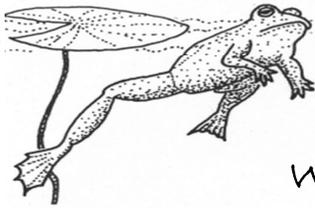
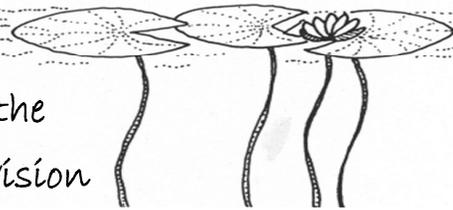


# Out of the Blue



A Newsletter of the  
Water Quality Division



Summer/Fall 2008 No. 34

Vermont Agency of Natural Resources  
Department of Environmental Conservation

## Volunteers Monitor Vermont Lakes for 30 Years!

The Clean Water Act was passed by the United States Congress in 1972, largely due to citizens' pressure to clean up the nation's waters. The ripple effects from this federal legislation helped inspire the creation of Vermont's volunteer lake monitoring program. In 1979, 30 years ago, the Vermont Lay Monitoring Program started.

The Vermont Lay Monitoring Program is a cooperative effort between the Vermont Department of Environmental Conservation and volunteers. The principal objectives are to collect water quality data in terms of nutrient enrichment; to establish a water quality database on each participating lake; and to involve citizens in lake protection.

Every week during June, July and August, more than 85 volunteers sample their favorite water body. Currently, 55 inland lakes and 17 stations on Lake Champlain are sampled for total phosphorus (a nutrient of concern), chlorophyll-a (the green pigment in plants and algae) and Secchi water clarity.

## Turtle Happiness Means Logs in Lakes

Happiness for turtles includes lots of submerged logs in lakes and rivers. Throughout their range from northern Mexico to southern Canada, painted turtles, *Chrysemys picta*, spend time sitting on logs. Painted turtles are relatively common in Vermont, however, in some areas they are threatened by the alteration of freshwater habitats, mainly through the removal of woody material and the disturbance of good nesting sites.

At times, as many as 50 painted turtles can be seen on a partially submerged log. Emergent logs provide an excellent site for turtles to bask in the sun, a crucial time for these turtles. Sunning helps them dry their shells, get rid of parasitic leeches, absorb calcium from food, and control their body temperature.

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With several years of data, these parameters answer the question of how fast, if at all, a lake is aging or changing because of increased nutrient enrichment over time.

Statistical analysis of the long-term lay monitoring data shows that the majority of lakes have good water quality trends. In other words, most lakes show a trend of stable water quality conditions for the last 30 years. However, the data also reveals declining water quality conditions in several

See page 3, "Volunteer Lake Monitors"

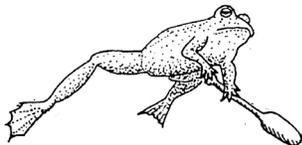


Like all reptiles, the painted turtle is cold-blooded, which means the climate regulates their body temperature, unlike mammals and birds which regulate their body temperature by internal metabolism.

Removing woody debris from the lakeshore forces turtles to bask atop riprap or seawalls and exposes them to predators, like

See page 2, "Turtles and Logs"

**"Out of the Blue"  
Available on the Web**



*Check out in color the newsletter issues on  
the Water Quality Division  
Web Page at  
[www.vtwaterquality.org](http://www.vtwaterquality.org)*

*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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*(continued from page 1)* **Turtles and Logs**

raccoons and foxes. Painted turtles, active during the day, are vigilant and seek refuge in the water at the slightest sign of danger. They can also retract their head and legs into the protection of their shell.

Under water the logs and branches offer hiding places from predators as well as ambush opportunities for the turtle while hunting for food. Many species that turtles feed on also use submerged wood for their habitat. The painted turtle is an omnivore, eating aquatic insects, snails, slugs, crayfish, tadpoles, mussels, small fish, carrion, and aquatic plants.

Upland habitats for turtle nesting are often lost or altered by human development. Slightly moist loamy or sandy soils are preferred for nesting substrate, preferably at a sunny spot near the water. Loss of this habitat forces female turtles to travel long distances to find suitable nesting sites making them more vulnerable to predators and being killed by automobiles while crossing roads. After hatching, the young turtles are exposed to the same threats as their mother as they try to reach the water.

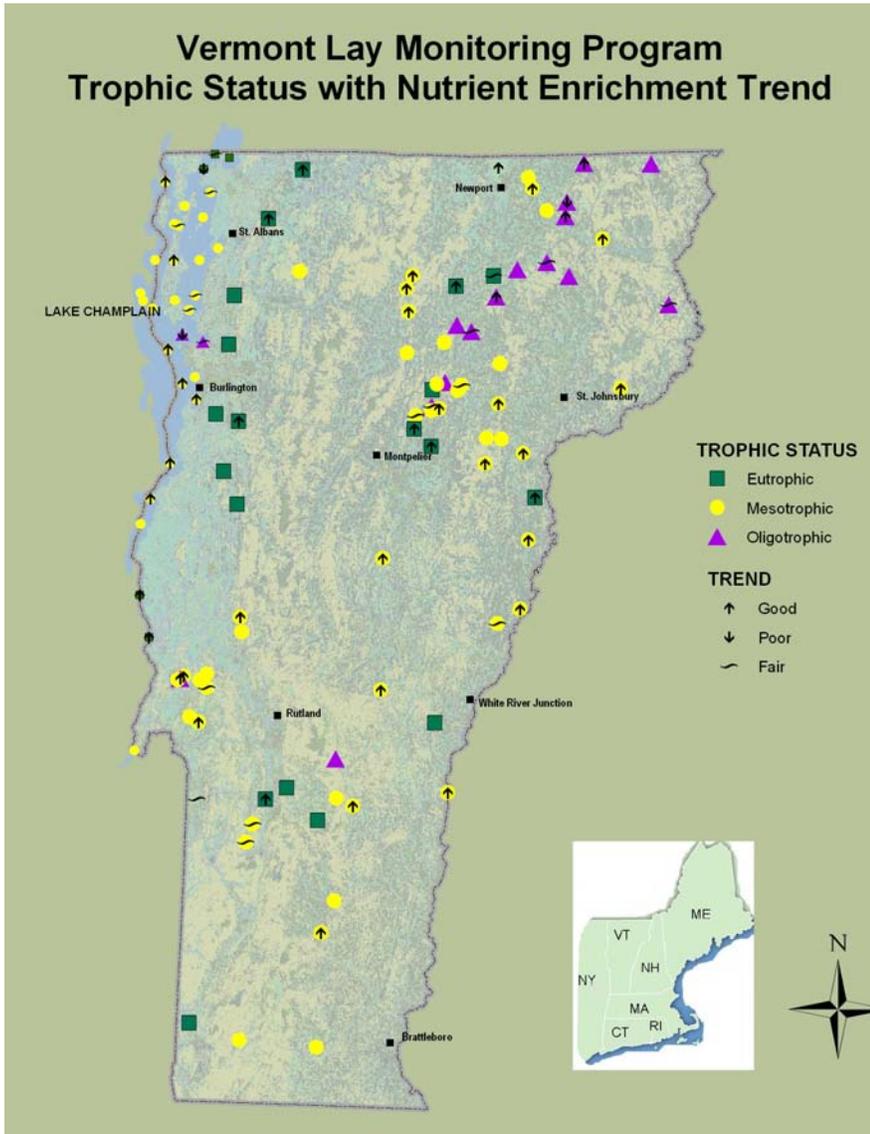
As of today, however, it is well understood why logs in lakes and rivers are so important to turtles. Logs, not only provide a safe site from which turtles can sun themselves and thereby regulate their bodies, but also create essential habitat for all aquatic life.

If a tree falls in the water, it is not necessary to remove it. Fallen trees and branches are valuable additions to aquatic habitat, not just for turtles. Unless it is in the way of your swimming or docking area, consider leaving it in the lake.



Painted turtles are five to seven inches long and can be recognized by their bright colors. Their skin has yellow and red stripes, and two distinctive yellow spots color each side of their neck. Their shell is solid green to black and smooth all over, but flipped over, the plastron (underside of the shell) is bright yellow with an occasional dark blotch. The undersides of the outer part of the shell are very colorful with yellow, red, and green markings.

Vermont lakes. The graphic below shows the current trophic and trend status.



## 30 years of Sampling Adds Up!!

**40,000**  
Secchi Disk Readings

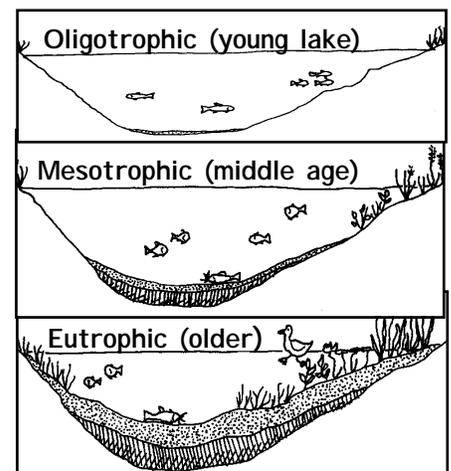
**80,000**  
Hose samples for Phosphorus & Chlorophyll-a



*I cherish everything about the lake — its natural beauty, water clarity and serenity*

Dolores Mobilio—long-time lay monitor at Sunrise Lake, Benson/Orwell, VT

Trophic status represents a stage of eutrophication, or age of a lake in terms of its nutrient load, and is generally divided into three broad states: oligotrophic; mesotrophic; and eutrophic. The nutrient enrichment or eutrophication of a lake is a natural process and occurs over 1000s of years. The trophic status shown for the lakes above have not changed in the 30 years of the Lay Monitoring Program. However, with increased human development in our lake watersheds, there is potential to accelerate a lake's eutrophication process. Most of the lakes monitored under the Lay Monitoring Program show good, stable trends, but a few lakes are showing poor trends, which raise red flags indicating the need for improved lake protection. See page six to read about Lake Seymour and what is being done to reverse an increase in phosphorus concentration.





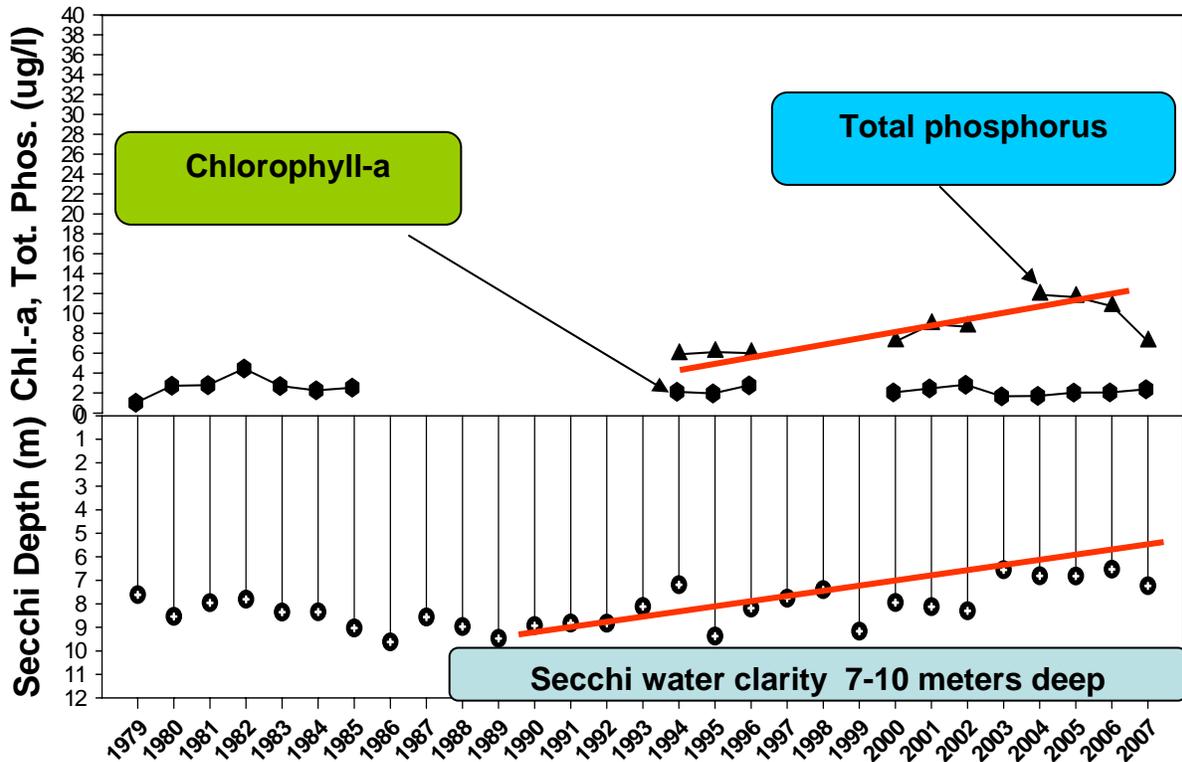
## Paying Attention to Lake Seymour

Seymour Lake has been sampled by volunteers under the Vermont Lay Monitoring Program since 1979. It also has been monitored by the Lakes and Ponds Section through the Lake Assessment Program, Spring Phosphorus Monitoring Program, Aquatic Plant Survey Program, the National Lakes Survey, and is part of the Littoral Habitat Study. During the winter of 2008, Lay monitoring data, graphed below, revealed a statistically significant rise in phosphorus concentration in the lake since 2000. Despite this increase, Sey-

mour is not considered impaired and its conditions are still excellent. However, an increasing trend of total phosphorus concentration above background levels for Seymour is worth paying attention to.

In the winter of 2008, Lakes and Ponds staff met with the Seymour Lake Association to communicate these findings. As a result, summertime meetings and field visits were scheduled to work towards identifying the pollution sources and solutions.

About 50 percent of the shore of Seymour is cleared of native vegetation and lawns extend down to the water. During an in-lake and shoreland survey from boats, Susan Warren, from the Lakes and Ponds Section, explained to lake association members in 2007, that the lack of natural buffer means that most of the runoff from the shoreland development runs directly into the lake. She pointed out some properties with good buffers and practices as examples of a more ideal shoreland development scenario. During this visit, the group observed aquatic plant growth, and in some cases attached algae, in abundance to the point of being inconsistent with Seymour's low-nutrient (oligotrophic) status — another indication that nutrients were on the rise in the lake.



Lake Seymour Lay Monitoring data show statistically higher levels of total phosphorus and lower Secchi water clarity readings. Chlorophyll-a levels show no statistical change over time.

The concern about the increasing suburbanization of lakeshores applies to Seymour Lake as well as many other Vermont lakes. Re-development of old camps is resulting in much larger and in some cases year-round homes that have a much greater impact on the lake in terms of phosphorus and sediment runoff and alterations of the shallow water habitat. This type of development could certainly be a factor in rising phosphorus concentrations.

The Seymour Lake Association has responded energetically and is anxious to tackle the task of phosphorus reduction. To date, the Water Quality Division has assisted them in a number of ways:

- ♦ A volunteer tributary phosphorus and sediment (turbidity) monitoring program is underway to pin point the major sources of phosphorus loading to the lake. All samples are analyzed at the DEC Lab in Waterbury.
- ♦ Summer phosphorus sampling continues under the Lay Monitoring Program.
- ♦ The Department of Agriculture, Food and Markets is now working with watershed farmers to improve water runoff from their farms.
- ♦ A Shoreland Walk in August 2008 was offered by a group of lakeshore owners to point out shoreland practices that are best for the lake. Additionally, guidance on good shoreland management practices was provided for the Association's newsletter.

- ♦ At the request of a Seymour Lake Association Board member who attended the New England Lakes Conference at Lake Morey in June 2008, two posters, one about the affect of shoreland development on lake habitat and water quality, and a second one showing the long-term Lay Monitoring data analysis were provided for display at the lake.
- ♦ Water Quality staff attended the summer Seymour Lake Association meeting to present the data and suggest actions to take.
- ♦ A group of private camp road residents will apply for a grant through the Better Backroads Program to help prevent road erosion near the lake.
- ♦ Seymour Lake is located in the Memphremagog basin where a Water Quality Division facilitated basin planning process is underway. The planning process engages the public to identify nonpoint source issues in their watershed and start implementation projects. Seymour Lake residents are involved in both the new Memphremagog Watershed Association and the Memphremagog Watershed Council.
- ♦ The lake association has been the recipient for many years of Aquatic Nuisance Control Grant funds and operates an excellent access area greeter program and in-lake monitoring for invasive species every summer. Seymour is not known to be infested with an invasive species. An angler found a fragment of Eurasian watermilfoil in the lake in 1999, but no plants have been found in the lake in follow-up surveys since then.



**Seymour Lake -  
"Sampling Assistants" on board with  
Lay Monitor, Tom Emery**

### 2008 Aquatic Pesticide Treatments

Permits were issued for the use of the aquatic herbicide, triclopyr as Renovate OTF and Renovate 3, in spot or partial-lake treatments to control Eurasian watermilfoil in three lakes in 2008.

- ♦ Lake Morey - 50 acres treated with Renovate OTF on May 13, 2008. All water use restrictions were lifted by June 10, 2008.
- ♦ Lake Hortonia - 33 acres treated with Renovate OTF (15 treated with Renovate 3) on May 19, 2008. All water use restrictions, except the restriction for use of the waters for irrigation, were lifted by June 11, 2008.
- ♦ Lake St. Catherine - 86 acres treated with Renovate OTF on May 20, 2008. All water use restrictions were lifted by July 22, 2008.

Experience in Vermont using the aquatic pesticide triclopyr revealed that not only should treatment take place in spring or early summer when watermilfoil is actively growing (as stated on the product label), but unless the plants are within a certain

**Continued on page 6**

## The Amazing Tail of the Four-toed Salamander

Although named the “four-toed salamander,” this wetland dependent species is perhaps best known for its tail. The four-toed salamander, *Hemidactylium scutatum*, grows three to four inches long and divides its time between wetlands in the early spring and forested upland areas the rest of the year.

Adults, living under logs and soil in the forest, are easily recognized by their white belly speckled with black spots, orange-brown back, and a constriction at the base of their tail (which looks like a rubber band was placed there too long). This special tail feature enables the salamander to voluntarily drop its tail. A predator will eat or be distracted by the writhing tail, giving the salamander time to escape.

Salamanders are the only vertebrates which can re-grow lost tails and limbs. Scientists are studying this regenerative ability in the hopes of learning how to do this in humans. A salamander would prefer to keep its tail because it stores fat energy used in times of high energy demand or low food availability. For example, egg laying and brooding use energy reserves, and when depleted, females typically skip years between breeding.

Since salamanders do not vocalize or have eardrums, they rely on other strategies for courtship rituals, including using a “tail-straddle walk.” Mating takes place in the forest during late summer through fall. Pheromones or scents also play a major role in courtship communication among salamanders.

All amphibians need moist locations to lay eggs. Four-toed salamander females migrate from their upland habitat to wetlands after snowmelt on

the first rainy nights with temperatures above 42° F, often in the company of other amphibians, including the spotted salamander, *Ambystoma maculatum*. In some Vermont communities, volunteers or the so called “Salamander Crossing Brigades,” help salamanders cross roads safely during their annual migration.

Female four-toed salamanders lay their eggs underneath thick mossy areas that over hang water and attend them through May and June. Some females lay eggs in groups and only one female will remain with the joint clutch. Larvae hatch in July, wriggling down into the water below the nest. Larvae grow rapidly, absorbing their gills and metamorphosing into tiny adults within three to six weeks.

All amphibians can respire through their skin. As a member of the Plethodontid family, the four-toed salamander is lungless and can only breathe through its skin and mouth lining. The permeable skin and aquatic habits of amphibians make them good indicators of environmental health. Amphibians will readily absorb a pulse of pollutants in water before the chemicals are buffered by soils or taken up by vegetation.

Salamanders are energy efficient. Since they are cold blooded and reflect the temperature of the area around them, they can use all their food energy for growing and reproducing without losing any energy for heating their bodies. The food that salamanders eat is transferred up the food chain to bears, small mammals, birds, snakes, and other amphibians. A healthy population of salamanders helps feed many wildlife species. But, in the case of the four-toed salamander, quite often predators have to settle for just the tail end of a meal.



## (Continued from page 5) Aquatic Pesticide Treatments

height range or growth stage, the treatments will be less effective. An additional benefit to treating earlier in the season is many of the non-target plants (native species) have not started growing. Also, lake residents typically do not start using their camps until Memorial Day and then for a time just on weekends. Therefore, little impact on the use of the waters is felt by the lakes residents.

A month after the treatments, Eurasian water-milfoil plants showed signs of impact and in some

cases had totally collapsed from the water column. In addition, non-target species showed no signs of impact.

Required aquatic plant survey reports are due in the year of treatment and for two consecutive years. The reports chronicle the success of the control of watermilfoil, the longevity of control, changes in the non-target environment, etc., and are publically available from the Lakes and Ponds Section (802-241-3777).

# HIGHLIGHTS

## Aquatic Invasive Species

**Vermont Invasive Patrollers (VIPs) early detection network is growing!** Six Vermont Invasive Patrollers training workshops were held around the state in June and July 2008, with approximately 70 participants. Over 150 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 the Water Quality Division. 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](http://www.vtwaterquality.org) (follow the links for Lakes and Ponds Section and Vermont Invasive Patrollers), email [leslie.matthews@state.vt.us](mailto:leslie.matthews@state.vt.us), or call 802- 241-3777.

**Boat Access Greeter Program Training Workshop:** In May 2008, VTDEC held an Access Area Greeter Program Training Workshop. The all-day workshop was attended by 27 boat access area greeters and program operators. We hope to make this training workshop a regular event in the coming years, and encourage anyone operating or contemplating a greeter program to participate.

**The Aquatic Nuisance Control Grant-in-Aid Program** awarded over \$550,000 in grant funds to municipalities this year to support projects related to the management of aquatic nuisance species. While the majority of the 41 projects target management of Eurasian watermilfoil, other projects include preventing the introduction of aquatic invasive species; education and monitoring of didymo; and control of purple loosestrife, curly-leaf pondweed and nuisance native plants. Funds awarded through this annual grant program represent a portion of Vermont motorboat registration receipts and federal funds from the U.S. Army Corps of Engineers, thanks to Vermont's congressional delegation. For more information, visit [www.vtwaterquality.org](http://www.vtwaterquality.org) (click link to grants).

***Didymosphenia geminata* ("Didymo")** continues to be a concern in the Connecticut and White Rivers and the Batten Kill. Nuisance level blooms have been noted this summer in the Connecticut and White Rivers. In addition, a significant bloom was observed in the Mad River, the first instance of this potentially invasive algae in the Lake Champlain watershed. The Agency of Natural Resources response continues to focus on public education about spread prevention, since there are no available control methods. For more information, visit the ANR didymo information web page by following the link under "What's New" at [www.vtwaterquality.org](http://www.vtwaterquality.org).

**Asian clam (*Corbicula fluminea*),** an exotic mollusk with the potential to become invasive, was discovered in the Champlain Canal in June 2008. Asian clams can cause some of the same problems that zebra mussels have caused: fouling water pipes and canal systems, competing with native mussels for food and habitat, and altering food webs. Although surveys to date have not found evidence of the clams in the stretch of the canal that flows into Lake Champlain, the clams could move up the canal into the Lake Champlain watershed, just as zebra mussels did in the 1990s. The Lake Champlain Basin Program and its partners (including Water Quality Division staff) are monitoring the situation and preparing a risk assessment that will help to inform our response to this new potential threat.



photo from the  
USGS website

**Have you seen this aquatic plant?** This floating leaved, unrooted European native is invasive and appears to be on the move in Vermont. It can be found widely distributed in quiet waters of Lake Champlain and more recently of Shelburne Pond (Shelburne) and Winona Pond (Bristol). European Frogbit's (*Hydrocharis morsus-ranae*) small, heart-shaped leaves, unrooted habit, and reproduction by runners distinguish it from our native floating-leaved aquatic plants. Report any suspicious sightings to the Lakes and Ponds Section at 802-241-3777.



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## A Watershed for Every Classroom

Seventeen Lake Champlain basin educators completed the first year of A Watershed for Every Classroom. Available at the resource room at ECHO in Burlington are copies of 17 new watershed teaching units, which will engage more than 500 students in Lake Champlain issues this school year. The Water Quality Division's Project WET partners with CBEI to offer this program, which receives funding through the Clean and Clear Initiative.



### Lakes and Ponds Gets New "Chief"

After more than 34 years as the Section Chief of Lakes and Ponds, Ginny Garrison has retired. Ginny's passion for lakes and her record of accountability and experience will be greatly missed. Susan Warren, a long time Lakes and Ponds staff member, is the new Section Chief for Lakes and Ponds. We wish Ginny lots of happiness in her retired life, and we look forward to continuing to work with her as a board member of the Federation of Vt Lakes and Ponds.

### Water Quality Division Changing to Center for Watershed Management

As part of the Department of Environmental Conservation's recent reorganization plan, many Water Quality Division programs soon will be located in the Center for Watershed Management. Peter LaFlamme, currently the Water Quality Division's Director, has been appointed the first Director of the new Center for Watershed Management. For more information about these changes and who to contact concerning Wetland, Stormwater, River, Lake, or other surface water quality issues, please call us at 802-241-3777 or visit on-line and select "Vermont Way Forward" at: <http://www.anr.state.vt.us/index.cfm>