Out of the Blue

A Newsletter of the
Water Quality Division

Winter 2010 No. 36

Vermont Agency of Natural Resources
Department of Environmental

Down Pours or Soft Drizzles, It's Still Acid Rain

In 1980, Vermont was one of the first states to start monitoring lakes and rivers for impacts from acid rain. The extensive findings of this effort led to the acid rain controls mandated in the 1990 U.S. Clean Air Act Amendments. However, just as the environmental benefits from stronger U.S. air quality legislation begin to take hold, now international acid deposition is recognized as one of the most serious pollution threats to biodiversity on the planet.

Acid rain occurs when sulfur dioxide (SO_2), and nitrogen oxides (NOx) are emitted into the atmosphere from burning fossil fuels. These pollutants combine with water and oxidants, like ozone (O_3), to become sulfuric and nitric acid. Even though Vermont emits the lowest amount of acid precipitation causing pollutants in the nation, emissions from midwestern states as well as from New York blow eastward and affect the chemistry and biology of Vermont lakes, streams, and uplands.

The most obvious environmental effect of acid rain is the loss of fish in acid sensitive lakes and streams. These waterbodies have little or no buffering capacity and can not neutralize acids because of the type of their underlying bedrock. Acid sensitive lakes are found in watersheds with granite bedrock because granite lacks the ions to bond with acids and neutralize the affects of acid rain.

Vermont lakes that are most sensitive to acid rain are often small, at high elevation, and located in areas with low buffering bedrock, such as those found in remote and undeveloped regions of the southern Green Mountains and in small pockets of the Northeast Kingdom. Most lakes in Vermont have adequate buffering bedrock like limestone, which means acid-neutralizing ions are present to neutralize the acid rain. Many lakes in the Adirondack area of upper New York state are underlain with granite

See page 3, "Acid Rain"

The Vermont Lay Monitoring Program - *Volunteers Essential for Safe-Guarding Lakes*

Truth be told, preserving Vermont lakes depends mostly on volunteers, or many Paul Reveres. Lay Monitors have played an essential role for 31 years in collecting weekly water quality samples that track lake nutrient enrichment; data that otherwise would have gone undocumented. For most of the 90 plus lakes

See page 4, "Lay Monitors"

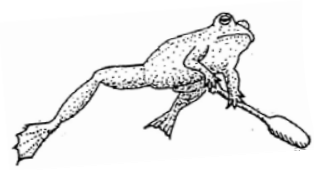
"Paul Revere earned his living as a silversmith. But what do we remember him for? His volunteer work."

– Susan J. Ellis

George and Patricia Wilcox
Island Pond Lay Monitors for 24 Years!

In This Issue

"Out of the Blue"



Available on the Web

Check out in color the newsletter issues on the Water Quality Division

Out of the Blue

is produced semi-annually by the Lakes and Ponds Section. Our purpose is to share information on lake, river, and wetland environments, water quality and state activities through articles on aquatic 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, please contact:

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Cleaning Up Lake Champlain

Nearly 50 percent of Vermont drains to Lake Champlain, which means that phosphorus gets washed into Lake Champlain from many sources, including farms, eroding stream banks, construction sites and gravel roads. Even small increases of this nutrient in the lake can lead to big algal blooms. As part of revising the 2002 plan that addresses phosphorus run-off to Lake Champlain, in 2009, the Vermont Agency of Natural Resources held several public events soliciting input. Feed back gathered from the public forums was used to rank the top five threats to Lake Champlain's water quality. Additionally, more than 1000 suggested actions were grouped into three broad solution strategy categories, and the top ten next steps were identified. The complete Revised Implementation Plan - Lake Champlain Phosphorus TMDL is available on the Clean and Clear Program's web site at: www.anr.state.vt.us/cleanandclear/. Below is a summary of the revised plan.

Five Highest Ranking Threats to Lake Champlain's Water Quality
Discharges from farmsteads & agricultural production areas
Poorly managed cropland
Land conversion
Road construction and/or maintenance
Untreated/unmanaged runoff from existing development

The three categories of strategies to improve water quality in Lake Champlain are:

1. Current Actions - All current programs and projects, with existing funding and that continue to be needed.
2. Next Steps - Programs and projects that do not currently exist, but that are necessary and timely when additional resources become available.
3. Future Measures - In this category, all programs and projects that may be necessary at some future time (e.g., regulatory measures to replace voluntary programs, programs with high cost per pound of phosphorus removed) depending on the efficacy of Current Actions and Next Steps were grouped here. The role of future measures will be periodically re-evaluated as implementation progresses.

Implementation of these strategies will employ one or more of the following policy tools:

- Expanded Regulatory Requirements. Specific steps would be provided that must be taken to control pollution.
- Financial Incentives. Funding eligibility and subsidies to control pollution would be linked to specific actions.
- Technical Assistance. Sharing information regarding the water quality impacts of current or planned actions and suggesting techniques to reduce impacts plays an essential role in Lake Champlain's management.

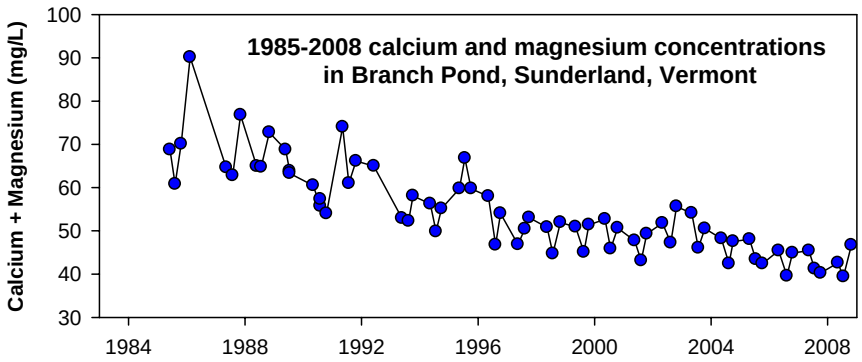
(continued from page 1) Acid Rain

and have suffered severe aquatic life loss because of acid rain.

Long-term results from the volunteer Vermont Acid Precipitation Monitoring Program show trends of decreased acidity or improved pH as a result of the federal air pollution control regulations. With the passage of the Clean Air Act, SO_2 levels have been reduced, but there have been no significant trends observed for NOx, which probably means it is too early to detect any decreased levels.

However, these favorable trends may be too late for the handful of the most acid sensitive lakes in Vermont, which have had their reservoirs of calcium and magnesium depleted by now in the struggle to neutralize acids. As the SO_2 emissions have declined, so too have the calcium and magnesium ions. Calcium and magnesium ions not only neutralize the deposition of SO_2 and NO_X, preventing acidification, but once mobilized from the soil, are available as essential nutrients for all living things. Calcium loss can be detrimental to the shell development of crustaceans and mollusks as well as to the ability of fish to respond to changes in water temperature and alkalinity. Subsequently, for lakes like Branch Pond in Sunderland, the significant reduction in these beneficial nutrients may prevent biological recovery.

The good news is that the majority of Vermont's 37 acid-impaired lakes have the potential to recover. Through Vermont's 29 year commitment to acid lake monitoring, the northeast, including Canada, has every reason to be optimistic that water quality in the region can improve with further reductions in air pollution.



pH Scale

13.8 Lye

7.5 Seawater

7.0 neutral

5.6 is normal rain, precipitation below this is considered "acid."
In Vermont, 94% of all storm events are less than 5.6 pH.
4.7 is Vermont's average precipitation.

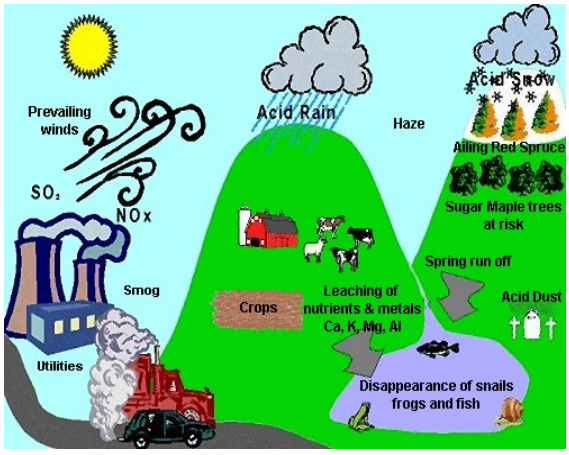
0.3 Battery acid

The acidity of rain is measured by a "pH" scale ranging from 0-14 with 0 being the most acidic and 14 the most alkaline.

1990 Clean Air Act Amendments

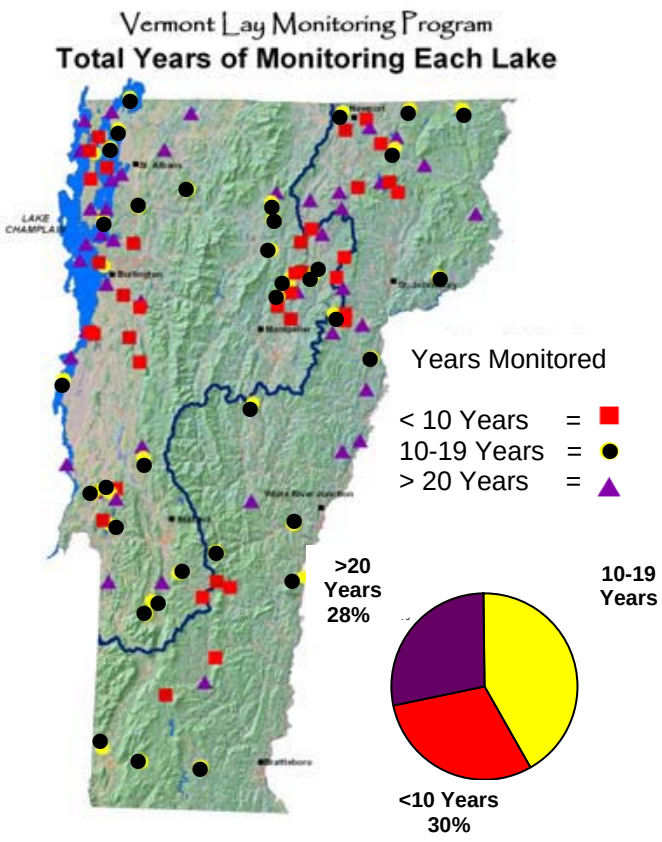
The Amendments specifically address the sources of and solutions for acid precipitation

Title IV of the Amendments required sulfur dioxide (SO_2) emissions to be cut 10 million tons below 1980 levels by the year 2000. These reductions were implemented in two phases. Phase I, effective January 1, 1995, required the largest fossil-fuel fired plants to reduce emissions. In addition, nitrogen oxide emissions were to be reduced by two million tons. Phase II, effective in the year 2000, includes the smaller fossil-fuel plants and the large coal-burning power plants. In 2007, by threat of litigation, American Electric Power agreed to reduce nitrogen oxide emissions that cause acid rain by 69 percent and SO_2 emissions by 79 percent by 2016. This will be accomplished by installing scrubber systems and other pollution controls at 46 coal-fired operations in 16 plants largely in Ohio, Indiana, Virginia and West Virginia.



Sources of acid rain

(continued from page 1) ## Lay Monitors



Since 1979, Lay Monitors have sampled 90 inland lakes and 40 stations on Lake Champlain. Volunteers have monitored 79 (50%) of Vermont's 158 lakes greater than 50 acres.

sampled, the water quality trends are favorable. However, in recent years, higher concentrations of phosphorus are being reported.

The nutrient, phosphorus, comes from many sources in the watershed, including erosion and nutrient run-off from farms, logging, gravel roads, and new and existing development. It takes volunteers in the lake community to help identify these sources and then plan for how to address them.

More than likely, the control of phosphorus run-off will depend on the voluntary actions of landowners. For example, a lake's natural line of defense against polluted run-off is its vegetated shores, which in many cases have been dismembered –literally, limb by limb. There are no statewide regulations on Vermont lakeshores, which means either a town adopts a lakeshore buffer by-law or leaving vegetation growing along a shore is entirely up to the landowner. Not only does a vegetated shore prevent against erosion and filter out phosphorus run-off, it enhances habitat both in the lake and on shore. Protection of lake shores counts on property owners implementing good property management practices.

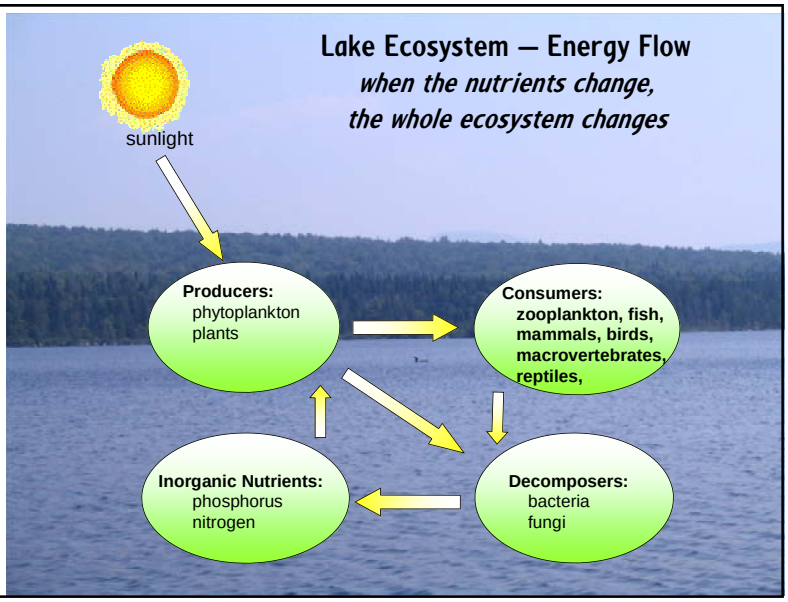
Lay Monitors do more than monitor, they provide a communication network between lake scientists and lake communities. They help inform their lake associations and neighbors about protecting shoreland habitat, and thereby the water quality. They also help prevent against the spread of invasive species, keep track of wildlife, and most importantly they demonstrate their love of their lake by getting involved in its care. Healthy lakes depend on volunteers.

Lay Monitors collect summer weekly samples for:

- Total Phosphorus,
- Chlorophyll-a, and
- Secchi Water clarity.

Unnaturally high levels of phosphorus can lead to excessive aquatic plant and algae growth, which causes lower water clarity as well as other lake ecosystem changes.

Poorly planned land use activities along a lake shore and in the watershed can accelerate the amount of phosphorus entering a lake. Monitoring alerts us to any unnatural changes in the nutrient levels of a lake and can lead to actions to control nutrient run-off from the land.

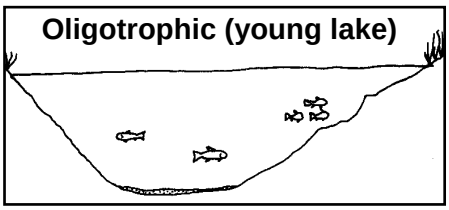


The Lay Monitoring Program results are used to evaluate the lake in several ways, a few of which are shown on this page.

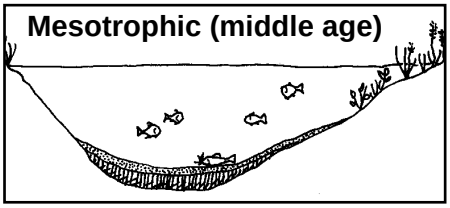
Long-term summer means are interpreted:

- To determine each lake's natural trophic state
- To detect changes in a lake's water quality
- To inform lake users of specific lake conditions
- To prioritize watershed projects
- To help keep lakes ecologically healthy

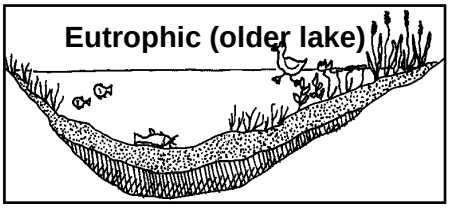
Lake Trophic State



- deep, clear water
- low nutrient enrichment
- little algae growth (low productivity)
- few aquatic plants
- bare sand or rock along most of shore
- often supporting coldwater fish species



- moderate nutrient enrichment
- moderate algae growth
- moderate aquatic plant growth
- some sediment accumulation on bottom
- usually supports warmwater fish species

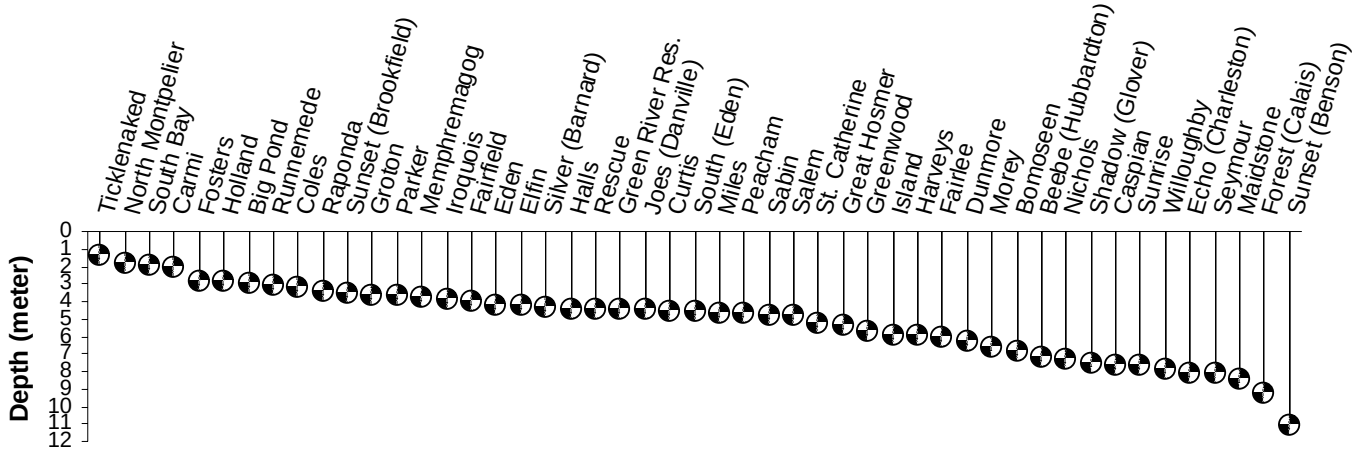


- high nutrient enrichment
- much algae growth (high productivity)
- extensive aquatic plant beds
- much sediment accumulation on bottom
- only warmwater fish species

TROPHIC STATE	SECCHI CLARITY	CHLOROPHYLL-A CONCENTRATION	TOTAL PHOSPHORUS CONCENTRATION
Eutrophic	Less than 3 meters	More than 7.0 ug/l	More than 14.0 ug/l
Mesotrophic	3 – 5.5 meters	3.5 – 7.0 ug/l	7.0 – 14.0 ug/l
Oligotrophic	More than 5.5 meters	Less than 3.5 ug/l	Less than 7.0 ug/l

Comparison of Lake Clarity for Lay Monitoring Lakes

This comparison of water clarity averages provides a perspective on the range of water quality conditions that exist in Vermont lakes. A water clarity reading of eight meters versus, say, three meters does not indicate better water quality conditions. A lake's water quality conditions are assessed by the statistical long-term trend analysis. Any lake showing change from its natural range of conditions, such as a deteriorating enrichment trend, is a lake that needs attention. A lake is considered stable and in good shape when there is no change in its natural range of conditions.



LMP Long Term Mean for Secchi Water Clarity - Inland lakes

What's The Plan?

To Curb Nonpoint Source Pollution

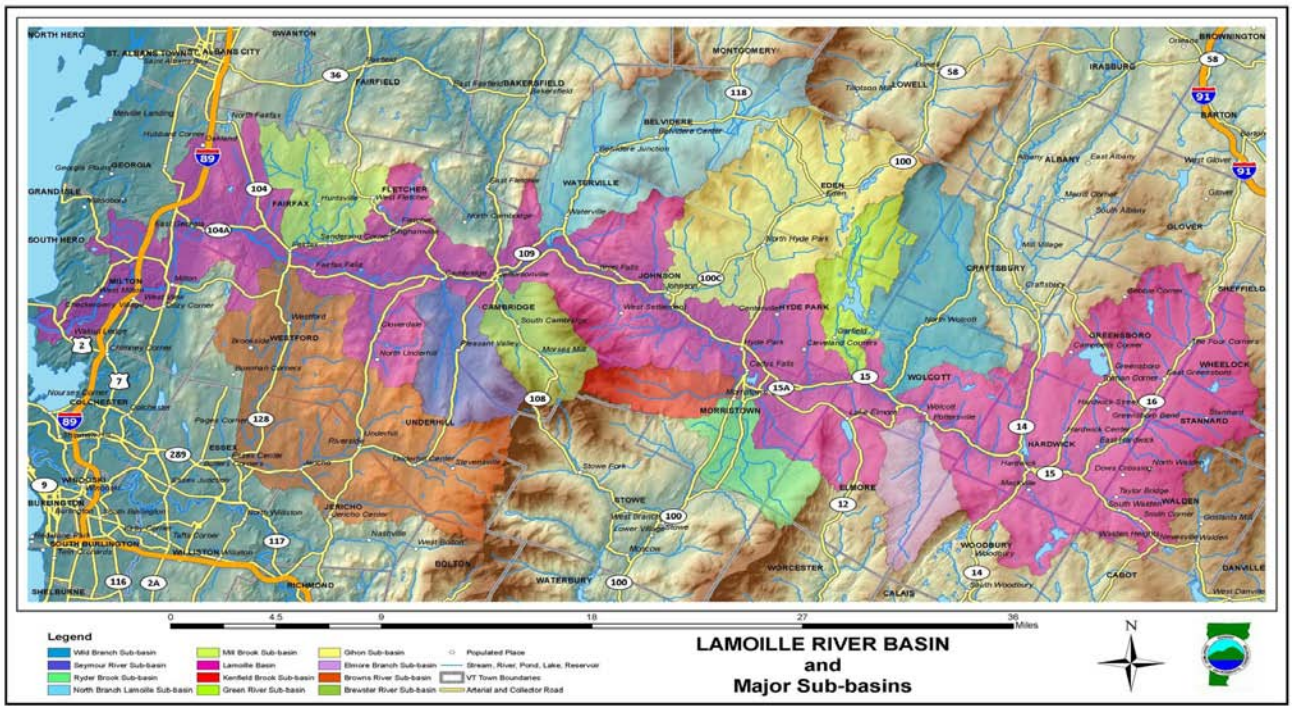
Synonymous with the word "plan" is sketch, map, graph, diagram, table, chart, prepare and arrange, all of which have been included in two recently drafted Vermont Agency of Natural Resources water quality "planning" documents. Management plans have been written for water quality in the Lamoille River watershed and within the northern Lake Champlain small, direct stream and river drainages. These plans mainly focus on the threats from and solutions to nonpoint source pollution to wetlands, lakes and rivers.

The plans integrate scientific monitoring and assessment data as well as input from watershed residents, local community and non-profit organizations, municipalities, and the federal government. In addition to stating the management objectives for the waters in each basin, compiled in the plans is the information used that resulted in the suggested course of actions. Each plan contains the following.

- A current assessment of water conditions.
- A description of the water resources, including recreation, natural communities, and fisheries.
- The management goals for waters in each basin. This section identifies the existing uses, such as swimming, fishing, and boating areas, to be reviewed before issuing an environmental permit that could affect them.
- A list of waters grouped by categories of impact such as from aquatic invasive species, water flow, or pollution.
- Water quality issues and improvement strategies.
- Project ideas for groups, including potential grant programs and partners to complete improvement strategies. (The plan itself can be used in support of grant applications).
- Work the Agency of Natural Resources has committed to by itself or with partners to address water quality problems in specific waters.

Although these plans have just been released, the Agency's Water Quality Division and its watershed partners have already begun implementation of many of the recommendations. Examples of these projects include: river corridor protection; reducing erosion from gravel roads; replacing undersized stream crossings; improving fish passage; addressing stormwater runoff; protecting swimming holes; planting riparian buffers; restoring wetlands; reducing erosion from logging operations; and removing flood plain encroachments.

These management plans as well as information about watershed planning in the other 15 major Vermont watersheds are available on the Water Quality Division website at: www.vtwaterquality.org. Or, contact the Watershed Coordinators, Karen Bates (Chittenden County – Lake Champlain) at Karen.Bates@state.vt.us, 802-879-2339; or Jim Ryan (Lamoille County) at Jim.Ryan@state.vt.us, 802- 476-0132.



What's a Buffer?

A buffer is a vegetated width of land between the water's edge of a lake, stream or wetland, and human land uses. A healthy buffer contains multiple layers of vegetation. Buffer zones have numerous values. These areas can filter out pollutants, stabilize shorelands, provide a protected corridor for wildlife to access the water, as well as shade the water's edge, keeping the water temperature cooled. A wooded shore provides terrestrial habitat for the myriad of bird and mammal species that live or feed near water.

Vegetative Buffers For Northeast Kingdom Lakes

Vermont lakes rely on people, partnerships and programs to protect them. Vermont is a small state and collaboration among many can often bring about the best results, especially when it comes to re-establishing native trees and shrubs along lake shores.

During the summer of 2009, the Essex and Caledonia County Natural Resources Conservation Districts introduced the Northeast Kingdom Lakeshore Buffering Program. After successful plantings on Lake Memphremagog, Seymour Lake, Lake Willoughby, Lake Parker, Salem Lake, Norton Pond, Island Pond and Miles Pond, the Conservation Districts will offer this service again to landowners in 2010.

The transformation of lakeshores from forested and wetland cover to lawns and sandy beaches, accompanied by residential development is a major stressor to lake habitat. Additionally, with shorelands cleared of vegetation, nutrients from lawn fertilizers, dirt road sediments, and eroding shores wash into the lake.

Living With Buffers

Nutrient loading (primarily phosphorus), caused from people's actions along the shore, often leads to excessive plant and algae growth in the lake. Native shrubs, trees, and herbaceous shoreland plants are a lake's first line of defense in preventing nutrient loading. Most shores can be easily replanted, which is a critical step to ensuring long-term health for a lake.

The Northeast Kingdom Lakeshore Buffering Program minimizes the causes and effects of nutrient loading by re-planting lake shores. This project also teaches landowners about beneficial shoreland practices. Furthermore, the program offers a valuable opportunity to plant native shrub and tree species on property in either Essex or Orleans Counties.

For more information, contact Tamara Colten at the Essex District office at 802-748-3885 ext. 114 or email tamara.colten@vt.nacdnet.net.

HIGHLIGHTS

Aquatic Invasive Species

Variable-Leaved Watermilfoil.

A Water Quality Division staff member discovered a substantial population in Lake Champlain's Missisquoi Bay in August 2009, during a routine water chestnut search. This brings the number of known infestations of this invasive aquatic plant to two – Halls Lake in Newbury has been coping with the first infestation in the state since fall 2008 (for more info on this infestation see the May 2009 OOB issue). The population in Missisquoi Bay is so extensive that management is considered impractical – efforts in 2010 will focus on preventing spread to other waters of the state. The WQD hopes to secure funds to support a boat access greeter for boat launch areas in the vicinity, to educate boaters and provide courtesy boat inspections. A Vermont Invasive Patrollers workshop to train volunteers to recognize this and other invasive species is also planned for the area.

New invasive species law!

In June 2009 the Vermont legislature passed, and Governor Douglas signed into law, an Act Relating to Aquatic Nuisance Control (Act 46). Important highlights of the new statute include revisions to the AIS transport law making transport of ALL aquatic plants between waters illegal, and a new mechanism for streamlining the permit process to facilitate rapid responses to infestations of new species.

2010 Grant-in-Aid Grant Applications Available for Aquatic Nuisance Species.

Applications and specific grant program information are available online at http://www.anr.state.vt.us/dec/waterq/grants.htm All types of aquatic nuisance control projects, for both native and non-native species management, are eligible for funds under this Program which is available to municipalities. Projects supported to date by this program include the control of Eurasian watermilfoil, purple loosestrife and nuisance native aquatic plants, and aquatic nuisance species spread prevention programs like VIPs or public access greeters. Applications are due **Wednesday, March 3, 2010.**

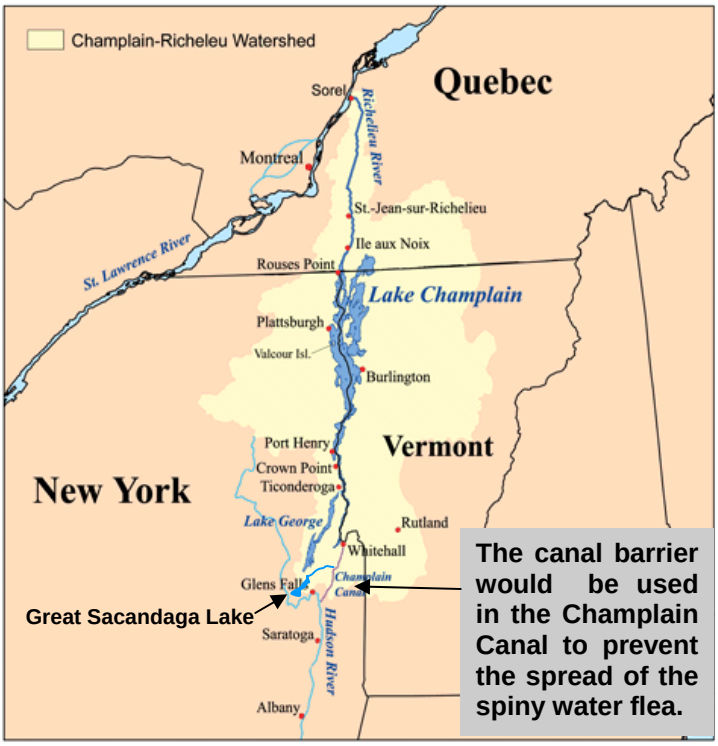
Water Chestnut.

Water chestnut management is looking for a rebound from the drastic federal funding reductions in 2009. However no ground was lost in the battle to reduce populations in Lake Champlain and in other waterbodies around the state. One time federal funding for aquatic invasive species work on Lake Champlain through the efforts of Senator Patrick Leahy may shore up the program in 2010.

Water Chestnut Harvester working on Lake Champlain

Lake Champlain Canal Barrier Funding.

With the help of Senator Patrick Leahy, the Lake Champlain Basin Program and the U.S. Fish and Wildlife Service have received funding to develop a preliminary design for a canal barrier to prevent the spread of the **spiny water flea** into Lake Champlain. This tiny invasive crustacean was discovered in New York's Great Sacandaga Lake, on the edge of the Lake Champlain watershed, in Oct 2008.



The outlet of Great Sacandaga Lake is connected to the feeder canal for the Champlain Canal, which could carry this unwanted invader into Lake Champlain. A canal barrier would eliminate one potential avenue by which the spiny water flea could enter the lake. In the meantime, an equally important spread prevention outreach campaign is underway in NY to encourage recreationists to take precautions to prevent the spread of "hitchhiking" water fleas on fishing gear, or in bilge water, bait buckets, or livewells.

Vermont Invasive Patrollers (VIPs) Early Detection Network still growing!

Five basic and one advanced VIP training workshops were held around the state during summer 2009 with a total of 52 participants. Approximately 300 people have now completed the training program since its inception in 2007, and more than 40 of those have become Certified VIPs, making the commitment to survey their waterbody twice each summer and submit data sheets to DEC. You can be a VIP too! Learn to recognize invasive species and distinguish them from our many lake-friendly native aquatic plants and animals. For more information, visit us online at www.vtwaterquality.org, follow the links for Lakes and Ponds section and Vermont Invasive Patrollers, email leslie.matthews@state.vt.us, or call 802- 241-3777.

A Day In A Wetland – Lockwood Pond Wetland

State Wetland Scientists have completed 79 wetland assessments in the last four years. These assessments provide a better understanding of the condition of wetlands statewide and establish water quality and habitat indicators to track the long-term condition of wetlands. Water, vegetation, soil, and macroinvertebrate data are collected, as well as photographs and notes taken of common, unique, or unusual features while exploring the entire wetland. In assessing Lockwood Pond Wetland in 2009, some surprising natural and unnatural things were found.

Newly hatched odonate, commonly known as a dragon fly

"While exploring the area we found a floating island."

Lookwood Pond Wetland was assessed as a high quality wetland with fen and shallow emergent marsh characteristics and will be used as a "reference wetland" to compare other wetlands to with similar features. However, some things discovered at this wetland won't necessarily be found in other similar types of wetlands.

"I never know what we might find as we head out to a new wetland site."

Lockwood Pond Wetland was assessed thanks to access permission granted by the Green Mountain Club. At this site, permission to cross over private land didn't exactly make the hike into the wetland any easier. Lockwood Pond Wetland is situated almost atop the Northern Green Mountains in a small basin just below Tillitson Mountain and two other unnamed peaks in Lowell. At 2,608 feet in elevation and 1.47 acres in size, this wetland is the headwater site for Lockwood Brook which flows into Burgess Branch, a tributary to the West Branch of the Missisquoi River in the Lake Champlain Basin. The wetland is fed by precipitation, groundwater, and intermittent surface run-off from the higher peaks. A mature softwood forest of balsam fir (*Abies balsamea*) and red spruce (*Picea rubens*) surround the wetland.

To the north, along a small tributary to the wetland, the uncommon, small floating mannagrass (*Glyceria borealis*) was growing among the wetland sedges, grasses and herbs. *A* unique floating peat island, about three meters in diameter, surfaced in the wetland's beaver pond. This little island was covered with grasses, bog bean (*Menyanthes trifoliata*), and pale St. Johnswort (*Hypericum ellipticum*) and quaked from the weight and pressure of exploring hands.

Dragonfly larval cases were noted, clinging to long slender green leaves, as was a newly hatched dragonfly with its wings still tight to its opalescent body. Nearby, lay an old stump, recently torn to shreds. And, yes, close to the stump rested a large, fresh pile of scat filled with berry seeds! Wetlands are great places for bears to forage and serve as corridors between wet areas and uplands. But, just a little ways from the stump, something out of place suddenly stood out. A small plane!

Dominant Vegetation
of Lockwood Pond Wetland in Lowell, Vermont

- tussock sedge (*Carex stricta*),
- star sedge (*Carex echinata*),
- Northwest Territory sedge (*Carex utriculata*),
- rattlesnake mannagrass (*Glyceria canadensis*),
- bluejoint (*Calamagrostis canadensis*), and
- Sphagnum moss (found covering the western end of the site).

Bog Bean (*Menyanthes trifoliata*)

Watershed Grants Go To Work Locally

OK, so you know about Vermont's conservation license plate that now sports the catamount image. Did you also know that money from the sale of these plates supports not only the Nongame Wildlife Fund, but also the Watershed Grant Fund? The Watershed Fund has been quietly chugging along now since 1998 and has provided $786,000 to fund 255 projects, most at just a few thousand dollars. It's the big little fund that gets a lot done.

The watershed grants leverage other funding and pay for projects that involve local volunteer work and student projects. Yes, the bang-for-the-buck is high, but even better is the way these projects teach and build a conservation ethic.

So who gets the money and what are some of these projects? Funds go to town or regional governmental agencies, nonprofit organizations, and citizen groups to do a wide variety of projects related to the conservation and enjoyment of our water resources. A few examples are streambank plantings; establishing a native plant nursery; developing wetland educational programs for children; fish passage improvements at stream barriers; lake water quality sampling; and watershed planning.

The Departments of Environmental Conservation and Fish and Wildlife co-administer the program. This year, 56 applications were received, and funding decisions will be made soon for the 2010 field season.

Continued... ## A Day In A Wetland

"I was so busy looking at bear signs, that at first I missed the presence of such an odd occurrence."

Only slightly emerged from a comfortable mossy bed was the crushed metal of fuselage.

Fuselage remains from a small plane crash

Bear scat

One can only speculate as to how the plane found its way to Lookwood Pond Wetland and to the fate of the unfortunate pilot and crew.

Wetlands are not only critical for the health of Vermont waters and the creatures who depend on them for breeding, nesting, and feeding, but they are clandestine communities harboring special treasures and tales. Wetland assessment work will continue to document these diverse communities and hopefully bring improved protection for these riches of our landscape.

Danielle Owczarski is quoted in this article about her day in Lockwood Pond Wetland.

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Recent News

National Lake Survey

The findings from the first national effort to assess the nation's lakes with consistent and similar methods are now available on the Water Quality Division web site. This study will help with national and Vermont lake management decisions. It also brings national attention and awareness to lakes, and possible increased funding opportunities for research and science in lake monitoring and protection. **www.vtwaterquality.org**

Stormwater

Check out the Chittenden County Regional Stormwater Education Program with interactive web page features and excellent fun fact sheets about protecting residential wells from pet waste and automobile oil contamination, and many other topics. They also have information on rain gardens and rain barrels for controlling excessive stormwater. Their resources are relevant to urban and rural communities. To help keep water running clean, visit them at: **www.smartwaterways.org**

The Federation of Vermont Lakes and Ponds

The Federation of Vermont Lakes and Ponds is working on a plan to strengthen outreach efforts to shoreland property owners. FOVLAP is launching a campaign to encourage lake property owners to establish vegetated buffer strips to reduce lake pollution and improve water quality. Volunteer committees from FOVLAP are working with professional marketing consultants and the Water Quality Division's Lakes and Ponds Section on this project. Anyone interested in this effort should contact Perry Thomas, President of FOVLAP, at epethomas@gmail.com. For more information, visit FOVLAP at: **www.vermontlakes.org/**

Save the Date!

- **Vermont Lake Seminar**
- **Friday, June 5th**
- **Hubbardton** (Kehoe Center at Lake Bomoseen)