

A Newsletter of the Lakes and Ponds Section

Fall/Winter 1996-97 No. 13

Vermont Agency of Natural Resources
Department of Environmental Conservation

Reducing Phosphorus in Lake Champlain

In June 1996, the States of Vermont and New York, the U.S. Environmental Protection Agency and the Lake Champlain Management Conference endorsed a Lake Champlain Phosphorus Reduction Agreement. The agreement establishes a 20-year schedule for meeting specific phosphorus loading targets for each state and each sub-watershed of Lake Champlain. Attainment of the target loads will bring the lake into compliance with the in-lake phosphorus concentration criteria established in 1993 under a previous New York, Quebec and Vermont Lake Champlain Water Quality Agreement (see side box on page 5).

Phosphorus is a nutrient that, when too plentiful, can produce an overabundance of algae. Rapid growth of algae turns water murky, causes odors and impairs drinking water quality.

Under the 1996 Phosphorus Reduction Agreement, the amount of phosphorus entering Lake Champlain from Vermont and Quebec must decline from 375 metric tons annually to 319 metric tons within 20 years. One quarter of that 56-ton reduction (14 tons) must be achieved within five years.

In October, 1996, Vermont submitted the "Lake Champlain Phosphorus Reduction Vermont Implementation Plan" indicating the steps Vermont would take to achieve the five-year goals. The Vermont Agency of Natural Resources will seek a further agreement with Quebec on the division of responsibility for phosphorus reduction in the shared watershed of Missisquoi Bay.

To reduce phosphorus loading to Lake Champlain by 14 tons within the next five years, the Vermont plan proposes upgrading 11 sewage treatment

See "Phosphorus" page 4

Streambank and Lakeshore Vegetation Management Procedure Adopted

The Vermont Agency of Natural Resources has adopted a new streambank and lakeshore vegetation management procedure designed to protect, maintain and restore Vermont's waterways.

Members from the Departments of Fish and Wildlife, Forest, Parks and Recreation, and Environmental Conservation were charged with revising the Agency's 1982 streambank policy. The new procedure, produced by an inter-departmental committee, will serve as educational guidance in the Agency's ongoing need to clearly state the importance of sound streambank and lakeshore management. Maintaining and restoring vegetation along waterways is a low-cost but highly effective means of reducing harmful runoff, erosion and the loss of wildlife and aquatic habitats. The procedure should be used as guidance in developing or reviewing projects which involve streambank, lakeshore and riparian alterations.

The procedure emphasizes the importance of vegetated streamside and

See "Streambank" page 2

In This Issue...

Commuting Past Great Blue Herons.....	3
Lake Lingo.....	3
Lake Champlain Plan.....	5
Lake Memphremagog Watershed Update.....	6
Lake Protection Advisory Committee.....	6
Summer Shoreland Workshop.....	7
Hydrilla Moves North to New England.....	8
Water Chestnut Update.....	10
Two Lake Associations Create Lake User Guides.....	11
Lake Champlain Zebra Mussel Update.....	12
Lake Groups and Nuisance Plants.....	14
Happenings.....	15

OUT OF THE BLUE

is produced semi-annually by the Lakes and Ponds Section. Our purpose is to share information on lake environments, water quality and state activities through articles on lake ecology and Section programs. Feel free to let us know what articles you would like to see in future issues. To be placed on the mailing list, or to receive extra copies, please contact:

Vermont Agency of Natural Resources
Dept. of Environmental Conservation
Water Quality Division
Lakes and Ponds Section
103 S. Main Street, 10 North
Waterbury, VT 05671-0408
(802) 241-3777

<http://www.state.vt.us/anr>

NEWSLETTER STAFF

Amy Bentley Picotte, Editor
Ann Bove
Susan Warren

CONTRIBUTORS

Amy Bentley Picotte
Ann Bove
Holly Crosson
Linda Henzel
Elizabeth Herron
Eric Smeltzer
Peter Stangel
Susan Warren

ARTWORK

Ann Bove
Susan Warren

The Vermont Agency of Natural Resources, Department of Environmental Conservation, is an equal opportunity agency and offers all persons the benefits of participating in each of its programs and competing in all areas of employment regardless of race, color, religion, sex, national origin, age, disability, or other nonmerit factors.

Streambank (continued from page 1)

lakeshore buffers. Buffer strips are defined as corridors of land between the top of the bank and the other land uses. They support native perennial vegetation and provide environmental, social and economic values. The procedure contains recommendations for widths of perennial vegetation that will support the important natural resource values. It also contains a set of recommended activities that may be used to protect, maintain and restore vegetated buffers.

Members of the inter-departmental committee hope to develop supplemental educational materials that will inform the public about the importance of protecting streamside and lakeshore vegetation. There is also interest in defining and documenting more detailed protocols for stream and lake buffer width determinations.

Summer Lay Monitoring Conference

Twenty Lay Monitors and Vermont Water Quality staff met in Burlington at the new Lake Champlain Basin Science Center for the fourth annual Lay Monitoring Conference in July. As tradition has it, the weather always puts



on a memorable show at these conferences! This year the winds blew so fiercely that the Burlington Boat House docks were soaked, slippery and bouncing in the turbulent, rough lake waters. Although these conditions prevented the group from practicing in the lake with the Stangle scopes, used to view aquatic plants, the Science Center provided an excellent dry and sheltered laboratory room for keying out pre-collected aquatic plant specimens.

After the aquatic plant identification presentation and hands-on practice session, the group "dove into" Project WET (Water Education for Teachers) activities! Several WET activities were demonstrated to introduce monitors to new materials and ways to present water quality information. Many monitors report their monitoring results at either their annual lake association meeting or at community gatherings, and by using Project WET activities, these presentations can be made more creative and interesting.

The morning conference concluded with a game of "aquatic jeopardy," which had five categories: Nonpoint or Point Source, Pollution Type and Solution, Watersheds, Wetlands and Lay Monitoring. Although the group shared many laughs, in truth, the game stumped most participants (perhaps some folks did not understand the game rules)! This game is available on loan if anyone else would like to liven up a meeting or just have some fun with their lake neighbors.

Every morning on the way to my work and day care for my 10 month old son, we travel by a popular great blue heron feeding spot, the wetland area of Lake Lamoille. As we approach this area, I always warn my son to get ready and look for the great blues, that is if he is not sleeping by then, which he usually is. It is a wonderful sight, seeing this calm, large bird gracefully hunt for its morning meal of fish and frogs. I especially enjoy seeing their stick-like figures on misty mornings; they remind me of some beautiful creature painted by a Chinese artist.

The great blue heron, *Ardea herodias*, is grey-blue with a yellowish bill and is easily spotted because of its large size, thirty-nine to fifty-two inches long, with a wingspan of seventy inches wide. In flight the great blue folds its neck against its body, leaving outstretched its long, skinny legs, and gracefully working its huge wings, making for an impressionable sight.

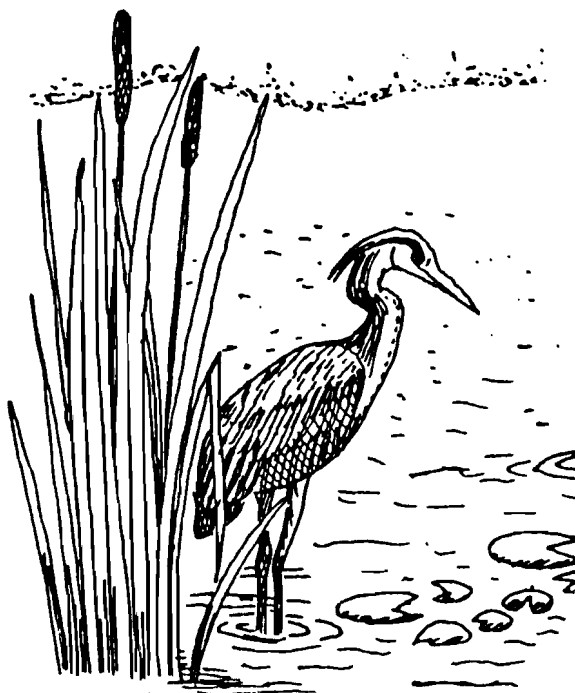
This bird ranges from Alaska, Quebec and Nova Scotia south to Mexico and the West Indies. Great blues are common throughout Vermont, and although they feed along the edges of marshes, swamps, streams and lake shores, they choose to nest in undisturbed wooded areas.

They nest in rookeries, or large colonies, where many nests are built in the same group of tall, deciduous trees. Nesting occurs from mid June through July, with fledglings starting to leave the nests by early July. The largest great blue heron rookery in Vermont is on Shad Island in the Missisquoi National Wildlife Refuge where approximately 250 pairs nest.

One day last week, mid-November, as my son and I drove by Lake Lamoille, winter had appeared overnight by covering the lake with a thin coat of ice. The great blues were nowhere in sight. They had migrated, as they do each year about mid-November, to the Atlantic Coast, where they will spend the winter with other great blues. There have been reports that some great blues have tried to overwinter along several of the bigger rivers in western Vermont, like the Batten Kill, which remains partly open during the winter.

Although my son was sleeping, I explained anyway to him that the great blues would return sometime next March, and that we would look for them then. Perhaps by next spring my son will be old enough to really see the great blues and all their majesty.

— Amy Picotte



Lake Lingo

Micrograms - (ug) the unit of measurement used to express one part per million (ppm).

Riparian - a term used to describe the shoreland areas of lakes, ponds, streams, and wetlands.

Turions - winter hardy buds on some aquatic plants, such as hydrilla, that develop from vegetative structures and typically mature during August through October.

Oligotrophic - oligotrophic lakes generally have low levels of nutrients, are usually deep and cold, have sufficient amount of oxygen at all depths and support little algal and aquatic plant growth.

Eutrophic - eutrophic lakes generally have a high level of nutrients, are often shallow, warm, seasonally deficient in oxygen in the lower depths of the lake, and supportive of large algal and/or aquatic plant populations.

plants. The 11 treatment plants targeted are in Enosburg Falls, Castleton, Fair Haven, Morrisville, West Rutland, Richmond, Brandon, Middlebury, Poultney, Northfield

Phosphorus loading (MT/yr) from Vermont subwatersheds (1991 base year)

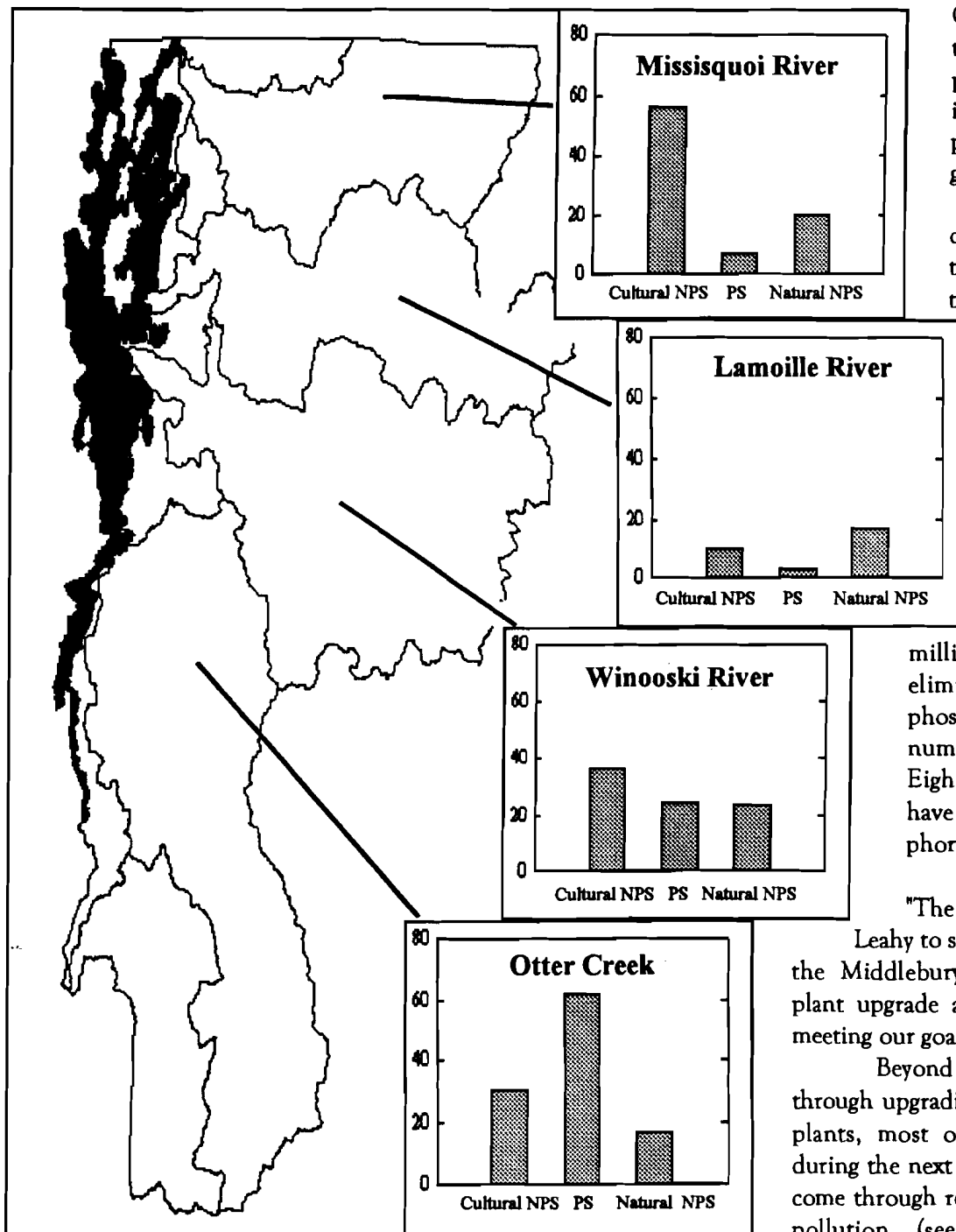


Figure Key

MT/yr - metric tons per year (1 MT = 2,205 lbs)
 NPS - nonpoint source of phosphorus
 Cultural NPS - human generated, nonpoint source of phosphorus
 PS - point source of phosphorus

and Montpelier. The upgrades will require \$9.6 million in federal and state capital funds. Capital funds for the construction of phosphorus removal facilities are currently provided as 100 percent grants to cities and towns.

"Vermonters have done a tremendous job in the past 25 years reducing the volume of pollutants entering Lake Champlain," said the Agency of Natural Resources' Secretary Barbara Ripley. "With an investment of more than \$16

million, we've already eliminated several tons of phosphorus, not to mention numerous other pollutants. Eighteen treatment plants have already received phosphorus removal facilities."

Ripley continued: "The recent efforts by Senator Leahy to secure federal funding for the Middlebury wastewater treatment plant upgrade are a big help to us in meeting our goals."

Beyond the reductions achieved through upgrading the sewage treatment plants, most of the reductions made during the next two decades will have to come through reducing nonpoint source pollution (see subwatershed map),

primarily by curbing the amount of agricultural runoff from farms in the basin. The Vermont Legislature has appropriated \$350,000 in each of the past two years for a statewide grant program to help farmers implement practices that reduce the volume of

phosphorus runoff. The program provides 85 percent funding if federal money is available, 50 percent funding when it is not. Control practices on other types of land

uses such as residential, urban, new construction and gravel roads will also be needed.

Total phosphorus criteria for Lake Champlain established in the 1993 New York, Quebec and Vermont Water Quality Agreement, compared with existing mean phosphorus concentration in each lake segment (Vermont Department of Environmental Conservation data). Total Phosphorus concentrations are shown in micrograms per liter (ug/l).

<u>Lake Segment</u>	<u>Existing Phosphorus Criterion (ug/l)</u>	<u>Phosphorus Concentration (ug/l)</u>
Malletts Bay	10	9.8
Main Lake	10	11.4
Port Henry	14	14.4
Burlington Bay	14	13.2
Shelburne Bay	14	14.5
Northeast Arm	14	14.5

New York, Vermont and USEPA Approve Lake Champlain Plan

On October 28, 1996, Governor Howard Dean, New York Governor George Pataki and USEPA representatives signed the final version of *Opportunities for Action: An Evolving Plan for the Future of the Lake Champlain Basin*. The plan, which has been under development for five years, provides recommendations for a wide range of management actions involving water quality, fish and wildlife, recreation and cultural resources. The three highest priorities in the plan include:

- ◆ reducing phosphorus levels (see article Reducing Phosphorus in Lake Champlain on page 1),
- ◆ reducing and preventing pollution from toxic substances, and
- ◆ controlling nuisance nonnative aquatic species.

The plan calls on the states to reduce pollution from toxic substances by identifying sources of toxic materials and implementing pollution prevention plans in local watersheds. The plan also recommends that a comprehensive approach be taken to address the impact of nuisance nonnative aquatic species such as zebra mussels, lamprey, water chestnut and milfoil.

Implementing the Plan

Responsibility for plan implementation will be transferred to the Lake Champlain Steering Committee, a group created by a Memorandum of Understanding in 1988. The Steering Committee consists of top environmental officials representing state and provincial governments in Quebec, Vermont and New York. *Opportunities for Action* includes specific recommendations for expanding membership of the Steering Committee to broaden the diversity of perspectives represented. The Steering Committee, scheduled to assume implementation responsibilities early in 1997, will continue to provide a forum for discussion and guide the use of federal funds for Lake Champlain projects. In the interim, the Lake Champlain Management Conference set up a transition team to provide oversight for the plan until the Steering Committee meets in January.

Lake Memphremagog Watershed Update

Quebec and Vermont committees continue to cooperate on watershed management issues for Lake Memphremagog. The efforts of the committees have focused on implementing the recommendations contained in the *Quebec/Vermont Working Group's Final Report on Managing Lake Memphremagog and Its Environment* (1993). The following actions have been accomplished in the last year.

1. A joint Quebec/Vermont Agricultural Work Group was established to promote and improve communication and educational offerings to farmers in the basin regarding measures they can take to reduce pollution.

2. A joint Quebec/Vermont Water Quality Monitoring Work Group began a long-term water quality monitoring program for the lake. Quebec will monitor the in-lake conditions, and Vermont will

establish a watershed monitoring program.

3. Zebra mussel infestation prevention continues to be a major concern of the committees. A boat washing station was installed in Newport, VT; seven have already been installed in Quebec. Additional work needs to be done to enhance boater education in the area and ensure that the Newport washing station is used.

The Lake Memphremagog Watershed Association is the lead local group in these efforts. VTDEC plans to work closely with the LMWA to design a watershed monitoring program for Memphremagog's basin. Many of the Northeast Kingdom's lakes are within the basin, and participation of these lake associations or residents is welcome and encouraged. Please contact either Susan Warren at the Lakes and Ponds Section or Karen Coffey of the LMWA at (802) 754-2254.



Lake Protection Advisory Committee

The summer of 1996 saw the initiation of the Lake Protection Advisory Committee. About a dozen lake association representatives have met twice with Water Quality Division staff to discuss lake protection strategies for Vermont's lakes. Although advising the state's lake program staff on lake protection issues was one of the main reasons for establishing the group, communication between lakes has been an obvious benefit as both meetings have seen productive discussions and information exchange among the lake representatives present.

At the first meeting lake protection was defined as "a coordinated proactive approach to waterbody (lakes, ponds and reservoirs) and watershed use and management which promotes, maintains and improves clean water and natural habitats." Five major areas for consideration were identified by the group:

1. **Who's who** - who has jurisdiction and who should be involved (landowner, town, state and federal);

2. **Volunteers** - how to get involvement from lake associations and lake residents;

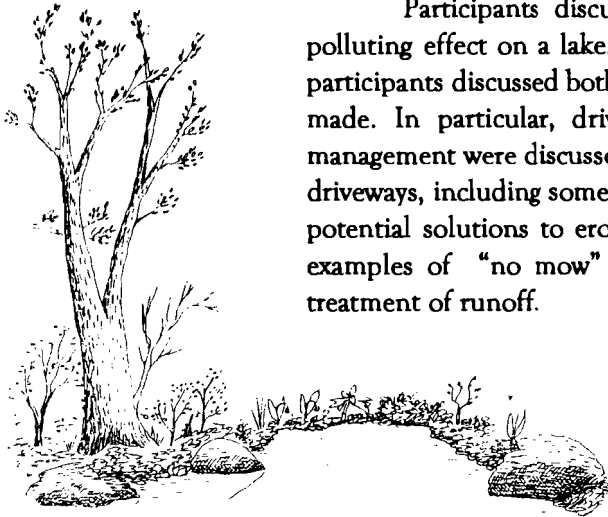
3. **Technical assistance** - review what the Water Quality Division and others have to offer;

4. **Resources** - what grants and personnel are available to help; and

5. **Communication** - how to get the word out.

Anyone is welcome to join the effort! During the summer a "lake protection" mailing list was established made of at least one person from each lake already on the Lakes and Ponds section general mailing list. For anyone who did not receive notice that this committee was starting up and would like to join or at least be kept informed about the committee's work, please contact Susan Warren at the Lakes and Ponds Section. The next meeting will be held in March, 1997, in order to make plans for the upcoming summer.

Cedar Lake in Monkton and Lake Willoughby in Westmore were each the site of a workshop on shoreland property management this summer. Lakes and Ponds staff conducted the workshop, and a local lake association member publicized the event and arranged the field trip sites. A property evaluation handout was developed for use at the workshops to help residents observe conditions and suggest solutions where needed.



Participants discussed management techniques that will minimize a camp area's polluting effect on a lake. Several shoreland properties were viewed in each workshop, and participants discussed both what practices were working well and how improvements could be made. In particular, driveway and private road maintenance and shoreland vegetation management were discussed. At Lake Willoughby the group was able to examine a diversity of driveways, including some with little erosion and others where the group was able to diagnose potential solutions to erosion problems. At Cedar Lake, the group observed two excellent examples of "no mow" zones along the lakeshore that provide bank stability and some treatment of runoff.

These workshops will be offered again during the summer of 1997. Lake residents need to provide the local organizing and Lakes and Ponds staff will be available to conduct the workshop. Please contact Susan Warren at the Lakes and Ponds Section to schedule a workshop.



New England Waters: Sharing Successes, Building a Future — Fourth Annual New England Lakes Conference and — First Annual Regional Volunteer Monitoring Conference



Mark your calendar now on June 6-8, 1997, for this exciting opportunity to meet and learn from fellow New Englanders (professionals, lay persons and students) who share your interest in lake and watershed protection. This event will take place in Kingston, Rhode Island, and is a combination of the annual New England Chapter of the North American Lakes Management Society conference and a special New England Regional Volunteer Monitoring conference. During this event, intensive workshops will also be offered on: Alternative On-Site Wastewater Treatment Systems, a Watershed Assessment Methodology, and World Wide Web/Geographical Information Systems.

There are still openings available for 20-30 minute presentations. If you would like to make an oral presentation, please submit a brief summary (no more than 200 words) by February 28, 1997 to Elizabeth Herron, Conference Coordinator, URI Watershed Watch, Woodward Hall, Kingston, RI 02881. Elizabeth may be reached by phone at (401) 874-2905 or e-mail (riww@uriacc.uri.edu), or contact Amy Picotte at the Vermont Lakes and Ponds Section for further information. Along with your written summary, indicate your choice of session topic selected from the list below.

Session Topics:

- ◆ Association, Program Building and Community Outreach
- ◆ Watershed Management and Protection
- ◆ Water Quality Preservation and Restoration
- ◆ Volunteer and School-based Water Quality Monitoring Issues and Methods
- ◆ Tool Time (A time to share favorite "tools" for accomplishing different goals.)

Registration Information

Conference registration is \$30.00 for a single day (\$25.00 if registered by May 10th), \$55.00 for two days (\$45.00 if registered by May 10th) or \$75.00 for all three days (\$65.00 if registered by May 10th). Registration fee includes: conference program with abstracts, other program materials, continental breakfasts (Saturday and Sunday only), lunches and snacks, with beverages at breaks. Low-cost housing is available through the University of Rhode Island Residential Housing (dorm rooms) or at reduced conference rates at the Holiday Inn- South County.

Hydrilla (*Hydrilla verticillata*) is one of those plants that can make biologists and lake users who are familiar with its ways shudder. Southerners, who have struggled to control the plant for more than 35 years, talk of its ability to easily out compete Eurasian watermilfoil and other aggressive aquatic plants currently choking our nation's waterways. Hydrilla is arguably the most devastating of any exotic aquatic plant to have invaded the United States, and it's getting too close for comfort. In 1995, the closest known hydrilla population to Vermont's border was in the state of Delaware. In the summer of 1996, a professor from the University of Connecticut found hydrilla thriving in a small pond in southeastern Connecticut.

A Description of Hydrilla

Hydrilla is a member of the Hydrocharitaceae, or Frogbit family. It is a submersed perennial aquatic plant with heavily branching, erect stems. It is rooted to the bottom but broken stem pieces may be seen drifting in the water. In deep water, stems may reach up to 30 feet or more in length. Leaves occur in whorls of three to eight and join directly to the stem. Leaf margins are visibly toothed and the underside of the leaf midrib may have one or more spines (see illustration). Upon first glance, it looks very similar to a native species found in Vermont, Elodea (*Elodea canadensis*).

Hydrilla can be either monoecious (both male and female flowers on the same plant) or dioecious (only male or female flowers on the same plant). Female flowers are solitary, white, and reach to the surface on stalks up to 4 inches long. Male flowers are green and are formed in the leaf axils. They are released and float freely to the surface as they reach maturity. The dioecious hydrilla found in the U.S. produces only female flowers. Monoecious hydrilla tends to spread along the bottom first and then grow upwards through the water column. Dioecious hydrilla usually grows upwards first and then spreads laterally across the water surface, forming mats.

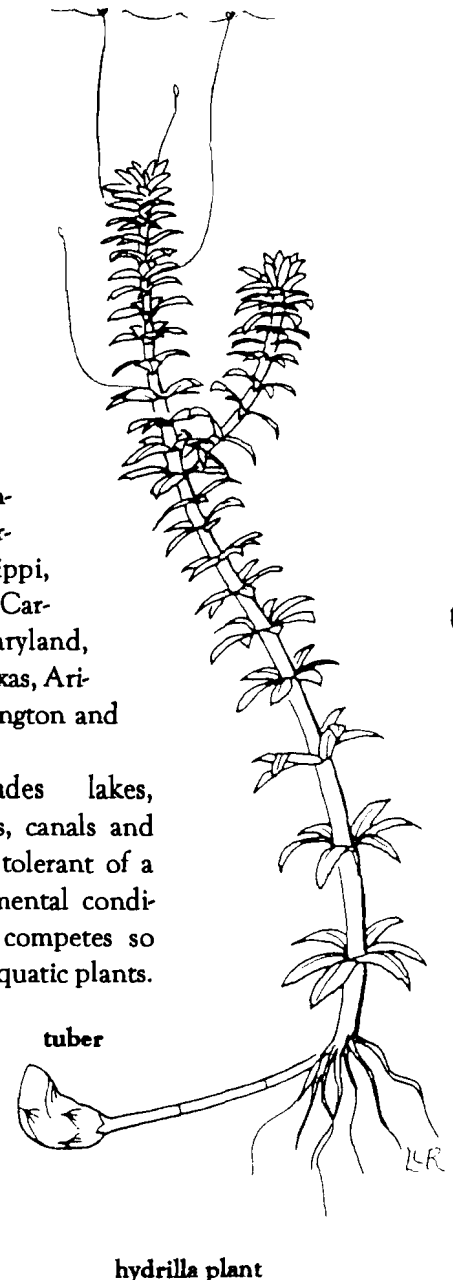
Hydrilla plants produce turions, or compact dormant buds, that serve as vegetative reproductive structures. The green turions form in leaf axils and drop off the plant when they are mature. Hydrilla also forms small (up to two-inch-long), potato-like tubers at the end of underground stems or rhizomes. The tubers can be found from 2 to 12 inches below sediment level and are off-white to yellow. Spread of hydrilla occurs via stem fragments, root crowns, tubers, turions and seeds.

Where Hydrilla Grows and Why It Causes Problems

Hydrilla is native to Australia, Asia and central Africa. It is an introduced exotic in Europe and the United States where it grows rampantly in many areas due to a lack of natural predators that keep it in check in its native habitat. The U.S. introduction occurred in the early 1950s by an aquarium fish and plant dealer who released several hydrilla plants from Sri Lanka into a canal near Tampa, Florida. Forty years later, more than 100,000 acres of public water in Florida are infested with hydrilla. Other states in the U.S. with hydrilla infestations include Georgia, Alabama, Mississippi, North Carolina, South Carolina, Virginia, Maryland, Delaware, Louisiana, Texas, Arizona, California, Washington and Connecticut.

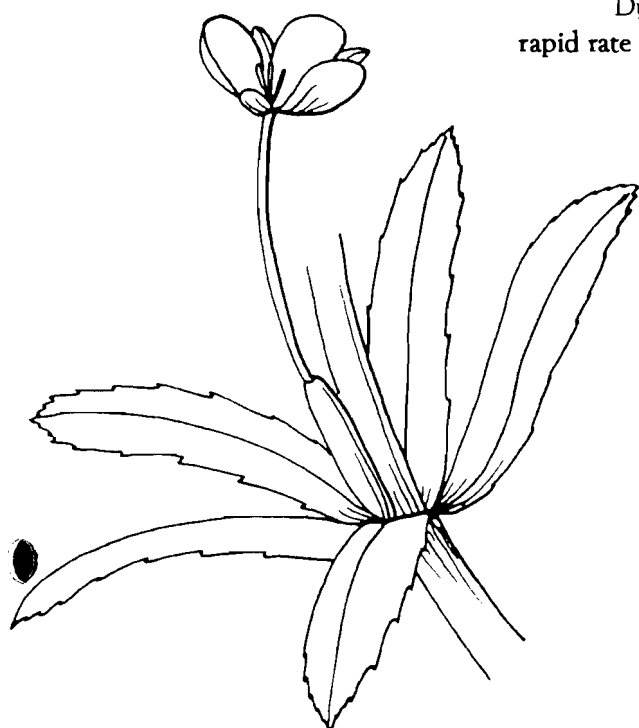
Hydrilla invades lakes, ponds, reservoirs, rivers, canals and drainage ditches. It is tolerant of a wide range of environmental conditions which is why it competes so successfully with other aquatic plants.

It has low light requirements, which allow it to colonize in deeper water and begin photosynthesizing earlier in the morning. It is found in both oligotrophic (low nutrient) and eutrophic (high nutrient) waterbodies. It can tolerate salinity up to 14 parts per thousand (38 percent saltwater) and grows in both acidic and alkaline waters, although it appears to prefer a pH of 6-8. Because the U.S. hydrilla population is predominantly found in

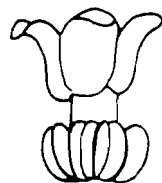


warmer areas of the country, there has been some question as to how well it would survive in the New England region. Based on latitudinal and temperature comparisons with China and Siberia where hydrilla occurs quite frequently, there is potential for it to invade the entire continental U.S. as well as Alaska and Canada. The northernmost reported hydrilla population in Siberia is only 9 degrees below the Arctic Circle! Hydrilla has not yet been found in Vermont, but VT-DEC biologists are keeping an eye out for this unwelcome plant.

Due to its rapid rate of spread



female flower



male flower



underside of leaf



turion

Illustration provided by:
IFAS, Center for Aquatic Plants
University of Florida, Gainesville, 1990

and ability to completely clog waterways, hydrilla poses significant threats to the aquatic ecosystem and recreational resources. Hydrilla can reduce biodiversity by out competing native aquatic plants. Dense infestations of hydrilla can reduce dissolved oxygen levels increasing the potential for fish kills. Water flow may be impeded by overabundant hydrilla growth, resulting in flooding and damage to shorelines and structures. Thick mats of hydrilla make swimming and other recreational activities difficult if not impossible.

Discovery of Hydrilla in Connecticut

Early this summer while doing some unrelated research, Don Les of the University of Connecticut noticed a herbarium specimen of hydrilla in the University's collection that had been misidentified as *Egeria densa*, another exotic species in the same plant family as hydrilla. The specimen had been collected in 1989 and the accompanying notes mentioned that the plant was growing very densely, forming a monoculture in the pond. Don visited the site in 1996 and sure enough, the plant was hydrilla, not *Egeria densa*. DNA fingerprinting done at Don's laboratory confirmed that the hydrilla is of the female dioecious strain. No one knows how the hydrilla got to the site, which is on private property. Preliminary discussions have taken place on potential control options but no decisions have yet been made on if or how this dense hydrilla infestation will be managed.

Control and Eradication Measures in the U.S.

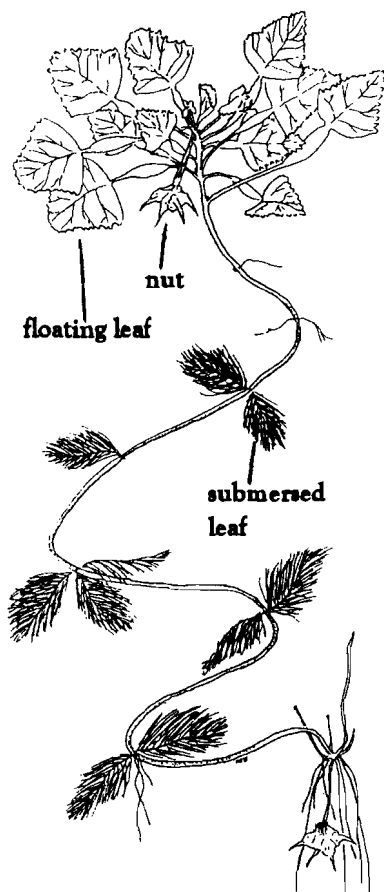
Hydrilla is one of the most difficult aquatic plants to control. Many methods have been employed to try to manage or eradicate this plant over the years. The most widely used means to control large infestations of hydrilla is the use of the systemic aquatic herbicide, Sonar. The herbivorous Asian fish known as the grass carp has also been used, particularly in the south. Two leaf-mining flies, one from Australia and one from India have been introduced as biological control agents. A tuber-feeding weevil from India and Pakistan is also being tried. Other efforts have included dredging, mechanical harvesting, suction harvesting and drawdown followed by dredging or fumigation for tuber removal. In spite of all these efforts and the expenditure of tens of millions of dollars, hydrilla continues to be a significant problem in many areas in the U.S.

continued on next page

What you can do to help prevent hydrilla from invading Vermont

- ◆ **Never dump unwanted aquarium plants in or near lakes, rivers or reservoirs!** Hydrilla and many other invasive exotic plants are still sold through the tropical fish trade.
- ◆ **Inspect nursery-supplied ornamental aquatic plants**, such as water lilies, that are shipped from growers in areas where hydrilla occurs. Hydrilla has been known to hitch-hike on these plants.
- ◆ **Learn how to identify hydrilla** and look for it when you are out on Vermont lakes and rivers.
- ◆ **Report any suspected hydrilla population** to the VTDEC immediately.
- ◆ **Teach others about hydrilla**, why it is a problem and how to look for it.
- ◆ **Remove all plant fragments** from boat propellers, boat trailers and fishing gear before leaving launch sites and dispose of plants in a trash receptacle or on high dry land.

Water Chestnut Update



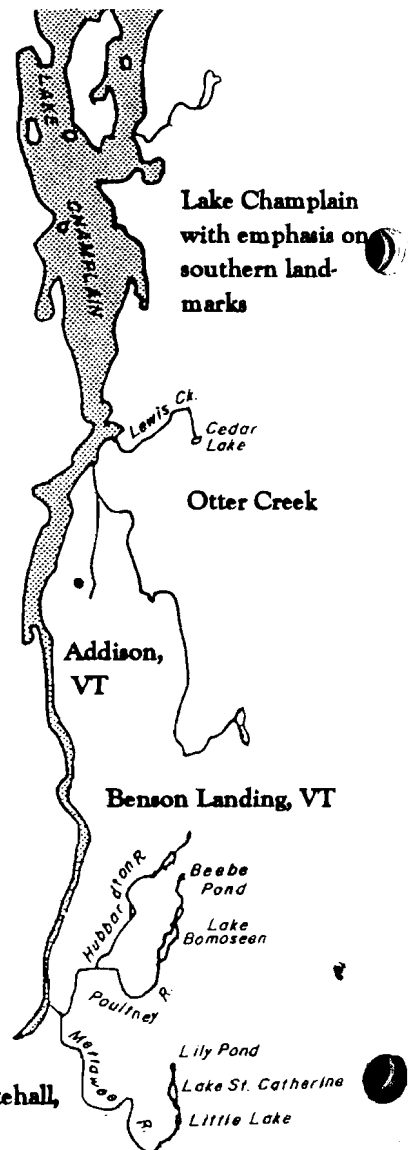
mature
water
chestnut
plant

Despite ongoing management efforts, by the end of the 1996 growing season water chestnut had continued its alarming advancement in Vermont. Water chestnut, *Trapa natans* L., is an invasive, non-native, annual, aquatic plant that can severely restrict all recreational and commercial uses of water.

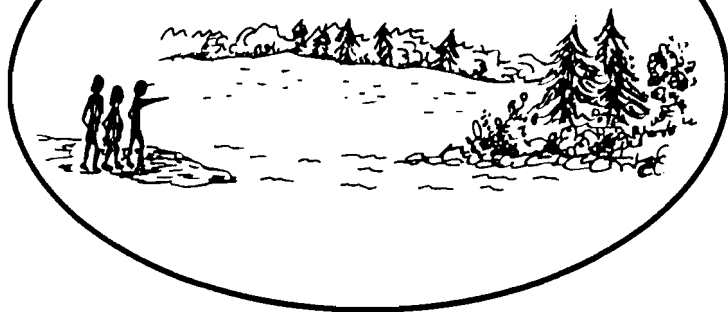
In Lake Champlain, water chestnut has now been found as far north as the mouth of Otter Creek in Ferrisburgh, Vermont. Thirty-eight other areas, from Otter Creek south to Benson Landing, have been identified on both sides of the lake with water chestnut growth. From Benson Landing, Vermont, south to Whitehall, New York, water chestnut invades most bays and many shoreline areas. In this most southern lake stretch, water chestnut plants form extensive surface mats from July through September; recreational and commercial use of the lake is severely restricted.

Four additional waterbodies in Vermont, three in Benson and one in Addison, now also have some amount of water chestnut growth. The populations in two of these four lakes may have been detected and targeted early enough to have "nipped them in the bud."

Budget constraints in recent years have prevented effective management of water chestnut in the basin. Management in the next few years is now more critical than ever. If you would like to know more about this problem plant and how you can help prevent its further spread, contact the Lakes and Ponds Section.



State of the Lakes



Actions of Lake Stewardship: Two Lake Associations Create Lake User Guides

Two lake associations have taken some innovative steps in lake management by writing and distributing "lake user guides." Visitors to Caspian Lake in Greensboro or Coles Pond in Walden are provided with lake user guides, produced by the lake association(s), free of charge to benefit everyone who uses these lakes.

The Caspian Lake Association decided four years ago to develop their own lake pamphlet, summarizing state boating rules for the lakes. This decision came about after petitioning the Water Resources Board for a specific set of surface use rules on Caspian Lake. Although portions of the petition were not supported by the Water Resources Board, specific restrictions on certain boating uses were imposed. Because these restrictions were unique to Caspian Lake, the association felt it was important to publish them, thereby creating their "Caspian Lake Boating Rules" pamphlet.

The pamphlet covers all the state boating rules that apply on Caspian Lake, including speed limits, operator restrictions, water skiing and jet skis, right of way and boat handling. The pamphlet also emphasizes environmental considerations, such as the protection of wildlife, littering, noise reduction and information about Eurasian watermilfoil. According to George Hasen, the Lay Monitor and former president of the lake association, the pamphlet seems to have been successful, in that most boaters follow the rules more closely. The 200 foot law still gets violated, but perhaps not as frequently as before publication of the pamphlet. (The 200 foot law is a state law that requires that all vessels travel at no-wake speed and less than five miles per hour

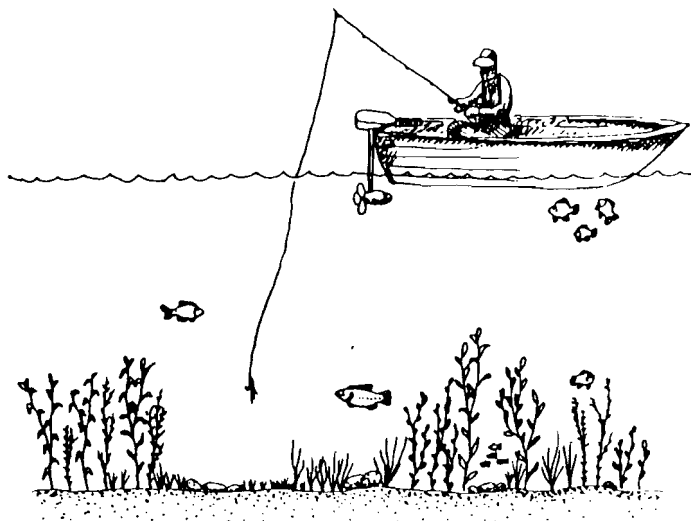
within 200 feet of the shoreline, a person in the water, a canoe, rowboat or other vessel, any anchorage or dock, or a diver's flag.)

After the Vermont Water Resources Board promulgated statewide lake surface use rules in the spring of 1995, the two associations of Coles Pond, the Eastern Avenue Property Owners and the Memory Lane and Shore Road Improvement Association, agreed to conduct a survey to learn the opinions of private property owners on Coles Pond regarding the use of the pond.

Benjamin Huffman, a Coles Pond property owner, explains the results of the survey. "A clear consensus on water use values emerged from the survey. These values also reflect the way the pond is now treated by virtually all current users. Members of our two associations decided they wanted to uphold the values reflected in the survey results, but did not want to take the step of imposing state enforceable rules on one another. Instead, it was decided to draft a *Coles Pond Water Use Guide*, to be posted in all our camps as a reminder to one another of our collective wishes for how to use the pond, and to communicate these values to visitors to the pond."

Included in the Coles Pond Water Use Guide are suggested actions to follow that promote compatibility between recreational uses and wildlife and help protect the water quality. The state boating laws are also explained to urge all boaters to abide by them.

Both Caspian Lake's and Coles Pond's water user guides offer a friendly welcome to visitors and residents, while cautioning people to be considerate of one another and of the beautiful natural resource they are enjoying.



The Long-Term Water Quality and Biological Monitoring Project for Lake Champlain, run by VT and NY DEC, and funded by the Lake Champlain Basin Program, continued to monitor the advance of the zebra mussel, *Dreissena polymorpha*, for the third consecutive year.

Veliger Densities (see map on page 12)

Sampling for zebra mussel veligers (the larval stage) took place at 12 open water and 11 shore sites. At the open water stations veligers were sampled with plankton net tows and densities were calculated per cubic meter (m^3).

The highest veliger density of the 1996 sampling season was noted at the Crown Point bridge with 93,798 m^3 which compares to a high of only 5,435 m^3 in 1995. The second highest veliger density of the season was found at Chipman Point with 89,453 m^3 . The southern portion of Lake Champlain continues to show the highest numbers, though increases in veliger counts have been noted throughout the main and northwest sections of the lake.

At the Grand Isle Ferry dock, veligers have increased 350 times from last year's high, and the Burlington Harbor station shows an increase of almost 50 times from 1995. Veligers were present at all stations in the Northeast Arm, from Missisquoi Bay south to Malletts Bay, although the numbers were quite low. It's important to note that veligers have 95 to 99 percent mortality rate, therefore these counts are used as an indication of the capacity of adult reproduction.

Juvenile Densities

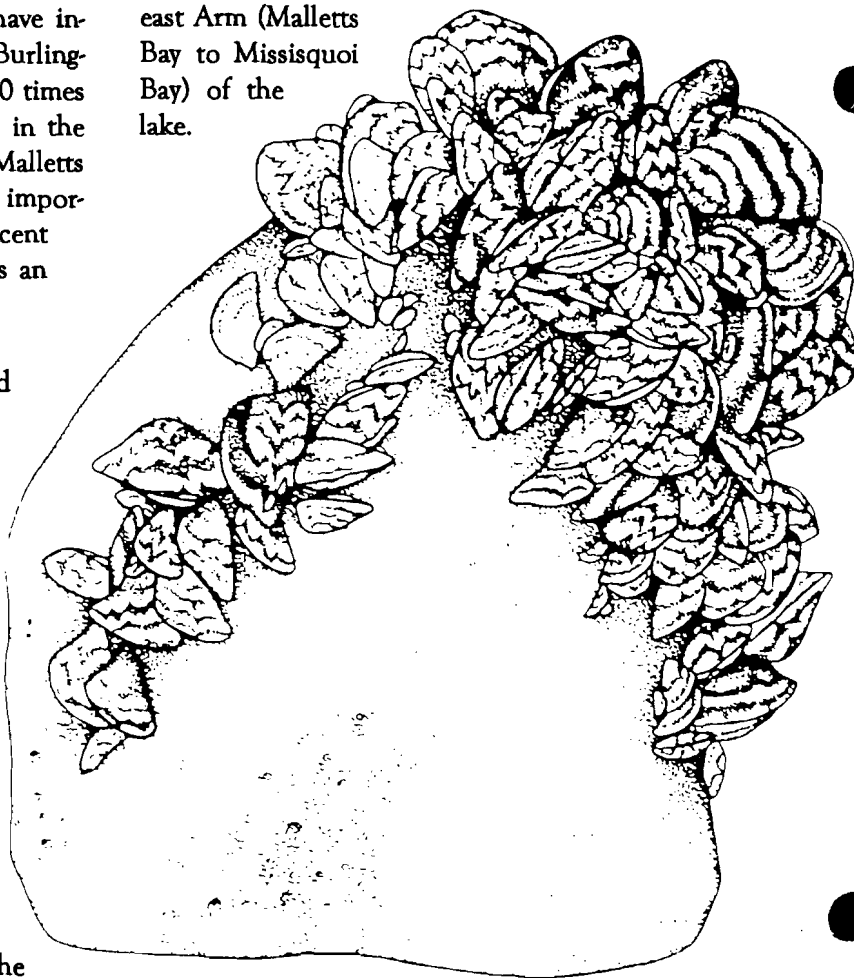
Zebra mussels that have recently moved from the free floating veliger stage to being attached to a substrate are referred to as settled juveniles. In order to sample settled juvenile mussels at the 11 shore stations, three 15 by 15 centimeter PVC plastic plates were suspended horizontally in the water column at a depth of approximately two meters for an average of one month. Juvenile densities were calculated based on numbers present on the bottom side of the plate. These counts were calculated as density per square meter (m^2).

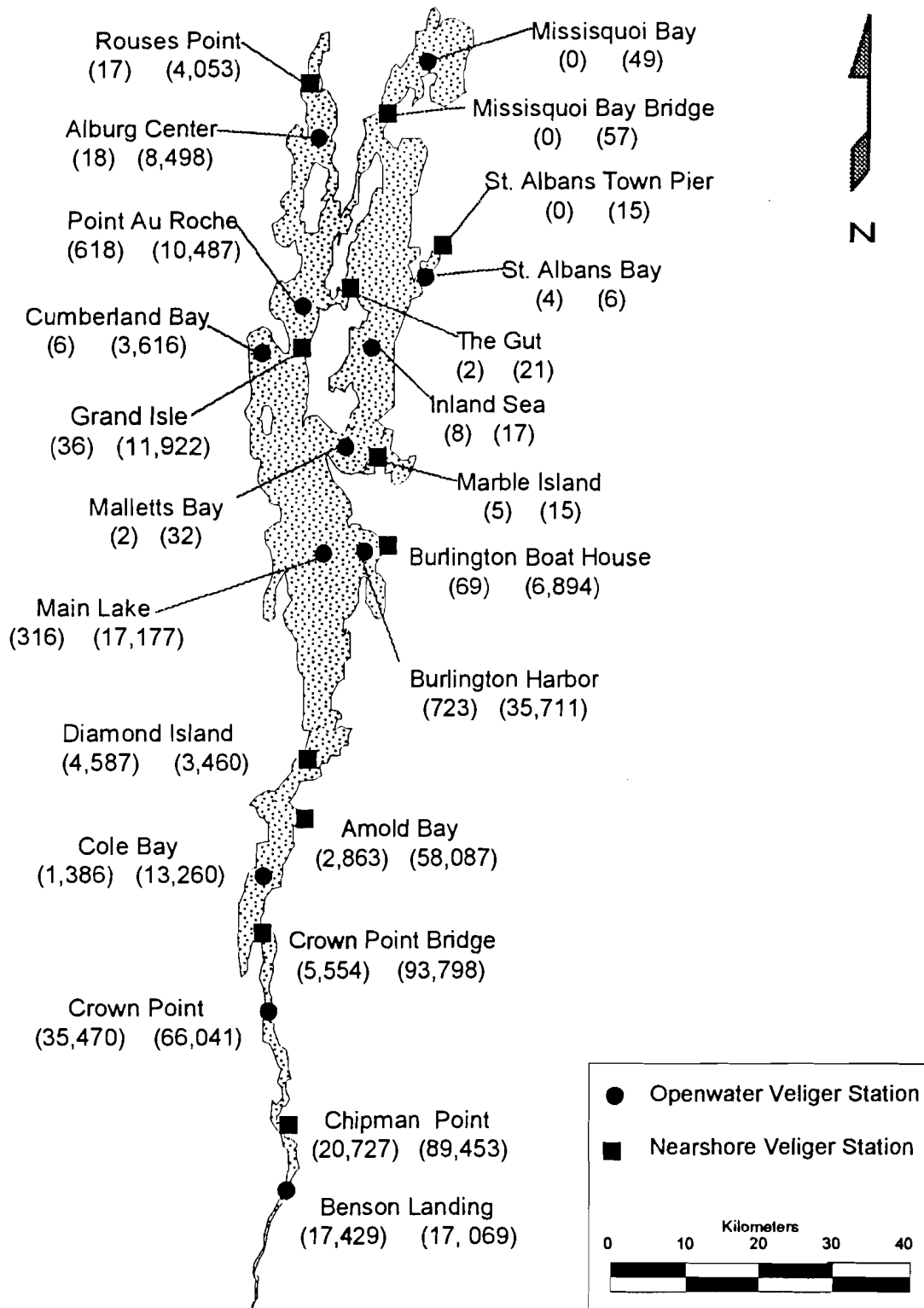
Juvenile settling densities were extremely high in southern Lake Champlain this year. The highest calculated settled juvenile density of the season, 3,670,000 m^2 , was found on the

Crown Point Bridge settling plates. Further north in Arnold Bay, settling plates showed a high juvenile density of 170,000 m^2 . The Chipman Point Marina settling plates had a density of 440,000 m^2 . Lower juvenile densities were found at the Grand Isle Ferry Dock (32,178 m^2), Burlington Boathouse (80,000 m^2), Diamond Island (23,664 m^2), and at Rouses Point (89 m^2).

Adult Sightings

The extent of adult infestations became apparent on shore, as strong south winds in October combined with low fall water levels washed up piles of zebra mussel shells on North Beach in Burlington. Adult populations continue to expand northward, west of Grand Isle, North Hero and Alburg. During 1996, new adult infestations were found in the Gut at Knight's Point State Park, at Tudhope's Sailing Center in Grand Isle, St. Annes' Shrine in Isle La Motte and Savage Point in Carry Bay. A sighting of adults in Malletts Bay by a recreational SCUBA diver was confirmed in mid-October. This report was the first sighting of adult zebra mussels in the Northeast Arm (Malletts Bay to Missisquoi Bay) of the lake.



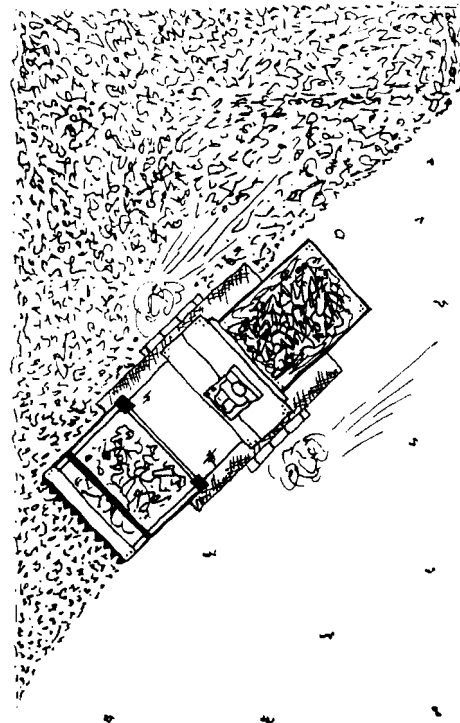


This map shows the increase of veligers lake wide in one year. **Veliger densities** reported are the peaks reported in 1995 (left hand value) and 1996 (right hand value). Densities are reported in veligers per cubic meter.

The Department's Aquatic Nuisance Control Grants-in-Aid Program awarded grants to 11 towns in 1996 for the management of nuisance aquatic vegetation. This program, established by the Vermont Legislature in 1978, provides financial assistance for aquatic nuisance control programs in the form of grants to municipalities. Although grants are awarded to municipalities, most projects are run by local lake associations.

All of the funded 1996 projects but one, Lake Parker in Glover, were managing the nonnative invasive aquatic plant, Eurasian watermilfoil. Floating mechanical harvester machines cut plants below the lake's surface, often to eight feet below, and collect the cut material for disposal at approved upland sites. Mechanical harvesting was funded on Lake Bomoseen, Lake St. Catherine and Lake Carmi. This type of aquatic plant management has been ongoing on Lakes Bomoseen and St. Catherine since 1984, and Lakes Parker and Carmi since 1985. The Town of Glover received funding to mechanically harvest nuisance native vegetation from specific areas of Lake Parker.

On another five lakes with primarily scattered Eurasian watermilfoil growth in limited areas along the shoreline, hand pulling activities were funded. Lakes Beebe, Dunmore, Cedar, Halls and Fairlee employed individuals to physically handpull watermilfoil plants from the lake's bottom and collect escaping fragments. On most of these lakes, scuba divers were employed to remove plants at deeper water depths. Educating lake

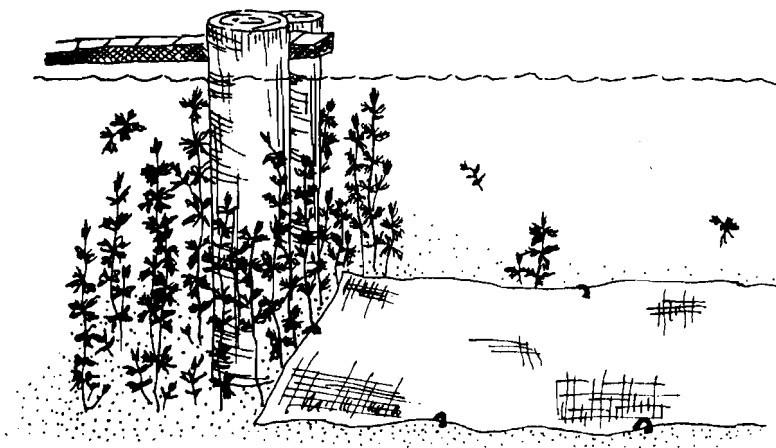


Mechanical Harvester

residents and users about this aquatic invader was also a strong component of these programs.

In addition to the hand pulling activities on Lake Morey in Fairlee, a grant to the Town of Fairlee also funded the use of a diver operated suction harvester. A suction harvester "vacuums" up watermilfoil plants that have been dislodged from the lake's bottom by a scuba diver.

Lastly, on Mill Pond in Windsor, Eurasian watermilfoil was managed at the Town of Windsor's swim area by covering an area of the lake bottom with a bottom barrier, a specially designed fabric that acts much like a mulching material in a home garden.



Bottom Barrier

★ Deb Parrella Leaves Project WET

Project WET Coordinator Deb Parrella is greatly thanked for her work in launching the program in Vermont. Deb successfully introduced project WET to hundreds of Vermont educators by designing a highly praised project WET workshop format and by providing educators with Vermont-oriented, water-related supplemental materials. Deb is leaving her position as Project WET Coordinator and will be missed for her willingness to share her expertise in and understanding of environmental education.

★ The Environmental and Water Resources Boards have Moved. Their new address is:

Water Resources Board
National Life Records Center Building
Drawer 20
Montpelier, VT 05620-3201
(802) 828-3309

★ Northeast Conference on Nonindigenous Aquatic Species

DATE: April 18-19, 1997
PLACE: Ramada Inn, Burlington, VT
CONTACT: Michael Hauser
Lakes and Ponds Section
(802) 241-3777

★ New England Waters: Sharing Successes, Building a Future Fourth Annual New England Lakes Conference and First Annual Regional Volunteer Monitoring Conference

DATE: June 6-8, 1997
PLACE: Kingston, Rhode Island
CONTACT: Amy Picotte
Lakes and Ponds Section
(802) 241-3777

◆ Please read the description about this event on page 6.

*Hosted by the University of Rhode Island Cooperative Extension
Watershed Watch Program and the New England Chapter of the
North American Lake management Society.*

Recently Made Available

★ Vermont Waters E-Mail List Server

A Vermont-specific lakes, rivers and watershed computer discussion group is now available! Please direct requests for subscription by mailing your current Email address via internet mail to:
NeilKammon@anrmail.anr.state.vt.us

★ Loon Program Available for Local Groups

The sight and sounds of loons offer inspirational wildlife experiences for residents and vacationers at lakes and ponds throughout the state. However, many may not realize just how precious these animals are. Loons are an endangered species in Vermont. There are approximately 20 nesting pairs of loons in the state that have successfully raised a total of about 20 chicks each summer for the past few years.

To increase awareness about these beautiful birds, the Nongame and Natural Heritage Program (NNHP) in the Vermont Fish and Wildlife Department makes available a scripted slide show and, when possible, a staff member to present the program. Contact Linda Henzel, NNHP education specialist, at (802) 241-3716 to schedule the slides for an annual meeting or special gathering.

This project is one of many funded by donations to the Nongame Wildlife Fund through the Vermont income tax return or hunting and fishing license applications. The Vermont loon work could not happen without continued support!

Department of Environmental Conservation
Vision and Mission

Vision

We envision a Vermont where people live in harmony with diverse and healthy natural systems;
appreciate and enjoy our natural resources;
understand the environment;
work together responsibly to reduce waste and risks to human health and the environment;
and prosper without significant degradation of natural systems.

We envision a Vermont where people breathe clean air;
drink clean water;
eat safe food;
and live in a sustained and healthy environment.

Mission

To preserve, enhance, restore, and conserve Vermont's natural resources, and protect human health, for the benefit of this and future generations.

*Wishing You
Happy
Holidays*



*From the
Lakes and
Ponds Staff*

Vermont Agency of Natural Resources
Department of Environmental Conservation
Water Quality Division
Lakes and Ponds Section
103 S. Main Street, 10 North
Waterbury, VT 05671-0408

BULK RATE U.S. POSTAGE PAID WATERBURY, VT PERMIT No. 17

Address correction requested.