Pontoosuc Lake Management Plan

Friends of Pontoosuc Lake/Watershed Corporation

Prepared by

The Friends of Pontoosuc Lake/
Watershed Corporation
and

The Berkshire Regional
Planning Commission

Funding Provided by the Berkshire Environmental Fund

December 2004

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Pontoosuc Lake: Resource Restoration and Management
Project conducted from April 2003 to December 2004

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I. INTRODUCTION

Pontoosuc Lake is a semi-urban lake located in central Berkshire County. Lake area residents and other local lake users, as well as those visiting the Berkshires, enjoy the recreational opportunities provided by the lake. However, like many area lakes, there are problems. While these problems are not unusual, atypical or severe, they do require attention.

The people who use Pontoosuc Lake are frustrated by the condition of the lake despite watershed management efforts, years of weed harvesting and drawdown, and implementation of diagnostic/feasibility study recommendations. Past efforts included agricultural runoff controls at watershed farms, stormwater detention along main tributaries, and installation of proprietary stormwater Best Management Practices (BMPs) in neighborhoods along the north shore. While these projects are expected to result in a net improvement in the lake's water quality over time, an overall management strategy is needed to ensure that improvement efforts continue in a coordinated fashion.

The weed-harvesting program has been in place for three decades. Additional lake improvements have also taken place over many years, with a local advisory board coordinating the efforts. These activities have received financial support by county and local government (Pittsfield and Lanesborough). A historical library of Pontoosuc Lake studies is on file in the South Street (Pittsfield) Office of the Department of Conservation and Recreation.

From 1997 to 1999 the local advisory board with additional residents and local officials served as a review committee for a diagnostic/feasibility study and evolved into a lake association called the Friends of Pontoosuc Lake/Watershed Corporation (the Friends of Pontoosuc). In their advocacy role, the group has worked closely with local officials with management responsibilities to address the lake's problems. Principally, the lake's problems are heavy infestations of exotic weeds, most notably Curly-leaved Pondweed *(Potamogeton crispus)* and Eurasian Water Milfoil *(Myriophyllum spicatum)*, high concentrations of pollutant loading from stormwater runoff, and responsibility for the lake that is divided among the City of Pittsfield, the Town of Lanesborough and the Commonwealth (current owner of record).

In addition to water quality, concerns at the lake involve recreational usage, maintenance of the beaches, annual clean-up efforts, stewardship by shoreline businesses and lake users, dam management, and fisheries management. A freshwater fish consumption advisory is in effect on Pontoosuc Lake for Largemouth Bass due to mercury. Children younger than 12 years, pregnant women, and nursing mothers should not eat Largemouth Bass from this water body. The general public should limit consumption of Largemouth Bass to two meals per month.

The Friends of Pontoosuc worked with the Berkshire Regional Planning Commission (BRPC) to secure funding from the Berkshire Environmental Fund to prepare this management plan that comprehensively addresses the management responsibilities of local stakeholders. The plan will serve as a roadmap for each organization with management responsibility to identify what they are responsible for and how their work should be coordinated with the others. Oversight of the

implementation of the plan ultimately rest with the Friends of Pontoosuc, as it is the only entity dedicated solely to the improvement of Pontoosuc Lake, and must take responsibility for coordinating with and advocating for the other entities, as well as performing what work we can do with our volunteer workforce, and raising money for those things which are beyond the reach of volunteer workers.

In generating the plan the Friends of Pontoosuc solicited inputs from interested parties. A final draft of the plan was submitted to the following stakeholders for comments and input: DCR (Western regional office, Department of lakes and Ponds); Pittsfield (Department of Parks and Recreation, Conservation Commission, Department of Public Works); Lanesborough (Town Administrator, Conservation Commission); Ken Wagner, CLM PhD (ENSR) and the DEP (Division of water Quality). Their comments were incorporated into the plan. The plan was also reviewed and endorsed by the Friends of Pontoosuc Board of Directors, and was made available to the membership at large through the newsletter, and will be submitted for endorsement at the annual meeting in the spring of 2005.

The plan will be updated annually by the Friends of Pontoosuc. As a minimum, the five year plan will be revised to reflect accomplishments and to extend the plan by a year. Modifications to the body of the document will be made by addendum as needed as part of the annual update.

Copies of the plan are being distributed to all the stakeholders listed above, and will be made available in the Pittsfield and Lanesborough libraries. Copies will be provided by the Friends of Pontoosuc to anyone who requests a copy.

II. MANAGEMENT CONTEXT

Entities with Management Responsibility

Pontoosuc Lake is located within the City of Pittsfield and the Town of Lanesborough. (See Map 1) There are multiple entities with various responsibilities regarding the management of Pontoosuc Lake. Until July 2000, the lake was owned by the Berkshire County Commission. When the Commission was dissolved by the state legislature, ownership of the lake was transferred to the state. Since that time, the lake has been a state asset residing with the Department of Capital Assets Management (DCAM). The management authority is divided between both municipalities and several state agencies whose responsibilities range from the maintenance and operation of the dam, permitting authority, and enforcement responsibilities. The Friends of Pontoosuc Lake/Watershed Corporation (The Friends of Pontoosuc) is the only management group concerned solely with Pontoosuc Lake and its overall management. The Friends of Pontoosuc have worked effectively with the Commonwealth of Massachusetts, the City of Pittsfield, and the Town of Lanesborough. The Friends of Pontoosuc have established a variety of effective partnerships utilizing the knowledge and skill base of local groups such as the Berkshire Regional Planning Commission (BRPC), the Lake and Ponds Association of Western Massachusetts (LAPA-West), and the Housatonic Valley Association (HVA).

Commonwealth of Massachusetts

As the current owner of record, the Commonwealth of Massachusetts has not identified a state agency to serve as the management authority and steward of Pontoosuc Lake. Presumably, legislation is pending to turn the lake over to the Department of Conservation and Recreation (DCR) for management.

The dam is currently monitored by DCR, through the Pittsfield State Forest Office. The lake is currently drawn down 3 ft each year, beginning in October and refilling in April. The *Technical and Environmental Evaluation of Lake Level Control for Aquatic Plant Management in Pontoosuc Lake*, prepared by IT Corporation, indicated that a periodic drawdown of 6 feet would serve as a better control for rooted aquatic plants. However, the Department of Fish and Game (DFG) has raised concern over potential negative impacts during deep drawdown, but no objective study has been conducted at Pontoosuc Lake to substantiate this concern. There has long been a concern over the depth of the drawdown and the absence of a fish screen at the dam outlet. Some concerns have been raised over the time it takes for the state to adjust the dam level during periods of high or low flow.

The Department of Fish and Game (DFG) Division of Fisheries and Wildlife (DFW) run the fish-stocking programs throughout Massachusetts. Pontoosuc Lake is stocked primarily in the spring with additional stocking activities occurring in the fall. The Massachusetts Environmental Police (EPO) also operates under the DFG. The EPO are responsible for Districts throughout the commonwealth. EPO officers have authority equal to that of State Police Officers, and are

empowered to enforce all general and criminal laws. EPO are responsible for the enforcement of fish and game laws and regulations on Pontoosuc Lake and within its watershed. Additional responsibilities include the enforcement of all recreational vessel laws and recreational vehicle laws and regulations. EPO are responsible for search and rescue missions. The average District is approximately five to six communities in size covering 180 square miles of patrol territory on average. The EPO rely heavily on support and back-up in times of emergency from local police departments and the Massachusetts State Police in order to effectively enforce the laws in such a large geographical area.

The Department of Environmental Protection (DEP) is responsible for devising strategies for protecting and preserving critical inland resources waters, such as Pontoosuc Lake. In addition, DEP administers grants and revolving loan programs that help cities, towns, and other regional entities improve their environmental resources. DEP has regulatory authority and is also responsible for various permitting, compliance, enforcement, emergency response, and site cleanup activities. DEP issues licenses for docks and other structures in the lake under Chapter 91 of Massachusetts General Law. All applications submitted to the local conservation commissions under the Wetland Protection Act are reviewed by the Western Regional Office Wetlands Program of DEP. This includes applications for lake management activities on Pontoosuc Lake. Title 5 of the State Environmental Code protects the public from the health threats caused by on-site septic systems that are not properly sited or maintained. Such systems can contribute pathogens and nutrients to groundwater and surface water, endangering surface water bodies. DEP shares the responsibility for the proper siting, construction, upgrade, and maintenance of on-site septic systems with the local Boards of Health and system owners.

Municipal Authorities

Both the City of Pittsfield and the Town of Lanesborough are required by new federal regulations to develop stormwater management plans. These regulations fall under the US EPA's National Pollution Discharge Elimination System Phase II Program, or NPDES Phase II as it is commonly known. The ultimate goals of this program are to improve the water quality in the Housatonic River and its tributaries in Pittsfield and Lanesborough, by preventing nonpoint source runoff and illicit stormwater discharges.

In order to comply with the federal regulations the City of Pittsfield and the Town of Lanesborough will develop, implement and enforce a program to reduce the discharge of pollutants from the municipal separate storm sewer system (MS4) to the maximum extent practicable; protect water quality, and satisfy the water quality requirements of the Clean Water Act and Massachusetts Water Quality Standards

All elements of the storm water management program will be implemented by the expiration date of the permit (5 year permit, effective March 10, 2003). The storm water management programs will implement the six minimum control measures required by the NPDES general permit. The six minimum control measures are Public Education and Outreach, Public Involvement/Participation, Illicit Discharge Detection and Elimination, Construction Site

Stormwater Runoff Controls, Post-construction Stormwater Management, and Pollution Prevention/Good Housekeeping for Municipal Operations.

While the greatest volume of pollutant inputs to Pontoosuc Lake come from the tributaries, the highest concentration of inputs come from stormwater outfalls during rain events and snowmelt. This indicates that stormwater treatment and management in the small geographic area of developed neighborhoods around the lake may result in reductions of pollutants through the efforts under the NPDES Phase II program.

City of Pittsfield

The City of Pittsfield is responsible for shoreline and watershed activities around the southern half of the lake. In this area there are two main public access points: the Public Access Board boat ramp at Pontoosuc Lake Park on Hancock Road, and the public beach known as the Blue Anchor on Route 7, North Street. Pontoosuc Park and the beach at the Blue Anchor are managed by the Pittsfield Parks Department. There has long been a concern with the public swimming area at Pontoosuc Lake Park being too close to the boat launch. The narrow channel in this area barely accommodates both uses. Swimmers seem to prefer this area because of the sandy/gravelly bottom and shallow access, while the beach area is both rocky and strewn with large underwater debris. In addition the City of Pittsfield Department of Parks and Recreation manages the public access boat launch on Hancock Road, which is owned by the Massachusetts Public Access Board. The City manages the site under a memorandum of understanding between the City and the Public Access Board. A dock at the ramp site is put in to the lake in May and removed in October by the City. There are a few unofficial access points that are mostly used in the winter. The dam at the lake's outfall is within the city limits at the intersection of Route 7 and Hancock Road. An existing sailing club that had been housed at the YMCA building that is next to the Blue Anchor park is proposing to move to a new facility in the area. The Williams College Sailing Club is housed by the sailing club at Pontoosuc Lake.

At this time, there are no lake-related public use buildings in the City; however, funding for a bath house has been earmarked by the City Council, and is supported by the Friends of Pontoosuc through partial funding from a Berkshire Environmental Fund Community Improvement Grant.

The City's primary responsibility with respect to lake management activities on Pontoosuc Lake is the operation of the mechanical harvesting program. The mechanical harvesting program is currently operated through the Department of Public Works and Utilities. The weed-harvesting program run by the City was determined to be highly effective in 2003 though the costs rose considerably. While the City of Pittsfield is responsible for operating the harvesting program, the cost of the harvesting program is divided equally between the City of Pittsfield and the Town of Lanesborough. The Commissioner of the Department of Public Works and Utilities, Bruce Collingwood, serves as the harbor master for the lake. The harbormaster is responsible for issuing permits for moorings and floating swim platforms.

Town of Lanesborough

Lanesborough is responsible for shoreline and watershed activities around the northern half of the lake. Approximately 90% of Pontoosuc's 13,607 acre watershed is in Lanesborough. The town designates a harbor master for the lake who is responsible for issuing permits for moorings and floating swim platforms. The harbormaster is not responsible for permitting docks which are attached to the shore, which the responsibility of the Commonwealth. In Lanesborough, the harbormaster is the only official whose duties focus entirely on the lake and is the de facto point of contact for the town on lake matters. The Harbormaster is also responsible for acquiring a permit for drawdown through the Lanesborough Conservation Commission.

There are a few small access points for non-motorized boats and winter access in Lanesborough including an unofficial town beach owned by the town on Sunrise Street. The largest public areas are along the causeways at Town Brook on Bull Hill Road and Secum Brook on Narragansett Ave. These areas provide a place for shoreline fishing, but not for boat access. The Town of Lanesborough maintains Reinhart Park, a public park, located on Narragansett Ave. In addition, the town owns two minor easements off Orchard and Katherine Streets. The town has adopted several streets around the shoreline of Pontoosuc Lake including Narragansett Ave., Profile St., National St., Imperial St., Ocean St. and Sunrise St.

The Friends of Pontoosuc Lake/Watershed Corporation

As the only advocacy organization concerned with Pontoosuc Lake, the Friends of Pontoosuc organized in 1999 and incorporated as a 501(c) (3) organization in 2004. This is a membership organization that works with local governmental entities to ensure adequate management of the lake.

The Friends of Pontoosuc have approximately 100 members that include lake residents, lake users, and others. The Mission and objectives of the organization are to maintain and improve the quality of Pontoosuc Lake, a Class B water body of approximately 493 acres lying within the town of Lanesborough and City of Pittsfield in Berkshire County, Massachusetts. This purpose is to be achieved by: 1) Providing advice to all public agencies which are directly or indirectly responsible for the management of Pontoosuc Lake and its watershed, 2) Coordinating and integrating all activities which impact the lake, 3) Organizing volunteer actions which will directly improve the lake and 4) Raising public and private funds to assist in the foregoing activities.

The Friends of Pontoosuc is considering more direct participation in the management of the Lake by doing such things as being the applicant for harvesting and drawdown orders of conditions from the Lanesborough and Pittsfield Conservation Commission, and by participating with DCR in the operation of the gates at the dam which control the lake level. There is a concern about the liability of the individual members of the board of directors should such direct action be undertaken by the organization, and this may limit the extent to which the Friends of Pontoosuc can expand its management responsibilities. The issue is being evaluated.

Past Planning and Management Efforts

Several planning and implementation projects involving Pontoosuc Lake and its watershed have occurred over the past two or three decades. The more significant projects, in terms of scope and scale, are described below. Other management activities have occurred over the same period; and these are listed in bullet form at the end of this section. These reports can be found at the BRPC, the City of Pittsfield Parks Department, the Town of Lanesborough Town Hall, the DCR Regional Headquarters, and the Friends of Pontoosuc.

1. Aquatic Plant Survey and Management Recommendations (GeoSyntec Consultants 2003): Survey data indicate that the principal species of invasive exotic plants are Curly-leaved Pondweed *(Potamogeton crispus)* and Eurasian Water Milfoil *(Myriophyllum spicatum)*. Water Chestnut (*Trapa natans)* was also discovered.

2. Post-Implementation Study of Pontoosuc Lake Pittsfield/Lanesborough, Massachusetts (ENSR, 2000): Diagnostic data indicate that nonpoint sources of pollution (other than septic system waste) are the dominant influences on water quality in the lake. Elevated levels of phosphorus within the water column can contribute to occasional algal blooms while nutrient-rich sediment in shallow water promotes the growth of rooted aquatic plants. The study indicates that small changes in the phosphorus loading in either direction could produce substantial changes in the condition of the lake. Nutrient control activities are needed to halt the degradation and initiate improvement of the water quality. Intense development around the lake is served by extensive stormwater systems that contribute the greatest concentration of nutrients and other pollutants to the lake. Fecal coliform bacteria levels in Secum Brook, Town Brook, and the eastern Inlet exceeded the permissible level for contact recreation (200col/100ml). Pet waste and wildlife appear to be the most significant sources of the bacteria.

3. Mechanical Harvesting Program (City of Pittsfield): The City of Pittsfield assumed the management of the weed harvesting program from the County Commission in 2000. The first two years of the program faltered, angering lake residents and recreational users. In 2003, the City revamped the program and had two successful harvests. The cost of the program however, has risen dramatically from levels under the County Commission. The town of Lanesborough annually appropriates money to fund half the cost of the Pontoosuc harvesting costs ($23,000 in 2004), and Pittsfield covers the remainder. The City is responsible for all equipment management and transport of the weeds for disposal at Rotti's Farm in west Pittsfield. The city provides harvesting services to other towns in Berkshire County which reduces the cost of harvesting Pontoosuc by sharing fixed program costs with other towns.

4. Stormwater Best Management Practices Installation: Two s319 grants (DEP# 99-3/319, and 01-14/319) were awarded to the BRPC and the Town of Lanesborough respectively. These projects designed three and installed two stormwater control devices and conducted other source control measures recommended in the *Post-Implementation Study of Pontoosuc Lake Pittsfield/Lanesborough, Massachusetts*, prepared by ENSR. The proprietary BMP systems known as Stormceptor ®, were installed on Profile and National Streets in Lanesborough. A

third was designed for Imperial Street for which implementation funds are being sought. ENSR found these three streets to have the highest concentration of stormwater pollutants.

5. Pontoosuc Lake Eutrophication and Aquatic Vegetation Control Program – April 1979: Prepared by consultants for the Berkshire County Commissioners and submitted to the Mass DEQE as the final application form for watershed measures and in lake improvements where the emphasis was split between drawdown, shore cleaning, harvesting and chemical treatment.

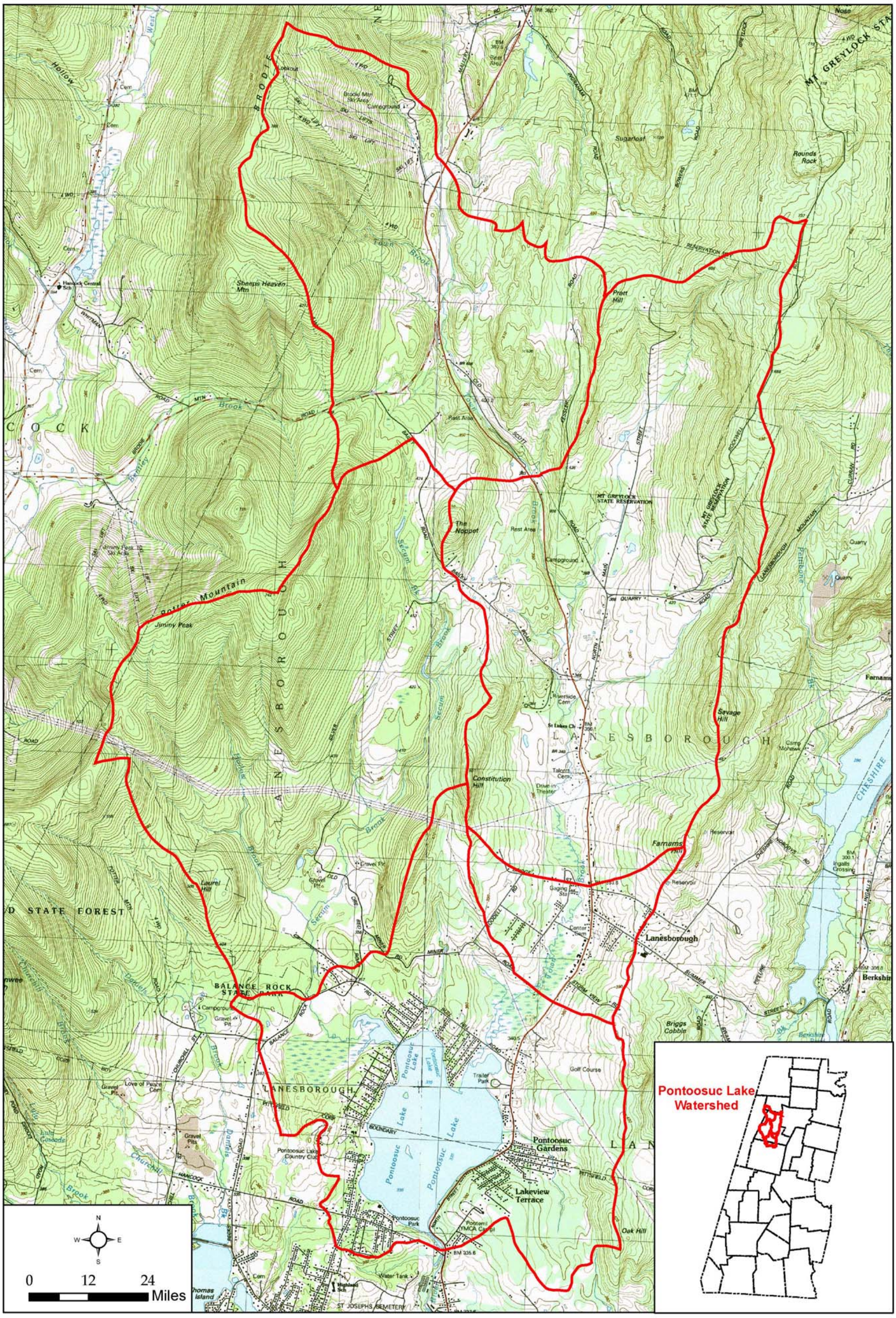
6. Technical and Environmental Evaluation of Lake Level Control for Aquatic Plant Management in Pontoosuc Lake, Berkshire County, Massachusetts – June 1989: Prepared by Aquatic Sciences Division of IT Corporation for the County Commissioners. This was a technical and environmental evaluation of Pontoosuc Lake that developed a water level management plan specifying depth, duration, and timing of lake level drawdown which would most effectively manage nuisance macrophyte growth in the lake. This report recommended a six foot drawdown as having the greatest cost/benefit.

7. Pontoosuc Lake Monitoring Reports – 1979 thru 1984: These reports contain test data including temperature, dissolved oxygen, Secchi, pH, alkalinity and conductivity readings for a five year period.

Implementation to date:

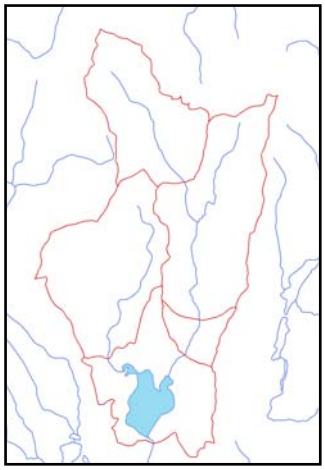
- Annual aquatic weed surveys by the Friends of Pontoosuc
- Bi-annual newsletter to lake association members and local businesses
- Outreach for stormwater and nonpoint source pollution control as recommended in the *Post-Implementation Study of Pontoosuc Lake Pittsfield/Lanesborough, Massachusetts,* ENSR 2000
- Development of a QAPP, by the Housatonic Valley Association (HVA) for monitoring stormwater inputs to the lake (as part of s319 # 99-3/319)
- DEM Lake and Ponds Grant for erosion control at stormwater outfall on Profile Street (Lanesborough) and a shoreline survey of Lanesborough
- Grant to improve stormwater drainage in watershed (in a Zone I along Town Brook) recommended in the Stormwater Assessment Report (DEP #00-07 WHP)
- Formation of a Lake Association as recommended
- Historical agricultural BMPs for manure management by NRCS (pursuant to a lake study done in the 1980's)
- Annual fish stocking programs of the Department of Fish and Game (DFG)
- Mechanical weed harvesting

PONTOOSUC LAKE MANAGEMENT PLAN
MAP 1- PONTOOSUC LAKE WATERSHED



III. STATE OF THE LAKE

Pontoosuc Lake and its Watershed



Pontoosuc Lake in Western Massachusetts is an important year round community resource that serves the most densely populated area of Berkshire County. The land surrounding the lake consists of dense residential development with a state highway traveling along a portion of the eastern shoreline.

The lake is a raised great pond of approximately 480 acres with a 13,607 acre watershed. The maximum depth is 35 feet with an average of 14 feet. Bottom sediments range from muck, in the north end and near the two main inlets, to predominantly gravel in the south end. The *Housatonic River Basin 1997/1998 Water Quality Assessment Report* classified Pontoosuc Lake as impaired by non-native plants and metals. (DEP, 1998) Pontoosuc Lake has been listed on the *Massachusetts Year 2004 Draft Integrated List of Impaired Waters* for impaired by metals and exotic species. (EOEA, 2004) Pontoosuc Lake is not identified as priority or estimated habitat by the Massachusetts Natural Heritage and Endangered Species Program (NHESP).

The *Post-Implementation Study of Pontoosuc Lake Pittsfield/Lanesborough, Massachusetts* (ENSR, 2000) found the lake to be in the early stages of eutrophication. Eutrophication is a natural process by which waters become rich in mineral and organic nutrients that promote a proliferation of plant life, especially algae. Eutrophication often results in reduced dissolved oxygen content and often causes the extinction of other organisms. The eutrophication of Pontoosuc Lake can be attributed to dense development within the watershed and subsequent increases in sediment and nutrient loading through an extensive stormwater drainage system. Non-point source pollution, including erosion must be controlled. At the present time, even small fluctuations in the amount of phosphorus entering Pontoosuc Lake may alter the water clarity. (ENSR, 2000) In addition, the excessive growth of nuisance, non-native aquatic plants threatens recreational options and other current uses of the lake.

Macrophytes

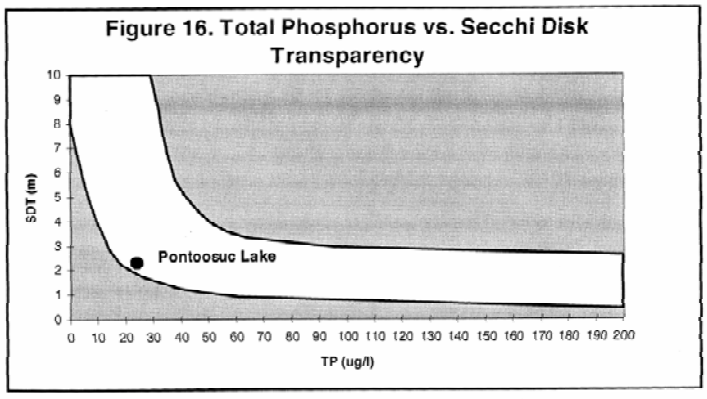
Rooted plants are common within Pontoosuc Lake to a water depth of approximately 15 feet within the lake. (ENSR, 2000) Seven taxa of aquatic vascular plants were documented during surveys conducted by ENSR between 1997 and 1999. In addition, ENSR documented two forms of large algae. These plants and algae included *Myriophyllum spicatum*, *Potamogeton crispus*, *Vallisneria americana, Chara* spp., *Ceratophyllum demersum, Najas* spp., *Nitella* spp., *Elodea Canadensis*, and filamentous green algae. Two plant species were found to be dominant Curly-leaved Pondweed *(Potamogeton crispus)* and Eurasian watermilfoil *(Myriophyllum spicatum).*

These species are considered to be invasive, non-native species. The Post-Implementation Study found that the conditions in Pontoosuc Lake suggest that milfoil and curly-leaf pondweed have displaced most native plant species, and that native plant species have not recovered through drawdown or harvesting. In 2003, GeoSyntec Consultants documented twelve species of aquatic plants in the *2003 Lake Pontoosuc Aquatic Vegetation Assessment*. However, survey results indicated relatively limited species diversity within the macrophyte community in Pontoosuc Lake. GeoSyntec Consultants found European Naiad (*Najas minor*) to be one of the most well distributed and dominant plant species. During September 2003 GeoSyntec Consultants discovered a pioneer infestation of Water Chestnut (*Trapa natans*) in the northeastern corner of the lake. Water Chestnut is an annual plant that reproduces by seed. This plant tends to spread rapidly through prolific seed production and severely impacts recreational uses and alters aquatic habitat.

Water Quality

While generally healthy and well within the state's water quality standards for safe swimming, Pontoosuc Lake has water quality issues that must be monitored closely. The Post-Implementation Study indicates that the lake is at a point where small increases or decreases in pollutants can make a visible impact in either direction. Overall the majority of pollutants were found to be entering the lake from developed land uses in the watershed, and through stormwater inputs. Most of the development in the watershed is located within ¼ mile of the lake shores. (ENSR, 2000)

When considering nutrient problems in freshwater, phosphorus is the limiting nutrient. The amount of phosphorus present determines the amount of growth in plants and algae and the overall productivity of the lake. For this reason, phosphorus control and reduction is a key to reducing excessive plant and algae growth.



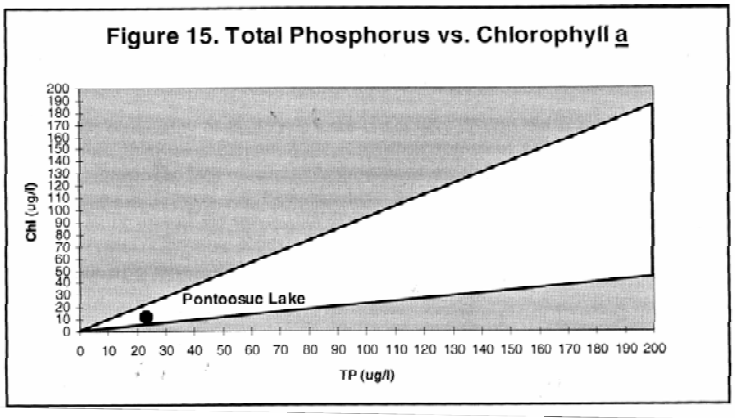
ENSR. *Post-Implementation Study of Pontoosuc Lake Pittsfield/Lanesborough, Massachusetts.* 2000. Page 101.

The Post-Implementation Study indicates that Pontoosuc Lake receives high inputs of phosphorus, approximately 2196 kg/yr. However, much of that phosphorus is inactive and doesn't contribute directly to eutrophication. The amount of active phosphorus, 1250-1420 kg/year, is higher than the estimated permissible load of 956 kg/year. This amount of phosphorus entering the lake is enough to reduce clarity, and result in occasional algal blooms. The Post-Implementation Study indicates that

relatively minor increases in pollutants, especially phosphorus, could have visible, negative impacts on water quality. However, even small reductions of phosphorus would appreciably improve clarity. (ENSR, 2000)

Levels of dissolved oxygen in Pontoosuc Lake decline in the summer with the deepest parts of the lake (below 5 meters) showing conditions that are not supportive of most aquatic species (<1 mg/l). These anoxic conditions may result in bound phosphorus being released from the sediment. Once bound phosphorus is released from the sediment it is active within the water column and available to algae. (ENSR, 2000) Algae blooms are present in Pontoosuc Lake but to date have not been significant enough to reduce water clarity below desirable levels for recreation.

Chlorophyll A levels were within normal range (approximately 10ug/l) and algae levels did not indicate over-fertilization. The Post-Implementation Study found fecal bacteria levels were elevated during storms. Fecal bacteria levels exceeded the swimmability standard of 200 colonies/100ml at most tributary and stormwater outfalls during storm events, with results exceeding 10,000/100ml in the stormwater outfalls from developed neighborhoods around the lake. Levels in the lake were well within safe contact range. Inputs are more likely to be from wildlife and pet waste than from septic systems. (ENSR, 2000)



ENSR. *Post-Implementation Study of Pontoosuc Lake Pittsfield/Lanesborough, Massachusetts.* 2000. Page 101.

Measurements of total suspended solids and turbidity reveal few specific problems for the lake. However, it was noted in the Post-Implementation Study that sediments and particulate matter are being drawn into the lake during drawdown. Drawdown, therefore, may be pulling additional phosphorus-laden sediment into the lake.

Land Use

A variety of land uses are found within the Pontoosuc Lake watershed. Residential development makes up the largest amount of developed land within the Pontoosuc Lake watershed at 7% of the total land area. Forested land covers the greatest area in the Pontoosuc Lake watershed, comprising 66% of the total, and is followed by cropland (11%). All remaining land uses are individually less than 5% of the total. These include pasture (4%), open land (4%), participation recreation (4%), wetland (2%), mining (<1%), spectator recreation (<1%), water based recreation

(<1%), commercial (1%), urban open (<1%), transportation (<1%), water (<1%), and woody perennial (<1%). (ENSR, 2000)

The Pontoosuc Lake watershed includes commercial land development, which includes both a restaurant and a Dunkin' Donuts© on the eastern shoreline. A portion of the Pontoosuc Lake Country Club and its associated golf courses are within the watershed of Pontoosuc Lake along with the Italian American Club (ITAM). In the town of New Ashford, the Snowy Owl Resort, formerly the Brodie Mountain Ski Area, drains to Town Brook, the largest tributary of Pontoosuc Lake. Additional areas of New Ashford and the town of Cheshire lay within the watershed, but these areas are located within the Mount Greylock State Reservation. Residential development in the Pontoosuc Lake watershed consists of 1000 or more homes on approximately ¼ acre each. A public access boat launch is located on Hancock Road and is owned by the Public Access Board and managed by DCR. DCR manages a dock at the ramp site that is in place from May through October. Additional access sites are owned by the City of Pittsfield and the Town of Lanesborough. The Town of Lanesborough owns a public park on Narragansett Avenue, while the City of Pittsfield Parks Department manages the Pines Park and the beach at the Blue Anchor.

The majority of the development within the watershed has occurred around the shoreline of the lake, limiting forested and open land to the rest of the watershed. Residential properties cover the vast majority of this shoreline area. Prior to 1995, four active dairy farms were present in the Pontoosuc Lake watershed. A number of best management practices were implemented on each of these farms during the 1990's to decrease pollutant loading to the aquatic ecosystem, including Pontoosuc Lake. Only one of the aforementioned farms was still in operation as of 2000. Agriculture within the watershed appears to be on the decline. However, horse farms and small croplands are still present. (ENSR, 2000)

Nutrient Budget

A pollutant load analysis summarizes the kilograms per year of total phosphorus, and total nitrogen entering the lake from each of the fourteen sub-basins of the Pontoosuc Lake Watershed. (See Map 2) Surface water storm flow contributes the greatest amount of phosphorus to Pontoosuc Lake at 1,709 kg/yr making up 77.8% of the total phosphorus load. The stormwater contribution is quite large and indicates substantial loading from residential areas. Direct drainage to the lake is a major contributor of phosphorus. The Post-Implementation Study estimation of nitrogen and phosphorus loading to Pontoosuc Lake show that sub-basins 1, and 3 are responsible for the bulk of the lake's nutrient loading. (ENSR, 2000) These sub-basins correspond respectively to the Secum Brook and Town Brook watersheds. However, these are the two largest sub-basins, and as such, their loading in itself is biased due to the size of the contributing watershed. Table 3 shows the phosphorus, nitrogen and total suspended solids (TSS) load from atmospheric sources, internal sources, and waterfowl as well as the total load to the lake. (ENSR, 2000)

Table 3 – Export Model Input and Calculations (ENSR, 2000)					
Direct Loads to Lake	**Phosphorus**	**Nitrogen**	**TSS**		**Water**
Atmospheric (kg/yr)	39.8	1,297.5	6,368.0	(CU.M/YR)	2,368,100.0
Internal (kg/yr)	54.6	136.5	27.3	(CU.M/YR)	0.0
Waterfowl (kg/yr)	14.0	66.5	350.0	(CU.M/YR)	0.0
Watershed Load (kg/yr)	1,312.3	29,846.4	19,7249.3	(CU.M/YR)	43,458,859.5
Total Load to Lake (kg/yr)	1,420.7	31,346.9	20,3994.6	(CU.M/YR)	45,826,959.5
Watershed & Direct Loads					
Total Input Conc. (mg/l)	0.031	0.684	4.451		

Fisheries

Pontoosuc Lake is primarily a warm water fishery. Species composition include largemouth bass (*Micropterus salmoides*), tiger muskellunge (hybrid between *E. lucius* and *Esox masquinongy*), white perch (*Morone Americana*), yellow bullhead (*Ameiurus natalis*), brown bullhead (*Ameiurus nebulosus*), chain pickerel (*Esox niger*), northern pike (*Esox lucius*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), white sucker (*Catostomus commersoni*), golden shiner (*Notemigonus crysoleucas*), common shiner (*Luxilus cornutus*), and common carp (*Cyprinus carpio*). In addition, species composition includes three cold water trout species brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), (ENSR, 2000)

The Massachusetts Division of Fisheries and Wildlife under (DFG) runs a fish stocking program on the lake. The primary stocking occurs in the spring with supplemental stocking of a smaller number of fish are stocked in the fall. Secum Brook and Town Brook, the two principal tributaries to the lake, are also stocked trout waters. Tiger Muskellunge have been stocked every year over the past decade. These fish are stocked at 3-12" and require up to 5 years to attain the 28" minimum legal length. Largemouth Bass fishing is reportedly good as well.

MA Freshwater Sportfishing Awards Program: Gold Pin Awards for Largest Fish in the State in each year (Records for Pontoosuc Lake):				
Species	**lbs**	**oz**	**Year**	**Comments**
Tiger Muskellunge	19	11	2000	This catch broke the state record for this species
Tiger Muskellunge	27	0	2001	This catch broke the state record for this species
Tiger Muskellunge	21	6	2002	

IV. IDENTIFIED PROBLEMS AND CONCERNS

The Friends of Pontoosuc facilitated an Advisory Group to formulate an understanding of the breadth of problems and concerns experienced by lake users and explore alternative feasible management approaches to address identified problems and concerns. The Advisory Group was composed of members of the Friends of Pontoosuc and a representative from BRPC. The Advisory Group worked with a larger group of representatives from agencies and municipalities, who were familiar with Pontoosuc Lake and its technical and regulatory matters to provide technical input and credibility.

The Advisory Group held a series of meetings throughout 2002 and 2003 focusing on a general overview, review and evaluation of relevant data, management concerns, management goals and objectives, management activities, and roles and responsibilities.

There are multiple lake management concerns for Pontoosuc Lake. These concerns have been prioritized by the Advisory Group and include nuisance aquatic plant and algae control, coordination of management responsibilities, nutrient control, education and outreach, water quality improvement, fisheries, recreational use, and coordination of independent initiatives. These issues provide the background needed for the development of Goals and Objectives and finally the Action Plan. Fortunately, environmental information is available with respect to the health of Pontoosuc Lake and the interests of a cross-section of the lake community and lake users are already reasonably well known.

The board did not limit considerations to strictly water quality concerns, but rather they identified any concern they had relative to the appearance, aesthetic enjoyment, environmental quality and overall condition of the lake and conditions in the urbanized area surrounding the lake. Additionally, identified concerns encompass the overlap and gaps in management responsibilities among the primary stakeholders: the Town of Lanesborough, the City of Pittsfield and the Commonwealth of Massachusetts.

Nuisance Aquatic Plants & Algae

Eurasian watermilfoil (*Myriophyllum spicatum*) is a non-native, exotic species and has been identified as the dominant species in the lake by ENSR, 2000 and in subsequent macrophyte surveys conducted by GeoSyntec Consultants in 2003. Milfoil was identified as the primary nuisance species of concern at Pontoosuc Lake by the Advisory Group. Milfoil is documented to grow in dense stands throughout the water column and form surface mats when fully grown. It tends to out compete the native plant assemblage and become the dominant species. Its dense growth interferes with boating as well as fishing, swimming, and aesthetics.

Curly-leaved Pondweed *(Potamogeton crispus)* and European Naiad (*Najas minor*) are also well distributed and dominant in Pontoosuc Lake. The Advisory Group identified these species as well as the pioneer infestation of Water Chestnuts priority concerns for Pontoosuc Lake. Water

Chestnuts are characterized by floating-leaved rosettes that have a tendency to cover the water surface in dense mats. Water Chestnuts are an annual plant that reproduces by seed. This plant tends to spread rapidly through prolific seed production and severely impacts recreational uses and alters aquatic habitat. The Advisory Group found that Curly-leaved Pondweed (*Potamogeton crispus*) and European Naiad were also at nuisance levels and were becoming problematic. (GeoSyntec, 2003)

Management Responsibilities

Until July 2000, the lake was owned by the Berkshire County Commission. When the Commission was dissolved by the state legislature, ownership of the lake was transferred to the state. Since that time, the lake has been a state asset residing in the Department of Capital Assets Management (DCAM). Since the ownership of Pontoosuc Lake was turned over to the state in July 2000, it has been recognized that there is a greater need of coordinated lake management. The Friends of Pontoosuc have worked with the City of Pittsfield, the Town of Lanesborough and DCR to facilitate communication and to keep up with ongoing management activities.

The weed-harvesting program had previously been run by the Berkshire County Commissioners. The program is now run by the City of Pittsfield and the cost of the harvesting program is divided equally between the City of Pittsfield and the Town of Lanesborough. The Conservation Commissions in both the City of Pittsfield and the Town of Lanesborough are responsible for issuing Orders of Conditions for a variety of lake management activities including drawdown. The Advisory Group acknowledged that it has often been unclear which management entity should file applications to the Conservation Commissions. In previous years both the City of Pittsfield and the Friends of Pontoosuc have applied to the Conservation Commissions for Orders of Conditions. In addition, DCR has accepted the responsibility of managing the dam through the Pittsfield State Forest Office. In previous years DCR has submitted a Notice of Intent for drawdown to the Pittsfield Conservation Commission while the Friends of Pontoosuc have submitted a separate Notice of Intent for drawdown to the Lanesborough Conservation Commission.

The interests of the Department of Fish and Game (DFG), which is responsible for the fish-stocking program at Pontoosuc Lake, must also be taken into consideration. DFG often has concerns relative to lake management techniques as mechanical harvesting, drawdown, and herbicides have the potential to negatively affect the fisheries.

The Advisory Group acknowledged that recreation and enforcement are lake management concerns critical to the effective management of Pontoosuc Lake. Efforts must be made to increase the coordination of various lake users. A public access boat launch is located on Hancock Road and is owned by the Public Access Board and managed by the City of Pittsfield Parks and Recreation Department. The City manages a dock at the ramp site that is in place from May through October. Additional access sites are owned by the City of Pittsfield and the Town of Lanesborough. The Town of Lanesborough owns a parcel at the end of Sunrise Street, a lakeside parcel at the intersection of Bull Hill Road and Sunrise Street, a park on Narragansett Avenue and two minor easements off Orchard and Katherine Streets. The town has adopted

Narragansett Ave, Profile, National, Imperial, Ocean and Sunrise Streets in neighborhoods around the Pontoosuc Lake shore. The City of Pittsfield Parks Department manages Pontoosuc Park and the beach at the Blue Anchor. The enforcement of laws and regulations at Pontoosuc Lake may fall under the jurisdiction of the Pittsfield Police, the Lanesborough Police, or the Environmental Police.

The vast number of different entities, both municipal and state, with various lake management responsibilities has the great potential to create confusion. The Advisory Group acknowledged that it is unlikely that these circumstances will be resolved in the near future. Although the Advisory Group supports the transfer of ownership of Pontoosuc Lake to DCR, this alone will not rectify this problem. The Friends of Pontoosuc should make an effort to coordinate the activities of the various lake managers at Pontoosuc Lake. The Friends of Pontoosuc should work with each lake manager individually and schedule joint meetings as required. The Friends of Pontoosuc should be the applicant for lake management activities permitted by the local conservation commissions under the Wetlands Protection Act.

A lake district is another management option, and was considered at the time of the transition from County ownership in 2000. Establishment of a lake district requires that all owners who will share financial responsibility of the district vote by a super majority to establish the district and accept the ensuing tax liability. A lake district was not seriously considered at that time because it was believed highly unlikely that even a simple majority of lakeshore owners would vote to accept this additional responsibility and financial burden. This is still the case.

Watershed Issues

The Post-Implementation Study (ENSR, 2000) determined that the majority of pollutants found in Pontoosuc Lake are carried through the watershed to the lake with runoff from forested, agricultural, and developed land. Many storm drains in the Pontoosuc Lake watershed discharge runoff directly into the lake. The concentrations of nutrients found in storm water drainage systems by ENSR were much higher than the concentrations found in the tributaries. Some evidence of waste water contamination was found by ENSR in both stormwater and ground water, and is attributed to standard leachfield septic systems. However, ENSR found that fertilizer and pet waste were likely to be dominant influences on the water quality of stormwater and ground water in the Pontoosuc Lake watershed.

Pontoosuc Lake was found to be in the early stages of eutrophication. (ENSR, 200) According to the Post-Implementation Study, small changes in nutrient loading could produce substantial changes in the condition of Pontoosuc Lake. Nutrient loading is controlled in part by limited development within the watershed and best management practices on agricultural lands. However, the Post-Implementation Study found that the intense development around the lake and the extensive stormwater drainage system facilitates inputs from storm events that can result in undesirable conditions for the lake.

The phosphorus levels in Pontoosuc Lake are lower than the limit for continued and severe problems. Although, point sources of pollution are largely regulated nonpoint sources of

pollution have the potential to have a cumulative impact on water quality over time. If nonpoint sources of pollution are left untreated the water quality of Pontoosuc Lake will likely deteriorate exponentially over time. Stormwater inputs from the extensive stormwater drainage system in the watershed are already having a negative impact on Pontoosuc Lake. (ENSR, 2000)

The Advisory Group acknowledged that nonpoint sources of pollution, including sediment and nutrients, should be addressed to prevent the deterioration of present conditions. The Advisory Group determined that it is important to consider the inputs from the larger watershed to prevent the deterioration of Pontoosuc Lake. Efforts should be made to manage stormwater including the implementation of land use regulations and best management practices (BMPs).

Water Quality

While generally healthy and well within the state's water quality standards for safe swimming, Pontoosuc Lake has water quality issues that must be monitored closely. (ENSR, 2000) The Post-Implementation Study indicates that the lake is at a point where small increases or decreases in pollutants can make a visible impact in either direction.

When considering nutrient problems in freshwater, phosphorus is the limiting nutrient. In other words, the amount of phosphorus present determines the amount of growth in plants and algae and the overall "productivity" of the lake. For this reason, phosphorus control and reduction is key to reducing excessive plant and algae growth. The Post-Implementation Study indicates that Pontoosuc Lake receives high inputs of phosphorus (about 2196 kg/yr) but that much of that phosphorus is inactive and doesn't contribute directly to eutrophication. However, the amount of active phosphorus (about 1250-1420 kg/year) is higher than the estimated ideal level of 956 kg/year. The levels of dissolved oxygen in the deepest parts of the lake decline in the summer. This condition may aggravate lake phosphorus loads by releasing the nutrient where it is bound to sediment. Additionally, such anoxic conditions are not supportive of most aquatic species (<1 mg/l). (ENSR, 2000)

The Post-Implementation Study found fecal bacteria levels exceeded the standard for safe swimming (200 colonies/100ml) at most tributary and stormwater outfalls during storm events, with results exceeding 10,000/100ml in the stormwater outfalls from developed neighborhoods around the lake. However, fecal bacteria levels in the lake were well within the safe contact range. The study concluded that inputs are more likely to be from wildlife and pet waste than from septic systems.

The Friends of Pontoosuc have an active water quality monitoring program. One of the objectives of the program is to determine the effectiveness of proprietary stormwater devices installed through an s.319 Nonpoint Source Pollution grant. The Housatonic Valley Association developed a Quality Assurance Project Plan (QAPP) that governs the water quality monitoring under this project. The Advisory Group acknowledged that the sampling of these devices yields beneficial information regarding the current inputs of stormwater to Pontoosuc Lake. The Advisory Group determined that a volunteer water quality monitoring program could yield beneficial data to measure trends and changes in the water quality of Pontoosuc Lake. The water

quality monitoring program should follow guidelines developed by the Massachusetts Water Watch Partnership (MassWWP). The Friends of Pontoosuc has worked with the Lakes and Ponds Association of Western Massachusetts (LAPA-West) to conduct water quality monitoring and is eligible to borrow water quality monitoring equipment. However, an in-lake water quality monitoring program may be more effective if the Friends of Pontoosuc had regular access to their own equipment.

Fisheries

Pontoosuc Lake supports a recreational fishery that is popular year round. The lake has produced several state records and the fisheries appear to be in adequate health. However, there is a consumption advisory on Largemouth Bass within the lake due to high mercury levels. According to the state wildlife department, children under 12, pregnant women, and nursing mothers should not eat any largemouth bass and the general public should limit consumption of the fish to two meals per month due to high mercury levels.

A diversity of game fish in Pontoosuc Lake is desirable. Three species of trout as well as the tiger muskies do not appear to maintain reproducing populations. Sportfishermans' associations have in the past, requested that a portion of the lake's aquatic weeds are not harvested during the June harvest to accommodate the fry of reproducing fish populations, especially largemouth bass. Many lake management techniques aimed toward addressing aquatic plants can have negative impacts of fisheries. The Advisory Group determined that drawdown and mechanical harvesting should be conducted in such a way to limit the negative impacts on fisheries at Pontoosuc Lake. There is anecdotal evidence that fish may be lost through the outlet pipe at the dam. The lack of a fish screen at the gatehouse penstock may allow for the stocked fish to pass out of the lake and downstream into the Housatonic River. This potential deficiency has been recognized and discussed by various management authorities for many years without resolution. The Advisory Group recognized that it is important to quantify the benefits of such a screen and substantiate the need.

Recreational Uses

Pontoosuc Lake is a highly visible community resource for the Berkshires. Recreational uses cover a spectrum of interests from those who merely enjoy the scenic view from Rt. 7 to active sport fishermen. Public access is very good and the lake is used to its fullest potential year round.

Pontoosuc is a recreational resource for residents and visitors in the winter as well as the summer. The Advisory Group expressed concern for the preservation of winter uses in implementing the management activities to ensure that the winter uses do not deteriorate as a result. Problems with trash and litter or garbage observed around the shoreline, in public parks, or overflowing from trash barrels have lead the Friends of Pontoosuc to organize annual lake watershed clean-ups. The Friends of Pontoosuc conducted successful lake clean-ups in previous years.

The enforcement of regulations is also recognized as a lake management concern critical to the effective management of Pontoosuc Lake. Meanwhile, the enforcement of existing safety and environmental protection regulations should be supported and strengthened. Wakes caused by large boats, jet skis, and 'boogie boards' are a serious concern with respect to shoreline erosion and causing unpleasant conditions on the lake. It has been noted as a safety concern when boaters exceed safe speeds, are inconsiderate to other lake users, and boat in and around established swimming lanes. More support is needed for instituting lake surface use ordinances on the lake as necessary.

Other

The Board of Directors of the Friends of Pontoosuc regularly meets to discuss lake issues. The goals of the Friends include promoting independent initiatives that promote the maintenance and improvement of the quality of Pontoosuc Lake. The Friends acknowledge that coordinating and integrating all activities that impact the lake, organizing volunteer actions, and raising public and private funds may result in direct improvements to the lake. The Friends identified several current initiatives that require attention.

Implementing lake management approaches or actions often requires significant funding. The primary source of funding for the Friends of Pontoosuc is currently through membership dues. The Friends of Pontoosuc acknowledged this short coming. In 2004, the Friends of Pontoosuc secured federal 501(c)3 non-profit status. It is the intent of the Friends of Pontoosuc to solicit public and private donations to finance additional projects and initiatives.

An annual drawdown of 3 ft is utilized to protect against flooding during spring runoff, protect against shoreline destruction from ice, and to provide limited control of invasive species. In 1989 the County Commissioners funded a study by the Aquatic Sciences Division of IT Corporation to evaluate the success of drawdowns in controlling nuisance aquatic macrophyte species or more specifically Eurasian watermilfoil and Curly-leaf Pondweed. This study recommended a six foot drawdown to control weeds in the lake. However, guidelines established by DFG and included within the *Generic Environmental Impact Report for Aquatic Plant Management in Massachusetts* (GEIR), prepared by DEP and DCR in 2004, recommend that drawdowns do not exceed ft. The GEIR recognizes drawdown as a multipurpose lake management tool that can be used for aquatic plant control. The Advisory Group recognizes that it is important to maintain a 3 ft drawdown to protect against flooding during spring runoff and to protect against shoreline destruction from ice. Efforts should be made to continue a 3 ft drawdown until all required permits can be obtained for a 6 ft. drawdown that will provide increased control of invasive species.

The population of Canada Geese has exploded on Pontoosuc Lake in the past few years, and they have come to be considered a nuisance. Goose droppings on lawns and beaches are a very serious problem. A less obvious concern is water contamination by goose feces. Goose feces include nutrients that can be used by plants and algae, and pose the additional problem of bacterial contamination, potentially making the lake unsuitable for swimming.

The Post-Implementation Study recommended that the eroding banks around Pontoosuc Lake are stabilized. There are well known situations which are deteriorating the lake now, and they demand immediate action. The Post-Implementation Study also recommended that coffer dams be installed in Secum Brook. Coffer dams can be utilized to promote upstream retention, sheet flow, and reduced scouring during storms.

The aesthetics of the lake and the ability of lake users to enjoy the lake are recognized as lake management concerns. Route 7 along the southeast shore of Pontoosuc Lake has been rerouted closer to the lake and was elevated, employing a high vertical wall to support the roadway. Previously the road was separated from the lake by a bank with trees and brush which grew down to the lakeshore. Now the view from the lake and from the west shore has significantly deteriorated as the view is of a high concrete wall instead of a green shoreline.

V. MANAGEMENT APPROACHES & ACTIVITIES

The Advisory Group identified management approaches and activities to address the prioritized problems and areas of concern with respect to the quality and conditions of Pontoosuc Lake. The Advisory Group reviewed previous recommendations for the management of Pontoosuc Lake and management techniques and approaches identified within the GEIR to select appropriate management approaches and activities. These management approaches and activities are reflected within the goals and objectives for lake management and form the basis for the Action Plan in which specific management actions are recommended and responsible parties are identified for their implementation over the next five years.

As the Advisory Group considered problems and concerns, they distinguished between concerns relative to the lake's quality or condition versus concerns they may have relative to management strategies or methods.

This section reviews those management approaches and activities that have been employed at Pontoosuc Lake in the past, those that are currently employed, and those that have been identified for potential application. The management approaches are reviewed in detail to assure that implementation activities are feasible and appropriately address the identified problems and concerns.

Nuisance Aquatic Plants & Algae

Mechanical Harvesting

The Post-Implementation Study recommended the continuation of the current mechanical harvesting program dependent upon the success of other control measures. Weed-harvesting is viewed as an effective at aquatic plant control at Pontoosuc Lake. However, it is not expected to eradicate the invasive, exotic species. According to the GEIR harvesting has been documented to be successful in providing long-term control of seed reproducing naiad *(Najas* spp.) and several pondweeds *(Potamogeton* spp.) Since milfoil species can regenerate from fragments, full control of this species is probably not achievable when harvesting alone is used on the lake. However, the GEIR states that where milfoil has become the dominant plant, there seems to be little harm from fragmentation and harvesting may be utilized to maintain open water.

The harvesting program has been conducted annually since the mid 1970's, with varying degrees of effectiveness, limited by funding constraints and the efficiency of the operation. In the

summer of 2003, funding and efficiency were improved, and many more weeds were removed from the lake than had ever been done in the past. In 2004, the conditions of the lake were dramatically improved. Native low-growing species which had been present in very limited quantities in the past became dominate in some areas. The curly-leaf pondweed never reached the surface before its early summer dieback. The Eurasian watermilfoil was still a nuisance but not to the extent reported in previous years. One possible reason for this is that removal of the invasives from the top of the water column allowed the low growing natives to compete better than they could previously. The partial refill after initial drawdown and hard freeze as discussed later in the drawdown section is another possible contributing factor.

The Advisory Group has recognized that the harvesting operation needs to be more selective than in the past. Steps should be taken to minimize the removal of non invasive native species, either by discontinuing harvesting in areas where they are dominant, or adjusting the cutter height to remove the invasive plants that shade the native plants without removing the desirable species.

Weed control is critical for the public's enjoyment of the lake, and harvesting is currently employed as the primary method of weed control. However, harvesting is expensive, as are most means of weed control, and annual funding is necessary. The Friends of Pontoosuc and other lake stakeholders must be vigilant to ensure that this critical activity is adequately funded every year. The Pittsfield City Council, and the voters at the annual Lanesborough Town Meeting are the decision makers for this funding and stakeholders must work to ensure that they fund Pontoosuc weed control.

Macrophyte Survey

The Friends of Pontoosuc contracted a macrophyte survey of Pontoosuc Lake in 2003 using funds from a Berkshire Environmental Fund (BEF) Community Improvement grant. The study, performed by GeoSyntec, had three objectives:

1. Assess the condition of the lake using accepted macrophyte, (plant), survey standards.
2. Train volunteers from the Friends of Pontoosuc to conduct future surveys.
3. Provide an assessment of options for weed control.

Two documents were delivered and will be used to coordinate future surveys:

1. Lake Pontoosuc Aquatic Vegetation Assessment.
2. Field guide to the Aquatic Plants of Pontoosuc Lake.

GeoSyntec trained three Friends of Pontoosuc volunteers in two sessions, one in June and another in August of 1003. GeoSyntec also developed a map of 63 points for plant sampling and a Field Guide to Pontoosuc's Aquatic plants that is used by the volunteers to continue the future surveys.

The Friends of Pontoosuc have been trained to perform volunteer macrophytes each year. Volunteer surveys are conducted every six weeks between the months of June and October. The Friends of Pontoosuc will continue to train additional volunteers utilizing DCR weed identification programs and measuring changes in the biomass or the plant coverage. These volunteers will perform periodic assessments to locate additional non-native plants. The Friends of Pontoosuc will distribute the results to all interested parties annually and as requested.

In the two short years that the Friends of Pontoosuc have been performing the macrophyte surveys they have proven to have value. In late 2003, the survey revealed a pioneer infestation of Water Chestnut, an invasive plant species. Water Chestnuts were discovered in the Town Brook Bay and in Town Brook. Hand pulling activity was initiated. The 2004 surveys show a variety of species, including much stronger populations of low growing natives than we have had in the past. One of the goals of the macrophyte survey program will be to develop data and recommendations for the harvesting program in terms of where and how to harvest. The goal will be to protect desirable species while removing the nuisance species. Volunteer macrophyte surveys will be conducted and the data from year to year will be compared. This is effective approach to track of the type of plant material and the amount of biomass in the lake. The surveys will establish if the weed control methods employed are being effective.

Hand pull Water Chestnuts

Through the volunteer macrophyte surveys discussed in the previous section a pioneer infestation of Water Chestnuts was discovered in Pontoosuc in late summer 2003. The invasive species was found on both sides of the Bull Hill Road Causeway in the Town Brook inlet. A hand pulling activity was conducted shortly thereafter, and approximately 1,600 gallons of weeds were removed. Unfortunately, the plants had matured, and seeds were dropped prior to and during the harvesting. There was a healthy population again in 2004.

In 2004 hand pulling removed 250 gallons of Water Chestnuts from the Town Brook inlet area. Another infestation was discovered in the Secum Brook inlet above the Narragansett Avenue causeway, and approximately400 gallons of weeds were removed. Based on the prior experience in the Town Brook inlet, it is believed that there will be re-growth of Water Chestnuts in this area next year.

The Friends of Pontoosuc consulted with the DCR Lake and Pond Program and its Invasive Species Task Force. Through those consultations it was confirmed that hand pulling is the recommended method of controlling this invasive species. The Friends of Pontoosuc will conduct hand pulling operations whenever colonies are discovered. Lake users must be altered to identify any signs of a new infestation so it can be controlled before it spreads further.

Records will be maintained documenting the amount of weeds removed from each location where colonies are found in order to track progress.

Herbicides & Algaecides

Herbicides have not been applied to Pontoosuc Lake for three decades and algaecides have never been applied. The Post-Implementation Study recommended that the use of fluridone be considered for Pontoosuc Lake if treatment at Onota Lake is successful. In addition to Onota Lake other area lakes such as Cheshire Lake and Ashmere Lake have applied herbicides and are being monitored by the Friends of Pontoosuc. Results in these lakes will be helpful in determining whether herbicides are a viable technique for application in Pontoosuc Lake. Two separate firms certified in herbicide application, Lycott and Aquatic Control Technologies, reviewed the condition of Pontoosuc Lake in the summer of 2004. Both firms provided the Friends of Pontoosuc with recommendations for herbicide application at Pontoosuc Lake.

The permitting process required for herbicide application is both time consuming and expensive. The GEIR provides data and information on the subject. Presently, there are seven herbicides and algaecides approved by the state for use by licensed companies for application in waterways. The GEIR recommends selecting an herbicide at a concentration to achieve a result with the greatest possible reduction in invasive plants with a minimum effect on desirable native plants. Consideration must be made with regard to the concentration of an herbicide to minimize the effect on fish and wildlife. It is likely that repeated annual applications will be required to achieve this balance. It is recommended that mechanical harvesting is not performed in conjunction with herbicide applications. Consideration will need to be made since mechanical harvesting is currently the primary aquatic plant management tool employed at Pontoosuc Lake. It is expected that the Friends of Pontoosuc will create a detailed plan of the assessing the effectiveness, cost, and feasibility of herbicide application in 2005. If the plan warrants, preparations will be made for a pilot program in fiscal year 2006.

Drawdown

Lowering the water level provides an inexpensive means to control some macrophytes, if there is an existing drawdown capability. Additional benefits may include opportunities for shoreline maintenance and oxidation or removal of nutrient-rich sediments. This technique is not effective on all submergent species. However, it does decrease the abundance of some of the chief nuisance species, particularly those that rely on vegetative propagules for over wintering and expansion (Cooke et al., 1993a). The Post-Implementation Study recommended continuing the current drawdown program with a target level of at least 3 ft depth. A study conducted by ITC in 1990 recommended that a greater drawdown of 6 ft be initiated to provide greater plant control benefits.

The GEIR lists guidelines for drawdown prepared by the Massachusetts Division of Fisheries and Wildlife. The recommendations consist of a 3 foot drawdown begun in mid-October with refill completed by April. However, in some instances a 4 to 6 foot drawdown is more effective

since a greater area of the lake bottom is exposed to the freezing conditions required to kill most invasive species. Some experts have recommended raising the level of the lake to uproot the weeds that were on the surface and became frozen in the ice after the first hard freeze, of 10-15 degrees Fahrenheit for a couple of days.

This condition occurred naturally in the late fall of 2003 and is believed to have been a major factor in the substantial reduction of the invasive Curly leaf Pondweed and Eurasian watermilfoil found in Pontoosuc Lake in the summer of 2004. The improved effectiveness of the harvesting program discussed previously is another possible reason for the improvement of the lake conditions.

Milfoil-eating Weevils

Milfoil eating weevils have been used with some success in other lakes in Massachusetts, and may have a use in Pontoosuc Lake. Mechanical harvesting and herbicide weed control are incompatible with weevil use, because an established colony must be allowed to develop by leaving weeds in the lake for them to live on and in. However, weevils could be introduced into the area upstream of the Bull Hill causeway where there is a significant milfoil infestation. No active weed control has been performed in this area and none is planned, therefore a colony could thrive there. The area is undeveloped, with wetlands along the edge of the lake, conditions for over wintering on the shore should be ideal.

If a colony is established in the proposed area, it is hoped that it would spread into the main body of the lake. If successful, weed control measures would be phased out as the colony grew. The milfoil from the inlet area, if reduced by weevil control, will provide a less robust source of re-infestation of areas in the lake where weed control activities are being conducted.

The inlet area above the Bull Hill Road causeway has been determined to be the best area for this program since there is a thriving infestation of milfoil there. In the other inlet, above the Narragansett causeway there is much less milfoil, and there is a healthy musk grass population, which may be keeping the milfoil density in check.

Stocking

The zooplankton community within Pontoosuc Lake is qualitatively sufficient to control algae to the maximum theoretical extent, but is of a biomass too low to be effective. Increasing zooplankton biomass can be accomplished by either increasing the food resources or decreasing the predation. According to the Post-Implementation Study, predation on grazing zooplankton is a function of planktivore (or panfish) density. A plentiful supply on young planktivores can have negative impacts on the *Daphnia* population, but is generally desirable for the piscivore population. For this reason, planktivore control usually focuses on adult panfish, too large to be food for most piscivores and which can consume a disproportionate amount of zooplankton. Stocking of more piscivores can eventually depress the planktivore population allowing biology to work in a positive manner. The Post-Implementation Study recommended that fishery

management actions foster greater populations of both tiger muskies and bass. The current stocking program is run by the Massachusetts Division of Fisheries and Wildlife. Neither the Post-Implementation Study nor this plan will presume to tell tem how to manage this program. The management recommendations within the Post-Implementation Study indicate that with greater funds more can be done with the fishery of Pontoosuc Lake and both the fishery and water clarity could benefit. According to the DFG, Pontoosuc Lake has perhaps the highest density of apex predators in the Berkshires. In the absence of data to the contrary, DFG suspect that in a nutrient rich lake such as Pontoosuc the zooplankton abundance is determined by the available food resources as opposed to predator density.

Explore Optimal Mechanical Harvesting Schedule

Although an effective harvesting program has been established, it may be possible to further improve it by using an optimized harvesting schedule. Two issues have been identified to date, and others may arise in the future:

1. Early harvest of Curly Leaf Pondweed - This weed has a natural growth cycle characterized by rapid growth in May and June followed by a dieback in early July. It may be possible to aggressively harvest this species early before it develops seeds for the next year, and reduce the problem on a long term basis. An early harvest must take into account the juvenile fish population and the availability of vegetative cover for fishes in their early life stages.
2. Late harvest of Eurasian watermilfoil - Since repeated harvesting within the same year has proven to be effective in reducing the density of Eurasian watermilfoil; an additional late harvest of this species may reduce its growth density the following year. Conversely, it may be preferable to let it grow to the surface and be trapped in the ice, ultimately to be uprooted by a partial refill of the drawdown after a significant thickness of ice has developed.

In order to answer these and other potential questions, it will be necessary to document the harvesting activities, and the condition of the lake weed population annually. Experiments should be devised to definitively answer questions on the effects of harvesting schedule. The results of these findings will be incorporated into the harvesting plan.

Plant Competition

The introduction of plants as a biological control agent is based on the general concept that native plants may have the ability to out compete the target plant for habitat and resources. The planting of native plants is suggested to prevent the invasion of disturbed areas by nuisance aquatic plants such as watermilfoil (Doyle and Smart, 1993). Although invasive nuisance plant species are invasive, there is evidence that the presence of a healthy, desirable plant community can minimize or slow infestation rates. Most invasive species are favored by disturbance, so a stable plant community may provide a significant defense. Unfortunately, natural disturbances abound, and almost all common plant control techniques constitute disturbances. Therefore, if

native and desirable species are to regain dominance after disturbance, it may be necessary to supplement their natural dissemination and growth with seeding and plantings. The use of seeding or planting of vegetation is still a highly experimental procedure, but if native species are employed it should yield minimal controversy.

Sediment features provide an alternative explanation for inhospitality to milfoil, but it has also been noted that when milfoil is cleared from an area and a native assemblage restored, re-growth by milfoil is greatly diminished (Eichler et al., 1995). More research is needed in this area, but establishment of desired vegetation is entirely consistent with the primary plant management axiom: if light and substrate are adequate, plants will grow. Control of rooted plants should extend beyond the limitation of undesirable species to the encouragement of desirable plants. Plantings for reduced light penetration might also control algae, but there could be many negative side effects of such an effort. The ability of native plants to become established in disturbed areas or areas adjacent to established populations of watermilfoil is dependent on many factors such as water depth and herbivory (Doyle and Smart, 1993), most of which cannot be easily controlled. Plant assemblage development is not typically a short-term endeavor, so short-term effects would not be expected. A dense cover of native plants may be an effective long term management method to prevent an invasion by plants such as watermilfoil, as watermilfoil tends to invade disturbed areas. There is little information available that suggests that native plants can exclude nuisance vegetation, and the information that is available suggests that the nuisance plants are more often the superior competitors and can eventually overrun a lake once introduced (GEIR). However, failure of nuisance species to overrun some lakes where they have been present for many years (e.g., Lake George, NY) may in part be due to a healthy native community. The presence of a carpet-like native assemblage is often favorable when compared with dense mats of watermilfoil.

Benthic Barriers

Benthic barriers or other bottom-covers are a physical management technique that has been in use for a substantial period of time. Benthic barriers are placed over the sediment and block light necessary for plant growth. Many materials have been used, including sheets or screens of organic, inorganic and synthetic materials, (Cooke 1980b; Nichols 1974; Perkins 1984; Truelson 1984). Benthic barriers are most commonly made of polyethylene, polypropylene, fiberglass, or nylon. Benthic barriers will typically kill plants under them within 1 to 2 months, after which they maybe removed (Engel 1984). Benthic barriers are effective and fairly low-cost control techniques for limited areas (e.g., <1 acre). This approach may be best suited to high-intensity use areas such as docks, boat launch areas, and swimming areas. However, they are too expensive to use over widespread areas, and heavily effect benthic communities. The benthic barrier is placed on the bottom of the lake and is held down by sand bags or PVC pipe with iron rebar inside for weight. Benthic barriers are left in place until September and then removed for cleaning and winter storage. Benthic barriers typically come in widths of 7 to 14 feet wide by 100 feet long with a recommended overlap of one foot.

Benthic barriers are very effective in controlling weed growth of all kinds and no species increase in biomass as a result of the barrier. Swimming areas, around docks, and launch areas

are the usual applications. Benthic barriers may have adverse impacts on aquatic animals, but may be a useful tool in limited applications. The installation of a benthic barrier requires the filing of a Notice of Intent with the Conservation Commission. It is not expected that special conditions would be imposed. Benthic barriers have been recommended for the swimming beach proposed for Pontoosuc Park on Hancock Road.

Boat Cleaning/Inspection

One of the sources for the increasing spread of invasive non-native aquatic species in Pontoosuc Lake are the weeds and other debris that are being carried on the trailers and boats of visiting fishermen and recreational users. These non-native or exotic species are plants or animals that are indigenous to other areas and when introduced to Pontoosuc Lake can disrupt the balance of the lake's ecosystem. Many of these non-native plants reproduce very rapidly, displacing native species and developing mats at the water's surface that interfere with boating, fishing, swimming and other recreational activities.

Some of these non- native plants make extended journeys on their way to Pontoosuc Lake. They can be introduced in a wide variety of ways including accidental escape from the aqua-gardening/aquarium trade, intentional release, or through ballast water. Once introduce to a new area, they are further spread around to additional water bodies on boat motors, trailers, fishing gear and in bait buckets. Many non-native plants reproduce vegetatively. This means, that when just one small plant fragment enters a new water body it is able to grow into a mature plant and potentially infest a body of water. When a non-native species is established it becomes expensive to control and virtually impossible to eradicate. Prevention is the key to minimizing the spread of invasive species. An active boat ramp-monitoring program offers a three pronged prevention approach to this problem. Monitors can be placed at the boat ramp during periods of high activity to inspect incoming boats. The goal of this program is to inspect every boat entering or leaving the lake to make sure that no plant fragments are attached to the boat, trailer or gear.

Management Responsibilities

Lake Management Plan

The GEIR recommends that lake management plans be developed for individual lakes as part of their comprehensive management. A lake management plan can be quite complex and govern aspects of management for the entire lake and its watershed. Alternatively, a lake management plan can focus on a single issue or set of issues such as aquatic plant growth and algae.

This plan is in-between the above two extremes. It addresses a fairly comprehensive set of lake issues but does not attempt to address watershed issues comprehensively. That task will be left to the Watershed Management Plan, as discussed later in the report. The responsibility for implementing the plan and for keeping it current has been discussed in the introduction.

Grant Funding

Acquiring funding through grants is a necessity to implement many lake management activities. Municipally funding is available to Pontoosuc Lake to support the weed harvesting program. In addition, drawdown activities are managed, in part, by DCR. However, in order to implement additional lake management activities or studies, funding through competitive grant awards is necessary. Grant programs through DEP such as 604(b) and s.319 are made possible through the Federal Clean Water Act. Through these programs federal funding is available through DEP for water quality assessment and nonpoint source pollution implementation projects. Funding has been available historically through programs such as DCR's Lake and Pond Grants.

Permits

In recent years permits have been issued by both the Pittsfield and Lanesborough Conservation Commissions for the annual fall drawdown of Pontoosuc Lake and the June through August harvesting of the weeds. In past years various governmental agencies have undertaken the role of applicant creating a certain amount of confusion. In future years the Friends of Pontoosuc will coordinate with the various entities responsible for the management of Pontoosuc Lake to apply for all necessary permits to implement the recommendations within the Management Plan. The Management Plan will be used as a guide to assist the permit issuers in understanding the need and rational for the permit.

Transfer of Lake Ownership

When the Berkshire County government was dissolved in 2000, all County assets, including Pontoosuc Lake, were transferred to the Commonwealth of Massachusetts. As part of the planning for the transition from County government a Pontoosuc Lake transition study committee developed a series of recommendations including that the lake owner should be the DEM (now the DCR). The lake ownership has not transitioned to the DCR, but is in the hands of the Department of Capital Asset Management (DCAM). DCAM is not equipped to participate in the management of the lake and it is important that DCR be given responsibility for Pontoosuc by transition of ownership, as recommended by the study committee. The DCR currently has responsibility for management of the dam, and is regulating the lake level and overseeing maintenance of the dam, but has minimal involvement in overall lake management.

The transition study committee included representatives from Berkshire County, the City of Pittsfield, the Town of Lanesborough, the DEM, and the Friends of Pontoosuc. Recommendations for management responsibilities were formulated and a series of Memorandums of Understanding (MOUs) were developed to implement the recommendations. These were agreed upon by all the representatives of the organizations on the committee, including the regional director of the DEM. He has since retired and the DEM was merged with

the Metropolitan District Commission and is now the DCR. The delay in the ownership transition has been attributed to the legislature, but it now appears that DCR is not supporting the transition recommendation.

The primary issue raised in 2000 was that the weed harvesting program could not be accomplished with the resources available to the DEM. This issue was resolved by obtaining agreement from Pittsfield and Lanesborough to conduct the harvesting program without state resources. Now, a new issue has surfaced; there is no state park land abutting Pontoosuc Lake. The DCR owns many other lakes without abutting state owned park land, so it is not clear why this is an issue for Pontoosuc. Adequate funding for the DCR is undoubtedly an issue, and needs to be addressed.

A series of actions is required to resolve this issue:

1. Work with DCR to address concerns with ownership transition and convince them that DCR ownership of Pontoosuc is desirable from the standpoint of all concerned.
2. Work with our legislative delegation to ensure their support and to take any action needed by the legislature to transfer ownership.
3. Be a political advocate for the DCR and work to get funding so they can meet their obligations, including management of Pontoosuc Lake.

Environmental Police

Environmental Police Officers assigned to the Western Massachusetts field office in Montague are responsible for patrolling Pontoosuc Lake. These officers are responsible for enforcing a wide variety of laws and regulations. Of particular importance to the lake are the enforcement of statues and regulations regarding hunting, fishing, trapping, boating and of all winter uses. These officers pay particular attention to wildlife management areas, boat access sites and the lake itself. The Friends of Pontoosuc have been able to develop a close working relationship with the officers from the Department of Fish and Game and over the years officers have addressed the annual meeting.

Library

A library of Pontoosuc Lake information will be established and maintained by the Friends of Pontoosuc. The library will contain a variety of information associated with the lake. Examples include but not limited to:

- Studies and reports associated with the lake
- Results of ongoing water quality monitoring activities
  - Water Quality Reports
  - Macrophyte survey reports
- Major initiatives accomplished
  - Dam repair

- Organizational information
  - Constitution and By-laws
- Agreements and Memoranda of Understanding
- Roles and Responsibilities
- Management Plans

This data will be available and will provide information for tasks:

- Provide a historical record
- Provide information to make future decisions related to the lake
- Aid in applications for Grants and Funding sources
- Provides technical information related to lake conditions over time

The library will be maintained in a public place such as the Berkshire Athenaeum or the Lanesborough public library. The Friends of Pontoosuc librarian will have control over the documents and they will be lent out with records maintained about location of checked-out documents.

A catalogue of documents will be maintained by the librarian. This catalog will be made available to all entities with lake management responsibilities and other interested parties.

Methods to Control Nutrients

Watershed-based Management Plan

A Watershed-based plan includes an identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated and to achieve the goals identified within the watershed-based plan. The plan is developed by incorporating and relying on existing information and data from other documents wherever possible. Existing reports include, but are not limited to, the Post-Implementation Study, the Housatonic Watershed Water Quality Assessment Report, the EOEA Five-Year Action Plan, the Housatonic NPS Assessment Report, and the Stormwater Assessment Report. The contributing total suspended solids (TSS) and total phosphorus (TP) loads can be modeled using such programs as the ArcView Generalized Watershed Loading Functions model (AVGWLF) and the most recent land use data available through MassGIS, the Town of Lanesborough and the City of Pittsfield or standardized modeling protocols, such as those developed by Schueler.

Through the plan the load reductions expected for the management measures can be estimated recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time. Estimates may include the total load reduction expected for agricultural properties, erosion or sediment controls, eroded streambanks, or impervious surfaces.

The plan includes a description of the NPS management measures that will need to be implemented to achieve the load reductions estimated, as well as to achieve other watershed

goals identified in this watershed-based plan, and an identification of the critical areas in which those measures will be needed to implement this plan. NPS management measures are selected based on the Massachusetts Stormwater Management Handbook and EPA Technology Transfer.

The plan will include an estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement this plan. As sources of funding, s.319 programs, State Revolving Funds, USDA Programs, and other relevant Federal, State, local and private funds that may be available to assist in the implementation of a watershed-based plan.

The plan includes an information/education component that is used to enhance public understanding of the project and encourage early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented.

A schedule for implementing the NPS management measures that is reasonably expeditious are identified in the plan. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented is identified in the plan.

A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining water quality standards is developed and included in the plan. An additional set of criteria is established for determining whether the watershed-based plan needs to be revised if substantial progress is not being made. The plan also includes a monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against established criteria.

Watershed Survey

Lake Watershed Survey methods have been developed by DEP and Riverways. A lake watershed survey is aimed to identify the sources of nonpoint source pollution that need to be controlled and estimates the extent to which they are present within the watershed. The survey process includes a planning meeting to discuss how a lake watershed survey using could complement other ongoing projects. A steering committee of municipal officials, educators, students, and watershed stakeholders develops a campaign for the solicitation of volunteers to conduct the survey of the watershed. This includes the creation, production, and mailing of promotional and educational materials. An Interactive Watershed Survey Training is held for all volunteers who will participate in the watershed survey. The training includes a PowerPoint Presentation to instruct volunteers in the proper methodology for conducting a watershed survey. GIS based maps of the watershed are used in the watershed surveys. Volunteers are supplied with data collection forms and conduct the watershed surveys over the following week. Volunteers return their completed data collection forms from the water surveys to be compiled by the Steering Committee. The Steering Committee compiles volunteers' priorities from each survey section onto a master Priority Sheet that contains essential information and serves as a basis for the action planning meeting. An Action Planning meeting is facilitated by the Steering Committee and includes all of the participants in the survey. This meeting creates the basis for a

full action plan of work to address problems and assets identified from the watershed surveys. The Action Plan, results in recommendations for continued monitoring and the reduction of nonpoint source pollution sources. In addition, recommendations are made for the watershed education and outreach to residents and business within the watershed.

Street Sweeping and Catch Basin Cleaning

The Post-Implementation Study identified 35 stormdrain and catchbasins connections that discharge stormwater and road run off directly into the lake. This is the highest source of pollutant loading to the lake and can create unstable and undesirable conditions in the lake. Infiltration systems have been installed on Profile Street and National Street. Conceptual designs have been prepared for infiltration systems at Imperial Street. Additional catchbasins in the watershed that eventually drain into the lake also deserve attention. The stormwater infrastructure within the watershed is not currently mapped. In addition, many catchbasins and stormdrains need to be upgraded and require more frequent maintenance.

Street sweeping should be completed at a minimum of once in the spring and once in the fall. Catchbasins should be cleaned when the sump is no more than two thirds full, with an annual inspection to make this determination. However, the City and Town Highway Departments are responsible for street sweeping and catchbasin cleaning/inspection and are subject to funding limitations.

Behavior modification

The Post-Implementation Study recommends a program to promote behavior modification to protect the lake from potential sources of nonpoint source pollution within the watershed. Measures should be taken to educate residents within the watershed on potential sources of nonpoint source pollution. A program should be put into place to encourage the use of phosphorus free fertilizers and phosphate free or low phosphate detergents. Residents should be educated on the nonpoint source pollution threat posed by household hazardous materials. Household hazardous waste pickups and disposal sites should be advertised to residents within the watershed. The importance of septic system maintenance should be advertised to residents within the watershed and a program for septic system maintenance should be offered through the Friends of Pontoosuc. Impervious surfaces around the lakeshore and within the watershed should be reduced or minimized. Residents should be encouraged to minimize driveways and other impervious surfaces, and treat residential stormwater through the use of rain barrels and vegetated buffers.

Nonpoint Source Pollution Best Management Practices (BMPs)

Between 1997 and 2000, the Post-Implementation Study identified stormwater as a major water quality problem for the lake. Water quality in the northern section of the lake is a concern, as the quality here affects the overall water quality of the lake.

Stormwater runoff from several steeply sloped streets in densely developed residential neighborhoods within the northern section of the lake watershed have traditionally been discharging stormwater into the lake untreated. However, over the last 3 years the Town of Lanesborough has methodically begun to remedy this situation by correcting priority stormdrain problems through the capture and treatment of the "first flush" of storm runoff. Stormdrain problems in the densely developed residential neighborhoods of National Street, Profile Street, and Imperial Street were identified in the Post-Implementation Study as carrying the highest concentration of pollutants into the lake. The Town, partnering with the BRPC, has installed three stormwater control systems. The first two stormwater control systems, at the ends of Profile and National streets, have been designed to treat stormwater through a "treatment train" of technologies. A system of catch basins, Stormceptor© units and infiltration tanks are removing greater than 80% of total suspended solids and significant percentages of other pollutants (most notably phosphorous and bacteria) from stormwater runoff that would otherwise be entering the lake. In addition, the Town is also planning to install a stormwater control system at the end of E Street as a component of the National Street project.

The installation of stormwater controls has provided an opportunity to educate residents on property management and stormwater runoff. Newsletter articles and inserts kept them apprised of the project and offered tips towards reducing residential NPS pollution of the lake.

A third Stormceptor© system is needed at the end of Imperial Street. The Stormceptor© and infiltration tanks need to be installed and tied to several of the existing stormdrains along the street into the Stormceptor© treatment system. This "end of the pipe" system will collect and treat stormwater runoff from the lower half of the street, which is the half that impacts water quality to highest degree. A new drainage system along the upper length of Imperial Street, is also needed to connect to the Stormceptor© treatment system.

In-lake treatments/techniques

Alum

Alum is effective at controlling algae blooms by removing phosphate from the water column. The alum is spread on the surface, and as it settles it precipitates out phosphates and carries them to the bottom. Treatment may need to be repeated as more phosphates enter the lake or are released into the water from sediments. Algae blooms have not been severe enough in Pontoosuc to warrant this treatment, but if the situation deteriorates this approach may warrant further consideration. The preferred alternative is to reduce the input of phosphates into the lake. Since alum treatments may need to be repeated, a reduction of phosphorus inputs will yield better long term results.

Aeration

Aeration is another technique to control algae by reducing phosphates. When a lake stratifies the deep layers can become anoxic. When the bottom layers are anoxic phosphates are released from the sediment into the water column and are available to algae. In the aeration process, water is pumped from the deep layers of the lake mixing and aerating it so an anoxic condition does not develop. Since Pontoosuc has a large influx of phosphate from runoff aeration would probably not be effective.

Dredging

The objective of dredging is to remove nutrients from sediments to reduce weed growth. Alum and aeration address nutrients in the water column, but would not be helpful in Pontoosuc for reducing weed growth since there is an ample source of phosphate in the sediment for weed growth. If phosphate inputs from other sources are reduced dredging may be an effective means of controlling weeds. However, it is extremely costly, difficult to permit, often not effective, and therefore probably not a reasonable option for Pontoosuc in the foreseeable future.

Education & Outreach

Newsletter

The Friends of Pontoosuc Newsletter is issued twice a year, at a minimum. The newsletter is mailed to members, lakeshore property owners, property owners within the watershed, officials, press, and by request. The newsletter serves multiple purposes.

1. Inform all stakeholders of issues within the lake and of actions being taken to address identified issues.
2. Educate those who live in the watershed and those who use the lake regarding steps they should take to improve and protect the lake.
3. Solicit involvement in ongoing lake management activities
4. Solicit input on perceived problems and priorities.
5. Maintain and/or increase membership in the Friends of Pontoosuc, and collect dues and donations.

The newsletter has been an effective communication tool. It is important that the newsletter continues to be published on a regular basis.

Throughout the development of the watershed-based plan the newsletter will be used as the primary means of communication with residents in the watershed. The mailing list will need to be expanded, and at that point it will be necessary to divide the mailing list into a core group, and a comprehensive group. This will keep mailing costs affordable and allow for a focused message to the public at large.

Questionnaire

The Friend sent a questionnaire to all of the recipients of the Newsletter. It clearly explained that the questionnaire would be used to identify activities that need to be undertaken to stabilize and restore the lake. The purpose of the questionnaire is to periodically receive input from the broader membership. The responses returned by the members are carefully reviewed and the results are incorporated into the ongoing management of the lake. Periodic questionnaires can identify public sentiment and concerns as they pertain to the lake by asking about uses, problems and watershed impacts.

Friends of Pontoosuc Watershed Organization

The Friends of Pontoosuc is intended to represent the interests of all of the stakeholders of Pontoosuc Lake. The board of directors is the key to the success of this special interest group, and represents the core advocates for Pontoosuc. The articles of incorporation define the board of directors as the four officers and three to eight members at large. The board meets periodically as required, currently once per month, but at least once per quarter, to consider and act on issues of interest. It is critical that the makeup of the board represents the diversity of interests in the lake, and is comprised of activists who are willing to give of their time and energies to further the interest of Pontoosuc. The flexibility in the makeup of the board (three to eight members at large) is intended to assure that we have the flexibility to include genuinely interested and active parties, but don't need to fill slots just to maintain a required total.

The periodic meetings of the board are open to all interested parties, members and non-members. The agendas are designed to include all current activities and provide an opportunity for input from any attendees to raise new issues or concerns and suggest initiatives to further the goal of improving the lake.

As the primary advocate for Pontoosuc Lake it is important that the membership represent all interests in the lake and be responsive to their desires. Membership dues are an important source of revenue, but dues must be kept affordable so all interested parties are given no impediment to membership. New members are solicited at all meetings and in newsletters. A mailing list is maintained and includes all recognized individuals who have shown or perhaps should show interest in the welfare of the lake. Currently the Friends of Pontoosuc is made up of 100 family memberships, many of whom support the Friends of Pontoosuc financially beyond the minimum dues requirement.

The charter requires that the Friends of Pontoosuc hold a general membership meeting annually. This meeting is an excellent opportunity to publicize activities and the needs of the lake. The annually meeting should be publicized in local papers and press should be invited to attend. The meeting agenda should stress ongoing actions and future plans, and recruit volunteers to support ongoing activities, and new members of the organization.

Another vehicle for publicizing the initiatives of the Friends of Pontoosuc is to increase media coverage by contacting reporters, or by issuing news releases. Local radio talk and call-in shows is another medium for increased publicity, and has been used in the past.

Mailing Database

A mailing list is being maintained to improve communication and information flow to property owners in the Pontoosuc Lake and watershed areas. The master list consists of an excel file and can be sorted into many categories. The list is updated at least twice a year for changes in property ownership. This list is utilized for a variety of purposes as follows:

- Newsletter
- Special notices to property owners
- E-mails announcements
- Membership drives
- Fund drives
- Lobbying
- Others.

Web Page

Web pages and email can be inexpensive education and outreach tools with tremendous potential. A web page could be used as a component of the education and outreach program for the public, nonprofit groups, and municipal and state officials. A web page could also serve to publicize meeting schedules and recruit volunteers.

A web page could include Newsletters, planning documents, and articles of interest. The Town of Lanesborough web site now includes the Friends of Pontoosuc newsletter which can be found at www.lanesborough-ma.gov.

Work with schools

Members of the Board of Directors have been fortunate in developing a strong working relationship with the members of the faculty of Mt Greylock Regional School District, Taconic and Pittsfield High Schools. The Friend are working with Mt. Greylock to develop "Senior Projects" that include participation in a lake watershed survey, weed identification, surveying and weed pulling, , water quality monitoring, catchbasin mapping and labeling, and shoreline vegetated buffer planting. These young citizens will become the next generation to continue the important work involved in the protection and restoration of the lake.

Educational Video

An educational video can be a tool to educate viewers on, the threat of nonpoint source pollution and the causes of lake eutrophication. Such a video can educate viewers further on what

individuals, groups, and political leaders can do to help keep the lake from further deterioration. The following subjects may be included in an educational video for Pontoosuc Lake:

- The use of non-phosphate fertilizer and the importance to the lake
- The importance of the stormwater runoff
- The importance of in-lake management techniques including, drawdown, harvesting, and hand-pulling
- The importance of assessment activities such as, water quality monitoring and macrophyte surveys

An educational video could be viewed through community access television or a web page. A educational video could also be valuable to show at the annual meeting of the Friends of Pontoosuc.

Monitoring Water Quality

Collect data that will conform to guidelines published by the Massachusetts Water Watch Partnership in cooperation with the DEP in 1995. These guidelines will assure the completeness, representativeness, comparability and accuracy. Acquire "state of the art", hand held dissolved oxygen and temperature measuring equipment to be used in gathering quality data to support lake management decisions. Monitor stormwater best management devices installed through Section 319 projects. Design format for generating annual reports of testing results. Create strategy for monitoring tributaries, streams and storm drains.

Fisheries

Maintain Health of Fisheries

Pontoosuc Lake is one of Massachusetts's premier fishing destinations. Fishermen from all over the Northeast travel to Pontoosuc Lake in the expectation of catching a variety of native fish species and record size tiger muskies found in Pontoosuc Lake. In addition, many other species of fish are stocked in Pontoosuc Lake by the Department of Fish and Game. While it is difficult to accurately assess the cost of the stocking its value can be reasonably identified as a fair portion of the $260 million that the Massachusetts Tourist bureau identifies as the annual fisherman expenditures in Massachusetts. However, dissolved oxygen profiles of Pontoosuc Lake conducted by ENSR in 2000 revealed that values of <5 mg/L were common in the bottom meter of the lake during most months of the year. Values below 5.0mg/L are generally considered undesirable for many species of aquatic life, especially trout. In addition, some

aquatic plant control methods have the [potential to negatively impact the fisheries. It is important to consider the fisheries when developing programs for techniques such as drawdown and mechanical harvesting. Aquatic plant control methods should also be employed in a manner in which vegetative cover remains for fish breeding, habitat and cover.

Stocking

Pontoosuc Lake supports a recreational fishery that is popular year round. The lake has produced several state records and the fisheries appear to be in adequate health. DFG runs the trout-stocking program on the lake in both spring and fall. Tiger Muskellunge have been stocked every year over the past decade. These fish are stocked at 3-12" and require up to 5 years to attain the 28" minimum legal length. Largemouth Bass fishing is reportedly good as well.

Fish Screen

The Pontoosuc Lake gatehouse has a 7-foot penstock that passes water into the Housatonic River. This satisfies the requirement that certain minimum flows be maintained in the Housatonic throughout the year. The lack of a fish screen at the gatehouse penstock may allow for the stocked fish to pass out of the lake and downstream into the Housatonic River. Some of the fish that are stocked in the lake are not native to the Housatonic and the lack of a fish screen may be viewed as a deficiency. This potential deficiency has been recognized and discussed for many years. The need and potential solutions were carefully reviewed amongst all of the governmental agencies and interested parties, and the provision of a 225 square foot fish screen around the penstock was agreed upon as a potential solution, provided that a design can be devised which will not adversely impact maintenance costs. However, concerns have been expressed regarding the maintenance requirements of a fish screen. A screen would act as both a trash rack and a fish screen, replacing the existing trash rack that is cleaned, on a periodic basis, by the DCR. The new screen with its smaller openings will gather more trash, increasing the maintenance burden and requiring additional labor. However the new screen may result in enhanced safety for the DCR employees charged with cleaning the screen.

It is important to quantify the benefits of such a screen and substantiate the need. A literature review on the effectiveness of fish screens should be conducted. The need for a fish screen at Pontoosuc Lake should be contrasted with that of relevant case studies of similar projects. The conceptual design should be reviewed with all stakeholders, and it should be determined whether the design meets their needs. If deficiencies are identified, modifications to the conceptual design should be developed which address any deficiencies before proceeding to the final engineering design phase.

Recreation Uses

Beach Clean-up and Improvements

The Friends of Pontoosuc organize annual lake watershed clean-ups. The Friends of Pontoosuc have experience in conducting successful lake clean-ups in previous years. The areas for the clean-ups are designated by the Clean-up Coordinator. Volunteers are organized and assigned designated clean-up areas. The lake watershed clean-ups are advertised and volunteers are recruited. Both radio and newspaper media are utilized to advertise the clean-ups. In addition, volunteers are recruited through a telephone campaign conducted by the Friends of Pontoosuc. Each clean-up is conducted over a designated three-day period. Clean-ups are conducted within the assigned areas by teams or individual volunteers at their convenience. Clean-ups are anticipated to include approximately 45 adults and 15 children, under the age of twelve. Clean-up activities include the use of boats. It is anticipated that upward of 130 total volunteer hours are dedicated per clean-up. The previous efforts conducted by the Friends of Pontoosuc are planned to be expanded to include an analysis of the findings.

The City of Pittsfield Parks and Recreation Department is currently assisting with the following projects/initiatives at Pontoosuc Lake Park:

Adopt-A-Park: This initiative is currently underway at the park. A local family has agreed to adopt this park and is undertaking small improvement projects periodically. Others wishing to participate in this initiative at this park (or others) may contact the Parks Department.

Pontoosuc Park Bath House Project: The project is on track for a spring 2005 construction and will go out to bid by mid-November. Current estimate is app. $140,000. Plans are available at the Parks Department.

Beach Improvements: The Parks Department has received city funds to improve the old beach at the park. Current plans call for the installation of a retaining wall in front of the old beach as well as new sand. A request for proposals is due back to the city in mid-November and an engineering firm will be hired to complete the design and oversee construction.

Trash Removal

Concerns are expressed when trash and litter or garbage is observed around the shoreline, in public parks, or overflowing from trash barrels. Concerns have been expressed regarding the need for improved trash pick up around Pontoosuc Lake. Efforts should be made to support City and Town efforts for trash collection and clean-up days. As previously discussed, the Friends of Pontoosuc organize annual lake watershed clean-ups. The areas for the clean-ups are designated by the Friends of Pontoosuc and volunteers are organized and assigned designated clean-up areas. However, this effort would be improved by regular clean-ups and trash removal.

Enforce Regulations

Enforcement of regulations is a lake management concern critical to the effective management of Pontoosuc Lake. Meanwhile, the enforcement of existing safety and environmental protection regulations should be supported and strengthened.

Wakes caused by large boats and 'boogie boards' are a serious concern with respect to shoreline erosion and causing unpleasant conditions on the lake. Further, wake jumping by personal watercraft is viewed as dangerous and inconsiderate. Boater behavior is noted as a concern, especially the practice of exceeding safe speeds and boating in and around established swimming lanes.

Concerns exist with regard to boat speed, wakes, traffic direction and congestion and are amplified by the number of users. Enforcement of existing rules and regulations is seen as substantially lacking. More support is needed for instituting lake surface use ordinances on the lake as necessary.

Safety & User Conflicts

The coordination of various users is a lake management concern critical to the effective management of various user interests. Efforts should be made to increase the coordination of various lake users. Garbage, off-road vehicles, and loose dogs are potentially problematic. Efforts should be made to support City and Town ordinances regarding the control of off-road vehicles and unleashed dogs.

Wakes caused by large boats and 'boogie boards' are a serious concern with respect to shoreline unpleasant conditions on the lake. Further, wake jumping by personal watercraft is viewed as dangerous and inconsiderate. Boater behavior was noted as a concern, especially the practice of exceeding safe speeds and boating in and around established swimming areas. In addition, it is necessary to separate formal swimming areas from formal boat launches.

Winter Uses

Pontoosuc is a recreational resource for residents and visitors in the winter as well as the summer. Ice fishing, skiing, skating, snowmobile use, and just walking across and around the lake are important uses of the lake in the winter. This plan is focused on issues such as water quality and weed control. The plan needs to keep winter uses of the lake in mind to assure that actions taken in implementing the management plan do not degrade this aspect of lake use, and to ensure that the winter uses do not deteriorate the lake for summer use.

Other

Fund raising

The primary source of funding for the Friends of Pontoosuc is currently through membership dues. This money is mostly utilized for printing and mailing the bi-annual member newsletter.

The Friends of Pontoosuc work closely with the Town of Lanesborough, the City of Pittsfield and other organizations including the BRPC (BRPC) to secure funding from local, state and federal governments for lake management and improvement projects. Most grant requests are submitted and managed via the BRPC.

In 2004, the Friends of Pontoosuc secured federal 501(c)3 non-profit status. It is the intent of the Friends of Pontoosuc to solicit public and private donations to finance additional projects and initiatives in line with the lake management plan, such as stormwater filtration, shoreline vegetative buffers, aquatic plant management, and improvement of the public beach and recreation areas. The Friends of Pontoosuc also plan to develop an educational program for lake area schools to teach children about the lake's condition, ways to improve water quality, and increase water safety.

Specific fundraising campaigns will be structured according to the purpose and amount of capital required. When possible the Friends of Pontoosuc will leverage funds raised as part of a match to grant funds. Large capital drives will be prepared as needed and the funds raised will be earmarked for particular lake projects. Funding will also be secured through direct solicitation of local businesses and the community. To enhance the Friends of Pontoosuc general account, campaigns will also be developed with the aim of seeking additional donations from our membership and community.

Continue 3ft Drawdown

The earliest drawdowns of Pontoosuc Lake resulted from water used by the mills immediately down stream of the dam. As recently as the late 1940's these mills drew large volumes of water for manufacturing processes and would often leave the lake level several feet below the top of the dam by the end of summer. In 1979 drawdown as a means of flood control were initiated by the Berkshire County Commission. These early drawdowns were a most effective means of controlling weed growth. In 1989 the County Commissioners funded a study by the Aquatic Sciences Division of IT Corporation to evaluate the success of drawdowns in controlling nuisance aquatic macrophyte species or more specifically Eurasian Watermilfoil and Curly-leaf Pondweed. This study by Aquatic Sciences Division recommended a six foot drawdown to control weeds in the lake and it went on to suggest that if the six foot drawdown proves unfavorable for implementation then a three to five foot drawdown could be employed.

The GEIR recognizes drawdown as a multipurpose lake management tool that can be used for aquatic plant control. This document identifies the benefit of refilling after an inch or two of ice forms, causing uprooting plants that inhibits re-growth.

In October of 2004, and on the basis of the extensive evaluations that have been made over the past 15 or so years, the Lanesborough Conservation approved a 3 to 5 foot drawdown for flood control and to assist in controlling weeds.

In the winter of 2003-4 a 3 foot drawdown was completed by early November by DCR. Then in December after a hard freeze followed by rain the level of the lake rose several inches and this is believed to be one of the major reasons for the significant reduction of weeds found in the lake during the summer of 2004.

Geese Control

The population of Canada Geese has exploded on Pontoosuc Lake in the past few years, and they have come to be considered a nuisance. Goose droppings on lawns and beaches are a very serious problem. A less obvious concern is water contamination by goose feces. Goose feces include nutrients that can be used by plants and algae, and pose the additional problem of bacterial contamination, potentially making the lake unsuitable for swimming. Some residents have taken action to keep geese off their shore by installing barriers however; this only moves the problem to others on the lake. No action has been taken to reduce the population. Large families of geese are on the lake in spring and summer, and the population continues to grow.

Other lakes in the northeast have addressed the issue by preventing eggs from hatching. Destroying the eggs in a nest is not effective, because the pair will produce replacement eggs. The recommended methods of eliminating the population growth are by addling the eggs (shaking them violently to destroy the yoke without breaking the shell), or by painting the eggs with vegetable oil to block air from the inside of the egg, preventing development of the hatchling. Eggs are returned to the nest after treatment with either method, and the pair will not produce viable replacement eggs.

To employ this strategy, permits must be obtained, volunteers must be trained, and the nests must be found and treated.

Bank Slope and Stabilization

The Post-Implementation Study indicates that erosion control is an important component of overall management designed to decrease pollutant loading to aquatic ecosystems. It is especially important to consider erosion control and bank stabilization in areas of new development with exposed soils that are vulnerable to erosion. Other critical areas include stream banks and riparian zones. Unpaved roads within the watershed are known to erode and wash silt and sediments into the lake with every thunderstorm in the summer. The Post-Implementation Study recommends that erosion control techniques be employed. There are well known situations which are deteriorating the lake now, and they demand immediate action. Techniques for bank stabilization should include best management techniques that minimize impacts to wildlife habitat.

Coffer Dams

Coffer dams create a blockage in a stream that promotes upstream retention, sheet flow, and reduced scouring during storms. The result may be a temporary pool that detains storm flows or a much wider stream corridor that makes use of emergent wetlands to treat storm flows. Reduced velocity and detention time are equally important in this approach. There are a number of concerns that surface regarding this management option including potential impacts to fish and wildlife passage and provision of adequate flood control. Design of any structure should consider fish and wildlife passage as well as water retention.

The Post-Implementation Study recommended consideration of this approach for Secum Brook just upstream of the inlet area where a current pool and wetland collect fine particles during the summer. The annual drawdown in the fall increases the velocity through this pool and lowers the water scouring accumulated particles into Pontoosuc Lake. Similar scouring may occur during large storms. The establishment of a low dam would allow water to be detained and released at lower velocities during drawdown or high flow periods.

In addition, the Post-Implementation Study recommends this approach at several wetland areas along Town Brook. Extreme caution must be used to avoid flood hazards.

Wall Beautification

A state highway project to improve the safety of State Highway Rout 7 along the southeast shore of Pontoosuc Lake was completed in the mid 90's. The highway was rerouted closer to the lake and was elevated, employing a high vertical wall to support the roadway. Previously the road was separated from the lake by a bank with trees and brush which grew down to the lakeshore. Now the view from the lake and from the west shore is of a high concrete wall instead of a green shoreline. A public outcry ensued, and the Massachusetts Highway Department promised action. However, the only measure taken was to lower the guardrail along the roadway to provide motorists a view of the lake. Nothing was done to improve the aesthetics from the lake side.

A small amount of funding was set aside by the City of Pittsfield accounts to address the issue, but nothing has been accomplished. Nothing will be done unless an advocacy group brings the issue to the forefront and requires action. The Friends of Pontoosuc have been an advocate for this work, and need to increase the intensity of the effort if anything is to be accomplished.

VI. MANAGEMENT RECOMMENDATIONS

Management goals, objectives and recommended actions were developed by the Advisory Group to address the problems and concerns identified in the previous section.

Effective management plans have meaningful and measurable goals and objectives to provide a context for the management actions that are prescribed and recommended. The goals and objectives also provide a framework to objectively evaluate the results of management actions. Management plans contain specific statements that result in meaningful action.

In the preceding section "Management Approaches and Activities", actions which have been taken, are ongoing, and should be taken are described. The purpose of this section is to clearly identify those actions recommended by the Advisory Group and the priority for implementation. Some of these activities are ongoing and will continue to be implemented, while others are new activities which we plan to initiate. This section represents the clear statement of goals and objectives identified by the Advisory Committee. Goals and objectives are listed in priority order. The objectives have been prioritized as 1c) currently implemented, 1) must implement and scheduled for immediate advancement, 2) desired for implementation and scheduled for subsequent advancement, 3) implementation contingent on future funding, and 4) requires more investigation and unlikely to be funded/implemented within five years. These priorities are reflected in the priority column of the Five Year Action Plan.

A. Nuisance Aquatic Plants & Algae

Goals

Control nuisance aquatic plants and algae to a) improve healthy native aquatic plants to b) minimize the ecological impacts and recreational nuisances of non-native plants, c) provide minimal distraction from recreational activities, and d) provide quality fish and wildlife habitat, e) provide for coordination of management and control activities.

Objectives

1. Continue mechanical harvesting
2. Continue macrophyte surveys
3. Continue hand-pulling of water chestnuts
4. Investigate applicability and feasibility of the use of herbicides/algaecides
5. Investigate applicability and feasibility of deeper drawdown
6. Investigate applicability and feasibility of Eurasian watermilfoil eating weevils
7. Influence stocking program for algae control
8. Investigate applicability and feasibility of optimizing harvest time
9. Investigate applicability and feasibility of plant competition
10. Investigate applicability and feasibility of benthic barriers

11. Initiate boat cleaning/inspection and boater education program

B. Management Responsibilities

Goal

To promote a restoration / management approach of the lake based on sound scientific principles and emphasizes Watershed management, In-lake management, Pollution prevention, Education, and Recreational usages.

Objectives

1. Continue updates, revisions, and or amendments to Lake Management Plan
2. Continue to pursue grant funding
3. Pursue streamline process for filing of local and state permits
4. Pursue transfer of ownership of the lake to DCR
5. Interface with Environmental Police
6. Develop library of reports, studies, plans, and data

C. Methods to Control Nutrients

Goals

Minimize the negative impact on lake ecology from development within the watershed.

Objectives

1. Develop Watershed-based Management Plan
2. Initiate watershed survey following guidelines developed by MADEP and the Riverways Program
3. Continue street sweeping and catch basin cleaning
4. Develop educational program to encourage behavior modification
5. Implement recommendations of Diagnostic Feasibility Study for nonpoint source pollution best management practices (BMPs)
6. In-lake treatments/techniques

D. Education & Outreach

Goal

Increase public awareness and knowledge through enhanced education and outreach efforts.

Objectives

1. Continue Friends of Pontoosuc newsletter

2. Develop questionnaire and distribute with Friends of Pontoosuc newsletter
3. Expand Friends of Pontoosuc Organization
4. Develop and maintain a mailing list
5. Develop and maintain a web page
6. Work with schools
7. Produce educational video for Community Access Television

E. Monitoring Water Quality

Goal

To develop quality data that can be used by government agencies in making decisions on the management of Pontoosuc Lake.

Objectives

1. Produce data that will conform to 1995 guidelines published by the Massachusetts Water Watch Partnership in cooperation with the DEP. These guidelines will assure the completeness, representativeness, comparability and accuracy.
2. Acquire "state of the art", hand held dissolved oxygen and temperature measuring equipment to be used in gathering quality data to support lake management decisions.
3. Monitor stormwater best management devices installed through Section 319 projects
4. Generate annual reports of testing results.
5. Create strategy for monitoring tributaries, streams and storm drains.

F. Fisheries

Goal

Improve the oxygen content of the lake water column, especially at the deeper locations. Make sure there are weed patches for fish habitat and protection. Support a fish screen program to keep stocked and native species from going down stream. Make sure that weed control has a minimum impact on the fish population.

Objectives

1. Maintain fisheries health
2. Stocking
3. Investigate applicability and feasibility of the installation of a fish screen at the dam outlet

G. Recreation Uses

Goals

Improve the coordination of lake users and increase the City's commitment to both lake preservation funding and the enforcement of existing safety and environmental protection regulations. Assure that boating activities are safe, courteous and do not add to shoreline erosion.

Objectives

1. Initiate beach clean-up and improvements
2. Continue efforts toward trash removal
3. Police enforcement of regulations
4. Safety & User conflicts
5. Initiate monitoring of winter activities

H. Other

Goal

To promote independent initiatives that promote the maintenance and improvement of the quality of Pontoosuc Lake by coordinating and integrating activities which impact the lake, organizing volunteer actions which will directly improve the lake, and raising public and private funds to assist in the foregoing activities.

Objectives

1. Fund raising
2. Continue 3 ft drawdown
3. LAPA-West and COLAP workshops
4. Geese control
5. Investigate potential health threats of beaver populations
6. Bank slope and stabilization
7. Install coffer dams
8. Beautification of wall on Route 7

VII. FIVE YEAR ACTION PLAN

GIER CHAPTER AND SECTION #	TASK	PRIORITY	RESPONSIBILITY	ESTIMATED COST	STATUS	SCHEDULE	YEAR
1.3	**A. NUISANCE AQUATIC PLANTS & ALGAE**						
4.3	1. Continue harvesting	1c	Pittsfield DPW	Minimal	Ongoing	Jun – Aug	Annually
5.4	2. Macrophyte Survey	1c	Friends of Pontoosuc	$12,000	Ongoing	Jun & Aug	Annually
2.4.8	3. Hand pull water chestnuts	1c	Friends of Pontoosuc	Minimal	Ongoing	July – Sept.	Annually
4.6	4. Consider use of herbicides/algaecides	2	Friends of Pontoosuc	>$46,000	Ongoing	May	2006
4.2	5. Deeper draw down	2	Friends of Pontoosuc/DCR	none	Discuss w/DFG	Spring & Fall	Annually
2.4.9	6. Weevils	2	BRPC/contractors	>$20,000	Pending funding	June	2007
	7. Influence stocking program for algae control	2	Friends of Pontoosuc/DFG	Unknown	Gain better understanding	Spring	2005-2006
4.3	8. Explore optimal mechanical harvesting schedule	2	Friends of Pontoosuc	Minimal	Gain better understanding	Spring/Fall	2005
	9. Plant Competition	2	Friends of Pontoosuc	Unknown	Gain better understanding	July	2008
2.4.10	10. Benthic barriers	3	vendor (TBD)	Unknown	Pending funding	Spring	2006
5.3	11. Boat cleaning & education	3	boat owners	Unknown	Work with DCR	Summer	2005
5.0	**B. MANAGEMENT RESPONSIBILITIES**						
5.4	1. Management plan	1	BRPC	$10,000	Completed December 04	Annual update	Annually
5.10	2. Grant funding	1	Friends of Pontoosuc	Minimal	Ongoing	As applicable	Annually
5.4	3. Permits (see list)	1c	Friends of Pontoosuc	Minimal	Ongoing	As required on 3 year cycle	2005 & 2008
5.10	4. Transfer of lake ownership	2	DCR	TBD	Ongoing	TBD	Ongoing
5.10	5. Environmental Police	3	EPO	Unknown	Ongoing	TDB	Ongoing
5.4	6. Library of documents (see attachment for list)	3	Friends of Pontoosuc	Minimal	Ongoing	Annually	Annually
1.5	**C. METHODS TO CONTROL NUTRIENTS**						
	1. Develop Watershed Management Plan	1	Friends of Pontoosuc	$50,000	Initiated through FY05 s.319	TBD	2005 & 2006
1.5	2. Watershed survey	1	Friends of Pontoosuc/BRPC		Initiated through FY05 s.319	Spring / Fall	2005
2.4.1	3. Street sweeping	1c	Pittsfield & Lanesborough	City/Town budgets	Ongoing	Annually	Annually
2.4.1	4. Catch basin cleaning	1c	Pittsfield & Lanesborough	City/Town budgets	Ongoing	Annually	Annually
3.5.1	5. Behavior modification	1	Friends of Pontoosuc/BRPC	Minimal	Ongoing	May & Nov	Annually
2.4.2	6. Install/Implement BMPs	2	Friends of Pontoosuc/BRPC /Lanesborough	>$80,000	Two completed, one pending	TBD	2005
	7. In-lake treatments/techniques	3	Friends of Pontoosuc	Unknown	Pending severe need	Summer, as required	2008
6.5	**D. EDUCATION & OUT REACH**						
6.5	1. Newsletter	1c	Friends of Pontoosuc	$2,100	Ongoing	May & Nov	Biannually
6.5	2. Questionnaire	1	Friends of Pontoosuc	$800	Ongoing	Spring	Annually
6.5	3. FOPLW Organization	1c	Friends of Pontoosuc	Minimal	Ongoing	Ongoing	Annually
6.5	4. Mailing database	1c	Friends of Pontoosuc	Minimal	Ongoing	Biannual	Biannual
	5. Web Page	1c	Friends of Pontoosuc /Lanesborough	None	Ongoing	Ongoing	Annually

GIER CHAPTER AND SECTION #	TASK	PRIORITY	RESPONSIBILITY	ESTIMATED COST	STATUS	SCHEDULE	YEAR
	6. Work with schools	2	Friends of Pontoosuc /Schools	Grant	Pending grant funding	TBD	Annually
	7. Produce educational video for Community Access Television	2	Friends of Pontoosuc /Producer	+/- $2,000	Pending grant funding	TBD	2006
5.5	**E. MONITORING WATER QUALITY**						
1.1.2	1. Develop water testing Program MWW guidelines	1	Friends of Pontoosuc	$300/ year	Ongoing	TDB	2005 – 2006
1.1.2	2. Acquire monitoring equipment	1c	Friends of Pontoosuc	$1,000	TBD	TBD	2006
2.4.2	3. Stormceptor monitoring	1c	Friends of Pontoosuc /HVA	Minimal	Ongoing	Apr-Nov	Ongoing
	4. Prepare annual report of testing results	1	Friends of Pontoosuc	Minimal	Ongoing	Winter/Spring	Annually
2.4.2	5. Monitor storm drains and tributaries	2	Friends of Pontoosuc	$300/ year	TBD	Apr-Nov	2007
	F. FISHERIES						
	1. Maintain fisheries health	1c	Friends of Pontoosuc/DFG	Unknown	Ongoing	Ongoing	Annually
	2. Stocking	2	DFG	Unknown	Ongoing	Spring & Fall	Bi-annually
	3. Fish screen	4	Friends of Pontoosuc/DCR	>$150,000	TBD	Fall	2005-2006
	G. RECREATION USES						
	1. Beach	1	Pittsfield	$46,000	Pending funding	Spring	2004
	2. Trash removal	1c	Friends of Pontoosuc/Pittsfield/DCR	Minimal	Ongoing	Ongoing	Annually
	3. Police enforcement of regulations	2	Pittsfield/EPO	Minimal	Ongoing	Ongoing	Annually
	4. Safety & User conflicts	3	Friends of Pontoosuc/Pittsfield/DCR	Minimal	Ongoing	Ongoing	Annually
	5. Winter uses	4	Friends of Pontoosuc/Pittsfield/DCR	Minimal	Ongoing	Ongoing	Annually
	H. OTHER						
5.4	1. Fund raising	1	Friends of Pontoosuc	Minimal	Initiate in FY05	Ongoing	Annually
	2. Continue 3ft Drawdown	1c	Friends of Pontoosuc/DCR	Minimal	Ongoing	Nov-April	Annually
	3. Geese control	2	Friends of Pontoosuc	Minimal	TBD	Spring	2006
	4. Bank and slope stabilization	2	Friends of Pontoosuc /Pittsfield/Lanesborough	Unknown	TBD	TBD	2006
	5. Install coffer dams	3	Friends of Pontoosuc /Lanesborough	Unknown	Further investigation required	TBD	2008
6.5	6. Wall beautification	3	Pittsfield/MHD	Unknown	Work with City of Pittsfield and MassHighway Department	TBD	2006

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