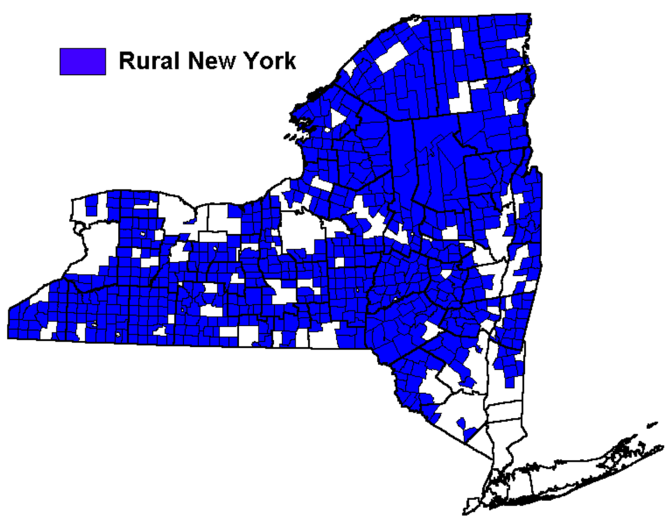
New York Rural Water Association

Local Source Water Protection and Smart Growth In Rural New York:

A Guide For Local Officials



Although the information in this document has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X982122-99-0 to New York Rural Water Association, Inc., it has not gone through the Agency's publications review process and therefore, may not necessarily reflect the views of the Agency and no official endorsement should be inferred.

Introduction

The term known as *smart growth* is currently a focus of attention across the country and in New York State. In reality, smart growth is not a new concept. Rather, it is simply sound planning that encourages and focuses development where it is most desirable. There are three principles that smart growth planning frequently addresses: economic, social, and environmental needs of communities.

A fundamental guiding principle of smart growth is the preservation of critical environmental areas. The protection of drinking water supplies (*source water*) is of critical environmental concern to small and rural communities and should be a vital component of any smart growth plan. As development occurs in an area, water supplies may diminish or become increasingly at risk of pollution.

This document is the result of a two-year project by the New York Rural Water Association (NYRWA), entitled “Local Source Water Protection and Smart Growth” that has been funded by the United States Environmental Protection Agency. The purpose of the project and this document is to illustrate how groundwater and source water concerns can be integrated into the local smart growth planning efforts of small and rural communities.

This publication is specifically designed as a guide to help small and rural community leaders and other interested community members take steps to promote drinking water protection as they formulate a blueprint for their community. It explains how rural groundwater water resources can be impacted by growth and development, demonstrates how local groundwater supply resources can be identified, shows how likely growth areas can be delineated, explains how the susceptibility of groundwater supply resources to growth can be determined, and demonstrates how to protect groundwater supply resources.

Rural Growth and Water Usage in New York

According to recently released 2000 Census figures, many rural and small towns did experience a significant growth of population between 1990 and 2000. Approximately 45 percent of rural and small towns in New York had population growth of at least 5 percent during this period (see Figure 1). Much of this rural growth occurred in towns at the fringe of larger metropolitan areas such as Buffalo, Rochester, Syracuse, and Albany. In addition, rural growth also occurred at the edges of smaller metropolitan areas such as Jamestown, Corning-Elmira, Ithaca, Binghamton, Utica-Rome, and Poughkeepsie-Newburgh. Some planning experts have described development in the rural countryside of metropolitan counties or adjacent counties as “rural sprawl”.

As growth continues in rural areas, there is an ever-increasing demand on groundwater resources. Approximately 75 percent of rural counties in New York utilized groundwater for the majority of their drinking water. Based on USGS data, approximately 1.9 million people rely on individual private wells in New York. The majority of residents in some 15 rural counties rely on individual private wells. The population on private wells is likely to increase as rural residential sprawl continues.

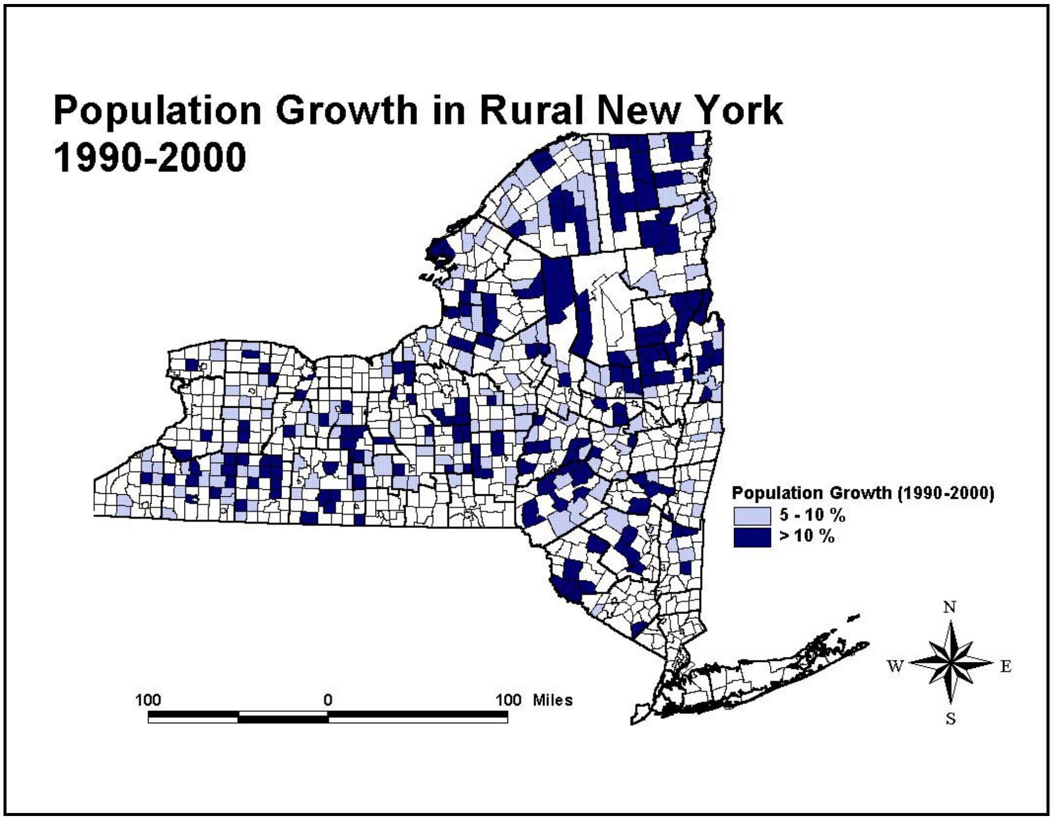


Figure 1

Ground Water Basics

Due to the ever-increasing demand on groundwater resources in rural New York, this guide focuses upon the relationships between groundwater resources and growth and development. Thus, it would be helpful to review some basics of ground water.

Groundwater Occurrence

Ground water occurs in the saturated zone beneath the land surface, where all open spaces are completely filled with water. The upper boundary of the saturated zone is the water table. Above the water table, the open spaces in soil and rock are filled with air and water. This is the unsaturated zone. Water found in the unsaturated zone does not flow to wells and is not ground water.

As the old adage goes, ground water is “out of sight, out of mind.” Unlike surface water, which can be readily seen, there are a number of misconceptions and myths surrounding ground water. A major misconception is that ground water occurs in underground lakes and streams. The truth is that here in New York, this statement is false at least nine times out of ten. Ground water is subsurface water that fills the tiny spaces between mineral grains or cracks (fractures) in rock. This is analogous to water being held in a sponge or a tiny pipe network.

Ground water flows in underground lakes or streams only where fractures in limestone or dolostone rock have been significantly enlarged by chemical solution. This solution activity (i.e. dissolving of the rock) can eventually result in localized cavernous conditions. Carbonate rocks (dolostone or limestone) occur across about ten percent of New York’s land area.

In addition to carbonate aquifers, the other productive bedrock aquifer types in New York are crystalline rock and sandstone. Ground water in these rocks occurs in secondary openings such as fractures and joints. These openings generally decrease in both size and frequency with depth. Shale bedrock does not yield large quantities of ground water due to its low permeability. However, shale often produces limited but usable quantities of water to domestic wells. Shale is often the only usable aquifer in many areas of upstate New York, particularly in the uplands of the Appalachian Plateau region.

The most productive aquifers in New York are unconsolidated aquifers composed of sand and gravel deposited largely by glacial meltwater. These deposits are commonly referred to as valley-fill aquifers. Unconsolidated aquifers either extend to the land surface (unconfined) or are confined and overlain by low permeability glacial lake clays or other fine-grained material. Unconfined aquifers are most vulnerable to surface sources of contamination.

Groundwater Flow

All ground water originates as precipitation that has infiltrated through the soil or rock and into the saturated zone. Ground water enters the saturated zone in areas referred to as recharge areas. Once in the saturated zone, ground water flows at relatively slow rates of a few feet per day or year. However, ground water has different residence times from the point where it originates as precipitation recharge to where it discharges to wells, springs, or surface water. As Figure 2 below illustrates, this residence time may range from days or months in the case of a spring to several months or years for a typical well. For deep or highly confined aquifers, the ground water may be several years, even decades or centuries old. In New York, much of groundwater flow is local in origin and occurs at shallow depths. Flow lines are relatively short, from local topographic highs to local topographic lows such as along lakes and streams.

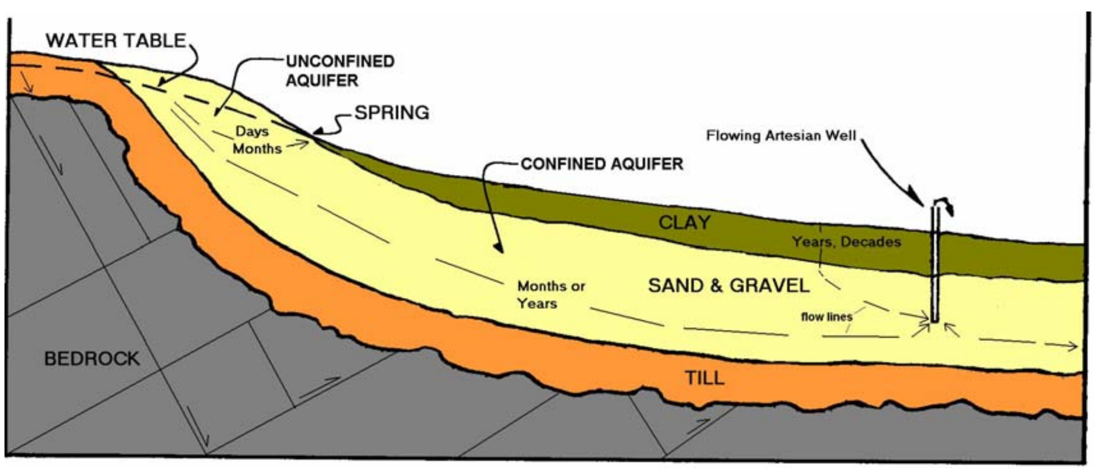


Figure 2

Ground Water and Surface Water Interaction

Both ground water and surface water are part of the hydrologic cycle. Ground water flows toward and is discharged into most streams and lakes (Figure 3). For example, in summer months, ground water sustains the flow of most streams. This is termed baseflow. Under pumping conditions, surface water can be induced to flow toward a well (Figure 3). This condition can be favorable for increasing yields, but can lead to water quality difficulties if there is inadequate ground water travel time from the surface water body to the well. The latter situation is termed ground water under the direct influence of surface water.

Although surface water features are often regarded as areas of groundwater discharge, wetlands and some surface water bodies can also serve as areas of groundwater recharge. This is particularly true of wetlands situated on sand and gravel deposits. The hydrologic function of surface water bodies often changes temporally and spatially in response to changing water conditions. For example, many streams recharge ground water during flood events but receive groundwater discharge during dry months.

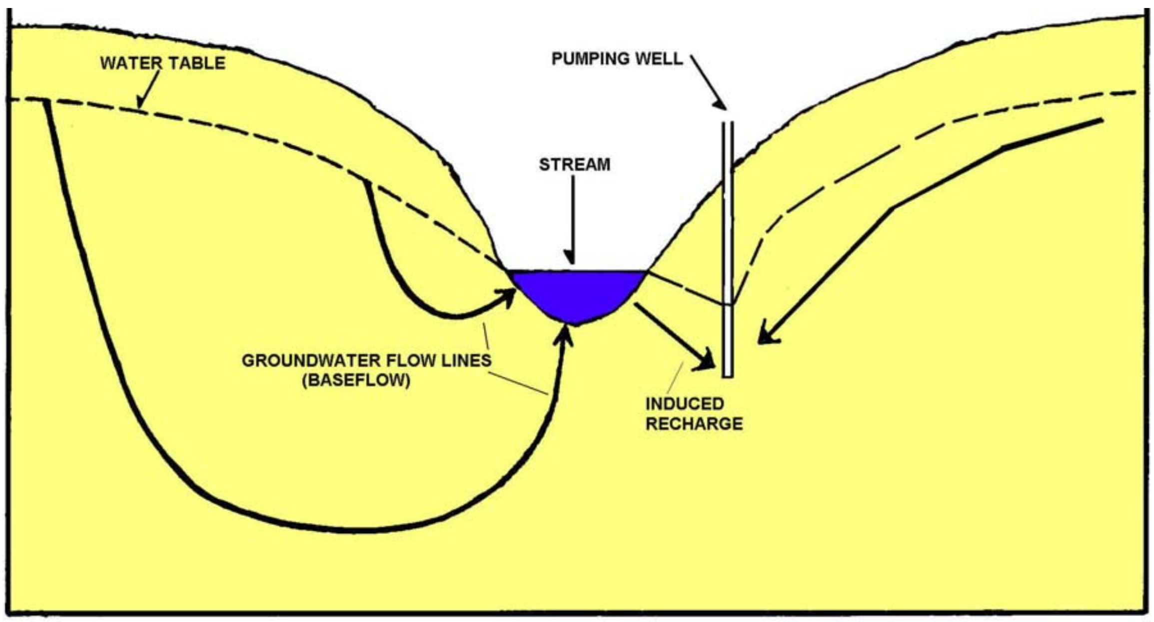


Figure 3

Groundwater Issues Associated With Growth

Development and growth in rural areas does have potential impacts on groundwater resources. Development of single-family homes in the country largely involves private wells and septic systems. The result of improperly planned development can sometimes leads to declining water supplies and/or water quality problems.

Well Yield Decline

As population increases, the demand for water will naturally increase as well. If the demand for water locally exceeds the annual recharge rate, water levels will decline. Such a decline of water levels and hence well yields has been observed in some areas of New York, particularly in areas with limited groundwater resources such as shale bedrock. Here, new development has brought larger homes and people from urban and suburban areas that have not previously relied upon groundwater supplies. Homeowners and even some municipal suppliers have had to deepen existing wells to improve storage capabilities or even drill new wells in hopes of finding more productive zones. These efforts sometimes do not succeed.

One way to help prevent well yield declines in response to development is to ensure that lot sizes are large enough to supply sufficient recharge. In upland areas covered by less permeable material known as glacial till, the recommended minimum lot size is 2.8 acres. In addition to a minimum lot size for water supply protection, a minimum lot width should be considered to assure proper well spacing. Unfortunately, many new lots in rural areas tend to minimize road frontage in order to maximize the number of lots. The results are a number of narrow lots and closer well spacings.

Development also leads to an increase in the amount of impervious surfaces such as rooftops, driveways, pools, etc. that do not allow water to infiltrate into the ground surface. The result is an overall reduction in annual groundwater recharge, a condition that could eventually reduce the safe yields of wells. In addition, development can involve the destruction of wetlands. As indicated before, wetlands can serve as important groundwater recharge sources.

Water Quality Degradation

Lowering the water table can lead to the introduction of deeper water of poorer quality to shallower depths. This condition is particularly evident in areas where highly mineralized water occurs at depth. Highly mineralized water can occur in both bedrock and deeper unconsolidated aquifers. Poor quality water can also be mobilized due to contamination from improperly abandoned gas wells and water wells.

Groundwater resources are sometimes vulnerable to contamination that originates at or near the surface. This is particularly true in areas where permeable soils or shallow bedrock exist. Once contaminated, ground water can be very difficult and costly to cleanup and an individual or community must face the daunting task of installing treatment facilities or locating an alternative source. Source water protection, the prevention of contamination, helps to ensure a safe water supply. The threat of groundwater contamination from growth and development generally comes from three types of sources: septic systems and fertilizer use, chemical storage and spills, and commercial and industrial processes.

Residential development in rural settings typically involves the installation of onsite wastewater treatment systems (i.e. septic systems). These systems can provide an effective means of wastewater disposal. However, if septic systems are improperly sited, designed, constructed, or maintained, they can contaminate the ground water with bacteria, viruses, protozoa, detergents, oils, and chemicals. Of particular importance with septic systems is nitrate, an inorganic compound associated with human or animal wastes that causes a potentially lethal illness in young children. Nitrate does not easily breakdown in ground water and can travel relatively large distances in aquifers with rapid flow such as unconsolidated sand and gravel aquifers.

Nitrate can be of particular concern if water wells are improperly located in close proximity or downgradient (i.e. downhill) of septic systems. It is important to maintain an adequate protective distance from the well to the septic system. Excessive nitrate loading of ground water can occur if there is too high a density of septic systems. Thus, it is vital to locate septic systems on large enough lots to minimize excess loading.

Local Source Water Protection and Smart Growth Planning

In order to properly formulate a blueprint for a community, local officials and citizens must ensure that safe, reliable, and affordable drinking water will be available for future generations. The best way to do this is through a multi-step process that can be accomplished as part of a smart growth planning initiative:

Step 1: Identify Local Water Supply Resources;

Step 2: Delineate Areas With Growth Potential;

Step 3: Evaluate Susceptibility of Water Supply Resources to Growth; and

Step 4: Develop and Implement Management Measures.

Steps 1 through 3 are best accomplished through use of a Geographic Information System (GIS). A GIS is a method to visualize, manipulate, analyze, and display geographic data. GIS allows one to not only visualize water supply resource data better, but it also helps you to analyze the data and evaluate the susceptibility of these resources to growth.

An excellent resource on GIS in New York State is the New York State Geographic Information Systems (GIS) Clearinghouse. Through the clearinghouse website http://www.nysgis.state.ny.us you can learn about GIS education and training opportunities and access GIS datasets from local, county, state, and federal sources. Communities should consider joining the Clearinghouse's data sharing cooperative.

GIS expertise for your community may be available from your local county planning agency or soil and water district. It may also be available from regional planning boards/councils, local colleges and universities, and non-profit organizations such as the New York Rural Water Association. In addition, a number of GIS consulting firms exist.

Step 1: Identify Local Water Supply Resources

The first step in a comprehensive source water protection plan is to identify available groundwater supply resources. This step involves categorizing current water supply use, delineating groundwater resources that have the potential to be used for drinking water, and defining critical recharge areas where resources are being replenished.

In order to show current water supply use, all public water supply systems should be mapped. New York State defines a public water supply system as a water system that provides water to the public for human consumption through pipes or other constructed conveyances, if such system has at least five service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Information on public water systems is available from the New York State Department of Health's Bureau of Public Water Supply Protection. Information on community and non-transient, non-community water systems is also available online from the United States Environmental Protection Agency. In addition to mapping the location of public water supply systems in a community, it is important to document the service areas of these systems.

It is important to be able to identify groundwater resources on a local level in order to know how to best develop and/or protect them. The best way is to inventory and compile all existing well data and geologic, hydrogeologic, and soils mapping. Next, the data should be portrayed at a scale and format that will be useful. Compiling water well data is fundamental in understanding the local availability of ground water. Water well data is available from the NYSDEC and the United States Geological Survey (USGS). The NYS Water Well Driller Registration Law of 1999 requires a water well contractor to file a well completion report with NYSDEC. A copy of this report is also to be provided to the owner of the well. This information is available upon request from the NYSDEC. NYSDEC has well completion reports for wells drilled beginning January 1, 2000.

The USGS maintains a database on water wells that has been compiled based upon various water resource investigations. This information is available from the USGS in Albany by calling (518) 285-5602 or is now available online at http://water.usgs.gov/nwis. You may also wish to contact local county agencies since a few counties have maintained a well records database. Finally, local water well drillers may be willing to share older well records with you. Figure 4 is an example of a map that can be generated using local water well data.

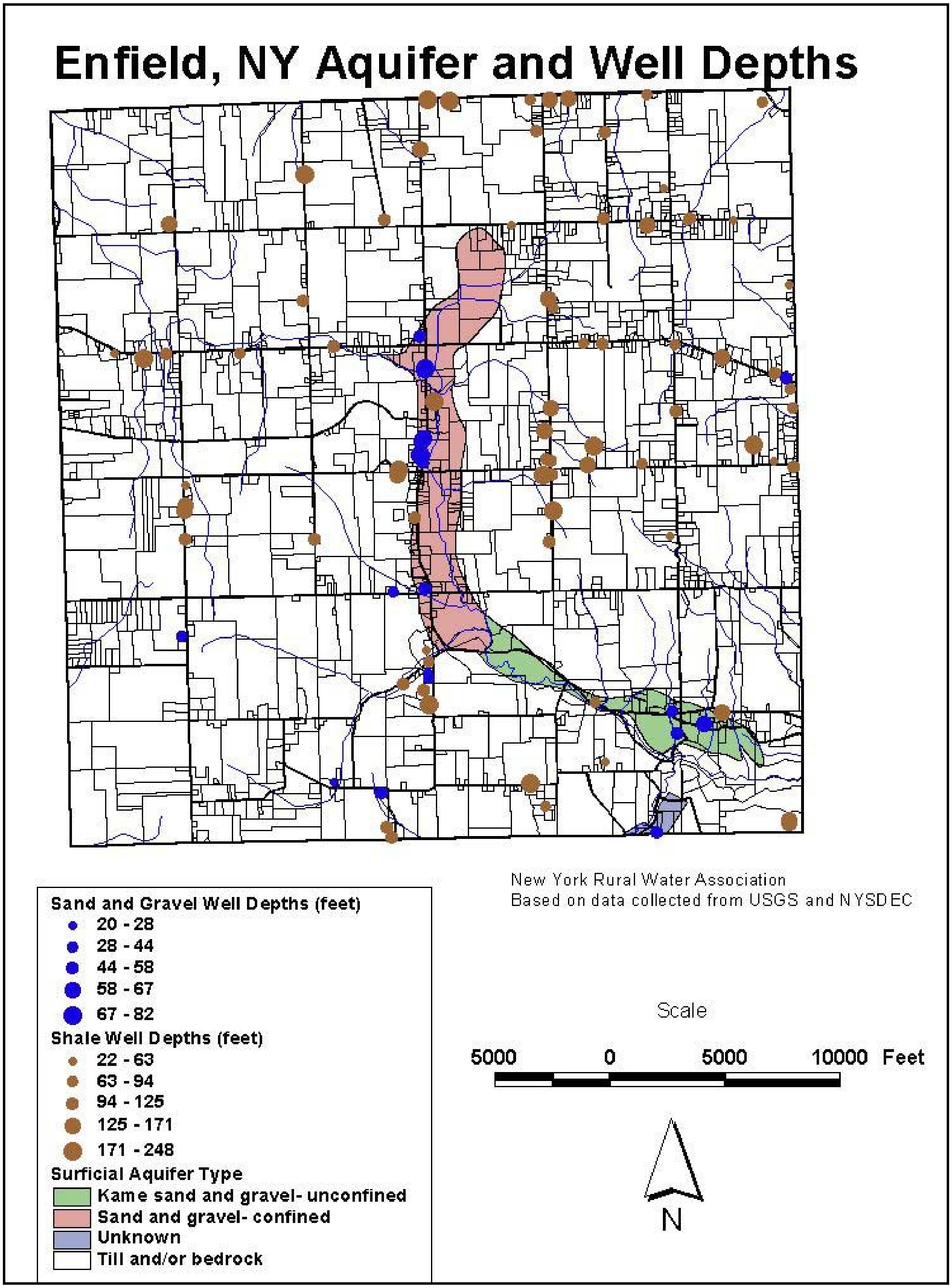
Geologic information for New York is available on a set of 1:250,000 scale maps that are published by the New York State Geological Survey. There is a Bedrock Geology Map and a Surficial Geology Map. Both are available in digital format as well. The usefulness of these maps is limited somewhat by their regional scale. Similarly, the United States Geological Survey published a series of maps of unconsolidated aquifers in New York at a scale of 1:250,000. These maps have been made available in digital format by the New York State Department of Health. The accuracy of such maps is not sufficient for many local land use planning purposes. For example, the aquifers displayed in Figure 4 (next page) were mapped by the USGS at a scale of 1:24,000. These same aquifers do not appear on the 1:250,000 scale aquifer maps.

The U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) (formerly Soil Conservation Service) has prepared soil maps for most counties in New York. A list of soil mapping availability can be found online at http://www.statlab.iastate.edu/soils/nsdaf or by calling the State Conservationist at 315-477-6504. Digitized soil maps are currently available from NRCS for several counties in New York. A listing of these counties is available at http://www.ftw.nrcs.usda.gov/stssaid.html. Soil survey maps at the county level are generally prepared at a scale of 1:15840. At this scale, soil mapping is useful for determining the suitability of soils for various uses such as septic systems, etc. It is also useful for identifying preferential groundwater recharge areas based upon the hydrologic soil groups and/or the depth to bedrock. Soil mapping can also be used to determine to approximate aquifer boundaries by use of the parent material of the soil.

As stated previously, recharge areas are where ground water is replenished by infiltrating precipitation. However, recharge rates are not uniform and there are areas where recharge occurs preferentially. For unconsolidated aquifers, groundwater recharge will preferentially occur on relatively low slopes where highly permeable soils exist. For bedrock aquifers, highest recharge rates are most likely to occur where the bedrock is at or near the land surface. Development in preferential groundwater recharge areas has the potential to more severely impact local well yields and water quality as described earlier.

Soils mapping can be used to identify areas of hydrologic group A soils that have a high infiltration rate and a low runoff potential. Soils maps can also be used to identify areas of shallow soils and/or exposed bedrock. Digitized topographic maps known as digital elevation models (DEMs) can be used with a GIS to identify areas with relatively low slopes. DEMs are available from the Cornell University Geospatial Information Repository (CUGIR) http://cugir.mannlib.cornell.edu/index.html or can be purchased from the USGS.

Figure 5 is an example of a preferential groundwater recharge area map for a local community. The land areas depicted possess either group A soils with slopes of less than 8 percent or shallow soils with bedrock at or within 40 inches of the land surface. The former areas would serve as key recharge areas for unconsolidated aquifers. The latter areas would serve as significant recharge areas for local bedrock aquifers.



Enfield, NY Aquifer and Well Depths
New York Rural Water Association
Based on data collected from USGS and NYSDEC
Sand and Gravel Well Depths (feet)
20 - 28
28 - 44
44 - 58
58 - 67
67 - 82
Shale Well Depths (feet)
22 - 63
63 - 94
94 - 125
125 - 171
171 - 248
Surficial Aquifer Type
Kame sand and gravel- unconfined
Sand and gravel- confined
Unknown
Till and/or bedrock
Scale
5000 0 5000 10000 Feet
N

Figure 4

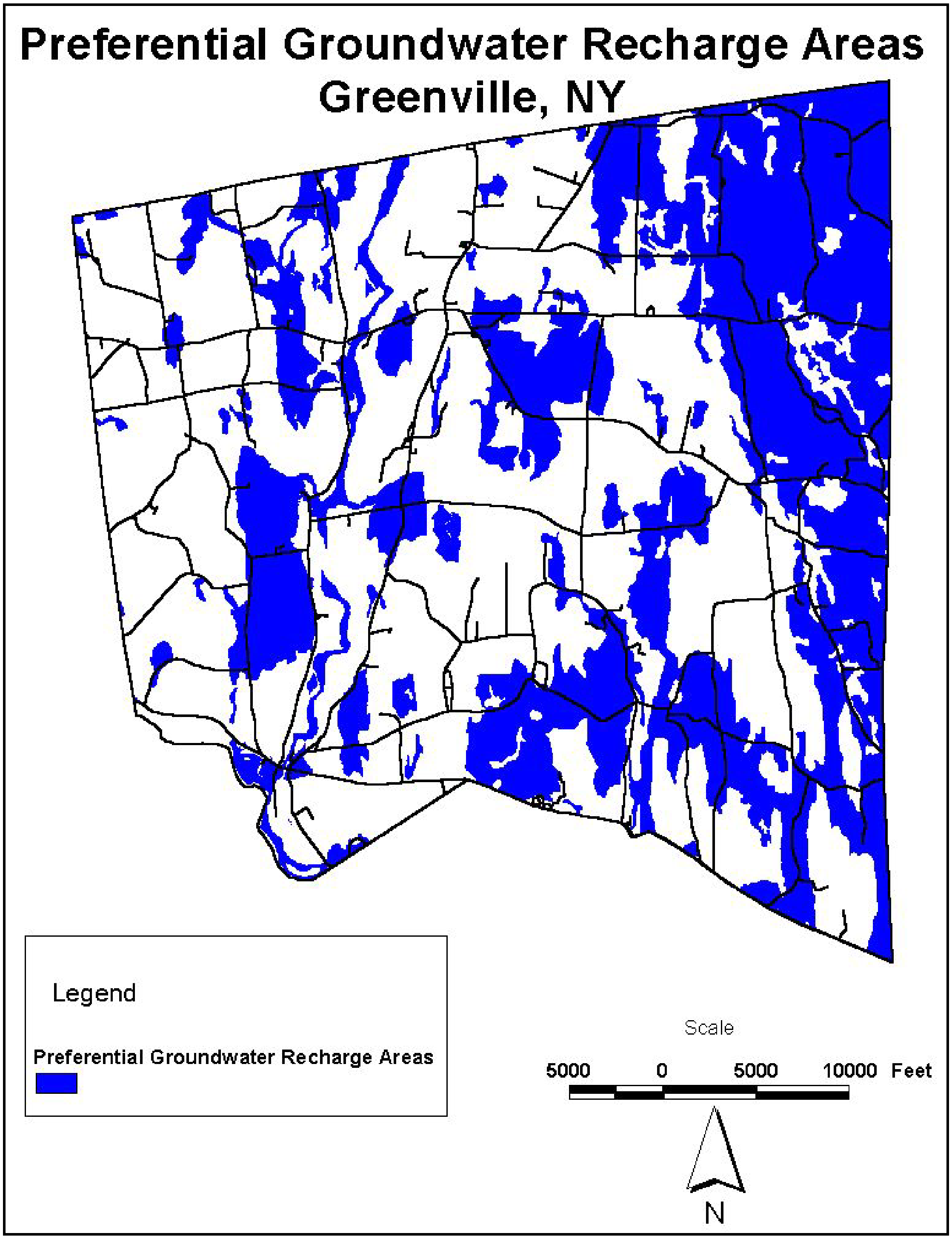

Preferential Groundwater Recharge Areas
Greenville, NY
Legend
Preferential Groundwater Recharge Areas
Scale
5000 0 5000 10000 Feet
N

Figure 5

Step 2: Analyze Undeveloped Land Which May Be Developed

In order to protect water resources, it is necessary to try to predict where development may occur. First, an assumption must be made that development will occur on land that is not now developed. A second assumption must be made that development is *not* likely in some areas due to physical constraints.

Delineating undeveloped land that may be developed can be accomplished using a GIS. Initially, a map of unprotected, undeveloped land can be made. This is done using a GIS by subtracting all publicly owned lands from all undeveloped land.

Developed land versus undeveloped land can be determined using the National Land Cover Dataset produced by the USGS using Landsat thematic mapper imagery. The New York State Department of Transportation (NYSDOT) has GIS datasets that map public lands in New York State. These are available from the New York State Geographic Information Systems (GIS) Clearinghouse http://www.nysgis.state.ny.us.

Once a map of unprotected, undeveloped land is produced, it is necessary to determine what areas are not likely to be developed due to physical constraints. These constraints include:

- proximity to wetlands, streams, ponds, lakes, and other surface waters;
- flood zones;
- hydric soils; and
- steep slopes.

Residential or commercial development would not likely occur within close proximity to wetlands, surface water bodies, and flood zones due to state or local regulations.

Wetlands maps are available in digital format from the NYSDEC from the Cornell University Geospatial Information Repository (CUGIR) http://cugir.mannlib.cornell.edu/index.html. Similarly hydrography files are available from CUGIR or the Clearinghouse and flood zone maps from the Clearinghouse.

A *hydric soil* is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. In general hydric soils have an extremely high water table or are seasonally saturated with water. Thus, they are not well suited for construction or septic systems. Data on hydric soils can be obtained from the local soil survey. Steep slopes are problematic for new construction for a variety of reasons including surface erosion, creep and sudden slope failure, and septic system failure. The prevalence of hydric soils and steep slopes may not necessarily preclude development within an area, but they would tend to discourage development for chiefly economic reasons.

Areas with lower development potential are either protected or already developed lands or lands with physical site constraints. Conversely, areas of higher development potential are unprotected, undeveloped lands that do not have development constraints. Figure 6 is an example of a development potential map.

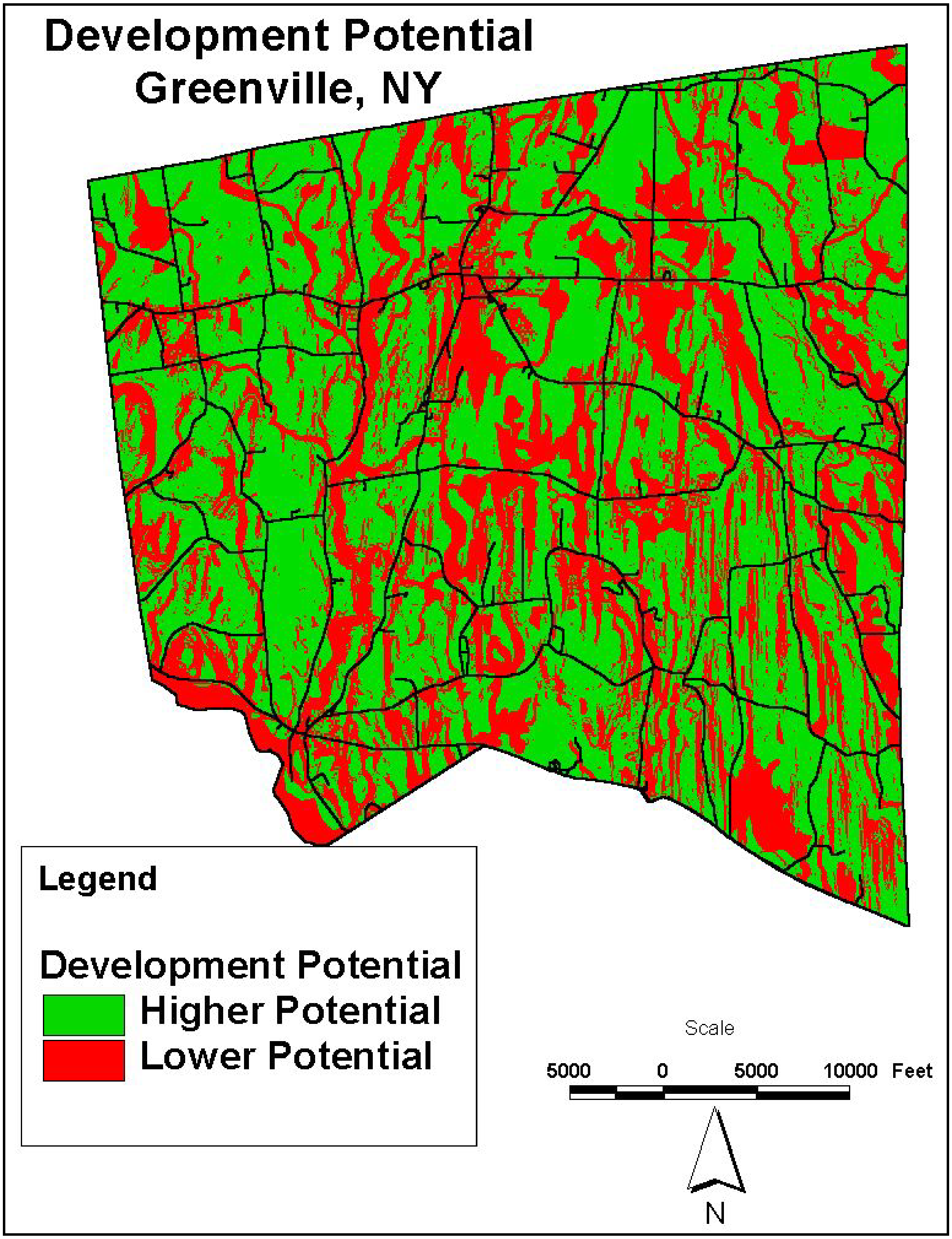

Development Potential
Greenville, NY
Legend
Development Potential
Higher Potential
Lower Potential
Scale
5000 0 5000 10000 Feet
N

Figure 6

Step 3: Evaluate Susceptibility of Groundwater Resources to Growth

Once the local water supply resources have been identified and the undeveloped land that may be developed has been delineated, the susceptibility of groundwater resources to future growth can finally be evaluated. This is a key step in drinking water protection for local communities. The sensitivity of the groundwater resources to the effects of well yield declines, water quality degradation and/or contamination is combined with the development potential to determine the overall susceptibility of groundwater resources to growth. Figure 7 below is a matrix that can be used to evaluate the susceptibility of groundwater resources to growth.

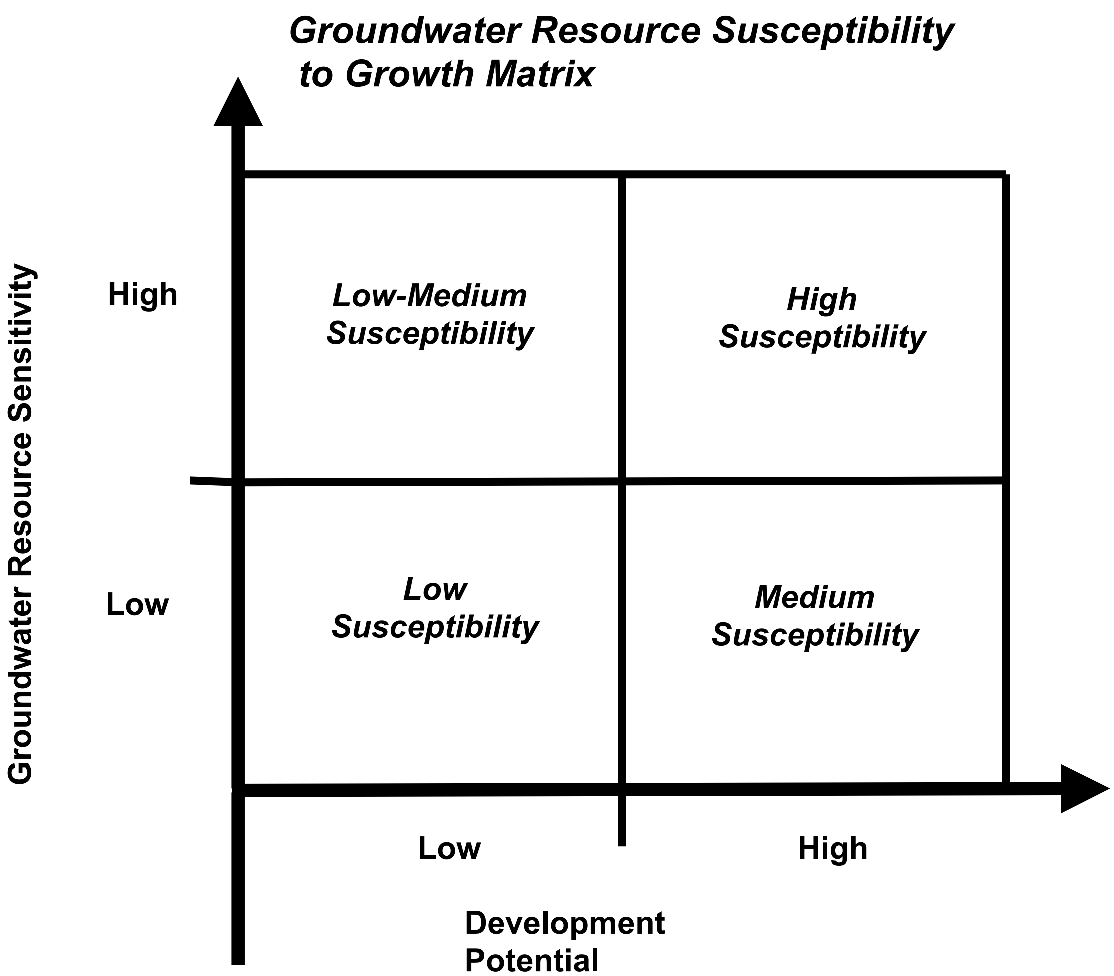


Figure 7

For planning purposes, it is important to be able to map groundwater susceptibility to growth ratings. Figure 8 (following page) is an example of such a map. Communities should prioritize protection planning efforts in areas of high groundwater resource susceptibility to growth. These are areas that are preferential groundwater recharge areas and have higher development potential.

In addition, attention should also be paid to areas of medium susceptibility if they are located in high-yielding aquifer areas. These are areas of higher development potential that are not located in preferential groundwater recharge areas.

Step 4: Develop and Implement Source Water Protection Measures

After determining groundwater resource areas that are susceptible to growth, it is important to develop and implement effective source water protection measures that protect these critical areas and encourage future development in other areas. There are number of source water protection measures that can be chosen. Some of these are regulatory in nature. Others are non-regulatory.

These measures could include:

- written comprehensive plans;
- land use regulations (subdivision regulations, site plan review, zoning);
- other local ordinances;
- agricultural land protection;
- environmental review;
- land acquisition; and
- local infrastructure planning.

Each community should determine which measures are acceptable given local socioeconomic and political conditions.

Written Comprehensive Plans

Ideally, water supply resource planning should be conducted as part of developing or revising a written comprehensive plan. Town Law of New York State defines a town comprehensive plan as *"the materials, written and/or graphic, including but not limited to maps, charts, studies, resolutions, reports and other descriptive material that identify the goals, objectives, principles, guidelines, policies, standards, devices and instruments for the immediate and long-range protection, enhancement, growth and development of the town.."*

Local Land Use Regulations

Land use regulations are a means to incorporate source water protection on a local level. Subdivision regulations relate to how land is to be divided into lots and what improvements such as utilities, drainage, etc. are made to service the lots. Site plan review is a local regulatory process that involves municipal review and approval of how development is to occur on a *single* parcel of land. Zoning regulates land uses, the density of land uses (lot sizes, etc.), and the siting of development. Subdivision, site plan review, and zoning regulations can each contain source water protection provisions. For example a frequent protection technique is to create a groundwater protection overlay district as part of the zoning. Overlay zoning creates a set of regulations for a given area that are in addition to the regulations in the standard "underlying" zoning districts. A model groundwater protection overlay district has been developed by USEPA and can be found at http://www.epa.gov/owow/nps/ordinance/mol7.htm#groundwater.

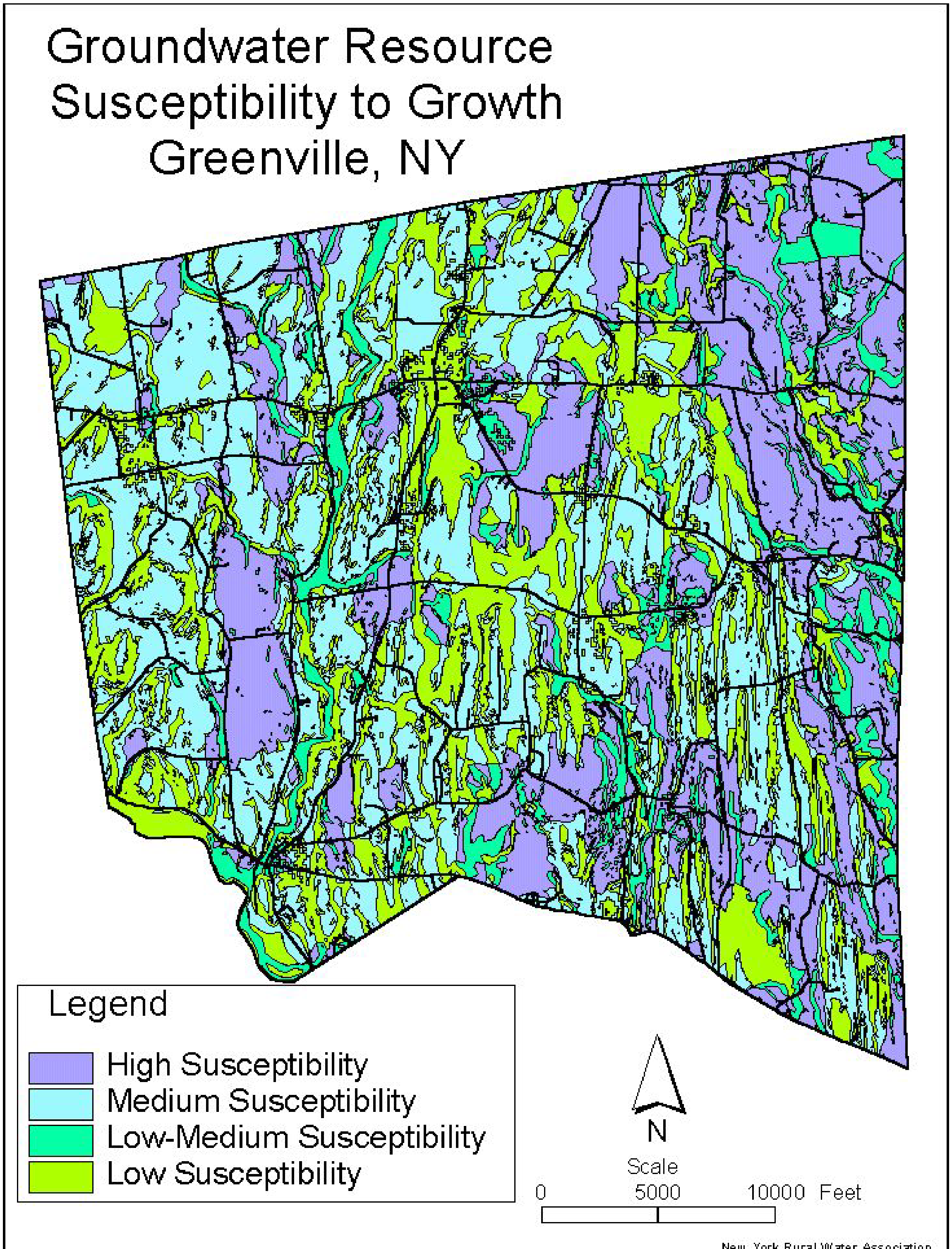

Groundwater Resource
Susceptibility to Growth
Greenville, NY
Legend
High Susceptibility
Medium Susceptibility
Low-Medium Susceptibility
Low Susceptibility
N
Scale
0
5000
10000 Feet
New York Rural Water Association

Figure 8

Other Local Laws

Under the Municipal Home Rule Law, towns and villages are given the specific authority to adopt other local laws other than land use regulations "for the protection and enhancement of [their] physical and visual environment." In addition to authority under the Municipal Home Rule Law, local governments have the authority under the Environmental Conservation Law to adopt a local freshwater wetlands law as long as it is at least as stringent as the New York State law. An example of a local wetland protection law adopted by Croton-on-Hudson, NY can be found at http://www.epa.gov/owow/nps/ordinance/hudson.htm. Other local laws that enable source water protection include junkyard laws and erosion and sediment control laws. A model erosion and sediment control local law developed by Wayne County Soil and Water Conservation District can be found at http://www.lakeontario.net/swcd/ordinance/.

Agricultural Land Protection

Local municipalities should encourage the sound environmental management and preservation of agricultural land in order to preserve open space and prevent the deterioration of groundwater resources from development. Agricultural Environmental Management (AEM) is a voluntary, incentive-based program in New York State that provides farmers with education, technical assistance and cost sharing to address non-point source pollution originating from farms. More information on AEM can be found online on the NYS Department of Agriculture and Markets website http://www.agmkt.state.ny.us/SoilWater/AEM/AEM.html.

Farmland preservation is a priority in many rural communities and a common mechanism to protect farming is the formation of an agricultural district. Under Agriculture and Markets Law, an agricultural district is a set of parcels of predominantly viable agricultural land that are voluntarily formed by agricultural landowners and adopted by county legislative bodies. Agricultural districts are designed to protect and enhance farm operations.

Agricultural districts are subject to county review eight, twelve, or twenty years after the date of creation. Local municipalities have the opportunity to comment on district boundaries during this review period. Areas with higher development potential should be taken into consideration when decisions on reviewing and/or creating agricultural districts are made.

Environmental Review

In New York, all state and local government agencies are required by the State Environmental Quality Review Act (SEQR) to consider environmental impacts prior to making decisions to approve, fund, or directly undertake an action. Types of decisions or actions that are subject to SEQR include approval or direct development of physical projects, planning activities that require a decision, and adoption of rules, regulations, procedures and policies. So-called Type II actions never require preparation of a "determination of significance" because they either do not significantly impact the environment or are specifically precluded from environmental review under SEQR. However, all other so-called Type I or Unlisted Actions do require a determination of significance. If an action is determined to have potentially significant adverse environmental impacts, an Environmental Impact Statement (EIS) is required.

One way to insure that government agencies take an area of critical environmental importance into account when making discretionary decisions is for a local municipality to designate a specific geographic area within its boundaries as a critical environmental area (CEA) under SEQR. The potential impact of any Type I or Unlisted Action on the environmental characteristics of the CEA is a relevant area of environmental concern and must be evaluated in the determination of significance prepared pursuant to SEQR.

Land Acquisition

In some instances, a community may wish to purchase the full interest in a particular parcel in order to conserve its natural or scenic resources. A more common method of land preservation is the purchase of an interest in the land, called a conservation easement.

Communities may purchase conservation easements or individuals can donate the easements and thus qualify for possible tax advantages. Alternatively, non-profit land trusts may purchase conservation easements or work with local governments to facilitate conservation easements.

Infrastructure Planning

Finally, many rural communities in New York that are experiencing growth are wrestling with the issue of whether to form water and/or sewer districts to address water quantity and/or quality concerns. Infrastructure planning is important and there are a number of financial and technical assistance programs provided by government and non-profit organizations for infrastructure development. These are spelled out in a guide published by the NYS Legislative Commission on Rural Resources entitled “Keeping New York's Waters Pure”. It can be found online at http://www.senate.state.ny.us/.