

Dream Lake Watershed Assessment



Prepared by the

Warren County Soil and Water Conservation District

Jim Lieberum, CPESC
Water Resources Specialist

51 Elm Street, Warrensburg, NY 12885
Phone: (518) 623-3119 Fax: (518) 623-3519

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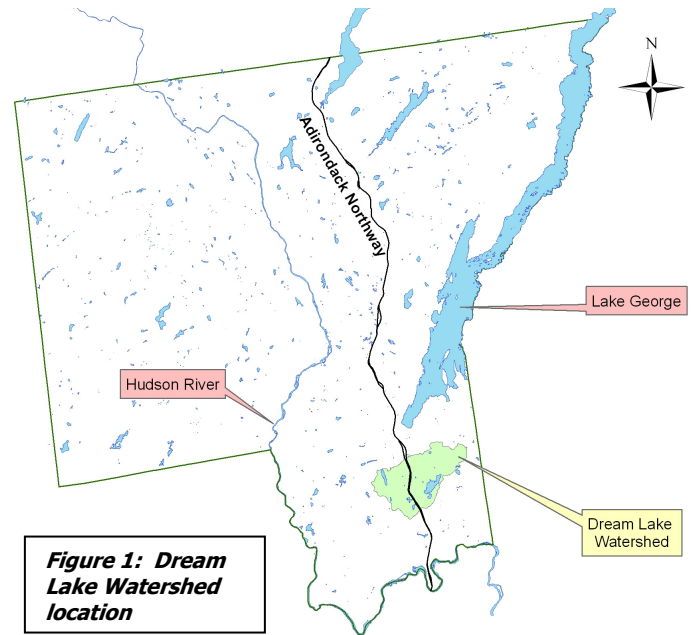
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Dream Lake Watershed Assessment

Introduction

Dream Lake is a seven acre lake within Warren County, located in the Town of Queensbury. This small lake has a large watershed for its size (10,300 acres) and a number of well known hydrographic features make up this watershed. Glen Lake, Rush Pond, Butler Pond and Bear Pond are found within this basin. Recently, landowners have formed the Dream Lake Association, which will benefit both the lake and landowners.

Working with the Warren County Soil & Water Conservation District, an effort to evaluate the condition of the watershed and the lake itself was begun in 2006. A substantial portion of the watershed evaluation has been completed through the Glen Lake Watershed Management Plan (1998), so the focus of this report will be on the Bear Pond Watershed and the watershed that does not pass through Glen Lake.



A component of this effort was to complete an assessment of potential and existing nonpoint sources of pollution and nutrients into Dream Lake, 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 District in conjunction with the Dream Lake Association has conducted a watershed wide assessment of potential and existing sources of these pollutants entering Dream Lake, and is undertaking an effort to educate the lakeside residents about failing septic systems, lake management, and other water quality related issues.

This assessment is part of a larger project which is intended to raise the awareness of water quality and other issues on Dream Lake, and to determine the existing condition of the lake and its surrounding watershed. These efforts are intended to give local residents 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 Dream Lake.

The following report is a brief review of the findings related to an assessment of the lake itself and 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.

Lake and Tributary Characteristics

Overview

Dream Lake is located in Warren County, in the Lake Champlain Watershed drainage. The lake itself is encompassed solely within the Town of Queensbury, and its surface area coverage is approximately seven acres. There has not been a bathymetric survey of the lake done, but it is a shallow lake, not likely exceeding 14-18 feet

in most of its area. Using an average depth of 4 feet, this would calculate the volume of Dream Lake to be approximately 28 acre-feet (acre foot equals the amount of water which would cover an acre to the depth of one foot). The NYS DEC water quality classification of Dream Lake is Class AA with the standards of AA(T). The best usages of Class AA waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. These waters shall be suitable for fish propagation and survival. It must be noted, that although this classification is its best intended use, this classification does not mean to evaluate existing water quality conditions.

This study is primarily intended to get a snapshot in time as to the condition of Dream Lake including the overall water quality of the lake, and to determine the existing and potential pollutant sources to the lake.

In order to undertake this study, it was first necessary to determine the extent of the watershed for the lake. While the Dream Lake Watershed is technically nearly 10,300 acres, much of this area's information has been covered in the Glen Lake Watershed Management Plan. The two other subsections of the basin include the Dream Lake Watershed proper (1,105 acres) and the Bear Pond Drainage (1,478 acres). A watershed is defined as "an area of land that drains to an associated water source such as a wetland, river or lake" (Terrene Institute, 1993). Essentially picture your sink, any water that flows into your sink is part of the watershed, any water that goes onto your counter tops or floors is in another watershed. A popular expression that is said to make people be aware of their surrounding is "We all live in a watershed".

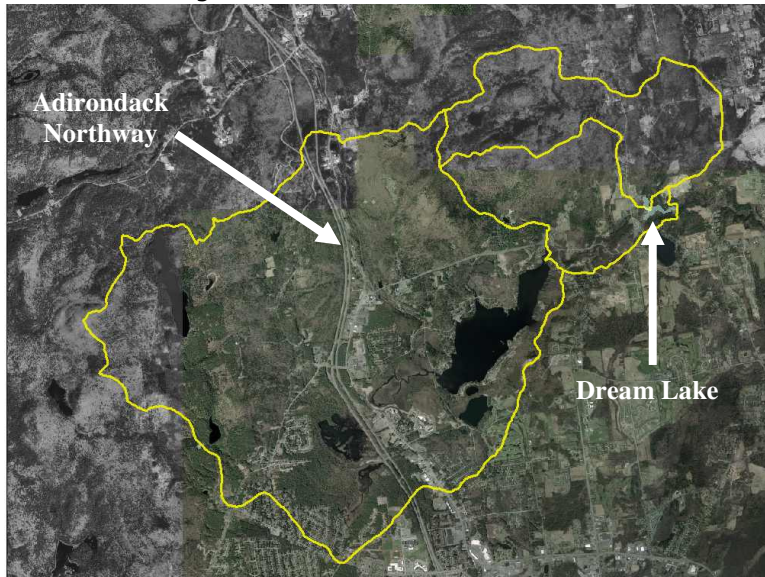


Figure 2: Dream Lake Watershed aerial view

The entire Dream Lake watershed is approximately 10,300 acres and has a lake to watershed ratio of 0.0007, which is not a very typical lake surface/watershed ration in the area. By comparison, Loon Lake is 0.07 and Schroon Lake is 0.01 (these numbers are just for comparison). This lake is an artificial one, since there is a dam installed as an outlet structure. This lake is very out of proportion with its watershed.

There are two main streams that contribute to the lake, one of which starts at the outlet of Glen Lake in the west and the other begins at Bear Pond in the north. Numerous wetlands are found in this watershed as well.

Lake Water Quality

To help determine the future of a lake in terms of its water quality and aquatic plant community, it is very helpful to evaluate past studies and try to determine a trend of what is happening. At this time, there has not been any identified water quality information for Dream Lake, however with the influence of Glen lake, it would be safe to say that much of the Glen lake water quality affects Dream Lake. To provide a greater understanding of the lake's water quality and chemistry, a basic sampling program could be undertaken by the Association which might cover the following elements:

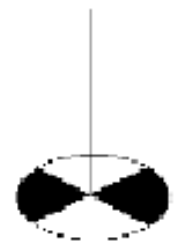


Figure 3: A simple Secchi disk

Secchi Disk Depth: The Secchi disk is used to measure how deep a person can see into the water. It is lowered into the lake by unwinding the waterproof tape to which it is attached and until the observer loses sight of it. The disk is then raised until it reappears. The depth of the water where the disk vanishes and reappears is the Secchi disk reading. The depth level reading on the tape at the surface level of the lake is recorded to the nearest foot.

Total Phosphorus: Phosphorus is the limiting nutrient in freshwater lakes. Generally the more phosphorus that a system has the more productive (i.e. weedy, murky) a system is. Not all types of phosphorus are available for plant use however, but analysis of the sample is done due to the potential of phosphorus changing into a useable form.

Nitrate (NO₃): Nitrate is another nutrient necessary for plant growth and development. Too much nitrogen can cause changes in the quality of the aquatic plants. If drinking water has too much nitrogen, Methoglobinemia, "Blue Baby Syndrome" may occur.

Color: Color is classified as the amount of dissolved materials in the water, usually consisting of organic matter. It does not indicate the quality of water, but may influence the waters transparency, directly relating to the amount of algae in the system.

pH: pH is the measure of hydrogen ions in the water. The average pH of Dream Lake from 1986-1990 was 7.43, which indicates that the lake is slightly basic (more like baking soda than vinegar). Neutral pH is 7, so Dream Lake's value is fine.

Conductivity: Conductivity is essentially a measure of ions (charged particles) in the water. If baseline data for conductivity is established, then continued monitoring could produce prioritized data. For example, if conductivity usually measures 40 µmho/cm (micromhos) for a particular waterbody, then a storm hits and conductivity raises to 500 µmho/cm, stormwater may be an issue. You could then monitor the stormwater outfalls and see if that is where the spike in conductivity comes from. If that is the case, you now know an area which needs to be addressed for water quality.

Chlorophyll A: This is a measure of chlorophyll **a**. This provides an estimate of the phytoplankton productivity. This may be in relation to the amount of phosphorus in the system.

Escherichia coli (E. coli) is another parameter that is tested for on recreational lakes. *E. coli* indicates the presence of fecal matter from warm blooded creatures, including humans (beavers, dogs, failing septic system, untreated wastewater discharge, faulty sewer line). High rates of *E. coli* have been found in swimming areas where gastroenteritis is common (Behar, et. al., 1996). No shoreline samples have been conducted at this time, however if bacterial levels are not in concentration at the sample locations, that is still a good thing.

Information on lake management and water quality is available through the Warren County Soil & Water Conservation District (518-623-3119), the Darrin Freshwater Institute (644-3541) and the NYS Department of Environmental Conservation (518-623-1200).

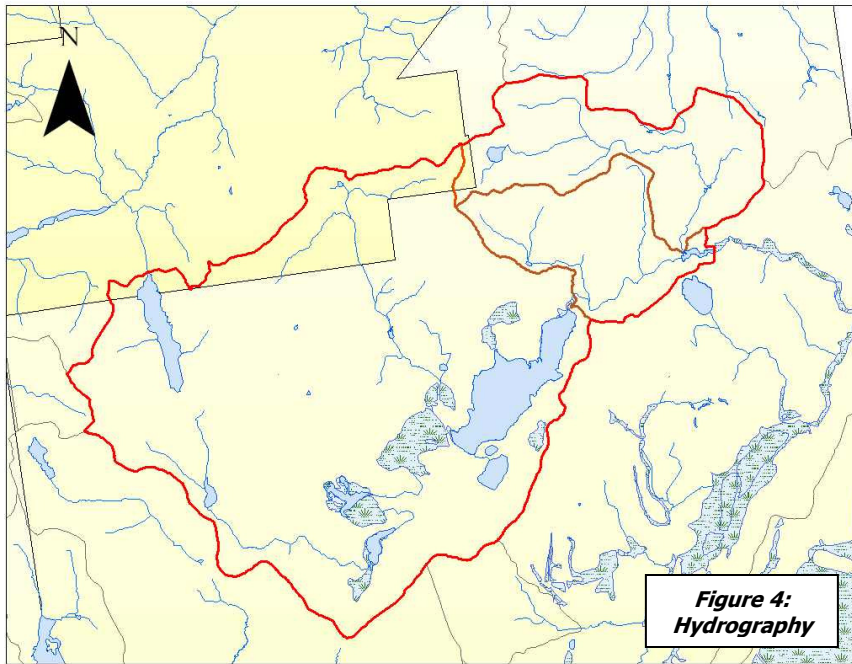
Dream Lake Hydrography

Dream Lake has two main tributaries in its watershed, which comprises most of the concentrated flow to the lake. No volumetric sampling has occurred to this point, but regardless these are two areas that should be kept as clean as possible and future development and land use changes taken into consideration with careful planning.

It is fortunate that one of these tributaries begins in a relatively undeveloped area of the watershed. Bear Pond is located in the Town of Queensbury and has been in the news in the past year for the development of a road and consequent disturbance to the wetlands and drainage patterns of this pond. Be it so, much of this watershed is not heavily developed and is heavily forested, which is a benefit to the water quality of Dream Lake. The main inlet to Dream Lake is the outlet of Glen Lake. While there has not been any collection of water samples from this tributary, it is assumed that this stream would reflect the water quality conditions of Glen Lake very closely. For more information on the Glen Lake water quality, please contact the Town of Queensbury or the Warren County SWCD for an electronic copy of the Glen Lake Watershed Management Plan.

Wetlands are nature's filters, and help to remove sediment and nutrients from the watershed system. In urbanized areas, artificial wetlands are constructed to address stormwater issues. With Dream Lake the wetlands are natural and seem to be very functional in treating any stormwater that may occur. In fact there is approximately 350 acres of mapped NYSDEC wetlands within the watershed. There are many other wetlands of various sizes and types, that are unmapped in the watershed ranging from the riparian areas along streams to shallow areas of ponds, these wetlands will provide the same functions as the identified areas.

Streambank erosion can contribute sediment and phosphorus to lakes and occurs more readily around areas of human disturbance. At the inlet from Bear Pond there appears to be a significant amount of sandy material that has accumulated on both sides of the under road culvert. From personal communications with local landowners it



was stated that years ago this was not the case and that it was significantly deeper in this section of water way. The property upstream is privately owned and would require permission from the landowners to investigate possible erosion sources. By utilizing the District's Geographic Information System (GIS), it is determined that the likely source of this sediment is within 0.6 mile of the outlet into Dream Lake. Looking at the aerial imagery, approximately 0.6 mile upstream is a wetland/shallow pond that would act as a settling basin for sources above that area. Between the pond and outlet there are two road crossings, which may also be contributors to the sediment load.

Aquatic Plants in Dream Lake

According to a personal communication with Mr. Pete Peters, there has not been a completed aquatic plant survey done at this time to determine the existing condition of the plants system. One is underway, but information is not available yet. A sampling of the aquatic plants has occurred and they were identified by the Darrin Freshwater Institute. However, a more detailed plant survey should be conducted.

It is likely that Dream Lake will classify as a mesotrophic to eutrophic lake. Lakes within these classifications typically reflect a diverse plant population, although they tend to be overproductive and sometimes generate too many plants or algae. Many animals utilize the various species for cover, food and in the case of fish, as nursery for fry (newly hatched fish). There are a number of invasive plants that can have a detrimental affect on lake systems, and Eurasian watermilfoil (EWM) is one widely known example.

It is known that Glen Lake has infestation of EWM. It is not unlikely that if EWM is not already in Dream Lake, then it will make an appearance. In this lake, EWM would be catastrophic as EWM will colonize water depths up to 16', as most, if not all of this lake is less than those depths. There is no real way to eradicate Eurasian milfoil, however it can be successfully managed by hand harvesting, mechanical, or chemical means. All in-



Figure 5: Eurasian Watermilfoil

water plant management requires a good plan and appropriate permits from the NYS Department of Environmental Conservation.

As there are a number of native milfoil plants that are similar in appearance to Eurasian milfoil, proper identification is a must. Milfoil appears when there is a disturbed site, generally where native plants are not aggressively growing or have been killed. That is why it is important to identify and understand the life history of Eurasian milfoil. Milfoil can also colonize with just a small piece of plant matter. If a plant is harvested incorrectly, or gets chopped up in a propeller, these pieces may float through the water column and establish a new plant in other areas within the lake. It is imperative to understand Eurasian milfoil, as it has the ability to affect a great amount of Dream Lake. Completion of an aquatic plant survey can help a lake association monitor and manage their aquatic plant issues.

Soils in the Watershed

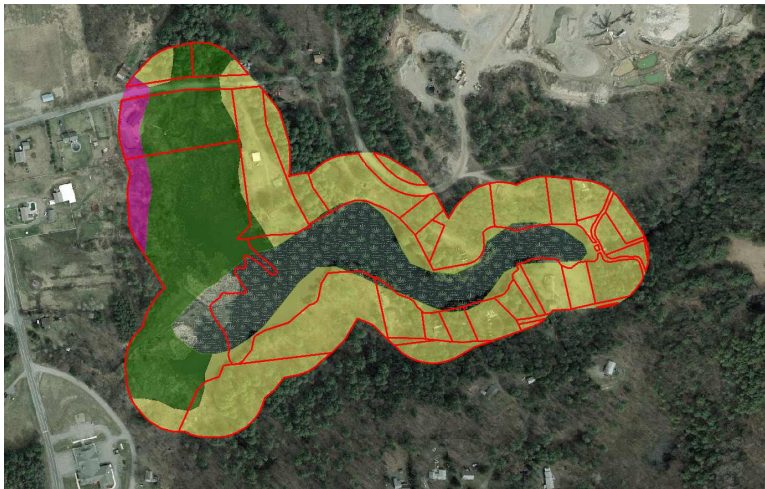


Figure 6: A close up view of properties 200' around Dream Lake. The yellow colored areas represent Hydrologic Soils Group A, which provide "poor" filtering of septic effluent as defined by the Warren County Soil Survey.

What benefit is it to know what the soils are within a watershed or along a shoreline? This question is often asked by lakeshore residents and communities when evaluating potential water quality impacts. The soils lay the framework that all land uses are based upon, and they have a direct correlation to the type of land uses that may be suited to a particular location. Very sandy soils may pose serious problems with siting a septic system for a house, whereas soils with a high clay content may cause difficulties with house foundations and construction. This section briefly evaluates the soils within the nearshore area of Dream Lake to summarize some of the potential concerns with land uses and water quality within the lake. Please note that this is only a brief summary of the soil conditions, and much more detailed information and maps are available in the Warren County Soil Survey available through the Warren County Soil & Water Conservation District.

Within the Dream Lake watershed, the soils around Dream Lake are of concern, due to coarseness of the soils and the proximity of on-site wastewater treatment systems to the lakeshore. In order to better grasp the soils situation on the lakeshore, the Warren SWCD has buffered the digitized soils and generated computerized maps for the area within 200' of the lakeshore (Figure 5). Most of the soils (62% or about 21 acres) within this 200' buffer of the lakeshore are primarily sandy soils, and are listed being in hydrologic soil group "A". This indicates that these soils have a high infiltration rate when wet and have a low runoff potential. They are mainly deep, well drained and sands or gravel (Warren County soil Survey).

The majority of the remaining soils (31%, about 10.5 acres) is identified as a Wareham, a loamy sand, and are classified as hydrologic soil group "C". This description indicates that this soil is less infiltratable (tighter) and has a high water table most of the year. Both of these soil groups are of concern for septic systems. According to the 1986 Warren County Soil Survey, these two soil series may not be readily suitable for septic system leachfields, and these soils constitute 93% of the soils found within 200 feet of the lakeshore. Groundwater contamination is listed as a hazard, primarily due to rapid infiltration rates within the "A" soils and a high water table in the "C" soils, which results in poor effluent treatment.

Since most of the soils around the lake are or droughty sands, soil fertility and lack of water may be a concern for plants. It is important to plan out plantings accordingly to meet the limitations of these soils. A soils analysis, which is available through the Warren County Cooperative Extension, is recommended to determine what nutrients

may be need for successful plantings. Keeping native, established vegetation is always best, but as construction is conducted planting plans need to be developed to reduce stormwater and soil inputs into the waterbodies.

Eroding soils are also cause for concern when they are carried to a nearby waterbody. Eroded soils can carry large amounts of phosphorous and nitrogen with them, which aids 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. This is particularly true given the steep slope conditions close to Dream Lake in developed areas of the watershed.

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.

Soils do present limitations to land uses in the watershed and to further development; therefore, they need to be considered in land use planning and water quality protection efforts. Whatever the soil conditions, whenever modifying an existing land use for development it is a good practice to control for erosion with a good site plan and follow-up. Erosion of soil into Dream Lake can cause problems with increased algae and weed production, both of which negatively impact the quality of the lake and its surrounding community. Erosion control advice and technical assistance is available at no charge from the Warren County Soil & Water Conservation District (518-623-3119).

Land Use and Development in the Watershed

Land use information is very important when characterizing a watershed and determining potential impacts to water quality of a lake. The extent to which an area is developed and where the development has occurred, can play a key role in the contaminant loading to a waterbody.

As mentioned previously, much of the Dream Lake Watershed is part of the Glen Lake Watershed. Land use for that section should be referenced to the *Glen Lake Watershed Management Plan* that is available electronically from the Warren County SWCD office. A second section of watershed from Dream Lake is the Bear Pond Outlet. Even with recent developments in the watershed, this subwatershed is relatively undisturbed with development. Few roads are located in this area and none would seem to have a significant impact on Dream lake, as the road crossings are a distance away. With that said, the main tributary that flows in this subwatershed does cross Route 149, an extremely heavily traveled road. Salt and sand during winter likely has localized effects of the system, but fortunately for Dream Lake, the land downstream of this crossing is heavily forested and contains fringe wetlands, which help to purify the waters. Sediment may become a concern and is discussed further in the *Hydrology* section.

The third and final subwatershed for Dream Lake is immediate drainage between the Glen Lake and Bear Pond watersheds. This subwatershed is approximately 1,100 acres in size, contains several streams and their road crossings. The main stream in this section is the Glen Lake outlet, and there are two tributaries that enter the outlet. Tributary number one originates on the north side of Route 149, and crosses Route 149 near the Martindale Road intersection. Most of this upland is undisturbed and appears to have low development density. Below the intersection with Route 149 there is a change in land characteristics, as the area is more developed

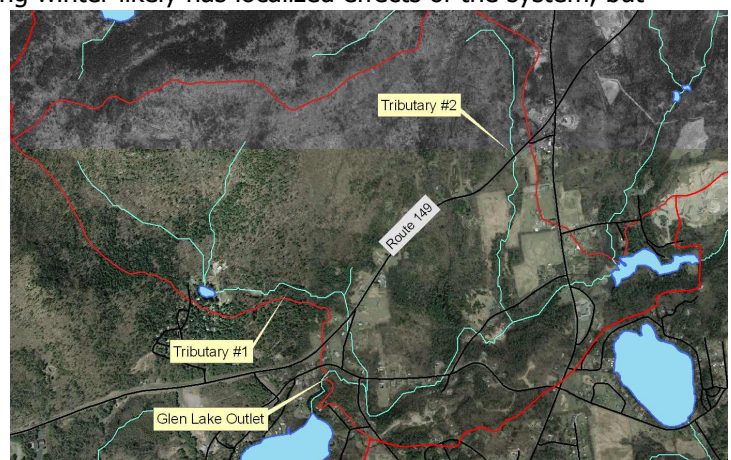


Figure 7: Identification of tributaries in the Dream Lake Proper subwatershed.

with residential structures and lawns.

The second tributary to the outlet again originates north of Route 149 and flows south under 149 and through a variety of rural lands, eventually making its way to the outlet shortly after it crosses under Walkup Road. Both of these tributaries should have similar characteristics as the paths that they flow are similar in headwaters and land use surrounding them. The road crossings would be critical for both and for tributary one, runoff from lawns and effluent from failing on site septic systems could be a concern. From tributary two, the agricultural lands that border this stream could provide inputs from the aspect of animal waste. Horses are located at this farm, and most of the time horses are fenced out of the stream for safety. This would be of greater concern if there were cattle in the area.

Current land use appears to be varied in the whole watershed with heavier development in the Glen Lake subwatershed and lower development and disturbances in the Bear Pond and Dream Lake Proper subwatersheds. Land development has occurred on the shoreline of Dream Lake. There are approximately 20 properties that line the shore, of which 13 are listed as having a bathroom. Therefore approximately 65% of the shoreline properties have been developed. Development along shorelines is of great concern, since it can readily impact a waterbody through erosion, stormwater runoff pesticides, fertilizers and failing or improperly installed on site septic systems. Any future development would need to be done properly, as to not negatively affect Dream Lake's water quality. When development occurs off the shoreline, care must be taken as well. It is important to remember that erosion control practices should be in place to keep the soil stable. Sediment control devices should also be considered in case the soils move from the site. The NYSDEC and USEPA require all soil disturbance (grubbing, clearing, tree removal) over 1 acre in size to go through a DEC permit process. Essentially, if you are going to develop a parcel and disturb 1 or more acres, you will need to fill out a permit form from the NYS Department of Environmental Conservation. This will be examined by the regional staff to see if your plan meets all required conditions listed on the permit. Failure to file a permit can result in stop work orders and/or daily fines. For more detailed information please contact the Warren County SWCD, 518 623-3119 or the NYS DEC Warrensburg office at 518 623-1200.

Land Use Considerations on Water Quality

One of the overriding factors affecting the quality and health of a lake is the composition of its surrounding watershed. In lakes with heavily developed watersheds, there tend to be more impacts to the lake from stormwater runoff, erosion, failing septic systems, and other development related issues. In largely forested watersheds, these impacts are generally minimal or largely nonexistent. There is a large mix of land uses in this watershed including heavily forested areas, which are good for water quality and developed areas, which generally are not good for water quality. Careful planning and development are critical to ensure proper water quality for the watershed and the waterbodies.

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.

There is little room on most of these lots for a standard leach field type system. The issue that arises is 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. 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 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.

Lawn Care and Fertilizer Use

Lawn care activities are 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 fertilizer allow for 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 Dream Lake shoreline area in residential development, the use of fertilizers on properties adjacent to the lake is a very real concern for water quality impacts. Lawns in and of themselves are 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* their property 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 on Dream Lake. As there are no regulations or statutes regarding lawn care, there is no good way to control 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

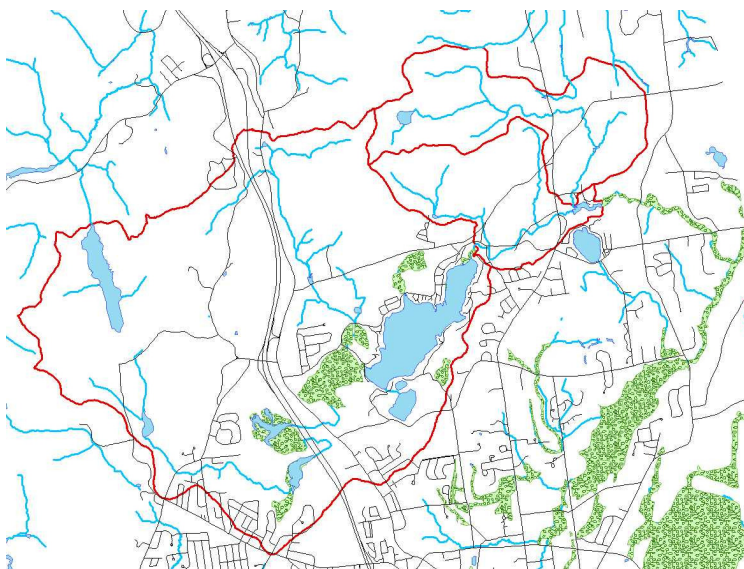


Figure 8: The Dream Lake Watershed, roads network and hydrology

One of the primary factors in lake quality and health of the aquatic ecosystem is the quality of the runoff which enters the lake. As land gets developed and roads are constructed, the flow patterns of rain runoff get altered in these areas. In most cases, runoff which once infiltrated into the ground before development now runs off into drainage ditches and storm drains. The eventual outlet of these storm drains and ditches is the lowest point in the area, most times being the lake itself. The result is a larger amount of surface runoff going directly into the lake, and in many cases the water quality of this runoff is generally less than it would have been under pristine conditions. As this runoff flows across blacktop and other impervious surfaces, it picks up contaminants on the road such as salt and sand from winter de-icing operations, oil and other chemicals, metals, and possibly fecal coliform bacteria from animal wastes. These pollutants are conveyed into the lake via the constructed drainage

system, i.e. the stormwater inlets and pipes and roadside ditches.

Dream Lake, like most other developed lakes, has a roadside drainage network throughout its watershed. The road system within the Dream Lake watershed was evaluated, on site, for potential road runoff impacts to Dream Lake. Even with the extensive road network, fortunately there are only a few areas of concern. For much of the Dream Lake road system, the ditches are grassed or stoned, and as being such tend to cause few problems. If a ditch is vegetated, then the material will filter out solids (sands, silts) and take up nutrients. If the ditch is rocked, then the solids are removed from suspension as well (Appendix A). Maintenance is the key to these designs, if

there is a build up of material in a ditch, then it would need to be removed, otherwise the sediment could, overtime, be washed into the lake. The following are potential areas of concern within the watershed (fig. 8):

1. Tributary One

Route 149 and Martindale Road:

(a) Tributary one of the Dream Lake Subwatershed basin flows at this intersection. On the east side of this intersection, stormwater runoff from 0.3 mile of Route 149 runs down concrete lined channels and grassed ditches on both sides of 149 and is deposited in this tributary. There is no treatment for this runoff which would likely contribute deicing and sanding materials. There is a catch basin on the east side of Martindale Road with an 18" HDPE pipe inletting and an 18" concrete pipe outletting to this stream. There appears to be a considerable amount of algae at this stream junction.

(b) The southwest section drains the same area and is conveyed to the stream through a mix of concrete lined channels, rock lined channels and a small wetland. Stormwater from this section should not be as potentially significant as there appears to be treatment for solids and nutrients with the stone and wetlands. While the rock lining provides no chemical treatment, it does reduce water velocity and allows for particulates to drop out of suspension. Routine inspection and maintenance of this channel should be conducted to ensure that sediment is removed from this system before it migrates to Tributary one.

Martindale Road: Much of this area has a stone retaining wall on the north side of the stream. The opposite side is heavily vegetated. This section flows under Moon Hill then to the Glen Lake Outlet. Standard roadside maintenance of sand cleanup in the spring should be conducted.

2. Tributary Two

Route 149

There appears to be minimal impacts from Route 149 at this stream intersection. Much of the stream area is part of a wetland/floodplain complex, so any nutrients or sediment is likely treated.

Walkup Road:

There appears to be minimal impacts from Walkup Road at this stream intersection. Much of the stream area is part of a wetland/floodplain complex, so any nutrients or sediment is likely treated.

3. Glen Lake Outlet

Bay Road/Old Bay Road:

(a) On the southwest side of this intersection, stormwater runoff begins 0.3 mile from uphill and runs down a grassed ditch and rock lined channel and is deposited in a grassed front yard. Water from below this rock lined area can make it to a drop inlet that outlet's in to the Glen Lake Outlet through an 18" CMP. Stormwater runoff flows untreated into the Glen Lake Outlet from 0.2 mile west on bay Road.

(b) Stormwater runoff from the southeast section of this intersection runs down the side of Bay Road to a drop inlet at the junction of Old Bay Road. This is outletted directly to the Glen Lake Outlet through an 18" CMP.

Bay Road:

Both sides of Bay Road on the north side of the stream eventually drain to the Glen Lake Outlet via grassed lined ditches and empty into the Outlet through an 18" concrete culvert. Water from a short section of Walkup Road is included in this drainage as well. Sediment and nutrients may be of concern in this area as it is a short distance between this outlet to Dream Lake.

4. Bear Pond Outlet

Bay Road

There appears to be minimal issues at this road section. Routine maintenance and monitoring of this area is recommended.

Route 149 Road

There appears to be minimal issues at this road section. Routine maintenance and monitoring of this area is recommended (see the *Land Use Section* for more information on this site).

Dream Lake Road

At this road intersection there is a substantial amount of sediment that flows into a wetland on Dream Lake. This is a dead end road that mainly is used for residential travel and it is suspected that the material found at this location is migrating from up above the road and the road is not contributing a high quantity of nonpoint source pollutants. That being said, typical sanding and salting operations do add to nonpoint source pollution and care should be taken to clean up in the springtime should occur.

Forestland and wetlands are great for treating stormwater before it enters a waterbody. In essence, the only contaminants coming from this section of highway should be winter road de-icing products (salt and sand), possibly some oil and grease and anti-freeze from leaking automobiles, fecal coliform bacteria from animals, and thermal impacts from hot road surfaces. To date, there has been no comprehensive study of the water quality of the stormwater coming out of these culverts, and therefore no quantitative measure can be given herein. However, the above mentioned pollutants are likely present on this roadway to some degree based on visual inspection, mandatory roadway maintenance (de-icing activities), and common sense. With having just one area, it will be easier to concentrate on a potential solution that would allow the stormwater to be treated before it goes into the lake. Overall, the impacts to Dream Lake from road runoff are seen as low-moderate, and can be minimized through some roadside drainage improvements. These drainage suggestions are listed in the "Recommendations" section below.

Recommendations to Protect the Quality of Dream Lake

Currently, the Dream Lake watershed appears to be in good condition related to the level of pollutants which enter the lake through surface runoff. However, there are situations that exist within the watershed which may have negative impacts on the water quality and overall health of Dream Lake.



The following recommendations are intended to provide specific, cost effective means to protect the quality of the water of Dream Lake. 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 Town of Dream Lake codes. They are primarily geared towards local stewardship of the lake and projects that can be done locally to protect this lake. The Dream Lake Association will likely be the catalyst for much of the protection and improvement efforts to be undertaken for Dream Lake, 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 Dream Lake, 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 Dream Lake, and to provide information relating to issues on Dream Lake to all shoreline and association residents. The ongoing activity and interest within this association is paramount to the continued long term health of Dream Lake.
2. Give an annual presentation to the Queensbury Town Board relating to work accomplished on Dream Lake and the status of water quality, nuisance aquatic weeds, and other related issues.
3. Contact Scott Kishbaugh (518.402.8282 or sakishba@gw.dec.state.ny.us) to discuss Dream Lake's entry into 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.

The New York State Federation of Lake Associations is also a place to get current information at their website: <http://www.nysfola.org/>.

4. 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.
5. Have copies of this document sent to all residences along the lake with a cover letter encouraging them to get involved with the watershed association.

Nuisance Aquatic Plant Recommendations

1. The Dream Lake Association should consider the formation of an aquatic plant management committee, if one does not exist. The committee should review the recommendations contained in this report and initiate aquatic plant management.
2. Consider conducting an aquatic plant survey. This survey will help to understand the aquatic vegetation in your lake. As noted in the Aquatic Plants section of this document, Eurasian Milfoil has been found and a management strategy has been used. However, little if any information about the health of the aquatic vegetation is available. There are several organizations that do this type of project, Paul Smith's College and Cedar Eden Environmental are two groups in the north that do this and Larry Eichler at the Darrin Freshwater Institute in Bolton does this as well. The cost should be +/- \$1200.
3. A milfoil management strategy should be developed which includes education and management of milfoil as well as other invasive/nuisance species. Eurasian watermilfoil is found upstream in Glen Lake, and it is not a stretch to envision it arriving in Dream Lake.
4. Dream Lake is outside of the Adirondack Park, however a great resource for terrestrial invasives is the Adirondack Park Invasive Plant Program (APIPP). APIPP is involved with aquatic invasives as well. Check out their website, as it is very detailed with invasive species within the Adirondack Park.
Hillary Oles, Program Coordinator
c/o Adirondack Nature Conservancy
PO Box 65
Keene Valley, New York 12943
518-576-2082 x 131
email : holes@tnc.org Website: <http://www.adkinvasives.com/>
5. Work with the Warren County Soil and Water Conservation District to develop a presentation on Dream Lake for a Town of Queensbury Board Meeting.

Water Quality Recommendations

Stormwater

1. Work with Warren County Department of Public Works and Town of Queensbury DPW to ensure that cleanup after winter sanding operations is done. Sweeping the roads and removing the excess sand will help to reduce the amount of sediment that may reach a waterbody. The Dream Lake Subwatershed and the Bear Pond Subwatershed would be the areas to focus on, since the stormwater in the Glen Lake Subwatershed is currently being remediated through a NYS Department of Environmental Conservation grant.
2. Develop a stormwater sampling program for roadside drainages. Evaluating stormwater quality will help to identify the areas of greatest concern for impacts on water quality. Phosphorus and Nitrogen would be key indicators that a retrofit project may be needed.

Sediment and Erosion Control

1. Work with the NYS Department of Transportation, the Warren County Department of Public Works and the Town of Queensbury DPW to hydroseed any newly cleaned ditches in the watershed. Bare ditches can increase sedimentation to a waterbody if left untreated. The Warren County SWCD can provide this assistance to the Warren County DPW and the Town at low cost.
2. Educate the residents within the watershed on the issue of erosion control. Since the majority of lakeshore properties have a dwelling, the chances for large scale erosion from development is low. However when one looks at the rest of the watershed, there are a number of places that could be of concern, since Dream Lake is the "bottom" of the run.
3. Construction Site Sediment Control: Maintaining the soil at the job site not only reduces the effects of it moving offsite, but can save money for the developer. Soil that migrates from a construction site will need to be replaced, why not capture it and retain it on-site instead of purchasing more to bring in? That would help reduce purchase and trucking costs. Keeping soil on site would reduce the likelihood of receiving soil from another location that may have a non-native weed seed in it. Japanese Knotweed is an example of an invasive plant that can be transported this way, and once it is in the locale, it is nearly impossible to eradicate.

Septic Systems

1. Contact Adirondack Community College professor Holly Ahern to determine the feasibility of the college 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 Dream Lake.
2. 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.
3. 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.
4. Sponsor an annual water quality workshop and invite interesting speakers to discuss the issues surrounding Dream Lake.

Lawn Care/Fertilizers

1. Through an 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. This is a simple, yet extremely valuable tool to reduce nonpoint source pollutants (i.e. phosphorus, nitrogen) from affecting the lake's water quality.

Summary and Conclusions

Lakes are one of our most precious natural resources. As population increases and development pressure expands its force on these resources, it is imperative that we strive to maintain these natural systems in a state where it can continue to support the aquatic ecosystem that it has developed. One key component in this effort is watershed management. By understanding the lands surrounding a lake, we can begin to understand how lakes respond to man's influence.

Over the past year, a watershed planning effort has taken place on Dream Lake to determine the current health of the lake and its surrounding watershed. Local citizens, the Dream Lake Association, the local Soil and Water Conservation District joined together in this undertaking, utilizing their diverse backgrounds and expertise in this endeavor. A close look was taken at the current and historical water quality of Dream Lake, the status of nuisance aquatic plants in the lake, and the condition of the land surrounding the lake. By reviewing all of this information, we get a feel for the health of the lake in its current state. Perhaps more importantly however is that this information gives us a perspective on where the lake is headed in the near future in relation to these issues.



A primary concern in lake management today is nuisance aquatic plants. One specific plant is of considerable concern for residents of Dream Lake; Eurasian Watermilfoil (milfoil). Milfoil is an aggressive plant which grows quickly and abundantly, with the potential to create large dense beds in water depths of up to twenty feet, in good conditions. Milfoil does not exist in Dream Lake, but it is found upstream in Glen Lake. Recommendations for management include completing an Aquatic Plant Survey for the Dream Lake and conducting monitoring on a yearly basis.

The third component of this study was an evaluation of the watershed lands surrounding Dream Lake. The quality of a lake's water and ecosystem are largely a result of the lands surrounding the lake. As development increases, many times there becomes a corresponding decrease in water quality due to road runoff, construction practices, and other related items. In the case of Dream Lake, there is a varied amount of development, much of which is found in the Glen Lake Subwatershed. This subwatershed has had much work done in it to reduce nonpoint source pollutants.

Road runoff in intensely developed areas can be a major contributor to lake water quality decline if this runoff picks up contaminants which lie on road surfaces. To determine any potential impacts to Dream Lake, a watershed wide study of the roads and highways was conducted. For the most part, there are minimal areas that likely are contributing large amounts of sediment to Dream Lake. Fortunately for the lake there are many wetlands that help to filter out nonpoint source pollutants before they enter Dream Lake.

Another potential water quality concern for lakes is failing on-site septic systems. It is difficult to determine whether one of these private wastewater treatment systems is working properly, but through nearshore water sampling, some of these sites can be detected. A good volunteer program exists through the NYS Federation of Lake Associations regarding volunteer testing of private systems, with a main component being homeowner education. To minimize the impacts of failing septic systems on Dream Lake, a strong educational effort for shoreline residents is strongly recommended regarding the necessary maintenance of their systems and other potential water quality impacts such as excessive lawn fertilizing.

Dream Lake as a waterbody will be around for many years to come. Development around Dream Lake and within its watershed is not likely to end in the near future. Poor management of these lands can strongly impact the water quality and aquatic ecosystem of Dream Lake. It is incumbent upon the residents and visitors of this precious resource to be vigilant in protecting this lake for the future. This report is intended to summarize and prioritize natural resource issues within the watershed and to improve our awareness of them. It is the responsibility of the landowners within the watershed to become stewards of this lake so generations beyond themselves may enjoy its beauty.

Useful Websites

- Warren County Soil and Water Conservation District: www.warrenswcd.org
- New York State Department of Environmental Conservation: <http://www.dec.state.ny.us/>
- Dream Lake Park District: <http://www.loonlakeassociation.com/>
- New York State Federation of Lake Associations: <http://www.nysfola.org/>
- Adirondack Park Invasive Plant Program: <http://www.adkinvasives.com/>
- Warren County: <http://www.co.warren.ny.us/>
- Adirondack Park Agency: <http://www.apa.state.ny.us/>