6. Lake Project Ideas for Protecting the Lake Environment

Project ideas for Muskellunge Lake are geared toward long-term protection of water quality.

A list of projects has seven main components:

1. Watershed projects.
2. On-site system maintenance.
3. Aquascaping projects.
4. Aquatic plant projects.
5. Fish management options.
6. Sediment alum treatment for water clarity improvement
7. Ongoing education program.
8. Watershed and lake monitoring program.

Details for these projects areas are given in the next few pages.

Side Note: Several other lake management options were considered but not recommended and include the following:

- **Barley straw for algae control:** Barley straw can control algae growth but is best suited for ponds and small lakes. A typical dose is 250 pounds of barley per lake acre is recommended. At this rate it would take 68,000 pounds of barley to control algae for one season. This would not be a practical approach.

- **Dredging:** Like many lakes in the area, there are shallow mucky or peaty areas in some of the bays. Sometimes dredging is considered. However, it is rarely implemented because it is expensive. For example, consider dredging a one acre area, 3-feet deep. This would involve removing about 4,840 cubic yards of material at $10/yard. The cost would be roughly $50,000 per acre. Dredging costs do not justify the benefits.

- **Muck-eating enzymes:** Muck eating enzymes come from bacterial additions. Although used in wastewater treatment processes to help decompose organic wastes, the organics found in lake sediments have already been worked over by the bacteria present in the lake and the remaining organic compounds, especially the peat, are resistant to breaking down further. Muck eating enzymes won't do much for reducing the volume of lake sediments and are not recommended.

- **Grass carp to control weeds:** Grass carp, which are not really a carp, are exotic species which have been imported and sterilized and stocked in some southern states lakes and ponds. Typically, they destroy or remove all plants in a lake. This is not a desirable outcome. In addition, they are illegal to stock in Wisconsin lakes.

- **Biological treatment:** The use of biology in a lake to improve water quality is often referred to as biomanipulation. It has a role in lake management. Sometimes water clarity can be improved if more gamefish are stocked. They will eat the smaller fish and then the zooplankton population will increase. With more zooplankton available, they will eat the algae and reduce algae numbers. This is a potential future project.

Project 1. Watershed Projects

The main goal of the watershed projects program is to protect the natural character of the watershed which helps maintain good runoff water quality.

Although majority of the watershed is forested, the surrounding wetlands probably contribute phosphorus, by way of groundwater, to Muskellunge Lake. However, this is a natural pathway. Watershed project areas to monitor in the future involve erosion control for new development as well as with forest harvesting activities.

Project 2. On-site System Maintenance

The septic tank/soil absorption field has been one of the most popular forms of on-site wastewater treatment for years. When soil conditions are proper and the system is well maintained, this is a very good system for wastewater treatment. The on-site system is the dominant type of wastewater treatment found around Muskellunge Lake today.

However, problems can develop if the on-site system has not been designed properly or well-maintained. Around Muskellunge Lake there are probably some on-site systems that need maintenance or upgrades. At the same time, it is good practice to ensure that systems that are functioning adequately now will continue to do so in the future.

This project calls for an organized program to be developed that makes homeowners aware of all they can do to maintain their on-site systems.

A description of possible activities associated with the on-site maintenance program are described below:

- **Septic Tank Pumping Campaign**
  Vilas County requires every septic tank associated with a permanent residence pumped 2-3 years in the shoreland area to help reduce phosphorous loading to the septic system drainfield.

- **Ordinance Implementation**
  Work to maintain enforcement of the county ordinance, where septic systems must be "evaluated" at the time a property is transferred. The seller would obtain a septic system evaluation from Vilas County at the time of property transfer. The evaluation would determine if the septic system was "failing", "non-conforming", or "conforming". A "failing" septic system includes septic systems that discharge onto the ground surface, discharges into tiles and surface waters, and systems found to be contaminating a well. The county would require a "failing" system to be brought into compliance with the Vilas County ordinance within 90 days of property transfer.

Project 3. Aquascaping Projects

Controls are in place at the county level to guide new shoreland development. A number of excellent reference publications are available to assist in promoting shoreland stewardship. For existing shoreland properties, it is important to either maintain or to improve the natural vegetative buffer.

The shoreland area is valuable for promoting a natural lake environment and a natural lake experience for lake users. The shoreland is defined as the upland area about 300 to 1,000 feet back from the shoreline, and out into the lake to about the end of your dock (Figure 28). A shoreland with native vegetation offers more wildlife and water quality benefits than a lawn that extends to the lake's edge. A summary of attributes and functions of native plants in the shoreland area is shown in Table 16.

Figure 28. Cross section of the lake shoreland habitat.

Table 16. Attributes and functions of native plants in the shoreland area (Source: Henderson and others, 1999. Lakescaping for Wildlife and Water Quality. MnDNR)).

Important functions of plants in and around lakes

Submergent and emergent plants

- Plants produce leaves and stems (carbohydrates) that fuel an immense food web.
- Aquatic plants produce oxygen through photosynthesis. The oxygen is released into lake water.
- Submerged and emergent plants provide underwater cover for fish, amphibians, birds, insects, and many other organisms.
- Underwater plants provide a surface for algae and bacteria to adhere to. These important microorganisms break down polluting nutrients and chemicals in lake water and are an important source of food for organisms higher in the food chain.
- Emergent plants break the energy of waves with their multitude of flexible stems, lessening the water's impact on bank and thus preventing erosion.
- Plants stabilize bottom sediments, which otherwise can be resuspended by currents and wave action. This reduces turbidity and nutrient cycling in the lake.

Shoreline and upland plants

- Shoreline and upland plants provide food and cover for a variety of birds, amphibians, insects, and mammals above the water.
- The extensive root systems of shoreline plants stabilize lake-bank soils against pounding waves.
- Plants growing on upland slopes that reach down to lake hold soil in place against the eroding forces of water running over the ground, and help to keep lake water clean.
- Upland plants absorb nutrients, like phosphorus and nitrogen, found in fertilizers and animal waste, which in excessive concentrations are lake pollutants.

Improving Upland Native Landscape Conditions: In the glacial lake states, three broad vegetative groups occur: pine forests with a variety of ground cover species including shrubs and sedges: hardwood forests with a variety of understory species, including ferns: and tallgrass prairie with a variety of grasses as well as bur oaks and willow trees. Residences around Muskellunge Lake are in the hardwood forest group.

Reestablishing native conditions in the shoreland area not only improves stormwater runoff quality, it also attracts a variety of wildlife and waterfowl to the shoreland area. Benefits multiply when other neighbors naturalize because the effects are cumulative and significant for water quality and wildlife habitat.

When installing native vegetation close to the shoreline residents are actually installing a buffer. A buffer is a strip of native vegetation wide-enough to produce water quality and wildlife improvements. Much of the natural vegetative buffer has been lost in shoreland areas with development where lawns have been extended right down to the shore.

Lawns are not necessarily bad for a lake. However they can be over fertilized and then runoff carries phosphorus to the lake. Also, lawns function as a low grade open prairie, with poor cover for wildlife and a food supply that is generally poor, except for geese

who may find it attractive. Replacing lawn areas with native landscaping projects reduces the need for fertilizer, reduces the time it takes to mow, increases the natural beauty of a shoreland area, and attracts wildlife.

Lawns do not make very good upland buffers. With runoff, short grass blades bend and do not serve as a very effective filter. Tall grass that remains upright with runoff is a better filter. Kentucky bluegrass (which actually is an exotic grass) is shallow-rooted and does not protect soil near shorelines as well as deep-rooted native prairie grasses, shrubs, or other perennials. Grass up to the shoreline offers poor cover, so predators visit other hiding areas more frequently reducing the prey food base and limiting predator populations in the long run. Also with short ground cover, ground temperatures increase in summer, evapotranspiration increases and results in drying conditions, reducing habitat for frogs and shoreline dependent animals.

Buffer Strip Considerations: A functional upland buffer should be at least 15 feet deep. With this you start getting water quality and wildlife habitat benefits. But a 35 foot deep buffer is recommended. In the past, before lakeshore development, buffers ringed the entire lake. For lakeshore residents it is recommended the length of the buffer extend for 75% of the shoreline, although 50% would produce buffer benefits.

A buffer strip can address two problem areas right away. Geese are shy about walking through tall grass because of the threat of predators. There will always be a few who charge right through but it is a deterrent for most of them. Also, muskrats shouldn't be a problem. They may burrow into the bank, but generally not more then 10 feet. With a buffer going back 15 to 25 feet, you won't be mowing over their dens. An occasional den shouldn't produce muskrat densities that limit desirable aquatic vegetation.

Several types of buffers can be installed or propagated that offer nutrient removal as well as wildlife benefits. Examples include:

Tall grass, sedge, flower buffer: Provides nesting cover for mallards, blue-winged teal and Canada geese. Provides above ground nesting habitat for sedge wrens, common yellow throat and others.

Shrub and brush buffer: Provides nesting habitat for lakeside songbirds such as yellow warblers, common yellowthroat, swamp sparrows, and flycatchers. It also provides significant cover during migration.

Forested buffers: Provides habitat for nesting warblers and yellow-throated vireo, Diamond herons, woodducks, hocked mergansers, and others. Upland birds such as red-winged blackbirds, orioles, and woodpeckers use the forest edge for nesting and feeding habitat.

Even standing dead trees, which are referred to as snags, have a critical role. When they are left standing they serve as perching sites for kingfishers and provide nesting sites for herons, egrets, eagles, and ospreys. In the midwest over 40 bird species and 25 mammal species use snags. To be useful, they should be at least 15 feet tall and 6-inches in diameter.

The initial step for lake residents to get started is to simply make a commitment to try something. Just what the final commitment is evolves as they go through a selection process. The next step in the process is to conduct a site inventory. On a map with lot boundaries, house and buildings, driveway, turf areas, trees, shrubs, and other features are drawn. If there is a chance, the property is checked during a rainstorm. Look for sources of runoff and even flag the routes. Find out where the water from the roof goes, and see if there are temporary ponding and infiltration areas. Are the paths down to the lake eroding? Then the next step is to consider a planting approach.

Native Landscaping for Buffers: Three Approaches: Native landscaping efforts can be put into three categories:

1. Naturalization
2. Accelerated Naturalization
3. Reconstruction

1. Naturalization: With this approach, the resident is going to allow an area to go natural. Whatever is present in the seedbank is what will grow. If they want to install a buffer along the shoreline, let a band of vegetation grow at least 15 feet deep from the shoreline back and preferably 25 feet or deeper. Just by not mowing will do the trick. Residents can check how it looks at the end of the summer. It will take up to three years for flowers and native grasses to grow up and be noticed. Residents can also select other spots on their property to "naturalize".

2. Accelerated Naturalization: After developing a plant list of species from the area, residents may want to mimic some features right away. They can lay out a planting scheme and plant right into existing vegetation. Several Wisconsin nurseries can supply native plant stock and seeds. The nurseries can also help select plants and offer planting tips. Wildflowers can be interspersed with wild grasses and sedges. Mulch around the new seedlings. With this approach lake residents can accelerate the naturalization process. Contact the Wisconsin Department of Natural Resources for a nursery list.

3. Reconstruction: To reestablish a native landscape with the resident's input and vision, another option is to reconstruct the site with all new plants. Again plant selection should be based on plants growing in the area. Site preparation is a key factor. Residents will want to eliminate invasive weeds and eliminate turf. This can be done with either herbicides or by laying down newsprint or other types of paper followed by 4 to 6 inches of hardwood mulch. Plantings are made through the mulch. This is the most expensive of the three native landscaping categories. Residents can do the reconstruction all at once, or phase it in over 3 to 5 years. This allows them to budget annually and continue evolving the plan as time goes by.

Also mixing and matching the level-of-effort categories allows planting flexibility. Maybe a homeowner employs naturalization along the sides of the lot and reconstruction for half of the shoreline and accelerated naturalization for the other half. Examples of the three approaches are shown in Figure 29.

1. Naturalization: The easiest way to implement a natural shoreline setting is to select an area and leave it grow back naturally.

2. Accelerated Naturalization: To accelerate the naturalization, plant shrubs, wild flowers, or grasses into a shoreland area.

3. Restoration: This involves removing existing vegetation through the use of paper mats and/or mulching and planting a variety of native grasses, flowers, and shrubs into the shoreland area.

Figure 29. Examples of three shoreland management options.

Project 4. Aquatic Plant Projects

Currently, Muskellunge Lake has a variety of native emergent and submergent aquatic plant growth. Aquatic plants are vital for helping sustain clear water conditions and contribute to fish habitat. As of August 2004, there are no exotic plant species found in Muskellunge Lake. However, in a couple of areas, native aquatic plants can produce navigational hindrences in some summers.

The primary aquatic plant goal is to maintain and/or protect submerged aquatic plants in Muskellunge Lake. Two plant management ideas are given below:

1. Maintaining good shoreland conditions can sustain long-term shallow water plant communities. Ongoing shoreland maintenance and improvement will be important.

2. Aquatic plant removal using manual methods is an option for maintaining an open area in front of your property. Mechanical harvesting is another option if channels out to open water are deemed necessary. However, only the minimum amount of plants needed to reduce navigational hindrences should be removed.

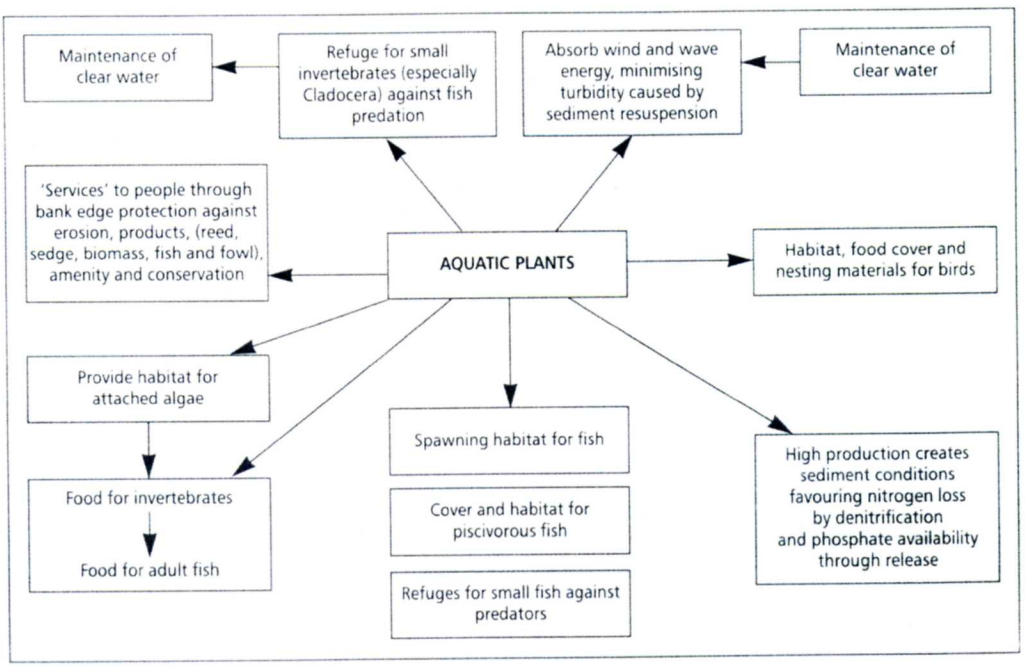

Figure 30. Links between aquatic plants and other organisms, including ourselves (source: Moss and others. 1996. A guide to the restoration of nutrient-enriched shallow lakes. Broads Authority Norwich, England).