VanVliet Lake Report

VILAS COUNTY, WISCONSIN

Summary of the Lake Management Study

Field Work: 2004 **Report: Summer 2005**

VanVliet Lake Management Program Formulated

Natural Conditions Rated as Good

AQUATIC PLANT PROJECTS COULD BE CONSIDERED

VanVliet Lake is located in Vilas County, Wisconsin. VanVliet Lake is 220 acres in size, has an average depth of 9 feet and a maximum depth of 20 feet.

A lake study was conducted in 2004 with two primary objectives.

* to characterize existing lake conditions.
* to develop a lake management plan that protects, maintains, and enhances VanVliet Lake' water quality.

Results found that lake summer water clarity conditions of about 10 feet were slightly better than expected compared to reference lakes in the area (see page 3 for more information).

Phosphorus is the typical nutrient that has the biggest influence in algae growth. Phosphorus levels on VanVliet Lake were on the low side at 18 parts per billion. This accounts for low algae growth and good water clarity that is found in VanVliet.

VanVliet Lake, Vilas County, Wisconsin

Aquatic plants were also studied in 2004. When the plant survey results of 2004 are combined with other plant data collected in years past, an aquatic plant picture emerges.

VanVliet Lake was found to have a good diversity of plants with at least 17 plant species. Two common plants are elodea and fern pondweed, both native species. Broadleaf pondweed is found along the western side of the lake, where it grows to the water surface. A potential project to consider is cutting boat cruising lanes through the broadleaf pondweed.

This special newsletter was prepared by Blue Water Science, St. Paul, Minnesota and is part of a lake management program conducted on VanVliet Lake. The program was funded by a grant from the Wisconsin DNR with volunteer assistance from the VanVliet Lake Association.

VanVliet Lake Statistics

VanVliet Lake	
Lake size (acre)	220
Mean depth (feet)	9
Maximum depth (feet)	20
Volume (acre-feet)	1,980
Watershed area (acre) (not including the lake)	1,370
Watershed : Lake surface ratio	7
Clarity in 2004 (feet)	10.8
Lake phosphorus in 2004 (parts per billion)	18

Summary of Lake and Watershed Conditions

Geology and Soils
VanVliet Lake is a glacial lake formed during the last retreat of the Wisconsin Valley glacial lobe starting about 10,000 years ago. The soils deposited by the glacier are primarily sands and loamy sands.

Watershed Characteristics
The watershed area draining to VanVliet (not including the lake) is 1,370 acres. Land use is primarily forests and wetlands, with residential use accounting for a small percent of the total watershed area.

Water Inflows and Outflows
The water inflow to VanVliet is from temporary streams and groundwater springs. The outflow is through Averill Lake and into Presque Isle Lake and out through Presque Isle Creek.

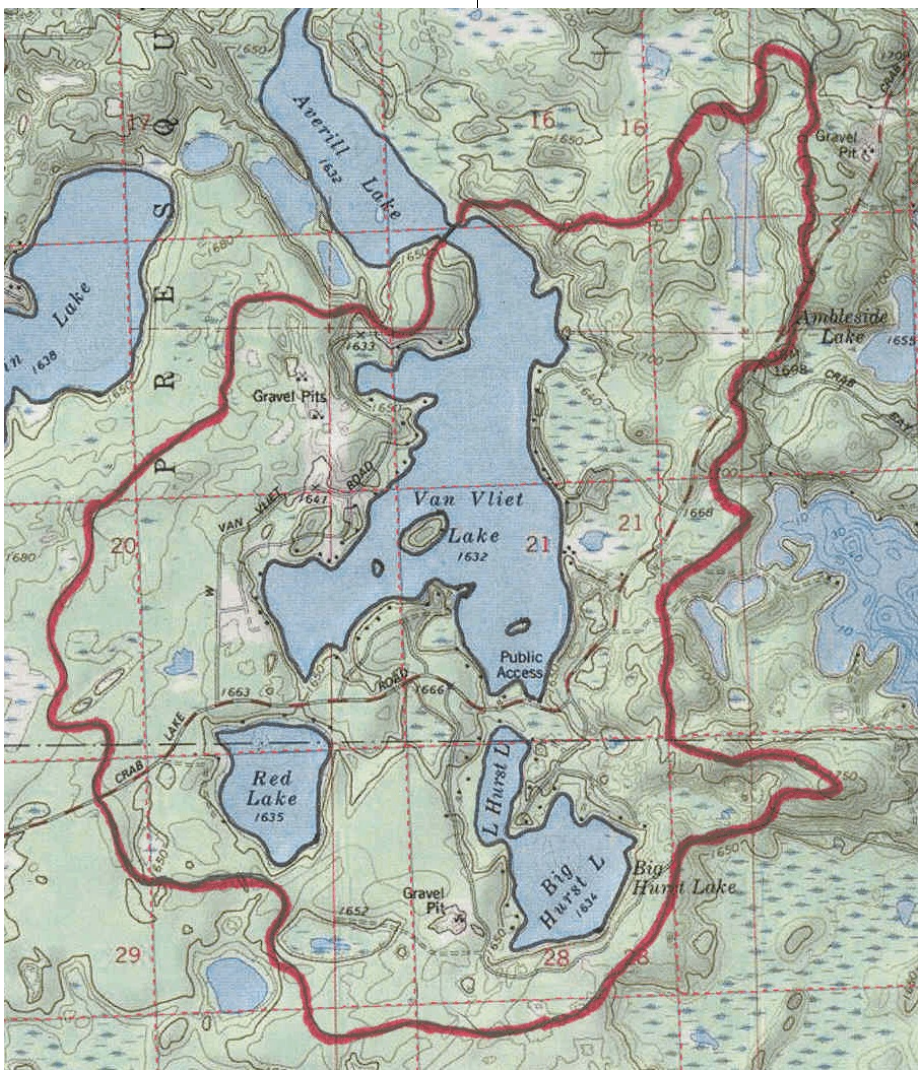
Lake Dissolved Oxygen & Temperature
VanVliet Lake thermally stratifies during the summer but weakly. This means that wind action will mix the upper lake water only during the summer. Oxygen concentrations may fall in the bottom water and become temporarily depleted in the bottom of the lake.

Lake Clarity
Lake water clarity in VanVliet Lake is good with a summer average around 10 feet.

Lake Nutrients
Phosphorus concentrations in VanVliet Lake are better then predicted when compared to other lakes in the Northern Lakes and Forest ecoregion. A growing season phosphorus average for 2004 for VanVliet Lake is 18 ppb. A predicted phosphorus concentration using ecoregion values is higher at about 24 ppb.

Lake Algae
VanVliet Lake has algae species that are common to lakes in this part of the state.

Lake Aquatic Plants
There is good coverage of submerged aquatic plants covering about 73% of the lake bottom (160 acres). Plants are beneficial as a filter for nutrients and as fish and wildlife habitat. Aquatic plant diversity is good with 17 submerged or floatingleaf plant species identified in VanVliet Lake.



The watershed drainage area to VanVliet Lake is about 1,370 acres and is outlined in red.

What is a watershed?

A watershed is the land area around the lake that captures rainfall and where all the drainage and runoff goes into the lake. It is also called a drainage basin. If the watershed has pollution sources, then the pollution will be carried into the lake with runoff. It is important to reduce the source of pollution in the watershed because this in turn will reduce the amount of pollution that gets into the lake.

Lake Assessment

Water quality of VanVliet is within range of lakes found in the Lakes and Forests Ecoregion. Water quality parameters consisted of transparency readings, phosphorus, and chlorophyll.

Lake water quality in VanVliet is about what would be expected based on it's watershed size and the ecoregion setting.

Lake management efforts should be directed to protect the existing good water quality.

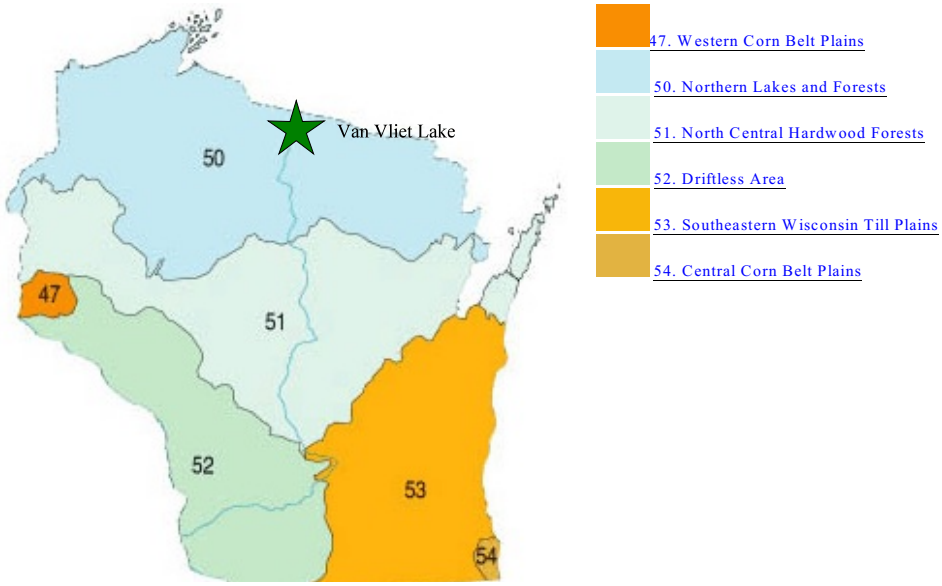
Native aquatic plants are diverse but two species present some navigational problems. In the shallow southwest bay, fern pondweed is found close to the surface or floating. In a channel along the west side, broadleaf pondweed grows to the surface and can restrict some types of navigation.

Ecoregions of Wisconsin

Revised April 2000

National Health and Environmental Effects Research Laboratory

U.S. Environmental Protection Agency



VanVliet Lake is located in the Northern Lakes and Forest Ecoregion. Lakes in this ecoergion have some of the best water quality n the state.

Recommended Lake Management Projects

1. Watershed projects - forests and wetlands

Maintain a photolog of typical forest and wetland areas to serve as a benchmark for future reference. Continue to take action to protect the VanVliet hemlock forest stands in the northern part of the watershed.

2. On-site system maintenance

On-site wastewater treatment systems operate satisfactorily when they are properly installed and maintained. Several activities can be implemented to assist in proper operation of the system. These activities include workshops, septic tank pumping campaigns, and ordinance implementation. However, much of the education can be conveyed through Lake Association newsletters.

There is little evidence of failing onsite systems based on shoreland setback distances and the conductivity survey. An option would be to contract with the County to randomly select 10% of the systems around the lake and conduct an onsite inspection and publish the results in a newsletter.

3. Shoreland protection and enhancement (landscaping projects)

VanVliet Lake has stretches of natural shoreline conditions but vegetative buffers and natural conditions could be improved along some of the developed parcels. The challenge is to protect the existing natural conditions and to enhance shorelands that lack native vegetative buffers. A volunteer lakescaping program should be implemented. Initially work with the UW Extension or a Planning Grant consultant to set up a VanVliet Lake Shoreland model describing how to design, install, and maintain a natural shoreland. Publish it in the lake's newsletter.

4. Aquatic plant projects

Based on the aquatic plant survey results from 2004, fern pondweed, a native aquatic plants may produce some navigational restrictions in the southwest bay. Along the western shoreline of VanVliet Lake, broadleaf pondweed grows to the water surface and may hinder boating activities.

In the southwest bay, fern pondweed is found either floating at the surface or weakly 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.

Recommended Lake Management Projects-concluded

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.

Along the western shore of VanVliet broadleaf pondweed, a desirable aquatic plant can grow to the surface. A mechanical harvester could be contracted to create navigational channels to allow boat passage. Estimated cost of hiring the harvester for two days is about $2,000.

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.

6. Ongoing education program

The Lake Association's newsletter should be an ongoing instrument to provide lake protection information. Abundant material is available from the WDNR on the internet and from a variety of books, including the book "Lake and Pond Management Guidebook" written by Steve McComas. This material can be inserted into newsletters.

A variety of educational opportunities are available that go beyond newsletter articles. Lake fairs and demonstration projects could be useful for advancing lake information. A good time for special events is in conjunction with the annual meeting.

7. Watershed and lake monitoring program

Ongoing lake testing should include: Secchi disk, total phosphorus, and chlorophyll a. Testing once per month from May through September is adequate to characterize lake conditions. Sampling twice per month would be better. An aquatic plant survey should be conducted every three to four years. The level of effort for a monitoring program depends on the availability of volunteers and funding levels.

In addition, winter dissolved oxygen levels could be collected to check for potential winterkill conditions caused by a lack of dissolved oxygen.

A mechanical harvester could be used to create cruising lanes through several areas of dense growth in VanVliet Lake.