6. Lake Management Plan for Protecting the Lake Environment

Project ideas for VanVliet 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. Ongoing education program.
7. Watershed and lake monitoring program.

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

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.

Currently, a majority of the watershed area is composed of wetlands and forests. An especially striking feature is a stand of over 400 acres of hemlocks, much of it is old growth, located in the northern end of VanVliet Lake's watershed and continuing into the Averill Lake watershed.

A hemlock stand of this type would be valuable to protect for ecological, wildlife, and lake water quality considerations.

Ongoing efforts will be needed and are recommended in order to protect and preserve this natural resource asset.

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 VanVliet Lake today.

However, problems can develop if the on-site system has not been designed properly or well-maintained. Around VanVliet 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:

- **Workshop**
  A workshop should be scheduled for VanVliet Lake Watershed residents to demonstrate the installation of a conforming septic system and the proper care and maintenance of a septic tank and septic system.

- **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.

Additional information on Vilas County septic system rules in found in the Appendix.

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 25). 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 15.

Figure 25. Cross section of the lake shoreland habitat.

Table 15. 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 VanVliet 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 Minnesota 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.

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 26.

A book that covers the shoreland improvements is “Lakescaping for Wildlife and Water Quality” by Carrol Henderson and others and is available from the Minnesota Department of Natural Resources for $21 (651.296.6157).

Shoreland erosion control effort on VanVliet Lake, 2004.

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 26. Examples of three shoreland management options.

Project 4. Aquatic Plant Projects

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

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

1. Maintaining good shoreland conditions can promote improved plant distribution. Ongoing aquatic plant monitoring and delineation will be important.

2. Conduct pondweed control demonstrations to evaluate the best way to control nuisance growth in VanVliet Lake.

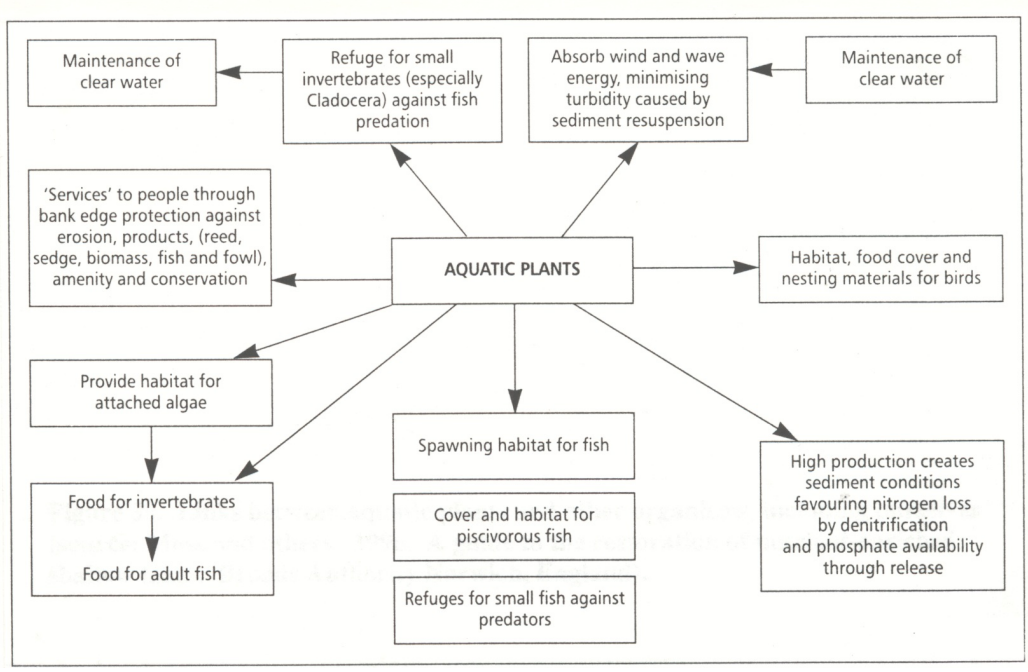

Figure 27. Links between aquatic plants and other organisms, including ourselves (source: Moss and others. 1996. A guide to the restoration of nutrient-enriched shallow lakes. Broads Authority Norwich, England).

Aquatic Plant Management Options: Based on the aquatic plant survey results from 2004, two species of native aquatic plants may produce some navigational restrictions in the southwest bay and along the western shoreline of VanVliet Lake.

In the southwest bay, fern pondweed is found either floating at the surface or anchored in the soft sediment and extending into the water column. Because the bay is only 2 to 3 feet deep, it does not take much plant material to produce nuisance conditions.

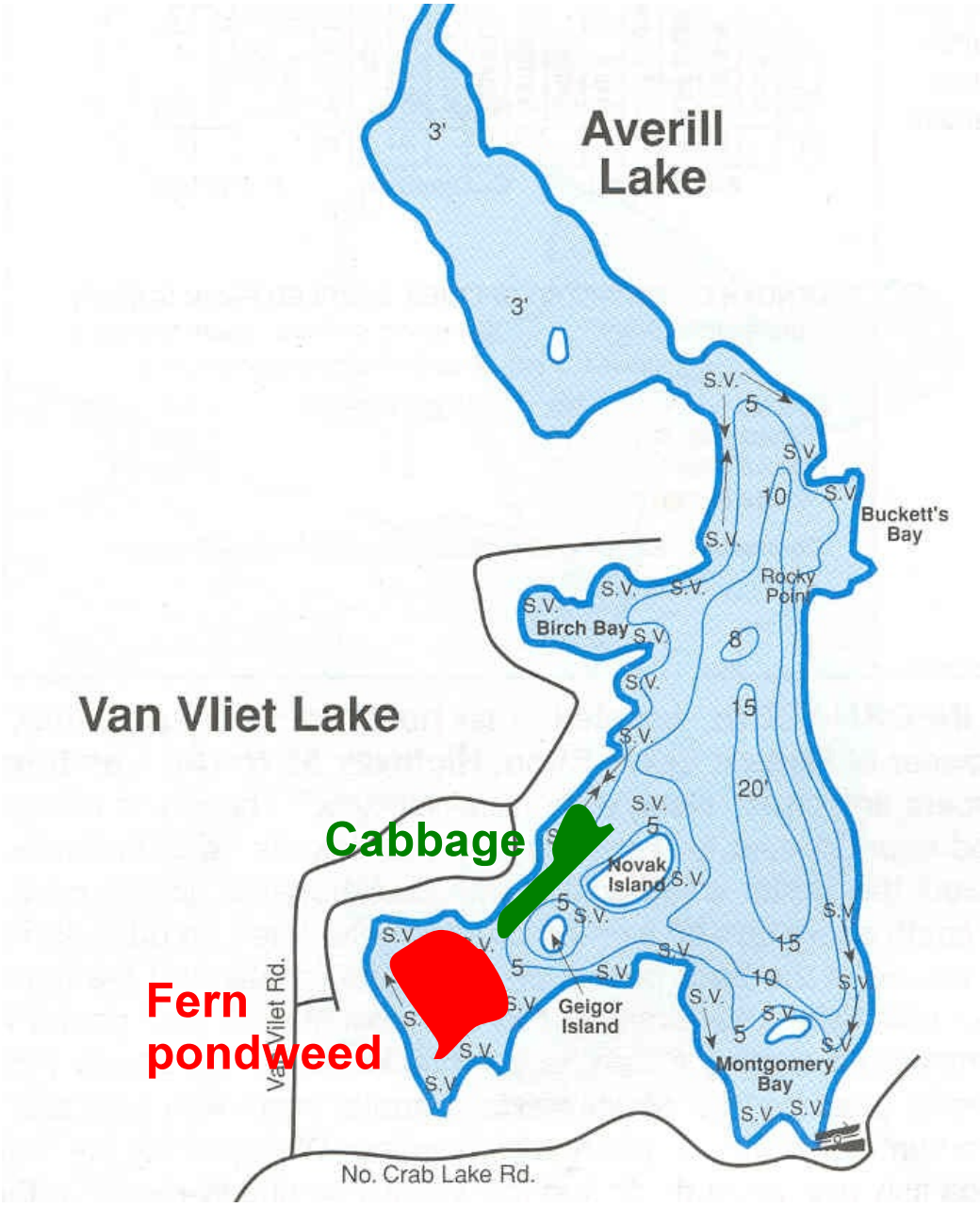

Figure 28. Areas where aquatic plants have occasionally grown to nuisance conditions. In the southeast bay (Montgomery Bay on the map), fern pondweed, and elodea grow up to the surface in shallow water (4 feet or less). Navigation channels could be cut through these areas to facilitate boat traffic in and out of VanVliet Lake.

It appears that fern pondweed conditions in early summer are probably influenced by ice effects. In the shallow bay, ice typically reaches to the lake bottom and may entrain pondweed into the ice. When the ice goes out, some fern pondweed is brought to the surface and floats for a while although it eventually sinks. However, later in the summer, normal growth of fern pondweed occurs and because the bay is only 2 to 3 feet deep, even average plant growth can result in plants reaching the water surface. If plant management is considered, a mechanical harvester is recommended because it will pick up the plant material. However, because of the soft sediment, there will be come sediment resuspension and a turbid condition will persist for a few days after harvesting is completed. Estimated cost of hiring the harvester for one day is about $1,000. It is estimated a mechanical harvester could cover about five to six acres of the sparsely growing fern pondweed per day.

Figure 29. Fern pondweed is a weakly rooted plant and is the dominant plant in the soft mucky sediment in the southwest bay.

Another area where plants grow to the surface is along the western side of VanVliet. Here the plant species is a broadleaf pondweed also referred to as cabbage. When cabbage reaches the water surface, navigation is hindered. Cutting or harvesting a channel about 20 to 30 feet wide through the surface matted growth would allow unrestricted navigation and should not harm the lake. If a cutter is used, cut weeds should be picked up. Mechanical harvesters pick-up most of the plants that are cut. Hiring a mechanical harvester to cut a channel would cost about $800 - $1,000. A single day of harvesting would probably be enough to create channels through the plant patch.

Figure 30. A mechanical harvester is recommended for picking up fern pondweed in the shallow southwest bay if plant management is considered.

Figure 31. Hockney-type weed cutter or a mechanical harvester could be used to cut one or two channels through the cabbage on the west side of VanVliet Lake.

Project 5. Fish Management Options

VanVliet Lake is a part of the Presque Isle Chain, which includes Presque Isle, Averill, and VanVliet Lakes. All three lakes are managed as a group. Boom shocking surveys indicate natural walleye reproduction is occurring in the chain and walleye stocking is probably unnecessary. Currently the plan by the WDNR is to stock muskies at one fish per two lake acres on odd numbered years.

One fishing tournament per year, usually over a weekend, is held on the chain. Fishing pressure and impacts are not considered to be excessive by the WDNR.

Project 6. Ongoing Education Program

Lake residents get an important amount of lake protection information from the lake newsletter. Each issue should offer tips on lake protection techniques. There is abundant material available. An example of an informational piece is shown below.

Reduce Waste *If not you, who?*

YOUR LAWN AND THE ENVIRONMENT

New phosphorus lawn fertilizer law aims to protect Minnesota lakes and rivers

Minnesota has recently passed a law that restricts the use of lawn fertilizers containing phosphorus, the primary nutrient that turns lakes green with algae.

New Phosphorus Law

Starting January 1, 2004, **fertilizers containing phosphorus cannot be used on lawns in the Twin Cities metro area** (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties). Greater Minnesota is restricted to lawn fertilizers with 3 percent or less phosphate content (with fertilizer, phosphorus is measured as *phosphate*). Look for the middle number on a bag of fertilizer. For the metro area, it should be zero (0) and in Greater Minnesota it should be three (3).

Keep fertilizer off paved surfaces: It's illegal to spread any fertilizer on hard surfaces such as streets, sidewalks, and driveways. Rain can wash the fertilizer into nearby storm drains or road ditches, eventually getting into a lake or river near you. If you accidentally spill or spread fertilizer on a hard surface, clean it up immediately.

Exemptions

Fertilizers containing phosphorus may be used on lawns if a soil test indicates that it is needed or if you are establishing a new lawn.

These restrictions do not apply to fertilizers used for agricultural crops, flower and vegetable gardening, or on golf courses by trained staff.

DO THE GREEN THING: FERTILIZE RESPONSIBLY Many garden centers and hardware stores now carry phosphorus-free lawn fertilizers.

Will phosphorus-free fertilizer keep my lawn healthy?

While phosphorus is necessary to grow healthy lawns, soils in many parts of Minnesota already have an adequate amount. In these instances, adding more phosphorus in fertilizer is not needed and will not benefit your lawn. Healthy lawns can be maintained with phosphorus-free fertilizers.

THE PROBLEM: TOO GREEN

GREEN AND MUCKY Excess algae and weed growth is a major problem in many Minnesota lakes and waterways.

MORE PHOSPHORUS, LESS FISH Too much algae lowers oxygen levels and darkens the water. This can have a devastating effect on fish populations.

What to look for

On any bag or box of fertilizer, there is a string of three numbers. The middle number indicates phosphorus content and should read "0" in the Twin Cities seven-county metropolitan area, and "3" or less in Greater Minnesota.

What can you do to protect water quality?

Fertilizers, leaves, grass clippings, eroded soil, and animal waste are all sources of phosphorus. When they are swept or washed into the nearest street or storm drain, they end up in your local lake or river. You can do your part to protect water quality by doing the following:

- Follow Minnesota's new phosphorus lawn fertilizer law.
- Keep leaves and lawn clippings out of your gutters, streets, and ditches.
- Clean lawn and garden equipment on the grass, not on hard surfaces. Never wash or blow soil or grass clippings into the street.
- Pick up pet waste promptly. Pet waste can contain harmful bacteria as well as nutrients. Never drop pet waste in the street or ditches.

- Control soil erosion around your house. When left bare, soil is easily washed away with rain, carrying phosphorus with it. Soil erosion can be prevented by keeping soil covered with vegetation or mulch.

Sweep it up Grass clippings and leaves left on streets and sidewalks are a major source of phosphorus.

Find out what you need: Test your soil

A soil test is a good idea, especially if you are concerned that your lawn may need phosphorus.

Instructions on soil testing are available through the University of Minnesota Extension Service's INFO-U by calling 612-624-2200 (metro) or 1-800-525-8636 and requesting message 468.

Soil testing information can also be obtained through the Internet by visiting **www.extension.umn.edu** and searching for "Lawn Soil Testing."

A list of laboratories certified for soil testing by the Minnesota Department of Agriculture can be found at **www.mda.state.mn.us/appd/soilabs.htm**.

Visit **www.reduce.org** for lots of ideas about reducing waste and toxic chemicals in your day-to-day life.

reduce.org

For more information on lawn care

- The **Yard & Garden Line** is the University of Minnesota Extension Service's one-stop telephone link to information about plants and insects in the home landscape. Call 612-624-4771, or (toll free) 1-888-624-4771 in Greater Minnesota.
- University of Minnesota **Extension Service's web site**: www.extension.umn.edu. From the home page click on "Garden" then on "Lawns."
- University of Minnesota Extension Service - **Sustainable Urban Landscape Information Series** (SULIS): www.sustland.umn.edu. From the home page, click on "Maintenance" then on "Lawn care."
- **Minnesota Department of Agriculture**: www.mda.state.mn.us. From the home page, click on "Water & Land," then on "Lawn Care & Water Quality."

To obtain additional copies of this fact sheet

contact Office of Environmental Assistance's **Education Clearinghouse** at 1-800-877-6300, 651-215-0232 or e-mail: clearinghouse@moea.state.mn.us.

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Project 7. Watershed and Lake Monitoring Program

At this time, because of good lake water quality and no permanent stream inflows, watershed water quality monitoring is not proposed. A lake monitoring program is outlined in Table 16. It is designed to be flexible to accommodate the volunteer work force and a fluctuating budget.

Table 16. VanVliet Lake Water Quality Monitoring Program

Category	Level	Alternative	Labor Needed	Cost/Year
A. Dissolved oxygen and temperature profiles	1	Check dissolved oxygen in VanVliet Lake once per month in January, February, and March depending on winter conditions.	Moderate	$0
	2	Check dissolved oxygen in VanVliet Lake every one to two weeks in December, January, February, and March, depending on winter conditions.	Moderate	$0
	3	Check dissolved oxygen and temperatures once per month from May - September.		
B. Water clarity	1	Secchi disc taken at spring and fall turnover.	Low	$0
	2	Secchi disc monitoring once per month May - October.	Low-moderate	$0
	3	Secchi disc monitoring twice per month, May - October.	Moderate	$0
C. Water chemistry	1	Spring and fall turnover samples are collected and sent to UW-Stevens Point. Selected parameters for analysis include: TP and chlorophyll.	Low	$200
	2	Sample for phosphorus and chlorophyll once per month from May - September (surface water only) with the Self-Help Monitoring Program.	Low-moderate	$300
	3	Sample for phosphorus and chlorophyll twice per month from May - October.	Moderate	$600
	4	Sample for phosphorus, chlorophyll, Kjeldahl-N, nitrate-nitrite-N, and ammonia-N once per month (May-October)	Moderate	$960
	5	Sample for phosphorus, chlorophyll, Kjeldahl-N, nitrate-nitrite-N, and ammonia-N twice per month (May-October).	Moderate	$1,920
D. Special samples or surveys	1	Special monitoring: suspended solids, BOD, chloride, turbidity, sampling bottom water, and other parameters as appropriate. Aquatic plant surveys, etc.	--	$100-$3,000

A recommended monitoring program consists of Level A1, A3, B2, and C3 annually. An aquatic plant survey (Level D1) should be conducted every three years.

Appendix

Appendix A

Special Project: Lake Sediment Testing Used to Evaluate Potential for the Nuisance Growth of Two Species of Exotic Aquatic Plants

Lake Sediment Sample Objectives: Sampling results from over 50 lakes indicate lake sediment characteristics help delineate areas of potential nuisance verses non-nuisance growth for two invasive aquatic plant species, curlyleaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*) (where nuisance growth is defined as plants matting at the surface)(McComas, unpublished). Lake sediments were collected using a zone sampling program and standard agricultural soil test methods were used for lake sediment analysis. For curlyleaf pondweed, the primary parameter correlated with nuisance growth conditions was a sediment pH above 7.7. Other important parameters included a bulk density less than 0.50 g/cm^3-dry, organic matter greater then 30% and a Fe:Mn ratio of less than 1.6. Nuisance growth of Eurasian watermilfoil was influenced by different conditions. The two most significant sediment parameters were nitrogen, as exchangeable ammonia greater than 10 µg/cm^3-dry, and organic matter, less than 20%.

Knowing the delineation of potential nuisance and non-nuisance plant growth using lake sediment sampling assists managers in formulating aquatic plant management actions. For example, where sediment results indicate non-nuisance growth conditions would be expected, those areas can be left alone because the non-native plants present no ecological or recreational problem.

Figure A-1. Lake sediment sample locations.

Results of the lake sediment testing are shown in Table A1.

Table A-1. VanVliet sediment results for six samples from three primary sites.

	Site 1		Site 2		Site 3	
	1	**2**	**3**	**4**	**5**	**6**
Bulk density	0.35	0.37	0.43	0.35	0.35	0.33
Organic matter	54.6	52.9	71.1	70.3	52.5	51.4
pH	5.4	5.5	5.4	5.7	5.4	5.4
NH_4-N	2.5	1.9	10.0	3.4	2.7	2.5
Bray P	0.9	0.6	6.6	2.6	0.6	0.6
Olsen P	1.5	1.0	7.4	2.1	0.9	0.6
K	18.1	16.5	54.8	21.2	13.6	10.4
Ca	645	665	1,133	690	477	401
Mg	37.6	45.3	124	54.7	40.1	32.8
Fe	340	293	304	261	354	325
Mn	25.1	19.6	38.8	25.8	21.2	19.6
SO_4	674.5	54.5	353	66.4	26.6	28.6
B	0.9	0.8	1.4	0.6	0.6	0.6
Zn	5.0	3.7	7.3	3.7	2.8	2.5
CU	1.5	1.7	2.3	1.4	1.9	1.8
Fe:Mn	13.6	15.0	7.8	10.1	16.7	16.6
Site characteristics			loose sediment	fern pondweed	cabbage	cabbage

Sediment results indicate there is only a moderate potential for the exotic plant, curlyleaf pondweed, to grow to nuisance conditions at three locations sampled in VanVliet Lake. Currently, curlyleaf pondweed is not found in VanVliet Lake.

Table A-2. VanVliet Lake sediment data and ratings for potential nuisance curlyleaf pondweed growth.

Sample ID	Bulk density (g/cm^3)	Organic Matter (%)	pH (su)	Fe:Mn Ratio	Potential for Nuisance Curlyleaf Pondweed Growth
non-nuisance	1.04	5	6.8	4.6	Low
light nuisance	0.94	11	6.2	5.9	Med
heavy nuisance	<0.51	>20	>7.7	<1.6	High
1	0.35	54.6	5.4	13.6	Medium
2	0.37	52.9	5.5	15.0	Medium
3	0.43	71.1	5.4	7.8	Medium
4	0.35	70.3	5.7	10.1	Medium
5	0.35	52.5	5.4	16.7	Medium
6	0.33	51.4	5.4	16.6	Medium

Sediment results indicate there is a low potential for the exotic plant, Eurasian watermilfoil, to grow to nuisance conditions in VanVliet Lake. Currently, Eurasian watermilfoil is not found in VanVliet Lake.

Table A-3. VanVliet Lake sediment data and ratings for potential nuisance Eurasian watermilfoil growth.

Sample Number	NH_4 ($\mu g/cm^3$)	Organic Matter (%)	Potential for Nuisance EWM Growth
non-nuisance or light nuisance	<10	>20	Low (green) to Medium (yellow)
heavy nuisance	>10	<20	High (red)
1	2.5	54.6	Low
2	1.9	52.9	Low
3	10.0	71.1	Medium
4	3.4	70.3	Low
5	2.7	52.5	Low
6	2.5	51.4	Low

Mild winters bring out the best in Van Vliet Lake

Mild winters can mark a dramatic upswing in the angling productivity within the shallow, weedy environs of Vilas County's Van Vliet Lake.

Part of the popular Presque Isle Chain, the 220-acre spring fed lake is susceptible to partial winterkill during severe winters, but Van Vliet bounces back quickly and can transform into an above average fishery on the heels of successive mild winters. With an average depth of only 13 feet, multiple species of weeds – pondweed, coontail, pickerelweed, celery, milfoil and elodea – dominate the bulk of the shallow lake basin.

Van Vliet Lake is the headwater of the Presque Isle Chain, feeding into Averill Lake at the north end, and eventually into Presque Isle Lake, itself. The lake's highly fertile water gradually reduces visibility throughout the open water season, from around five feet in the spring to two feet or less as the summer progresses. The mainly sand bottom is broken by isolated areas of gravel and muck.

Many a species call Van Vliet home, from walleye, northern pike, muskie and largemouth bass, to perch, bluegill, crappie and pumpkinseed. The occasional winterkill events impact the abundance and composition of the species within the fishery, but muskie, largemouth, bluegill, pumpkinseed and crappie take the biggest hit from the depleted oxygen levels. Northern pike and yellow perch do a better job of coping with the relative lack of oxygen during severe winters. The lake's heavy weed growth can also contribute to the oxygen depletion when they die off over the winter months.

As the headwaters of the chain, however, Van Vliet acts as a natural magnet, drawing fish "upstream" from Averill and Presque Isle. Mild winters help trigger that natural upstream migration, particularly for muskie and walleye. The lake's walleye population did get hammered hard by anglers and guides a couple of decades back, however, prior to the popularity of catch-and-release and the implementation of new size limit structures. There is currently no minimum length limit on walleye, but anglers are allowed to keep only one fish longer than 14 inches.

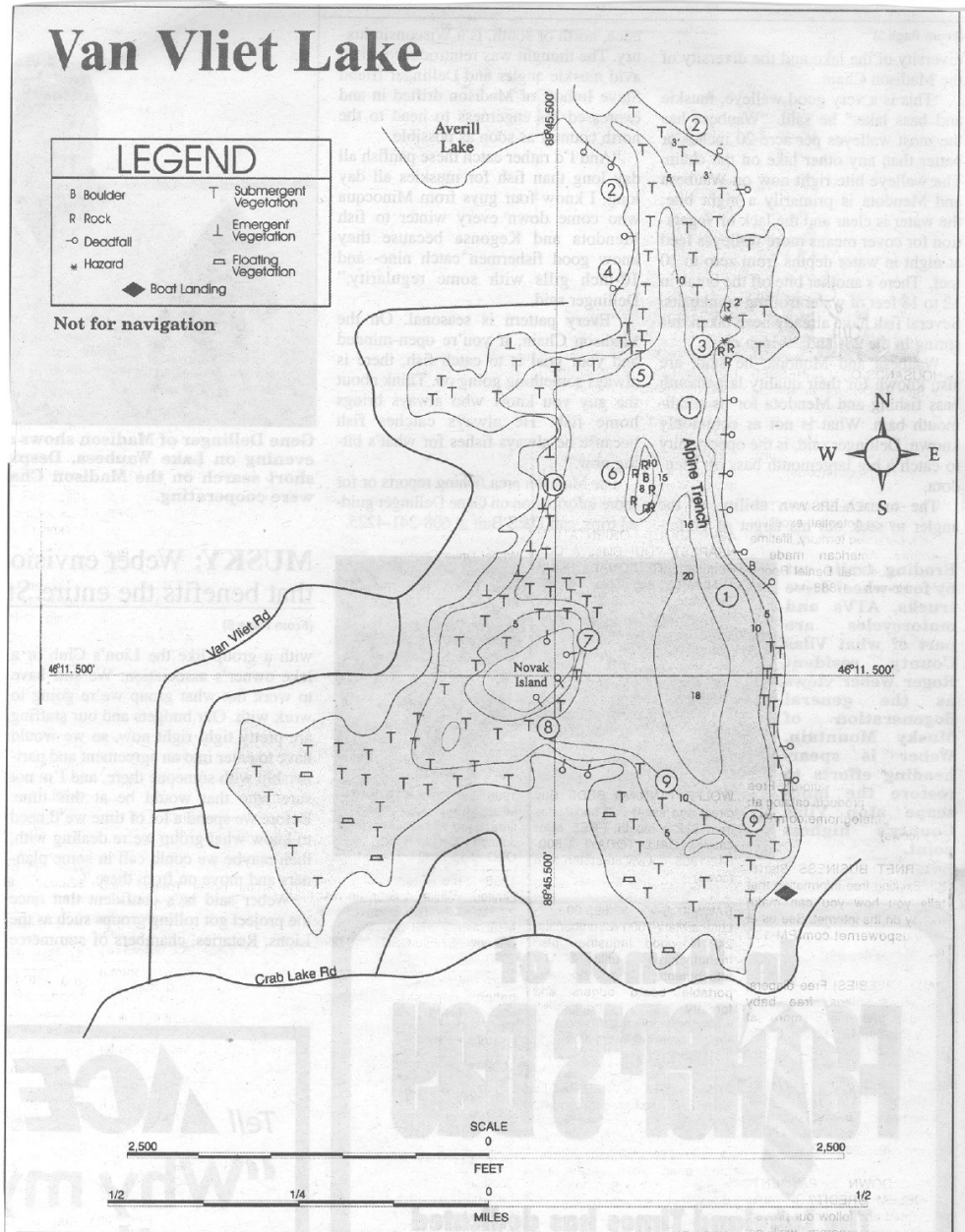
Still, walleye are ranked as "common," as are panfish, while muskie, northern and largemouth all are classified as "present." Yellow perch headline a panfish population that is also rife with bluegill and pumpkinseed, while an occasional smallmouth bass, rock bass or bullhead is a possibility.

Northern populations can fluctuate up and down, but for the most part pike are actually more "common" than "present." A pike larger than 18 to 22 inches can be a rarity, however, while largemouth display decent growth rates. With no stocking in recent years it appears that all species are self-sustaining, and fingerling and yearling walleye were recorded during recent DNR electro-shocking surveys.

Anglers should be prepared to work through Van Vliet's heavy weed growth to get to the fish. Weedless jigs and slip bobber combinations work well to pull walleye from the weeds, while shallow running bucktails, spinners or topwater baits can seduce muskie or pike from the vegetation. Largemouth bass, often overlooked on Van Vliet, will hunker down in the shallower, heavier "slop" closer to shore. Target the largemouth accordingly with plastics, twitchbaits and small spinners.

A summary of the numbered fishing locations designated on the attached map follows:

Van Vliet Lake



Locals know Area 1 as the "Alpine Trench," a quick descent to 12 or 14 feet along the length of the eastern shoreline. Drowned wood and weeds alternate along the shoreline, hiding panfish that attract both walleye and muskie. Hit walleyes with the traditional jig and minnow combo or slip bobber presentations. Muskies work the region throughout the season, with bright lures the best option in the darker waters.

Walleye, muskie and northern pike work the underwater channels and weed points that form each year in Area 2, the outlet to Averill Lake. Again, slip bobbers, weedless jigs, tandem spinnerbaits or topwaters are the best bet for accessing the fish. Fish will also relate to a less weedy channel that sometimes develops along the east shore. Evening walleye provide Area 3's attraction, with light jigs or slip bobbers a good choice for working the rocky point. Northern pike and muskie will also cruise the area.

A jumble of drowned wood and weeds define the northwest shoreline, Area 4. The abundant structure draws walleye, muskie, northern and largemouth, and requires a variety of bait and lure presentations to adequately work the varied cover. A distinct point of weed forms each year near Area 5, a line of cabbage that reaches out into the main lake basin. Muskie, northern and walleye, particularly in the morning and evening, all frequent the area.

Area 6 is a small gravel hump that attracts walleye, particularly in the morning and evening, or under overcast skies. A locator is a plus for finding the bar and determining its breaklines, including a plunge to 15 feet off the "center bar." Jigs and minnows will do the trick for walleyes and bonus crappies, or work for muskies with crankbaits or live bait quick strike rigs. The northeast shoreline of Novak Island, Area 7, also holds northern pike, walleye and muskie. Weeds alternate with gravel, angling to the northwest adjacent to deeper flats that cater to walleye and muskie. A locator will help define the weed edge and the flats, which hold the promise of the occasional trophy muskie.

Sticking to the edge of the weedline is the key to locating the northern and muskie that cruise Area 8. The same holds true for Area 9, where the weed line breaks adjacent to the small island are a good place to work for muskie and pike, as well as walleye and crappie. The deeper edge of the weed typically falls away at around the 10-foot mark. Drowned wood and weeds are also the draw for Area 10, a segment of the north shore that attracts multiple species.

Van Vliet Lake can be accessed via a relatively new launch facility on the east side of the lake, east of Hwy. P and adjacent to Crab Lake Road. The boat landing has a turn-around, paved ramp, concrete planks, a loading dock and parking for three or four rigs.

Editor's note: All of the above information pertaining to Van Vliet Lake was compiled from Fishing the North Country's Presque Isle and Winchester lakes map book.

Van Vliet Hemlocks

The Land

Covering the far northern portion of Van Vliet Lake and the southern half of Averill Lake is an undeveloped parcel of land very important to the Van Vliet watershed, scenic enjoyment, natural qualities and wildlife. It is owned by the State of Wisconsin, Board of Commissioners of Public Lands ("BCPL"), and is called "Van Vliet Hemlocks" in its records and "The Trust Lands" by local residents.

Below is an abridged description of the property taken from a recently completed BCPL Biotic Inventory:

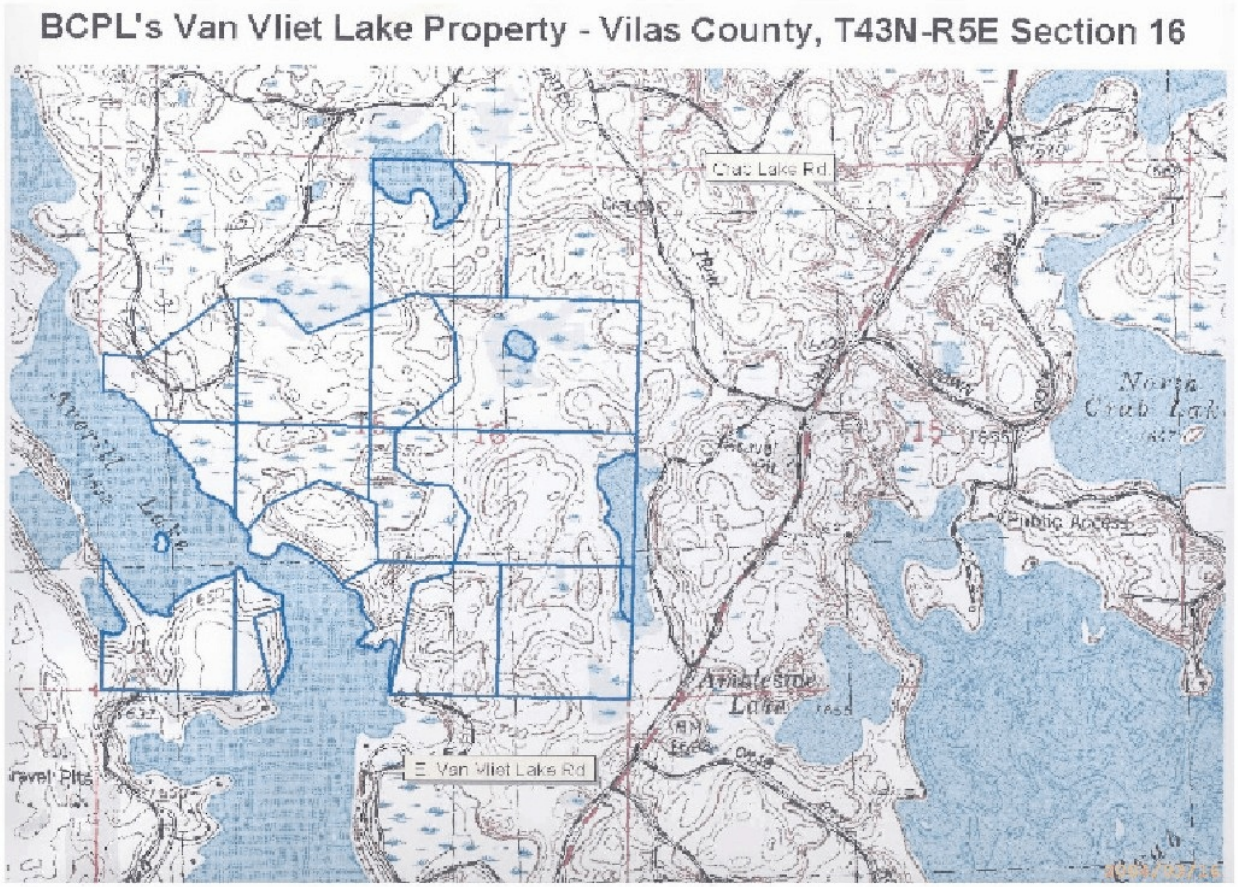
> **Van Vliet Lake Hemlocks - 400+ acres** (Vilas Co.) T43N R6E Section 16) A substantial portion of this site is managed, old-growth hemlock hardwoods with scattered super-canopy pines on hummocky end moraine topography. This site also includes undisturbed kettle bogs, several small undeveloped lakes,, large beds of emergent aquatic macrophytes, and approximately 2 ½ miles of undisturbed lake frontage, most of which is on Van Vliet and Averill Lakes. Eagles, osprey, and loons all nest here. Hemlock reproduction is noteworthy in several locations throughout this tract. A large block of private timberland enrolled in Managed Forest Law occurs to the north along the East Branch of the Presque Isle River. This tract is also an important part of a potential landscape wildlife corridor connecting Northern Highland American Legion State Forest with the Ottawa National Forest in Michigan.

Bog pond with old-growth hemlock/white pine

Averill Lake shore

The land is bisected by Van Vliet and Averill Lakes and is accessible either by going all the way to the end of either West Van Vliet Road or East Van Vliet Road. If going to the portion accessible off of East Van Vliet Lake Road, there is only a narrow access along the road immediate adjacent to private lands to the east, west and south of the small parking area.

A map is below:



The western portion has a nice walking trail, a nice stand of hemlocks with yellow birch and maples present as well. Part of a small lake is contained within the western portion.

The eastern portion is substantially larger and has several trails – all accessible from the parking area at the end of East Van Vliet Road (go past the turnaround and all

the way to the end). This area has larger stands of hemlock, yellow birch, maples and other trees indigenous to this forest type. There are three small lakes in this portion – 1 entirely within the area, another about ½ within the area and a third lake which is approximately ¾ within the area. The terrain is a combination of rolling moraine formations and wetlands in hollow depressions.

The trails within the area are old logging roads, but the area has not been logged since sometime in the 1980's and then was selectively cut. The site is currently deferred from logging by the BCPL. The most interesting trees in the parcel are old growth hemlock, yellow birch and super-canopy white pine.

Approximately 40% of the undisturbed 2 ½ miles of shoreline is on Van Vliet Lake with the remainder on Averill Lake. It creates both a delightful area for wildlife but also a very important buffer of wild shoreline important to the watershed.

Nesting loons and eagles are seen regularly on the parcel with occasional nesting osprey. Great blue heron, mergansers and mallards are seen all summer along with regular deer and muskrat sightings and occasional bear sightings. Many migratory waterfowl utilize the wild areas of the lakes during spring and fall.

The BCPL and the Wisconsin Department of Natural Resources rate this parcel as being " State Natural Area" quality. It contains old growth hemlock and yellow birch which are uncommon and make up only a small portion of the northern Wisconsin forest. In addition, it lies just off the northern edge of the Northern Highland State Forest and, with adjacent lands currently (within the Managed Forest Law Program), can be an important wildlife corridor between the Northern Highland State Forest and the Ottawa National Forest in Michigan's Upper Peninsula.

Concerns

The Board of Commissioners of Public Lands is one of the oldest state agencies in Wisconsin and was originally responsible for distribution of lands received from the federal government when Wisconsin became a state. The proceeds of the sales of these lands were deposited in one of several trust funds to be used for governmental or for

public school purposes. Section 16 of each township was set aside in the Ordinance of 1785 to fund public schools. The Van Vliet property was first surveyed by the US Government in the early 1860's.

Nearly all these "school sections" were sold off over time and the monies placed in the Common School Fund This fund, which annually disburses millions of dollars to K-12 public school libraries, has a current balance of over $500 million.

The BCPL now holds approximately 78,000 acres of land scattered across the northwoods. Much of it is managed for timber production and provides revenue to the BCPL which is then used for loans to governmental bodies and other state purposes. In the past, the Commissioners have shown strong stewardship over lands which are of significant scientific or wild quality.

The Commissioners consists of 3 high level elected state officials – the Attorney General, the Secretary of State and the State Treasurer. These officials are elected every 4 years in statewide contested, political elections. It is safe to say that none run on a platform that relates to the preservation of lands but rather on platforms which relate to the performance of their primary duties in their individual offices. It is difficult to predict the policy concerning Trust Lands which will be set by this Commission in the future.

With current issues in the budget of the State of Wisconsin, there have been several proposals to change the management approach to northern forests. With the duty of the BCPL to provide revenue, this is a particular concern for BCPL lands. Although the BCPL is apparently not subject to the control of the Legislature, its elected Commissioners must be responsive to political issues.

In short, there is concern that this extremely valuable part of the Van Vliet Watershed may come under pressure at some time. It is very important that we take action to try to assure its continuation in its current status.

Actions to Date

The Van Vliet Lake Association appointed a Friends of Van Vliet Hemlocks Committee in 2004 to work with the BCPL, the Natural Resources Foundation of Wisconsin, the North Lakeland Discovery Center and other interested parties to assure the preservation of Van Vliet Hemlocks. Representatives of this group have met with the Executive Secretary of the BCPL on several occasions, with the Executive Director of the Natural Resources Foundation of Wisconsin, with Department of Natural Resources officials and with executives of the North Lakeland Discovery Center. They have also attended planning sessions regarding preservation of northern forests.

In addition to walks to familiarize people with the tract, tours of the property conducted by naturalists have been sponsored by the Van Vliet Lake Association.

The goal of the Van Vliet Lake Association is to preserve and protect this valuable resource. We are still in the process of formulating a longer term action plan. We intend to stay in close touch with the Executive Secretary of the BCPL and the Executive Director of the Natural Resources Foundation of Wisconsin as well as the Department of Natural Resources. Activities will be reported regularly in the Van Vliet Lake Association newsletter “Van Vliet Views”.