TECHNICAL REPORT 2

Plan for clean water

Monroe County, Pa.

How to use the maps at the township and borough level

Plan for clean water

THANK YOU!

The staff of the Monroe County Planning Commission have been invaluable partners in creating the maps you see here and in all the Plan for Clean Water documents. Their skill, patience, professionalism, and work ethic are outstanding.

Monroe County Planning Commission will provide municipal and parcel level maps at the request of local municipalities. The maps provide a fascinating level of detail about a community — and help guide land-use choices that will protect pure drinking water for ourselves, our children and grandchildren.

Healthy water makes for healthy communities.

From the forest to your faucet

This part of the Plan for Clean Water brings all this accumulated water science down to the backyard level.

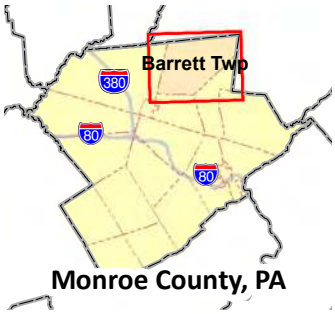
The county-wide composite maps show multiple layers of information about land and water. (Copies are in Technical Report 1.) They may seem like a patchwork of lands with high, medium, and less benefits for water protection. That's because Monroe County consists of many kinds of geology, glacial deposits, soil types, forests, wetlands, creeks and streams, like most of the Poconos.

Further, the county covers 617 square miles — about 390,000 acres. So a tiny dot on the county-wide map may be a significant water resource of 100 acres or more.

In this section, we zoom in first on Barrett Township (pages 3-7) and then on Smithfield Township (pages 7-11). The examples are about already conserved properties, so as not to seem to push any particular parcel for conservation. The purpose is to show how to use detailed data about factors that protect clean water in making land use decisions at the local level.

Barrett Township's Mount Wismer/ Gravel Preserve

Mount Wismer is steep, rocky and forested. The adjoining Gravel Family Nature Preserve is low and level, part old farmland, part forest, and part marsh and creek. This preserved land was chosen as an example of how to use the Plan for Clean Water because together they provide a microcosm of Monroe County's terrain, habitat, and land cover.



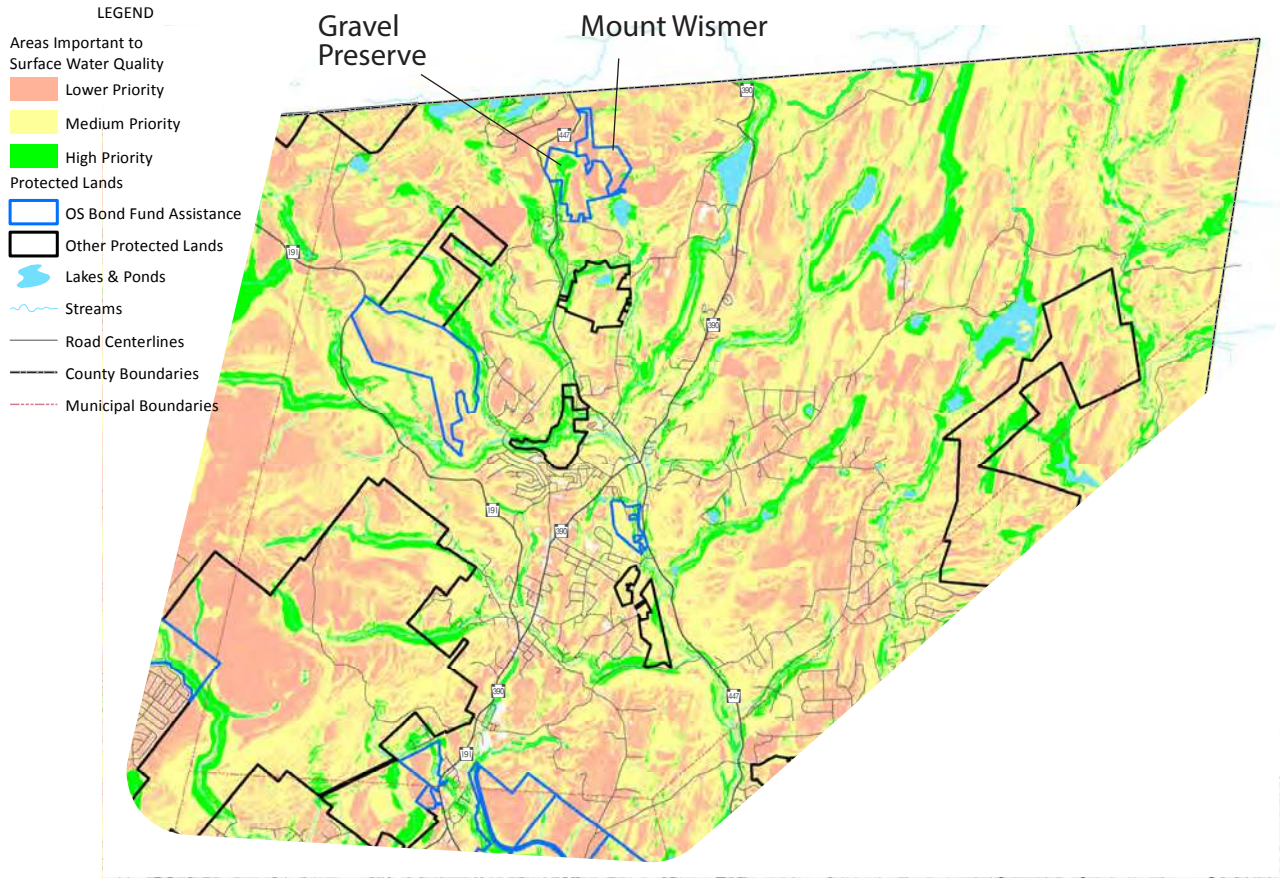
Mount Wismer/Gravel Preserve is the land outlined in blue at the far north of these maps of Barrett Township.

Both maps show far more detail about the land conditions than the county-wide maps.

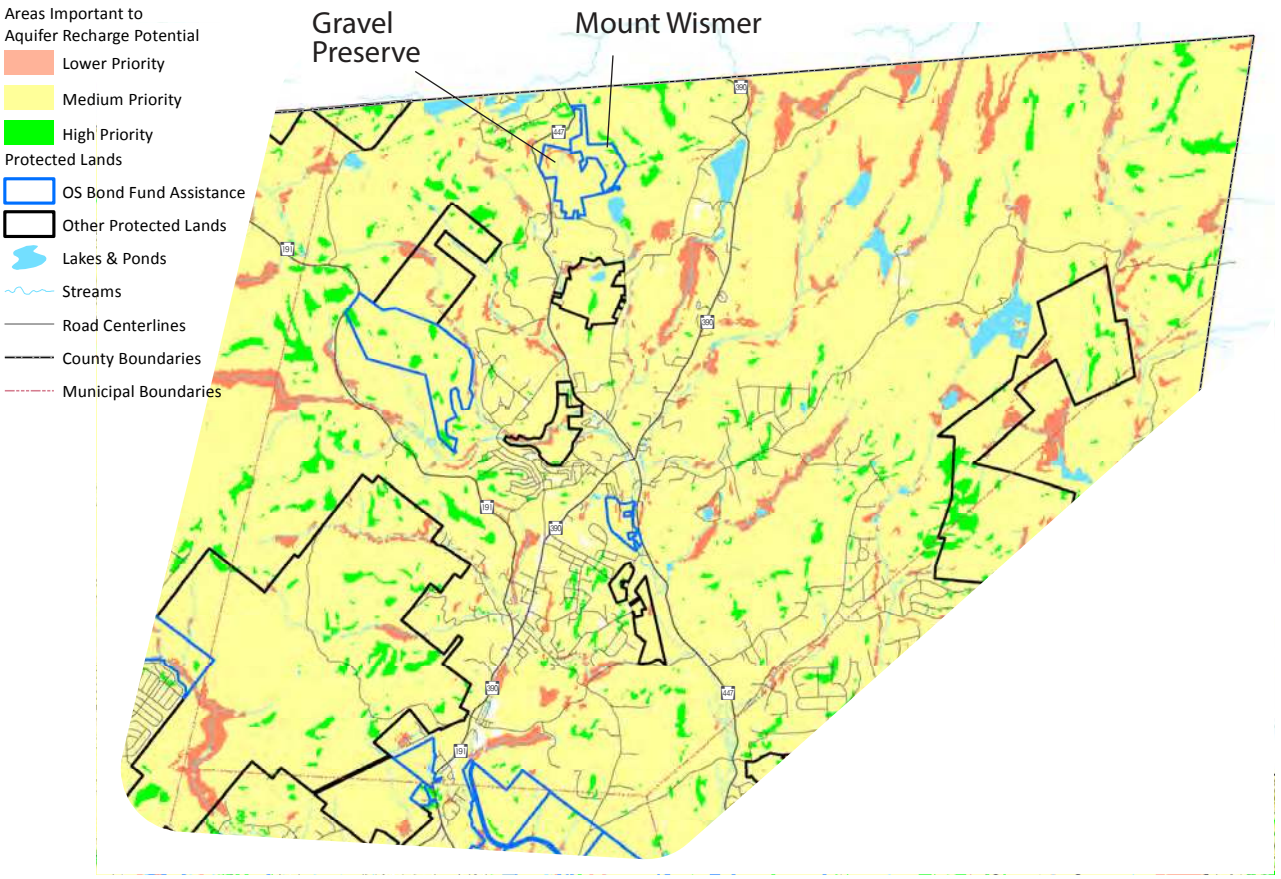
Following the light grey roadways, you can pinpoint locations easily.

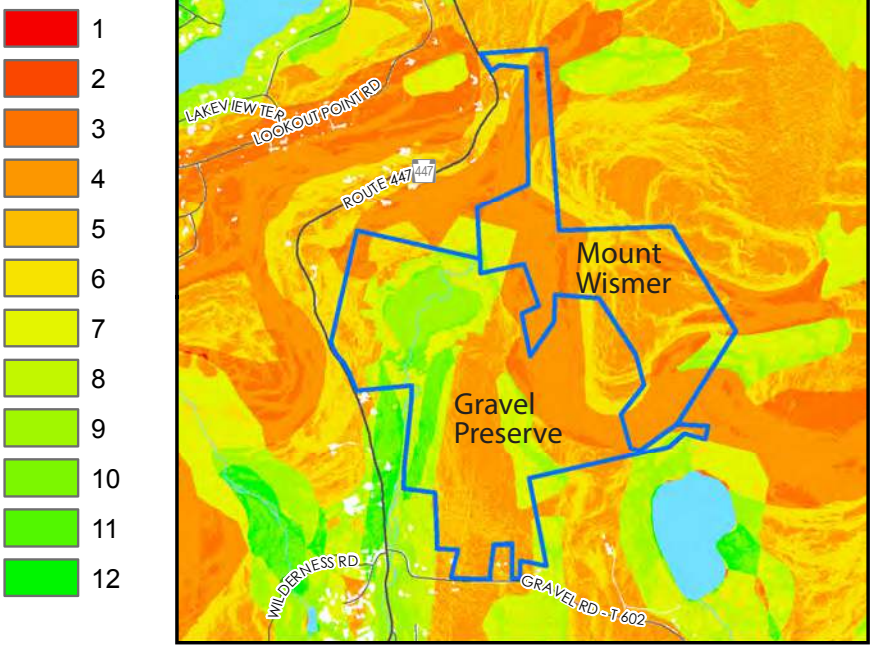
In the next series of maps, we zoom in further on just these two parcels.

BARRETT TOWNSHIP SURFACE WATER QUALITY COMPOSITE MAP



BARRETT TOWNSHIP AQUIFER RECHARGE POTENTIAL COMPOSITE MAP





SURFACE WATER COMPOSITE CLOSEUP OF MOUNT WISMER/ GRAVEL PRESERVE

The green in the lower parcel shows that there are significant surface water benefits on Gravel parcel but not on Mount Wismer. The final series of maps separates out the four factors in surface water protection and shows them individually.

SURFACE WATER

LAND COVER DETAIL

Map 1 Land Cover

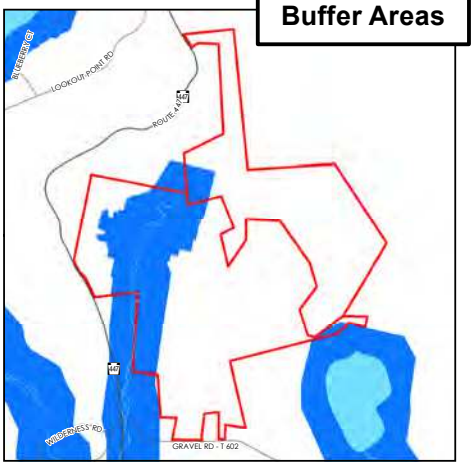
Entire property is forested, a plus for surface water protection.

SURFACE WATER

BUFFER DETAIL

Map 2 Surface Water Buffer Areas

Headwaters of Middle Branch creek and portion of the creek itself mean this land is highly important for surface water.

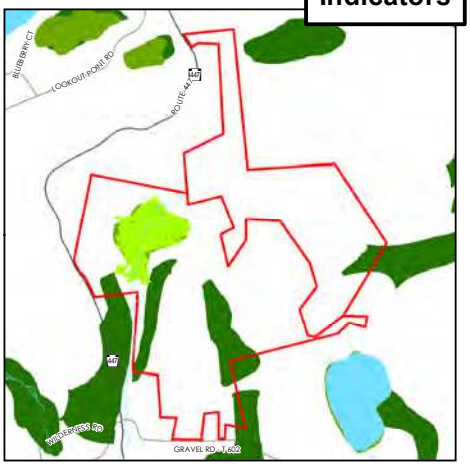


SURFACE WATER

WETLAND INDICATORS DETAIL

Map 3 Wetland Indicators

Patches of wetlands both on the property and nearby. Bright green marsh is where the Middle Branch rises.

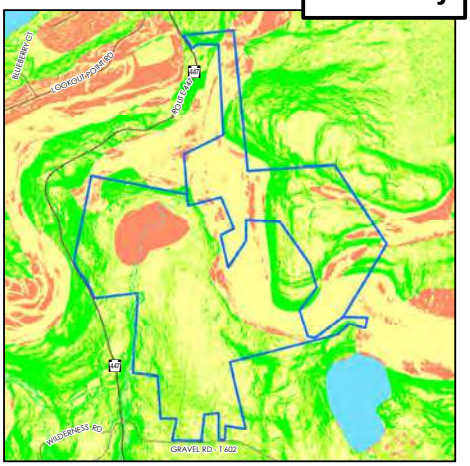


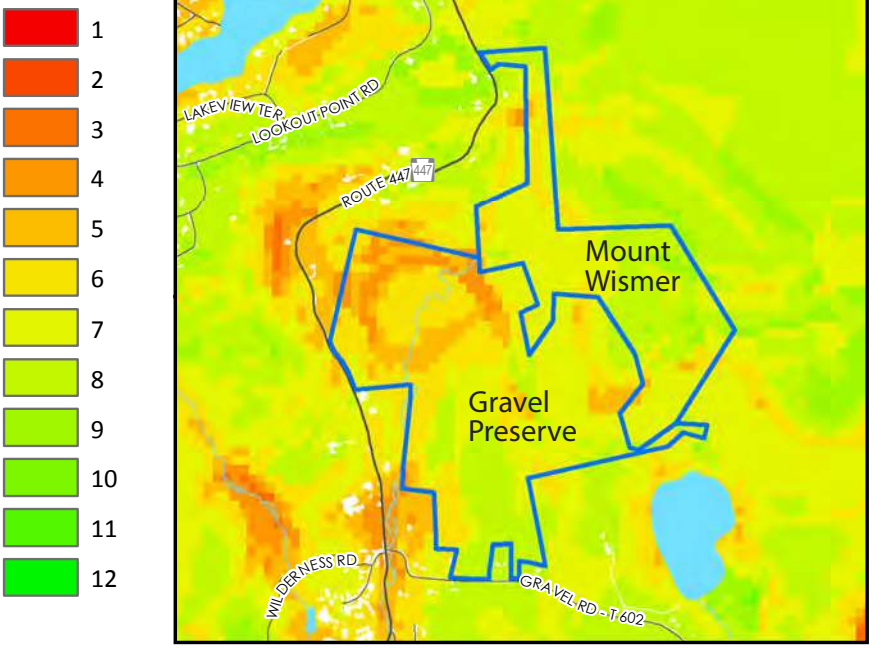
SURFACE WATER

SOIL ERODIBILITY DETAIL

Map 4 Soil Erodibility

High level of soil erosion potential, shown in green, throughout the two parcels.





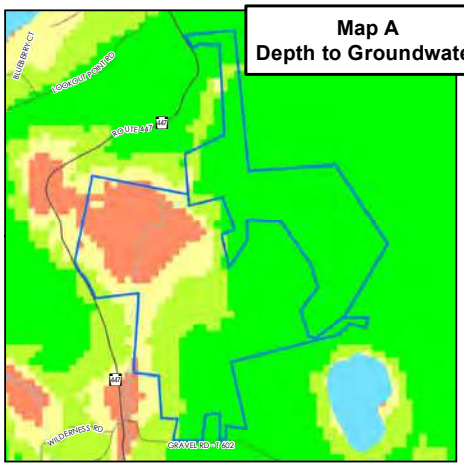
AQUIFER RECHARGE CLOSEUP OF MOUNT WISMER/GRAVEL PRESERVE

Mostly green and yellow-green give the land high scores for aquifer recharge. The main exception is the marsh area on the Gravel property. Some wetlands can recharge groundwater. But for this study, all wetlands were assumed to be "groundwater discharge wetlands," which by definition don't recharge groundwater. The final series of maps separates out the four factors that affect aquifer recharge and shows them individually.

AQUIFER RECHARGE

DEPTH TO GROUNDWATER DETAIL

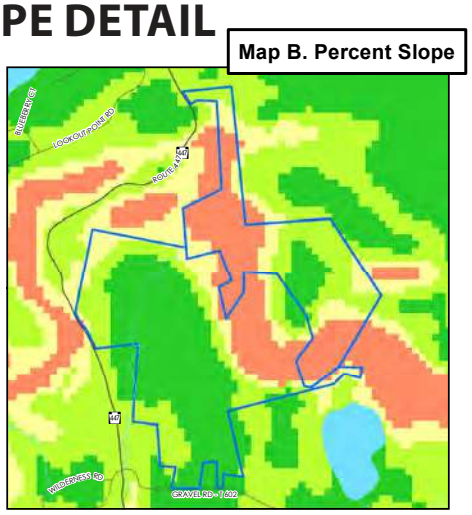
The parcels both rank high by providing highest ranking in depth to groundwater (greens). The marsh is assumed to be a type of wetland that doesn't contribute to groundwater recharge.



AQUIFER RECHARGE

PERCENT SLOPE DETAIL

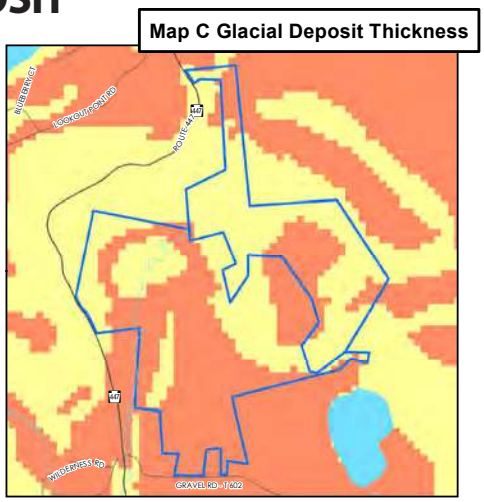
The sharp, winding edge of the Pocono escarpment (light red) clearly shows the steepest areas on the parcel. These indicate lesser recharge areas. Larger swaths in light and dark green are flat lands where recharge is high.



AQUIFER RECHARGE

GLACIAL DEPOSIT THICKNESS DETAIL

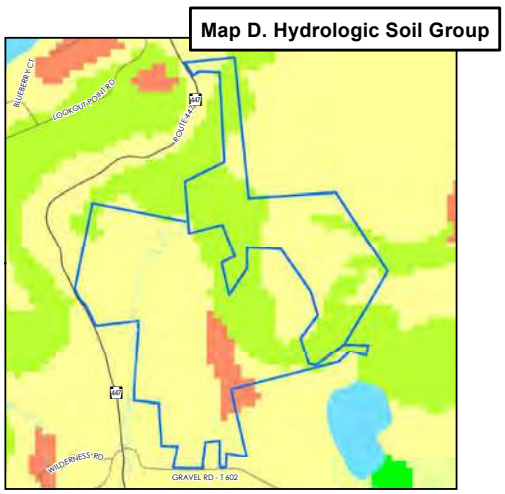
Glacial deposits are thick here (light red), though the yellow areas would have some recharge potential.



AQUIFER RECHARGE

HYDROLOGIC SOIL GROUP DETAIL

The green band of the escarpment appears to have the best soils for recharge.



SUMMARY

Gravel Preserve and Mount Wismer in Barrett Township

Together, these two parcels score high in water protection. Mount Wismer offers more aquifer recharge potential, and Gravel offers more benefits in protecting surface water. But to see these details, it's important to "get down in the weeds." The composite maps give only the roughest overview. Studying the underlying map layers is where it becomes clear that this land contributes to water quality and quantity. It was a good choice for preservation.

What the maps don't show is local, on-the-ground factors. For instance:

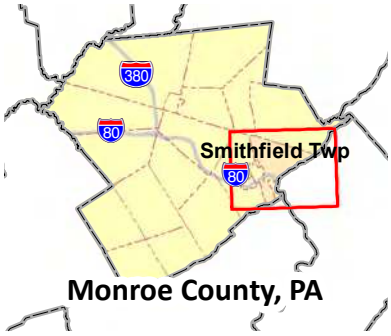
- The wetlands here are more extensive than the mapping shows.
- The land is upstream from multiple feeder creeks to Brodhead Creek, and thus protects them as well.
- Mount Wismer/Gravel is between or near three other large landholdings. Only one is privately preserved, but all are owned by conservation-minded entities. This enhances not just water quality and quantity, but also wildlife/hunting/fishing habitat and maintains green views in this tourism area.
- The property is near an existing township park.
- Hundreds of blueberry bushes provide summer food and fun.

A further, local consideration is: Who owns the land? Are they interested in donating or selling an easement to protect it? Do they want to donate or sell the land outright? A willing landowner is an important weighting factor in making decisions about protecting land to protect water. In this case, landowners were interested in selling the property to the township.

These additional factors, based on local knowledge, make the Mount Wismer/Gravel Preserve a great decision.

EXAMPLE 2

Smithfield Township's Minisink Park and River's Edge



Minisink Park is owned by Smithfield Township, and River's Edge is jointly owned by Smithfield and Middle Smithfield townships. Divided by Brodhead Creek, the two parks are very similar in terrain, landcover and elevation.

This preserved land was chosen as an example of how to use the Plan for Clean Water because of its closeness to two creeks and the Delaware River, as well as the residential and tourism areas of Delaware Water Gap and Shawnee-on-Delaware.

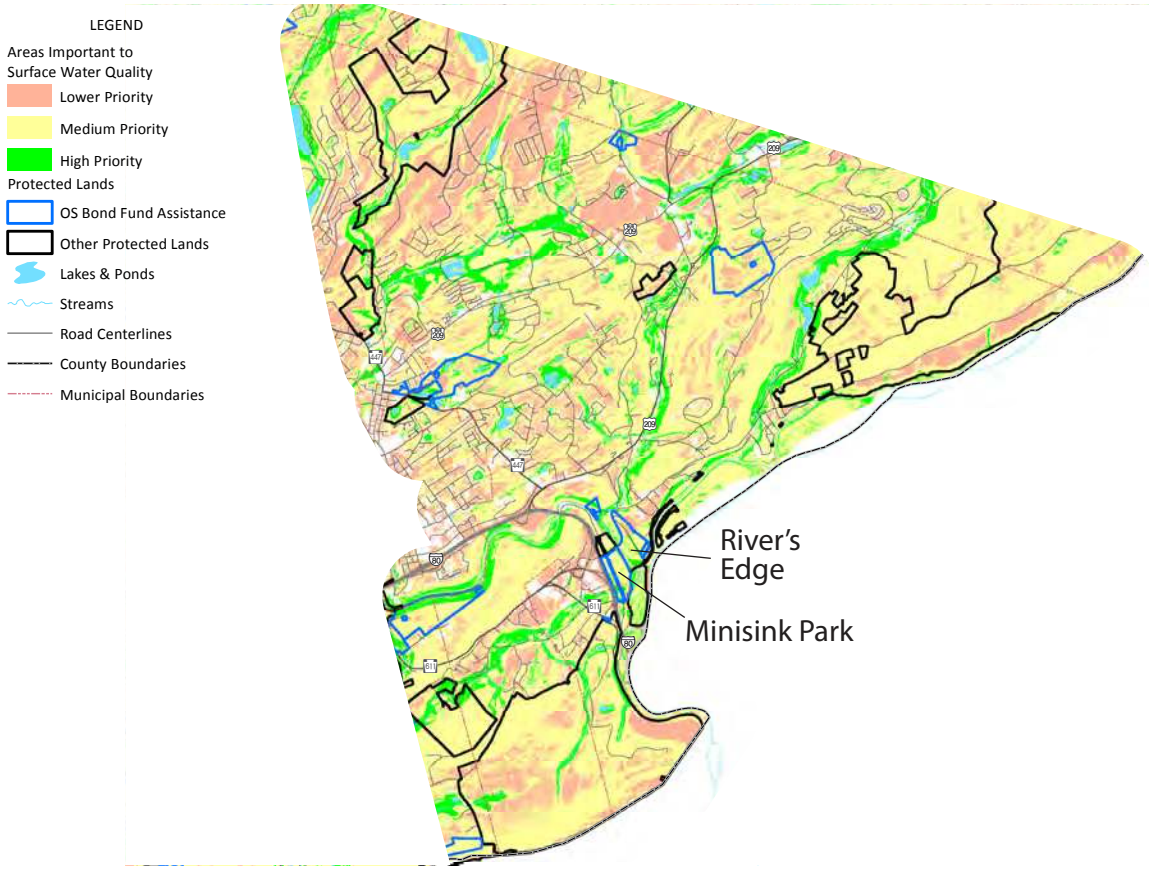
Minisink Park and River's Edge Regional Park, along River Road, are outlined in blue on these maps of Smithfield Township.

These township-level composite maps show more detail about surface water quality and aquifer recharge potential factors than the county-wide maps. Following the grey roadways, you can pinpoint locations.

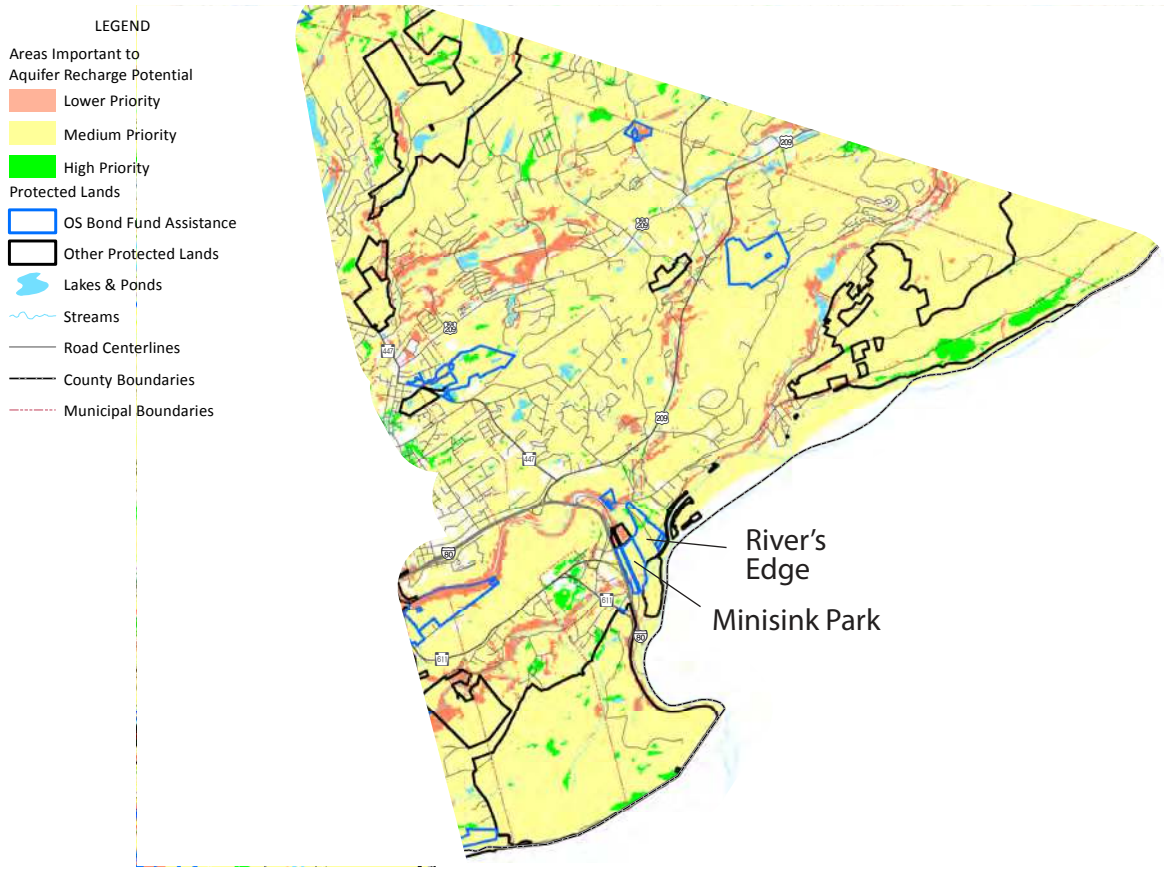
The land is low-lying, near the point where Brodhead Creek and Cherry Creek meet before entering the Delaware River. Train tracks and Route 80 abut the Minisink parcel.

The parks are a tiny fraction of the land area of Smithfield. In the next series of maps, we zoom in further on just these parks.

SMITHFIELD TOWNSHIP SURFACE WATER QUALITY COMPOSITE MAP



SMITHFIELD TOWNSHIP AQUIFER RECHARGE POTENTIAL COMPOSITE MAP



SURFACE WATER COMPOSITE CLOSEUP OF MINISINK PARK AND RIVER'S EDGE REGIONAL PARK

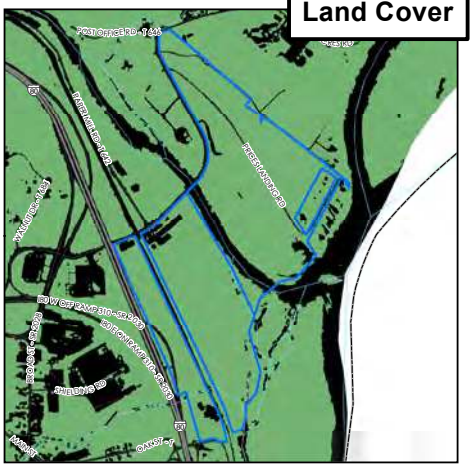
At this level of detail, the large amount of green and yellow throughout the two parks suggests significant potential for protecting surface water. The exception is the area in orange at the top of River's Edge. To show the data at its most detailed level, the next four maps are of the individual factors that affect surface water.

SURFACE WATER

LAND COVER DETAIL

Map 1 Land Cover

Almost the entire property is green, indicating the land cover is trees, shrubs, and grass — a plus for surface water protection.

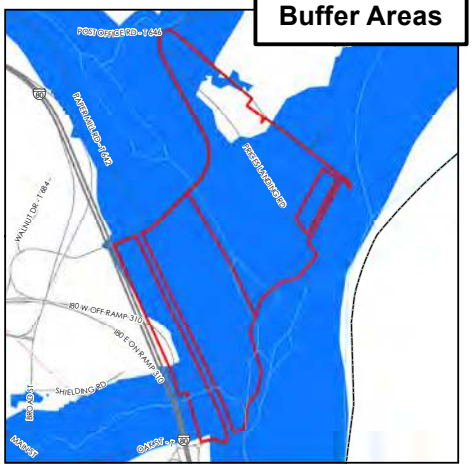


SURFACE WATER

BUFFER DETAIL

Map 2 Surface Water Buffer Areas

Because the parks are close to the Delaware and include portions of Brodhead and Cherry creeks, this is an exceptional surface water buffer zone, as shown by the nearly solid blue.

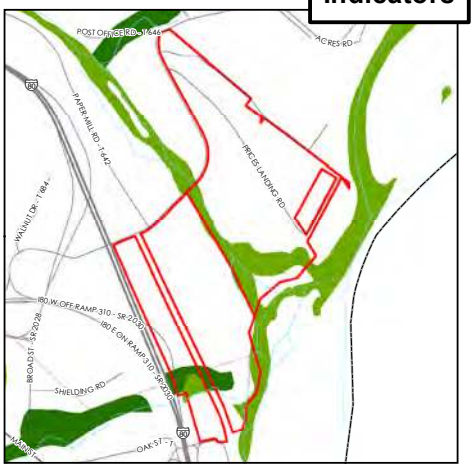


SURFACE WATER

WETLAND INDICATORS DETAIL

Map 3 Wetland Indicators

The green color of land along both Brodhead Creek and Cherry Creek indicates wetlands exist here, which is verified on-site.

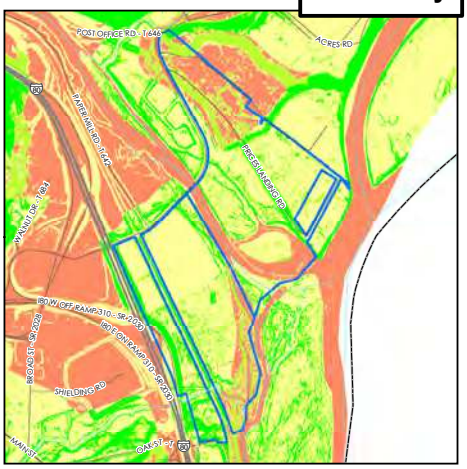


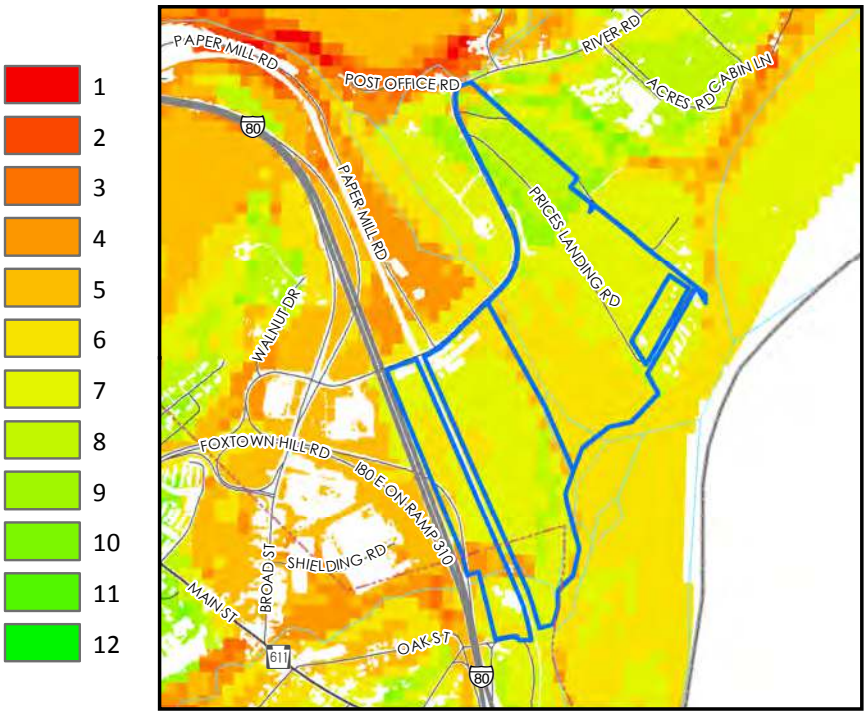
SURFACE WATER

SOIL ERODIBILITY DETAIL

Map 4 Soil Erodibility

Relatively little potential for erosion exists at the parks — except the orange stretch right along the Brodhead. Though there is not much erosion potential, what there is exists in a highly sensitive location.





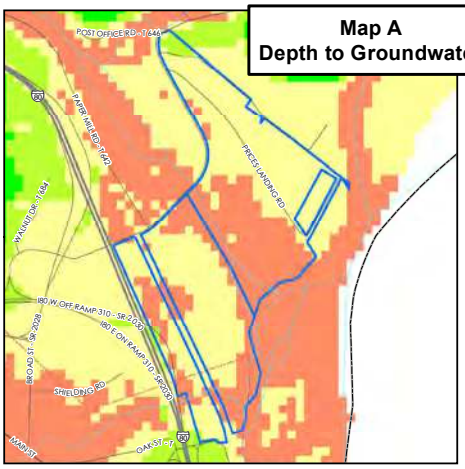
AQUIFER RECHARGE CLOSEUP OF MINISINK PARK AND RIVER'S EDGE REGIONAL PARK

At the blended composite level, the potential for aquifer recharge seems modest toward the center of the property, which shows as mostly yellow. However, light and dark greens elsewhere suggest that rain and snowmelt could infiltrate the soil here to recharge the aquifer. It is important to look closely at the four underlying factors to see the full picture.

AQUIFER RECHARGE

DEPTH TO GROUNDWATER DETAIL

Judging by the amount of yellow and orange here, groundwater is quite shallow. Shallow groundwater levels limit the potential for aquifer recharge.

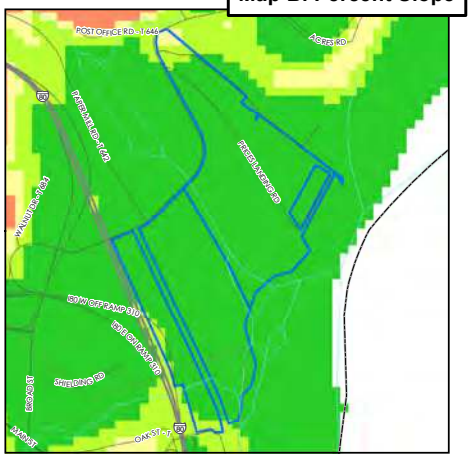


Map A
Depth to Groundwater

AQUIFER RECHARGE

PERCENT SLOPE DETAIL

Solid dark green throughout the parks shows that this is very flat ground. Steep slopes provide less aquifer recharge potential, so this low-slope land is better for groundwater recharge.

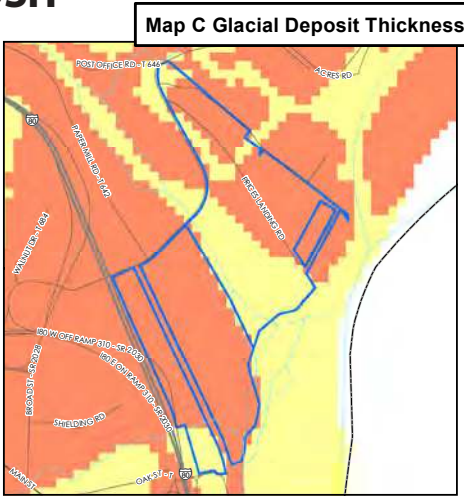


Map B. Percent Slope

AQUIFER RECHARGE

GLACIAL DEPOSIT THICKNESS

The orange that predominates represents data showing fairly thick deposits of glacial debris. The deeper the deposits, the lower the potential for groundwater recharge.

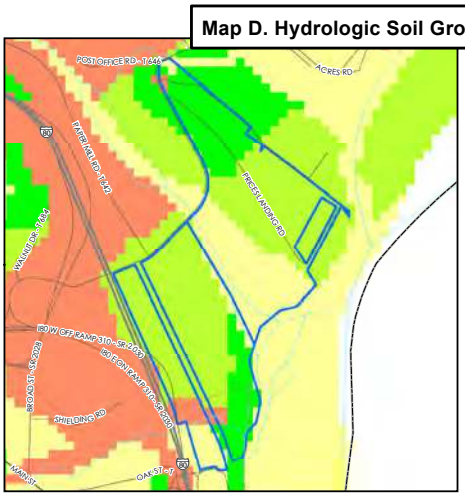


Map C Glacial Deposit Thickness

AQUIFER RECHARGE

HYDROLOGIC SOIL GROUP DETAIL

The dark-green and mid-green areas of both parks mean that the kind of soil that dominates the area is good for groundwater recharge.



Map D. Hydrologic Soil Group

SUMMARY

Minisink Park and River's Edge Regional Park in Smithfield Township

These two parks score high in surface water protection. The data for Land Cover and Buffers alone are very strong predictors that the land is important to protecting the creeks and the river. The wetland indicators are less strong, but support the case for surface water protection.

The score for potential aquifer recharge is somewhat mixed. Two of the data sets — Depth to Groundwater and Glacial Deposit Thickness — suggest these parcels are neutral to less important for groundwater recharge. However, both slope and soil group are solid positives for protection.

Together, the maps make a strong case for protecting this land. What they don't show is local, on-the-ground factors that affect land-use decisions. For example:

- The properties, especially Minisink Park, are subject to regular passive flooding when the creeks rise. Creating soccer fields instead of a park-and-ride or other paved space protects life and property.

- Located between the residential and tourism villages of Shawnee-on-Delaware and Delaware Water Gap, the parks provide green views and recreation for visitors and residents. For Delaware Water Gap, Minisink Park provides a walkable green space with outdoor play options for children and recreation for teens.

- Proximity to Route 80 and the railroad presents the potential for contaminated stormwater runoff or catastrophic spills. Protecting the land creates a buffer for the Brodhead and Cherry creeks and the Delaware River. This protects businesses specializing in recreation on the river and also drinking water sources for people locally and downstream.

- Residents of Smithfield Township recently passed a referendum in support of acquiring properties that protect forested land and water quality. These parcels were purchased before that referendum, but residents' interest in clean water is a consideration for future purchases.

Whether or not the land is available for sale is an important local consideration as well. A willing landowner is an important weighting factor in making decisions about protecting land to protect water.

These additional factors based on local knowledge make the Minisink and River's Edge Parks a great decision.

Plan for clean water