

Friends Lake Watershed Assessment



Prepared by the

Warren County Soil and Water Conservation District

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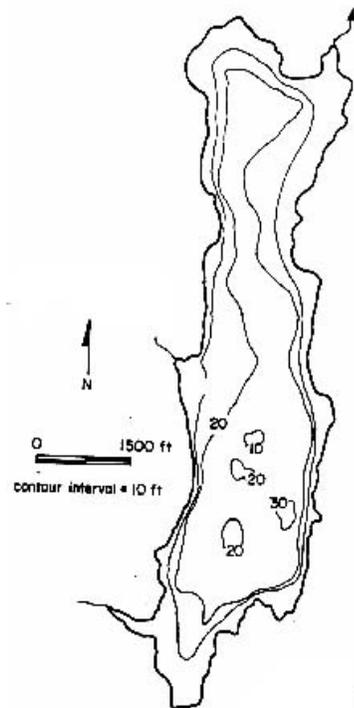
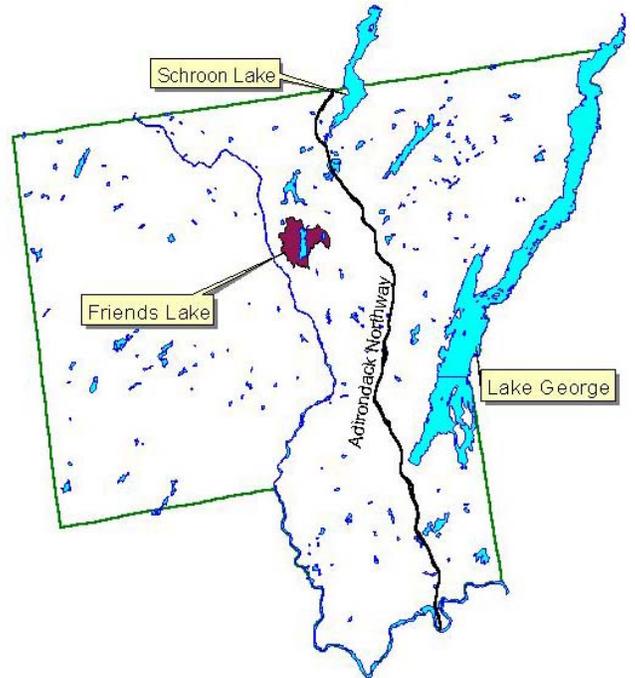
Document Overview and Summary

This document describes a cursory evaluation of the conditions of the Friends Lake Watershed, specifically related to the presence of existing sources of pollutants which could affect the water quality of Friends Lake. This study results from a request by the Friends Lake Property Owners Association (FLPOA), who has been very active in addressing issues on the lake and within the watershed. The District has conducted Watershed Assessments of five other lakes in Warren County to date, each lake having issues of concern in relation to either water quality or nuisance aquatic plants.

After preliminary field and office review of the watershed and the land uses within it, the District has determined that there are very few identifiable impacts to the water quality of the lake such as erosion, stormwater, logging, agricultural runoff, and other nonpoint sources of pollution. In addition, the FLPOA has been diligent in addressing such issues as septic system impacts on water quality, nuisance aquatic plants, recreational conflicts, and development impacts.

Therefore, this evaluation will be an abbreviated version of a full report on recommendations related to issues and recommended strategies for remediation.

However, within this document exists information regarding the lake's characteristics, its watershed and land uses, its water quality, and some recommendations for future actions. It should be used as a resource for general information about the lake and its surrounding watershed, and as a guideline for potential stewardship activities to benefit Friends Lake.



Lake and Watershed Characteristics

Friends Lake is one of the largest lakes in Warren County, covering approximately 450 acres of area. The watershed for the lake is relatively small (3,558 acres) as compared to the size of the lake, which overall acts as a benefit to the lake's water quality (with proportionally less land area contributing pollutants). There is a fair degree of development around the lakeshore (see Figure 2), mostly concentrated on the eastern shoreline. There is no public access to Friends Lake,

although there are a number of small homeowners association boat access points along the lakeshore.

The average depth of Friends Lake is 14 feet, with a maximum depth of 30 feet. The volume of the lake is approximately 6,300 acre feet, and with the flow into and out of the lake, the hydraulic retention time (the "flushing rate" of the lake) is approximately 0.9 years (NYS DEC Morphometric Atlas of Selected Lakes, Region 5, January 1998). The lake level is controlled by a dam at the outlet of the lake, which maintains an average elevation of approximately 913 feet above mean sea level. Friends Lake is classified as AA (Special) by the NYS Department of Environmental Conservation, which is the highest classification for a waterbody in New York State. This designation is not specifically related to current water quality, but rather sets a standard that the lake is meant to be maintained at for best possible use. "AA Special" is rated as drinking water quality as its achievable standard, although it is important to note that it is not recommended that water be consumed from any surface waterbody without proper filtration and treatment (including Friends Lake).

The primary land coverage/land use in the Friends Lake watershed is forestland (by quite a bit), followed secondarily by haylands and open fields. Development within the watershed away from the shoreline is very sparse, and the number of houses on the shoreline is similar to the number of houses within the rest of the entire watershed.

The soils within the watershed are 85% Bice soils, which are deep, well drained soils. Slopes of the landforms within this soils series range from 3 to 15 percent, and the seasonal high water table is generally at a depth of 6 feet or more. This is also true of bedrock outcrops, although there are sporadic areas of rock outcropping (and also high water table) which are important to note when considering development and other land use modifications. The Warren County Soil Survey contains volumes of practical information about the soils at all points within the watershed, and can act as a tool for land use planning and development activities. The Soil Survey is available at the Warren County Soil and Water Conservation District office in Warrensburg.

Lake Water Quality and Aquatic Plants

The Friends Lake Property Owner's Association has been actively participating in a voluntary water chemistry monitoring program through the NYS DEC, in a program called the Citizen's Statewide Lake Assessment Program (CSLAP). This program provides funding to monitor water quality for five years, measuring such items as phosphorus, pH, transparency, and other such items. Being a five year on, five year off, five year on program, the Lake Association has begun their second round of sampling in 2001 and will carry through 2005.

Additional studies have been conducted by Larry Eichler of the Darrin Freshwater Institute in Bolton Landing, in conjunction with the lake association. The following is the executive summary of a report completed in year 2000 by the DFWI, and available through the Friends Lake Property Owners Association:

"At the request of Mary Van Leuven of the Friends Lake Association, a summary of historical water quality data for Friends Lake was developed by the Darrin Fresh Water Institute. The findings of this data review include the following:

1. *Friends Lake is best described as an oligotrophic to mesotrophic lake, indicating that the nutrients necessary for the growth of aquatic algae are low to moderate. Water transparency is high and nutrient and contaminant levels are low.*
2. *New York State classifies Friends Lake as Class AA(special), their highest classification, indicating that water quality is considered suitable for any and all uses including as a drinking water source with minimal treatment.*
3. *Water quality in Friends Lake is currently adequate for the primary use of its residents, namely recreation. No water use impairment was noted by coliform bacterial examinations, with values well below New York State Standards for contact recreation.*
4. *No long term changes in water quality were observed over the 20 years of record. Impacts typical to our region, from acid precipitation and shoreline development, were not observed to produce substantial water quality changes in Friends Lake over the last 20 years.*
5. *Aquatic plant populations for Friends Lake are diverse (34 species) and healthy, providing habitat, shelter and food resources for all other components of the lake food chain. No exotic plants species were reported in a 1996 survey."*

Stormwater/Road Runoff

Stormwater runoff from roads and other impermeable surfaces can carry phosphorus and other pollutants into waterbodies. Friends Lake is fortunate in terms of impacts from road runoff, in that it is adjacent to only one short section of highway. County Route 46 (Atateka Drive) runs adjacent to the lake at only one short section (see figure 1), and there are only two culverts which enter the lake directly from this road. The amount of road surface which these culverts drain is relatively small, and water quality impacts from stormwater runoff from this section are seen as minimal. There are no improvements to the drainage system recommended from Atateka Drive.

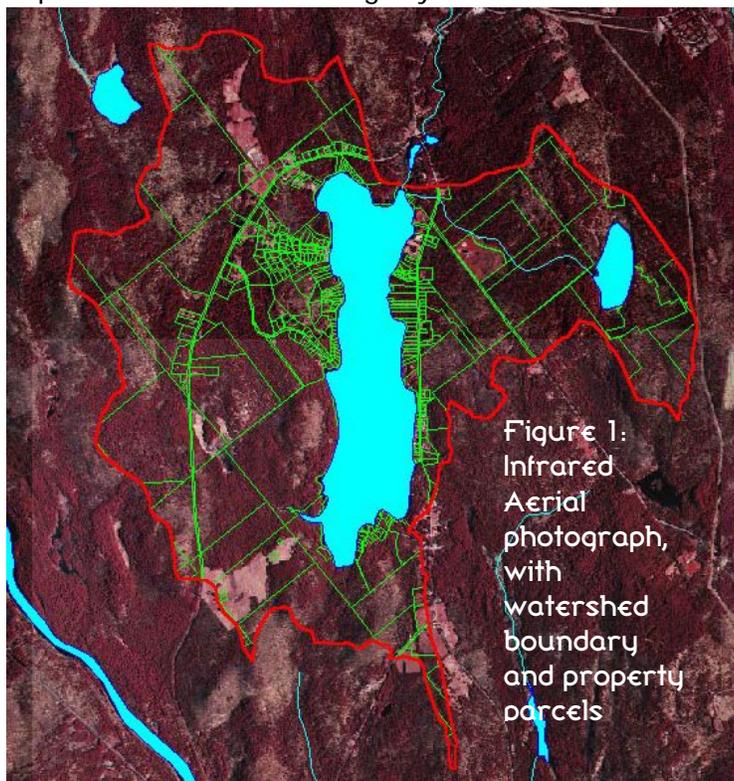


Figure 1:
Infrared
Aerial
photograph,
with
watershed
boundary
and property
parcels

There are a few dirt and gravel roads which provide access to lakeshore properties on Friends Lake. Each of these roads was reviewed for proper drainage and erosion control, and no water quality problems were found which would arise from poor drainage and ditching techniques.

On the west side of Friends Lake is Friends Lake Road (the thick green line on figure 1 to the west of the lake). There is a great deal of buffering between the lake and Friends Lake Road, and there are no undue impacts to lake water quality from this road. In addition, although there is a development and associated smaller roads and driveways on the northwest shore, field reviews showed no appreciable

concern relating to erosion and stormwater runoff into Friends Lake.

The only recommendation related to roadway maintenance within the watershed is diligence and proper management of secondary roadways within close proximity to the lake and direct drainages to it. Maintaining current operating practices is adequate to stave off stormwater pollutants from roadway runoff.

Onsite Wastewater Treatment (Septic Systems)



There is no public (or private) sewer system around Friends Lake, which means that all residences and commercial properties within the watershed utilize an onsite wastewater treatment system to address wastewater. When properly designed, installed and maintained, septic systems 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 major concern especially on lakes where lot sizes are small and many of the structures on these lots are older.

Figures 1 and 2 depict the tax map parcel data for this area, overlain on a digital orthoquad photograph. The tax parcel information used to develop this figure are from the 2000 Warren County tax parcel database. Using an ArcView Geographic Information System, an assessment of the age of lot developments on the lake was created. Figure 2 has a colored breakdown of the parcels, based upon whether or not they have development on them and the timeframe in which the structure was built. This information is useful to characterize the history of development on Friends Lake, and also to get a potential feel for the age of the septic systems around the lake. However, the latter is only viable assuming the systems were not upgraded or

replaced. Individual assessments or building permit reviews would be necessary to determine if this were the case.

In Figure 2, the color coding is as follows: Pre 1900 are blue, 1901-1950 are green, and 1951-2000 are orange. There are four structures identified as being built prior to 1900 on Friends Lake, thirty six from 1901-1950, and sixty five from 1951-2000. The earliest structure identified on Friends Lake was built in 1860, and the most recent was in 2000 (the database was developed in year 2000, and does not account for more recent development).

So how does this information relate to septic systems and their impacts to lake water quality? This information should be used as more of an educational tool than anything else, to let residents know that about half of the development on the shoreline of Friends Lake was prior to 1950. Without repair or replacement of those systems, they would have ceased to serve their intended purpose of successfully treating wastewater a long time ago. This being the case, effluent from failing septic systems would go largely untreated into the groundwater or into the lake directly. In many cases, this failure would go unnoticed, as the soils are very sandy within the Friends Lake watershed, and the failure would be subsurface.

A beneficial follow-up activity to this assessment would be to determine how many of the older systems have been upgraded or replaced altogether, and how many remain as original systems. This might provide a good assessment of the potential for septic system failure impacts to the lake.

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 Friends 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* 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 Friends Lake. 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 below.

Recommendations

Friends Lake and its surrounding watershed, overall, is in excellent condition by any number of parameters. Having a small watershed in relation to lake size, having a relatively small level of development within its boundaries, and having a proactive Lake Association are all benefits to the water quality and overall environment surrounding the lake. However, diligence is always warranted in lake management and water quality issues. With this in mind, the following are recommendations that will serve to protect and even improve upon the quality of Friends Lake and its surrounding watershed:

1. Maintain an active lake association to act as a hub to address issues of concern on Friends Lake, and to provide information relating to issues on the lake to all shoreline and association residents. The ongoing activity and interest within this association is paramount to the continued long term health of Friends Lake.
2. Give an annual presentation to the Chester Town Board relating to work accomplished on Friends Lake and the status of water quality, nuisance aquatic weeds, 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. 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 and the Darrin Freshwater Institute's report on nuisance aquatic plants (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.
6. 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.
7. Sponsor an annual water quality workshop and invite interesting speakers to discuss the issues surrounding Friends Lake.
8. 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.
9. 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.
10. 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.

Conclusion

Friends Lake as a waterbody will be around for thousands of years. Within only a few short decades, development around Friends Lake has occurred to a point where a good deal of the shoreline is developed with residential properties. Poor management of these lands can strongly impact the water quality and aquatic ecosystem of Friends Lake, to a point whereby it can never regain its original state. It is incumbent upon the residents and visitors of this precious resource to be vigilant in protecting this lake for the future. We have the potential to pollute this beautiful lake but we also have the potential to keep it in its current state. With a strong stewardship ethic towards Friends Lake, it will continue to be a natural resource that our generation and future generations can greatly enjoy.