forestry enterprises with unnecessary zoning and other regulations.
 - Evaluate more progressive means of open land preservation aimed at agricultural land preservation including agriculture protection zoning, conservation subdivision design, purchase of easements, and transfer of development rights, especially in cooperation with conservancy and land trust organizations.
 - Economic Development - Encourage local economic development groups to make the use of local agriculture and forest products an integral part of all promotion efforts.
- Conservation and Sensitive Natural Areas** **Conserve open land, including those areas containing unique and sensitive natural features such as woodlands, steep slopes, streams, flood plains and wetlands, by setting them aside from development.**
- Identification Identify sensitive natural areas such as wetlands, groundwater recharge areas, woodlands, steep slopes, poor soils and flood plains, and adopt regulations to protect such areas by requiring resource sensitive development.
 - Critical Resource Areas - Promote the conservation of open space within the Township and the County and actively promote the long-term preservation and maintenance of valuable natural resource areas through public negotiated acquisition, private dedication of easements, and other cooperative efforts.
 - Land Use Ordinances - Evaluate and develop land use ordinances in terms of effects on natural resources with the goal of maintaining open space to the greatest extent possible while allowing a reasonable density of development.
 - Development Incentives - Implement adopted municipal policies to conserve a variety of irreplaceable and environmentally sensitive resource lands, including provisions for reasonable incentives to create a greenway and trail system for the benefit of present and future residents.

- Conservation Design - Use *conservation subdivision design* to cluster residential development away from important natural, historic, scenic and cultural features, and preserve the resulting open space.
- Transferrable Development Rights - Use transferrable development rights to direct development to locations with adequate infrastructure and enable conservation-minded landowners to preserve their properties.
- Area Wide Cooperation - Coordinate environmental preservation efforts with neighboring jurisdictions, and establish an action plan targeting environmental concerns that require a regional approach.

**Water Supply/Quality;
Surface Water Quality**

Protect the supply and quality of drinking water and protect surface water quality.

- E & S Control - Reduce erosion and sedimentation by requiring compliance with DEP regulations
- Stormwater - Adopt an up to date stormwater ordinance to control runoff through the use of best management practices.
- Water Quality - Consider the impacts of residential and nonresidential development on water quantity and quality and encourage the use of best management practices.
- Sewage Disposal - Monitor the effectiveness of on-lot sewage disposal systems and evaluate central sewage disposal as a means of correcting any widespread problems.
- Buffers - Establish setbacks/buffers for streams, lakes and wetlands.
- Well Ordinance - Apply well construction standards with a well ordinance in areas not served by community water supply.
- Community Water Supplies - Apply well head protection standards to maintain good drinking water quality.

Wildlife Habitat

Protect critical wildlife habitat areas.

- Luzerne County Natural Areas Inventory - Protect sites of rare, threatened, and endangered species as identified in the Luzerne County Natural Areas Inventory.
- Forest - Conserve large forested areas that provide habitat.
- Corridors - Protect wildlife corridors, consisting of networked open space areas and stream corridors.

Ridge Lines/Scenic View

Conserve ridge lines and scenic view sheds.

- Development Standards - Consider measures that will preserve the characteristics of important ridge lines and scenic view sheds by limiting the amount and type of clearing associated with development and controlling the location of buildings.

EXISTING CONDITIONS

Overview

The discussion of existing conditions provides an inventory of the Township's natural features, issues related to their current state, and protections afforded by the Township and other regulatory agencies. The inventory includes physiography, topography, and geology; soils; forest and vegetative cover; watersheds, streams and lakes; wetlands; floodplain; and critical habitat. The assessment of existing conditions forms the basis of future planning policy recommendations and implementation strategies. The various elements of the natural environment must be conserved because the environment has a finite, limited capacity for development. And, given the interrelationship of all elements of the environment, a change in one element will result in an often unexpected effect on another element.

Physiography and Topography

The natural features of Franklin Township are a direct result of its geological past. Bedrock geology and glacial geology are key factors affecting the natural environment and development pattern of Franklin Township by providing the base for the formation of soils. Franklin Township lies in the Appalachian Plateaus Province, one of the major physiographic divisions of the Commonwealth. See the *Physiographic Provinces of Pennsylvania Figure* on the following page.¹ More specifically, Franklin Township is part of the Glaciated Low Plateau Section which *includes an area of diversified topography in northeastern Pennsylvania. The topography consists of rounded hills and broad to narrow valleys all of which have been modified by glacial erosion and deposition. Swamps and peat bogs are common in the eastern part of the Section. The Section reflects the interplay between bedrock of various types, mainly sandstones and siltstones, and glacial erosion and deposition. The more erosion-resistant rocks form the hills, while the less erosion-resistant rocks occur in the valleys. Glacial deposits, mainly glacial till or sand and gravel, may occur anywhere, but are found mainly in the valley bottoms and margins.*²

Franklin Township's topography can be characterized as rolling with significant elevation changes from the tops of ridges to the stream valleys. Elevations in the Township range from 1,500 feet on the hilltops at the western tip and in the southern section of the Township, up to 1,000 feet on other hilltops, down to 850 feet where Sutton Creek flows into Exeter Township (Luzerne County).

Planning Implications: Steep Slopes

Most of the Township falls below the steep slope threshold, so steep slopes are not significant in terms of limiting overall development. Nevertheless, disturbance of steep slopes and vegetation alters topography and drainage, contributes to slope instability and erosion, and the increased stormwater runoff diminishes groundwater recharge and exacerbates flooding, so development on steep slopes should be regulated. Although development on steep slopes 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. Measures are needed to maintain slope stability, prevent erosion, and ensure a safe and adequate groundwater supply

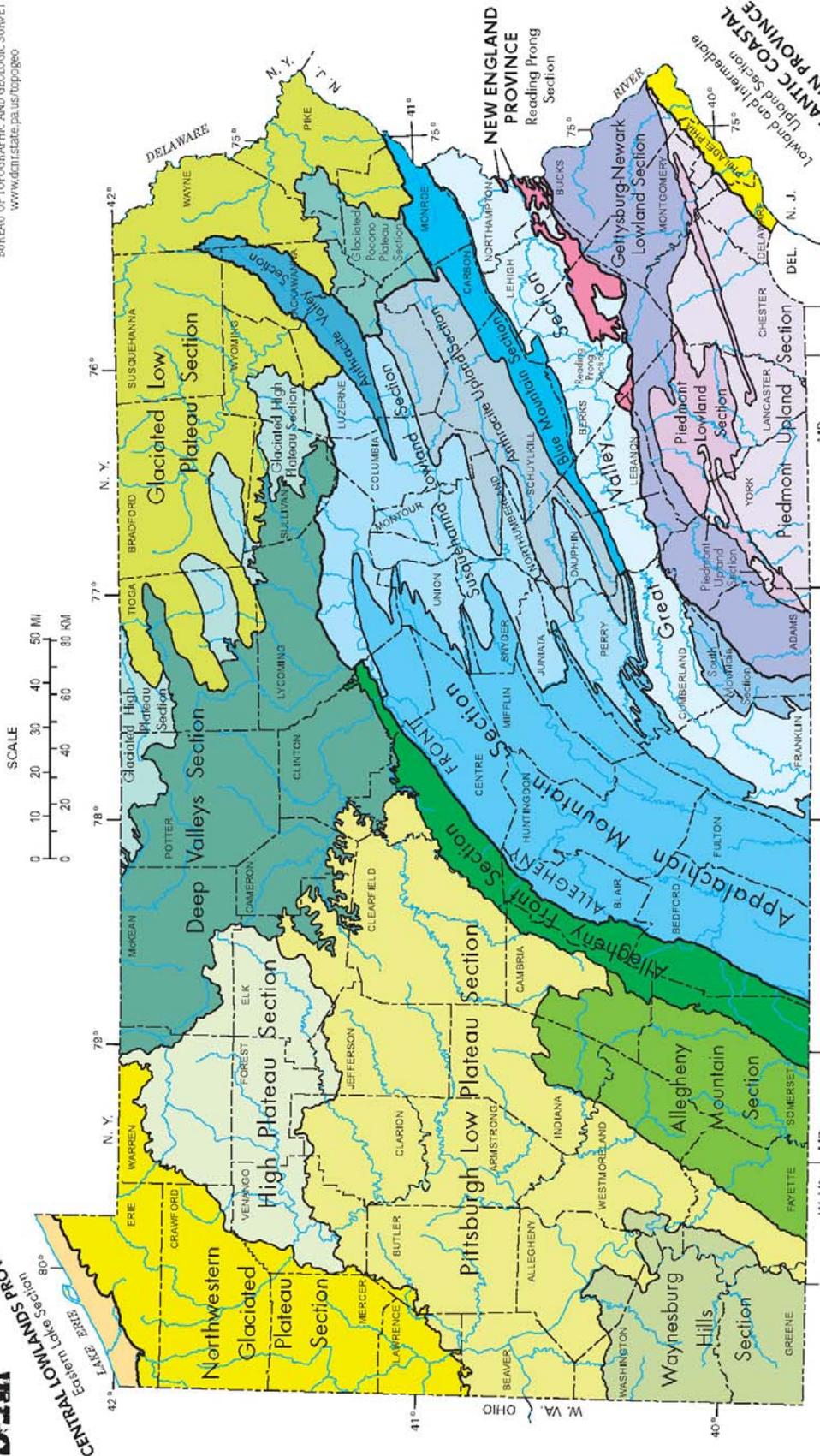
¹www.dcnr.state.pa.us/topogeo/maps/map13f.pdf.

²www.dcnr.state.pa.us/topogeo/map13/13glps.aspx.

PHYSIOGRAPHIC PROVINCES OF PENNSYLVANIA

MAP 13


COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF
 CONSERVATION AND NATURAL RESOURCES
 BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY
 www.dcnr.state.pa.us/topogeo



SYMBOLS

Approximate boundary between physiographic provinces

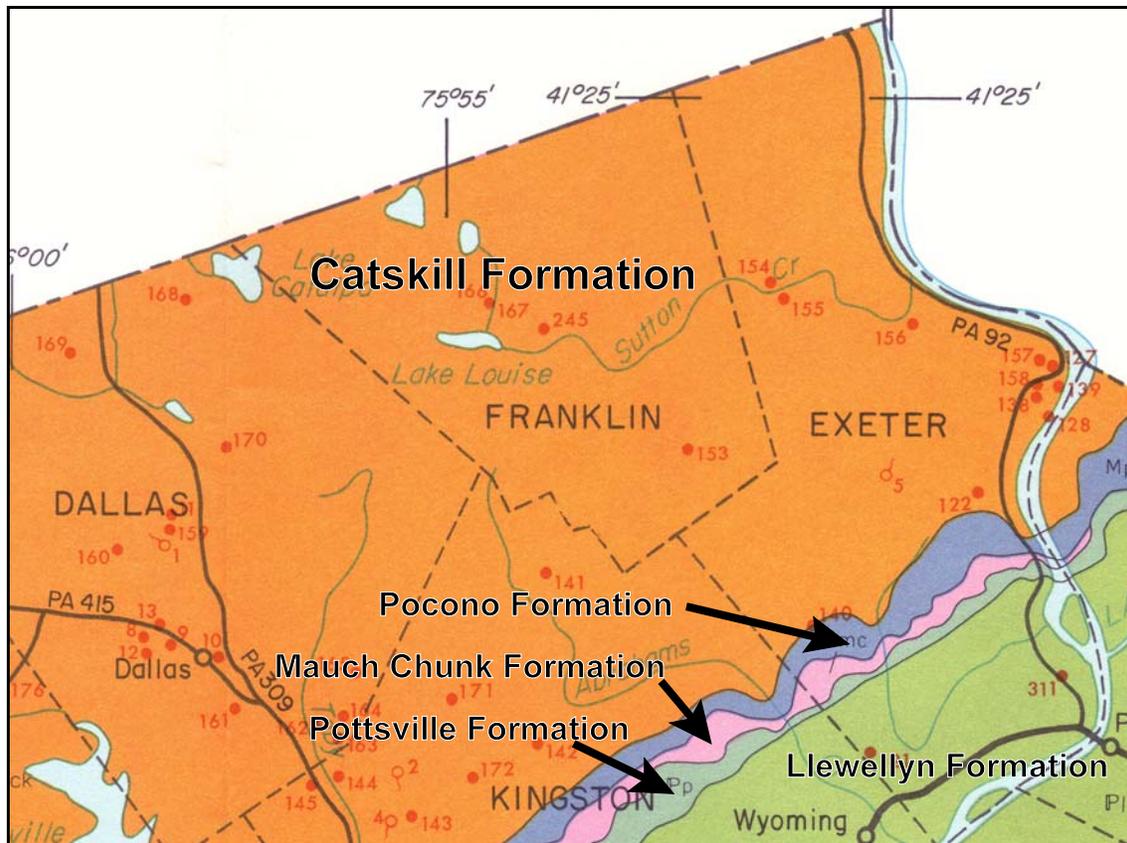
Approximate boundary between physiographic sections

EXPLANATION

Province	Section	Color
CENTRAL LOWLANDS PROVINCE	Eastern Glaciated Plateau Section	Light Yellow
	Northwestern Glaciated Plateau Section	Yellow
	High Plateau Section	Light Green
	Low Plateau Section	Light Yellow-Green
APPALACHIAN PLATEAUS PROVINCE	Allegheny Mountain Section	Dark Green
	Allegheny Front Section	Medium Green
	Deep Valleys Section	Light Green
	Glaciated Plateau Section	Light Yellow-Green
RIDGE AND VALLEY PROVINCE	Appalachian Mountain Section	Blue
	Susquehanna Valley Section	Light Blue
	Antietam Valley Section	Medium Blue
	South Mountain Section	Light Blue
	Great Valley Section	Light Blue
	Blue Mountain Section	Dark Blue
PIEDMONT PROVINCE	Piedmont Lowland Section	Light Purple
	Piedmont Upland Section	Medium Purple
	Galtzberg Section	Dark Purple
	Piedmont Upland Section	Light Purple
NEW ENGLAND PROVINCE	Reading Prong Section	Red
	Reading Prong Section	Red
ATLANTIC COASTAL PLAIN PROVINCE	Lowland and Intermediate Section	Yellow
	Lowland and Intermediate Section	Yellow

Compiled by W. D. Sewan, Fourth Edition, 2000.

In terms of the use of on-site sewage disposal systems, many areas are relatively flat and present no slope limitations. Nevertheless, steep slopes throughout the Township present a problem for the installation of conventional on-site sewage disposal systems, and in the case of steeper slopes, preclude even the use of elevated sand mounds. In accord with DEP regulations, 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. The undulating topography, along with the often shallow bedrock, will also be a cost consideration in any areas proposed for the use of sewage collection and treatment systems, requiring the use of pump stations in lieu of gravity for collection and conveyance of sewage.



Geology Map (Water Resources Report 44, Groundwater Resources of Luzerne County, Pennsylvania.)

NOTE: Much of the information on geology and groundwater contained in this Plan was taken from the Pennsylvania Geological Survey Water Resources Report 44, Groundwater Resources of Luzerne County, Pennsylvania, published in 1977 which should be consulted for more details.

Geology and Hydrology

Geology is a fundamental natural feature because it shapes all other features including topography, soils, vegetation, and hydrology. The physical characteristics and geographic patterns exhibited by these features are in large part a result of underlying geologic formations and processes along with the more recent glaciation. The specific characteristics of the underlying bedrock and other geologic strata determine the quality and quantity of the ground water.

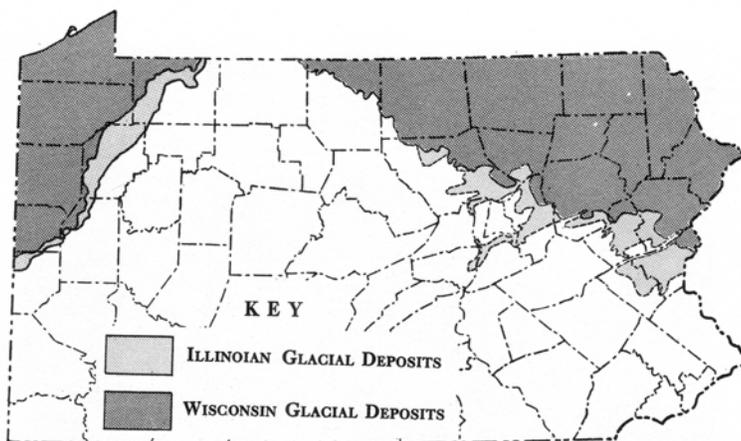
The geology of the Township and the region is characterized as follows:

- Franklin Township is underlain primarily by bedrock of the Devonian System which are some 350 to 400 million years old, including bedrock comprised of the the Catskill Formation.
- The Catskill Formation is some 1,800 feet thick and is comprised of shale, claystone, siltstone, sandstone and conglomerate – finer grain rock predominates in the lower half.
- Surficial deposits, that is, those materials lying on top of the bedrock, have accumulated by a number of natural processes including weathering by water, temperature fluctuation, plant and animal activity and wind, hydraulic activity of flowing streams, downward movement of materials on steep slopes, glaciation, and the accumulation of organic materials in ponds and lakes which eventually formed peat and muck.
- Surface deposits from the glaciers cover substantial areas of the Township and depending on thickness, can yield adequate supplies of water.
- Water in the Catskill Formation is typically abundant in supply with an average yield of 20 gallons per minute and the water is soft and of good quality, but may be locally salty.

Glaciers in Luzerne County

The glaciation in Luzerne County has had considerable effect on the soils and groundwater water supply by depositing varying depths of overburden on the underlying rock formations.

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 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.*³



Glacial Deposits in Pennsylvania (Source: *Pennsylvania and the Ice Age*, Commonwealth of Pennsylvania, 1962.)

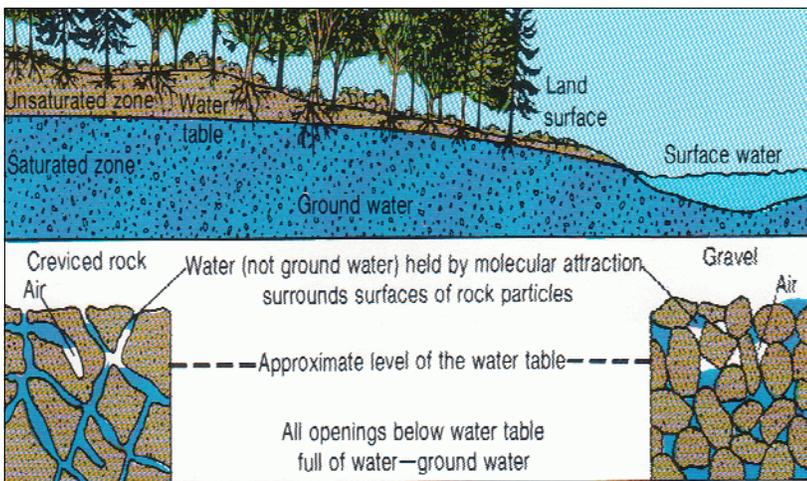
³*Pennsylvania and the Ice Age*, Commonwealth of Pennsylvania, 1962, p. 16.

Glacial Deposits

Much of Franklin Township is covered by material deposited by the Wisconsin Glacier. While these deposits typically yield groundwater of good quality and more than adequate supply, the rapid percolation rates can result in groundwater contamination. Olean Till, the most common surface deposit, is found primarily on lower slopes and stream valleys with depths of 6 to 200 feet. This unsorted and non-stratified mixture of clay, silt, sand, pebbles, cobbles and boulders is reported as a good aquifer with a median yield of 28/gal/min for domestic wells.

Groundwater

Groundwater is that subsurface water in the saturated zone - the zone in which all the spaces or interstices in the rocks, ideally, are filled with water under pressure equal to or greater than atmospheric pressure. Rocks that are capable of yielding usable supplies of water to wells or springs are called aquifers. Ground water occurs in joints, bedding planes, fault and other fractures in the rock. The extent to which the rock is fractured, its density and size will all contribute to its ability to store and move water. In unconsolidated rock, water is stored and moves through the openings in these deposits. In consolidated rock aquifers, water moves primarily through fractures, joints and along bedding planes.



Water Bearing Geology

Franklin Township residents rely entirely on groundwater for domestic water supply, with most of the supply pumped from deep wells. The Township is served by wells sited on individual lots or by community or private water companies. Based on available studies and with long term consumption primarily residential and commercial, and large areas of undeveloped land for recharge, it appears that the overall supply of groundwater in the Township and all of Luzerne County should be adequate to sustain development and meet the needs of the foreseeable future.

Groundwater Recharge

Franklin Township and Pike County lie in the same Glaciated Low Plateau Section of the Appalachian Plateaus Province and share the Catskill Formation geology. *Water Resources Report 65, Groundwater Resources of Pike County, Pennsylvania* concludes that the average groundwater recharge rate in Pike County is 915,000gallons per day per square mile.⁴ While the report is specific to Pike County, the data, along with that in the *Groundwater Recharge Rates Sidebar* provides a measure for the Township.

Most groundwater in the Township moves from upland and hillside recharge areas down gradient with discharge to streams. Alluvial and glacial deposits are also good recharge areas. Comparison of this recharge rate to the volumes of groundwater extracted for residential and commercial use, the only significant water uses in the Township, suggests adequate groundwater supply, although cones of depression can extend a few thousand feet from heavily pumped wells during the summer.

⁴Water Resources Report 65, *Groundwater Resources of Pike County, Pennsylvania*, Pennsylvania Topographic and Geologic Survey, D. K. Davis, 1989, p. 10.

**Recharge
in the Planning Area**

Given the total land area of 12.9 square miles, average groundwater recharge in the Township, using a conservative factor of 70% undeveloped land, is estimated to range from 6,800,000 to 9,000,000 gallons per day. Engineers typically use an estimate of 250 gallons per day per dwelling unit when designing water systems and, applying this factor to the number of dwelling units in the Township, almost 750, yields an estimated 187,500 gallons per day in residential water use. Commercial and agricultural water use would add additional amounts, but the total is well below the estimated recharge rate.

Groundwater Recharge Rates

In 1989, the Pennsylvania Topographic and Geologic Survey estimates in *Water Resources Report 65, Groundwater Resources of Pike County, Pennsylvania*, that in Pike County the average groundwater discharge is estimated to be about 635 (gal/min)/mi², twice the amount estimated for most areas of Pennsylvania. Based on this, groundwater recharge in Pike County is about 900,000 gallons per day per square mile of land area.

In 1964, the U.S. Geological Survey reported that a conservative estimate for recharge in the Highlands of the Delaware River Basin was 750,000 gpd/sq mi. (*Water Resources of the Delaware River Basin*, Geological Survey Professional Paper 381, U.S. Department of the Interior, Parker, Garald G, et. al., 1964, p. 91.)

In 1982, a Delaware River Basin study of the Upper Delaware Basin reported:

- a recharge rate of about 1,000,000 gpd/sq mi for the Upper Pocono Plateau. (*Special Groundwater Study of the Upper Delaware River Basin Study Area III, Volume I*, Delaware River Basin Commission, Wright Associates, R.E., 1982, p. 3-10.)
- normal year recharge rates in the Upper and Lower Pocono Plateaus range from 900,000 to 1,000,000 gpd/sq mi and during a normal year, recharge to the Catskill formation, which underlies Pike County, is about 930,000 gpd/sq mi. (*Special Groundwater Study of the Upper Delaware River Basin Study Area III, Volume II*, Delaware River Basin Commission, Wright Associates, R.E., 1982, p. 8-3.)

Withdrawal Regulation

Municipalities in Pennsylvania cannot regulate the quantity of water use, but can require developers to assess effects on groundwater supplies and require developers to address the effects. The PA Safe Drinking Water Act enables state review of withdrawal impacts and the PA Water Resources Planning Act requires the registration of withdrawals of 10,000 gallons per day. Consumptive uses of 20,000 gallons per day and withdrawals of 10,000 gallons per day must be approved by the Susquehanna River Basin Commission.

**Planning Implications:
Need for Conservation**

An adequate overall supply is no reason for residents and local officials to ignore the important issues of localized groundwater supplies and groundwater conservation. This is particularly important as development occurs. Wells near large water uses can be drawn down resulting in inadequate supply. Increases in impervious areas such as buildings, driveways and roads inevitably leads to more stormwater runoff and less groundwater recharge. In addition, given the characteristics of aquifers, development in the region can also effect local groundwater availability and result in greater potential for contamination. Simply stated, groundwater availability is a regional issue and adequate supply is not a valid reason for postponing or avoiding action to ensure continued adequate supply.