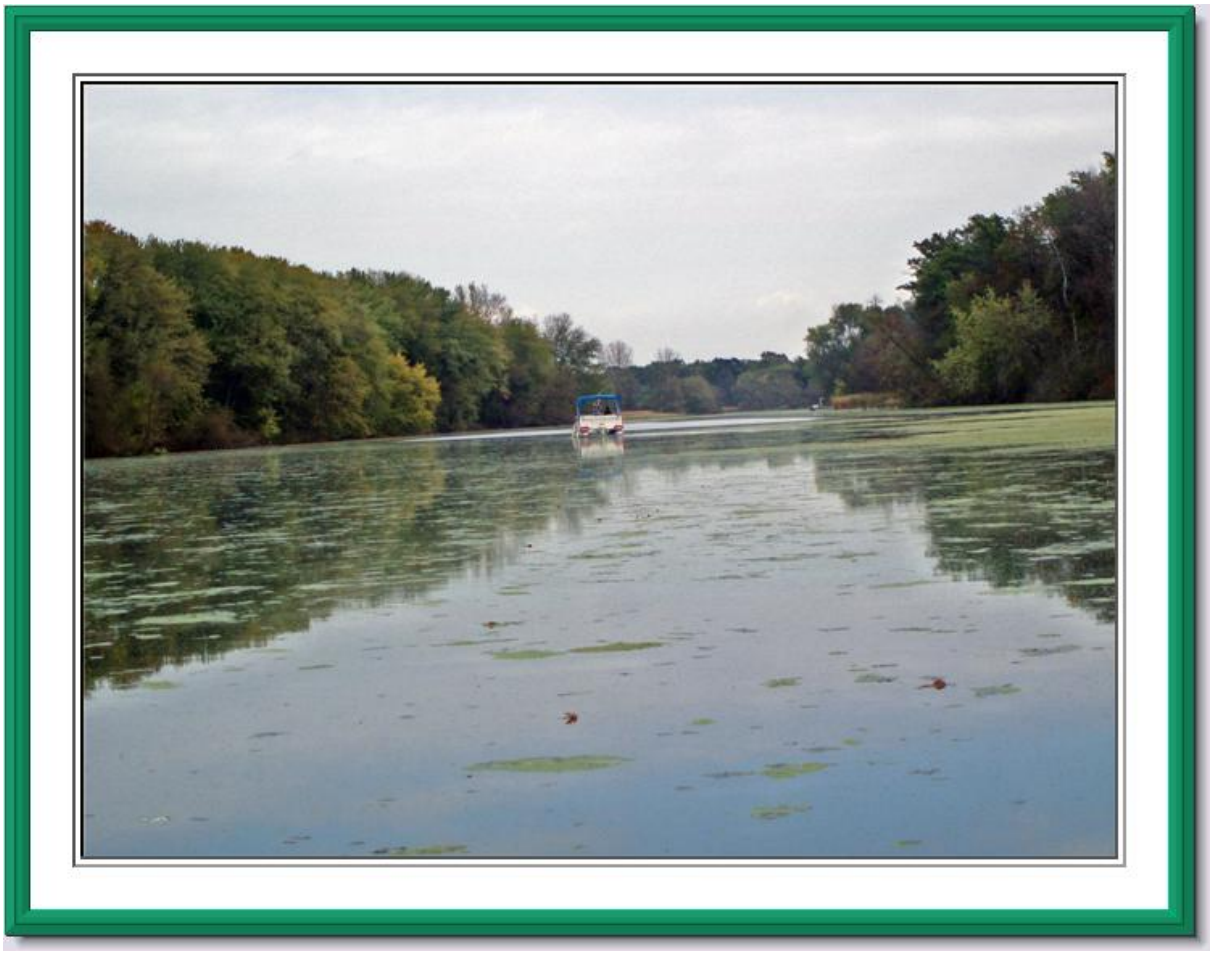
Lake Management Plan for Lazy Lake

Fall River, Wisconsin



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Introduction

With its location in Columbia County, Wisconsin, Lazy Lake is an impoundment located on the North Branch of the Crawfish Watershed within the Rock River Basin. Primarily a sport fishery, Lazy Lake also provides for a multitude of other recreational opportunities.

Lazy Lake is considered euthrophic; historically the lake has produced very dense stands of aquatic macrophytes. Ultimately the abundant plant community and the desired management thereof was the catalyst for the Lazy Lake Management District creation in 1979. The purchase of their first of two plant harvesters was in 1991 providing the base for Lake management for two decades. As the Lazy Lake Management District looks into the future they strive to provide science based management not only for their plant community but toward their lake ecosystem and for the watershed itself.

What is a "watershed"?
The Random House College Dictionary defines a watershed as "the region or area drained by a river, stream, etc.; drainage area." A watershed is body of land from which rainfall (and/or snow melt) drains into a receiving body of water: stream or other water body. Watersheds are also sometimes referred to as drainage basins. The highest ground or ridge delineates the boundaries of the watershed. At these boundaries a divided is created, as such, rain falling on one side flows toward the low point of one watershed, while rain falling on the other side of the boundary flows toward the low point of a different watershed.

What is "runoff"?
"Runoff" or "surface runoff" is the flow of water from precipitation (snow fall, rain) or other water source across the lands surface, see Figure 1.1 page 2. As development increases in a watershed, the quantity of water infiltrating into the soil column is reduced; as a result, it increases runoff. Runoff water drainage systems are incorporated in developed areas as preventive action to minimize localized flooding. These drainage systems may discharge through an individual or local outfall to a surface water body or swale, or may runoff the land as overland flow.

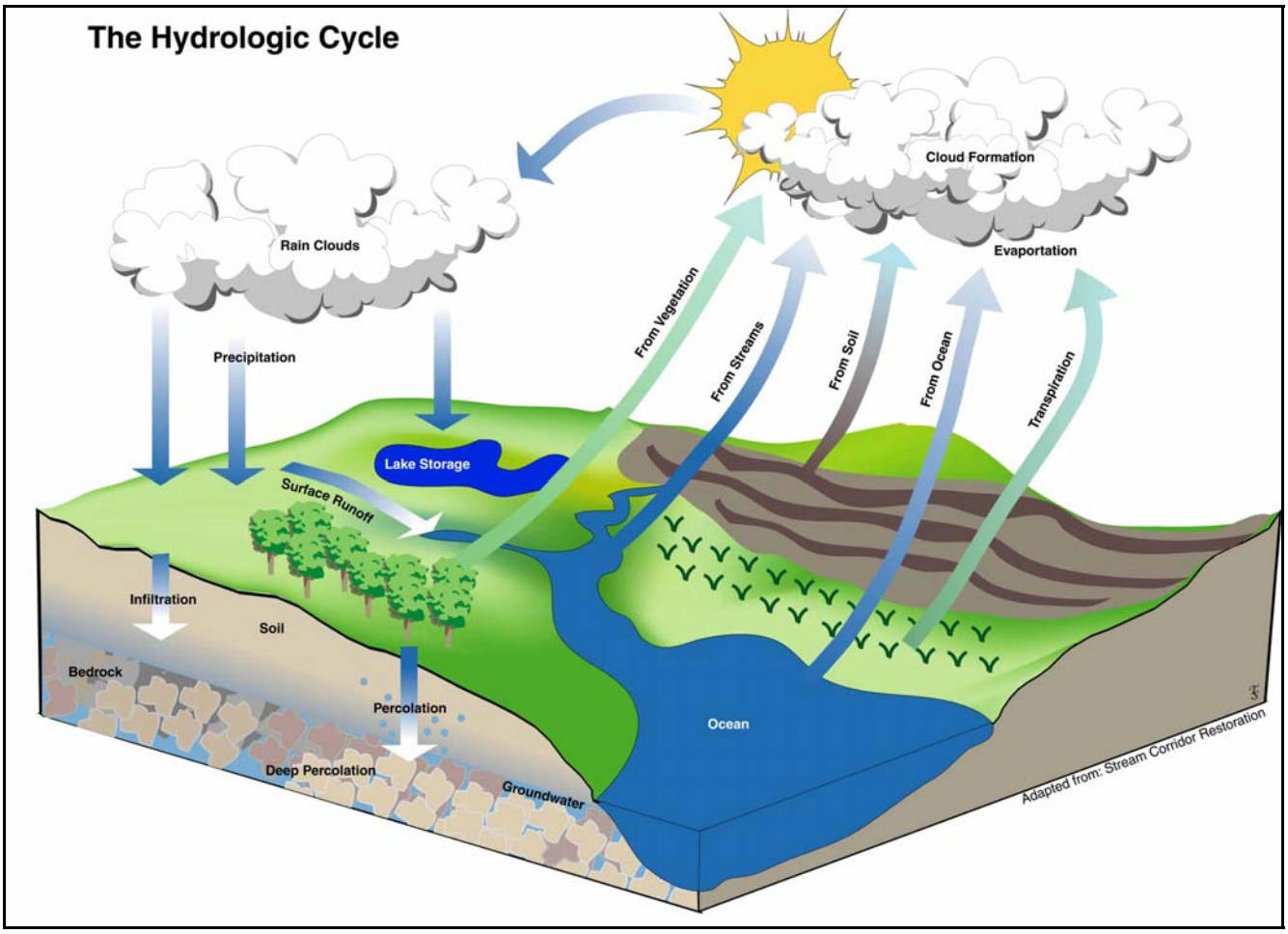


Figure 1.1 Hydrologic Cycle

The Rock River Basin

The Rock River Basin is in southern Wisconsin. The basin covers about 3,777 square miles or 2.4 million acres over ten counties. The watershed has 3,900 river miles. The main river of the watershed, the Rock River has its' headwaters in the City of Waupun. The Rock River Basin includes over 443 lakes and impoundments. The basin includes 26 cities ranging from Madison to smaller cities like Janesville, Stoughton, Hartford, and Delevan. The Rock River Basin also includes 36 smaller villages and total 760,000 residences. The entire Basin is located entirely within the southern region of the state in the Prairie-Forest Border Ecoregion. The Rock River Basin includes 28 watersheds, including the Crawfish Watershed and Lazy Lake.

The Crawfish Watershed

The total estimated area in the watershed is 515,001 acres. This watershed is located in Dodge, Columbia, Dane and Jefferson Counties in southeast Wisconsin.

The terrain of the watershed varies from nearly level to moderately steep. The highly productive soils generally consist of silt loam over glacial till. It is for this reason that agriculture is by far the predominant land use with corn, soybeans and alfalfa being the major crops. Pastureland in the watershed comprises about 40,000 acres. There are also large areas of muck soils where vegetables and sod are the primary crops. The Crawfish River is a tributary to the Rock River, which also has a

highly agricultural watershed. (NRCS Web page http://www.wi.nrcs.usda.gov/programs/csp05_crawfish.html)

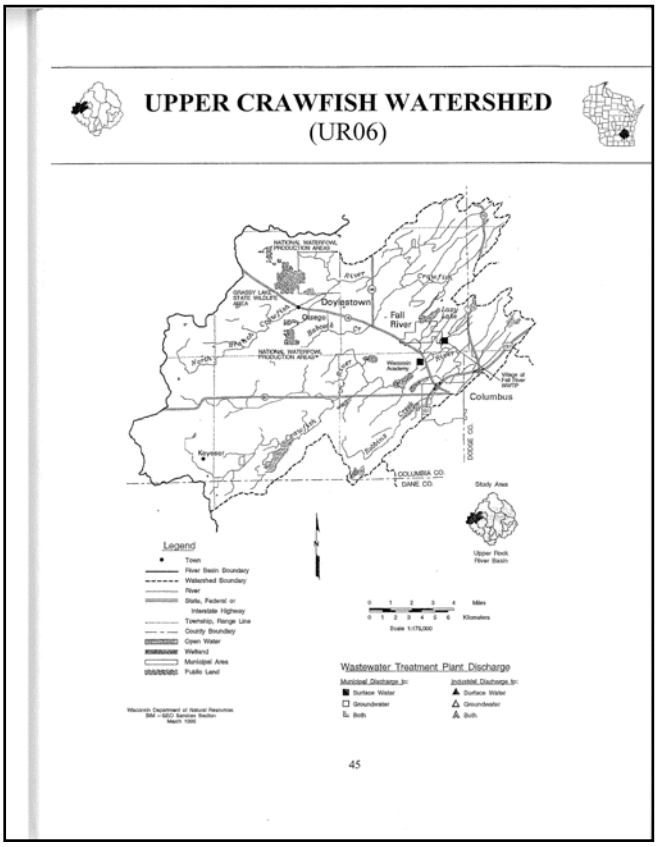


Figure 1.2 Upper Crawfish Watershed

Upper Crawfish River Watershed
The watershed of the Upper Crawfish River is 164 square miles which includes the Crawfish River above the dam at Columbus and the entire North Branch of the Crawfish River, see figure 1.2 . The watershed includes the communities of Columbus, Fall River and Doylestown. The predominate land use in the watershed is agriculture, mostly cash cropping, dairy and/or feeder animals. The watershed is 73% agricultural land (WDNR. 2002).

Babcock Creek
Babcock creek is a tributary to the North Branch of the Crawfish River, up river of Lazy Lake. Despite heavy stream bank pasturing and significant loads in the stream, the creek's water clarity is exceptional (WDNR, 1994).

Crawfish River
As a tributary of the Rock River, the Crawfish River is 50 miles of meandering river through south central Wisconsin. The Crawfish River headwaters start in Columbia County. To generalize, the Crawfish River flows eastwardly, collecting the North Branch of the Crawfish River (see below) passing through Fall River and Columbus. The Crawfish River also passes through Jefferson County. It is in the City of Jefferson where it finally outlets into the Rock River. Problems with agricultural nonpoint pollution have traditionally plagued the Crawfish. The problems which degrade the water quality primarily consist of barnyard runoff and cropland erosion (WDNR 2002). Channelization and wetland drainage have been land use practices traditionally implemented in the headwaters and upper reaches of the Crawfish River.

North Branch Crawfish River
Just south of the Village of Fall River, the North Branch of the Crawfish outlets into the Crawfish River. In 1994 the WDNR reported "polluted agricultural runoff, low levels of dissolved oxygen and low flow problems exist(ing)" (WDNR, 1994). It is on the North branch of the Crawfish River where Lazy Lake is found.

Lazy Lake

In south central Columbia County, Wisconsin located on the North Branch of the Crawfish River, in the Village of Fall River, see figure 1.3.

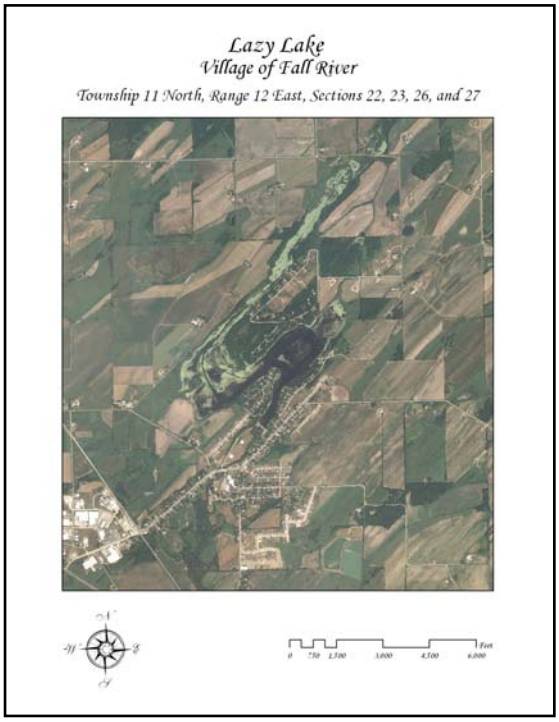


Figure 1.3 Lazy Lake Aerial Photo

The dam creating Lazy Lake was originally built approximately in 1860 (WDNR, 1979). The Dam was rebuilt, around 1917 (WDNR, 1979). Over time the water has been used to generate power for a variety of industrial endeavors: saw mill, grist mill and flour mill. As a result of this dam, the impoundment of Lazy Lake creates a recreational water body which totals 161 surface water acres, with a maximum depth of 8 feet and a mean depth of 3.6 feet, see figure 1.4 page 5. Lazy Lake has a storage capacity of 578 acre feet with a normal water elevation of 98.6 feet. Lazy Lake has 4.2 miles of shoreline. Lazy Lake is similar to other southern shallow water impoundments sharing problems such as high turbidity, low dissolved oxygen, excessive algae blooms and weed growth (WDNR, 2002). Self-help monitoring data indicate that the lake has been and still is eutrophic (WDNR, 1990).

A USGS feasibility study from 1979, states that Lazy Lake has an outflow average of 28.4 cfs, with a low and high of 9.4 to 138.2 cfs. The monitoring for the 1979 study was considered to be done during a low flow year and it was estimated by the USGS that a normal year would produce 53 cfs. The water retention time for the lake is 10.3 and 5.5 days respectively.

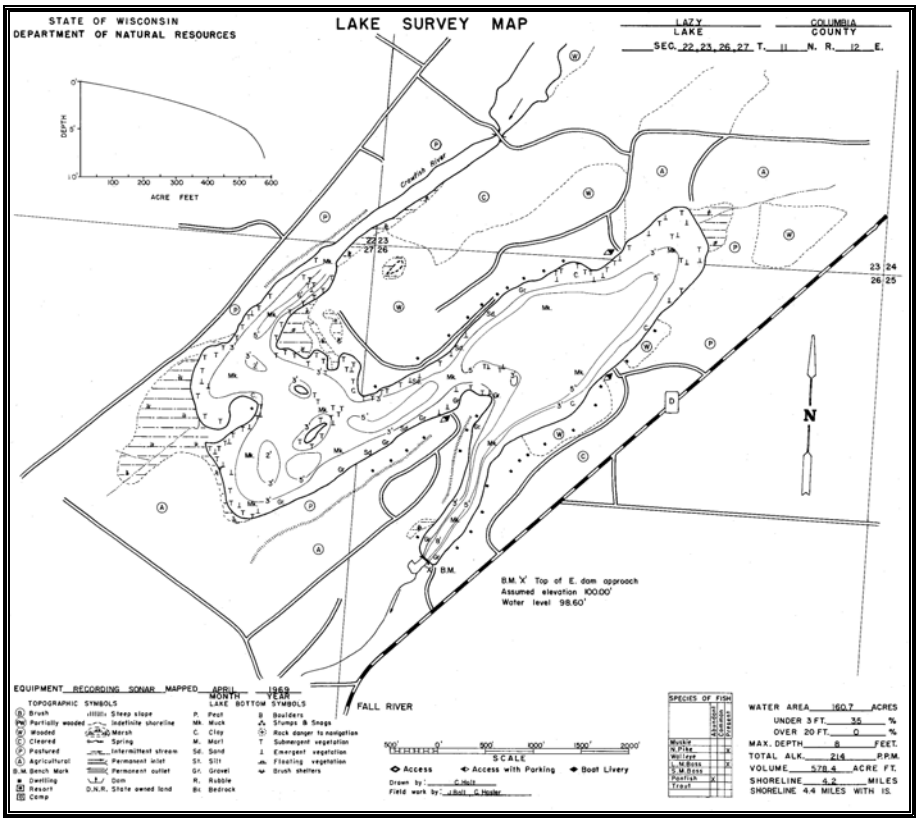


Figure 1.4 Lazy Lake 1969 WDNR Bathymetry Map

Lazy Lake Watershed

The Lazy Lake watershed is 57 square miles or approximately 39,330 acres, providing a watershed-to-lake ratio of 227 to 1. In the glacial drift area the Lazy Lake watershed is positioned over dolomite bedrock. The soil associations most commonly found in the watershed are: Grellton-Gilford-Friesland, Plano-Griswold-Saybrook, and St. Charles-Ossian-Dodge. The soils in these associations can generally be described as well-drained loamy soils, ranging from gentle to steep slopes, and are formed in moraines, outwash terraces, and lucustrine plains (USDA, 1978). In 2005, the Lazy Lake watershed was identified to be compromised of the following land uses.

- Agriculture - 34,725 acres
- Forest - 2,143 acres
- Wetland - 1,829 acres
- Water - 228 acres
- Urban - 404 acres

It is believed, through core analysis that sedimentation during 1958-64 resulted in a 1.6 cm per year increase in depth, while radiometric dating states the period of 1964-78 resulted in a 1 cm per year increase in depth (Johnson, 1981). One could assume that tillage practices incorporated soil conservation practices over the time the soil deposition lessened.

MANAGEMENT RESPONSIBILITIES OF LAZY LAKE

There are several governmental bodies and agencies that have some level of responsibility for the overall management of Lazy Lake. There will likely be some areas of overlap in regards to resource management. Cooperation between these entities is crucial in achieving the objectives of this comprehensive lake management plan. This section is an attempt to highlight many of the responsible parties and their roles.

The State of Wisconsin is charged with the responsibility of protecting public waters for the public's use and enjoyment. The Public Trust Doctrine is a body of state constitutional, statutory, administrative and common law that protects the public rights to fish, swim, boat, and hunt, while enjoying the natural scenic beauty of Wisconsin waterways. The Wisconsin Department of Natural Resources (WDNR) is the specific state agency responsible for the enforcement of regulations concerning waterways including lakebed alterations, aquatic plant management, water quality, boating, fishing, hunting and dam functions. The Wisconsin Department of Agriculture, Trade and Consumer Protection's (DATCP) Soil and Water Resource Management Bureau, has specific statutory responsibilities regarding soil and water conservation on the agricultural landscape. DATCP provides oversight and management of several state-funded conservation programs, including the Land and Water Resource Management Program, Nutrient and Pesticide Management Program and the Farmland Preservation Program. The Columbia County Land and Water Conservation Department (LWCD) is the local delivery mechanism for these DATCP programs.

The United States federal government has several agencies that play a role in the management and protection of Lazy Lake and its watershed. The U.S. Army Corp of Engineers reviews applications and issues permits for alterations of waterways and conducts studies as applicable. The United States Geological Survey (USGS) conducts water quality monitoring, operates water level gauging stations and conducts studies. The Natural Resource Conservation Service (NRCS) is the federal conservation partner to the Columbia County LWCD. NRCS administers a wide range of conservation programs targeted at water quality, land preservation and soil erosion. This agency is responsible for monitoring and assuring conservation compliance for all federal farm program participants. The U.S. Fish and Wildlife Service (USFWS) conducts a number of programs on both public and private lands focused on fisheries management, wildlife management and overall habitat improvement.

Columbia County has two departments that play a role in the management and protection of Lazy Lake. The Columbia County Planning and Zoning Department is directly responsible for programs such as shore land zoning, land-use planning, and zoning/septic system oversight. The Columbia County Land and Water Conservation Department (LWCD) has a mission to "Protect, Promote and Enhance the Natural Resources of Columbia County." These efforts are carried out through a combined effort of ordinance enforcement and water quality management program implementation. The LWCD is directly responsible for the implementation of best management practices that control and reduce non-point source impacts in the watershed. The LWCD continues to provide local program implementation through a partnership with the Lazy Lake Management District. The LWCD is well-versed in accessing a wide array of financing options through various grants.

The boundaries of Lazy Lake fall within the municipal boundaries of both the Town of Fountain Prairie and the Village of Fall River see figure 1.5, page 7. The Village of Fall River is responsible for implementation of applicable local ordinances such as shore land zoning, land use, building codes, erosion control and storm water management. The Town of Fountain Prairie is also responsible for

the implementation of its own applicable local ordinances while deferring others to the Columbia County Land and Water Conservation.

In 1974, the Wisconsin legislature enacted laws enabling individual lakes to form inland lake protection and rehabilitation districts. The law allowed local residents to choose to create local government taxing entities to help focus local financial resources on local priorities. The Lazy Lake Management District was created in 1979 for the purpose of weed control. The district boundaries were drawn to include riparian's (landowners with lake frontage) and other landowners within a certain proximity to the lake.

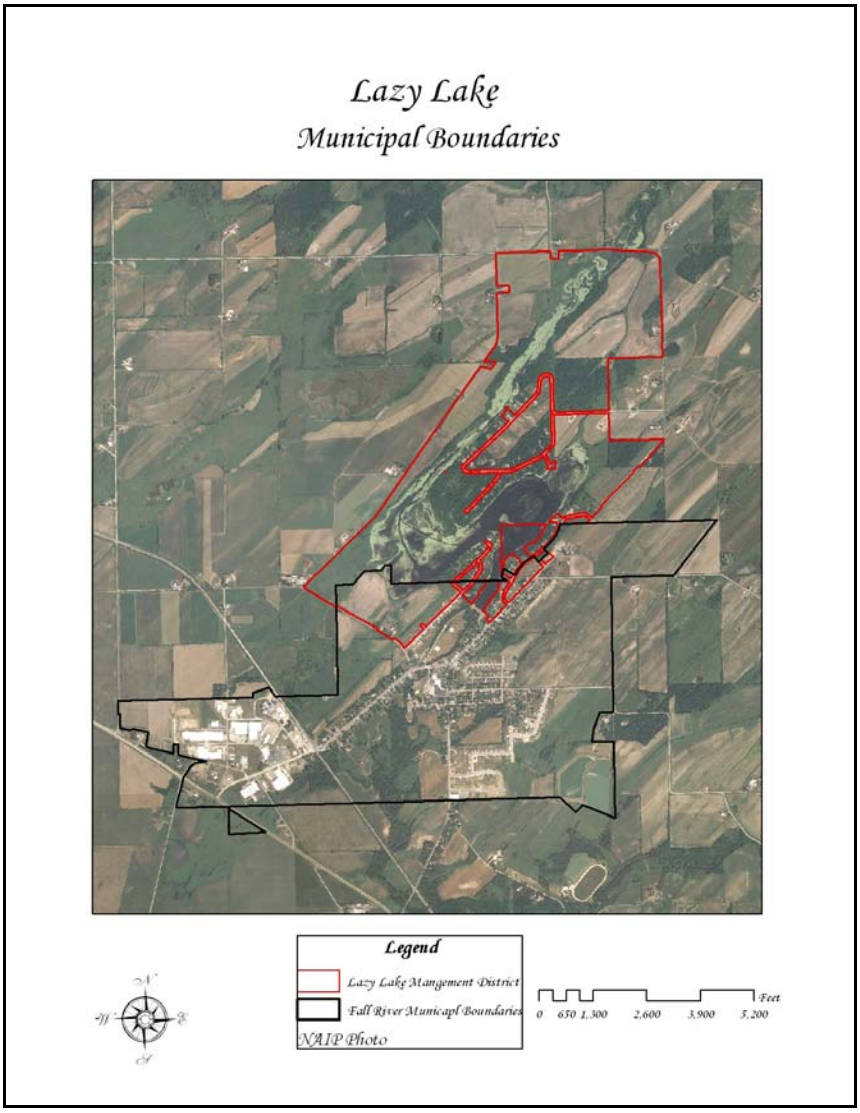


Figure 1.5. Lazy Lake Municipal Boundaries

The property owners are assessed a special charge to finance lake management projects. A board of commissioners makes decisions and sets goals for lake management. The current Lazy Lake Management District Board of Commissioners includes two appointed positions, one each from Columbia County and the Township of Fountain Prairie, and three members elected at large.

Chapter 2

Public Participation Process

Introduction

One core value that was shared at the beginning and throughout the planning process used to create the *Lazy Lake Management Plan* was that public participation in decisions about the future development and improvement of the Lazy Lake through the Lazy Lake Management District (LLMD) would be fundamental to achieving lasting and possible solutions. Collaborative problem solving generally can be accomplished with less confrontation and fewer occasions of "gridlock," since participants understand what opportunities are available and also whatever resources or other constraints must be considered. Involving citizens also ensures that the solutions (and possibly some very creative or unconventional solutions) are tailored to local needs.

Primary goals when laying out the planning process:

- Create a public participation planning process.
- Utilize factual and scientific data.

A facilitated strategic planning process was engaged to create this *Plan*. The process included:

- Pre-agreed upon roles and responsibilities of participating agencies (LLMD Board, Columbia County Land and Water Department and Columbia County UW-Extension).
- Open meetings, posted agendas and meeting outcomes.
- Agreed upon ground rules.
- Team building activities.
- Public participative process that lead, to consensus decision-making.

A carefully constructed participation program encourages an open exchange of information and ideas. Together the participants establish a collective vision for the future, and share responsibility for problems as well as their solutions. Those engaged in the planning process including LLMD Board Members, Village of Fall River Officials and Staff, Town of Fountain Prairie Officials, LLMD Property Owners, Technical Advisors, and Columbia County Staff, were involved in many ways to influence decision-making. Table 2.1 (page 9) documents the participatory activities and results, from the beginning of the process to the creation of this Plan.

Table 2.1 Lazy Lake Planning Schedule

Date	Type of Meeting	Where	Who
5/7/2008	Mission Statement Workshop	Savanna Oaks Cultural Center 5:30	LLMD Board
5/7/2008	Introduction to Planning	Savanna Oaks Cultural Center 6:30	Board & Public
5/21/2008	Vision Statement Workshop	Savanna Oaks Cultural Center 6:30	Board & Public
5/21/2008	Vision Statement Workshop & Development of Watershed Survey	Savanna Oaks Cultural Center 6:30	Board & Public
7/15/2008	Issue Identification	Savanna Oaks Cultural Center 6:30	Board& Public
7/21/2008	Preparation of Goals and Objectives	Savanna Oaks Cultural Center 6:30	Board& Public
3/28/2009	Plan Presentation	Savanna Oaks Cultural Center 9:00	Board & Public

Planning Meetings Review

With the conclusion of the Lazy Lake Management Plan we wanted to chronicle the planning meetings.

We have been delighted that the community-based planning effort has appealed to volunteers from such a diverse cross-section of the community. The volunteers in attendance have been drawn to the process by a common desire to provide the community they love, as well as, their families, particularly their children, with a clean, healthy lake to use and enjoy for generations into the future. The planning effort has drawn volunteers from various town boards, members of the Village of Fall River Board, Town of Fountain Prairie Board, Lazy Lake residents, agricultural producers from Lazy Lake Watershed, the current Lazy Lake Management District members, as well as various other people interested in the future of Lazy Lake.

On May 7th, the planning effort began with a Mission Statement workshop for the Lazy Lake Management Board.

Mission Statement Workshop

The mission statement defines the existence of the Lazy Lake Management District (LLMD). It focuses on today by embodying the LLMD goals, philosophies, and ambitions. The mission is the purpose of the LLMD. This statement will become the document that is constantly referred back to when it is necessary to remember where we have come from. The mission statement will be the building block to the next step of the planning process: Visioning.

Lazy Lake Mission Statement

The Lazy Lake Management District, a special taxing and government entity, seeks to promote a healthy eco-system for Lazy Lake and its' watershed.

The Lazy Lake Management District encompasses landowners within the communities of Fall River and Fountain Prairie. The Lazy Lake Management District also represents the surrounding areas and the recreational users of the Lazy Lake and its watershed for their enjoyment of Lazy Lake.

Lazy Lake Management District's caring leadership and public involvement will utilize factual data to form a solid lake management plan in partnership with our citizens, professionals and governmental representatives to fulfill our mission.

The District seeks to achieve this by education and community involvement, and a solid lake management plan.

May 7th (Savanna Oaks Cultural Center) - Introduction to Planning

At this meeting the public was informed of the history and current relationship between the LLMD and the LWCD; specifically their mutual agreement to plan. The upcoming planning schedule for Lazy Lake was presented and the expectations of a dynamic community based planning effort were discussed.

May 13th (Savanna Oaks Cultural Center) - Visioning Workshop

The vision statement focuses on the future by answering the question, "Where do we want to be?" The visioning process emphasis is on the desired outcome, the finished product; as a result, the LLMD will create a picture for the future, a story. The visioning process will present a story, telling all of the future they wish to create for Lazy Lake. The vision statement will serve as a point on the horizon that will guide the LLMD in determining how it implements its strategies to achieve its' goals and objectives. The vision statement can create dynamic citizen empowerment as the crucial first step in the public participation process.

Simply put, the final visioning statement will be one of the most important steps of the Lazy Lake Management Plan.

Lazy Lake Vision Statement

The Lazy Lake Management District and watershed envisions sparkling, crystal clear water, obtained by restoring and maintaining the health of Lazy Lake's ecosystem, for the solitary and social enjoyment of watching a symphony of ripples created by wind, wildlife, birds, fish, and diverse recreational activities.

Lazy Lake is a natural resource that will bring joy and beauty to water enthusiasts and fisherman for generations to come. Clean usable water that is healthy for people and animals shall be the focus of Lake District activity.

The District will be the leader in protecting and enhancing the water quality and resources of the Lazy Lake for perpetuity.
In performing this leadership role, the District will serve as policy-maker, regulator, planner, manager, and mediator on behalf of lake and watershed stakeholders.

May 21st (Savanna Oaks Cultural Center) - Visioning & Developing the Watershed Survey
This meeting provided a second night to complete the visioning workshop. The remainder of the meeting consisted of the participants reviewing and adding critical questions necessary for the completion of the Public Participation Survey.

June 18th (Savanna Oaks Cultural Center) - Issue Identification
At this meeting the participants reviewed the results of the Issue Identification Survey. The participants were also be given the task of identifying any other issues, which need to be addressed through the planning process. The issue identification meeting focused on the issues, not the answers. This marked the beginning of the strategic planning phase of the Lazy Lake Management Plan Development. The responses in their entirety from the Lazy Lake survey are in the Appendix C. Also at this meeting the desired route was laid out for developing the goals and objectives necessary in the Management Plan.

July 15th (Savanna Oaks Cultural Center) - Goals & Objectives
The participants decided on June 18th to defer the role of creating the objectives and goals to the CCLWCD. The goals will ultimately have accompanying specific, measurable, and attainable objectives written. The objectives will answer who, what, where, and how of obtaining each goal.

Primary goals of the Planning Process:
Example of how each subject is listed below:

 # Subject
a) Value Statement
b) Goal

1. **Water Quality**
   a) The *community, families, and future generations deserve to have a lake with clean water to use and enjoy.*
   b) Maintain water clarity, protect water clarity, prevent algae blooms, and reducing nutrient levels in the lake.

2. **Sediment and Nutrient**
   a) *It is not fair for one land use to hurt what the rest of the people value: clean water for a healthy Lazy Lake.*
   b) Reduce sediment and nutrient loads from watershed.

3. **Ecosystem & Fishery**
   a) *Healthy lake ecosystems are vital and valuable natural resources for lake shore property owners. A self-sustaining fishery will be monitored and protected by protecting high quality aquatic plant communities and managing angler harvests.*
   b) Monitor and protect a healthy, self-sustaining blue gill, northern pike and bass fishery.

4. **Aquatic Plants**
   a) *Restoring and protecting high quality aquatic plants will help maintain the restored clear water state while providing critical habitat for a self-sustaining fishery.*
   b) Protect aquatic vegetation.

5. **Water Quality Monitoring**
   a) *We need to invest in the health of our lakes; balanced and sound lake management is what is right for Lazy Lake.*
   b) Implement water monitoring strategy to apply a model, thus quantifying nutrient and sediment loads.

6. **Shoreline**
    a) *Restoring and protecting native buffers will provide privacy and tranquility, as well as a natural space for families to enjoy nature. Our families and community expect maintained water quality and lake protection provided from a native shoreland buffer. Furthermore, native shorelands increase the value of the lake, increasing the value of our families' property values.*
    b) Restore and protect healthy, stable shoreland habitats (public and private) with native buffers.

7. **Decision Making Based on Science**
    a) *Basing decisions on sound data allows the LLMD Board the ability to allocate a finite tax base in a responsible and effective manner on behalf of the LLMD and the Lazy Lake community.*
    b) Use past and future studies as bases to make future decisions.

8. **Working with other Governing Bodies**
    a) *Our community deserves to know any new development will be done in a manner that minimize the impact of the development on Lazy Lake.*
    b) LLMD will provide information to local governments for best management practices (BMP's) for future development on and around Lazy Lake.

9. **Community Relations**
    a) *Our community deserves and expects to know the most current management and data available for Lazy Lake and its management.*
    b) LLMD will work to redevelop its' approach to information distribution for its community.

10. **Communication – Education and Information**
    a) The *LLMD will continue to seek out and provide the most update information available for its board members and citizenry.*
    b) LLMD will promote information and educational services for their community.

11. **Organization**
    a) *LLMD Board and its' community value the public service commitment from the LLMD board members, by increasing the capacity of the LLMD boar, they will be better prepared to make sound decisions on behalf of the Lazy Lake community.*
    b) LLMD Board members will prepare the LLMD citizenry to address emerging issues, as such, board members will be better equipped to leverage available resources to implement and meet the goals of the plan.

12. **Dredging**
    a) *LLMD citizenry deserves to understand, assess and mange Lazy Lake sediment depths.*
    b) LLMD district will develop factual data to assess and implement a plan to deal with Lazy Lake Depths.

March 28th (Savanna Oaks Cultural Center) - Presenting the Plan

At the Annual meeting, the Lazy Lake Management District presented the Lazy Lake/Watershed Management Plan. The LLMD will review the plan and collaborate with the LWCD at a seperate meeting to discuss possible changes prior to submittal for WDNR approval.

Chapter 3

Shallow Lake Management Concepts

INTRODUCTION

The ecology of shallow lakes is quite different from that of deep lakes. Shallow lakes tend to have higher nutrient concentrations, resulting in greater productivity and biodiversity. Shallow lakes are also more easily affected by fluctuations in water level. They do not develop thermal stratification in summer and mixing readily cycle's phosphorus and other nutrients from the sediment. Restoration efforts that have been successful on deep lakes - reversing eutrophication through phosphorus reduction-have often failed on shallow lakes. Paragraphs adopted from the Big Muskego Lake and Bass Bay – Management Plan are followed by a double asterisk **.

ALTERNATIVE STABLE STATES MODEL

Researchers have found that shallow lakes tend to be in one of two stable states. Over a wide range of nutrient concentrations, both plant-dominated and algal-dominated states can exist as alternatives (Scheffer, 1990 and 1998; Moss, 1998). The preferred plant-dominated condition is typified by seasonal windows of clear water where algae are grazed to low levels, aquatic plants (rooted aquatic plants) dominate and game fish like bluegill, pumpkinseed, northern pike, and largemouth bass are dominant. The alternative algal-dominated state is typified by high available phosphorus levels, turbid water, dominance of algae, a relative absence of aquatic plants and is dominated by benthivorous fish (bottom feeding fish like carp and bullhead). Turbid water puts sight-feeding game fish at a disadvantage and often results in slower growth rates and size. Figure 1 graphically illustrates the two stable states. **(Big Muskego Lake and Bass Bay – Management Plan)
Shallow lakes can shift or "switch" between these states, although the reasons are often difficult to pinpoint. Lake researchers have identified conditions that resist a switch and have termed these "buffers." They have also identified conditions that will likely induce a switch between the two states. **

Figure 3.1 on page 14 illustrates the relative stability of each state under various nutrient conditions (Scheffer, 1993). The "marbles" in the valleys of the landscape diagram correspond to stable ecological conditions. In the oligotrophic (nutrient poor) situation in the top diagram, the plant-dominated, clear state is the only stable condition. Likewise, in the hypertrophic (extremely nutrient rich) condition on the bottom diagram, the algal-dominated, turbid state is the only stable condition. The middle three diagrams show how the marble may rest within two alternative valleys, but how nutrient enrichment affects which state within which the marble is more likely to rest. Continued nutrient enrichment gradually causes the stability of the clear state to shrink to nil, where the lake is more vulnerable to perturbations that would shift the equilibrium to the turbid state. **

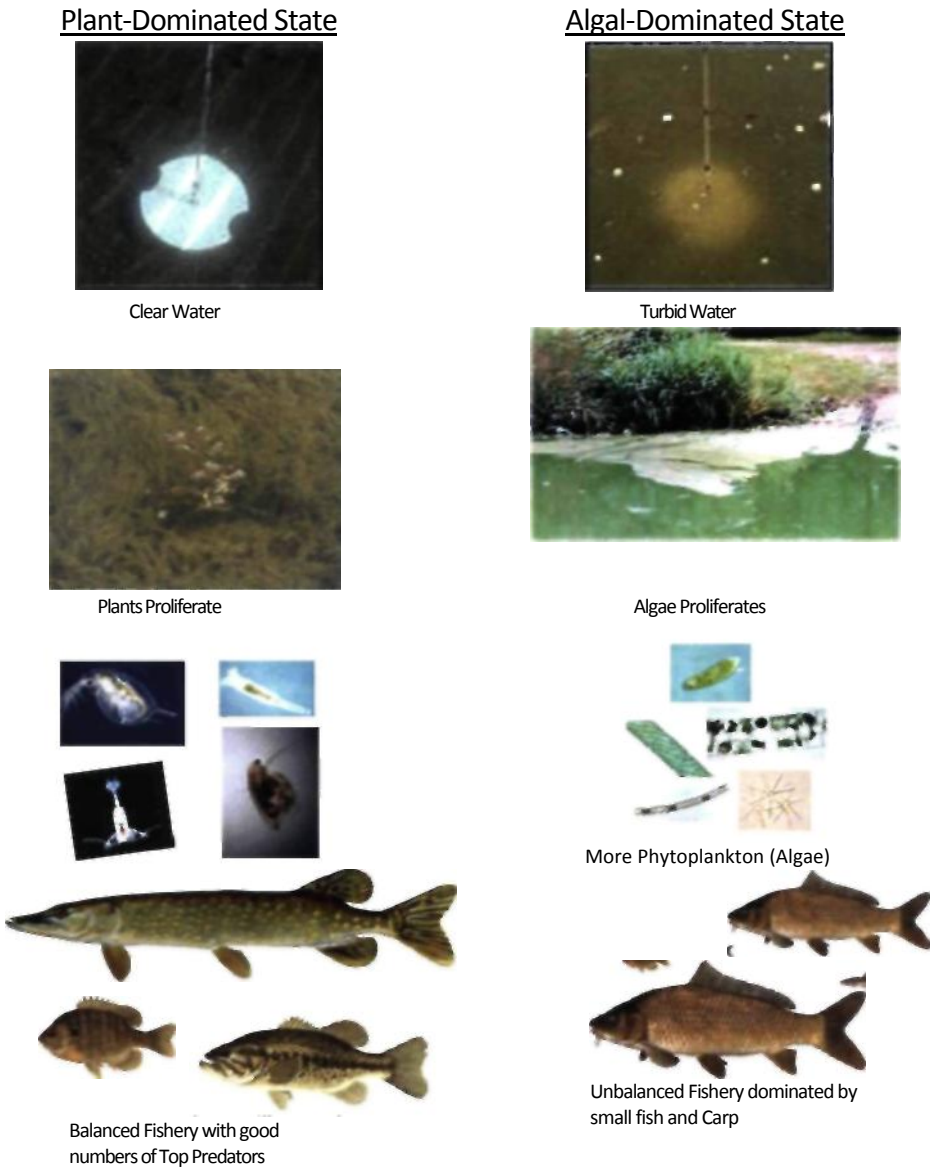


Figure 3.1: Alternative Stable States Model (Big Muskego Lake Plan)

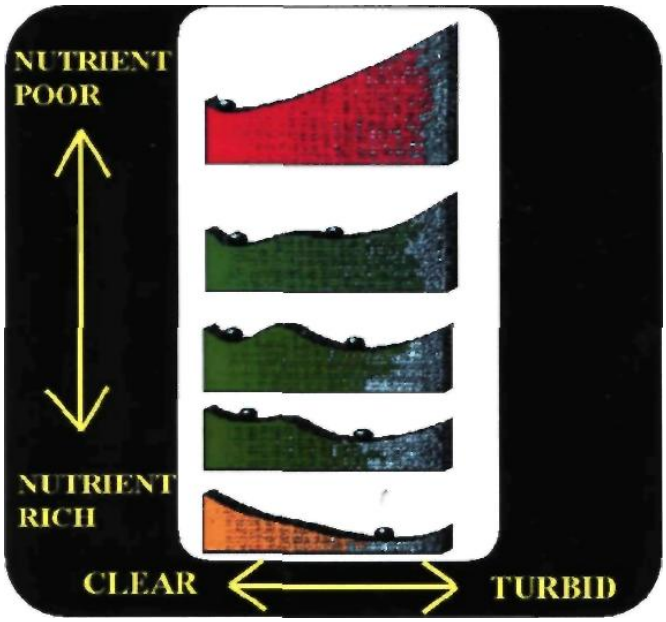


Figure 3.2: Stability of Each Alternative State (Big Muskego Lake Plan)

Buffers for the Plant-dominated (Clear-Water) State

Moss (1998) identifies particular sets of buffer mechanisms that can stabilize each of the alternative states. The plant-dominated state is buffered by the following factors:

1. Suppression of wave action or eddy currents. Stands of rooted emergent plants reduce open fetch areas, which in turn lessen the likelihood of submergent plants becoming uprooted. Beds of submergent plants also absorb wave energy, reducing the resuspension of sediments and resulting turbidity. This turbidity could, in turn, block sunlight to the plants causing their decline.
2. Uptake of nutrients by plants. Plants take up large amounts of both nitrogen and phosphorus (luxury consumption) compared to their immediate growth needs.
3. Structural refuges for zooplankton. Plant photosynthesis changes the chemistry of water located near it. Through inorganic carbon equilibrium, carbon dioxide and bicarbonate are withdrawn and pH values can rise above nine. This appears to inhibit fish activity and thus a refuge from fish predation is created for zooplankton within the bed of aquatic plants (Beklioglu and Moss, 1996).
4. Allellopathy and provision of habitat for grazers of periphyton. Periphyton algae can pose a threat to aquatic plants by forming a fur of growth on their surface and compete for sunlight, nutrients and carbon dioxide. Laboratory experiments show that plants secrete substances that inhibit the growth of algal cultures (Forsberg, et. al., 1990). In addition to this allellopathy, plants provide habitat for periphyton grazers such as snails, mayfly nymphs and chironomid larvae.
5. Production of structured sediment suitable for plant germination. At the end of the growing season, plants lay down a coarse material that stabilizes sediments and provides a good rooting medium for the following year.

**

Buffers of the Algal-Dominated (Turbid-Water) State

1. Maintenance of open habitat conducive to wind mixing. Greater fetches of open water can produce larger waves with greater energy to stir sediments that block sunlight and inhibit the establishment of rooted plants. Phytoplankton also rely on eddy currents to keep them suspended and re-supplies nutrients.
2. Early algal growth competing with plants for sunlight and carbon dioxide. Algae grow rapidly because they have shorter diffusion pathways for the uptake of dissolved substances.
3. Maintenance of structureless habitat with no refuge for large zooplankton against fish predation. In shallow open water, lacking of structure with deep dark layers to provide refuges for zooplankton, fish easily remove large, efficient grazers such as water fleas (Cladocera). With grazing intensity reduced, phytoplankton flourish.
4. Production of small algal species with high capacity for light absorption. Small algal species are easily moved through the water column and can photosynthesize toward the surface. Their greater surface area to size ratio also makes them more efficient photosynthesizers.
5. Production of amorphous, high water-content sediment unsuitable for plant regeneration. Dead material from phytoplankton is more fluid and amorphous than that from plants. This creates an unstable rooting medium and is also vulnerable to resuspension resulting in turbidity that reduces light for plant development.
6. Maintenance of fish communities with high numbers of small fish. Structureless habitat favors large populations of small fish because their predators, such as northern pike and largemouth bass, need cover from which to ambush their prey. **

Switches or Flips

The events or manipulations to a shallow lake system that cause a change between plant-dominated and algal-dominated states are known as a switch or flip (Moss, 1998). A change from plant dominance to algal dominance is referred to as a forward switch. Reverse switches cause a change from algal dominance to a plant-dominated system and are often associated with intentional human efforts to restore a shallow water system. **

Forward Switches or Forward Flips

Two types of forward switches occur in shallow lakes: those that directly destroy the plant structure and those that indirectly affect the plant structure by preventing buffer mechanisms from operating. The direct type includes mechanical harvesting of plants, the application of herbicides or damage done by boating. It can also include natural damage from wind, storms, ducks and geese (Moss 1998, Sondergaard et al 1996). Examples of indirect forward switches include the leakage of pesticides and other toxins that kill zooplankton, the addition of nutrients from surface run-off and introduction of common carp. There is a strong correlation between the presence of pesticides in sediment and zooplankton mortality (Stansfield et al 1989). With populations of zooplankton reduced, lakes become susceptible to algal domination. **

Water level in a lake is an important control variable with respect to aquatic plant (macrophyte) dominance. Vegetation can withstand turbid water more easily if a lake is shallower. A small

shift in critical turbidity, resulting from a higher water level, can cause a loss of aquatic plant coverage and a forward switch to the algal-dominated state (Scheffer, 1998). **

REVERSE SWITCHES or REVERSE FLIPS

Drawdown

One of the buffers of the algal-dominated state is the maintenance of open water habitat conducive to wind mixing. Lake drawdown can be used to induce a switch or flip to a plant-dominated state (figure 1). Reduced water levels and an exposed lakebed can promote the growth of stands of emergent vegetation, which will reduce wind fetch. Reduced wind mixing subsequently keeps water clearer and promotes the growth of rooted submergent plants. Depending on the goal of management, either a partial or a complete drawdown may be employed. Chemical eradication of the fishery may also accompany a lake drawdown project if the carp population is at a nuisance level. ** (Big Muskego Lake and Bass Bay – Management Plan)

There is also a scenario where a lake drawdown may be considered even if the lake is in a plant-dominated state. A drawdown may be considered if a nuisance aquatic plant, particularly Eurasian Water Milfoil (EWM), dominates the plant community. EWM has a growth habit of topping out on the water's surface and can preclude boating activity. Excessive EWM can also negatively affect fish populations and effective biomanipulation may not be possible. **

Biomanipulation

Biomanipulation is an ecological management approach that manipulates the biomass of a particular level of the food web to have an effect on the biomass of another. The term originally encompassed a range of techniques applied to terrestrial and aquatic ecosystems. In aquatic systems, it typically refers to top-down manipulation of fish communities, i.e. enhancement of piscivorous (fish-eating) fish populations and reduction of zooplanktivores and/or benthivores (Perrow et al., 1997). In one of the earliest published reports, Caird (1945) hypothesized that stocking of largemouth bass was responsible for reductions in phytoplankton through food chain interactions. Several researchers (Hrbacek et al., 1961; Brooks and Dodson, 1965; Hurlbert et al., 1971) found that planktivorous (plankton-eating) fish can severely reduce or eliminate *Daphnia,* the largest, most efficient grazers of phytoplankton. These results suggested that lowered planktivorous fish densities would maintain greater densities of *Daphnia,* and thus control algal biomass. **

A reverse switch can involve biomanipulating the fish community to reinstate the plant buffers and destroy the buffers of algae-dominance. An abundance of small, zooplanktivorous fish can quickly reduce the population of *Daphnia* that efficiently graze algae. Biomanipulation seeks to replenish the zooplankton population by reducing the population of their predators. To decrease populations of small zooplanktivorous fish, top predators, such as pike, are added to the system. At larger sizes, panfish become more piscivorous in their feeding habits and help reduce the numbers of small, zooplanktivorous fish. Lower predation pressure allows the zooplankton community to thrive and prey on planktonic algae. Biomanipulation is graphically depicted in Figure 3.3. ** (Big Muskego Lake and Bass Bay – Management Plan)

Biomanipulation to attain a plant-dominated state can also involve eliminating common carp and/or gizzard shad from the system, not just because of their zooplanktivorous habits, but more importantly, their behavior of stirring sediments and the resultant turbidity that inhibits plant growth. Because it is impractical to selectively remove carp while maintaining desirable

fish species, total fish eradication is often performed for a biomanipulation project. The lake is then restocked with a healthier balance of fish, including more "top predator" piscivorous fish. Piscivorous fish include largemouth bass and bluegill (at larger sizes). These fish keep the population of zooplanktivorous fish under control by preying on eggs and juvenile fish so that large zooplanktons such as *Daphnia* are allowed to flourish and consume phytoplankton (algae). As a result, the water becomes clearer, allowing sunlight penetration and the proliferation of the submergent aquatic plant community. The established aquatic plant community utilizes the nutrients (i.e. nitrogen and phosphorus) that were the main food source of the algae, and the algae diminish. Overall, biomanipulation can be extremely successful, but often only for short periods of time. In order for it to be successful in the long term, the piscivore and zooplanktivore populations in the lakes must be closely monitored to prevent a forward switch. **

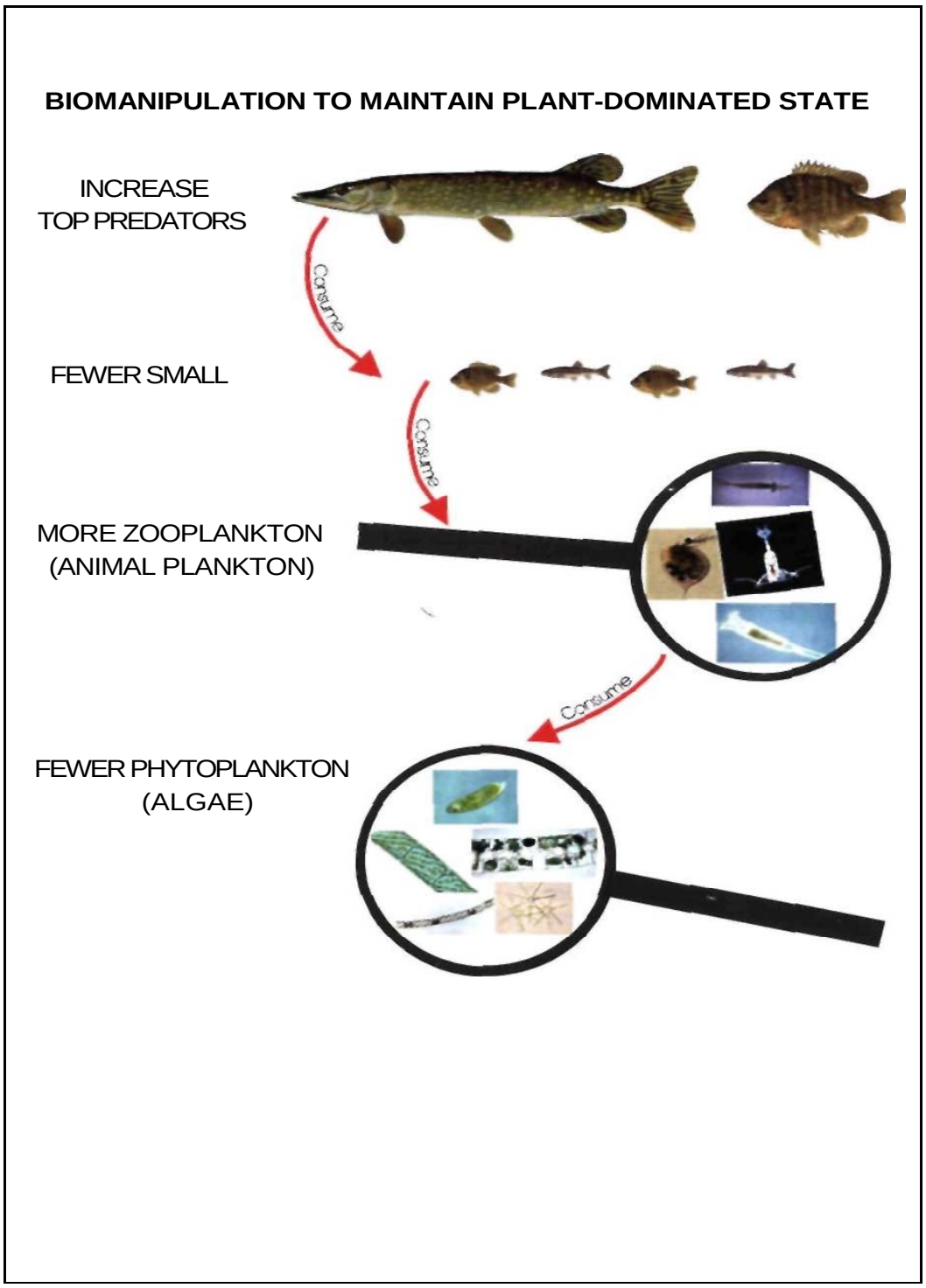


Figure 3.3 Biomanipulation to Maintain Plant-Dominated State (Big Muskego Lake Plan)

Water Level Manipulation

Water level drawdown is a multipurpose management strategy used in shallow lakes. The technique is used to control certain aquatic plants, to manage fish populations, to repair structures such as dams and locks, and to carry out other improvement procedures such as dredging. Drawdowns are used in the management of submergent aquatic macrophytes through their exposure to dry, freezing, or dry, hot conditions for a period long enough to kill the plants (Cooke et al 1993). Minimization of the volume of water in a lake facilitates more economical chemical control of nuisance aquatic plants and fish. Drawdown also can consolidate sediments, reduce internal nutrient loading, and provide opportunities to conduct habitat and shoreline improvement projects.

A lowering of water level can buffer the plant-dominated state or even induce a reverse switch from algal-dominance to a plant-dominated state (Scheffer, 1998). Coops and Hosper (2002) suggest that shallow lake managers consider a combined strategy of restoring natural water level fluctuations and managed manipulations designed for a specific process to occur. An example would be a two-month recession of water to stimulate expansion of submersed vegetation. **

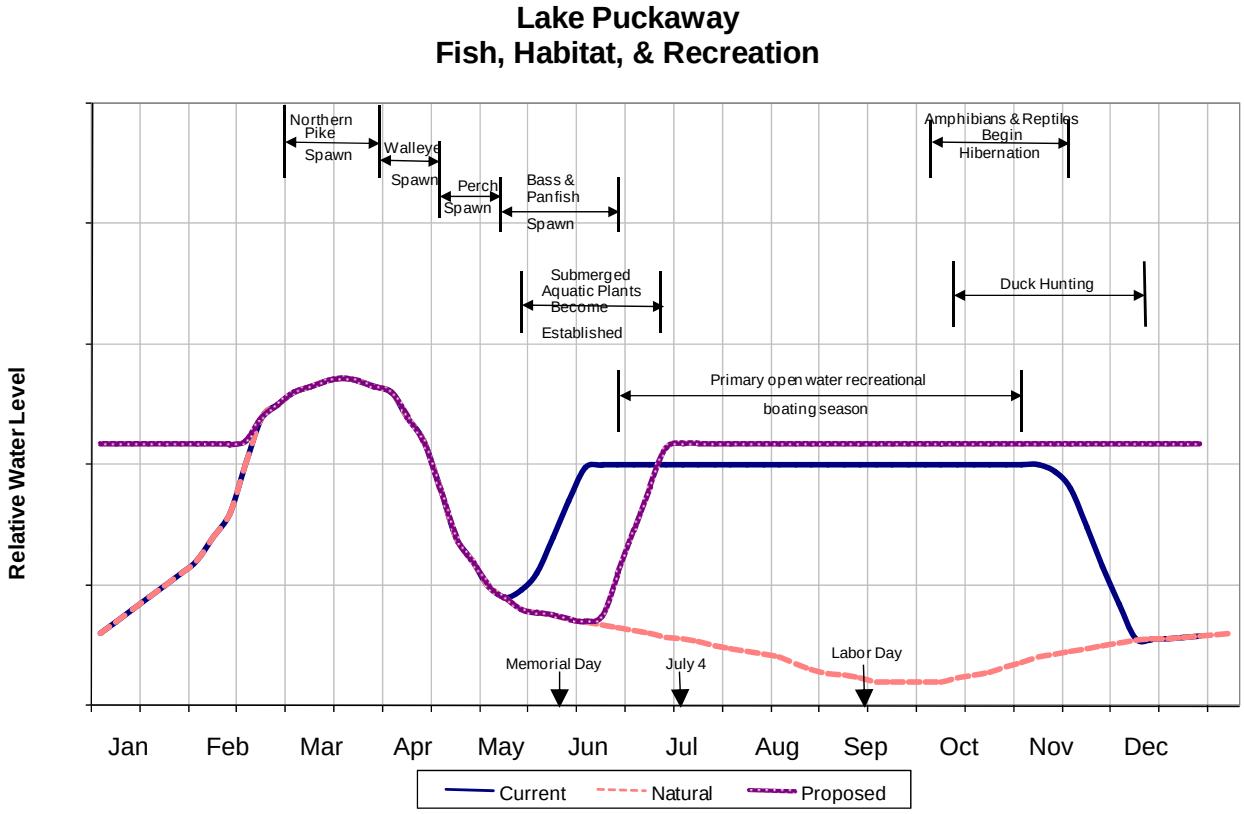


Figure 3.4. Lake Puckaway Fish, Habitat, & Recreation (R McLennon/C Cook)

As can be seen in Figure 3.3, Lake Puckaway Fish Habitat, & Recreation, the natural water level patterns for a water body are in direct contrast to the annual water level as managed in a dam operated impoundment. Nevertheless, with minor adjustments to the current traditional water level management in an impoundment a great benefit can be provided to various species such as but not limited to: bass and panfish, submerged aquatic plants and amphibians and reptiles. Tarrant Lake should use the proposed line in figure 3.3 as a goal guide for managing annual water levels.

Winter Drawdowns

Winter drawdowns can be very effective tools to manage Eurasian Water milfoil.

Advantages

- If a water control structure is in place, drawdown can be a very cost-effective way of controlling plants like Brazilian elodea and Eurasian Watermilfoil.
- The expansion of native aquatic plants in areas formerly occupied by exotic species can be enhanced by drawdown.
- Game fish are reported to experience enhanced populations after drawdown.
- Drawdowns provide an opportunity to repair and improve docks and other structures.
- Loose, flocculent sediments can become consolidated after drawdown occurs.

Disadvantages

- The growth of some aquatic plants may be enhanced by water level drawdowns - know the species that you want to control.
- Winter weather may influence the success in killing the target species. Snow before a hard freeze may insulate the sediment and prevent freezing to a depth that will kill the roots; milder climates may not experience the freezing or dewatering conditions needed to kill the exposed plant roots and rhizomes.
- Docks are left high and dry, water intakes may no longer be in the water, it may not be possible to launch boats, and some people will complain about aesthetics of the waterbody.
- There will be significant impacts to fish and aquatic wildlife by lowering the water and exposing the sediments.
- Algal blooms have been reported to occur after drawdowns have occurred.
- Water levels may be lower in wells during drawdowns

Aquatic Plant Response to Drawdown

Aquatic plants do not all respond the same way to a drawdown. In lakes with a mixture of species, exposure of the lakebed to a combination of dry and hot or dry and cold conditions may eliminate or curtail one nuisance plant and favor the development of a resistant species (Cooke et al 1993). The effects of a drawdown on Lazy Lake aquatic plant community can only be expected to perform to levels at which the system preformed in the past. (see Aquatic Plant Native species on in Table 6 and 7)

**

Cattail Response to Water Level Changes

The ability of cattails to grow within various water depths is linked to the conditions in which the plants convert stored carbohydrates to the energy needed for shoot growth (U.S. Fish & Wildlife Service, 1993). Starches stored in the rhizomes (fleshy, root-like stems) can be converted to energy both aerobically (with oxygen) and anaerobically (without oxygen). Passageways called "aerenchyma" located within living or dead cattail leaves supply a means through which the rhizomes can utilize oxygen from above the water. Aerobic starch conversion is much more efficient so stored energy is available to grow roots through greater depths of water. Conversely, if oxygen is not available, shoots emerging from the rhizomes have less energy to grow through the water column. For this reason, cattails are generally found growing in water less than four feet deep. Cattail growth can be stimulated through complete exposure of the lakebed, which causes germination of seeds. Lowering water levels without exposing the substrate can also encourage cattail growth from the rhizomes of adjacent plants. In contrast, raising water levels can reduce the growth of cattails. Cutting of shoots and stems below the water necessitates the inefficient conversion of starches within cattail plants and causes a reduction in growth. **

Populations of muskrats *(Ondatra zibethicus)* help keep cattails in check. These mammals utilize leaves for building lodges and the shoots and stems for food. Muskrats create open pockets of water that are utilized by nesting waterfowl. **

Water Quality

To understand Lake Data in a simply manner, one must first understand the following:

When understanding concepts in shallow lake ecology, one must develop an understanding of lake water quality and how that data is used for analysis. Every surface water body is unique, creating a very specific set of variables which effect how the lake goes through a variety of chemical changes daily and seasonally. Year to year changes occur on every system. An example of parameters that effect these changes are surface runoff, groundwater inflow, precipitation, land use changes and temperature.

Trophic state is another indicator of water quality. Lakes can be divided into categories based on trophic state:oligotrophic, mesotrophic, and eutrophic. These categories reflect a lake's nutrient and clarity levels (WDNR, 2008).

Oligotrophic lakes are generally clear, deep and free of weeds or large algae blooms. Though beautiful, they are low in nutrients and do not support large fish populations. However, oligotrophic lakes often develop a food chain capable of sustaining a very desirable fishery of large game fish (WDNR, 2008).

Mesotrophic lakes lie between the oligotrophic and eutrophic stages. Devoid of oxygen in late summer, their hypolimnions limit cold water fish and cause phosphorus cycling from sediments (WDNR, 2008).

Eutrophic lakes are high in nutrients and support a large biomass (all the plants and animals living in a lake). They are usually either weedy or subject to frequent algae blooms, or both. Eutrophic lakes often support large fish populations, but are also susceptible to oxygen depletion. Small, shallow, eutrophic lakes are especially vulnerable to winterkill, which can reduce the number and variety of fish. Rough fish are commonly found in eutrophic lakes (WDNR, 2008).

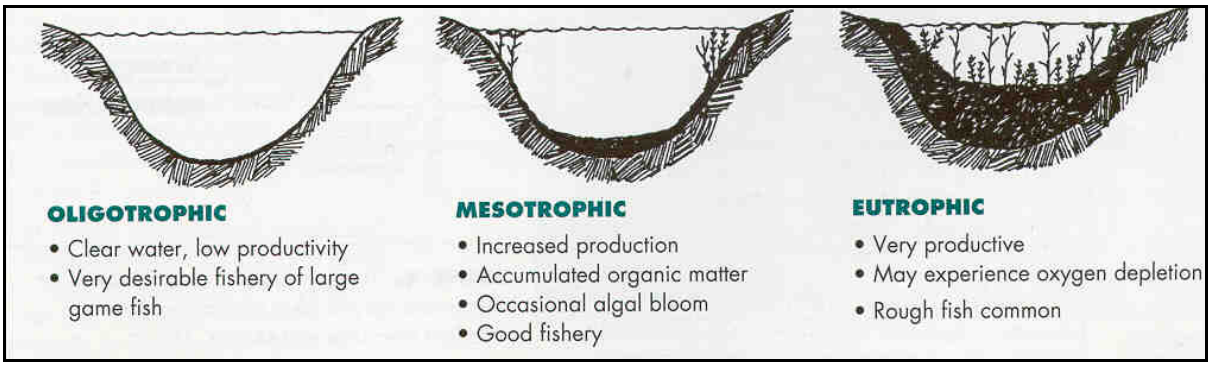


Figure 3.5 Trophic State Illustrations

Trophic State index (TSI)

Trophic state index (TSI) is determined using a mathematical formula (Wisconsin has its own version). The TSI is a score from 0 to 110, with lakes that are less fertile having a low TSI or Oligotrophic and lakes with high fertility as eutrophic. We base the overall TSI on the Chlorophyll TSI when we have Chlorophyll data. If we don't have chemistry data, we use TSI Secchi. We do this rather than averaging, because the TSI is used to predict biomass.

Table3.1 Trophic Classification of Wisconsin Lakes based on total phosphorus values, chlorophyll a, and water clarity measurements. (Adapted from Lillie and Mason, 1983.)

Trophic class	Total phosphorus (ug/l)	Chlorophyll a (ug/l)	Secchi Disc (feet)
Oligotrophic	3	2	12
	10	5	8
Mesotrophic	18	8	6
	27	10	6
Eutrophic	30	11	5
	50	15	4

Total Phosphorous

In Table 3.2, it shows the index used for Total Phosphorous from the publication Understanding Lake Data. When considering Lazy Lake, it should be noted that the average for impoundments is listed in the mid-60's. Phosphorous is commonly a limiting nutrient for plant growth and in "80% of Wisconsin's lakes, the key nutrient affecting the amount of algae and weed growth" (UW Extension, 2000). Phosphorous is derived from a variety of sources that include human and animal waste, soil erosion, detergents, septic systems, lawn and agricultural runoff. In Chapter 4, Lake Characteristics, Lazy Lakes total phosphorous numbers are in the range of the mid/upper 60's to low 70's.

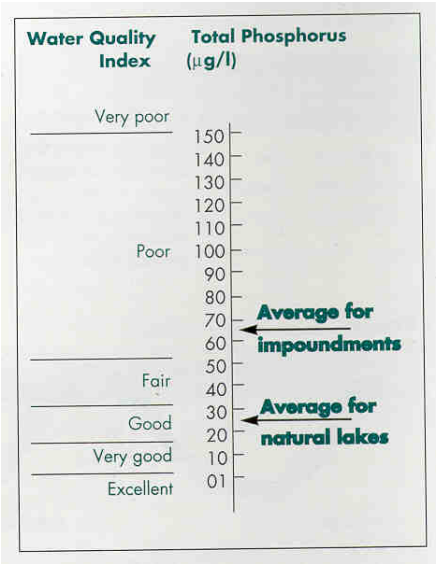


Table 3.2 Water Quality Index-Total Phosphorus

Secchi Disc

A Secchi Disc, a circular metal plate, with an upper surface of which is divided into four equal quadrants painted so that two quadrants opposite are black and while the remaining two are white, is a tool used to measure visibility in water (Welch, 1948). The recorded measurement obtained with the Secchi disc consists of an average of two measurements or the "limit of visibility", the first is the recorded depth of when the disc is no longer viewable, while the second is the recorded depth of the disc when viewable again.

General methods used for Secchi Disc should follow:

- Clear sky
- Sun directly overhead (between 12pm – 1 pm)
- Measurements over the shaded side of boat
- Minimal waves or ripples.

*Any conditions which do not follow under these conditions should be noted when data is collected.

Secchi disc values vary throughout the summer as algal populations increase and decrease. Measuring several sites may be useful in some lakes, depending upon the uniformity of the lake. Year to year changes result from weather and nutrient accumulation. Weekly or biweekly Secchi records (April-November) over a number of years provide an excellent and inexpensive way to document long-term changes in water clarity. (UW-Extension, 2000)

The color of lake water reflects the type and amount of dissolved organic chemicals it contains. Measured and reported as standard color units on filtered samples the color's main significance is aesthetic. Color may also reduce light penetration, slowing weed and algae growth. Many lakes possess natural, tan-colored compounds (mainly humic and tannic acids) from decomposing plant material in the watershed. Brown water can result from bogs draining into a lake. Before or during decomposition, algae may impart a green, brown or even reddish color to the water. (UW Extension, 2000)

Table 3.3 Water Quality Index Secchi Disc

Water Clarity	Very Poor	Poor	Fair	Good	Very good
Secchi Depth (ft.)	3	5	7	10	20

Chlorophyll a

Chlorophyll a concentrations correspond to the abundance of algae or the potential for algae in lake water. Chlorophyll a levels fluctuate with seasonal light changes, lake water nutrient loads, water transparency, aquatic macrophyte density, water temperature, and zooplankton abundance.

Algal Bloom Catalyst:

- Rain events causing high suspended solid loads
- Decrease in zooplankton
- Significant manipulation of macrophyte community

Up to this point, Chapter 3 has described how it is desirable to manage a shallow lake for a plant-dominated state. However, aquatic plants themselves (native or non native) often pose as a nuisance. Growths of certain aquatic plants, particularly non-native plants, can be invasive and cause negative impacts to fish and wildlife habitat and human recreation. Control measures are needed at times to minimize the nuisance level.

Aquatic Invasive Species (AIS)

Currently one of the biggest threats to Wisconsin's lakes is aquatic Invasive species (AIS). Non-native plants, animals and pathogens are displacing native species, often unbalancing ecosystems creating foreseen and often unforeseen consequences on the ecosystem and recreation. The invasives often lack native predators, providing a competitive advantage allowing for populations to increase by out competing natives. People play a major role in the spread of invasives.

Lazy Lake currently has two aquatic invasive species, Curlyleaf Pondweed (Potamogeton crispus) and Eurasian Watermilfoil (Myriophyllum spicatum) with frequencies of occurrence of 96% and 94%, respectively.

AIS can be dealt with in a variety of ways:, chemically, biological or mechanically. These are described later in the section, Nuisance Aquatic Plant Management Alternatives, in Chapter 3.
The state of Wisconsin has an Aquatic Invasive Species Program which focuses on preventing the introduction of new invasives species, preventing the spread of invasive species, and controlling the population of species when it is deemed to be prudent.

The program is comprised of five main components:

- Watercraft Inspection
- Monitoring
- Information and Education
- Purple Loosestrife Biological Control
- Clean Boats, Clean Waters Program

LLMD must decide if they will implement a long term management plan or implement a native plant restoration plan which incorporates long term management for navigation.

NUISANCE AQUATIC PLANT MANAGEMENT ALTERNATIVES

This chapter described why it is desirable to manage a shallow lake for a clearer water and healthier fishery. However, aquatic plants themselves often can pose as a nuisance. Growths of certain aquatic plants, particularly non-native plants can be invasive and cause negative impacts to fish and wildlife habitat and human recreation. Control measures may be needed to minimize the nuisance level to allow reasonable use of swimming, fishing and navigation.

Chemical Controls

Chemical treatment of aquatic plants in all waters of the state, public or private, requires an approved permit from the Wisconsin DNR. Only chemicals registered for aquatic use with the U.S. Environmental Protection Agency (EPA) and the State of Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) can be used. In many cases, a licensed applicator, certified by DATCP must apply the chemicals.
Aquatic vegetation that is killed with an herbicide/algaecide will decompose Decomposition utilizes dissolved oxygen and in turn increases the likelihood of a fish kill. When aquatic vegetation has accumulated to the point at which massive amounts are present, the decomposition that occurs after an herbicide/algaecide application could result in oxygen demand so great that there is not enough to sustain fish life, and a fish kill may occur. This problem can be avoided if chemical weed control efforts are carried out before there is a large accumulation of vegetation.

2, 4-D

The chemical herbicide 2,4-D (2,4-dichlorophenoxyacetic acid) is selective in killing dicotyledonous or broad leaf plants. It has been found to selectively control infestations of EWM at low concentrations and short exposure times (Killgore, 1984; Miller and Trout, 1985). The goal of treatment is to reduce the distribution and density of EWM and allow native plants to flourish and to allow reasonable use of swimming, fishing and navigation. Early season treatments can attack the small exotics in a vulnerable state while native species are dormant. At this time there is also minimal microbial degradation. Mike Netherland, US Army Corps of Engineers Center for Aquatic and Invasive Plants is reporting that decreases of species per site (including native species), decreases in species richness (including native species) and an overall significant decline in native species including a complete eradication of small pondweed (Potamogeton pusillus). Small pondweed was present in the 2005 Aquatic Plant Survey for Lazy Lake, Table 7 on Page 40. John Skogerbee, US Army Corps of Engineers Eau Galle Aquatic Ecology Laboratory says, through the use of 2-4D application the risk of a chemical resistance for EWM exists.

Fluridone

Fluridone, more commonly known as SONAR, is a slow acting systemic chemical herbicide that must remain in contact with target plants for up to ten weeks. Fluridone is effectively absorbed and translocated by both plant roots and shoots. It will control a broad range of submerged and floating aquatic plants and some emergent plants but is particularly effective for duckweed and Watermilfoil control. When applied at reduced rates, Sonar can be used to selectively control undesirable, non-native species. In 30-90 days after application, the target weeds will be controlled and effects can last up to two years. Disadvantages of this control method include its relatively high cost and its effect on non-target plant species. Residue readings should be taken after application. This will allow for a more

critical evolution of the application and may also indicate the need for a bump application, thus protecting the initial cost of the Fluridone treatment.

Alum

Aluminum sulfate or alum is used to reduce internal phosphorus release from the lake bottom. On contact with water, alum forms a fluffy aluminum hydroxide precipitate called "floc." Aluminum hydroxide reacts with phosphorus to form an insoluble aluminum phosphate compound. On the bottom of the lake the floc forms a layer that acts as a phosphorus barrier by combining with phosphorus as it is released from the sediments. Although alum is effective in preventing phosphorus from entering the water column, rooted aquatic plants are still capable of utilizing phosphorus within the sediment. Therefore alum is primarily used as a control of algae, rather than aquatic macrophytes. Alum can't be used in shallow areas where wind energy can stir up the bottom, or the wind will disrupt this barrier layer.

Glyphosate

The chemical glyphosate formulated for use over water, such as the brand name Rodeo, can be used to control invasive Purple Loosestrife. Foliar formulations will also kill any non-target plants in the zone of spraying because the chemical is a broad-acting vegetation killer. A selective but more labor-intensive method is to cut individual purple loosestrife stems and apply a more concentrated formulation of herbicide to the cut end. This control method is impractical for large areas and is best employed to eliminate small colonizing stands of this invasive plant.

Manual Controls

Manual removal of submergent or emergent aquatic plants by hand pulling or raking is an effective means of controlling nuisances in small areas (see Appendix "Milfoil Infested Lake Control Strategies". In the WI Administrative Code NR 109 it allows riparian owners to remove vegetation in a 30-foot wide area without a permit. The Code also allows for hand removal of non-native aquatic vegetation beyond the 30-foot area, provided the native vegetation is not removed or harmed. When hand pulling Eurasian Watermilfoil, care must be taken to remove the entire root crown and not create fragments (Washington State Department of Ecology, 2007).

Weed Barriers

Bottom weed barriers require WDNR permits. The most commonly used bottom weed barriers are constructed of fiberglass mesh or polyvinyl fabric. The barriers are laid on top of aquatic plants and weighed down with bricks, chain, stakes or other anchoring devices. Plants become crushed and sunlight is blocked. Barriers may require removal and cleaning every 1 to 3 years. Barriers are appropriate management tools for controlling aquatic plants along docks and in deeper swimming areas. Initial cost for the barriers is relatively high, but they can usually be used for 5 or 10 years with proper care and maintenance. It should be noted that due to the vast array of problems associated with implementation this activity is rarely permitted by the WDNR.

Biological Controls

Biological controls for aquatic plants and algae are in the developing stages and include pathogens (bacteria or fungi) and herbivores (insects, crustaceans or fish). Bacterial treatments are commonly used in small fish-rearing ponds. Presently, fish and crustaceans are not legal control options in the state of Wisconsin. It is illegal to transport or stock grass carp or live crayfish into Wisconsin waters.

Weevils *(Euhrychiopsis lecontei) or* North American aquatic weevil are tiny native aquatic insects found to feed heavily upon milfoil species. Adult weevils cause lesions that make the plant more susceptible to bacteria and fungi, while the larval stage burrows into the stems. Subsequent tissue damage causes the plants to lose buoyancy and collapse (Sheldon, 1995).

Biological Controls are also being employed for the control of purple loosestrife. Two chrysomelid beetles *(Galerucella pusilla and G. calmariensis),* which feed exclusively on purple loosestrife, have been imported from Eurasia. Releases of these insects have been shown to significantly reduce stands of purple loosestrife within a three-year period. An aggressive propagation and release program is underway in Wisconsin to utilize this biological control. Biological controls are most appropriate when the loosestrife has already spread widely in an area and other control methods are inadequate to address the infestation.

Mechanical Harvesting

Mechanical harvesters are large floating machines that cut plants below the water surface. Harvesting is considered a short-term technique that temporarily removes nuisance plants. To achieve maximum removal of plant material, harvesting is usually performed during summer when submerged and floating-leafed plants have grown to the water's surface. Conventional single-staged harvesters combine cutting, collecting, storing and transporting vegetation into one piece of machinery. Cutting machines are also available that perform only the cutting function. Maximum cutting depths for harvesters and cutting machines range from 5 to 8 feet with a swath width of 6.5 to 12 feet.

Mechanical harvesting can efficiently remove nuisance aquatic vegetation from large areas and facilitate greater recreational use of a waterway. Mechanical harvesting removes aquatic plants from the system, thereby reducing the build-up of organic sediment and removing nutrients that were tied up within the tissue of the plants.

There are some drawbacks to mechanical harvesting however:

> It is generally not possible to operate a mechanical harvester in water depths less than three feet; the reduced competition from aquatic plants can result in greater algal growth. Young-of-the-year fishes are often captured along with aquatic plants. In addition, equipment, maintenance, and staffing are costly.

The Wisconsin DNR regulates mechanical removal of aquatic vegetation through Administrative Code Chapter NR 109.

Burning

Controlled or prescribed burning can be used to control cattails and promote other native plants such as sedges and bulrushes. Cattail burns are most effective when flooding follows as it inhibits cattail regrowth. Controlled burning conducted within navigable waters is regulated under NR 109 and requires a permit.

Native Shoreland Buffer

As we understand more about the structure and function of shoreland, we also become aware of the importance of our role in keeping these systems healthy. Our efforts can lead to the restoration of a quality outdoor resource, and a community full of life and beauty (MDNR, 2009). A native shore land should be viewed as an ecosystem. It is an area on the water's edge that provides habitat and refugee for plants, insects, fish, birds, amphibians, reptiles and mammals. The combination of the soil and plants creates a nutrient and pollutant filter prior to the water runoff washing into the lake.

Shoreline degradation, erosion and increasing development pressures are placing an increasing strain on the lake ecosystem. We now recognize how our activities can affect the health of the shoreland:

- Lawns stretched to the shoreline remove habitat for native animals.
- 90% of all living things found in our lakes and streams are found along the shallow margins and shores
- Studies have shown that there can be as much as 500% more species diversity in the area near the water's edge compared to adjoining uplands.
- 80% of the plants and animals on the endangered species list live all or part of their life cycle in the near-shore zone.
- Removal of native vegetation--from upland trees to underwater plants--destroys natural cover and water quality protection.
- The chronic use of fertilizers, herbicides and pesticides can contaminate the water and disrupt natural processes.

Figure 3.6 Native Shoreland Buffer

Native shore lands are vital components to lake ecosystems. Native shore lands improve water quality while improving the health and diversity of the aquatic environment. Healthy and diverse shore land vegetation than becomes critical healthy habitat for wildlife and birds. Aside from the biological benefits of shore land buffers there are also water quality benefits.

Water quality is greatly benefited from Native shore land buffers.

- **Reduced water runoff**
  - Precipitation is slowed and redirected through the upper story, mid-story and ground level vegetation, compared to a mostly natural landscape has only 10% runoff.
- **Filtered water runoff**
  - Pollutants are prevented from entering the water.
  - Sediments are reduced and water quality is preserved.
  - Excessive nutrients are eliminated and excessive aquatic plant growth is controlled.
- **Increased ground water infiltration**
  - Water is filtered before it enters the ground and results in cleaner drinking and agricultural use water.
  - Increased infiltration recharges underground aquifers.
  - Natural landscapes infiltrate 50% of precipitation.

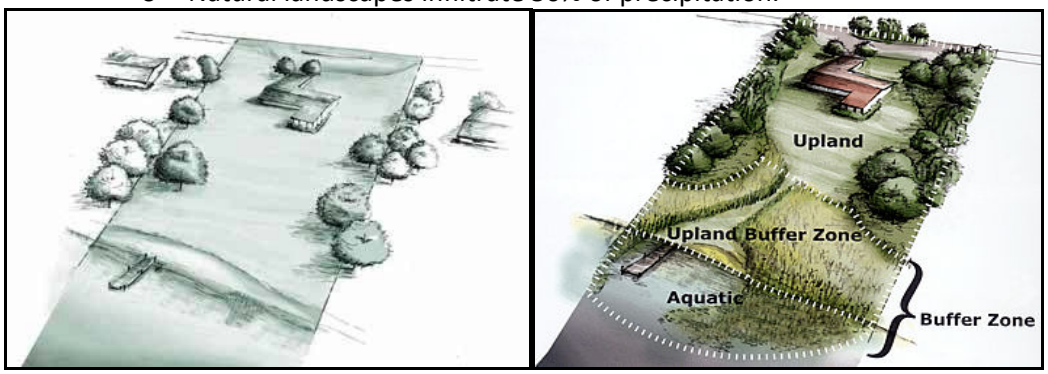


Figure 3.7 Buffer vs. No Buffer (Pictures from Lakescaping for Wildlife and Water Quality)

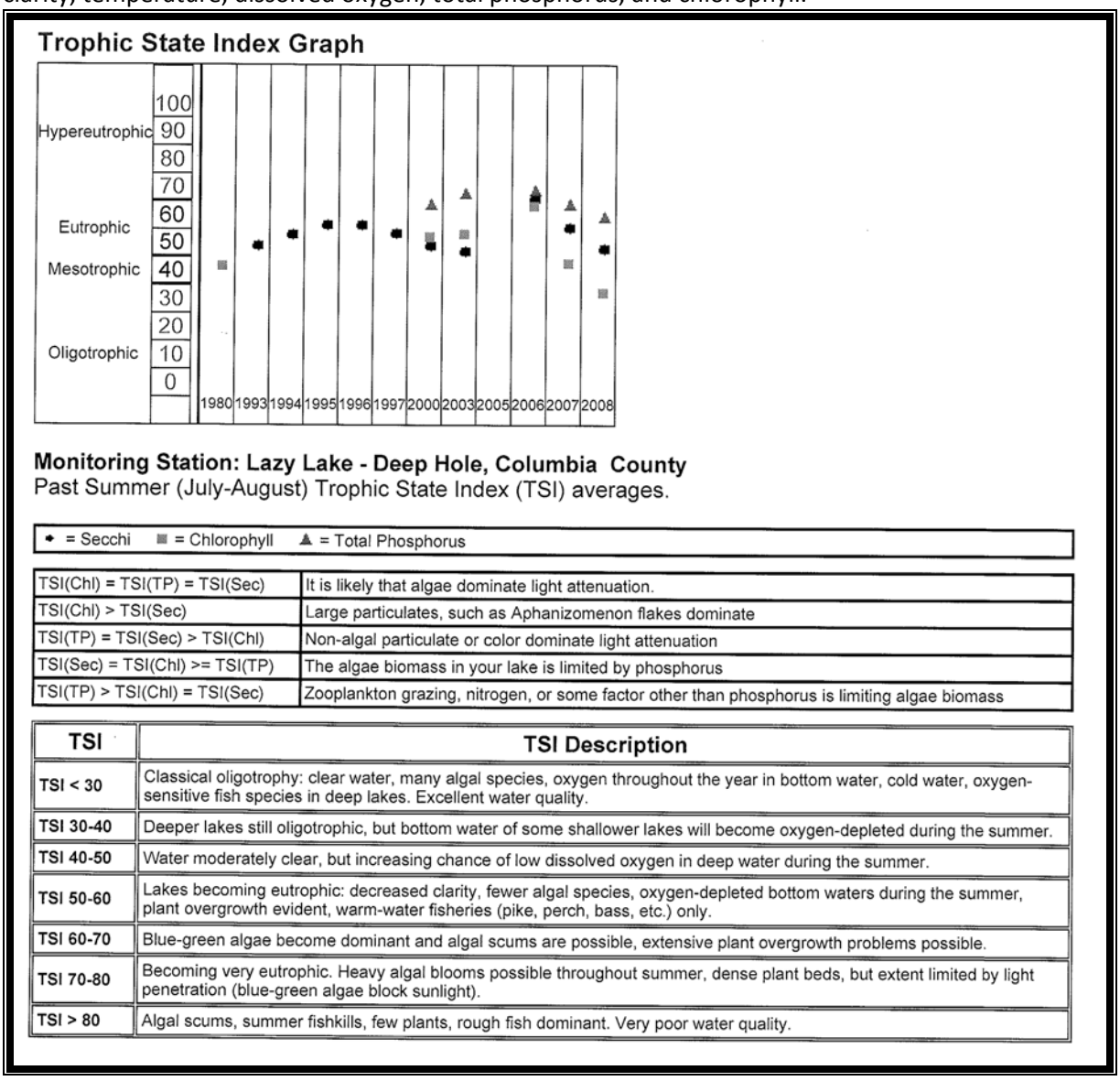
Aside from the biological and water quality benefits, the aesthetic beauty associated with native shoreland buffers provides the most noticeable advantage for many lakeshore owners. A native shoreland visually provides an attractive natural edge, thus providing a visually pleasing experience for that on land and on the water.

Chapter 4

Lake Characteristics

Water Quality

Water quality data for Lazy Lake has been collected through the Citizen Lake Monitoring Program periodically since 1980. Through the Citizen Lake Monitoring Program, Lazy Lake was tested for water clarity, temperature, dissolved oxygen, total phosphorus, and chlorophyll.



TSI(Chl) = TSI(TP) = TSI(Sec)	It is likely that algae dominate light attenuation.
TSI(Chl) > TSI(Sec)	Large particulates, such as Aphanizomenon flakes dominate
TSI(TP) = TSI(Sec) > TSI(Chl)	Non-algal particulate or color dominate light attenuation
TSI(Sec) = TSI(Chl) >= TSI(TP)	The algae biomass in your lake is limited by phosphorus
TSI(TP) > TSI(Chl) = TSI(Sec)	Zooplankton grazing, nitrogen, or some factor other than phosphorus is limiting algae biomass

TSI	TSI Description
TSI < 30	Classical oligotrophy: clear water, many algal species, oxygen throughout the year in bottom water, cold water, oxygen-sensitive fish species in deep lakes. Excellent water quality.
TSI 30-40	Deeper lakes still oligotrophic, but bottom water of some shallower lakes will become oxygen-depleted during the summer.
TSI 40-50	Water moderately clear, but increasing chance of low dissolved oxygen in deep water during the summer.
TSI 50-60	Lakes becoming eutrophic: decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident, warm-water fisheries (pike, perch, bass, etc.) only.
TSI 60-70	Blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.
TSI 70-80	Becoming very eutrophic. Heavy algal blooms possible throughout summer, dense plant beds, but extent limited by light penetration (blue-green algae block sunlight).
TSI > 80	Algal scums, summer fishkills, few plants, rough fish dominant. Very poor water quality.

Figure 4.1 Trophic State Averages 1980-2008

Table 4.1 Lazy Lake Secchi Disc Yearly Average Since 1979

*1979 Summer average (Office of Inland Lake Renewal Study)

Year	Secchi Mean	Secchi Min	Secchi Max	Secchi Count
1979	4.9*			
1993	4.7	2.25	6.25	5
1994	3.5	2.25	5.25	6
1995	2.6	2.25	3	6
1996	2.7	2.25	3.5	7
1997	3.3	2.75	3.5	6
2000	4.5	4.5	4.5	1
2003	5.5	5.5	5.5	1
2006	1.3	1	1.5	3
2007	2.9	2	4	4
2008	5	5	5	2

When looking at the three data perimeters (Secchi disc, Chlorophyll A, and Total phosphorous) for Lazy Lake as in Figure 4.1, page 30, Trophic State Average 1980-2008, we see average Secchi Disc levels (poor/very poor), Total Phosphorous (poor) and Chlorophyll A (poor) in the water quality data for Lazy Lake, indicating an eutrophic lake system.

FISHERY

Lazy Lake Comprehensive Fish Survey Report 2003-2004

Comprehensive Fisheries Survey - Defined

A comprehensive fisheries survey was conducted on Lazy Lake in Columbia County in 2003-2004. A comprehensive fisheries survey is an assessment of the entire fish community in a lake. Different survey methods are used to sample all the different fish species that inhabit a lake. These methods include spring fyke netting for northern pike, fall electrofishing for panfish and bass, and mini fyke netting for assessing panfish reproduction. An additional spring electrofishing survey was also conducted as part of a northern pike population estimate. This report was compiled by Laura Stremick-Thompson, Department of Natural Resources (DNR) Fisheries Biologist-Horicon (920) 387-7876 or Laura.Stremick-Thompson@dnr.state.wi.us.

Gamefish Summary

Northern Pike

Abundance:

- 2004 Spring Fyke Netting Catch = 3.1/net

Size Structure:

- 2004 Spring Fyke Netting Length Range = 11.9–34.6 inches
- 2004 Spring Fyke Netting Average Length = 23.9 inches

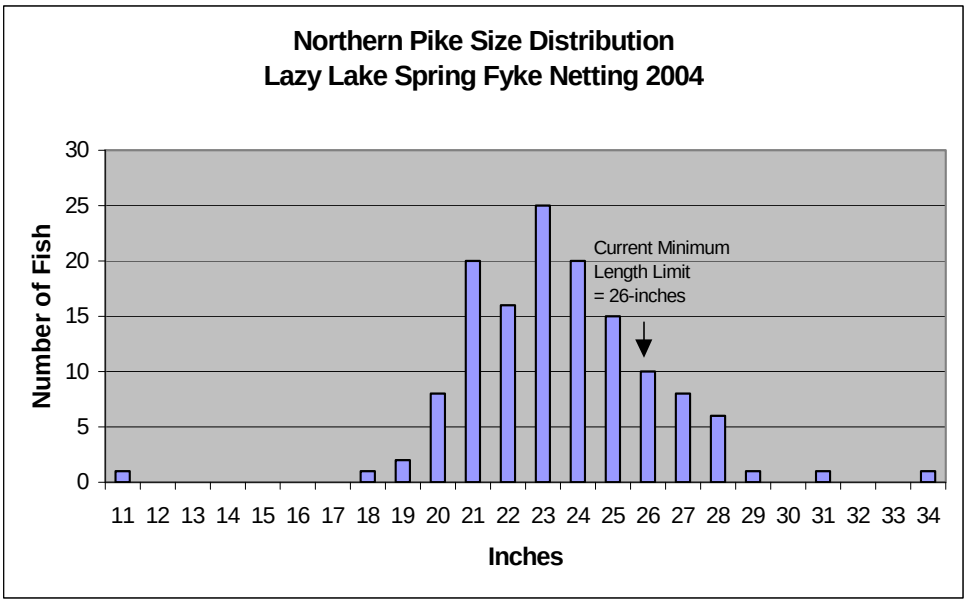


Figure 4.2 Northern Pike Size Distribution Lazy Lake Fyke Netting 2004

A total of 135 northern pike were collected during 2004 spring fyke netting. Of the 135 northern pike measured, 20% were greater than 26 inches (current legal harvestable size). The northern pike sampled were heavily infested with "black spot", a common fish parasite. The northern pike population in Lazy Lake is naturally reproducing and no stocking is currently conducted by the DNR. A northern pike population estimate was attempted by marking northerns collected during 2004 spring fyke netting and attempting to collect marked fish during electrofishing surveys conducted in May 2004. The best estimate was obtained using the Schumacher-Eschmeyer method and resulted in an estimated population size of 220 to 400 fish (95% confidence limits).

Largemouth Bass

Abundance:

- 2003 Fall Electrofishing Catch = 166/hour
- 2004 Spring Electrofishing Catch = 150/hour

Size Structure:

- 2003 Fall Electrofishing Length Range = 2.3-19.4 in.
- 2004 Spring Electrofishing Length Range = 4.0-19.5 in.
- 2003 Fall Electrofishing Average Length = 10.1 inches
- 2004 May Electrofishing Average Length = 12.3 inches

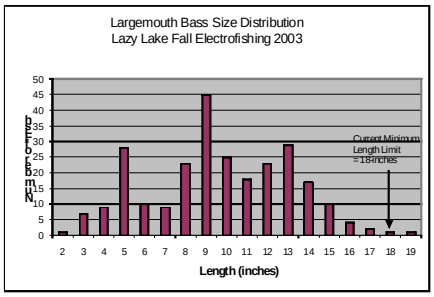


Figure 4.3. Largemouth Bass Size Distribution Lazy Lake Electrofishing 2003

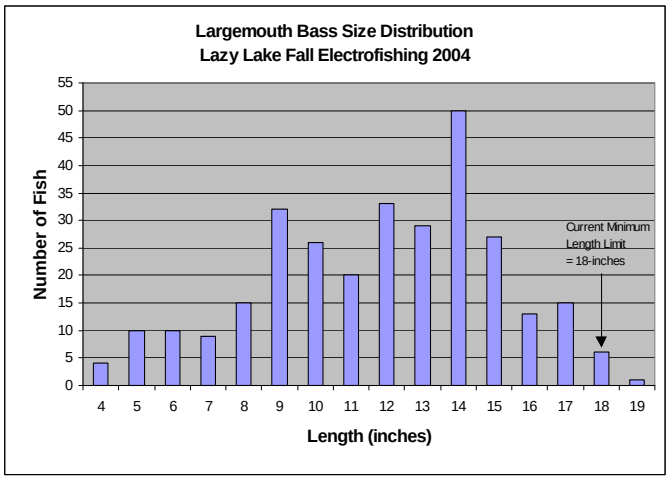


Figure 4.4 Largemouth Bass Size Distribution Lazy Lake Electrofishing 2004

The catch rates for largemouth bass were similar in fall 2003 and spring 2004 electrofishing. During 2003 fall electrofishing, a total of 262 largemouth bass were collected. The number of largemouth bass greater than 18 inches (current legal harvestable size) was .76% in 2003 fall electrofishing and .02% in 2004 spring electrofishing. The largemouth bass population in Lazy Lake is naturally reproducing and no stocking is currently conducted by the DNR.

Smallmouth Bass

Abundance:

- 2003 Fall Electrofishing Catch = 2 fish total or 1.27/hour.
- 2004 May Electrofishing Catch = N/A

Size Structure:

- 2003 Length Range = 9.5-12.4 inches.
- 2004 Length Range = N/A
- 2003 Average Length = 10.95 inches.
- 2004 Average Length = N/A

Panfish Summary

The panfish community in Lazy Lake is composed of bluegill, pumpkinseed, crappie, and green sunfish. A very small number of yellow perch also inhabit the lake.

Results of mini-fyke netting indicated the presence of young-of-the-year (YOY) bluegill, pumpkinseed, largemouth bass, and green sunfish. YOY bluegill had the highest relative abundance of the fish species sampled.

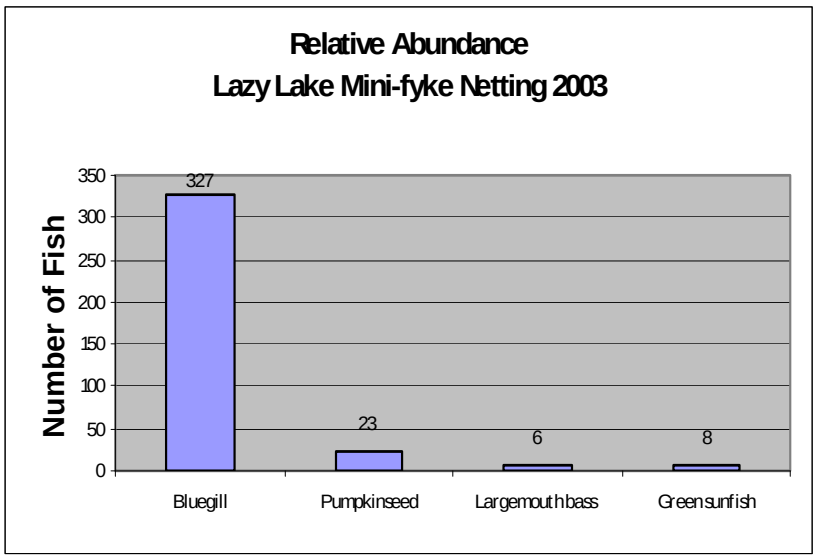


Figure4.5 Relative Abundance Lazy Lake Mini-fyke Netting 2003

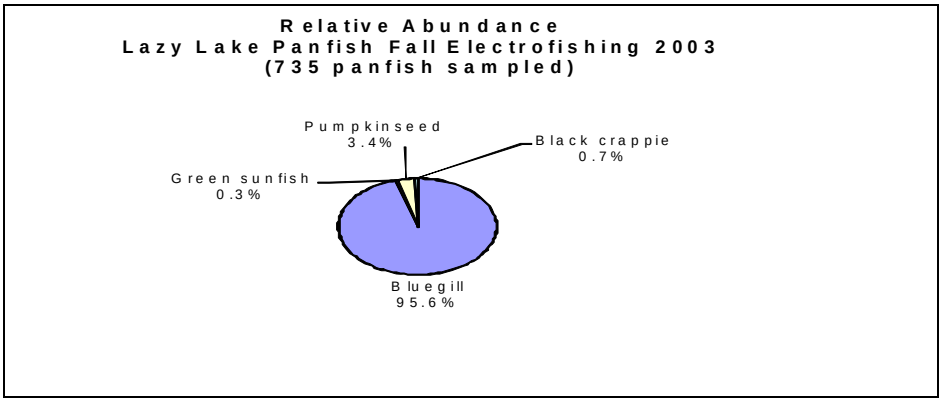


Figure 4.6 Relative Abundance Lazy Lake Panfish Electrofishing 2003

Bluegill

Abundance:

- 2003 Fall Electrofishing Catch = 445/hour
- 2004 Spring Fyke Netting Catch = 9.4/net

Size Structure:

- 2003 Length Range = 1.5-7.5 inches
- 2004 Length Range = 2.9-10.1 inches
- 2003 Average Length = 4.3 inches
- 2004 Average Length = 6.0 inches

In 2003 fall electrofishing, 6% of the 285 bluegill measured were greater than 6 inches in length. In 2004 spring fyke netting, 48% of the 308 bluegill measured were greater than 6 inches. While direct comparisons of the bluegill population cannot be made between the two gear types (electrofishing and fyke nets), the spring fyke netting data illustrates that larger bluegill are present in Lazy Lake.

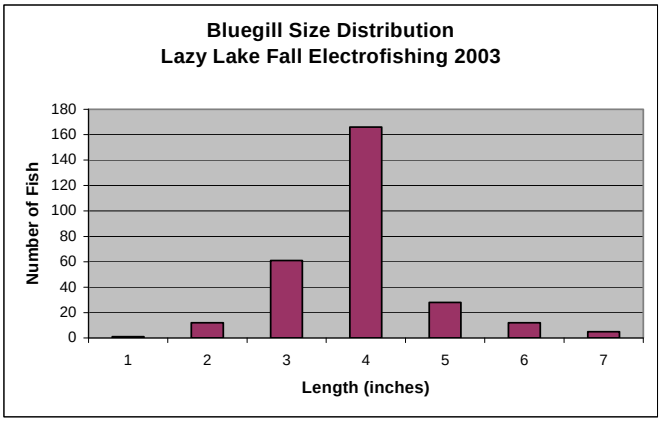


Figure4.7. Bluegill Size Distribution Lazy Lake Fall Electrofishing 2003

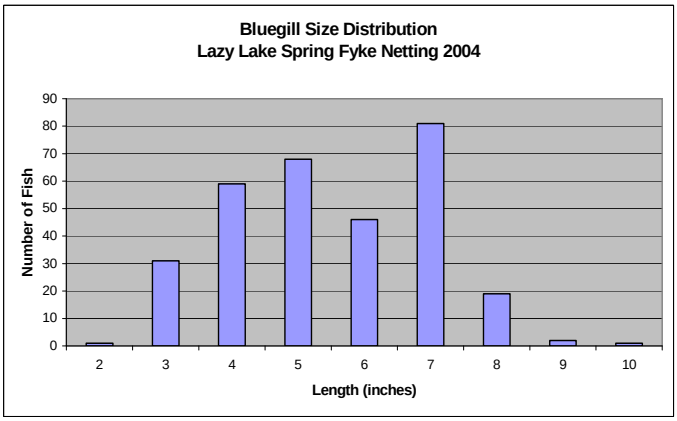


Figure 8. Bluegill Size Distribution Lazy Lake Spring Fyke Netting 2004

Pumpkinseed

Abundance:

- 2003 Fall Electrofishing Catch = 15.8/hour.

Size Structure:

- 2003 Length range = 4.3-6.6 inches.
- 2003 Average Length = 5.2 inches.

Other Species

Lazy Lake also contains populations of white sucker, common shiner, golden shiner, bullhead and common carp.

Fishery History

While there is not much data available from the past on Lazy Lake's fishery; however, traditionally Lazy Lake has been considered a very good sport fishery. It should be noted that rough fish have been traditionally a problem. In 1958 the lake was drained and treated in an attempt to eradicate rough fish.

Aquatic Plant Management

As in many other Southern Wisconsin Lakes, especially shallow water impoundments, a high abundance of aquatic plants (native and invasive) is a reality. Lazy Lake is no different. Aquatic macrophyte growth or weeds was the reason the Lazy Lake Management District was established and is still a top issue today.

The first aquatic plant study on record is a WDNR aquatic plant survey from September, 1979. The study was done by the old Wisconsin Department of Natural Resources, Office of Inland Lake Renewal as one of five components of a feasibility study for a dredging project.

Submergents		**Floating leaf**	
Ceratophyllum demersum	Coontail	Nymphaea sp.	White lily pad
Myriophyllum spp.	Milfoil	Lemna minor	Duckweed
Heteranthera dubia	Mud plantain	**Emergents**	
Potamogeton crispus	Curlyleaf pondweed	Scirpus sp.	Bulrush
P. pectinatus	Sago pondweed	Sagittaria sp.	Arrowhead
P. zos teriformis	Flatstem pondweed	Typha sp.	Cattail
Ranunclus longirostris	Buttercup	Sparganium sp.	Burreed
Naja fleilis	Bushy pondweed		
Elodea canadensis	Waterweed		

Table 4.2 1979 Macrophytes Present in Lazy Lake

The following comments are from the 1979 Office of Inland Lake Renewal Study

Thirteen genera of macrophytes are present in the Lake. Ceratophyllum demersum is by far the dominant species in the lake. It was found at 100% of the sampling sites in September and had a density rating of almost four. This species is severely hampering lake usage. Other species with problem densities throughout the summer include milfoil and mud plantain. The three pondweeds were dense during a part of the summer only. In general, densities tended to be reduced in the deeper water, but submergents grew over the entire lake bottom. The average water clarity in summer was 4.9 feet, indicating a maximum depth for weed growth of 8.7 feet. The usable area of the lake decreased throughout the summer. Emergent vegetation was common around the entire periphery of the lake and was especially dense at the north and south ends.

Genus	Species	Common Name	Category
Brasenia	Schreberi	Watershield	Floating-Leaf
Ceratophyllum	Demersum	Coontail	Submersed
Elodea	Canadensis	Elodea	Submersed
Lemna	Minor	Small duckweed	Free Floating
Myriophyllum	Spicatum	Eurasian watermilfoil	Submersed
Najas	Flexilis	Slender Naid	Submersed
Nuphar	Variegate	Spatterdock	Floating-Leaf
Nymphaea	Odorata	White water Lily	Floating-Leaf
Potamogeton	Crispus	Curlyleaf Pondweed	Submersed
Potamogeton	Foliosus	Leafy Pondweed	Submersed
Potamogeton	Pusillus	Small Pondweed	Submersed
Potamogeton	zosteriformis	Flatstem Pondweed	Submersed
Ranunculus	flabellaris	Yellow Water Buttercup	Submersed
Stuckenia	pectinate	Sago Pondweed	Submersed
Typha	Latifolia	Broad Leaf Cattail	Emergent
Wolffia	columbiana	Common watermeal	Free Floating

Table 4.3 Taxa Detected During 2005 Aquatic Plant Survey, Lazy Lake

Aquatic Plant Community Statistics	June
Frequency of Occurrence (Percent Vegetated Intercept Points)	100
Simpson Diversity Index	0.87
Maximum Depth Index	7
Taxonomic Richness (Number Taxa)	16
Mean Intercept Point Taxonomic Richness (Taxa/Intercept Point)	6.2
Mean Intercept Point Native Taxonomic Richness(Native Taxa/Intercept Point)	4.3

Table 4.4 2005 Aquatic Plant Community Statistics, Lazy Lake

HISTORY OF AQUATIC NUISANCE CONTROL ON LAZY LAKE (1966-1978)

Utilization of both algaecides and herbicides, for purpose of aquatic nuisance control, was initiated by D.N.R. on Lazy Lake during the summer of 1966. Various treatments were continued, on the lake, throughout the past 12 years with the concentrations of chemicals and areas treated being outlined below. (Refer to Map IV for illustration of treated areas)

1) Demonstration plot on Lazy Lake began in 1966.
   a. One acre was treated with Aquathol plus granular, 50 pounds/acre.
   b. One acre treated with 1.5 gallons of Diquat.

2) 1967
   a. 15 acres were treated with 300 pounds of copper sulfate, and 31 gallons of Diquat (2 gallons/acre) Myriophyllum spp. and Lemna minor identified as major aquatic plant and algae present.

3) 1972
   a. 6.4 acres were treated with 14 gallons of Diquat at a concentration of 2.3 gallons/acre. Average depth was 3 feet.

4) 1973
   a. 16 acres were treated with 44 gallons of Diquat (2.75 gallons/acre). Average depth was 3 feet.

5) 1974
   a. 3 treatments applied throughout the year.
   b. 10 acres treated with 30 gallons of Aquathol.
   c. 8 acres treated with 23 gallons of Aquathol.
   d. 100 pounds of copper sulfate applied.

6) 1975
   a. 4 treatments applied throughout the year.
      i. 2 herbicide treatments and 2 algicide treatments.
         1. 20 acres were treated with 40 gallons of Diquat and 65 gallons of Aquathol K (5 gal./acre), average depth 3 feet.
         2. 5 acres treated with a 2:1 ratio of Diquat and Cutrine.
         3. 10 acres treated with copper sulfate at a concentration of 10 pounds/acre.
         4. 9 acres treated with a concentration of Cutrine equivalent to 54 pounds copper sulfate. Average depth was 3 feet.

7) 1976
   a. Trial plots were treated with a 2:1 ratio of Diquat and Cutrine (1.5 gallons/acre) and with Aquathol K and Cutrine ratio 1:1 (2 gallons/acre) and 2-4-D (2 gallons/acre). Average depth 3 feet. Aquatic plants: Myriophyllum

spp. 20% Potomogeton crispus 30%, Ceratophyllum demersum 20%, Potomogeton pectinatus 10%, Filamentous algae 20%.

Survey by D.N.R. found that plants were lime encrusted and thought that this protected the plant from contact with the chemical. Sprayed approximately 20 acres with 70 gallons of 2-4-D (3.5 gallons/acre). Average depth was 3 feet.

8) 1977
   a. Trial plots sprayed with a 2:1 ratio of Diquat to Cutrine (2 gallons/acre) some areas with Anacharis canadensis, Ceratophyllum demersum comprised about 70% of plant population and was the most resistant.
9) 1978
   a. No chemical treatments were conducted during this year.
10) 1991
   a. LLMD purchases first of two Aquatic Plant Harvesters
11) 2007
   a. LLMD completes an Aquatic Plant Management Plan

Chapter 5
Water Quality Monitoring Plan

Phase 1-Development of a Water Quality Module for the Lazy Lake Watershed

DESCRIPTION OF PROJECT AREA

Lazy Lake is a 161-acre impoundment of the North Branch of the Crawfish River in and near the Village of Fall River. It is part of the Upper Crawfish River Watershed. The lake has many problems such as low dissolved oxygen, excessive alga blooms and submergent aquatic plant growth. Lazy Lake has a very good bass, northern pike and bluegill population. Overall, monitoring indicates polluted agricultural runoff, low levels of dissolved oxygen and low flow problems. The Lazy Lake Management District has been utilizing aquatic plant harvesting over the last several years to try and control and remove excessive aquatic plant growth. High numbers of AIS are present in the system.

BACKGROUND INFORMATION

Over the last 2 years the LWCD has been working closely with the Lazy Lake Management District discussing the concepts and concerns associated with watershed based planning. Studies have shown that agricultural and development impacts within the watershed are increasing sedimentation and nutrient input into Lazy Lake.

In 2006-2007 the Lazy Lake Management District through the Columbia County received a DNR lake planning grant that was the first step in this planning grant process. The focus of this 2006-2007 planning grant was to contract with the Columbia County Land and Water Conservation Department to complete a watershed wide inventory related to the NR 151 performance standards. This inventory along with program marketing was completed at the end of 2007. This first step in completing the inventory of the watershed in regards to sources of sediment and nutrients was planned be the precursor to this current DNR Lake Planning Grant application. This grant application is to provide the staff resources for the Columbia County Land and Water Conservation Department to work with the Lazy Lake Management District to develop and complete a Comprehensive Lake Management Plan for Lazy Lake. This planning effort will guide and protect the management of these resources now and into the future.

DESCRIPTION OF PROBLEMS TO BE ADDRESSED INCLUDING GOALS AND OBJECTIVES

Current available data on this portion of the Crawfish River and the downstream reservoir of Lazy Lake have led us to believe that nutrient and sediment loading from the watershed is severely impacting the water quality of Lazy Lake. The intent of this monitoring program is to get some current up to date water quality information. Our goal is to continue to invest in a citizen monitoring program while moving forward with an advanced monitoring program that will allow us to eventually develop a better understand of the watershed and work towards the development of a water quality model for this watershed. This information will establish a baseline level for water quality monitoring and will help us evaluate and understand needs for improvement within the watershed. Along with creating a baseline, it will help us access the value of working towards water quality goals and BMP's. Currently Columbia County LWCD has inventoried the entire watershed, looking at all sources of nutrients (croplands/barnyards). The next step is to acquire the data to work towards this model. The two

objectives of this study are: 1) quantify the phosphorus export from the watershed. 2) Link the water quality with nutrient loss from the land. The models that will be used will be SWAT and WiLMS. In the later phases of this project the modeling would be conducted by UWSP, under the supervision of the Center for Watershed Science and Education. Once the lake and its watershed have been sampled, inventoried and modeled, we will move forward in developing a TMDL. This information will lead us towards identifying priority areas to target our implementation efforts.

DESCRIPTION OF METHODS, ACTIVITIES AND DATA TO BE COLLECTED

This grant application will be used to address 1 component of a multiple phase project. This grant will be part of **Phase 1** (Data Collection). Once adequate monitoring data has been collected, we will move into the future phases, they include **Phase 2** (Data Modeling, Compilation and Recommendations) and **Phase 3** (Model Development).

In early spring 2009 staff gages and pressure transducers were put in place at 4 sites above Lazy Lake and one at the outflow. Columbia County staff will be measuring weekly stream flow to develop rating curves for these instruments. The staff gauges will be installed at each site to enable evaluation of stream elevation into the future. This project would enable the collection of samples at a regular twice/month interval (March-November) and monthly (December-February). In addition, event samples would be collected during the initial stages (siphon sampler) and within/after the event (grab) five times per year. Each of the 5 sites will have up to 2 siphon samplers. Sampling will be conducted by County staff. Volunteers in the watershed will record daily precipitation between April and November at three sites.

Based on evaluation of the first year of data, additional sample points may be added further into the watershed to better resolve the relationship between land use, water quality, and assessment of the ability of the wetlands to function as phosphorus sinks or sources.

Any additional future sampling locations will be selected to provide a mixture of land cover and land use to provide a data set that could be used to calibrate several water quality modeling tools. We would anticipate that the phosphorus loading would be correlated with spatial characteristics (e.g., distance to waterway) and physiographic features (e.g., soils) to refine the export coefficients approach to nutrient export. The data would also provide a data set that could be used to calibrate process-based water quality models such as the Soil and Water Assessment Tool (SWAT). As part of this project, we would develop a comparison of export coefficient approach (Wisconsin Lake Modeling Spreadsheet: WiLMS), modified WiLMS, and SWAT.

Some lake data would be collected. This would include sampling once during winter, spring and fall (overturn) and five times during the summer. Columbia County Land and Water Conservation Department staff will collect summer samples and UWSP staff will collect overturn samples. Weekly Secchi measurements will be collected by volunteers from the lake management district or by the Columbia County Land and Water Conservation Department Staff.

EXISTING AND PROPOSED PARTNERSHIPS

This project will consist of many existing partnerships. The project will continue and ongoing partnership with the Lazy Lake Management District as we work towards the implementation of their recently completed lake management plan. The fostering of this monitoring program has brought together the following partners on this endeavor: The Columbia County Land and Water Conservation Department, Columbia County NRCS, Lazy Lake Management District, Village of Fall River, WDNR and UWSP CWSE.

DELIVERABLES AND PLAN FOR SHARING OF PROJECT RESULTS

We will have several information/education opportunities throughout the project. Once the project is successfully funded a news release will be produced to give and overview of the project. As we move ahead with this more advanced monitoring program we will be providing the Lazy Lake Management District and the general public updates through regular meetings and announcements. Information will be provided through a presentation at the annual meeting of Lazy Lake Management District and other regular meetings. Upon completion of the multiple phases outlined as part of this study, a model and report will be completed and this information will be used as a guiding document. This model will be the final report for this long-term program.

ROLE OF PROJECT IN LAKE MANAGEMENT

The goal of this monitoring program is to attain the monitoring data to utilize modeling programs to develop a watershed model for Lazy Lake. This will directly aid in the evaluation of water quality impacts and the status of the watershed as a whole. The implementation of several components that will be outlined in the soon to be completed Lazy Lake Management Plan will directly hinge on the outcome of this study. The relationship to in-lake management options is directly related to the nutrient loading coming from the watershed. This information will help focus staff and financial resources throughout this process.

TIMETABLE DISCUSSION

If both grants that we are applying for are approved in this grant cycle, we will be able to utilize these resources to begin implementation of this more advanced monitoring process as soon as funds become available.

This process will begin no later than January 2009 and the funding outlined in the budget will allow us to accomplish the following actions in 2009: This project would enable the collection of samples at a regular twice/monthly interval (March-November) and monthly (December-February). In addition, event samples would be collected during the initial stages (siphon sampler) and within/after the event (grab) five times per year. Sampling will be conducted by County staff. Volunteers in the watershed will record daily precipitation between April and November at three sites.

Based on evaluation of the of data, additional sample points may be added further into the watershed to better resolve the relationship between land use, water quality, and assessment of the ability of the wetlands to function as phosphorus sinks.

Chapter 6
Watershed Management Plan

Lake management alternatives include both watershed management measures and in-lake rehabilitation techniques. Watershed management, including land-use planning and zoning and non-point source pollution control, is used to maintain or improve the quality of water before it reaches the receiving boundary of water. In this section, we will focus on the discussion of implementing watershed management in Lazy Lake.

Managing inputs into a nutrient-rich system such as Lazy Lake is very important if we want to provide for long-term water quality improvements. Managing and reducing these inputs is traditionally done through the identification, design and installation of best management practices (BMPs). BMPs are actions or structures that are designed to reduce non-point source pollution at construction sites, agricultural lands and developed areas. BMPs include things such as barnyard runoff systems, silt fences, detention or retention ponds, manure storage, buffer strips, reduced tillage and other associated practices.

There are many individual sources of non-point source pollution within any one watershed. The biggest and most important challenge is to identify and remediate as many of those sites as you can. Some areas of concern may seem very small-scale, but it is very important to realize that the cumulative impacts from multiple small sources are the biggest hurdle associated with winning the battle over non-point source pollution. When looking at Table 9, 77% of the agricultural fields in the Lazy Lake Watershed are meeting “T” or Tolerable soil loss. That is to say that 77% of the fields in the watershed are eroding at a rate less than 5 tons/acre/year. Issues that seem small at first can have huge cumulative impacts as you move downstream, combining the impacts associated with over 57 miles squared or 39,330 acres of small sources. In 2009, the Columbia County LWCD will begin to implement a long- term water quality monitoring program in the Lazy Lake Watershed. As this project moves into the advanced stages over the next several years, the goal is to utilize these loading rates to more specifically determine sub-watershed sources throughout the watershed to help focus reduction and conservation efforts by quantifying the nutrient load entering the lake via the watershed. The water quality monitoring section of this plan provides more details related to the specifics associated with this endeavor.

	1999		2000		2001		2002		2003		2004		2005		2006		2007	
	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acre
#1 "T"	83%	17372	83%	17372	77%	16197	72%	15152	78%	16457	80%	16849	81%	17085	81%	17111	76%	1593
-2 "T"	14%	3004	14%	3004	18%	3788	24%	4962	18%	3787	16%	3265	16%	3399	16%	3392	19%	404
-3 "T"	1%	261	0%	0	2%	391	2%	391	1%	131	1%	131	1%	141	0%	0	2%	394
-4 "T"	2%	391	3%	652	3%	652	2%	392	2%	523	4%	783	1%	261	1%	261	3%	655
nknown	0%	0	0%	0	0%	0	1%	131	1%	130	0%	0	1%	142	1%	264	0%	0
Totals	100%	21028	100%	21028	100%	21028	100%	21028	100%	21028	100%	21028	100%	21028	100%	21028	100%	2102

There are 93414.146 Acres in the Upper Crawfish River Watershed.
There are 46272.504 Acres in the Lazy Lake Watershed.(.4953489 of the total area)

Percentages are based on the total acres monitored in the entire Upper Crawfish River Watershed.

Table 6.1 Lazy Lake Watershed Transect Survey Soil Loss

For the purpose of the Lazy Lake Watershed we have divided them into 4 main categories including: Storm Water Management and Construction Site Erosion Control, Riparian Property Management and Upland Agricultural Source Management. These individual categories represent different levels of severity and necessity within the overall scope of implementing a watershed management plan. The overall watershed management perspective hinges on the ability to actively reduce the amount of phosphorus and sediment entering the system.

Storm Water Management and Construction Site Erosion Control

Storm water runoff has the ability to impact water resources by increasing the amount of runoff from impervious areas such as roofs, driveways, and sidewalks. The increased runoff travels over land picking up containments and deposits them in local waterways. The increased volume of runoff combined with the increased rate of runoff can create increased erosion on upland sites. Impacts from storm water runoff have not yet been fully assessed. There are likely opportunities to increase efficiency and effectiveness of current local and state storm water management requirements. It would be important for the Lazy Lake Management District along with the Town of Fountain Prairie to be the catalyst in a process to analyze current storm water issues affecting Lazy Lake. The implementation of a county-wide storm water ordinance would help streamline the effectiveness of storm water impacts on a watershed basis.

When looking at sources of Total P deliver Lawns and streets deliver significant amounts of phosphorous to lakes, as shown in Graph 9.

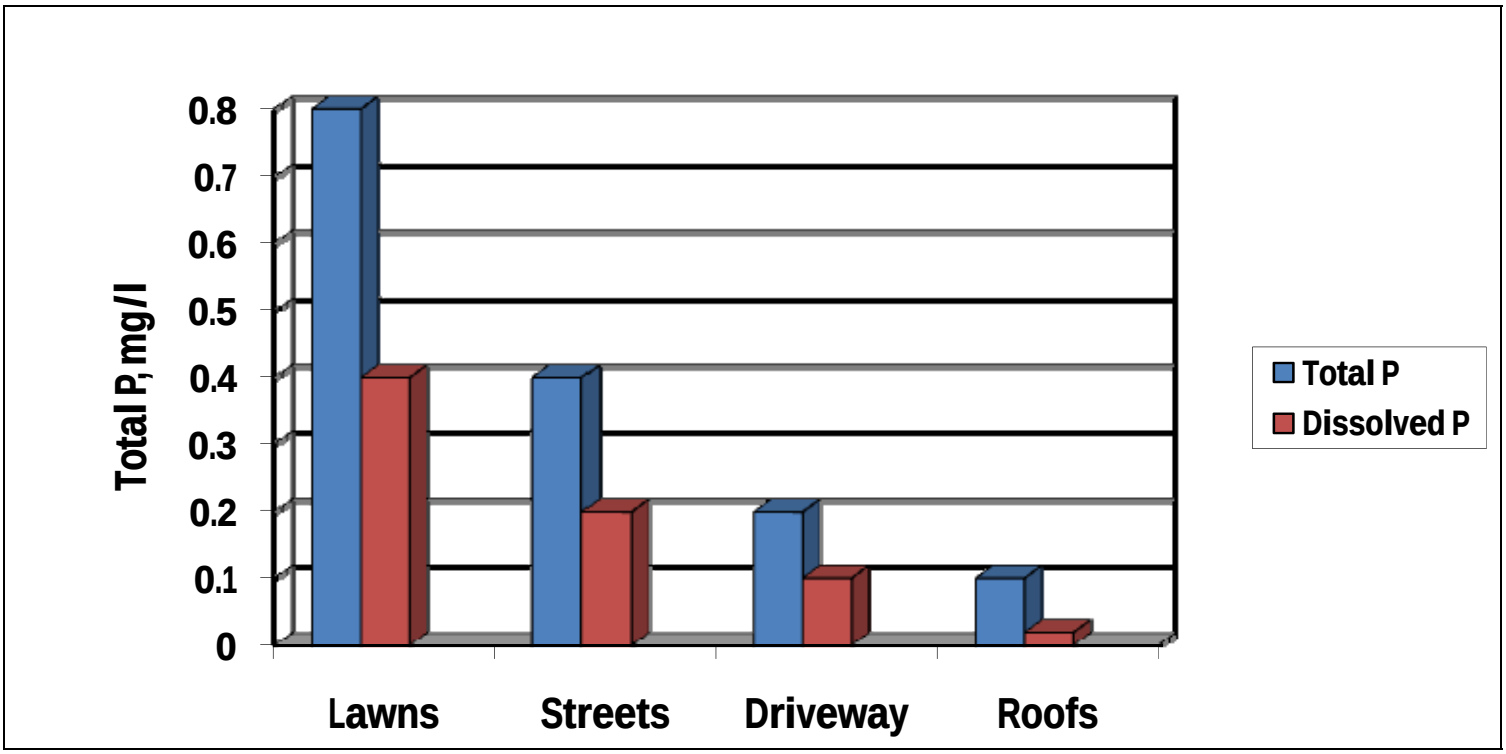


Figure 6.1 Total and Dissolved P Geometric Means for Different Source Areas in Residential Area - Monroe St

Native buffers should be put in place to prevent the runoff to Lazy Lake. Furthermore, any storm water runoff sources that directly enter Lazy Lake from the street should have sedimentation ponds or filter strips to treat the water prior to entering Lazy Lake.

At the boat launch off of County Highway D a large volume of concentrated flow moves along the north eastern edge of the parking lot, this would make an excellent area for a filter strip or sedimentation pond.

The control of erosion coming from sources such as construction sites could also be a potential source of increased sedimentation. As there are currently upslope sites for sale and secondary development traditional targets previously developed lots, construction site erosion is and will continue to be a serious issue for Lazy Lake.

Currently, erosion control measures are required under several local and state permit requirements. As is often the case, there is typically a need for increased utilization and regulation of the BMPs required for construction sites. Both of these factors will largely depend on the amount of land-use changes we see within the Lazy Lake watershed. It will be very important for the Village of Cambria, Lazy Lake Management District and the community to embrace and understand the associated implications of land-use changes. Future homes can be built and lots can be laid out in a manner which allows for maintaining pre and post development runoff volumes and rates as a means of not additively effecting the degradation of Lazy Lake water quality. Lots can be designed to allow for increased infiltration with BMP practices such as: rain gardens, ponding areas, the combination of the two creating “treatment trains”, lot requirements % native cover, narrower roads, and rain barrels. These progressive

approaches can be meet with resistance though as they are not traditional approaches toward storm water management.

Riparian Property Management

Riparian properties are lands directly adjacent to water. In this case, the majority of riparian owners will be those directly located on Lazy Lake. Lots adjacent to Lazy Lake are devoid of natural cover within 35' of the high water mark. When comparing Wisconsin turf lawns to native cover, the average Wisconsin soil with turf cover produces a phosphorous load 4 to 7 times greater than a site in native cover(MDNR, 2006). Knowing this, we can identify opportunities for nutrient load reductions in the watershed from the majority of riparian properties along Lazy Lake. Traditional turf management practices include an import of commercial fertilizer on these sites. The inclusion of native buffers along the shoreline of Lazy Lake, combined with a reduced use of commercial phosphorus fertilizer, will provide a reduction in overall nutrient loading from riparian properties and provide increased fish and wildlife habitat while reducing landowner maintenance time and costs. The Lazy Lake Management District should start a program targeted at increasing to install native shoreline buffers and proper use of commercial lawn-care fertilizers with no phosphorous. A cost share/demonstration project funded through the Lazy Lake Management District would be an ideal way to promote acceptance and adoption of native buffers on both public and private land holdings.

Typically NR 115 Shoreland zoning is enforced through a counties Planning and Zoning Department. Although adopted into ordinance, in Columbia County, NR 115 Shoreland Zoning is not enforced. The LLMD should advocate for to the Columbia County Planning and Zoning Department for the implementation and enforcement of NR 115 as a means to protect the water quality of Lazy Lake and its ecosystem.

Upland Agricultural Source Management

Figure 6.2 Phosphorous foaming over road in Lazy Lake

Science has proven that phosphorus is the typical limiting nutrient responsible for promoting algae and aquatic plant growth in surface water systems. The current and historical nutrient loads into this system have provided a surplus amount of nutrients and are a factor in the lake's risk of transitioning from a plant-dominated community to an algae-dominated system. This turbid condition has many factors, but the best available science has proven a reduction of phosphorus levels entering the system will be very important for the vitality and restoration of this system.

The Columbia County Land and Water Conservation Department has been working with the Lazy Lake Management District on watershed improvement efforts since 2005. In 2007, the Columbia County LWCD completed a watershed-scale inventory to identify issues in the watershed. This inventory

provides a solid foundation to begin to understand many of the challenges we face in summary of inventory data is included to help summarize and define the inventory process and the results.

We have also projected watershed improvement costs based on the information found in our inventory. This information will help the TLPC understand the conditions now and associated costs. The costs associated with agricultural watershed improvement efforts are often not well understood and under-estimated by the general public. The costs and associated funding options will also help the TLPC understand and set realistic timelines for stepped watershed improvements.

In watersheds with a steeper slopes adjacent to intermittent streams, perennial tributaries, and/or other surface water bodies, higher rates of sedimentation result from Flash runoff events. When looking at Map 5 (page 49), it shows a watershed with two very different slopes adjacent to water. The western half of the watershed has little highly erodible slopes and an increased amount of wetlands. Based on the GIS map developed for the Lazy Lake watershed during the 2007 inventory process we see a majority of the C, D and E slopes within the Lazy Lake Watershed are adjacent to areas with concentrated flow or a surface water body and are also on the eastern half of the watershed. AS increased slopes are often subjected to an increased rate of sediment delivery this relationship is cause for concern and will be analyzed when looking at the water quality monitoring data.

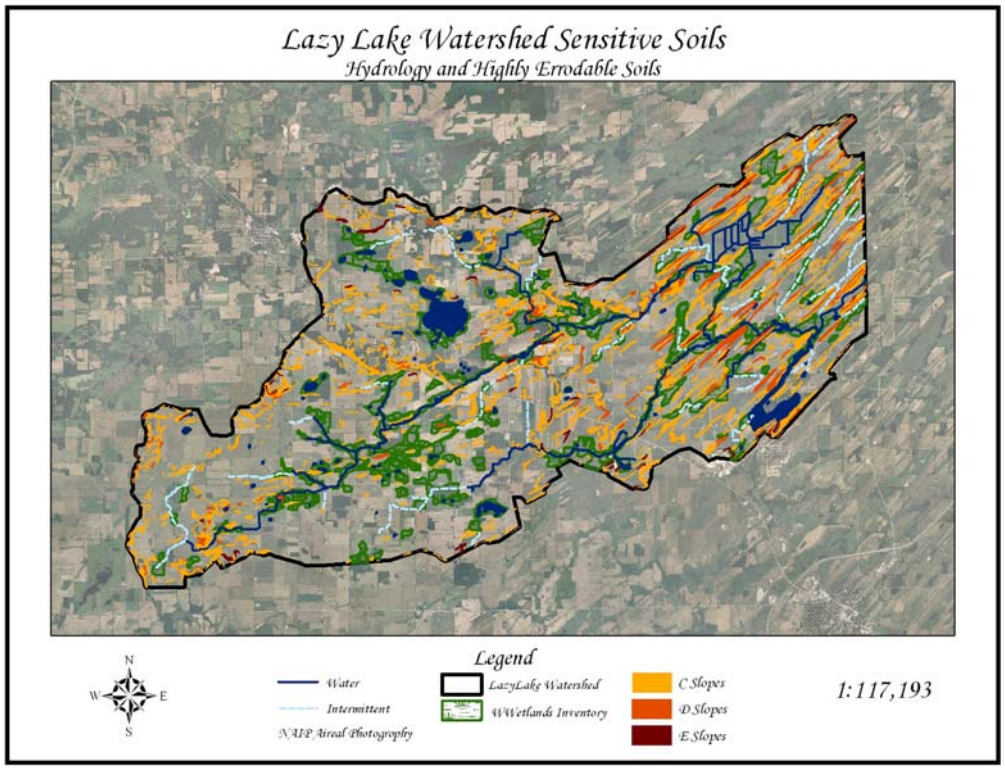


Figure 6.3 Lazy Lake Watershed Sensitive Areas

Through multiple funding sources, the Columbia County Land and Water Department is going to develop phosphorous based nutrient management plans. The plans will be used to implement phosphorous and water quality based NRCS NMP 590. The data collected will provide a data set that could be used to calibrate process-based water quality models such as the Soil and Water Assessment Tool (SWAT). The data collected will also be used to develop a strategy for locating tillable fields exceeding the Phosphorous Index (PI) standards and developing PI implementation strategies.

Summary Interpretation of Inventory Data

Lazy Lake Watershed
The following is a summary and interpretation of some of the data in regards to watershed improvement efforts.

Direct Runoff from Livestock Operations
A total of 59 livestock operations were inventoried. A total of 14 of them have obvious runoff issues related to NR 151. These 14 operations include a total animal count of 1432 Dairy/Beef Cows. 12 of these direct runoff issues are ranked as either medium or high in regards to environmental degradation.

Unlimited Cattle Access to Stream/Adequate Sod Cover Maintained:
A total of 9 out of the 59 livestock operations have cattle with unconfined access to water. 6 out of the 9 are not maintaining adequate sod and the cattle should be removed from the stream.

Existing Rill or Gully Erosion Present
50 of the 59 livestock operations felt that they had no erosion taking place anywhere. We think this is worth noting, because it holds true to the idea that many operators see some level of erosion as normal and do not associate it with being a problem. The reality is, that in a watershed of this size, and with phosphorus level exceeding high in many of the soils, even the smallest amount of erosion and sediment delivery can have a large impact. More education and understanding is probably needed with the agricultural community.

Existing Manure Storage Structure
A total of 8 out of 59 operations have a manure storage structure. 2 of these structures need to be abandoned, 5 of them have potential problems and 4 of them are in need of upgrades.

Utilization of Manure Stacks
23 of the 59 livestock operations stack manure for a period of time. 5 of them stack manure within the NR 151 WQMA adjacent to a stream/lake or water body.

Is Clean Water Diverted from Feedlot

14 of the 59 livestock operations were adequately diverting clean water from their feedlot. 37 of them are in need of some form of clean water diversion. 7 of the operations are in need of earthen surface water diversion and 35 are in need of roof runoff diversions (5135').

Existence of a 590 Nutrient Management Plan
Only 4 of the 59 livestock operations have a certified 590 NPM plan. The remaining 55 operations need to develop a 590 NPM plan.

Updated Conservation Plan to meet "T"
Only 11 of the 59 operations inventoried where aware of their conservation plan, and new it was updated. The remaining 31 operators were not aware of the status of their plan. It's likely that many farms are meeting T without an updated plan, but it is also likely that just as many operations are not meeting T because they are not referencing a conservation plan. This will continue to be a concern as the demand for corn grows. We also realized that a high percentage of our highly erodible sites where directly adjacent to our sensitive areas.

Livestock Populations in Watershed
It was determined that there are roughly 1920 dairy animals in the watershed. This represents 97% of the reported high/low for herd range. These 1920 dairy exist on 26 individual operations. There are 21 operations housing 1612 Beef animals in the watershed. There are 401 hogs and about 181 sheep. There are also numerous other smaller populations of horses, dogs and other smaller scale animal operations in the watershed

We set out to complete an inventory of the Lazy Lake watershed with the following criteria as our starting point:

- Identify and locate all livestock operations in the watershed
- Identify livestock operations that fall within the WQMA as referenced in NR 151
- Determine compliance of livestock operations with water quality performance standards found in NR 151
- Locate and identify sensitive areas
- Determine areas in need of riparian buffers
- Determine areas that would be potential wetland restoration sites
- Locate obvious areas of gully/soil erosion
- We have included GIS developed maps that show the following relationships from our data:
- Location of all livestock operations
- Wetlands and highly erodible soils (sensitive areas)
- Farmland Preservation Program acres
- Acres under NPM 590 plan
- Locations of potential wetland restoration sites
- Existing manure storage structure locations
- CREP eligible buffer sites

Our GIS database contains the following data layers to help us interpret and use the data:
Tax parcel

1) Livestock sites
2) Manure storage structure locations
3) Township range
4) Section
5) ¼ Section
6) Roads
7) Soils
8) Erosion sites (Aerial Interpretation)
9) 4’ Contour
10) Potential WRP
11) Watershed boundary
12) Hydrology
13) DNR Map of Watersheds
14) Parcels adjacent to water
15) Zoning
16) Wetlands
17) Nutrient Management Plans
18) Farmland Preservation Program
19) CREP 150’
20) Permitted animal waste structures
21) Location of existing BMP’s
22) Land Cover
23) Columbia County High Resolution Aerials (Black and White)
24) NAIP –1meter resolution color
25) Original Vegetation

Chapter 7
Aquatic Plant Management Plan

As of 2007 Lazy Lake Management District has an approved WDNR Aquatic Plant Management Plan done by Northern Environmental Technologies. This document represents the current LLMD Aquatic Management Plan and should continue to do so.

When looking at the issue of aquatic invasives species (AIS), many lake Districts and associations are trying to reduce the invasives favoring the native plant species. However, considering the extremely delicate state of the Lazy Lake system, the curlyleaf pondweed (Potamogeton crispus) and Eurasian watermilfoil (Myriophyllum spicatum) are still providing critical habitat for the fish community Columbia County staff feels that a reduce and restoration approach for Lazy Lake is extremely risky. Any attempt to eradicate a more realistic goal to reduce the aquatic invasives might jeopardize the plant dominated state, thus favoring an algal dominated state. It should also be understood the WDNR (AIS) grants have become extremely competitive and as such are very limited for restoration of established infestations. When considering the competitive nature of the AIS grants and the extreme risks associated with Lazy Lake there is very little chance that an AIS grant for reduction and restoration would be awarded.

With a residence time of 5.5 days to 10.3 days (flow dependent) Lazy Lake is acting like a river; as such using liquid treatments on the lake are not a realistic option for a majority of higher flow areas; nevertheless, there may be areas not in the main channel which would have flow rates allowing for granular treatments. Therefore using granular treatments would present the only option and the major consideration for chemical treatments. However, considering the high abundance and density of aquatic invasives in the system, especially at the inlet of the Lazy Lake system and due to the very high risk associated with severe plant manipulation causing the lake to turn to a stable algal dominated state the Lazy Lake Management District would be risking their plant and fish communities if they start to engage in large scale aquatic invasive plant management. It is believed that while some lakes have been successful and the task before the LLMD is not impossible it is extremely risky and would require the use of chemical treatments with very little probability of success.

An alternative to chemical treatments to work toward restoring a healthier, native plant community may exist in the use of a winter drawdown. A winter drawdown, designed to lower the water level 3' would expose the curlyleaf pondweed (Potamogeton crispus) and Eurasian watermilfoil (Myriophyllum spicatum) in the < 3' area of the lake where mechanical harvesting is inappropriate. In combination with the winter drawdown, mechanical harvesting could be aimed at cutting the curlyleaf pondweed prior to seed development, thus reducing the seed bank and over time reducing the abundance. The ability to limit the abundance of curlyleaf pondweed would play a vital role in limiting the phosphorous recycling that occurs through curlyleaf pondweed. It should be noted that be reducing the water level 3' poses a risk for the fish community through winter kill and drastically reduces the recreational uses available through the winter.

Columbia County staff recommends that Lazy Lake continue to interact with the plant community in a way that allows for them to manage their social needs through short term aquatic plant nuisance management (i.e. mechanical weed harvesting for navigation purposes). Furthermore, the LLMD's approach toward Aquatic Invasive Species Management needs to have a goal set determining a desire of short term nuisance management or reduction/restoration.

A lake district such as the LLMD must decide if they want to continue short term nuisance management to meet the needs of lake users, or to proactively attempt to reduce exotics and restore native species abundance. As one would imagine there are pros and cons to both. The appropriate approach towards AIS can be debated and is ultimately determined by the stakeholders such as the LLMD, assuming approval of an aquatic plant management (APM) plan as required under NR 109 Wis. Adm. Code.

Regardless of the approach toward the current aquatic invasive species on Lazy Lake, potentially much worse species are on the horizon and could pose very substantial risks for Lazy Lake and the local economy. These species include but are not limited to: Zebra Mussel, Spiny Water Flea, Round Goby, Rusty Crawfish, Chinese Mystery Snail, Hydrilia, Brazilian Elodea, Yellow Floating Leaf, Water Chestnut, and Rock Snot (not a typo), among others.

As such the Columbia County staff recommends an AIS prevention program. The prevention program is based on the following components:

- Conduct AIS monitoring
- Spread the word About AIS through information and education
- Clean Boats Clean Water Program
- Develop a AIS Contingency Plan

A proactive approach toward dealing with AIS for the future would be to create an AIS contingency plan. This will allow the LLMD to implement a rapid response to the introduction of a new invasive.

In summary, the LLMD should:

- Continue to implement current plant management plan
- Determine future AIS goal (short term nuisance relief vs. reduction and restoration)
- Plan and implement a feasible AIS prevention plan for new invasives
- Develop AIS contingency plan for AIS of the future

Chapter 8
In Lake Management

Shoreland Restoration

As discussed in Chapter 6, Watershed Management Plan, the Columbia County staff recommends the LLMD create a Shore land Restoration Program to provide information, education, and possibly cost sharing assistances for erosion control and native plant buffers. Shore lands are naturally full of a rich diversity of life: plants, animals, and microorganisms, and are extremely important in maintaining healthy lake ecosystem.

Dredging

There was concern from various members of the planning effort to address the loss of depth through sedimentation. This was an alternative to Lazy Lake in the late 70's and early 80's but was ultimately voted against in a referendum. If dredging is going to be considered once again it should be understood that there are no public funds available for dredging. It is highly recommended to use the sedimentation loads which will be developed in through the Water Quality Monitoring Plan and a dredging feasibility study to understand the cost of gaining depth vs. the rate at which depth is being lost. This will allow the LLMD to make an informed decision based on science. It should also be noted a sediment core analysis should be obtained if dredging is to be implemented.

Fishery Plan

The lazy Lake fishery is considered to be in excellent shape. It is recommended to continue to protect the aquatic plant community in order to keep phytoplankton numbers high, as phytoplankton provide a valuable food source for zooplankton as well as a strong foundation of biomass for the fishery.

Lazy Lake is currently on a 5-year sampling rotation, with 2012 being the next sampling year. It is currently planned that in 2012 the WDNR will be doing spring fyke netting for northern pike, spring electrofishing for attempting a northern pike population estimate, late spring electrofishing for panfish and fall electrofishing for bass (Stemick-Thompson, 2009)

Annual Water Level Manipulation Plan

In a natural setting a surface water body undergoes seasonal water level fluctuations. TLPC should work through their WDNR Lake coordinator to work with WDNR Water Resources Management Specialist, Scott Provost via Susan Graham, to develop an annual Water Level Manipulation Plan.

Water Quality

There is not enough water chemistry data available to make any preliminary goals. Water Quality goals will be determined after the first two years of Water Quality monitoring has occurred and analyzed. The water quality model *Bathtub* will be used to assess water quality conditions and based off the Bathtub analysis, water quality goals can be set for the water quality indicators (i.e. phosphorous, cholorophyll, Secchi disc).

Chapter 9
Recommendation for Action

- Develop a Lake Shore Restoration Program
  - Action
    - LLMD should develop an educational and/or cost sharing program to promote and install native shore land buffers on Lazy Lake
  - Contact
    - WDNR Columbia County Water Resources Management Specialist, Susan Graham
    - Columbia County Land and Water Conservation Department
  - Funding
    - WDNR Lake Protection Grant Up to 200,000 or (75%) with 25% Local Match

- Develop an annual Water level Manipulation Plan
  - Action
    - LLMD should create a water level manipulation plan that would mimic a natural water body closer
  - Contact
    - WDNR Water Resources Management, Scott Provost, WDNR Water Resources Management Mark Sesing
  - Funding
    - None needed

- Conduct Aquatic Plant Inventory (4-7 year interval)
  - Action
    - Continue to conduct Aquatic Plant Inventories
  - Contact
    - Private Firm
  - Funding
    - WDNR Lake Planning Grant $10,000 (75% with 25% local match)

- Determine future AIS goal (long term management vs. reduction and restoration)
  - Action
    - Lazy Lake Management District needs to develop an AIS goal for the future
  - Funding
    - None needed

- Plan and implement a feasible AIS prevention plan for new invasives
    - Action
        - Develop education, prevention and planning programs
        - Develop early detection and response plan
    - Contact
        - WDNR Columbia County Water Resources Management Specialist Susan Graham
    - Funding
        - AIS Grant
            - 75% of the cost of a project up to a maximum grant amount of $200,000 for **Education, Prevention and Planning**
            - 75% of project costs up to a maximum of $20,000 for **Early Detection and Response**
            - 75% of project costs up to a maximum of $200,000 for **Established Infestation** Control

- Implementation of Watershed Plan
    - Action
        - Obtain annual updates on watershed work
        - Show support with letters for future grants
    - Contact
        - Columbia County Land And Water Conservation
    - Funding
        - Targeted Runoff Management Grant (TRM)

- LLMD should develop their current watershed monitoring program into a Total Maximum Daily Load Study to examine what water chemistry standards are necessary from the rural and urban watersheds to promote and sustain water quality.

    - Action
        - Obtain annual updates on watershed work
        - Show support with letters for future grants
    - Contact
        - Columbia County Land and Water Conservation
    - Funding
        - WDNR Lake Protection Grant Up to 200,000 or (75%) with 25% Local Match)

- The LWCD will develop phosphorous index based nutrient management plans for all fields in the Tarrant Lake watershed to assess the

    - Action
        - Show support with letters for future grants
    - Contact
        - Columbia County Land and Water Conservation
    - Funding
        - WDNR Lake Protection Grant Up to 200,000 or (75%) with 25% Local Match)
        - DATCP Soil and Water Resource Management Funds

- Promote, advocate and develop standards for storm water and construction site BMP's for runoff.
    - Action
        - Meet with Ordinance Experts from Center for Land Use Education to analyze current ordinance and enforcement protocol
    - Contact
        - Lynn Markham, Land Use Specialist with the Center for Land Use Education
    - Funding
        - WDNR Lake Protection Grant Up to 50,000 or (75%) with 25% Local Match
        - WDNR Lake Planning Grant $10,000 (75%with 25% local Match

- Advocate for the implementation and enforcement of NR 115 by Columbia County Planning and Zoning
    - Action
        - Contact Columbia County Supervisors to duiscuss Columbia County Planning and Zoning Department enforcing NR 115
    - Funding
        - none needed

- Dredging Feasibility Study (If dredging is to be considered)
    - Action
        - Obtain Dredging Feasibility Study
        - Obtain Sediment core Analysis
    - Funding
        - WDNR Lake Planning Grant $10,000 (75%with 25% local Match)

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Appendix A

GLOSSARY

Algae: One-celled (phytoplankton) or multicellular plants either suspended in Water (plankton) or attached to rocks and other substrates (periphyton). Their abundance, as measured by the amount of chlorophyll *a* (green pigment) in an open water sample, is commonly used to classify the trophic status of a lake. Numerous species occur. Algae are an essential part of the lake ecosystem and provides the food base for most lake organisms, including fish. Phytoplankton populations vary widely from day to day, as life cycles are short.

Alkalinity: A measure of the amount of carbonates, bicarbonates, and hydroxide present in water. Low alkalinity is the main indicator of susceptibility to acid rain. Increasing alkalinity is often related to increased algae productivity. Expressed as milligrams per liter (mg/1) of calcium carbonate ($CaCO_3$), or as microequivalents per liter (µeq/1). 20 µeq1 = 1 mg/1 of $CaCO_3$.

Aquatic Invertebrates: Aquatic animals without an internal skeletal structure such as insects, mollusks, and crayfish.

Best Management A practice or combination of practices that is determined to be most effective and practical (including technological, economic, and institutional considerations), means of controlling point and nonpoint pollutant levels compatible with environmental quality goals.

Bioaccumulation: see "Food Chain".

Biomass: The total quantity of plants and animals in a lake. Measured as organisms or dry matter per cubic meter, biomass indicates the degree of a lake system's eutrophication or productivity.

Blue-green algae: Algae that are often associated with problem blooms in lakes. Some produce chemicals toxic to other organisms, including humans. They often form floating scum as they die. Many can fix nitrogen (N_2) from the air to provide their own nutrient.

Catch Basin: An inlet to the storm drain system that typically includes a grate or Curb inlet where stormwater enters the catch basin and a sump to Capture sediment, debris and associated pollutants.

Chlorophyll *a*: Green pigment present in all plant life and necessary for photosynthesis. The amount present in lake water depends on the amount of algae and is therefore used as a common indicator of water quality.

Conductivity (specific conductance): Measures water's ability to conduct an electric current. Conductivity is reported in micromhos per centimeter (µmhos/cm) and is directly related to the total dissolved inorganic chemicals in the water. Values are commonly two times the water hardness unless the water is receiving high concentrations of contaminants introduced by humans.

Cost Sharing: The use of ouside financial resources to offset or share the total cost of the installation of best management practices. Typical cost share rates range from 50% to 90%.

Drainage Basin: A geographic and hydrologic subunit of a watershed.

Drainage Lakes: Lakes fed primarily by streams and with outlets into streams or rivers. They are more subject to surface runoff problems but generally have shorter residence times than seepage lakes. Watershed protection is usually needed to manage lake water quality.

Dry Detention Ponds: A structural BMP or retrofit that consists of a large open depression that stores incoming storm water runoff while percolation occurs through the bottom and sides.

Eutrophication: The process by which lakes are enriched with nutrients, increasing the production of rooted aquatic plants and algae. The extent to which this process has occurred is reflected in a lake's trophic classification: oligotrophic (nutrient poor), mesotrophic (moderately productive), and eutrophic (very productive and fertile).

Filamentous algae: Algae that forms filaments or mats attached to sediment, weeds, piers, etc.

Food Chain: The sequence of algae being eaten by small aquatic animals (zooplankton) which in turn are eaten by small fish which are then eaten by larger fish and eventually by people or predators. Certain chemicals, such as PCBs, mercury, and some pesticides, can be concentrated from very low levels in the water to toxic levels in animals through this process.

Groundwater: Subsurface water occupying the zone of saturation. In a strict sense, the term is applied only to water below the water table.

Drainage Lake: Often referred to as spring-fed lake; has large amounts of groundwater as its source, and a surface outlet. Areas of high groundwater inflow may be Visible as springs or sand boils. Groundwater drainage lakes often have intermediate retention times with water quality dependent on groundwater quality.

Impervious Surface: Hard surface that prevents and retards the entry of water into the soil mantle as natural conditions prior to development and/or a hard surface area that causes water to runoff the surface in greater quantities or at increased flow rates from the flow present under conditions prior to development. Common impervious surfaces include, but are not limited to rooftops, walkways, patios, driveways, parking lots, storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam, or other surfaces that similarly impede the natural infiltration of urban runoff

Impoundment: Manmade lake or reservoir usually characterized by stream inflow and always a stream outlet. Because of nutrient and soil loss from upstream land use practices, impoundments ordinarily have higher nutrient concentrations and faster sedimentation rates than natural lakes. Their retention times are relatively short.

Infiltration: The penetration of water through the ground surface into subsurface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls.

Land Conversion: A change in land use, function or purpose.

Limiting factor: The nutrient or condition in shortest supply relative to plant growth requirements. Plants will grow until stopped by this limitation; for example, phosphorus in summer, temperature or light in fall or winter.

Local Government: Any County, City, or Town having its own incorporated government for local affairs.

Macrophytes: See "Rooted aquatic plants".

Non-point Pollution: Pollution whose sources cannot be traced to a single point such as a municipal or industrial wastewater treatment plant discharge pipe.

Overturn: Fall cooling and spring warming of surface water increases density, and gradually makes temperature and density uniform from top to bottom. This allows wind and wave action to mix the entire lake. Mixing allows bottom waters to contact the atmosphere, raising water's oxygen content. However, warming may occur too rapidly in the spring for mixing to be effective, especially in small sheltered kettle lakes.

Phosphorus: Key nutrient influencing plant growth in more than 80% of Wisconsin lakes. Soluble reactive phosphorus is the amount of phosphorus in solution that is available to plants. Total phosphorus includes the amount of phosphorus in solution (reactive) and in particulate form.

Photosynthesis: Process by which green plants convert carbon dioxide (CO_2) dissolved in water to sugar and oxygen using sunlight for energy. Photosynthesis is essential in producing a lake's food base, and is an important source of oxygen for many lakes.

Phytoplankton: See "Algae".

Pollution Prevention: A management measure to prevent and reduce nonpoint source loadings generated from a variety or everyday activities within urban areas. These can include turf management, public education, ordinances, planning and zoning, pet waste control, and proper disposal of oil.

Respiration: The process by which aquatic organisms convert organic material to energy. It is the reverse reaction of photosynthesis. Respiration consumes oxygen (O_2) and releases carbon dioxide (CO_2). It also takes place as organic matter decays.

Retention Time (turnover rate or flushing rate): The average length of time water resides in a lake, ranging from several days in small impoundments to many years in large seepage lakes. Retention time is important in determining the impact of nutrient inputs. Long retention times result in recycling and greater nutrient retention by most lakes. Calculate retention time by dividing the volume of water passing through the lake per year by the lake volume.

Retrofit: The modification of an urban runoff management system in a previously developed area. This may include wet ponds, infiltration systems, wetland plantings, streambank stabilization, and other BMP techniques for improving water quality and creating aquatic habitat. A retrofit can consist of new BMP construction in a developing area, enhancing an older runoff management structure, or combining improvements and new construction.

Rooted Aquatic Plants (macrophytes): Refers to higher (multi-celled) plants growing in or near water. Macrophytes are beneficial to lakes because they produce oxygen and

provide substrate for fish habitat and aquatic insects. Overabundance of such plants, especially problem species, is related to shallow water depth and high nutrient levels.

Runoff: That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface water. Runoff can carry pollutants into receiving waters.

Secchi disc: An 8-inch diameter plate with alternating quadrants painted black and white that is used to measure water clarity (light penetration). The disc is lowered into water until it disappears from view. It is then raised until just visible. An average of the two depths, taken from the shaded side of the boat, is recorded as the Secchi disc reading. For best results, the readings should be taken on sunny, calm days.

Sedimentation: Accumulated organic and inorganic matter on the lake bottom. Sediment includes decaying algae and weeds, marl, and soil and organic matter eroded from the lake's watershed.

Sedimentation Basins: Sediment storage areas that may consist of wet detention basins or dry detention basins. Excavated areas with storage depression below the natural ground surface; creek, stream, channel or drainageway bottoms properly engineered and designed to trap and store sediment for future removal.

Seepage Lakes: Lakes without a significant inlet or outlet, fed by rainfall or groundwater. Seepage lakes lose water through evaporation and groundwater moving on a down gradient. Lakes with little groundwater inflow tend to be naturally acidic and most susceptible to the effects of acid rain. Seepage lakes often have long residence times and lake levels fluctuate with local groundwater levels. Water quality is affected by groundwater quality and the use of land on the shoreline.

Soluble: Capable of being dissolved.

Stratification: The layering of water due to differences in density. Water's greatest density occurs at 39°F (4°C). As water warms during the summer, it remains near the surface while colder water remains near the bottom. Wind mixing determines the thickness of the warm surface water layer (epilimnion), which usually extends to the depth of about 20 feet. The narrow transition zone between the epilimnion and cold bottom water (hypolimnion) is called the metalimnion or thermocline.

Suspended Solids: A measure of the particulate matter in a water sample, expressed in milligrams per liter. When measured on inflowing streams, it can be used to estimate the sedimentation rate of lakes or impoundments.

Thermocline: See "Stratification".

TMDL: Total maximum daily load. A watershed study designed to set thresholds to establish high quality water by determining expectable nutrient and sediment loads from all sources.

Trophic State: See "Eutrophication".

Turnover: See "Overturn".

Watershed: A drainage area or basin where all land and water areas drain or flow toward a central collector such as a creek, stream, river or lake at a lower elevation.

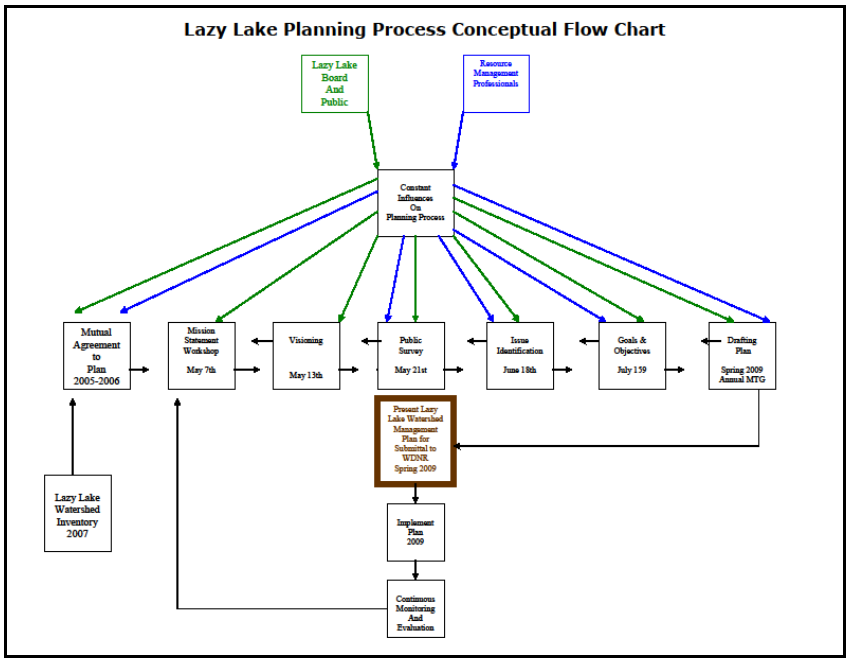
Wet Detention Ponds: A structural BMP or retrofit that consists of a single permanent pool of

water that stores and treats incoming storm water. Wet detention ponds usually have three to seven feet of standing water, allowing pollutants to settle, with a defined siltation/sedimentation pond and outlet structure.

Appendix B

Public Participation Process Documentation

The following are the agendas, handouts, worksheets, survey and results of the planning process.



You are invited to the
2008
Lazy Lake Watershed Planning Process

6:30 Wednesday May 7th, Savanna Oaks Cultural Center,
Introduction to Public Participation Planning Process

6:30 Tuesday May 13th, Savanna Oaks Cultural Center,
Visioning – at this meeting the community will identify its purpose, their core values and vision for the future of Lazy Lake Watershed

6:30 Wednesday May 21st, Savanna Oaks Cultural Center,
Visioning (if more time is needed)
Developing the Watershed Survey – Present preliminary survey

6:30 Wednesday June 18th, Savanna Oaks Cultural Center,
Issue Identification – The culmination of the survey results will be presented. The present group will then prioritize the issues.
Discuss development of Goals and Objectives – The group will discuss options for developing goals and objectives.

6:30 Tuesday July 15th, Savanna Oaks Cultural Center,
Presentation of Goals and Objectives

2009 Lazy Lake Annual Meeting - Spring of 2009
Present Lazy Lake Watershed Plan

Any Questions or Concerns Please Contact
Chris Arnold, Conservation Technician -608-742-9670
Columbia County Land and Water Conservation

2008
Lazy Lake
Watershed Planning
Process
Revised May22

6:30 Wednesday May 7th, Savanna Oaks Cultural Center,

Introduction to Public Participation Planning Process

6:30 Tuesday May 13th, Savanna Oaks Cultural Center,

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6:30 Wednesday May 21st, Savanna Oaks Cultural Center,

Visioning (if more time is needed)

Developing the Watershed Survey – Present preliminary survey

6:30 Tuesday July 15th, Savanna Oaks Cultural Center,

Issue Identification – The culmination of the survey results will be presented. The present group will then prioritize the issues.

Discuss development of Goals and Objectives – The group will discuss options for developing goals and objectives.

6:30 Monday July 21st, Savanna Oaks Cultural Center,

Presentation of Goals and Objectives

2009 Lazy Lake Annual Meeting

Present Lazy Lake Watershed Plan

Any Questions or Concerns Please Contact Chris Arnold,
Conservation Technician, Columbia County Land and Water Conservation

What is a "Vision" Statement and
What is a "Mission" Statement

Vision without action is merely a dream. Action without vision just passes the time. Vision with action can change the world. If you have just a mission, the action written, - and not the vision, you will not know where you're going or if you have arrived. -- Joel Barker

Vision Statements and Mission Statements:

- power-packed drivers of the organization
- when used they release the potent energy within the people
- The best missions and visions become mantras for action; they're catalysts.

A **vision** defines the **destination** whereas the **mission** is the **road map** that will take you there.

Mission:

A mission statement answers three key questions:

- What do we do?
- For whom do we do it?
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Your **mission** is what you do best **every day**, and your **vision** is what the **future looks like** because you do that mission so exceedingly well.

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VISION **creates that momentum** of growing anticipation about the future, where **change is embraced** as a step closer to that very **compelling picture** of what's coming next. The **excitement** about the future **trumps** any **apprehension** about the uncertain — change is recognized as the **catalytic converter** it is.

Lazy Lake Management District Planning Working Agenda
May 7, 2008 @ 6:30 pm
Savannah Oaks Cultural Center @ Fall River

6:30 pm Welcome & purpose of meeting -- Steve, Bd. Pres. of Lazy Lake Mgt. Distr.

- Purpose of meeting/why are we hear tonight
- Introduce county staff to support process – LWCD & UWEX
  - Kurt Calkins, Director of the Col. Co. Land and Water Conservation Dept.
  - Chris Arnold, Conservation Technician
  - Kathleen Haas, Col. Co. UW-Extension/Community Development Educator

6:50 Purpose of Process and Planning Process Overview

- **Your Role**
- **Meeting Etiquette & Guidelines**
  - One person talks at a time; there are no side discussions
  - We emphasize open and honest communication – there are no hidden agendas
  - Listen and have an open mind
  - Focus on the future, not the past
  - Focus on the issue, not personalities
  - Criticize only ideas, not people
  - Expect to change your own mind, but don't expect to change another's mind
  - Practice self-respect and mutual respect
  - Within our group, we have the resources we need to solve any problem that arises, this means that we will all be contributors
  - It is O.K. to disagree
  - Be an "Adventurer" not a "Prisoner"
  - **Have Fun!**
- Buy in & agreement to Plan
- Mission Statement
- Building common ground and understanding
- Vision
- Issue Identification
- Goal & Objectives
- Lazy Lake Watershed Plan

7:00 Introductions & Icebreaker: ***Change***

- Set up (3 min)
- Individual reflection (5 min)
- Interviews (10 min)

UW Extension
Columbia County
University of Wisconsin-Extension
120 West Conant Street
P.O. Box 567
Portage, WI 53901-0567
608-742-9680
608-742-9862 (FAX)
711 for Relay (TTY/TTD)
http://www.uwex.edu/ces/cty/columbia

Cooperative Extension

Lazy Lake Icebreaker

May 7, 2008

1.) Take **5 minutes** to read this activity and respond to the questions in #4

2.) Pair up with someone you don't know too well.

3.) Re-introduce yourself. **Each** of you will have **5 minutes** to share your "change" story.

4.) Think about a time when you made a big change in your life -- went to college, got married, took a new job, had children, bought a house – how did you frame, react, plan, share and cope with the change?

- "Flight or fright" I----------I "Embrace or grow"
- What did you consider when making the change?
- How did you share the change with friends and family?
- How did your friends and family react to the change?
- Reflecting back, did you make a good decision?

5.) Take some time to write down and describe the "change process" your partner went through. You will recap the "change process" to the rest of the group

It takes a lot of courage to release the familiar and seemingly secure, to embrace the new. But there is no real security in what is no longer meaningful. There is more security in the adventurous and exciting, for in movement there is life, and in change there is power. -- Alan Cohen

Lazy Lake Group Activity

Common Ground Leads to Common Vision

Lazy Lake Management District

Issue Identification Worksheet

Name:_____ Contact (phone # or E-mail):_____

	In-Lake Issues	Watershed Issues
Air		
Land		
Water		
Plants		
Animals		

Please return to: Chris Arnold, Columbia County Land and Water Conservation Dept, P.O. Box 485, Portage, WI 53901

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University of Wisconsin-Extension
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Take some time to write down and describe the "change process" your partner went through. You will recap the "change process" to the rest of the group.

- Took an opportunity – lifelong friends
- Started business from ground up – big risk - give up security – consider future - how to make it work – many questions - son took over business
- Retiring – didn't know what was ahead – worries – uncertainty – more freedom to share time with family and friends – feel good
- Retirement – set date – planned for it – wouldn't go back to profession – plans have changed – people set your day – security – no one asking your opinion, yet yesterday they were
- Office moved 25 miles further – "flight" response – reconsidered change is good – family supported
- Leave Sun Prairie – embrace and grow in new place – didn't' know where they were going – good move – big change
- Became more social – signed up to be on a committee – embraced change – learning experience – wanted to change – talking more – good decision
- More assertive – farming
- Don't look back – moving to city from small town then to farm – looked forward to moving back to city – kids loved farm – married to farmer – good decision
- Fright – retirement – house for sale same month retired – built another house – didn't have job – what am I going to do? – 22 years on County Board – took some time
- Job change – midlife change – do something on his own – scary – new business – family supportive – good decision

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Cooperative Extension

Lazy Lake Management District Planning Working Agenda

May 13, 2008 @ 6:30 pm

Savannah Oaks Cultural Center @ Fall River

6:30 pm Welcome & purpose of meeting -- Steve, Bd. Pres. of Lazy Lake Mgt. Distr.
- Purpose of meeting/why are we hear tonight

6:50 Recap & Overview
-- Chris Arnold/Col. Co. Land & Water Conservation Technician
- Recap 5/7 meeting -- notes
- Purpose of Process and Planning Process Overview
  - Your Role
  - Meeting Etiquette & Guidelines
  - Buy in & agreement to Plan
  - Mission Statement
  - Building common ground and understanding
  - Vision
  - Issue Identification
  - Goal & Objectives
  - Lazy Lake Watershed Plan

7:00 What is Visioning...
-- Kathleen Haas/Columbia Co. UW-Extension

7:15 Introductions & Icebreaker

7:45 Visioning Part I

8:30 Wrap-up & Next Steps
- Visioning Part II
- Next Meeting: 5/21 @ 6:30 pm

Visioning Session for the Lazy Lake Management District
Vision Part I
May 13, 2008

Imagine that you are ship wrecked with the rest of the folks at your table. You have been stranded on a deserted island for several years. Suddenly you and the rest of the folks have been rescued and returned to Lazy Lake.

As you look around, everything is as you hoped it would be and just as you always wished it could be. There is an ecological infrastructure in place to sustain Lazy Lakes as part of a larger watershed.

- ❖ What is different from today?
- ❖ What do you see going on?
- ❖ What are people doing? Saying?
- ❖ What is in place to support and maintain the water quality?
- ❖ What land stewardship practices are in place?
- ❖ What systems are in place to protect the aquatic/land plants and animals that make up the Lazy Lake Management District?

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Lazy Lake Management District Planning Working Agenda
May 21, 2008 @ 6:30 pm
Savannah Oaks Cultural Center @ Fall River

6:30 pm Welcome & purpose of meeting -- Steve, Bd. Pres. of Lazy Lake Mgt. Distr.
- Purpose of meeting/why are we hear tonight

6:50 Recap & Overview
— Chris Arnold/Col. Co. Land & Water Conservation Technician
- Recap 5/13 meeting -- notes
- Purpose of Process and Planning Process Overview
  - Your Role
  - Meeting Etiquette & Guidelines
  - Buy in & agreement to Plan
  - **Mission Statement**
  - Building common ground and understanding
  - Vision
  - Issue Identification
  - Goal & Objectives
  - Lazy Lake Watershed Plan

7:00 Visioning Part II

8:30 Wrap-up & Next Steps
- ▸ Survey
- ▸ Next Meeting: 5/27? @ 6:30 pm

Lazy Lake Management District **Issue Identification Worksheet**

Prepare a master list of key issues phrased as questions (Issue Statement) that have more than one answer. The issues should be ones that organization can do something about. Also describe the consequences of not addressing this issue.

Example Issue Statement: How can the Lazy Lake District enhance public understanding of managing the native aquatic plant life?

	In-Lake Issues	Watershed Issues
Air	Issue Statement: Consequence:	Issue Statement: Consequence
Land	Issue Statement: Consequence	Issue Statement: Consequence
Water	Issue Statement: Consequence	Issue Statement: Consequence
Plants	Issue Statement: Consequence	Issue Statement: Consequence
Animals	Issue Statement: Consequence	Issue Statement: Consequence
Public Relations	Issue Statement: Consequence:	Issue Statement: Consequence:
Organizational Capacity	Issue Statement: Consequence:	Issue Statement: Consequence:
Information & Education	Issue Statement: Consequence:	Issue Statement: Consequence:

Lazy Lake Management District's Vision I Results
From 5/13/08 Meeting

Nouns	Adjectives	Verbs: active tense	Adverbs
Water	Clear	Clarity	Visibility
Order free	Fresh		
Multiple Uses & Users	Community accessible		
Swimming	Clean	fresh	
Fish	Diversity & Abundance	Fishing	Excellent, healthy, relaxing & enjoyable
Water Sports	Activity		
Boats	Variety	Sailing, canoeing, water skiing	
Wild Flowers & plants, grasses	Natural, native, buffer zones	Diverse	Model
Family & Friends	Enjoy	Recreate	
Business	Support	Supportive	Financial
Winter	Activities	Ice Fishing	
Education	Lake management	Teach & Inform	On-going
Animal Waste & Farm	Nutrient management	Partner & Manage	Best Practices
Lawns	Best Practices	Erosion Control	Buffers
Kids	Vision	Want/Envision	Quality of Life
Stewardship	Land, air, water & plant and animal	Educate & Manage	Science based, sustainable, conservation
Ownership			Care & Value
Practices	Regulation	Educate & Enforce	Incentives Zoning
Aquatic Life Turtles Plants Muskrats	Diversity	Balance	Healthy
Birds	Habitat	Abundance	

Lazy Lake Management District Planning Agenda

July 21, 2008 @ 6:30 pm
Savannah Oaks Cultural Center @ Fall River

6:30 pm **Welcome & purpose of meeting** – Purpose of meeting/why are we hear tonight

6:40 **Recap & Overview**
-- Chris Arnold/Col. Co. Land & Water Conservation Technician
- Recap 7/15 meeting
- Purpose of Process and Planning Process Overview
  - Your Role
  - Meeting Etiquette & Guidelines
  - Buy in & agreement to Plan
  - Mission Statement – on back
  - Building common ground and understanding
  - Vision Statement – on back
  - Issue Identification
  - **Goal & Objectives**
  - **Lazy Lake Watershed Plan**

6:50 **Lazy Lake Issue Statements**

A. How can the Lazy Lake Management District (LLMD) enhance and sustain the peaceful and tranquil attributes of the Lake and surrounding area?
- Family friendly

B. How can the LLMD improve water quality
- Algae
- safe H20 quality, clear H20

C. How can the LLMD reduce nutrient loads?
- Curb runoff
- Practice good land stewardship and conservation strategies
- Ag fertilizers/pesticides

D. How can the LLMD protect it shoreline?
- shoreline buffers
- Erosion
- muskrats/beavers

E. How can the LLMD improve communications (information/education) with community residents?
- newsletters
- dam meeting

F. How can the LLMD garner more community involvement & grass roots support?
- variety of lake users – fishing, swimming,
- Access public beach
- Address conflict between various Lake users

Lazy Lake Management District
c/o N3145 Sleepy Hollow Road
Fall River, WI 53932
lazylake@centurytel.net

May 28, 2008

Lazy Lake Use and Water Quality Survey

Dear Friends and Neighbors,

This Spring, the Lazy Lake Management District began a joint effort with the Columbia County Land and Water Conservation Department to develop a lake management plan to protect and preserve one of our area's greatest assets, Lazy Lake. Part of that effort is developing overall goals and objectives to address water quality, lake use, and lake management; ultimately designed at improving and protecting Lazy Lake. The Lazy Lake Management District is completely committed to these goals, as the Vision Statement indicates below. As a result, we are conducting a survey to determine your thoughts,ideas, comments and concerns regarding Lazy Lake.

We ask that you take a few minutes to fill out this survey and return it as soon as possible but no later than **June 19th** in the self addressed envelope supplied in the packet. Surveys can also be dropped off at the **Mobile Mart and Cafe**, 722 South Main St, Fall River. Your responses will be kept in complete confidence and be used to help develop an overall strategy to protect our communities defining resource, Lazy Lake.

If you have any questions, please feel free to contact Chris Arnold at the Columbia County Land and Water Conservation Dept, 608.742.9674. If you are interested in learning about or becoming part of the Planning Process for Lazy Lake, the next meeting is on **July 15**, 6:30pm, at the Savanna Oaks Cultural Center, 100 Posner Rd at Hwy 16, Fall River.

Thank you for your time and consideration.

Steven Sobiek
President
Lazy Lake Management District

VISION STATEMENT:The Lazy Lake Management District and watershed envisions sparkling, crystal clear water, obtained by restoring and maintaining the health of Lazy Lake's ecosystem, for the solitary and social enjoyment of watching a symphony of ripples created by wind, wildlife, birds, fish and many diverse recreational activities.

Lazy Lake is a natural resource that will bring joy and beauty to water enthusiasts and fishermen for generations to come. Clean useable water that is healthy for people and animals shall be the focus of Lake District activity.

The District will be the leader in protecting and enhancing the water quality and resources of Lazy Lake for perpetuity.

In performing this leadership role, the District will serve as policy-maker, regulator, planner, manager and mediator on behalf of lake and watershed stakeholders.

LAZY LAKE PLANNING PROCESS OPINION SURVEY (Summer 2008)

Property Location:

- ☐ Lakefront Property Owner
- ☐ Management District Only
- ☐ Watershed Only
- ☐ I do not know

Property Type:

- ☐ Permanent Residential Home
- ☐ Part-time Residential Home
- ☐ Agricultural Land
- ☐ Vacant/Undeveloped
- ☐ Business/Commercial
- ☐ Renter
- ☐ Off-Lake Landowners w/access rights

Years On Property:

- ☐ < 1 year
- ☐ 1-3 years
- ☐ 4-10 years
- ☐ 11-20 years
- ☐ 21-30 years
- ☐ 30+ years

Property Use During Summer:

- ☐ Never
- ☐ 1-3 days/mo
- ☐ 4-6 days/mo
- ☐ 7-10 days/mo
- ☐ 10+ days/mo
- ☐ Every day

Lake Use During Summer:

- ☐ Never
- ☐ 1-3 days/mo
- ☐ 4-6 days/mo
- ☐ 7-10 days/mo
- ☐ 10+ days/mo
- ☐ Every day

Lake Use During Winter:

- ☐ Never
- ☐ 1-3 days/mo
- ☐ 4-6 days/mo
- ☐ 7-10 days/mo
- ☐ 10+ days/mo
- ☐ Every day

NOTE: The next section of the survey includes a series of gradient-type questions. Responses could fall anywhere along a 10-point scale between two opposing positions (i.e. 1 - 10). The last option of some questions states "comment", please feel free to enter another option and then fill in a box for your option. Please fill in one box per question.

1) Perceptions About Lazy Lake:

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Water clarity:	completely murky												completely clear
Plant growth:	overly weed-choked												overly sparse
Weekend crowding:	overly crowded												calm
Weekday crowding:	overly crowded												calm
Public boating acess:	too much												too little
Public shore fishing access:	too much												too little
Local lake rules:	overly restrictive												inadequate
Law enforcement:	overly aggressive												inadequate
Visual Aesthities:	unpleasing												pleasing

2) What value do (or would) you place on each of the following as contributing to your "quality of life" as a property owner?

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Good fishing:	not important												very important
Peace and tranquility:	not important												very important
Natural scenic beauty:	not important												very important
Clear water:	not important												very important
Safe water quality:	not important												very important
Boating policies and/or restrictions:	not important												very important
Unique and diverse wildlife:	not important												very important
Access to public beach:	not important												very important
Access to public boat launch:	not important												very important
Access to public shore fishing:	not important												very important
Access to walking/biking paths:	not important												very important
Healthy aquatic plant community:	not important												very important
Abundant fish and wildlife habitat:	not important												very important
Minimal boat traffic:	not important												very important
Lazy Lakes Presence:	not important												very important
Enforcement of rules:	not important												very important

Please return as soon as possible, but no later than June 19th in the self-addressed envelope supplied in the packet. Surveys can also be dropped off at Mobil Mart & Café, 722 South Main Street, Fall River, WI. Any questions, contact Chris Arnold at 608-742-9674.

3) What activities do (or would) you and your family most enjoy while on or at Lazy Lake?

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Swimming:	least enjoy												most enjoy
Fishing:	least enjoy												most enjoy
Enjoying peace and tranquility:	least enjoy												most enjoy
Observing wildlife:	least enjoy												most enjoy
Bird watching	least enjoy												most enjoy
Slow, motorboat cruising:	least enjoy												most enjoy
Jet Skiing:	least enjoy												most enjoy
Water skiing or tubing:	least enjoy												most enjoy
Speed boating:	least enjoy												most enjoy
Paddling or canoeing	least enjoy												most enjoy
Walking/biking around lake:	least enjoy												most enjoy
Visiting lazy lake park:	least enjoy												most enjoy
Ice skating:	least enjoy												most enjoy
Ice fishing:	least enjoy												most enjoy
"Shiverfest":	least enjoy												most enjoy
"January Fishery":	least enjoy												most enjoy
"Spring Fishery":	least enjoy												most enjoy
Other:	least enjoy												most enjoy

4) How does each of the following CURRENTLY limit your use and enjoyment of Lazy Lake:

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Water clarity:	big problem												not a concern
Algae:	big problem												not a concern
Nuisance aquatic plants:	big problem												not a concern
Fish/wildlife habitat:	big problem												not a concern
Crowding:	big problem												not a concern
Lake rules:	big problem												not a concern
Access to lake:	big problem												not a concern
Litter:	big problem												not a concern
Quality of fishing:	big problem												not a concern
Carp:	big problem												not a concern
Building and development:	big problem												not a concern
Conflicts with other users:	big problem												not a concern
Water levels:	big problem												not a concern
Pier-related issues:	big problem												not a concern
Canada geese:	big problem												not a concern
Noise:	big problem												not a concern
Lack of natural scenic beauty:	big problem												not a concern
Other:	big problem												not a concern

5) Which of the following do you feel are CURRENTLY Lazy Lake's biggest threats:

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Overuse of lawn fertilizers/pesticides:	big threat												not an issue
Overuse of agricultural fertilizers/pesticides:	big threat												not an issue
Non-native, invasive plants/animals:	big threat												not an issue
Loss of habitat:	big threat												not an issue
Polluted runoff:	big threat												not an issue
Over-development:	big threat												not an issue
Over-crowding:	big threat												not an issue
Groundwater depletion:	big threat												not an issue
Lake-rule violations:	big threat												not an issue
Uninformed public:	big threat												not an issue
Lake-level fluctuations:	big threat												not an issue
Enforcement of regulations:	big threat												not an issue
Loss of native shorelines	big threat												not an issue

Which of the following do you feel are CURRENTLY Lazy Lake's biggest threats (Continued):

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Poor land-use planning:	big threat												not an issue
Misguided lake-management programs:	big threat												not an issue
Other:	big threat												not an issue

6) How informed do you feel about issues affecting Lazy and its management?

		No Opinion	1	2	3	4	5	6	7	8	9	10	
	not at all												very informed

7) How do you (would you) prefer to receive your Lazy Lake news and information?

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Attend Lake District meetings:	least												most preferred
Community workshops/events:	least												most preferred
Newsletters:	least												most preferred
Friends and neighbors:	least												most preferred
Email Updates:	least												most preferred
Email News Letter:	least												most preferred
Web page:	least												most preferred
Other:	least												most preferred

8) How do you (would you) feel about the following Lazy Lake efforts?

		No Opinion	1	2	3	4	5	6	7	8	9	10	
Development of management plans:	strongly oppose												strongly support
Mechanical weed harvesting	strongly oppose												strongly support
Water quality monitoring	strongly oppose												strongly support
Lake Use Monitoring:	strongly oppose												strongly support
Control of invasive plants/animals:	strongly oppose												strongly support
Dredging:	strongly oppose												strongly support
Aquisition of conservancy areas:	strongly oppose												strongly support
Lake District Website:	strongly oppose												strongly support
Lobbying for lake-protection policies:	strongly oppose												strongly support
Public meetings/forums:	strongly oppose												strongly support
Property owner surveys	strongly oppose												strongly support
Lake research to diagnose problems:	strongly oppose												strongly support
Pier placement:	strongly oppose												strongly support
Shoreline Protection:	strongly oppose												strongly support
Other:	strongly oppose												strongly support

9) Would you be interested in a landowner program offering up to 50% cost-sharing and technical assistance for projects that benefit Lazy Lake (i.e. rain gardens, shoreline restorations, etc.)?

		No Opinion	1	2	3	4	5	6	7	8	9	10	
	not interested												very interested

10) How do you feel about Lazy Lake Management District using district raised revenues for projects on Lazy Lake and its' watershed:

		No Opinion	1	2	3	4	5	6	7	8	9	10	
	strongly oppose												strongly support

11) How do you feel about raising the current tax rate for the Lazy Lake Management District to be used on projects for Lazy Lake and its' watershed:

		No Opinion	1	2	3	4	5	6	7	8	9	10	
	strongly oppose												strongly support

Please return as soon as possible, but no later than June 19th in the self-addressed envelope supplied in the packet. Surveys can also be dropped off at Mobil Mart & Café, 722 South Main Street, Fall River, WI. Any questions, contact Chris Arnold at 608-742-9674.

12) What other funding sources would you recommend the Lazy Lake Management District using?:

_____

_____

_____

13) What specific actions are needed to better protect and manage Lazy Lake?

_____

_____

_____

14) What topics would you like to learn about at future meetings or through the website?

_____

_____

_____

15) What do you think is the most positive aspect of Lazy Lake or its' management?

_____

_____

_____

16) What do you think is the most negative aspect of Lazy Lake or its' management?

_____

_____

_____

17) Fishing:

a. Days fished per year? _____

b. Days ice fished per year? _____

c. What species of fish did you catch last year? (circle all that apply)

1. Panfish
2. Yellow Perch
3. Crappie
4. Channel Catfish
5. White Sucker
6. Northern Pike
7. Walleyed Pike
8. Largemouth Bass
9. Smallmouth Bass
10. Other (please specify) _____

d. How do you rate the fishing quality?

1. Excellent ____
2. Good ____
3. Fair ____
4. Poor ____

Comments:

_____

_____

_____

_____

_____

LAZY LAKE PLANNING PROCESS PROPERTY OWNER SURVEY RESULTS
(Summer 2008)

Property Location:		***Property Type:***		***Years On Property Ownership:***	
Lakefront	34	Permanent Residential Home	84	< 1 year	4
Management District Only	25	Part-time Residential Home	5	1-3 years	14
Watershed Only	25	Agricultural Land	25	4-10 years	34
I do not know	26	Vacant/Undeveloped	6	11-20 yrs	18
		Business/Commercial	2	21-30 yrs	6
		Off-Lake Landowners w/access rights	1	30+ yrs	22

Property Use During Summer:		***Lake Use During Summer:***		***Lake Use During Winter:***	
Never	11	Never	52	Never	59
1-3 days/mo	4	1-3 days/mo	21	1-3 days/mo	23
4-6 days/mo	5	4-6 days/mo	7	4-6 days/mo	6
7-10 days/mo	4	7-10 days/mo	4	7-10 days/mo	5
10+ days/mo	6	10+ days/mo	15	10+ days/mo	3
Every day	68	Every day	4	Every day	5

NOTE: The next section of the survey includes a series of gradient-type questions. Responses could fall anywhere along a 10-point scale between two opposing positions (i.e. 1 - 10). For each question, the explanation associated with the gradient is listed appropriately. Please fill in one square per question.

1) Perceptions About Lazy Lake:		Total Responses	Average	Median	Standard Deviation	
a. Water clarity:	completely murky (1)	85	4	4	2	completely clear (10)
b. Plant growth:	overly weed-choked (1)	85	2	1	1	overly sparse (10)
c. Weekend crowding:	overly crowded (1)	76	7	8	2	calm (10)
d. Weekday crowding:	overly crowded (1)	75	8	9	2	calm (10)
e. Public boating acess:	too much (1)	78	5	5	2	too much (10)
f. Public shore fishing access:	too much (1)	78	6	5	2	too much (10)
g. Local lake rules:	overly restrictive (1)	73	5	5	2	overly restrictive (10)
h. Law enforcement:	overly aggressive (1)	74	6	5	2	overly aggressive (10)
i. Visual Aesthities:	unpleasing (1)	86	4	3	3	overly aggressive (10)
j. Other:						

2) What value do (or would) you place on each of the following as contributing to your "quality of life" as a local property owner?		Total Responses	Average	Median	Standard Deviation	
b. Good fishing:	not important (1)	86	7	8	3	very important (10)
c. Peace and tranquility:	not important (1)	89	8	9	2	very important (10)
d. Natural scenic beauty:	not important (1)	90	8	9	2	very important (10)
e. Clear water:	not important (1)	88	8	8	3	very important (10)
f. Safe water quality:	not important (1)	88	9	10	2	very important (10)
g. Boating policies and/or restrictions	not important (1)	84	6	6	3	very important (10)
h. Unique and diverse wildlife:	not important (1)	90	7	7	3	very important (10)
i. Access to public beach:	not important (1)	79	4	3	3	very important (10)
j. Access to public boat launch:	not important (1)	84	6	6	3	very important (10)
k. Access to public shore fishing:	not important (1)	85	5	5	3	very important (10)
l. Access to walking/biking paths:	not important (1)	85	5	5	3	very important (10)
m. Healthy aquatic plant community:	not important (1)	87	7	8	3	very important (10)
n. Abundant fish and wildlife habitat:	not important (1)	87	8	9	3	very important (10)
o. Minimal boat traffic:	not important (1)	86	6	6	3	very important (10)
p. Lazy Lakes Presence:	not important (1)	82	7	8	3	very important (10)
q. Enforcement of rules:	not important (1)	85	7	7	2	very important (10)
r. Other						

3) What activities do (or would) you and your family most enjoy while on Lazy Lake?		Total Responses	Average	Median	Standard Deviation	
a. Swimming:	least enjoy (1)	80.0	4.0	2	4.0	most enjoy (10)
b. Fishing:	least enjoy (1)	86.0	7.0	9	3.0	most enjoy (10)
c. Enjoying peace and tranquility:	least enjoy (1)	86.0	8.0	10	3.0	most enjoy (10)
d. Observing wildlife:	least enjoy (1)	86.0	7.0	8	3.0	most enjoy (10)
e. Bird watching	least enjoy (1)	84.0	7.0	7.0	3.0	most enjoy (10)
f. Slow, motorboat cruising:	least enjoy (1)	85.0	6.0	6	3.0	most enjoy (10)
g. Jet Skiing:	least enjoy (1)	84.0	2.0	1	2.0	most enjoy (10)
h. Water skiing or tubing:	least enjoy (1)	83.0	3.0	1	3.0	most enjoy (10)
i. Speed boating:	least enjoy (1)	84.0	2.0	1	2.0	most enjoy (10)
j. Walking/biking around lake:	least enjoy (1)	87.0	6.0	6	3.0	most enjoy (10)
k. Visiting Lazy Lake Park:	least enjoy (1)	84.0	6.0	5	3.0	most enjoy (10)
l. Ice skating:	least enjoy (1)	85.0	5.0	5	3.0	most enjoy (10)
m. Ice fishing:	least enjoy (1)	83.0	6.0	5	4.0	most enjoy (10)
n. Shiverfest	least enjoy (1)	84.0	5.0	6	3.0	most enjoy (10)
o. "January Fishery"	least enjoy (1)	81.0	6.0	6	4.0	most enjoy (10)
p. "Spring Fishery"	least enjoy (1)	78.0	5.0	5	3.0	most enjoy (10)
q. Other:	least enjoy (1)	15.0	5.0	5	4.0	most enjoy (10)

4) How does each of the following CURRENTLY limit your use and enjoyment of Lazy Lake:		Total Responses	Average	Median	Standard Deviation	
a. Water clarity:	big problem (1)	85	4.0	3.0	3.0	not a concern (10)
b. Algae:	big problem (1)	83	2.0	1	2.0	not a concern (10)
c. Nuisance aquatic plants:	big problem (1)	84	2.0	1	2.0	not a concern (10)
d. Fish/wildlife habitat:	big problem (1)	83.0	7.0	6	3.0	not a concern (10)
e. Crowding:	big problem (1)	81	7.0	8	3.0	not a concern (10)
f. Lake rules:	big problem (1)	79	7.0	7	3.0	not a concern (10)
g. Access to lake:	big problem (1)	83	6.0	6	3.0	not a concern (10)
h. Litter:	big problem (1)	78	6.0	7	3.0	not a concern (10)
i. Quality of fishing:	big problem (1)	75	6.0	6.0	3.0	not a concern (10)
j. Carp:	big problem (1)	82	6.0	5.0	3.0	not a concern (10)
k. Building and development:	big problem (1)	82	6.0	5	3.0	not a concern (10)
l. Conflicts with other users:	big problem (1)	81	7.0	8.0	3.0	not a concern (10)
m. Water Levels:	big problem (1)	81	6	5	3	not a concern (10)
n. Pier-related issues:	big problem (1)	75	7.0	7	3.0	not a concern (10)
o. Canada geese:	big problem (1)	77.0	6.0	6	3.0	not a concern (10)
p. Noise:	big problem (1)	82	7.0	8	3.0	not a concern (10)
q. Lack of natural scenic beauty:	big problem (1)	82	6.0	7	3.0	not a concern (10)
r. Other	big problem (1)	15.0	5.0	5	4.0	not a concern (10)

5) Which of the following do you feel are CURRENTLY Lazy Lake's biggest threats:		Total Responses	Average	Median	Standard Deviation	
a. Overuse of lawn fertilizers/pesticides:	big threat (1)	75	4.6	6.5	2.9	not an issue (10)
b. Overuse of agricultural fertilizers/pesticides	big threat (1)	73	3.7	6.5	2.9	not an issue (10)
c. Non-native, invasive plants/animals:	big threat (1)	73	4.4	7	2.7	not an issue (10)
d. Loss of habitat:	big threat (1)	71	4.3	3.5	2.6	not an issue (10)
e. Polluted runoff:	big threat (1)	74	2.9	1.5	2.5	not an issue (10)
f. Over-development:	big threat (1)	71	5.7	3.5	3.0	not an issue (10)
g. Over-crowding:	big threat (1)	71	7.4	5.5	2.6	not an issue (10)
h. Groundwater depletion:	big threat (1)	71	5.4	2.5	3.0	not an issue (10)
i. Lake-rule violations:	big threat (1)	70	6.5	3	2.7	not an issue (10)
j. Uninformed public:	big threat (1)	72	4.9	2	3.0	not an issue (10)
k. Lake-level fluctuations:	big threat (1)	82	6	5	3	not an issue (10)
m. Enforcement of regulations:	big threat (1)	77	7.0	7	3.0	not an issue (10)
l. Loss of native shorelines:	big threat (1)	80	5.0	5	3.0	not an issue (10)
n. Poor land-use planning:	big threat (1)	74	4.0	5	3.0	not an issue (10)
o. Misguided lake-management programs:	big threat (1)	72	4	4	3	not an issue (10)
p. Other:	big threat (1)	17	4	1	4	not an issue (10)

6) How informed do you feel about issues affecting Lazy Lake and its management?		Total Responses	Average	Median	Standard Deviation	
	not at all (1)	86	5.0	5	3.0	very informed (1)

7) How do you prefer to receive your Lazy Lake news and information?		Total Responses	Average	Median	Standard Deviation	
a. Attend Lake District meetings:	least (1)	78	4.0	4	3.0	most preferred (10)
b. Community workshops/events:	least (1)	76	4.0	5	3.0	most preferred (10)
c. Newsletters	least (1)	86	8.0	10	2.0	most preferred (10)
d. Friends and neighbors:	least (1)	76	4.0	5	3.0	most preferred (10)
e. Email updates:	least (1)	77	6.0	6	4.0	most preferred (10)
f. Email News Letter:	least (1)	78	6.0	7	4.0	most preferred (10)
g. Web page:	least (1)	78	6.0	7	4.0	most preferred (10)
h. Other	least (1)	9	4.0	1	5.0	most preferred (10)

8) How do you (would you) feel about the following Lazy Lake efforts?		Total Responses	Average	Median	Standard Deviation	
a. Development of management plans:	strongly oppose (1)	85	7.0	8	3.0	strongly support (10)
b. Mechanical weed harvesting:	strongly oppose (1)	87.0	8.0	9	3.0	strongly support (10)
c. Water quality monitoring:	strongly oppose (1)	88	8.0	9	3.0	strongly support (10)
d. Lake Use Monitoring:	strongly oppose (1)	83.0	7.0	8.0	3.0	strongly support (10)
e. Control of invasive plants/animals:	strongly oppose (1)	85.0	8.0	10.0	2.0	strongly support (10)
f. Dredging:	strongly oppose (1)	80	7.0	8	3.0	strongly support (10)
g. Acquisition of conservancy areas:	strongly oppose (1)	82	7.0	7	3.0	strongly support (10)
h. Lake District Website:	strongly oppose (1)	79	7.0	8	3.0	strongly support (10)
i. Lobbying for lake-protection policies:	strongly oppose (1)	81	7.0	7	3.0	strongly support (10)
j. Public meetings/forums:	strongly oppose (1)	79	6.0	5	2.0	strongly support (10)
k. Property owner surveys:	strongly oppose (1)	83	7	8	3	strongly support (10)
l. Lake research to diagnose problems:	strongly oppose (1)	83	7.0	8	3.0	strongly support (10)
m. Pier placement:	strongly oppose (1)	76	6.0	6	3.0	strongly support (10)
n. Shoreline Protection:	strongly oppose (1)	81	7.0	8	3.0	strongly support (10)
o. Other:	strongly oppose (1)	8	6.0	8.0	4.0	strongly support (10)

9. Would you be interested in a landowner program offering up to 50% cost-sharing and technical assistance for projects that benefit Lazy Lake (i.e. rain gardens, shoreline restorations, etc.)?

	Total Responses	Average	Median	Standard Deviation	
not interested	83	5.0	5	3.0	very interested

10) How do you feel about Lazy Lake Management District using district raised revenues for projects on Lazy Lake and its' watershed:

	Total Responses	Average	Median	Standard Deviation	
strongly oppose	85.0	6.0	7	4.0	strongly support

11. How do you feel about raising the current tax rate for the Lazy Lake Management District to be used on projects for Lazy Lake and it's watershed:

	Total Responses	Average	Median	Standard Deviation	
strongly oppose	92	3.0	1.0	3.0	strongly support

12) What other funding sources would you recommend the Lazy Lake Management District using?

a. Your own money/not mine
b. Federal & State, County grants, Association fund-raising social events
c. Difference of rate of tax between lake frontage and non-lake frontage.
d. Local business that would support the management.
e. Grants/fundraisers
f. The lake is a resource, currently and in the future, used by more non-district residences than lake district residents. The State as a whole must be taxed for lake improvements.
g. Go fish
h. Grants.
i. No more taxes, we pay too much already.
j. Boating and fishing licenses
k. Donations or fundraisers
l. Fees for using the lake.
m. Explore Wis. Dept of Commerce for financial aid that would encourage development of lake use related businesses to grow in the Fall River area.
n. State and Federal wildlife dept. subsidies.
o. Private funding & fund raisers
p. Grants & Government sources
q. Increase and enforcement of non-owner boat launch fees consideration of tax/fee on new boat launches - public
r. Stop spending $$ on mechanical weed control & try spraying the weeds instead. You spend a lot of money on something that is proved ineffective over the years. Relocate that money towards something that does work.
s. Fundraisers that are great for community, how about fishing lessons for children.

t. No opinion

u. How much money needs to be raised? Where is the current funding coming from? People who live on the lake and use it recreationally should find fund the project.

v. Look into grant sources for funding lake improvement projects.

w. DNR?

x. User fees only

y. Fund-raising raffle tickets - public cook-out fundraising events.

z. Have fishing fee & lakes use donations.

aa. Partner with schools & civic groups for clean-up, monitoring and other do-able projects. Gov't grants. A signature benefit event annually.

ab. Remove the dam it's a sh@#ty lake! Also flooding issues.

ac. Fundraisers, outings, and donation boxes. Up the cost of docking boats at the docks.

ad. Federal or State grant programs.

ae. Anything but asking property owners for more money - people have enough expenses such as gas cost - groceries, etc. - than to put money towards lake improvement.

af. Boat launching fees; ice fishing - car fees; Lazy Lake Fishery for the lake not the gun club.

ag.

ah. 1) Local Rod & Gun Clubs; 2) WDNR; 3) The Fed's; 4) Ducks Unlimited.

ai. Depends on funding for what.

aj. DNR Programs/Grants?

ak. Possible grants to increase the water clarity, reduce

al. State/Federal

am. 1) Tax for property owners; 2) Tamp fee for boats; 3) fishing license fee

an. Fund-raising

ao. U.S. Fish & Wildlife Service, Wings over Wisconsin, Ducks Unlimited

ap. State or Federal Grants

aq. DNR - if we are to go and use this lake and by rates set forth off the DNR should maintain? Control this lake.

ar. State of Wisconsin plus possible federal funding.

as. User fee

at. A few decades ago there was federal money to dredge this lake. It was turned down at the time. It would have cost pennies then compared to millions now.

au. Federal & State Grants

av. Any possible grants or community fund raisers.

aw. Where is the money from the DNR! Maybe higher license fees for boaters & fishermen

13. What specific actions are needed to better protect and manage Lazy Lake?

a. Remove the dam & let nature take its course. No more millpond lakes.

b. Get rid of overgrowth of plants of people can swim.

c. Dredging/weed cutting.

d. Runoff!

e. The lake should be dredged to remove the very fertile sediments of the last 100+ years. The last 10-12 inch rain demonstrated mass runoff. The water was a thick brown.

f. Remove the dam.

g. Weed control.

h. None

i. Check septic systems on lake property especially sleepy hollow.

j. It seem that there are few occasions when both cutters are employed to manage weeds.

k. Better communication with people living in the watershed so they can be mobilized when items affecting the watershed need attention.

l. Get weeds under control. Make sure all septics are not running into the lake.

m. Stricter run-off controls.

n. Weed control & possible better fishing.

o. Quit cutting weeds like a lawn and dredge it.

p. In my opinion farm runoff is the biggest threat, phosphorus limited fertilizer in those areas that drain to the lake. Buffer zone between lake and field or river and field.

q. We need to control more weeds on lake, they are just plugging bottom.

r. It seems you have a plan to investigate the lake's needs.

s. 1. Better communication - I'm not able to attend weekday/night meetings what is our direction? 2. Develop & communicate a plan to improve the water quality & clarity.

t. Deepen the lake without losing the fish.

u. Dredging. We need to get the weeds under control. Cutting does not eliminate them. They will continue to spread unless some sort of elimination program is put into effect.

v. Water run-off

w. Don't know

y. A new Board of Directors

z. Control runoff from lakeshore properties and within the watershed.

aa. Eliminate the dam.

ab. Keep the waste and litter picked up in and around the water. Weed eater up and going more often.

ac. Weeds. I don't understand why we need 2 weed cutters. I understand they are not new and sometimes in need of repair, but neither one is being used in this part of Lazy Lake. Have not taken pontoon boat out. Hear owners of very small boats.

ad. User fees: Fountain Prairie buying land around lake. DNR patrolling for general violations, i.e. litter, stopping the annexation of the Village along the shore.

ae. Dredging

af. User fees/boat launch charge being mandatory

ag. Shoreline buffers of vegetation 5-7 feet from shoreline. Geotextile fabric & medium riprap of all residential property shoreline. Beaver & Muskrat trapping by professionals.

ah. Septic problems with lakeshore homeowners

ai. Protect the shoreline, protect wildlife, fish - educate lake front owners about lawn fertilizers' & pesticides - for water quality, fish production, birds & animals.

aj. Limit growth & expansion of village which directly impact Lazy Lake.

ak. 1) Dredge to make this lake more viable/user friendly; 2) establish an aggressive weed & algae reduction program; 3) Raise the necessary dollars to deliver the 1st two?

al. Deeper water, spray lake weeds, monitor oxygen levels

am. Control the weeds & water clarity.

an. To leave it up to the professionals that are indeed employed in this field to due the management.

ao. Better weed harvesting

ap. Farm runoff is biggest problem - erosion and fertilizer runoff

aq. Clean-up and then set necessary guidelines for the watershed & lake.

ar. The runoff and fill-in are the problems.

14. What topics would you like to learn about at future meetings or through the website?

a. Lake should deepened all around than the depth so swimming is better than it is.

b. Management and control of the dam. Seasonal wildlife habitat & fish.

c. How we are spending our money.

d. Available financial resources. In my 38+ years on Lazy Lake, I have been involved in several studies of the lake that provided employment opportunities but no lake improvement. The DNR shelves hold the studies needing a small update, not a total start.

e. All of the key components of the management plan and the benefits/detractions.

f. Landowner Program offerings.

g. Dredging

h. How would draining the lake in the winter help to reduce invasive weed growth in the following spring & subsequent years.

i. Shoreline preservation & water & shoreline aquatic plants.

j. The projects management is trying.

k. Run-off issues, water quality.

l. Weed control & possible better fishing.

m. What these surveys show you/tell you
n. None
o. What action stops and who is responsible for guiding us toward our vision statement?
p. How to control weeds so boats can be used all summer while fish. Website should contain current up-to-date information when flooding occurs.
q. Fish netting surveys
r. Co-ordination/Dodge Co. Land & Water Dept, Juneau Bob Bird et al.
s. What website?
t. What are some ways I can help?
u. DNR rules and why we can't keep up with the weeds, and what the DNR has to say about it.

v. Potentional F.P. buying lots around the lake. Boat launching/shanty launching fees!! Dam preservation!
w. 1 - Stop shoreline erosion
x. If we plant buffer zones, how do we do it without tilling the shoreline area (i.e. silt fence protection) and what plants and/or tree species do we use or what do you recommend?
y. What is the plan to address questions 12 & 13?
z. Oxygen levels, weed removal plan
aa. Activities, Rules, Meeting minutes, Board of Directors
ab. Present & future plans for lake maintenance.
ac. Things that could be done alone the watershed and the estimated cost.
ad. All info would be appreciated.

15. What do you think is the most positive aspect of Lazy Lake or its' management?

a. Poor
b. Remove dam.
c. Concerned and active group of leaders
d. The serenity of the lake & friendliness of the management.
e. I think most people on the lake want to work together for a better lake.
f. A balance of multiple uses and thus good support. Should anyone use win out by unfairly limiting the use of the lake to another group. The unity and support for the lake district would quickly be list. The existence
g. Willingness to discuss future plans/goals.
h. Location
i. Great fishing
j. Fish/bluegill/bass
k. Controlling weeds & speed of boats
l. The dedication of the district's management team.
m. The weed cutters.
n. Management's upbeat attitude wanting to make the lake a better place.
o. Good fishing and a good dam to hold up to the rain.
[p. Dedicated individuals who are informed on the issues.
q. They are trying, but need to address things that aren't working and change them instead of continuing down the same path. They know what issued need to be addressed though.
r. It can produce a record (size) fish…create holding pond below dam for fish - dredge it.
s. Not completely developed.
t. It is a friendly family-oriented spot.
u. Cutting weeds
v. It's better than it used to be (Lazy Lake Management), Lazy Lake has decent fishing.
w. Pan fishing
x. Not sure
y. The weeds.
z. There are a lot of people who chose to live on or very near the lake who are potential volunteers and supporters.
aa. Nothing
ab. The good or great fishing the lake has to offer. The Landing are in great shape and the dam is beautiful. (except for litter).
ac. Not having to be concerned about the safety of eating fish caught in Lazy Lake. Glad chemicals are not being used.

ad. Concern from the residents. Activation of emergency response for dam preservation (this may not have involved the management initially but I'm hopeful they were presented).

ae. Residential lake-side and lakeview development has slowed. I enjoy the undeveloped wilderness. I would be thrilled for my fellow citizens to see one more public park.

af. It's a family lake. Kids can learn/grow about water, lakes, fishing & being kids safely.

ag. Looking at it as I ride by in car (since I can't even see it from my home in summer!)

ah. Trying to get a handle on the weeds. Getting 2 cutter was great.

ai. People working together

aj. Great Fishery - Leave it Alone!

ak. It has great potential that is unfortunately going unrealized.

al. Good fishing, good boat landings

am. Location, Fishing, Wildlife

an. It's natural beauty.

ao. Lake quality protection; plans for future improvement.

ap. Cutting weeds allows some use of lake by some individuals

aq. Nothing, it is a slimy useless lake that doesn't benefit me in any way but I still have to pay for it.

ar. The added beauty to the village and community.

as. Lazy Lake looks great 8 months a year and it is great fishing.

16. What do you think is the most negative aspect of Lazy Lake or its' management?

a. Lack of water clarity

b. Algae, duck weed

c. Lake is not clean enough to swim.

d. More newsletters or email. Loss of shoreline solutions.

e. The weeds!

f. The lack of funds to clean out an over-abundance of weeds. If lake property owners did not pay $100's more in taxes to harvest weeds, the lake would become a swampy, stinky hole that did not exist 30 yrs. Ago.

g. Insistence on dam retention.

h. Weed control

i. Weeds

j. What do they do.

k. Weeds

l. Lake depth; weeds

m. Need more support of residence.

n. No waterskiing, jet ski

o. Cost to homeowners.

p. To much vegetation (weeds) smells bad - shoreline needs clean up. Need to remove bogs that washed to shore after the flooding.

q. Lack of participation by the majority of the landowners.

r. residential Growth

s. We need more adequate weed control & I feel this is not being addressed seriously enough. Current weed chopping (mechanical) methods are not working. Crystal lake had similar problems & through

t. Taxes on a lake that is not swimmable and barely boatable due to the weeds.

u. Lack of concern by management.

v. Funding

w. Water quality!! This spring the lake shoreline was un-useable almost from the time the ice went out algae gathered on the shore and manure lined the bank, the water stunk!!

x. The landowner doesn't work together.

y. Lazy Lake management seems to agree with DNR's answers to everything. My perception is the DNR is opposed to dredging.

z. Weed problem

aa. Not informing down river Crawfish communities.

ab. Attitude of some board members and weed harvesting crew waste of time & money

ac. Vast numbers of people who use the lake but don't contribute or get involved.

ad. Increases my taxes!!! Floods my land when it rains heavily.

ae. Weeds, and litter in the park and off on shore.

af. The lake having so many weeds, etc. It makes it hard or impossible to fish from some homeowner's piers or boat. Boats or canoes are also having problems just moving around in the lake.

ag. Public access funding - especially ice fishing participants prompt action to purchase surrounding land/lots. No funding acquired from public usage.

ah. Lack of personnel

ai. Expecting me to pay more in taxes to help in the problems of Lazy Lake - that and the fact you wanted this survey done with me either wasting my gas & time to deliver it or the cost of mailing it - ridiculous

aj. Excess weeds

ak. Invasive milfoil weeds and the lack of aggressive cutting of this species. Duck weed control is number 2 on this list. Please, weed cut.

al. To be known for only fishing - It is supposed to be "Lazy Lake", just sit and relax and enjoy whether in small boat or on shore. And most of winter too many snowmobiles after midnight! And too much alcohol!

am. Weeds & too many houses

an. Unable to go swimming. The water is way unclean, too many weeds, no public beach.

ao. Not much improvement in lake (weeds, smell)

ap. Residential Growth

aq. Slow to address concerns

ar. No public fishing piers for handicap and public

as. Weeds/algae

at. Current involvement of such individuals that know nothing about management or lake environment.

au. Weeds & brown water.

av. Current weed harvesting deployable

aw. Limits on what really can be done - watershed problems

ax. The condition this lake has been allowed to become.

ay. Needs cleaning up and a few added features to make it more user friendly.

az. The DNR telling us where we can and can't cut weeds.

	Total Responses	Average	Median	Standard Deviation
17. Fishing:				
a. Days fished per year:	75	21.0	1	48.0
b. Days ice fished per year:	77	8.0	0	18.0

c. What species of fish did you catch last year?

1. Panfish	44
2. Yellow Perch	9
3. Crappie	27
4. Channel Catfish	1
5. White Sucker	2
6. Northern Pike	23
7. Walleyed Pike	4
8. Largemouth Bass	38
9. Smallmouth Bass	11
10. Other	0

d. How do you rate the fishing quality?

1. Excellent	3
2. Good	32
3. Fair	14
4. Poor	1

18. Comments:

a. We did not receive this until today, June 27th. Thank you for your efforts to help the lake!

b. Funding for lake protection and improvement must be statewide just as lake use is. My overal taxes are too high. -Efforts by the DNR to limit weed harvesting show a complete lack of knowledge of lazy lake harvesting, etc……!!

c. As with our success with the Milwaukee River (I was in management with the MMSD). I believe the Crawfish and it's watershed would greatly benefit from eliminating the dam.

d. At this time with budgets already stressed related to increased property taxes and the cost of oil, we need to cut back costs not look for ways to increase them.

e. As an agricultural landowner, (on the outskirts of Fall River), I nor any of my family ever use or have an interest in Lazy Lake. We just saw our real estate taxes jump 25% last year and have no desire to get another increase for a lake we never use. Etc

f. I would like fish here more if the weeds were not so bad.

g. Worst issue with fishing and boating - WEEDS!

h. You are 25 years to late to fix this swap.

i. This survey was too long!!! But hope it helps,

j. Bigger size limit on northern pike is needed. Matt Johnson 484-2217

k. I believe it is imperative that we do something about the water quality of the lake - above & beyond rain gardens!

l. We enjoy living on Lazy Lake very much and hope that plans will be made to dredge the lake. We currently own a fishing boat that we can't use past the month of June due to the large amoun tof weeds that develop. Etc.

m. We should look into restocking northern pike and increase the size limit on pike.

n. Conflict w/Farm Tech Days @ Greenleaf July 15th - reschedule please! Our attendance was to draw attention to the 1/2 M $ Columbus is putting in their city for the Tri-Co. area, 12 Townships. Would hope these areas have a suggested referendum., (etc)

o. I do not feel the truck should be used for personal business or sit on the street. I also don't want to see the lake dredged so that it can be used for jet skiing or water skiing. It is what it is. It will never be a Lake Monona or Mendota. Etc..

p. Need to consider the issue of individual septic systems on and near the lakeshore. Are they properly maintained? Is this method of waste management sustainable? You should have included a map! Many ppl won't realize they're on the watershed.

q. Have lakefront property owner's bare the burden of the Lazy Lake cost to maintain.

r. Please keep up on the weeds and try to create a dredging project. But all-in-all the lake serves as a great asset to the commmmunity and is doing fine. Thank you for this opportunity!

s. Something needs to be done as far as the weeds. Have not seen the weed cutters used except when the flooding happened on June 7. The lake needs to be dredged if this is possible.

t. I'm too old for this, no livestock here, lived on this farm 51 yrs.

u. Although we are in the Lazy Lake management district, other than the view of the lake, we do no use it. We don't feel it adds any value to our particular property.

v. Tom Todd has some great ideas about buying land around the shore. I feel strongly that many lake property owners would support this with increasing taxes for lake land preserve. Etc.

w. The lake needs $$ so attention can be paid and a good job done to repair & maintain.

x. I enjoy fishing April & May, usually bass, but just gets too weedy so I fish elsewhere throughout the season.

y. Our property is not in the lake district.

z. All bodies of water should be taken care of.

aa. Don't use Lazy Lake or ever expect to.

ab. 1) Install aireation system after first ice, every year; 2) Weed cut main lake basin as early as possible in spring, but leave shoreline untouched until after spawning; 3) Cut weeds in an inside-out oval pattern to

ac. The current tax rate is very high. Last year tax hike almost killed us. Some people who do not live on the water but across the lake have to pay just as high taxes as those who live on the lakefront. To increase the tax rate would really be hard on ppl

ad. Thank you for this survey - Now, let's do something with the information collected.

ae. Weed control is my biggest concern and from other people I've talked to. It's tough to fish when you can't find a hole in the weeds to cast a line. The size and quantity of bluegills I've caught the last two years

af. Weeds are big problem, makes fishing difficult, swimming and waterskiing impossible. When weeds die, oxygen levels not safe for fish.

ag. Weed control is foremost. The Communication of Program and meetings would be great. We found out about the meeting in a local newspaper and couldn't make it - what happened, what was discussed?

ah. Again there is a need of action regarding this lake. But in my personal opinion, the State has the money - let them control it, they are already telling us how big, how many, fish we can catch, no wake, wake

ai. Living 5 miles out I do not benefit from Lazy Lake. My property taxes are already high and due to planned retirement I cannot afford any more taxes with the cost of living going high. Only ppl the lake directly affects should fund this w/State help.

aj. Thank you for your interests and concerns.

ak. I fish other lakes though - Beaver Dam, Crystal, Rock, Puckaway. A good community resource that should be saved for future generations.

al. If I could be removed from lake management I would, I don't have lake property and this lake doesn't do anything to improve the value of my property or home. I want out of tax dollar responsibility for it!

am. Weeds Terrible - hard to fish from shore - Weed cutter guys awesome, good job for the tools they have. I feel they give it an outstanding effort.

an. I have never used Lazy Lake for anything. I don't go to or use any lakes.

Appendix C

Miscellaneous Information

Reporting Boating Ordinances

When reporting violations:

1. Place Phone Call to
    a. 920.484.3707 Fall River Police Department
    b. 1.800.TIP.WDNR Wisconsin Department of Natural Resources
2. Helpful Information
    a. Boat Identification Number
    b. Description of Activities
    c. Photo Documentation (Not necessary but always helpful)

* **********

If buoys are not located on the waterscape Wisconsin Department of Natural Resources State Game Wardens and Columbia County Sheriff's Department Deputies cannot enforce "Slow No-Wake" violations. As a result; when reporting "Slow No-Wake" violations in early spring and late fall, please make sure that buoys are on the waterscape.

****

Aquaculture Contacts

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Aqua Culture Services Check List

- Does the company sell product raised vs. catch and sell?
- What are the companies in the wild survival rate?
    - The higher the rate of survival the better
- How does the company feed their stock?
    - Live Feeding
        - Fosters hunting skills
    - Artificial Feed
        - Does not foster hunting
- How long has the company been providing aquaculture services?
- Ask for companies list of testing policies.
- Ask for references on companies testing history.
    - Must have excellent track record
- Company must provide health certificate.
- Obtain WDNR stocking permit in advance.
    - Must be done way ahead of time
- If aquaculture service is from out of Wisconsin
    - Must obtain a valid WDNR import permit
- Verify the age of the specimens being purchased/ per species?
- Verify the size of the specimens being purchased/ per species?
- Verify harvest technique used by Aquaculture Company?
    - Stress on fish can be significant
    - 5° change during transport can cause delayed mortality a month later
- Verify stocking technique.
    - No under ice stocking
- Verify time of stocking.
    - Night?
    - Day?
- Verify time specimens will be transported or time on truck.
        - time in transport = >stress = < probability of survival rate
    - 5° change during transport can cause delayed mortality a month later
- Develop Long term relationship with aqua culture company
- Verify Reputation
    - Must research company with their past clients

Appendix D

Past Reports

Northern Environmental℠
Hydrologists · Engineers · Surveyors · Scientists

1203 Storbeck Drive
Waupun, WI 53963
(920) 324-8600
(800) 498-3921
Fax (920) 324-3023
www.northernenvironmental.com

AQUATIC PLANT MANAGEMENT PLAN

LAZY LAKE
COLUMBIA COUNTY, WISCONSIN

February 20, 2007

Prepared for:

Lazy Lake Management District
N3161 Sleepy Hollow Road
Fall River, Wisconsin 53932

Prepared by:

Northern Environmental Technologies, Incorporated
1203 Storbeck Drive
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DNR Grant # LPL–996-05
Northern Environmental Project Number: LZL 08-5500-0691

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Marty L. Koopman, PG
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ACG/msd

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1.0 EXECUTIVE SUMMARY

Lazy Lake is a 161 acre lake located in the town of Fountain Prairie in southeast Columbia County, Wisconsin. Lazy Lake exhibits fair water quality but experiences periods of dense aquatic plant and algal growth. The aquatic plants on the lake provide important habitat for fish and wildlife, but dense plant growth has historically been a nuisance condition, interfering with recreation on the lake (e.g. boat navigation). The District currently operates one aquatic plant harvester to address nuisance plant growth on the lake and developed an Aquatic Plant Management (APM) Plan to obtain a harvesting permit from the Wisconsin Department of Natural Resources (WDNR).

Water quality data collected in 2000 and 2003 indicate a mesotrophic to eutrophic lake system. Nutrients from within the lake, nutrients flowing into the lake from the Crawfish River and from land uses within the watershed are likely enhancing aquatic plant growth. During summer 2005 an aquatic plant survey was completed on Lazy Lake. Sixteen aquatic plants were identified on Lazy Lake. Two aquatic invasive plant species Eurasian watermilfoil (*Myriophyllum spicatum*) and Curly-leaf pondweed (*Potamogeton crispus*) were identified in high densities and frequency. The most abundant free-floating aquatic plants were free-floating small duckweed (*Lemna minor*) and common watermeal (*Wollfia columbiana*). The most abundant submersed aquatic plants were curly-leaf pondweed (*Potamogeton crispus*), Eurasian watermilfoil (*Myriophyllum spicatum*), and Coontail (*Ceratophyllum demersum).*

The District has prepared a comprehensive APM Plan to manage nuisance aquatic plant growth on Lazy Lake which includes the following components

Manual Removal:	Individual property owners can manually remove nuisance aquatic plants in the lake offshore from their property to a maximum width of 30 feet for native aquatic plants and an unlimited width for exotic species to provide pier or swimming raft access.
Harvesting:	The District will continue mechanical harvesting for navigation purposes in accordance with the conditions of a WDNR-issued harvesting permit.
Selective Chemical Control:	The District will consider use of selective chemical herbicides for navigation and exotic species relief purposes in near shore areas where the harvestor can not operate. This activity can be completed by the District or individual landowners (WDNR permit is required).

Other components of the APM Plan include periodic review of APM technologies, nutrient control efforts by the District and landowners within the District, water quality monitoring, periodic aquatic macrophyte surveys, aquatic species prevention and control, and public education about the value of aquatic plants and threat of aquatic invasive plant species.

2.0 INTRODUCTION

Lazy Lake is located in the town of Fountain Prairie in southeast Columbia County, Wisconsin. Figure 1 depicts the lake location [United States Geological Survey (USGS) 1982]. Lazy Lake provides year around activities ranging from, fishing, waterfowl hunting, motorized boating activities (early and late in the open water season), snowmobiling, cross country skiing, and ice fishing. Lazy Lake is primarily used for sport fishing.

Lazy Lake exhibits fair water quality and experiences periods of dense aquatic plant and algal growth. While the aquatic plants on the lake provide important habitat for fish and wildlife, dense aquatic plant growth on Lazy Lake has historically interfered with recreation on the lake (e.g. boat navigation). In response to the lake users concerns, the Lazy Lake Management District was formed in 1976 specifically for the purpose of controlling lake vegetation. Control methods used have included draw down of the lake water level, aquatic herbicide applications, and weed harvesting and removal. Recent changes in Wisconsin's aquatic plant management laws and the subsequent Wisconsin Department of Natural Resources' (WDNR) administration of their aquatic plant management program (NR 109 Wis. Adm. Code) required that the District develop an Aquatic Plant Management Plan (APM Plan).

This APM Plan was designed to meet the District's needs for nuisance plant relief and the WDNR's requirements (e.g. applying for permits under Chapter NR 109 Wisconsin Administrative Code for aquatic plant harvesting). This APM Plan summarizes the lake morphology and lake watershed characteristics; reviews historical aquatic plant management activities; discusses the District's, goals and objectives; presents the aquatic plant ecology; presents results of the recent 2005 aquatic plant survey; evaluates feasible aquatic plant management alternatives; and provides a selected suite of aquatic plant management options in a comprehensive and integrated APM Plan.

2.1 Lake History and Morphology

Lazy Lake is a 161-acre impoundment and has approximately 4.2 miles of shoreline. The lake's mean depth is 3.6 feet and the maximum depth is reported as 8 feet on the WDNR lake survey map. Figure 2 illustrates the bathymetry of Lazy Lake measured during the June 2005 aquatic plant survey. Surface water enters Lazy Lake from precipitation, groundwater and via an impoundment of the Crawfish River. A static water level is maintained on Lazy Lake at the lake's south end.

The fishery is comprised of panfish, largemouth bass, northern pike, and walleye. The WDNR stocked Lazy Lake with northern pike fry in 1978, 1989 – 1991 and fingerlings in 1992, 1994-1996. The Fall River Rod and Gun Club also stocked walleyes in 1990.

2.2 Watershed Overview

The Lazy Lake Watershed is approximately 39,330 acres. Figure 3 illustrates the watershed. The watershed to Lake Ratio is approximately 250:1, a high-ratio lake. A high watershed to lake ratio generally means that runoff within the watershed has more of an impact on a lake's water quality.

The watershed lies in a region of glacial drift overlying dolomite bedrock. The watershed generally is within the Grellton-Gilford-Friesland, Plano-Griswold-Saybrook, and St. Charles-Ossian-Dodge Soil Associations. Soils in this association formed in moraines, outwash terraces, and lacustrine plains and consist of gently sloping to steep, well drained loamy soils (United States Department of Agriculture, 1978).

Nutrients from runoff within the watershed may contribute to abundant aquatic plant growth on Lazy Lake. Analysis of Lazy Lakes watershed identified the following land uses within the watershed.

Agriculture (34,725 acres)
Forest (2,143 acres)
Wetland (1,829 acres)
Water (228 acres)
Urban (404 acres)

Potential nutrient loadings to Lazy Lake may be occurring from all of the above land uses. Agricultural runoff however, is the number one sediment and nutrient loading source to Lazy Lake.

2.3 Water Quality

2.3.1 Trophic Status

Total phosphorus, chlorophyll *a*, and secchi disk depths are used to classify the trophic state of a lake. A trophic state is a measure of a lake's biological productivity. Water resource managers and scientists use the Carlson's and/or Wisconsin Trophic State Index (TSI) to monitor Wisconsin lakes water quality. Aquatic resource managers use the secchi disk, total Phosphorus, and chlorophyll *a* data and apply Carlson's and/or Wisconsin's TSI to place the water into one of the following categories.

Trophic Category Descriptions

Category	TSI	Lake Characteristics
Oligotrophic	1-40	Clear water; oxygen rich at all depths, except if close to mesotrophic border; then may have low or no oxygen; cold-water fish likely in deeper lakes.
Mesotrophic	41-50	Moderately clear; increasing probability of low to no oxygen in bottom waters.
Eutrophic	51-70	Decreased water clarity; probably no oxygen in bottom waters during summer; warm-water fisheries only; blue-green algae likely in summer in upper range; plants also excessive.
Hypereutrophic	70-100	Heavy algal blooms throughout the summer; if > 80, fish kills likely in summer and rough fish dominate.

All lakes undergo a natural aging process, shifting from an oligotrophic state to an eutrophic state. Human activities can accelerate this aging process through nutrient and sediment additions from agriculture, lawn fertilizers, septic systems, and urban storm sewers. Using the summer 2003 surface water data, (total phosphorus concentration of 354 µg/l, chlorophyll *a* concentration of 23.2 µg/l, and a secchi depth of 5.5 feet), Lazy Lake is classified at the lower end of the eutrophic spectrum with an average Wisconsin TSI of 53 using Secchi Disk, in the eutrophic spectrum with an average Wisconsin TSI of 58 using chlorophyll *a* and in the hypereutrophic spectrum with a average Wisconsin TSI of 74 using total phosphorus levels. Eutrophic lakes typically have turbid water, can develop anoxic hypolinia during the summer, may have excessive aquatic macrophytes, and will normally only support warm-water fisheries (Shaw, 1994).

Trophic classification of Wisconsin lakes based on chlorophyll *a*, water clarity measurements, and total phosphorus values. (*Adapted from Lillie and Mason, 1983.*)

Trophic class	Total phosphorus µg/l	Chlorophyll *a* µg/l	Secchi Disc feet
Oligotrophic	3	2	12
	10	5	8
Mesotrophic	18	8	6
	27	10	6
Eutrophic	30	11	5
	50	15	4

Several sampling events by WDNR in 2000 and 2003 also provided secchi disk, total phosphorus, or chlorophyll *a* data that was also used to establish the TSI of Lazy Lake. Historical TSI values were calculated from these sample results. Water quality parameters were collected as part of the Self-Help Lake Monitoring program in 2000 and 2003. Analysis of the water quality information from 2000 and 2003 indicates that Lazy Lake is a mesotrophic to eutrophic lake. Eutrophic lakes have the potential for: heavy algal blooms throughout the summer, fish kills, and a fishery typically dominated by rough fish.

2.4 Aquatic Plant Management History

Lake users have historically reported problems with dense aquatic plant growth on Lazy Lake. The Lazy Lake Management District was formed in 1976 specifically for the purpose of controlling lake vegetation. The District acquired an aquatic plant harvester in 1991, and presumably began harvesting plants that year although contract harvesting may have been completed previously. Limited information is available, but WDNR files indicate that aquatic herbicide treatment occurred on 34 acres in 1991 and 1992. A five acre treatment permit was requested in 2001, but it is unknown if the treatment occurred. The District continued operation of the harvester since then to manage the excessive aquatic macrophyte growth.

A WDNR file review indicated that an aquatic plant assessment was completed in conjunction with a feasibility study and management alternatives report completed in 1979 by the WDNR Office of Inland Lake Renewal. This feasibility and management alternatives report identified thirteen genera of aquatic macrophytes. *Myriophyllum spp.* was reported as an identified species in 1979 (WDNR, 1979) and presumably was Eurasian Watermilfoil. Eurasian Watermilfoil (*Myriophyllum spicatum* - EWM) was officially verified by WDNR staff on Lazy Lake in 1994 (WDNR, 2004). Dense aquatic plant growth continues to impair most recreation on Lazy Lake. EWM and Curlyleaf Pondweed (CLP) in particular have been problem species. Therefore, aquatic plant harvesting has been used to manage the abundant vegetation.

2.5 Goals and Objectives

Since there previously was no aquatic plant survey information available, a main project objective is to complete an aquatic plant survey, which can then be used to quantify and map the abundance and distribution of aquatic plant species. Since there is no formal APM Plan, another District goal is to develop an integrated aquatic APM Plan. At the time of the grant application, discussions with the District indicated that the following items were important APM Plan goals and objectives:

- Maintain and improve recreational opportunities
- Educate lake users on invasive species and benefits of native aquatic plant communities
- Preserve native aquatic plants
- Protect sensitive areas
- Prevent the spread of aquatic invasive species (AIS), such as Eurasian watermilfoil, Curlyleaf pondweed, and Purple loosestrife
- Protect and improve fish and wildlife habitat
- Strive to manage the potential sources of nutrients

3.0 PROJECT METHODS

To accomplish the District's goals, the District needs to make informed decisions regarding APM on the Lake. To make informed decisions, the District proposed to:

- Collect, analyze, and interpret basic aquatic plant community data
- Recommend practical, scientifically-sound aquatic plant management strategies

Offsite and onsite research methods were used during this study. Offsite methods included a thorough review of available background information on the Lake, its watershed and water quality. One aquatic plant community survey was completed onsite to provide data needed to evaluate aquatic plant management alternatives.

3.1 Existing Data Review

A variety of background information resources were researched to develop a thorough understanding of the ecology of the Lake. Information sources included:

- Local and regional pedologic, geologic, limnologic, hydrologic, and hydrogeologic research
- Discussions with District members
- Available topographic maps and aerial photographs
- Data from WDNR files
- Past Lake Study Reports

These sources were essential to understanding the historic, present, and potential future conditions of the Lake, as well as to ensure that previously completed studies were not unintentionally duplicated. Specific references are listed in Section 7.0 of this report.

The abundance and distribution of aquatic macrophytes are controlled by light availability, lake trophic status as it relates to nutrients and water chemistry, sediment characteristics, and wind energy. Lake morphology and watershed characteristics relate to these factors independently and in combination (NALMS, 1997).

In many instances aquatic plants serve as indicators of water quality due to the sensitive nature of plants to water quality parameters such as water clarity and nutrient levels. To grow, aquatic plants must have adequate supplies of nutrients. Microphytes and free-floating macrophytes (e.g., duckweed) derive all their nutrients directly from the water. Rooted macrophytes can absorb nutrients from water and/or sediment. Therefore, the growth of phytoplankton and free-floating aquatic plants is regulated by the supply of critical available nutrients in the water column. In contrast, rooted aquatic plants can normally continue to grow in nutrient-poor water if lake sediment contains adequate nutrient concentrations. Nutrients removed by rooted macrophytes from the lake bottom may be returned to the water column when the plants die. Consequently, killing aquatic macrophytes may increase nutrients available for algal growth.

In general, an inverse relationship exists between water clarity and macrophyte growth. That is, water clarity is usually improved with increasing abundance of aquatic macrophytes. Two possible explanations are postulated. The first is that the macrophytes and epiphytes out-compete phytoplankton for available nutrients. Epiphytes derive essentially all of their nutrient needs from the water column. The other explanation is that aquatic macrophytes stabilize bottom sediment and limit water circulation, preventing resuspension of solids and nutrients (NALMS, 1997).

If aquatic macrophyte abundance is reduced, then water clarity may suffer. Water clarity reductions can further reduce the vigor of macrophytes by restricting light penetration, reducing the size of the littoral zone, and further reducing water clarity. Studies have shown that if 30 percent or less of the area of a lake occupied by aquatic plants is controlled, water clarity will generally not be affected. However, lake water clarity will likely be reduced if 50 percent or more of the macrophytes are controlled (NALMS, 1997).

Aquatic plants also play a key role in the ecology of a lake system. Aquatic plants provide food and shelter for fish, wildlife and invertebrates. Plants also improve water quality by protecting shorelines and the lake bottom, improving water quality and adding to the aesthetic quality of the lake.

4.2 Aquatic Invasive Plant Species

Invasive species have invaded our backyards, forests, prairies, wetlands, and waters. Invasive species are often transplanted from other regions, even from across the globe. "A species is regarded as invasive if it has been introduced by human action to a location, area, or region where it did not previously occur naturally (i.e., is not native), becomes capable of establishing a breeding population in the new location without further intervention by humans, and spreads widely throughout the new location " (Source: WDNR website, Invasive Species, 2006). AIS include plants and animals that affect our lakes, rivers, and wetlands in negative ways. Once in their new environment, AIS often lack natural control mechanisms they may have had in their native ecosystem and may interfere with the native plant and animal interactions in their new "home". Some AIS have aggressive reproductive potential and contribute to ecological declines and problems for water based recreation and local economies. AIS often quickly become a problem in already disturbed lake ecosystems (i.e. one with relatively few native plant species). While native plants provide numerous benefits, AIS can contribute to ecological decline and financial constraints to manage problem infestations.

emerge from rhizomes in the spring and flowers come into bloom over several weeks. Both fruit and foliage are consumed by a variety of waterfowl. When it is growing in shallow areas it may also be grazed upon by upland birds. Stems and leaves of yellow water buttercup provide valuable invertebrate habitat and it is considered a fair producer of food for trout (Borman, et al., 1997).

Stuckenia pectinata (Sago Pondweed)

Stuckenia pectinata (Sago Pondweed) resembles two other pondweeds with needle-like leaves, but sago pondweed is more common. The fruit and tubers of sago pondweed are very important food sources for waterfowl, while leaves and stems provide shelter for small fish and invertebrates (Borman, et al., 1997).


Sago Pondweed
Source: UW Herbarium Website

4.4.4 Emergent Plants

Emergent aquatic plant species were identified during the 2005 aquatic plant surveys and are listed in Table 1. A brief description of some of these plant species follows.


Broad-leaf Cattail
Source: UW Herbarium Website

Typha latifolia (Broad-leaf Cattail)

Typha latifolia (Broad-leaf Cattail) has pale green, sword-like leaves that emerge from a robust, spreading rhizome. The leaves are sheathed around on another at the base and junction of the leaf sheath and blasé the sheath is usually tapered. Broad-leaved cattail can be distinguished from narrow-leaved cattail by the presence of male and female flower spikes immediately adjacent to each other, and the leaves are wider and flatter. Cattails provide nesting habitat for many marsh birds and cover for small fish (Borman, et al., 1997).

4.5 WDNR Plant Survey (1979)

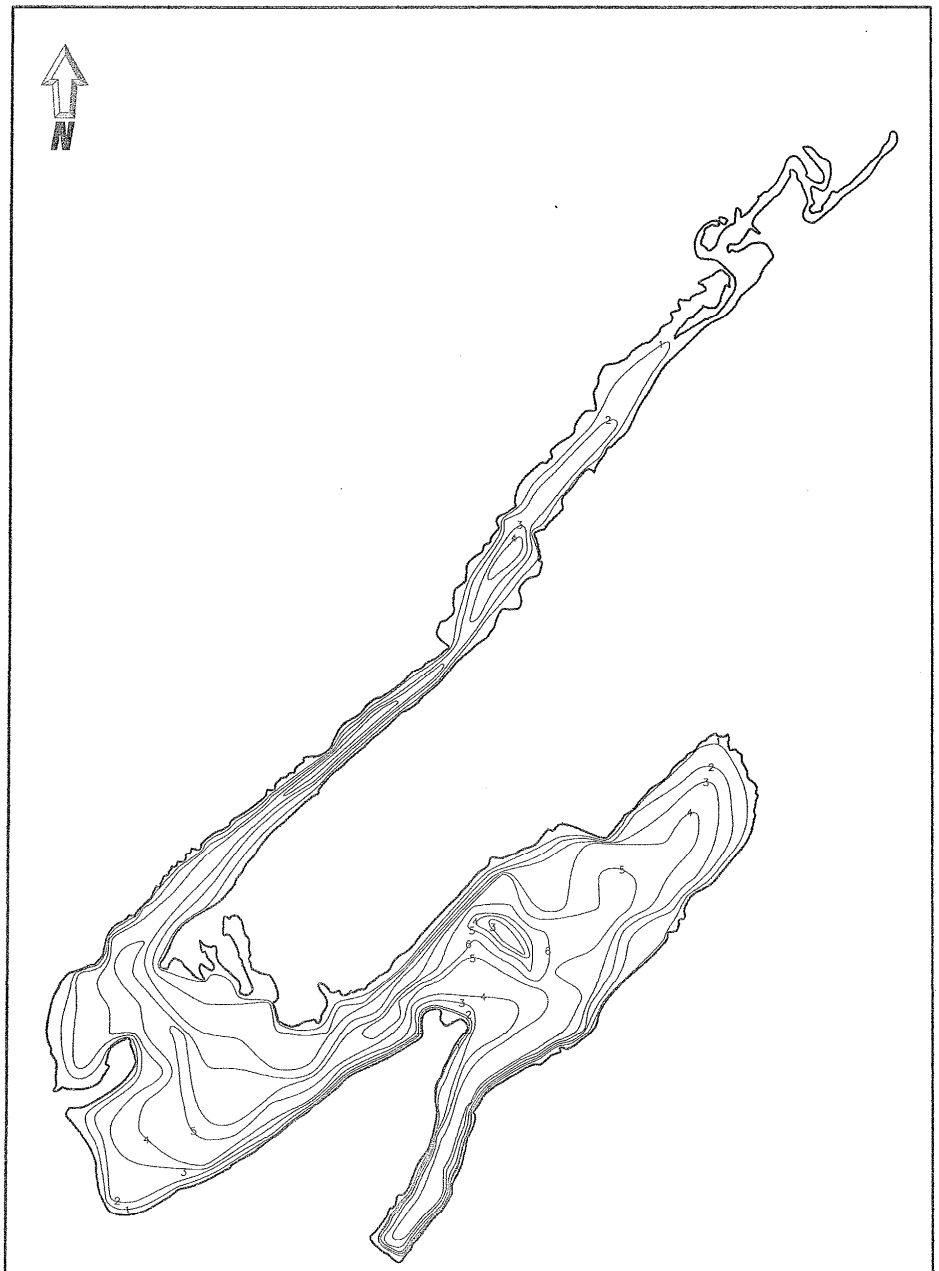
The WDNR aquatic plant survey completed in 1979 did not include a formal point-intercept survey; however, the following species were identified during the plant monitoring efforts:

Submergent

Ceratophyllum demersum	coontail
Myriophyllum spp.	milfoil
Heteranthera dubia	mud plantain
Potamogeton crispus	curlyleaf pondweed
P. pectinatus	sago pondweed
P. zosteriformis	flatstem pondweed
Ranunculus longirostris	buttercup
Najas flexilis	bushy pondweed
Elodea Canadensis	waterweed

Table 1: Taxa Detected During 2005 Aquatic Plant Survey, Lazy Lake, Columbia County, Wisconsin

Genus	Species	ID	Common Name	Category
Brasenia	*schreberi*	1	Watershield	Floating-Leaf
Ceratophyllum	*demersum*	2	Coontail	Submersed
Elodea	*canadensis*	3	Elodea	Submersed
Lemna	*minor*	4	Small Duckweed	Free Floating
Myriophyllum	*spicatum*	5	Eurasian watermilfoil	Submersed
Najas	*flexilis*	6	Slender Naid / Bushy Pondweed	Submersed
Nuphar	*variegata*	7	Spatterdock	Floating-Leaf
Nymphaea	*odorata*	8	White Water Lily	Floating-Leaf
Potamogeton	*crispus*	9	Curlyleaf Pondweed	Submersed
Potamogeton	*foliosus*	10	Leafy Pondweed	Submersed
Potamogeton	*pusillus*	11	Small Pondweed	Submersed
Potamogeton	*zosteriformis*	12	Flat-stem Pondweed	Submersed
Ranunculus	*flabellaris*	13	Yellow Water Buttercup	Submersed
Stuckenia	*pectinata*	14	Sago Pondweed	Submersed
Typha	*latifolia*	15	Broad-Leaf Cattail	Emergent
Wolffia	*columbiana*	16	Common watermeal	Free Floating



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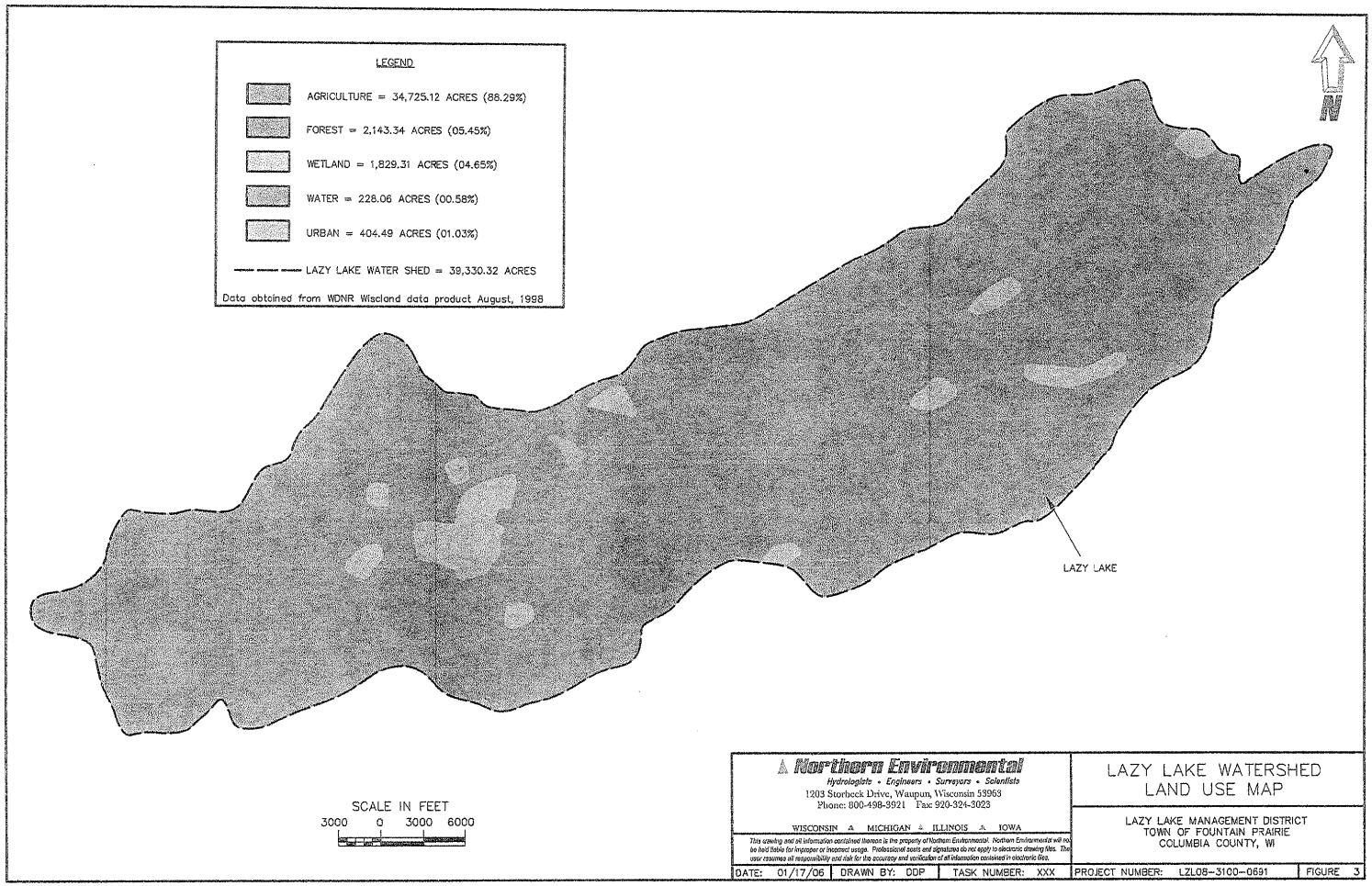
LAKE BATHYMETRY MAP

LAZY LAKE MANAGEMENT DISTRICT
TOWN OF FOUNTAIN PRAIRIE
COLUMBIA COUNTY, WI

DATE: 01/17/06 | DRAWN BY: DDP | TASK NUMBER: XXX | PROJECT NUMBER: LZL08-3100-0691 | FIGURE 2


LEGEND
AGRICULTURE = 34,725.12 ACRES (88.29%)
FOREST = 2,143.34 ACRES (05.45%)
WETLAND = 1,829.31 ACRES (04.65%)
WATER = 228.06 ACRES (00.58%)
URBAN = 404.49 ACRES (01.03%)
LAZY LAKE WATER SHED = 39,330.32 ACRES
Data obtained from WDNR Wiscland data product August, 1998
N
LAZY LAKE
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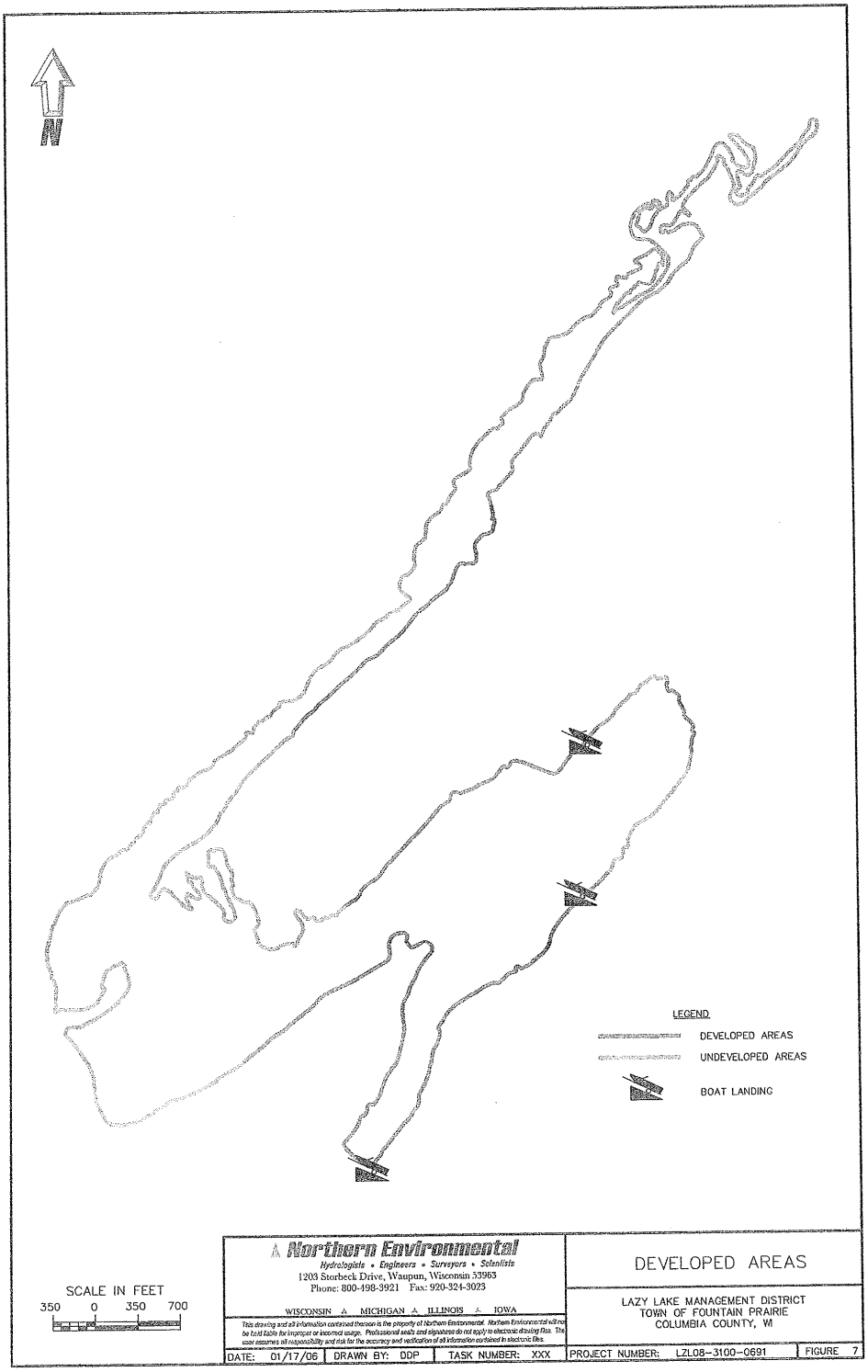
LAZY LAKE WATERSHED
LAND USE MAP
LAZY LAKE MANAGEMENT DISTRICT
TOWN OF FOUNTAIN PRAIRIE
COLUMBIA COUNTY, WI
DATE: 01/17/06
DRAWN BY: DDP
TASK NUMBER: XXX
PROJECT NUMBER: LZL08-3100-0691
FIGURE 3



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DEVELOPED AREAS

LAZY LAKE MANAGEMENT DISTRICT
TOWN OF FOUNTAIN PRAIRIE
COLUMBIA COUNTY, WI

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