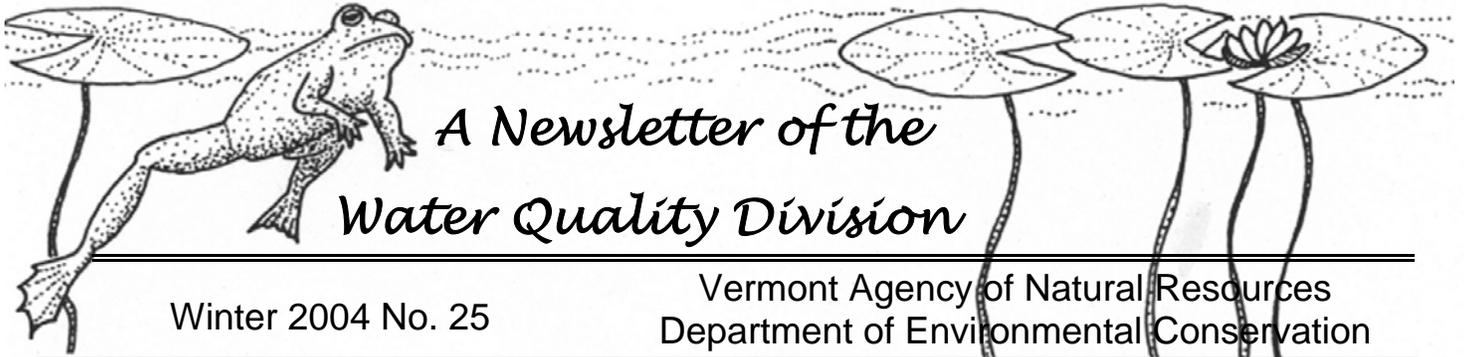


Out of the Blue



Winter 2004 No. 25

Vermont Agency of Natural Resources
Department of Environmental Conservation

Sonar A.S.: Aquatic Pesticide Use in Vermont Lakes

To date, Burr Pond, Lake Hortonia, Beebe Pond, Sunrise Lake, and a private pond have been treated with the aquatic pesticide, Sonar A.S. Applicants were issued a permit to conduct a whole-lake treatment using Sonar A.S., active ingredient fluridone (Trademark of SePRO Corporation, Carmel, IN).

The nuisance aquatic plant species in four of the lakes is Eurasian watermilfoil; the private pond contains nuisance native vegetation. The applicants all have one thing in common, they want to regain the recreational uses and aesthetic beauty of their lakes. To accomplish this goal the applicants proposed to use Sonar A.S., which at this time is one of the few products manufactured for whole-lake aquatic pesticide treatment.

Sonar A.S. is a selective systemic aquatic pesticide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, and drainage and irrigation canals. Plants take up the herbicide's active ingredient, fluridone, from the water through foliage and from sediments by roots, and translocate it throughout their systems. Fluridone kills susceptible plants by interfering with the plant's ability to make carotene, a plant pigment important for photosynthesis. Without the ability to make food, the plant dies. Susceptible plants become pinkish or whitish, and typically die within 30 to 90 days. The effectiveness of a Sonar A.S. treatment is a function of maintaining an adequate concentration of fluridone for a sufficient exposure time. The amount of time that the plants were exposed to fluridone in four of the five treated lakes was from 45 to 90 days.

See page 2, "Sonar"

Snowmaking at Vermont Ski Areas

Twenty alpine ski areas operate in Vermont according to information in the Water Quality Division's records. They range from small, local areas to larger destination resorts. Nineteen of these ski areas have some type of snowmaking system. Heavy snowfalls in recent weeks have provided Vermont's ski areas with excellent skiing conditions, but mother nature is not always so generous. Snowmaking systems allow the resorts to provide good skiing at times when natural snowfall is inadequate or when the surface snow conditions are poor.

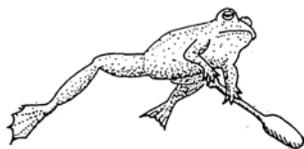
Snowmaking systems need a water source, which often has been a nearby river or stream. In 1996, working in collaboration with the Vermont Ski Areas Association and others, the Vermont Agency of Natural Resources established conservation flow standards. The standards, or minimum flows, are designed to maintain sufficient water in the stream or river to protect aquatic habitat and biota. In most cases, the standards require a ski resort to leave a specified amount of water in the stream, but they can withdraw all of

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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, 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, or to receive extra copies, please contact:

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(continued from page 1) — Sonar

The whole-lake Sonar A.S. treatments in Vermont were deemed successful at reducing levels of aquatic nuisance plants in the year of treatment by at least 90% in Burr and Beebe Ponds and Lake Hortonia, and an estimated 99% in Sunrise Lake, while causing no significant direct impacts to the majority of non-target aquatic and wetland plants. However, by year two post-treatment, the aquatic nuisance plant species had reinfested Burr Pond and Lake Hortonia. Sunrise Lake is a relatively small lake with characteristics conducive to successful control through intensive non-chemical control methods, which appears to be the reason for effective control of the regrowth. Beebe Pond was treated in 2003 and it is too soon to evaluate this treatment. Nuisance native vegetation returned in the private pond by year three post-treatment.

For all aquatic pesticide treatments in waters of the state (except landowner(s) applying to use a pesticide on a pond located entirely on their property), a long-range management plan is required. The plan must be designed to manage the infestation of the nuisance aquatic species by combining the use of non-chemical methods with the initial chemical treatment for at least five years. The goal of the five-year integrated management plan is to reduce the aquatic nuisance species population in the first year with an



**Sonar A.S. application by air boat on
Lake Hortonia, Hubbardton and Sudbury, VT**

aquatic pesticide treatment so that non-chemical methods, such as handpulling, bottom barriers, mechanical harvesting and public education, can successfully be employed in subsequent years.

The costs associated with these whole-lake herbicide treatments are dependent upon the size of the lake, the type of treatment proposed, public notification and water sampling requirements, and the components of the long-range management plan. The approximate costs for whole-lake herbicide treatment, non-chemical controls and monitoring, were as follows: 1) Sunrise Lake - \$1,242 per acre, 2/3) Burr Pond/Lake Hortonia - \$145 per acre, and 4) Beebe Pond \$418 per acre (the private pond costs are not comparable here because the pond is less than one acre).

As stated in the beginning of the article, five waterbodies have been treated with Sonar A.S. The amount of information generated from these treatments has been enormous. However, it also represents the total amount of information available in our state and it is still a relatively small amount of documented information with which to evaluate both the long-term effectiveness of the treatments on the target species and the potential impacts of the treatments on the non-target populations in and around the waterbodies treated.

As of January 2004, one additional permit has been issued for Lake St. Catherine, Little Lake, and Lily Pond and other permit applications have been submitted to the VTDEC requesting the use of Sonar A.S. for whole-lake treatments to control Eurasian watermilfoil. The permit issued for Lake St. Catherine, Little Lake and Lily Pond represents the largest waterbody system to submit an application for a whole-lake treatment to date. The permittee proposed an initial whole-lake treatment and follow-up non-chemical methods, with a second whole-lake treatment or spot/partial-lake chemical treatment in years three or four of the long-range management plan. The plan states that due to the size of the lake system it is unlikely that adequate efforts can be sustained to manage the infestation of the aquatic nuisance species using only non-chemical control methods.

The VTDEC determined the long-range management plan for Lake St. Catherine, Little Lake, and Lily Pond, proposing a potential follow-up aquatic pesticide treatment with Sonar A.S. None or in combination with another aquatic pesticide, met the requirement set forth in the statute for controlling aquatic nuisance plant species by pesticide in waters of the state.

And the Survey Says: ANS Management on Lakes

In 2003, the Westmore Association, a lake group representing Lake Willoughby, Bald Hill Pond, Jobs Pond, and Long Pond, surveyed representatives from lakes and ponds around the state about their aquatic nuisance species management programs. The survey was conducted in an effort to expand lakes and ponds groups' understanding of Vermont aquatic nuisance species control and prevention programs, and as a resource for additional or future contacts.

Of the 43 respondents, 20 have active Eurasian watermilfoil control projects and 11 engage in aquatic nuisance species spread prevention. The survey yielded the following information:

- 7 associations hire a project manager or facilitator,
- 22 have a volunteer project manager or facilitator,
- 20 utilize a volunteer labor force,
- 10 employ scuba divers,
- 4 have a boat wash station,
- 9 monitor public boat access areas,
- 12 institute shoreline watch networks,
- 2 have fishing derby education programs,
- 9 use plant identification workshops,
- 20 actively survey or monitor their waters,
- 8 use bottom barrier,
- 11 engage in hand-pulling efforts,
- 1 respondent used herbicides (permitted),
- 2 use hydro-raking control methods,
- 6 engage in mechanical harvesting,
- 3 use diver-operated suction harvesting methods.

The survey was made possible through a grant awarded to the Westmore Association through the Vermont Conservation License Plate Program, and was conducted in conjunction with the Federation of Vermont Lakes and Ponds, and the VTDEC. For a copy of the full survey results with accompanying lakes and ponds contact information, ask Ann Bove at the Lakes and Ponds Section, 802-241-3777, or email: ann.bove@anr.state.vt.us.



Aquatic Nuisance Species

HIGHLIGHTS

- ◆ **Water Chestnut.** During the summer of 2003 new infestations of water chestnut were found in a private pond in Bennington, in a small pond adjacent to Otter Creek in Ferrisburgh, and in North Springfield Reservoir in Springfield and Weathersfield, Vermont. All populations were pulled by hand.
- ◆ **2003 Lake Champlain Water Chestnut.** Hand-pulling crews covered 76 miles of Vermont shoreline and 44 miles of NY shoreline, pulling approximately 55 tons of water chestnut. Mechanical harvesting crews cut approximately 136 acres of water chestnut in the Benson, VT area of Lake Champlain, 15 acres of which was further south than previously harvested in this program. Two larger and faster 800-cubic foot harvesters were used, allowing for improved efficiency. Funding for these efforts came from Ducks Unlimited, Lake Champlain Basin Program, U. S. Army Corps of Engineers, U. S. Fish and Wildlife Service, and VTDEC.
- ◆ **Other ANS Sightings.** No new infestations of Eurasian watermilfoil, zebra mussels, or any new plant or animal invaders were reported in Vermont in 2003.
- ◆ **Hydrilla.** Watch cards are now available to assist with the identification and reporting of Hydrilla. Contact the Water Quality Division at 802-241-3777 to obtain a free copy. Quantities are available for distribution to groups.
- ◆ **Beebe Pond Sonar Application.** In 2003, the Beebe Pond Property Owners Association initiated the chemical treatment portion of a five-year long-range management program to control Eurasian watermilfoil in the 111-acre lake. Beebe Pond was treated with the aquatic herbicide, Sonar A.S. in June 2003 at a target concentration of 8 parts per billion. Supplementary booster treatments were conducted in July and August to maintain the target concentration for at least 90 days. The treatments appear effective, however Sonar is a slow-acting herbicide and the true success of the treatments will not be known until next year. (See "Sonar A.S." on the front page.)
- ◆ **Grant-in-Aid.** The VTDEC Grant-in-Aid Program awarded 31 grants to municipalities working on aquatic nuisance species control or spread prevention projects in 2003. Awarded funds totaled over \$500,000 and were supported by a portion of Vermont motorboat registration receipts and the U. S. Army Corps of Engineers thanks to the efforts of Senator Leahy. To receive an application for 2004 funds, contact Vicky Barney at 802-241-3777.
- ◆ **Lakes and Ponds Survey.** The Westmore Association in conjunction with the VT Federation of Lakes and Ponds and VTDEC conducted a survey of aquatic nuisance species programs around the state. (See "Survey" on page 3 for the details.)
- ◆ **Purple Loosestrife.** The total number of beetle releases in 2003 increased by nearly 28% to a total of 72,203. Twenty-seven new release sites were added, covering 85 acres in 10 towns across the state. Site checks showed 39% with significant beetle damage and 14% with no flowering purple loosestrife. This is significantly better than last year and is a sign of the growing success of the program as beetle populations expand over time.



the water above that level. As the natural flow in the river approaches the minimum required flow, the resort must reduce and ultimately suspend the withdrawal of water. In other cases, usually used only on larger rivers, a maximum withdrawal rate is instead specified. This rate is a very small fraction of the river's natural flow, so it does not result in significant ecological impacts.

Five ski areas currently have snowmaking systems that meet the Agency's 1996 standards, while five other ski areas have developed schedules to meet these standards. Nine ski areas are currently operating under older permits with lower streamflow standards.

Most of the resorts that are or soon will be in compliance with current standards have built large storage reservoirs. Snowmaking reservoirs allow resorts to start making snow with plenty

of readily available water. The reservoirs are replenished during warmer periods in the winter when stream flows are higher. The water is stored for use during colder periods, when streamflows are typically lower but snowmaking conditions are more favorable. This approach avoids water withdrawals that would be ecologically harmful.

Vermont ski areas collectively use approximately 2.0-2.5 billion gallons of water each year for snowmaking. Much of that water is used in November and December, as the resorts lay down a base of snow in preparation for the Christmas and New Year holiday weeks. Close work between the Agency and Vermont's ski resorts has resulted in snowmaking systems that address the resorts' needs for water while protecting the environment, natural snow or not.



Betty Hutchinson Retires



Betty with Vicky Barney (Lakes and Ponds Staff Member) at her retirement party in Dec., 2003

After 17 years of answering phones and performing daily office operations for the Water Quality Division, Betty Hutchinson has retired. Through the years, Betty has won the respect and hearts of the public and her co-workers. Betty's helpfulness and good nature will always be remembered.

Federation of Vermont Lakes and Ponds

The Federation of Vermont Lakes and Ponds had an active year in 2003. Currently the Federation has 35 member associations and hopes to see that number continue to increase in the coming years. The highlight of the year was the Milfoil Seminar in June of 2003, hosted in cooperation with VTDEC. Presentations were given by lake associations on their experiences with Eurasian watermilfoil control or spread prevention, including obtaining permits and funding. Over 80 people from across the state attended and all agreed it generated great discussion and exchange of information. VTDEC also benefited by hearing constructive comments about the funding and technical assistance programs, as well as on the permitting process. The Federation plans to hold a similar seminar in 2004, watch for a notice through your association! More information about the Federation is available at www.vtlakes.org or by contacting Jackie Sprague, President, at jackie@sprague.org or 802-482-2885.

The Vermont Lay Monitoring Program: Afloat for 25 Years!

Volunteers don't necessarily have the time, they just have the heart

The Vermont Lay Monitoring Program celebrated its 25th Anniversary during the summer of 2003. The LMP, a statewide, cooperative effort between the Water Quality Division and volunteer lake monitors, continues to operate under the original program goals established 25 years ago: to involve citizens in lake protection and to establish a database on each lake useful for documenting future changes in water quality.

Vermont has 288 lakes at least 20 acres in size. The LMP has had a volunteer monitor on 83 of these lakes at some time during the last 25 years. In addition, 36 stations on Lake Champlain are sampled bringing the total number of LMP sites to 120. Seventeen of these sites have been monitored for more than 21 years, 28 sites have been monitored for 16-20 years, 20 sites for 11-15 years, and databases have been started for 55 lakes with less than 10 years of data collection (see the map of the 2003 sites monitored under the LMP).

Over the last 25 years, Lay Monitors have collected weekly samples for analysis of total phosphorus and chlorophyll-a, and have taken weekly Secchi water clarity readings. In general, the more phosphorus (a naturally occurring nutrient that gets washed into rivers and lakes in excess because of human activities in the watershed), the more algae will grow (algae feed on phosphorus and are measured by the green pigment, chlorophyll-a), and the lower the Secchi

water clarity readings become. The accompanying graphs relay four water quality "stories" of different LMP lakes.

As successful and cost-effective as the LMP has been in monitoring so many Vermont lakes and ponds that otherwise might have gone unmonitored, the most impressive achievement of the LMP is the proof that volunteers can and do make an important difference in many areas, including lake protection. The following excerpt from "The Daffodil" (author unknown) speaks to the accomplishments of the Lay Monitors, who have worked for over 25 years gathering information to help better understand the health of Vermont lakes. Thank you past and present Lay Monitors!

"There were five acres of flowers.

I thought of this woman whom I had never met, who, more than forty years before, had begun- one bulb at a time- to bring her vision of beauty and joy to an obscure mountaintop. Still, just planting one bulb at a time, year after year, had changed the world. This unknown woman had forever changed the world in which she lived. She had created something of ineffable (indescribable) magnificence, beauty, and inspiration.

The principle her daffodil garden taught is one of the greatest principles of celebration. That is, learning to move toward our goals and desires one step at a time- often just one baby- step at a time- and learning to love the doing, learning to use the accumulation of time. When we multiply tiny pieces of time with small increments of daily effort, we too will find we can accomplish magnificent things. We can change the world."

Mary Sondergeld has been a Lay Monitor on Beebe Pond for 25 consecutive years! Through her dedication to monitoring, she has contributed greatly to the understanding of the water chemistry in Beebe Pond in Hubbardton, VT. Since Secchi water clarity readings indicate a lake's transparency, or the amount of phytoplankton (algae) and zooplankton (microscopic animals) present in the water column, Mary's data shows how little the water quality of Beebe Pond has changed over the years. Although, Beebe Pond LMP data shows consistent water quality results, Mary has noticed other



changes to the pond. Eurasian watermilfoil, first discovered in Beebe Pond in 1991, has had a heyday in this 43-foot deep, 111-acre pond, causing ongoing recreational use problems. In addition to Mary's weekly lay monitoring, she has been actively involved in the battle of watermilfoil and control options, including the recent chemical herbicide treatment with Sonar A.S. The staff from the Water Quality Division's Lakes and Ponds Section extend a huge thank you to Mary for her interest, dedication, and involvement in protecting Beebe Pond through all these years.

State of the Lakes



— 2003 Vermont Watershed Grants —

Several lake associations and local groups received Watershed Grants in 2003. These grants are funded by the sale of the Conservation License Plate.

- **Lake Morey Protective Association/Town of Fairlee, Lake Elmore Association, the Nin-evah Foundation, Seymour Lake Association, Pelots Bay/Town of North Hero, and the Fairfield Pond Association** all received grants to assist with their Eurasian watermilfoil control or spread prevention efforts.
- The **City of Newport** received a grant to operate a boat washing station on Lake Memphremagog.
- The **Lake Groton Association** received a grant to conduct a detailed aquatic plant survey and establish an “early detection” monitoring program.
- The **Franklin Watershed Committee** received funding to reduce nonpoint source pollution and phosphorus loading to Lake Carmi.
- The **St Albans Area Watershed Association** received funding to conduct “community education and outreach” related to reducing phosphorus loading to St Albans Bay.

Information about the grant program can be obtained at www.vtwaterquality.org/lakesgrants.htm or by calling Susan Warren at 802-241-3794.



— Shoreland Protection —

Each summer the Lakes and Ponds Section receives phone calls with a similar ring: “Someone across the lake has just clear-cut a steep shoreline lot and bulldozed down to the water’s edge! Aren’t they violating state shoreland regulations?” The answer is NO (as long as they are not working in the lake itself). There is no statewide shoreland zoning. It is up to towns to enact regulations or lake associations to enact educational programs to promote environmentally responsible shoreland development.

Lake and pond shorelands are a valuable and limited resource, and are one of the most desirable types of real estate in the state. People flock to lakes for recreation, beauty and relaxation. In addition, undeveloped shorelands are critical to the ecological functioning of a lake. Responsible development and conservation of undeveloped shorelands is increasingly becoming a focus of lake associations.

Below are some suggestions for conserving shorelands on your lake.

Municipal Shoreland Zoning: Towns can adopt development setbacks in conjunction with natural vegetation protection (buffer strip) regulations to protect the natural functions of the shore. However, a VTDEC inventory shows that less than 15% of Vermont towns take advantage of municipal shoreland zoning. Instead, the majority of shoreland development undergoes limited town review. (Larger developments or subdivisions undergo Act 250 review, but the majority of shoreland development is too incremental to trigger this state review.) Assistance in drafting zoning regulations is available from regional planning commissions or VTDEC’s Water Quality Division.

Landowner Education: Lake associations can work with local residents to encourage maintenance or replanting of woody vegetation along the shore. Even if there is only room for a 10-foot wide strip of trees and shrubs, this size buffer strip would benefit the lake. Grants are available to lake associations wanting to conduct a re-planting project. For more information, contact the Lakes and Ponds Section.

Roll Out the Welcome Wagon: Some lake associations have provided information to new shoreland property owners about recommended shoreland development and management practices. Many people do not understand the bene-

Dam Removal Leads to Stream Restoration

Vermont's program to restore streams by removing dams that no longer have economic or social value began to show results in 2003. Two small dams impounding Vermont streams were successfully removed and were the first projects to be completed since VTDEC became active in dam removal in 2000.

The first was a privately-owned dam on a small tributary of the Ompompanoosuc River in Norwich. Inspection of the dam, an earthfill structure about 18 feet high and 100 feet long, indicated that there were potential structural problems that could result in dam failure. Rather than reconstruct the dam, the owner opted to restore the site to its natural condition by having the dam removed.

After the necessary permit was obtained by the owner, the impoundment behind the dam was dewatered by cutting down the spillway to lower the water level, then pumping out the remaining water. The earth used to construct the dam was regraded to restore the natural contours as much as possible. Finally, the stream channel was restored. The entire project took two weeks and was completely funded by the owner.

The second project completed in 2003 was removal of another earthfill dam on the campus of Johnson State College. This dam, an earthfill structure

about 255 feet long and 31 feet high, was constructed in the 1960s on a small tributary of the Gihon River. The spillway began to fail in 1998 and the impoundment behind the dam had been mostly drained since that time. Beginning in 2002, the college authorities decided to remove the dam and worked closely with VTDEC staff to plan the project. A major part of the plan was to reconstruct a natural stream channel in the area formerly occupied by the dam and impoundment. The project began in early October and was completed in November.

The Johnson State College project was part of the VTDEC's watershed planning initiative in the Lamoille River watershed. The VTDEC watershed planning and restoration efforts in the basin included a watershed-wide dam inventory and assessment conducted in cooperation with the University of Vermont. The assessment has identified other smaller dams for removal to improve fish passage, water quality, and stream stability.

These projects are only the beginning – several other dam removal projects are in the planning stages and some will be undertaken in 2004. While the two dams removed in 2003 were small dams with respect to their size and the size of the streams they impounded, they were an important milestone for river restoration in Vermont.



Norwich dam diverting stream flow



Norwich dam removed

continued ...

Shoreland Protection

fits of natural vegetation along the shore, but would do what is best for the lake if they had the information. By working with the Town Clerk, lake associations can get good information to new shoreland owners as soon as the property changes hands.

Conservation Easements: Some lake associations have become involved in projects to conserve undeveloped stretches of shoreland. Land can be purchased outright or just the development rights bought in order to give the owner fair value for a property, while allowing for land to stay unde-

veloped. Contact either a local land trust or the Vermont Land Trust for information on the various land conservation options.

For more information on conserving shoreland, please contact Susan Warren at the Lakes and Ponds Section.

Note: Erosion from cleared lots and construction sites resulting in discharges of sediment to the lake may be a violation of Vermont Water Quality Standards. Also, work in the lake ("beyond mean water level") requires a Shoreland Encroachment Permit from the Water Quality Division.

River Watershed Planning

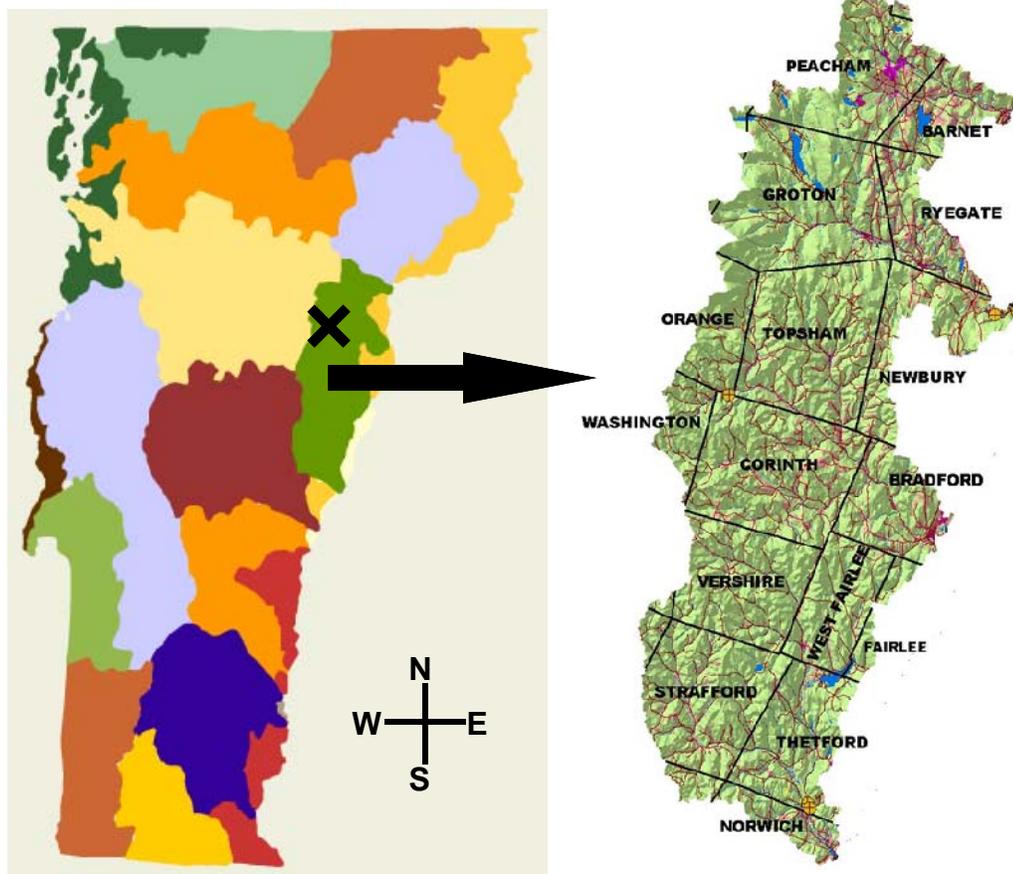
The Vermont Department of Environmental Conservation's Watershed Planning process is underway in the Wells, Waits, Stevens, and Ompompanoosuc River watersheds. All four of these rivers rise up in the hills of eastern Vermont, flow in a southeasterly direction, and empty into the Connecticut River. These watersheds are rural and dominated by forests, with some pockets of farming. Within these watersheds lay several lakes and ponds, for example, Lake Fairlee, Harvey's Lake, Ticklenaked Pond, Groton Pond, Ricker Pond, Kettle Pond, Noyes Pond, and Martins Pond.

Local participation with the planning for these watersheds is welcomed and encouraged. Within each watershed local Watershed Councils will be formed. The more diverse the Council members are, the better representation of all interests in the watershed, including: farming, forestry, logging, private businesses, town operations, fishing, local watershed organizations, environmental groups, schools, utility companies, regional planning efforts, and others.

In 2004, a series of public forums will be held throughout the four watersheds to solicit residents' concerns, ideas, and goals regarding water quality issues. The top issues of the forums will be prioritized and used by the local Watershed Councils, VTDEC, and various partners to develop strategies and secure funds to improve local water quality. A watershed plan will be developed to guide the implementation of watershed restoration projects within the watershed.

Several watershed restoration projects are anticipated in each of the four watersheds. These projects may be streambank buffer plantings, stream stabilization, stormwater management, municipal road improvements, and agricultural Best Management Practice implementation. Additionally, bridge and culvert assessments are already planned for several portions of the watersheds. These assessments will be used to identify areas susceptible to flash flood damage as well as for improvement of fish habitat, water quality, and stream stability.

Stevens, Wells, Waits, and Ompompanoosuc River watersheds enlarged from the Vermont state map depicting the 17 major watersheds



Watershed Planning is taking place in all of the state's 17 watersheds on a five-year rotational basis. The VTDEC is working collaboratively with other state, federal, non-profit and volunteer organizations, and local residents for input, funding, technical assistance, and public education on water quality improvement projects identified through the watershed planning process.

For more information about the Wells, Waits, Stevens, and Ompompanoosuc River watershed planning process, or the VTDEC watershed planning process overall, please contact Jim Ryan, Watershed Coordinator at 802- 476-0132.

Leeches... Gross and Fascinating!

Many folks want to know what to do about leeches in the water. For those who have found a leech attached to them after emerging from a refreshing dip, how to eradicate the whole lot of leeches is the question!

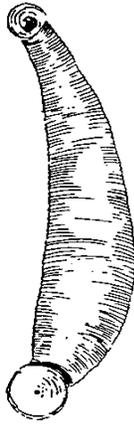
Leeches live in all parts of the world, from tropical areas to small desert watering holes to Antarctic waters. In the northeastern United States, leech species are tolerant of cold weather and overwinter by burrowing in the shoreline mud below the frost line.

Leeches are actually segmented worms and are related to the earthworm. Over 300 species of leeches exist worldwide, ranging in size from half an inch to eight inches. Leeches are either green, black, brown, or red, and sometimes have stripes or spots.

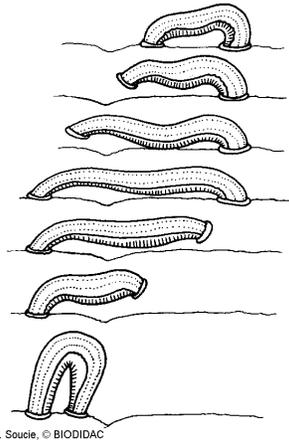
With flat bodies and tapered ends, most leeches are one to two inches long. Each end of the leech has a sucker: the anterior or front sucker, and the posterior or back sucker. The anterior sucker contains mouthparts and the posterior sucker is primarily for adhesion. Both suckers are very strong. In general, the whole body of the leech is strong.

Leeches have well-developed muscles throughout their body walls that enable them to move forcefully if needed. This motion also allows them to swim through the water in an undulating motion. Leeches may also move across surfaces by crawling.

While most people think of leeches as being parasitic (living off another organism without benefit to the host), many species are predatory, feeding only on invertebrates such as snails, worms, and insect larvae. Leeches find their host or prey species because they are sensitive to changes in movement and light. Photoreceptors throughout their bodies enable them to detect changes in light, temperature and vibration, and chemical receptors on the head aid in smell.



common leech appearance



leeches can move like inchworms

Leeches provide food for ducks, fish, turtles, and loons. Predatory leeches help balance the populations of other aquatic invertebrates by feeding on them. They also are important to modern science and technology with their medicinal use dating back thousands of years. In modern medicinal practices, an anti-coagulant in leech saliva, which enables the leech to feed without the blood hardening, is extracted and used as a blood thinner. Currently, a synthetic version of the leech's anti-coagulant is under development.

Although leeches play important roles in the food chain and in modern medicine, they remain rather an uncherished group of animals that most folks would rather not encounter at their favorite swimming hole. One practice to rid a small area of

leeches is to place raw meat in a can and cover it with a resealable lid with holes in it. When the can is placed in the water, the parasitic leeches, attracted to the meat, will enter the can and not be able to escape because they will be too engorged to fit through the holes in the lid. The leeches can then be removed from the site.

Of course, the easiest option to avoid leeches is to swim in deeper water where leeches are not present. Foe or friend, leeches remain a natural part of our aquatic system.



In early 19th century Europe, using leeches for bloodletting was a common medicinal practice.

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Native Plants Available for 2004 Shoreline Plantings

As part of the Intervale Foundation, located along the Winooski River in Burlington, Vermont, the Vermont Riparian Project was initiated to establish a local source of trees and shrubs for riparian conservation and restoration projects throughout the state. For two years, tree and shrub seeds and cuttings, collected exclusively from Vermont watersheds, have been propagated, grown, and distributed for riparian planting projects. Orders are being accepted now for Spring 2004 riparian planting projects.

Tree and shrub species that the VRP expects to have in significant quantities for the spring will either be available in bareroot form or in a "tubeling" form. Tubelings have well-developed root systems in a tube-shaped container with soil. This enables the trees to be planted after they have begun to leaf out. (Bareroot plants need to be planted in early spring, prior to the buds blooming.) Species available in large quantities for 2004 include: silver maple (*Acer saccharinum*), box elder (*Acer negundo*), black willow (*Salix nigra*), sandbar willow (*Salix interior*), American elm (*Ulmus americana*), red oak (*Quercus rubra*), swamp white oak (*Quercus bicolor*), and eastern cottonwood (*Populus deltoides*). Limited quantities of other species are also available. Please contact Josie Hannon at 802-660-0440, ext.105 or email info@intervale.org for quantities, sizes, and prices.



The Vermont Riparian Project is a program of the Intervale Foundation
The Intervale Foundation
180 Intervale Road
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**Available
on
the Web**



www.vtwaterquality.org

Watershed and Lake Associations of Vermont, is a listing of contact information of local associations addressing lake or river watershed issues.
Compendium of Vermont Lake and Pond Associations and Projects (2003), is a complete listing of lake association projects.