

THE MANAGEMENT OF FINDLEY LAKE

AND

ITS WATERSHED

PREPARED BY:

THE FINDLEY LAKE WATERSHED MANAGEMENT TEAM

IN COOPERATION WITH:

**FINDLEY LAKE PROPERTY OWNERS, INC.
TOWN OF MINA
CHAUTAUQUA COUNTY**

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Introduction

Findley Lake is located in the westernmost county (Chautauqua) of New York, three fourths of a mile east of the Pennsylvania state line (Routes 426 and 430) and one mile south of Interstate 86 (old Route 17). The lake was formed in 1815 by damming a creek, resulting in the flooding of two ponds. At that time a horizontal water wheel furnished power for both a sawmill and a gristmill. The water impounded behind the dam facilitated timbering on the watershed and floating of logs to the mill.

The maximum depth of the lake is 38 feet; however, most of the lake is less than 11 feet deep. Its 309.5 acres of surface area make it popular with recreational boaters. There are 543 vessels permanently moored at shoreline docks with no limit on boat or motor size. The lake provides widely varied recreational opportunities. A boat launch, owned by the Findley Lake Property Owners', Inc. (FLPO), is available to the general public weekdays during the summer months. The launch is closed weekends to prevent an influx of out-of-area vessels. Even so, the lake is sometimes extremely crowded, with 543 vessels permanently moored at shoreline docks.

In 1949, the FLPO was formed and purchased the area where the dam is located. Gates in the dam facilitate control of the lake level by the FLPO. The lake is lowered approximately three feet in the fall and refilled in the spring. This lowering of the water over winter helps protect dock structures from the damaging effects of ice. It also allows for some freezing of aquatic plants along the exposed shoreline.

The Findley Lake watershed includes Findley Lake and all the surrounding land whose runoff water drains into the lake. The watershed is comprised of five square miles that encompass twelve percent of the Town of Mina and two percent of the Town of French Creek. The lakeshore is home to about 200 year round residents. It contains approximately 318 housing units, many being seasonal or vacation homes. Adjacent areas, including part of the hamlet of Findley Lake, are not physically located within the watershed, but are closely associated with it. These areas contain a number of commercial, recreational and entertainment establishments and 180 homes. The watershed area also contains three active dairy farms, wetlands and forest.

Located at the headwaters of the West Branch of French Creek, the Findley Lake watershed is actually part of the much larger Ohio River Basin and Mississippi River system. The waters of the Findley Lake watershed ultimately travel through several states and exit the North American continent at the mouth of the Mississippi River into the Gulf of Mexico.

Executive Summary

Since 1986, Findley Lake has been in the Citizens Statewide Lake Assessment Program (CSLAP) in cooperation with the New York State Federation of Lake Associations (NYSFOLA) and the New York State Department of Environmental Conservation (NYSDEC).

In 1997, Findley Lake was selected by the New York State Federation of Lake Associations (NYSFOLA) and the New York State Department of Environmental Conservation (NYSDEC) as one of seven lakes statewide to be included in a pilot partnership program.

The main goal of the program is to assist local communities in developing and prioritizing management strategies in their watershed. This would be accomplished by combining the expertise from NYFOLA, NYSDEC, local government agencies and interested citizens to develop a watershed plan, the result being a series of management recommendations and prioritized projects which, when implemented, will lead to improved water quality of the lake.

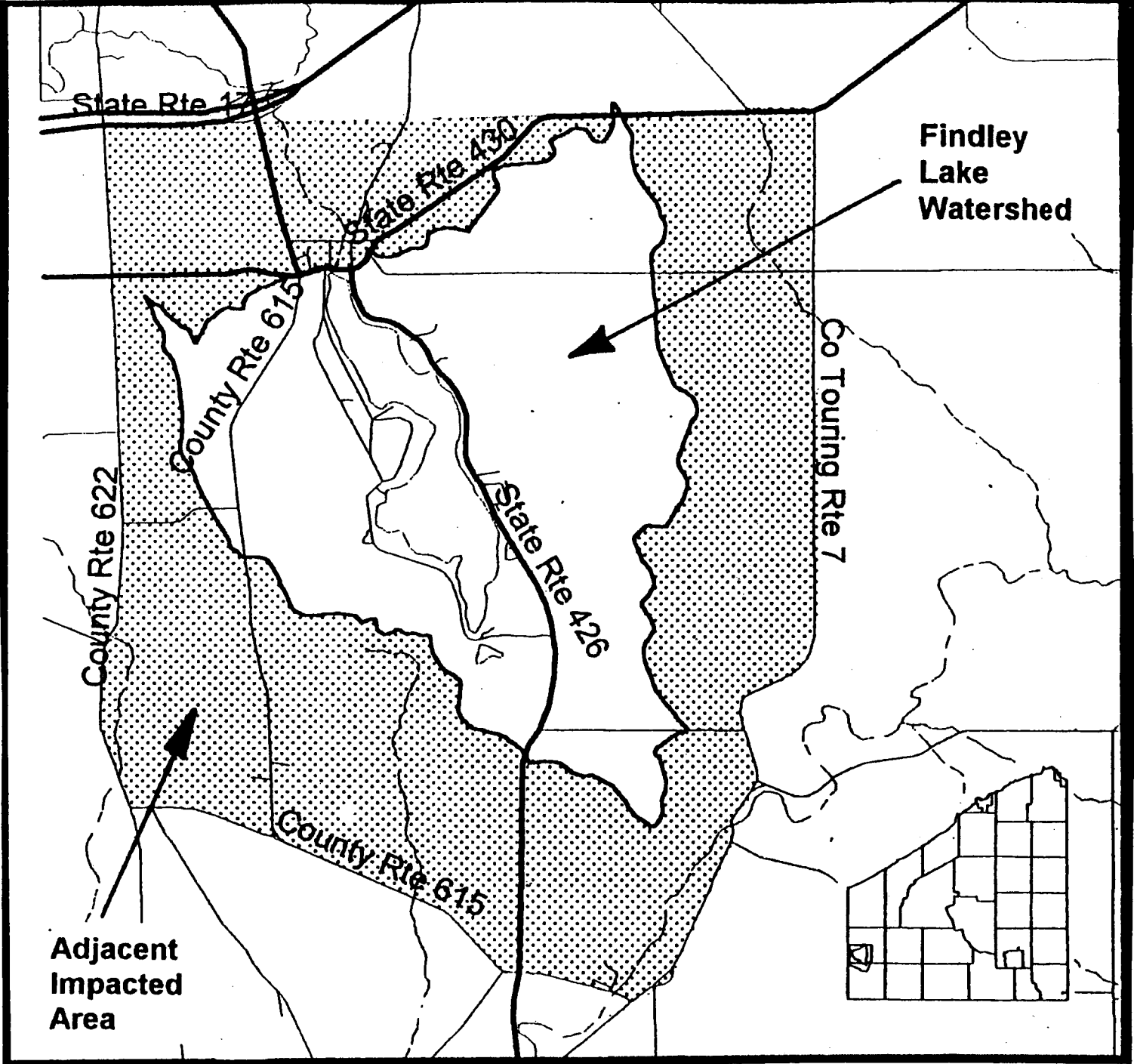
The first step in the project was to establish a committee of individuals (the Findley Lake Watershed Management Team) which would be responsible for development of the watershed management plan. The team represented a cross section of the watershed residents in the watershed. Due to the uniqueness of the watershed, the management team included representation from those in the watershed and those in close proximity to it. The adjacent map defines the watershed and the adjacent non-watershed areas having a direct effect on the lake.

A questionnaire regarding the watershed was sent to all individuals, organizations and local government entities and agencies located in either of these two geographical areas. A special thanks is given for the effort extended by the Chautauqua County Planning Department in the development and mailing of the survey.

The Findley Lake Watershed Management team was organized, and a project lake manager was appointed to be responsible for tracking the progress of deliverable items and for providing assistance and advice to the team. The NYSDEC and the Chautauqua County Planning Department shared mentoring for the project.

Joseph Kowalski of the FLPO was selected as the Project Lake Manager. His responsibilities were to coordinate all activities related to the development of the plan including identifying watershed groups, assembling mailing lists, and conducting information gathering, organizing meetings, publicizing events and tracking project implementation.

The Project Lake Manager would also mediate disputes that arose in the process of reaching consensus on recommendations regarding use of the lake and land within the watershed.



The scientist responsible for preparing the State of the Lake Report was William Boria, Chautauqua County Department of Health, Division of Environmental Health, and the NYSDEC. Mr. Boria and his associates assembled the technical data necessary to write a diagnostic report on the baseline condition of the lake and the watershed. They also identified monitoring locations where information and data would be collected. This information gathering was obtained using volunteers and interns working in conjunction with the Chautauqua County Health Department, Chautauqua County Soil & Water District, SUNY-Fredonia College and Jamestown Community College.

The State of the Lake Report (SOLR) was developed from data gathered during the project and from some of the CSLAP reports for Findley Lake. Topics studied included the geology, hydrology and biology of the lake and its watershed. The SOLR documents past and current water and land uses in the watershed. It also includes baseline data, a map of the entire watershed and adjacent area, land use maps, demographic information and water quality data. A mailing list of all people residing in the project area was also developed. The list was used to survey residents for both statistical and subjective information pertaining to their individual lake and watershed perceptions. Care was taken to ensure that the issues and concerns of all interested persons were addressed during the development of the management plan.

The SOLR provides a snapshot of lake quality, tributary water quality and land use for the period 1997 to 1998. It also includes information about all available past lake quality data, maps of the watershed and its land use and demographic information.

The ultimate goal was to produce a document to be known as the "Findley Lake Watershed Management Plan", which references the SOLR and prioritizes actions in the form of management recommendations with methods and strategies for their implementation. It addresses informing and involving the public, measuring and monitoring success, plus securing local, state and federal funding necessary for implementation.

The watershed management plan identifies the need for action. It further recommends actions for improving the quality of Findley Lake, thereby insuring its aesthetic, recreational and economic benefits into the future. In doing so, it identifies strategies that are beyond the economic capability of the local community to implement. The Findley Lake Watershed Management Team hopes that the plan will provide the basis on which application for additional funding and securing of that funding will be made.

The implementation of the management plan will take a long, concerted team effort of all watershed residents. The effort put forth must be constant throughout the years to have a pronounced effect on the watershed and the lake. Each individual watershed resident is responsible for this implementation. They should not rely on their neighbors to achieve the ultimate goal.

The development of the SOLR and Management Plan was done over a four-year period. The first year consisted of developing a team of volunteers to collect and disseminate the data. During this period, a survey was sent to all watershed residents and users. Samples of the lake and streams were taken and analyzed by the Chautauqua County Health Department and Microbac Laboratories, Inc. of Erie, Pennsylvania. The results of the Microbac analysis were sent to the lake scientist. The second year consisted of more water sampling, some soil sampling, well, septic system and radon sampling of residences along the lake. In addition, the information received from the survey responses was compiled. During the first two years, seven

general public meetings were held, over 584 water samples were taken from the lake and streams, 29 sediment samples were taken and 45 well samples were taken from lake residences.

The third and fourth years were spent in putting the data gathered into useable bases for interpretation for the SOLR. After this was accomplished, we began to develop the watershed management plan. There were 11 open meetings regarding the outline, information and discussion of the contents of the management plan.

Although we received funding from NYSFOLA for the study, we required additional funding and received this funding from the Town of Mina, Chautauqua County Water Quality Task Force and the DEC.

Education

Grant Funding

Recommendation:

The development of a committee to investigate and contact various agencies, which accept and fund projects that benefit the watershed. The committee should develop a rapport with legislators to acquire access to funds that are available from each level of government for projects. These funds will help projects that cannot be funded solely by the watershed residents and lake users. This activity must become a strong point, which is lacking today.

Recommended Action:

Develop a grant and fund raising committee to identify and pursue agencies that will fund watershed projects. These agencies should include, but not be limited to, all levels of government, foundations, trusts and environmental groups.

Grass Root Communication System

Recommendation:

The need for a good communication system is essential to inform individuals of the importance of their role in the preservation and improvement of the watershed. This system would inform them of needed and current legislation and projects that affect the watershed. All forms of communications should be used e.g. bulletin boards, newspapers, annual meetings, FLPO newsletter and flyers. Information regarding procedures that have an impact on the lake (docks, seawalls, riparian stream and lake work, etc.) must be made readily available as to requirements for permit application, availability and location where the permits are to be sent for approval.

Recommended Action:

Develop a committee and sub-committees to address the many areas of education essential to inform the watershed residents and lake users of their responsibilities and their effect on the watershed. Those areas mentioned above that affect the environment and development in the watershed are discussed in those sections of the lake management plan. The education programs must be ongoing and continuously updated. The areas that should be covered are the Rules of the Road, boating safety, property acquisition and those items in the other sections of this plan.

Management of Aquatic Vegetation

Aquatic Insect Control of Plant Life

The eutrophic nature of Findley Lake puts vegetation (Eurasian Watermilfoil) control high on the list of desired actions voiced by watershed residents. One control method provided by nature is biological. This host-predator condition is common in all of nature and should not be looked on as a way to eradicate the host organism but as a means of controlling it. Biological control is a cyclical occurrence. When the host increases (intense plant growth) the predator begins to increase. When the predator numbers catch up with and then surpass the plant growth rate, suppression becomes evident and the predator begins to reduce in number. At some point the predator-host balance will again favor the host and the cycle begins again.

Scientific studies have identified several insect predators of Eurasian watermilfoil. Two of the most effective are native to New York State. These watermilfoil predators are the aquatic moth and a weevil. Both insects are present in Findley Lake. Current evidence is inconclusive as to the effectiveness of total biological control; however, it should be pointed out that the insect form of biological control is the least disruptive to the lake's ecological health. Other potential control methods (chemical and harvesting) may have an adverse impact on biological control methods. Chemical treatment of weed beds has been shown to inhibit the growth of weevil populations. Harvesting may remove the weevil and their primary habitat.

Recommendations:

Continue to work with educational institutions and the New York State Federation Of Lake Associations to determine the effectiveness of this method of control.

Schedule harvesting in select areas only.

Refrain from applying chemical controls, use only as last resort.

Recommended Action:

Continue to study the effects of this type of weed control in cooperation with universities and state agencies.

Be selective when harvesting and/or using chemical applications

Chemical Control of Aquatic Vegetation

The New York State Department of Environmental Conservation (NYSDEC) strictly regulates the use of herbicides in New York State waters. Permits are required for the use of any herbicide in the lake and can only be applied by a NYSDEC licensed applicator. Presently, New York State allows the use of four herbicides: Aquathol-K, diquat, 2,4-D and Sonar. Copper sulfate can also be used but it is only effective for algae control. To date the only herbicide that is approved for use in Findley Lake is Aquathol-K and can only be applied by a licensed applicator. The use of this herbicide may be liquid or pelletized and applied to the target area or to the plants directly. Using chemicals to control aquatic plants has advantages and disadvantages.

Advantages

Application can be less expensive (depending on the type of herbicide used and frequency of application) than other aquatic plant control methods.

Herbicides are easily applied around underwater obstructions and surface structures such as docks.

Herbicides can be applied directly to problem areas regardless of size; however, there are practical and ecological limitations that usually limit herbicide treatment to small areas or small lakes.

Disadvantages

Herbicides result in water restrictions pertinent to swimming and drinking. Herbicide use may create unwanted (possibly unknown) impacts on people who use the water and to the environment.

Non-targeted plants, as well as nuisance plants, may be adversely affected by some herbicides. (The lack of specificity may be a serious ecological concern).

Depending on the herbicide used, it may take several days to weeks and/or several treatments during a growing season before the herbicide controls or kills targeted plants.

Rapid-acting herbicides, like Aquathol-K, may cause low oxygen conditions to develop as plants decompose. This results in the release of nutrients back into the water. Low oxygen conditions may result in fish kills.

To be effective, herbicides must be applied to specific growth stages of the plant, i. e. young shoots, flowering stages.

Expertise in using herbicides is necessary in order to be successful and to avoid unwanted impacts. It is especially important to follow all label instructions. Permits are required for aquatic herbicides in NYS lakes. For more information on permitting requirements, the NYSDEC Region 9 Pesticides Unit should be contacted. The Findley Lake Watershed and adjacent land are located in Region 9.

Many people strongly oppose the use of chemicals in water. Public involvement and education in the permitting and treatment process are essential.

Outflow from Findley Lake goes into French Creek, which also provides municipal water to the Borough of North East, Pennsylvania. This raises serious concerns regarding application of herbicides to Findley Lake.

Overflow from Findley Lake goes directly into French Creek, which is one of the last pristine streams in the Commonwealth of Pennsylvania. It contains endangered and protected wildlife. Any herbicides released into this stream could have a disastrous effect on the stream and its wildlife.

Recommendations:

Continue to apply for permit for selective use of herbicides in the lake.

Use liquid herbicide rather than pellets. Pellets sink and lodge in the bottom silt, which reduces the herbicide's ability to activate with the target.

Recommended Action:

Continue to apply annually for the permit for application, even if not needed during that year.

Use only in very select areas.

Do not circumvent label instructions. There is additional label information specific to New York State.

Identify local and regional pesticide applicators licensed by NYSDEC who work in the lakes and request price quotes for performing the work at the same time as making the permit application.

FLPO, Inc. (permit applicant) should work with the Borough of North East at the time of the permit application and again, if the permit is granted, just before applying the herbicide.

Water level should be lowered at least one-half foot before application to eliminate potential chemical outflow to French Creek or the wetlands.

Notify watershed residents of penalties involved with illegal application of chemicals in the watershed in an attempt to discourage unauthorized use (monetary fines and/or jail confinement).

Grass Carp

The use of grass carp has been beneficial to some ponds or lakes in the states of New York and Pennsylvania. These fish feed on the aquatic vegetation, first devouring the native plants and then the exotic (Eurasian Watermilfoil) ones. Results from introducing the carp to the pond or lake are not noticed until the end of the second year.

New York State allows the use of grass carp if the area to be treated meets the following conditions.

1. Lakes with more than 40% of their surface area are covered by aquatic plants;
2. Lakes with controllable inlets and outlets, meaning screens or other mechanisms to prevent escape.
3. If less than one acre, a single owner; if more than one acre, a permit and environmental impact statement is needed.

Recommendations and Recommended Action

None.

Mechanical Harvesting

Mechanical harvesting is the physical removal of rooted aquatic plants (macrophytes) from the lake using a mechanical machine to cut and transport the vegetation to shore for proper disposal. This is the most common method of aquatic vegetation control in New York State.

Principle

The physical removal of rooted vascular plants serves to eliminate the symptoms of a common lake problem - excessive vegetation growth. Immediately after harvesting, many lake use impairments associated with excessive weeds are greatly reduced. Harvesting also serves to remove the nutrients, primarily phosphorus, stored in the plant structure, thereby addressing one component of high nutrient concentrations, a common cause of excessive rooted vegetation growth.

There are two different types of mechanical harvesting operations. The most common is usually referred to as single-stage harvesting. The typical single-stage mechanical harvester cuts a swath of aquatic plants from six to ten feet in width and from six to eight feet in depth. The harvester usually has two upright cutting bars and a vertical cutting bar. The cut vegetation is transported up a conveyer belt and stored on the harvester. The maximum capacity of the harvesting barge is usually between 6,000 to 8,000 pounds (wet weight) of aquatic plants. The harvester transports the plants to shore where they are unloaded via a shore conveyer to a truck for disposal.

The multistage harvester refers to two or more specialized pieces of equipment. The first machine moves through the lake with cutting bars similar to the single stage harvester, cutting the vegetation and allowing the plant's natural buoyancy to bring it to the surface. A second machine follows the cutter and rakes up the cut fragments for disposal. The cutting capabilities for the multistage harvester can be greater than the single-stage harvester; the depth can extend as far as ten feet and the width can be up to twelve feet.

Applicability

Since an aquatic-harvesting program is aimed at controlling nuisance levels of vegetation, the species of plants and their growth patterns should be identified before harvesting. This will help target the areas that should be controlled, with an approximate date when the aquatic plants will begin to cause some impairment to lake use. When a harvesting schedule is set up, the lakeshore property owners should be informed of where and approximately when harvesting will take place. Several criteria should be examined before establishing this schedule.

Initially, harvesting should involve the areas where public use is most impaired. The type of recreational use will determine the extent and type of harvesting. Fishing areas only need open lanes, but swimming and most boating activities will require large areas free from plants at or near the surface. Areas with significant weed beds will take longer to harvest due to time lost in unloading the conveyer.

Certain areas should be restricted from harvesting either because they are important as a fishery or wetland area or because they receive little or no use. These areas should be identified before the harvesting program begins each year. The regional NYSDEC office can help determine the location of any important fisheries or wetland areas. Other areas may not be harvestable due to the physical constraints imposed by the size of the harvester; vegetated areas between docks or in shallow coves often cannot be reached.

The growth rates of some species of aquatic plants may require two or more harvests during the recreational season. If multiple harvests are planned, this may reduce the amount of area that can be covered during the first cutting. For those lake associations that do not own their own harvester and must contract out for these services, multiple cuttings will increase the cost of operation per unit area due to additional transportation and setup costs. It may also be more difficult to schedule subsequent visits by the harvester due to other commitments by the contractor.

The location of unloading sites should be identified and mapped before the harvesting season begins. If a site is located on private property, it may be necessary to sign a contract with the owner to protect against liability claims. These sites should have suitable conditions to enable the harvester to get close to shore and allow a truck access to load the harvested weeds for disposal. The selection of these sites may determine the efficiency of harvesting in certain areas of the lake.

Possible Adverse Effects

The most significant adverse effect of mechanical harvesting is fragmentation. Fragments of cut plants that are not picked up and removed by the conveyer can move from the treatment area by wind or currents, spreading the plant to other portions of the lake or to downstream water bodies. This can be a particularly bothersome problem for those plants that spread primarily from fragmentation, such as milfoil.

Harvesting may alter plant communities. If both native and fast-growing exotic plants are cut to the same degree, the exotic plants, often the original target for harvesting, may grow faster and dominate the plant community. This is especially true for plants that are benefited by fragmentation.

Other potential adverse effects include the removal of small, slower moving fish trapped in the cutting blades or conveyer, and the temporary release of phosphorus and other nutrients from cut stems. These effects can be minimized by proper treatment design. Most other potential ecosystem problems due to oxygen depletion or nutrient release can be reduced by removal of all cut vegetation.

Costs

The current cost of the equipment averages between \$50,000 and \$120,000 for the harvester and shore conveyer. The harvester can cut approximately one acre of aquatic plants every four to eight hours, depending on the size of the harvester and density of plants, and costs about \$200 per acre to operate. The time and costs vary greatly, depending upon the type and densities of the aquatic plants being harvested. The numbers shown here are averages for North American lakes predominately infested with Eurasian watermilfoil.

Mechanical harvesters can also be leased for use on smaller plots. A typical leasing price in New York State is approximately \$50-150 per hour, usually with a setup, transport, and setting fee of about \$200.

Additional Information

Harvesting is one of the most common and accepted methods for controlling rooted aquatic vegetation. Harvesting opens recreational areas and navigation channels and removes unsightly vegetation covering the surface of the lake. The adverse effects noted above are considered minor relative to the overall benefits. Activities in other portions of the lake are not greatly affected, and in many communities the harvested plants are dried and used as compost and lawn fertilizers.

Mechanical harvesting, however, is not universally accepted. Many lake residents recognize that it is, for the most part, a cosmetic treatment, treating only the symptoms of a more pervasive water quality problem. An appropriate analogy to mechanical harvesting is mowing the lawn. Neither harvesting nor mowing will prevent re-growth, or even provide any significant long-term control. Both methods are used to provide a cosmetic control of excessive growth and sustain recreational uses.

The long-term benefits derived from harvesting do not compare to the benefits of other cause-based or source-based management strategies. Due to the slow cutting rates and relatively narrow cutting band, the harvester may need to be on the lake throughout the summer during most daylight hours. Some residents consider the perpetual presence of the machine "unnatural". Others who accept the presence of the machine become easily frustrated over the time required to get local weed beds harvested. This problem is further exacerbated by the limited areas available for harvesting due to shallow water or confined navigational corridors, unfavorable weather conditions, and downtime for mechanical repairs. Both capital and operating costs can be quite high due to the large equipment expenditures and the technical expertise necessary to run and repair the machinery. Leasing a harvester can reduce the overall costs. It should be noted, however, that since harvesting may be required at least once a year, leasing costs will soon exceed purchasing costs.

Recommendations:

Selective use in specific areas so as not to destroy the biological controls in other areas;

Do not use on a continual basis, as uncollected weed fragments will eventually over-populate the area; each fragment of Eurasian watermilfoil is a new plant;

Hire a licensed contractor.

Recommended Action:

Prudent use of this mechanical weed control method.

Make certain all harvested vegetation is removed from the lake. Vegetation left in the lake will provide additional nutrients that act as fertilizer for the next growth and reduces the oxygen in the lake.

Recreation

Findley Lake is used primarily for recreational purposes with the following being the major choices (per our questionnaire): Passive viewing, power boating, swimming and fishing either from dock, shore or boat. Some uses, such as boating and angling, have increased in recent years. A visual boat census was taken in 1998 with a total count of 543. The count consisted of: 106 inboard vessels, 161 outboard vessels, 60 jet skis, 136 canoes/kayak/paddle boats, 29 sailboats and 51 pontoon boats. The Town of Mina issued approximately 800 fishing licenses in 1998.

The boating capacity is approaching or exceeding the state recommended standards. Although the lake is excessively crowded with boaters, water skiers, tubers, etc. on weekends and holidays, it nevertheless appears that controls, including those relating to safety, have been adequate to minimize problems so far. Lakefront property owners conduct boating more frequently than those with right-of-way access or those people who have no private access to the lake.

The most popular lake access to boaters is the main gate at the north end of the lake. This gate is closed from 10:00 p.m. Friday until 3:00 p.m. Sunday from the first weekend in June to Labor Day to help control the boat census. Other public access areas are the properties controlled by the NYSDEC and NYSDOT; which are primarily used for picnicking, fishing and used as a location for hand launching small non-motorized boats. The major private boat launch is located at the Paradise Bay Campgrounds.

Power boating and other recreational uses on Findley Lake are governed by New York State regulations. The regulations are fairly extensive and address noise, lighting, operator age, speed, manner of boat operation, required equipment, training requirements, etc. (Table 1). The regulations are enforced by the Chautauqua County Sheriff's Marine Patrol which, in 1999, included two full time and 12 seasonal employees to patrol activities on Findley Lake and other water bodies associated with the county (including Chautauqua Lake and Lake Erie).

Despite the publication of boating regulations and indications that adequate space is available for safe water recreation most of the time, boating accidents still occur. Tables 3 and 4 present statewide statistics regarding the leading type and cause of boating accidents and fatalities. The leading types and cause of boat collisions are due to lack of proper look-out, operator inexperience, rules of the road infractions, submerged object and navigation error. The major types of boating fatalities are capsizing due to passenger movement/behavior, hazardous waters and improper or overloading of the boat. Most boating accidents occur on summer weekends around 5:00 p.m.

The recommended space requirements for boating activities according to the NYS Comprehensive Outdoor Recreation Plan 1994 are reflected in Table 2. At times, the boating activity during a weekend exceeds these recommended guidelines on Findley Lake. The other concerns with regard to the recreational uses of the lake that need to be addressed are:

- a. Aesthetics--odors emanating from nearby farms (most noticeable late in the day);
- b. Goose population--creates unsanitary conditions, contributes to bathing beach closings and possibly swimmers itch;

- c. Possible uncontrolled use of herbicides--potential public health and environmental threat by not abiding to quarantines as noted on the instruction labels and uncontrolled application of rates and quantities;
- d. Aquatic vegetation--weeds and algae hinder recreational use;
- e. Water quality—increased turbidity (cloudy water) and odors from rotting vegetation diminish use of the lake;
- f. Sedimentation--prevents recreational use in some portions of the lake;
- g. Non-participation--large number of property owners who live out of the watershed and do not or are unable to participate in the management and control of the lake;
- h. Lack of government assistance--the watershed does not receive much financial support from town, county, state or federal agencies;
- i. Bio-control--skepticism regarding whether weevils and moths will help alleviate weed problems;
- j. Findley Lake “Rules of the Road”—need for a brochure that is specific to Findley Lake and continuous updating of the bulletin board as it pertains to lake activity and regulations;
- k. Stumps--have caused damage to boats and discourages boating in these areas;
- l. Fishing rules--lack of knowledge of fishing rules that are applicable to Findley Lake.

Some of these concerns will be addressed in other sections of the lake management plan. Those of a lesser nature will be acted on in the future.

Perceived Problems

The ranking of responses to the Findley Lake watershed questionnaire indicated that watershed residents and lake users felt the biggest problems were jet skis (excessive noise), reckless driving, and boaters’ unfamiliarity with boating rules and regulations.

The Chautauqua County Sheriff’s Department response to problems associated with lake recreation were jet skis (generally because of young and/or inexperienced operators) and boaters’ lack of knowledge of regulations. The sheriff’s department also does not have the resources to adequately patrol the lake due to failure to keep equipment (particularly patrol boats updated), constant turnover of trained patrol personnel and a better notification system regarding new water recreation regulations by mail instead of only with boat registration renewal.

Safety

Recommendation:

Safety in the watershed is always a main concern. This safety, as it regards the lake, is jeopardized by the unfamiliarity with the “rules of the road”, uncertified boaters, jet skis, reckless boating and physical hazards.

Continue to offer safe boating programs with a certified boating instructor(s), who will conduct classes and certify those individuals who pass the required safety boating courses. More stringent enforcement of the rules and regulations as they pertain to Findley Lake is needed. Review and continually update the safety rules for the lake. Publish handouts for residents and non-resident users of the lake with the rules and regulations as what is expected of them when they are enjoying the waters of the lake.

Recommended Action:

FLPO should assign a board member to be responsible to keep the position of a certified boating safety instructor filled at all times and ensure that classes are made available. Each year notify the public of the dates, time and location of the classes. The notification must include the state's requirements as to who must receive certification to operate a vessel on the lake.

The FLPO must work closely with the sheriff's marine patrol to review the regulations that are unique to Findley Lake. They should also request more enforcement time for the lake and cover what areas of enforcement need more attention (noise, reckless boating).

Develop a brochure that explains what is expected of lake users and the "rules of the road" as they pertain to Findley Lake. The brochure should be continuously updated to include new and/or delete obsolete items and be distributed on an annual basis.

Property Acquisition

Recommendation:

Passive viewing is the number one use of the lake according to the questionnaire, and as green space diminishes around the lake, so decreases the aesthetic view of the lake. A survey was taken as part of the SOLR on land to determine undeveloped property and what action should be taken with interest to acquire the property, how should it be used, who would purchase the property (private, government, others) and how funding would be raised (grants, public funding, etc.). Work with the Town Planning Board to limit residential growth on the borders of the lake and receive assurance of passive viewing space.

Recommended Action:

The formation of a committee to do the survey and determine what action should be taken regarding undeveloped property. This committee would work closely with the Town Zoning Board to ensure passive viewing into the future. Some areas that are to be reviewed with the town zoning board are covered in the development section of the lake management plan.

Water Quality

This area of recreational concern is discussed in the environmental and development sections of this plan.

Recommendation and Recommended Action:

Refer to environmental and development sections of the lake management plan.

Table 1

Select regulations pertaining to boating on Findley Lake.

Refer to New York State Boaters' Guide, A Handbook of Registration, Operation & Safety Information for the Prudent Mariner for details and additional regulations.

Vessel Noise

- a. Most recent regulations in 1993.
- b. Must be less than or equal to 90 decibels in a stationary or 75 dB in a moving test.
- c. It is illegal to manufacture or sell boats that do not meet these specifications.
- d. It is illegal to remove, alter or modify systems to prevent it from operating in compliance with noise regulations.

Lighting

- a. Navigator lights must be displayed at all times between sunset to sunrise, and during periods of reduced visibility.
- b. An all around white anchor light must be exhibited for all anchored vessels 7-50 meters in length.

Age of Operators

- a. Persons 10 to 18 years of age must obtain a NYS boating safety certificate (or comparable) before they can operate a mechanically propelled boat without adult supervision.
- b. Liveries are prohibited from renting Personal Water Craft (PWC) to individuals under 16 years of age.

Speed

- a. Boat speed must not exceed 5 mph within 100 feet of shore, dock, pier, raft, float, anchored or moored vessel.
- b. Boat speed must not exceed 5 mph from one-half hour after sunset and one-half hour before sunrise.
- c. Additional for PWC - "No operation permitted within 500 feet of a designated swim area. However, should a designated access site exist within the 500 feet exclusion area, PWC may access and exit at no more than 10 mph."

Training Requirement

- a. Persons age 10-18 years of age must obtain a safety certificate before operating a mechanically propelled boat without adult supervision.
- b. Recommended to 18+ years of age enroll in New York Basic Boating Course (or comparable).

Reckless Operation of PWC

Reckless operation of a PWC is prohibited and includes:

- a. Weaving through congested traffic.
- b. Wake jumping close to vessels.
- c. Intentionally waiting until the last minute to swerve to avoid a collision.
- d. Any maneuver which unreasonably or unnecessarily endangers life, limb or property, including carrying more passengers than is recommended by the manufacturer.

Table 2

The recommended space requirements for boating activities on New York State waters per the NYS Comprehensive Recreation Plan 1994 are:

- a. Still fishing boats: 3-5 boats/acre
- b. Trolling fishing boats: 1 boat/acre
- c. Sail boat: 6-8 vessels/acre
- d. Water skiing: 10-15 acres/vessel.
- e. Row boating: 1 acre/vessel.
- f. Power boating: 6-8 acres/vessel.

Table 3 Types and causes of boating accidents (1992-1995).

TYPE/CAUSE BOATING ACCIDENTS					NO. ACCIDENTS
	1992	1993	1994	1995	1992-1995
Capsizing/Sinking/Flooding/Swamping	80	30	20	45	175
Improper/Overloading	58	4	1	3	66
Rough Waters	3	6	6	23	38
Water Over Gunwales	10	6	6	0	22
Passenger Movement/Behavior	6	8	1	6	21
Water Through Hull	1	5	3	3	12
Improper Weight Dist.	2	1	0	1	4
Inadequate/Improper Anchoring			3	1	4
Equipment Failure				3	3
Unknown				2	2
Weather				2	2
Fault of Machinery				1	1
Fire	7	9	14	12	42
Fuel System	5	4	10		19
Electrical System	0	4	1		5
Auxiliary Gear/Ventilation	0	1	3		4
Ignition of Spilled Fuel/Vapor				3	3
Machinery Failure				2	2
Unknown				2	2
Other	2	0	0		2
Failure to Vent				1	1
Fault of Machinery				1	1
Equipment Failure				1	1
Fault of Machinery				1	1
Machinery Failure				1	1
Collisions/Grounding	111	126	118	198	553
Improper Lookout	37	43	32	45	157
Inexperience	16	16	19	18	69
Rules of the Road	10	19	12	10	51
Submerged Object	16	6	21	8	51
Navigation Error	19	20	8		47
Speeding	3	9	11	16	39
Inattention	7	5	10	13	35
Careless/Reckless Operation				24	24
Hazardous Waters				15	15
Poor Visibility	0	3	2	8	13
Congested Waters				11	11
Unknown				11	11
Machinery Failure				6	6
Weather				6	6
Improper Lights	1	2	1	1	5
View Obstructed	0	2	2		4
Improper Nav. Aid	2	1	0		3
Alcohol Use				3	3
Improper Loading				1	1
Passenger/Skier Behavior				1	1
Standing/Sitting on Gunwales, Bow, Transom				1	1
Falls Inboard/Overboard	21	25	19	24	89
Force of Wake/Wave	15	13	11	0	39
Not in Seat	5	7	3	2	17
Hazardous Waters				8	8
Sharp Turns	0	4	2	0	6
Speed Change	0	1	3	0	4
Careless/Reckless Operation				4	4
Excessive Speed				3	3
Unknown				3	3
Slippery Surface	1	0	0	0	1
Machinery Failure				1	1
Passenger/Skier Behavior				2	2
Operator Inexperience				1	1
Skier Mishap	0	0	0	5	5
Passenger/Skier Behavior				3	3
Hazardous Waters				2	2
Other Causes	62	35	51	6	164
Other	20	12	18		50
Hit & Run	17	10	13		40
Equipment Failure	11	3	10		24
Wind/Weather	8	3	4	2	17
Unknown	4	5	5		14
Alcohol/Drugs	1	2	1		4
Inadequate Anchor	1	0	0		1
Excessive Speed				1	1
Hazardous Waters				1	1
Operator Inattention				2	2

Table 4 Types and causes of boating fatalities (1992-1995).

TYPE/CAUSE BOATING FATALITIES	NO. FATALITIES				
	1992	1993	1994	1995	1992-1995
Capsizing/Sinking/Flooding/Swamping	13	16	7	18	64
Passenger Movement/Behavior	5	7	1	4	17
Rough Waters	1	3	2	9	15
Improper/Overloading	3	3	1	2	9
Water Over Gunwales	2	2	1		5
Improper Weight Dist.	2	1			3
Unknown				3	3
Water Through Hull	0		1	0	1
Inadequate/Improper Anchoring			1		1
Equipment Failure				0	0
Weather					0
Fault of Machinery				0	0
Fire	0	0	0	0	0
Fuel System				0	0
Electrical System				0	0
Auxiliary Gear/Ventilation				0	0
Ignition of Spilled Fuel/Vapor				0	0
Machinery Failure				0	0
Unknown				0	0
Other				0	0
Failure to Vent				0	0
Fault of Machinery				0	0
Equipment Failure				0	0
Fault of Machinery				0	0
Machinery Failure				0	0
Collisions/Grounding	4	4	7	6	21
Improper Lookout	2	2	3	2	9
Speeding			2	2	4
Rules of the Road	1	1	1	0	3
Submerged Object		1	1	0	2
Navigation Error	1			0	1
Careless/Reckless Operation				1	1
Alcohol Use				1	1
Inexperience				0	0
Inattention				0	0
Hazardous Waters				0	0
Poor Visibility				0	0
Congested Waters				0	0
Unknown				0	0
Machinery Failure				0	0
Weather				0	0
Improper Lights				0	0
View Obstructed				0	0
Improper Nav. Aid				0	0
Improper Loading				0	0
Passenger/Skier Behavior				0	0
Standing/Sitting on Gunwales, Bow, Transom				0	0
Falls Inboard/Overboard	4	1	2	7	14
Not in Seat	3		2	2	7
Unknown				3	3
Passenger/Skier Behavior				2	2
Sharp Turns		1		0	1
Hazardous Waters				0	0
Speed Change				0	0
Careless/Reckless Operation				0	0
Excessive Speed				0	0
Slippery Surface				0	0
Machinery Failure				0	0
Operator Inexperience				0	0
Force of Wake/Wave	1			0	1
Skier Mishap	0	0	0	0	0
Passenger/Skier Behavior				0	0
Hazardous Waters				0	0
Other Causes	10	5	8	0	23
Unknown	3	4	3		10
Other	3	1	3		7
Wind/Weather	3				3
Equipment Failure			2		2
Hit & Run	1				1
Alcohol/Drugs					0
Inadequate Anchor					0
Excessive Speed					0
Hazardous Waters					0
Operator Inattention					0

Environment

The impact on the environment in the watershed has been dramatic in recent years.

Many lake residences have transformed from summer cottages to year around homes. The population has increased due to the newfound popularity of the lake as a retreat. The influx of activity associated with this growth has put an additional strain on the environment in the watershed.

We have addressed those areas that most greatly affect the watershed. Some lesser areas were not covered in this lake management plan, however, and they should be addressed at a later date.

The residents of the watershed pointed out that the first and foremost item is water quality. The weed infestation is limiting the recreational use and beauty of the lake. It can have an effect on the property values of the residences surrounding the lake.

The following address perceived problems regarding water quality.

Lake Clean-up

All stakeholders in the watershed must be educated regarding their input of nutrients into the lake. Topics of concern include lawn care, composting, personal yard ditches, buffer zones, pet waste, leaf and lake plant removals, outside drains from basement or garage, car detergents and degreasers, laundry detergents, hazardous waste, waterfowl and swim platforms. The run-off from the lake periphery is 40 percent of all runoff entering the lake. This peripheral run-off contributes 64 percent of the chloride load, 19 percent of the phosphorous load and 64 percent of the nitrate-nitrogen load. Education of the stakeholders is necessary to reduce the nutrient loading to the lake and thereby curb the growth of aquatic plants.

Recommendations:

Reduce lawn fertilizing to a minimum, especially along the lake and stream banks;

Compost where feasible;

Construct yard ditches so as not to flow directly into the lake;

Develop buffer zones along streams and lakefront;

Remove and properly dispose of pet waste;

Removal of leaves from contact with streams, ditches and other run-off areas;

Outside drains should be properly lined and not directed to waterways or to the lake;

Use car detergents and degreasers sparingly, prevent them from directly entering lake waters;

Use non-phosphorous laundry detergents;

Have a semi-annual hazardous waste pick-up date locally;

Do not feed waterfowl, erect barriers along lake shore to discourage waterfowl from eating on lawn areas;

Clean swim platforms of goose and duck waste and dispose of properly and take care to prevent excrement from contaminating lake water;

Ensure that incoming watercraft do not carry weeds, other debris or zebra mussels into the lake.

Recommended Action:

Develop a committee to provide educational information to watershed residents and continue programs needed on a timely basis in future years;

Endorse and distribute the Home *A * Syst program and keep up with realty transfers. Work with Town of Mina supervisor and board members to develop a pickup schedule for leaves, lake plants and other debris on a spring and fall schedule on both sides of the lake;

Identify local sites where lake weeds and leaf refuse could be composted;

Work with the Town of Mina and/or Chautauqua county government for a local hazardous materials pick-up day and advertise existing hazardous waste collection programs locally;

Allow natural barriers (shrubs, high grass, etc.) along the shoreline to make feeding areas less attractive to waterfowl and provide a natural filter for run-off entering the lake;

If waterfowl nuisance becomes too overwhelming, the use of a grape extract (menthly anthranilate) can be used; this extract is annoying to the geese and discourages them from returning to their favorite eating and resting areas; it is not harmful to the geese;

Conduct seminars regarding development of buffer zones; Cornell Extension has videos and information pertaining to this topic;

Work with FOLA and NYSDEC to develop a statewide program for watercraft inspections.

Sediment Removal or Dredging

Sediment removal involves dredging bottom sediment from a lake to increase the depth, control nuisance aquatic vegetation, control nutrient release from sediments, and to remove toxic substances.

Dredging projects take the form of either draw down excavation or in-lake dredging. In draw down excavation water must be pumped or drained from the lake basin and the resulting mud de-watered sufficiently to accommodate heavy earth moving equipment. The exposed sediments can then be dredged. Where it is difficult or impossible to draw down a lake and appropriately de-water the lake bottom, bucket and hydraulic dredges have proven effective in removing nutrient-rich sediments. While such dredging can help control algae blooms, it is used most often to deepen lakes and remove macrophytes.

Cutterhead hydraulic pipeline dredges are most commonly used to remove lake sediments. These dredges can operate anywhere on the lake, cutting to a depth of 18 meters. The system is operated from a floating steel hull, moved by raising and lowering vertical pipes ("spuds") to "walk" the dredge forward.

The cutterhead typically consists of three to six smooth or toothed conical blades, mounted on a movable steel boom or ladder at the bow of the platform. When the cutterhead is lowered to the lake bottom and moved from side to side, the rotating blades loosen the sediments that are transported to the pickup head by suction from the dredge pump.

The sediment slurry (10-20 percent sediment and 80-90 percent water) is then pumped through a pipeline for discharge at the disposal site. Such slurries require relatively large disposal sites designed to allow adequate residence time for the water to evaporate.

Most cutterheads have been designed to loosen sand, silt, clay or even rock. Few, if any, conventional cutterheads have been designed to remove soft, loosely clumped sediments. Although they are effective, most of these machines are not the most efficient means of dredging lakes. However, specialized dredges such as the Mud Cat have been designed specifically for use in lakes. The mobile Mud Cat can be transported from lake to lake. It uses a horizontal auger to move the sediments to the suction pipe, reducing re-suspension and turbidity associated with other cutterhead dredges.

Grab-type bucket dredges are used only in special situations, most commonly around docks, marinas and shoreline areas. They can be easily transported to different areas within a lake or to different lakes. Stumps and other debris that may impede cutterhead dredges do not hamper their performance.

However, bucket dredges have some disadvantages. The sediment must be dumped within the radius of the crane arm, onto a barge or into a truck on shore. It is a time consuming process. The operation also creates turbidity and can leave the bottom "chewed up" and uneven.

Applicability

Sediment removal is used to deepen a lake for recreational and navigational purposes. Deepening a lake may be the only recourse when the lake has become too shallow for boat navigation, swimming and fishing. Other control methods such as adding chemicals or installing bottom barriers are of little use when water depth is no longer sufficient for the lake's intended uses.

Dredging may help control weed growth in several ways. The dredging process physically removes plants and the nutrients entrapped within the plants. The bottom sediment, which contains the root system of the plant and serves as a nutrient reservoir for plant and algae growth, is also removed. In addition, dredging serves to reduce rooted vegetation growth by increasing the lake depth and reducing the amount of sunlight that reaches the sediment. Since plants require sunlight for growth, reducing the light levels will reduce the plant levels.

In lakes where nutrient loading from sediments is a major source of nuisance weed and algae growth, sediment removal may improve the overall water quality. Dredging removes the top layer of sediment, which contains the most biologically available nutrients and participates most readily in sediment-water interactions and exchanges.

If heavy metals and other toxic materials are present in bottom sediments, dredging these sediments can reduce the concentration of these hazardous substances in the sediments, and ultimately in the overlying water and organisms living in the sediment and water.

Dredging has proven to be an effective control technique for many lakes for increasing mean depth, reducing excessive vegetation levels, controlling nutrient release from sediments, and reducing the concentrations of toxic substances in sediment. It has been used for the entire lake basin in small lakes, or only a small portion of the basin for large lakes.

Potential Adverse Effects

If dredging is not done properly, it can actually make lake conditions worse by causing excessive turbidity, fish kills and algae blooms. As a result, an extensive monitoring program must accompany all dredging projects. The main problems occur when bottom sediments mix with lake water during the dredging process. This can happen while the sediments are being removed or when return water from a hydraulic dredging settling basin is discharged back into the lake. Nutrients, toxins and other contaminants may be carried back into the lake. Many of the problems of re-suspension can be minimized by the proper selection of specialized dredges.

Dredging can harm fish, not only by causing turbidity but also by eliminating the benthic organisms upon which the fish feed. After the dredging of a lake, it could take two or three years for benthic fauna to become re-established. For this reason, it is advisable to leave a portion of the lake undredged.

Disposal areas for dredged sediments ("spoils") should be selected carefully, as the muck will blanket vegetation and can kill it. Disposal is unsuitable in woodlands, floodplains, wetlands or within 50 feet of the bed or banks of a protected stream, creek or lake. A carefully engineered and dike upland area may be the best option. Any disposal site should be fenced to keep out people and animals.

Costs

Sediment removal is expensive. Costs vary depending upon site conditions, desired depth of excavation, available access, nature of the sludge, disposal, transport and monitoring arrangements. Treatment costs per acre of surface area (typically cut to a depth of about three feet) range from about \$1,000 to \$40,000; the latter figure represents a situation in which sediment spoils must be transported out of the area, as may be the case for municipal lakes.

Additional Information

Dredging projects are probably the most difficult lake restoration technique to successfully complete. The costs are much higher than almost any other technique, while the potential for negative impacts can be extremely high. While the benefits of dredging can persist for much longer than other techniques, most lake communities have not been willing to endure the entire environmental review and permitting process.

The public perception of such a drastic control technique is usually unfavorable. If mechanical harvesting can be equated to cosmetic surgery, then sediment removal is akin to a lobotomy. Even if lobotomies are shown to be successful, most people do not favor such radical treatments. Like a lobotomy, dredging can have profound effects on the entire body, in this

case the lake ecosystem. Many of these effects are temporary or can be easily predicted, but many cannot be easily pre-determined. Since many of these effects will depend on the specific conditions at a lake, it is extremely difficult to say if dredging is the correct treatment for a lake. It is radical, but it can be very effective.

Since dredging projects will not easily elicit the support of the local community, other management strategies should be considered first. Excessive rooted vegetation may be more simply controlled by mechanical harvesting, herbicides, or diver dredging. Phosphorus precipitation and inactivation can control nutrient release, and toxic materials may be more easily contained with sand and bottom barriers or chemical inactivation. Unfortunately, there may not be any other feasible management alternative for increasing the lake depth.

If, after considering all other options, dredging is still the preferred control technique, then a number of considerations may ease the process. The most important decisions are those dealing with public acceptance, equipment selection and disposal area design. To avoid future delays and ensure cooperation from all local environmental organizations and officials, it is critical to involve the lake community in the planning process. Residents who feel removed from, or ignored in, the design phase may serve to turn public opinion against the project. People who adhere to the NIMBY ("Not In My Back Yard") syndrome, especially those involving toxic materials, will always oppose dredging projects. This may become very apparent in the discussions concerning the disposal site. Unanimous or near complete approval in any phase of the project may be needed in order to move to the next phase.

Equipment selection will depend upon factors that include availability, time constraints, the distance which the slurry must be transported, and the characteristics of the dredge spoils. The design of the disposal area depends upon the amount of dredge spoils that must be contained. In addition, the size of sediment grains and the settling characteristics of the dredged materials are important factors to consider if any suspended solids will be discharged in water from the disposal site. The project will need a permit for such discharges.

Any dredging requires a permit from the regional NYSDEC office. Depending upon various factors, the project could require multiple permits. The NYSDEC Regional Permit Administrator should be contacted as early as possible when a dredging project is contemplated. In all cases, sediments should be analyzed for toxicity.

Recommendations:

Be selective in the choice for areas to be dredged;

Apply for permits through NYSDEC;

Work with local NYSDEC office to when and why permits are applied for so that duplication will not occur.

Recommended Action:

None at this time.

Water Level Control and Draw Down

This technique involves manipulating the water level of a lake to expose rooted aquatic vegetation and sediments to freezing and drying conditions, which serves to affect the growth of the plants.

Principle

In water bodies where lake levels can be raised or lowered, lake draw down can control or eradicate aquatic vegetation in shallow near shore areas. Since the lake sediment is exposed to the same freezing and drying conditions as the vegetation, this technique may also have some effect on nutrient release and re-suspension from the sediments under low oxygen conditions.

In New York State's climate, draw down is only beneficial in winter. Sediments are exposed to the freezing and drying action of cold air. Ice cover may help control weeds by loosening roots and loose organic material on the exposed lake bottom. The drying action may also serve to compact the loose upper layer of sediment, ultimately reducing the potential for re-suspension of this sediment and the nutrients adhering to the sediment.

Applicability

When the lake level is lowered in winter, some species of rooted plants and their seeds can be severely damaged or killed off by two to four weeks of freezing and drying. However, other species that are resistant to freezing are unaffected, and some species may actually be enhanced by this technique, either through increased growth rates, or increased space due to the control of other competing species.

Draw down is obviously limited to lakes that have either a dam structure or some other mechanism for controlling lake level. For draw down to have any significant effect, the water level must be lowered at least three feet, and the plants must be exposed for at least four weeks, with bottom sediments frozen to a depth of at least four inches. In New York State, draw down usually occurs between December and April. However, in mild winters, snow cover may actually insulate the sediments and prevent freezing.

Draw down is best used once or twice every three years to discourage the establishment of resistant plant species, which are often the non-native or exotic plants that were originally the target of the draw down.

Potential Adverse Effects

If the lake is shallow and the sediments and inflow have a high oxygen demand, winter draw down can deplete oxygen, and fish kills may result. Nutrient release may also be enhanced, causing algae blooms. In such cases, hypolimnetic aeration may be necessary.

The removal of macrophytes along the shore may increase turbidity due to wind-induced erosion and/or re-suspension of sediments. Some lakes with complete draw down can experience alga blooms after refilling. Another problem could be the emergence of new or previously unnoticed plant species that are enhanced or unaffected by draw down. These plant species may prevent the re-growth of native plants, and without competing species, may grow to levels greater than those prior to draw down.

Costs

If the lake has means for controlling lake level, such as a dam or controllable spillway, costs are negligible unless pumping is needed to reduce the lake level, or if aeration is necessary.

Additional Information

Water level manipulation is one of the most common lake management techniques, used not only for the control of nuisance aquatic vegetation, but also for repairing dams and docks, and as part of the dredging and bottom screening techniques. It is a simple and readily acceptable control technique, due to the low cost and the timing (scheduled during the winter, not during the summer recreational season). Since most nuisance vegetation problems occur in the shallow littoral zone near areas of high development and activity, the shallow areas can be "treated" by draw down without having a significant effect on the open water portion of the lake.

In periods of normal or high precipitation, the potential side effects of draw down are usually overridden by the benefits. Nuisance vegetation levels may be controlled, and summer recreational uses should not be significantly altered. Since no chemicals or significant mechanical equipment is used, there may be no visible changes in the lake, with the exception of vegetation levels.

If the lake is drawn down too low, however, the water may take a long time to return to acceptable levels. This is of particular concern in stream fed lakes during periods of drought. Low water levels can significantly affect many recreational uses and access points. However, once the lake is drawn down, refilling is dependent upon a natural process. It is critical to plan for a potentially low precipitation summer when devising a draw down schedule, since the residents and lake users may otherwise be denied use of the lake for much of the summer. This could significantly decrease resident acceptance of this technique and also affect summer revenues from recreation and tourism. The concerns over "putting in another board" to raise the summer level could dominate lake association meetings, and if a management decision to lower lake levels is not ultimately rewarded by decreased weed growth and restored water levels, the lake manager may need to look for another lake.

Findley Lake

The water level is controlled in our lake by the outlet structure in the dam at the north end. Each year on October 15, the water level is dropped as rapidly as possible so that repair work can be accomplished on docks, etc. The outlet will allow a lowering of the water level by approximately 36 inches. There is also an eight-inch pipe at the lowest level that runs all winter to assist in the water level control. This is the maximum that our lake can be lowered unless an expensive pumping operation would be undertaken. As soon as the ice cover leaves in the spring the level is again raised for summer recreation. Additional FLPO members should be trained in the procedure to lower or raise the water levels to the measurements as set in the by-laws.

Agriculture

The agricultural community is an integral part of the Findley Lake watershed. They not only add to the economy of the watershed but provide us with agricultural "view scape" (i. e. open fields, pastured livestock, etc.). Their activities have a direct effect on the watershed and the lake.

Local farmers currently participate in many programs designed to reduce the nutrient load that is added to the watershed. Some of these programs are Best Management Practices (BMP), Phosphorous-Based Comprehensive Nutrient Management Plan (CNMP) and Agricultural Environmental Management Program (AEM). These programs are designed to reduce the degrading effect of agricultural activity on the environment. They are developed and implemented with the assistance of the Chautauqua County Soil and Water Conservation District, United States Department of Agriculture, Department of Environmental Conservation and the County Extension of Cornell University.

A number of farmers in the French Creek and Findley Lake watersheds were awarded funding in 1999. This funding is being used to implement BMP through the United States Department of Agriculture. Of the three dairy farms doing business in the watershed, two are involved in the program.

Recommendation:

Continue to work with the agricultural community to reduce degrading effect on the watershed. Encourage farmers to continue their use of county, state and federal programs designed to improve the quality of water entering the lake from adjacent farmlands.

Actions Recommended:

Meet regularly with the agricultural community personnel to assist them in receiving monetary grants for current and future programs.

Assist, when applicable, with the implementation of any program that could benefit from the expertise/resources of the Lake Association.

Ditching-Channeling of Surface Water Runoff

Much surface water that reaches the lake is channeled through the streams that feed the lake. In some instances, ditches are used to collect the water and transport it to the streams. Ditches also serve to collect and transport considerable volume of water directly to the lake. Regardless of where a ditch discharges its water, efforts should be made to slow the water flow allowing maximum infiltration and recharging of ground water.

Recommendations:

Eliminate pipe culverts and replace with grassed-lined ditches whenever possible;

Line new and existing ditches with sod or stone and fabric;

If possible, include sedimentation basins in ditching systems;

Utilize erosion control measures (hay bales, silt fences, etc.) in bare ditches to inhibit rapid water flow;

Require watershed residents to implement temporary erosion methods whenever bare soil is exposed during construction or landscaping activities;

If roadside ditches must be cleared, recommend late spring or early summer to allow for vegetation re-growth.

Recommended Action

Revisit local and state highway departments to review and restructure the current ditching programs in the watershed;

Provide erosion and sedimentation control workshops individually tailored to select audiences including highway department personnel, watershed residents, builders, landscapers and code enforcement officers.

Dumpsites-Old and New

In the “good old days”, it was a common practice to dispose of our trash back in the ravine or possibly even on a neighbor’s land. This served the purpose of solving a temporary problem, but as our so-called trash disintegrated, it created many more serious problems to our environment.

Toxic pollutants such as heavy metals (chromium, lead), inorganic chemicals (salt, acids) and organic chemicals (pesticides, solvents) can damage human health or aquatic organisms. Toxic effects can be acute, causing immediate death or impairment, or chronic, causing subtle damage that may not show up until years after exposure. Toxins often persist in the environment, collecting either in water or in lake bottom sediments. Toxins can bioaccumulate in the tissues of organisms after repeated intake or exposure. Toxic concentration can increase at higher levels in the food chain, called biomagnification. Possibly mercury, poisonous chemicals, carcinogens and other substances yet to be identified, are entering our ground water, and we and our grandchildren will be using this for their drinking source.

Recommendation:

Within our watershed there are sites still actively being used and many previous sites have not yet been remediated. Our objective is to locate these old sites, and dispose of the waste at approved landfills. We should be proactive in our present day considerations of disposal.

Recommended Action:

Develop a committee that will work with the Town of Mina and the county health department to locate and remove “old” and illegal dumpsites. Also, the public should be advised of approved landfills or dumpsites and the hours they are open.

In Home Water Conservation

Home water usage conservation can be very important to the health of the watershed. Water conservation is also a good idea for anyone with a well water system and/or a septic waste system. Every time a faucet is turned on or a toilet is flushed, nutrients are added to the septic system and eventually to the ground water. The SOLR has identified high levels of nutrients and chloride salts in groundwater around the lake. It is imperative that programs, such as water conservation, be instituted to reduce the flow of contaminants entering our groundwater.

Recommendations:

Use low flow faucets when possible;

Limit use of the garbage disposal;

Run full loads in dish and laundry machines;

Reduce the volume of water used for baths and other bathroom activities;

Limit lawn watering especially adjacent to the lake or stream;

Wash vehicles at commercial car washes.

Recommended Action:

Develop an educational program, endorsed by the Town of Mina and FLPO, that advocates water conservation. This will better inform stakeholders of their activities and how they have a direct effect on the watershed;

Integrate the continued use of the Home*A*Syst program into this effort, which would greatly add to any educational program;

FLPO should provide an educational package, including water conservation programs and Home*A*Syst, to all new property owners by working with area realtors.

Snow Removal

The use of salt, brine and sand by local, county and state highway departments degrades water quality. At present, anti-skid mixtures applied to local roadways consist of six parts of sand and one part of salt. Melting snow, ice and precipitation transport these materials into the ditches, streams, ponds and lake. Snow scraped from treated roadways and park areas is routinely dumped into the lake. The result is the addition of salt to the lake water and a buildup of sandy sediment near the dam. This, in time, could hinder the system used to control the lake water level.

Recommendations:

Work with the highway departments to reduce the amount of these products applied to local highways;

Work to eliminate the dumping of treated snow and ice directly into the lake and on nearby areas where runoff into the lake can occur;

Encourage the use of holding areas in the watershed rather than have road runoff into the lake or streams; this would reduce the introduction of sediment and chemicals into waterways and decrease the nutrient loading of the lake.

Recommended Action:

Work with different highway departments to review ditching so as to reduce direct introduction of salt and sediment into the lake and/or streams;

Reduce the amount of salt, sand and brine being used on roadways;

Stop using the lake as a dumpsite for treated snow and ice.

Development

In recent years, the demographics of the Findley Lake watershed have undergone substantial changes such as population growth, revitalization of the downtown district, more year round residences and a rise in property values. The areas where growth can continue for housing and other development are mainly hillside properties. This type of growth will have a drastic effect on the watershed. The expansion of year around recreation facilities will continue to put a burden on the environment.

The following categories address the perceived problems regarding development in the watershed.

Public Water and Sewer Systems

Residential Management Practices

Another non-point source problem identified in developing areas is failing "onsite" sewage systems. An onsite system is any decentralized sewage disposal system; the wastewater is disposed in the same general area in which it is generated. The average volume of wastewater for most families is about 60 gallons per day per person; this average would increase for homes with dishwashers and (clothes) washing machines, garbage disposals, and multiple bathrooms.

In most cases, onsite systems consist of a septic tank connected to a leach field, dry well, or seepage bed. In principle, sewage solids settle in the septic tank and the liquid soaks into the ground. When wastewater begins to bubble up to the ground surface, the system is said to have "failed". Often the reason for failure is that the local soils are too impervious or too thin, and are not suited for disposal of the wastewater. Septic seepage poses a hazard to human health and water quality. Since the wastewater is high in plant nutrients, failing onsite systems can promote algae blooms, especially close to lakeshore areas.

A less visible kind of onsite system failure can occur where soils are porous. The wastewater does not manifest itself at the surface, but either quickly percolates down through the soils to groundwater or directly enters the lake, with very little filtration. Consequently, either the groundwater or the lake can be directly contaminated by this wastewater, resulting in a potential source of health problems.

The exact source of sewage seepage is very difficult to detect. The process should begin with involvement and education of the individual homeowners. A well-informed lake homeowner should be aware of the location and condition of his septic system, how to detect potential problems, and the health and water quality problems, which develop when a system fails.

Septic surveys have been used in several New York State lake communities to assess the overall condition of septic systems in homes around the lake and to increase the homeowners' level of understanding regarding septic maintenance and failures.

Dye tests are often used by lake communities, as part of a regular water quality monitoring program, to determine the number and approximate locations of failed septic tanks. However, the accuracy of these tests, and the degree to which they detect leach field failures, may somewhat restrict the use of dye tablets as a quantitative septic survey.

Another method of determining the level of septic leachate flow to the lake is through the use of a septic leachate detector. This is a hand held fluorometer, which can locate effluent plumes and domestic wastewater in lakes. When the probe is submersed in lake water in front of a shoreline home, a response can be noted on the chart recorder if human sewage, detergents, and whiteners found in laundry products are detected.

The septic leachate detector (otherwise known as a septic snooper) has been used by public health officials, water planning agencies, consultants, and engineers. A significant limitation to its widespread use, however, has been the high purchase cost. The combined cost of the detector and the chart recorder is approximately \$5,000. There are also some questions as to the effectiveness of the snooper in detecting plumes from poorly functioning septic tanks.

In lake areas, it is often difficult to remedy failing onsite systems. Often, cottage lots are very small, with septic systems established long before running water and flush toilets were added. The worse areas may need to be replaced with a new system. In other situations, the onsite systems can be repaired. In some cases, a return to the outhouse may be the best alternative.

Conventional treatment systems are not usually the best alternative for small communities and individual homeowners. Generally, conventional treatment plants are complicated mechanical systems. They typically use large amounts of energy and are costly for small communities to build. In addition, they require skilled operators to run and maintain them. Wastewater is collected in most conventional systems by gravity, but the cost per household of gravity sewers is high in small communities and increases greatly in rural areas or wherever the ground is hilly, rocky, or wet.

Community Treatment Systems

At many larger lake communities, municipal sewage treatment facilities have replaced small-scale treatment systems such as onsite septic tanks, or cluster systems. New residences or existing lots presently using smaller treatment options can often hook directly into the sewer lines associated with these community treatment systems. The conventional sewers used in most treatment systems are usually the major cost for a community wastewater system. Alternative sewer systems are smaller in size and are installed at shallower depths. They have no manholes and fewer joints, reducing the amount of infiltration from rain and groundwater into the sewer. This serves to limit excessive water flowing to the treatment plant.

Three general types of alternative sewer systems might be attractive to small communities or individual homeowners when a major municipal or regional facility already exists and has available capacity:

1. Small diameter gravity sewer systems use plastic pipes to carry septic tank effluent away from the residential septic tank. These are usually placed at a shallower depth and less slope than a conventional sewer. Operation and maintenance costs are low since solids remain in the septic tank and cannot clog the sewer mains. This piping system should only be used if the septic tank is properly designed to handle high flow rates, due to the potential for clogging if solids pass out of the tank.

2. Pressure sewer systems use a small pump at the outflow of residential septic tanks to move wastewater under pressure through small diameter plastic pipes to a treatment facility or large interceptor sewer. The small pressure pipes can also clog easily with wastewater solids. Unless a pumping chamber is installed to handle excessive solids, this system also requires regular maintenance and pump-out of septic tanks.
3. Vacuum sewer systems draw wastewater from each residence through small collector pipes to a central collection station by vacuum. Vacuum valves at each individual or cluster of residences control wastewater entry into the system. The vacuum collection station houses a pump, which delivers this wastewater to either the treatment facility or interceptor sewer. Vacuum sewers are relatively ineffective at lifting large volumes of wastewater from the residences to the collection tank and treatment facility or sewer line. Gravity or pressure sewers may be more effective for delivering wastewater in all but the flattest areas.

The EPA or the regional and NYSDEC and NYSDOH offices may have additional information on the suitability of community treatment systems for a specific lake watershed.

Gray Water Systems

Another method of assisting the onsite wastewater treatment is the incorporation of a "gray water system". This is usually accomplished with new home construction, since retrofitting present structures can be expensive. This is a method where all the waters used in washing of clothes, baths, etc. are stored in a tank and then reused in the toilet facilities. This is a saving on the quantity of fresh water required and also eliminates considerable quantity that flows to the septic system. Unfortunately, some of the County Health Departments in New York State do not approve of this method.

Some localities will allow for the surplus gray water to be used for plant and garden usage. Otherwise, if there is a surplus it would then be cycled to the regular septic system. As our fresh water becomes scarcer it will be necessary to incorporate whatever method possible.

Recommendations:

Initiate a septic monitoring program; responses to the survey question regarding funding of such a program indicated that 17% of respondents were willing to pay \$20 per year and 35% were willing to pay between \$20-\$99 per year;

Practice in home water conservation;

Spas should be emptied on grassy areas and not through the septic system.

Recommended Action:

Educate watershed residents and lake users in home water conservation;

Work with the Town of Mina and county health department to determine if a public sewage system is needed or if the current onsite systems are meeting acceptable standards;

Develop a task force to monitor septic systems;

Work with the county health department and the Town of Mina to determine if a dual system for gray and wastewater is feasible.

Forestry

The removal of trees and shrubs from the watershed has a direct impact on Findley Lake water quality. If precautions are not taken during the removal of trees from the forest, especially hillsides, environmental degradation will occur in the form of increased run-off causing sedimentation in the lake. Loss of wildlife habitat, forest recreation opportunities and aesthetic views are additional concerns. Trees and shrubs should be replaced. Land contours and drainage ways, disrupted during logging operations, should be restored to their original state.

Recommendations:

There is a need for local laws to regulate the logging industry. These laws should target plans for erosion control, stream crossings and selective cutting. Items such as use of silt fences to catch soil runoff, hay bales to control erosion and replanting of trees and shrubs should also be included.

Streams should have buffer zones maintained and “ecosystem-friendly” crossings established.

Information regarding best management forestry practices provided to the loggers and property owners of forested land. A forest management program for landowners can be obtained from the NYS DEC Lands and Forests Office in Falconer, NY. Also, the Chautauqua County Soil & Water Conservation District in Jamestown, NY conducts a tree and shrub sale program each spring offering a variety of species at a minimal cost. Landowners are encouraged to take advantage of these programs.

Recommended Action:

Cooperate with the Town of Mina planning board to develop a forestry plan and code;

Strive for full enforcement of current Town of Mina planning codes;

Develop a committee to inform the stakeholders of county and state forestry programs.

Forested Hillside Management

The development of forested hillside property is a topic requiring special attention. Deforestation of sloping wooded hillsides would cause increased major run-off, pollution and siltation. Presently, the surrounding forests are protecting the watershed and enhancing the aesthetics of the environment.

Recommendations:

That zoning ordinances regulating development of forested lands specifically address the following:

- Subdividing would keep deforestation to a minimum;
- Erosion and re-deposition of soil would be prevented;
- Developing hillside properties must be kept to the minimum;
- Vegetative cover removed replaced to insure erosion control and provide aesthetic benefits.

Actions Recommended:

Work with the Town of Mina and the Chautauqua County Soil and Water Conservation District to develop zoning laws or ordinances that are specific to the Findley Lake watershed.

They should include:

- Two-acre lots for construction/development;
- Restoration of trees and plants;
- Erosion and sedimentation controls before, during and after development of the property;
- Provide for 50 foot buffer zones along streams;
- Include deed restrictions detailing percentage of green space that must be maintained on the property;
- Require detailed building permits on all construction or development;
- Implement strict inspection and enforcement of procedures.

Green Space

Development in the Findley Lake watershed will continue to expand in the future. It is critical that green space areas be preserved in a natural state. Green space is an area not subject to commercial or residential development. The area may serve to control noise or erosion. Green space may hide a developed area or simply preserve a patch of nature. Ideally, the area should be left in a natural state where native flora and fauna can continue to exist. Zoning regulations should be crafted so that steep ridges, hillsides and stream banks can be designated for preservation. Also, zoning regulations should require plans for subdividing and developing land to address green space needs. If we are to preserve the rural beauty of the area and keep soil erosion and subsequent siltation in the lake to a minimum, steep ridges, hillsides and stream banks should be designated for preservation. Plans for subdividing and developing land should address green space needs.

Recommendations:

Work with local public and private organizations to develop a strategy for acquiring desirable areas;

Target areas for possible acquisition by concerned organizations.

Actions Recommended:

Identify possible sources of funding for acquisition of green space area.

Work with public and private entities to acquire green space in the watershed and adjacent non-watershed areas.

Enlist the assistance of the Chautauqua County Planning Board.

New Construction

New construction and development on existing sites has direct and dramatic effects on the health and condition of Findley Lake and its watershed.

Discussions regarding the effects of construction identified concerns such as lot size, septic systems, buffer zones, soil erosion, green space and zoning. All issues and concerns regarding new construction and development in the Findley Lake watershed must be addressed in conjunction with the Town of Mina zoning laws.

Recommendations:

Lot size requirements be determined by the location of the site as identified in the Town of Mina zoning; sites within the area identified as residential lakefront must be at least one half (.5) acre; all non-lakefront residential construction must be one acre or more;

New or replaced septic systems must be 100 feet from the lake water and all creeks and streams in the watershed; water wells, as required by County regulations, must be 100 feet if possible from a septic system;

Indiscriminant stripping of vegetation of new construction sites must be prevented; all new construction, as well as landscaping of existing sites within the watershed, must be designed so as to minimize erosion and subsequent re-deposition of surface soils;

Buffer zones approximately 50 feet wide adjacent to streams must be established to control run-off and maintain the quality of water flowing to the lake. Lakefront construction must allow for a 50-foot buffer along the lakeshore. It should be noted that any project that causes the bed or banks (within 50 feet of the water body) of a protected water body to be physically disturbed (i.e. land clearing, filling, drainage/pipe ditch installation, etc.) requires a Protection of Waters Permit from NYSDEC (Article 15, Title 5 of the Environmental Conservation Law). Therefore, if this recommendation is acted upon, and, in the future, a variance is requested and granted (bringing the project within the buffer zone), the owner would not only need the variance, but also a permit from NYSDEC.

Each tree removed as a result of construction must be replaced with three trees of the same species. These should be planted in such a manner as to provide maximum erosion abatement.

Multiple unit development sites should be designed utilizing cluster methods for sewage disposal.

Green space must be preserved for erosion control and the aesthetic benefits it produces.

Areas such as steep ridges, hillsides and stream banks should be designated for preservation.

All subdivided property should contain reserved green space areas.

Building plans for undeveloped lots should address green space needs.

Actions Recommended:

Work with the Town of Mina Board and the Chautauqua County Soil and Water Conservation District to develop zoning laws or ordinances specific to the Findley Lake watershed.

Targeted items include, but are not limited to:

- One half acre size lots for lake front construction and one acre for non-lake front lot size;
- Establish septic systems distance from lake or running water;
- Establish erosion control ordinances that address buffer zones, green space, erosion control plan requirements and waste disposal;
- Special requirements for hillside construction or development;
- Detailed building permit requirements for all new construction;
- Strict inspection, enforcement procedures and substantial infraction fees.

Again, committees must be formed to attain needed results that will effect the development in the watershed. A working rapport between FLPO and government agencies must be encouraged to arrive at the needed changes to zoning regulations and to achieve funding.

WATERSHED RESIDENTS' SURVEY

Background Information

At the very outset of the Watershed Management project, the need to determine the attitudes and views of the stakeholders in the Findley Lake watershed was recognized. To obtain this information an opinion survey was developed by a committee made up of directors from the Findley Lake Property Owners', Incorporated.

The survey was constructed in such a way as to gather data about the residents of the watershed, as well as to learn what issues the residents felt were important. The survey (see Appendix) was set up in five parts:

- 1.) Recreational Uses and Controls;
- 2.) Environmental Concerns;
- 3.) Land Use;
- 4.) Possible Management Solutions;
- 5.) Background Information.

The survey was mailed to 562 Findley Lake watershed residents and watershed user residents (see map Appendix). The mailing was sent during August of 1997. It was prepared so that it could be completed, placed in a postage paid envelope that was provided and returned to the Chautauqua County Planning Department. The residents' addresses were taken from a mailing list prepared by the Chautauqua County Planning Department using the 1997 tax records. The mailings included 195 residents who lived outside the watershed, 147 residents who live in the watershed but away from the lake, and 220 residents who live in the watershed on the lakeshore. We also distributed 40 non-resident surveys.

There were 174 responses to the resident survey (31%) and 19 responses to the non-resident survey (48%). Response by geographic delineation were 24 responses from residents that lived outside the watershed (12%), 38 responses from residents that lived in the watershed but away from the lake (26%) and 112 responses from residents that live in the watershed on the lakeshore (51%).

1. Recreational Uses And Controls

This section surveyed the use of Findley Lake and the potential problems regarding the use of the lake. The recreational use of the lake was defined by ranking the activities. We used a weighted average to determine the ranking (see Appendix).

Question Number	Recreational Use	Rank
A34	Passive viewing of lake	1
A25	Power boating	2
A20	Swimming	3
A31	Fishing from shore/dock	4
A32	Fishing from boat	5
A36	Water skiing	6
A22	Canoeing/rowing	7
A27	Nighttime boating	8
A26	Jet skiing	9
A23	Sailing	10
A29	Cross country skiing on lake	11
A28	Ice skating on lake	12
A33	Ice fishing	13
A30	Snowmobiling on lake	14
A21	Snorkeling/SCUBA diving	15
A24	Wind surfing	16
A35	Waterfowl hunting on lake	17
A5	Reckless boat driving is a problem	3
A12	Young unsupervised boaters cause problems	4
A2	Excess boat speed is a problem	5
A4	Noisy boats are a problem	6
A16	Counter clockwise rotation is not observed	7
A3	Conflicts between different uses is a problem	8
A1	The large number of boats is a problem	9
A10	Boat congestion at narrows is a problem	10
A9	Nighttime boating causes problems	11
A11	Moored swim rafts cause problems	12
A6	Water skiing causes problems	13
A14	Wintertime activities on the ice causes problems	14

The five unranked questions dealt with the time of recreation-related problems, regulations, education and tourism. The question regarding time of recreation-related problems (A13) noted that the majority of response stated that during weekends and holidays were the most apt time for a problem to arise. Questions (A15 & 17) indicated less new regulations and stricter enforcement of current regulations. The question asking about education (A18) received an overwhelming response that more educational programs are needed to inform the stakeholders in the watershed on the proper use and care of the natural environment to attain and ensure a better place for us to live and enjoy. The final question (A19) reveals that the residents feel that the promotion of tourism has a negative effect on the lake and the economic benefits do not outweigh this negative effect.

2. Environmental Concerns
Perceived Problems Affecting Findley Lake and Watershed

Residents were asked to respond to a list of categorized problems throughout the watershed. They were environmental and land use problems. The environmental questions were divided into shoreline development and vegetation, goose control, lake vegetation and the quality of the water and land around the lake.

The ranking of the environmental concerns (using a weighted value) follows:

Question Number	Question	Rank
B15	The placement and protection of fuel storage tanks should be regulated to minimize the possibility of fuels entering the lake	1
B6	Stormwater run-off controls should be required for new development in order to minimize pollution and siltation that enters the lake	2
B22	Goose population needs to be controlled	3
B2	Lawn fertilizers and weed killer use should be prohibited near the shoreline	4
B3	Techniques used to construct highways, bridges and ditches should be improved in order to reduce erosion both during and after construction	5
B21	Goose population creates water quality problems	6
B12	Developers of large projects should be required to dedicate a percentage of their property to open space	7
B10	Steep slope development should be regulated to reduce erosion	8
B19	Industrial and commercial operations in the watershed should be controlled to better protect the environment	9
B1	All new structures should be set back from the shoreline as far as is reasonably possible to minimize the input of pollutants to the lake	10
B18	Strict limits on gasoline and oil leakage from boats should be enforced	11
B20	Development controls should be enforced for the entire watershed and not just areas on or near lake	12
B8	Conservation plans should be mandated for all farms in the watershed in order to reduce agricultural run-off	13
B11	Development along stream corridors should be regulated to reduce erosion and siltation problems	14
B9	Efforts to conserve wetlands in the watershed should be increased because wetlands act as filters for the lake	15
B17	Discharge from septic systems contributes to lake pollution	16
B7	Removal of sand and gravel from stream banks should be more strictly controlled	17

B4	Natural vegetation located adjacent to the shoreline should be protected since it acts as an environmental “filter”	18
B16	Septic system maintenance districts should be created for non-sewered areas in close proximity to the lake	19
B5	“Clustering” or the concentration of housing for new developments should be required with the “excess” land retained permanently for “open space”	20
B13	Developers should make a cash payment for each lot developed and dedicate funds to purchase open space	21
B14	Treated lumber for docks and decks should be prohibited when it will come in direct contact with Findley Lake waters	22

The main concerns of the residents are areas that through education and individual adherence can be attained to reduce pollution to the watershed. The other areas of concerns regard land use and development. These concerns come under the jurisdiction of the Town of Mina planning board and will be addressed in the management plan.

Regarding the lake vegetation and control quality problems as stated in questions 23, 27, 28 and 29, the responses were overwhelming that the aquatic vegetation, algae blooms (green scum), turbid/colored water and odors associated with the lake are the most critical areas of concern and must be addressed in the lake management plan.

The type of management for these conditions of the lake is the use of a harvester and aquatic herbicides. These two management tools received favorable endorsement. However, managing the flow of pollutants into the lake received the highest percentage of responses and will be looked at very closely in the watershed management plan.

The overall perceptions regarding the quality of the property adjacent to the lake has improved over the past five years. However, the quality of the property has mixed emotions on whether or not it is in need of upgrading. Most responses were neutral or agreed that the quality of property adjacent to the lake is excellent.

The results definitely agree with all other responses regarding the quality of the water, now and over the past five years. Both questions regarding the water quality overwhelmingly resulted in the fact that this is a very large area of concern and needs to be addressed in the lake management plan.

3. Land Use

This section of the questionnaire deals with the current and future uses of vacant and developed land in the watershed. The results were:

Question Number	Question	Rank
C12	Single family detached housing development should be favored over multi-family housing near the lake	1
C7	Lakefront fence heights and locations should be regulated to protect views	2
C2	Steep slope development should be regulated to protect scenic views	3
C1	Significant historic sites should be protected	4
C5	Building heights on lakefront properties should be regulated so as to preserve views	5
C9	The appearance of commercial areas should be upgraded, concentrating on the natural beauty of the watershed	6
C14	Limitations (e.g., maximum of four families per 50 feet of shoreline) should be placed on the number of non-lakefront "2 nd tier" watershed residents and lake users can utilize a lake access right-of-way in order to protect existing lakefront neighborhoods from usage which is too dense	7
C4	Minimum sign standards should be created for lakefront businesses that deal with size, number, appearance, lighting, etc .	8
C6	The density of moored boats should be regulated (e.g., maximum of 3 boats per 50 ft. of shoreline)	9
C10	Only water dependent uses (e.g., housing, hotels, marinas and restaurants) should be encouraged in commercial areas to the lake	10
C3	An architectural review board should be created to consider design, materials and colors of new developments	11
C8	More public open space and parks should be created with increased public access to the lake	12
C15	Further development of existing waterfront commercial and residential areas should be encouraged in order to preserve low-density levels in other less developed areas	13
C13	Multiple family housing (e.g., condos and apartments) should be encouraged because they provide a higher density of development than single family houses	14
C11	Industrial development should be promoted, even if the site is in close proximity to the lake	15

The consensus of responses favors the protection of the viewing of the lake and limiting any obstruction of such view. Single family dwellings carried the most significant response. Multiple dwellings, commercial and industrial development received unfavorable responses.

4. Possible Management Solutions

This section of the questionnaire deals with opinions of regulations, implementation methods, financing, and the agency or level of government that you feel should implement the watershed management plan.

The area of regulations resulted in the below ranking of responses.

Question Number	Question	Rank
D7	Water quality has an impact on property values near the lake	1
D9	A committee of residents, businessmen, farmers, environmentalists, and municipal leaders should convene with the purpose of guiding watershed management	2
D8	More education, not regulation, is needed to implement watershed protection policies	3
D13	Jobs or economic growth should be sought if there will be little or no risk to the environment	4
D1	Regulations slow down the rate of development	5
D11	If a district board is created, it should only make recommendations	6
D6	Even if we had stricter land use regulations, local governments would generally not enforce them adequately	7
D4	Uniform watershed-wide regulations are preferred over individual Town/Village regulations	8
D3	Land use regulations destroy property rights	9
D14	Environmental and land use laws should be stricter in areas adjacent to Findley Lake and should be less strict for areas farther back in the watershed	10
D5	Present land use laws adequately deal with environmental and land use issues in the watershed	11
D12	A full time coordinator should be hired to direct the preparation of a watershed plan as well as to help implement it	12
D2	Our watershed area does not need land use laws	13
D10	If a watershed management district is created, it should have taxing powers	14

The residents of the watershed again pointed out that the water quality of the area is the first and foremost important item to be addressed. The survey respondents' ranking of funds for implementation is the following:

Question Number	Question	Rank
D16	Maintenance-weed control, pollutant input controls clean-ups	1
D17	Education- provide information, training & education to various agencies, administrators, and the public	2
D19	Enforcement- provide funds to enforcement officials to encourage fuller enforcement of law and regulations regarding watershed management issues	3
D20	Fund additional lake & watershed research	4
D18	Incentives- provide financial incentives to various levels of government, institutions & private entities to encourage implementation of watershed management issues	5
D21	Purchase properties- unique open space or other features should be purchased	6
D15	Regulations- provide assistance in updating regulations	7

Regarding an educational budget, the areas where the respondents felt the groups that should receive the most funding for education and training in order of importance is the following:

Group	Rank
Farmers	1
Enforcement officers	2
Adult residents	3
Developers	4
General ad campaigns aimed at all groups	5
Highway Departments, Town Boards and other municipal agencies	6
High school students	7
Elementary students	8

The ranking of funding sources for the watershed management implementation according to survey respondents is the following:

Potential Source of Funding	Rank
Developer fees associated with projects	1
State government	2
County government	3
Federal government	4
Town/Village governments within the watershed	5
Tourists & visitors from outside the County- user fees	6
Boat registration fees	7
Lakefront owner – donations	8
Owners of property near, but not adjacent to the lake - donations	9
Owners of property within the watershed, but not upland of State routes 430 & 394 – donations	10
Lake management district with taxing power	11

Survey respondents' ranking of agency involvement in watershed management implementation:

Potential Implementation Agency	Rank
Findley Lake Property Owners', Inc.	1
Town/Village governments	2
County government	3
District made up of all lands in the watershed	4
District including only lands close to the lake	5
State government	6
Federal government	7

There were two questions asked which deal with willingness to contribute to the implementation of watershed management practices. The questions and responses were:

If asked to contribute to a watershed management program annually, I would be willing to contribute the following:

Amount	Percentage
Nothing	13
Under \$20	15
\$20 to \$99	44
\$100 to \$200	11
Over \$200	3
Undecided	14

If asked to contribute to a septic system management program annually, I will be willing to contribute the following:

Amount	Percentage
Nothing	25
Under \$20	17
\$20 to \$99	35
\$100 to \$200	6
Over \$200	1
Undecided	16

5. Background Information

The response to the background information was received from 169 residents of the watershed and 16 visitors. The profiles of the responses are:

The average household is made up of two individuals followed by households of five or more individuals. The employment picture shows that 61% of the responders are fully employed followed by 30% of retirees. The top two areas of employment are 30% engaged in manufacturing and 23% in providing services. On the educational level 24% are high school graduates, 24% are college graduates and 22% have completed college graduate degrees.

Residency reflected that 44% utilized their Findley Lake residence 10-12 months annually followed by 23% using the residence for 1- 3 months per year. Residences in the watershed that are never rented are 87% compared to 6% that are rented during the year. The length of ownership of watershed residences is:

5% less than 5 years
23% 5-10 years
62% - over 10 years

Those residents whose primary residence is in the Findlay Lake watershed is 27% and those outside the watershed but in Chautauqua County is 7%. The other areas of primary residence are:

New York-1%
Pennsylvania-37%
Ohio-20%
Other states-8%.

The question involving age received the following response:

Status	Percentage
Under 20	0
20-29	1
30-39	10
40-49	23
50-59	27
60 and above	39

The final area was your approximate 1996 total household income before taxes. We received 154 responses to this inquiry, which reflected that 52% of the respondents earn greater than \$50,000 and 37% earned between \$20,000 to \$49,999.

The questionnaire is an integral part of the lake management planning process and provides insight as to the areas of concern as seen by the stakeholders in the Findley Lake watershed.

Summary

In summation, the areas of recommendations should also be prioritized by the FLPO so that results can be accomplished as soon as possible. Some projects must be long term and will require many hours of investigation, fund raising, planning and then implementation of the project. Short-term projects should be implemented as soon as possible. This will encourage the residents of the watershed to become active in the plan and their environment.

The Findley Lake Watershed Team recommends that the FLPO implement those suggested projects which will have a direct impact on the watershed.

The FLPO should organize committees to handle the projects as stated in the lake management plan. Each committee should be chaired by a director of the FLPO. The chairperson should coordinate the activities of the committee and direct it to reach a conclusion to the project in a timely and efficient manner.

The FLPO should prioritize the recommended actions so that projects that can be handled quickly, will be resolved speedily, and the more difficult projects will receive the effort needed to implement that project.

According to the survey, education to keep watershed residents and lake users abreast of what is happening and what is expected of them is necessary and must be addressed each year.

Results will be minimal without the input of the watershed residents and lake users to the watershed program.

Remember--your actions and those of your neighbors have a direct impact on the watershed and Findley Lake.

RECOMMENDED TIME SCHEDULES

GOAL	TIME SCHEDULE
Lake Cleanup	Should be ongoing; send out spring, summer and fall recommendations for watershed management.
In Home Water Conservation	Should be ongoing, yearly reminders to watershed residents; integrate the Home*A*Syst Program to all lake residents; work with realtors to provide the program to new owners.
Safety	A yearly program to certify boaters; develop and update a "Rules of the Road" brochure for lake users to be distributed each spring.
Property Acquisition Green Space	Develop a committee to identify properties and acquire funding (3-5 years).
Aquatic Insect Control of Plant Life	Continue current yearly study of this control method; apply for grant monies to help assist in study over next 5 years.
Chemical Control of Aquatic Vegetation	Set up a yearly application procedure.
Ditching-Channeling of Surface Run-off	Work with road departments (1-5 years)
Mechanical Harvesting	Handle on a yearly basis if needed.
Public Water and Sewer Systems	Work with Town of Mina (2-10 years).
Sediment Removal or Dredging	Apply for funding to build capital for project (5-15 years).
Snow Removal	Work yearly with road departments.
Water Level Control or Draw Down	Continue as currently practiced.
Forestry Forest Hillside Management	Work with Town of Mina to implement (2-5 years).
New Construction	Work with Town of Mina to develop zoning laws and ordinances (2-5 years).

Index of Abbreviations

FLPO	Findley Lake Property Owners', Inc.
CSLAP	Citizens Statewide Lake Assessment Program
NYSFOLA	New York State Federation of Lake Associations
NYSDEC	New York State Department of Environmental Conservation
SOLR	State of the Lake Report
NYSDOT	New York State Department of Transportation
PWC	Personal Water Craft
BMP	Best Management Practices
CNMP	Comprehensive Nutrient Management Program
AEM	Agricultural Environmental Management Program

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Others

Dale Braden
Jay Bloomfield
Patricia Crosscombe
Gene Del Greco
Dr. Tom Erlandson
Gina Gallinger
Betsy Hohenstein
Scott Kishbaugh
Steven La Mere
Paul McKeown
Dr. Dave Orvos
R. Gil Randell
Kelly Riforgiat
Pauline Thorndike
Dave Wilson
Dr. Mike Wilson