Out of the Blue

A Newsletter of the

Water Quality Division

Summer 2005 No. 28

Vermont Agency of Natural Resources
Department of Environmental Conservation

Healthy Shores, Healthy Lakes

The shoreland is the interface between water and land and is a critical factor in the ecological health and future of the lake. A "buffer" of natural vegetation on the shore means the lake can function as an ecological whole. This article explores some of the lesser known habitat benefits of shoreland vegetation.

A buffer is a width of land between a waterbody and the adjacent land uses that protects the water from the negative effects of these land uses. To function as a buffer, the shoreland needs to be primarily natural vegetation. The immediate benefits to people of buffers include bank stability, scenery and privacy, protecting property values by protecting water quality, and increased wildlife viewing opportunities. On lakes with a resident geese problem, even a low shrub buffer will discourage geese from coming up on to the shore.

Ecologically, buffers contribute in significant ways to a healthy lake habitat for fish and other lake inhabitants:

1. The canopy provided by overhanging branches cools the shallow water, and is a source of food as insects fall in the lake.
2. Leaves, branches, and trees fallen in the water provide a variety of "structure," an important element of aquatic habitat that offers various living surfaces for insects, a food source, and shelter.
3. Water quality protected by stable banks and buffer strips maintains a stable lake ecology.
4. Many terrestrial species relay on shoreland vegetation for shelter, breeding areas and food

See page 6, "Healthy Shores"

Treating the "Treatment" Facilities of Stormwater

Stormwater runoff is precipitation that does not infiltrate into the soil. Stormwater runoff often occurs because development has decreased the available permeable ground for water to infiltrate. Paved and unpaved roads, parking areas, roofs, driveways, and walkways increase stormwater runoff. In turn, this runoff can cause local flooding, stream bank erosion, and loss of infiltration to groundwater as well as pick-up pollutants such as sediment, oil, fertilizer, and waste and deliver them to the nearest river, lake, or other surface water.

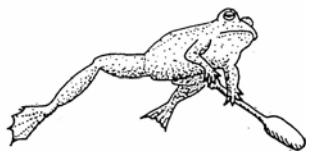
Stormwater Treatment Facilities

Stormwater treatment facilities are often necessary to manage runoff when development alters the natural water flow and/or permeability of soils. Stormwater treatment structures vary depending on the site, but typically involve either a pond, basin, wetland, ditch, swale, or vegetative- or sand-strip designed to filter and remove excess amounts of surface water runoff from developed areas. Without these man-made structures to control stormwater, increased erosion, pollution, and flooding would occur.

See page 2, "Stormwater"

In This Issue...

"Out of the Blue" Available on the Web



Check out the latest and future newsletter issues on the Water Quality Division Web Page at

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, or to receive extra copies, please contact:

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

NEWSLETTER STAFF
Amy Picotte, Editor
Ann Bove
Susan Warren

CONTRIBUTORS
Sara Hadd (Town of Colchester)
Erin Haney
Michael Hauser
Jim Pease
Amy Picotte
Susan Warren

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Stormwater

Stormwater facilities for any new, large scale development (more than 2 acres of impervious surface) have been required in Vermont since the mid 1970s. Most residential subdivisions built since then also would have a stormwater facility on the property. A map showing properties with stormwater facilities can be found on the Water Quality Division's web page at:
http://www.anr.state.vt.us/dec/waterq/stormwater/htm/sw_permitviewer.htm

Treating the Treatment Facilities

Improper or inadequate maintenance can cause stormwater facilities to lose their effectiveness. Maintenance should occur at least on an annual basis. Proper maintenance can be as simple as removing accumulated sand from a ditch with a shovel or may involve hiring a contractor with larger equipment. Also, correcting any eroding areas that drain and contribute sediment to stormwater treatment structures can reduce maintenance costs.

Dry detention areas can be recognized as depressed grassy basins with inlet and outlet pipes. These areas should be regularly mowed and sediment cleared from the piping. Wet detention areas include ponds or constructed wetlands. These stormwater facilities detain water during storm events in order to prevent flooding and streambank erosion. Aquatic plants, such as sedges, help filter out pollutants. Information about maintenance practices for stormwater facilities can be found at the web sites listed below.
http://www.metrocouncil.org/environment/Watershed/BMP/

http://www.anr.state.vt.us/dec/waterq/stormwater/docs/sw_manual-vol2.pdf (Appendix D8)

Stormwater Treatment Facilities Protect Lake Champlain

Most stormwater runoff from the greater Burlington area flows to either Malletts, Burlington, or Shelburne Bay. There are more than 250 state permitted stormwater facilities that discharge stormwater to these waters. Six of the watersheds (or almost 25% of the 120 square miles of area draining to these bays) are considered unsafe for swimming, boating, or drinking water due to stormwater runoff. The principal causes of the pollution are excessive levels of sediment, which impact the aquatic biota, and excessive levels of the fecal coliform bacteria, *E. coli*, which indicate disease-producing organisms in the water. For more information about the water quality in these bays, visit the following web sites.
Burlington Bay: http://www.uvm.edu/envnr/burlington_bay/pdf/BBay_final_report.pdf
Malletts Bay: http://town.colchester.vt.us/water/
Shelburne Bay: http://www.shelburnebay.org/

The first step in good stormwater facility maintenance is to increase public awareness of the important role these sites play in protecting surface waters. The next step is learning how they are being maintained and by whom. With well maintained stormwater facilities, less sediment, nutrients, bacteria and toxins will enter Lake Champlain, helping to keep the lake safe for all uses.

Aquatic Nuisance Species

HIGHLIGHTS

Lake Seminar. The Federation of Vermont Lakes and Ponds held its annual, one-day Lake Seminar on June 24th in Waterbury, Vermont. For more information contact Jackie Sprague, President of the Federation, at Jackie@sprague.org or 802-482-2885, or Susan Warren in the Lakes and Ponds Section at susan.warren@state.vt.us or 802-241-3777.

2nd New England Invasive Plants Summit. The 2nd New England Invasive Plants Summit will be held September 16-17, 2005 in Framingham, Massachusetts. For more information visit www.ipane.org

Maine's Virtual Herbarium. The Maine Center for Invasive Plants has developed a Virtual Herbarium of Aquatic Plants. The website offers a collection of photos, line drawings and scanned images of both native and invasive aquatic plants, many of which are applicable to Vermont. Visit http://www.mciap.org/herbarium

U.S. Army Corps of Engineer Funding. Senator Leahy has assisted in again securing funding from the Army Corps of Engineers for Vermont's Lake Champlain Basin water chestnut and Eurasian watermilfoil management. At least $330,000 in cooperative cost-share funds (requiring a 50/50 match) is expected.

Law Enforcement. In May, Lakes and Ponds Section staff conducted ANS training sessions for the Vermont State Police Marine Patrol. State Troopers and Vermont Fish & Wildlife Wardens will again be actively enforcing the Vermont ANS Transport Law during the 2005 boating season. It is illegal to transport Eurasian watermilfoil, water chestnut, zebra mussels and quagga mussels to or from any surface water in Vermont. Violators may be subject to penalties up to $1,000.

ANS Watch. Keep aquatic nuisance species from gaining a foothold in Vermont waters – help watch for ANS. To report a potential ANS sighting in Vermont, call 802-241-3777. For additional information visit http://www.vtwaterquality.org/ans/ans-index.htm

Eurasian Watermilfoil Management. In 2004, Lake St. Catherine (including Lily Pond and Little Lake), Star Lake and Burr Pond/Lake Hortonia each received a whole-lake treatment of the aquatic herbicide, Sonar A.S. (fluridone) to control Eurasian watermilfoil. The first post-treatment plant surveys were conducted in the fall of 2004 and revealed successful treatments. 2005 marks year two of implementation of a five-year integrated management plan (IMP) for the treated lakes. In addition to whole-lake treatments the IMP includes surveys by citizen watch groups and professional contractors, hand-pulling, bottom barrier installation and potential spot or partial-lake chemical treatment. The IMP is reviewed annually for effectiveness, impacts to non-target species, and other pertinent issues. The goal is to implement the most effective strategy to prevent re-infestation over the long-term. For more information contact Susan Jary in the Lakes and Ponds Section at susan.jary@state.vt.us or 802-241-3786.

Ahoy! Be on the Look Out for Eurasian Watermilfoil and Other Aquatic Nuisance Species

Aah, summer! A good time to get out the barbeque, work in the garden, enjoy the outdoors, and go for a swim. Lake residents will also want to be on the look out for Eurasian watermilfoil (EWM). EWM is an aggressive, nonnative, aquatic plant with the ability to completely invade lakes once introduced.

A watch program organized and staffed by lake association and/or shoreline property owner volunteers and conducted regularly throughout the growing season can be very effective in identifying and preventing the spread of EWM. Other spread prevention activities for EWM and other aquatic invasive species include:

⇒ remove all visible plant fragments from the boat and associated transport equipment;
⇒ drain all bilge water; and
⇒ thoroughly rinse all equipment with hot water or let equipment dry in the sun for at least five days prior to use in or near any other waterbody.

If you are lucky and your lake or pond is free of EWM, starting a watch program can help protect your lake. If EWM is introduced, early detection and early implementation of control methods are essential for keeping this plant from rapidly spreading. If EWM is found in your waterbody, some options for control include handpulling, bottom barrier installation, mechanical harvesting and chemical treatment. All of these activities and control methods, except for handpulling, require an Aquatic Nuisance Control Permit from the Department of Environmental Conservation. Control methods and permit application information is available on the Water Quality Division web site at: www.anr.state.vt.us/dec/waterq/permits.htm.

The table on the next page illustrates some of the associated costs, effectiveness, advantages and disadvantages related to the control of EWM. It should be noted that chemical permits require the permittee to develop and implement a five-year integrated management plan incorporating a schedule of pesticide minimization and utilizing non-chemical control methods to manage regrowth. Once introduced, complete eradication of EWM is rare, therefore, efforts to control EWM necessitate a long-range plan.

The spread prevention methods and control options described in this article and at the web address listed above are designed to:

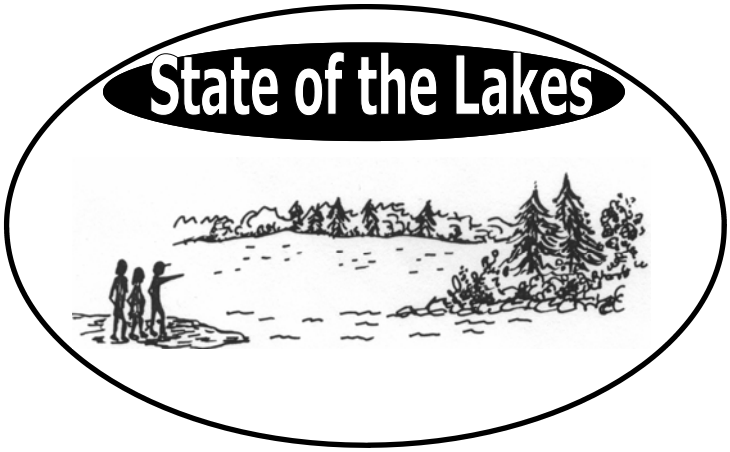
- enhance native aquatic plant communities by removing significant portions of the invasive EWM population;
- allow native plant species to spread restoring habitat diversity;
- improve the recreational use of a waterbody currently impaired by EWM;
- remove dense surfacing stands of watermilfoil improving opportunities for swimming, fishing and boating; and
- help prevent EWM fragments from being transported from one lake to another via boat motors and trailers or other recreational equipment.

As you enjoy this summer season, remember to keep in mind the aesthetic beauty, ecology, health and future enjoyment of the lakes and other waters throughout Vermont. To implement an aquatic nuisance species watch program and spread prevention measures for EWM or for more information on control options, contact the Water Quality Division's Aquatic Nuisance Control Program at 802- 241-3777.

new aquatic nuisance species sign

Control Options	Effectiveness	Cost Estimate	Advantages	Disadvantages
Handpulling * requires permit	has potential to be very effective depending on site conditions and diligence of handpullers most effective on newly established populations that are scattered in density	variable, depending on whether or not volunteers are used diver costs range from $15-$60/hour	can selectively remove milfoil can be done with volunteers to keep costs down long-term control may be achieved if roots are removed no interference with water supplies or water use	too slow and labor intensive to use on a large scale short-term turbidity makes it difficult to see remaining plants creates fragments difficult to remove whole plant so regrowth can be a problem
Bottom Barrier * requires permit	immediate 100% reduction in plants maintained barrier may provide up to 10 years control, depending on barrier type	cost varies by product but is generally from $7,000-$15,000 per acre (not including cost for weighting devices and installation and removal of the barrier) square foot costs range from 15-35 cents (one product is $1.50 per square foot installed)	may provide long-term control if properly installed and maintained immediate control throughout entire water column may be used in areas not accessible by other methods no interference with water supplies or water use if properly installed	not feasible on a large scale because of cost requires regular maintenance to remove silt, correct billowing, etc. installation may require scuba in deeper water not selective for milfoil kills invertebrates beneath barrier
Mechanical Harvesting * requires pemit	immediate plant removal can cut up to 3 acres per day depending on water temp., depth of cut, etc., plants may be at pre-harvest density within 4 weeks after harvesting	cost of new machine is $80,000-$100,000+ operational cost is $300-$600/acre cost does not include fast transport barge, dump truck or other equipment used to increase efficiency	can be used on a large scale immediate creation of open water areas lower part of plant remains intact to provide some habitat no interference with water supplies or water use can be targeted to high use areas where control is most desirable relatively low operational cost	creates fragments plant disposal necessary constant machine maintenance short-term results removes small fish, turtles, etc. not selective for milfoil removal not feasible in areas with underwater obstructions
Chemical (Fluridone) 1 1 active ingredient	under favorable conditions susceptible species may see up to 100% decrease in 60 to 90 days control may last from less than 1 season to 3 years (possibly longer if supplemented by hand removal or other non-chemical methods)	$500-$1,500/acre depending on water depth and formulation cost does not include collection, plant monitoring, public notification or analysis of water samples, which may be required	kills roots and root crowns slow-acting so fish kills due to low oxygen are generally not a problem control up to 2-3 years doesn't interfere with underwater obstructions low dose treatments (6 ppb to 8 ppb) may be used without significant impacts to non-target aquatic vegetation	may take 3 months to work depending on rate used, and permit conditions may be some water use restrictions alternate water supply may be needed for a period of time in VT rates above 10 ppb may have non-target plant impacts long contact time required (90 days) spot treatments generally not effective

EWM Control Options and Associated Issues



(continued from page 1) — **Healthy Shores**

sources; these include many songbirds, waterfowl, mink, otter and other mammals, and reptiles and amphibians.

5. The zones of aquatic plants that grow along undisturbed shorelands also offer habitat structure, water cooling, and a wave buffer.

Recent trends in lakeshore development are replacing old camps tucked in the woods with larger homes with more intensive land use. Along with that, more shoreland is cleared, and the ecological values of shoreland vegetation are diminished. Here is what you can do to improve in-lake habitat:

- Leave down trees and branches in the water if they do not interfere with your immediate docking and swimming area.
- Replant shrubs and trees along the shore and don't mow these areas.
- Redirect drainage into vegetated areas so it can infiltrate before reaching the lake.

- Correct erosion problems on your property to avoid sedimentation of the lake.
- Stabilize eroding banks with trees and shrubs rather than retaining walls.
- Designate some of your shoreline for swimming and docking, and leave some for aquatic habitat.
- Provide information to fellow lake residents.
- Encourage your town to adopt good shoreland zoning measures.
- Protect undeveloped stretches of a lake.
- Provide information to new shoreland owners through your town office.

For more information, contact the Lakes and Ponds Section at 802-241-3777.

Why Stencil Storm Drains …because it works!

Stenciling next to storm drains alerts others to the fate of runoff water and the pollution carried with it from lawns and streets. The stenciled message is highly visible. And when it is time to refresh the stencil, this service-learning activity reaches a whole new set of volunteers and offers another chance to spread the word on pollution prevention.

In late May, twenty-five 6th grade students from Edmunds Middle School hit the pavement with spray paint and decorated 40 storm drains in Burlington—telling residents not to dump (and why). These students worked with the City of Burlington's Public Works Department to safely and efficiently stencil storm drains within a mile of their school. Stencil materials and encouragement were provided through the Project WET program, a K-12th grade educational program sponsored by the Water Quality Division.

Stenciling is a practical, positive, easy first step toward public education and involvement in local, storm water pollution prevention. For more information on Project WET, call 802-241-3789.

The Riverine Floodplain Forest: A Special Type of Wetland

Try saying riverine floodplain forest fast ten times and the words blur into the sound of a rushing river! As a matter of fact, this type of wetland is found next to high energy, high gradient rivers. Riverine floodplain forests are a common yet very important type of wetland found in Vermont.

The floodplain of a river is a perfect breeding habitat for amphibians and reptiles that do not like to be submerged under water, but need moisture to survive. The forested floodplain creates cavities around tree bases, wet depressions surrounded by upland hummocks (vegetation), and canopy cover good for protection of ground animals and for bird activity. The diverse habitats of the riverine floodplain forests support many animals, including the ones listed in the box below.

Amphibians:	American toad, wood frog, spring peeper, blue-spotted salamander
Mammals:	river otter, mink, muskrat, beaver
Birds:	veery, yellow warbler, eastern wood pewee, blue-gray gnatcathcher, warbling vireo, northern oriole

There are a number of different types of riverine floodplain forests in Vermont which are distinguished by their vegetation and not by what animals live there. The riverine floodplain forests recognized in "Wetland, Woodland, Wildland- A Guide to the Natural Communities of Vermont" by Elizabeth Thompson and Eric Sorenson are as follows:

- Silver Maple - Ostrich Fern,
- Silver Maple - Sensitive Fern,
- Sugar Maple - Ostrich Fern, and
- Lakeside Floodplain Forest.

As the titles indicate, the floodplain forests have a dominant tree and herbaceous layer or ground cover, and an overall low coverage in the shrub layer. Most of the trees and ground cover in floodplain forests like to have their roots wet for a majority of the growing season, which is why these species are able to tolerate frequent flooding. Floodplain forests almost always contain a few pits of standing water and wet soil on a fairly permanent basis.

The herbaceous plants found in the floodplain forests are mainly ferns, such as the abundant sensitive and ostrich ferns. Before ostrich ferns unfurl in early spring, they are recognized by their tight curled up heads, called fiddleheads. Ostrich fiddleheads are edible if harvested just after they have poked-out from the winter snow.

In addition to the varied habitats provided by the little cavities and open spaces of the riverine floodplain forest, this wetland type has the ability to accommodate and retain large amounts of water from storm events and spring ice melt. This important function protects water quality by reducing any sediment transport to the neighboring river and by limiting erosion to streambanks. These wide, vegetated wetlands also act as visual and physical barriers from residential properties, state highways, agricultural fields, and farm animals.

These special wetlands are one of Vermont's many important and beautiful natural communities and are certainly one to explore and protect.

Good Bye and "Good Duck" Carl Pagel

Carl Pagel retired from State Government May 13th after 34 years of dedicated work with wetlands and the people of Vermont. Carl demonstrated repeatedly that natural resource protection and the ability for people to farm or develop their land are not mutually exclusive. He was both a wise teacher and a stalwart defender of the state's valuable wetlands, thereby assuring that these critical resources will be here for future generations to enjoy.

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

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Just Released: Lake Champlain 2005 State of the Lake Report

During the weekend of June 25-26th, the Echo Leahy Center for Lake Champlain hosted the "State of the Lakes" event, unveiling the latest report on Lake Champlain's water quality in the Lake Champlain Basin Program's document, *State of the Lake: Lake Champlain in 2005--A Snapshot for Citizens*. At this event, there were booths and presentations throughout the weekend. The Agency of Natural Resources exhibited a booth featuring the Governor's Clean and Clear program to clean up Lake Champlain (www.Vermont.gov/cleanandclear). For a copy of the *State of the Lake: Lake Champlain in 2005--A Snapshot for Citizens* report, contact the Lake Champlain Basin Program at (800) 468-5227.

US Senator Patrick Leahy and his wife, Marcelle, stop by the ANR Clean and Clear booth at the Echo Leahy Center's "State of the Lakes" event