

Forest Lake/Lake Allure Watershed Assessment



Prepared by the

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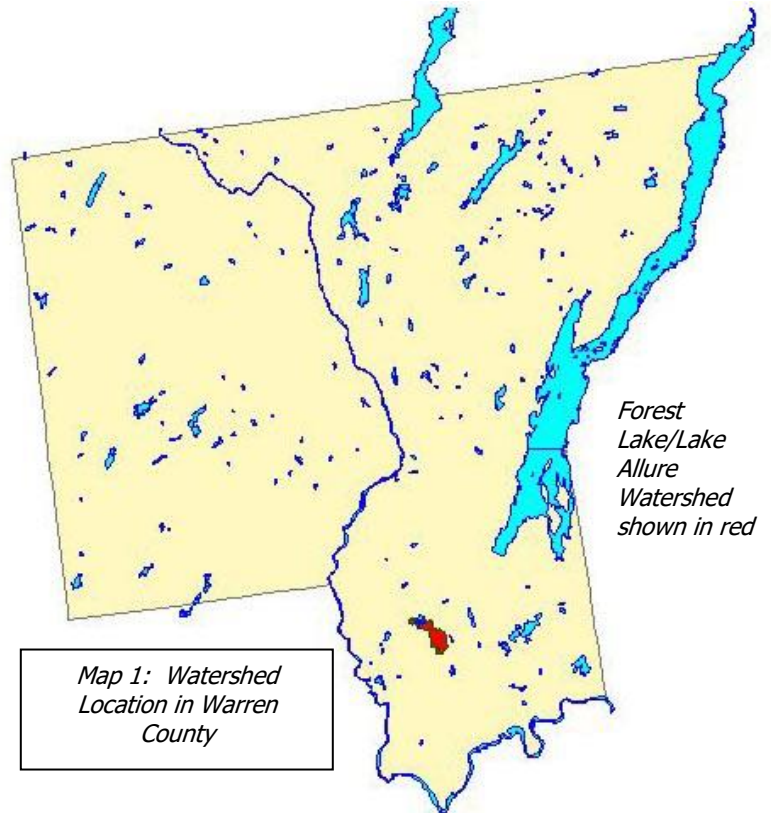
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Forest Lake/Lake Allure Watershed Assessment

Introduction

Forest Lake and Lake Allure are small lakes within Warren County (approximately 24 surface acres for Forest Lake and 4.5 acres for Lake Allure), located in the Town of Lake Luzerne. The lake/homeowner's association for the area is called the Northwoods Association, which acts not only as an advocate for these lakes, but also administers approximately 286 acres of common property within the watershed. The Northwoods 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. 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 the year 2000. A component of this effort was to complete an assessment of potential and existing nonpoint sources of pollution and nutrients into Forest Lake/Lake Allure, 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 Northwoods Association has conducted a watershed wide assessment of potential and existing sources of these pollutants entering Forest Lake and Lake Allure, 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 Forest Lake/Lake Allure, and to determine the existing condition of the lake and its surrounding watershed. Other components of this overall effort include an aquatic plant survey conducted by the Darrin Freshwater Institute (a separate document available through the Northwoods Association), and an ongoing water sampling program (Citizens Statewide Lake Assessment Program) being undertaken by volunteers who live on the lakes. These efforts are intended to give local residents and elected officials of the Town of Lake Luzerne a better view into the condition of these lakes, and to provide insight into issues that may be negatively impacting them.

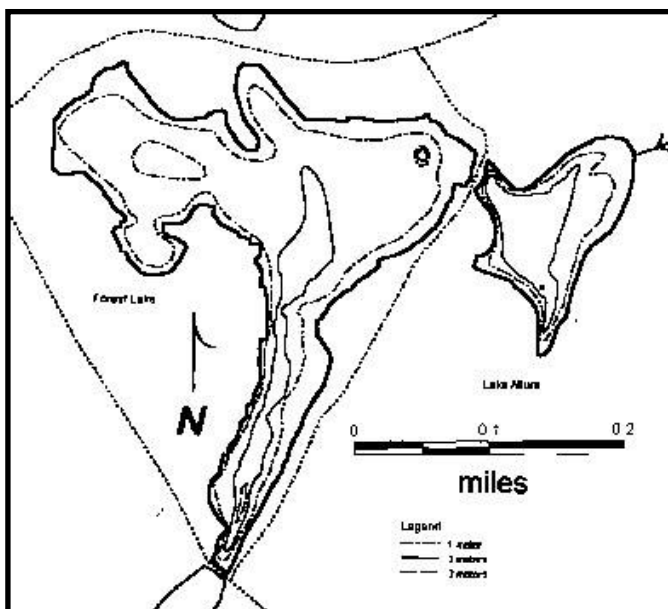
The following report is a brief review of the findings related to an assessment of the lake itself and the land use characteristics and conditions within the watershed, and it includes specific recommendations for improvement projects and educational efforts which could be undertaken to protect and improve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

Lake and Tributary Characteristics

Overview

Forest Lake is located in Warren County, in the Upper Hudson River watershed drainage. Forest Lake is approximately 0.3 miles long; it is the second lake in a chain of lakes that drain to the Hudson River along State Route 9. The lake (24.3 acres) and watershed (885 acres) are encompassed within the Town of Lake Luzerne, but its drainage includes Lake Vanare. The maximum depth of Forest Lake is approximately 12 feet.

Lake Allure is located on the east of Forest Lake and is separated by a small dam. Lake Allure is approximately 0.12 miles in length and is 4.5 acres. Maximum water depth of Lake Allure is approximately 9 feet. Water from Lake Allure flows into Forest Lake, as it has a higher water surface elevation resulting from a controlled dam structure.

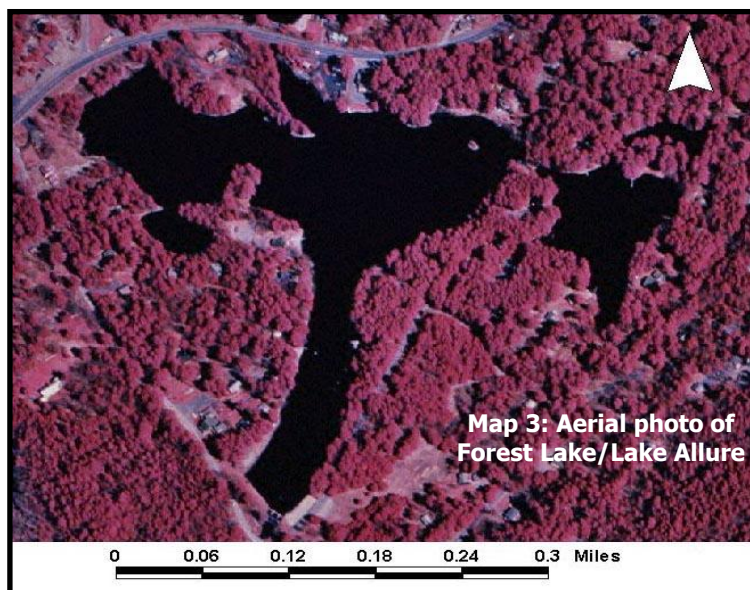


Map 2: Bathymetry of Forest Lake/ Lake Allure

Lake Water Quality

In 2001 Forest Lake was admitted into the NYS Citizens Statewide Lake Assessment Program (CSLAP) for the ensuing five years.

The purpose of this program is to obtain some relatively general information on the lake's water quality for a five year period, in an effort to determine any problems or negative trends in the lake's water quality.



Map 3: Aerial photo of Forest Lake/Lake Allure

In this program, volunteers from the lake association collect water samples, offer them to NYS DEC for analysis, and the data is collated via the five annual CSLAP reports. Parameters measured in CSLAP are:

- Water temperature: Taken in the field, affects dissolved oxygen content.
 - Transparency: Taken in field, using a black and white secchi disk, estimates clarity of water.
 - Conductivity: Lab, measures electrical current in water, indicates presence of positively charged ions.
 - pH: Lab, measures free hydrogen ions – indicates acidity.
- Color (true): Lab, color of dissolved organic materials in water, may indicate the affect on transparency or phytoplankton.
 - Phosphorus: Lab, limiting nutrient that when in excess, can promote excessive plant growth.
 - Nitrogen: Lab, can act as limiting nutrient in some lakes.
 - Chlorophyll A: Lab, provides estimate of phytoplankton productivity, may be directly linked with phosphorus.

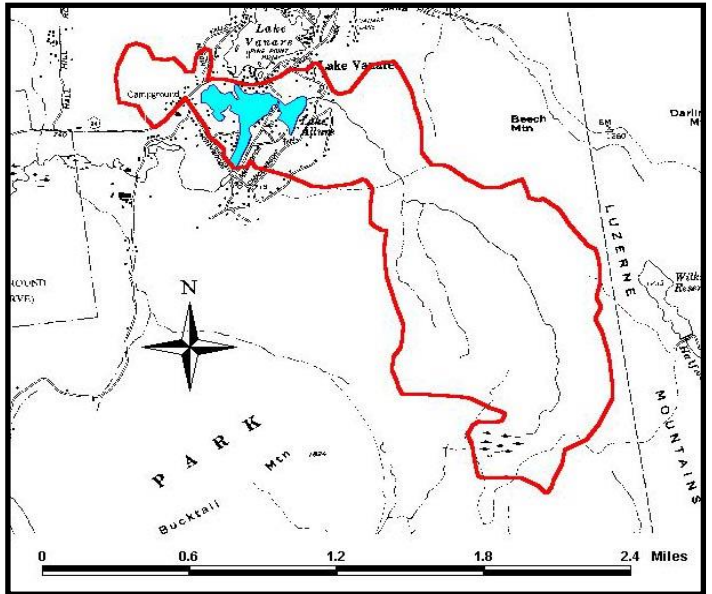
Sampling has begun for the 2001 season, and a preliminary report will be issued in the fall of or winter of 2001. Sampling will continue for four more years, then is out of the program for five years, and then the lake will be eligible to join the program again after this time. CSLAP sampling will allow for determining a baseline trend in water quality to be used in comparison with future sampling efforts.

Small increases in phosphorus from lawn fertilizers or failing septic systems can cause increases in lake algae content and a corresponding decrease in water clarity and quality. Once a lake has reached a lower level of water quality, it is very difficult to regain its original state. Information on lake management and water quality is available through the Northwoods Association, the Warren County Soil & Water Conservation District, and the NYS Department of Environmental Conservation.

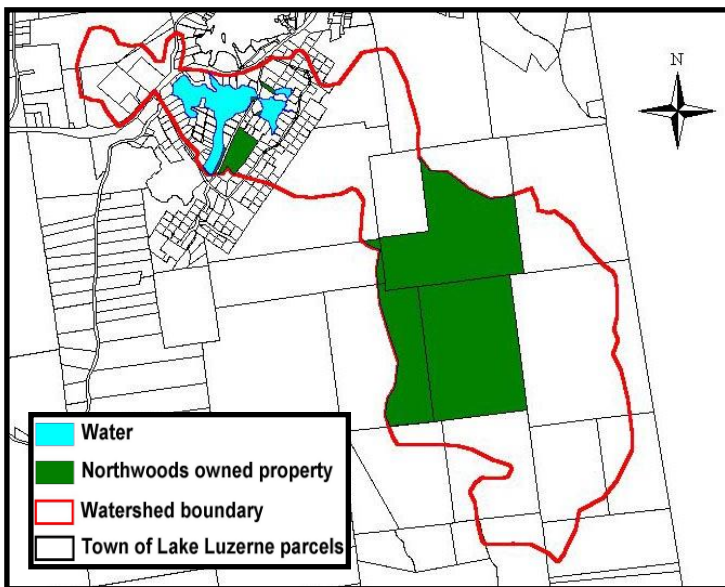
Forest Lake and Lake Allure Tributaries

There are two inlets into Forest Lake, the first is the outlet from Lake Vanare and the second is the outlet of Lake Allure. Lake Vanare has not had a watershed assessment or any other comprehensive study conducted to date, so there is little data that is available for use. However, examining the land use around Vanare reveals that while residential structures and a few hotels surround the lake, there is quite a bit of undeveloped area as well. This lake might be studied in the future by the Soil and Water Conservation District if there is interest from the local lake association on Lake Vanare.

The land around Lake Allure also is not heavily developed and likely does not have much impact on Forest Lake. However the houses that are surrounding the area could contribute to nonpoint source pollution from failing septic systems (see **Recommendations: Septic Systems**). Lake Allure has a major tributary that feeds into it approaching from the southeast. There is a trail that crosses this tributary that has been examined with the landowner and it appears that there is low concern for water quality impacts.



Map 4: Forest Lake/Lake Allure watershed. Red line indicates watershed boundary



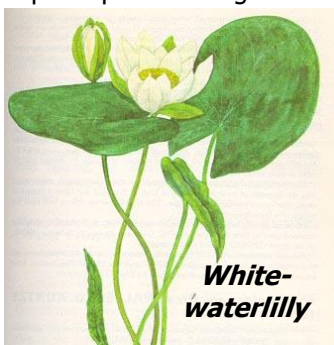
The Northwoods Association owns "common property" both within the watershed and outside of it, which has been managed for the past 30 years as a revenue source for the Association. Logging activities supervised by a professional forester have been generally well done, with minimal impacts to downstream water quality over the years. These parcels are not developable within the current common property designation, and therefore there will not be any new structures potentially impacting water quality of this lake.

Map 5: Indicates the property owned by the Northwoods Association within the watershed

Aquatic Plants in Forest Lake and Lake Allure

In October of 2000, the Darrin Freshwater Institute (DFI) was commissioned to complete a comprehensive study of the aquatic plant community in Forest Lake and Lake Allure. A total of 25 submersed plant species were observed in the lakes, and no Eurasian Watermilfoil was observed in either of these lakes as of this time. By having a high diversity of plants, it stands to reason that there is a healthy aquatic plant population. Aquatic vegetation was found to be present at almost all depths in both lakes, but there was limited plant growth in Lake Allure. A positive aspect for aquatic vegetation control is that there were no NYS rare or threatened species.

In order to maintain a healthy plant community there are several steps that should be taken. The first is the formation of an aquatic plant management committee to oversee management efforts. This group would be the lead in new techniques and technologies. Second, since there is very limited plant growth on Lake Allure, aquatic plant management is not necessary. Finally, post inlet and outlet areas of

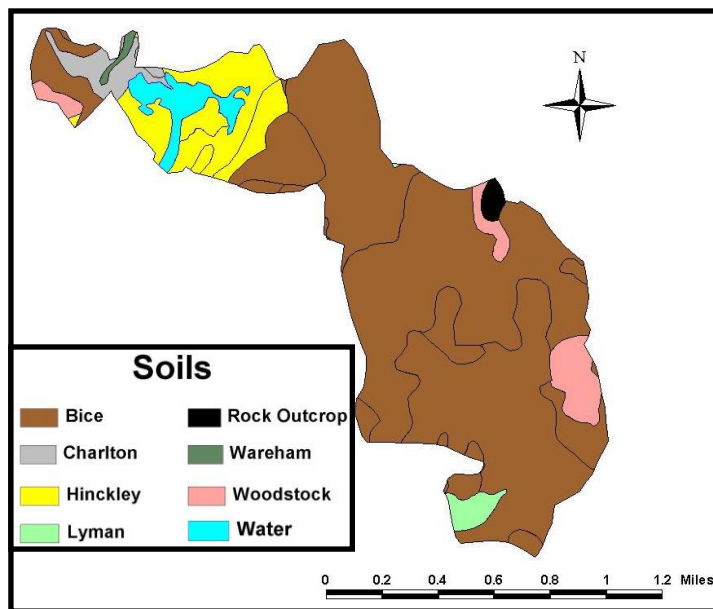


the lakes and all boat access areas with informational posters identifying Eurasian watermilfoil and how to prevent its introduction to Forest Lake. This serious aquatic nuisance plant can take over lakes and ponds and alter the ecology of the waterbody. It is extremely difficult to control and very invasive. For more detailed information on the aquatic plant community in Forest Lake and Lake Allure, refer to Darrin Freshwater Institute's Technical Report 2000-6, "An Aquatic Plant Survey of Forest Lake & Lake Allure, Warren County, New York. Copies are available through the Northwoods Association.



Soils in the Watershed

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 on which all land uses are based because their characteristics have an effect on what type of land use may suited to a particular location. For example, very sandy soils may pose serious problems with siting a house's septic system, while soils with a high water table or that are shallow to bedrock would present severe limitations to constructing buildings with basements. This section briefly evaluates the soils within the Forest Lake watershed in order to summarize what some of the potential concerns might be with land uses and the quality of the lake water. Information and soils maps of a much more detailed nature are available from the Warren County Soil and Water Conservation District.



Most (80%) of the soils in the Forest Lake Watershed are Bice fine sandy loam, which are primarily found in the forested/undeveloped portion of the watershed. This area is characterized by moderate to steep slopes and a few small areas

Map 6: Soils of the Forest Lake/Lake Allure Watershed

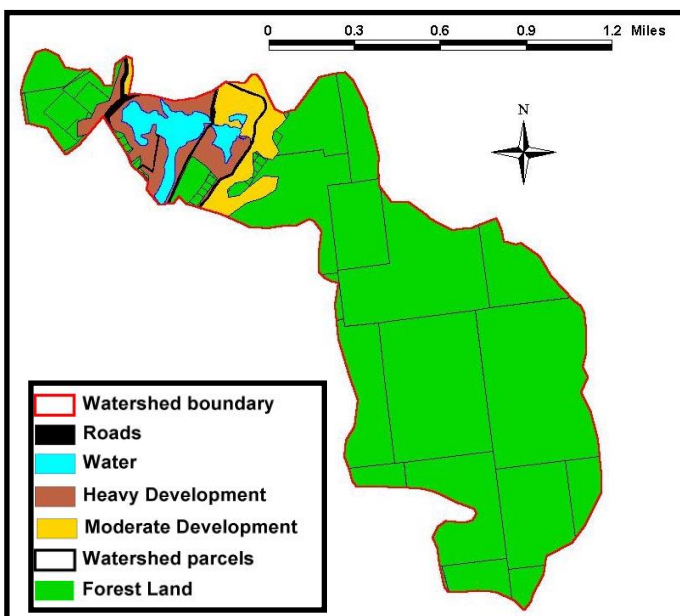
which are shallow (less than 20 inches) to bedrock or are rock outcrop. Most of the watershed, being largely forested and undeveloped, does not contribute any potential environmental impact to Forest Lake itself either from soil erosion or from sewage system effluent. This area is unlikely to be developed even in the future due to both site conditions and common property land ownership constraints.

The soils that surround the lake are a different story. These soils, which comprise 14% of the total watershed area, are primarily very sandy soils (Hinckley cobbly sandy loam – HnA, HnB, and HnC = 11% of watershed). These soils may present severe limitations for septic systems because they are considered to be poor filters of septic effluent and thus pose a potential impact on the lake’s water quality. Nutrients from poorly filtered effluent can contribute to increased algae and weed growth and pathogens/bacteria could contribute to raised coliform counts in the water and therefore have a potential effect on human health. This is not to say that this condition exists on Forest Lake, it just presents the potential for this to occur. A detailed study of the functioning of septic systems adjacent to the lake would have to be conducted in order to discover if there is an actual problem. At this point, there is no reason to suspect a serious problem with septic systems malfunctioning. The above shows that the characteristics of soils can present limitations to land uses and further development; therefore, need to be considered in land use planning and water quality protection efforts.

Recreational activities and second home/camp construction can expose the soils adjacent to the lake to soil erosion. Whenever situations of this nature exist they usually can be corrected by establishing vegetation on-site. If logging were to occur in the future in the eastern portion of the watershed, attention would need to be paid to drainage and erosion control on logging roads, skid trails, and the header(s).

Whatever the soil conditions, whenever modifying an existing land use for development it’s good practice to control soil erosion with a good site plan and follow-up. Erosion of soil into Forest Lake could cause problems with increased algae and weed production resulting from the higher level of nutrients carried to the water with the eroded soil. Both of these would have a negative impact on the quality of the lake and its surrounding community. Situations that could contribute eroded soil to the lake can be avoided with proper erosion control measures. Technical assistance and advice related to erosion control activities are available, at no charge, from the Warren County Soil and Water Conservation District at (518) 623-3119 or at disrict@nycap.rr.com.

Land Use in the Watershed



Map 7: Land use in 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. To determine the land uses within the Forest Lake/Lake Allure watershed, a geographic information system (GIS) was employed to develop a coverage related to the various land uses.

Forest Lake is a 24 acre lake in the eastern portion of the Town of Lake Luzerne. The watershed for Forest Lake/Lake Allure is approximately 885 acres, of which approximately 727 acres is forested. The most heavily developed areas of land within the watershed, as expected, are along the shoreline. Except for a few scattered lots (nine to be exact), the shoreline of the lake is fully developed. In the near shore area, there are

approximately 34 vacant parcels that are developable. The upland, forested, area of the watershed is zoned by the Adirondack Park Agency to allow development at a size of 1.3 acres and 8.5 acres per dwelling unit. If this land should become developed, great care should be taken to avoid

negative impacts on water quality of the lake. As can be seen from the "common property" map in this document, much of this upland forest area is owned by the Northwoods Association and management of this land is in their hands. Other properties in the upland area are privately held by individuals and companies such as International Paper. As mentioned in "Soils in the Watershed", natural resource conditions impose various limitations which can restrict development within the near shore area and in many other locations within the watershed.

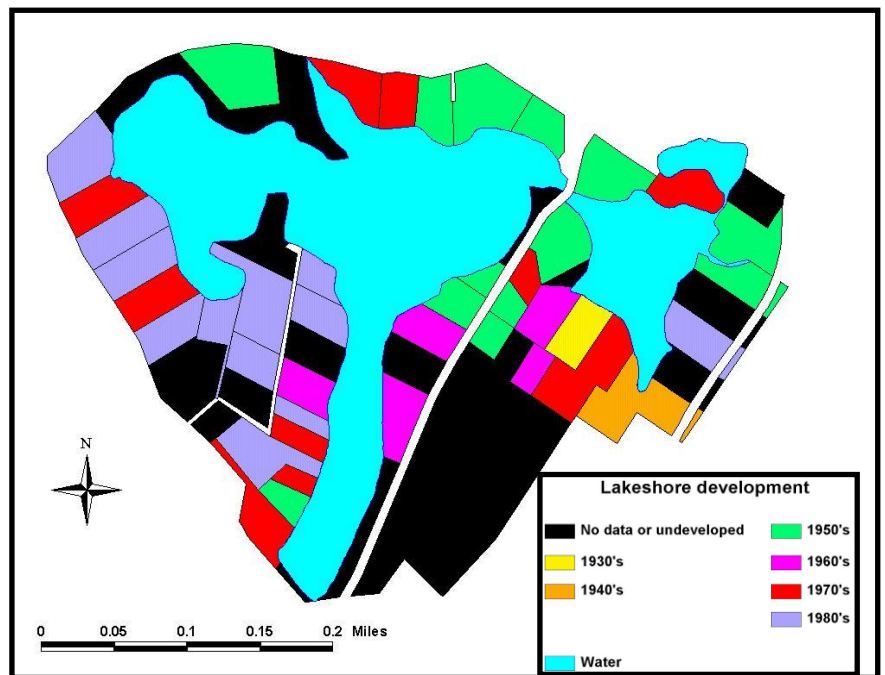
For the purposes of this assessment, the land uses in the developed areas were categorized as follows:

Land Use	Acreage
Forested	727
Moderately Developed	44
Heavily Developed	78
Roadway	8
Water	28
TOTAL	885

Lake Allure and Forests Lakes Development

Utilizing the updated parcel data from the Town of Lake Luzerne, development of structures within the watershed can be documented. Referring to the map, there are 19 lots that are black which are either undeveloped or have no data attached to them. In regards to the remaining 48 parcels the breakdown of development is as follows:

- 1930-1939: 1 lot developed
- 1940-1949: 2
- 1950 – 1959: 16
- 1960 – 1969: 5
- 1970 – 1979: 11
- 1980 – 1989: 3



Map 8: Lakeshore development

By examining the map you will notice that development in the 1950's and 1980's represents 56% of the development within the years on 1930 – 1990. Development in the 1950's was situated mainly to the north and east of the lakes. A total of 16 lots were developed in this decade with only 3 lots not situated on lakeshore. In the 1980's the south and western sides of Forest Lake were developed, essentially closing off the remainder of the lakeshore developments. A total of 11 lots were developed with only 1 not on lakeshore. A concern that has been noted is the age of the developments in regard to septic systems. Septic systems need routine maintenance in order to keep in working condition (**see Recommendations:** Septic System).

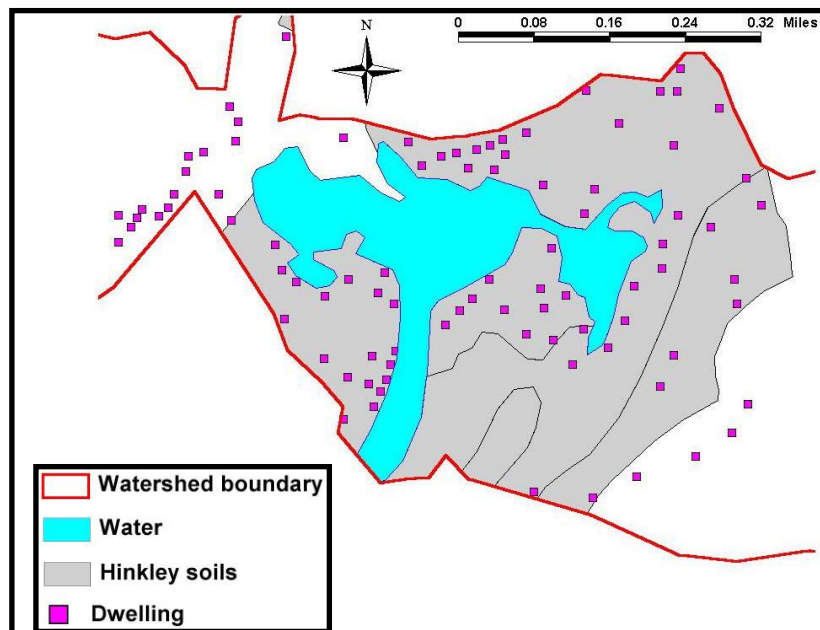
Land Use Considerations on Water Quality

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.

As seen from the land use map of the Forest Lake/Lake Allure watershed, the strong majority of the 885 acre watershed is forest land. In a water quality sense, this is very good for Forest Lake and Lake Allure.

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 major concern especially on lakes where lot sizes are small and many of the structures on these lots are older.



Forest Lake and Lake Allure have numerous year-round residences and camps upon their shorelines. Many of these residences were built in the mid 1950's through the 80's, with less concern given to the potential development impacts upon the water quality of the lake than is today. The building lot sizes around Forest Lake/Lake Allure 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 are likely to exist. 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.

As can be seen from map 9, most of the residential development within the watershed is clustered on the southwest corner of the lake. The soils at this location (as seen in gray) are Hinckley cobbly sandy loam. As defined in the Warren County Soil Survey, "If this soil is used for sanitary waste disposal systems, groundwater contamination is a hazard because of poor effluent filtering". In the "Sanitary Facilities" table of the soil survey, it

is stated that there are "severe" limitations on siting of septic tank absorption fields due to these soils being a poor filter.

In relation to lake water quality, with poor filtering capability of the Hinckley soils, there exists the possibility that some improperly treated septic effluent reaches the lake. However this has not been documented. A shoreline water quality sampling program geared to determining septic influences should be undertaken to more quantitatively determine if there is a problem which impacts the lake.

Soil Erosion in the Watershed

Eroding soils are 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.

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.

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 Forest Lake/Lake Allure 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.

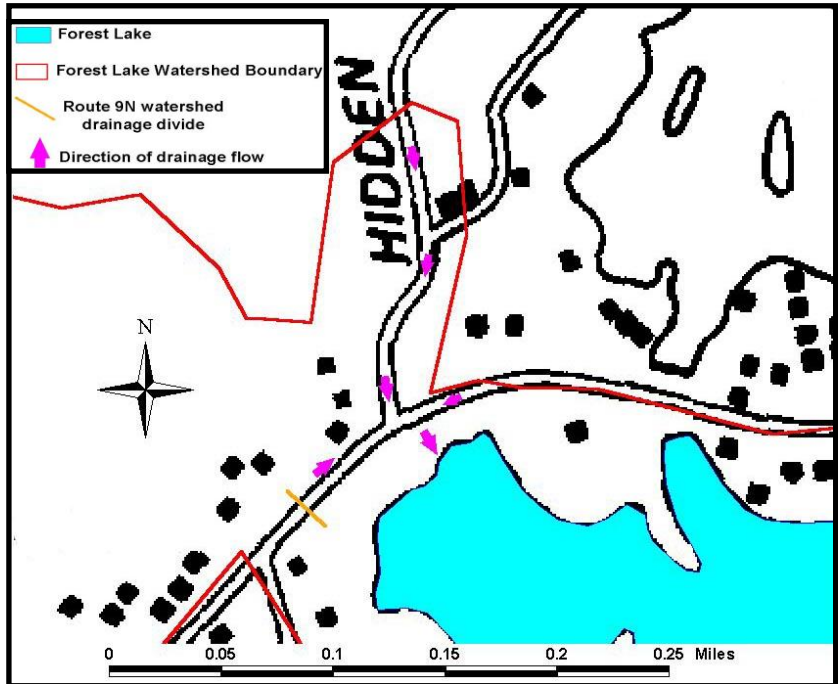
The degree to which the shoreline landowners apply fertilizers and pesticides to their lawns is not known on Forest Lake or Lake Allure. As there are no regulations or statutes regarding lawn care, there is no good way to control the application of these chemicals to shoreline areas. The best means of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

Road Runoff

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 inlet pipes and roadside ditches.

Forest Lake and Lake Allure, like most other developed lakes, have a roadside drainage network surrounding the lake. Every road within the Forest Lake/Lake Allure sub-watershed was evaluated on site for potential road runoff impacts to Forest Lake/Lake Allure. Fortunately even with the road network, there is



Map 10: Road drainage into Forest lake, along Route 9N.

only one section of road or highway that drains into the lake; Route 9N near Hidden Valley Road (western tie-in to Route 9N). In the case of Route 9N, there is no commercial

development such as gas stations, convenient marts, large parking lots and other such things which might harbor potentially harmful substances on their surfaces. This is a definite plus in terms of the runoff water quality. 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 this culvert, 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 Forest Lake and Lake Allure from road runoff are seen as 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 Forest Lake/Lake Allure

Currently, the Forest Lake/Lake Allure watershed appears to be in very good condition related to the level of pollutants which enter the lake, and in excellent condition regarding the amount of non-native nuisance aquatic weeds within the lake. However, there are situations that exist within the watershed which may have negative impacts on the water quality and overall health of Forest Lake and Lake Allure. It is these situations which the following recommendations have been put forth to improve upon.



The following recommendations are intended to provide specific, cost effective means to protect the quality of the water of Forest Lake/Lake Allure. 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 Lake Luzerne codes. They are primarily geared towards local stewardship of the lake and projects that can be done locally to protect this lake. The Northwoods Association will likely be the catalyst for much of the protection and improvement efforts to be undertaken for Forest Lake/Lake Allure, with assistance from the Town of Lake Luzerne, the Warren County Soil and Water Conservation District, and many others. By increasing the awareness of the issues on Forest Lake/Lake Allure, 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 Forest Lake/Lake Allure, and to provide information relating to issues on Forest Lake/Lake Allure to all shoreline and association residents. The ongoing activity and interest within this association is paramount to the continued long term health of Forest Lake/Lake Allure.
2. Give an annual presentation to the Lake Luzerne Town Board relating to work accomplished on Forest Lake/Lake Allure 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.

Nuisance Aquatic Plant Recommendations (as per Darrin Freshwater Institute study)

1. The Northwoods 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. Very limited plant growth is observed in Lake Allure, thus no plant management is necessary. Aquatic plant growth in Forest Lake is extensive, with surface growth and canopy formation present for a number of species. Plant growth at its current level interferes with recreational use of Forest Lake.
3. The Northwoods Association should post all boat access areas both on Forest Lake/Lake Allure and upstream Lake Vanare, with posters identifying Eurasian watermilfoil and urging boaters to clean their boats prior to launching and upon retrieval. This would help reduce the chance of spreading of Eurasian watermilfoil to Forest Lake and Lake Allure.
4. Water level drawdowns, as they have been used in recent years, are the least expensive aquatic plant management option. Survey results suggest that aquatic plant populations are healthy at the current time, even after a number of years of annual drawdowns.

Water Quality Recommendations

Stormwater

1. Work with NYS DOT on designing and installing stormwater improvement structures for the one identified drainage site (see map 10). This structure should be retrofitted or replaced with a structure that has the capacity to act as a catch basin/infiltrator to infiltrate the first flush of stormwater and remove road sand and debris from road runoff before it reaches the lake. This structure (pre-cast dry wells) has been proven to be effective at infiltrating stormwater in sandier soils such as are present on the shore of Forest Lake/Lake Allure.

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 (particularly the heavily developed southwest shoreline). 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 Forest Lake/Lake Allure.
2. Contact John Miller, past president of the NYS Federation of Lake Associations (FOLA) to get the Northwoods Association involved with their volunteer septic monitoring program. This program works on the Lake Association level through cooperation with local landowners to dye test individual septics 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 Northwoods Association 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 Forest Lake/Lake Allure. 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 that is adjacent to the lakeshore 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

Lakes are one of our most precious natural resources. As population increases and development pressure expands its force on this resource, it is imperative that we strive to maintain this natural system 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 Forest Lake and Lake Allure to determine the current health of the lake and its surrounding watershed. Local citizens, the Northwoods Association members, the local Soil and Water Conservation District, municipal officials and other parties 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 Forest Lake and Lake Allure, 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.

Through a volunteer water quality monitoring effort, Northwoods Association has begun collecting information on various parameters including lake clarity, algae content, phosphorus, and others beginning in 2001. With proper land use management, it is likely that the lake will continue to exhibit good overall health.

A primary concern in lake management today is nuisance aquatic plants. One specific plant of considerable concern for residents and visitors to Forest Lake and Lake Allure is Eurasian Watermilfoil (milfoil). At this time, Eurasian Watermilfoil is not found in Forest Lake or Lake Allure, however it has been found in a lake downstream in the chain of lakes. 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. The Darrin Freshwater Institute was commissioned in the fall of 2000 to undertake a survey of the lake and report on current conditions. Their findings indicate that there is a healthy aquatic vegetation community within the lakes. Recommendations for aquatic vegetation management are included in the report. Copies of the complete report are available through the Northwoods Association or the Warren County Soil and Water Conservation District.

The third component of this study was an evaluation of the watershed lands surrounding Forest Lake and Lake Allure. 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 Forest Lake and Lake Allure, most of the development in the watershed is adjacent to the shoreline, which creates a higher potential for impacts to the lake.

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 Forest Lake and Lake Allure, a watershed wide study of the roads and highways was conducted. Route 9N on the west side of Forest Lake is of concern, and an area was identified for stormwater drainage retrofitting. Working with the NYS Department of Transportation, this site can be improved to a state where stormwater impacts to Forest Lake are minimized.

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 Forest Lake and Lake Allure, 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.

Forest Lake and Lake Allure as waterbodies will be around for many hundreds or thousands of years. Development around Forest Lake and Lake Allure has been gradual over the past 70 years, but it has happened. Poor management of these lands can strongly impact the water quality and the aquatic ecosystems of both these lakes. It is incumbent upon the residents and visitors to these precious resources, that they be vigilant in protecting these lakes for the future. We most certainly have the potential to pollute these beautiful and enjoyable lakes, but we also have the potential to keep them in their current state. With a strong stewardship of the land and an understanding of watershed management, Forest Lake and Lake Allure will continue to be natural resources that our generation and future generations can greatly enjoy.