AQUATIC PLANT MANAGEMENT PLAN

JENNI AND KYLE PRESERVE PONDS
TENNEY PARK LAGOON
VILAS PARK LAGOON
WARNER PARK LAGOON
Lower Rock River Basin
and
VERONA QUARRY
Grant-Platte-Sugar-Pecatonica Basin

DANE COUNTY, WISCONSIN

Tenney Park Lagoon – June 26, 2007

November 2007

OFFICE OF LAKES AND WATERSHEDS
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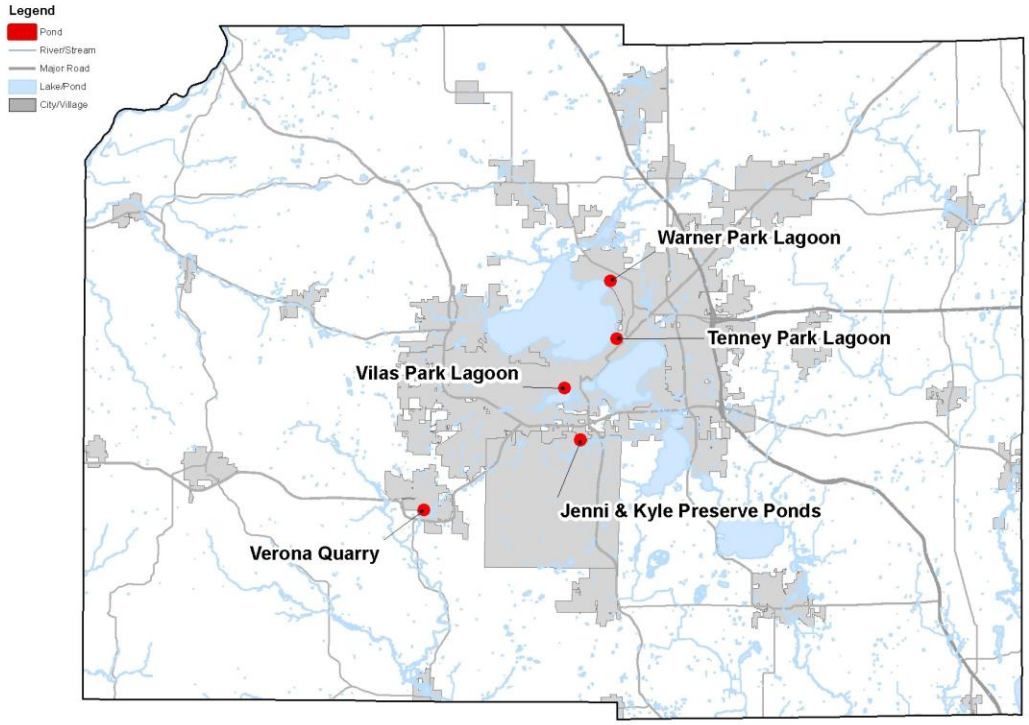
Copies of this plan are available at:
www.danewaters.com/management/AquaticPlantManagement.aspx

Summary

As part of a Lakes Planning Grant awarded to Dane County Office of Lakes and Watersheds, five ponds and lagoons located in Dane County were inspected in 2007 to develop an aquatic plant management plan. High productivity in ponds and lagoons typically requires management to provide functional recreation and public enjoyment. Figure 1 shows the location of the inspected waterbodies within Dane County.

Figure 1: Jenni and Kyle Preserve Ponds, Tenney Park Lagoons, Verona Quarry, and Vilas Park Lagoon location within Dane County



Jenni and Kyle Preserve Ponds were inspected on June 22nd and again on June 28th 2007. On June 22nd, the first pond (smaller pond closest to the parking lot) had clear water but billows of filamentous algae grew along the perimeter at the water surface and submersed in deeper areas. On June 28th, filamentous algae covered most of the water surface in the first pond. Filamentous algae and dense rooted plants dominated the second pond, with greater density on June 28. Fishing opportunities were obstructed by the dense aquatic growths on both dates. No unusual or rare emergent or submersed aquatic plants were found in either pond. Mechanical harvesting and improved access for harvesting equipment are recommended to provide recreational opportunities in the park. Floating logs were providing good habitat for painted turtles in the ponds.

Tenney Park Lagoon was inspected on June 26th 2007. The several arched footbridges aided the qualitative plant surveys. Most of the meandering lagoon was covered with dense growths of Eurasian watermilfoil (EWM) and filamentous algae. Supersaturated dissolved oxygen levels reflected the high rate of photosynthesis. Although a nighttime survey was not conducted, there is potential for dissolved oxygen to drop below water quality criterion (5 mg/l) as a response to respiration of the dense plants. Impairments to recreation and aesthetics were evident during the survey. Mechanical harvesting is recommended to reduce nuisance levels of Eurasian watermilfoil and filamentous algae.

Verona Quarry was inspected on June 22nd and July 2nd 2007. Due to its relatively large size, boat and SCUBA surveys were performed on July 2nd. The spring fed quarry displays very good water clarity but EWM grows across much of the quarry, including the maximum depth of 20 feet. A boat ramp provides good access for mechanical harvesters that are needed to control EWM growth in the deeper parts of the quarry. Elsewhere, Chara and slender naiad grow on rocky bars and substrates, providing good fish habitat.

Vilas Park Lagoon was inspected on June 28th 2007. The tall arched footbridge aided the observations of aquatic plant growths. Dense EWM growth occurred across the lagoon with white water lilies providing favorable habitat along the perimeter at numerous locations. Filamentous algal growths were also draped on most of the EWM. Mechanical harvesting is recommended to reduce nuisance EWM growths that top out of the water in the lagoon. Goose droppings created nuisance conditions along the manicured shorelines.

Warner Park Lagoon was inspected on June 26th and July 13th 2007. Two surveys were required since the relatively large surface area required a boat survey. The Warner Park Lagoon was the only pond that lacked clear water and had phytoplankton blooms. Submersed plants were scarce and patches of white water lilies provided good habitat in the lagoon. Mechanical harvesting was not recommended in 2007. However, given the eutrophic conditions and shallow depths, harvesting would be needed if EWM or other nuisance plant becomes an ecologically dominant in the lagoon. Goose droppings created nuisance conditions along the manicured shorelines. Coarse woody habitat was evident in the undeveloped portions of the lagoon and should be protected. White water lily habitat should be protected as well.

Public input was requested on this Plan via press releases and the Dane County Lakes and Watershed Commission web site, in October 2007.

Recommendations

1. Harvesting is recommended at Jenni and Kyle Preserve Ponds to provide pond angling opportunities and aesthetically pleasing conditions for visitors. After pre-season visual observation, early harvesting should be conducted to control Eurasian watermilfoil, with subsequent harvesting only as necessary to provide fishing access. Improving access for mechanical harvesters is recommended for both ponds. Maintaining favorable turtle habitat is also recommended by sustaining floating logs.

2. Mechanical harvesting is recommended for controlling high densities of EWM and filamentous algae in Tenney Park Lagoon. White water lily habitat should be surveyed pre-season and protected during the harvesting season.
3. Mechanical harvesting is recommended only as needed, based on pre-season survey, for controlling EWM in Verona Quarry to improve boating access, angling opportunities and improve fish habitat. Coarse woody debris should be protected for fish and turtle habitat.
4. Mechanical harvesting is recommended for Vilas Lagoon to control dense EWM growths that top out across the water surface and to minimize effects of super saturation caused by excessive plant growth and photosynthesis. White water lily habitat should be protected.
5. Water clouding phytoplankton in Warner Lagoon inhibited submersed plant growth except for the sparsely occurring plants close to shore. Mechanical harvesting was not recommended in 2007 but conditions may change and warrant harvesting in the future. White water lily habitat should be protected. If mechanical harvesting is used in the future, areas with white water lilies should be avoided.
6. Dane County mechanical harvesting crews should continue to take steps to prevent the spread of exotic invaders across Dane County lakes. These steps include removing any visible plants, mud, debris, water, fish or animals from the machinery and thoroughly washing the equipment. The fact sheet in Appendix A is included in the harvesting crews' operations manual.
7. No Sensitive Areas are recommended for Department of Natural Resources designation under NR 107 at this time.

Methods

The perimeters of all ponds were inspected and dominant plants were noted. Additional observations included identification of high value aquatic plants and habitat values. Access from footbridges and fishing piers enhanced inspecting some of the ponds. Boat surveys were conducted on Verona Quarry and Warner Lagoon since the larger ponds could not be inspected adequately from shore. During the boat surveys, secchi measurements and dissolved oxygen/temperature profiles were collected with an YSI Model 52 meter. A SCUBA survey was also conducted on Verona Quarry to include underwater photography of aquatic plant habitat. Dissolved oxygen, temperature, pH and specific conductivity measurements were recorded from each pond and are found in Table 1.

Table 1: Chemical characteristics of ponds surveyed

Pond	Date	Time	Temp C	D.O. mg/l	pH	Sp Cond. uS/cm
Jenni Kyle (small)	6/22/07	13:05	12.2	12	7.38	1027
Jenni Kyle (large)	6/22/07	13:30	18.2	16.4	8.19	924
Tenney Lagoon	6/26/07	13:20	29	17.3	10.2	402
Verona Quarry	6/22/07	12:16	25	10.6	8.49	665
Vilas Lagoon	6/28/07	09:30	26.8	8.5	9.5	350
Warner Lagoon	6/26/07	12:40	31.5	13.2	9.38	305
Figures 3 and 5 display vertical d.o./temp profiles at Verona Q. and Warner L.						

Jenni and Kyle Preserve Ponds

Jenni and Kyle ponds are located in the Dane County Parks Preserve of the same name, located within the Cities of Madison and Fitchburg, and in the Lower Rock River Basin. The Preserve provides accessible fishing and picnic areas, trails, and two spring-fed ponds containing trout and panfish.

The Jenni and Kyle ponds were inspected initially on June 22nd. The dominant plants in the small pond included common waterweed (*Elodea canadensis*), sago pondweed (*Struckenia pectinatus*), leafy pondweed (*Potamogeton foliosus*), coontail (*Ceratophyllum demersum*), and exotic curly-leaf pondweed (*Potamogeton crispus*). No unusual or rare submersed plants were observed and no species that would be undermined by mechanical harvesting. Of greatest management concern was the presence of filamentous algal mats along the perimeter and in the form of billowing growths submersed in the middle of the pond. Riparian plants included cattails (*Typha*), bur-reed (*Sparganium*), exotic reed canary grass (*Phalaris arundinacea*), Canada goldenrod (*Solidago canadensis*), exotic Canada thistle (*Cirsium arvense*) and exotic birdsfoot trefoil (*Lotus corniculatus*). The cold surface temperature (12.2 C) reflected the spring-flow in the pond and favorable habitat for trout. Rooted vegetation was much greater in the larger pond that receives overflow from the first pond. Water temperatures were warmer (18.2 C) but still sustainable for trout at that time. Painted turtles were observed on floating logs and there was evidence of attempted turtle nest digging on the west side of the pond. Submersed vegetation included common waterweed, sago pondweed, leafy pondweed and coontail. Filamentous algae was present but at a lower density compared to the smaller pond. Rainbow trout and bluegills were observed in the larger pond.

The second survey was performed on June 28th. Filamentous algal growth was significantly greater in both ponds, rendering them un-fishable for shoreline anglers (Photos 1 and 2). Rooted plant growth in the larger pond had expanded as well.

Mechanical removal of aquatic plants and filamentous algae in the ponds has improved both public access and fish habitat. Moving mechanical harvesters into the ponds is somewhat challenging given the small surface areas. The riparian vegetation is not high quality and therefore not subject to damage while accessing the ponds. Manual methods of aquatic plant control may be more appropriate for the small pond. Efforts to increase turtle habitat have been successful by adding coarse woody debris (logs). Consideration should be given to improving mechanical harvester access to the ponds and continue sustaining turtle habitat.

Photo 1

Photo 2

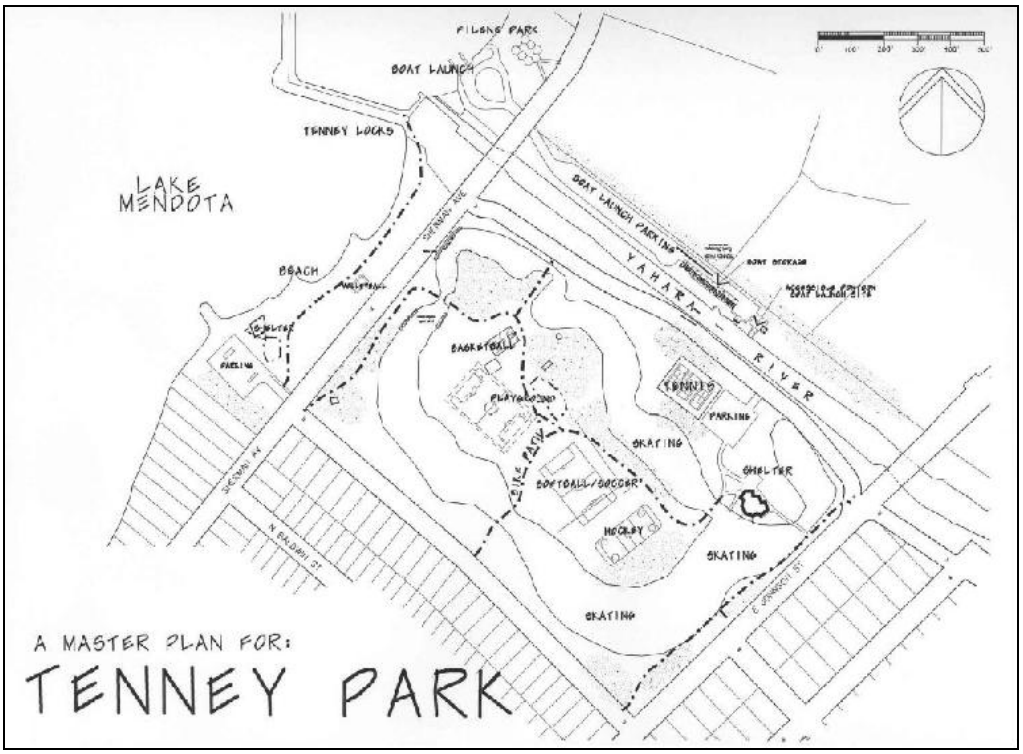
Tenney Park Lagoon

Tenney Park Lagoon is a 8.22-acre waterbody located in the City of Madison's Tenney Park, and in the Lower Rock River Basin. It is used for fishing, and for ice-skating in the winter.

Tenney Park Lagoon was inspected on June 26, 2007. The meandering lagoon was nearly choked with EWM and filamentous algae in the deeper sections of the pond but supported white water lily in the nearshore areas. Other submersed plants included coontail and curly-leaf pondweed (CLP). Water temperature was warm at 27.5 C and dissolved oxygen was supersaturated exceeding 16 parts per million. Very high pH (10.2) was also measured and reflected the excessive photosynthesis. The dense vegetation clearly represented nuisance conditions for paddlers or anglers and had potential for significant ecological impacts. Although dissolved oxygen was not measured in the early morning hours, respiration of the dense vegetation had potential for substantial oxygen depletion. The cover photo captures the conditions found in most of the lagoon on June 26. Figure 2 is a layout of the entire lagoon.

Tenney Park Lagoon was the site of experimental bottom fabric placement to reduce EWM during the late 1980's. However, excessive filamentous algae grew on the artificial substrate while benthic gases caused the material to float to the surface and take on a "Loch Ness" appearance. Mechanical harvesting improves both public access and fisheries habitat. Removal of excessive aquatic vegetation can reduce extreme fluctuations in dissolved oxygen and pH. Tenney Lagoon has potential for expanding urban pond fishery recreation.

Figure 2



Verona Quarry

Verona Quarry is located in the City of Verona's Fireman's Park, and in the Grant-Platte-Sugar-Pecatonica Basin. It is 9.39 acres in size, with a maximum depth of 20 feet. Secchi depth measurement was greater than 20 feet, generating a TSI score of 34 (indicating oligotrophic (very low nutrient) condition and clear water body). The Quarry provides fishing and swimming opportunities.

Verona Quarry/Swimming Beach was inspected on June 22nd and again on July 2, 2007. The June inspection entailed a shoreline inventory of aquatic plants but due to the large surface area a boat survey was also performed in July. The crystal clear water in the quarry supports slender naiad (*Najas flexilis*) and muskgrass (*Chara*) on rocky substrates. In the deeper portions, EWM was dominant based on both surface observation and a SCUBA survey performed in July. Other species observed included sago pondweed, leafy pondweed, common waterweed, CLP and an unidentified nearshore floating-leaf pondweed, possibly long-leaf pondweed (*Potamogeton nodosus*). Coarse woody habitat was evident around parts of the pond. Fish species observed during the SCUBA survey included largemouth bass, bluegill, green sunfish and a single large carp. Minnows were observed near shore. Figure 3 is a temperature – dissolved oxygen profile from the deep hole at 20-foot water depth. Adequate dissolved oxygen was found at all depths and the quarry was not thermally stratified. Water was very clear with the Secchi reading greater than the maximum depth (>20 feet). Photos 3 through 5 demonstrate the underwater habitat in the clear water. EWM grows at the maximum depth of 20 feet. Photo 6 demonstrates recent harvesting in about 8 feet of water.

Mechanical harvesting of EWM benefits both fish habitat and angler access in the lake. Anglers were observed fishing both from the two piers and from watercraft. Planting floating leaf plants such as white water lilies or spatterdock may improve habitat in the nearshore areas. Maintaining the wooded areas and associated fallen trees will continue to provide valuable habitat for fish and herptiles.

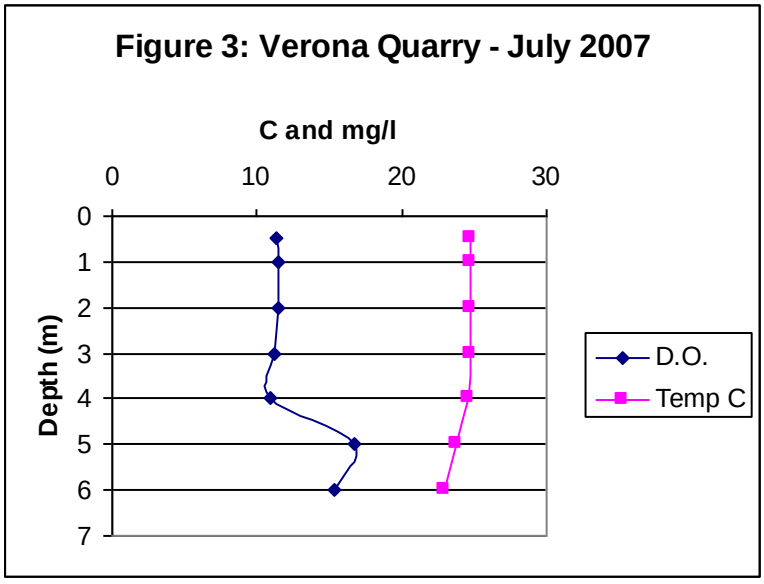


Photo 3 (rock bar with low growing Chara and naiad)

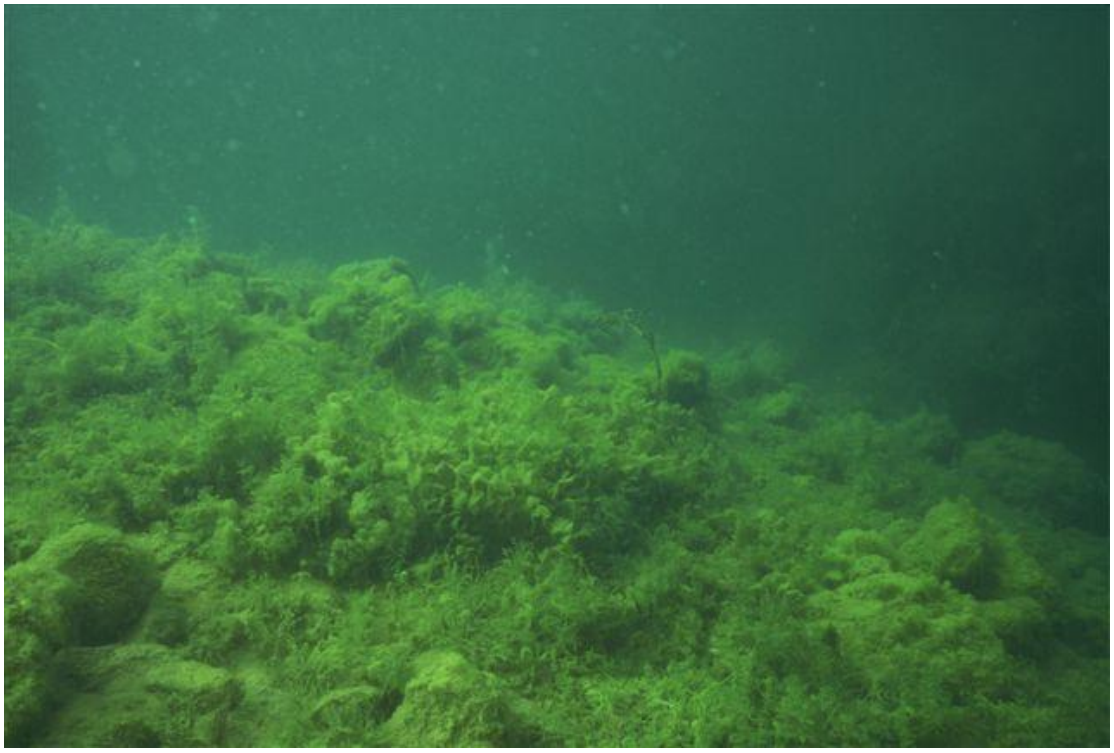


Photo 4 (EWM in deeper sections of the quarry)

Photo 5 (harvested EWM in 8 feet of water)

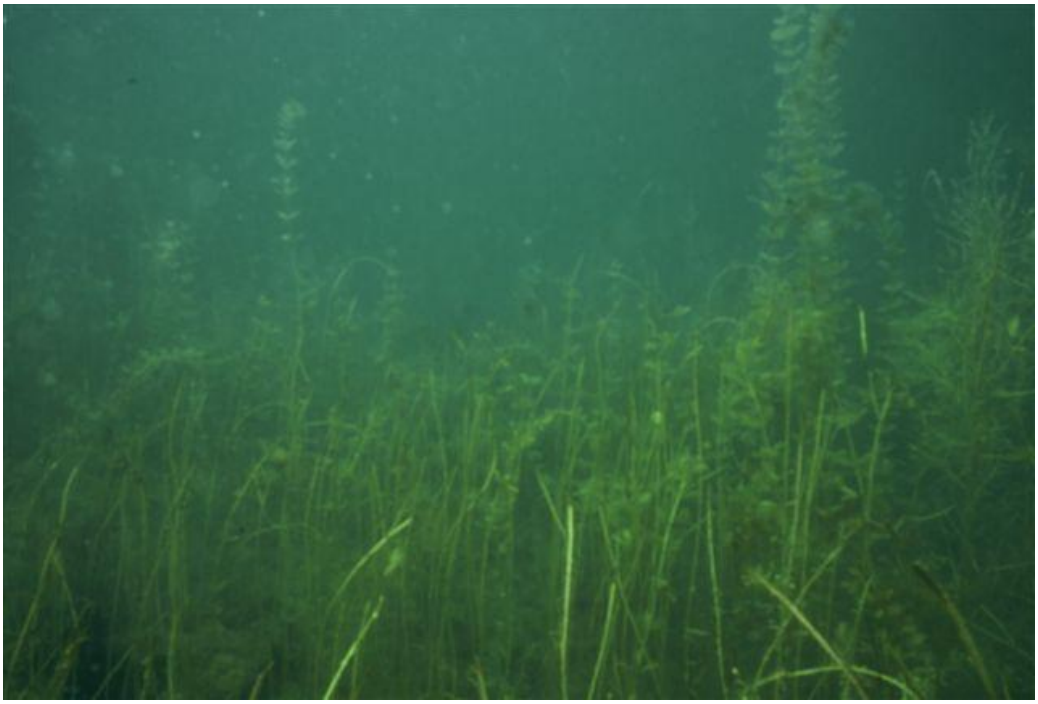


Photo 6 (naiad and common waterweed with cut EWM in background)

Vilas Park Lagoon

Vilas Lagoon is located in the City of Madison's Vilas Park, and is in the Lower Rock River Basin. Recreational uses include fishing and ice-skating.

Vilas Park Lagoon was inspected on June 28, 2007. Water clarity was good but EWM grew in dense beds from shore to shore. Filamentous algal growths were evident in some areas as were healthy beds of white water lily near the pond perimeter and mouth near Lake Wingra. A few carp were observed west of the island within the carp containment area. The lagoon is being used to trap and remove carp from Lake Wingra. At 9:40 a.m. dissolved oxygen had already reached 12.8 mg/l and pH was high at 9.5. Low nighttime dissolved oxygen may occur due to respiration of the dense growths of EWM and filamentous algae. Emergent vegetation was scarce since the park lawn manicured to the pond edge and goose droppings were abundant. Figure 4 displays the lagoon and park setting and Photo 7 captures the fish habitat near the bridge and outlet to Lake Wingra.

Vilas Park Lagoon was previously the site of an experimental alum treatment to designed reduce sediment sources of phosphorus for EWM during the mid-1980s. Later research determined that sediment nitrogen is the typical limiting factor for rooted macrophytes.

An Edgewood College project is monitoring the seasonal distribution and abundance of Canada geese in Vilas Park, using direct counts in different park areas as well as video surveillance. The video monitoring is focused along the north shore of the Vilas Lagoon, in order to determine the effectiveness of a native vegetation buffer in discouraging geese passage between the lagoon and the mowed park areas. The vegetation buffer is part of a collaborative project of Friends of Lake Wingra, Edgewood College, Dane County Land and Water Resources, Wisconsin Department of Natural Resources, and City of Madison Parks. Information gathered during this project could be applied to other ponds and lagoons in the future.

Mechanical harvesting of EWM and attached filamentous algae improves fisheries habitat and park aesthetics. Expanding white water lily beds would improve both resource attributes. Expanding riparian vegetation could improve herptile habitat.

Figure 4

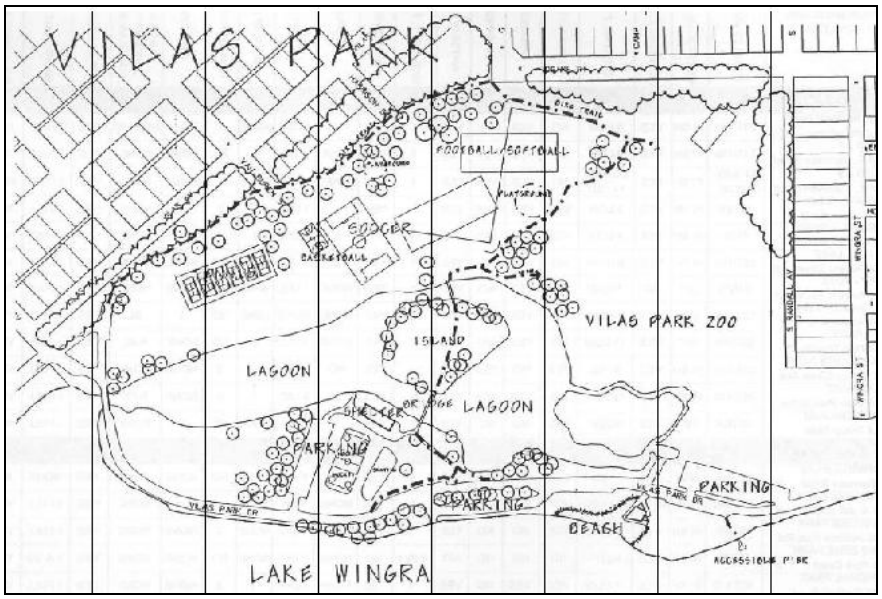


Photo 7

Warner Park Lagoon

This 27.78-acre lagoon is located in the City of Madison's Warner Park, and is in the Lower Rock River Basin. Warner Lagoon is very eutrophic (very productive and fertile). It provides fishing and ice-skating recreational opportunities.

Warner Park Lagoon was inspected on two dates. A shoreline inspection was conducted on June 26th and boat survey on July 13, 2007. Water was very turbid due to phytoplankton blooms on both occasions. Secchi depth was only 1.1 feet on July 13th. Submersed plants were very scarce

due to the high turbidity. Pockets of white water lilies provided favorable habitat but were not overly abundant. The island provided substantial woody habitat and the south part of the lagoon appeared to be in a more natural state. A few people swam with their dogs in the south lagoon. The north shoreline of the lagoon is mowed to the water and goose droppings covered much of the nearshore lawn.

Figure 5 demonstrates that dissolved oxygen levels were low during the July survey, probably due to dense phytoplankton. Figure 6 is the park lagoon layout. Photo 8 captures one of the numerous pockets of white water lilies.

Mechanical harvesting was not recommended in 2007 since submersed aquatic plants were scarce and white water lilies were providing beneficial habitat functions. Harvesting may be needed in future years if the eutrophic pond shifts to submersed macrophyte dominated, particularly EWM.

Figure 5

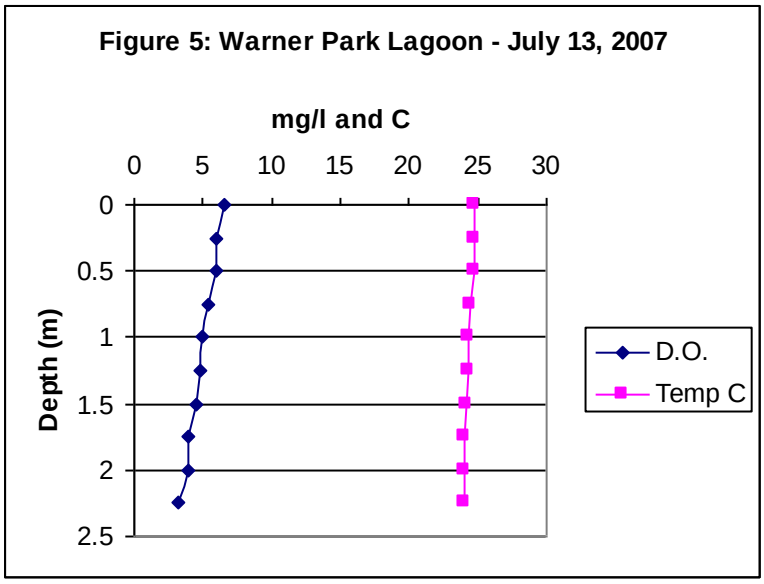


Figure 6

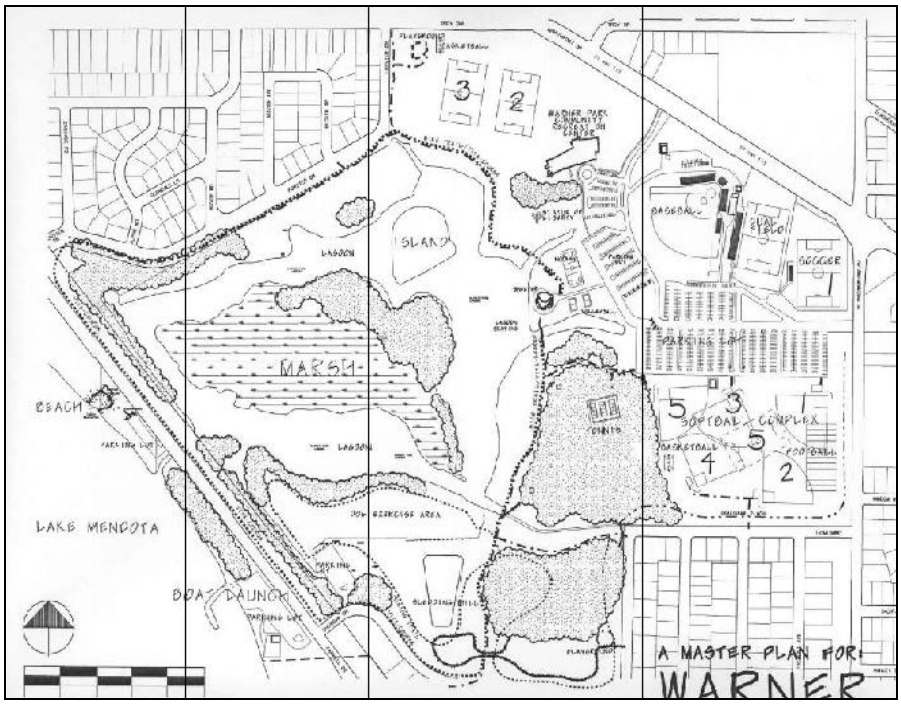


Photo 8

Management Alternatives

Ponds typically function as small shallow lakes that trap and process nutrients. These systems are rarely nutrient deficient and are often productive. Given their shallow rooting depth, lush growths of aquatic plants and filamentous algae frequently occur. Some form of management is often needed so that the water resources can be used and enjoyed by the public. Below is a set of alternatives considered for this plan.

Physical barriers - bottom fabrics: Bottom fabric was experimented in Tenney Lagoon and proved to be ineffective due to filamentous algal growth and upwelling from anaerobic gases. The use of this material is too labor-intensive for the numerous ponds that Dane County manages.

Chemical treatments: Chemical treatments are not recommended in ponds with no chemical treatment history. Decomposition of decaying plants and algae can deplete dissolved oxygen and cause fish kills. However, some of the ponds with dense EWM may be better test sites for experimental chemical treatments than conducting experiments on relatively large lakes.

Dredging: Dredging is typically too expensive and temporarily disruptive for park pond management. It may be useful in some circumstances; however typical pond dredging depths are not sufficient to reduce growth of nuisance aquatic plants such as EWM.

Mechanical harvesting: Mechanical harvesting can effectively reduce filamentous algae and EWM nuisances in most ponds. In some cases, manual harvesting methods may be a better alternative for smaller ponds, such as the Jenni and Kyle Preserve (small) pond.

Appendix A

PROTECT YOUR WATERS

General Prevention Procedures for Stopping Aquatic Hitchhikers:
A must read for all recreational users

Follow a general set of procedures every time you come in contact with any body of water. By doing so, you can protect your waters from harmful aquatic hitchhikers. Because you never know where a nuisance species has been introduced, but has yet to be discovered.

There are hundreds of different harmful species ranging from plants, fish, amphibians, crustaceans, mollusks, diseases or pathogens. Some organisms are so small, you may not even realize they are hitching a ride with you. So, it is important to follow this general procedure every time you leave any body of water.

Remove all visible mud, plants, fish/animals

- Before leaving any body of water, it is important to examine all your equipment, boats, trailers, clothing, boots, buckets etc and: Remove any visible plants, fish or animals
- Remove mud and dirt since it too may contain a hitchhiker*
- Remove even plant fragments as they may contain a hitchhiker*
- Do not transport any potential hitchhiker, even back to your home. Remove and leave them at the site you visited

*The larvae (immature form) of an animal can be so tiny that you cannot see it. However, it can live in mud, dirt, sand, and on plant fragments.

Eliminate water from all equipment before transporting anywhere

Much of the recreational equipment used in water contains many spots where water can collect and potentially harbor these aquatic hitchhikers. Thus, make sure that you:

- Eliminate all water from every conceivable item before you leave the area you are visiting
- Remove water from motors, jet drives, live wells, boat hulls, scuba tanks and regulators, boots, waders, bait buckets, seaplane floats, swimming floats
- Once water is eliminated, follow the cleaning instructions listed below

Clean and dry anything that came in contact with the water

Basic procedures for boats, trailers, equipment, dogs, boots, clothing, etc., include:

- Use hot (< 40° C or 104° F) or salt water to clean your equipment
- Wash your dog with water as warm as possible and brush its coat

The following recipes are recommended for cleaning hard-to-treat equipment that cannot be exposed to hot water:

- Dipping equipment into 100% vinegar for 20 minutes will kill harmful aquatic hitchhiker species.
- A 1 % table salt solution for 24 hours can replace the vinegar dip.

This table provides correct mixtures for the 1 % salt solution in water:

Gallons of Water	Cups of Salt
5	2/3
10	1 1/4
25	3
50	6 1/4
100	12 2/3

If hot water is not available, spray equipment such as boats, motors, trailers, anchors, decoys, floats, nets, **with high-pressure water.**

DRY Equipment. If possible, allow for 5 days of drying time before entering new waters.

Do not release or put plants, fish or animals into a body of water unless they came out of that body of water

Also, do not release them into storm drains, because most storm drains lead to water bodies or wetlands. This is an important prevention step because many plants and animals can survive even when they appear to be dead. The two categories below describe some common situations where people may feel compelled to release aquatic plants or animals.

Aquarium and Aquatic Pets: If your family gets tired of its aquarium or aquatic pets, do not release anything from the aquarium (water, plants, fish or animals) into or near a body of water or storm drain. Explain to your children how you could be hurting all of the streams and lakes around the country and killing other fish and animals that already live in the water.

If you cannot find a home for the critters in you aquarium, bury them. Dump the water into the toilet or yard, far away from storm drains.

Bait: Whether you have obtained bait at a store or from another body of water, do not release unused bait into the waters you are fishing. If you do not plan to use the bait in the future, dump the bait in a trashcan or on the land, far enough away from the water that it cannot impact this resource. Also, be aware of any bait regulations, because in some waters, it is illegal to use live bait.

Source: Aquatic Nuisance Species Task Force website (www.protectourwaters.org/prevention/prevention_generic.php)