THE FEDERATION OF VERMONT LAKES AND PONDS

NEWSLETTER

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Adapting to Climate Change

By Sacha Pealer and Gwen Dunnington,Vermont Climate Change Team

Last summer, during FOVLAP's Annual Meeting, lake association representatives discussed indicators of climate change in Vermont, Wisconsin, and other areas of the globe with keynote speaker John Magnuson. The topic of adaptation came up toward the end of our discussion. The question of how we can prepare ourselves and our lakes for climate change effects such as more frequent storm events has become a statewide concern since Tropical Storm Irene ravaged Vermont. The following article, written in April 2011, is an excerpt from a larger report titled "Climate Change and Vermont's Waters." This and other contributions to the Climate Change Adaptation White Paper Series are available on the Vermont ANR Climate Change website: (http://www.anr.state.vt.us/anr/climatechange/).

Are we ready for climate change?
What water resources are most vulnerable?

Vermont is just beginning to identify the water resources most vulnerable to climate change, which is an important step toward planning adaptation efforts. Vulnerabilities may be found in human communities and aquatic ecosystems where the resource is already highly stressed, or in particular species that are rare or highly sensitive due to specialization.

Human communities

In human communities, vulnerabilities may include locations of infrastructure already at risk. For example, flood-prone shorelines and streams with high levels of encroachment may be especially susceptible. Significant and costly structures (e.g., bridges, culverts, roads, ditches, homes, and embankments) could be damaged by erosive flooding, and stormwater systems could be overwhelmed during high rainfall events. Similarly, dams may be subject to changing flow regimes, accelerated sediment buildup behind structures, and elevated risk for catastrophic failure during high flow events. Because of the potential for increased pollution and short-term droughts, drinking water availability and quality may also be at risk, creating additional costs associated with storage and/or treatment.

Aquatic ecosystems

Aquatic ecosystems may be especially vulnerable wherever habitats are already compromised. For example, locations with little or no vegetated buffer will experience higher thermal stress. Also, habitats may be fragmented by barriers to aquatic species movement, such as culverts, berms, or dams. Critical ecosystem processes that have been altered (e.g., where floodplain function is diminished by flow regulation or excessive encroachment) may already limit habitat diversity and availability. Particular species vulnerabilities may include species sensitive to warmer temperatures and oxygen-poor waters (e.g., brook trout), rare species or species sensitive to sedimentation (e.g., freshwater mussels), species with pronounced susceptibility to mercury contamination (e.g., loons), or species that may provide benefits to other species (e.g., tree species important for riparian buffers that may themselves be vulnerable to warming temperatures) (Stager and Thill, 2010; Frumhoff et al., 2007).

What are we already doing?

In most cases, the challenges posed by climate change are not new, only expected to become more intense in the upcoming decades. Therefore, management strategies already utilized by the Water Quality Division may become increasingly critical for climate change adaptation and mitigation, now and in the future. Some existing programs that may be useful in addressing climate change include:

1. Monitoring biological, chemical, and physical conditions of lakes, rivers, and wetlands, to establish baseline conditions and help maintain the health and quality of local waterways.
2. River corridor, floodplain, and shoreline protection to reduce encroachment, and river, lake, and wetlands vegetated buffer promotion.
3. Stormwater regulation and promotion of low impact development/ best management practices.
4. Improving and protecting existing infrastructure near waterways. This includes upgrading of undersized culverts and bridges, regulating uses that alter stream flows, and the strategic removal of obsolete, inoperative dams.

Working considerations of climate change into these existing management strategies will be one efficient way of utilizing the systems already in place to deal with new challenges.

What more can be done to protect Vermont's waters in the short term? What research would help?

Climate changes are already in motion, and further change may occur rapidly. To protect our vital water resources, we must respond quickly. Going forward, Vermont could implement these strategies:

- Ensure climate change is an important consideration in water resources policy and decision-making.
- Participate in climate change discussions and planning at the regional (Northeastern U.S. and Canadian provinces) level.
- Support and refine existing efforts to protect water resources.
- Improve lakeshore protection and ecologically appropriate shoreline stabilization policies.
- Re-establish and maintain physical stability ("geomorphic equilibrium") of streams.
- Protect river corridors and floodplains to accommodate river adjustment and floodplain processes.
- Protect and restore vegetated buffers on lakes, streams, and wetlands.
- Develop education and outreach programs concerning climate change as a water resources issue.
- Establish policies that set new infrastructure further back from waterbodies and retains naturally vegetated buffers to protect the infrastructure from the predicted higher frequency and magnitude of flooding and lake level fluctuations.

Understanding climate trends and their impacts to Vermont's water resources will be essential to making wise decisions about adaptation. Much of what we know can be refined through planned research efforts:

- Continue to evaluate how precipitation changes may affect stream flow and flooding.
- Analyze buffer characteristics needed for maintaining adequate microclimate over Vermont water bodies, map thermal risks throughout watersheds, and monitor water temperature and dissolved oxygen in lakes, rivers, and wetlands.
- Conduct species vulnerabilities surveys and create monitoring and/or "rescue" plans.
- Assess ecological functions and vulnerabilities by watershed, and prioritize locations for additional protection, buffering, and/or restoration.
- Enhance monitoring programs for toxins in wastewater, ground water, and water bodies.

(continued on page 3)

President's Corner – Perry Thomas

After a trip to Castleton in early April, my family and I are freshly aware of the force with which Tropical Storm Irene swept through Vermont. We had seen photographs and video footage of flood damage, but seeing the impacts up close is a different experience altogether—even seven months after the event.

In this newsletter, thanks to input from Sacha Pealer and Gwen Dunnington, we consider how aquatic ecosystems can be protected from more frequent and more intense storm events—a discussion we began at last summer's Annual Meeting. We also anticipate several 2012 summer workshops that grew out of discussions begun at the 2011 Lake Seminar.

FOVLAP is grateful to the Vermont Community Foundation and Green Mountain Coffee Roasters for supporting our 2012 educational outreach activities. More information about these and other upcoming events will be posted on our website (www.vermontlakes.org) as it becomes available.

Also on our website is a link to our new legislative blog. Click on "2012 Legislative Updates" to visit the blog. Many thanks to blogger Cindy Swanson and other members of FOVLAP's Legislative Issues Committee for keeping us abreast of lake-related developments at the State House.

If you would like to join us in our work on behalf of lakes, please send a message to fovlap@vermontlakes.org.

Adaptation (cont'd from page 2)

What next?

Vermont would benefit from a thorough vulnerability study of human communities, aquatic habitats, and species. This vulnerability analysis can be used to inform an adaptation strategy for all watersheds in Vermont. In order to be most effective, existing water resources management programs must be coordinated and integrated with any climate change adaptation strategy.

References

Frumhoff, P.C., J.J. McCarthy, J.M. Melillo, S.C. Moster, and D.G. Wuebbles. 2007. *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions*. Synthesis report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists.

Stager, J.C. and M. Thill. *Climate change in the Champlain Basin: What natural resource managers can expect and do*. The Nature Conservancy, May 2010.

Lay Monitors Recognized as Citizen Scientists

The Lay Monitoring Program was a finalist for the 2012 Green Mountain Environmental Leadership Award, Citizen Science category.

Matt Sutkoski of the Burlington Free Press praised Lay Monitoring volunteers for amassing 33 years of data documenting water quality across Vermont's lakes.

Amy Picotte nominated the Program and recommended Andy Dales to represent the volunteers. Dales has been monitoring Caspian Lake since 1979 and reports water quality has not declined over the years, in fact his data suggest water quality may have improved slightly.

The Green Mountain Environmental Leadership Awards are co-sponsored by Free Press Media, ECHO Lake Aquarium and Science Center at the Leahy Center for Lake Champlain, and AllEarth Renewables. Visit www.burlingtonfreepress.com/greenawards to learn more.

Native Plant Nursery Grows Trees for You!

By Marli Rupe

The mission of the Champlain Valley Native Plant Restoration Nursery is to produce high quality container-grown seedlings from local seed stock for restoration and buffer plantings in the Champlain Valley. One of the key strategic directions identified for conservation success in the Southern Lake Champlain Valley is to implement the planting of native trees and shrubs in floodplain, clay plain forests, and other restoration projects. There are compelling reasons for using plants with genetic-based adaptations to local conditions. Plants adapted to local conditions have a significantly better chance of prospering in local conditions than plants that evolved elsewhere under different conditions. It is also possible that local plant populations can co-evolve with local fauna, such as insects, fungi and birds, thus developing unique relationships.

Shrubs	
Speckled alder	*Alnus incana**
Silky dogwood	*Cornus amomum**
Gray dogwood	*Cornus racemosa**
Red-osier dogwood	*Cornus sericea **
Witch-hazel	*Hamamelis virginiana**
Winterberry holly	*Ilex verticillata**
Carolina rose	*Rosa caroliniana**
Maple-leaf viburnum	*Viburnum acerfolium*
Arrowwood	*Viburnum dentatum**
Nanny berry	*Viburnum lentago**
Highbush-cranberry	*Viburnum trilobum**

In 2001, as a result of the need for local genetic plant material The Nature Conservancy's Southern Lake Champlain Valley Program and the Poultney-Mettowee Conservation District together started a native plant nursery. In 2011, the nursery was re-located to the Green Mountain College campus in Poultney, Vermont, and the college became a full partner in this project, opening new doors for education, outreach and plant propogation and sales.

Trees	
Silver maple	*Acer saccharinum **
Red maple	*Acer rubrum **
Sugar maple	*Acer saccharum**
Musclewood	*Carpinus caroliniana**
Shagbark hickory	*Carya ovata**
American beech	*Fagus sylvatica*
White ash	*Fraxinus americana**
Green ash	*Fraxinus pennsylvanica**
Hophornbeam	*Ostrya virginiana**
White pine	*Pinus strobus**
Sycamore	*Platanus occidentalis**
Cottonwood	*Populus deltoides **
White oak	*Quercus alba**
Swamp white oak	*Quercus bicolor **
Bur oak	*Quercus macrocarpa **
Chestnut oak	*Quercus prinus**
Red oak	*Quercus rubra **
Black willow	*Salix nigra **
Basswood	*Tilia americana**
Eastern hemlock	*Tsuga canadensis**
American elm	*Ulmus americana **

The nursery receives a great amount of help from volunteers and interns in accomplishing seed collection, propagation and growing operations. Many opportunities exist for individuals and groups interested in learning about native plant production and lending a hand. The long-term financial goal of the nursery is to become self-sustaining through the sale of seedlings. Seedlings are being sold wholesale to individuals and groups engaged in conservation and restoration plantings in the Champlain Valley such as regional watershed and county conservation districts, private conservation organizations, and farmers and private landowners enrolled in government cost-share conservation programs.

Available plants vary each year but the lists indicate normal seed propagation. Contact Keith Roberts, Nursery Manager for further information (at robertsk@greenmtn.edu).

Nursery
Green Mountain College
One Brennan Circle
Poultney, VT 05764
802-282-6314

FOVLAP's 2011 Annual Meeting Redux

At the 2011 Annual Meeting, lake association representatives reported on issues ranging from milfoil management to snowmaking impacts. Joe Curcillo compiled a list of the issues presented, and Ginny Garrison recorded details of follow up discussions. If you would like to connect with one of the lake association representatives listed below, please e-mail us at fovlap@vermontlakes.org to obtain contact information.

Canada Geese:	Caspian Lake (Greensboro Association) – Andy Dales
Snow Making:	Little/Big Hosmer – Judy Davis
Greeter Programs:	Lake Eden – Art Curcillo
	Lake Bomoseen – Chuck Hughes
	Lake Dunmore – Jay Michael
Lakeshore Buffers:	Seymour Lake – Peggy Barter
	Shadow Lake – Tim Stone
Milfoil Management:	Lake Elmore – Martha Twombly
	Willoughby Lake – Carroll Guitar
	Halls Lake – Cindy McCarthy
	Burr Pond – Dave Weaver
	Lake Dunmore – Jay Michael
	Lake St. Catherine – Robert Williams
Lake Safety:	Lake Morey – Bruce Durgin
Educational Programs:	Calais Lakes – Noreen Bryan
Watershed/Nutrients:	Lake Iroquois – Roger Crouse
	Lake Bomoseen – Chuck Hughes
	Mephremagog Watershed – Gail Lynch
Liability (D & O):	South Pond (Eden) – Jerilyn Bergdahl
Boat Access:	Greenwood Lake – Paul White

After issue reports, there was an opportunity for attendees to ask questions or provide responses to questions raised during the lake reports. Three issues were discussed during this time:

(1) INSURANCE for lake associations and Boards of Directors/Officers: some lakes have it, some do not; it is relatively expensive. The membership asked the FOVLAP Board to (a) determine if there is protection for Boards through Vermont state law as there appears to be in some states, (b) pursue statewide legislation to protect Boards, and (c) determine if FOVLAP can offer insurance to member associations.

(2) GOOSE MANAGEMENT: Some suggestions for effective goose deterrent techniques included getting a resident osprey, running a string about one foot high along the shoreline, erecting coyote silhouettes on spinning pins, establishing buffer strips with native vegetation, and oiling the eggs (state permission needed).

(3) STORMWATER RUNOFF MANAGEMENT: A Vermont Rain Garden Manual is available from the Winooski Natural Resources Conservation District. There is also a VT Low Impact Development Guide for Residential and Small Sites, and a Low-Risk Site Handbook for Erosion Prevention and Sediment Control, available from the VTDEC.

Updates regarding insurance, goose management, stormwater runoff management, and other issues will be provided at FOVLAP's 2012 Annual Meeting.

Where Are Our Friends in DEC's Lakes and Ponds Section?

After the Waterbury State office complex was flooded by Tropical Storm Irene, the Lakes and Ponds team moved to the VSAC building in Winooski. New contact information is now available on the DEC website: (http://www.vtwaterquality.org/contacts.htm).

The Lakes and Ponds Section is pleased to welcome Bethany Sargent to the staff beginning in April of 2012. Bethany comes from the Lake Champlain Sea Grant, where she has been Communications Coordinator, and brings with her extensive experience in both water quality monitoring and watershed education. She will be coordinating the Lay Monitoring Program and the Vermont Invasive Patrollers as well as conducting outreach, freeing Amy Picotte up to devote more time to Shoreland Management outreach.

The Northeast Kingdom Healthy Waters Initiative

By Maria Young, Education & Outreach Coordinator, NorthWoods Stewardship Center

When introducing the concept of a watershed at work to 6th graders this spring, one curious student asked: "So, am I standing in a watershed right now?" The answer was an emphatic, "yes!" Not only are you standing in one now, you also sleep in one, eat in one, recreate, explore, and work in one. Many of us are fortunate to do these things in the Memphremagog Watershed, whether it is a small brook, lake, forest, field, or mountaintop headwaters that we visit or call home. The Northeast Kingdom Healthy Waters Initiative was launched by a collaborative effort of the Memphremagog Watershed Association and several other organizations in the fall of 2011, including area lake associations, FOVLAP, the NRCD and the VT DEC, and the NorthWoods Stewardship Center. The Healthy Waters Initiative workshops and events this summer take a watershed's perspective on water quality–aiming to unify each of us and our place in the watershed through a common goal: to better understand our watershed at work, and to learn to become better stewards of this special place.

The NEK Healthy Waters Initiative begins with an evening seminar: "Stewardship at Water's Edge" on Friday, June 8th, at NorthWoods Stewardship Center in East Charleston. Through Eric Hansen's incredible photography and work on loon habitats and Kellie Merrill's experience with lakeshore buffers and watershed health, the evening will be informative, engaging, and inspiring!

Successive workshops aim to provide hands-on training, education, and resources to help participants became more active and engaged in watershed health. On Saturday, July 14th, at Seymour lake in Morgan, Dayna Cole of the NRCD and Maria Young of the NorthWoods Stewardship Center, will provide landscaping tips, techniques, and resources at "Restoring your Shore with Natural Buffers."

On Wednesday, July 25th, Bill Kilpatrick and Art Brooks will explore life in the littoral zone of Seymour Lake—the shallow waters at lake's edge. With nets and microscopes, lesser-known macro-invertebrates will help answer the question, "What's in your Waters?"

On August 15th, the series will conclude with a Vermont Invasive Patroller (VIP) Workshop on Lake Memphremagog. The first part of the day will be dedicated to aquatic plant identification, followed by instruction for early detection of cyano-bacteria (blue-green algae) and other aquatic invasive species. This workshop is supported by a grant to FOVLAP from Green Mountain Coffee Roasters.

Registration for all events listed above is through NorthWoods Stewardship Center (802-723-6551). More details are available at www.northwoodscenter.org. We hope that the summer's events will help you gain a new perspective on watersheds.

REMINDER: *You do not want to miss!*

Lake Seminar

Friday ~ June 1, 2012 ~ VTC, Randolph Center, VT

Mark your calendars for Friday, June 1, 2012; we will hold the annual Lake Seminar in the Red School House adjacent to Vermont Tech's campus in Randolph Center. Sessions will address shoreline buffer restoration, invasive species spread prevention, and water quality management. Please join us for an engaging and informative day. Watch the FOVLAP website for details or write to us at fovlap@vermontlakes.org to make sure you are on the mailing list. ***See you there!***

Regional Events

The Northeast Kingdom Healthy Waters Initiative kicks off with "Stewardship at Water's Edge" on Friday, June 8th, 7:00 p.m., at the NorthWoods Stewardship Center in East Charleston.

Members of central and southern Vermont lake associations are invited starting at 10:00 a.m. for lively discussion and lakeshore exploration on Saturday, June 9th, at the Kehoe Conservation Education Center in Castleton.

Annual Meeting

Monday ~ July 30, 2012 ~ The Steak House
at 1239 US Route 302 – Berlin (Barre-Montpelier Road)

Check the FOVLAP website (www.vermontlakes.org) for more details about all of the events listed above.

Please send us your updated list of Association Officers and e-mail contact. Mail them to our P.O. Box or email them to us at fovlap@vermontlakes.org

2012 Membership Dues

We invite you to join our Federation and help preserve Vermont's lakes and ponds.

( ) **$25.00** *Association Member* ( ) **$15.00** *Individual Member*

Name: _____

Address: _____

Association: _____

Contact Phone No.: _____ e-mail: _____

( ) *We would like to show our support with the following additional donation* $_____.

The Federation is a 501c3 non-profit organization. Your contribution is tax deductible in accordance with I.R.S. regulations.

Checks payable to the Federation of Vermont Lakes and Ponds and mailed to our P.O. Box 421, Waterbury, VT 05676.

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Join us.....

Join us at the NorthWoods Stewardship Center in East Charleston (June 8th at 7:00 p.m.) or the Kehoe Conservation Education Center in Castleton (June 9th at 10:00 a.m.) to meet with neighbors and ecologists as we consider together how best to "Save Our Lakes" with lakeshore buffers. Or, if you want to get started with spring planting now, visit the Vermont Department of Environmental Conservation's water quality website to learn more (http://www.vtwaterquality.org/lakes.htm).

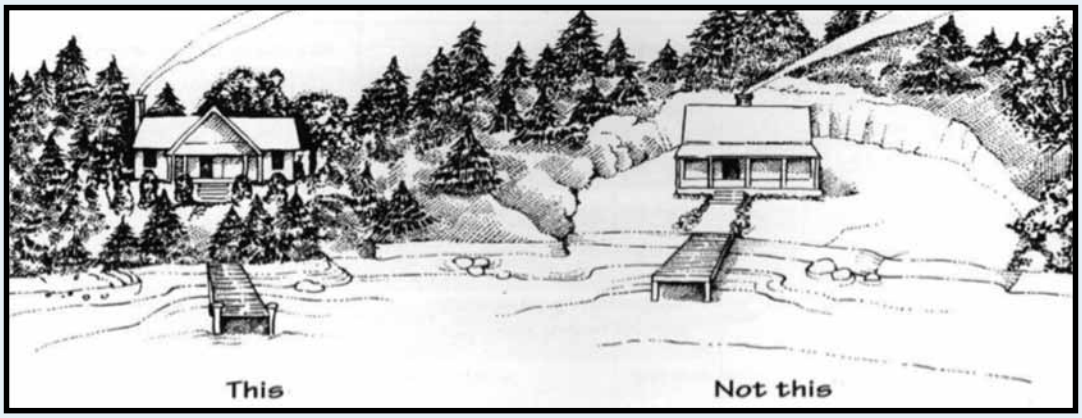

Illustration courtesy of Maine Dept of Environmental Protection
(VT Agency of Natural Resources, Lake Protection Series #2: "Only You Can Save Your Lake."
http://www.anr.state.vt.us/dec/waterq/lakes/docs/lpseries/lp_lpseries2.pdf#zoom=100)