Calais Lakes and Ponds WORKING GROUP

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Are Calais's Lakes Changing?

Have you ever wondered whether Calais's lakes and ponds are the same as they always have been? For some time now volunteers have been looking into Calais's lakes and ponds, taking samples and making observations, and we are beginning to have some answers to that question. For those of us who have been dangling our feet in the water for only the past decade, the ponds probably look pretty much the same. But there is more to this story. When we pull back and look at a longer period—thirty to forty years—people can remember when Bliss Pond had few cattails, the water was clear, and the swimming was good. Upper Adamant Pond was not choked with water lilies and other aquatic plants. Today, volunteers are trying to figure out what changes are occurring to our ponds, what the causes are, and whether other ponds are at risk.

Under the state's Lay Monitoring Program, volunteers look at the water itself. They observe its clarity and its potential to grow algae and pond plants. In Watershed Surveys, volunteers look at all the areas of the landscape that affect a lake. They look into the lake itself, at the lake bottom, and at the types and density of plants. They observe conditions along the shoreline and along the rivers, roads, and fields where waters flow on their way to the lake. State grants provide the funds for volunteers to measure the amount of bacteria and ultimately whether swimming is safe.

Laura Brown canoeing near the northern delta at North Montpelier Pond.

Under the Lay Monitoring Program, data has been collected for six of the ponds in Calais. There is comprehensive data spanning more than five years for Bliss, Curtis, Nelson, and North Montpelier ponds. Partial data exists for No. 10 Pond and Woodbury Lake. Review of the data shows disturbing trends. At Curtis and Nelson ponds the levels of phosphorus have jumped by 50 to 60 percent. This begs the question of how much phosphorus is too much. As part of the program to protect the aesthetics and recreation in Lake Champlain, scientists at the Vermont Department of Environmental Conservation asked volunteers, "Would you swim in this water?" Patterns emerged. When the phosphorus levels rose above 14 parts per billion, the volunteers were likely to say the water was uninviting. There was enough phosphorus in the water to fuel unpleasant algae and weed growth, making the water no longer nice to look at or swim in. Bliss and North Montpelier ponds have had phosphorus levels in excess of 14 parts per billion for as long as the monitoring has been done. But this condition is relatively new for Curtis and Nelson ponds. In Curtis Pond the jump to 18 to 20 parts per billion occurred after 1998. It takes some time for plants and algae to respond to the increased levels of nutrients. With eight years of increased phosphorus in Curtis, the changes are becoming apparent. Algae, both floating mats and bottom-clinging types, are more widespread. The types of aquatic plants are changing, and they are becoming denser. Nearly everyone has noticed the expanding colonies of water lilies. At Nelson the increases in phosphorus have occurred for only two years, so it is too soon to see observable changes in plants or algae. However, if this trend continues Nelson Pond will change. Preserving our ponds as good places to swim and play requires lifestyle changes that will reduce the levels of phosphorus.

Watershed surveys have been completed for four of the ponds in Calais: Bliss, Curtis, No. 10, and North Montpelier. For all of these ponds the surveys show that increased phosphorus poses a risk to water quality. In addition, at North Montpelier Pond, large amounts of silt are leading to murky waters and a rapidly expanding delta in the north. The two major sources of phosphorus are soil carried by runoff from the gravel roads and inputs from shoreline and river fronting properties. Here fertilizers, soil from eroding banks or newly created beaches, and failing septic systems are the most likely culprits. Calais has begun to address the phosphorus from the roads by making improvements to grading, ditches, and culverts. Under the state's Better Backroads Program, the Calais Conservation Commission has been awarded two grants to improve conditions on the Worcester Road near Curtis Pond and on No. 10 Pond Road. In the survey of North Montpelier Pond's watershed, which encompasses nearly all of Calais and parts of Woodbury, numerous spots have been identified along the roads where improvements are desirable. In the year ahead we hope to get further grants from the Better Backroads Program.

When it comes to reducing phosphorus from individual properties, it takes attention from each owner to reduce the impact. In our next newsletter we will talk about steps that each of us can take to lower our input of phosphorus into the ponds.

Want to help? Grants to monitor bacteria, specifically *E. coli,* are available from the state. For 2000–2005 *E. coli* levels have been measured in Curtis Pond. For summer 2006 *E. coli* monitoring at Curtis pond was restricted to the town's public swimming beach. Throughout the time of the monitoring, *E. coli* levels have been very low and swimming has been safe. If you are interested in monitoring *E. coli* levels in another Calais pond, there is the opportunity to apply for state grants. **Contact Noreen Bryan (noreen1945@yahoo.com) for information on how to apply.**

River Assessment of Kingsbury Branch Watershed

The Agency of Natural Resources' Rivers Management Program is working with The Friends of the Winooski River and the towns of Woodbury, Calais and East Montpelier to conduct an assessment of the Kingsbury Branch watershed. The study will use an analysis of physical, chemical, biological, and historical data to help explain problems on the river and its tributaries. The study will identify potential measures to resolve or avoid conflicts between the river system and human investments on the landscape. If there is local interest, the assessment could begin this fall.

Eroding stream banks may represent the largest source of sediment and phosphorus pollution entering Vermont's surface waters. Not only is erosion a threat to human infrastructure, but to the aquatic environment that we all value. The 2005 North Montpelier Pond Watershed Survey, conducted by the Lakes & Ponds Working Group of the Calais Conservation Commission, described a large delta forming on the northern end of the pond due to sediment from incoming streams. This sediment was reported as causing murkiness, algae growth, increased weed growth, and scum in the pond. The report identified potential sources of sediment from road crossings, ditches, and stream banks. The upcoming watershed assessment will look at the physical health of the river and its tributaries and attempt to understand the root causes of stream bank instability. The assessment will build on data collected by the Lakes & Ponds Working Group during the various watershed surveys.

The Kingsbury Branch watershed assessment will be used to identify opportunities for enhancing water quality through river and riparian corridor protection and restoration projects. Moreover, the assessment will identify erosion hazards in order to reduce property loss and damage from erosion during flooding events. Finally, the assessment will help plan for potential changes to streams from land uses, floodplain development, loss of riparian vegetation, or stream channel management. **Please contact Ann Smith at The Friends of the Winooski (802-655-4878) or Kristen Rose at the Agency of Natural Resources (802-241-1006) for more information. The River Management website also has information: www.anr.state.vt.us/dec/waterq/rivers.**

Pekin Brook drains most of Calais as it winds its way to the Kingsbury Branch.

Winooski River Basin Planning

The Department of Environmental Conservation will be writing basin plans for each of the seventeen major watersheds in the State of Vermont, and will update them every five years. Next up is the Winooski River, which drains approximately 1,080 square miles in Central Vermont, encompassing all of Washington County, about half of Chittenden County, and portions of Lamoille and Orange Counties. Over thirty Vermont towns contain land that drains to the Winooski River. The Kingsbury Branch of Calais and East Montpelier is one of seven major tributaries of the Winooski. The others are the Little River, , North Branch, Stevens Branch, Dog River, Mad River, and Huntington River.

The Winooski River Basin Plan will summarize natural resource information, current and past water quality assessments, and efforts at the state and local level to protect and restore water quality. The basin plan will identify and prioritize state and local water quality issues, develop strategies for solving water quality problems, and implement on-the-ground protection and restoration projects. The purpose of the basin plan is to guide state and local efforts, and to serve as a resource document for the Winooski watershed.

Watershed Coordinator Kristen Rose will collaborate with state, federal and municipal organizations, local conservation groups, businesses, and a variety of landowners and citizens to develop the Winooski Basin Plan. Public input will be solicited through meetings, educational events, and the development of watershed councils for each major area of the Winooski watershed. Watershed councils will consist of local citizens, organizations, and municipalities representing diverse interests, and they will contribute ideas as well as make decisions on the content of the Winooski River Basin Plan. Watershed Coordinator Jim Ryan will assist the public in securing funding for on-the-ground restoration and research projects in the Winooski watershed. **For more information, please contact: Kristen Rose, 802-241-1006, Kristen.Rose@state.vt.us Jim Ryan, 802-476-0132, Jim.Ryan@state.vt.us**

Illogical Ice

As fall slides into winter in Calais and Mother Nature gets ready to pull the blanket of ice over our ponds for the Long Nap, it's a good time to take note of some of water's more mysterious qualities. In general, water, like most other physical substances, obeys the standard rule of temperature: it sinks as it gets colder. We know that warm air rises (put your hand over a candle flame to find out) and cold air sinks (hence the insulation in your attic). The same is true for water. Anyone who has ever leaped into Nelson Pond on a sunny May afternoon has discovered that bracing fact: A thin skim of warm water will be floating on the top, but just a few inches down it is still chilly, and once you get a foot or two under the surface you are in the polar zone. If you were masochistic enough to hold your breath and dive down further still, you would find that the water keeps getting colder, all the way to Nelson's eternally wintry lower depths.

So far, we are in the realm of "duh" facts. Water sinks as it gets colder. Big deal. Well, the big deal happens when water hits about 40 degrees. As it drops into the 30s, it gets *lighter.* (Less dense, really.) Why? I don't know; ask a chemistry teacher. But it does! By the time it hits 32 degrees and freezes, it is much less dense and likes to float. You've no doubt observed this in your glass many times, or the last time you watched *Titanic.* But you may not have grasped the implications.

In a winter pond, you have ice-cold ice floating on the top. In spring, as the ice warms and melts, it gets denser and sinks, until it gets warm enough (over 40), at which point it rises again. This weird yo-yo quality of water is essential for all life in a lake. It ensures that the water in a lake mixes, with the oxygen-rich surface water cooling and sinking, bringing oxygen to the bottom of the pond, and stirring bottom water to the top, where it gets fresh oxygen. Without this mixing action, which happens in spring and fall, the deeper levels of lakes would never get any oxygen at all, and would quickly become lifeless.

In fact, if water behaved like air and got continually denser as it cooled, the lower levels of Vermont lakes would be frozen solid year-round. Ice would stay at the bottom, with just a surface of sun-warmed liquid water in summer. No fish, or anything else, would exist.

This winter, if you get a chance to get out on a frozen pond for some hockey or ice fishing, give three cheers for the miracle of floating ice.