

Lake Sunnyside Watershed Assessment



Prepared by the
Warren County Soil and Water Conservation District

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Introduction

Lake Sunnyside is a small lake in Warren County (approximately 35 surface acres), located in the Town of Queensbury (see Appendices 1 & 2). The Lake Sunnyside Association has recognized a need to understand the current condition of the Lake and surrounding watershed, so that they might be better equipped to protect and improve it for the future. A component of this effort was to complete an assessment of potential and existing nonpoint sources of pollution and nutrients into Lake Sunnyside, in order to find practical means to minimize these inputs. Nonpoint source pollution is defined as any pollutant which enters a waterbody that does not come directly out of a point source, such as a pipe. Examples of nonpoint source pollution include runoff from fertilized lawns, failing septic systems, agricultural runoff, and runoff from roads and other asphalt surfaces which may have gas and oil on them. The Warren County Soil and Water Conservation District in conjunction with the Lake Sunnyside Association has conducted a watershed wide assessment of potential and existing sources of these pollutants entering Lake Sunnyside, and has undertaken an effort to educate the lakeside residents about failing septic systems, lake management, and other water quality related issues.

This assessment is a part of a larger project which is intended to raise the awareness of water quality issues on Lake Sunnyside, and to determine the existing condition of the lake. This project was funded through a grant from the NYS Soil and Water Conservation Committee. Other components of this overall effort include an aquatic plant survey conducted by the Darrin Freshwater Institute (a separate document available through the Lake Sunnyside Association), an ongoing water sampling program being undertaken by the Lake Sunnyside Association, a lake cleanup day, and a septic system education program conducted by the Warren County Soil and Water Conservation District. These efforts are intended to give the Lake Association and the Town of Queensbury a better view into the condition of the lake, and to provide insight into issues that may be negatively impacting Lake Sunnyside.

The following report is a brief review of the findings related to an assessment of the land use conditions within the watershed, and it includes specific recommendations for improvement projects and educational efforts which could be undertaken to protect and improve the lake.

Hydrology and Lake Characteristics

Lake Sunnyside is a kettle pond resulting from glacial times, with no perennial inlet or outlet. At the southeastern end of the lake, there is purported to be a "groundwater flow" in which the lake water outflow is subsurface in nature. This characteristic would be supported by the hydraulic gradient of the surrounding topography, which slopes from the northwest to the southeast. This theory is also supported by data collected in the 1960's by the USDA Soil Conservation Service in a study on the best means to seal this groundwater outlet with a clay trench, as the lake level was declining at an alarming rate. Due to cost constraints, this project was never undertaken.

The water in the lake is classified as DEC class "B", which is suitable for contact recreation and fishing. Over the past few decades, numerous residences and camps have been built along the shoreline, and the water quality on this lake has somewhat declined. The lake would currently be classified as being in a mesotrophic state, meaning that is neither overburdened with algae nor is it crystal clear. As a kettle lake, it does not have the recharge of fresh water that most lakes would have, and may therefore accumulate nutrients and other pollutants over time at a somewhat accelerated rate. This creates an obvious concern, in that any pollutants entering this small lake will likely be present for a long time.

The Darrin Freshwater Institute has recently (September 1999) completed a comprehensive study of the aquatic plant community in Lake Sunnyside, and they have found the presence of two non-native species of plant that are considered "nuisance" species. Of primary concern is the presence of Eurasian Watermilfoil, which may establish dense beds that could cause difficulty with recreational opportunities. At the present time, the Milfoil problem in Lake Sunnyside is not too severe, and the Institute report outlines various techniques for managing this plant. For more detail on the aquatic plant issues on Lake Sunnyside, a copy of this report can be obtained from the Warren County Soil and Water Conservation District or the Lake Sunnyside Association.

Soils in the Watershed

The Lake Sunnyside watershed has three different soil types: Oakville, Hinckley and Plainfield (see Appendix 3). All of these three soil types are either well drained or excessively drained (very sandy). These types of soils present difficulties with location and functioning of septic systems due to the poor filtering capacity of the soil. This is primarily due to the short contact time that septic effluent has with the soil, due to the rapid flow through the sandy material. A more detailed description of the soils within the watershed is as follows:

Hinckley – 8- 15 percent Slopes, 42% of Lake Sunnyside watershed soils- This is a sloping, excessively drained soil. The rate of water movement in the soil (permeability) is rapid in the surface layer of the soil, and very rapid in the substratum. The surface runoff is medium, and capacity to store water for plant growth is very low. Although this soil is suited for most types of urban development, if the soil is used for sanitary waste disposal systems, such as septic system absorption fields, ground water contamination is a hazard because of poor filtering of effluent. Septic systems on shoreline property are often close to surface and ground water. The direction of groundwater flow near the shoreline is towards the lake, and in very permeable soils partially treated effluent is likely to enter adjacent lakes.

Plainfield- 8-15 percent slopes; 11% of Watershed soils. A sloping, excessively drained soil type with slow to medium surface runoff. Permeability is moderately rapid in the surface layer and rapid in the subsoil. The slope and sandy texture of the soil are its main limitations when used for development, primarily it is a concern for use as septic tank absorption fields, as ground water contamination is a hazard because of permeability in the subsoil.

Oakville- 8-15 percent slopes; makes up 47% of Watershed soils. This is a sloping, well drained soil. Permeability of this soil is very rapid, with slow to medium surface runoff. The soil does not hold water well, and is not very well suited for use as septic tank absorption fields. The result is poor filtering of effluent, which could cause ground water contamination, leading to contamination of the lake.

The sandy nature of the soils within the watershed and on the shoreline presents a concern for Lake Sunnyside for two reasons. First, the rapid infiltration of septic effluent may minimize the soils ability to remove nutrients such as phosphorus and nitrogen, and other pollutants such as fecal coliform bacteria. The second concern is one of perception. The public's general perception of a failing septic system is one which fails to the ground surface and ponding of septage can be seen. If this is not observed, the perception is often that the system is working properly. However, this may not be the case. The other type of failure is one in which the effluent reaches the ground water before it is properly treated. This type of failure cannot be seen visually, but must be detected through water sample analysis. If this type of failure is occurring, there is concern for private water well contamination and lake water contamination.

Currently, there has been no comprehensive water sampling program to detect these impacts to Lake Sunnyside, and there can be no conclusion drawn to either support or disprove this potential situation.

Land Use in the Watershed

To determine the land uses within the watershed, a geographic information system (GIS) was employed to develop a coverage related to these various uses (see Appendix 4). Once the watershed was delineated on a USGS 7.5 minute topographic map, 1995 digital aerial photography was used to determine the land uses within the watershed. When these categories were developed on the GIS, they were then confirmed with field reconnaissance to check accuracy. Land use information is very important when characterizing the watershed and determining potential impacts to water quality.

The strong majority of the Lake Sunnyside watershed is generally residential, however there are five different types of land uses within the watershed. The total acreage for the land area of Lake Sunnyside's watershed is 98 acres. The following is a breakdown of the land uses within the Lake Sunnyside watershed:

Light/Moderate Residential: This category accounts for 47 acres within the watershed.

(48% of watershed area).

Dense Residential: There are 31 acres of dense residential area within the watershed. (32% of watershed area).

Forest: There are 17 acres of forest in the watershed. (17% of watershed area).

Roadways: There are 1.5 acres of roadway in the watershed. (1.5% of the watershed area).

Cemetery: The cemetery on Sunnyside Road is 1.5 acres. (1.5% of the watershed area).

As can be seen above, residential development accounts for approximately 80% of the land area within the watershed. This constitutes a very high percentage of land within the watershed that is managed by private individuals as a primary or secondary residence. There are approximately 40 residences located on the shoreline, and approximately 20 more which are within two hundred feet of the lake. Approximately 17% of the watershed is undeveloped forestland, however it is not located adjacent to the lake and provides no buffering benefit to the lake. Therefore, in essence all of the land area surrounding Lake Sunnyside is residential development. With this high level of development around the lake comes a concern for water quality impacts, which are expanded upon in the next section.

Land Use Considerations on Water Quality

Septic Systems

On-site wastewater treatment systems (septic systems), when properly designed, installed and maintained, have no adverse impacts on water quality or public health. When one of these three criteria fall short, there may be impacts to water quality of a nearby lake. In addition, there may be health concerns related to improperly treated septic effluent, as bacteria may reach the groundwater and may end up in a private or public well. Effluent from a standard septic system flows out of an absorption trench or a seepage pit and into the ground where the soil provides the final treatment and uptake of nutrients and pollutants. If the system is very old or is not properly maintained, it has a good chance of failing and not providing the treatment that it should. This is a concern especially on lakes where lot sizes are small and many of the structures on these lots are older.

As stated previously, Lake Sunnyside has numerous year-round residences and camps upon its shoreline (see Appendix 7). Many of these residences were built in the mid 1950's and 1960's, and less concern was given to the potential development impacts upon the water quality of the lake than is today. The building lot sizes around the northeastern side of Lake Sunnyside are relatively small, with camps and small homes built close to the shoreline. As many of these structures were seasonal camps, the septic systems were designed as such and generally consist of small septic tanks and seepage pits. There is little room on most of these lots for a standard leach field type system, and therefore very few exist. The issue that arises out of this is that the level of treatment that the septic effluent receives may not be as high as on a larger lot with a leach field system because the effluent is localized in a seepage pit. Discussions with many of the landowners on the lake have identified this issue as a concern, in that their small lot size is not capable of supporting an upgrade to a standard septic system. In addition, many of the residents on the lake do not know exactly what type of septic system is located on the property. This is a concern also because if they do not know what type of system is on the property, then there is little likelihood that this system has been properly maintained.

Although a qualitative survey of the septic system situation along the Lake Sunnyside shoreline would suggest some concern, currently there is no evidence of negative impacts from septic systems on Lake Sunnyside. There have been

no reported cases of illness due to polluted well water from residences along the shoreline, and it is very difficult to determine if the aquatic weed growth is being spurred on by nutrients from failing septic systems. It would be beneficial to quantitatively determine any existing impacts from septic systems, but to date no comprehensive study of the water chemistry along the shoreline has been conducted which would discover these impacts.

Soil Erosion in the Watershed

Eroding soils are a cause for concern when they are carried to a nearby waterbody, as they can carry large amounts of phosphorus and nitrogen with them which aid in the growth of algae and aquatic weeds. A complete roadside survey of existing bare banks, ditches and other potential erosion sites within the watershed revealed no considerable concern for soil erosion at the present time. However, new construction on or near the lakeshore if improperly undertaken can be a substantial source of eroding soil at any time in the future. Also, road ditch maintenance activities undertaken by local highway departments if improperly seeded and mulched can be a direct source of erosion and sedimentation to a nearby waterbody. It is very important to keep soil in place during construction activities by proper planning and installation of erosion control devices such as silt fence and hay bales. Staff from the Warren County Soil and Water Conservation District are available to landowners at no charge to assist with recommendations for erosion control from new development.

Lawn Care and Fertilizer Use

Lawn care activities are of a concern along the shoreline of lakes because they are potential non-point sources of pollution either through the excessive use of lawn care products (fertilizers and pesticides) or by disposal of lawn clippings and other debris close to the water. By definition, fertilizers are created to provide nutrients to improve the growth of lawns and other vegetation. If a landowner puts down more fertilizer than a plant can uptake, the remaining fertilizer may run off into the nearest waterbody. If this fertilizer reaches the waterbody, it acts in exactly the same way as it does on a lawn. The nutrients in the fertilizer allow for a much more aggressive growth of aquatic plants and algae, which may cause problems with the water quality and recreational opportunities for the lake. With such a large percentage of the Lake Sunnyside watershed area in residential development, the use of fertilizers on properties adjacent to the lake is a very real concern.

As stated above, there are approximately 40 residences along the shoreline of Lake Sunnyside, all of which have a yard to some degree. Appendix 2 is a color infrared aerial photograph of the Lake Sunnyside watershed, and land use can be identified on this photo. As can be seen, the shoreline is densely developed, with many lawns which abut the lake. This in itself is not a concern, as the grasses in a lawn actually slow the flow of runoff and allow for infiltration of stormwater runoff. Where it does become a concern is when landowners over-fertilize in an attempt to create the perfect lawn.

The degree to which the shoreline landowners apply fertilizers and pesticides to their lawns is not known. As there are no regulations or statutes regarding lawn care, there is no good way to control for the application of these chemicals to shoreline areas. The best means of minimizing the impacts from over-fertilization from these landowners is through education. Suggestion for educational efforts are outlined in the "Recommendations" section that follows.

Road Runoff

The 1.5 acres of roadways and other impervious surfaces are another land use area of concern within the watershed, as sand from winter road de-icing operations and other roadway pollutants such as gas and oil drain into Lake Sunnyside through the stormwater drainage system. Not all of the 1.5 acres drains directly into Lake Sunnyside, as seen on the stormwater drainage map (Appendix 5). Much of the road drainage within the Lake Sunnyside watershed is of no harm to the water quality of the lake, as it is infiltrated long before it reaches the lake or is outleted outside of the watershed. The red arrows on Appendix five show the direction of runoff after a rain event, based upon the sloping and crowning of the road surface. Each road and its drainage characteristics were looked at and are outlined below. Overall, the impacts to Lake Sunnyside from road runoff are moderate, and can be minimized through some roadside drainage improvements. These drainage suggestions are listed in the "Recommendations" section.

Sunnyside North

Approximately one half of Sunnyside North drains directly to Lake Sunnyside through culverts. There are three culverts which outlet road runoff directly into the lake from Sunnyside Road North, and these culverts are shown on Appendix 5 as orange arrows that point to the lake. The concern regarding this is primarily from winter road sanding operations, as this sand gets carried with runoff from a storm event into the lake. The three culverts which outlet directly into the lake are described as follows:

1. In the area of 104 North Sunnyside there are two drop inlets, connected across the road, which run straight to the lake through an old culvert. Sediment such as road traction material, which has flowed out of the drop inlets throughout the years, has created a small delta at the outlet into the lake.
2. The drop inlet located next to 150 North Sunnyside is no longer doing its job, the pipe which runs the stormwater from the drop inlet to the lake is broken, and the water is spilling out before it reaches the lake.
3. Another drop inlet, at 52 North Sunnyside, drains a significant part of the road, however the pipe which connects the drain to the lake is broken, and ends in the yard of the house on this site. While surveying the stormwater for the lake, we talked to the persons renting the property at the time, and they reported that during a rainstorm there is a large flow of water coming out of the pipe, which then flows down into the lake, taking with it sand and other yard material.

Sunnyside Road

The majority of Sunnyside Road actually drains outside of the watershed through a drainage ditch which outlets on the south side of the road near the cemetery. There are no stormwater concerns from this road section which comprises most of the length of the road. However, there is one area of potential stormwater concern on the southeast section of the lake where Sunnyside Road is closest to the lake. Currently there is a narrow strip of land between the lake and the road, and this strip acts to filter out any possible road runoff pollutants before they enter the lake. In order for this strip of land to properly filter the water before it reaches the lake, the approximately 30 foot buffer of dense vegetated land should be kept in a well vegetated condition. As this is private property it is up to the landowner of this property to maintain it as he or she sees fit, which may or may not be in the vegetated condition described above.

Lake View Drive

There are three infiltration devices located on this road which collect the majority of stormwater which would flow from this road. These devices sections of perforated corrugated metal culvert which are installed into the roadside under a drop inlet grate for the purposes of taking runoff and infiltrating it into the ground. These simple structures are used very effectively throughout the Town of Queensbury, especially on town roads with a minimum gradient. There is no concern for stormwater impacts to water quality from this road.

Recommendations to Protect the Quality of Lake Sunnyside

The following recommendations are intended to provide specific, cost effective means to protect the quality of the water of Lake Sunnyside. They entail both educational efforts and on-the-ground tasks to be undertaken to help ensure the long term water quality of the lake. These recommendations do not go into issues regarding zoning regulations around the lake, nor do they look at statutory changes to the Queensbury codes. They are primarily geared towards local stewardship of the lake and projects that can be done locally to protect this lake. The Protective Association for Lake Sunnyside will likely be the catalyst for much of the protection and improvement efforts to be undertaken for Lake Sunnyside, with assistance from the Town of Queensbury, the Warren County Soil and Water Conservation District, and many others. By increasing the awareness of the issues on Lake Sunnyside, the lake association can begin to achieve support from all landowners on the lake and undertake many of the improvements to protect it for the future.

General Recommendations

1. Maintain an active lake association to act as a hub to address issues of concern on Lake Sunnyside, and to provide information relating to issues on Lake Sunnyside to all shoreline and association residents. The ongoing activity and interest within this association is paramount to the continued long term health of Lake Sunnyside.
2. Give an annual presentation to the Queensbury Town Board relating to work accomplished on Lake Sunnyside and the status of water quality and other related issues.
3. Maintain status in the Citizens Statewide Lake Assessment Program, which is a voluntary lake water quality assessment program administered by the NYS DEC. As this is a five year on / five year off / five year on program, determine a way to fund those middle five years so that a continuous record of water quality data will be created for the lake.
4. Review the findings in the Darrin Freshwater Institute's report on aquatic plants within Lake Sunnyside, and develop a strategy to control the two nuisance species (Eurasian Watermilfoil and Variable Pondweed).
5. Conduct frequent roadside surveys of potential soil erosion sites, on road ditches and banks and new development sites. Contact the Warren County Soil and Water Conservation District if any sites of significance are found, so that technical assistance may be given to correct the situation.
6. Have copies of this document and the Darrin Freshwater Institute's report (or subsections of these) sent to all residences along the lake with a cover letter encouraging them to get involved with their lake association if they are not already.

Stormwater

1. Install catch basins at the location of the three drop inlet structures on Sunnyside North: These three locations are where the culverts are directly entering the lake. These drop inlet structures should be retrofitted or replaced with structures which have the capacity to act as catch basins to remove road sand and debris from road runoff before it reaches the lake. Work with the Queensbury highway department to have this undertaken.
2. Install infiltrators at locations specific locations on Sunnyside North, as seen on Appendix 6. These infiltrators will cut down on the amount of surface runoff reaching the lake, and will also decrease the maintenance/cleanout of the roadside catch basins. Work with the Queensbury highway department to have this undertaken.
3. Maintain and improve vegetated strip of land where Lake Sunnyside is closest to the road. Discuss with the landowner the importance of vegetated buffers and work to keep this area as well vegetated as possible.
4. Clean out the roadside infiltrator in front of 127 Sunnyside North to regain its capacity.
5. Work with the Town of Queensbury highway department to establish a regular catch basin cleanout schedule on an annual or semi-annual basis.

Septic Systems

1. Contact Adirondack Community College professor Holly Ahern to determine the feasibility of the college in undertaking a water quality sampling study to determine the degree to which septic systems are failing along the lakeshore. Professor Ahern and her students conducted a comprehensive study on Glen Lake in 1997-1998 on this topic, and may have interest and availability of doing it for Lake Sunnyside.

2. Contact John Miller, past president of the NYS Federation of Lake Associations (FOLA) to get the Protective Association of Lake Sunnyside involved with their volunteer septic monitoring program. This program works on the Lake Association level through cooperation with local landowners to dye test individual septic systems to check for failures. The number for FOLA is (800) 796-3652.
3. Conduct a voluntary survey of lakeshore landowners to obtain information regarding individual septic systems regarding their age, size, and maintenance schedule. This will give the lake association a clear idea of the necessity of upgrading or maintaining systems around the lake. Since this is always a sensitive issue among homeowners, the association should network with their friends around the lake to get as much cooperation as possible.
4. Create a water quality section in the Lake Sunnyside Association's newsletter which would feature articles on such topics as the impacts to water quality from failing septic systems, septic system maintenance tips, who to call if you have a septic problem, and any others related to this topic.
5. Contact a reputable septic system pumper to work out a bulk deal whereby many landowners get their septic tanks pumped out at a reduced cost. Network with the landowners on the lake to generate interest in this. If it works out, attempt to make this a three year program whereby these landowners know that this deal will come around only once every three years and to get involved.
6. Sponsor an annual water quality workshop and invite interesting speakers to discuss the issues surrounding Lake Sunnyside. A general rule: feed them and they will come...

Lawn Care/Fertilizers

1. Through the Association's newsletter, educate watershed residents about the issues related to over-fertilization of lawns and gardens and the impacts to water quality on their lake from these activities.
2. Contact a local landscape nursery to determine the most environmentally friendly (low phosphorus) fertilizer which would be recommended for lawns on a shoreline. Discourage fertilizer use on any lawn which is adjacent to the lake shore and is sloped towards the lake.
3. Contact Cornell Cooperative Extension to obtain soil sample bags for use by landowners to determine the nutrient needs of their lawns. To increase participation, create a "lawn care program" where the cost of analysis (\$17) is cost shared or paid for by the Association.

Summary and Conclusions

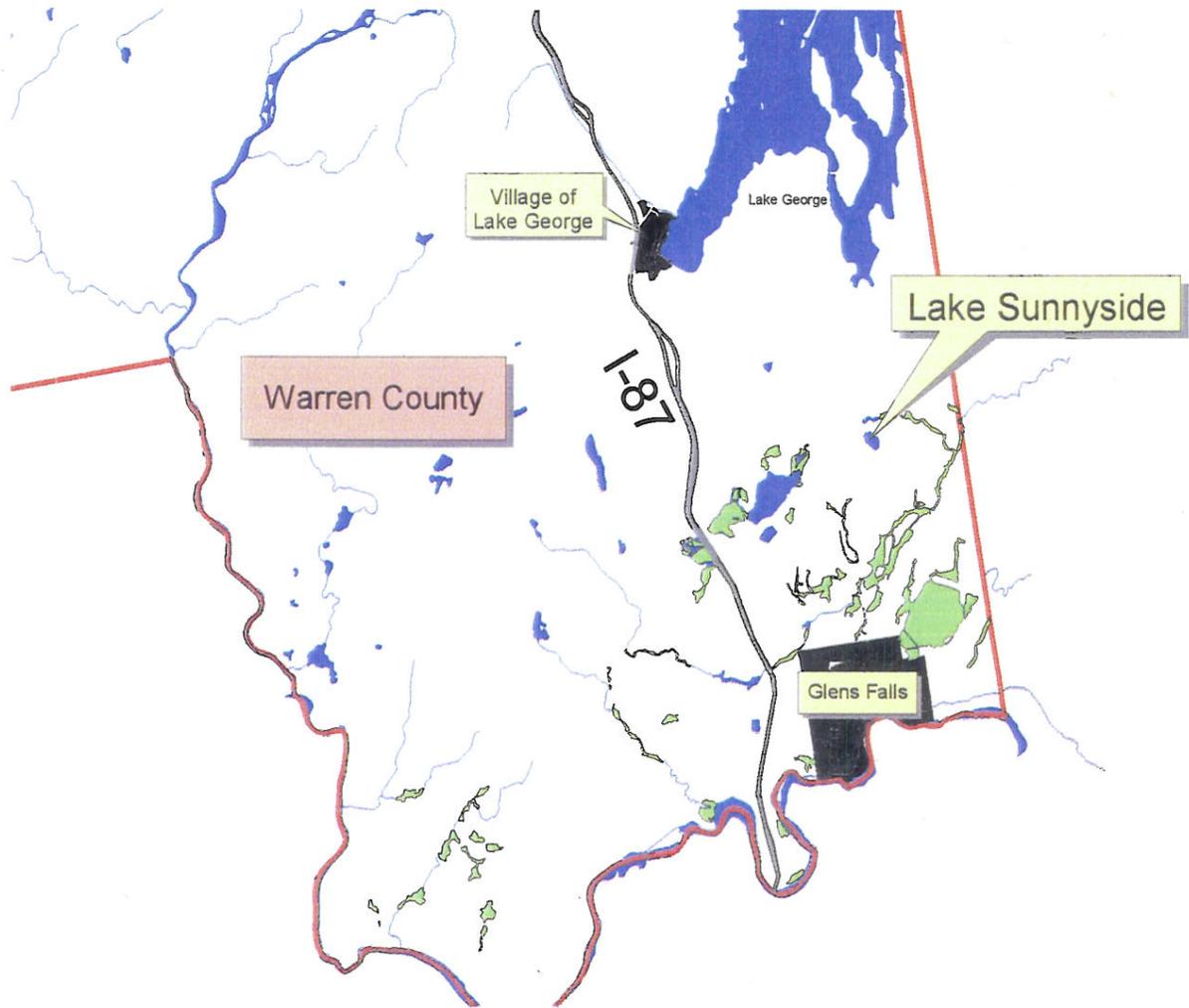
Lake Sunnyside is a 35 acre lake in the Town of Queensbury which has a highly developed shoreline and surrounding watershed. Concerns regarding the maintenance of good water quality of this lake for the future prompted an assessment of the lake's watershed to determine potential pollutants which are impacting the lake, and to recommend actions to help ensure the long term quality of the lake's waters. Field work and mapping were conducted to undertake this assessment as the primary means to determine these conditions.

The Lake Sunnyside watershed is approximately 98 acres, most of which is developed for residential use. The majority of the shoreline is developed with both year-round and seasonal residences, with approximately 40 residences along the shoreline. The remaining acreage is primarily forest, but this forestland is not adjacent to the lake. There are three concerns for upland pollutants entering Lake Sunnyside: runoff from roads, soil erosion, shoreline septic systems, and shoreline fertilizer/pesticide use. Recommendations for action to help alleviate potential and existing problems relating to the above issues include the installation of new roadside drainage structures, educational programs related to septic systems and lawn care, and volunteer efforts related to erosion control, water sampling and monitoring.

Lake Sunnyside is currently in good condition in relation to its water quality and aquatic plant community. The highly developed condition of its watershed necessitates ongoing diligence in maintaining this good condition, through both educational activities and practical projects to protect the current character of the lake. The Protective Association for Lake Sunnyside will need to be the focal point for these activities, as their constituents have the most vested interest in the lake's lasting health. By partnering with the Town of Queensbury and other groups interested in Lake Sunnyside, the current condition of the lake and its surrounding watershed can likely be maintained at a level which the local residents have come to know and enjoy.

Appendix 1

Location Map



-  Wetlands
-  Streams
-  County boundary
-  Lakes and ponds



Lake Sunnyside Watershed



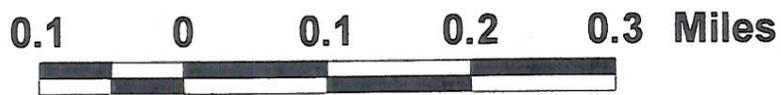
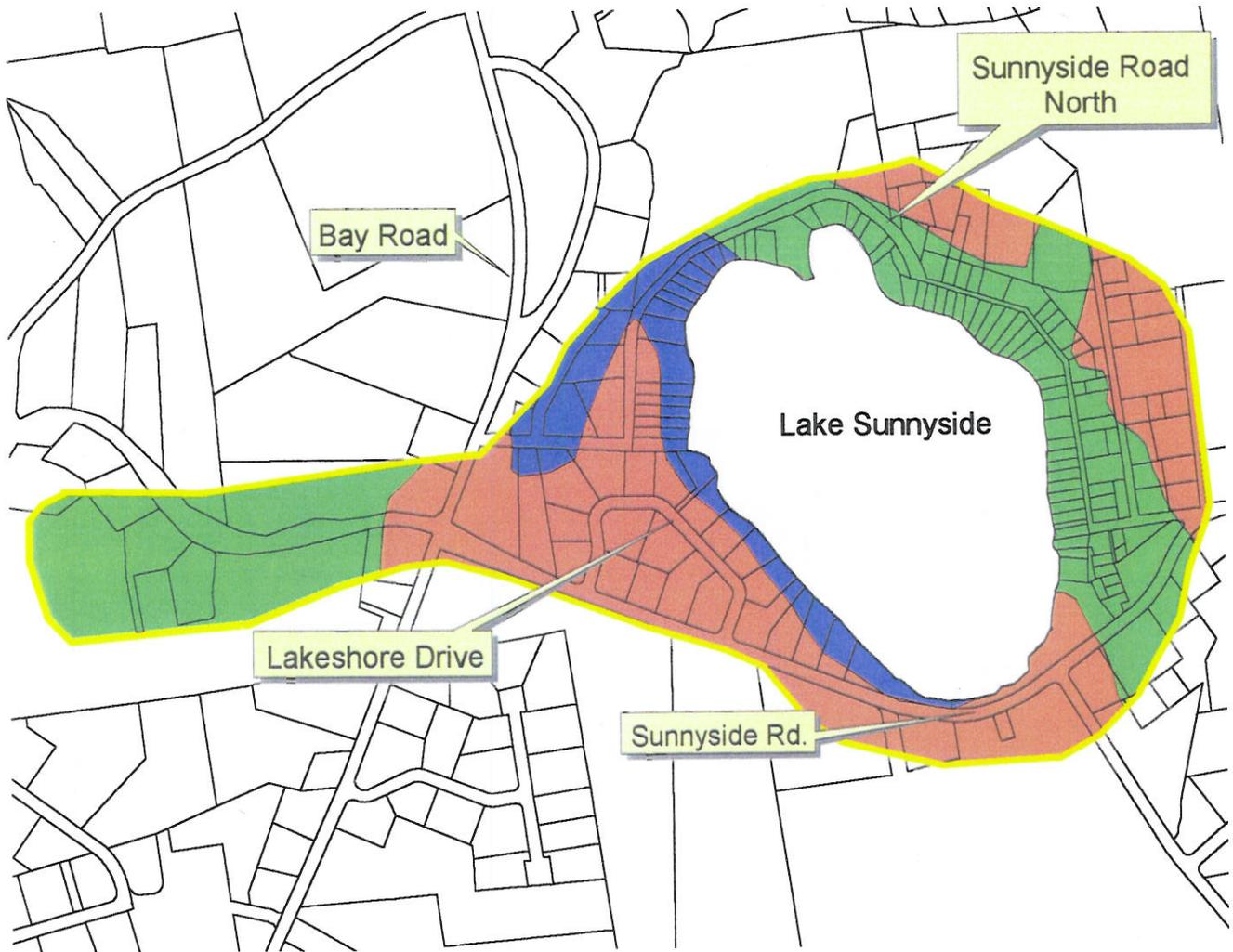
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 Lake Sunnyside Watershed

Appendix 3

Lake Sunnyside Soils



 Lake Sunnyside Watershed

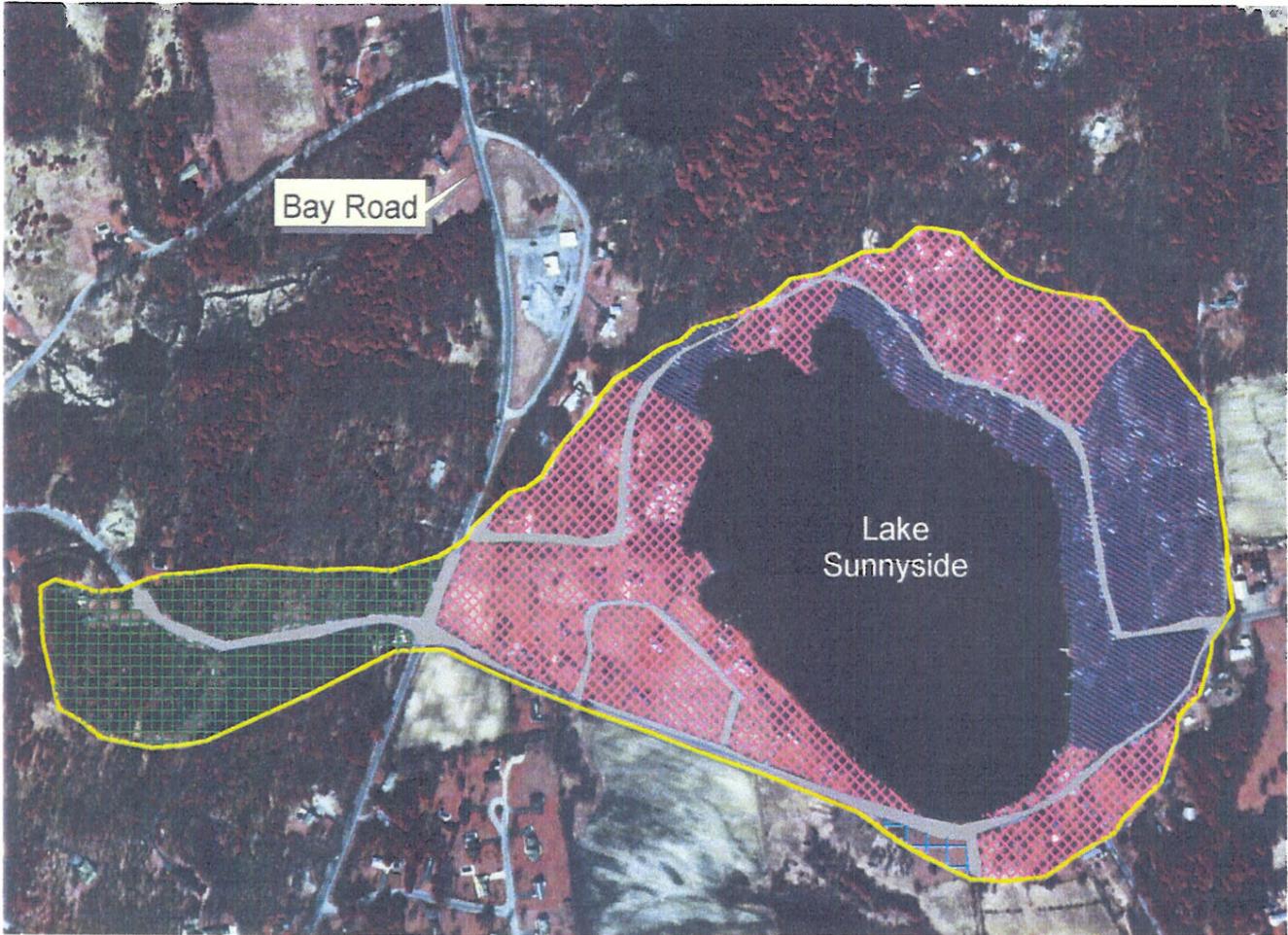
Soils Key

-  Hinckley
-  Oakville
-  Plainfield



Appendix 4

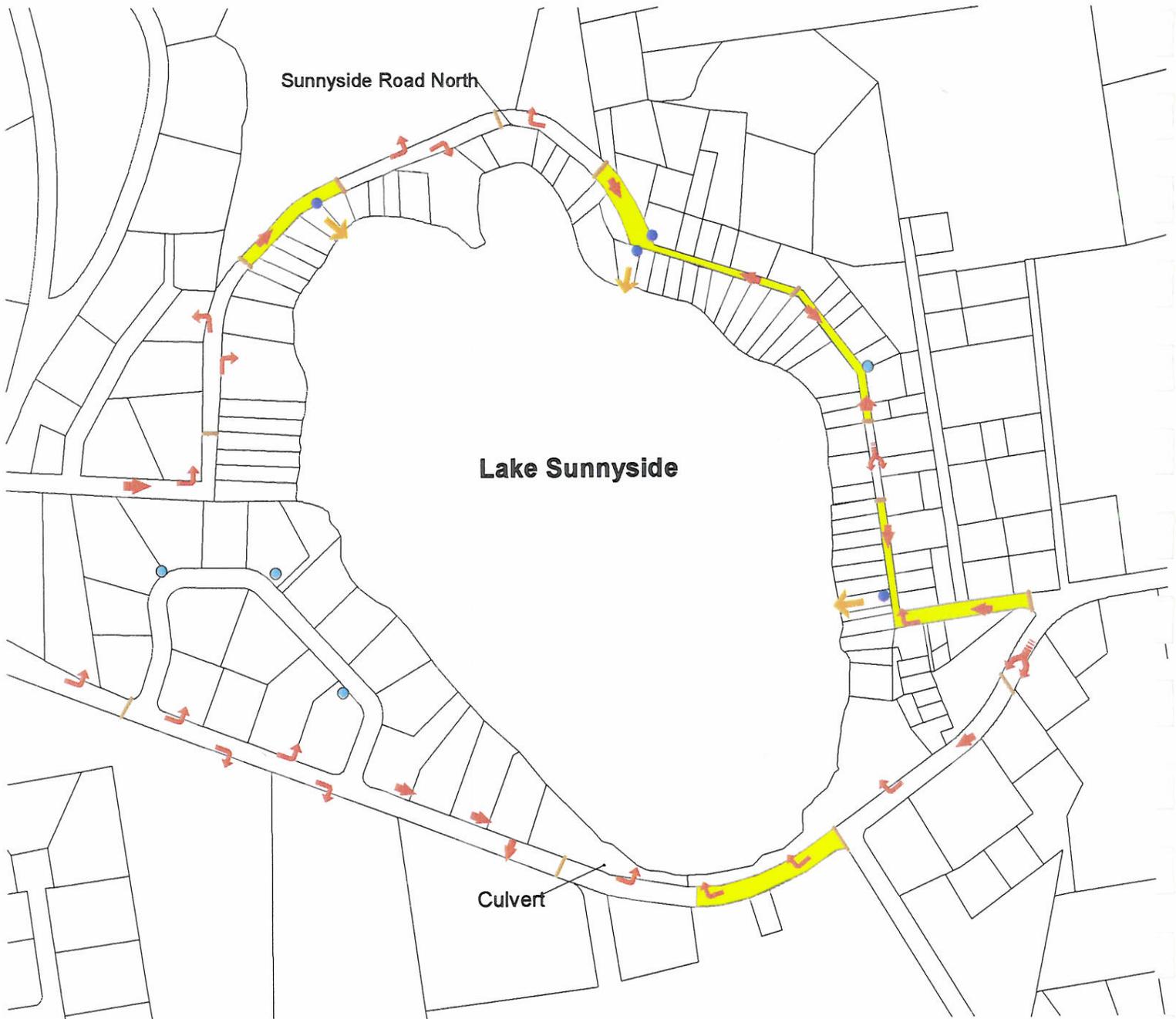
Lake Sunnyside Land Use



- Roads
- Sunnyside land uses
 - Cemetery
 - Dense Residential
 - Forest
 - Moderate Residential
- Lake Sunnyside Watershed



Appendix 5 Lake Sunnyside Existing Stormwater Drainage



- Drainage divide
- ↑ Stormwater flow direction
- Drop Inlets
- Areas of concern
- Infiltrators



Produced by the Warren County Soil
and Water Conservation District

Appendix 6

Lake Sunnyside Recommended Stormwater Drainage Improvements



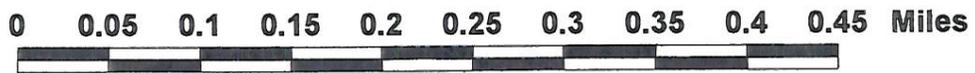
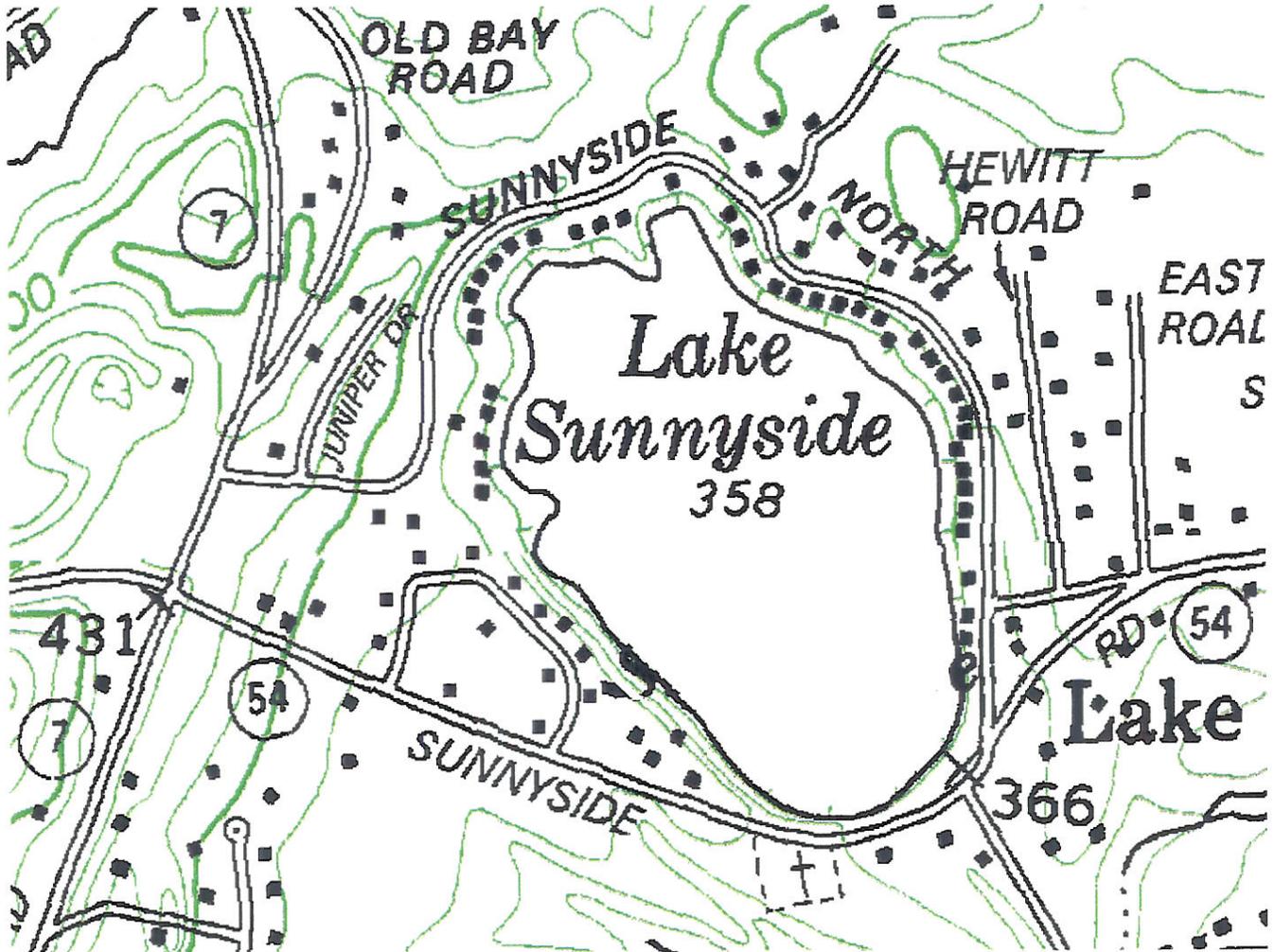
-  Drainage divide
-  Recommended infiltrator
-  Recommended catch basin
-  Existing infiltrator
-  Areas of concern



Produced by the Warren County Soil and Water Conservation District

Appendix 7

Shoreline Development and Topography around Lake Sunnyside



- Key
- Houses/Camps
 - ∩ Topographic Lines

