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Addendum (2011): The Town of Middlefield Profile and Inventory (February 2011) is included as an addendum in support of this Master Plan. This Profile and Inventory is excerpted from the Final Generic Environmental Impact Statement (FGEIS) on the Capacities of the Cooperstown Region (accepted by the Town in December 2002). In the spirit of this Master Plan, the FGEIS examines the current environmental conditions of the entire Otsego Lake region, identifies environmentally sensitive locations and analyzes the capacity for growth and development in the Towns of Otsego, Middlefield, Springfield and Hartwick, and the Village of Cooperstown. The FGEIS identifies important natural resources of the area, evaluates potential impacts that could occur in the future and offers a set of mitigation measures that could be taken to avoid those impacts. While the entire FGEIS can be used by Middlefield to help implement this Master Plan, the Profile and Inventory and associated maps highlight important natural resources that the people of the Township desire to be protected.

homogeneous mixture of grain sizes. Glacial lake sediments are made up of finer grains than outwash deposits and typically possess a much lower permeability than outwash sand and gravel deposits.
Alluvium: River and stream deposits (Alluvium and alluvial fans) are relatively permeable, recent deposits consisting of fine sand to gravel. Alluvial deposits are generally confined to valley floodplains. Fan deposits can be found at the foot of steep slopes in the area.

Swamp or Peat Marsh: Swamp or peat marsh deposits include peat muck and unoxidized or organic silt and sand in poorly drained areas.

i. Bedrock Geology

The Bedrock Geology map (Map 2) is a simplified version of the Geologic Map of New York State, Hudson-Mohawk Sheet with some local detail from unpublished preliminary field maps (Rickard, 1953-1955). The map shows the locations of the two main bedrock types that are found in the study area. One bedrock type consists of inter-layered shale, siltstone, and sandstone; the second type contains limestone and dolostone units. The limestone/dolostone (henceforth referred to as "limestone") bedrock is limited to the northernmost part of the study area, north of Otsego Lake, in the Town of Springfield. The shale/sandstone/siltstone (henceforth referred to as "shale") bedrock underlies the rest of the entire area.

Limestone is a sedimentary rock composed mainly of calcium carbonate. The limestone bedrock type includes Onondaga, Alsen, Becraft, New Scotland, Kalkberg, Coeymans, and Manlius Limestones; the Schoharie Formation (limestone and shale); Rondout Dolostone; Carlisle Center Siltstone, and Esopus Shale. Shale is also a sedimentary rock. The shale bedrock type includes Cooperstown and Portland Point Shales and Sandstones; the Panther Mountain Formation (shale, siltstone, and sandstone); the Marcellus Formation (shale and sandstone); the Oneonta Formation (shale, sandstone, and conglomerate); Cherry Valley Limestone; and Union Spring shale members.

Where limestone is present, the rock can solution or dissolve. This results in the formation of karst topography such as sinkholes, caverns, sinking streams, and resurgences. Sinkholes are depressions that indicate underground solutioning and caving, and are the main concern of building over limestone. Sinkholes, caves, and sinking streams are locations where concentrated amounts of water enter bedrock to reach groundwater aquifers. Resurgences are locations where underground water returns to the surface. Underground caves and cracks can cause instability on the surface. However, the chances of this happening decrease as more, less soluble rocks mix in with the limestone. In the study area, the presence of sandstones, siltstones, dolostones, shales, and conglomerates mixed with the limestone increases the stability of the bedrock.

ii. Surficial Geology

The Surficial Geology map (Map 1) includes information from the Surficial Geology Map of New York State, Hudson-Mohawk Sheet (Cadwell, et al., 1987) with additional local detail from unpublished preliminary field maps (Cadwell, 1983-1984). Prominent surficial deposits and bedrock outcrops are designated on the map. Till deposits are found on hillsides and along steeper terrains throughout the study area. They have variable thicknesses ranging from one to fifty meters. The finer grained clay and

silt matrix of till deposits make it more resistant to weathering. Bedrock outcrops can be found in some of the steepest and highest terrain.

Kame deposits are found further downslope from the till deposits along the walls of most of the larger valleys in the study area ranging from ten to thirty meters thick. Lacustrine, alluvial, and outwash sand and gravel deposits are found throughout the study area as valley floor deposits and range in thickness from one to twenty meters.

iii. Mining Resources

The Potentially Mineable Resources Map (Map 3) shows areas of both bedrock and unconsolidated materials. This map is derived from the available bedrock and surficial geology maps, and from information obtained from the NYSDEC, Division of Mineral Resources. The map shows the distribution of bedrock and unconsolidated material that is suitable for mining; however, other factors such as economics, adjacent land use, zoning, etc. may preclude mining in many areas.

The shale bedrock unit that underlies the majority of the study area could also be mined. All three of the rock types in this unit – shale, sandstone, and siltstone – have potential use as road aggregate, retaining wall blocks, building stone, and flagstone for decorative walkways, flooring, and patios. Shale is also a component of Portland cement.

According to the NYSDEC, no bedrock mines of any kind are located within the study area (NYSDEC Division of Mineral Resources (DMR, 2001). There is no history of profitable oil and gas or mineral exploration in the area and there is no geologic evidence for development of these resources.

Mining of unconsolidated deposits, specifically outwash sand and gravel, is presently, and has historically been occurring within Otsego County. The Potential Mineable Resource Map (Map 3) shows both operating and former mines and quarries in the study area, with currently permitted quarries plotted with the quarry name on the map (NYSDEC DMR, 2001). The potentially mineable sand and gravel deposits throughout the study area are located in the valley floor deposits along stream and river channels. Potential uses of sand and gravel include building foundation, road, and sidewalk construction when mixed with cement to form concrete; filtering and drainage for septic systems, storm drains, and surface runoff; and walkways and trails. Gravel can also be used for road and railroad bed fill and slope stabilization. Additional uses for sand included playground surfaces, man-made beaches, temporary flood protection walls, and glass manufacturing.

iv. Soils

The soils of the study area have been studied and mapped by the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS). NRCS has also evaluated the soil types for their suitability for different land uses. The NRCS report for Otsego County has not been published, but the soil listings and descriptions and mapping database have been made available through the NRCS website (www.nrcs.usda.gov) and by request from the Otsego County Soil and Water Conservation District.

For purposes of this section, soil is defined as any unconsolidated material above bedrock consisting of mineral grains and organic matter. Soils are defined and characterized as soil series, phases or complexes. Soil series are different soil types with similar characteristics of composition, thickness, and arrangements. Soils of one series may be further divided if they differ in texture, slope, salinity, wetness, degree of erosion, or another feature that affects use or management (SCS, 1992). A few of the soil map units in the area are listed as "complexes". The NRCS uses the term "complex" to refer to a map unit of two or more soil types that cannot be practically separated and indicated at the mapping scale. A single complex has similar soil patterns and proportions throughout, making it relatively homogeneous at a large scale.

The soils of the study area are mostly loams. Loam is defined by the SCS (1992) as "soil material that is, by volume, 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles." In other words, a loam is a soil that is at least half fine-grained particles. The loams in the study area include mucky silt loams, silt loams, channery and gravelly silt loams, and channery loams (NRCS, 2001). Muck is dark-colored, well-decomposed, organic soil material; it can hold little water at saturation. Channery loam is a loam deposited or reworked by a stream or river that has a volume that is more than 15 percent flat, thin pieces of sandstone, shale, slate, limestone, or schist that are no more than 6 inches in the longest dimension (SCS, 1992). The soils in the study area form slopes from 0 percent up to 60 percent. Areas with slopes steeper than 50 percent are generally rock outcrops (i.e., no soil cover).

Soil characteristics affect soil behavior, and are very important in determining potential land uses, such as building construction, septic system suitability, road construction, housing, agriculture, pasture, recreation, wildlife habitats, woodlands, landscaping, water management, and mining. The soil survey provided by NRCS is intended as an inventory and evaluation of the soils of the area and can be used "to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses. It is not meant as a substitute for thorough site studies and testing that need to occur prior to specific development or land use decisions. The soil characteristics that can be determined from the NRCS maps and inventory include:

- Permeability of the soil and substratum
- Drainage
- Available water capacity
- Depth to the water table
- Flooding / seasonal changes in the water table / droughtiness / wetness
- Firmness when wet / dustiness when dry
- Texture
- Thickness / depth to rock
- Slope stability
- Shrink-swell potential
- Potential frost action
- Plasticity
- Erosion
- Surface stones, boulders, and rock outcrops

v. Slope

The bedrock features as described above, control the topography of the area to a large degree. The region exhibits moderate relief with elevations ranging from 1150 to approximately 2000 feet above mean sea level. Though glaciers caused much of the shaping of the area, the rate at which rock types can be eroded controls, in part, the steepness (relief) of the topography (See Map 4). This map illustrates the extensive area in the region that have steep slope conditions. Steep cliffs tend to form where there are shale layers that crumble and wear easily, giving overlying rock little support. Less steep, rolling topography occurs where bedrock is more uniform and/or more resistant, because water cannot easily erode the rock. Near vertical cliffs are not abundant in the study area.

2. AQUIFERS OF THE COOPERSTOWN REGION

Aquifers refer to ground water systems. There can be interaction between surface and ground waters. The relationship between surface water and ground water depends on the geologic materials in the area. Highly permeable geologic materials promote water movement and allow interchange and connection between surface water and ground water regimes. The presence of geologic materials that have low permeability inhibits movement and interaction between surface water and ground water. The following sections describe the hydrogeologic conditions in the bedrock and unconsolidated geologic materials of the study area.

A. Detailed Description of the Region's Aquifers

i. Bedrock Aquifers

The regions' aquifers are important determinants to the capacity an area has for growth. New development typically depends on adequate water, both in amount and quality. Water supplies are derived from either surface water or ground water sources. Ground water supplies can come from either bedrock or unconsolidated aquifers.
The amount of ground water that can be removed from a bedrock aquifer (called the "effective yield") depends on the frequency and size of fractures and bedding planes in the rock. Bedding planes are the dividing lines in rocks that separate the individual layers. Rocks such as slates and shale often separate along bedding planes where there are no pore spaces for storage of water.

The flow of water through these rock fractures depends on the size and degree of connection between the fractures. The frequency and extent of fractures vary with rock type. Limestone typically yields more water than shale and sandstones, because fractures in limestone are enlarged by solutioning. Fracturing is usually less well developed in shale. In areas inter-mixed with shale, sandstone, and siltstone, water flow tends to be along the bedding planes, and is often above a shale layer. Here, water flows in the direction of the rock's dip (Harman, 1997). Though limestone tends to yield more water than the shale/sandstone units, the yield in limestone depends largely on the degree of interconnected fractures.

Wells drilled into the shale bedrock in the study area usually yield between 1 and 10 gallons per minute and limestone wells typically yield from 12 to 15 gallons per minute (Randall, 1972; Barney, 2001; Bosc, 2000; and Reed, 2000). On hillsides and hilltops, water runs down slope to the valleys before much of it can infiltrate and recharge the bedrock, resulting in a lower yield in the hills and a higher yield in the valleys. Yields in bedrock wells drilled in the valley may also be higher due to recharge to the bedrock from surface water and overlying unconsolidated aquifers.

Depth to bedrock is correlated to the availability of ground water in the study area. Areas' having shallow depth to bedrock generally means that ground water must be obtained from bedrock wells. These typically produce lower quantities of ground water than wells completed in unconsolidated deposits. Map 2 shows locations having shallow depth to bedrock.

ii. Aquifers in Unconsolidated Material

Well yield in unconsolidated material is dependent on the thickness, extent, and type of aquifer material, well depth, well diameter, well construction details, and the type and capacity of the pump. However, it is useful to describe yields for the aquifers in the study area in general.

The Unconsolidated Aquifer map (Map 5) shows the deposits that could serve as potential groundwater sources. Wells that are known to extract water from the unconsolidated aquifer material, and their published production rates (Bugliosi, 1988; Randall, 1972), are also plotted on the map. The yield information for these wells is listed in Table 1.

In the study area, existing wells located in unconsolidated materials tend to be more productive than wells in bedrock. Unconsolidated materials are cobbles, gravel, sand, silt, and clay that are not cemented together. Water in unconsolidated aquifers exists in pore spaces between the grains of material. In the study area, the soils are thickest in the valleys because of deposition by past glacial activities, and continued erosion and accumulation of sediment in low-lying areas. Thicker unconsolidated deposits in valleys contain and produce the greatest volumes of ground water.

Unconsolidated geologic materials in the area are rarely homogeneous. As such, the characteristics of the area cannot realistically be determined in detail over such a large area. Specific characteristics of the unconsolidated materials, and more importantly, their water production potential, can only be verified by drilling or excavating, and then they are only verified for that exact location. Specific well yields, therefore, cannot be predicted at this time with great certainty for any aquifer material in any location within the study area.

Table F2.1. Summary of Well Information.

Well Information						
Well Number	Latitude (Deg-min-sec)	Longitude (Deg-min-sec)	Well Depth (Feet)	Depth to Bedrock (Feet)	Aquifer	Yield (Gpm)

Well Information

24-57	42-35-24	75-3-57	117	56	bedrock	7
27-6	42-35-27	75-4-6	100	60	bedrock	4
26-7	42-35-26	75-4-7	33		unconsolidated	unknown
36-23	42-36-36	74-54-23	90		unconsolidated	15
3-2	42-36-3	74-55-2	100	33	bedrock	2
54-41	42-37-54	74-52-41	110	95	bedrock	5
47-45	42-37-47	74-52-45	118	68	bedrock	8
43-50	42-37-43	74-52-50	50		unconsolidated	10
54-54	42-37-54	74-52-54	155		unconsolidated	5
54-55	42-37-54	74-52-55	150		unconsolidated	5
51-29	42-37-51	74-53-29	125		bedrock	5
34-34	42-37-34	74-53-34	121		unconsolidated	3
43-35	42-37-43	74-53-35	47	47	unconsolidated	11
34-38	42-37-34	74-53-38	63		unconsolidated	20
28-39	42-37-28	74-53-39	68		unconsolidated	120
8-52	42-37-8	74-56-52	185		unknown	unknown
15-32	42-38-15	74-52-32	150		unconsolidated	8
43-47	42-38-43	74-52-47	80		unconsolidated	30
36-21	42-38-36	74-53-21	65		unconsolidated	5
37-57	42-38-37	74-57-57	156	63	bedrock	3
42-9	42-39-42	74-53-9	72	28	bedrock	35
40-46	42-39-40	74-56-46	171		unconsolidated	15
59-49	42-39-59	74-56-49	208	178	bedrock	10
53-57	42-39-53	74-56-57	200		unconsolidated	2
41-4	42-39-41	74-57-4	265		unconsolidated	30
49-30	42-39-49	74-57-30	233		unconsolidated	10
42-31	42-39-42	74-57-31	110		unconsolidated	30
3-51	42-39-3	74-57-51	120	30	bedrock	5
4-44	42-40-4	74-51-44	167	5	bedrock	5
0-54	42-40-0	74-56-54	31		unconsolidated	unknown
14-9	42-40-14	74-57-9	160		unconsolidated	unknown
11-24	42-41-11	74-50-24	125	85	bedrock	35
13-28	42-41-13	74-50-28	91		unconsolidated	17
50-32	42-41-50	74-50-32	85		unconsolidated	12
23-41	42-41-23	74-50-41	95		unconsolidated	5
5-32	42-41-5	74-57-32	93	89	bedrock	5
0-36	42-41-0	74-57-36	132		unconsolidated	55
1-36	42-41-1	74-57-36	182	120	bedrock	25
1-39	42-41-1	74-57-39	114		unconsolidated	18
1-40	42-41-1	74-57-40	153	138	bedrock	8
42-46	42-41-42	74-57-46	37		unconsolidated	unknown
27-16	42-42-27	74-53-16	180	50	bedrock	10
21-33	42-42-21	74-58-33	208		unconsolidated	10
35-49	42-42-35	74-58-49	76		unconsolidated	unknown
59-0	42-42-59	74-59-0	180	112	bedrock	15
37-10	42-42-37	74-59-10	172		unconsolidated	unknown
7-4	42-43-7	74-59-4	165	105	bedrock	4
27-3	42-43-27	75-0-3	65		unconsolidated	17
50-13	42-43-50	75-0-13	165		unconsolidated	unknown
5-42	42-44-5	75-0-42	210	155	bedrock	11
17-11	42-47-17	74-56-11	105	5	bedrock	8
26-2	42-48-26	74-50-2	38	8	bedrock	12

Well Information						
12-6	42-48-12	74-50-6	45	18	bedrock	3
17-22	42-48-17	74-50-22	75	70	bedrock	25
1-50	42-48-1	74-54-50	298	145	bedrock	4
45-5	42-49-45	74-48-5	189	30	bedrock	8

iii. General Yield Information in the Unconsolidated Aquifer

The Unconsolidated Aquifer map (Map 5) shows that the areas having the most water are typically located in the valleys. Here, the overburden is the thickest and surface water bodies and surface runoff from surrounding higher elevations provides greater recharge to these unconsolidated materials. The most productive unconsolidated aquifers in the area are in outwash sand and gravel, and alluvial deposits. The majority of the study area consists of till and bedrock outcrop material where water yields are minimal and generally produce less than 3 gallons per minute. In general, the potential yields associated with the deposits found in the Cooperstown area are:

Table F2.2. Type of Deposits and Expected Yields

Type of Deposit	Expected Yield Information
Outwash Sand and Gravel and alluvial deposits	10 to 100 gallons per minute where they are less than 10 feet thick and greater than 100 gallons per minute in thicknesses greater than 10 feet.
Silt and Clay	3 to 120 gallons per minute, with average production rate of 21 gallons per minute in study area wells.
Kame, Kame Terrace and Kame Moraine Deposits	Little published data, but yields likely less than 10 gallons per minute. Yield may be slightly higher where streams or other water bodies are present to provide recharge to the aquifer and wells. Calcareous cement, which may substantially reduce permeability, may be present locally.
Lacustrine Deposits	Typically yield less than 10 gallons per minute because the silt and clay decreases the permeability of the deposit. Peat marsh areas are presented on the Unconsolidated Aquifer map together with the lacustrine deposits. Peat marsh areas themselves yield little water but wells drilled through peat marsh into deposits below the peat can be expected to have yields similar to the yields of wells in surrounding deposits. Well 23-41 (Map 5) drilled through a peat deposit and screened in lacustrine sands, yields 5 gallons per minute.
Glacial Till and Bedrock Outcrop Deposits	Glacial till deposits are made up of low permeability silt and clays and generally yield less than 3 gallons per minute because they lack open pore space to hold and transmit water. Wells in the study area typically are not completed in till, but usually penetrate through it and are screened in the underlying bedrock which typically yields more water. The till in the study area, is not considered to be an aquifer.

3. WELL HEAD PROTECTION AREAS

A. Detailed Description of Wellhead Protection Areas in the Cooperstown Region

Amendments to the federal Safe Drinking Water Act (SDWA) were passed in 1986 to establish a nationwide program to protect groundwater sources used for public water supplies from contamination. According to the SDWA, states should develop Wellhead Protection Programs to protect wellhead areas of public water supplies from contaminants that may adversely affect human health. Each state decides on its own approach for WHPA delineation. In New York State, WHPAs define areas where activities that may compromise ground water quality could be regulated by New York State or local government in the future.

The New York State Department of Health (NYSDOH) has developed a statewide Wellhead Protection Program for New York and uses a "distance criteria," to delineate critical lands surrounding public water supplies. In Otsego County, none of the private water supplies and only some of the public supply wells have been designated as WHPAs. In the study region, WHPAs for non-municipal community wells were delineated in 1995 (Map 6) only in the Towns of Hartwick and Middlefield. The two Hartwick Water District wells are the only municipal community wells in the study area but the NYSDOH has not defined WHPA's for these two wells.

Map 6 identifies potential ground water supplies, public water supplies, and wellhead protection areas. WHPA's do not typically extend to all areas within a watershed that contribute surface water or ground water to a well or well field. The purpose of the WHPA is to protect the immediate vicinity of a well or well field and a reasonable area near the wellhead from direct pollution. Development that might result in pollution is normally prohibited or limited in WHPA's as a preventative measure. Such development typically precludes commercial and industrial uses that store, treat, handle, or dispose of petroleum products and chemicals.

New York State may enact watershed rules and regulations to control and limit industrial, commercial, and agricultural activity and land usage within the delineated WHPA's. The NYSDOH has enacted watershed rules and regulations for surface water in that portion of the Otsego Lake Watershed in Otsego County including the towns of Middlefield, Otsego, Springfield, and the Village of Cooperstown. The Allens Lake Watershed is covered separately as a water supply for Richfield Springs. There are no other rules and regulations for the Towns of Hartwick, Middlefield, Otsego, and Springfield.

The Hartwick Pines wells supply water for 50 people through 17 service connections. The WHPA's for these three wells were delineated in 1995 as one mile in the up gradient direction and 1300 feet in the down gradient direction. Wells 1, 2, and 3 produce 12, 10, and 6 gallons per minute (gpm), respectively. The two wells supplying the Oak River Mobile Estates (50 people through 23 service connections) have WHPA's of one mile in the up gradient direction and 1500 feet in the down gradient direction. Well 1 is 80 feet deep; the yield is unknown. Well 2 is 96 feet deep and yields 24 gpm. The two wells at The Meadows serve 400 people through 2 service connections. Well 1 yields 95 gpm; its WHPA was delineated in 1995 as 1 mile in the up gradient direction and 2800 feet in the down gradient direction. Well 2 yields 40 gpm; its WHPA is one mile up gradient and 1800 feet down gradient. In 1982, wells at the Fritts Trailer Park served 30 people, but no current information has been found.

4. SURFACE WATER

A. Detailed Description of Surface Waters of the Cooperstown Region

1. Surface Water Classification

The Cooperstown region and surrounding area lies within the Susquehanna River Basin and watershed. The study area is within the northeastern section of the Susquehanna River Drainage Basin. The watersheds within the study area include, from west to east, the Otego Creek watershed, the Oaks Creek watershed, the Upper Susquehanna River watershed, and the Cherry Valley Creek watershed. These are shown, as defined by the Natural Resource Conservation Service on the Watershed Map (Map 7).

A watershed is a geographic area that is drained by, or contributing water to, a stream, lake, or other primary body of water. Watershed boundaries are drainage divides where water on one side of the divide flows into one primary body of water while water on the opposite side of the divide flows into a separate primary body of water.

Watersheds are scale-dependent. Large watersheds such as the Upper Susquehanna River watershed contain, among others, the Otsego Lake watershed, which contains ten watersheds of major streams. Each stream basin contains the watersheds of the tributaries, and so on.

The watershed of Otsego Lake includes those areas drained by Willow Brook, Glimmerglen Creek, Brookwood Creek, Leatherstocking Creek, Mohican Creek, White Creek, Cripple Creek, Hayden Creek, and Shadow Brook.

Surface water is a significant environmental resource in the study area. Otsego Lake is a drinking water source for about 2,400 people in the Village of Cooperstown and the immediate surrounding area. The numerous surface water bodies in the study area are of significant importance for groundwater recharge, wildlife habitats, aesthetics, sustaining downstream water levels, recreational fishing areas, and for irrigation and livestock support.

Pursuant to Article 12 of the Public Health Law, the Water Pollution Control Board has assigned classifications and standards of water quality to most of the water bodies in the study area. The meanings of the various classifications and standards are specified in Parts 701 and 703 of 6NYCRR Part X. Section 701.1 addresses the general conditions applying to all water classifications in New York State. The section states, "The discharge of sewage, industrial waste, or other wastes shall not cause impairments of the best usages of the receiving water as specified by the water classifications at the location of discharge and at other locations that may be affected by such discharge." The classifications and specifications of the study area water bodies are listed in Part 930 of Article 17 of the Environmental Conservation Law.

The study area's water bodies have classifications ranging from AA through C. Section 701.5 of 6NYCRR Part X defines the best usages of Class AA fresh waters for drinking, culinary purposes, primary and secondary contact recreation, and fishing. It also states that "the waters shall be suitable for

fish propagation and survival." The AA classification for fresh surface waters "may be given to those waters that, if subjected to approved disinfection treatment, with additional treatment if necessary to remove naturally present impurities, meet or will meet New York State Department of Health [NYSDOH] drinking water standards and are, or will be, considered safe and satisfactory for drinking water purposes."

Class A fresh surface waters are discussed in Section 701.6 of 6NYCRR, Part X. The best usage of Class A fresh waters is the same as for Class AA. The only difference between the two classes is that where Class AA waters may be subjected to disinfection treatment, Class A waters may be subjected to "approved treatment equal to" coagulation, sedimentation, and filtration in addition to disinfection, "with additional treatment if necessary to reduce naturally present impurities," in order to meet NYSDOH drinking water standards.

Section 701.7 of 6NYCRR, Part X states that the best uses of Class B fresh surface waters are primary and secondary contact recreation and fishing. Only fishing is listed as the best usage of Class C fresh surface waters (Section 701.8). Both of these classes of fresh surface water "shall be suitable for fish propagation and survival." While primary and secondary contact recreation is a best use of Class B waters, Class C "water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.@ The other factors may include, but are not limited to, water body size, depth, and location; wildlife habitats; plant life; and shore and bottom conditions.

In the study area, some of the streams have water classifications that are followed by a T or a TS specification in parentheses. These specifications indicate that the water body is a trout stream or a trout spawning area, respectively.

Part 703 of 6NYCRR Part X includes Surface Water Quality Standards. These standards for the Class AA through Class C waters of the study area include narrative standards (turbidity; suspended, colloidal, and settleable solids; oil and floating substances; thermal discharges; taste-, color-, and odor-producing, toxic, and other deleterious substances), pH, dissolved oxygen, dissolved solids, odor, color, turbidity, and coliforms. The actual quality standards that must be met for each surface fresh water class are listed in sections 703.2, 703.3, 703.4, and 703.5 of 6NYRCC, Part X. Section 701.1 of this law states that discharges of sewage, industrial waste or other wastes shall not cause impairment of the best usages of the receiving waters as specified by the water classifications. The standards outlined in Part 703 should be used as the threshold criteria for new development. NYS DEC has the ability to, on a case-by-case basis, set more stringent groundwater standards or limitations under certain circumstances.

2. Wetlands

The Wetlands map (Map 8) presents wetlands designated by the NYSDEC pursuant to Article 24 of the Environmental Conservation Law, The Freshwater Wetlands Act (January 5, 1988). Map 8 shows wetlands protected under this law. All the wetlands in the study area are freshwater wetlands and most are associated with small streams and tributaries to Otsego Lake. The Wetlands map shows approximate wetland boundaries and non-wetland areas included in a wetland boundary; these are indicated as "upland" inclusions. Wetland identification codes are also presented. The codes consist of two uppercase letters representing the quadrangle in which most or all of the wetland lies followed by a one

or two digit number. The numbers were arbitrarily assigned to wetlands within a quadrangle and do not imply any ranking or importance.

Wetlands are a natural resource dependent upon local hydrologic and geologic conditions. Wetlands form at the water table, near the ground surface, or where surface water collects in low-lying areas characterized by geologic materials of low permeability. The United States Environmental Protection Agency (USEPA) definition of a wetland is an area that is "inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions." (USEPA, 1993, EPA-902-F-93-001). The NYSDEC definition is more encompassing and states that wetlands are "a) lands and submerged lands . . . supporting aquatic or semi-aquatic vegetation; b) [lands and submerged lands] containing the remnants of any vegetation that is not aquatic or semi-aquatic that has died because of wet conditions over a sufficiently long period, provided that such wet conditions do not exceed a maximum seasonal water depth of six feet and that such conditions can be expected to persist indefinitely barring human intervention; c) lands and water substantially enclosed by aquatic or semiaquatic vegetation as per a) and b); and d) the waters overlying the areas set forth in a) and b) and the lands underlying c)." (USEPA, 1993, EPA-902-F-93-001). Wetlands include swamps, bogs, marshes, wet forests, flats, sloughs, and wet meadows. While most wetlands occur in flood plains adjacent to water bodies, wetlands can also be isolated from other water in depressions and low lying areas.

The U.S. Army Corps of Engineers (Corps) uses vegetation, soil, and hydrology to make wetland determinations. Plant types that occur in wetland areas are called hydrophytic vegetation; there are nearly five thousand types in the United States. Cattails, bulrushes, cordgrass, sphagnum moss, bald cypress, and willows are just a few common examples. Trees with shallow and/or exposed root systems or swollen trunks are also common indicators. Wetlands contain hydric soils, those developed in low oxygen conditions. Indicators of hydric soils include high concentrations of decomposed plant material (peats or mucks); a thick surficial layer of decomposing plant matter; dull, bluish gray, gray, brownish black, or black color; sulfur (rotten egg) odor; sandy soil with a surficial layer of decomposing plant material; and sandy soil with dark stains or streaks of organic material in the upper layer. A wetland has water at or above the soil surface for enough time during the year to effect hydric soils and hydrophytic vegetation. Indicators of wetland hydrology include standing or flowing water during the growing season, waterlogged soil during the growing season, water marks on trees, drift lines and debris piles, and thin layers of sediments on leaves and other objects (Corps, Recognizing Wetlands).

Freshwater wetlands and adjacent areas are valuable resources for flood control (runoff and flood water storage), wildlife habitats, ground and surface water quality protection, water resources, shoreline stabilization, open space, recreation, research, education, and aesthetics (NYSDEC, 1991). Wetlands can remove pollutants such as soil particles, fertilizers, pesticides, heavy metals, and petroleum products, thus protecting downstream surface water and underlying groundwater. Water stored in wetlands during wet periods recharges ground water and maintains stream flow during dry periods, thus protecting stream ecosystems.

In general, to be protected under the Freshwater Wetlands Act, a wetland must be at least 12.4 acres. Smaller wetlands may be protected by the NYSDEC if the NYSDEC Commissioner determines the smaller wetlands are important locally in terms of the benefits listed in the previous paragraph

(NYSDEC, 1991). The boundaries shown are approximate and are intended by the NYSDEC for reference only. While National Wetland Inventory (NWI) Maps are available for this area, they are not a substitute for NYSDEC maps. NWI mapping relies mostly on aerial photographs that have not all been ground-truthed, while many NYSDEC maps have been field checked. Parties interested in wetland use and permitting should consult the USEPA, the Corps, the NYSDEC, and their local government. Areas within 100 feet of wetland boundaries (buffer areas) are subject to regulation pursuant to the Freshwater Wetlands Act; a local authority or the NYSDEC Commissioner, based on site-specific mapping and conditions, may extend these buffer areas.

Plant communities and animal populations in wetlands can be affected directly and indirectly during the construction phase of a project. Severe impacts can result from construction on adjacent lands as well if erosion and sediment runoff damage the quality of the wetland area.

3. Flood Plain

Flood plain boundaries, available from the Federal Emergency Management Agency (FEMA); the Village of Cooperstown; and the Towns of Hartwick, Middlefield, Otsego, and Springfield are plotted on the Flood Plain map (Map 9). FEMA supplies Flood Insurance Rate Maps (FIRM) to these communities. The Flood Plain map displays the zone designations for a community according to flood hazard areas.

A few terms must be defined in order to understand the zone designations. A floodway is for most waterways, where floodwaters are the deepest and fastest. One hundred year flood boundaries delineate the flood elevation that has a 1 percent chance of being equaled or exceeded each year. A 500-year flood line shows the flood elevation that has a 0.2 percent chance of being equaled or exceeded each year. Zone A areas shown on Map 9 are within 100-year flood boundaries, generally follow or parallel a water body, stream and wetland borders, and include the floodway (there are no separate floodways mapped in the study area).

FEMA had not calculated floodways for the waterways in the study area, when the maps were last revised. Before developing in an area where no floodways are indicated, a Conditional Letter of Map Amendment (CLOMA) should be obtained from FEMA (Ferber, FEMA, 2001). This letter does not revise an effective flood map, but indicates whether the project, if built as proposed, would be recognized by FEMA (FEMA, 2001). This process can be burdensome to those who desire to construct close to but not in the floodplain. Investment in flood elevation mapping would assist in this process.

The base flood elevation (100-year flood elevation) has only been determined for Otsego Lake within the Village of Cooperstown and the part of the Susquehanna River between Otsego Lake and Mill Street; that base flood elevation is 1194.3 feet above the National Geodetic Vertical Datum of 1929 (NGVD 29). Mandatory flood insurance purchase requirements apply for building and construction in Zone A.

The Zone C areas on Map 9 (referred to as Zone X on the Village of Cooperstown FIRM) are outside the 500-year flood boundaries. This means these areas are at a flood elevation that has less than a 0.2 percent chance of being flooded. The higher a land's elevation and the farther from a water body, the lower the chance of flooding. These areas are shown as unshaded areas on the Flood Plain map. No

flood hazard information is available for the red crosshatched areas, as they are state-owned lands for which the federal government does not have land use jurisdiction (Ferber, FEMA, 2001).

5. OTSEGO LAKE AND WATERSHEDS

A. Detailed Description of Otsego Lake and Watersheds

According to New York State DEC, Otsego Lake is considered a Class A (TS) water body meaning that the best uses for the lake are as a source of water supply for drinking and culinary purposes; for bathing, fishing, and swimming; and for fish propagation and survival. The "TS" designation stands for trout spawning, and results in more stringent water quality standards being set to protect the survival and propagation of cold-water fish species. Lakes with the TS designation also have more stringent requirements for the amount of dissolved oxygen in the water that cold-water fish need.

According to the publication, The State of Otsego Lake, 1936 to 1996, Harman et al (1997), Otsego Lake has undergone many profound changes since the early 1900s. The ecosystem of Otsego Lake has changed dramatically during this time period. The primary causes are increased phosphorus loading to the lake and introductions of exotic organisms. The 1997 Upper Susquehanna River Basin Watershed Management Reconnaissance Study (excerpted in the Plan for the Management of the Otsego Lake Watershed (Otsego Lake Watershed Council, 1998)) states that "Problems identified in Otsego Lake and its contributing tributaries include shoreline erosion, excess suspended sediment and phosphorus, sediment load from tributaries, decreases in number, size and functions of surrounding wetlands, and lack of appropriate habitat conditions for the coldwater lake fishery." Further, it states, that Otsego Lake, Willow Brook, Cripple Creek, Hayden Creek and portions of Shadow Brook are on the NYS DEC priority water body list. The following table shows a problem area matrix developed by the Army Corps of Engineers in that Reconnaissance Study (US Army Corps of Engineers, 1997).

Table F5.1. Problem Areas: From Plan for the Management of the Otsego Lake Watershed (Otsego Lake Watershed Council, 1998)

Town	Sub-watershed	Problem	Scope	Solutions
Springfield Center	Clarke Pond, Cripple Creek, Otsego Lake, Hayden Creek	Flooding and Environmental	12 acre pond	Remove sediment, repair dam, create wetlands to reduce phosphorus
East Springfield	Otsego Lake, Shadow Brook	Environmental	4083 acre lake	Wetlands, stream restoration and stormwater management ponds to reduce excessive phosphorus and sediments
Cooperstown	Otsego Lake	Environmental	50 homes and 400 properties	Improve dam intake structure to better control lake levels which would restore shoreline vegetation and reduce phosphorus recycling
Towns around Lake	Otsego lake	Environmental		Septic lines in place of septic fields to reduce phosphorus to the lake

1. Phosphorus Loading

Levels of total phosphorus in the lake have increased over many years. For example, in 1991, a total of 6,261 kg of total phosphorus in the lake was calculated: about 76% of this came from its tributaries (4,809 kg), about 7% came from septic inputs (456 kg), and the remaining amounts came from atmospheric deposition. The amount of total phosphorus being retained in the lake was 4,921 kg. By 1993, the amount of phosphorus increased to 12,936 kg, with 10,754 kg being retained in the lake.

Phosphorus loading has been documented (Harman et. al, 1997 and Gallinger, 1998) as coming from three primary sources: agricultural runoff, inadequate septic disposal, and development. Another significant source of phosphorus originates from the lake's own sediments. When dissolved oxygen levels in the deepwater areas of the lake fall to low levels (below 2 mg/l of dissolved oxygen), phosphorus is released from the sediments to the water. There is a strong correlation between phosphorus levels in the lake and dissolved oxygen. As phosphorus levels rise, there is an increase in algal growth. This in turn results in the consumption of large quantities of dissolved oxygen as the biomass of algae decays. As the dissolved oxygen levels fall, more phosphorus is released, further compounding the problem and leading to the eutrophication of Otsego Lake (Harman 1997). This process has the potential to contribute tremendous phosphorous loads to the lake.

Sources of Phosphorus

Total phosphorus contributed by lakeside septic systems was estimated to be 0.8 kg/capita/year in 1996. Recent research (Green 2001, Ptacek 1998, Robertson et al 1998, and Zanini 1998) has shown that septic tank systems, even those designed, built and maintained properly, allow nutrients such as phosphorus to enter the system. Further, most of the soils in the watershed have severe limitations for septic tank absorption fields. High rates of phosphorus migration are seen and nutrient runoff from septic systems can occur in all soil types. Agricultural operations such as use of fertilizers, and manure spreading are also sources of phosphorus. Development of land also contributes nutrient loading due to the increase in runoff from impervious surfaces such as roads, roofs, and parking lots.

Although the majority of the phosphorus loading comes from agricultural sources (about 80%), sources from septic systems and development have more impact on the lake. Most agricultural runoff reaches the lake during spring runoff. While there is a larger amount of phosphorus, it enters the lake very diluted due to the volume of water. Additionally, spring runoff occurs when the lake waters are cold, and phosphorus is bound inorganically to a large volume of silt. Consequently, much of the phosphorus is unavailable for uptake by plants. Conversely, nutrient loading from septic systems or land development enter the lake year-round, and more importantly, all summer when the water is warm and the phosphorus is available for uptake by plants. In summary, agricultural runoff contributes more phosphorus by volume, but development and septic systems have more serious negative impacts due to the timing of their release into the lake.

Role of Septic Systems in Phosphorus Loading

Day (2001) estimates that 20-30% of the total phosphorus from raw wastewater accumulates in the sludge of a septic tank. While regular pumping (recommended at 3-5 year intervals) removes that phosphorus, the remaining excess nutrients flow into the leachfield and are not entirely removed during treatment. A 1995 survey in the Otsego Lake Watershed indicated that 41% of surveyed systems have never been pumped (McIntyre 2001) posing even more risk of phosphorus entering lake waters.

The Otsego Lake Watershed Council has determined that the 2.3-mile stretch of development just past Five Mile Point is a high-risk area. This designation was given due to the density of development within 100 feet of the Otsego Lake. Steep slopes and soils severely limit the use of leach fields in this location.

Much of the nutrient loading in the watershed comes from the northern end of the lake. Cripple Creek, Hayden Creek and Shadow Brook contribute the majority of total phosphorus (in 1993, 92% of the total amount). These tributaries have the largest catchment areas (64% of the watershed). Runoff from Springfield is high where increased population densities in the hamlets combine with agriculture. This results in the collection of excess nutrients draining to Cripple Creek, Hayden Creek and Shadow Brook. Harman et. Al (1997) indicated that these sources contributed significantly to the buildup of excess nutrients in the lake. Residential and commercial runoff from sources in Otsego and Middlefield is not considered severe, except when associated with strip development along the lake.

Willow Brook is the only creek having significant urban characteristics in the watershed. From June to September, Willow Brook has been documented to deliver 11.8% of its annual phosphorus load. The brook empties into shallow water near the public waterfront and boating facilities in Cooperstown, leading to constant agitation of nutrient rich sediments and degradation of water quality at the brook's mouth. However, because the total tributary loading from Willow Brook is small, lake-wide impacts are not extensive. Soluble nutrients delivered by this stream have a short retention time in the lake because of its close proximity to the mouth of the Susquehanna River. Conversely, loading from the more extensive catchment area to the north in the watershed has greater, long-term effects.

2. Ecosystem Trends

An increase in phosphorus in Otsego Lake has resulted in increased algal growth, decreased levels of oxygen in certain locations of the lake, decreased water clarity, and changes in animal and plant populations. These impacts, coupled with the introduction of numerous exotic species to the lake, have resulted in a dramatically different lake ecosystem over the past decades. The State of Otsego Lake (1997) has documented these factors. Trends and changes are summarized below.

Fish Populations

There have been 34 species of fish representing nine different families documented in the watershed tributaries. Minnows dominate these fish populations where they are 52% in Shadow Brook, and 100% of species in Willow Brook. Blacknose dace and creek chub are the most abundant species.

There have been dramatic changes in the fish population since 1935. These are primarily human related and include introduction of cisco, rainbow smelt, alewife in mid-1980s, and European rudd in 1990. Walleye populations are minimal. Harman et. al (1997) categorizes these fish population changes as:

introduction of fish species by the public or by the state, ecosystem imbalance regarding predator control of forage species, decreases in cool-water fish populations, and a decline in cold-water fish populations.

Willow Brook and Three-Mile Point Creek have the lowest fish species richness of all the watershed tributaries. Shadow Brook and Hayden Creek have highest species richness. This is partly due to the length of these streams: the longer the creek, the more diverse the stream characteristics, and the more species are known to exist.

Barriers that prevent fish movement can also affect species richness. Route 80 crossings are examples of such barriers. Species richness below these barriers is higher. In other words, barriers prevent movement to the upper reaches of streams. Access to streams from the lake has a tremendous impact on fauna, and the length of stream between the lake and a barrier seems to be a major factor in determining the number of species present in the creeks.

The diversity of species in Cripple Creek becomes lower as you move downstream toward the lake, reflecting habitats that are slightly degraded from the input of nutrients from the headwaters to below Clarke Pond. Shadow Brook and Hayden Creek show a greater degradation due to increased levels of nutrients in the water, primarily of phosphorus. In these creeks, species diversity dropped from the headwaters to the intermediate locations, then increased dramatically in downstream areas. The increase in the downstream area is due to the addition of lake species into the creek. Excess nutrients was not considered severe in either of these two streams, but high populations of oligochaetes in Shadow Brook indicate a severely stressed environment.

Zooplankton, Phytoplankton, Bacteria, and Insects

There has been a marked shift in the algal community structure in recent years. This is a result of increased total phosphorus levels, which in turn, favor both greater algal growth, and dominance by fewer types of algae. This high level of algal growth is also correlated with increased oxygen depletion in bottom waters.
Areas with chronically high populations of bacteria have been observed, and have included the Susquehanna River where it leaves the lake, the mouths of Willow Brook and Hayden Creek where they enter the lake, Hayden Creek near Springfield Center, and the west shore of Otsego Lake in the vicinity of Six-mile point.

There have also been considerable changes in the characteristics of cladocerans (zooplankton) in the lake since 1935. Up until 1975, the numbers of crustacean zooplankton have increased. This was generally thought to be a result of increasing eutrophication of the lake. However, more recent declines in crustacean zooplankton have occurred along with dramatic increases in rotifer populations. These changes appear to be the direct result of introduction of the alewives. Lack of grazing on algae by larger zooplankton together with excessive phosphorus loading have led to a marked increase in the amount of algae which in turn causes negative effects on water clarity and oxygen concentrations.

Some invertebrate populations have decreased as well. Lake-wide, the average species richness of invertebrates has decreased 27.5%, pollution intolerant species richness has decreased by 56.1%, and the number of Mollusca species has decreased by 52.9%. The number of pollution intolerant species dropped even in areas where the total number of species remained stable. Hyde Bay has been impacted

the most due to development of a sand beach and filling of a 50-acre wetland there. Some of these changes are the result of alteration of water levels associated with the dam improvements in Cooperstown during the 1950s that resulted in increased water levels. This action reduced the amount of emergent vegetation along the shoreline that in turn affected the invertebrate populations.

Other Lake Characteristics

Excessive chloride levels are not considered a problem lake-wide, but these levels have quadrupled between the 1920s and 1970s. Increased road salting and more extensive discharge of septic tank effluent in the watershed parallel the increase in chloride concentrations. Cooperstown's waterfront has high concentrations of chloride during the winter. Efforts have been taken to reduce the amount of de-icing salts used and lake-wide there has been a reduction in the rate of increase of chloride levels. However, Willow Brook continues to have very high levels.

There is no evidence of herbicide pollution in the Lake. The lake presently meets all standards for trace metals, organics, and other contaminants. Harman et al. (1997) stated, "no motor oil, gasoline, kerosene, or fuel oil was detected. There were traces of BTEX compounds (volatiles and polycyclic aromatic hydrocarbons) found at every sampling site except in deep water samples. There has been no evidence of correlation between any pollution and powerboat uses.

In summary, Otsego Lake is heading towards increasing eutrophy. It is considered to have reached or exceeded its capacity to assimilate certain nutrients. The phytoplankton community is now dominated by different species, there has been a large loss of diversity in macrophytes, a lake-wide reduction of species richness due to alterations in the zoo-macrobenthic community, and decreases in food and cover for insects.

There have been recent efforts to rectify these problems. In 1997, agricultural best management practices have begun to be implemented on farms in the watershed through the Natural Resources Conservation Service's EQIP program. Additionally, a 200' no-wake zone was implemented on the lake. Specific sites for riparian buffers and wetland restoration have been selected, and an engineering study to restore a large sediment detention basin and impoundment repairs has been initiated. In 2001, a preliminary study of lakeside septic systems was conducted.

The Biological Field Station has been working to increase walleye populations in the lake. This project's goals are to increase this fishery to control the alewife populations and to decrease algae growth. According to the Field Station (Harmon, 2001), it is too soon to determine the effectiveness of this program.

Water quality in the lakes tributaries has shown some signs of improvement (Harmon, 2001). Although this is promising, it will take up to several decades for the lake to respond. Because of the way nutrients cycle through the lake's ecosystem, conditions may deteriorate before they show improvement. The necessary step to improve water conditions in the lake is to stop new inputs of excess nutrients.

3. Non-Point Source Runoff

Non-point source runoff can affect Otsego Lake in several ways. These include:

1. When development activities increase non-point runoff, in either volume or peak flow rate; the quality of the runoff degrades because more contaminants are suspended in the runoff. These contaminants negatively affect stream biota, can cause drainage structures to fill in and malfunction, and may contribute to stream delta growth. Further, these contaminants can cause lakes to support more algal and aquatic plant growth, and can accelerate the process of eutrophication. This accelerates the process by which lakes eventually fill in to become wetlands.

2. When non-point source runoff is not controlled, the portion of runoff that occurs as "first flush" runoff is increased. First flush runoff is often the most contaminated runoff due to the build-up of dust and other dryfall contaminants. Retention of the first flush runoff and the associated sediment load can greatly reduce non-point source pollution.

3. Increased non-point runoff reduces the opportunity for recharge of groundwater. This is because much groundwater recharge occurs in upland areas where sufficient opportunity exists to infiltrate and recharge the subsurface groundwater.

4. When non-point runoff is increased, the likelihood, frequency, and severity of floods are increased. When non-point runoff is minimal, the volume of water reaching potential flood zones is reduced and the time to high water is usually delayed.

5. Often regulations require permits to conduct construction activities. The 1987 Clean Water Act amendments specifically identified the types of stormwater discharges requiring permit authorization and established deadlines for their achievement. New York State administers its State Pollutant Discharge Elimination System (SPDES) program that serves as the authorizing mechanism for activities in the State to comply with the National Pollutant Discharge Elimination System (NPDES) program. At this point in time, these regulations require that owners of lands which discharge stormwater associated with construction activity must apply for a permit if activities involve the disturbance of five (5) acres or more. Construction activity that results in a land disturbance of less than five (5) acres, but which is part of a larger common plan of development or sale, must also be covered by a permit. By March 10, 2003, the United States Environmental Protection Agency (USEPA) will require projects that will disturb 1 acre to obtain a permit for construction projects.

6. HISTORIC RESOURCES

A. Detailed Description of Historic Resources in the Cooperstown Region

Within the study area, several significant National Register (NR) historic locations exist. Map 10 illustrates the location and extent of these historic areas. The following list details those properties included on the State and National Register listing:

Fly Creek Methodist Church	Otsego
Cooperstown Historic District	(Included in the Glimmerglass NR HD)
Hyde Hall Covered Bridge	Springfield
Glimmerglass Historic District	Middlefield, Otsego, Springfield

The Cornfield	Otsego
Middlefield Hamlet Historic D.	Middlefield
Benjamin D. North House	Middlefield
Hyde Hall	Springfield
Otsego County Courthouse	Cooperstown
US Post Office	Cooperstown
East Springfield Union School	Springfield (eligible)

The largest district in the study area, the Glimmerglass district encompasses the entire area surrounding Otsego Lake and the Village of Cooperstown, and consists of 1,475 resources listed on the National Register of Historic Places. The Waggoner Patent, located in the Town of Springfield, has been determined to be eligible as a listed historic district by the New York State Historic Preservation Office. This proposed district encompasses most of the Town of Springfield.

1. Glimmerglass National Register Historic District

According to the United States Department of the Interior, National Park Service's narrative description of the Glimmerglass NR HD, this district encompasses 15,000 acres and includes portions of the Towns of Otsego, Springfield, and Middlefield along with the entire Village of Cooperstown. The Cooperstown Historic District was first listed on the National Register in 1980. Other features were added to this listing in 1988, 1992, and 1997. It is now included in the Glimmerglass NR HD. The Glimmerglass NR HD also encompasses the physical and social sphere of Otsego Lake. The district's landscape is dominated by Otsego Lake, the ridges rising along the Lake's east and west shores, and lower, rolling hillsides along the flatter land at the head and foot of the Lake. Visual points of reference include the Susquehanna River, Mount Vision, Mount Wellington, and the 600-foot hill near the north end of the lake.

Along the west side of the lake, the lower and more gradual slopes show evidence of agricultural use; the steeper ridge along the east shore is forested. The flat foot of the lake is the site of the Village. The district includes a variety of built features that illustrate human activity in the area since 1785.

The Village is one of the district's prominent built features. Cooperstown is noted for its history as a market town, the county seat and a resort area. Recreational resources such as boathouses, monuments, designed gardens; scenic viewpoints and museums are found throughout the district and are among the 1,475 contributing features. Some of the other significant resources here include the Cooperstown Post Office, Hyde Hall and the Hyde Hall Covered Bridge.

Impacts to Historic Resources

Most concern related to potential negative impacts on historic resources is directed at those sites, properties, structures or objects that are listed or that are eligible for listing in the National Register of Historic Places. According to the State Historic Preservation Office (Kathleen LeFrank, 2002), they consider the entire area to be historically sensitive and any development should consider the impact on historic resources, including archaeological resources. Adverse direct impacts to historic resources may

include destruction of all or part of the historic property, isolation from or alteration of its surrounding environment, introduction of visual, audible or atmospheric elements out of character with the property (or that alter its setting), and neglect that results in its deterioration or destruction. Primary impacts on archaeological resources may occur whenever the ground surface is disturbed by construction activities. Construction impacts consist of potential disturbances of sites with the consequent loss of scientific or historic information.

Development of or alteration to the open spaces that surround known historic or archaeological resources may diminish the historic integrity of such properties. Similarly, alteration of the character of potential historic districts by the introduction of structures, objects or land uses incompatible with the historic setting or buildings in the district would be considered an adverse impact on the cultural quality of the district.

7. VISUAL RESOURCES

A. Detailed Description of the Visual Resources of the Cooperstown Region

1. Rural and Small Town Character

Since the terms "rural" and "small town character" are often used in varying contexts, a visual survey was conducted to more objectively define these terms and correlate them with specific landscapes that could be used to help judge future environmental impacts.

A visual survey was conducted where participants were shown seventy-five slides and asked to rate them as to how close they came to their "vision" of rural character or small town nature. Next, they were also asked to comment on each slide and describe it in words. The data were analyzed by averages, standard deviation, and percentage for each rating. See Appendix A for a complete discussion of this technique and its results. The survey established that the most preferred rural character can be best defined as landscapes having a mixture of active farm fields, wooded, and other undeveloped natural areas. Acceptable rural character is also those landscapes having the above, along with barns, silos and other obvious farm buildings. Small settlements having distinct boundaries surrounded by woods and fields were preferred over those landscapes having low-density residential sprawl.

People perceive a diminution of rural character as landscapes depicted in the slides became dotted with scattered non-farm residential development. Rural character is further reduced with large conventional subdivisions, increased density of housing, use of large lot sizes, fragmentation of land with roads and driveways, and isolated commercial development.

Small town or village character was also assessed in the visual survey. The survey results showed traditional single family houses built close to other houses and to the street, with sidewalks, street trees, garages that do not dominate the road frontage, and other amenities such as porches are landscapes that best describe small town character. According to the survey, small town character also includes traditional main street commercial and downtown areas where buildings are two or three stories high and have similar architecture, characteristics very similar to existing Main Street in Cooperstown. Small town character does not include attached housing where facades are dominated by garages, conventional housing subdivisions, wide multi-lane streets bordered by commercial development, multi-story office buildings, and mini-mall or strip mall style development.

Many of those locations considered to be significant by scoping participants were described as being beautiful or scenic. Most of these sites fall within the watershed of Otsego Lake and are located on the eastern, western and northern ends of the lake. The Village of Cooperstown itself is considered an important visual resource due to its small town (described above) and historic character.

The areas identified as being scenic, having great natural beauty, or being in important viewsheds in the study area should be considered sensitive locations due to the value placed on these resources by area residents. Development done out of context to the character of the area, or in locations that damage such resources should be carefully reviewed and mitigated to prevent future negative impacts.

2. Viewshed Analysis

During the scoping process, meeting participants were asked to identify locations of importance by labeling large maps with stickers and descriptive notes. Several of the participants pinpointed significant visual resources or viewpoints at varying locations within the study area. These spots generally overlooked Otsego Lake, or up into the steep slopes and well-forested hills. Through computer analysis, maps were generated that digitally represent the significant "viewsheds" found at these locations. These representations (shown in the attached maps 11a-c) attempt to establish the distance and scope that one can see from an individual point.

Viewshed Analysis Process:

The basis of the Viewshed analysis process is the Digital Elevation Model (DEM). A DEM contains a series of elevations that digitally represent the topography found within an individual quadrangle. For this project, DEMs were acquired for the entire GEIS study (covering 10 separate USGS quadrangles) from the U.S. Geological Survey and NYSDEC through the Cornell University Geospatial Information Repository (CUGIR). Later the files were joined into one large DEM for continuity and ease of use in the viewshed analysis process. The large, "mosaic" DEM was analyzed using the Spatial Analyst Extension with Arc/View version 3.2. This computer analysis demonstrates in map form the distance and scope or "line of sight" from individual points within the study area. However, it is important to note that this analysis does not take into consideration barriers to sight such as structures and vegetation, overhead wires and utility poles that may impede views. Furthermore, the analysis does not examine distance of sight beyond the study area boundary.

Seven points that were identified by participants and further analyzed with this method include:

a. View of Otsego Lake from Springfield (public landing road area) (point 123)
b. View from Otsego Lake to surrounding ridges (point 106)
c. View of Otsego Lake from farmer's museum and golf course (point 30)
d. View of Otsego Lake from Keys Road in the Town of Otsego (point 113)
e. View overlooking Otsego Lake near Ralph Buddle Road – looks out to Middlefield (point 147)
f. View in all directions from Trip Hill Road in Otsego (point 122)
g. Incredible views from Christian Hill Road in Otsego (point 112)
h. View of Otsego Lake, Town of Otsego, and surrounding areas from Middlefield

The Viewshed Analysis delivers a map-based visual tool that can be used to determine impacts of development on important vistas and overlooks. Projects that are located near significant viewpoints may reduce the line of sight through structural impedance, light pollution, or by reducing access to the site. Furthermore, development that is located within a viewshed may result in a reduction of the overall quality through poor site planning (for example, too much vegetation removal or improper structure siting and design). While these impacts will not be represented within the Viewshed Analysis, it can help in determining the impact of proposed developments on distant overlooks and viewpoints.

8. WILDLIFE, PLANTS AND IMPORTANT HABITATS

A. Detailed Description of Wildlife, Plants and Important Habitats in the Cooperstown Region

1. Birds

Data from the New York State Breeding Bird Atlas were collected and analyzed to offer an inventory of bird life in the area. This New York State program determines the identification, location, and breeding status of breeding birds. This program does not record migratory birds that may be using the area temporarily during the spring or fall migration periods, however. Numerous birding enthusiasts have recorded many other species in the area, especially during migration seasons.

Within the study area, 120 different species of breeding, or probably breeding birds have been recorded. Of these, 10 are listed as having "possible breeding" status, 19 listed as "probably breeding", and 91 listed as having "confirmed breeding" status. Out of the 120 species, 9 are considered game birds, and the rest are songbirds.

Northern Harrier	Threatened	Possible Breeding
Sharp-shinned Hawk	Special Concern	Confirmed Breeding
Cooper's Hawk	Special Concern	Probably Breeding
Northern Goshawk	Special Concern	Possible Breeding
Red-shouldered Hawk	Special Concern	Possible Breeding
Upland Sandpiper	Threatened	Confirmed Breeding
Red-headed Woodpecker	Special Concern	Confirmed Breeding
Horned Lark	Special Concern	Probably Breeding
Golden-Winged Warbler	Special Concern	Probably Breeding
Cerulean Warbler	Special Concern	Possible Breeding
Vesper Sparrow	Special Concern	Probably Breeding
Grasshopper Sparrow	Special Concern	Confirmed Breeding
Henslow's Sparrow	Threatened	Probably Breeding

According to 6NYCRR 182.5, and New York State Conservation Law Section 11-0535, endangered, threatened and special concern species are defined and listed. Data from the Breeding Bird Atlas identify no endangered species, three threatened species, and 10 species of special concern in the study area. The three threatened species are listed as either possible or probable breeders in the study area. Except for game birds and exotic birds (which have no legal protection), all other species included in the Atlas are birds that have protected status. Protected species are defined in ECL 11-0103, and include wild game, protected wild birds, and endangered species. Species listed as threatened are species likely to become endangered in the foreseeable future in New York, and those listed as Special Concern are not yet recognized as endangered or threatened, but for which documentation exists for their continued welfare in New York. Threatened species receive additional protection under law; species of special concern do not.

In addition to the status under New York law, the NY Natural Heritage Program also assigns each species a global and a state rank. These ranks carry no legal weight but reflect the rarity of the species in the world or within New York State.

In the study area, most species are given the rank of "S4" or "S5". This indicates that they are common to very common. However, two species have the rank of "S3". This rank is rare to uncommon, with typically 20 to 100 occurrences, or limited acreages where they are found. Some may have few local occurrences but have large populations overall. These "S3" species are the Northern Harrier (a possible breeder), and the Long-eared Owl (a confirmed breeder).

2. Reptiles and Amphibians

New York State also sponsors a project to inventory amphibians and reptiles. This is the NY Herpetological Atlas. Although records are limited for the Cooperstown Area, 19 species have been confirmed in the area. These include the Jefferson Salamander, Blue-spotted Salamander, Spotted Salamander, Red-spotted Newt, Northern Dusky Salamander, Northern Redback Salamander, Northern Two-lined Salamander, Eastern American Toad, Northern Spring Peeper, Bullfrog, Green Frog, Wood Frog, Northern Leopard Frog, Common Snapping Turtle, Painted Turtle, Northern Redbelly Snake, and the Eastern Garter Snake. Of these, the Jefferson Salamander and the Blue-spotted Salamander are listed as species of special concern. The other species are considered "unlisted."

3. Critical Natural Areas

The New York Natural Heritage Program also keeps a database of rare and important habitats or locations critical to plants and animals. According to their records, two locations within the study area are considered to be significant. The first location, in the Town of Springfield, has several critical plant components consisting of a rich graminoid fen, a rich shrub fen and a white cedar swamp. Threats to this resource include nutrient enrichment and changes in water quality. The three sub-units at this location are globally ranked "G3" (Either rare and local throughout its range or found locally in a restricted range, or vulnerable to extinction throughout its range because of other factors), or "G4" (apparently secure globally), though it may be quite rare in parts of its range, especially at the periphery, respectively. The graminoid and shrub areas are given state ranks as "S1S2". This is extremely rare or very rare, making it very vulnerable in New York State. The white cedar swamp is ranked "S2S3" (very rare and rare to uncommon). The second significant location, in the Town of Otsego the northern portion of Fly Creek has been identified as a critical habitat for the Henslows Sparrow and the Grasshopper Sparrow. The vicinity of Oaks Creek has been identified as another critical habitat for the Henslows Sparrow.

9. AGRICULTURAL RESOURCES

A. Detailed Description of Agriculture in the Cooperstown Region

i. Countywide Trends

In 1999, Otsego County adopted an Agriculture and Farmland Preservation Plan. This document analyzed the current agricultural conditions and trends in the county. Since that time, there have been changes in agriculture both Countywide and locally in the study area. Agricultural statistics have been compiled through 1999 for Otsego County as follows:

1. The number of farms decreased to 1045 countywide in 1998, and increased slightly to 1075 in 1999. There were 1270 farms recorded in 1984.

2. Land in farms continues to decrease. In 1999, 228,700 acres were farmed, (a slight increase from the previous year). There was about 285,000 acres farmed in 1984.

3. The number of cropland acres continued to decrease. In 1999, there were 123,300 acres of cropland compared to 140,500 in 1984.

4. Total milk production and number of cows both continued downward trends.

5. Pounds produced per cow per year continued its upward trend to 20,500 average pounds per cow in 1999.

The latest US Census for Agriculture was done in 1997. Trends for the county from this data are:

1. Net cash return of farms fell 15% to $10,288 per farm.

2. Production expenses also fell from 1992 levels to those about equal to that of 1987 ($45,447).

3. Market value of products sold decreased from 1992 levels to those equal to that of 1987 ($59,667).

ii. Agricultural Trends

Site-specific data from the 1992 and 1997 Census of Agriculture are available by zip code for the study area. However where zip codes do not match municipal boundaries, CP&EA analyzed those where at least 50% of the area was found within the towns of Otsego, Hartwick, Springfield, or Middlefield. Zip codes analyzed in this study include:

13326: Cooperstown
13337: Fly Creek
13348: Hartwick
13468: Springfield Center
13807: Milford

The 1992 and 1997 Census of Agriculture were analyzed to document the number and type of farms in the study area. These figures offer a snapshot view of agriculture in the study area in those years. Between 1992 and 1997, the total number of farms increased by 12% (to 144). The number of small farms (earning less than $10,000 per year in agricultural sales) increased 37% and the number of larger farms (earning more than $10,000 per year in agricultural sales) decreased by 5%. Similarly, there was a 33% increase in the number of farms where farming is not the principal occupation of the owner. These figures indicate that although there has been increased agricultural activity in the region, there has been a significant shift to small, part-time or hobby farms.

The greatest changes in farm characteristics took place in the Milford zip code area (13807) and the Hartwick zip code area (13348). In Milford, the number of farms that earned over $10,000 in annual sales decreased by 50% in 5 years with a corresponding increase in the number of farms where farming is not the principal occupation of the owner. In Hartwick, there was a 19% increase in the number of farms, with increases in both small and larger earning farms.

Table F10.1 Census of Agriculture Data, 1992

Location as Determined by Zip Code	**# Farms in this zip code**	**# Farms with Annual Market Value < $10,000**	**# Farms With Annual Market Value > $10,000**	**# Farms where Farm is Principal Occupation of Owner**	**# Farms where Farm is not Principal Occupation of Owner**	**# Farms with land in Govt. Conservation or Wetland Reserve Programs**
Milford 13807	11	3	8	10	1	0
Springfield Center 13468*	10	0	10	9	1	1
Hartwick 13348	26	13	13	19	7	1
Fly Creek 13337	12	6	6	9	3	0
Cooperstown 13326	70	30	40	46	24	5
Total	**129**	**52**	**77**	**93**	**36**	**7**

** Small areas of two other zip codes located within the Town of Springfield are not included in this analysis because the zip codes extended primarily into locations not in the study area.*

Table F10.2 Census of Agriculture Data, 1997

Location as Determined by Zip Code	**# Farms in this zip code**	**# Farms with Annual Market Value < $10,000**	**# Farms With Annual Market Value > $10,000**	**# Farms where Farm is Principal Occupation of Owner**	**# Farms where Farm is not Principal Occupation of Owner**	**# Farms with land in Govt. Conservation or Wetland Reserve Programs**

Location as Determined by Zip Code	# Farms in this zip code	# Farms with Annual Market Value < $10,000	# Farms With Annual Market Value > $10,000	# Farms where Farm is Principal Occupation of Owner	# Farms where Farm is not Principal Occupation of Owner	# Farms with land in Govt. Conservation or Wetland Reserve Programs
Milford 13807	11	7	4	6	5	0
Springfield Center 13468*	11	2	9	10	1	1
Hartwick 13348	31	15	16	20	11	2
Fly Creek 13337	12	6	6	6	6	0
Cooperstown 13326	79	41	38	54	25	6
Total	**144**	**71**	**73**	**96**	**48**	**9**

** Small areas of two other zip codes located within the Town of Springfield are not included in this analysis because the zip codes extended primarily into locations not in the study area.*

iii. Current Characteristics of Agriculture in the Study Area

Using 2000 data obtained from New York State, there were 622 parcels of land farmed within the study area (Table 5). The parcel-based data represent 49,147.46 acres of land, or 39.02% of the regions land base. Maps 12A, 12A.1 and 12 B show locations of designated agricultural districts, parcels that are currently being farmed, and prime farmland soils. The major agricultural activity is dairy farming, with hay and corn as the predominant crops. Other agricultural activities taking place within the region include sheep and wool, honey production, horse farms, field crops, orchards, and nursery and greenhouses.

Agricultural Districts

New York State Agriculture and Markets Law 25AA allows farmers and landowners to form special districts where agriculture is encouraged and protected. This law includes many different techniques to protect farmland. In addition to formation of agricultural districts, use-value assessment programs, right-to-farm legislation, and protection from unreasonable local regulation, this legislation also requires development of agricultural impact statements on public projects being conducted in an agricultural district, as well as agricultural data statements on local land use decisions.

Communities and farmers find both advantages and disadvantages to the agricultural district program. Agricultural district legislation attempts to address conflicts in land uses, over-regulation of farmland, and high costs for public services and increases in land value and taxes. These districts assist farmers by decreasing tax burdens and helping to equitably distribute the local tax burden. The original intent was to protect large blocks of land for agriculture and by law they are to include land that is predominantly viable for agriculture. However, there is little guidance as to the particulars of what this means. Consequently, most Ag districts have a scattering of houses, idle lands, woodlands, and active farmlands

mixed together. Some research has shown that the penalties for taking land out of a district are not enforced or severe enough to be a real detriment to converting land in a district (Nelson 1990a and 1992). Further, this research has shown that tax policies encouraged by the agricultural district program can distort land values, induce urban sprawl, and extend the impermanence syndrome by subsidizing holding and operating costs of farms (The impermanence syndrome occurs when farmers stop investing in farm operations in anticipation of future development).

Farmed Parcels

The Town of Middlefield had the most number of farmed parcels and acres in the study area (235 parcels and over 18,000 acres). About 47% of Middlefield's' land base is in farming. Springfield has 167 parcels covering almost 15,000 acres, or 55.46% of its land base in farming. Hartwick and Otsego have about the same number of parcels (109 and 105, respectively) although Otsego has slightly more acres farmed. Both have about 26% of the land base in farming. Six parcels in the Village of Cooperstown are classified as being agricultural.

Table F10.3. Agricultural Parcels Comparison (Parcels with property class code of 100 – 199; Tax data from 2000)

Municipality	Acres	% Of land with tax code of 100	Total Assessment of Parcels with tax code of 100	% Of total municipal assessments in parcels with tax code of 100	Mean Assessment of parcels with tax code of 100
Otsego	8,703.70	26.25%	$5,698,900	4.28%	$54,275
Cooperstown (Otsego)	65.42	8.56%	$436,800	0.26%	$218,400
Middlefield	18,616.79	46.93%	$19,888,244	20.28%	$84,631
Cooperstown (Middlefield)	27.50	16.40%	$123,300	0.75%	$30,825
Hartwick	6,797.56	26.91%	$4,148,600	5.52%	$38,061
Springfield	14,936.49	55.46%	$16,174,932	14.34%	$96,856
Totals	**49,147.46**	**39.02%**	**$46,470,776**	**7.72%**	**$74,712**

Most (548 out of the 622 agricultural parcels) are used for livestock or crops, or for dairy products. According to the New York State Department of Real Property Services, 2000 Data, the total assessed value of all agricultural parcels in the study area is $46,470,776.00 (Table 6). This represents an average assessment per parcel at $74,712.00. Land used as orchards have the highest average assessments ($129,300.00) and land used for horse farms have the lowest average assessments (25,900.00).

Table F10.4. Breakdown of Agricultural Property Class (Entire study area)

Property Class	Parcels	Acres	Total Assessment	Avg. Assessment
105	256	14680.41	$12,772,605	$49,893

Property Class	Parcels	Acres	Total Assessment	Avg. Assessment
110	226	18504.41	$13,967,689	$61,804
112	66	9478	$12,890,982	$195,318
113	22	1939.49	$1,739,000	$79,045
114	6	645.66	$626,300	$104,383
116	1	5.62	$69,900	$69,900
117	2	46.67	$51,800	$25,900
120	29	3221.19	$2,972,300	$102,493
140	4	293.83	$211,300	$52,825
151	1	5.91	$129,300	$129,300
170	8	320.66	$974,700	$121,838
180	1	5.61	$64,900	$64,900
Totals	**622**	**49147.46**	**$46,470,776**	**$74,712**

Tables F10.5-8 detail the tax assessment information for each municipality. The Town of Springfield has the highest average assessment values (96,855.88), followed by Middlefield ($84,631), Otsego ($54,275), and then Hartwick ($38,061). Two parcels in the Town of Otsego portion of the Village are assessed as agriculture (one as an agricultural property, and the other as a greenhouse/nursery) and have the highest assessed rate of $436,800 in total assessments ($218,400 average assessed value). The Middlefield portion of the Village has four parcels (27 acres or16% of the total land area) and is assessed at $123,300. Middlefield has the highest percentage of its total municipal assessments in agriculture (20.3%) followed by Springfield (14.34%) while Hartwick and Otsego have slightly less than 6% of their municipal assessments coming from as agriculture.

Table F10.6. Breakdown of Existing Agricultural Property Class: Town of Middlefield

Town of Middlefield (excluding Cooperstown)					
Tax Code	**Parcels**	**Acres**	**Total Assessment**	**Avg. Assessment**	**Percent of area in each property class**
105	34	2,350.1	$7,474,005.00	$219,824.00	5.92%
110	198	15,918.25	$12,242,089.00	$61,829.00	40.13%
112	1	329.84	$91,650.00	$91,650.00	0.83%
170	1	12.99	$15,600.00	$15,600.00	0.03%
180	1	5.61	$64,900.00	$64,900.00	0.01%
	235	**18616.79**	**$19,888,244.00**	**$84,630.83**	**46.93%**
Middlefield (Cooperstown Only)					
105	2	20.04	$41,700.00	$20,850.00	11.95%
110	2	7.46	$81,600.00	$40,800.00	4.45%
	4	**27.5**	**$123,300.00**	**$30,825.00**	**16.40%**

Within the study area, agricultural parcels make up about 39% of the total land area, and almost 8% of the total tax assessments. Conversely, residential properties take up about 31% of the total land area and make up just over 54% of the total assessments. In the study area, the average assessment for agricultural land is $74,712 and $85,003 for residential properties.

Between 1996 and 2000, there was a loss of approximately 38% of agricultural acreage (NYS Real Property Office 2001). Springfield had the greatest loss (-26.23%), followed by Hartwick (-6.56%), Middlefield (-3.02%), and Otsego (-2.84%). Some of this land was converted to residential or other built land uses, while others were abandoned and are now classified as vacant lands.

Prime Soils

Agricultural statistics can offer much information on the agricultural economy of an area. None, however, reflect the location or quality of farmland that exists. Aggregate numbers simply do not tell us where land is most conducive to agriculture, how valuable that land is, and where land is being converted. In order to determine the significance of farmland loss and changes in the agricultural community, it must be tied to the question of where farming (and farmland loss) is taking place.

Map 12-B indicates locations of prime soils in the study area. Prime soils are, according to NRCS, " land that is best suited to the production of row, forage and fiber crops. Due to inherent natural characteristics such as level topography, good drainage, adequate moisture supply, favorable soil depth and favorable soil texture, this land consistently produces the most food and fiber with the least fertilizer, labor and energy requirements. Prime soils tend to be resistant to erosion and runoff". In addition to prime farmlands, two other categories describe important farm locations: "unique farmlands," and "statewide important farmland."

In the study area, there are no soils classified as being "unique". However, a large portion of the area is considered to have lands statewide importance. These soils are defined by the NRCS as "in addition to prime farmland, statewide important farmland is of particular state importance for the production of food, feed, fiber, forage, and oilseed crops. Generally these farmlands include soils that are classified as nearly prime and that produce high yields of crops when treated and managed according to modern farming practices. If conditions are favorable, some may produce yields as high as prime farmland."

Soils graded as either prime or as statewide importance are especially important to agriculture. The USDA estimates that about 56% of our nation's crops are grown on prime farmland but these soils are the most likely to be converted to nonagricultural use. Consequently, in many locations around the United States incentives are offered to protect lands that are considered prime farmland. Any farmland protection program should specifically target prime farmland locations.

Economic Trends of Agriculture

Agriculture is a significant economic influence in the area. The Otsego County Agriculture and Farmland Protection Plan estimated that about 1.3% of the total earnings in the county can be attributed to agriculture even though its contribution to county employment and earnings is relatively small. In 1992, total farm employment was 1657 people, or 5.63% of total county employment. Economic multipliers of agriculture in New York State show that the largest multipliers for total income were found among the agricultural industries. Multipliers for agricultural employment were also larger than other sectors. This indicates that a direct increase in income or employment in the agricultural sector will lead to larger total income and employment creation within the local economy than would a corresponding increase in non-agricultural sectors. Dairy production showed a 2.29 multiplier for total income, and 1.52 multiplier for employment. This suggests that although agriculture in Otsego County

accounts for small percentages of total personal income and employment, the industry exerts a much larger effect on the economy. Farms make relatively large expenditures locally and statewide compared to many other industries, meaning large secondary benefits may be produced for businesses linked to farm and food production.

10. TRANSPORTATION ANALYSIS

A general transportation study was conducted on major routes to the Village of Cooperstown. This included evaluation of traffic volume, accidents, road capacity, and intersection delays. In addition to new field data, information for this analysis was provided by the New York State Department of Transportation (NYS DOT), Community Planning & Environmental Associates (CP&EA), and Sterling Environmental Engineering, PC. The data was collected between mid-June of 2001 August 2001. Note: Raw traffic count data used in this GEIS are filed with the Town of Middlefield.
During the summer months, the population in and around the Village of Cooperstown increases due to interest in the National Baseball Hall of Fame, The Fenimore Art Museum, The Farmers' Museum, The Glimmerglass Opera and Otsego Lake. Due to Cooperstown's centralized location, seasonal roadway traffic initiates from nearby cities such as Albany, Boston or New York. Travelers from these locations will use interstate highways to get to NYS 20 (west) then to NYS 80 (south) into the Village of Cooperstown. Traffic originating from Binghamton and other southern New York cities will use Interstate highways to Interstate 88 (east) then to NYS 28 (north) to the Village of Cooperstown. The remaining western New York cities will use Interstate 90 (east) or Interstate 81 (south) to Interstate 90 (east) to the Herkimer Exit 30, then to NYS 28 (south) to Cooperstown.

Airport hubs in Syracuse and Albany are also known destinations for visitors to the Cooperstown area. Subsequent transport to Cooperstown will follow the above routes. Train service does not extend to the Village of Cooperstown, however, Amtrak services both Utica (west) and Albany (east), and transportation from these stations would follow the above-mentioned routes to the Village center. Bus service from many cites are offered by private companies such as Trailways or Greyhound at varying times throughout the year. Public bus services are provided on a regular basis from the Oneonta Public Transit (OPT) and the Otsego Express. Taxi and Limousine services are also available to those whose need immediate access or can afford the cost of these services.

A. Accident Analysis

Accident data for roadways in the study area were reviewed to provide insight into problem areas that may require access management initiatives or warrant a change to traffic control devices. In January of 2001, accident reports from NYSDOT were requested through the Freedom of Information Law (FOIL). In March of 2001, NYSDOT returned SASS Report data for the most recent three (3) year recorded period for the state highways and roadway segments within the project study area. The reports included information for the Town of Otsego, Town of Middlefield, Town of Hartwick, Town of Springfield and the Village of Cooperstown for NYS Route 20 (NYS 20), NYS 28, NYS 80, NYS 166 and NYS Route 205. In addition, statewide averages for accident categories were provided for two (2) lane/undivided/rural highways, two (2) lane/undivided urban highways, four (4) lane/divided/rural highways, four (4) lane/urban/divided highways and four (4) lane/undivided/urban highways. The

segments were further divided to provide summaries for intersection accidents and roadway segment accidents. Accidents that are listed as non-reportable are generally considered to involve no personal injury and property damage less than $1,000.

NYS Route 20

NYS 20 analyses suggest that from September of 1996 through June of 1999 approximately 31 accidents occurred along a five- (5) mile stretch of roadway. Approximately 45 percent (14/31) occurred at the four (4) intersections along NYS 20 between and including Route 80 and CR 54. Route 80 was the only signalized intersection in the study area. However, Route 80, Route 31 and Route 54 (Map 14a) each had three (3) reportable accidents.

Roadway segment summary suggests that approximately 20% of accidents are attributable to each of the following factors: speed; animals; driver inattention; and non-reportable accidents. When compared to State averages for roadway segments, individual incident summaries are generally higher than State averages. However, non-reportable accidents have been shown with a lower mean rate than State averages. Intersection summaries suggest that 20% of accidents are attributable to each of the following factors: inattention; yielding R.O.W.; and animals collisions, with approximately 30% due to the lack of observance of prevailing traffic control. Overall summary for a two- (2) lane undivided rural highway suggests 6.2 accidents per measured vehicle mile (acc/mvm) compared to the mean rate of 2.67 acc/mvm or the 95th percentile rate of 10.9 acc/mvm. For roadway segments, it appears as though accident rates are higher due to drivers' loss of concentration and/or excessive rate of speed given driving conditions.

NYS Route 28

NYS 28 analyses suggest that from September of 1996 through June of 1999 approximately 185 accidents occurred along a14-mile stretch of roadway (please see Map 14b). Approximately 20 percent (38/185) occurred at the sixteen (16) intersections between and including County Route 45 and NYS Route 80. The highest percentage, 12/38 (32%) occurred at the intersection of CR26, which is a no-passing zone. At CR 26, it appears as though drivers tend to assign less risk to a crossing maneuver than they should. It is likely that approaching speeds are occasionally misinterpreted, resulting in side impact and rear-end collisions. Approximately 13 percent (13%) of all accidents occur at each of CR 11C, CR 11 and NYS Route 80 intersections.

A total of 51 non-reportable accidents were noted in this analysis, 44 of which occurred along roadway segments. Roadway segment mean rate of 3.64 falls between the State mean rate of 1.19 and 95% rate of 10.9. Ground mounted "Stop" and "Yield" signs control the above noted intersections. However, the intersection of CR 26 is approaching warrants for a traffic signal based on the frequency of accident occurrence.

Overall, the mean accident rate of 13.2 acc/mile along NYS 28 is greater than the State 95% rate of 10.9 acc/mile due to the high number of intersection accidents at CR 26 and animal/object collisions along roadway segments.

NYS Route 80

NYS 80 analyses suggest that from September of 1996 through June of 1999 approximately 148 accidents occurred along this 22.5-mile stretch of roadway, (Map 14c). Approximately 23 percent (34/148) occurred at the sixteen (16) intersections between and including Salamanca Road and NYS Route 80. Approximately 16% of these accidents occurred at the intersection of both Fish Road and NYS 80. At each intersection it appears as though drivers did not obey traffic control right-of-way (ROW) rules.

A total of 57 non-reportable accidents were noted in this analysis, 49 of which occurred along roadway segments. The roadway segment mean rate of 2.53 falls between the State mean rate of 1.19 and 95% rate of 10.9. Thirty of the 148 accidents occurred along the roadway segments between CR 28 and Bartlett Road. Approximately 40% of these accidents are attributed to both non-reportable accidents and animal/object collisions. Overall, the mean accident rate of 6.58 acc/mile is less than the State 95% rate average of 10.9 acc/mile.

The remaining intersections and roadway segments, where data were available, appear to operate with acceptable ranges of accident rates at this time. Further review of local MV 104 and MV 104A police reports would yield further insight into specific accident data for the problem intersections and roadway. If MV 104 and MV 104A reports are available, review should consist of the most recent three- (3) year period for critical intersections and roadway segments identified.

B. Traffic Volume Analysis

All available traffic count data for the project area roadways and intersections were evaluated and supplemented with new traffic count data. Information contained in the NYSDOT, The Highway Sufficiency Ratings, and the NSDOT, Traffic Volume Report was used.

Year 2001 Current Traffic Counts

In addition to available existing traffic volume data for the intersections and roadway segments for the study area, supplemental automatic traffic data recorders were placed at or about Village limit lines to account for current daily traffic conditions.

Automatic traffic data recorders were placed at four (4) locations to collect continuous traffic volumes for a period of not less than seven days, each starting on June 22, 2001, (Map 15). Counters were placed at the northern Village border, across NYS 80; at the eastern Village border, across CR 31, west of Estli Avenue; at the southern Village border across NYS 28 south of Walnut Street; and at the western Village border, across NYS 80 (NYS 28 overlap). Specifically, the NYS 28 counter was placed along Glen Avenue, approximately opposite the Credit Union Building east of Maple Street and the red park-n-ride lot. The southern NYS 28 counter was placed south of Walnut Street at the northern end of the commercial parking lot, and the remaining NYS 80 counter was placed north of the golf course driveways and just south of the yellow park-n-ride lot.

A percent adjustment correction for heavy vehicle (HV) traffic as suggested by the NYSDOT – Highway Sufficiency Ratings, 1997, has been applied to all raw data recorded. A "heavy vehicle" is usually defined as any vehicle larger than a UPS truck or any vehicle that slows traffic below typical

travel speeds. Note that a heavy vehicle percent correction is more likely indicative for weekday traffic verses weekend traffic volumes and therefore not applied to Saturday and Sunday raw data. Raw data can be found in Appendix C.

Table F.13.1: NYS Route 80

DAILY TRAFFIC VOLUME SUMMARY*											
NYS 80 – south of Yellow Park-n-Ride lot											
	Weekday Avg. (M - F)				% Of Weekday Average						
	Total	- HV	Ave.	%	MON	TUE	WED	THU	FRI	SAT	SUN
NB	12995	-520	2495	51	0.95	1.02	1.05	0.97	1.01	0.94	0.92
SB	12349	-494	2371	49	1.01	1.06	0.98	0.95	1.00	0.99	0.94
Total			**4866**								

** For the Daily Traffic Volume Summary Tables, volumes are shown by direction then first by total number of vehicles for the week recorded, then how many trips are deducted due to the influence of truck traffic, then by weekday average volume (with truck traffic correction) with percent distribution. The remaining columns indicate on a daily basis how the recorded daily volumes compare to the weekday average. The intent of this table is to show the daily relationship of traffic to the weekday average commuter traffic. This table quickly reveals the weekly directional "tides" of traffic per direction for a given roadway. The symbol HV refers to heavy vehicle or truck traffic and NB/SB/EB/WB refers to northbound/southbound/eastbound/westbound travel directions.*

Weekday average bi-directional traffic volumes along N.Y.S. Route 80 were determined to be approximately 4,866 vehicles per day, after an approximately four-percent (4%) heavy vehicle correction.

According to recorded count data for NYS 80, northbound traffic along this location has an AM Peak hour centered around 11:00 AM, then builds during the midday peak, and continues to the highest levels during the PM peak hour centered around 5:00 PM. Southbound traffic along N.Y.S. Route 80 at this location has an AM peak hour centered around 8:00 AM then steadily drops through the midday with resurgence peaking again at approximately 1:00PM.

The volumes then slowly drop through the PM peak hour with considerable loss of volume after 8:00 PM. The northbound traffic volumes building from approximately 11:00 AM on through the PM peak period are inconsistent with either midday tourist's trips or PM peak hour commuter traffic. To speculate the peak flows, one might suggest that midday trips may be attributed to Glimmerglass Opera House or other northern day trip attractions. The remaining northbound PM peak flows may be attributed to day tourists/employees return home after a day at Cooperstown. The southbound traffic data suggest that employee (commuter) traffic may attribute to 8:00AM peak with midday traffic peaks likely due to visitor trips. Saturday and Sunday bi-directional volumes are comparable to weekday volumes, which suggest increased retail or visitor trips at this location.

Weekend traffic data collected suggest Saturday's bi-directional traffic volumes generally peaked between 12:00 Noon and 1:00PM with volumes of approximately 440 vehicles. Sunday's bi-directional traffic volumes generally peaked between 1:00 PM with volumes of approximately 450 vehicles. Total cars per day on Saturday (bi-directional) were 4676, and on Sunday was 4522.

According to NYSDOT, NYS 80 has shown recent traffic volume growth rates of approximate one percent per year (1%/yr) growth in traffic volumes with two-way Annual Average Daily Traffic

(AADT) volumes of approximately 4,700 vehicles (estimated in 1997). These numbers appear accurate with ADT (Average Daily Traffic) of 4,866 vehicles recorded in 2001 as shown above.

Table F.13.2: NYS Route 28 (east of Maple Street)

DAILY TRAFFIC VOLUME SUMMARY											
NYS 28 – east of Maple Street (Red Lot)											
	Weekday Avg. (M - F)				**% Of Weekday Average**						
	Total	- HV	Ave.	%	MON	TUE	WED	THU	FRI	SAT	SUN
NB	14717	-1030	2737	52	0.96	0.96	1.04	0.97	1.06	0.89	0.71
SB	13383	-937	2490	48	0.96	0.96	1.05	0.97	1.05	0.91	0.73
Total	**17,082**		**5227**								

Weekday average bi-directional traffic along N.Y.S. Route 28 was determined to be approximately 5,227 vehicles per day, after an approximately seven-percent (7%) heavy vehicle correction.

For NYS 28 (NYS 80 overlap, east of Maple Street), according to recorded count data, northbound traffic along N.Y.S. Route 28 at this location has an AM peak hour centered around 11:00 AM then builds during the midday peak and continues to the highest levels during the PM peak hour centered between 4:00 PM and 5:00 PM. Southbound traffic along N.Y.S. Route 28 at this location has an AM peak hour centered around 8:00 AM then slowly dropping to a midday resurgence peaking again at approximately 12:00 Noon. The volumes then slowly drop through the PM peak hour with considerable loss of volume after 6:00 PM. This summary is similar to NYS 80 and bears the same speculations. The southbound traffic data suggest that employee (commuter) traffic may attribute to 8:00AM peak with midday traffic peaks likely attributed to the Credit Union facility and daily banking activities. Saturday and Sunday bi-directional volumes are lower by at least 100 trips compared to weekday volumes, which may suggest more retail trips than visitor trips at this location.

Weekend traffic data collected suggest Saturday's bi-directional traffic volumes generally peaked between 11:00 AM to 12:00 Noon with volumes of approximately 446 vehicles. Sunday's bi-directional traffic volumes generally peaked at 11:00 AM and again at approximately 4:00 PM with volumes of approximately 295 vehicles. Total cars per day on Saturday were 4696 and on Sunday was 3773.

According to NYSDOT, NYS 28 shows recent traffic volume growth rates of approximately nine percent per year (9%/yr) growth in traffic volumes with two-way Annual Average Daily Traffic (AADT) volumes of between 5,900 vehicles (estimated in 1997) to 4550 vehicles. By comparison, the vehicles recorded in 2001 are lower than those referenced for NYS 28 in year 1997. This 9%/year rate of growth is generally considered a high value. Typically, higher growth rates are tied to nearby large residential or industrial developments.

Table F.13.3: NYS 28 (South of Walnut Street)

DAILY TRAFFIC VOLUME SUMMARY			
NYS 28 – south of Walnut Street			
	Weekday Avg. (M - F)		**% Of Weekday Average**

	Total	- HV	Ave.	%	MON	TUE	WED	THU	FRI	SAT	SUN
NB	28719	-2010	5342	54	1.04	1.04	1.00	0.95	0.97	0.87	0.84
SB	24225	-1696	4506	46	0.99	1.00	0.99	1.01	1.01	0.87	0.77
Total	**55,944**		**9848**								

Weekday average bi-directional traffic volumes along N.Y.S. Route 28 were determined to be approximately 9,848 vehicles per day, after an approximately seven-percent (7%) heavy vehicle correction.

For NYS 28 (south of Walnut Street) the northbound traffic data suggest that employee (commuter) traffic at 9:00 AM and 2:00PM peaks may be attributable to the Dreams Park facility activities and/or Bassett Hospital shift change at 3:00PM. Southbound traffic flows build from the morning peak hour with highest levels between 4:00 PM and 5:00 PM, consistent with employee (commuter) trends. Saturday and Sunday bi-directional volumes are lower by a few hundred trips compared to weekday volumes, which is more indicative of retail trips than visitor trips at this location.

Weekend traffic data collected suggest Saturday's bi-directional traffic volumes generally peaked between 1:00 PM to 2:00 PM with volumes of approximately 742 vehicles. Sunday's bi-directional traffic volumes generally peaked at approximately 1:00 PM with volumes of approximately 679 vehicles. Total cars per day on Saturday were 8548 and on Sunday was 7941.

According to NYSDOT, NYS 28 shows recent traffic volume growth rates between one and two percent per year (1.3%/yr) and growth in traffic volumes with two-way Annual Average Daily Traffic (AADT) volumes of between 7,900 (estimated in 1997) to 7700 vehicles. Data collected in 2001 are significantly higher than that estimated by NYS DOT.

Overall there appears to be an indication of a rise in traffic volumes during the first part of the week (Monday and Tuesday) and decreasing activity for the remainder of the week. Specifically, the Saturday impact from the Dreams Park location was not apparent in the data collected along NYS 28.

Table F.13.4: CR 31 (east of River Street)

DAILY TRAFFIC VOLUME SUMMARY											
CR 31 – east of River Street											
	Weekday Avg. (M - F)				**% Of Weekday Average**						
	Total	- HV	Ave.	%	MON	TUE	WED	THU	FRI	SAT	SUN
EB	8596	-172	1685	50	1.05	1.02	1.01	1.01	0.94	0.82	0.82
WB	8486	-170	1663	50	0.93	1.00	1.07	1.05	0.96	0.93	0.86
Total	**17,092**		**3348**								

For CR 31 (east of River Street), according to recorded count data, eastbound traffic along CR 31 at this location has an AM Peak hour generally centered between 10:00 AM and 11:00 AM then peaks at Midday (12:00 Noon) then declines for remainder of the day. Westbound traffic along CR 31 at this location has an AM Peak hour centered around 4:00 AM then slowly dropping and peaking again at approximately 12:00 Noon, then steadily declines in volumes after 1:00 PM. The eastbound midday peaks are suspected to occur from either large employee shifts (Bassett Hospital), general retail activities, or from Dreams Park recess. The westbound traffic data have similar midday peaks however;

the 4:00 AM peak is inconsistent even from large employers such as Bassett Hospital. Saturday and Sunday bi-directional volumes are not significantly lower compared to weekday volumes, which is more indicative of site generator trips (i.e. Dreams Park) rather than retail trips at this location. Overall, peak hour trip volumes for this roadway are low in comparison to the surrounding roadways.

Weekday average bi-directional traffic volumes (not including Saturday and Sunday, after heavy vehicle correction) along CR 31 were determined to be approximately 3,348 vehicles per day, after an approximately two-percent (2%) heavy vehicle correction. Weekend traffic data collected suggest Saturday's bi-directional traffic volumes generally peaked between 8:00 AM to 9:00 AM with volumes of approximately 230 vehicles (2933 total cars per day). Sunday's bi-directional traffic volumes generally peaked at approximately 12:00 Noon with volumes of approximately 275 vehicles (2816 total cars per day).

Overall there appears to be an indication of a rise in traffic volumes during the middle of the week (Tuesday and Wednesday) and significant activity for both Saturday and Sunday.

C. Road Capacity Analysis

The procedures in the 1997 Highway Capacity Manual (HCM) were used to determine the operating condition of the study area roadway segments, which will be described in terms of capacity for the existing conditions. In addition, Tasplus Software, Version 4.10b was used for vehicle classification and speed data analyses. Theoretical capacity is compared to actual traffic volumes counted and observed in August 2001. The capacity for each two-lane roadway studied; NYS 80, NYS 28, NYS 28/NYS 80 and CR 31 are presented below in accordance with the Highway Capacity Manual (HCM).

1. Theoretical Capacity

As stated in the HCM, ideal conditions for two-lane highways are defined having no retrictive geometry, traffic or other enviromental conditions. Ideally a two-lane rural highway will have a design speed greater than 60 miles per hour (mph), 12 feet wide (min.) lanes, 6 feet wide (min.) shoulders, no passing, 50/50 directional split, no impediments and level terrain. The capacity of NYS 80, NYS 28 and CR 31 are compared to this theoretical ideal roadway. The capacity under these conditions is 2,800 passenger cars per hour (pcph) total both directions. Uninterrupted flow would result in the theoretical capacity to be set at approximately 2,000 pcph per lane (pcphpl).

2. Actual Capacity

Road capacity is measured as a Level of Service (LOS). Each LOS receives a grade. The grading for LOS ratings is similar to a school report card with LOS A being the best and LOS E/F the worst. LOS A is rated an excellent condition, and indicates no delays. LOS B is considered very good but has minor delays with a decrease in traffic gaps between vehicles. LOS C is average/good with some delay and fewer gaps than LOS B. LOS D is considered acceptable, with frequent delays and small gaps, a condition in which motorists begin to accept risk for turning mancuvers and expect delays. LOS E is considered a failing condition with long delays and few gaps, with motorists accepting higher risks and expecting to wait long periods to get to their destination. LOS F is considered unacceptable conditions where delays are often and prolonged. LOS rating less than LOS D is when motorists begin to search for alternative routes or alternative mode of transportation (i.e. bus, train etc.). For a particular roadway to fail from capacity conditions, the LOS rating would need to be LOS E or worse for a duration of several hours usually during typical daily peak periods.

The PM peak period is shown to have the highest demand for all roadway segments.
- NYS 80 has a Level Of Service (LOS) C during the PM peak period, with a reserve capacity (the amount left before failure, LOS E or worse) of approximately 1500 vehicles, total both directions.
- NYS 28/NYS 80 overlap (east of Maple Street) has a LOS D, with reserve capacity of approximately 1200 vehicles total both directions.
- NYS 28 (south of Walnut Street) has a LOS D, with reserve capacity of approximately 1300 vehicles both directions.
- CR 31 has a LOS C during the PM peak period with a reserve capacity of approximately 1600 vehicles both directions.

In this analysis the LOS D rating is misleading. LOS D rating was estimated based on the highest peak hour volumes. This condition occurs only once a day during one of many peak periods. However, continuous LOS D ratings would still be considered acceptable but on the verge of a failing condition. Our analysis indicates that all roads are LOS D rated or better. Poor conditions only persist for a brief period during the day and week. It is also important to note that the LOS conditions stated above will have better rating and less delay at all other times during the day than during the heaviest vehicle demand.
In summary, roadway capacity for all roadways studied, is currently at acceptable levels or better, during the peak hours of demand.

11. EMERGENCY SERVICES

The following is an inventory and analysis of emergency services (police, fire, and ambulance) within the study area.

Police

Otsego County Sheriff's Department

The Otsego County Sheriff's Department (based in the County Public Safety Building on County Route 33 in the Town of Middlefield) provides police services for all of Otsego County. However, the Sheriff's Office does not patrol the Village of Cooperstown except in backup situations. When needed, the department receives backup from New York State Police out of Oneonta and Richfield Springs. During the daytime, there is typically one vehicle patrolling roads in the County (2 during night), however, due to the limited number of officers, there is no coverage for a few early morning hours each day.

Current staff:
8 road patrol officers (Officers work ten-hour shifts)
4 Court/Security Officers
1 Road Backup/Civil Service

During an interview conducted with the Sheriff's Department, it was reported that there is always a need for more staff and officers (estimated need for at least three more people). Furthermore, In 1996 Otsego County completed a "Manpower Study" for the Sheriff's Department that also discussed the level of staffing in road patrol. The report compares Otsego with 35 other similar counties and New York and found that Otsego's staffing level is below all but one county. Furthermore, using a model employed by the State Division of Criminal Justice Services, it was determined that 2 or three full time positions should be added to the current road patrol.

Cooperstown Police Department

The village police department has 10 officers, including the chief of police and 5 part-time officers. The village also employs one year-round parking officer and adds a second officer during the summer. There are two patrol cars, with one car in reserve, and the primary car is replaced periodically. Computer equipment and programs are up to date as are such police items as radios and bulletproof vests. The patrol car is equipped with a defibrillator for emergency use. In general, one officer is on duty during each eight-hour shift, but on weekends and on certain evenings the shifts overlap so that there are two officers on duty for most of the night hours. The department has jurisdiction only within the village but does answer emergency calls to contiguous property and cooperates with all law-enforcement agencies.

1 Department Office
10 Patrol Officers (5 full time, 5 part time)
2 Vehicles (one acts as a backup)

New York State Police

The New York State Police serves the study area from the police barracks in Richfield Springs. According to a 1996 study completed by Otsego County, there are 9 full-time troopers with officers working eight-hour shifts, seven days a week. The State officers do not patrol Cooperstown, however they will provide backup if necessary. Within the rest of the study area, the State officers provide backup to the sheriff's department when necessary. Typically, the "closest car" determines which agency is the first to respond to an incident requiring law enforcement presence.

New York State Park Police: New York State operates a small department of park police from the main office at Glimmerglass State Park at the northern end of Otsego Lake (Otsego County Sheriff's Department Manpower Study). The office is staffed by one full-time, year round individual with part-time assistants during the summer months. The department has jurisdiction over several counties in the area, however, within the study area, the office covers the Glimmerglass State Park, Gilbert Lake State Park and the state boat launch on Canadarago Lake. The staff is available to provide backup to other law enforcement agencies in the area upon request.

Fire and Ambulance Services

Within the study area there are five Fire Districts with Springfield and Hartwick each having two companies. Fire department chiefs were contacted and asked a series of questions regarding equipment inventory and status, volunteer services, and general emergency services trends and concerns. By far the most significant concern among the fire chiefs was staffing. Each interviewee noted that there was a significant reduction in volunteers over the past decade. Even when a resident wishes to volunteer for fire or EMS work, they are often unable to do so due to travel time and distance. This is one byproduct of the decentralization and sprawling development pattern in the study area. Sprawl was not mentioned as a factor impeding response time or emergency services except in the districts' inability to attract volunteers and support. While there were no other "major" or significant issues reported, it was mentioned that development in higher elevations might not receive proper fire support in winter (due to lack of snow removal). This should be considered during site plan review and when considering the creation of development regulations and laws.

Middlefield, Chief: Kim Gohde (607) 547-2933
Similar to the other districts in the study area, the Middlefield Fire District lacks adequate volunteers to perform emergency service duties. There are no other major concerns.
Inventory:
17 volunteers
1 team of first responders
2 tankers, 1 engine, 1 rescue, and 1 misc. vehicle

The main issue related to emergency services in the study area is finding adequate numbers of volunteers for its five fire departments. Each fire chief interviewed mentioned the lack of manpower as the most pressing issue facing the department. Unfortunately, it is likely that this trend will continue for the foreseeable future. As the population of the region continues to age and development occurs in fragmented sprawl-style development the difficulty in finding volunteers, especially during the daytime hours, will worsen. Fire departments will find it increasingly necessary to expand mutual aid agreements with other departments to cover the lack of manpower. Further, it is possible that the lack of volunteers could lead to the need for paid emergency staff. The changeover of the emergency services

from a non-paid, volunteer organization, to a professional, paid department would certainly lead to an increase in tax rates for the affected community. In order to avoid such costs, each municipality should undertake aggressive recruitment campaigns before switching to paid emergency services staff.

12. LAND USE TRENDS

A. Current Land Use in the Area

Map 16 and the following tables detail land uses within the study area. Land uses were analyzed by examining parcels and assessment values from data received from the Otsego County Real Property Office. More recent data (year 2000) used for the tabular analysis was made available through the New York State Office of Real Property Services (NYS ORPS). Mapped parcels from map 16 are current only as of 1998. Please note that the following figures and analysis detail the more recent NYS ORPS data.

B. Land Use Characterizations **(see Map 16)**

Agricultural

Agricultural lands account for almost 50,000 acres or 39% of the study area with the majority of this farmland found in Middlefield and Springfield. Among the study area municipalities, the Town of Springfield has the highest concentration of contiguous agricultural lands followed by Middlefield, Otsego, and Hartwick. While Middlefield still contains a substantial amount of farmland, these lands are generally interspersed with vacant, residential and forest lands (some large concentrations of farmed areas are found in portions of the northern, southeastern, and western portion of Middlefield). Otsego has one large, unbroken mass of agricultural land in the central portion of the town surrounded by residential and vacant parcels. The Town of Hartwick has a scattering of agricultural land, but no large concentrations in any one location.

There are a variety of types of farming being conducted on the study area's agricultural land. These include: livestock and products (18,504 acres, 37.65% of total agricultural land), productive vacant land (14,680 acres, 29.87%), dairy products (9,478 acres, 19.28%), field crops (3,221 acres, 6.55%), cattle, calves and hogs (1,939 acres, 3.95%), sheep and wool (646 acres, 1.31%), and other activities (678, 1.38%). For a more detailed discussion of agriculture please turn to Chapter 10: Agricultural Resources.

Commercial

The area's major commercial center is located in the Village of Cooperstown where health and tourism businesses dominate. Additional areas of intensive commercial activity occur south along Route 28 at the boundary between Hartwick and Middlefield, as well as within each of the study area's hamlets. There is also some commercial activity along the shores of Otsego Lake.

Commercial activities found within the study area include hotels and motels, cottages, inns, restaurants, diners, auto dealers, service and gas stations, auto body shops, parking lots, warehouses, lumber yards,

trucking terminals, neighborhood shopping centers, supermarkets, banks and office buildings, funeral homes, veterinary clinics, junkyards, mini-marts and mixed use professional office buildings. Additional commercial entities include theatres, auditoriums, a brewery, sports facilities, museums, camps and resorts, golf courses and other outdoors sporting activities. For a more detailed description of the study area's commercial activities and economy please turn to Chapter 17: Economic Conditions.

Industrial

There are very few industrial uses within the study area; these include manufacturing, mining, and sand and gravel operations. There is no major concentration of industrial activity within the study area.
Parks, Recreation, and Open Space

Much of the area's open space is held in private preserves and forests. The table entitled "Property Classes and Land Use Characteristics for the Entire Study Area" shows that the property class code labeled "Wild Forested, Conservation Lands and Public Parks" accounts for 7.49% of the study area. However after removing privately owned wild or forested lands and hunting grounds, only 3,844 acres or 3.05% remains as publicly owned open space or parks. In addition to the "Wild Forested, Conservation Lands and Public Parks" property class, the 25,000 acres of vacant land contribute significantly to the study area's rural quality and open space. Regardless of current use, these vacant lands are available for future development. Subdivision and development of these vacant properties would negatively impact open space and rural character of the study area. Since many of the local and county routes still have large, undivided parcels, the impact of subdivision at these locations will change the character and perception of the area.

Otsego Lake is the geographic center of the study area. It is also central to the region's high quality of life by supplying drinking water, beautiful vistas, and recreation for residents and tourists. The lake's eastern shore is primarily forested or used for agriculture, while the western shore is almost exclusively residential. Parcels along the eastern shore of the lake are very large except for near the Village of Cooperstown and just south of Glimmerglass State Park. Along the eastern shore, parcels are typically smaller from the northern tip south to Five Mile Point. From that point southward to Cooperstown the parcels are generally much larger.
Residential

Within the study area a variety of housing types exist including single family, two family, rural residences, estates, seasonal residences, mobile homes, and apartments.

The majority of housing within the study area consists of single-family homes. They are scattered throughout each municipality with concentrations in the Village of Cooperstown, each of the area's hamlets, and south along route 28. Two family homes are found almost exclusively within the Village of Cooperstown, the Hamlets of Hartwick and Toddsville.

Seasonal residences are generally concentrated in areas along the western shore of Otsego Lake, the eastern shore of Canadarago Lake, Arnold Lake in Hartwick, and a small portion on the eastern side of Otsego Lake at Hyde Bay. Mobile homes are scattered throughout the study area with concentrations in and around the study area's hamlets. Most of the apartment housing is located within the Village of Cooperstown with small apartments located in the hamlets.

Public Uses

Excluding public parkland, most government uses are found within the Village of Cooperstown with small offices and facilities scattered through each municipality including the Otsego County Offices south of Cooperstown in Middlefield.

Table F18-1: Property Classes and Land Use Characteristics for Entire Study Area

	Parcels	% Of all Parcels	Assessment	% Of Total Assessments	Avg. Assessment	Acres	% Of Total Area
Agricultural (100)	622	8.90%	$46,470,776	7.72%	$74,712	49147.46	39.02%
Residential (200)	3853	55.14%	$327,515,257	54.38%	$85,003	38457.38	30.53%
Vacant Land (300)	1719	24.60%	$25,436,738	4.22%	$14,797	25065.71	19.90%
Commercial (400)	293	4.19%	$59,336,675	9.85%	$202,514	948.61	0.75%
Recreation and Entertainment (500)	41	0.59%	$23,987,400	3.98%	$585,059	1452.58	1.15%
Community Services (600)	140	2.00%	$82,164,400	13.64%	$586,889	939.52	0.75%
Industrial (700)	4	0.06%	$474,050	0.08%	$118,513	122.36	0.10%
Public Services (800)	132	1.89%	$25,851,289	4.29%	$195,843	209.81	0.17%
Wild, Forested, Conservation Lands and Public Parks (900)	176	2.52%	$10,722,209	1.78%	$60,922	9428.34	7.49%
No Code	8	0.11%	$262,110	0.04%	$32,764	175.88	0.14%
Total	**6988**	**100%**	**$602,220,904**	**100%**	**$86,179**	**125947.65**	**100.00%**

Source: New York State Office of Real Property Services, 2000

Table F18-2: Characteristics of All parcels in study area: Parcels, Acres, and Assessment

Municipality	Total Parcels	Total Acres	Total Assessment	Mean Assessment
Otsego	1836	33,151.55	$133,025,404	$72,454
Cooperstown (Otsego)	895	763.87	$166,706,728	$186,265
Middlefield	1562	39,669.41	$98,052,931	$62,774
Cooperstown (Middlefield)	126	167.69	$16,492,243	$130,891
Hartwick	1457	25,263.04	$75,138,428	$51,571
Springfield	1112	26,932.09	$112,805,170	$101,443
Totals	**6988**	**125,947.65**	**$602,220,904**	**$86,179**

Source: New York State Office of Real Property Services, 2000

C. Changes in Land Use

Table F.18-3 below generally describes the trends in land conversion from agricultural uses to residential uses between 1996 and 2000. The data were derived from State level real property tax information, and was also discussed in Chapter 10 (Agricultural Resources). The chart reflects changes in land use classifications from 1996 to 2000. There are a number of reasons why land use classifications may change, including an actual change in the land use. The GIS was used to compare tax assessment classifications from year to year to identify changes in land use. The greatest amount of farmland lost and converted in the study area has been in the Town of Springfield. In Springfield, there was a 26% decrease in the amount of land classified as agriculture between 1996 and 2000. At the same time, there was a 175% increase in the number of acres now classified as residential land uses.

The Town of Hartwick also showed considerable changes (a change of about -7% of agricultural parcels). Hartwick saw a 10% change in the number of residential acres. Middlefield had a -3% change in its agricultural acres, and gained about 8% in residential acres. Otsego also had similar changes of farmland acres but had a smaller increase in residential acres than Middlefield. There was no loss of agriculture within the Village. However, there was an increase of 19% of residential acres in the Middlefield portion of the Village.

Table F18-3: Land Use Trends

1996-2000	% Change in Acres of Agricultural Parcels	% Change in Acres of Residential Parcels	Population Change (1990-2000)	Change in Number of Housing Units (1990-2000)
Hartwick	-6.56%	10.09%	8.5%	16.21%
Middlefield - Cooperstown	0.00%	19.00%	-6.8% (Entire Village)	-4.1% (Entire Village)
Middlefield	-3.02%	7.91%	1.1%	9.3%
Otsego-Cooperstown	0.00%	-0.01%		
Otsego	-2.84%	1.03%	-1.2%	2.2%
Springfield	-26.23%	175.11%	2.6%	1.2%

Source: Source: New York State Office of Real Property Services, 1996-2000, and US Census 1990, 2000

D. New Construction Activity

The Otsego County Planning Department has been collecting reported building permit activity for several years. Overall, 266 building permits have been issued for new residential housing in the study area 1995. Of that, about 178 (67%) were for manufactured or mobile homes, and stick built homes made up the rest. Stick built construction accounted for less than 30 new permits per town. Seventeen building permits were issued in Hartwick for new commercial construction. The Town of Hartwick had the most residential construction activity (about 59% of all permits issued in the study area) between 1997 and 1999. This was followed, in decreasing order, by the Towns of Springfield, Otsego and Middlefield.

These trends are commonly seen in many other upstate New York communities. Populations are staying static, or showing small increases, while at the same time, there are a large number of new homes being built.

E. Synopsis of Local Zoning Ordinances

The Town of Middlefield has four districts: R-80 (residence-agriculture), R-HD (residence-hamlet), PDD (planned development district), and FPD (flood protection district). The vast majority of the Town is in the R-80 district which requires a minimum of three acres of land, except that they allow subdivision of one smaller lot, no less than one acre, from a parent parcel 10 acres or larger. The R-80 district allows a variety of residential uses. The R-HD allows a variety of residential and commercial uses. A 12,500 square feet minimum lot size is required in the Hamlet. Like Otsego, Middlefield allows flexible development through the PDD on parcels 10 acres or larger. The PDD is considered a floating zone, and is not mapped until a specific use is proposed. In addition to the Flood Protection District, and the Otsego Lake/Susquehanna River Shoreline Protection Area, the zoning law regulates parking and loading areas, signs, junkyards, mobile homes, and camps. Through its subdivision law, the Town of Middlefield also allows on a voluntary basis use of clustering. Preservation of natural features, including existing trees and shrubs, protection of flood areas, steep slopes, and sediment control are included as requirements when land is subdivided.

F. Build-out Analysis

Projections for future land consumption and development patterns

The completion of a Build-out Analysis results in data that demonstrate the potential impacts of growth according to current land use ordinances and development regulations. The analysis can help to measure the long-range effectiveness of local laws and the impact development may have on infrastructure and community resources. In this report, the Build-out Analysis estimates the impact of growth upon the study area once all developable land has been consumed and converted to uses permitted under the existing regulatory framework. It does not predict the time frame under which the final build-out will occur. The build-out is estimated after specific environmental constraints such as slope, floodplains, wetlands, and streams are identified and removed from the analysis. Thus the figures estimated in the tables below represent the potential amount of land that could be reasonably built upon. It assumes that water and septic capability are available.

Town of Middlefield Build Out

The Town of Middlefield could see a 608% increase in population at build-out resulting in 5,431 new units and 13,686 new residents for a total population of 15,935. Most of this growth would occur in the town's R-80 district resulting in a total loss of farming activities, open space and rural character.

2000 Census Population: 2,249

Table F18-10: Town of Middlefield Build-Out

	R80 District	HD District	Totals
Land Available for	18,250	392	18,642

Development			
Number of units	4,417	1,014	5,431
New residents*	11,131	2,555	13,686
Water consumption**	834,813	191,646	1,026,459
Roads (in acres)***	913	20	932
Police and fire personnel ****			13 to 14
Total potential population at build-out			15,935

**2.52 persons per household*
***Based on 75 gallons per day per person*
****5% of developable land*
*****1 additional officer and 1 additional fire fighter for each 1,000 persons*

MAPS

The following maps are referenced in this profile and inventory. Full sized maps are located in Town Hall.

1. Surficial Geology
2. Bedrock Geology
3. Potentially Mineable Resources
4. Slope
5. Unconsolidated Aquifers
6. Potential Water Supply
7. Susquehanna River Basin and Otsego Lake Watershed
8. Wetlands
9. Floodplains
10. Historic Resources and Viewpoints
11. Farmed Parcels
12. Agricultural Districts
13. Soil Suitability for Septics
14. Land Use
15. Extreme Environmental Limitations

CRITICAL AND SENSITIVE LOCATIONS

1. Extremely Severe Limitations (Please see map 15)

Certain locations have severe environmental constraints for future development. Areas that are considered extremely severely constrained for any type of development should be considered un-buildable. They are particularly vulnerable to disturbance. These areas will experience significant negative environmental impacts (direct and indirect), often have a legal status that prevents or severely limits future development there, and are often locations vital to ecosystem functioning.

The following environmental features are considered to have extremely severe environmental constraints for future development. Many of these resources are already exhibiting environmental degradation from changes in land uses (lakes and streams, for example) and should be considered to be at their capacity. Prohibition of most development in these areas may be necessary to prevent further degradation. In addition, these resources also are easily impacted due to indirect impacts from other locations. Since these are prominent and major resources in the study area, project review should carefully examine indirect impacts. Map 15, Extremely Severe Limitations condenses all six of these resources into one map.

1. Lakes
2. Streams
3. Slopes > 20%
4. Wetlands

5. Public Water Supplies and lakes
6. Shoreline Buffer

The resources and environmental features listed above were included in **the extremely severe limitations** category due to a variety of factors:

Lakes and Streams: These are the watered areas, but not the shorelines, and include any public water supplies that are lakes. These are un-buildable areas due to presence of water.

Slopes > 20%: These areas were calculated from the topographic data. Building on steep slopes poses many difficult problems that make construction economically unfeasible and environmentally unacceptable. Steep slope construction leads to erosion and sedimentation, which degrades area streams and lakes. Steep slope construction, especially on ridgelines can negatively impact viewsheds, and can disrupt wildlife travel corridors.

Wetlands: Wetlands have many important natural functions such as flood control, ground water and surface water quality protection, shoreline stabilization, provision of open space and wildlife habitats, protection of stream ecosystems, and are aesthetically valuable to many people. DEC regulated wetlands are included.

Deed Restricted Lands or Lands with Easements: These are private lands that have restrictions on them that will prohibit future subdivision, building, or other development. These resources are not mapped, but the information is available for each tax parcel and should be requested information during each project review.

Shoreline Buffer: These are lands within 100 feet of the shoreline of Otsego Lake and along the Susquehanna River. Currently, the Town of Otsego and Middlefield restrict building within this buffer area to protect water quality and to preserve visual aesthetics.

2. Severe Limitations

The following resources are those locations considered to have severe limitations for development in the future. They are lands that could be potentially developed, but that have certain environmental conditions, or a legal status, that make it likely that one or more direct, indirect and cumulative negative environmental impacts will occur during development unless specific conditions or project alterations are carried out to protect resources. Prohibition of certain land uses or careful mitigation to prevent negative environmental impacts will be necessary in areas having severely limited lands.

The resources included in this analysis for severe limitations include:

1. Well head protection areas
2. Natural Heritage Areas
3. Slopes 15 – 20%
4. Riparian Zones (areas along streams and rivers)

5. Soils not amenable to septic systems (includes categories of "Probably Require Enlarged Absorption Field", and " Septic Tank Absorption Field May Be Prohibited or Require Alternative System"
6. Wetland Buffers
7. Otsego Lake Watersheds – Willow Brook, Cripple Creek, Hayden Creek, Shadow Brook
8. Aquifers
9. Shallow Bedrock
10. Public Lands & Deed Restricted Lands and lands with known easements that prevent future development

Because of the following factors, these environmental features were included in this category of analysis as follows:

Well Head Protection Areas: These are the lands within designated wellhead protection areas. Such areas need protection from activities that can introduce pollutants and hazardous wastes to the ground water.

Natural Heritage Areas: These are lands that have been designated by the NYS DEC, Natural Heritage Program as having significant, rare, or important species or habitats. None of the species or habitats in the study area are endangered, but some are listed as threatened, rare, or of special concern. (To protect these important areas, NYS DEC does not allow publication of this map for the general public).

Slopes 15-20%: Lands having slopes in this range pose some engineering and economic problems for placement and proper functioning of septic systems. Further, development on steep slopes can increase erosion and sedimentation, can disrupt wildlife corridors, and impinge on scenic views. Slopes of 15 to 20% are less constrained than those greater than 20%.

Riparian Zones: These areas include stream banks or riverbanks, and the immediate lands adjacent to them. Riparian zones are important areas and function as flood control mechanisms, groundwater recharge areas, water filtration areas, and important fisheries and wildlife habitats. The size of riparian zones varies according to the topography of each stream; in general, 100-foot buffers from the stream encompass critical parts of most riparian zones.

Soils Not Amenable to Septic Systems: See Section F, Chapter 11 for a discussion of the soil limitations for septic systems. These are locations that have soils with soil characteristics and percolation rates that are considered not amenable for placement of a standard septic system. These soils place severe limitations on the location and affordability of placement of septic systems. Where feasible, alternative septic systems may be required. These areas have a high risk of introducing nonpoint pollution from septic system runoff due to inadequate or poorly designed septic systems.

Wetland Buffers: These are 100-foot buffers around NYS DEC designated wetlands. State regulations require a 100-foot buffer around wetlands to protect natural wetland functioning.

Otsego Lake Watersheds: The sub-watersheds of Otsego Lake including Willow Brook, Cripple Creek, Hayden Creek, and Shadow Brook currently contribute most of the phosphorus loading to the lake. The

waters entering the lake from these sub-watersheds are currently environmentally stressed, and should be considered at, or over capacity, for conveyance of excess nutrients.

Aquifers: Except in the Village of Cooperstown, future development will rely on wells drilled into bedrock or unconsolidated aquifers. Because bedrock is the primary aquifer throughout a significant portion of the study area, low water yield could be problematic. Further, development in areas using wells drilled in bedrock aquifers may result in inadequate water production and degradation in water quality. Water availability may be a severe limiting factor to development, but it must be determined on a project-by-project basis.

Shallow Bedrock: Various locations throughout the study area have shallow soils, and/or exposed bedrock. These areas are not suitable for standard septic system construction because there is not enough soil for adequate treatment of waste. Further, exposed bedrock or shallow soils pose limitations for construction of sub grade foundations and buried utilities.

Public Lands & Deed Restricted Lands: Public lands, state forests, other wild conservation lands, lands that have public utilities, and those with known easements that prevent future development are not likely to be developed in the future.

3. Moderate Limitations

Areas having moderate limitations are potentially developable, but development here could result in indirect or cumulative negative environmental impacts to the environment and to resources that are highly valued features of the landscape. Many of the resources included in this category are those that have important social or cultural significance such as historic districts, and agricultural districts. Mitigation of negative environmental impacts in these areas will most likely be necessary prior to development approval.

The resources included in the category of having moderate limitations include:

1. Agricultural Districts
2. Historic Districts
3. Prime Farmland Soils
4. Soils of Statewide Importance
5. Otsego Lake Watersheds (All the other sub-watersheds, excluding Willow Brook, Cripple Creek, Hayden Creek, and Shadow Brook)
6. Soils with percolation rates that meet NYSDOH Requirements, but that have other limitations
7. Roads (see description below)
8. Limestone Bedrock
9. Aquifers
10. Floodplain

These environmental resources and features were included in the category of moderate limitations as follows:

Agricultural Districts: New York State designated agricultural districts are locally delineated areas. Their purpose is to protect farm businesses and farmland. This is accomplished through property tax relief, prevention of unreasonable local regulations of farm operations, limitation of eminent domain proceedings, right-to-farm protection, disclosure requirements for real estate transfers, limitation on imposition of special ad valorem levies, and notice of intent requirements. When land is removed from active agriculture within a district, tax relief savings are supposed to be prorated and paid back to the local government. Agriculture is to be considered a primary land use in these areas. Loss of agriculture can have numerous negative environmental impacts related to both the natural and man-made environments. Such losses can result in damage to open space, wildlife habitats, scenic views, and rural character. When farmlands are converted to other uses such as housing, additional negative impacts can include increased costs of providing services; increased erosion, sedimentation and conveyance of nutrients; overcrowding schools, etc. (However, certain agricultural activities can also cause erosion and conveyance of sediments and excess nutrients.)

Historic Districts: Historic Districts are significant cultural and economic resources that act as attractions for tourism, enhance quality of life, and provide a connection to the history of an area. When an entire area such as the Glimmerglass Historic District is listed on the Register of Historic Sites, it signifies the presence of a high amount of important cultural and historic resources. Any development within the study area's historic districts should receive special review at local and state levels to ensure for the proper treatment of artifacts and sites as well as to mitigate any impacts the proposal may have on the district as a whole.

Prime Farmland Soils: Prime farmland is defined by the United States Department of Agriculture, Natural Resources Conservation Service as those soils that are particularly suited and best used for agricultural purposes. This is land that has the best combination of physical and chemical characteristics for producing food, forage, fiber or other crops. It must also be available for these uses. Prime soils generally have the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops. These soils are not excessively erodable or saturated with water for a long period of time and do not flood frequently or are protected from flooding.

Soils of Statewide Importance: These lands are defined specifically for New York State and are of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Some farmlands of statewide importance are nearly prime farmland and can produce high yields of crops in an economic manner when treated and managed according to acceptable farming methods.

Otsego Lake Watershed: Land uses throughout the watershed can impact water quality of the lake because of the introduction of excess nutrients. The sub-watersheds of Willow Brook, Cripple Creek, Hayden Creek, and Shadow Brook currently convey most of the excess nutrients to the lake and are included in the severe limitations analysis, above. All other sub-watersheds of the Lake are included in this level of analysis as moderately limited environmental areas.

Soils with percolation rates that meet New York State Department of Health (NYSDOH) requirements, but that have other limitations: See Section 11 for a detailed discussion of this limitation. There are various locations within the study area where the soils have characteristics and percolation rates that would be expected to meet the NYSDOH requirements, but that also have other limitations. These

locations are sensitive because limitations may exist that would prevent installation of a standard septic system.

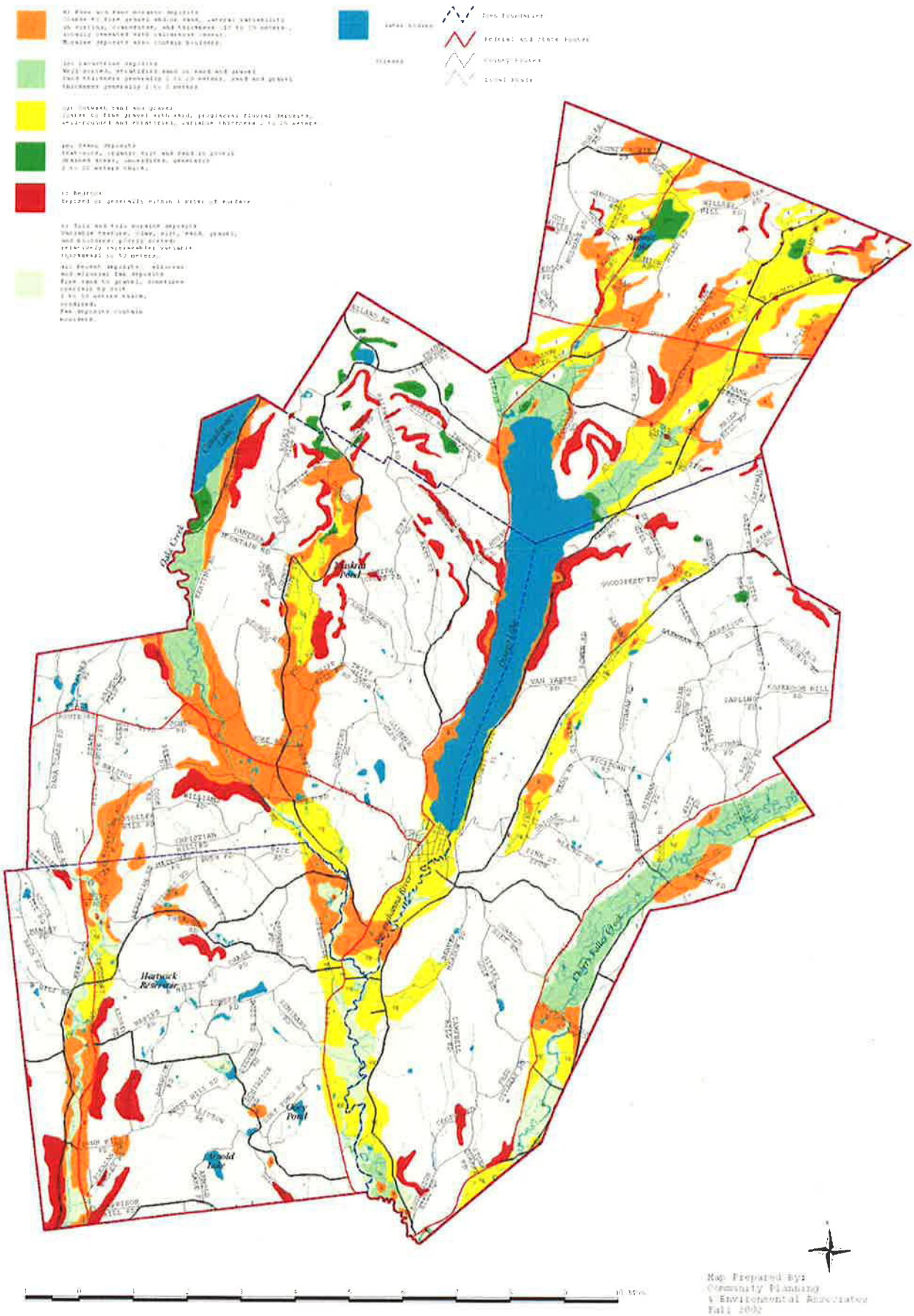
Aquifers: Except in the Village of Cooperstown, future development will rely on wells drilled into bedrock or unconsolidated aquifers. Because bedrock is the primary aquifer throughout a significant portion of the study area, low water yield could be problematic. Further, development in areas using wells drilled in bedrock aquifers may result in inadequate water production and degradation in water quality. Water availability may be a moderate limiting factor to development, but it must be determined on a project-by-project basis.

Floodplain: Development in the floodway and Zone A can interfere with the natural functioning of the area by reducing the capacity of the flood plain or flood way to hold and conduct water. Construction here can increase water flow velocities, increase floodwaters, and pose significant safety and property damage issues. Mapped floodways and Zone A areas are considered as having moderate environmental constraints.

Limestone Bedrock: These are areas that have limestone bedrock. Within the study area, this feature is present only in the Town of Springfield. These rocks are prone to dissolution over time and may possess cracks, crevices, sinkholes, caves, and other karst features. This fractured rock may provide direct conduits from the surface to the groundwater. This connection makes groundwater resources vulnerable to contamination from land uses. Development over limestone has the potential to negatively impact groundwater. The hydrologic characteristics of the limestone bedrock present at a particular site should be determined on a project-by-project basis.

Roads: The transportation analysis shows that Route 28 has the most congested conditions of all major roads studied. Level of Service (which is a measurement of road capacity) is lower here compared with other major roads in the area. While other roads in the study area have the capacity to handle additional traffic, existing conditions make Route 28 especially vulnerable to further reductions in level of service. Traffic inputs can be from a large generator, or from the cumulative impact of many smaller traffic generators. The specific area along Route 28, from the Village boundary south to include Beaver Street, Walnut Street, County Route 11, County Route 11C, the Hartwick Commons driveway, and Cooperstown Dream Park driveway, is a very sensitive transportation area and road conditions here are likely to moderately limit future development.

Map 1: Surficial Geology



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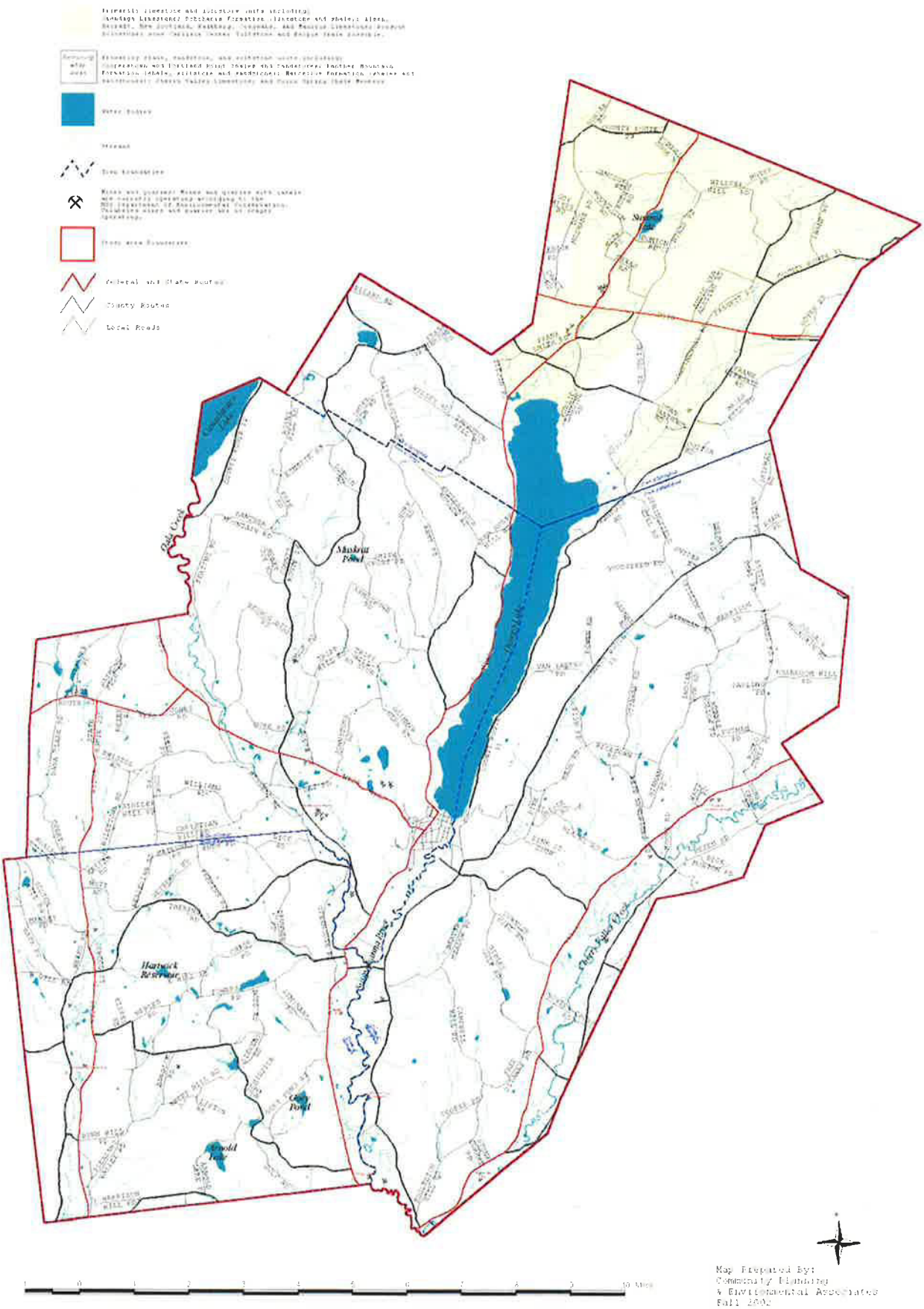
Fall 2002

Map 2: Bedrock Geology



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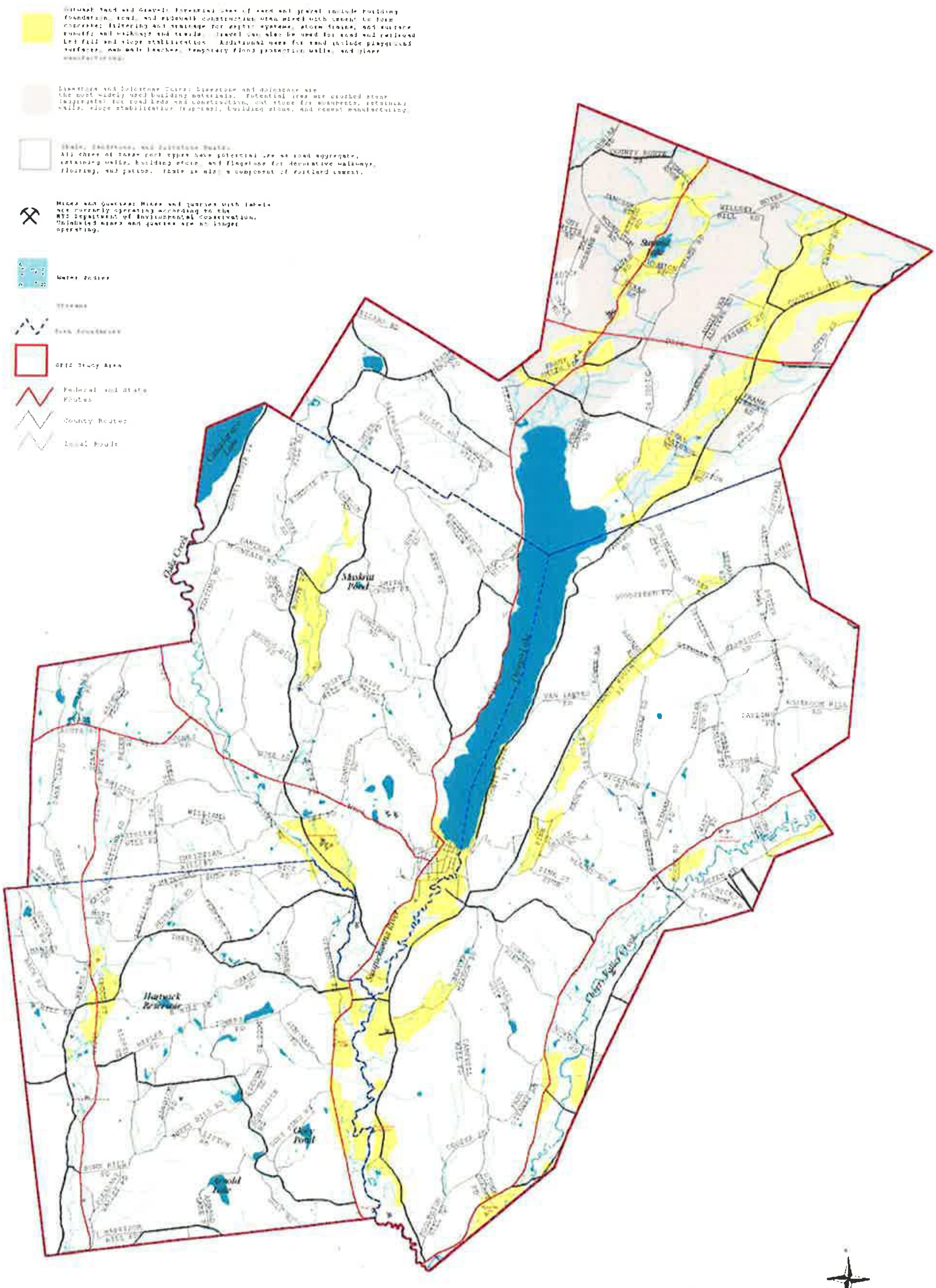
Map 3: Potentially Mineable Resources



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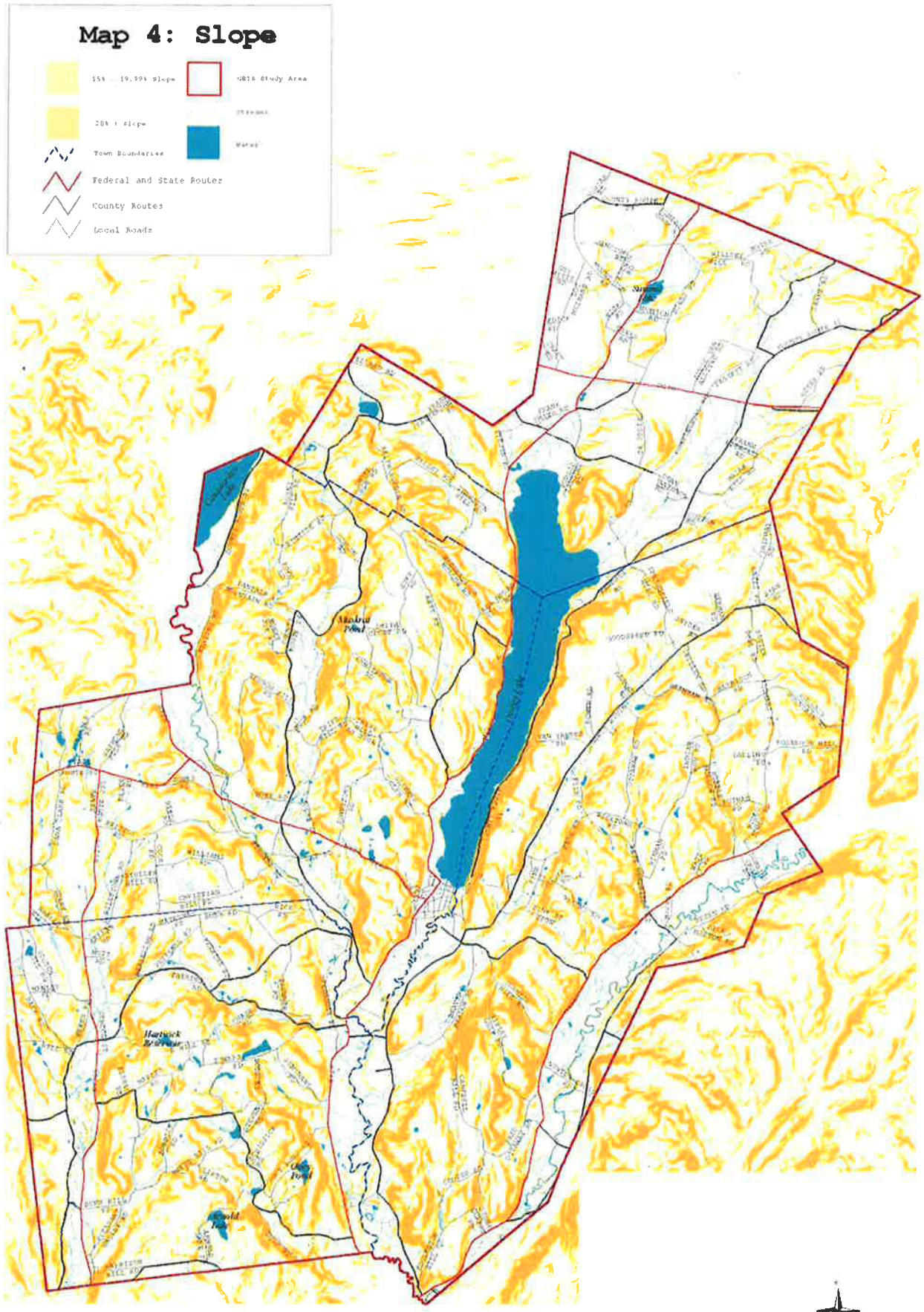
Map 4: Slope



1 0 1 2 3 4 5 6 7 8 9 10 Miles

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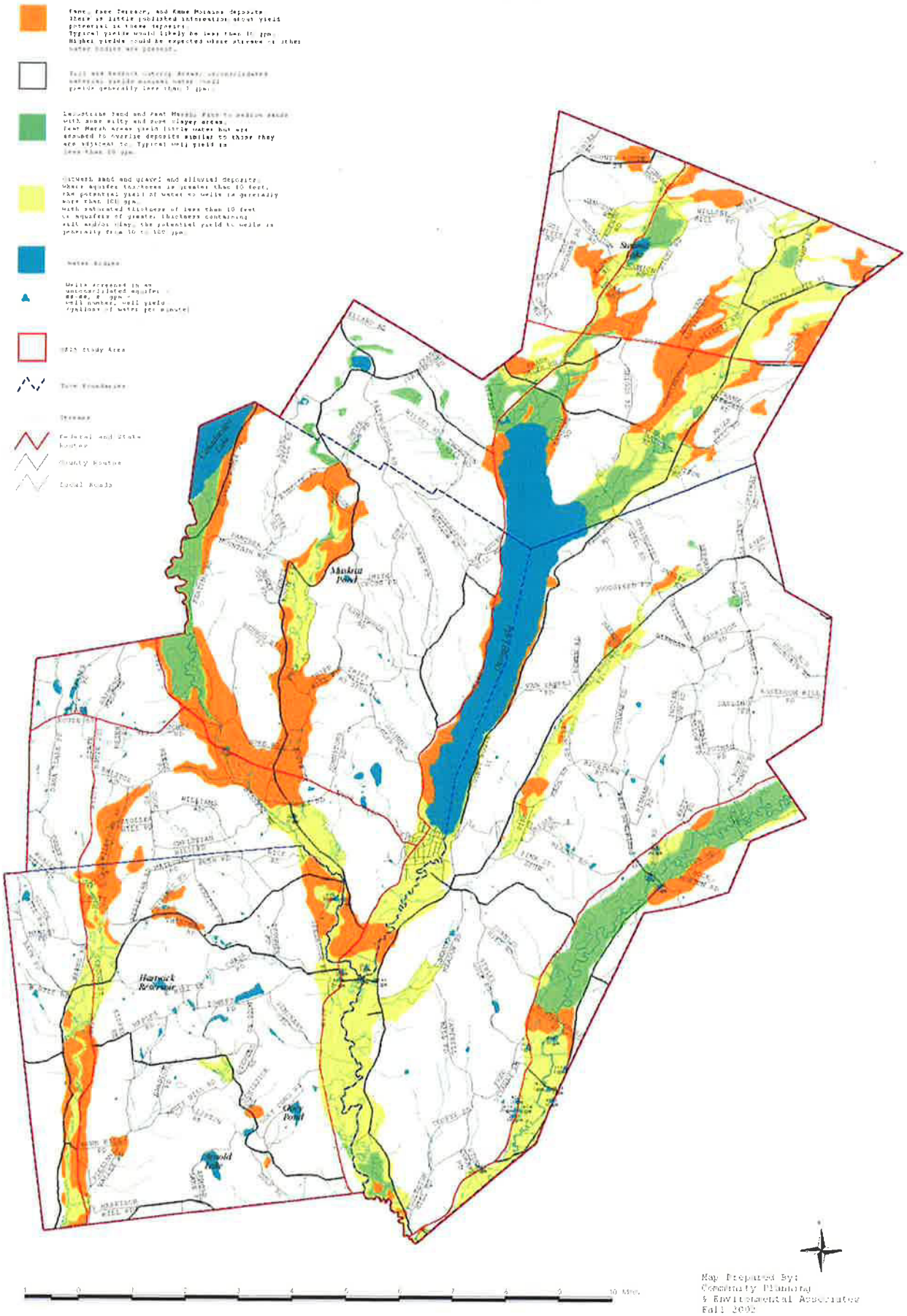
Map 5: Unconsolidated Aquifers



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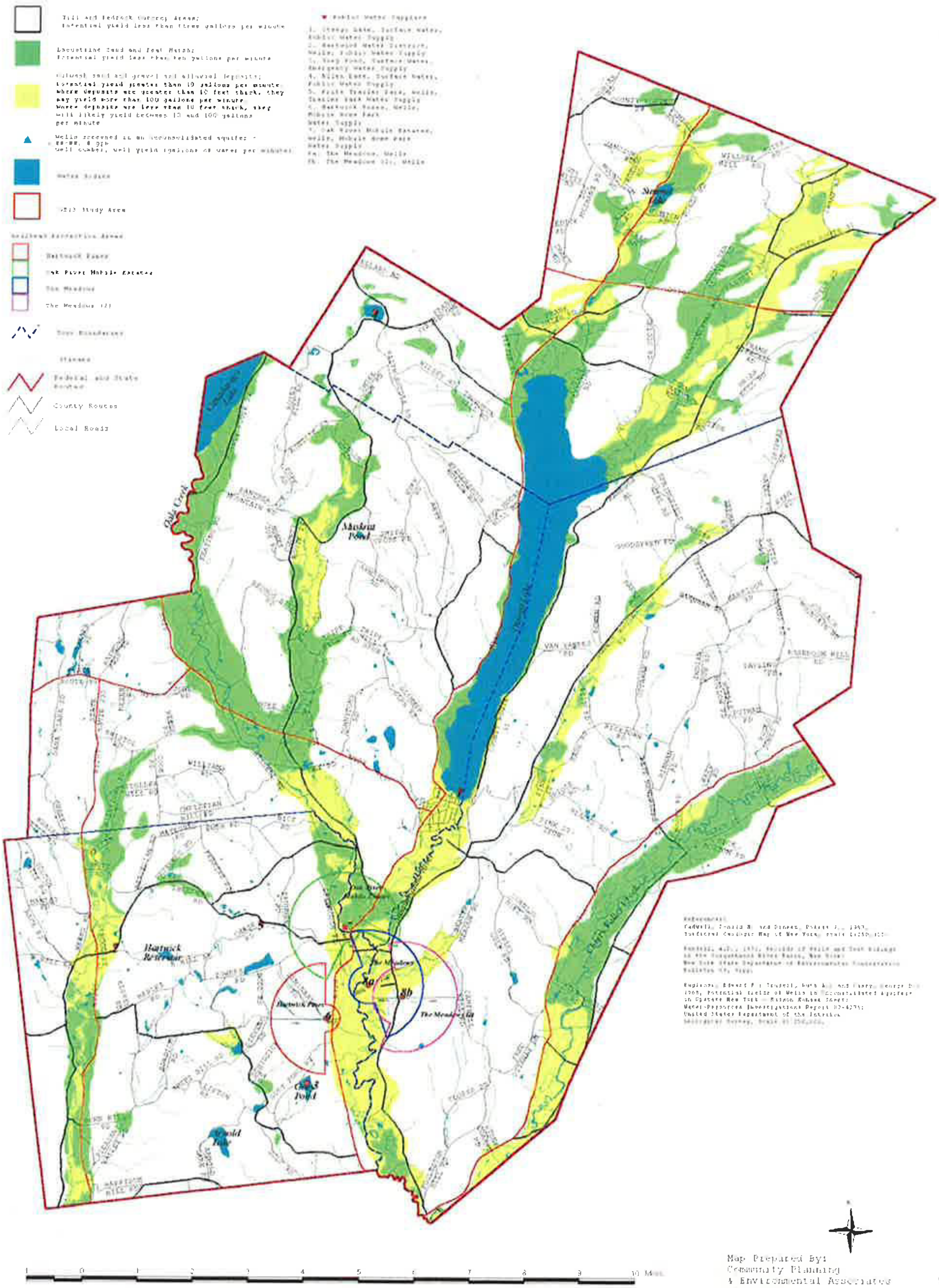
Map 6: Potential Ground Water Supply, Public Water Supplies, and Wellhead Protection Areas



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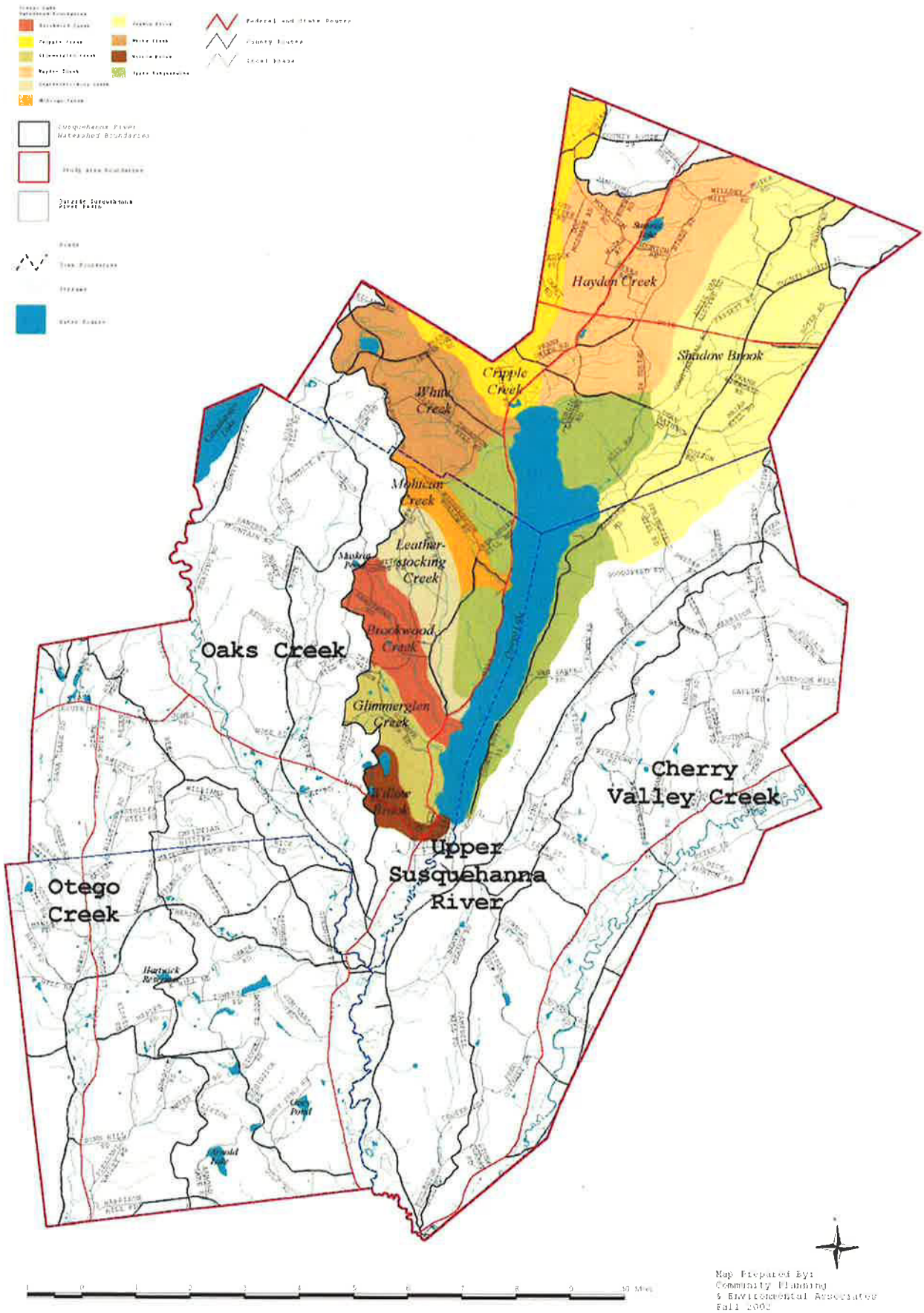
Map 7: Susquehanna River Basin and Otsego Lake Watersheds



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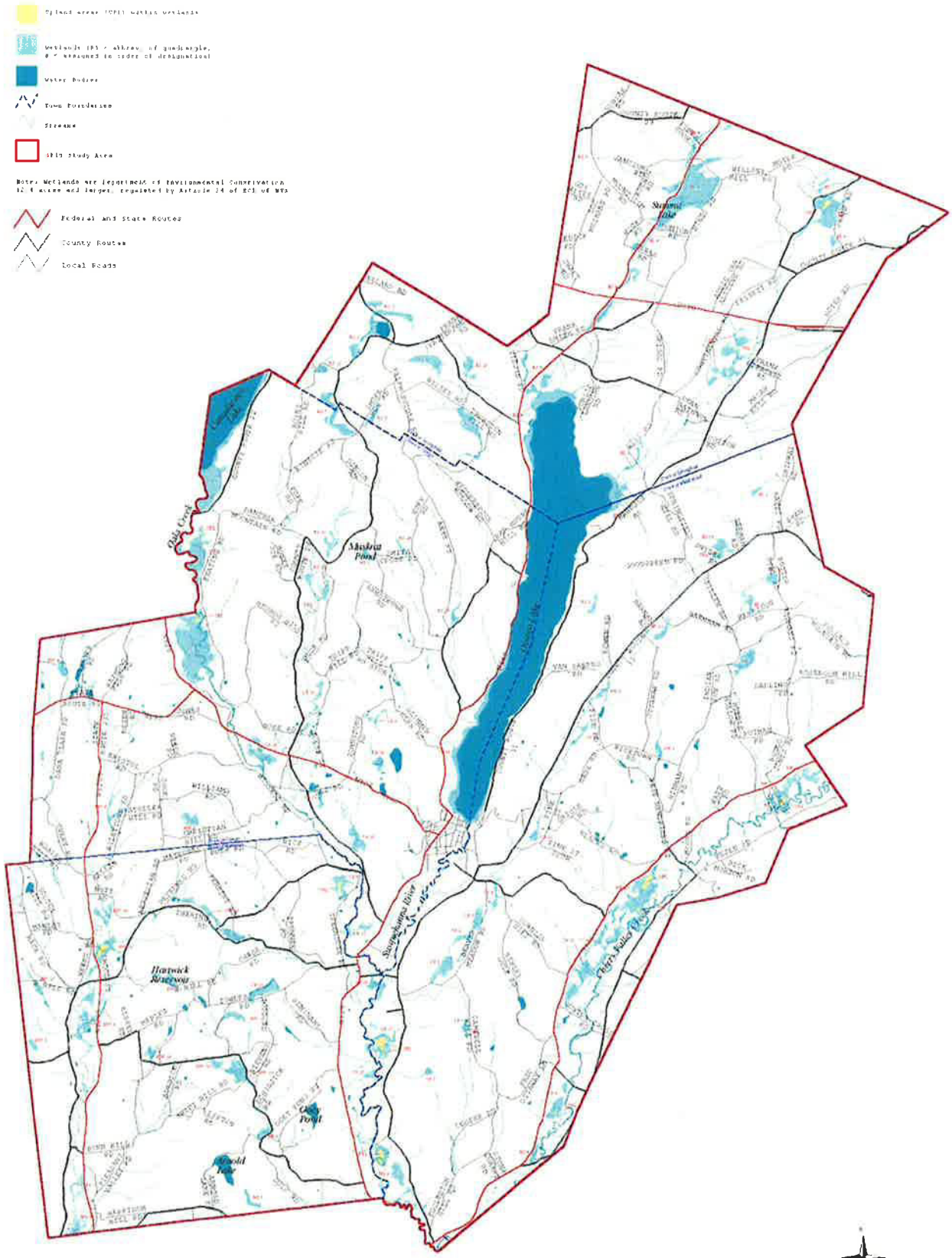
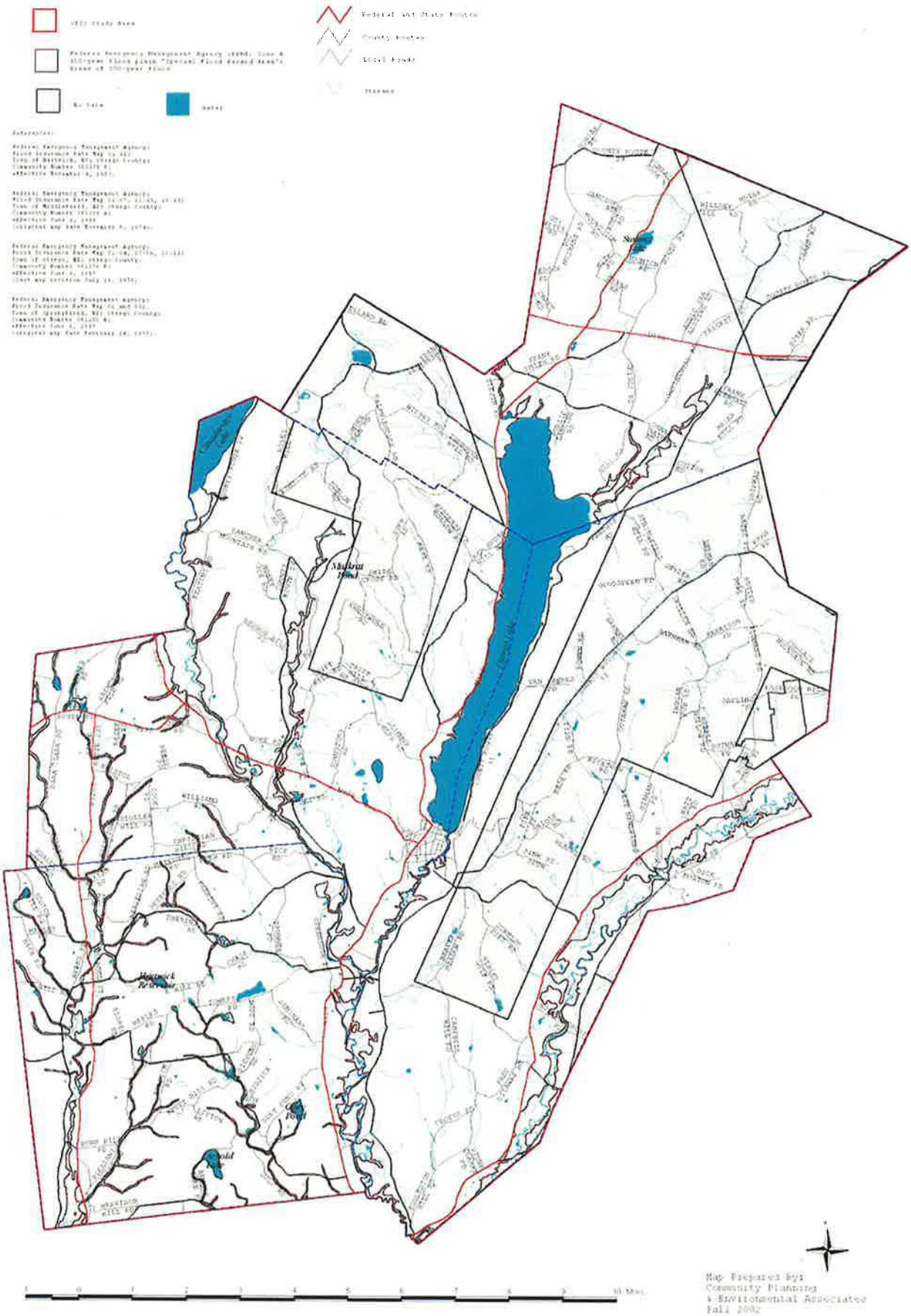
Map 8: Lakes, Streams and Wetlands



Map 9: Flood Plain



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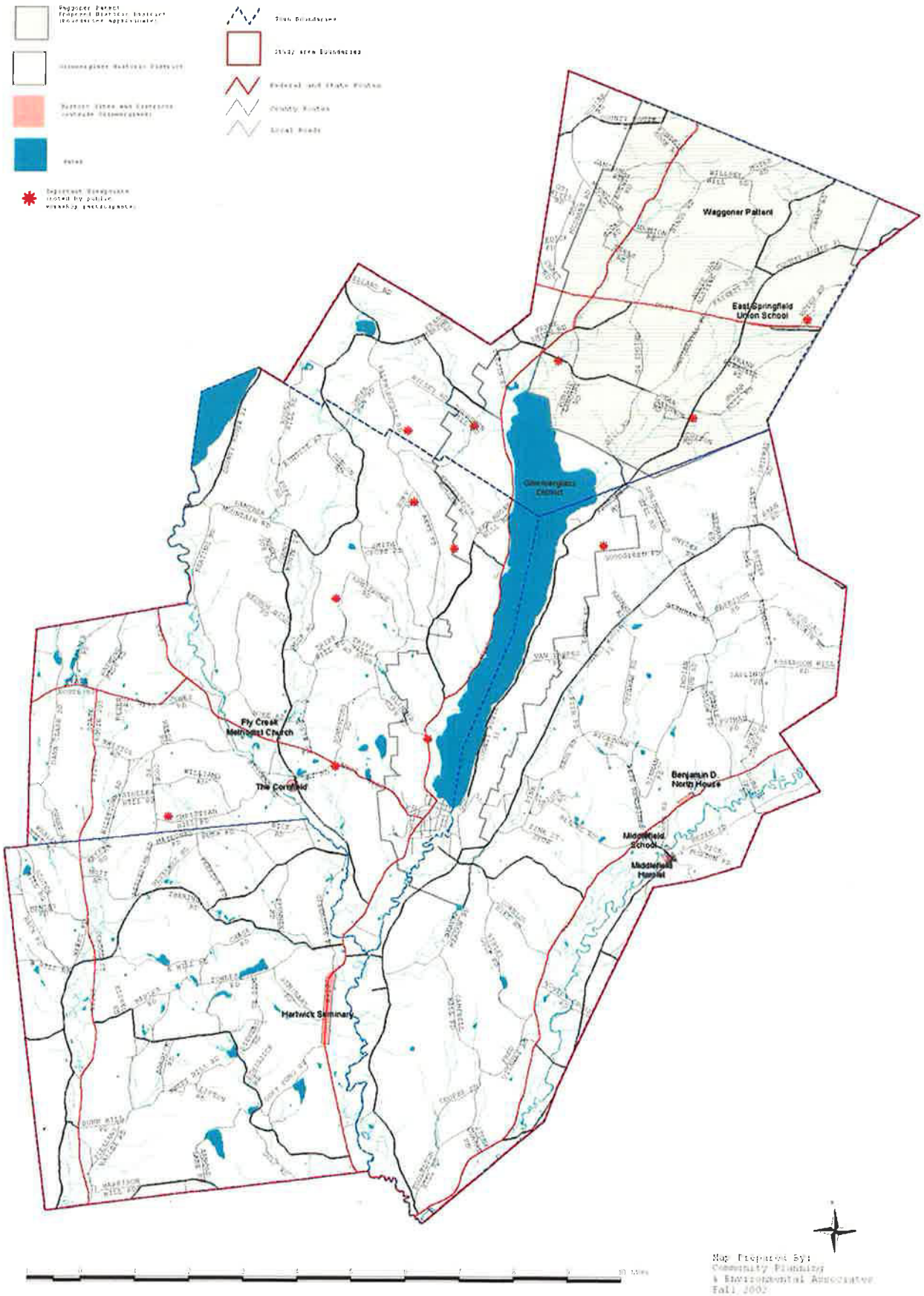
Map 10: Historic Resources, and Important Viewpoints



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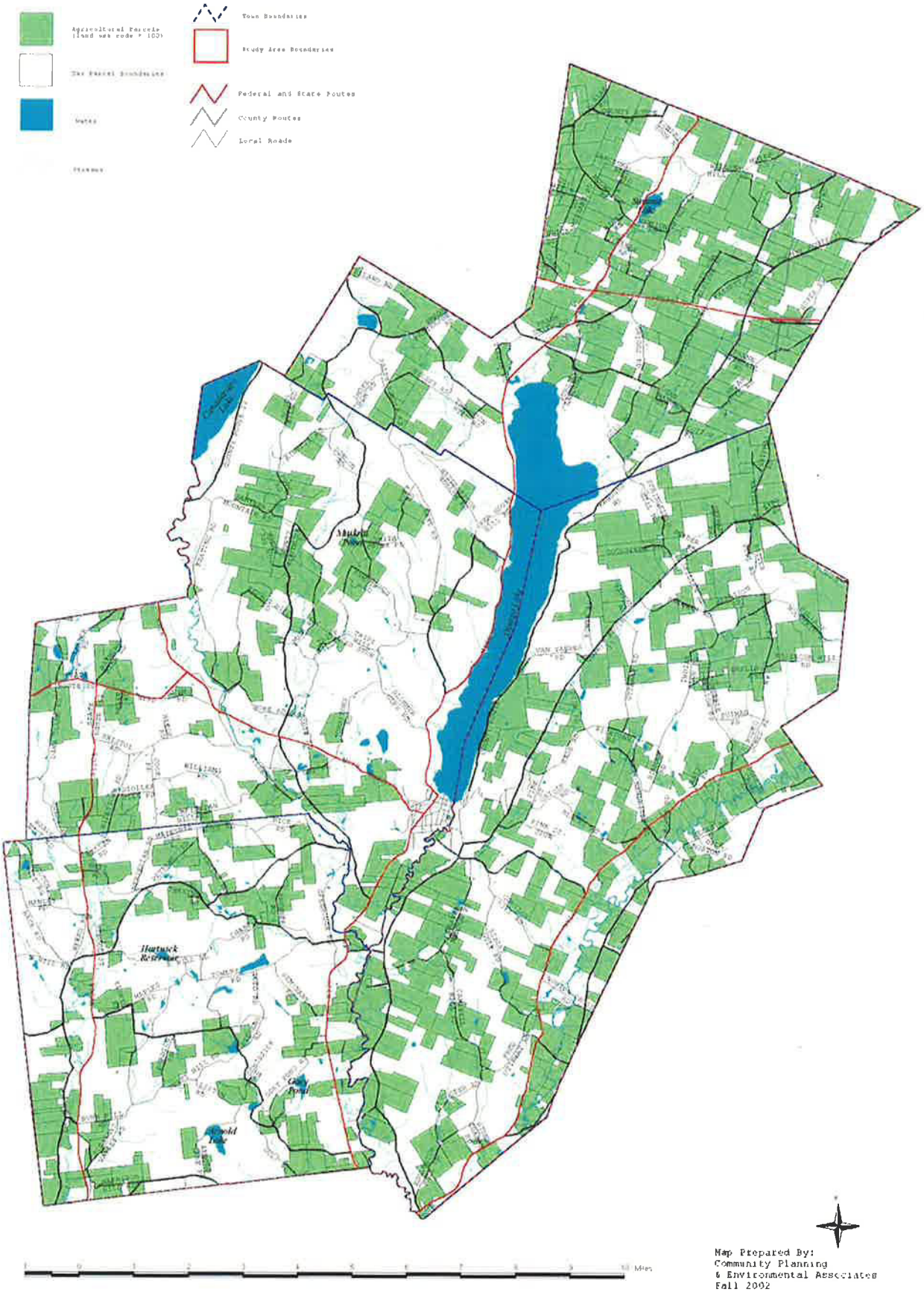
Map 12-A.1: Farmed Parcels



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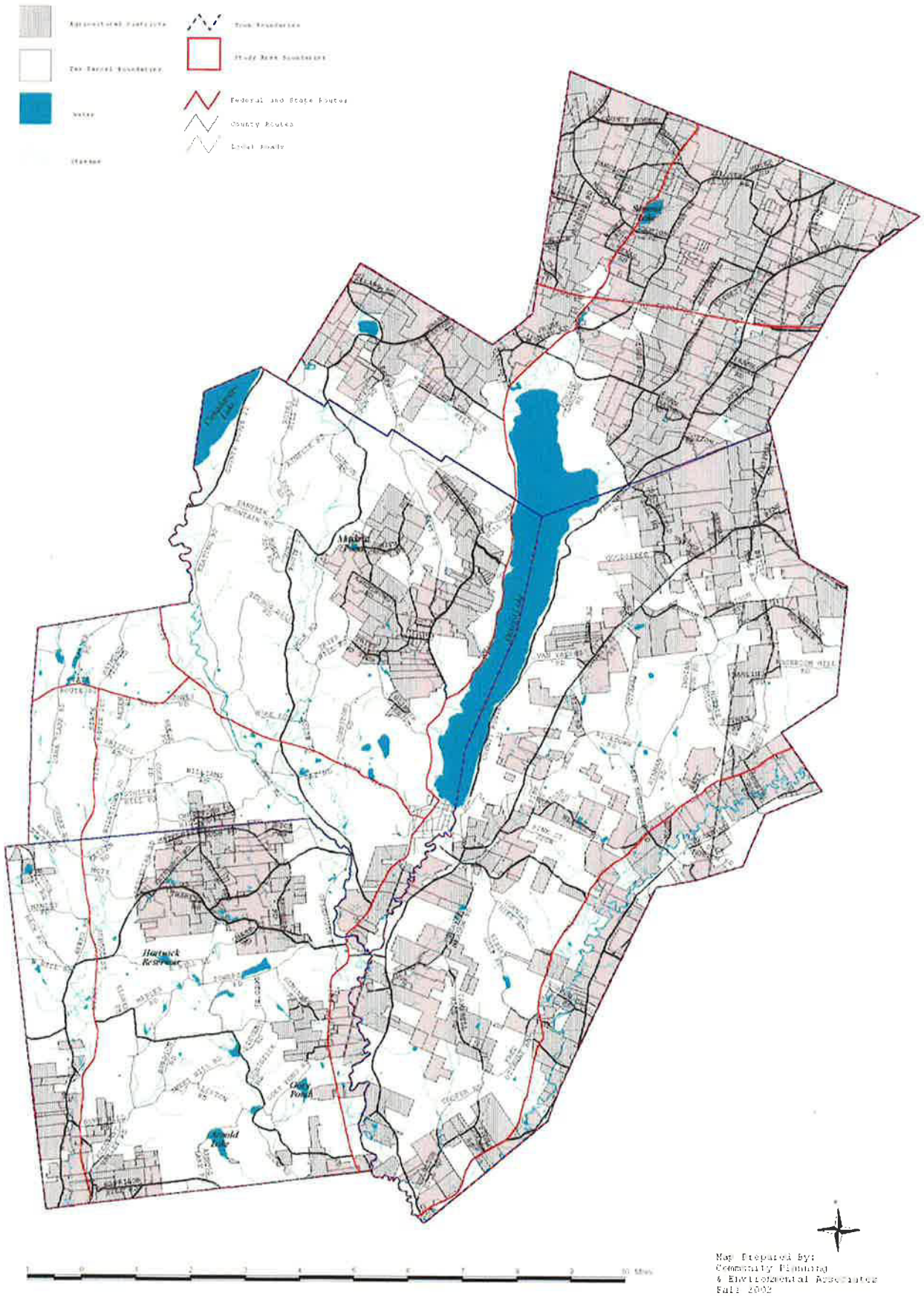
Map 12-A: Agricultural Districts



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Map 12-B: Prime Farmland Soils and Farmland of Statewide Importance

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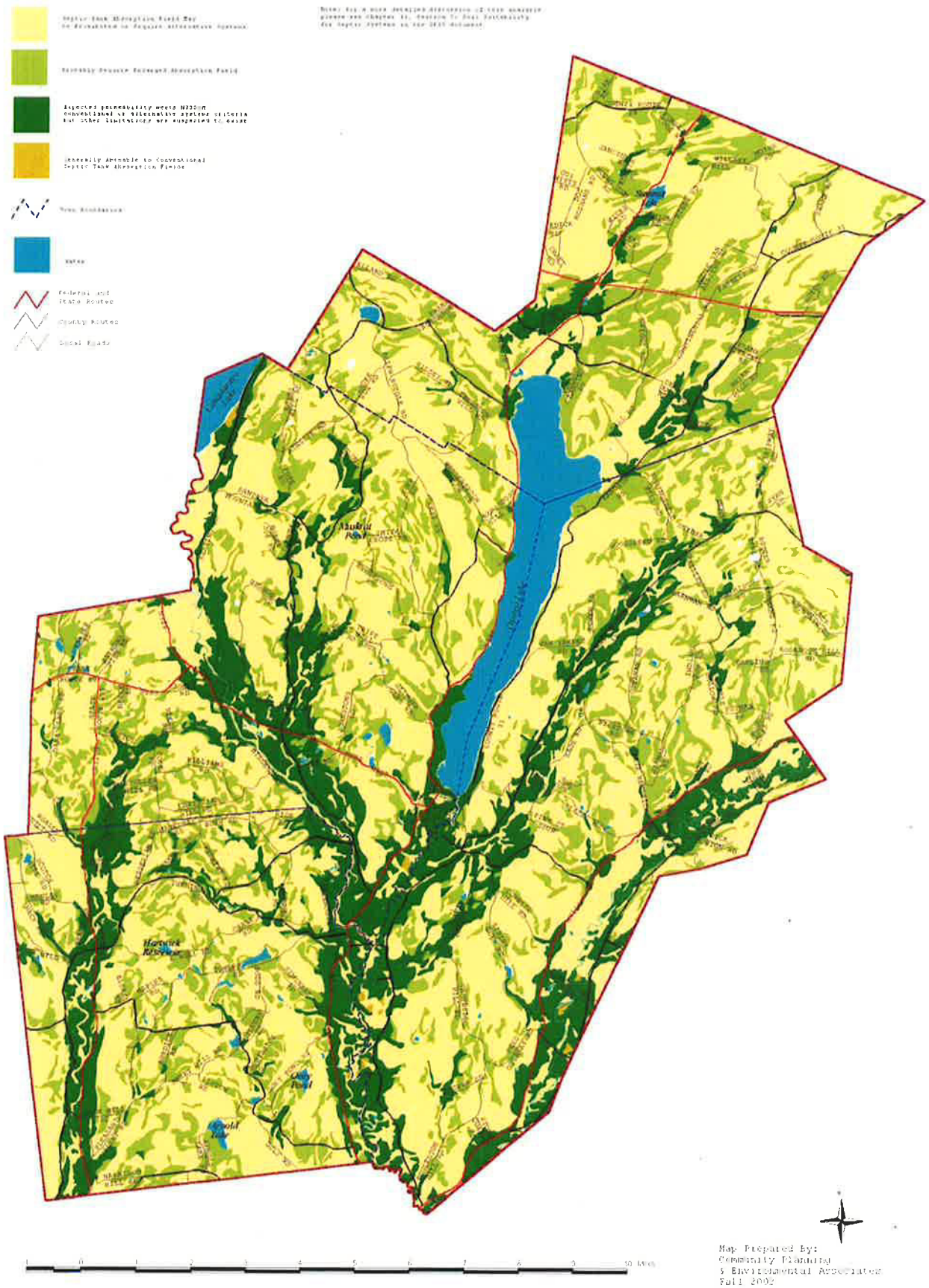
Map 13: Soil Suitability for Septic Systems



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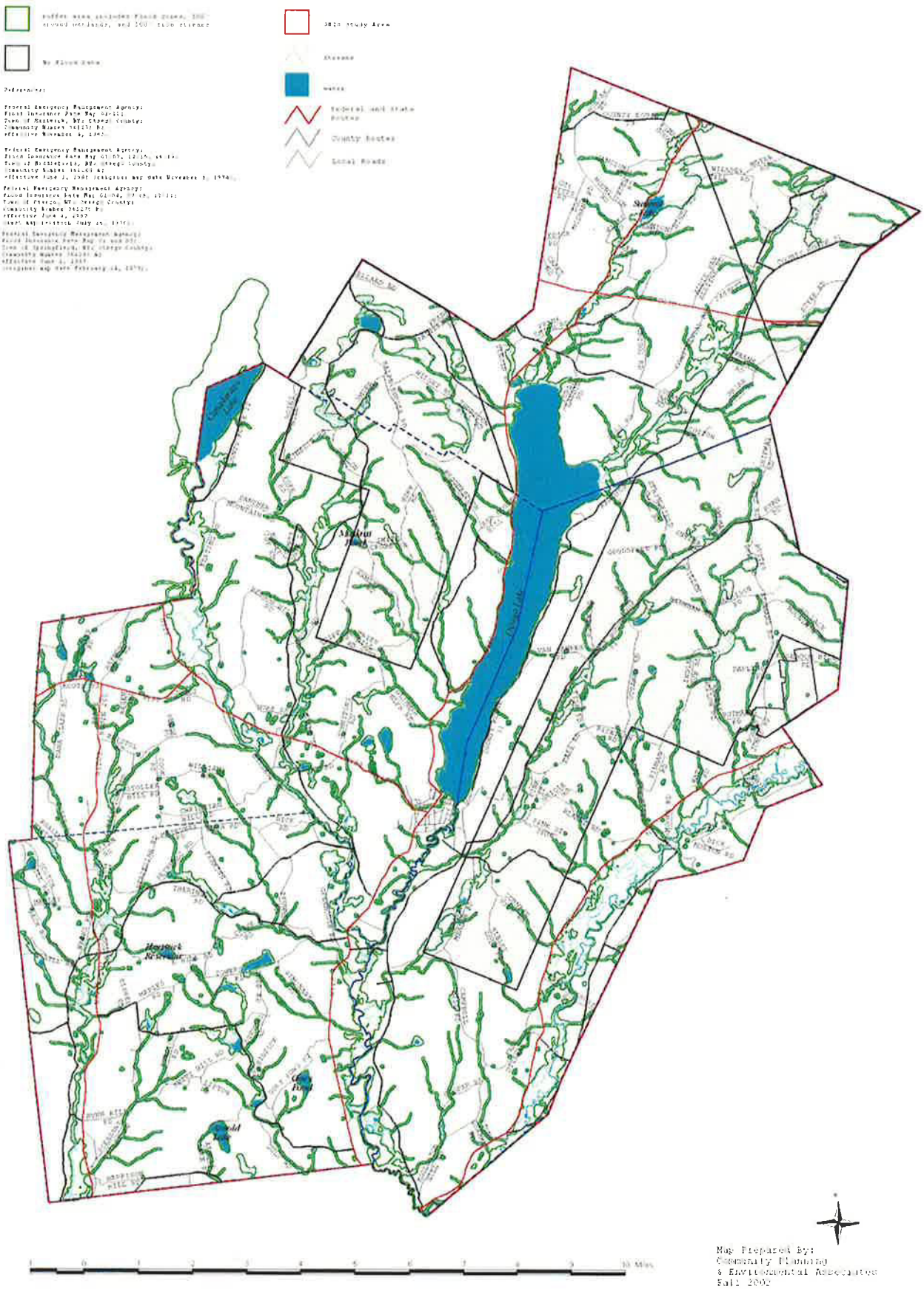
Map 17: Stream, Wetlands and Flood Plain Buffer



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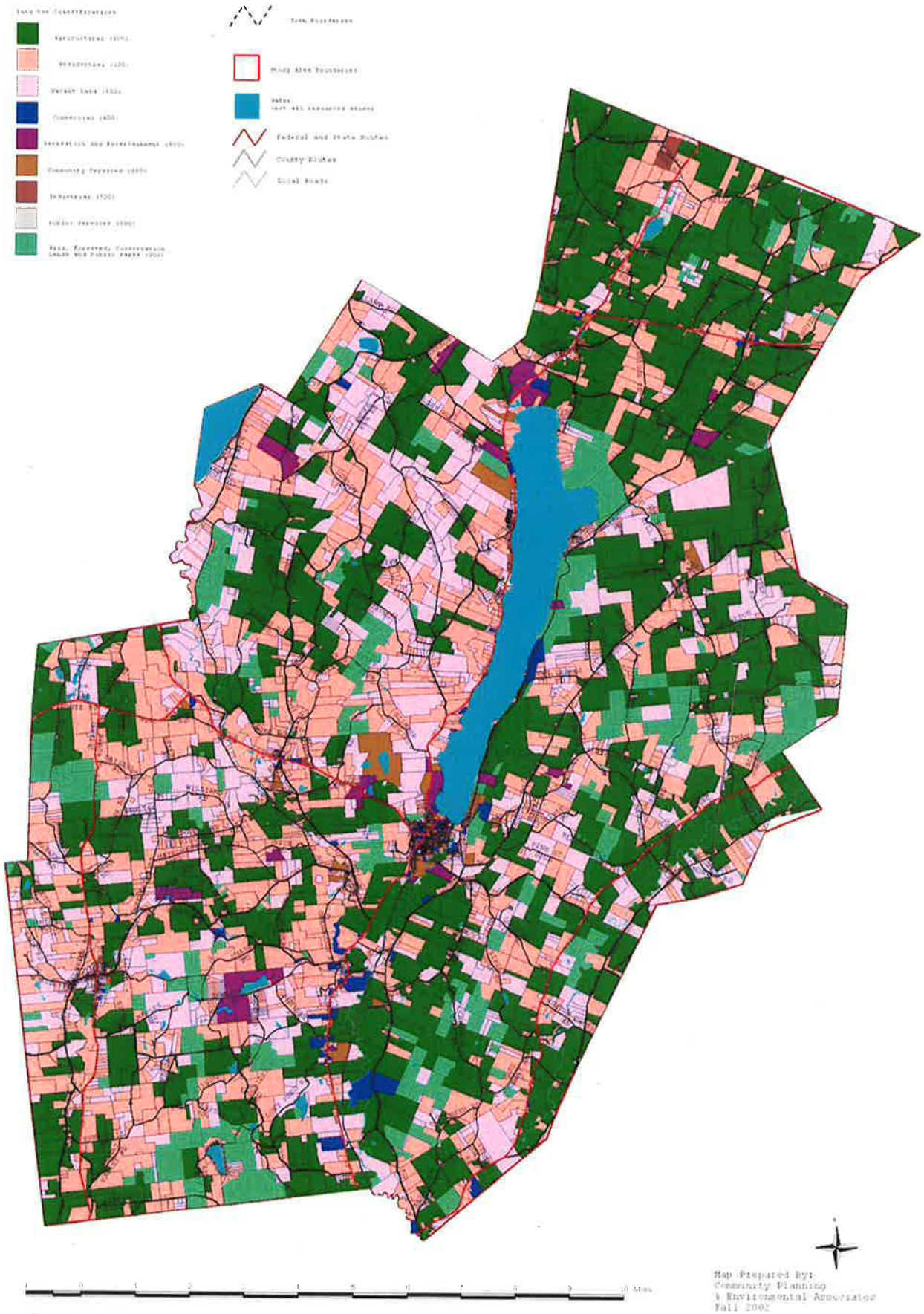
Map 16: Land Use



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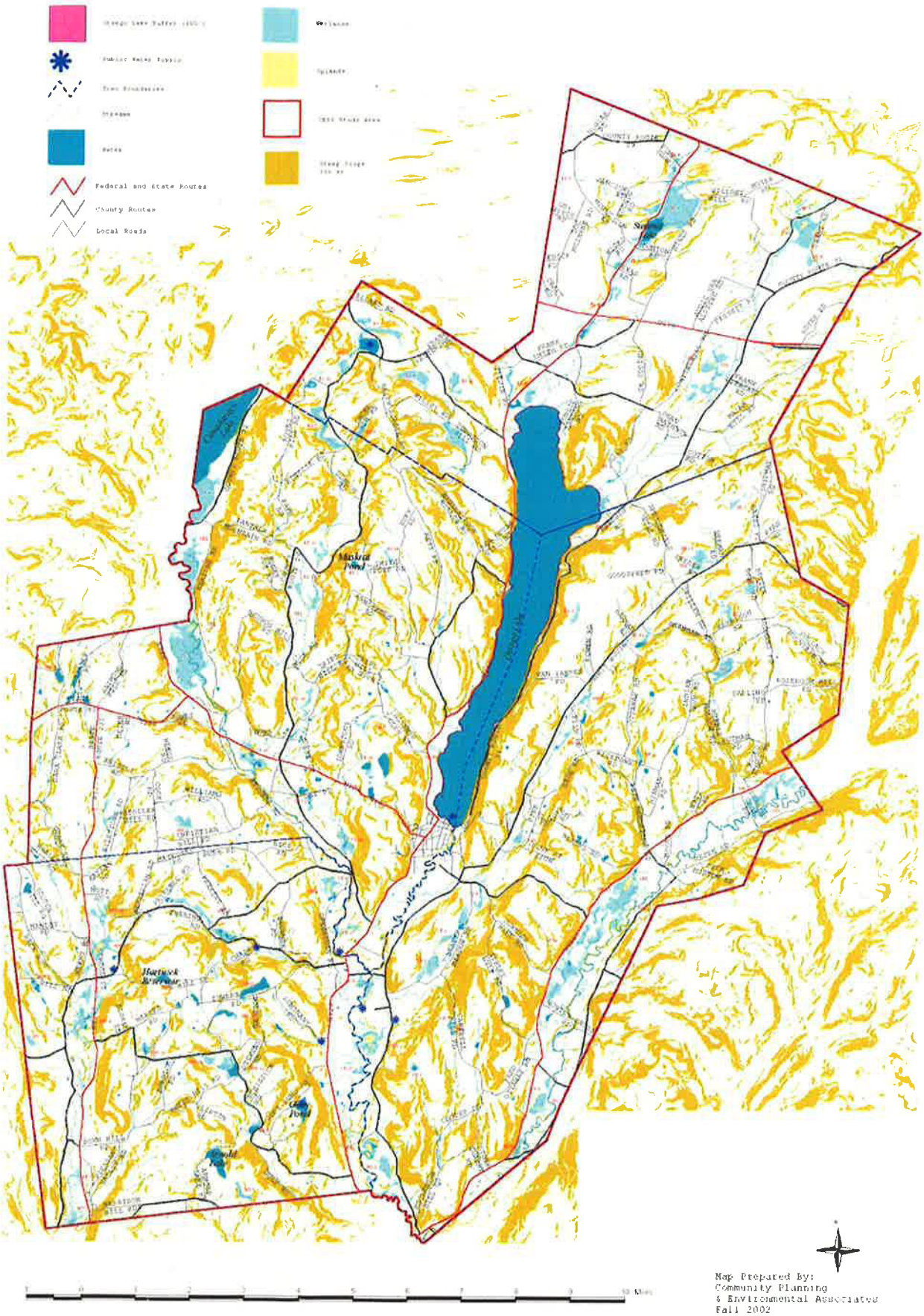
Map 18: Extremely Severe Limitations



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