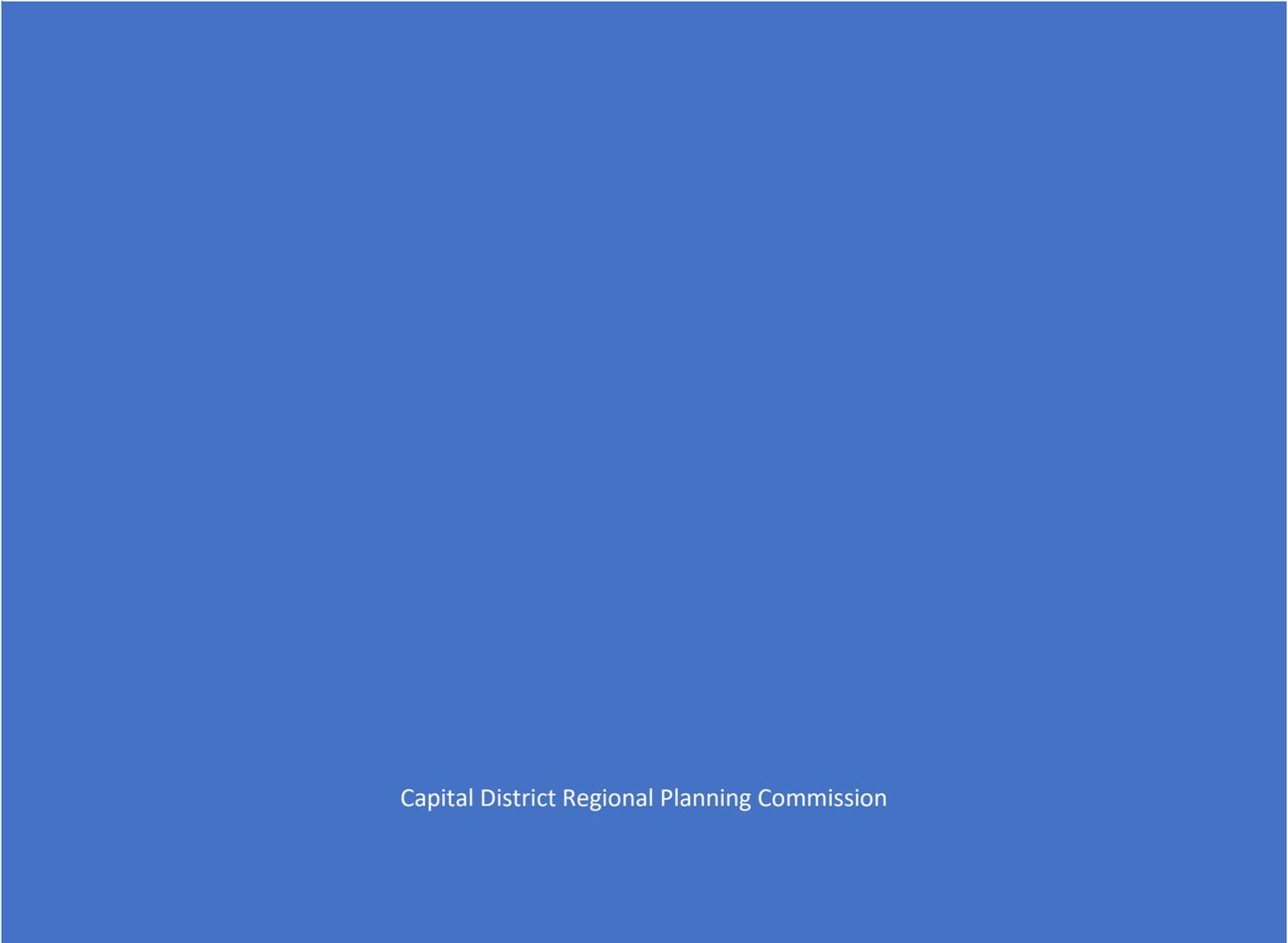




TOMHANNOCK RESERVOIR PROTECTION PLAN



Capital District Regional Planning Commission

INTRODUCTION

Regardless of whether our water resources are intended for public consumption or for a combination of public drinking use and general recreational activities, these resources are increasingly being threatened by the more intensive nature of current land uses.

As the region's population increases, land that was previously left undeveloped is now being woven into the growing urban/suburban pattern of roadways, parking lots, and building sites. Even land that remains devoted to agricultural production is more intensively used as farmers battle to stay economically viable. These factors result in increased pressure upon our water resources and a diminished capacity for the watershed to naturally filter out potentially polluting or damaging chemicals and nutrients. As rain falls within our watershed, it carries soil and debris from construction sites, fertilizers and pesticides run off from lawns and crop fields, and motor oil and antifreeze wash off driveways, parking lots and roads. Much of these chemicals and nutrients wash into our streams and eventually deposit into our ponds and lakes. Each community must then bear the financial costs to reduce these effects through increased filtration and purification, mechanical vegetation control and the physical dredging of lakes and rivers.

In some instances, water resources are irreversibly damaged such as a trout stream that becomes so clogged with silt, soil, and nutrients that it can no longer provide the necessary environment for trout spawning and habitation. This loss of habitat not only affects recreational fishing enthusiasts but also produces a continually rippling process that effects all interrelated flora and fauna. Indeed, vibrant water resources are an important aspect of a community's overall quality of life. Much can be done, however, to protect and preserve one's water resources before irreversible damage occurs. The ultimate intent of this study, therefore, is to offer a range of options that a community can employ or support to protect its natural water resources.

Funding for this project was provided by a grant from the New York State Department of Environmental Conservation (NYSDEC) originating from a federal allocation from the Environmental Protection Agency (EPA) under Section 604(b) of the National Water Quality Act.

In designing this project, the Capital District Regional Planning Commission met with local representatives of the USDA Natural Resource Conservation Service (NRCS, formerly Soil Conservation Service - SCS) and county Soil and Water Conservation District (SWCD) agents to identify impacted areas in our region where the development of watershed protection measures would be critical to preserve and protect water resources for the future. On the basis of these discussions, two separate geographic study areas were chosen, and projects were designed to address the characteristics and needs of each of these areas.

The first study area, and subject of this report, is the geographic area contained within the Tomhannock Reservoir watershed located in north central Rensselaer County. This hilly and primarily agricultural region includes the majority of the Town of Pittstown and portions of the towns of Brunswick, Grafton, Hoosick and Schaghticoke. The Tomhannock Reservoir serves as the water source for over 100,000 people including the residents of the cities of Troy and

Rensselaer, the village of Menands, and the towns of East Greenbush, North Greenbush, Brunswick and Schaghticoke.

Several identifiable problems exist in the watershed that impact the environmental quality of the reservoir. These include periodic high levels of algal activity and of turbidity, sedimentation, increased aquatic weeds and activities in the watershed which result in excessive soil erosion. Another concern is unplanned residential and commercial development and how it might affect the rural character of the watershed as well as the reservoir itself. Concerns that have been raised include excessive erosion during construction, loss of farmland, and the location of residences on sites poorly suited for development.

The objective of this portion of the study is to address the threat of excessive sediment in the watershed due to development pressures and nutrient penetrations associated with failed septic systems and barnyard practices and to promote the development of effective and practical programs to protect the integrity of the Tomhannock watershed.

Complimenting this effort, the SWCD received funds under this grant program to undertake a barnyard demonstration project that would use Best Management Practices including manure management, livestock watering, and roof water management at the Kershaw Farm. The farm has 200 acres of corn, 150 acres of hay, 90 milk cows, and 112 young stock.

The Rensselaer Institute of Limnology, an affiliate of the Rensselaer Fresh Water Institute, has been given the responsibility of monitoring pre and post BMP levels of bacteria, phosphates, nitrates, and E Coli discharged from the demonstration site. The Institutes' primary responsibility includes establishing baseline data, defining sampling techniques, and delineating additional sampling areas.

The second study area, to be presented in a separate report, will include watershed areas identified by the Saratoga County Water Quality Coordinating Committee as impacted by recent urban and suburban development pressures.

It is the Capital District Regional Planning Commission's hope that this study's findings and recommendations will increase the affected communities' public awareness of the importance of implementing watershed protection measures to protect their critical natural and water resources. The intent of this study is also to provide a range of viable watershed protection options and effective management strategies should these communities wish to implement such measures.

The report outline for this study is as follows:

CHAPTER I introduces the concept of watersheds and discusses the ways in which development and agricultural uses can adversely affect the watershed and its water quality.

CHAPTER II includes the methodology and investigative process for this project.

CHAPTER III gives a brief history of the Tomhannock Reservoir and provides an historical profile of the communities within the watershed.

CHAPTER IV describes a variety of existing environmental conditions relating to specific

soil characteristics present within the watershed.

CHAPTER V provides an illustration of the types of land use activities that are occurring within the watershed area.

CHAPTER VI describes the existing land use regulations and best management practices that serve to protect the Tomhannock Reservoir watershed.

CHAPTER VII concludes this report by recommending appropriate watershed protection strategies and techniques for each of the communities located within the Tomhannock Reservoir watershed.

CHAPTER I

AN OVERVIEW OF WATERSHED PROTECTION

Most of us are generally not accustomed to thinking in terms of "watersheds" since the physical boundaries of these areas are sometimes difficult to see. Technically, watershed boundaries can be identified by examining the highest and lowest elevations for a particular drainage area on a topographic map. The highest elevations divide one watershed from another and a line drawn along these elevations can form the watershed boundary. The execution of this task requires some skill and knowledge of the region and may be quite challenging.

Nevertheless, the concept of a "watershed" can be simply expressed as an area of land that slopes or drains toward a stream, river, or lake. Rain that falls on the watershed eventually finds its way to a lake or stream by running over the land, by entering a storm sewer, or by percolating through the soil into the groundwater. Watersheds may be as small as a few dozen acres or may encompass thousands of acres of land. Furthermore, smaller watersheds aggregate to form larger watersheds. The watershed of a stream groups with others to form the watershed of a lake, and that watershed forms a portion of an even larger watershed. The important aspect to remember, therefore, is that we all live within a watershed and that our actions contribute to the quality of the water within the watershed.

On undeveloped land, rainfall has greater opportunity to slowly filter into the ground water than on developed land. Trees, shrubs and grasses all help to slow rainfall in its descent from the sky and when the rain reaches the ground, it is able to then percolate through permeable soil. Much of the volume of the rainfall is absorbed directly into the ground and since the rate of runoff is relatively small, less soil and other particles are carried off with surface runoff to be directly deposited in streams, rivers, and lakes.

On developed land, however, both the volume and rate of rainwater runoff is substantially increased due to the clearing of vegetation and the construction of impervious structures. Roadways are built, fields are paved over for parking lots and buildings are constructed on previously undeveloped land thereby contributing less and less surface area land for the filtering of rainwater. Since rain cannot quickly soak into the ground, it accumulates on the surface and creates larger volumes of water to runoff over the land. As water volume increases and runs over impermeable surfaces, the rate of flow also increases. This higher volume and faster rate of water is then able to carry more sediment and surface waste to the streams, rivers, and lakes.

The potential sources of water quality contamination due to runoff from developed areas are varied. For the Tomhannock Reservoir, agricultural uses and failing residential septic systems are the most immediate problem sources of contamination, and erosion/sedimentation from new construction sites is a potential future concern. Listed below are a sampling of nonpoint contamination sources, as found in the *Watershed Planning Handbook for the Control of Nonpoint Source Pollution* prepared by the NYSDEC and the NYS Soil and Water Conservation Committee.

AGRICULTURAL USES

Land that is used for agricultural purposes such as crop lands and land treaded upon by farm animals is effected by stormwater runoff. Agricultural lands are often cleared of natural vegetation that would ordinarily help to impede the rate of water flow thereby making these lands exposed and more vulnerable to rainwater runoff. Land devoted to barnyard activities and animal enclosures is subject to greater soil displacement due to the movement of farm animals. In turn, these lands may also be the site of accumulated animal wastes. Crop lands are tilled and cultivated thereby exposing more easily transported soil to the surface and allowing for faster water runoff along planting rows.

Furthermore, the intensive use of pesticides and fertilizers on these crop lands introduce yet additional materials that may runoff into water resources. As rainwater crashes onto the land at roughly 30 m.p.h. and washes over these agricultural lands, pesticides, fertilizers, animal wastes and sediments are carried along to be deposited into the nearest stream, river, or lake.

HOME SEPTIC SYSTEMS

Failing or poorly designed and/or located systems are more likely to overflow during wet weather periods. Sewage may then be carried with runoff into receiving waters.

CONSTRUCTION SITES

Soil erosion from land disturbed by construction is a highly visible source of solids in urban runoff. Important sites include large-scale projects such as highway construction and urban renewal. Construction methods and control measures will influence stormwater quantity and quality.

STREET PAVEMENT

The components of road surfaces, including breakup and degradation of asphalt, tar, and other oil-based substances are sources of contamination in urban runoff.

MOTOR VEHICLES

Fuels and lubricants spill or leak, particles are worn off from tires or brake linings, exhaust emissions collect on the road surface, and corrosion products or broken parts fall from vehicles. While the quantity of material deposited from individual vehicles may be small, the combined impact from numerous vehicles is significant. Automotive service stations tend to have high concentrations of the above contaminants.

ATMOSPHERIC FALLOUT

Air pollutants include dust, contaminants, and particles from stacks and vents, from automobiles and planes, and from exposed land. The airborne matter will settle on the land surface and wash off as contaminated runoff.

VEGETATION

Leaves, grass clippings, and other plant materials that fall or are deposited on urban land may become part of the runoff problem. Quantities depend on the geographic location, season landscaping practices, and disposal methods.

SPILLS

Producers and manufacturers must store and use large quantities of hazardous substances to supply the goods we demand. Sometimes - through mismanagement, neglect, or accidents - leaks or spills of these substances introduce them into the air, land, and water. Consumer products such as paint thinner, lacquers, wax resins, detergents, etc., also find their way into storm drainage systems.

LITTER

This consists of various kinds of discarded refuse items, packaging materials, and animal droppings. Although the quantities may be small, the pollutant sources can be significant and may be the most visible form of urban runoff.

ANTI-SKID COMPOUNDS AND CHEMICALS

In the northeast, urban areas employ large amounts of substances designed to melt ice in the winter. Salts, sand, and ash are the commonly used agents. A variety of other chemicals may be used as fertilizers, pesticides, and herbicides. Many of these substances will become part of the urban runoff when improperly stored or applied.

STORM SEWERS

These tend to accumulate deposits of materials that will eventually be dislodged and transported by storm flows.

COMBINED SEWER OVERFLOW

Wet-weather loading from combined storm/sewage overflows may be many times larger than loads discharged from sewage treatment plants during storms, and equal or exceed total annual discharges from sewage treatment plants. (This will only occur in areas of existing development having combined sanitary and storm sewers.)

Regardless of whether the materials being washed into the water resources are due to the disturbance of soil and the introduction of litter and petroleum-based elements caused by urban development or consist of sediment, pesticides and nutrients as the result of agricultural practices, all of these materials negatively impact the water quality within the watershed. More specific effects of stormwater runoff pollution are illustrated below as described in the *Watershed Planning Handbook for the Control of Nonpoint Source Pollution* prepared by the NYSDEC and the NYS Soil and Water Conservation Committee.

SEDIMENT (sand, silt, clay in colloidal suspension)

Sediment may destroy fish habitat through blanketing of fish spawning and feeding areas and elimination of certain food organism; directly impact fish through gill abrasion and fin rot; and reduce sunlight penetration, thereby impairing photosynthesis of aquatic plants. Suspended sediment decreases recreational values, reduces fishery habitat, adds to the mechanical wear of water supply pumps and distribution systems, and adds treatment costs for water supplies. Nutrients and toxic substances attached to sediment particles are transported to water bodies and may enter aquatic food chains, cause fish toxicity problems, impair recreational uses, or degrade the water as a drinking water source.

NUTRIENTS (phosphorus, nitrogen)

Nutrient enrichment of surface waters may cause excessive algae and aquatic plant growth, choking open waters & consuming oxygen (mainly through plant die-off). Fish and aquatic organisms, fishing and boating, and the use of the resources for water supply are thereby impacted. Nitrogen contaminants in drinking water significantly above the drinking water standard may cause methoglobinemia (a blood disease) in infants, and have forced closure of several water supplies.

THERMAL STRESS (sunlight)

Direct exposure of sunlight to urban streams which lack shade may elevate stream temperatures which can exceed fish tolerance limits, reduce survival and lower resistance to disease. Urban street surfaces and other impervious surface areas which have been heated by sunlight may transport thermal energy to a stream during a storm event adding stress to living organisms. Cold water fish (such as trout) may be eliminated, or the habitat may become marginally supportive of the fishery.

OXYGEN-DEMANDING ORGANICS (human, animal excreta; decaying plant/animal matter; discarded litter, food wastes)

Organic materials (natural or synthetic) may enter surface waters dissolved or suspended in runoff. Natural decomposition of these materials may deplete dissolved oxygen supplies in the surface waters. Dissolved oxygen may be reduced to below the threshold necessary to maintain aquatic life, impairing or killing fish and other aquatic plants and animals.

TOXIC SUBSTANCES (heavy metals, pesticides, oil and other petroleum products)

Toxic chemicals may enter surface waters either dissolved in runoff or attached to sediment or organic materials, and may enter ground waters through soil infiltration. The principal concerns in surface water are their entry into the food chain, bio-accumulation, toxic effects on fish, wildlife and microorganisms, habitat degradation, and potential degradation of public water supply sources. The ground water impacts are primarily related to water supply sources.

PATHOGENS (bacteria, viruses)

Bacteria and viruses include infectious agents and disease-producing organisms, normally associated with human and animal wastes. The principal concerns are the survival and transmission of such organisms and their impacts on drinking water supplies, contact recreation waters, and fish and wildlife or domestic animals.

These effects of stormwater pollution may gradually accumulate until the quality of the water is dramatically reduced and the overall health of the whole resource is endangered. Streams become polluted to the point where they can no longer provide a healthy habitat for fish and other wildlife. Rivers, swollen with the increasing water volume that can no longer filter into the ground water, flood and cause damage in areas where the river had never flooded in the past. Lakes become covered with algae and clogged with weeds discouraging any recreational uses that may have occurred in the past. In each of these instances, the water resource itself has been damaged and the overall quality of life associated with these water bodies has been seriously diminished if not outright curtailed.

Watershed pollution and water quality degradation may not be occurring in one's area to this extent; however, without careful consideration and foresight to protect the watershed, this scenario can occur all too easily and in a relatively short time-frame. While it is true that many of the effects of stormwater runoff pollutants can be reversed, these solutions can be very expensive to implement. Impacted streams can be cleaned, silt traps can be constructed, and fish species can be reintroduced. Riverbanks can be strengthened and water retaining devices can be installed. Drinking water can be purified through physical filtration and chemical introduction and lake weeds can be mechanically harvested a number of times throughout the year. Each of these attempts at remediation, however, requires a substantial investment in time, expertise and money.

Therefore, in these times of fiscal constraint, it is vastly more efficient to protect one's watershed through thoughtful planning and sound and fair establishment of watershed protection guidelines and through the implementation of appropriate agricultural best management practices. Furthermore, since the land most easily worked (due to its flatness and accommodating soil characteristics) is generally developed first, the land that remains undeveloped tends to have a higher degree of slope, less favorable soil characteristics and is more vulnerable to soil erosion. This increasingly marginal land needs even greater protection than land already devoted to development.

The remainder of this report will focus upon the Tomhannock Reservoir watershed and the communities that are found within this watershed area. A chapter on recommended watershed management strategies and techniques will conclude this report. For additional information regarding watershed protection strategies and implementation techniques, please investigate the many excellent sources listed in this report's bibliography or contact your local USDA Natural Resource Conservation Service agent or county Soil and Water Conservation District representative.

CHAPTER II

PROJECT METHODOLOGY

STUDY AREA DEFINITION

The first step of this Tomhannock Reservoir watershed study was to meet with the USDA Natural Resource Conservation Service (USDA NRCS) agent for this region and with the Rensselaer County Soil and Water Conservation District (SWCD) representative to gather insight in defining the study area. Based upon their recommendations, the Tomhannock Reservoir watershed area was chosen due to the impacts that agricultural practices and recent development were having upon the watershed.

As previously mentioned, several identifiable problems exist in the watershed that impact the environmental quality of the reservoir. These include periodic high levels of algal activity and turbidity, sedimentation, increased areas of aquatic weeds and activities in the watershed which result in excessive soil erosion and nutrient loss. Another concern is unplanned residential and commercial development and how it might affect the rural character of the watershed as well as the reservoir itself. Concerns related to this development include excessive erosion during construction, loss of farmland, and the location of residences on sites poorly suited for development.

Once the study area was defined, work then began on collecting, organizing and synthesizing a wide variety of data relating to the watershed area. This data included such information as existing environmental and soil characteristics for the watershed area, enacted regulatory measures designed to protect the watershed and non-regulatory practices employed to achieve the same goal. Much of this data is in digital format and was analyzed using a geographic information system (GIS). The data is displayed in the report in the form of data tables and maps. In addition, these files have been transferred to Rensselaer County for their in-house use.

Throughout this project, we have received valuable information relating to the watershed from a number of sources. The Capital District Regional Planning Commission would like to express its appreciation for this collaboration to all of these organizations including the USDA Natural Resource Conservation Service, the Rensselaer County Soil and Water Conservation District, the Rensselaer County Office of Economic Development and Planning, the Rensselaer - Taconic Land Conservancy, the Rensselaer Institute of Limnology, the City of Troy Department of Public Works, representatives from the Towns of Brunswick, Grafton, Hoosick, Pittstown, and Schaghticoke, and the New York State Department of Environmental Conservation.

EXISTING ENVIRONMENTAL CONDITIONS

The next step of this project was to analyze the environmental conditions that currently exist within the Tomhannock watershed area which impact the opportunity for future development and

general water quality within this region.

SOIL CONDITIONS

Soil conditions have tremendous impact on what activities are appropriate for a portion of land. For example, the ability of the soil to percolate materials directly affects the efficiency and design of septic systems. Soil characteristics and depth of bedrock will affect the design of building construction and also provide insight into the likelihood of flooding.

Soil characteristics for this study originate from the *Soil Survey of Rensselaer County, New York* prepared by the USDA Natural Resource Conservation Service (formerly the Soil Conservation Service). For this study, we analyzed, and prepared maps where appropriate, for the following aspects relating to soil characteristics:

- Soil name and symbol
- Soil attributes
- The watershed acreage represented by this soil type
- Soil survey designation of "prime farmland"
- Soils with slopes greater than 15 percent
- Soils identified with woodland management erosion hazard concerns
- Soils identified with building site development concerns
- Soils identified with septic tank absorption concerns
- Soil flooding frequency
- Soil depth to bedrock

In addition to these soil characteristics, the occurrence of wetlands and flood prone soils also impacts the ability to develop a portion of land and general runoff patterns. As such, we have included maps of the general location of these areas that fall within the watershed.

EXISTING LAND USES

Existing land use activities, from the Rensselaer County Office of Economic Development and Planning and derived from the New York State Office of Real Property Service (NYSORPS) data, were mapped as tax parcels for those areas within the watershed. The tax parcels were then classified based on the NYSORPS uniform land use activity classification system to illustrate those areas within the watershed that are currently developed and those areas where development may occur in the future in relation to their proximity to the streams and reservoir.

EXISTING LAND USE REGULATIONS AND BEST MANAGEMENT PRACTICES

The New York State Office of Real Property Services tax parcel data establishes a site-specific illustration of current land use activities. Having identified current land uses, attention was then focused upon investigating the regulatory framework in place governing the establishment of future land uses within the watershed.

Meetings were arranged with town supervisors and/or planning board members in each of the communities located within the watershed. These discussions proved invaluable in gaining an understanding of the towns' plans for future development and their attitudes concerning watershed protection measures. Adopted zoning, subdivision, and site plan regulations were researched and evaluated in terms of their control over water quality impacts from soil erosion, sedimentation and stormwater runoff. Additional regulatory measures designed to protect the watershed such as public health law provisions and county legislative measures were also investigated and are summarized in Chapter VI.

Since the area located within the Tomhannock Reservoir watershed is primarily devoted to agricultural practices, the next stage of this study focused upon evaluating the Best Management Practices (BMP's) that are currently being utilized as part of the Watershed Plan for the Tomhannock Reservoir. This Plan, developed through the efforts of the Rensselaer County SWCD in conjunction with the USDA NRCS, was adopted as part of Public Law 566 to help protect water quality and control runoff. Chapter VI also describes this Plan and the BMP's that are currently being utilized.

RECOMMENDATIONS FOR WATERSHED PROTECTION STRATEGIES

Having evaluated the existing environmental conditions, current land uses, state, county and local regulatory framework and best management practices in the Tomhannock Reservoir watershed, Chapter VII concludes this report by providing recommended watershed protection strategies and techniques for each community within the watershed.

It is recognized that these communities may wish to pursue these recommendations or choose selectively among the suggested actions. Obviously, each community must respond to the specific needs of its residents and plan the development of the community in accordance with those desires. Nevertheless, since all those who reside within the watershed will ultimately affect the water quality by their actions, it is therefore also the responsibility of those within the watershed to protect and preserve this natural resource. Certainly, excellent water quality and the preservation of outstanding natural beauty enhances the overall quality of life within this watershed area. Reasoned planning and effective implementation of appropriate protection measures, whether regulatory or procedural, will only promote the advantages that this area has to offer and encourage the development of a healthy tax base critical to the advancement of these Tomhannock Reservoir watershed communities.

CHAPTER III

A BRIEF HISTORY OF THE TOMHANNOCK RESERVOIR AND THE WATERSHED COMMUNITIES

THE TOMHANNOCK RESERVOIR

The Tomhannock Reservoir was created by the impoundment of the Tomhannock Creek in 1906 to provide the City of Troy with a reliable and plentiful source of water. Previously, Troy had employed a number of smaller constructed reservoirs located at various points around the city and nearby communities. These smaller reservoirs were sufficient for a time but Troy's needs soon outgrew their capacities and water shortages plagued the City's residents. Beyond the residents' needs, the City fire department was also affected by the periodic shortages of water and often had to pump water directly out of the Hudson for its fire fighting purposes. In fact, the lack of an adequate supply of water for fire protection contributed to the devastation caused by a fire in 1863 that destroyed much of Troy. The Tomhannock Reservoir, however, proved to be a generous source of water (even during the most severe droughts) and Troy's water capacity problems were solved.

Water treatment began in 1966 with the construction of Troy's modern water treatment plant. The water is chlorinated for the elimination of harmful bacteria, alum is added for sedimentation of solid matter, lime is added to reduce the corrosive action of the water, carbon may be added for taste and odor control, potassium permanganates may be added for manganese control and fluoride is added for the protection of the teeth of the consumers.

By 1968, the City of Rensselaer and the Town of East Greenbush completed an extensive construction program and began taking advantage of this healthful, plentiful water. The Tomhannock Reservoir currently serves the water needs of over 100,000 people including the residents of the cities of Troy and Rensselaer, the Village of Menands and the towns of East Greenbush, North Greenbush, Brunswick and Schaghticoke.

The Tomhannock Reservoir has a maximum depth of 50 feet and a mean depth of 23 feet, is over five miles long, nearly 1/2 mile wide and has 17 miles of shoreline nestled in a beautiful and mostly wooded valley. The outlet for the reservoir is located at its northwest terminus and the reservoir is traversed by New York State Route 7 in its southeast section. In total, the Tomhannock Reservoir contains a surface area of 2.8 square miles and encompasses a drainage area of 66.6 square miles within its watershed. The vast majority of the watershed area is in the Town of Pittstown with smaller portions in the towns of Brunswick, Grafton, Hoosick and Schaghticoke.

The City of Troy owns the reservoir and the land that immediately surrounds it. The reservoir and its lands are closed to all unauthorized persons except those who have a permit to fish as

granted by the City of Troy Department of Public Utilities. Fishing during the open water season and ice fishing is allowed with an appropriate permit and along designated areas. Boats, snowmobiles, bathing, swimming, picnics, camping, hunting, trapping, or the building of fires is expressly forbidden; however, special permits may be issued at the discretion of the City of Troy for uses other than fishing.

THE TOMHANNOCK RESERVOIR WATERSHED COMMUNITIES

The Tomhannock Reservoir Watershed includes parts of five towns located in the northern portion of Rensselaer County: Brunswick, Grafton, Hoosick, Pittstown, and Schaghticoke. Due to physical constraints such as steep slopes, rocky soils and wetlands prevalent throughout the county, this area has maintained a rural, mostly agricultural character. Over the past two decades, however, there has been a modest increase in population and development pressure as a result of the general regional trend towards suburbanization. The location of these towns, within a fairly short commuting distance from the urban areas of the county and to the rest of the Capital Region, has made them attractive to prospective home buyers.

TOWN OF BRUNSWICK

The first settlement of Brunswick began in the 1740's. Most of the early settlers were farmers moving into the area in search of new land. This influx of farmers continued through the Revolutionary War and the War of 1812. By 1800, as the need for services began to increase, taverns and stores, as well as grist mills and some industries were found in the town. Several hamlets, such as Eagle Mills, Center Brunswick, Haynersville, Tamarac, East Brunswick, Cropseyville and Albia, developed as centers of small-scale industry in the town. After the Civil War, the pattern of residential development followed the farm development of a hundred years before. Most of the residential development occurred in the western part of town, close to the City of Troy. That pattern has not changed significantly through today.

According to the 1980 aerial study of land use development patterns, the Town of Brunswick held 52 percent of its 29,994 acres as brushland and forest, while 33 percent was used for agricultural purposes. Roughly 14 percent of the town's land was classified as "developed", with over 10 percent in residential use and less than one half of one percent classified as industrial or commercial. The situation in Brunswick has changed somewhat with regard to industrial, and to a greater extent, commercial development since the 1980 survey. Most of this change has occurred along the Route 7 corridor and particularly in the western portion of the town where sewer and water services are available. Furthermore, easy access to downtown Troy and to the remainder of the Capital District make the area attractive for industrial and commercial development. Aside from the western portion of town, generally along the Route 7 corridor and the areas adjacent to the City of Troy, Brunswick remains predominantly rural in character. This is certainly the case in the portion of town located within the Tomhannock Reservoir Watershed.

In terms of population, the Town of Brunswick has experienced periods of growth and decline over the last half century.

- According to the U.S. Bureau of the Census, the town experienced dramatic

growth between 1950 and 1960, from 5,967 to 9,004 persons (51%). This growth continued at a slower rate in the next decade, increasing to 11,193 by 1970 (24%).

- By 1980, the population had declined 2% to 10,974. Between 1980 and 1990, population in the town increased by a modest 1% to 11,093. Still, this number was lower than the population in 1970.
- The Census Bureau's estimate of the town's 1992 population was 11,526. This estimate represents a 4% increase in just two years. It is uncertain as to whether this rapid increase in population will actually continue throughout the decade.
- CDRPC population projections, prepared in June 1992 and based on the 1990 census, projected the town's population to increase to only 11,263 by the year 2000 and to 11,387 by 2010. These projections do not represent nearly as much growth as the Census estimate indicates. In either case, indications are that the Town of Brunswick will see continued slow to moderate population growth over the next decade.

According to the 1990 Census, 56% of the Town of Brunswick's population is rural while 44% is classified as urban. There are 4,146 households in the town and the average household size is 2.68 persons. The median household income in Brunswick is \$41,815. This is considerably higher than the \$31,958 for Rensselaer County and \$32,965 for the state. The poverty rate is slightly under 3%.

TOWN OF GRAFTON

The area that is today the Town of Grafton was settled in the 1780's and 1790's by pioneers moving westward from New England and by Dutch Settlers from the Hudson Valley. The area was then known as Roxborough and was part of the Northeast Manor of Rensselaerwyck owned by the Van Rensselaers. Farmers were attracted to the leases of large tracts of land offered by the Patroon. The Town of Grafton was officially established in March 1807. The logging industry, along with its related industries (sawmills, charcoal and potash manufacture) and agriculture were the foundations of the town's economy in the early 19th century. The town reached a peak in 1840 and was a flourishing community with churches, stores, lovely homes and many businesses. By 1850 the population was 2,033, higher than the 1990 figure. The boom of the 1850's ended with the Civil War. In the late 1800's and early 1900's the town experienced another boom, this time due to a flourishing tourist industry. Today, Grafton remains a popular summer recreation area due to the presence of Grafton Lakes State Park.

According to the 1980 aerial study of land use development patterns, the Town of Grafton held 81% of its 30,285 acres as brushland and forest (of this amount, 99% was forest). In addition, 2% was used for agricultural purposes and 3% was water. Therefore, roughly 14% of the town's total land was considered "developed" with only 3% identified as residential and 11% identified as public land & recreational (this is due to the presence of Grafton Lakes State Park). For the

purposes of this study, lands that are set aside as "public land & recreational" are considered "developed" because they are not available for conversion to more intensive uses that might negatively impact the watershed. Agricultural lands, which are categorized here as undeveloped, are more likely to see this type of conversion. Finally, less than one half of one percent of the total land area in Grafton was classified as industrial and commercial. The land use pattern in Grafton has not changed substantially since the 1980 survey. There has been modest population growth in the town over the past decade, however Grafton remains rural in character. This is especially true for the portion of town that is located within the Tomhannock Reservoir Watershed. With the exception of residential areas around Babcock Lake, this northern portion of Grafton remains mostly undeveloped. One concern regarding this undeveloped land is the impact of sediment runoff from logging operations on water quality in the watershed.

The Town of Grafton has experienced continuous population growth throughout the last half century.

- In 1940, the population of the town was 836. The population increased 15% between 1940 and 1950, 5% between 1950 and 1960, and 30% between 1960 and 1970.
- By 1980 the population in the town reached 1,665, nearly double the 1940 figure and 27% higher than in 1970. By 1990 the town added an additional 252 persons, an increase of 15% over 1980. Considering that Rensselaer County's population actually decreased between 1970 and 1980, and that it only increased less than 2% during the 1980's, Grafton's growth over the last twenty years has been fairly impressive. In fact the only municipalities in Rensselaer County that experienced a higher percentage of growth during the 1980's were the Village of Schaghticoke and the Town of Stephentown.
- The U.S. Census Bureau's 1992 estimate of population for the Town of Grafton was 1,979 persons, a 3% increase in two years.
- CDRPC population projections prepared in 1992 (based on 1990 census data) indicate that the town's population will continue to grow. By the year 2000, it is projected to reach 2,133, an 11% increase over 1990, and up to 2,291 by 2010, representing a nearly 20% increase over 1990.

According to the 1990 census, all of the Town of Grafton's population is classified as rural. There are a total of 655 households in the town and the average household size is 2.93 persons. The median household income in Grafton is \$37,372. This is higher than the median income for Rensselaer County and the median income statewide. The poverty rate for the town is under 5%.

TOWN OF HOOSICK

The first permanent settlement in Hoosick was established near the junction of the Hoosick and Walloomsac Rivers in 1724. Until 1760, the area was settled very slowly, however after the hostilities related to the French and Indian War had ceased, many new settlers came into the area.

By 1773, a major road system which included present day Routes 7, 22, and 67 was established. The area played an important role in the War for Independence with the defeat of British troops at the Battle of Bennington in 1777. The Town of Hoosick was organized as part of Albany County in 1788. Three years later, in 1791, it became part of Rensselaer County.

According to the 1980 aerial survey of land use development patterns, the Town of Hoosick held 54% of its 40,582 acres as brushland and forest. An additional 40% was agricultural land. Therefore, roughly 6% of the total lands in the Town of Hoosick were identified as developed with over 2% devoted to residential uses while approximately one half of one percent classified as industrial or commercial. The Town of Hoosick also contains a substantial village which is located outside of the watershed study area. Of course, the distribution was quite different in the Village of Hoosick Falls where 34% of the total land was residential, while almost 6% was classified as industrial or commercial.

The situation in Hoosick has not changed dramatically since this survey. There is some development along the Route 7 corridor that results from the road's importance as a link from New York to southern Vermont, but overall both the village and the town have witnessed little growth in recent years and the population is still centered in or near the village. The portion of town located within the Tomhannock Reservoir Watershed remains largely undeveloped.

The population of the Town of Hoosick has not changed a great deal since 1940.

- In 1940 the population of the Town of Hoosick, including the village, was 6,549. The population decreased slightly during the 1940's and the 1950's to 6,490 by 1960. This represented a 1% decline over 20 years. During the 1960's, the population started to increase, to 6,651 in 1970, and continued in the 1970's to 6,732 by 1980. This equaled a nearly 4% increase over 20 years.
- During the 1980's, the population of the town, including the village, decreased one half of one percent to 6,696 by 1990. Overall, from 1940 to 1990 the population increased just 2%. Population in the Village of Hoosick Falls decreased a substantial 18% over the same 50 year period.
- The U.S. Census Bureau 1992 population estimates show both the town and the village growing again. The town estimate is 6,852 (a 2% increase in two years) and the village estimate is 3,677 (a 5% increase in two years). The only municipalities in Rensselaer County that are estimated by the Census Bureau to be growing at a faster rate than the Village of Hoosick Falls are the Village of Valley Falls and the Village of Castleton-on-Hudson.
- However, CDRPC projections prepared in 1992 (based on the 1990 census) do not indicate this rapid rate of growth. The projections show a 1% increase to 6,760 between 1990 and the year 2000 for the town, and a nearly 2% decrease to 3,430 between 1990 and the year 2000 for the village. By 2010, the projections indicate an increase of over 2% from 1990 for the

town, and a nearly 3% decrease from 1990 for the village.

According to the 1990 Census, 52% of the Town of Hoosick's population is considered urban while the remaining 48% is rural. Not surprisingly, all of the "urban" population is located within the Village of Hoosick Falls. There are 2,556 households in the town and the number of persons per household is 2.59. The median household income is \$26,683. In the village it is lower at \$24,265. Both of these are less than the median household income for Rensselaer County (\$31,958) and for the state (\$32,965). The poverty rate for the town is nearly 9%.

TOWN OF PITTSTOWN

Pittstown received its name from King George III in 1761 in honor of William Pitt, Earl of Chatham. At that time, he was the leading statesman in England. The town officially began its existence at a town meeting on the first Tuesday in April, 1789. The meeting was held at an inn operated by James Stitt on what was called the North Road, now Croll Road near County Route 111. Israel Thompson of Valley Falls was made the first supervisor of the town.

Of the five towns within the Tomhannock Reservoir Watershed, Pittstown contains the most significant portion of the total land in the study area. In fact, considerably more than half of the town is located within the watershed boundary.

According to a 1980 aerial study of land use development patterns, the Town of Pittstown held 55 percent of its 42,556 acres as brushland and forest, while 5 percent was comprised of water. In addition, agricultural land uses accounted for 36 percent of the total acreage. Therefore only about 4 percent of the total land area in the town was classified as "developed." Of this amount, just more than half was devoted to residential land use. Although this study was conducted several years ago, the basic development pattern has not changed dramatically and the vast majority of land in Pittstown remains "undeveloped". However, the modest population growth since 1980 indicates that this part of Rensselaer County can attract new residents, and therefore the land use pattern described above may change.

Further evidence of this potential change comes from building permit issuances for single family homes in the town. According to the U.S. Bureau of the Census, Construction Statistics Division, there was a fairly substantial number of these permits issued during the mid-1980's (75 permits issued in 1986, 70 issued in 1987). The number declined somewhat in the late 1980's (44 issued in 1989) and has remained low but fairly consistent through the early 1990's (in the mid 20's each year).

Over one hundred and fifty years ago, the census of 1840 recorded the Town of Pittstown's population as 3,919. By 1970 the population had not changed significantly.

- According to the census, the town's population in 1970 was 3,905. However the population in 1970 represented a 31% increase over the 1940 figure of 2,973.
- This growth has continued over the past two decades. The population in

1980 was 4,901, a 26% increase over 1970, and the population in 1990 was 5,468, representing a 12% increase from 1980. The increase between 1980 and 1990, although not tremendous, was considerably larger than that for the county as a whole (2% over the same time period).

- By 1992, the U.S. Bureau of the Census estimated the population of Pittstown to have increased to 5,654.
- According to CDRPC population projections, the Town of Pittstown should see a continued increase in population to 5,966 in the year 2000 and to 6,304 by 2010. Based on these numbers, the town is expected to see a 9% growth in population in the current decade.

According to the 1990 Census, 100% of the town's population is rural. There are 1,852 households in the town and the average household size is 2.95 persons. The median income for households in the Town of Pittstown is \$33,770 which compares favorably to the median household income for Rensselaer County (\$31,958) and for the state (\$32,965). The poverty rate is just over 5%.

TOWN OF SCHAGHTICOKE

The Town of Schaghticoke was formed in 1788 and was made part of Rensselaer County when the county was formed in honor of Killiaen Van Rensselaer in 1791. In 1819, part of the town was annexed by Lansingburgh. However, when Lansingburgh became part of the City of Troy in 1900, the northern portion of the previously annexed area was returned to the town. In 1867 the Village of Schaghticoke and in 1904 the Village of Valley Falls were incorporated as areas within the town. Both villages were developed due to their location along railroad lines and along rivers that provided a source of waterpower. This fostered the growth of industries involved in paper and cloth manufacture as well as the milling of grains, in these villages. Around the turn of the century, there was a shift away from small-scale manufacturing in hamlet areas like Schaghticoke in favor of large-scale manufacturing in urban centers such as Troy.

According to the 1980 aerial survey, the Town of Schaghticoke held 57% of its 33,263 acres as brushland and forest. In addition, 32% of the town's land area was devoted to agriculture while 5% was water. Therefore, roughly 6% of the town's total area was identified as developed with 4% devoted to residential land uses and one third of one percent devoted to industrial and commercial uses. The town's close proximity to Troy and to other employment centers in the Capital District has likely increased the amount of land dedicated to residential use. However, the overall pattern of land use has not changed dramatically since the 1980 survey. There is only a very small portion of the town located within the Tomhannock Reservoir Watershed. This area remains almost entirely undeveloped.

The population of the Town of Schaghticoke has increased continuously since 1940.

- The population grew from 3,246 persons in 1940 to 4,019 in 1950, 5,269 in 1960, 6,220 in 1970, and 7,094 in 1980. This represents a 119% increase

over the 40 year period. Rensselaer County's population increased just 25% over the same time period.

- Between 1980 and 1990 population in the town increased another 7% to 7,574.
- The U.S. Census Bureau's 1992 estimate of population for the town was 7,650, a 1% increase in two years.
- CDRPC population projections prepared in 1992 (using 1990 census data) indicate that Schaghticoke's population will continue to grow. It is projected to reach 8011 by the year 2000, a 6% increase over 1990, and 8,446 by 2010, a 12% increase from 1990.

According to the 1990 Census, 28% of the Town of Schaghticoke's population is classified as urban while 72% is rural. There are 2,579 households in the town and there are an average of 2.93 persons per household. The median household income is \$38,782, higher than the median household incomes of both Rensselaer County (\$31,958) and the state (\$32,965). The poverty rate for the town is under 4 %.

CHAPTER IV

EXISTING ENVIRONMENTAL CONDITIONS

EXISTING CONDITIONS BASED UPON SOIL CHARACTERISTICS

The selected information contained in this chapter relating to soil conditions and characteristics is based upon the *Soil Survey of Rensselaer County, New York* prepared by the USDA Natural Resource Conservation Service. The soil survey contains predictions of soil behavior for selected land uses and highlights limitations and hazards inherent in the soil, improvements needed to overcome these limitations, and the impacts of selected land uses on the environment. For additional information regarding soil characteristics, please refer to the Soil Survey or contact your local USDA Natural Resource Conservation Service or county Soil and Water Conservation District representative.

The soil survey is designed for many different uses. Farmers, foresters and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders and home buyers can use the survey to plan land use, select sites for construction and identify special practices needed to insure proper performance. Conservationists, teachers, students and specialists in recreation, wildlife management, waste disposal and pollution control can use the survey to help them understand, protect and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding, some are shallow to bedrock, and some are too unstable to be used as a foundation for buildings or roads. Soils high in clay content and wet soils are poorly suited for septic tank absorption fields and a high water table makes a soil poorly suited to basements or underground installations.

Included in Appendix B is a list of soil types and a summary of soil characteristics for the land area located within the Tomhannock Reservoir watershed. Below are brief descriptions of these selected characteristics. More detailed information can be found within the Soil Survey itself in conjunction with the Survey's soil map.

SOIL SYMBOL AND NAME

The soil symbol refers to the map unit designation for that soil type. The map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. This soil unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class, there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects and, therefore, may be intermixed with a variety of soils and properties. As such, every map unit is made up of soil or soils for which it is named and some soils that belong to other taxonomic

classes. These latter soils are called inclusions or included soils. The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data since the objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on soil maps provides sufficient information for the development of resource plans but on-site investigation is needed to plan for intensive uses in small areas.

The soil unit symbol refers to the soil name (the first two letters of the symbol) and may be followed by another capital letter designating the degree of slope found in that soil type. The soil name includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

WATERSHED ACREAGE

The Tomhannock Reservoir watershed consists of 2,600 identified soil portions that make up the 43,137 square acres found within the watershed. The extent of each soil, as identified in the following tables, is calculated as to the total number of acres that it occupies and also the overall proportion that it represents within the watershed.

PRIME FARMLAND

The term "prime farmland" used in this chapter refers to those soils identified by the U. S. Department of Agriculture as best suited to producing food, feed, forage, fiber and oilseed crops. Prime farmland soils may currently be in use as cropland, pasture or woodland, or they may be in other uses. They are either used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. Their slope ranges from 0 to 6 percent.

Those soils identified as being prime farmland are designated with an X. Within the Tomhannock Reservoir watershed, 3,570 square acres of land have been identified as prime farmland. This represents 8.3% of total watershed land.

SLOPE GREATER THAN 15 PERCENT

Slope refers to the inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. Those soils identified as having a slope greater than 15 percent are designated with an X; those soils identified with an asterisk represent a collection of soils that may or may not have a slope greater than 15 percent. Further on-site evaluation of these soils is needed to determine their precise site-specific slope.

Within the Tomhannock Reservoir watershed, 13,187 square acres of land have been identified

as having a slope greater than 15 percent. This represents 30.6% of total watershed land.

WOODLAND MANAGEMENT / EROSION HAZARD CONCERNS

Ratings of the erosion hazard in this category refer to the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Within the Tomhannock Reservoir watershed, 470 square acres of land have been identified as having *moderate* woodland management/erosion hazard concerns. This represents 1.1% of total watershed land. No lands within the watershed were designated as having a *severe* rating for woodland management/erosion control concerns.

BUILDING SITE DEVELOPMENT CONCERNS

This category illustrates the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements and small commercial buildings. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Within the Tomhannock Reservoir watershed, 2,479 square acres of land have been identified as having *slight* residential building concerns. This represents 6.2% of total buildable watershed land.

For the purposes of this analysis, lands identified as having *moderate* or *severe* (only in cases where the structure includes a basement) concerns relating to construction of residential dwellings have been grouped together. This was performed since conditions may be *severe* relating to a dwelling with a basement, but design modification may be done to remove the basement and thereby reduce the building concern to *moderate*. As such, 17,745 square acres of land have been identified as having *moderate* or *severe* residential building concerns representing 44.1% of total buildable watershed land.

Lands designated as having *severe* residential building concerns, regardless of whether there is a basement or not, total 20,014 square acres and represent 49.7% of total buildable watershed acreage.

SEPTIC TANK ABSORPTION CONCERNS

This category describes the degree and the kind of soil limitations that affect septic tank absorption fields. The limitations are considered *slight* if soil properties and site features are generally favorable for this use and limitations are minor and easily overcome; *moderate* if soil

properties or site features are not favorable for the indicated use and special planning, design or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs and possibly increased maintenance are required.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features and observed performance of the soils. Permeability, a high water table, depth to bedrock and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing effluent and hillside seepage can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively.

Within the Tomhannock Reservoir watershed, **ALL** soils are designated as having *severe* septic tank absorption concerns. Some soils have a severe rating due to indicated wetness, others have slow percolation rates, severe slope considerations or have shallow depths to bedrock. Nevertheless, all future development plans should recognize this aspect and design accordingly.

The Rensselaer County Water Quality Committee has received support grants to address several issues associated with septic system maintenance and upgrade projects within the watershed.

FLOODING FREQUENCY

The vast majority of soils within the watershed are not known for their frequency to flood. In fact, there are only two soils indicated as having an occasional frequency to flood. These soils are the Teel and Hamlin silt loams (TeA, HaA) and these soils combined make up less than 1% of the watershed. Only the Limerick silt loam soils (LmA) are indicated as disposed to frequent flooding and these soils account for only 1% of the watershed.

DEPTH TO BEDROCK

A soil's indicated depth to bedrock affects site selection, building design and the soil's ability to filter and percolate water and materials. This category in the following tables illustrates the varying depths to bedrock for the soils within the watershed.

NEW YORK STATE REGULATED WETLANDS

An additional condition that was investigated was the presence of New York State regulated wetlands within the Tomhannock Reservoir watershed. A map illustrating the general locations of these wetlands is provided at the end of this chapter. The location of these regulated wetlands is based upon information from the New York State Department of Environmental Conservation

and should be used for general locational purposes only. Maps of greater detail and additional information regarding these areas may be obtained directly from the NYSDEC.

FINDINGS

Rensselaer County, in general, and specifically the area located within the Tomhannock Reservoir watershed is endowed with an abundance of soils that have numerous limitations and hazards relating to their use and development:

- Only 8.3% of the watershed is designated as *Prime Farmland*
- More than 30% of the watershed soils have slopes greater than 15%
- More than 87% of the watershed soils have *moderate* or *severe* residential building concerns
- **ALL** of the watershed soils have *severe* septic tank absorption concerns
- There are numerous locations of NYS regulated wetlands within the watershed

Given these soil characteristics and conditions, it is clearly evident that any development to take place upon these lands must be planned and constructed with specific attention devoted to its impact upon the soils and landscape within the watershed. Future development and land uses without the proper attention and sensitivity to these existing conditions will most certainly adversely effect the landscape, soil conditions and water quality found within the Tomhannock watershed.

CHAPTER V

EXISTING LAND USES

This chapter investigates the land use activities currently taking place on the land within the Tomhannock Reservoir watershed. This information is critical to the evaluation and planning of watershed protection strategies because it provides insight into the intensity of land use and existence of any materials that might run off of these sites for eventual deposition into nearby water bodies. Particular attention should be directed towards those land use activities with the most potential for contributing sediment and other materials on tax parcels closest to existing water bodies. Since the watershed encompasses a large amount of land, much of these materials may settle out before they reach a water body. Greater attention, however, should be devoted to those areas closest to streams and the reservoir itself since any materials that runoff of these lands are quickly transported and more rapidly deposited into the water bodies.

The land use data is based upon information from the Rensselaer County Bureau of Planning and, ultimately, from the New York State Office of Real Property Services' (formerly NYS Department of Equalization and Assessment) property classification system. This system is used to identify each tax parcel's most current and prevalent use. Additional information regarding this land use information may be available directly from either of these two sources. This system of classification consists of 3-digit numeric codes in nine *categories*. Each *category* is composed of *divisions*, indicated by the second digit, and *subdivisions* (where required) indicated by a third digit. The nine *categories* are:

- | | | | |
|-----|--|---|--|
| 100 | <i>Agriculture</i> | - | Property used for the production of crops or livestock. |
| 200 | <i>Residential</i> | - | Property used for human habitation. Living accommodations such as hotels, motels, and apartments are in the Commercial category - 400. |
| 300 | <i>Vacant Land</i> | - | Property that is not in use, is in temporary use, or lacks permanent improvement. |
| 400 | <i>Commercial</i> | - | Property used for the sale of goods and / or services. |
| 500 | <i>Recreation & Entertainment</i> | - | Property used by groups or individuals for recreation, amusement or entertainment. |
| 600 | <i>Community Services</i> | - | Property used for the well being of the community. |

- 700 ***Industrial*** - Property used for the production and fabrication of durable and nondurable goods.

- 800 ***Public Service*** - Property used to provide services to the general public.

- 900 ***Wild, Forested, Conservation Lands and Public Parks*** - Reforested lands, preserves, and private hunting and fishing clubs.

A land use map follows in this chapter illustrating the extent of these land uses within the watershed area. This map should be used for general location purposes only; additional information may be obtained directly from the New York State Office of Real Property Services.

For the purposes of this evaluation, several of the above categories were grouped together to express similarity of land use intensity and several divisions were included in other categories for that same purpose. For example, apartments were moved from the commercial category to the residential category.

WATERSHED LAND USE ANALYSIS

AGRICULTURE - 100

The land uses evaluated within this category include:

- 100 Agriculture
- 105 Agricultural land (productive - part of operating farm)
- 111 Poultry
- 112 Dairy
- 113 Cattle, calves, hogs
- 120 Field crops

The amount of land devoted to agricultural purposes within the watershed represents approximately 32% of the total watershed. Land devoted to livestock farming represents 41.8% of this agricultural land subtotal and approximately 13.4% of total watershed land.

Since agricultural practices involving farm animals result in the accumulation of farm wastes and animal excreta, and these materials may be easily transported via runoff, special attention should be devoted to those parcels located nearest the water bodies to prevent these wastes from the watercourse system.

RESIDENTIAL - 200

The land uses evaluated within this category include:

- 210 One-family year-round residence
- 220 Two-family year-round residence
- 230 Three-family year-round residence

- 260 Seasonal residences
- 270 Mobile homes
- 271 Multiple mobile homes
- 280 Multiple residences
- 411 Apartments (not condos or coops)
- 416 Mobile home park
- 417 Camps, cottages, bungalows

The total amount of land devoted to these residential purposes within the watershed represents approximately 12% of the total watershed area.

These uses represent areas of existing residential development. As such, it is less likely that these areas will be further subdivided in the future thereby creating more intensive residential land use activities. For that reason, apartments, mobile home parks and camps, cottages and bungalows have also been included in this category.

In addition to the creation of impermeable surfaces and the introduction of residential wastes such as oil- and petroleum-based products and litter, residential developments also impact the watershed by the existence of septic systems. When septic systems do not work properly, human excreta and pathogens may be introduced into the ground water or percolate to the surface and then be transported by runoff. Since, based on soil classifications, all of the land within the watershed has severe septic tank absorption concerns, this can be a serious problem negatively impacting the water supply.

VACANT - 300

The land uses evaluated within this category include:

- 240 Rural residences with acreage (10 or more acres)
- 311 Residential vacant land (in residential areas)
- 312 Residential land including small improvements
(not for living accommodations)
- 313 Waterfront vacant
- 314 Rural vacant lots of 10 acres or less (in rural residential areas)
- 321 Abandoned agricultural land
(nonproductive, not part of operating farm)
- 322 Residential vacant land greater than 10 acres (in rural areas)
- 323 Other rural vacant lands
(waste lands, sand dunes, salt marshes, swamps, etc.)
- 330 Vacant lands in commercial areas

The amount of land classified as "vacant" for the purposes of this evaluation represents approximately 37% of the total watershed.

The objective for evaluating these parcels is to display those lands where future development may occur (unless there are significant environmental constraints that prohibit development). For this reason, "rural residences with acreage" was included in this grouping since that land

offers the possibility of future subdivision activity. Currently, the lands indicated in this group provide the undeveloped land where rainfall can filter into the ground unhindered by building or pavement, or without the effect of agricultural activity. Future development of these lands may increase both the volume and rate of runoff due to the increased impermeable nature of these developed areas.

**COMMERCIAL / INDUSTRIAL / PUBLIC AND COMMUNITY SERVICES (except "Water supply")-
400 / 600 / 700 / 800**

The land uses evaluated within this category include:

- 415 Hotel
- 421 Restaurants
- 423 Snack bars, drive-ins, ice cream bars
- 433 Auto body, tire shops; other related auto sales
- 449 Other storage, warehouse and distribution facilities
- 471 Funeral homes
- 474 Billboards
- 483 Converted Residence
- 484 One-story small structure
- 534 Social organizations
- 612 Schools
- 620 Religious
- 651 Highway garage
- 662 Police and fire protection
- 695 Cemeteries
- 710 Manufacturing and processing
- 721 Sand and gravel
- 734 Wells, junk
- 810 Electric and gas
- 811 Electric power generation - Hydro
- 817 Electric transmission and distribution
- 831 Communication, telephone
- 852 Landfills and dumps

The total land devoted to these selected activities represents approximately 1.5% of the total area within the Tomhannock Reservoir watershed.

This aggregation of land uses represents areas with fairly intensive activities such as industrial, commercial, and public service establishments and buildings with the likelihood of paved parking surfaces. These types of uses diminish the permeable nature of the soils through the construction of buildings and parking lots and increase the potential for urban waste, including oil- and petroleum-based materials, chemical wastes and other products, to runoff into the water system. In the case of "sand and gravel" activities, increased sediment loads could be deposited in the reservoir. Compounding the introduction of potentially polluting materials and sediment, urban development as represented by most of these land uses also increases the volume and rate of runoff that would otherwise filter into the ground.

WILD, FORESTED, CONSERVATION LAND AND PUBLIC LAND - 900

(also includes beaches and public water supply)

The land uses evaluated within this category include:

- 910 Private wild and forest lands - except for private hunting and fishing clubs
- 920 Private hunting and fishing clubs
- 930 State-owned forest lands
- 932 State-owned lands other than forest lands
- 961 State-owned public parks, recreation areas or other multiple use
- 560 Improved beaches
- 822 Water supply

The land within the watershed devoted to these activities represents approximately 9.5% of the total watershed area.

These land areas serve a similar purpose as vacant lands in that they represent undeveloped land where rainfall can filter into the ground unhindered by building or pavement, or without the effect of agricultural activity. Currently, they are fairly well protected through state and private management. Some attention, however, is warranted in the continued protection of these lands should they enter into the private real estate development market in the future. This represents an example where foresight into future development possibilities can help to prevent a more serious problem from occurring a number of years down the road.

Public water supply has also been added to this category and includes the land directly adjacent to the reservoir. The Troy Department of Public Utilities owns 718 acres of this land which is predominately woodland and is managed for protection of the water supply based on recommendations of NYSDEC Bureau of Forest Management. Portions of this land along the shoreline are also selectively protected as part of New York State Public Health Law: Chapter 3, Section 138.1 (see Chapter VI).

FINDINGS

Due to the nature of the soils and slopes within this area, the Tomhannock Reservoir watershed is primarily devoted to agricultural pursuits and, in general, is not used for highly intensive land use activities. In fact, much of the watershed land currently is classified as "vacant". Additional points of interest are listed below:

- Almost 1/3 of the watershed land is used for agricultural purposes.
- Livestock farming accounts for over 13% of total land and more than 40% of agricultural land.
- A number of land parcels identified as involved in livestock farming are located adjacent to streams that flow directly into the Tomhannock Reservoir.

- Residential land use accounts for roughly 12% of the watershed land.
- 37% of watershed land is vacant.
- Commercial, Industrial, Public and Community Services account for only 1.5% of the watershed area.
- Wild, forested, conservation lands and public water supply make up about 9.5% of the watershed area.

Given the results of this land use evaluation, it is evident that residential, commercial and industrial activities are not threatening to choke the watershed area. In fact, these activities only account for about 14% of the watershed area.

A large proportion (37%) of the watershed, however, is currently vacant or underutilized. This may present conflicts in the future if these areas are allowed to develop without regard to their location and impact upon the waters of the watershed. It is crucial that the watershed communities envision and plan for the eventual development of portions of this land as the population increases. New residential development must be balanced with the limited capacities of the soil to accommodate septic tank construction. As the residential population increases, the need for commercial services also grows and this may attract more retail and service entities to the area. Special consideration must be given to the location of these establishments to diminish the likelihood that litter and oil- and petroleum-based materials will runoff these developed areas into the streams and lakes.

Clearly, it is agricultural activity that is most prevalent in the watershed. While it is crucial to plan for the possibility that some of this land may eventually be developed, it is also imperative that current agricultural practices be designed to lessen their impact upon the watershed. Agricultural activities, including both crop lands and livestock, can have tremendous impact upon water quality and the overall health of the streams and lakes within the watershed. Recognizing this critical concern, both the Rensselaer County Soil and Water Conservation District and the USDA Natural Resource Conservation Service have pursued the implementation of best management practices to control sediment and reduce phosphorous loadings to the reservoir.

CHAPTER VI

EXISTING LAND USE REGULATIONS AND BEST MANAGEMENT PRACTICES

A variety of land use regulations currently govern activities within selected areas of the Tomhannock Reservoir watershed. Some of these regulations originate from State law and others were enacted as local laws or ordinances by the watershed communities. The enforcement of these regulations may be carried out by the New York State Department of Environmental Conservation, the State or County Departments of Health, or by the community itself.

In addition, a Watershed Plan has been prepared and a series of agricultural “Best Management Practices” (BMP’s) have been implemented under PL 566 and other support grants by the Rensselaer County Soil and Water Conservation District and Natural Resource Conservation Service.

In each case, these regulations and BMP’s have been enacted to preserve the health, welfare and safety of the individuals living within this area and to protect the water quality of the Tomhannock Reservoir. Following is a more detailed description of these regulations and programs.

NEW YORK STATE PUBLIC HEALTH LAW

NEW YORK STATE PUBLIC HEALTH LAW: CHAPTER 3 - PUBLIC WATER SUPPLIES, PART 138 - RENSSELAER COUNTY, SECTION 138.1 - CITY OF TROY

This section of the New York State Public Health Law outlines the rules and regulations that apply to:

*"sources of supply which comprise the source of the public water supply of the City of Troy, Rensselaer County, New York. Said sources being those portions of the drainage areas of the streams which form or are tributary to the sources of water supply of the **Tomhannock Reservoir** and the Quackenkill Diverting Dam Reservoir and to all other lakes, ponds or reservoirs whose waters form or are tributary to the sources of water supply of the City of Troy, New York."*

In essence, this section of the New York State Public Health Law effects **all** of the water bodies that are located within the Tomhannock Reservoir Watershed. Specific regulations from this law include the following:

- No portion of the seepage unit (tile field, seepage pit or equivalent) of a

subsurface sewage disposal system shall be constructed, placed or allowed to remain within 50 feet of any reservoir or watercourse.

- Before any existing sewage disposal system is altered or any new sewage disposal system is constructed on the watershed, the plans in relation thereto shall have been first approved by the State Commissioner of Health.
- No sewage or polluted liquid of any kind shall be discharged or allowed to flow into any reservoir or watercourse nor on or beneath the surface of the ground on the watershed (except into watertight receptacles or watertight pipes connected to a sewage disposal system approved by the State Commissioner of Health) within 50 feet of any reservoir or water course. These restrictions and limiting distances shall not apply to sewage treatment works installed in accordance with plans which first have been submitted to and approved by the State Commissioner of Health.
- No herbicide, pesticide or toxic chemical shall be discharged, applied, or allowed to enter into any reservoir or watercourse, unless a permit to do so has been obtained from the State Commissioner of Health.
- No manure pile shall be maintained or allowed to remain within 50 feet of any reservoir or watercourse.

The intent of these regulations under the Public Health Law is to provide for the health and safety of the residents by protecting the areas immediately adjacent to the water courses. In essence, this establishes a 50 foot buffer around all of the water bodies within the watershed and **selectively** restricts certain activities within this area.

N. Y. S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC): PROTECTION OF WATERS PROGRAM

Based on the Environmental Conservation Law (ECL) Title 5 of Article 15, New York State is committed to protecting its lakes, rivers, streams and ponds. To implement this policy, the New York State Department of Environmental Conservation (NYSDEC) created the Protection of Waters Regulatory Program. Under this program, the disturbance of the bed or banks of a "**protected stream**" or other watercourse is a regulated activity.

Certain waters of the state are classified and protected on the basis of the existing or expected best usage of these waters. The highest classification, "AA" or "A" is assigned to protect waters for uses including drinking and cooking. The next category, "B", is protected for uses including swimming and other contact recreation but not for drinking water. Classification "C(t)" indicates waters protected at a level which will support trout populations, a valuable and sensitive fisheries resource. There are other lower classifications of waters but these streams are not regulated under this portion of the Protection of Waters program.

If a project affects any of the watercourses or waterbodies mapped as "C(t)" or higher, which are collectively referred to as "protected streams" or "protected waters", it is subject to the stream protection restrictions of the Protection of Waters regulations described below. **Nearly all of the streams within the Tomhannock Reservoir Watershed are classified as category "A" waters and are, therefore, protected.** To determine exactly which category a stream or stream segment is in, contact the NYSDEC's Region 4 office at (518) 357-2069.

The Protection of Waters permit program regulates activities that occur in or near protected waters. Generally, regulated activities include any alteration or excavation of the bed or banks of a protected waterway (river, stream, canal) or any excavation or fill in a protected body of water or watercourse. A watercourse is the area of land upon which the flow of water is ordinarily confined due to the contour of the land.

For dam projects, the watercourse includes the area between the mean high water lines on the banks of a body of water and the bed of a body of water. For projects involving disturbance of the bed or banks, the bank of a stream is considered to be the area immediately adjacent to the bed of the watercourse, not to extend more than 50 feet horizontally from the mean water line.

According to the NYSDEC, the **activities that require a permit** include:

1. Disturbance of a stream bed or banks, or removal of gravel or other material from the stream bed or protected watercourse.
2. Construction or reconstruction of a dam or artificial obstruction (temporary or permanent) in or across a natural stream or watercourse that has a watershed of greater than one square mile; or a) exceeds ten feet in height from the original grade to the top of the dam; or b) impounds one million gallons of water or more (approximately 3 acre-feet).
3. Excavation or placement of fill in navigable waters of the state including adjacent marshes and wetlands.
4. Conducting any activity including, but not limited to, the construction or operation of facilities which may result in any discharge or runoff into navigable waters.

If activities which are regulated under the Protection of Waters program are begun before a permit is obtained, the person undertaking these activities and any contractors working for that person may be subject to enforcement action by the NYSDEC. Such an action may include:

1. Civil court action, criminal court action, or both;
2. Fines; or
3. An order to remove structures or materials or perform other remedial action, or both a fine and an order.

Certain activities are **exempt from regulation and do not require a permit**. The most common of these are listed below.

1. Disturbance of a protected stream conducted by local public corporations which enter into written agreements with the DEC and which are in compliance with appropriate regulations;
2. Agricultural activities involving the crossing and re-crossing of a stream by livestock or farm equipment or the withdrawal of irrigation waters **that does not alter the stream bed or banks**;
3. Construction of a dam or structure used for impounding water that has a watershed of less than one square mile, provided that: a) it is less than ten feet in height above the bed of the stream at any point; and b) it impounds less than one million gallons of water; and c) it is not in the bed of a protected stream or wetland.
4. Construction of a farm pond on farm land: a) which is not in a natural stream or watercourse, and has an earthen embankment which does not exceed fifteen feet from the top height of its embankment to the lowest point of excavation; or b) which does not impound more than one and one-half million gallons and has an area of 200 acres or less draining into the pond; or c) which is less than 10 acres in surface area when full and does not use water diverted by an artificial obstruction in or across a natural stream or watercourse.

Applications for a permit are available from the NYSDEC's Region 4 office. It is recommended that the NYSDEC be contacted early in the planning process for any development that might impact a protected stream.

**TOMHANNOCK COOPERATIVE FISHING AREA:
OPERATED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION IN
COOPERATION WITH THE DEPARTMENT OF PUBLIC UTILITIES OF THE CITY OF TROY UNDER
THE PROVISIONS OF THE FISH AND WILDLIFE MANAGEMENT ACT.**

Under this cooperative arrangement, access to the Tomhannock Reservoir for the purposes of fishing is regulated. Revocable permits to fish the Tomhannock Reservoir are issued by the Department of Public Utilities of the City of Troy. Specific prohibitions which apply to this cooperative area include:

- No person shall fish or trespass outside areas posted with "restricted area" signs unless they are fishing under permit or are accompanying someone who is fishing under permit.
- No person shall hunt, trap, litter, build fires, wade, swim, bathe, picnic, operate a boat or snowmobile, erect any hut or tent, damage or molest fences, gates, equipment, trees, or other property, or disturb persons who

may be working on the cooperator's lands.

- No person shall discharge, apply, or allow any herbicide, pesticide, or toxic chemical to enter into any reservoir or watercourse in the area.
- No person shall possess or use on the ice of the reservoir any power auger, other machines or mechanical devices, nor possess gasoline or other fuel.

A complete listing of prohibitions affecting the Tomhannock Cooperative Fishing Area, and a map of the area boundaries is available from the DEC Region 4 office or from the City of Troy Department of Public Utilities.

LOCAL LAND USE REGULATIONS WITHIN WATERSHED

One of the primary means of protecting water bodies from contamination is through the control of nonpoint source pollution. A common type of nonpoint source pollution resulting from new development is silt/sediment deposits carried from cleared development sites by stormwater runoff. This type of contamination may be a concern for the Tomhannock Reservoir in the future since a large percentage of the land in the watershed is either vacant or in agricultural use and could be subdivided and developed. Following is an assessment of the level of protection, in the form of existing regulations and requirements regarding soil erosion, sedimentation, and stormwater runoff, that each community within the Tomhannock Reservoir Watershed enforces when new development occurs. The regulation of development activities at the local level, and in particular the regulation of soil erosion, sedimentation and stormwater runoff, is typically done through the use of zoning ordinances, subdivision laws, site plan review ordinances and other specific laws such as soil disturbance and stormwater management ordinances.

The Town of Brunswick

The Town of Brunswick has an adopted zoning ordinance which includes a requirement for a special permit for certain uses. However, there is no reference or requirements in the standards for special use permits or in any other part of the ordinance that pertain to erosion, sedimentation, or stormwater runoff from new development.

The town has also adopted a separate site plan review act. The requirements of this act, however, do not apply to single family dwellings. When the planning board reviews site plans it considers, among other things:

- adequacy of stormwater and drainage facilities;
- maximum retention of existing vegetation;
- special attention to the adequacy of structures, roadways, and landscaping in areas with susceptibility to ponding, flooding and and/or erosion.

The town has also adopted subdivision regulations. Included in the regulations are design standards for the preservation of natural features such as:

- restrictions on the removal of topsoil;
- preservation to the fullest extent possible of existing trees and shrubbery;

- preservation of the boundaries and alignment of watercourses.

The town also requires drainage improvements which include the submission of a storm drainage plan.

The Town of Grafton

The Town of Grafton does not have an adopted zoning ordinance. The town has adopted a site plan review ordinance, however, the ordinance does not apply to one and two family dwellings. When the planning board reviews site plans it considers, among other things:

- adequacy of stormwater and drainage facilities;
- maximum retention of existing vegetation;
- special attention to the adequacy of structures, roadways, and landscaping in areas with susceptibility to ponding, flooding and and/or erosion.

The town has also adopted subdivision regulations. The only reference to erosion control or stormwater

included in the regulations is one paragraph on general design standards for grading and drainage. This section basically states that the relation to topography should be considered and that drainage should be adequate and should consider drainage above and below the tract.

The Town of Hoosick

The Town of Hoosick does not have an adopted zoning ordinance or site plan review regulations.

The town has adopted subdivision regulations. A requirement included in the mandatory sketch plan review states that “If the site falls into areas on the soils map denoted as having “severe” or “very severe” limitations, within flood hazard areas, or areas of steep slope, or areas of unique hydrologic or natural habitat areas (including wetlands), the planning board may require the applicant to consult with appropriate technical review or assistance agencies ... to determine appropriate measures to mitigate or eliminate any problems or conflicts.” The planning board may require that development avoid these critical areas.

Also included in the regulations are general improvements and design standards such as “Soil Preservation and Final Grading” requirements to:

- minimize grading;
- retain natural contours;
- limit stormwater runoff;
- limit removal of the natural vegetative cover and soil;
- restore topsoil and seed disturbed areas.

“Drainage Improvements” that consider elements such as:

- removal of spring and surface water;
- accommodation of upstream drainage areas;
- effect on downstream drainage areas;
- wetlands;

- flood plain areas.

The Town of Pittstown

The Town of Pittstown has an adopted zoning ordinance which includes a “Stream and Water Body Restriction” under the supplemental regulations which states that “No development shall be permitted within 100 feet of any stream or water body.”

The zoning regulations also include a section requiring special permits for selected uses. These uses do not include single family residential dwellings nor two family residential dwellings, commercial or industrial uses in the Hamlet District. General review standards for special permits includes requirements such as:

- lot coverage of all improvements shall not exceed 40%;
- proposed uses and its sanitary and water facilities are compatible with geologic and soil conditions;
- proposed use will not generate any adverse environmental impact ... such as emission of pollutants which may contaminate the air or water.

The town has also adopted subdivision regulations which include general development standards and requirements for the preservation of natural features such as:

- stabilization and seeding of disturbed topsoil and limits on topsoil removal;
- maximum conservation of existing trees and shrubbery;
- preservation of boundaries or alignment of watercourses;

The ordinance also requires the submission of a drainage plan for major subdivisions and drainage improvements which include elements such as:

- adequate storm drainage systems designed by the subdivider’s engineer;
- removal of spring and surface water;
- drainage facilities to accommodate a 20-year storm;
- responsibility for drainage downstream.

The Town of Schaghticoke

The Town of Schaghticoke has an adopted zoning ordinance. Included in the ordinance are several supplemental regulations relating to water quality protection. In particular, sections on:

- “Excavation as Part of Site Preparation” which requires the restoration of crop cover to exposed areas by the following growing season;
- “Development Near Streams and Wetlands” which requires a special permit for development within 100 feet of a stream or wetland;
- “Development with the Flood Fringe Overlay District” which also requires a special permit ;
- “Timber Harvesting” which includes detailed requirements for logging within the town.

The towns special permit requirements, however, do not directly address or require direct mitigation of erosion, sedimentation, and stormwater runoff.

The town's zoning ordinance also has a section requiring site plan review for selected uses. These uses do not include one and two family dwellings. Those uses requiring site plan review must consider such elements as:

- adequacy of stormwater and drainage facilities;
- maximum retention of existing vegetation;
- special attention to the adequacy of structures, roadways, and landscaping in areas with susceptibility to ponding, flooding and/or erosion, both during and after construction.

The town's zoning ordinance also includes provisions for cluster development.

The Town of Schaghticoke has also adopted subdivision regulations. There is no reference to erosion and sediment control included in these regulations. The only reference to stormwater management is in the subsection called "Responsibility resulting from drainage downstream" under the "Reservations and easements" section. This subsection states, in part, that... "The subdivider shall study and report on the effect ... on the existing downstream drainage facilities outside the area of the subdivision".

AGRICULTURAL BEST MANAGEMENT PRACTICES

As noted in the discussion of existing land uses, one third of the land in the watershed is devoted to agricultural related activities. The Tomhannock Reservoir has problems that are not uncommon to reservoirs in similar agricultural settings. Increased sediment and nutrient loading from agricultural runoff leads directly to increased weed and algae growth and increased water treatment costs. Two important characteristics of cropland soils affecting sediment and phosphorous loadings are slope and runoff potential. Over 90% of the cropland soils have slopes of greater than 8% in the watershed indicating moderately high runoff potential.

In response to the concerns associated with agricultural activities in the watershed, the Rensselaer County Soil & Water Conservation District created an agricultural subcommittee to its Watershed Steering Committee in 1989. In 1991 a Watershed Plan designed to "improve the water quality of the Tomhannock Reservoir and protect the soil resource base of the watershed for sustained productivity" was prepared and adopted. The Plan was prepared under the authority of the Watershed Protection and Flood Prevention Act, (Public Law 566, as amended). The sponsoring local organizations responsible for the plan development were Rensselaer County and the Rensselaer County Soil & Water Conservation District with assistance from the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS).

The Agricultural subcommittee recommended several practices for inclusion in the plan to control sediment and reduce phosphorous loadings to the reservoir. These include:

- strip cropping;
- no till;
- reduced tillage;
- cover cropping;

- rotational grazing;
- conversion to long term hay;
- diversion;
- critical area seeding;
- streambank protection;
- agricultural waste systems to deal with barnyard runoff, milk house wastes, manure storage, and manure utilization.

The plan calls for erosion control on approximately 4000 acres of cropland, 700 acres of forest, 100 acres of pasture, 10 miles of farm access roads, 10 miles of streambanks, and .25 acres of road bank. It also calls for animal waste management systems to be installed on 11 dairy and 16 nondairy livestock operations.

Based on 1990 dollars, the total estimated cost to undertake the land treatments was \$1.6 million, of which \$880,000 represents federal assistance utilizing PL-566 funds. The Rensselaer County Soil & Water Conservation District was assigned the responsibility to encourage participation and review applications for assistance. In addition to protecting the water quality of the reservoir, the plan would maintain cropland productivity and lower costs of farming operations. The goal of the program is to reduce the annual sediment and phosphorous load to the reservoir by 40%.

Since receiving plan approval in 1991, 48 contracts have been prepared and approved totaling approximately \$454,000 in committed PL-566 funds. Though no funds were authorized in 1994 and 1995, \$100,000 in additional monies is expected to be available in 1996.

Additional support grants for water quality protection and agricultural BMP's have also been applied for through the District and County Water Quality Committee. Several of these grants have been received, including a road bank seeding project and a "Know Your Watershed" sign display project. The Rensselaer County Soil & Water Conservation District along with the NRCS and the Rensselaer Institute of Limnology will continue to actively pursue support grants to implement the Watershed Protection Project.

CHAPTER VII

RECOMMENDATIONS FOR APPROPRIATE WATERSHED PROTECTION STRATEGIES AND TECHNIQUES

SUMMARY OF EXISTING CONDITIONS

As detailed in the preceding pages of this report, there are a number of existing conditions, characteristics and regulatory practices that directly impact the nature of the Tomhannock Reservoir watershed and the quality of water found within the streams and lakes of this region. These are summarized below.

ENVIRONMENTAL AND SOIL CONDITIONS

The area located within the Tomhannock Reservoir watershed is endowed with an abundance of soils that have numerous limitations and hazards relating to their use and development.

- Only 8.3% of the watershed is designated as *Prime Farmland*.
- More than 30% of the watershed soils have slopes greater than 15%.
- More than 87% of the watershed soils have *moderate* or *severe* residential building concerns.
- **ALL** of the watershed soils have *severe* septic tank absorption concerns.
- There are numerous locations of NYS regulated wetlands within the watershed.

Furthermore, since the better, more stable land is generally developed first, the remaining land is increasingly more susceptible to erosion and more vulnerable to development activities that might impact the watershed.

EXISTING LAND USE ACTIVITIES

The Tomhannock Reservoir watershed is primarily devoted to agricultural activities and much of the watershed land currently is classified as "vacant" or may be available for future development.

- Almost 1/3 of the watershed land is used for agricultural purposes.
- Livestock farming accounts for over 13% of total land and more than 40% of agricultural land.

- A number of land parcels identified as involved in livestock farming are located adjacent to streams that flow directly into the Tomhannock Reservoir.
- Residential land use accounts for roughly 12% of the watershed land.
- 37% of watershed land is classified as vacant.
- Commercial, Industrial, Public and Community Services account for only 1.5% of the watershed area.
- Wild, forested, conservation lands and public water supply make up about 9.5% of the watershed area.

Special attention should be devoted to promoting agricultural practices to preserve soil and protect water quality. Given the abundance of vacant land, foresight is crucial to prevent the development of these areas (particularly those on vulnerable soils) from negatively impacting the water quality and general watershed.

EXISTING AGRICULTURAL BEST MANAGEMENT PRACTICES

- A watershed Plan was prepared and adopted for the Tomhannock Reservoir Watershed under Public Law 566, as amended. The Plan recommends a series of Best Management Practices to protect the soil resource base of the watershed.
- Since 1991, 48 contracts have been prepared and approved totaling \$454,000 in committed PL-566 funds to implement the Plan recommendations. A variety of other support grants along with volunteer work have also been utilized.
- The District and NRCS staff work very closely with the agricultural community seeking voluntary compliance to install conservation practices throughout the watershed.

EXISTING LAND USE REGULATIONS

In general, land use regulations have not been extensively used in the watershed communities to protect the water resources and quality of the streams and lakes in this area.

- Of the five municipalities within the watershed, three have enacted a zoning ordinance to provide guidance to future development patterns.
- All of the watershed communities have adopted subdivision regulations, most with general considerations for stormwater runoff and vague erosion considerations.
- The Town of Pittstown is the only watershed community that prohibits development within 100 feet of a stream or water body.

- The Town of Schaghticoke is the only watershed community to directly regulate timber harvesting and to allow residential cluster development.
- None of the watershed communities require the submission of an erosion and sediment control plan.
- Both State Public Health Law and NYS DEC have provisions regulating selected activities within a roughly 50 foot distance of nearly all of the streams within the watershed.
- The Public Health Law and NYS DEC provisions have not always been comprehensively enforced within the region and the watershed communities generally have not reinforced these provisions as part of their zoning ordinances.

RECOMMENDED PROTECTION MEASURES

As documented in the 1991 Watershed Plan, a large percentage of existing land use in the watershed is agricultural. Nonpoint source pollution from these uses is an immediate concern. In addition, a large amount of land within the watershed has the potential to be developed in the future either through the subdivision of existing farm or vacant lands. Given the hazards and limitations posed by poor soils and steep topography, and the severe consequences if the reservoir becomes contaminated, it is imperative that the watershed communities employ foresight to design an appropriate plan for future development that protects their valuable resources. Once the residents have agreed upon the general direction for future development within the community, land use regulations such as zoning, subdivision laws, and site plan review could then be enacted (or amended) to carry out this plan and to protect the reservoir from future development impacts. Both agricultural and development oriented Best Management Practices can be utilized to directly mitigate water quality impacts

AGRICULTURAL BEST MANAGEMENT PRACTICES (BMP's)

As described in Chapter VI, the County Conservation District and the NRCS staffs are aggressively pursuing and have been successful in implementing a variety of best management practices in voluntary cooperation with the agricultural community, to protect the watershed under the PL 566 program and other support grants.

The PL 566 program has proved to be very successful and a continuous funding stream from federal sources is strongly advocated. Communities are also encouraged to seek additional funding sources to supplement the federal program. The County Conservation District should continue to provide technical support, promote, and seek cost-sharing measures to install additional conservation measures as outlined in its Watershed Protection Plan. These BMPs can be applied to agricultural activities as well as to urban development projects. In both applications, these practices serve to protect streams and water bodies and also enhance the productivity and stability of the soil.

ZONING REGULATIONS

As previously described, three of the five communities within the watershed have enacted a zoning ordinance to guide the location and types of future development. A zoning ordinance can be used effectively to control and thus mitigate certain potential nonpoint pollution sources which could contaminate the reservoir. In particular, zoning can be used to limit the density of development by restricting lot size. Lower density development translates to less impervious surface which in turn means less stormwater runoff to carry pollutants, erode soils, and increase downstream flooding. In addition, larger lot sizes, especially in areas with poor soils, decrease the probability of well contamination from on-site septic systems. Therefore, each watershed community should be conscious of the underlying soil characteristics and constraints within their community and base their allowed zoning density accordingly.

Zoning is also used to restrict the location of different land uses. This becomes increasingly important when certain uses such as gasoline/auto repair stations, landfills, chemical plants, and others have the potential to release toxic substances that could infiltrate ground water and/or be washed into surface water bodies. Therefore, communities should be aware of the land uses with the potential for contamination and, once identified, these uses should be restricted from aquifer recharge areas and stream corridors and special precautions should be taken for the storage and disposal of their potential contaminants.

SITE PLAN REVIEW

Many communities also adopt site plan review procedures which may be included in their zoning ordinances or adopted as a separate law. Site plan review, in regards to water quality protection, is useful for controlling the location of the structure on the lot so as to avoid sensitive environmental features such as wetlands, flood plains, steep slopes, poor soils, aquifer recharge areas, and stream corridors and to limit the amount of natural vegetation removal. Site plan review can also be the forum for community planning boards to require and review erosion and sediment control and stormwater management plans.

SUBDIVISION LAWS

Subdivision laws are also very useful for mitigating potential water quality impacts. The subdivision of land is the process whereby the structure of a community is established; road layout and design, sewer and water line extensions, and lot layouts are approved. In addition, subdivision approval is typically the first time that development is reviewed by the planning board for potential environmental impacts (unless development is on an existing site).

All of the communities within the watershed have enacted subdivision regulations. Therefore, as a general recommendation for controlling nonpoint source pollution from new development, ***those communities that do not currently require the submission of an erosion and sedimentation and/or storm water management plan should consider amending their subdivision regulations to require such plans when it is determined that erosion, sedimentation and/or stormwater runoff from the proposed development will have a significant effect on the environment.***

For the communities within the watershed that have also adopted zoning with site plan review, it is recommended that , for commercial and industrial projects (which may not require separate subdivision approval), **a special section be included under site plan review that requires the submission of erosion and sedimentation and storm water management plans.**

EROSION, SEDIMENT CONTROL AND STORMWATER MANAGEMENT PLANS

Erosion and sedimentation resulting from stormwater runoff are common nonpoint source pollution concerns regarding new construction. One of the most effective ways in which the Tomhannock Reservoir can be protected from nonpoint source pollution created by future development is to require developers to prepare and implement storm water management and erosion and sediment control plans. Typically, these plans include a series of Best Management Practices (BMP's) which are designed by the developer's engineer, based on the characteristics of the site and the proposed development. The planning board, as part of the development application process, reviews the BMP's to ensure that the community's objectives for nonpoint source pollution and storm water management have been satisfied.

In order for municipalities to require storm water management and erosion and sediment control plans, the appropriate local laws must be adopted. Also, the adoption or amendment procedure must follow the requirements prescribed in the appropriate state laws. In addition, community development review personnel must understand and be able to enforce and monitor these regulations in order for them to be effective.

As with the adoption of any land use regulations, a thorough "thought process" followed by the establishment of specific objectives should transpire prior to the law's amendment (or adoption). This should take place during the comprehensive planning process. However, absent a comprehensive plan, the community should, at minimum, include an additional statement of objectives with the appropriate ordinance. To use examples from the NYS DEC, the objectives of a storm water management and erosion and sediment control plan may include:

- reduce the erosion potential from a development or construction project so as to prevent deposition of sediment into streams and other receiving water bodies;
- decrease nonpoint source pollution and water quality degradation;
- maintain the integrity of stream hydrology by preventing stream channel erosion so as to sustain the hydrologic functions of stream;
- prevent increases in the volume and flow of storm water runoff associated with new development so as to prevent an increase in the hazards and costs associated with flooding;
- prevent decreases in groundwater recharge and stream base flows so as to maintain aquatic life, assimilative capacity, and potential water supplies;
- secure, to the extent practical, multiple community benefits such as open space protection, increased recreational opportunity, and enhanced landscaping from storm water management facilities.

Each community that decides to amend its existing regulations or adopt new regulations should also establish minimum applicability criteria for project reviews. At a minimum, it is

recommended that **erosion control and storm water management plans should be prepared and reviewed for all land development projects when it is determined that erosion and/or storm water runoff will have a significant effect on the environment, such as:**

- land clearing, land grading or earth moving projects involving:
 - site preparation within 100 feet of a wetland;
 - site preparation on slopes which exceed 1 ½ ft. of vertical rise to 10 ft. of horizontal distance (15%);
 - site preparation within 100 feet of any water course;
 - site preparation within the 100-year flood plain of any water course delineated on the U. S. Department of Housing and Urban Development Flood Hazard Maps;
 - excavating or filling which exceeds a total of 100 cu. yds. of material within any parcel or contiguous parcels.
- residential development consisting of five or more dwelling units, unless each dwelling unit is on a lot of two or more acres, and residential development consisting of less than five dwelling units where the imperviousness of the site after construction will be greater than 30 percent;
- industrial and/or commercial development projects which result in an impervious surface 10,000 ft. or greater;
- all highway, road, and street construction.

Ideally, these minimum applicability thresholds should be adopted by all the communities in the watershed study area. More specific and detailed requirements may vary according to each community's specific goals, the location and severity of environmental constraints and the degree that development pressure is taking place.

The Town of Greenfield, located in Saratoga County, has requirements contained within their subdivision regulations that could serve as a model example of erosion and sediment control and stormwater management requirements. These requirements include:

Drainage improvements such as:

- provisions for the removal of spring and surface water;
- drainage structures to accommodate potential runoff;
- responsibility for drainage downstream;

Erosion control measures such as:

- minimal alteration of the natural terrain;
- utilizing filter fabric, siltation fences, hay bale barriers, terracing, rip-rap, mulching and vegetative strips and other measures during construction to protect exposed surfaces;
- protection of natural watercourses and their flood plains from encroachment;
- incremental clearing and development to limit the amount of exposed surface and the coordination and placement of erosion control measures prior to each increment of the construction process;
- installation and maintenance of sediment basins throughout the development process;

- preservation of existing trees to the maximum extent practical;
- limitation of the removal of vegetation and trees within flood zones, wetlands and 15 feet of stream banks;
- required planting of trees and vegetation in certain circumstances;
- no paving with impervious materials allowed within the tree crown (drip line) of trees to be preserved;
- prohibition of soil and other stockpiled materials in location that would suffocate tree root systems;
- re-vegetation of disturbed areas as soon as utilities and other site improvements are completed;
- pavement of streets, parking areas, sidewalks and other impervious surfaces must be completed with 30 days of final grading and removal of surface vegetation.

The town also requires the submission of a storm water management plan prior to plat approval for major subdivisions. This plan must include:

flood control measures such as:

- controlling storm water runoff from a 2-year, 10-year, and 100-year storm so that predevelopment rates are not exceeded;
- a 100 foot buffer (building restriction line) is required between the 100-year flood zone and any structure;
- provisions for runoff conveyance systems;
- avoidance or minimization of land clearing, grading, or disturbance of riparian vegetation within a stream corridor;

water quality management requirements such as:

- controlling the first ½ inch (first flush) of runoff using, as appropriate, infiltration, retention, and/or extended detention;
- control of thermal discharges.

Communities requiring the submission of an erosion and sediment and/or storm water management plan will need to define:

- the specific contents required in the plan(s);
- the process for reviewing the plan(s);
- specific performance standards to measure and ensure that the objectives of the regulations are being accomplished;
- provisions for the maintenance of the erosion and storm water facilities;
- means of enforcing the requirements of the plan(s).

A model erosion control and storm water management ordinance as well as a more detailed explanation of the preceding requirements can be found in ***Reducing the Impacts of Stormwater Runoff from New Development***; available from the New York State Department of Environmental Conservation. It is recommended that this document be consulted prior to the amendment of existing land use regulations or the adoption of a separate erosion and sedimentation and storm water management ordinance. In order to ensure the proper content and

procedural requirements are met, it is also recommended that the services of the community attorney be utilized for any amendment or adoption of local laws.

Local communities should also be aware that the Rensselaer County Soil and Water Conservation District is available to review projects for the impacts from erosion, sedimentation, and storm water runoff if the community requests such service. Also, digital GIS files of the critical environmental features within the watershed area are available from the Capital District Regional Planning Commission, the Rensselaer County Office of Economic Development and Planning or the Rensselaer County Soil and Water Conservation District. These files could be used by those communities with electronic media capabilities (or for others, a hard copy map could be printed) to develop a special “environmental constraints” overlay district to be used for development application reviews. This overlay district could be incorporated into each community’s zoning ordinance and used as criteria for additional project review standards.

TIMBER HARVESTING

Timber resources are harvested in many areas of the Tomhannock Reservoir Watershed. If timber harvesting practices are poorly carried out, they can result in significant environmental damage to the harvested land and to adjacent lands and waters. Therefore, the communities within the watershed that have forested areas that are currently being harvested or have the potential to be harvested, should consider adopting timber harvesting regulations.

Timber harvesting requirements are intended to regulate those harvesting activities most likely to result in environmental damage. These regulations typically require reclamation efforts to control erosion and sediment laden runoff and utilize professional forest management expertise in the preparation and evaluation of timber harvest plans. Timber harvesting regulations typically include permit requirements, standards for harvesting, and an approval procedure.

The Town of Schaghticoke is the only community within the watershed to have adopted timber harvesting regulations. These requirements are included in their zoning ordinance and could be used as a model by the other watershed communities. Additional information relating to this topic may be obtained within the *Town of Schaghticoke Zoning Law, Section V, Regulation K*, or by contacting the Town of Schaghticoke Planning Board.

SPECIFIC COMMUNITY RECOMMENDATIONS

This report concludes with a section on specific recommendations for each of the five communities that make up the Tomhannock Reservoir watershed. It should be noted that a watershed is defined, and works according to its natural processes, without regard for political boundaries. All of the activities that occur within the watershed are interrelated and collectively impact the overall water quality of the streams and lakes that make up the watershed. This interrelated nature should promote coordination and cooperation among neighboring communities since negative impacts upon the watershed effect all of its residents regardless of whether political and municipal boundaries are traversed.

While acknowledging the interrelated characteristics of the watershed process, each community

also has conditions that are specific to its own growth, development patterns and regulatory framework. These specific recommendations, therefore, were prepared after evaluating the environmental conditions, the prevalent land use activities, and existing land use regulations within each community. The intent of these recommendations is to offer each community some options in their effort to better protect their water resources.

THE TOWN OF BRUNSWICK

The land use evaluation concluded that the watershed portion of the Town of Brunswick encompasses a great deal of vacant land. In addition to vacant land, Brunswick also has a fair portion of land devoted to agricultural activities with some livestock farming occurring in parcels adjacent to streams that feed directly into the reservoir. Residential activity has also occurred at the head waters of the Tomhannock Creek.

Brunswick has an approved Comprehensive Plan and has enacted zoning, subdivision regulations and site plan review procedures. The Town has recently appointed a committee to update the comprehensive plan. Given these conditions, the following recommendations are offered:

- Consider, as part of the zoning ordinance, establishing an overlay protection zone along the watershed stream corridors to reinforce existing State Public Health Laws and NYS DEC regulations.
- Reinforce existing zoning and site plan review procedures with detailed requirements for mitigating the effects of soil erosion, sedimentation, and stormwater runoff.
- Evaluate the types of uses allowed near aquifer recharge zones (well heads) and water bodies and consider eliminating or requiring special storage and disposal provisions for land uses with the potential to contaminate these water resources.
- Consider amending existing subdivision regulations to require the submission of erosion, sediment control and stormwater management plans for developments likely to have a significant effect on the environment (see “EROSION, SEDIMENTATION AND STORMWATER MANAGEMENT” above for a listing of such developments). As part of this requirement, the town should establish minimum applicability criteria, content requirements, a process for review, performance standards, design standards, maintenance provisions, and methods of enforcement.
- Actively support and promote the implementation of appropriate BMPs to prevent soil and erosion degradation in developed and developing areas.
- Actively support and promote the implementation of appropriate agricultural BMPs to protect the streams and general water quality of the watershed.
- Consider adopting a Timber Harvesting Law to control erosion and sediment laden

runoff and other related environmental damage from timber harvesting activities, and to utilize professional forest management practices in the evaluation of timber harvest plans. These regulations should include permit requirements, standards for harvesting, and an approval procedure.

THE TOWN OF GRAFTON

The Town of Grafton land located within the watershed is mostly devoted to residential development with a significant portion of land still vacant. The town also contains some wild, forested and conservation lands.

The Town of Grafton does have a written Comprehensive/Master Plan, subdivision regulations, and site plan review procedures but has not enacted zoning regulations to date. Given these conditions, the following recommendations are offered:

- Evaluate the need for appropriate zoning regulations to effectively guide the location and types of future development as envisioned in the Town's long-range development plan.
- In the absence of zoning, evaluate the need for local laws establishing an overlay protection zone along the watershed stream corridors to reinforce existing State Public Health Laws and NYS DEC regulations.
- Evaluate the incorporation of appropriate soil and erosion control measures into site plan review procedures to protect the watershed from increased commercial development and from mining operations.
- Consider amending existing subdivision regulations to require the submission of erosion, sediment control and stormwater management plans for developments likely to have a significant effect on the environment (see “EROSION, SEDIMENTATION AND STORMWATER MANAGEMENT” above for a listing of such developments). As part of this requirement, the town should establish minimum applicability criteria, content requirements, a process for review, performance standards, design standards, maintenance provisions, and methods of enforcement.
- Actively support and promote the voluntary implementation of agricultural BMPs to protect areas devoted to agricultural activities.

An additional issue was raised by local officials regarding the impact that logging and timber harvesting activities may have upon the watershed. It was observed that during certain times of the year, logging and timber harvesting activities have a significant impact on levels of soil erosion. Therefore:

- Consider adopting a Timber Harvesting Law to control erosion and sediment laden runoff and other related environmental damage from timber harvesting activities, and to utilize professional forest management practices in the evaluation of timber harvest

plans. These regulations should include permit requirements, standards for harvesting, and an approval procedure.

THE TOWN OF HOOSICK

The watershed land located within the Town of Hoosick is primarily devoted to agricultural activities. In fact, much of this agricultural land, including portions devoted to livestock farming, are located adjacent to the head waters of various tributaries of the Sunkauissia Creek that flows into the Tomhannock Reservoir. There are also significant amounts of land currently vacant or classified as wild, forested, and conservation lands.

The Town of Hoosick does have a written Comprehensive/Master Plan and subdivision regulations but has not enacted zoning regulations or site plan review procedures. Much time was spent preparing a draft zoning law, but that was never enacted. Given these conditions, the following recommendations are offered:

- Evaluate the need for appropriate zoning regulations to effectively guide the location and types of future development as envisioned in the Town's long-range development plan.
- In the absence of zoning, reevaluate measures advocated in the draft zoning law for incorporation into local law to specifically protect the watershed streams.
- Evaluate the need for local laws establishing an overlay protection zone along the watershed stream corridors to reinforce existing State Public Health Laws and NYS DEC regulations.
- Evaluate the need to enact site plan review procedures for greater oversight of activities that, without proper placement and consideration, could negatively impact the watershed.
- Actively support and promote the voluntary implementation of agricultural BMPs to protect areas devoted to agricultural activities.
- Consider amending existing subdivision regulations to require the submission of erosion, sediment control and stormwater management plans for developments likely to have a significant effect on the environment (see “EROSION, SEDIMENTATION AND STORMWATER MANAGEMENT” above for a listing of such developments). As part of this requirement, the town should establish minimum applicability criteria, content requirements, a process for review, performance standards, design standards, maintenance provisions, and methods of enforcement.
- Consider adopting a Timber Harvesting Law to control erosion and sediment laden runoff and other related environmental damage from timber harvesting

activities, and to utilize professional forest management practices in the evaluation of timber harvest plans. These regulations should include permit requirements, standards for harvesting, and an approval procedure.

THE TOWN OF PITTSTOWN

The Town of Pittstown constitutes the vast majority of land located within the Tomhannock Reservoir watershed including the reservoir itself. This land is currently devoted to the range of land use activities although much of it is involved in agricultural activities. Many of the watershed parcels in Pittstown identified as involved in livestock farming are located adjacent to the watershed streams that flow directly into the reservoir. A significant portion of watershed land in Pittstown is vacant and some has been developed for residential uses, commercial and industrial uses. Due to its composition of much of the watershed, the land use activities that occur in Pittstown have the potential for direct impact upon the quality of the watershed streams and the reservoir.

The Town of Pittstown has enacted zoning and subdivision regulations. Pittstown has no site plan review process and is currently developing a Comprehensive Plan. Given Pittstown's obvious and direct impact upon the waters of the Tomhannock Reservoir and the reservoir itself, the following recommendations are offered:

- Evaluate the future development potential of currently vacant land and lands now devoted to agricultural activities. Work to develop a long-range Comprehensive plan that balances future development with resource protection.
- Evaluate the need to enact site plan review procedures for greater oversight of activities that, without proper placement and consideration, could negatively impact the watershed.
- Evaluate the incorporation of appropriate soil and erosion control measures into zoning regulations and potential site plan review procedures to protect the watershed from increased residential and commercial development.
- Actively support and promote the voluntary implementation of agricultural BMPs to protect areas devoted to agricultural activities.
- Consider amending existing subdivision regulations to require the submission of erosion, sediment control and stormwater management plans for developments likely to have a significant effect on the environment (see “EROSION, SEDIMENTATION AND STORMWATER MANAGEMENT” above for a listing of such developments). As part of this requirement, the town should establish minimum applicability criteria, content requirements, a process for review, performance standards, design standards, maintenance provisions, and methods of enforcement.

- Consider adopting a Timber Harvesting Law to control erosion and sediment laden runoff and other related environmental damage from timber harvesting activities, and to utilize professional forest management practices in the evaluation of timber harvest plans. These regulations should include permit requirements, standards for harvesting, and an approval procedure.

THE TOWN OF SCHAGHTICOKE

The amount of watershed land that is located within the Town of Schaghticoke is quite small. This area is comprised of land devoted to agricultural activities and a small portion that includes a stable residential subdivision.

The Town of Schaghticoke does not have a written Comprehensive/Master Plan but has enacted zoning and subdivision regulations and site plan review procedures. Although the amount of watershed within Schaghticoke is small, the Town has enacted land use regulations to protect the watersheds that fall within the town including a 100 foot development buffer subject to special use permit review. Given these conditions, the Town of Schaghticoke might offer its experience in these issues relating to stream and watershed protection to the other watershed communities. The following recommendations specific to Schaghticoke are offered:

- Evaluate the future development potential of currently vacant land and lands now devoted to agricultural activities. Work to develop a long-range plan that balances future development with resource protection.
- Consider incorporation of appropriate and detailed soil and erosion control and stormwater management measures into subdivision regulations, special permit, and site plan review procedures to protect watershed from increased residential and commercial development.
- Actively support and promote the voluntary implementation of agricultural BMPs to protect areas devoted to agricultural activities.

ONE FINAL NOTE

During the extent of this project, it was evident that friction exists between the desires of the Town of Pittstown and the desires of the City of Troy. Clearly, the existence of the reservoir creates a difficult situation whereby one municipality owns and regulates land wholly within another municipality. Even though there is a contractual agreement on the part of the City of Troy to pay taxes to the Town of Pittstown, the town is, nevertheless, highly restricted from actively using a great portion of land that effectively constitutes the center of the town. In fact, when asked during a comprehensive plan committee public meeting to name sites that are near and dear to them, the residents of Pittstown did not readily contribute the Tomhannock Reservoir as one such site. Clearly, the residents of Pittstown do not feel any "ownership" (whether social or environmental) of this precious natural resource.

Furthermore, the development buffer established by selected provisions within the New York

State Public Health Law exists solely due to the fact that the streams within this watershed feed a public water supply source in Troy. This situation has led to numerous disagreements and a general breakdown of coordination between the two municipalities. Obviously, this relationship has deep roots (dating back nearly 100 years to the original condemnation of prime farmland to create the reservoir) and will not be easily resolved.

Both the City of Troy and the communities located within the Tomhannock Watershed are stakeholders in preserving the water quality of the reservoir. It is imperative that the adversarial relationship that presently exists between the two parties be addressed. It is recommended that the City of Troy take a more proactive role in working with the watershed communities. For example, the city could consider contributing funds, staff, and/or in-kind work towards the protection of the reservoir. As a first step toward improving this adversarial situation, it is recommended that the City of Troy evaluate the potential for allowing greater recreational activity on and within the reservoir lands to the extent that the safety, health and water quality of the reservoir is not unalterably diminished.

Fishing and ice fishing are currently allowed by permit on Tomhannock Reservoir lands owned by the City of Troy, but all other activities, including the use of passive walking trails, are either outright prohibited or seriously discouraged. The recommendation, therefore, is to evaluate whether additional passive uses of the reservoir and its lands could be allowed without endangering the water supply source. Such additional uses might include the use of strictly non-motorized boats upon selected areas of the lake for recreational and fishing purposes and the use of existing trails around the lake by pedestrians for their outdoor enjoyment.

The City of Troy has expressed valid concerns regarding this increased use of the reservoir for recreational purposes including the potential for increased litter and the possible introduction of zebra mussels into the lake by small non-motorized watercraft. Since the concept of recreational activities combined with water supply sources is not a new idea and, in fact, is advocated in many areas throughout the nation, there is confidence that these, and other concerns and details, can be worked out to a mutual agreement among the parties involved.

This apparent lack of communication and cooperation does nothing to improve the protection of the watershed and will require serious effort to resolve. The offering of "ownership" of this resource to the Town of Pittstown, at least in the sense of increased recreational opportunities, may provide one step towards greater cooperation between these municipalities leading to the institution of management practices that will further protect this valuable resource.

APPENDIX A

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