

DRAFT
NATURAL RESOURCE INVENTORY

**TOWN OF ROCHESTER
ULSTER COUNTY, NEW YORK**

Revised: July 24, 2006



PREPARED FOR:

**TOWN OF ROCHESTER
50 SCENIC ROAD
ACCORD, NEW YORK 12404**

PREPARED BY:

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Revised: July 24, 2006

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Introduction

The Town of Rochester is located in south-central Ulster County, situated between the City of Kingston to the northeast and the Village of Ellenville to the southwest. The Town of Rochester is bordered by the Town of Wawarsing to the south, the Towns of Gardiner and New Paltz to the east, the Towns of Marbletown and Olive to the north, and the Town of Denning to the west.

The Town is comprised of approximately 88 square miles, and according to the 2004 U.S. Census, is home to approximately 7,236 people. More densely settled areas are generally located within and around the Town's chief hamlet areas.

The Town of Rochester's natural setting is one of the key defining characteristics of the Town and collectively has continued to make the Town a desirable place to live and work. Wetlands, heavily forested areas, numerous watercourses, and varying topography with prominent ridgelines all contribute to the Town's scenic beauty and are considered valuable resources by Town residents and visitors alike.

What is a Natural Resource Inventory?

A Natural Resource Inventory is a document that inventories, to the extent possible, the natural resources of an area, in a usable format so that decision makers can make educated planning decisions. The primary purpose of this Natural Resource Inventory is to provide data that can form a basis for municipal planning and to assist in the preparation of the Town's Comprehensive Plan.

This Natural Resource Inventory identifies and illustrates some of the Town's natural resources. This document is not an all-inclusive description of the Town's natural resources, but rather is a first step in identifying resources such as steeply sloped areas, ridgelines, wetlands, streams, aquifers, and agricultural lands and provides a basis for identifying appropriate resource management strategies in the Comprehensive Plan.

Topography

The Town of Rochester is characterized by diverse topography (see Figures 1 and 2). Slope and topography describe the shape and relief of the land. Topography is a measurement of elevation and slope is the change in elevation over a certain distance. Figure 3 illustrates three different slope categories throughout the Town: 0-15%, 15-20%, and 20% and greater. Although a significant amount of the Town's

surface area has a slope of 0-15%, very little of the Town is noticeably flat and the flat land is mainly associated with the Rondout river valley. The steep slopes of the Shawangunk and Catskill Mountains (greater than 20%) provide the Town with an appealing landscape and scenic viewsheds.

The topography of the Town is comprised of three dominant physical characteristics, which include the Shawangunk Mountains located in the eastern portion of the Town, the Catskill Mountains located in the western portion of the Town, and the flat lands along the Rondout Creek. Elevations in the Town range from approximately 200 feet to approximately 2,600 feet above sea level (see Figure 4). The area along the river valley contains low elevations until reaching the mountain ranges to both the east and west. Areas to the west of the Rondout Creek can be characterized as gently rolling and level until reaching the Catskill Mountains where the slope increases. The land to the east of the Rondout Creek experiences more severe slopes toward the Shawangunk Mountains.

High points in the Town of Rochester include:

- North and west of Big Rosy Bone Knob (2,630 feet)
- Big Rosy Bone Knob (2,220 feet)
- Castle Point (2,140 feet)
- Pope Hill (1,972 feet)

Surficial Geology

Surficial geology describes the rocks and unconsolidated materials that lie between the bedrock and the surface of the land. The unconsolidated materials or soils refer to the minerals and organic matter on the immediate surface of the Earth, while the rocks include exposed bedrock or glacial deposits. While soils refer to the organic components in these materials, surficial geology refers to the rock and mineral components of these materials. As the glaciers receded some 11,000 years ago, the rock and debris that was frozen within the ice was left behind in various formations. These formations contain various sized particles and are classified by their shape of formation, thickness, and the type and size of particles found.

Figure 5 illustrates the surficial geology of the Town. The data used in the preparation of this map was kindly provided by Steven Winkley of the New York Rural Water Association and is based on the NYS Surficial Geologic Map, the Ulster County Soil Survey, and on site and well reconnaissance by Mr. Winkley.

In general, Figure 5 indicates that: 1) only thin soils cover parts of Rochester Center, South Berme, and Tow Path Roads, 2) that deeper sediments including silty clay as well as sand and gravel occupy the central valley (roughly paralleling the Rondout Creek), and 3) the northern half of Town consists of clayey glacial till that covers most upland areas, with mixed sediments occupying the upland valleys.

Groundwater

Aquifers are geologic formations beneath the Earth's surface that store and yield usable amounts of groundwater. The location, size, capacity, depth, and flow characteristics of an aquifer are the direct result of the geology and hydrology of the particular aquifer and its recharge area (the land area that contributes to the aquifer's replenishment). Aquifers are replenished by the infiltration of precipitation through the soils directly over or adjacent to aquifers, and sometimes by infiltration from surface water resources such as streams or ponds.

An unconsolidated aquifer is an aquifer composed of material that is loosely arranged or whose particles are not cemented together, such as sands and gravels. Figure 6 illustrates potential unconsolidated aquifers identified by the Rural Water Association within the Town. The Rural Water Association indicates that no surficial aquifers exist in the southern quarter of the Town and that some groundwater resources may exist in valley sediments in the northern half of the Town. Their report suggests there may be productive aquifers in the deeper sediments in the central valley following the Rondout Creek, some of which are covered by clay (confined aquifers) and some of which are directly recharged through surface soils (unconfined aquifers).¹

The bedrock underlying the study area consists of Silurian to Devonian aged rocks. The New York Rural Water Association has suggested grouping these various bedrock formations into seven hydrostratigraphic units. A hydrostratigraphic unit is a mappable body of rock or sediment that is hydraulically connected (allows groundwater flow) or grouped together on the basis of similar hydrologic properties such as hydraulic conductivity, porosity, and well yields.²

Figure 7 illustrates mapped hydrostratigraphic units. The Helderberg/Tristates Carbonates, Silurian Carbonates and Onondaga/Schoharie carbonates share similar geologic properties and are collectively identified by the New York Rural Water Association as Karst Aquifers. Karst-forming carbonate aquifers store water not

¹ The thickness, recharge rates, or productivity of these aquifers has not been confirmed by The Chazen Companies.

² Draft report prepared by Steven Winkley of the New York Rural Water Association titled "Town of Rochester Groundwater Protection Plan."

only within fracture and joint openings, like other bedrock formations, but can also contain wider open passages developed by chemical erosion of limestone over time. Areas with suspected highest rates of groundwater recharge into the Karst Aquifer were identified by the New York Rural Water Association and shown on Figure 7 as Karst Aquifer Recharge Areas.³ Karst aquifers require particular management care because recharge can flow directly into rock caverns, in some cases with little to no filtration benefits, and wells installed in karst formations can yield unfiltered water.⁴ Detailed field mapping and swallow-hole die testing is usually required in karst terrain to identify specific recharge points and to estimate the locations of subterranean flow passageways.

As illustrated on Figure 7, Esopus Shale is located between the Helderberg/Tristates Carbonates and Onondaga/Schoharie Carbonates. Similar clastic rock formations underlie the northern half of the Town. Groundwater flow rates are much more limited in these formations due to the lack of solution passageways. Groundwater quality withdrawn from wells in such formations can therefore be more predictably high-quality since most water will have been adequately filtered by infiltration through soil horizons and narrow opening rock fractures.

The Shawangunk Conglomerate underlies the southern third of the Town, consisting of brittle and massive quartzite. Well drilling is difficult in this formation and yields are low and can contain dissolved iron.

Aquifer recharge rates vary throughout the Town based on soils. Once water enters the subsurface, it then migrates from higher elevation areas to lower area discharge locations. Accordingly, all areas except extremely clayey areas and paved areas provide recharge to Rochester's various aquifers. The draft report prepared by the New York Rural Water Association for the Town of Rochester does not include aquifer recharge rates; however, a similar study by the same group for the Town of Saugerties estimated recharge rates of 18 inches per year in areas with sand and gravel exposed at grade, 7 inches per year in areas with thin till-derived soils or exposed bedrock, and 3 inches per year in areas with thick clayey-silt and former glacial lake deposits. The source of these recharge rate estimates in the Saugerties NY Rural Water Association study is not cited.

A recent study completed by The Chazen Companies for the Dutchess County Water & Wastewater Authority has assigned aquifer recharge rates to readily-available

³ Draft report prepared by Steven Winkley of the New York Rural Water Association titled "Town of Rochester Groundwater Protection Plan."

⁴ The location or water quality of these karst aquifers or their primary recharge areas has not been confirmed by The Chazen Companies.

Natural Resource Conservation Service (NRCS) Hydrologic Soil Groups, instead of to geologic formations. A list of these Hydrogeologic Soil Group Assignments is provided in Chapter Seven of the NRCS Hydraulics and Hydrology Technical References, National Engineering Handbook, available at ftp://ftp.wcc.nrcs.usda.gov/downloads/hydrology_hydraulics/neh630/hydro_soil_groups.pdf.

In general terms, sandy soils are assigned to Hydrologic Soils Group A and A/D, silty sand soils are assigned to Hydrologic Soil Group B, clayey silts are assigned to Hydrologic Group C and C/D, and clay soils are assigned to in Hydrologic Group D. Throughout the Hudson Valley, Hydrologic Groups B, C, and C/D together normally constitute approximately 80 percent of all soils and often include all till-based soils and the more fine-grained soils found in valley outwash areas. Of the remaining 20 percent, approximately 10 to 15 percent are Hydrologic Soils Group A and A/D soils, consisting of sand and gravel areas, and 5 to 10 percent of soils are clays assigned to Hydrologic Soil Group D.

The Chazen Companies provides the following preliminary recharge rate estimates based on Dutchess County's recharge rates, which have been adjusted here to reflect rainfall differences between Rochester and Dutchess County: annual aquifer recharge rate of approximately 21 inches through Hydrologic Soil Group A and A/D, annual aquifer recharge rate of approximately 15 inches through Hydrologic Soil Group B soils, annual aquifer recharge rate of approximately 8 inches through Hydrologic Soil Group C and C/D soils, and annual aquifer recharge rate of approximately 4.5 inches through Hydrologic Soil Group D soils. Each of these soils may receive additional 20 to 30 percent infiltration volumes that do not reach the underlying aquifer but instead flow laterally to streams or ponds within a matter of days, known as interflow.

All aquifer and interflow recharge rates estimated within this document by The Chazen Companies are preliminary in nature and have not been confirmed by field investigations. These estimates and those estimated by the New York Rural Water Association for Saugerties are included as part of this Natural Resource Inventory because they provide an indication of the ability of lands across Rochester to support sustainable domestic and community wells and septic systems and are useful in evaluating the effects of human water uses on stream-flow preservation.

Surface Water Resources

The Town of Rochester has numerous water resources, including wetlands, lakes, streams, and associated buffer areas and floodplains (see Figure 8). Although water resources are abundant in the Town of Rochester, certain activities, particularly related to development, can adversely affect the ecological balance and environmental function of these resources.

The surface water in the Town of Rochester drains from the Catskill and Shawangunk Mountains into numerous tributary streams before reaching the Rondout Creek, which ultimately joins the Wallkill River in Rosendale and then flows into the Hudson River in Kingston. Groundwater leaving aquifers throughout Rochester also supports surface water streams, comprising a majority of stream flow, or baseflow, during dry periods.

Streams

The major watercourses that originate from the Catskill Mountains include the Mombaccus Creek, Mill Brook, Rochester Creek, North Peters Kill, and Vernoy Kill; these watercourses generally flow from the north to the south. The primary streams generated from the Shawangunk Mountains include the Stony Kill, Sanders Kill, and Peters Kill, which generally flow from the southwest to the northeast.

The New York Department of Environmental Conservation (NYSDEC) has assigned classifications to water resources for best uses and standards of quality and purity. Classifications are based on water quality at the time of sampling, as well as the natural conditions predicated on the past and current uses of lands bordering various water resources. The most pristine waters are assigned a classification of AA, while the most degraded waters are assigned a classification of D. Class A and AA waters are suitable for drinking water; Class B waters are suitable for primary contact recreation, such as swimming; Class C waters are suitable for fish propagation; and Class D water are suitable for secondary contact recreation, such as boating. A Class D designation, however, does not necessarily imply that the water is polluted. These are waters that may not have been sampled, are small, or are intermittent and, therefore, unsuitable for fish propagation. The symbol (T) after any class designates that the waters contain trout and the symbol (TS) after any class designates that the waters are suitable for trout spawning. Modification or disturbance of the bed or banks of protected streams that are classified C(T) and above requires a permit from the NYSDEC.

The Rondout Creek is the largest water resource in the Town of Rochester. The Rondout is a Class B stream and is a tributary to the Hudson River. In addition to the Rondout Creek, there are numerous creeks and streams that flow throughout the Town. Below is a list of the primary streams within the Town and their associated classification:

Stream Name	Class
Coxing Kill	C(T)
Kripplebush Creek	C(T)
Mettacahonts Creek	A(TS)
Mill Brook	A(T)
Mombaccus Creek	A(TS)
North Peters Kill	A(T)
Peters Kill	B(T)
Rochester Creek	A(TS)
Rondout Creek	B
Sanders Kill	AA(T)
Sapbush Creek	A(TS)
Stony Kill	AA(T)
Trout Creek	A(TS)
Vernoy Kill	A(TS)

Observations indicate that a number of the stream classifications may not accurately reflect existing water quality. The Environmental Commission has volunteered to conduct the necessary research and examine the current status of high priority streams within the Town of Rochester. For example, the Coxing Kill is currently classified as a C(T) Stream by the NYSDEC; however, the Coxing Kill holds a significant trout population and evidence recently obtained by the NYSDEC Division of Fish, Wildlife and Marine Resources indicates that trout utilize this stream for spawning purposes.

Wetlands

According to the United States Army Corps of Engineers (ACOE), wetlands are those areas that are inundated or saturated by surface water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. According to the NYSDEC, wetlands are those areas of land and water that support wetland plants that out-compete upland plants because of the presence of wetland hydrology or hydric soils.

Both the NYSDEC and the ACOE regulate wetlands in New York and have designated wetland areas of protection within the Town of Rochester (see Figure 8). The Town of Rochester encompasses approximately 1,365 acres of NYSDEC freshwater wetlands and approximately 1,948 acres of wetlands regulated by the ACOE.

NYSDEC freshwater wetlands are protected under Article 24 of the Environmental Conservation Law, commonly known as the Freshwater Wetlands Act (FWA). The FWA protects those wetlands equal to or larger than 12.4 acres in size and certain smaller wetlands of unusual importance. A 100-foot buffer area is associated with all NYSDEC wetlands and disturbance to the wetland or its associated buffer requires approval from the NYSDEC. The ACOE protects wetlands adjacent to navigable waters and their tributaries under Section 404 of the Clean Water Act, irrespective of size.

As illustrated in Figure 8, many wetlands throughout the Town are co-regulated by both the NYSDEC and the ACOE. In order to ensure adherence to state and federal wetland regulations, the existence and exact extent of wetlands should be field verified when development activity is proposed.

Floodplains

Floodplains are also common along the streams located throughout the Town. Floodplains serve two important purposes: they act as temporary natural water storage areas during periods of high water following heavy rains or melting snows, and they reduce peak flows during flooding, therefore limiting downstream bank erosion. Figure 8 illustrates the locations of floodplain boundaries throughout the Town.

The Federal Emergency Management Agency (FEMA) has developed a national standard for flood protection by establishing floodplain and floodway boundaries for 100-year storm events. A 100-year floodplain delineates the area that is susceptible to a 1% annual chance of flooding (i.e., the 100-year storm event). Encroachment of development onto floodplains reduces the flood-carrying capacity of streams, increases flood heights and velocities, and increases flood hazards beyond the area of encroachment.

Chapter 81 of the Rochester Town Code provides for flood damage prevention. Adopted in 1987, it regulates land uses in all 100- and 500-year floodplains mapped by FEMA. Chapter 81 requires a Flood Development Permit for construction activity within FEMA mapped floodplains throughout the Town. The purpose of

this ordinance is to promote public health, safety, and welfare relating to flood conditions. Overall, the ordinance provides methods for managing flooding and preventing flood damage in the community.

Agriculture

Article 25-AA of the Agricultural and Markets Law authorizes the creation of local agricultural districts pursuant to landowner initiative, preliminary county review, state certification, and county adoption. The purpose of agricultural districting is to encourage the continued use of farmland for agricultural production. The program is based on a combination of landowner incentives and protections, all of which are designed to forestall the conversion of farmland to non-agricultural uses. Figure 9 illustrates the location of the Agricultural District (Ulster County Agricultural District #3) and certain agricultural features within the Town of Rochester.

The Town of Rochester has had a strong agriculture base since the late 1600's. The early farms were located in the fertile floodplains along the Rondout Creek. These same areas are still used for farming today. Agriculture and farming has always been and will continue to be an economic benefit and an important land use in the Town. There are a number of active farms in the Town which produce a range of agricultural products. According to Figure 9, there are 466 parcels of land in the Town of Rochester that are located within the Agricultural District, totaling approximately 8,115 acres.

Vegetation, Wildlife, Protected Lands, and Conservation Targets

Vegetation

The vegetative communities found in Rochester vary greatly due to the various environmental conditions that exist in the Town. Upland areas of the Town are comprised of predominantly second growth mixed hardwood forest; the Shawangunk Mountains are dominated by chestnut-oak, northern red, white, and black oak species. The rocky summits contain a mix of dwarf pitch pine, oak, blueberry and huckleberry. These are old growth, or climax, forests that require disturbances like fire to be sustained. Ravines and lowland areas are dominated by hemlocks, red maple and sugar maple. The Catskill Mountains support a variety of coniferous and deciduous species including hemlocks, spruce, fir, beech, and birch trees. Vegetation along the Rondout Creek consists of red maple, sugar maple, box elder, eastern cottonwood, and willow.

Wildlife

The Shawangunk Mountains, the Catskill Mountains, and the Rondout Creek are the most predominant physical characteristics in Town and provide ample habitat for many wildlife species. Some of the wildlife found throughout the Town's habitat includes woodchucks, white tail deer, black bear, fox, raccoons, squirrels, chipmunks, opossum, bobcats, coyote, porcupine, skunks, otter, and shrews. Various avian species such as hawks, owls, ducks, heron, turkey, vultures, and a variety of songbirds also occupy woodland and wetland/creek habitats.

The diversity and health of wildlife populations which inhabit an area are closely linked to the physical environment of the region. Many factors influence vegetation and wildlife including soils, climate, hydrology, and human activities.

Endangered, Threatened, Rare, and Species of Special Concern

Information was requested from the New York Natural Heritage Program regarding the presence and location of endangered, threatened, rare, and species of special concern throughout the Town of Rochester. A response has been received and the following table identifies species found within the Town of Rochester since 1980 on the Sundown Wild Forest, Minnewaska State Park Preserve, and the Mohonk Preserve. It should be noted that information provided by the New York Natural Heritage Program focuses on those species occupying the Mohonk Preserve, Minnewaska State Park, the Sundown Wild Forest, and the Catskill Mountains. The New York Natural Heritage Program has not analyzed the Town outside of these protected areas; therefore, the absence of data for the remainder of the Town does not necessarily mean that sensitive species do not exist.

**New York Natural Heritage Report
on Rare Plants And Animals**



**within Public Lands And Protected Private Lands in the
TOWN OF ROCHESTER**

Prepared February, 2006 from the Biodiversity Databases of the New York Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.

Last documented on Protected Lands since 1980

SCIENTIFIC NAME	COMMON NAME	NY STATE LISTING	NY STATE RANK*
<u>NYS DEC Lands</u>			
Sundown Wild Forest <i>Crotalus horridus</i>	Timber Rattlesnake	Threatened	S3
<u>NYS State Parks</u>			
Minnewaska State Park Preserve			
<i>Myotis leibii</i>	Eastern small-footed bat	Special Concern	S2
<i>Falco peregrinus</i>	Peregrine Falcon	Endangered	S3
<i>Glena cognataria</i>	Blueberry Gray Moth		S1S3
<i>Zanclognatha Martha</i>	Pine Barrens Zanclognatha Moth		S1S2
<i>Zale curema</i>	A Noctuid Moth		SU
<i>Apharetra dentata</i>	Toothed Apharetra Moth		S2S3
<i>Cordulegaster obliqua</i>	Arrowhead Spiketail (Dragonfly)		S2S3
<i>Minuartia glabra</i>	Appalachian Sandwort	Threatened	S2
<i>Corema conradii</i>	Broom Crowberry	Endangered	S1
<i>Carex cumulata</i>	Clustered Sedge	Threatened	S2S3
<i>Asplenium montanum</i>	Mountain spleenwort	Threatened	S2S3
<i>Sphagnum andersonianum</i>	Moss		S2
<i>Sphagnum angermanicum</i>	Moss		S1
<i>Sphagnum tenellum</i>	Moss		S2
<i>Sphagnum trinitense</i>	Moss		S1
<u>Mohonk Preserve</u>			
<i>Falco peregrinus</i>	Peregrine Falcon	Endangered	S3
<i>Glena cognataria</i>	Blueberry Gray Moth		S1S3
<i>Apharetra dentata</i>	Toothed Apharetra Moth		S2S3
<i>Asplenium montanum</i>	Mountain Spleenwort	Threatened	S2S3

Rarity in NYS as ranked by NY Natural Heritage Program on a 1 to 5 scale:
S1 = Critically imperiled; S2 = Imperiled; S3 = Rare or uncommon;
S4 = Abundant and apparently secure; S5 = Demonstrably abundant and secure;
SU = Not yet ranked.



Figure 10 illustrates locations of rare species, significant natural communities, and areas important to natural communities or rare species. The data used in the preparation of this map was graciously provided by the New York Natural Heritage Program. Figure 10 illustrates two locations of the Appalachian Sandwort, a New York State listed threatened species, which are located outside of the NYSDEC Forest Preserve, New York State Parks, and the Mohonk Preserve, and whose locations are relatively precisely known.

According to the New York Natural Heritage Program, the natural community occurrences illustrated on Figure 10 are all ranked as being of excellent or good quality and therefore are considered significant from a statewide perspective. By meeting specific document criteria, the New York Natural Heritage Program considers these occurrences to have high ecological and conservation value. For descriptions of each of the ecological community types identified on Figure 10, please refer to the draft Second Edition of Ecological Communities of New York State (2002) at http://www.dec.state.ny.us/website/dfwmr/heritage/draft_ecny2002.htm.

Figure 10 also illustrates areas important to natural communities or rare species which lie outside, or partly outside, the NYSDEC Forest Preserve and Minnewaska State Park Preserve. According to the New York Natural Heritage Program, these areas should be considered approximate.

Protected Lands

Figure 11 illustrates various protected lands throughout the Town. According to data provided by the Ulster County Nature Conservancy, there are three prominent protected areas in Town: the Catskill Park Forest Preserve, the Minnewaska State Park Preserve, and the Mohonk Nature Preserve. In addition, there are approximately 22 parcels of land within the Town with conservation easements, and the Sundown Wild Forest also extends into the Town.

The Ulster County Nature Conservancy conducted a study identifying unfragmented lands south of the Rondout Creek. This area includes lands within both the Minnewaska State Park Preserve and the Mohonk Nature Preserve; however, unfragmented forest areas extend well past these protected lands. Large, intact forested areas support wildlife species that need large areas and species that are most sensitive to specific habitat requirements, particularly interior forest habitat. The unfragmented forest of the northern Shawangunks has been identified by The Nature Conservancy as a globally significant forest block. Opportunities to build or protect large forest blocks may include protecting areas adjacent to existing protected large blocks, such as the ridge-top preserves. Figure 12 illustrates

unfragmented forest areas and parcels that have been developed south of the Rondout Creek. Unfragmented forest areas are an important consideration in the context of future development proposals and could assist in providing undisturbed habitat and open space corridors if the Town so desires. While the mapping was limited to south of the Rondout Creek, the Environmental Commission intends on expanding the study area by focusing on unfragmented lands and undeveloped parcels north of the Rondout Creek.

According to the NYSDEC, a Forest Preserve includes public lands within the Adirondack and Catskill Parks and within “forest preserve counties” as defined by the New York State Legislature. Forest Preserve lands are protected by Article XIV of the New York State Constitution.

According to the NYSDEC, State Forests were originally confined to “reforestation areas,” but have been expanded to include land parcels acquired under several bond acts as well as conservation easements. Those lands known as “State Forests” are under the administration of the Division of Lands and Forests and are located outside the Adirondack and Catskill Parks.

The NYSDEC defines Nature Preserves as parcels of land owned by the state and acquired to protect the biological diversity of plants, animal, and natural communities and may provide a field laboratory for the observation and education of these relationships. These areas may be used for passive recreational pursuits by the public.

Conservation Targets

In order to facilitate understating about the habitats and natural communities of the Shawangunks, the Shawagunk Ridge Biodiversity Partnership has provided data to identify the different habitat areas contained within the Ridge. The Partnership has identified approximately forty different ecological communities in the Shawangunks. For the purposes of planning and management, these communities have been rolled into six major ecological systems, referred to as “Conservation Targets.” These six system types support the numerous rare plant and animal species that are found in the Shawangunks. The six Conservation Targets are illustrated on Figure 13 and are described in detail below. The following descriptions and the data illustrated on Figure 13 were graciously provided by Cara Lee of the Nature Conservancy.

Cliff and Talus

Cliff edges, escarpments, and talus provide habitat for lichens, ferns and several locally rare animals, including the peregrine falcon, common ravens, and black vultures. Cliffs include three components: the cliff edge, the free face, and the talus slope. The cliff edge is at the top of the cliff and often has a sparse cover of heaths and barrens vegetation. The free face is the vertical portion of the cliff below the cliff edge. The talus is the rocky slope beneath the cliff, which has varying amounts of vegetation, from forested to exposed rock. The cliff faces provide an ecological niche for rare species and several state-endangered plants, such as mountain spleenwort, arctic rush, broom crowberry and Appalachian sandwort. There are 416 acres of cliff and talus within the Shawangunks, with 11% of this habitat type located in the Town of Rochester. Cliff and talus areas are some of the least disturbed areas in the Shawangunks.

Ridgetop Dwarf Pitch Pine Barrens

This globally rare community depends on shallow, infertile soils, and is dominated by dwarf pitch pine trees, huckleberries, blueberries and scrub oak. While proportionally small, this community is one of the richest areas for rare species. The term barrens is generally used to describe communities adapted to periodic fire that occur on droughty, infertile soils. Current fire suppression practices are causing this community to change in ways that ultimately may reduce biodiversity.

This community is slow to recover from disturbance. Several rare types of wetlands are interspersed within the dwarf pitch pine barrens, including perched bogs, high-bush blueberry bog thickets, dwarf shrub bogs, and pitch pine-blueberry peat swamps. Rare animal species known to occupy this community include: marbled salamander, Jefferson salamander, prairie warbler, and whip-poor-will.

Hemlock-Northern Hardwood Forest

There are approximately 21,000 acres of hemlock-northern forest in the Shawangunks, with almost half occurring in Minnewaska State Park Preserve, Mohonk Preserve, and Sam's Point Preserve (Route 52 between Pine Bush and Ellenville in the Hamlet of Cragmoor). The most abundant tree is usually hemlock, with white pine, sugar maple, red maple, black and yellow birch and black cherry interspersed; witch hazel is a common shrub.

Chestnut Oak Forest

The chestnut oak forest on the Shawangunk Ridge is the second largest in New York State, totaling over 28,000 acres. This is the dominant forest type of the Shawangunks, and in addition to being an important buffer to the rarer, higher elevation communities, the chestnut oak forest contains numerous rare species and natural communities. The dominant trees are the chestnut oak, red, and white oak. Common shrubs include mountain laurel and black huckleberry. Ground-layer species include Pennsylvania sedge, wild sarsaparilla, wintergreen, and pin cushion moss.

The largest blocks of chestnut oak forest are located within Wawarsing (8,595 acres or 31%), Rochester (7,356 acres or 26%) and Gardiner (5,448 acres or 19%). The chestnut oak forest replaced the native chestnut forest after it was decimated by chestnut blight.

Lakes, Streams and Wetlands

The Shawangunk Ridge has five “sky lakes” and numerous wetlands and watercourses, as well as ponds and reservoirs. These water resources play a critical role in supporting biodiversity. Wetlands provide for floodwater storage, pollutant uptake, and groundwater recharge. Many wetland communities are found along the ridge, such as shrub swamps, peat lands, wet meadows, marshes, bogs, swamps, floodplain forests, and vernal pools, and are “hotspots” of faunal diversity.

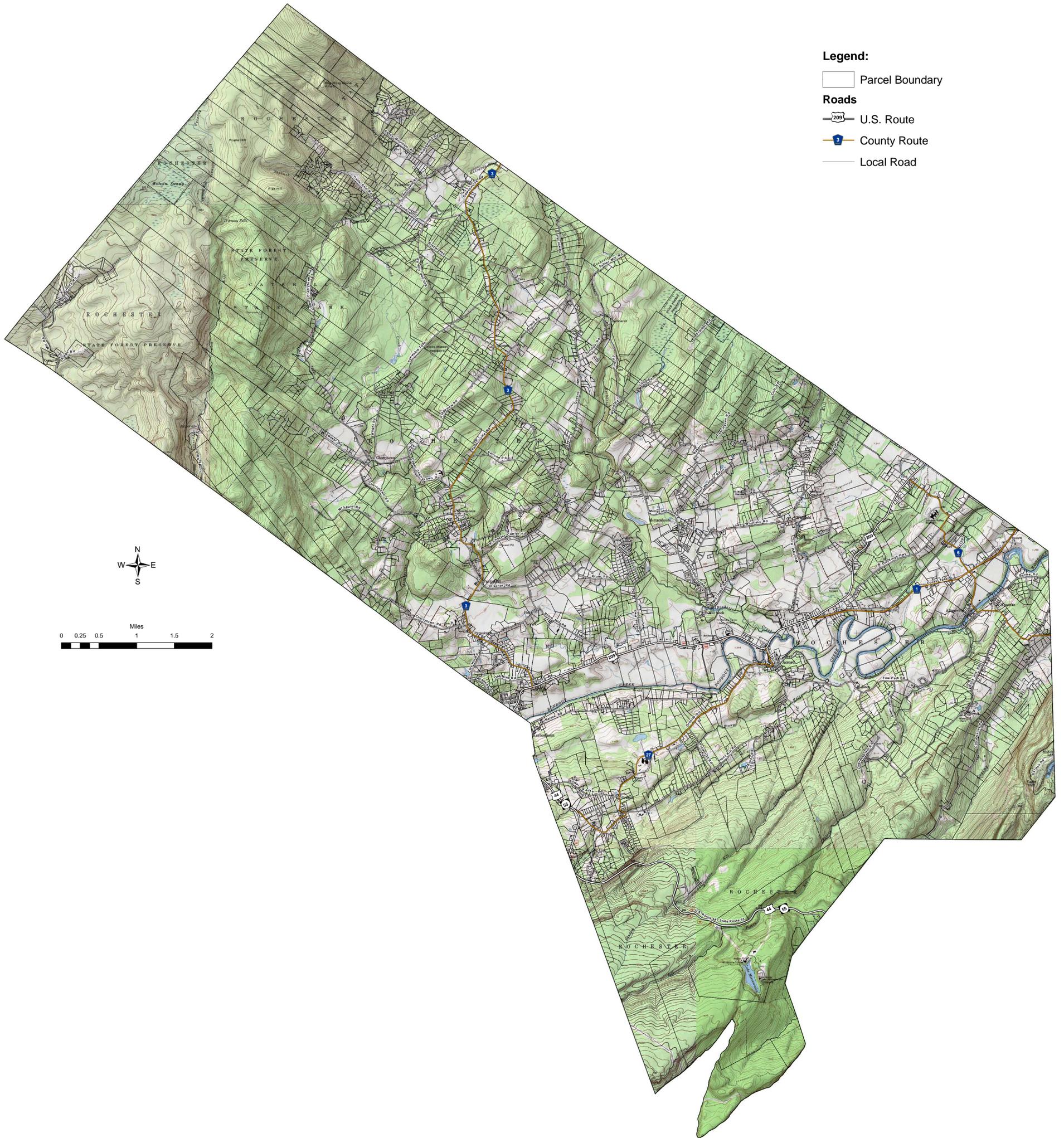
Pitch Pine/Oak/Heath Rocky Summit

Like the dwarf pitch pine barrens, this community is found at higher elevations and typically has shallow soils, is adapted to frequent fire, and supports rare species. Species include pitch pine, chestnut oak, high-bush blueberry, black huckleberry, low-bush blueberry, sheep laurel, and mountain laurel. This community is found in large and small patches within the chestnut oak forest. As with the dwarf pitch pine ridge community, this community is slow to recover from disturbance, and is therefore fragile. The largest rocky summit areas are found in Wawarsing (83%) and Rochester (15%).

Cultural Resources

In 1993, The Town of Rochester Historic Preservation Commission issued a report titled “Historic Resources Reconnaissance Survey.” This survey identifies and evaluates the significant and potentially significant historic resources within the community. The inventory also evaluates the potential for selected sites that are eligible or potentially eligible for inclusion on the State and National Register of Historic Places. The Town has several properties listed on the State and National Register of Historic Places, which are identified in the report.

The role of archeological resource assessment within the land development process is continually growing and expanding. The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) has identified larger corridors along and to the south of the Rondout Creek that are potentially archeosensitive. As a result, land development applications within these areas may require further investigation from professional archeologists to identify if the site contains cultural resources worthy of protection.



Legend:

-  Parcel Boundary
- Roads**
-  U.S. Route
-  County Route
-  Local Road

Data Sources:
 Parcels and Roads - Ulster County Real Property Tax Service.
 Parcels are current to January 2006. The roads dataset was completed in 2005.
 Elevation - based upon USGS Digital Elevation Model data.

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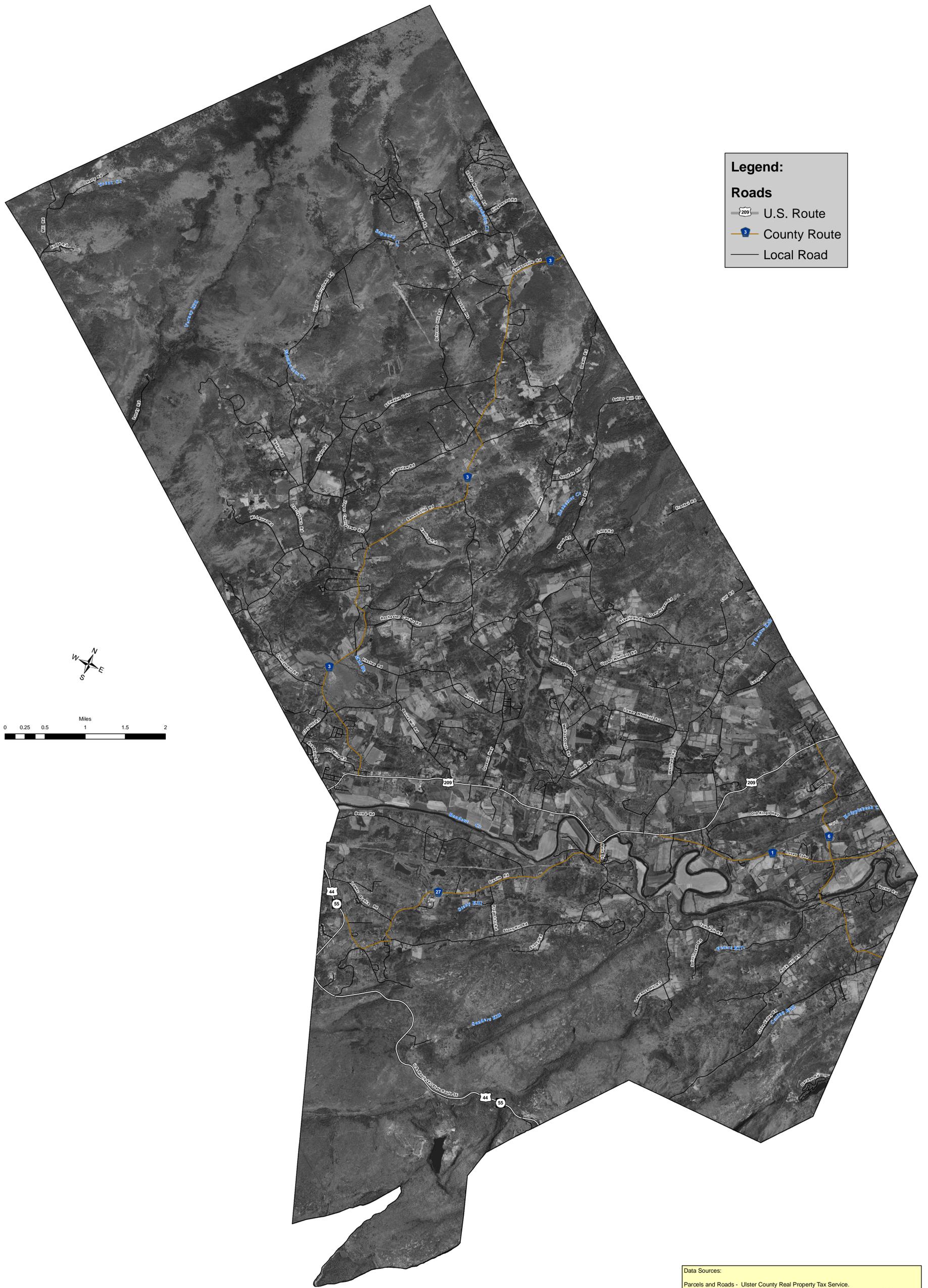
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Town of Rochester Natural Resource Inventory

**Figure 1.
 Topography**

Town Of Rochester
 Ulster County, New York

Drawn:	CLC
Date:	05/26/2006
Scale:	1:40,000
Project:	10603.00
Figure:	1



Legend:

Roads

- U.S. Route
- County Route
- Local Road



Data Sources:
 Parcels and Roads - Ulster County Real Property Tax Service.
 Parcels are current to January 2006. The roads dataset was completed in 2005.
 Orthophotos - Provided by the NYS Dept. of State. Orthophotos were flown in April 2004.

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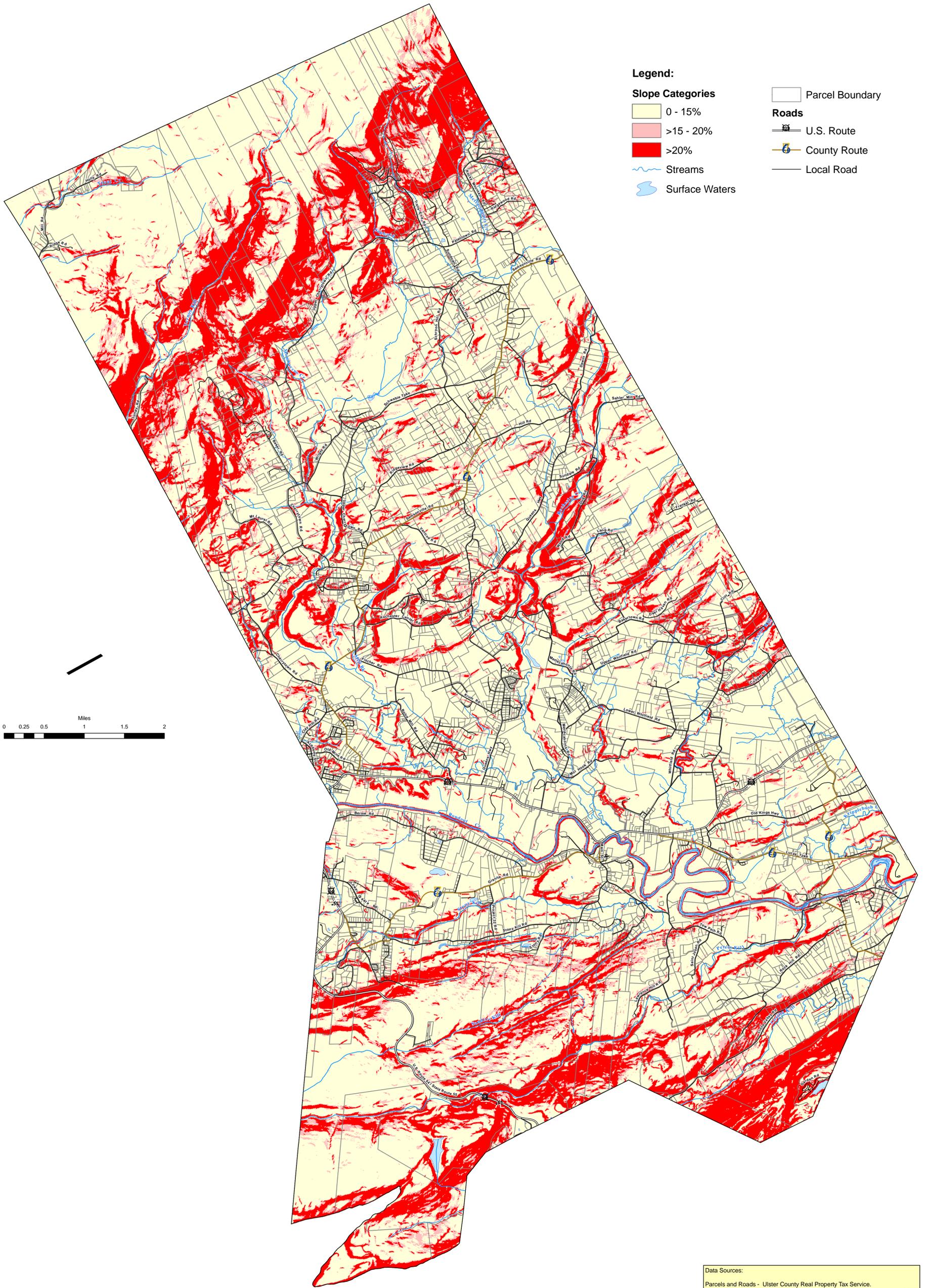
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Rochester Planning Support

**Figure 2.
Orthophoto Map**

Town Of Rochester
Ulster County, New York

Drawn:	CLC
Date:	05/25/2006
Scale:	1:34,000
Project:	10603.00
Figure:	



Legend:

Slope Categories

- 0 - 15%
- >15 - 20%
- >20%
- Streams
- Surface Waters

Parcel Boundary

Roads

- U.S. Route
- County Route
- Local Road

Data Sources:
 Parcels and Roads - Ulster County Real Property Tax Service.
 Parcels are current to January 2006. The roads dataset was completed in 2005.
 Slope - based upon USGS Digital Elevation Model data.

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Town of Rochester Natural Resource Inventory

**Figure 3
 Slope**

Town Of Rochester
 Ulster County, New York

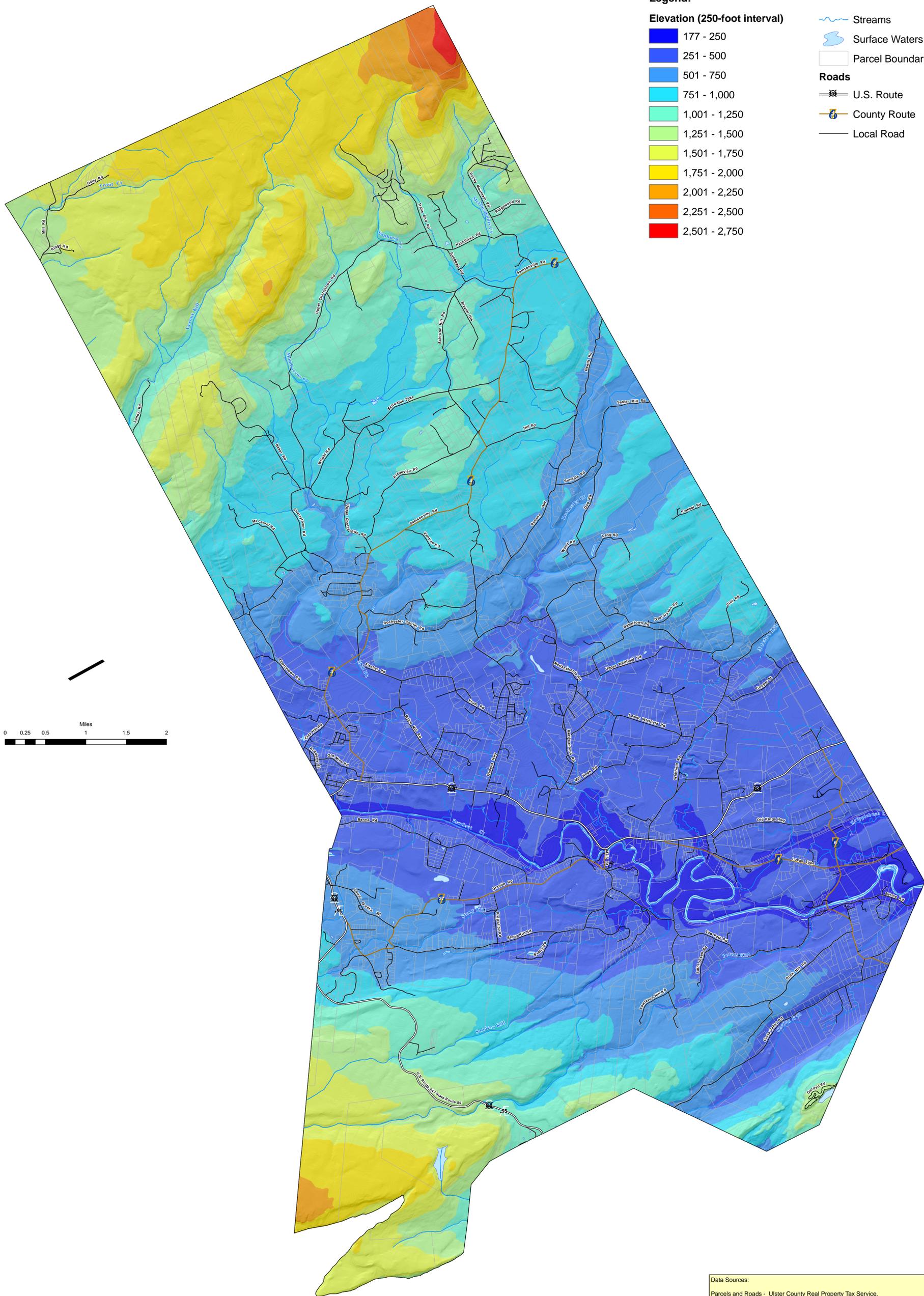
Drawn:	CLC
Date:	05/26/2006
Scale:	1:34,000
Project:	10603.00
Figure:	3

Legend:

Elevation (250-foot interval)

- 177 - 250
- 251 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- 1,251 - 1,500
- 1,501 - 1,750
- 1,751 - 2,000
- 2,001 - 2,250
- 2,251 - 2,500
- 2,501 - 2,750

- Streams
- Surface Waters
- Parcel Boundary
- Roads**
 - U.S. Route
 - County Route
 - Local Road



Data Sources:
 Parcels and Roads - Ulster County Real Property Tax Service.
 Parcels are current to January 2006. The roads dataset was completed in 2005.
 Elevation - based upon USGS Digital Elevation Model data.

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Town of Rochester Natural Resource Inventory

**Figure 4
 Elevation With Shaded Relief**

Town Of Rochester
 Ulster County, New York

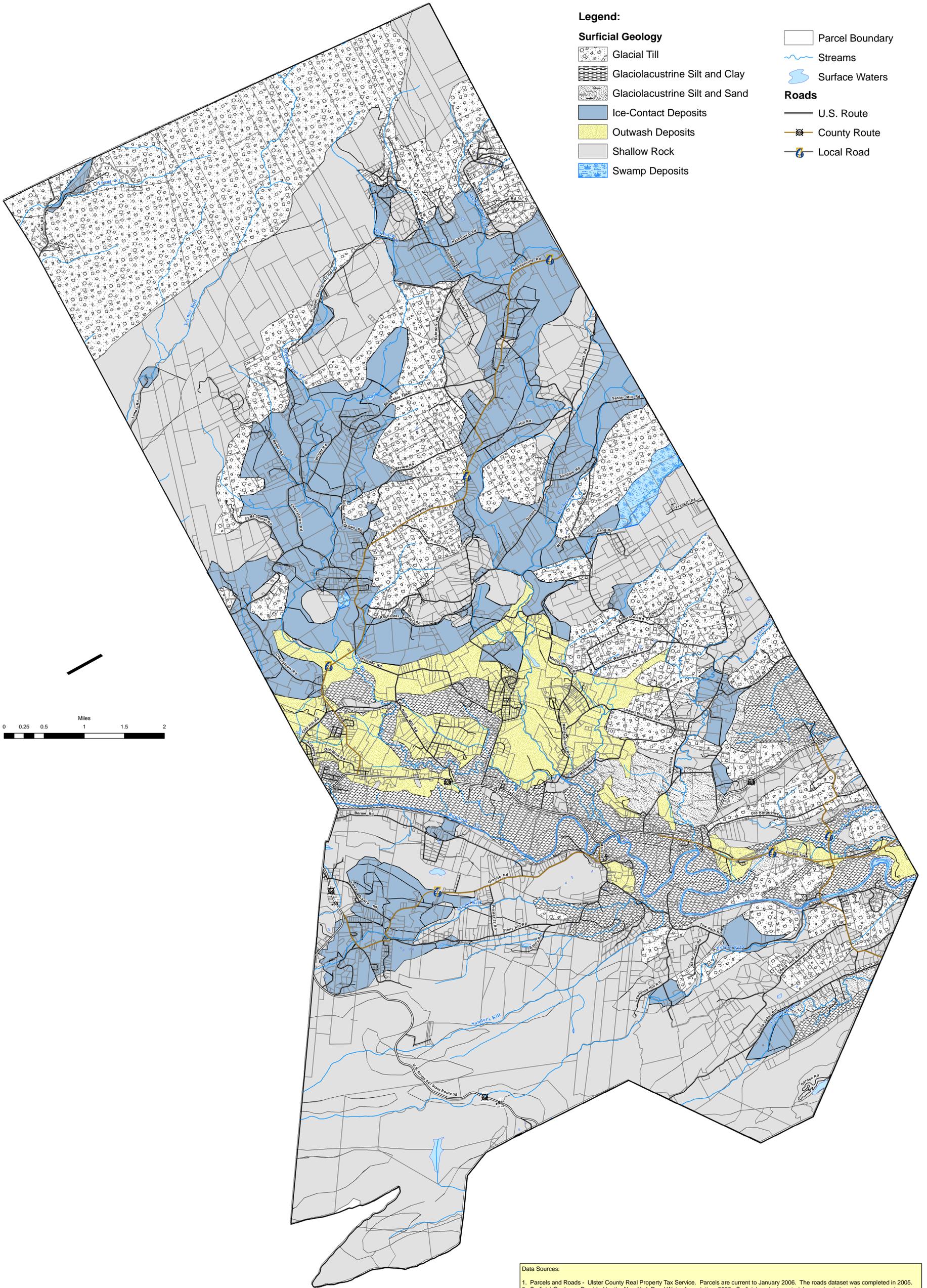
Drawn:	CLC
Date:	05/26/2006
Scale:	1:34,000
Project:	10603.00
Figure:	4

Legend:

Surficial Geology

-  Glacial Till
-  Glaciolacustrine Silt and Clay
-  Glaciolacustrine Silt and Sand
-  Ice-Contact Deposits
-  Outwash Deposits
-  Shallow Rock
-  Swamp Deposits

-  Parcel Boundary
-  Streams
-  Surface Waters
- Roads**
-  U.S. Route
-  County Route
-  Local Road



Data Sources:

1. Parcels and Roads - Ulster County Real Property Tax Service. Parcels are current to January 2006. The roads dataset was completed in 2005.
2. Surficial Geology - Provided by the New York Rural Water Association, 2006. Surficial geologic materials mapping is based upon reconnaissance by Steven Winkley of New York Rural Water Association, water well data, the Surficial Geologic Map of New York State, and Ulster County Soil Survey.

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Town of Rochester Natural Resource Inventory

**Figure 5
 Surficial Geology**

Town Of Rochester
 Ulster County, New York

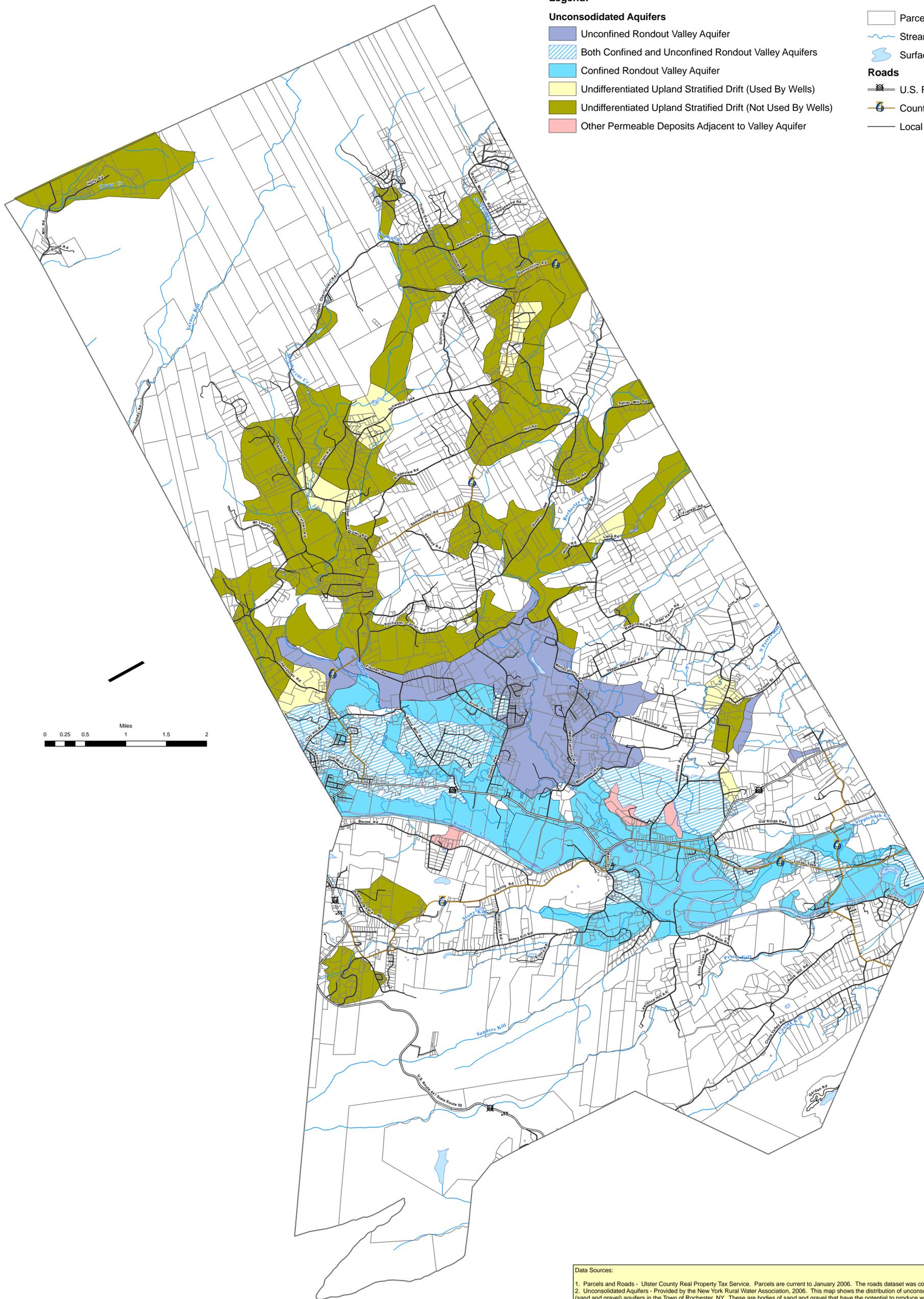
Drawn:	CLC
Date:	05/30/2006
Scale:	1:34,000
Project:	10603.00
Figure:	5

Legend:

Unconsolidated Aquifers

- Unconfined Rondout Valley Aquifer
- Both Confined and Unconfined Rondout Valley Aquifers
- Confined Rondout Valley Aquifer
- Undifferentiated Upland Stratified Drift (Used By Wells)
- Undifferentiated Upland Stratified Drift (Not Used By Wells)
- Other Permeable Deposits Adjacent to Valley Aquifer

- Parcel Boundary
- Streams
- Surface Waters
- Roads**
- U.S. Route
- County Route
- Local Road



Data Sources:

1. Parcels and Roads - Ulster County Real Property Tax Service. Parcels are current to January 2006. The roads dataset was completed in 2005.
2. Unconsolidated Aquifers - Provided by the New York Rural Water Association, 2006. This map shows the distribution of unconsolidated (sand and gravel) aquifers in the Town of Rochester, NY. These are bodies of sand and gravel that have the potential to produce water to properly constructed wells. The boundaries of the aquifers are based upon surficial geologic mapping, water well data, and site reconnaissance performed by Steven Winkley of New York Rural Water Association.



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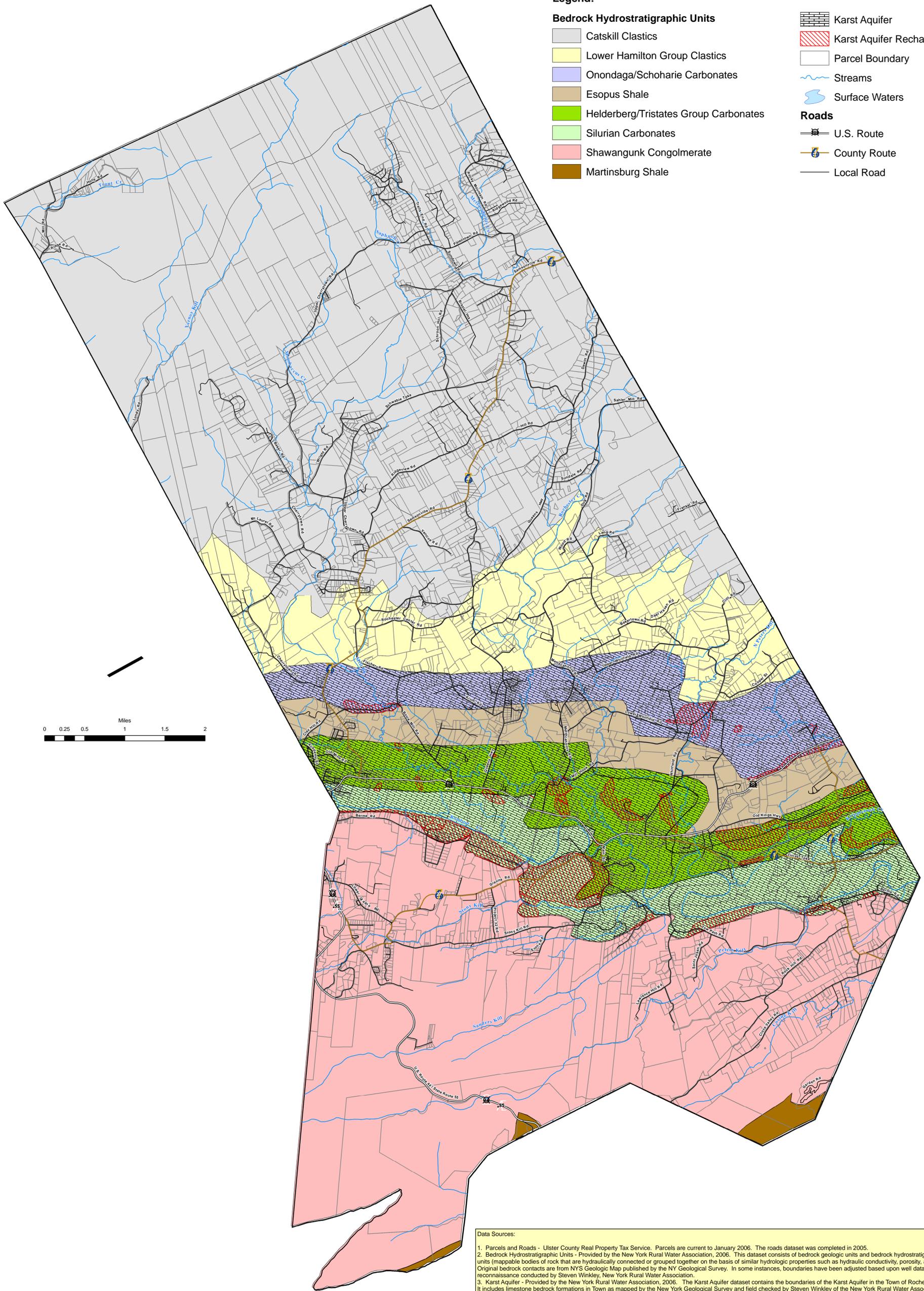
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Town of Rochester Natural Resource Inventory

**Figure 6
Unconsolidated Aquifers**

Town Of Rochester
Ulster County, New York

Drawn:	CLC
Date:	05/31/2006
Scale:	1:34,000
Project:	10603.00
Figure:	6



Legend:

Bedrock Hydrostratigraphic Units

- Catskill Clastics
- Lower Hamilton Group Clastics
- Onondaga/Schoharie Carbonates
- Esopus Shale
- Helderberg/Tristates Group Carbonates
- Silurian Carbonates
- Shawangunk Conglomerate
- Martinsburg Shale

- Karst Aquifer
 - Karst Aquifer Recharge Area
 - Parcel Boundary
 - Streams
 - Surface Waters
- Roads**
- U.S. Route
 - County Route
 - Local Road



Data Sources:

1. Parcels and Roads - Ulster County Real Property Tax Service. Parcels are current to January 2006. The roads dataset was completed in 2005.
2. Bedrock Hydrostratigraphic Units - Provided by the New York Rural Water Association, 2006. This dataset consists of bedrock geologic units and bedrock hydrostratigraphic units (mappable bodies of rock that are hydraulically connected or grouped together on the basis of similar hydrologic properties such as hydraulic conductivity, porosity, and well yield). Original bedrock contacts are from NYS Geologic Map published by the NY Geological Survey. In some instances, boundaries have been adjusted based upon well data and site reconnaissance conducted by Steven Winkley, New York Rural Water Association.
3. Karst Aquifer - Provided by the New York Rural Water Association, 2006. The Karst Aquifer dataset contains the boundaries of the Karst Aquifer in the Town of Rochester, NY. It includes limestone bedrock formations in Town as mapped by the New York Geological Survey and field checked by Steven Winkley of the New York Rural Water Association.
4. Karst Aquifer Recharge Area - Provided by the New York Rural Water Association, 2006. The Karst Aquifer Recharge Area dataset contains areas where the Karst Aquifer in the Town of Rochester is preferentially recharged. It includes areas of shallow bedrock and/or surficial sand and gravel deposits that overlie the aquifer.



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Town of Rochester Natural Resource Inventory

**Figure 7
Bedrock Hydrogeology**

Town Of Rochester
Ulster County, New York

Drawn:	CLC
Date:	05/30/2006
Scale:	1:34,000
Project:	10603.00
Figure:	7

Legend:

-  NYSDEC Wetlands
-  USFWS NWI Wetlands
-  100-Year FEMA Floodplain
-  Streams
-  Surface Waters
-  Parcel Boundary
- Roads**
-  U.S. Route
-  County Route
-  Local Road



Data Sources:
 Parcels and Roads - Ulster County Real Property Tax Service.
 Parcels are current to January 2006. The roads dataset was completed in 2005.
 100-Year FEMA Floodzone Boundary - FEMA GIS data published 1996.
 NYSDEC Wetlands - NYSDEC, 2001.
 USFWS NWI Wetlands - Compiled May 2006 from GIS data published on USFWS NWI Wetlands website.

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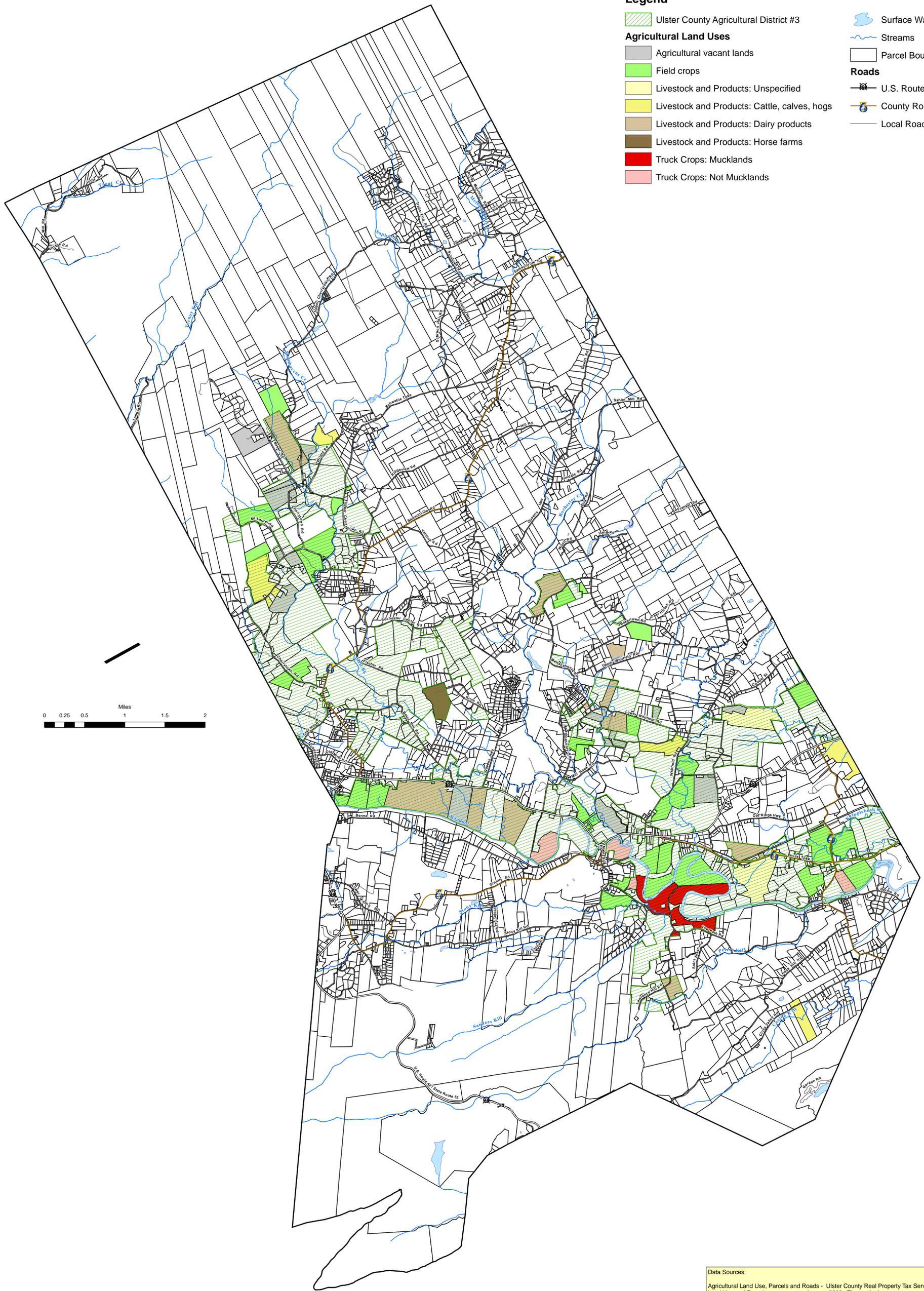
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Town of Rochester Natural Resource Inventory

**Figure 8
 Wetlands and Water Resources**

Town Of Rochester
 Ulster County, New York

Drawn:	CLC
Date:	05/26/2006
Scale:	1:34,000
Project:	10603.00
Figure:	8



Legend

- Ulster County Agricultural District #3
- Agricultural vacant lands
- Field crops
- Livestock and Products: Unspecified
- Livestock and Products: Cattle, calves, hogs
- Livestock and Products: Dairy products
- Livestock and Products: Horse farms
- Truck Crops: Mucklands
- Truck Crops: Not Mucklands
- Surface Waters
- Streams
- Parcel Boundary
- Roads**
- U.S. Route
- County Route
- Local Road



Data Sources:
 Agricultural Land Use, Parcels and Roads - Ulster County Real Property Tax Service.
 Land Use and Parcels are current to January 2006. The roads dataset was completed in 2005.
 Agricultura District - Provided by Cornell Institute for Resource Information Systems, 2003.

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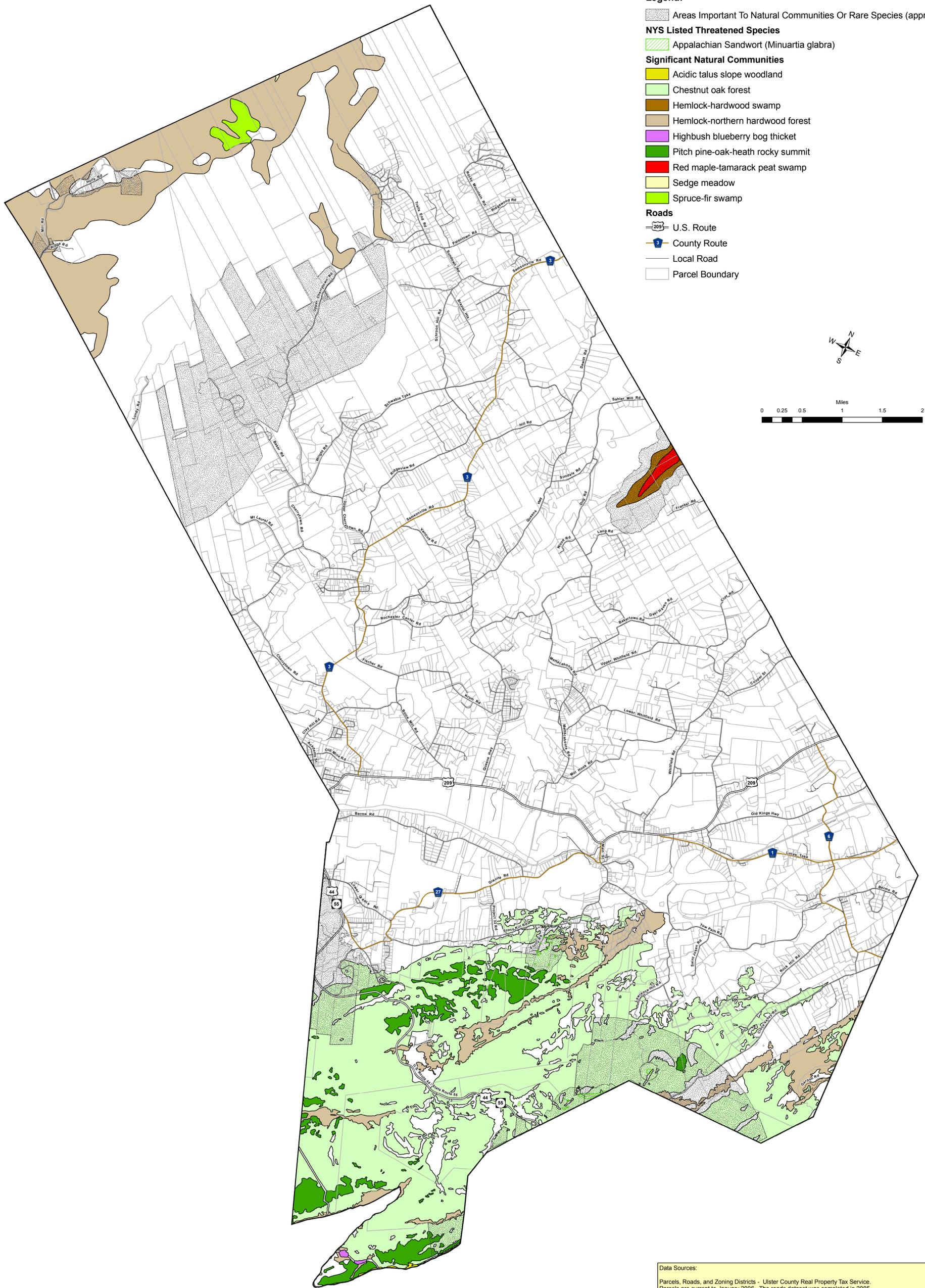
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Town of Rochester Natural Resources Inventory

Figure 9
Agricultural District and Agricultural Land Uses

Town Of Rochester
 Ulster County, New York

Drawn:	CLC
Date:	05/26/2006
Scale:	1:34,000
Project:	10603.00
Figure:	9



Legend:

- Areas Important To Natural Communities Or Rare Species (approximate)
- NYS Listed Threatened Species**
- Appalachian Sandwort (*Minuartia glabra*)
- Significant Natural Communities**
- Acidic talus slope woodland
- Chestnut oak forest
- Hemlock-hardwood swamp
- Hemlock-northern hardwood forest
- Highbush blueberry bog thicket
- Pitch pine-oak-heath rocky summit
- Red maple-tamarack peat swamp
- Sedge meadow
- Spruce-fir swamp
- Roads**
- U.S. Route
- County Route
- Local Road
- Parcel Boundary



Data Sources:
 Parcels, Roads, and Zoning Districts - Ulster County Real Property Tax Service.
 Parcels are current to January 2006. The roads dataset was completed in 2005.
 Rare Species, Natural Communities, and Important Areas - Provided by the NYS Natural Heritage Program, 2006.



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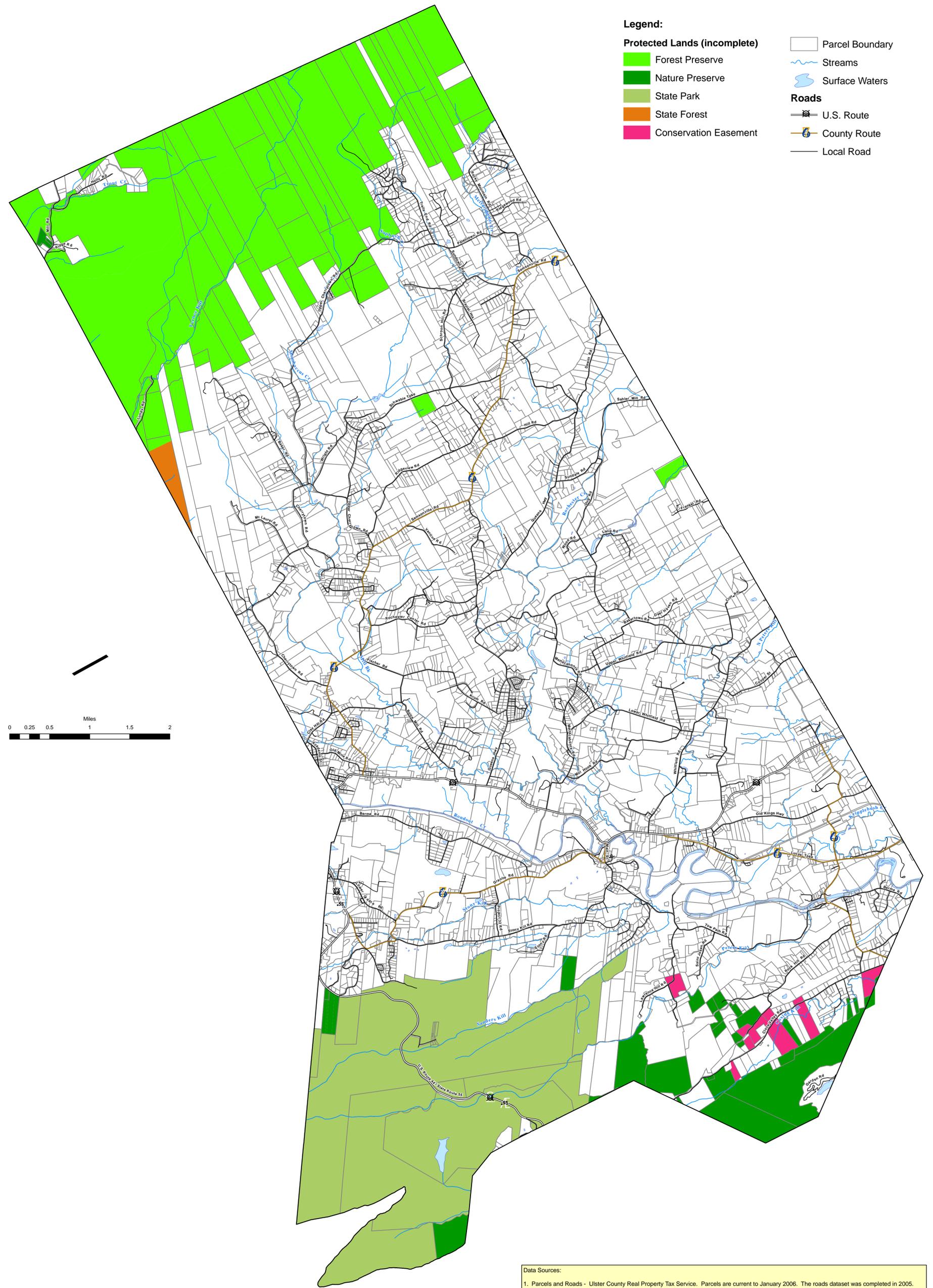
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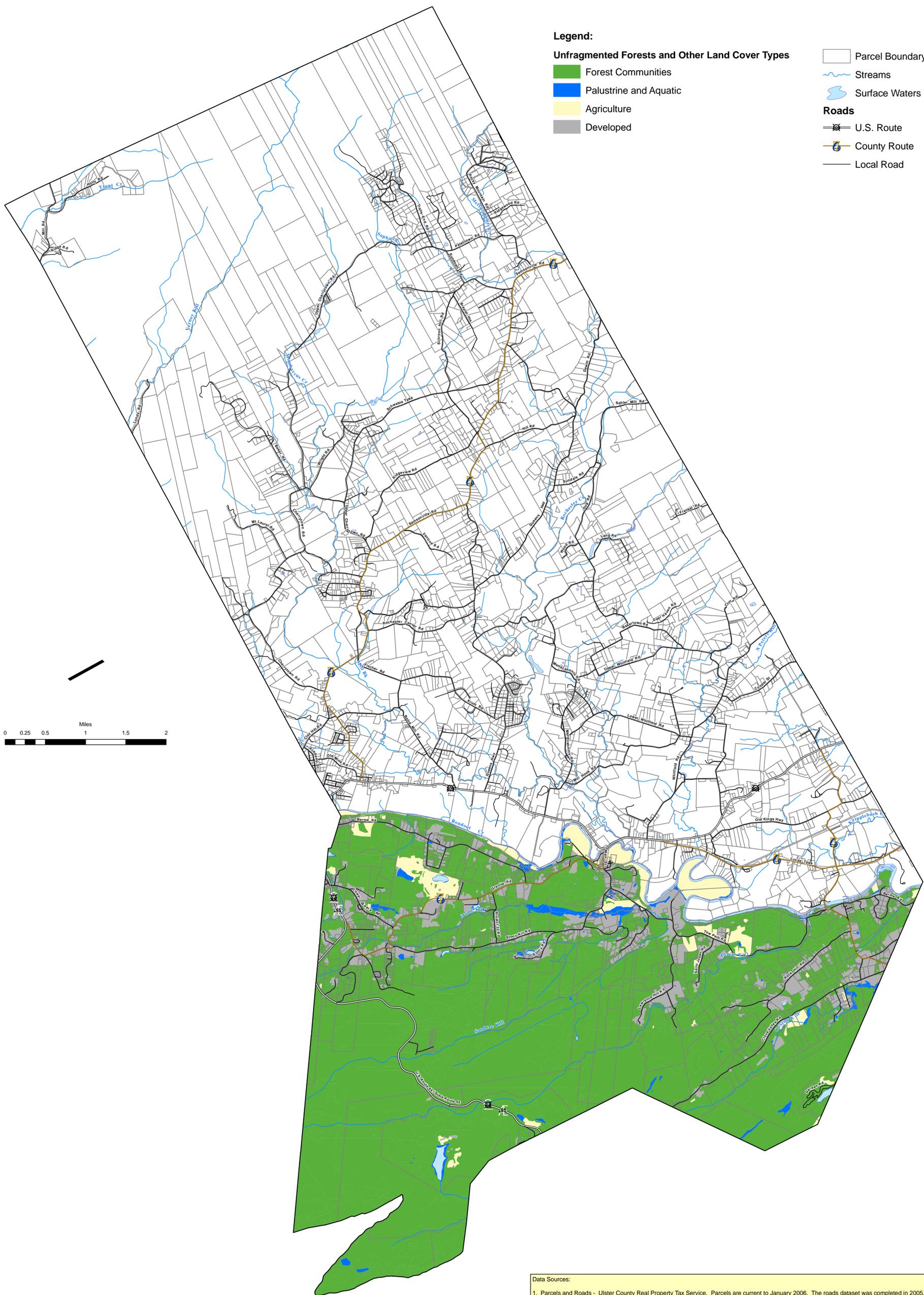
Town of Rochester Natural Resource Inventory

Figure 10. Significant Natural Communities

Town Of Rochester
 Ulster County, New York

Drawn:	CLC
Date:	07/10/2006
Scale:	1:34,000
Project:	10603.00
Figure:	





Legend:

Unfragmented Forests and Other Land Cover Types

- Forest Communities
- Palustrine and Aquatic
- Agriculture
- Developed

Parcel Boundary

Streams

Surface Waters

Roads

U.S. Route

County Route

Local Road

Data Sources:

1. Parcels and Roads - Ulster County Real Property Tax Service. Parcels are current to January 2006. The roads dataset was completed in 2005.
2. Unfragmented Forests - The unfragmented forests dataset is from The Shawagunk Ridge Biodiversity Partnership GIS, May 2006. This dataset was provided by The Nature Conservancy, 195 New Karner Road, Albany, NY 12205.



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GIS Consultants

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Town of Rochester Natural Resource Inventory

Figure 12
Unfragmented Forests
And Other Land Cover Types for
Lands South of the Rondout Creek
Town Of Rochester
Ulster County, New York

Drawn: CLC

Date: 05/31/2006

Scale: 1:34,000

Project: 10603.00

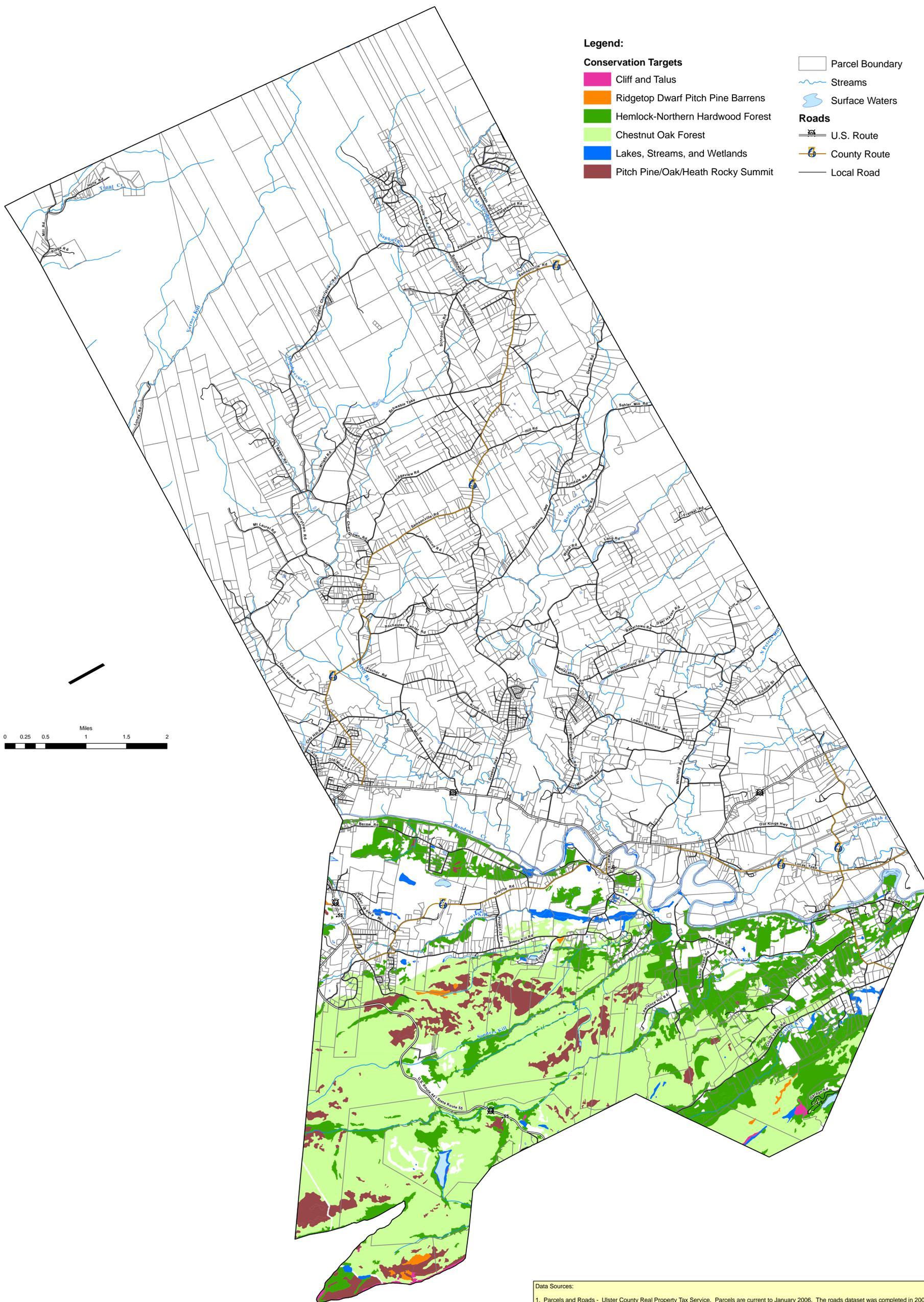
Figure: 12

Legend:

Conservation Targets

- Cliff and Talus
- Ridgetop Dwarf Pitch Pine Barrens
- Hemlock-Northern Hardwood Forest
- Chestnut Oak Forest
- Lakes, Streams, and Wetlands
- Pitch Pine/Oak/Heath Rocky Summit

- Parcel Boundary
- Streams
- Surface Waters
- Roads**
- U.S. Route
- County Route
- Local Road



Data Sources:

1. Parcels and Roads - Ulster County Real Property Tax Service. Parcels are current to January 2006. The roads dataset was completed in 2005.
2. Conservation Targets - The conservation targets dataset is from The Shawagunk Ridge Biodiversity Partnership GIS, May 2006. This dataset was provided by The Nature Conservancy, 195 New Karner Road, Albany, NY 12205.

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Town of Rochester Natural Resource Inventory

Figure 13.
Conservation Targets
Lands South of the Rondout Creek
 Town Of Rochester
 Ulster County, New York

Drawn:	CLC
Date:	05/31/2006
Scale:	1:34,000
Project:	10603.00
Figure:	