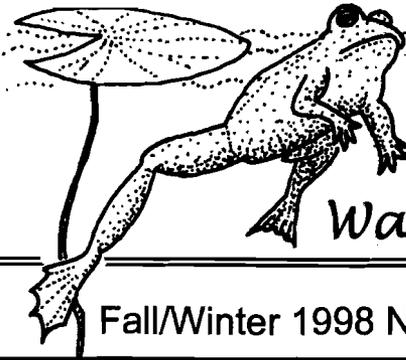
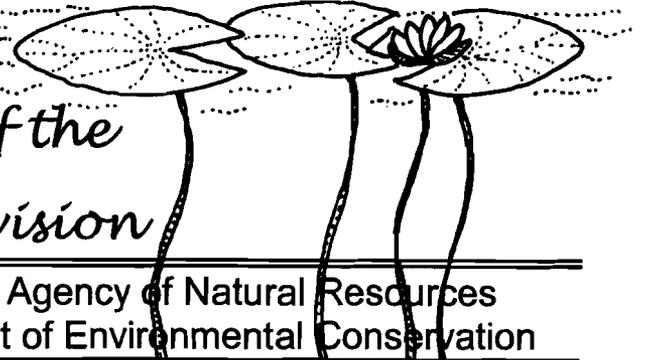




Out of the Blue



A Newsletter of the Water Quality Division



Fall/Winter 1998 No. 17

Vermont Agency of Natural Resources
Department of Environmental Conservation

Lay Monitors and Other Volunteers Receive Recognition Awards

The Vermont Lay Monitoring Program celebrated its 20th year by thanking its volunteers, who are the heart of the program. More than 200 volunteers have participated since the LMP started in 1979, and more than 79 lakes and 35 Lake Champlain stations have been monitored.

In addition to recognizing the dedicated work of the Lay Monitors, the award ceremony honored others who have significantly contributed time and resources to lake protection work. The following are the awards which were distributed.

Lay Monitoring Program Awards

◆ 16-20 Year Monitors (4 monitors total)

Mary Sondergeld (in attendance from Beebe Pond), Don Wilson (Lake Fairlee), James Leamy (Lake Bomoseen), and Ian James (Lake Hortonia).

◆ 11-15 Year Monitors (12 monitors total)

In attendance were Richard Harter (Champlain #4 and #21), Marilyn and Ron Brostek, (Beebe Pond), Barbara and Bill Duval (Champlain #20 and #30), David Reissig (Champlain #22), Anne Miller (Elfin Lake), and David and Martha Sirjane (Spring Lake). Not in attendance were Richard Davis (Lake Carmi), Sherry and Vaughn Clark (Cole Pond), John Brodhead (Great Hosmer Pond), Albert Wright (Halls Lake), Rod Willard (Island Pond), Robert and Helen Hall (Lake Iroquois), and Wesley Eldred (Champlain #6).

◆ 6-10 Year Monitors (33 monitors total)

In attendance were Sally and Evan Littlefield (Champlain #2), Mike Pinnette (Champlain #17), Robert Easton (Danby Pond), Thomas Benoure (Fairfield Pond), George Fisher (Fern Lake), William Rank (Harvey's Lake), See "LMP" page 2

LakeFEST 1998: The First Annual Celebration of Lakes

Look who has been celebrating Vermont lakes! This summer the Lake Protection Advisory Committee, a volunteer group of lake users and the Vermont Agency of Natural Resources sponsored the first statewide LakeFEST.

Governor Howard Dean proclaimed LakeFEST 1998, a week to "enhance and promote communication and cooperation between residents and watershed towns and all lake users to further stewardship goals." A series of local and statewide events including fun activities and workshops on watershed management and aquatic nuisance species were offered and opened to public participation.



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OUT OF THE BLUE

is produced semi-annually by the Lakes and Ponds Section. Our purpose is to share information on lake and watershed environments, water quality and state activities through articles on lake, stream and wetland ecology and Division 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:

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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.

Lay Monitors (continued from page 1)

Lee and Mary Stewart (Maidstone Lake), Don Weaver (Lake Morey), and Madonna Parker (South Pond).

◆ 3-5 Year Monitors (54 monitors total)

In attendance were Joe Frankiewicz (Chipman Pond), Bob Johnson (Lake Parker), Brian Picotte (Metcalf Pond), John Wood (Champlain #10), Paul Gerveas (Champlain #9), and Ginger and Eric Johnson (Lake Iroquois).

◆ 1-2 Year Monitors (87 monitors total)

In attendance were Bob Richards (Lake Parker), Michael Quinn (Lake Runnemeade), and Tom Mowatt (veteran Champlain #1).

Three Milfoil Management Projects Received Awards

- 1) The Lake Dunmore-Fern Lake Owners Association was recognized for exemplary efforts in implementing an aggressive and comprehensive program to control and prevent further spread of Eurasian watermilfoil in both Lake Dunmore and Fern Lake.
- 2) Roger Trachier of the Halls Lake Association was honored for his outstanding efforts organizing and implementing a program that has successfully controlled Eurasian watermilfoil in Halls Lake.
- 3) The Lake Morey Protective Association, the Town of Fairlee, and the Lake Morey Commission received special recognition for exemplary efforts in spearheading the implementation of a Eurasian watermilfoil management program on Lake Morey.

The Aquatic Nuisance Species Proactive Award was presented to the Greensboro Association for implementing a diverse program to prevent the spread of Eurasian watermilfoil, zebra mussels, and other aquatic nuisance species at Caspian Lake.

The Watershed Protection Award was given to the Lake Parker Association for exemplary efforts to understand and document potential watershed sources of pollution affecting Lake Parker, and to build cooperative working relationships with town officials and residents.

Robert Arnold Lake Protection Award was initiated in recognition of Bob's tireless effort and love he showed toward Seymour Lake. Bob's wife and family were on hand to receive the award. *Tom Benoure* received the first Robert Arnold Lake Protection award for his all-around devotion and love of Fairfield Pond.

Special Recognition Award was given to Jackie Sprague for her outstanding leadership and sustained efforts on behalf of all Vermont lakes through her work with the Federation of Lake Associations, Northern Vermont; the New England Chapter of the North American Lake Management Society; and the Lake Protection Advisory Committee.

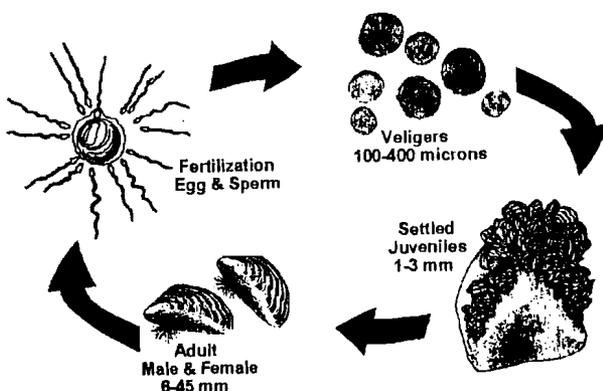
Aquatic Nuisance Species

HIGHLIGHTS

- Water chestnut has been found in two new inland lakes in Vermont (see article pg. 4).
- The water chestnut range has not advanced further north in Lake Champlain however expansion has occurred in several areas (see article pg. 4).
- The Nature Conservancy received funding to hire a coordinator to oversee and increase volunteer efforts to control water chestnut in waters on both Conservancy and non-Conservancy lands (see articles pg. 4).
- The statewide total of Eurasian watermilfoil lakes rose to 46 with the discovery of milfoil in four new lakes (see article pg. 5).
- The DEC awarded aquatic nuisance management grant funds totaling about \$288,040 to 13 municipalities in 1998 (see article pg. 5).
- The Water Resources Board granted authority to the Secretary of the Agency of Natural Resources to temporarily close areas of public waters in order to enhance the efficacy of active aquatic nuisance species management programs (see article pg. 6).
- During 1998 zebra mussel reproduction in southern Lake Champlain decreased from the previous year for the first time since 1994. Unusually high summer water levels and turbidity may have played a role.
- A record high zebra mussel reproduction was recorded for Burlington Harbor (88,000 veligers per cubic meter) in July 1998.
- Native mussel populations in Lake Champlain continue to be displaced by zebra mussels.
- Zebra mussels still have not been found in any Vermont inland lake.
- Zebra mussels continue to be rare in much of the Northeast Arm of Lake Champlain (Malletts Bay north).
- Zebra mussels have been found in the state of Connecticut for the first time - East Twin Lake in Salisbury.
- The Vermont Fish & Wildlife Board has prohibited the transportation, possession or use of alewives as bait in any waters other than those from which they have been captured.

Visit the VTDEC ANS Website at: www.anr.state.vt.us/dec/waterq/ans/ans-index.htm

Zebra Mussel Life Cycle



● Each adult zebra mussel can reproduce one million eggs per year.

● A fertilized egg becomes a veliger, the microscopic larval stage of a mussel. Veligers are free floating and can spread to new waterbodies.

● As adults, zebra mussels stay fixed onto hard surfaces.

1000 microns (μm) = 1 millimeter (mm)
1000 mm = 1 meter

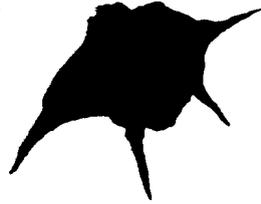
Water Chestnut Update

1998 marked yet another year where water chestnut was discovered in waters outside of Lake Champlain and its tributaries. A small water chestnut population was found and removed from 40 acre Lake Paran located in the southern Vermont towns of Bennington and Shaftsbury. Twenty acre Coggman Pond located in West Haven, Vermont was also discovered with water chestnut plants this year. At both sites, water chestnut plants were pulled from the lakes by hand.

Other waters where water chestnut has been identified include Lake Bomoseen (Hubbardton); Root Pond, Parson's Mill Pond and Strong Swamp (Benson); and Dead Creek (Addison).

Water chestnut is an annual, aquatic plant native to Asia. This plant spreads to new areas primarily by its four-pronged, barbed seeds. A single water chestnut plant may give rise to 15 to 20 seeds. A true annual species, water chestnut over winters entirely by seed. If the plant can be removed before the seeds drop in late summer, water chestnut can be effectively controlled.

In 1998, water chestnut's range in Lake Champlain did not spread further north; however, Water Quality Division staff surveys documented an expansion of water chestnut in many other



waterchestnut
actual size

areas. Significant spread was noted on both the Vermont and New York sides of the lake from Orwell, VT south.

1998 water chestnut management efforts included both mechanical harvesting and hand removal. Mechanical harvesters target dense water chestnut populations. Hand removal of water chestnut plants is used for less dense populations or for individual plants.

Cooperative management efforts between the Vermont Department of Environmental Conservation (DEC), The Nature Conservancy (TNC), and many volunteers increased the control effort in 1998. Some of the sites in southern Lake Champlain managed in 1998 had not been targeted since 1989.

A notable 1998 water chestnut search effort was collaborated between the DEC, Lake Bomoseen Association, and TNC. Individuals representing all three groups scoured the wetland at the northern end of Lake Bomoseen in July in search of water chestnut. Water chestnut plants were discovered and handpulled from one site in the wetland in 1997. A few water chestnut plants were found at this wetland site in June of 1998. The July 1998 collaborative search, however, found no water chestnut anywhere in the wetland. *Contact the Lakes and Ponds Section at (802) 241-3777 for further water chestnut information and updates.*



volunteers harvesting waterchestnut chestnut

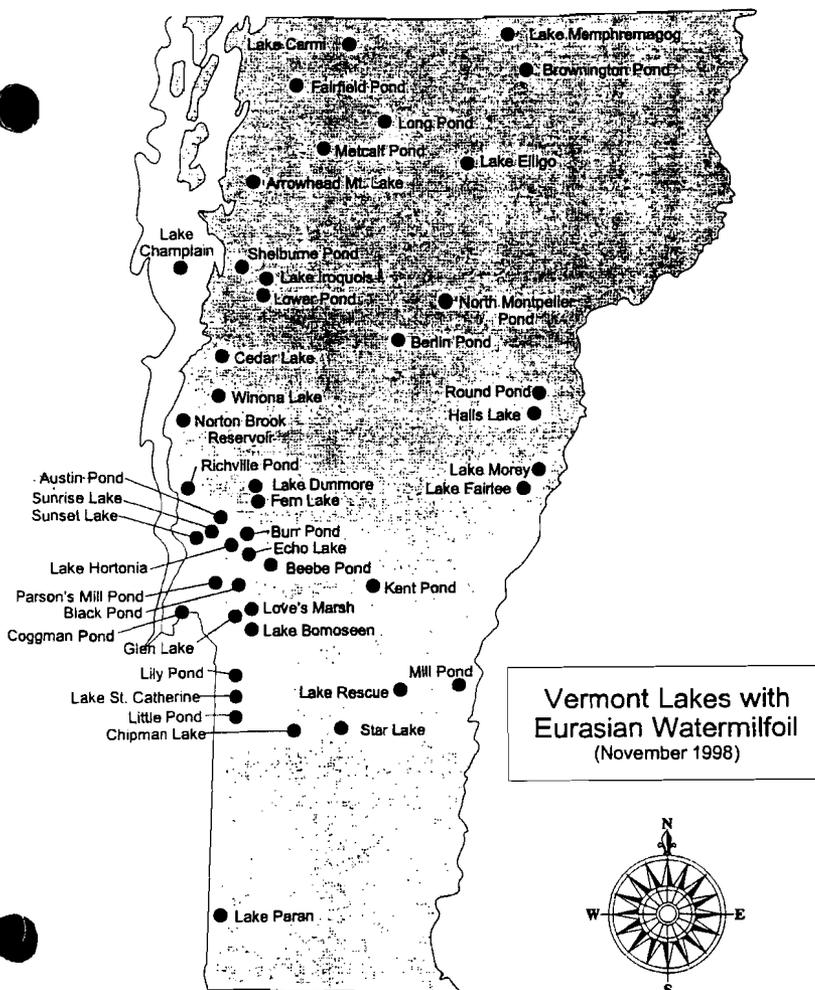
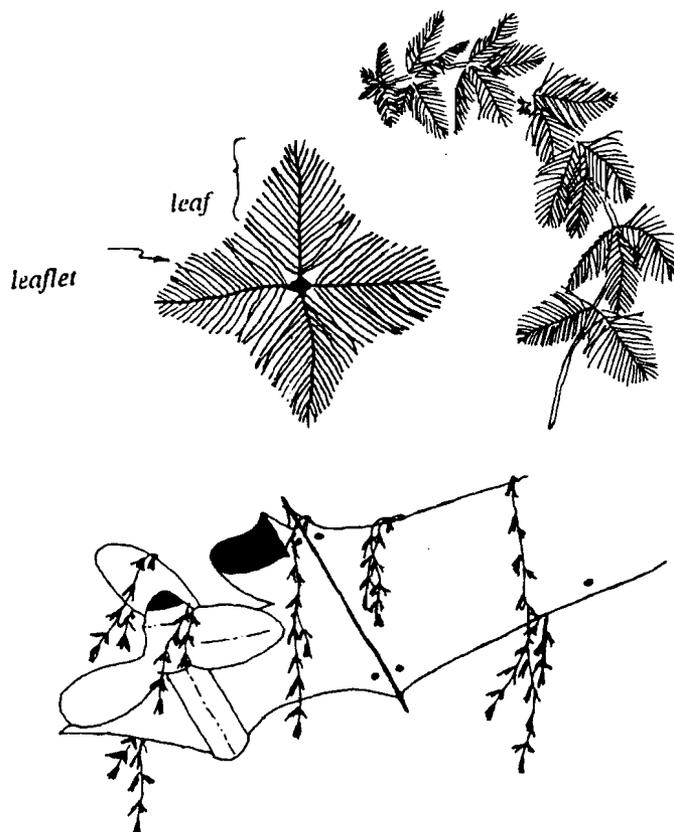
Partnering to Target Water Chestnut

Funding provided by the Lake Champlain Basin Program and awarded through the DEC, enabled the Vermont Chapter of The Nature Conservancy to hire a coordinator to oversee and increase volunteer efforts to control water chestnut in waters on both Conservancy and non-Conservancy lands. TNC has been controlling water chestnut at select Vermont sites for a number of years. In 1998, 155 volunteers contributed a total of 1,075 hours and removed an estimated 58,000 water chestnut plants from both Vermont and New York sites. The DEC and TNC hope to team up on water chestnut management again in 1999.

Eurasian Watermilfoil Invades Four More Lakes

The statewide total of Eurasian watermilfoil lakes has risen to 46. Milfoil was discovered in four more lakes in 1998 by Lakes and Ponds staff. Chipman Pond in Tinmouth and Lake Rescue in Ludlow were found with milfoil populations that should be controllable by hand removal. Hand-pulling of milfoil from both lakes did occur this season. Property owners on both lakes have begun to organize to develop management programs. The milfoil populations in Coggman Pond in West Haven and Long Pond in Eden appear too dense and widespread for handpulling. Lakes and Ponds staff will continue to monitor the milfoil in these lakes.

Remember, Eurasian watermilfoil is spread primarily by humans when pieces of milfoil become entangled on recreational equipment and are then transported from an infected to an uninfected waterbody. Please take a few minutes to remove **any** aquatic plants from your equipment before leaving a lake's access area. Spread the word not the plant!



Grants Awarded in Aquatic Nuisance Species Management

Since 1994, the DEC has received a percentage of the motor boat registration funds to award grants to municipalities managing aquatic nuisance species. The DEC has the ability to award up to 75% of the total project cost.

In 1998, grants were awarded to 13 municipalities. All of the projects focused on management of Eurasian watermilfoil except one; this lake mechanically harvested nuisance native plant growth. Estimated total project costs for all 13 projects is \$288,040; the state's share will be approximately \$182,956. Final project totals and award percentages will not be available until all 13 towns submit their final project reports.

For information on the "Grant-in-Aid" Program contact Ann Bove or Vicky Barney at the Lakes Ponds Section at (802) 241-3777.

Water Resources Board Rule Change, Another Tool for Aquatic Nuisance Species Spread Prevention

On May 14, 1998, the Water Resources Board adopted Section 4.1 of Section 4 of the Vermont Use of Public Waters Rules. Section 4.1 allows the Secretary of the Agency of Natural Resources to temporarily close areas of public waters to all persons, vessels, or both to prevent, control, or contain the spread of aquatic nuisance infestations.

In order for the Secretary to temporarily close an area of a lake, pond, or reservoir the following must be met: 1) the total area closed must not be more than 10 percent of the surface area or 50 acres, whichever is less; 2) the total area adjacent to the shoreline closed must not be more than 10 percent of the waterbody shoreline; 3) every effort is made to configure the area to minimize the impact on a public access area and to provide access to the waterbody for all shoreline property owners; and, 4) closure will enhance the efficacy of an active, aquatic nuisance species management program.

On June 15, 1998, the Secretary received a request from the town of Fairlee to temporarily designate a no boating zone in a 5.8 acre area at the northern end of Lake Morey. In response, the Agency issued an order establishing a 5.8 acre temporary no boating zone to minimize the spread of Eurasian watermilfoil in Lake Morey on July 31, 1998.

Eurasian watermilfoil was first identified in 538 acre Lake Morey in 1991. The town of Fairlee, in conjunction with the Lake Morey Protective Association, the Lake Morey Commission, and many individuals, has been working in an integrated fashion to control and prevent lake-wide spread since

milfoil's discovery. The town's integrated management plan includes: bottom barrier placement, scuba diver operated suction harvesting, pulling of individual plants by hand, and education and outreach.

In August, the Lake Morey Protective Association, acting on the town of Fairlee's behalf, placed buoys around the area to delineate the no boating zone and insure adequate public notice.

The Secretary will review the order before July 15, 1999 and every two years thereafter to determine whether preventing the spread of Eurasian watermilfoil in Lake Morey is being achieved.



Photo taken by Don Weaver from Lake Morey



International Lake Technical Exchange Program: Lake Toba (Indonesia) and Lake Champlain Share Ideas

In September, three individuals from the Lake Toba region traveled to Vermont to participate in a technical exchange program as part of the Lake Toba-Lake Champlain Sister Lakes Exchange.

The focus of the technical exchange was in three areas: 1) establishment of an education and science center for Lake Toba, 2) tourism and sustainable development, and 3) sustainable forestry, and pulp and paper pollution control. Many Lake Champlain regional groups and organizations shared their knowledge in these three areas with exchange participants during the six day program, including Shelburne Bay Lay Monitor, Wesley Eldred, Essex Technical Center's floating classroom teacher, Tom Keck, and Lakes and Ponds staff, Amy Picotte and Ann Bove.

Lake Toba, located in the province of North Sumatra, Indonesia, is the world's largest crater lake (see *Out of the Blue F/W 1997-98 No. 15*). Unfortunately, the lake is characterized by deforestation, drought, declining water levels, water quality degradation, and a loss of biological diversity. In 1996, a sister lakes exchange program was initiated between Lake Toba and Lake Champlain. This exchange program establishes a long-term relationship between key institutions on both lakes, allowing for the transfer of watershed management experience, technologies, and practices to the Lake Toba region.

In September 1997, 18 delegates from the Lake Toba region visited the Lake Champlain region. Their visit resulted in a report with recommendations for improving the management of Lake Toba.

From April 26 to May 3, 1998, 11 delegates from the Lake Champlain region, including Lakes and Ponds staff member, Ann Bove, traveled to the Lake Toba region for a one week study tour. The delegation met with members of the Lake Toba Heritage Foundation, a small non-government organization organized by local leaders, as well as leaders in government, industry, and

universities. Their visit resulted in the signing of a Memorandum of Understanding between the governors of North Sumatra and Vermont, establishing a cooperative program in environmental management, tourism and culture, human resources development, agriculture and forestry, and urban and rural development.

It is hoped that information will continue to be exchanged in these areas if further funding can be found.



Tom Keck, Essex Technical Center teacher, takes exchange participants out on his floating classroom, "S.O.S."



Betsy Rosenbluth, Lake Champlain Basin Science Center Co-Director (L), and Dr. Ir. Bungaran Saragih on board the "S.O.S."

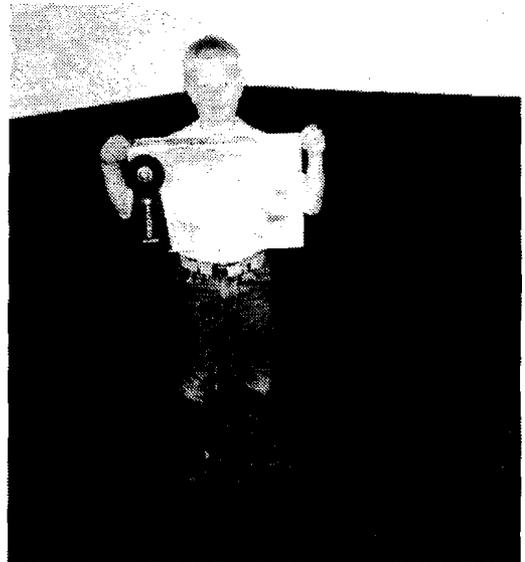
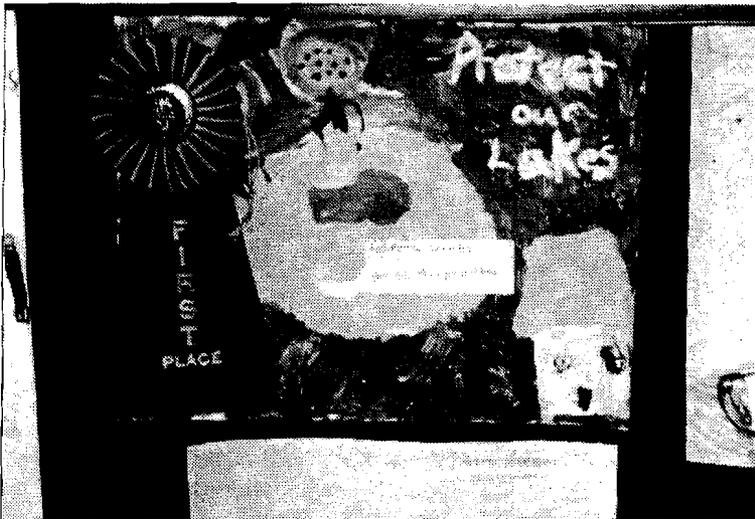
LakeFEST 1998

Lake Associations that participated in this year's LakeFEST '98 celebration hosted a range of diverse and interesting events. Given the great response from this first year, LakeFEST will continue as an annual event. Anyone is welcome to help in planning LakeFEST '99, July 17-25, 1999. Included here is a sampling of what some lake associations sponsored for this year's LakeFEST '98 celebration:

- The folks at Lake Parker in Glover featured a **Dixieland Jazz Band** that toured the lake on a pontoon boat, providing all of their campers with a reason to dance a jig.



- The Lake Parker Association also collaborated with the Shadow Lake Association, also from Glover, to put on "Glover Day," which included a **poster contest** by area school children using lake protection as the theme for their LakeFEST celebration.

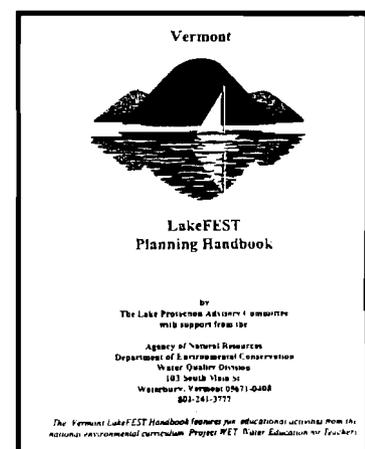


- At Lake Iroquois in Hinesburg and Williston, the LakeFEST celebration included a **triathlon**, non-motorized **boat demonstrations**, and **live bluegrass music**. They also hosted a VTDEC staff led **Eurasian Watermilfoil Lake Tour/workshop**.
- The folks on Harvey's Lake in West Barnet celebrated LakeFEST with a boat parade, a **horseshoe tournament** (enjoyed by young and old alike), **fireworks** and a **BBQ**.
- At Willoughby Lake in Westmore, the Westmore Association held its **annual meeting** on the shores of the lake and wound up the evening with a **pot-luck supper** at the community hall followed by a VTDEC staff **Watershed Survey** presentation.
- The Barnard Silver Lake Association LakeFEST celebration featured children's activities, at the State Park located on the lake, including many submissions for its **essay contest** on their lake from area schoolchildren.
- At Lake Morey in Fairlee, the Lake Morey Protective Association sponsored a whole slew of events celebrating LakeFEST including a **sailing regatta**, a presentation by the **boy's choir**, and a **quilt** commemorating the lake community. Additionally, the Lay Monitors on Lake Morey also presented their long-term water quality data at the annual meeting following their daylong LakeFEST celebration. The data suggests that water clarity has improved on Lake Morey in recent years.



If you would like to join the Lake Protection Advisory Committee, or if you simply want to get involved in planning LakeFEST '99, scheduled for the week of July 17th – 25th, 1999, please call Susan Warren at the Lakes and Ponds Section at (802) 241-3777.

For ideas on different activities that you may want to consider for LakeFEST '99, please call for the free Vermont LakeFEST Planning Handbook!



Vermont Dams and Their Impacts

Vermont has over 1,000 dams within its borders. While many have been breached and no longer impound any water, and others form artificial ponds, most are either on rivers or regulate the water level of natural lakes.

Vermont's dams have been built over the last two centuries to meet many societal and individual needs. Current uses include electrical generation, flood control, and water supply. They create ponds that are often important aesthetic amenities to residents and visitors. They provide opportunities for quiet-water canoeing, boating and fishing. And finally, they can be used to raise the water level in lakes for the benefit of lake-shore property owners and other recreational users.

But for every benefit, there are also drawbacks.

One can think of rivers as long, linear ecosystems. In a free-flowing river, fish and other aquatic organisms are free to move up and downstream (until they reach a natural barrier, like a waterfall). They benefit from well oxygenated water resulting from the river flowing over riffles, rapids and waterfalls; the river current also carries food to these organisms. Sediment is also transported by the rivers as part of a natural geological process, carried downstream during spring melt and following heavy storms.

Damming a river substantially alters natural ecosystems. First of all, the river is no longer continuous, at least from an ecological standpoint. The dam prevents the movement of fish upstream, and frequently downstream as well. Sediment carried by the river is deposited in the still water impounded behind the dam, gradually filling in the impoundment. Because the energy of the moving water must be in balance with the amount of sediment it carries, this often results in erosion

below large reservoirs as the river picks up additional material to compensate for that deposited in the reservoir. The water in the impoundment is heated by the sun, often raising the temperature beyond the threshold where cold-water fish species, like trout, can survive. And, water that settles into the deeper portions of an impoundment can have so little dissolved oxygen that it won't support fish or other life.

Dams also impose societal costs. They change the recreational value of a river, for example a cold-water fishery becomes a warm-water fishery, or white-water canoeing becomes flat-water canoeing. While some dams are built for flood control, the presence of dams can also increase the likelihood or severity of floods by constricting the flow of the river or causing ice jams.

Finally, the financial and legal liability associated with dams is a significant issue. Dams are expensive to build and maintain. The Agency of Natural Resources owns and maintains nearly 90 dams, at a significant cost to Vermont's taxpayers. Dams that are abandoned by their owners after they are no longer useful can

fall into disrepair, resulting in hazardous, and perhaps dangerous, conditions downstream in the event of dam failure.

Most existing dams in Vermont were built well before passage of the Federal Clean Water Act and institution of other environmental laws and regulations. When the Department of Environmental Conservation reviews conditions at these older dams or receives an application for a new dam, it very carefully weighs the benefits against the social and environmental costs.



The dam of North Springfield Lake, located on the Black River in Springfield, VT.

Help Prevent Winter Road Salt from Affecting Vermont Waters: Road Salt and Salted Sand Storage Guidelines

Improper storage and loading procedures associated with road salt and salted sand can significantly pollute ground and surface water resources. Salt or sodium chloride applied to roads to melt winter ice is not known to have ever caused toxic conditions in Vermont's surface waters, however, it has contaminated ground waters and drinking wells in Vermont. Toxic conditions of sodium chloride can cause health problems for the general public and problems to aquatic habitat. The potential for serious liability for the owners and/or operators of the storage facility also exists.

When the following siting and management guidelines are used, the better chance of significantly reducing the risks of impacting surface waters and contaminating ground water resources from improper salt storage.

Where to Stockpile Salt and Salted Sand

Salt and salted sand stockpiles should be located where salt is not likely to leach into the ground water and especially into drinking water wells or springs. Stockpiles of road salt and salted sand should be situated on impervious surfaces, such as pavement or concrete, to help prevent salt from seeping into the ground and to facilitate any cleanup of spilled materials. Loading areas should also be impervious for the same reasons. Stockpiles should not be located directly above or near an existing well or spring. Conversely, new wells and springs should not be developed directly below an existing salt or salted sand storage facility. Stockpiles should not be located where material can erode and directly runoff into surface waters, including wetlands. And, finally, stockpiles should not be located in floodplains.

The Water Supply Division of the Department (802-241-3400) is available to assist towns and other public agencies with safely locating stockpiles of road salt and salted sand.

Covering the Pile

Road salt and salted sand stockpiles should be covered or housed to prevent precipitation from dissolving the salt. Dissolved salt becomes runoff to surface waters or leaches into ground water. If stockpiles are housed, storage buildings should be approved by the Regional District Administrator of the Agency of Transportation. Salted sand piles are often too large for a reasonably sized building, but should be covered with a flexible impermeable material, such as a plastic tarp. Preventing the loss of salt easily can pay the cost of a facility in a short period of time.

Site Maintenance and Housekeeping

Prompt and efficient cleanup of spilled salt or salted sand can significantly reduce the amount of salt exposed and available for transport into the ground.

All of the above will help to minimize the potential impact to Vermont's water resources from salt and salted sand storage. Although studies by the Department of Environmental Conservation have not revealed any undue impacts to surface water quality, high sodium levels in drinking water from road salt are a known and significant risk to human health.



Purple Loosestrife: Pretty but Powerfully Invasive

In the early 1940s, several Quebec farmers noticed a plant taking over their pastures. The investigator who researched the farmers' complaints found five square miles of pasture land that was overgrown by purple loosestrife (*Lythrum salicaria*), a non-native plant. He reported that, due to its dense growth and to the unwillingness of cattle to feed on it, some of this land had virtually no value to livestock.

Interestingly, until this time, purple loosestrife had been in North America for more than a hundred years without causing any known problems. Since 1940, however, it has spread rapidly and degraded many acres of wetland and agricultural land. Purple loosestrife now covers an estimated 400,000 acres in the United States and Canada, and has been declared a noxious weed in 16 states.



Although purple loosestrife does add a bright splash of color to the landscape in midsummer, it eliminates much of which is vital from wetlands: native plants, food supplies for wildlife, shelter for waterfowl, and spawning grounds for fish. Purple loosestrife has several traits that allow it to be successful. Its tall stalks, two to seven feet, tower over most other wetland plants, shading them out. It can also adjust to a wide range of environmental conditions, requiring only moist soil for seed germination and open, sunny areas. Purple loosestrife plants can thrive on dry land or in several feet of water, and the plant is equally tolerant of a range of soil texture and acidity.

It has an impressive ability to reproduce: as many as 2.7 million seeds have been produced by one plant, and broken pieces of stem and root are capable of producing new plants as well. Enough energy is stored in the plant's large woody root mass that it can survive several years of cutting or defoliation.

Several methods have been used to control purple loosestrife. Cutting or digging the plants can eliminate small patches, but is too labor intensive for large infestations. Because root fragments can be left behind, this method must be repeated every year to prevent re-infestation. Another control method is using herbicides. Herbicides, however, can kill other wetland plants. Using herbicides may harm species that should be protected while opening up more ground for purple loosestrife to invade. Additionally, herbicide applications, similar to cutting and pulling, must be done yearly and are very costly. Burning and flooding have been tried as control methods with no success.

A new method of control, called biocontrol, is now being used to fight purple loosestrife. Biocontrol uses an invasive species' natural enemies to control it. Several species of insects that feed on purple loosestrife are now being raised and released in the United States and Canada. The goal of biocontrol is not to completely eliminate purple loosestrife, but to decrease its density enough that native species can thrive. Biocontrol programs in Minnesota and Ontario have already reduced the purple loosestrife populations in some wetlands. Vermont begun using biocontrol in 1995.

The insects used for purple loosestrife biocontrol come from Europe, where loosestrife is na-

native, and were studied intensively before being released in North America. Of the 120 insect species that eat purple loosestrife in Europe, 14 were found to feed only on purple loosestrife. Five species were selected as the most likely to be successful in North America, because they have a large range and can colonize isolated purple loosestrife populations. Feeding tests on almost 50 plant species from North America (both native wetland plants and important agricultural crops) determined that the risk these insects pose to other plants is minimal. In 1992 three species (*Galerucella pusilla* and *Galerucella calmariensis*, leaf and shoot feeding beetles, and *Hylobius transversovittatus*, a root boring weevil) were approved for release by both the United States and Canada. Releases were made in seven states and several Canadian provinces that year. Two more species (*Nanophyes brevis* and *N. marmoratus*, flower feeding beetles) were approved by both countries in 1994.

Three biocontrol species have been released in Vermont: *Galerucella pusilla*, *G. calmariensis*, and *Hylobius transversovittatus*. All three were released at the Missisquoi National Wildlife Refuge in 1995. In 1996, the Vermont State Wetlands Office began raising the two leaf and shoot feeding beetles. The beetles are raised on netted purple loosestrife plants by putting ten of these small beetles on each plant in late spring. Ten beetles will produce about 500 offspring, which are then released in Vermont wetlands in mid-summer. As of fall 1998, approximately 82,000 beetles have been released in 11 counties and twenty-five towns across the state. Several purple loosestrife populations experienced a great deal of beetle feeding damage in 1998, and reductions in purple loosestrife populations are expected within the next few years. For more information, contact the Wetlands Office at (802) 241-3770.

Vermont Project WET

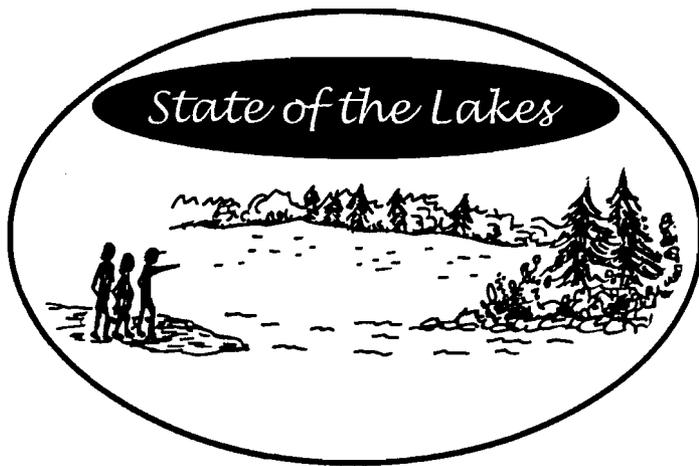
Vermont Project WET, Water Education for Teachers, is a k-12th grade, hands-on, integrated curriculum designed to facilitate and promote awareness, appreciation, knowledge, and stewardship of Vermont's water resources.

The Project WET Activity and Curriculum Guide is available only through workshops conducted by Vermont's Project WET coordinator and trained facilitators.

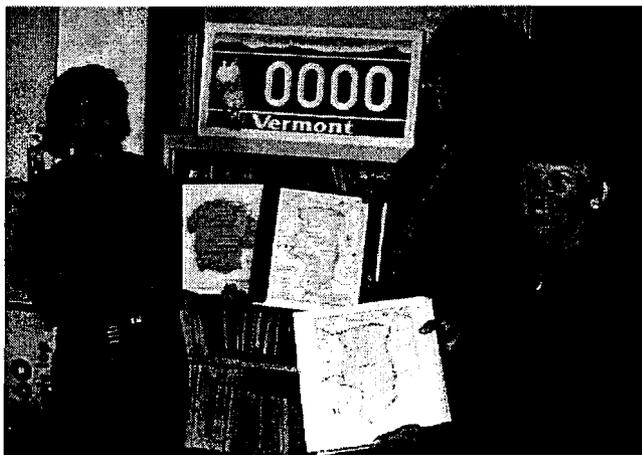
Three exciting thematic Project WET workshops are offered annually, covering the following topics: Watersheds, Macroinvertebrate Monitoring, and Wetlands. In addition to these workshops, others will be scheduled based on request and the level of interest. See "Happenings," on page 15 for a listing of upcoming workshops.

Project WET





Knowing Your Watershed



Madeliene Ducham and Bob Johnson of the Lake Parker Association show off their completed Watershed Survey.

Congratulations, Lake Parker Association!

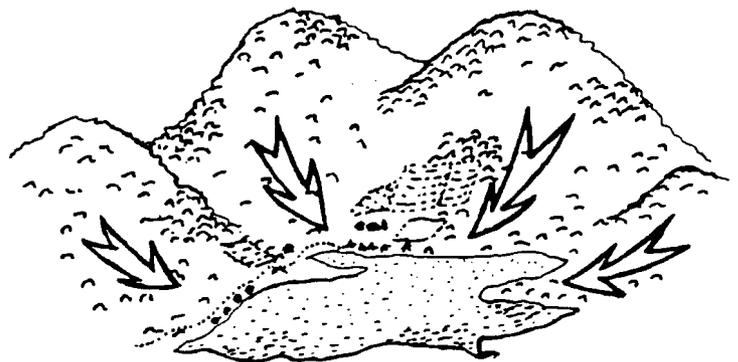
After three years of hard and thorough work, the Association has finished their Watershed Survey!

Funded in part by a grant through the conservation license plate program, but completed mostly with lots of leg work and determination, a three notebook report was presented to the Lakes and Ponds Section. Following the guidance in "Citizens Watershed Surveys," the association surveyed the in-lake, shoreland and watershed areas of the lake. Taking careful notes on algae, sedimentation, erosion and nutrient sources, they compiled a comprehensive inventory of situations in the watershed that should be addressed to reduce phosphorus enrichment of the lake. The survey has been a useful tool to both learn about the watershed and to establish good communications with town residents and government. The lake association has already begun addressing many of the concerns identified.

Watersheds are where its at! By understanding the interactions between land uses, topography, plants and animals, surface water and human uses, our favorite waters can be best protected and restored. An increasing number of lake residents have been involved in various forms of watershed surveying, including Seymour Lake (Morgan), Silver Lake (Barnard), Lake Carmi (Franklin), Harvey's Lake (Barnet), Lake Iroquois (Williston, Hinesburg), Lake Parker (Glover), Lake Willoughby (Westmore), Caspian Lake (Greensboro), Lowell Lake (Londonderry) and Spring Lake (Shrewsbury). In addition, more than 25 river watershed associations are active in Vermont. Please contact Susan Warren at the Lakes and Ponds Section if you are interested in learning more about the activities of the groups in your area or around Vermont.

The "Citizens Watershed Survey" is being updated this winter based on the experiences of the Lake Parker Association and of Ethan Swift of VTDEC and Lake Willoughby. The revised instructions will include suggestions on a "one-day" survey method, as well as improved comprehensive survey methods. The survey method involves observing conditions in the lake as well as documenting shoreland land uses and those further uphill from the lake. Lake association are usually familiar with existing conditions, but documenting observations is great way to get a dialogue started that can lead to meaningful lake protection.

Please contact Susan if you are interested in receiving a copy of the updated version. In addition, Susan will be available during the summer of 1999 to help lake residents get started on investigating a watershed, whether a "one day" survey or a longer-term project is contemplated.



A watershed is the area of land which sheds its water to a common body of water.

Happenings

10th Annual New England Regional Nonpoint Source Meeting Advanced Announcement

In May 1999, the Vermont Department of Environmental Conservation along with the New England Interstate Water Pollution Control Commission will host the 10th Annual Nonpoint Source (NPS) meeting. The meeting will target interstate and inter-program coordination related to NPS issues. NPS personnel from each of the six New England states will attend as well as personnel from the states of New York and New Jersey, and the US EPA. Public participation and attendance

is welcome.

The location for the three-day meeting has not been determined but it is likely the meeting will occur in the eastern part of Vermont. The agenda will be structured to include a mix of technical presentations on control techniques, updates on funding, roundtable discussions, and field trips.

For more details on the Annual Regional NPS Meeting call the Planning Section at (802) 241-3770.

Vermont To Host NEAEB in 1999!

The New England Environmental Association of Environmental Biologists Annual Conference will be hosted and held March 10-12, 1999 in Vermont. NEAEB brings environmental biologists together to share with each other and the public current research topics, monitoring meth-

ods, community-based educational outreach initiatives, and other exciting topics. Come join us for what will surely be a worthwhile learning opportunity, not to mention a fun time! Since plans are currently being put in place, please call Neil Kamman at the Lakes and Ponds Section for updated conference details (802-241-3777).

Project WET Workshops

March 1999 – Watershed Workshop (how land uses affect the water quality of a local watershed)

April 1999 – Wetlands Workshop (what are wetlands and why they are important)

May 7- 8, 1999 – Facilitator Training and Refresher Workshop held at the Farm and Wilderness Outdoor Education Center in Plymouth, VT. This special overnight training will

certify those interested in becoming Project WET Facilitators and offer new inspiration to current facilitators. This workshop is being funded through an Environmental Education and Training Partnership grant, which will cover the costs for all participants. Vermont Project WET Facilitators are the only ones certified and compensated to train others in the use of all Project WET materials. Call Amy Picotte, at the Lakes and Ponds Section (802-241-3777) for workshop dates and locations.

6th Annual New England Lakes Conference Advanced Announcement

June 18-20, 1999 held in Auburn, Maine and sponsored by the New England Chapter of the North

American Lake Management Society. Call the Lakes and Ponds Section for more details.

Recently Made Available

◆ **Vermont Invasive Exotic Plant Fact Sheets** – a new guide to the 36 exotic aquatic and terrestrial plant species to watch out for, including illustrations (VTDEC, VT Fish and Wildlife, and the Nature Conservancy, 1998).

◆ **Vermont LakeFEST Planning Handbook** – a comprehensive resource guide for planning a local water celebration and information on how to participate in the annual, statewide LakeFEST event.

Education for Sustainability Project What's This All About

If you have ever tried to look at our culture through a lens that viewed only the sustainable aspects, not a lot would be seen, but a lot would be learned.

The Vermont Agency of Natural Resources has partnered with the Vermont Departments of Agriculture, Education, and Public Service, the University of Vermont, SWEEP (StateWide Environmental Education Programs), and AITC (Ag in the Classroom) to review the new Vermont Educational Framework for Standards and Learning Opportunities for concepts of sustainability. These partners, wearing the lens that screens for sustainability notions, is looking at whether or not the new Vermont educational standards (an educational standard is a learning target for what all students are expected to achieve) teach about preserving and protecting Vermont for future generations to come. The group is asking if the educational standards need strengthening in terms of the concepts of sustainability and if so, is charged with the task.

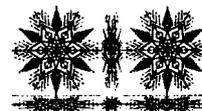
What is sustainability anyway? It's a new-fangled term for a long-standing Vermont tradition: working to meet the needs of the present while not compromising the needs of future generations. The partners of the Education for Sustainability project hope to strengthen students' understanding of citizenship and responsibility toward "the commons" - those resources we have in common including our environment, economy, and human resources.

The people who embody the principles of sustainability are the likely ones, for example, who will lead us to practice sustainable development and find solutions to sprawl, which currently poses the greatest threat to Vermont's landscape, economy, and culture.

If you would like to get involved or find out more about the Education for Sustainability project, please call Amy Picotte at the Lakes and Ponds Section (802) 241-3777.



Wishing You A Happy Winter



**Vermont Agency of Natural Resources
Department of Environmental Conservation
Water Quality Division
Lakes and Ponds Section
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