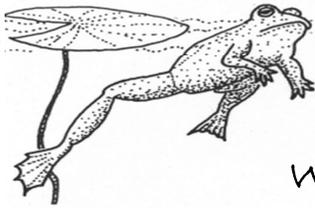
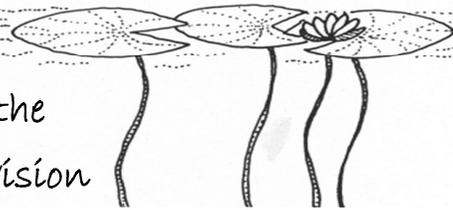


Out of the Blue



A Newsletter of the
Water Quality Division



Summer 2009 No. 35

Vermont Agency of Natural Resources
Department of Environmental

The Quadricentennial (400 Years!) of Lake Champlain

Samuel de Champlain visited the lake in 1609 and proclaimed this area to be a land of "Vert Mont" or "Green Mountain."

Lake Champlain's name dates back to its exploration by Europeans four hundred years ago in 1609. It was named after the first European explorer to reach its shores, a Frenchman, Samuel de Champlain.

Samuel de Champlain was the first European to see Lake Champlain and is credited with discovering the essential waterway between the Hudson and the St. Lawrence Rivers, hence how Lake Champlain was named. Coincidentally, a few months later, the English explorer, Henry Hudson, navigated his way north, up what was later named the Hudson River. Both explorers hold significant historical legacies, as their journeys opened up new passage ways for others to follow and bring change to the surrounding landscape.

When the first Europeans arrived in the Champlain Valley searching for land and water routes, they set into motion a series of events that would lead to the downfall of the Iroquois, Abenaki, Mohican and Mohawk and forever influence the history in the region. **See page 2, "Quadricentennial"**

Birds, Shores and Water Quality

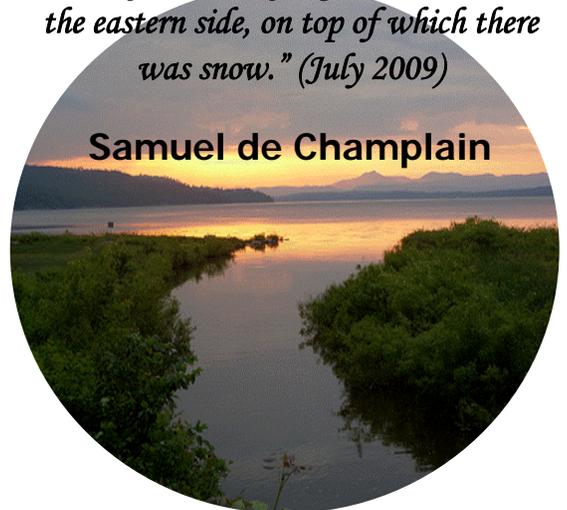
How healthy are the woods around your lake? Maybe the birds can tell you! Audubon Vermont has produced a list of the "Birder's Dozen;" twelve relatively common Vermont species whose habitat needs collectively represent a range of forest conditions. You can use this list to see how many are in the woods around you and along the lakeshore, and check to see if they are returning each year.

Northern New England and New York State have among the highest density of breeding bird species on the continent as shown by Audubon's annual breeding bird surveys. Audubon has identified 39 "Responsibility Birds" that the Audubon Vermont Forest Bird Initiative is working to protect.

See page 5, "Birds and Water"

"... we entered the lake... Continuing our course over this lake on the western side, I noticed, while observing the country, some very high mountains on the eastern side, on top of which there was snow." (July 2009)

Samuel de Champlain



In This Issue

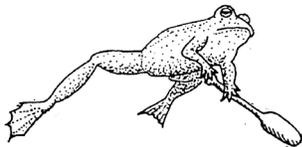
State of the Lakes:

- 12 Great Facts About Vermont Lakes 4
- Clean and Clear: Lake Champlain 5
- Aquatic Invasive Species Highlights 6-7



**Scarlet Tanager -
one of the "Birder's Dozen"**

**"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

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) Quadracentennial of Lake Champlain

In 1535 the French explorer, Jacques Cartier, had established trading with the Iroquois and other tribes living along the banks of the St. Lawrence River. Exchange of furs for metal tools with the Europeans lead to rivalry and warfare among the Native American tribes. The deadly spread of disease, the desire for trading alliances, and continual warfare broke up native communities and drastically weakened their populations. By the time Samuel de Champlain arrived in 1609, he easily defeated the Mohawks at Ticonderoga.

The Lake Prior to Champlain's Arrival

Before Champlain arrived in Vermont, the Lake survived 12,000 years of transitions. As the Laurentian Ice Sheet - the last of the glaciers - retreated north, Lake Vermont was formed from water of the melting glacier. However, this freshwater community did not last, as eventually the sea flowed in from the St. Lawrence waterway creating a marine environment known as the Champlain Sea.

This new habitat for marine wildlife and upland species, roughly 10,000 – 9,000 years ago, brought hunting opportunities for Native American tribes. The first people believed to have come to the Champlain Valley were the Paleoindian Hunter-Gatherers.

With the weight of the mile thick glacier gone, the earth's surface rebounded, changing the drainage direction which cut off the flow of the ocean into the Champlain area. From rainfall and snow melt, the freshwater environment eventually took over in Lake Champlain, and left it as we know it today.

Samuel de Champlain only spent about a month in the Champlain Valley, but long enough to make a lasting impression and have his name used for Vermont's largest lake. Champlain is also credited with founding Quebec City, a place he established to control trade through the St. Lawrence River and use as a base for his travels along the Atlantic Ocean.

The Lake After Champlain's Arrival

Since the period of exploration, Lake Champlain has been the forum for a pivotal Revolutionary battle, the Battle of Valcour; used as a major trading route between the St. Lawrence and the Hudson Rivers; and most recently is the location of wonderful recreational opportunities.

Unlike when Champlain visited the Lake 400 years ago, much of Vermont has been logged, used for agriculture, or has been settled by permanent residents. About half of Vermont drains to Lake Champlain; its large watershed makes it very challenging to manage and protect. Public awareness and involvement in keeping Lake Champlain clean and healthy is the most effective tool available for protecting the Lake. To learn more about who and what is being done to manage Lake Champlain today, visit the Vermont Clean and Clear web site at: www.anr.state.vt.us/cleanandclear/; or contact the Lake Champlain Committee at: www.lakechamplaincommittee.org/; or visit the Lake Champlain Basin Program at: www.lcbp.org. And, contact Amy Picotte at: Amy.Picotte@state.vt.us to learn more about volunteer monitoring opportunities on Lake Champlain.

LAKE CHAMPLAIN TIME LINE

1972 US Clean Water Act leads to citizen lake protection

1823 Champlain Canal Opens

1776 Battle of Valcour Island

1609 Samuel de Champlain

0

Prehistoric

7,000 BC

10,000 - 12,000 BC

Period of Recreation

Period of Trade and Commerce

Period of Battles (1664—1815)

Period of Exploration (1500s)

Woodland Period (900BC –1600AD)

Archaic Period (7000– 900BC)

LAKE CHAMPLAIN

Paleoindian Hunter-Gatherers

CHAMPLAIN SEA

LAKE VERMONT

Laurentian Ice Sheet Melts

Vermont Volunteer Monitoring

1963 The Lake Champlain Committee

1979 Vermont Lay Monitoring Program

1987 River Watch Network

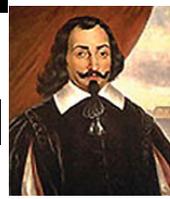
1980s St. Michaels College - River Monitoring for Schools

1990 Lake Champlain Basin Program

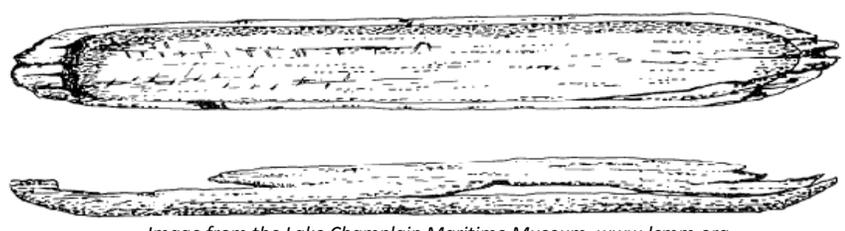
1999 UVM Watershed Alliance

2003 LaRosa Partnership Program

2007 Volunteer Invasive Patrollers



400 Years of History!



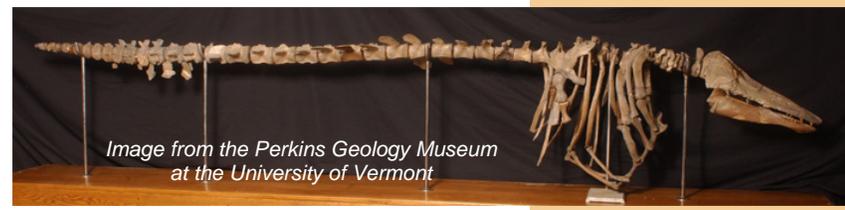
Native American Dug-Out Canoe from about 1450 AD, found in Shelburne Pond

Image from the Lake Champlain Maritime Museum, www.lcmm.org

A Whale in the Champlain Valley?

The Vermont state fossil is the beluga whale (*Delphinapterus leucas*)! This is a white whale that still lives in the arctic and subarctic waters of the world, making it the only state fossil of an animal still living today. The first bones of this animal were uncovered in 1849 near Charlotte while constructing the railway.

The "Charlotte Whale" must have lived here about 12,500 years ago, during the time of the Champlain Sea. The Champlain Sea existed for roughly 2,500 years after the last glaciers retreated into Canada, leaving an opening for the Atlantic Ocean to flow into. When the earth rebounded from the lifted weight of the glaciers, the direction of water flow reversed, preventing the ocean from entering the Champlain Valley. The marine environment eventually changed into a fresh water one. The reconstructed skeleton of the Charlotte Whale can be visited at the Perkins Geology Museum at the University of Vermont, www.uvm.edu/perkins/mission.htm.





- ◆ Vermont has a lake that was once a Great Sea! That's Lake Champlain.
- ◆ Lake Willoughby in Westmore is known for its spectacular scenery and clear water, and is sometimes called the "Lake Lucerne of America."
- ◆ Sunset Lake in Benson holds the all-time record for water clarity among Vermont lakes, with a transparency reading of 52 feet recorded on August 11, 2002. This reading is one of the deepest ever recorded across the country.

**A Dozen Great Facts About Vermont Lakes
— Natural Resource Jewels —**

◆ Eighty-seven percent of all fresh surface water on the planet is found in lakes; rivers holds two percent and wetlands 11 percent. Vermont has a similar distribution of fresh surface water.



◆ Vermont lakes offer colorful, amazing snorkeling experiences that rival any Caribbean underwater adventure! Plus, Lake Champlain has over 300 shipwrecks, nine of which can be visited by divers through the Lake Champlain Underwater Historic Reserve!



Cousteau (CNN)

◆ Famous aquatic biologist Jacques Cousteau took his first dive into the underwater world on Harveys Lake in Barnet, Vermont! Cousteau credited his childhood experience at Harveys Lake with greatly influencing his love for and pursuit of aquatic ecology and science.



◆ The Town of Woodbury has 24 lakes and ponds, the greatest number in Vermont.

◆ Thirty-five of the 53 Vermont State Parks are located on Vermont lakes, including the most popular parks.

◆ Lake Champlain has a legendary monster called Champ.

◆ In the late 1790s, the first steam engine boat was invented and tried out on Lake Morey.

◆ The Vermont Lay Monitoring Program is the 4th longest running citizen lake monitoring program in the country and for that matter, the world!

◆ Beautiful Vermont lakes are only protected by public involvement as there is no statewide regulation on shoreland and watershed development.

Clean and Clear - Lake Champlain!

The Vermont Clean and Clear Action Plan was initiated in 2003 with the goal of accelerating the reduction of phosphorus pollution in Lake Champlain. The Clean and Clear Action Plan involves programs designed to better manage the landscape in order to “turn off the spigot” and reduce the annual load of phosphorus pollution being delivered to Lake Champlain.

Clean and Clear emphasizes efforts to improve water quality in those segments of Lake Champlain showing the most profound affects of phosphorus pollution - in northern Lake Champlain, particularly the Missisquoi and St. Albans Bay watersheds, and in southern Lake Champlain (areas south of Crown Point) - by undertaking innovative steps to control land-side phosphorus loads. Programs include efforts to install the necessary structures in barnyards to prevent direct farmstead discharges; minimize the further loss of floodplain function in order to maximize watershed storage of sediment and nutrients; reduce storm-water erosion in urban and suburban areas as well as along backroads; and eliminate discharges of improperly or untreated sewage.

Additionally, the Clean and Clear program has supported hundreds of water quality projects throughout the state such as: securing belt-width river corridor easements on active channels in watersheds from the Batten Kill to the Missisquoi; providing incentives for more than 8,000 acres of cover cropping; and providing technical and financial assistance to nearly 150 towns to reduce road-related erosion.

The 2008 Clean and Clear Annual Report describes the program’s purposes and accomplishments in more detail, and can be found on-line at: <http://www.anr.state.vt.us/cleanandclear/rep2008/CleanandClear2008Rpt.pdf>



(continued from page 1) Birds and Water

These 39 species are especially reliant on Vermont and other northeastern woodland habitats, and we have a responsibility to protect them here in the area they most rely on. The Birder’s Dozen is a subset of these that can help citizen scientists track forest health and bird populations in their area.

Many bird species particularly prefer wooded areas along lakes and streams. These buffer areas offer not only feeding opportunities for many bird and animal species, but the interaction between the woods and the water is a critical factor in lake habitat health as well. Diverse woods and buffers offer a variety of feeding and habitat conditions to satisfy even the pickiest of species. Of the Birder’s Dozen, the yellow bellied sapsucker searches out dying birch and poplar trees to build a new nest every year, the veery, the thrush with the beautiful descending spiral song, favors mature wood with dense understory, while the black-throated green (a warbler) uses coniferous forests.

Check out the diversity and health of the bird populations and woods around your lake by downloading a fact sheet about the Birder’s Dozen at www.vtaudubon.org, click on “Science and Conservation,” then on “Forest Birds Fact Sheets.” The Birder’s Dozen fact sheet also provides suggestions on enhancing habitat for these species. Remember, land conditions good for these birds are conditions good for the lake as well.

The Birder’s Dozen

1. Wood Thrush
2. Blue-Headed Vireo
3. Eastern Wood-pewee
4. Yellow-Bellied Sapsucker
5. Chesnut-Sided Warbler
6. Black-Throated Green Warbler
7. Black-Throated Blue Warbler
8. Scarlet Tanager
9. White-Throated Sparrow
10. Canada Warbler
11. American Woodcock
12. Veery



HIGHLIGHTS

Aquatic Invasive Species

◆ Variable-Leaved Watermilfoil

The arrival of one new invasive aquatic plant in Vermont, variable-leaved watermilfoil (*Myriophyllum heterophyllum*), was confirmed fall 2008 in Halls Lake in Newbury located on the eastern side of the state.

Variable-leaved watermilfoil (VLM) is not native to Vermont and can be difficult to control once established. It is a perennial species whose seeds, if produced, germinate readily. It is also spread easily by plant pieces. This plant is aggressive and grows rapidly making swimming, boating and other recreational uses difficult. It easily will outcompete beneficial native aquatic plants in the waters it invades, causing negative shifts in the ecological balance. Under the Agency of Agriculture, Food and Market's Noxious Weed Quarantine Rule (#3), VLM is a Class A Prohibited Species in Vermont.

The Halls Lake VLM population represents the **first confirmation of this invasive aquatic plant in Vermont** and the first new invasive aquatic plant confirmed in the state since European frogbit was found in Lake Champlain in the early 1990s. This fact, in addition to its Class A status under the quarantine rule, points to the need for aggressive action in preventing its establishment or spread in Vermont.

The Department of Environmental Conservation staff deployed rapid response initiatives – searches, handpulling, fragment curtain, education and outreach efforts - throughout October and the first half of November 2008 to survey for and remove VLM from Halls Lake. At the conclusion of these efforts on November 13, 2008, VLM was believed limited to a three-acre cove at the southern end of the lake. In total, handpulling efforts removed an estimated 51 cubic feet of VLM plants ranging in size from multi-stemmed plants up to 2.5 feet in length to



**Eurasian watermilfoil, left;
variable-leaved watermilfoil, right**

single-stemmed plants of an inch in size. Removed plants were composted off-site. On-going efforts in 2009 have started as immediate attention is critical to continued success.

A unique opportunity exists to successfully manage and possibly eradicate VLM from Halls Lake, **and** prevent it from gaining a foothold in other waters in Vermont. Success will depend on continued management efforts and the availability of appropriate control options if needed.

If you are interested in learning more about VLM, like how to distinguish it from its invasive cousin, Eurasian watermilfoil, or look-a-like beneficial native aquatic plants, **sign-up for a VIP workshop this summer**. For a schedule of upcoming workshops, visit our website at: www.vtwaterquality.org/lakes.htm

◆ Spiny Water Flea

Another new species - **spiny water flea** (*Bythotrephes longimanus*) – is threatening to invade Lake Champlain. The spiny water flea is not really a flea – it’s a tiny crustacean from Asia and Europe that showed up in Lake Ontario in 1982. **In the summer of 2008, the spiny water flea was discovered in Great Sacandaga Lake, NY**, on the edge of the Lake Champlain watershed. The outlet of Great Sacandaga Lake is connected to the feeder canal for the Champlain Canal, which could carry this unwanted invader into Lake Champlain.

The spiny water flea and its cousin, the fish hook water flea, can disrupt important food webs leading to significant impacts on plankton biodiversity and fish populations. It can also clog fishing rod guides and foul fishing lines, making it difficult to reel in a fish. Water fleas are spread by “hitchhiking” on fishing gear that isn’t cleaned, or in bilge water, bait buckets, or livewells that aren’t drained before moving to a different waterbody.

A spread prevention outreach campaign is underway in New York state. The Lake Champlain Basin Program and its partners are also investigating potential barrier technologies, such as filters, that could be deployed in the feeder canal to prevent the spiny water flea from traveling up the canal into Lake Champlain.

◆ Eurasian Watermilfoil

Only one new **Eurasian watermilfoil** (*Myriophyllum spicatum*) water was confirmed during the 2008 field season (Fairfield Swamp Pond, Fairfield), bringing the total number of known lakes with populations to 65 and 25 other waterbodies.

◆ Water Chestnut

Good News: - In 2008, a new private access site was developed at Red Rock Bay in Benson four miles south of the old access site at Benson Landing, enabling mechanical harvesting operations to increase efficiency 40% because of the close proximity of harvesting sites to the



Spiny water fleas foul fishing gear
(photos taken by Jeff Gunderson, MN Sea Grant)

offloading area.

- 16 of 68 handpulling sites in Lake Champlain had no chestnut in 2008.
- 100% of mechanically harvested water chestnut spoils are now composted.
- No new “other waterbody” sites were discovered in 2008.

Bad News: - One new handpulling site discovered in Lake Champlain in Bulwagga Bay in Port Henry, New York.

◆ Join the Vermont Invasive Patrollers (VIPs) Early Detection Network!

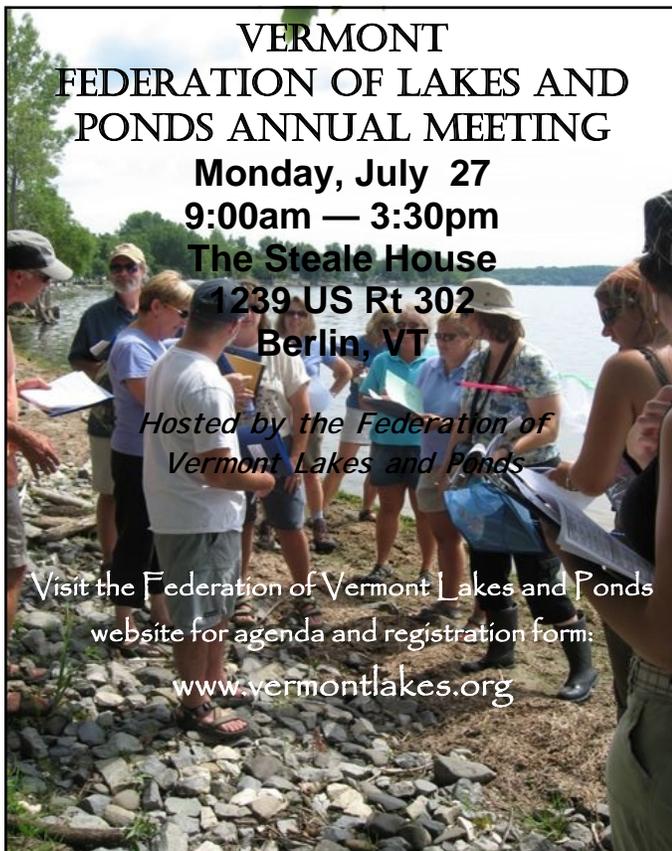
Attend a training workshop and find out how you can monitor your waterbody for new invasive species infestations. You’ll learn to recognize invasive species and distinguish them from our many lake-friendly, native aquatic plants and animals. *Host a VIP training workshop for new volunteers during summer 2009 and receive a free underwater view scope for your group!*

To host a VIP workshop, you need a place with electricity (church basement, school room, town hall, etc.) that is not too far from a waterbody, and a minimum of six participants. For more information, visit us online at www.vtwaterquality.org/lakes.htm ; email leslie.matthews@state.vt.us; or call 802- 241-3777.

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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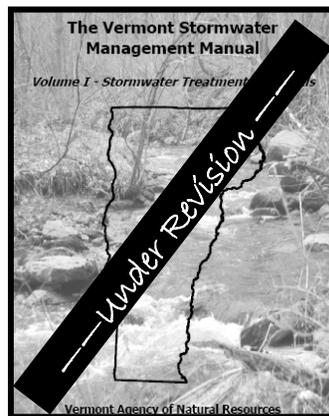
Printed on Recycled Paper



**VERMONT
FEDERATION OF LAKES AND
PONDS ANNUAL MEETING**
Monday, July 27
9:00am — 3:30pm
The Steale House
1239 US Rt 302
Berlin, VT
*Hosted by the Federation of
Vermont Lakes and Ponds*

Visit the Federation of Vermont Lakes and Ponds
website for agenda and registration form:
www.vermontlakes.org

STORMWATER MANAGEMENT MANUAL



Anyone interested in stormwater runoff pollution is encouraged to join the revision process for the Stormwater Management Manual. Input from work groups for infiltration, low impact development, alternative treatment practices, and other areas will help update standards, credits and practices that allow for development while minimizing any damage to the neighboring streams, wetlands and lakes from stormwater runoff pollution.

To learn more, contact Christy Witters at christy.witters@state.vt.us or 802-241-4582. Also check on the web at:

www.vtwaterquality.org/stormwater.htm