

# 2011 Water Testing Report

## Lakes Environmental Association



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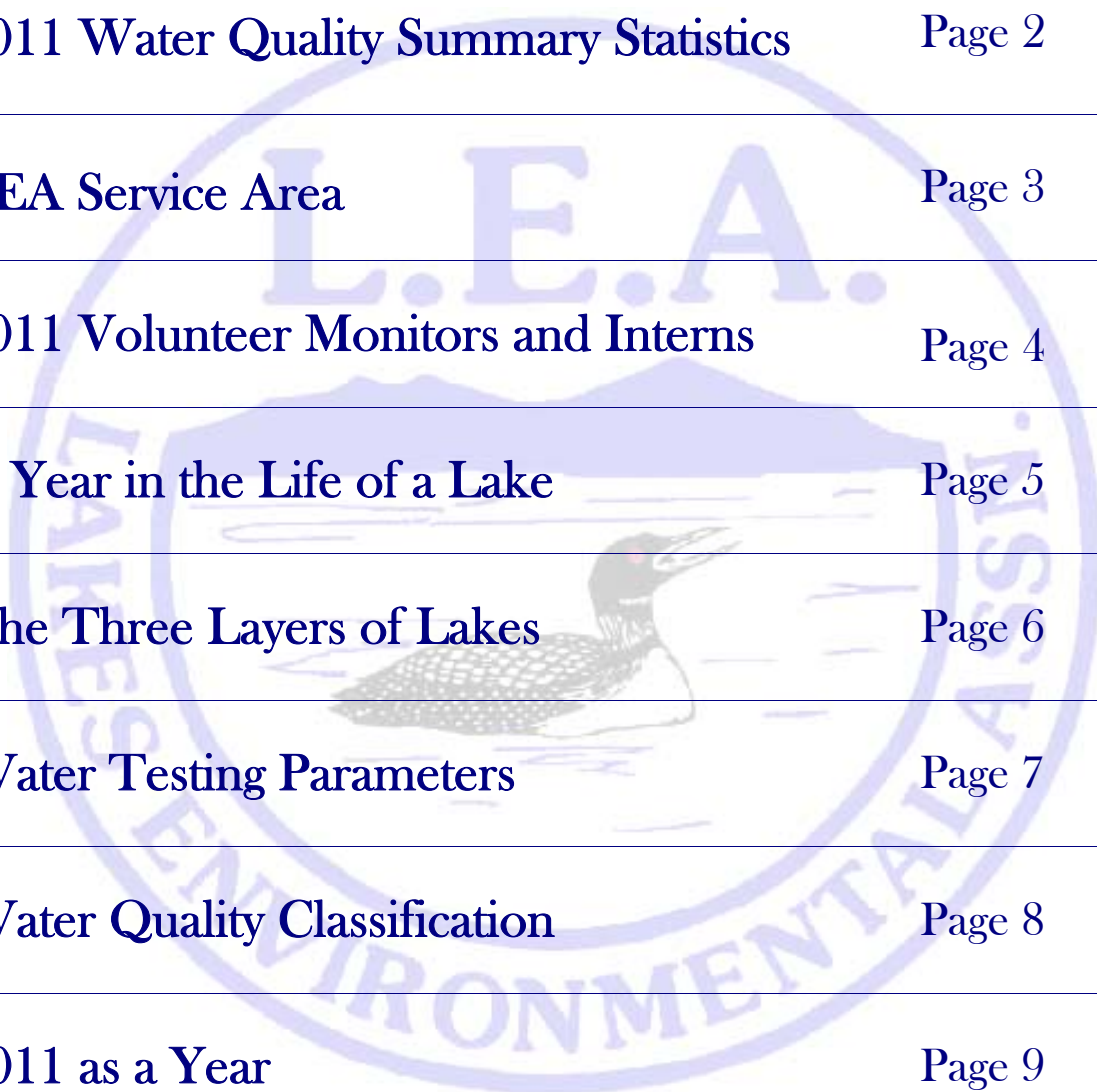
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# Please join LEA!

If you swim, boat, fish or simply believe Maine wouldn't be Maine without clear, clean lakes and ponds, please join the Lakes Environmental Association and protect Maine's lakes now and for future generations. Our lakes face serious threats, from erosion to invasive plants. Since 1970, LEA has worked to protect the lakes and ponds of Western Maine through water quality testing, watershed education and outreach programs.

## 37 lakes tested

LEA protects water quality by helping landowners avoid problems such as erosion and by testing the waters of 37 lakes in Western Maine with help from volunteers and support from the Towns of Bridgton, Denmark, Harrison, Naples, Sweden and Waterford.

## LEA leads the milfoil battle

Invasive aquatic plants, such as milfoil, are not native to Maine waters. Once they invade a lake or stream, they:

- Spread rapidly and kill beneficial native plants.
- Form dense mats of vegetation, making it difficult to swim, fish or boat.
- Alter native fish habitats
- Lower waterfront property values.

## Watershed education

LEA offers environmental education programs to local schools, reaching roughly 500 students annually. Many more people enjoy nature at LEA's Holt Pond Preserve and others join in the Caplan Series of nature pro-

## Landowner and Municipal Assistance

LEA provides free technical assistance to watershed residents interested in preventing erosion on their property. This service, called the "Clean Lake Check Up" helps educate citizens about simple erosion control techniques and existing land use regulations. LEA also works with municipalities on comprehensive planning, natural resources inventories and ordinance development.



Thousands of students have learned about watersheds on LEA's "Hey You!" cruises.

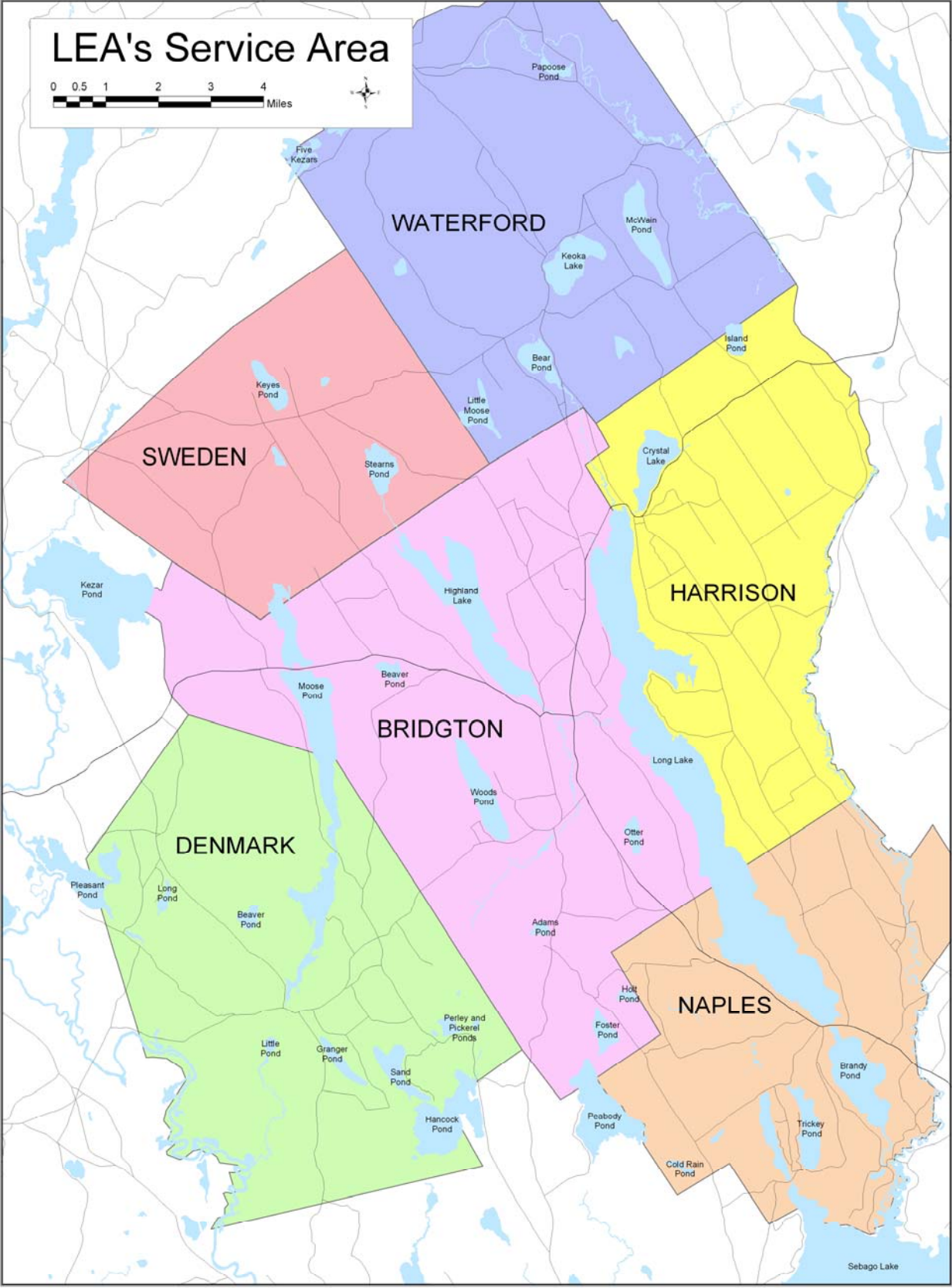
You can become an LEA member with a donation of any amount. Just mail a check to LEA, 230 Main St., Bridgton, ME 04009 or join online at [www.mainelakes.org](http://www.mainelakes.org).

## 2011 water quality at a glance

Lake	Surface Area (acres)	Watershed Area (acres)	Max. Depth (ft)	Av. Secchi (m)	Av. Color (SPU)	Av. Chl-A (ppb)	Av. Phos. (ppb)	Av. PH	Degree of Concern
ADAMS POND	43	196	51	7.1	13	3.2	8.1	6.8	High
BACK POND	62	584	33	6.4	16	2.2	8.0	6.8	Avg/Mod
BEAR POND	250	5,331	72	5.4	18	5.1	10.2	6.7	Avg/Mod
BEAVER P. (Bridgton)	69	1,648	35	6.7	17	4.3	7.0	6.9	High
BEAVER P. (Denmark)	80	1,288	8	2.4	10	4.6	14	6.7	Average
BRANDY POND	733	2,300	44	6.4	17	2.5	8.1	6.7	Mod/High
COLD RAIN POND	36	505	36	4.5	19	6.0	10.0	6.6	High
CRYSTAL LAKE	446	5,345	65	5.8	17	3.1	8.0	6.7	High
FOSTER POND	149	1,090	28	6.9	11	2.2	6.4	6.8	Average
GRANGER POND	125	642	28	6.8	11	3.8	8.9	6.7	High
HANCOCK POND	858	2,222	59	7.1	11	2.7	6.1	6.8	Mod/High
HIGHLAND LAKE	1,295	5,101	50	6.4	15	2.6	7.3	6.6	High
HOLT POND	41	2,118	10	3.0	25	4.7	14	6.5	Average
ISLAND POND	115	1,128	48	5.3	18	2.9	9.5	6.6	Mod/High
JEWETT POND	43	638	41	4.4	20	5.4	-	6.5	High
KEOKA LAKE	460	3,808	42	5.8	16	4.7	8.1	6.7	Mod/High
KEYES POND	191	1,213	42	6.1	20	3.5	8.8	6.7	Mod/High
KEZAR POND	1,851	10,779	12	0.6	100	7.0	74	6.7	Average
LITTLE MOOSE POND	195	1,184	43	6.5	13	2.1	6.8	6.7	Mod/High
LITTLE POND	33	633	13	4.1	16	3.5	11.0	6.4	Avg/Mod
LONG LAKE	4,935	33,871	59	6.3	17	3.0	7.7	6.7	High
LONG POND	44	217	20	4.7	8	3.1	10.0	6.5	Average
McWAIN POND	445	2,505	42	5.9	17	2.6	6.8	6.7	Mod/High
MIDDLE POND	72	231	50	4.9	23	3.3	7.8	6.7	High
MOOSE POND (Main)	1295	7,258	70	6.9	12	2.2	6.4	6.7	High
MOOSE POND (North)	323	10,462	20	5.0	24	3.2	9.0	6.3	Moderate
MUD POND	45	1,661	35	4.3	25	3.6	12.0	6.4	Moderate
OTTER POND	90	814	21	4.8	30	3.8	22	6.6	Moderate
PAPOOSE POND	70	192	15	3.8	25	5.3	16	6.7	Mod/High
PEABODY POND	740	2,522	64	7.5	14	2.5	6.8	6.8	Mod/High
PERLEY POND	68	293	27	5.0	18	2.3	7.0	6.5	Moderate
PICKEREL POND	17	290	18	5.3	17	2.6	9.0	6.4	Average
PLEASANT POND	604	4,624	11	0.9	100	9.7	57	6.3	Moderate
SAND POND	256	1,394	49	5.6	14	3.9	9.7	6.6	High
SEBAGO LAKE	29,526	122,551	326	10.3	10	1.5	4.8	6.8	Average
STEARNS POND	248	4,116	48	5.2	20	3.2	7.6	6.7	Mod/High
TRICKEY POND	315	555	59	9.7	10	1.7	5.3	6.7	Moderate
WOODS POND	462	3,229	29	4.8	31	2.2	8.3	6.6	Mod/High

Note: Secchi disk readings, color, chlorophyll-a, phosphorus and pH are yearly averages from epilimnetic surface cores.

# LEA's Service Area



LEA would not be able to test the 37 lakes and ponds of this area without strong support from our surrounding community. Every year, we rely on volunteer monitors, lakefront landowners, summer interns and financial support from the Towns of Bridgton, Denmark, Harrison, Naples, Sweden, and Waterford to continue to collect and analyze lake water quality. **Thank you for all your help!**

### 2011 Volunteer Monitors and Lake Partners

Harold Arthur	Kokosing	Don Rung
Richard and Andy Buck	Richard LaRose	Jane Seeds
Camp Tapawingo	Long Lake Marina	Carolyn Stanhope
Steve Cavicci	Bob Mahanor	Foster & Marcella Shibles
Janet Coulter	Bob Mercier	Arthur and Jean Schilling
Ken Forde	Richard and Daphne Meyer	Linda Shane
Jean Forshay	Earl Morse	Bob Simmons
Matt Foye	Naples Marina	Don & Pat Sutherland
Joe and Carolee Garcia	Papoose Pond Campground	Bob & Ellen Tompkins
Bill Grady	Barry & Donna Patrie	Larry and Jan Tuck
Nelson Gouterman	Nancy Pike	Camp Wigwam
Shelly Hall	Jean Preis	Rich & Nancy Worthington
	Carol and Stan Rothenberg	

### 2011 Water Testing Interns

Dan Bishop	Kristy Garcia	Cindy Montanez
Christian Oren	Tyler Oren	Adam Perron
Helen Roberts	Amy Tragert	Jack Tragert

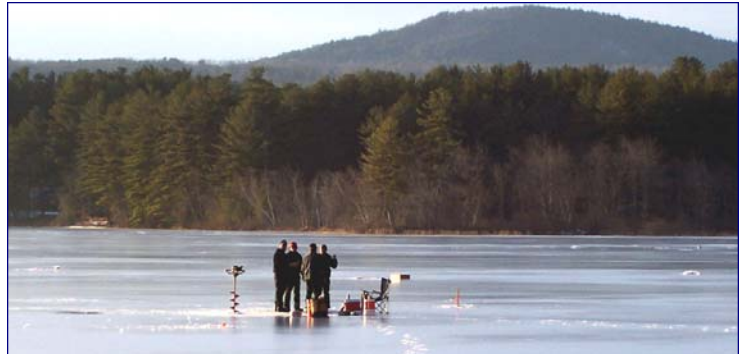
### Dedicated to Ken Forde 1936-2011

“Ken was ‘always there’ for LEA, doing whatever was needed - doing it quietly and without expectation of reward. He probably did thousands of jobs for LEA that many of us weren't even aware of. Ken was one of those people who have made LEA such a strong force for lake protection, and he did that with no fanfare.” *-Jean Preis, Former LEA Board President.*



# *A year in the life of a lake*

**Winter** is a quiet time. Ice blocks out the sunlight and also prevents oxygen from being replenished in lake waters because there is no wind mixing. With little light below the ice and gradually diminishing oxygen levels, plants stop growing. Most animals greatly slow their metabolism or go into hibernation.



**Spring** is a period of rejuvenation for the lake. After the ice melts, all of the water is nearly the same temperature from top to bottom. During this period, strong winds can thoroughly mix the water column allowing for oxygen to be replenished throughout the entire lake.

This period is called spring turnover. Heavy rains, combined with snow melt and saturated soils are a big concern in the spring. Water-logged soils are very prone to erosion and can contribute a significant amount of phosphorus to the lake. Every soil particle that reaches the lake has phosphorus attached to it.



**Summer** arrives and deeper lakes will gradually stratify into a warm top layer and a cold bottom layer, separated by a thermocline zone where temperature and oxygen levels change rapidly. The upper, warm layers are constantly mixed by winds, which “blend in” oxygen. The cold, bottom waters are essentially cut off from oxygen at the onset of stratification. Cold water fish, such as trout and landlocked salmon, need this thermal layering to survive in the warm summer months and they also need a healthy supply of oxygen in these deep waters to grow and reproduce.

**Fall** comes and so do the cooler winds that chill the warm upper waters until the temperature differential weakens and stratification breaks down. As in Spring, strong winds cause the lake to turn over, which allows oxygen to be replenished throughout the water column.



# The three layers of lakes

The critical element for understanding lake health is phosphorus. It's the link between what goes on in the watershed and what happens in the lake. Activities that cause erosion and sedimentation allow phosphorus from the land to be transported to the lake water.

Phosphorus is a naturally occurring nutrient that's abundant on land but quite scarce in lake waters. Algae populations are typically limited by phosphorus concentrations in the water. But when more phosphorus comes into a lake, the added nutrients spur increases in algae growth.

More algae growth causes the water to be less clear. Too much algae will also use up the oxygen in the bottom of the lake. When algae die they drift to the lake bottom and are decomposed by bacteria in a process that consumes the limited oxygen supply. If deep water oxygen levels get too low, cold water fish are unable to grow or reproduce.

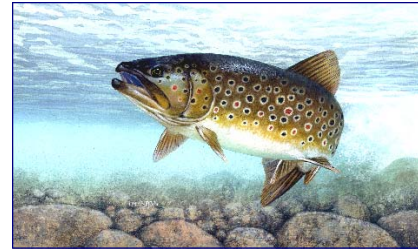
If there's no oxygen available at the bottom of a lake, another detrimental process called phosphorus recycling can occur. Phosphorus from sediments on the bottom become re-suspended in the water column. That doubles the lake's nutrient problem, since phosphorus is now coming from watershed as well as the lake itself.

Lake  
Depth

0-30  
feet

30-36  
feet

Below  
36  
feet



Brook Trout

## Epilimnion

The warm upper waters are sunlit, wind-mixed and oxygen rich.



Landlocked salmon

## Metalimnion

This layer in the water column, also known as the thermocline, acts as a thermal barrier that prevents the interchange of nutrients between the warm upper waters and the cold bottom waters.



Lake trout, also known as togue

## Hypolimnion

In the cold water at the bottom of lakes, food for most creatures is in short supply, and the reduced temperatures and light penetration prevent plants from growing.

## ***Water Quality Testing Parameters***

LEA's testing program is based on parameters that provide a comprehensive indication of overall lake health. Tests are done for transparency, temperature, oxygen, phosphorus, chlorophyll, color, conductivity, pH, and alkalinity.

**Transparency** is a measure of clarity and is done using a Secchi disk. An 8 inch round disk divided into black and white quarters is lowered into the water until it can no longer be seen. The depth at which it disappears is recorded in meters. Transparency is affected by the color of the water and the presence of algae and suspended sediments.

**Temperature** is measured at one-meter intervals from the surface to the bottom of the lake. This sampling profile shows thermal stratification in the lake. Lakes deep enough to stratify will divide into three distinct layers: the epilimnion, metalimnion, and hypolimnion. The epilimnion is comprised of the warm surface waters. The hypolimnion is made up of the deep, colder waters. The metalimnion, also known as the thermocline, is a thin transition zone of rapidly decreasing temperature between the upper and lower layers. Temperature is recorded in degrees Celsius.

**Phosphorus** is a nutrient that is usually present in only small concentrations in the water column. It is needed by algae for growth and reproduction and can therefore give an indication of the potential for an algal bloom. Algal blooms caused by excess phosphorus loading can deplete dissolved oxygen levels in deep water. Phosphorus is measured in parts per billion (ppb).

**Dissolved oxygen** is also measured at one-meter intervals from the surface to the bottom of the lake. Over the course of the summer, oxygen is depleted in the bottom waters through the process of decomposition of organic matter like dead algae. When there is excessive decomposition, all available oxygen is used up and coldwater fisheries are threatened. If dissolved oxygen concentrations are significantly depleted in bottom waters, a condition occurs which allows phosphorus to be released into the water column from bottom sediments. This is called phosphorus recycling and can cause increased algal growth to further deplete lake oxygen levels. During the fall, cooler temperatures and winds cause the lake to de-stratify and oxygen is replenished in the deep waters as the lake "turns over" and mixes. The same mixing of waters occurs in the early spring right after ice-out. Dissolved oxygen is measured in parts per million (ppm).

**Chlorophyll-A** is a pigment found in algae. Chlorophyll sampling in a lake gives a measure of the amount of algae present in the water column. Chlorophyll concentrations are measured in parts per billion (ppb).

**Conductivity** measures the ability of water to carry electrical current. Pollutants in the water will generally increase lake conductivity. Fishery biologists will often use measurements of conductivity to calculate fish yield estimates. Conductivity is measured in micro Siemens ( $\mu$ S).

**Color** is a measure of tannic or humic acids in the water. These usually originate in upstream bogs from organic decomposition. Chlorophyll results are more important on lakes that are highly colored because phosphorus and transparency results in those lakes are less accurate. Color is measured in Standard Platinum Units (SPU).

**pH** is important in determining the plant and animal species living in a lake because it reflects how acidic or basic the water is. pH is a measurement of the instantaneous free hydrogen ion

concentration in a water sample. Bogs or highly colored lakes tend to be more acidic (have a lower pH).

**Alkalinity** is a measure of the amount of calcium carbonate in the water and it reflects the ability of the water to buffer pH changes. In Maine lakes, alkalinity generally ranges from 4 - 20 parts per million (ppm). A higher alkalinity indicates that a lake will be able to withstand the effects of acid rain longer than lakes with lower alkalinity. If acidic precipitation is affecting a lake, a reduction in alkalinity will occur before a drop in pH.

### Water Quality Classification

While all lakes are sensitive to land use and activities within their watershed, the health and longevity of some lakes is more precarious than others. LEA classifies lakes into categories based on their overall health and susceptibility to algal blooms. Lakes in the *Average Degree of Concern* category are those lakes that are not currently showing water quality problems that are likely a result of human activity. The *Moderate Degree of Concern* category describes lakes where testing shows routine dissolved oxygen depletion, elevated phosphorus levels or a potential for phosphorus recycling. The *High Degree of Concern* category is reserved for those lakes that routinely show signs of phosphorus recycling, have a cold water fishery that is regularly impacted by oxygen depletion or have had algal blooms in the past.

The following criteria are used for reviewing transparency, phosphorus, chlorophyll and color data for each lake:

<u>Transparency (m)</u> <u>in meters</u>		<u>Phosphorus (ppb)</u> <u>in parts per billion</u>		<u>Chlorophyll-A (ppb)</u> <u>in parts per billion</u>		<u>Color (SPU)</u> <u>Standard Platinum Units</u>	
10.0 +	excellent	less than 5.0	low	less than 2.0	low	less than 10.0	low
7.1 - 10.0	good	5.1 - 12.0	moderate	2.1 - 7.0	moderate	10.1 - 25.0	moderate
3.1 - 7.0	moderate	12.1 - 20.0	high	7.1 - 12.0	high	25.1 - 60.0	high
less than 3.0	poor	20.1 +	very high	12.1 +	very high	60.1 +	very high



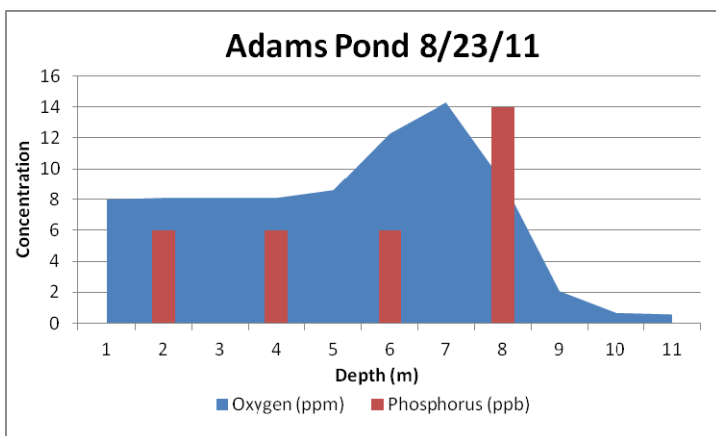
An intern pours off a sample from a deep water grab to be analyzed later for phosphorus concentration.

## 2011 as a Year

Approximately half the lakes LEA sample showed worse than average clarity in 2011. Just under 30% showed better clarity and the remaining 20% had either similar readings to the long-term average or the disk hit the bottom of the waterbody when sampled. Chlorophyll readings were worse than average on 50% of the lakes LEA tests, better than average on 44% and about the same on 6%. Unfortunately, phosphorus levels were above average on over 70% of this area's lakes, meaning that overall, more nutrients were coming into lake region waters than usual. There are several factors that were likely responsible for these conditions. First, it was a wetter than normal summer which means there were more opportunities for sediment and nutrients to wash into our waters. We also had several intense storms such as the one at the end of July where almost 3 inches of rain fell in a 24-hour period and of course hurricane Irene in August. Heavy rains often scour out ditches and culverts, quickly washing large amounts of material downstream. In fact, for weeks after Irene, ponds associated with Saco River flows continued to remain turbid and murky. Secondly, July was hot and recorded as the warmest month ever at the Portland Jetport. Warm conditions are conducive to algae growth and go hand-in-hand with ample sunlight which also allows algae populations to flourish. Sadly, warmer and wetter conditions are what the best climate models are predicting for our region so the negative trend this past summer could soon become the norm unless different policies are adopted to reduce carbon emissions.

### Individual Lake Summaries:

**Adams Pond** – The average Secchi disk reading of 7.1 meters was slightly less deep than the long-term average of 7.2 meters. Low oxygen conditions were first observed in late May and for most of the summer the bottom six meters of the water column were depleted of oxygen. Phosphorus concentrations from the surface waters averaged 8.1 ppb for the season, which is higher than the long-term average of 7.0. In the waters below the thermocline, phosphorus concentrations increased to high levels and measured 14 ppb. These conditions have been observed in previous years and are indicative of phosphorus recycling. Alkalinity averaged 10 ppm and pH averaged 6.8 for the year. Both readings were again very close to their long-term averages. Chlorophyll averaged 3.2 ppb, which was above the long-term average of 2.6 ppb. Average conductivity of 30  $\mu$ s was lower than the long-term average of 37  $\mu$ s. Average color was 13 SPU, which is above the long-term average of 11. Dissolved oxygen depletion and elevated phosphorus levels in the bottom waters are frequently observed in Adams Pond. For these reasons, the pond remains in the HIGH degree of concern category.

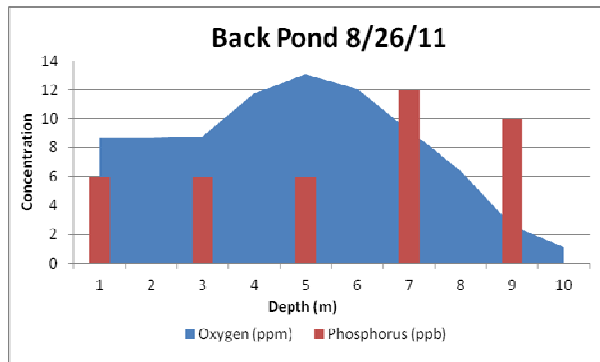


<b>Surface Area:</b>	43 acres
<b>Maximum Depth:</b>	51 feet
<b>Mean Depth:</b>	27 feet
<b>Volume:</b>	955 acres/feet
<b>Watershed Area:</b>	196 acres
<b>Flushing Rate:</b>	0.54 flushes per year
<b>Elevation:</b>	640 feet

#### Adams Pond Quick Statistics 2011 Average Verses the Long Term Average:

Secchi : Worse  
Chlorophyll: Worse  
Phosphorus: Worse

**Back Pond** - The 2011 average Secchi disk reading of 6.4 meters was deeper than the long-term average of 6.3 meters. Dissolved oxygen depletion occurred in the bottom 2 to 3 meters of the water column beginning in July. Phosphorus concentrations in the surface waters averaged 8 ppb, which is above the long-term average of 6.3 ppb. Phosphorus levels below the thermocline were higher and average 11 ppb. Average alkalinity was 9 ppm, above the long term average of 8 ppm and pH was 6.8, which is above the long term average of 6.7. Chlorophyll concentrations were 2.2 ppb, which is above the long term average of 2.0 ppb. Conductivity was 16  $\mu$ s, under the long term average of 21  $\mu$ s. Average color of 16 SPU was slightly above the long-term average of 15 SPU. Overall water quality appears stable on the pond. Back Pond remains in the AVERAGE/MODERATE degree of concern category.

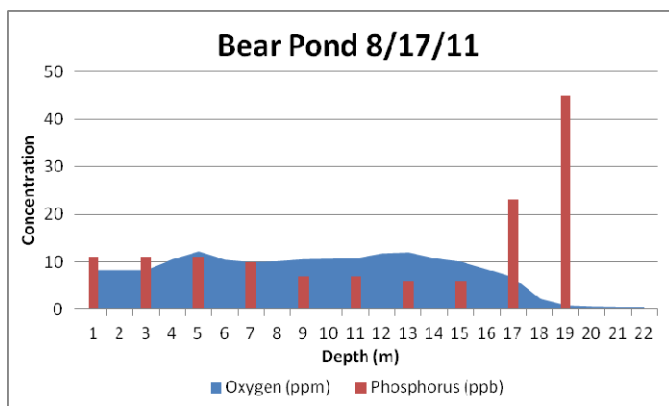


**Surface Area:** 62 acres  
**Maximum Depth:** 33 feet  
**Watershed Area:** 584 acres  
**Elevation:** 572 feet

**Back Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Better  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Bear Pond** - The 2011 Secchi disk average of 5.4 meters was less deep than the long-term average of 5.7. Oxygen depletion first appeared in the pond in late June and continued throughout the rest of the sampling season in the bottom 3 to 4 meters of the water column. During the height of oxygen depletion, there was still ample cold and well oxygenated water available for cold water fish. Phosphorus concentrations in the upper waters averaged 10.2 ppb, which is higher than the long-term average of 9.2 ppb. Phosphorus levels in the bottom waters of the pond were higher and averaged 14.9 ppb. Alkalinity was 9 ppm, which is above the long term average of 8 and pH was 6.7 which is below the long term average of 6.8. Chlorophyll levels were moderate at 5.1 ppb, which is above the long-term average of 3.7. Average color of 18 SPU was just under the long term average of 19 SPU. Average conductivity was 25  $\mu$ s, which was lower than the long-term average of 34  $\mu$ s. Bear Pond again maintained a good volume of well-oxygenated, cold water below the thermocline. These conditions are needed to support a cold-water fishery. Bear Pond remains in the AVERAGE/MODERATE degree of concern category.



**Surface Area:** 250 acres  
**Maximum Depth:** 72 feet  
**Mean Depth:** 34 feet  
**Volume:** 7,978 acres/feet  
**Watershed Area:** 5,331 acres  
**Flushing Rate:** 2.3 flushes per year  
**Elevation:** 375 feet

**Bear Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Beaver Pond (Bridgton)** - The 2011 Secchi disk reading of 6.7 meters was deeper than the long-term average of 5.1. Oxygen depletion was pronounced again this year. The phosphorus concentration above the thermocline was 7.0 ppb, which was below than the long-term average of 9.2. Alkalinity was 10 ppm, which is above the long term average of 9 ppm. pH was 6.9, which is higher than the long term average of 6.7. Chlorophyll was 4.3 ppb for the year, which is lower than the long-term average of 4.7 ppb. Conductivity was 48  $\mu$ s, which is just lower than the long-term average of 49  $\mu$ s. Color was 17 SPU, which is below the long-term average of 26 SPU. Due to heavy oxygen depletion in the bottom waters and evidence of phosphorus recycling, Beaver Pond remains in the **HIGH** degree of concern category.



**Surface Area:** 69 acres  
**Maximum Depth:** 35 feet  
**Watershed Area:** 1,648 acres  
**Flushing Rate:** 3.7 flushes per year  
**Elevation:** 473 feet

**Beaver Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Better  
 Chlorophyll: Better  
 Phosphorus: Better

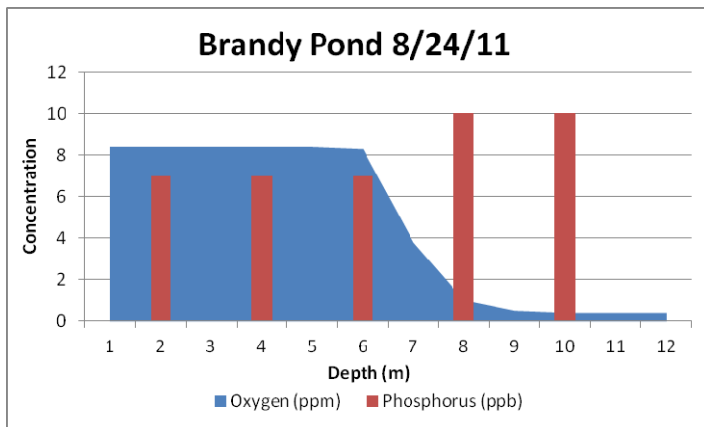
**Beaver Pond (Denmark)** - This year’s Secchi disk reading was 2.4 meters, however, the disk hit the bottom of the pond. The long-term Secchi average is 2.7 meters. The shallow water column remained well oxygenated again this season. Phosphorus levels in the surface waters were 14 ppb, which is below the long term average of 15.9 ppb. Alkalinity was 11 ppm, which is above the long term average of 8. Chlorophyll concentrations were 4.6 ppb, which is higher than the long-term average of 3.0 ppb. Conductivity was 16  $\mu$ s, which is below the long term average of 21  $\mu$ s. pH was 6.7, which is below the long term average of 6.9. Average color was 10 SPU, which is below the long term average of 17 SPU. Beaver Pond remains in the **AVERAGE** degree of concern category.



**Surface Area:** 80 acres  
**Maximum Depth:** 10 feet  
**Watershed Area:** 1,288 acres  
**Elevation:** 397 feet

**Beaver Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Hit Bottom  
 Chlorophyll: Worse  
 Phosphorus: Better

**Brandy Pond** - The 2011 Secchi disk average of 6.4 meters was less deep than the long-term average of 6.5 meters for the pond. Dissolved oxygen concentrations began declining at depth in late July and levels continued to decrease in the deeper waters throughout the testing season. Phosphorus concentrations in the surface waters were 8.1 ppb, which is above the long-term average of 6.7. Much of this increase can be attributed to an abnormally high phosphorus reading in early June. Phosphorus levels below the thermocline were moderate and averaged 10 ppb. Alkalinity was the same as the long term average of 8 ppm and pH was 6.7, which is below the long term average of 6.8. Average conductivity was again 35  $\mu$ s, which is below the long term average of 44  $\mu$ s and color was 17 SPU, which is just over the long term average of 16. Chlorophyll levels were moderate and averaged 2.5 ppb, which is just above the long-term average of 2.4 ppb. Due to the limited volume of cold, well-oxygenated water, suitable habitat for trout and landlocked salmon was again diminished for much of the summer. Because of the restricted fishery habitat and the substantial amount of development within the watershed, Brandy Pond remains in the MODERATE/HIGH degree of concern category.



<b>Surface Area:</b>	733 acres
<b>Maximum Depth:</b>	44 feet
<b>Mean Depth:</b>	16 feet
<b>Volume:</b>	11,789 acres/feet
<b>Watershed Area:</b>	2,300 acres
<b>Flushing Rate:</b>	10 flushes per year
<b>Elevation:</b>	267 feet

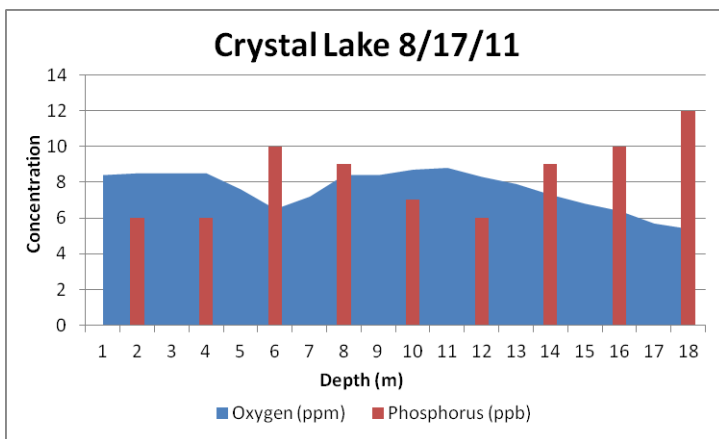
**Brandy Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Cold Rain Pond** - The 2011 Secchi disk average of 4.5 meters was less deep than the long-term average of 4.8 meters. Dissolved oxygen depletion was observed in the bottom 5 meters of the water column during sampling. Surface water phosphorus concentrations were 10.0 ppb, which is below the long term average of 10.4 ppb. Alkalinity was 10 ppm, which is above the long term average of 7 ppm. pH was the 6.6 for the year, which is above the long term average of 6.7. Chlorophyll was moderate at 6.0 ppb, which is above the long-term average of 3.9 ppb. Conductivity averaged 19  $\mu$ s, which is under the long term average of 25  $\mu$ s. Color was 19 SPU for the year, which is below the long term average of 23 SPU. Due to strong dissolved oxygen depletion, Cold Rain Pond remains in the HIGH degree of concern category.

**Cold Rain Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Better

<b>Surface Area:</b>	36 acres
<b>Maximum Depth:</b>	36 feet
<b>Mean Depth:</b>	13 feet
<b>Volume:</b>	469 acres/feet
<b>Watershed Area:</b>	505 acres
<b>Flushing Rate:</b>	1.9 flushes per year
<b>Elevation:</b>	505 feet

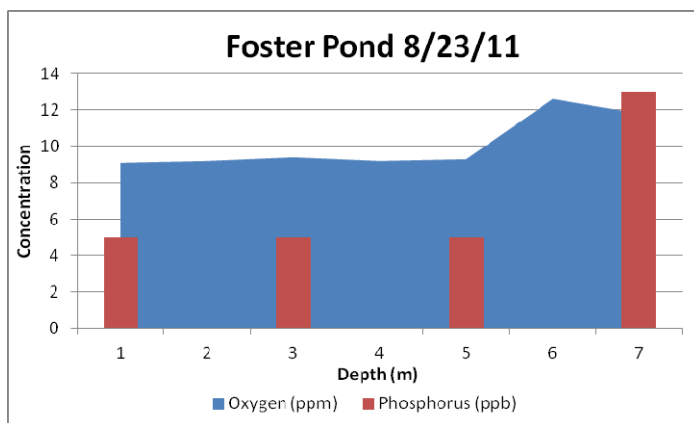
**Crystal Lake** - The 2011 Secchi disk average of 5.8 meters was less deep than the long-term average of 6.0 meters. Oxygen depletion was mild and only observed in the bottom waters of the lake at end of the season. Phosphorus concentrations in the surface waters averaged 8.0 ppb, which is above the long term average of 7.6 ppb. Phosphorus concentrations in the deeper waters averaged 9.0 ppb. Alkalinity was 9 ppm, which is above the long-term average of 8 ppm. pH was 6.7, which is under the long term average of 6.8. Conductivity was 38  $\mu$ s, which is below the long term average of 48  $\mu$ s and average color was 17 SPU, which is below the long term average of 20 SPU. Chlorophyll averaged 3.1 ppm, which was above the long-term average of 2.8 ppm. Crystal Lake's deep, well-oxygenated water column is good for the lake's cold water fishery, however consistently declining water clarity readings are a major concern. For this reason, the lake is in the **HIGH** degree of concern category.



**Surface Area:** 446 acres  
**Maximum Depth:** 65 feet  
**Mean Depth:** 33 feet  
**Volume:** 14,253 acres/feet  
**Watershed Area:** 5,345 acres  
**Flushing Rate:** 0.65 flushes per year  
**Elevation:** 294 feet

**Crystal Lake Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Foster Pond** - The 2011 Secchi disk average of 6.9 meters was slightly less deep than the long-term average of 7.0 meters. The water column remained well oxygenated throughout entire testing season. Phosphorus concentrations in the surface waters averaged 6.4 ppb for the year, which is below the long-term average of 7.1 ppb. Alkalinity was 8 ppm, which is above the long term average of 6 ppm. Average chlorophyll was the same as the long term average of 2.2 ppb. Average conductivity was 16  $\mu$ s, which is under the long term average of 20  $\mu$ s. Color was the same as the long term average of 11 SPU and pH was also the same as the long term average of 6.8. Foster Pond continues to exhibit good water quality conditions. It remains in the **AVERAGE** degree of concern category.



**Surface Area:** 149 acres  
**Maximum Depth:** 28 feet  
**Mean Depth:** 17 feet  
**Volume:** 2,382 acres/feet  
**Watershed Area:** 1,090 acres  
**Flushing Rate:** 0.93 flushes per year  
**Elevation:** 470 feet

**Foster Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Worse  
 Chlorophyll: Similar  
 Phosphorus: Better

**Granger Pond** – The 2011 Secchi disk average of 6.8 meters was deeper than the long-term average of 6.6 meters. Dissolved oxygen depletion was observed in the bottom meter of the water column several times during the season. Surface water phosphorus concentrations were moderate and averaged 8.9 ppb, which is above the long-term average of 8.1 ppb. 2011 alkalinity was the same as the long term average of 7 ppm. Color averaged 11 SPU, which was below the long term average of 13 SPU and pH was the same as the long term average of 6.7. Chlorophyll readings averaged 3.8 ppb, which is above the long-term average of 3.3 ppb. Conductivity averaged 17  $\mu$ s, which was below the long-term average of 24  $\mu$ s. Clarity, phosphorus and chlorophyll are all within their normal range for Granger Pond. However, because of recent algae blooms in 2007 and 2008, it still remains in the **HIGH** degree of concern category.

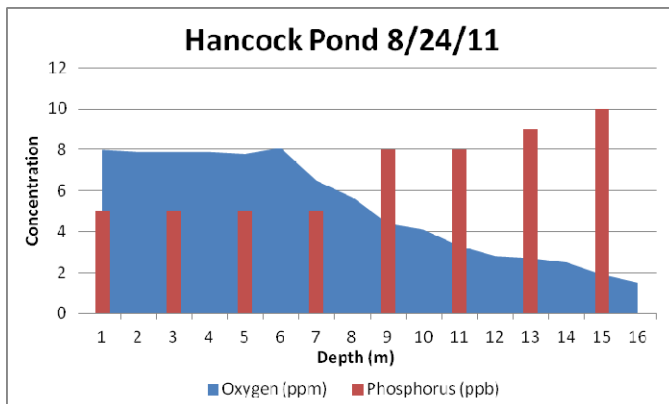


**Surface Area:** 125 acres  
**Maximum Depth:** 28 feet  
**Watershed Area:** 642 acres  
**Elevation:** 525 feet

**Granger Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Better  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Hancock Pond** – Secchi disk readings were the same as the long-term average of 7.1 meters. Oxygen depletion occurred in the bottom waters of the pond starting in June and expanded up the water column to within 7 meters of the surface by September. Phosphorus concentrations were moderate in the upper waters, averaging 6.1 ppb, which is above the long term average of 5.8 ppb. Concentrations in the deeper waters averaged 8.8 ppb. Alkalinity was 7 ppm, which is above the long-term average of 6 ppm. Color was 11 SPU, which is below the long term average of 14. pH was the same as the long term average of 6.8. Chlorophyll readings were moderate, averaging 2.7 ppb for the year, which is below the long-term average of 3.0 ppb. Dissolved oxygen depletion in the bottom waters is impacting and limiting the pond’s substantial cold water fishery. For this reason, the pond is in the **MODERATE/HIGH** degree of concern category.

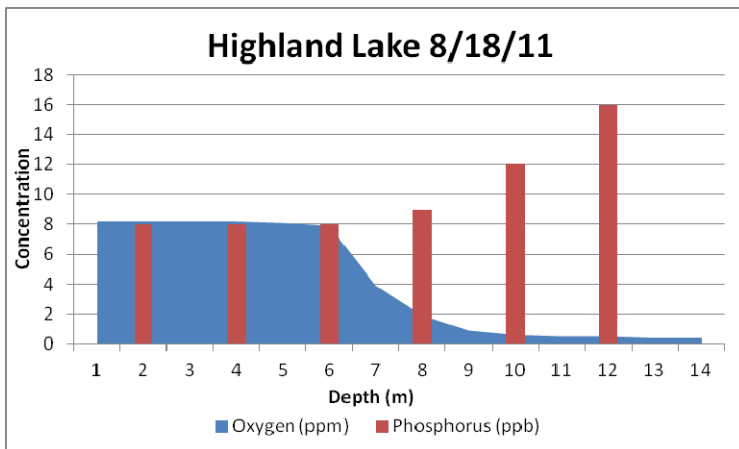


**Surface Area:** 858 acres  
**Maximum Depth:** 59 feet  
**Watershed Area:** 2,222 acres  
**Elevation:** 502 feet

**Hancock Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Similar  
 Chlorophyll: Better  
 Phosphorus: Worse

**Highland Lake** - The 2011 Secchi disk average of 6.4 meters was less deep than the long-term average of 6.7 meters. By early July, dissolved oxygen depletion was occurring in the bottom waters of the lake. As the summer continued, the depletion expanded up the water column from the bottom and increased in severity. Phosphorus concentrations in the surface waters were moderate and averaged 7.3 ppb, which is higher than the long-term average 6.7. Below the thermocline, the average phosphorus concentration was 12.3 ppb. Alkalinity was 8 ppm, which is above the long-term average of 7 ppm. Color was the same as the long term average of 15 and pH was 6.6, which is under the long term average of 6.7. Chlorophyll readings averaged 2.6 ppb, which was below the long-term average of 2.9 ppb. Conductivity was 24  $\mu$ s, which is below the long-term average of 32  $\mu$ s. Due to pronounced dissolved oxygen depletion and past water quality conditions, Highland Lake remains in the **HIGH** degree of concern category.



**Surface Area:** 1,334 acres  
**Maximum Depth:** 50 feet  
**Mean Depth:** 20 feet  
**Volume:** 44,030 acres/feet  
**Watershed Area:** 5,178 acres  
**Flushing Rate:** 0.94 flushes per year  
**Elevation:** 426 feet

**Highland Lake Quick Statistics  
 2011 Average Verses the Long Term Average:**

Secchi : Worse  
 Chlorophyll: Better  
 Phosphorus: Worse

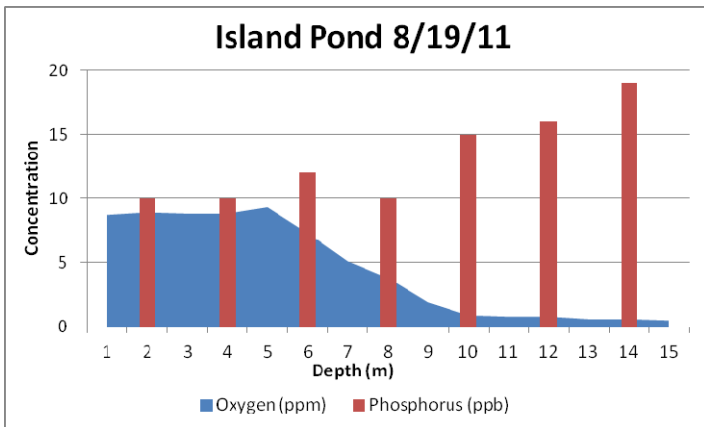
**Holt Pond** - The 2011 Secchi disk reading hit the bottom at 3.0 meters, which is the same as the long-term average. Dissolved oxygen depletion was observed in the bottom meter of the shallow water column. Phosphorus concentrations were 14.0 ppb, which is higher than the long-term average of 13.3 ppb. Alkalinity was 12 ppm, which is above the long term average of 9 ppm and pH was the same as the long term average of 6.5. Chlorophyll was 4.7 ppb, which is above long-term average of 4.0 ppb for the pond. Conductivity was 41  $\mu$ s, over the long term average of 38  $\mu$ s and color was 25 SPU which is under long term average of 47 SPU. Holt Pond's large watershed, shallow depth and surrounding wetlands are likely accountable for much of the pond's water quality characteristics. Holt Pond remains in the **AVERAGE** degree of concern category.

**Holt Pond Quick Statistics  
 2011 Average Verses the Long Term Average:**

Secchi : Hit Bottom  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Surface Area:** 41 acres  
**Maximum Depth:** 10 feet  
**Mean Depth:** 7 feet  
**Watershed Area:** 2,118 acres  
**Flushing Rate:** 46 flushes per year  
**Elevation:** 455 feet

**Island Pond** - The 2011 Secchi disk average of 5.3 meters was less deep than the long-term average of 6.0. Dissolved oxygen depletion first appeared in late June near the bottom and intensified and expanded upward as the season continued. Phosphorus levels in the surface waters averaged 9.5 ppb, which is higher than the long-term average of 7.3 ppb. Phosphorus levels below the thermocline averaged 14.4 ppb. Alkalinity was 8 ppm, which is above the long-term average of 7 and pH was 6.6, which is below the long term average of 6.7. Conductivity averaged 29  $\mu$ s, which was lower than the long term average of 39  $\mu$ s. Chlorophyll averaged 2.9 ppb, which is below than the long-term average of 3.2 ppb. Color was the same as the long term average of 18 SPU. Because of low oxygen conditions and periodically elevated phosphorus levels in the bottom waters, Island Pond is in the MODERATE/HIGH degree of concern category.



<b>Surface Area:</b>	115 acres
<b>Maximum Depth:</b>	48 feet
<b>Mean Depth:</b>	16 feet
<b>Volume:</b>	1,626 acres/feet
<b>Watershed Area:</b>	1,128 acres
<b>Flushing Rate:</b>	1.3 flushes per year
<b>Elevation:</b>	448 feet

**Island Pond Quick Statistics**  
2011 Average Verses the Long Term Average:

Secchi : Worse  
Chlorophyll: Better  
Phosphorus: Worse

**Jewett Pond** - The 2011 Secchi disk reading of 4.4 meters was deeper than the long-term average of 4.3. Dissolved oxygen depletion was very pronounced during summer sampling. Phosphorus data is not available for 2011 due to a lab error. Alkalinity was 8 ppm, which is above the long term average of 6 ppm. Chlorophyll was 5.4 ppb, which is slightly higher than the long-term average of 5.1 ppb. Conductivity was 18  $\mu$ s, below the long term average of 24  $\mu$ s and color was 20 SPU, which is below the long term average of 33 SPU. pH was the same as the long term average of 6.5. The low oxygen and high phosphorus conditions in the deeper waters are indicative of phosphorus recycling. For this reason, Jewett Pond remains in the HIGH degree of concern category.



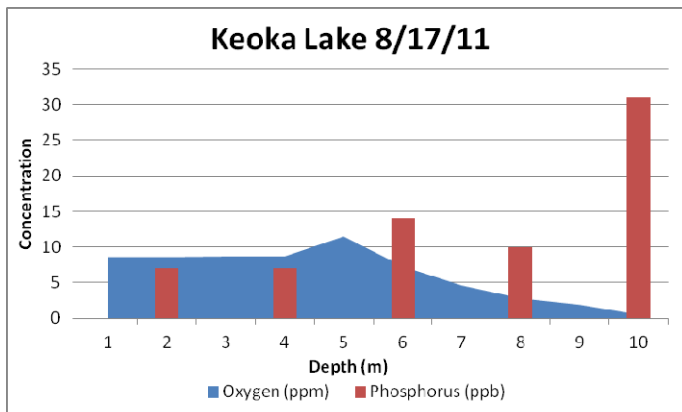
Bill Hanger

<b>Surface Area:</b>	43 acres
<b>Maximum Depth:</b>	41 feet
<b>Watershed Area:</b>	638 acres
<b>Elevation:</b>	580 feet

**Jewett Pond Quick Statistics**  
2011 Average Verses the Long Term Average:

Secchi : Better  
Chlorophyll: Worse  
Phosphorus: No data

**Keoka Lake** - The 2011 Secchi disk average of 5.8 meters was less deep than the long-term average of 5.9 meters. Dissolved oxygen depletion began to appear in the bottom waters of the pond in late June. As the summer continued, depletion progressed and consumed the bottom 4 to 5 meters of the water column. Phosphorus concentrations in the surface waters were moderate and averaged 8.1 ppb for the year, which is just under the long term average of 8.2 ppb. Phosphorus concentrations below the thermocline averaged 18.3 ppb. Alkalinity was 9 ppm, which is above the long term average of 8 ppm and pH was 6.7, which is under the long term average of 6.8. Average chlorophyll was 4.7 ppb, which is above the long-term average of 3.7. Average conductivity was 28  $\mu$ s, which is below the long term average of 36  $\mu$ s. Color was 16 SPU for the year, which is below the long term average of 18 SPU. Because of low oxygen conditions and periodically elevated phosphorus levels in the bottom waters, Keoka Lake is in the MODERATE/HIGH degree of concern category.

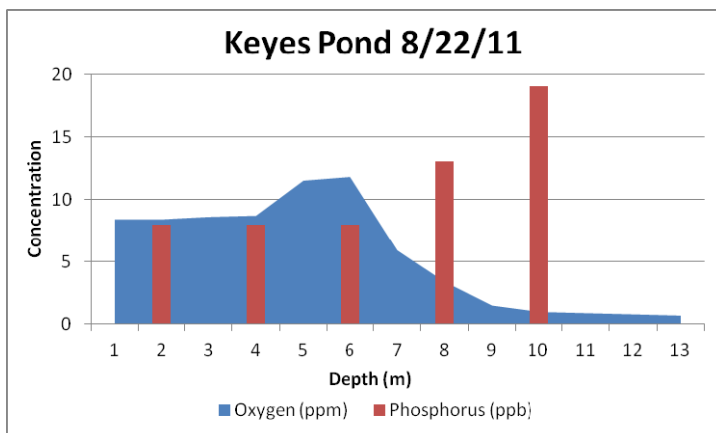


<b>Surface Area:</b>	460 acres
<b>Maximum Depth:</b>	42 feet
<b>Mean Depth:</b>	25 feet
<b>Volume:</b>	10,569 acres/feet
<b>Watershed Area:</b>	3,808 acres
<b>Flushing Rate:</b>	0.7 flushes per year
<b>Elevation:</b>	492 feet

**Keoka Lake Quick Statistics**  
2011 Average Verses the Long Term Average:

Secchi : Worse  
Chlorophyll: Worse  
Phosphorus: Better

**Keyes Pond** - The 2011 Secchi disk average was the same as the long-term average of 6.1. Mild dissolved oxygen depletion was first observed in the bottom waters of the pond in late June and as the season progressed, depletion became more severe and expanded up the water column. Phosphorus concentrations in the surface waters were moderate and averaged 8.8 ppb, which is above the long-term average of 7.4 ppb. In waters below the thermocline, phosphorus concentrations averaged 16 ppb. Alkalinity was 8 ppm, which is above the long term average of 7 ppm and pH was the same as the long term average of 6.7. Chlorophyll was 3.5 ppb which is above the long-term average of 3.3 ppb. Average conductivity was 32  $\mu$ s, which is below the long term average of 42  $\mu$ s and average color was 20 SPU, which is over the long term average of 15 SPU. Because of low oxygen conditions and periodic elevated phosphorus levels in the bottom waters, Keyes Pond is in the MODERATE/HIGH degree of concern category.



<b>Surface Area:</b>	191 acres
<b>Maximum Depth:</b>	42 feet
<b>Mean Depth:</b>	17 feet
<b>Volume:</b>	3,333 acres/feet
<b>Watershed Area:</b>	1,213 acres
<b>Flushing Rate:</b>	0.8 flushes per year
<b>Elevation:</b>	508 feet

**Keyes Pond Quick Statistics**  
2011 Average Verses the Long Term Average:

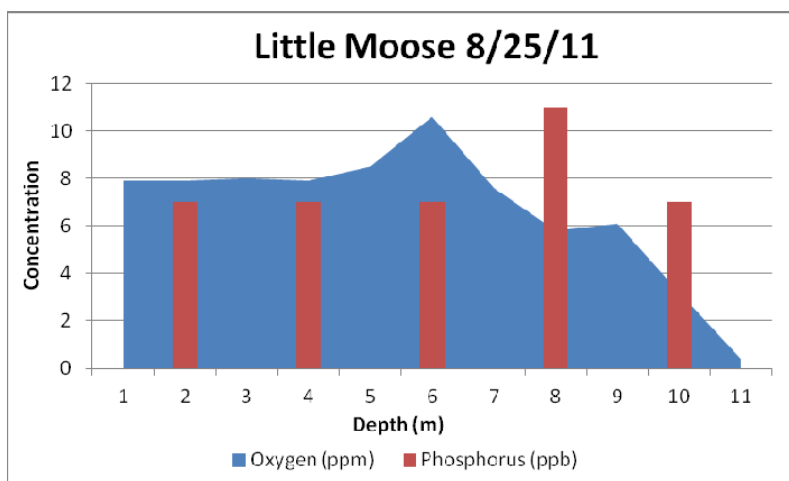
Secchi : Similar  
Chlorophyll: Worse  
Phosphorus: Worse

**Kezar Pond** – The 2011 Secchi disk reading of 0.6 meters was less deep than the long-term average of 2.7. This unusually low clarity reading was due to an extremely high sediment load in the water column due to post hurricane Irene flooding. Mild dissolved oxygen depletion was observed in the last meter of Kezar’s shallow water column during August sampling. Phosphorus concentrations were extremely high at 74 ppb and well above the long term average of 19.3 ppb. This was also likely due to the high amounts of sediment in the water from hurricane Irene. Alkalinity was the same as the long term average of 8 ppb and pH was also the same as the long term average of 6.7. Chlorophyll levels were high at 7.0 ppb, which is above the long-term average of 4.4 ppb. Conductivity was 20  $\mu$ s, which is under the long term average of 29  $\mu$ s and color was 100 SPU, which is well above the long term average of 38 SPU. High phosphorus values in Kezar Pond are likely a result of the pond’s large watershed combined with riverine input. Kezar Pond remains in the AVERAGE degree of concern category.

**Kezar Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Surface Area:** 1,851 acres  
**Maximum Depth:** 12 feet  
**Watershed Area:** 10,779 acres  
**Elevation:** 369 feet

**Little Moose Pond** – The 2011 Secchi disk average of 6.5 meters was less deep than the long-term average of 7.3 meters. Dissolved oxygen depletion was first observed in the bottom waters during early July sampling. As the season continued, the depletion became more severe and expanded up the water column. Phosphorus concentrations in the surface waters were moderate and averaged 6.8 ppb, which is above the long term average of 5.9 ppb. Phosphorus levels below the thermocline averaged 9 ppb. Alkalinity was 8 ppm, which is above the long term average of 6 ppm. pH was the same as the long term average of 6.7. Chlorophyll levels averaged 2.1 ppb, which is below the long-term average of 2.3 ppb. Conductivity was 16  $\mu$ s, which is below the long term average of 23  $\mu$ s and color was 13 SPU, which is above the long term average of 11 SPU. Because of oxygen depletion and periodically elevated phosphorus values at depth, Little Moose remains in the MODERATE /HIGH degree of concern category.



**Surface Area:** 195 acres  
**Maximum Depth:** 43 feet  
**Mean Depth:** 22 feet  
**Volume:** 4,010 acres/feet  
**Watershed Area:** 1,184 acres  
**Flushing Rate:** 0.6 flushes per year  
**Elevation:** 545 feet

**Little Moose Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Worse  
 Chlorophyll: Better  
 Phosphorus: Worse

**Little Pond** – Even though the Secchi disk reading of 4.1 meters hit the bottom, it was still deeper than the long-term average of 4.0 meters. Mild oxygen depletion was observed in the deeper waters during August sampling. Phosphorus concentrations were moderate at 11.0 ppb, which is slightly above the long-term average of 10.8 ppb. Alkalinity was 12 ppm, which is above the long term average of 9 ppm. pH was 6.4, which is below the long term average of 6.6. Chlorophyll levels were 3.5 ppb, which is below the long-term average of 5.2 ppb. Conductivity was 31  $\mu$ s, under the long term average of 38  $\mu$ s and color was again 16 SPU, which is below the long term average of 20 SPU. Water quality conditions in Little Pond appear stable. Little Pond remains in the AVERAGE/MODERATE degree of concern category.

**Little Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Hit Bottom  
 Chlorophyll: Better  
 Phosphorus: Worse

**Surface Area:** 33 acres  
**Maximum Depth:** 13 feet  
**Watershed Area:** 633 acres  
**Elevation:** 360 feet

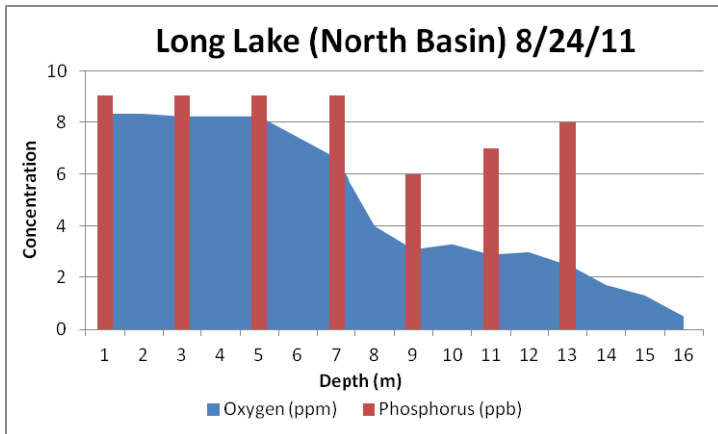
**Long Lake** – Although phosphorus and chlorophyll concentrations are moderate in Long Lake, consistent and pronounced dissolved oxygen depletion in the deeper waters is negatively affecting the lake’s cold-water fishery. During seasons with a late fall turnover, these low oxygen conditions are prolonged, making the problem even more severe. For this reason, Long Lake remains in the HIGH degree of concern category.

**North Basin** – The 2011 Secchi disk average was the same as the long-term average of 6.2 ppm. Dissolved oxygen depletion occurred again this year, starting in late July in the bottom waters and increasing in severity as the summer continued. For the remainder of July, and all of August and September, oxygen and temperature data showed no suitable habitat for most cold water fish species. Phosphorus concentrations in the surface waters averaged 8.6 ppb, which is above the long-term average of 7.6 ppb. Phosphorus levels below the thermocline were moderate and averaged 7.0 ppb. Alkalinity was 9 ppm which is above the long term average of 8 ppm. Conductivity was 33  $\mu$ s, which is under the long-term average of 45  $\mu$ s and pH was 6.7, which is under the long term average of 6.8. Chlorophyll was 3.3 ppb, which is above the long-term average of 3.0 ppb. Average color was the same as the long-term average of 17 SPU.

**Middle Basin** – The 2011 disk average was the same as the long-term average of 6.2 meters. Dissolved oxygen depletion was first observed in the bottom waters in early July. The depletion expanded up the water column as the season continued. Suitable habitat for cold water fish was absent from the middle basin’s water column for most of the summer. Phosphorus concentrations in the surface waters averaged 8.0 ppb, which is above the long-term average of 6.9 ppb. Phosphorus concentrations below the thermocline averaged 7.7 ppb. Alkalinity was 9 ppm, which is above the long term average of 8 ppm and pH was 6.7, which is below the long term average of 6.8. Chlorophyll was 3.0 ppb, which is higher than the long term average of 2.9 ppb. Conductivity was 34  $\mu$ s, which is under the long-term average of 44  $\mu$ s and color was 18 SPU, which is just over the long-term average of 17.

**South Basin** – The 2011 Secchi disk average was the same as the long-term average of 6.4 meters. Dissolved oxygen depletion was first observed in early July and continued throughout the rest of the testing season. During most of the summer, oxygen and temperature data showed no suitable habitat for most cold water fish species. Phosphorus concentrations in the upper waters were

moderate and averaged 6.6 ppb, which is below the long term average of 6.8 ppb. Phosphorus concentrations below the thermocline were moderate and averaged 6.3 ppb. Alkalinity was 9 ppm, which is above the long term average of 8.0 ppm and pH was 6.8 which is the same as the long term average. Chlorophyll was 2.7 ppb, which is slightly lower than the long-term average of 2.8 ppb. Conductivity averaged 34  $\mu$ s, which is under the long term average of 45  $\mu$ s and color was 16 SPU, which is just under the long term average of 17 SPU.



<b>Surface Area:</b>	4,935 acres
<b>Maximum Depth:</b>	59 feet
<b>Mean Depth:</b>	34 feet
<b>Volume:</b>	165,500 acres/feet
<b>Watershed Area:</b>	33,871 acres
<b>Flushing Rate:</b>	0.94 flushes per year
<b>Elevation:</b>	267 feet

**Long Lake (all basins) Quick Statistics  
2011 Average Verses the Long Term Average:**

Secchi : Similar  
Chlorophyll: Worse  
Phosphorus: Worse

**Long Pond** - The 2011 Secchi disk average of 4.7 meters was less deep than the long-term average of 5.3. Oxygen depletion showed up in the last meter of the water column during August sampling. Phosphorus values were moderate in the surface waters at 10 ppb, which is above the long-term average of 8.1. Alkalinity was 9 ppm, which is above the long term average of 6 ppm and conductivity was again 17  $\mu$ s, which is under the long term average of 21  $\mu$ s. Chlorophyll levels were 3.1 ppb, which is above the long-term average of 2.9 ppb. Color was 8 SPU, below the long term average of 12 SPU. pH was 6.5, which is below the long-term average of 6.7. Because of Long Pond's well oxygenated water column, moderate phosphorus levels and overall stability it remains in the AVERAGE degree of concern category.

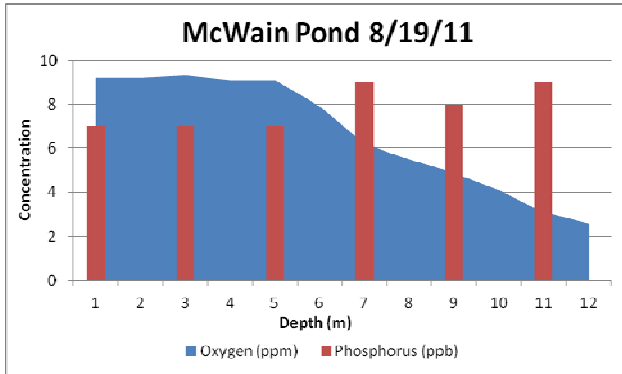


<b>Surface Area:</b>	44 acres
<b>Maximum Depth:</b>	20 feet
<b>Watershed Area:</b>	217 acres
<b>Elevation:</b>	401 feet

**Long Pond Quick Statistics  
2011 Average Verses the Long Term Average:**

Secchi : Worse  
Chlorophyll: Worse  
Phosphorus: Worse

**McWain Pond** - The 2011 Secchi disk average of 5.9 meters was slightly less deep than the long-term average of 6.0 meters for the pond. Dissolved oxygen depletion was first observed in the bottom waters in late July. Depletion continued and expanded up the water column for the rest of the summer. Phosphorus concentrations in the surface waters averaged 6.8 ppb, which is less than the long term average of 7.5 ppb. Below the thermocline, phosphorus concentrations were again 8.7 ppb. Alkalinity was 8 ppm, which is above the long term average of 6 ppm and pH was the same as the long term average of 6.7. Chlorophyll concentrations were moderate at 2.6 ppb, which is lower than the long-term average of 3.1 ppb. Conductivity was 22  $\mu$ s, which is under the long term average of 28  $\mu$ s and color was the same as the long term average of 17 SPU. Because of dissolved oxygen depletion in the bottom waters, McWain Pond remains in the MODERATE/HIGH degree of concern category.

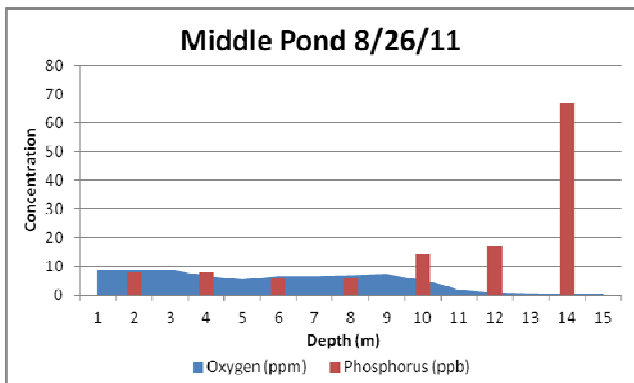


<b>Surface Area:</b>	445 acres
<b>Maximum Depth:</b>	42 feet
<b>Mean Depth:</b>	23 feet
<b>Volume:</b>	9,756 acres/feet
<b>Watershed Area:</b>	2,505 acres
<b>Flushing Rate:</b>	0.5 flushes per year
<b>Elevation:</b>	533 feet

**McWain Pond Quick Statistics  
2011 Average Verses the Long Term Average:**

Secchi : Worse  
Chlorophyll: Better  
Phosphorus: Better

**Middle Pond** - The 2011 Secchi disk average of 4.9 meters was less deep than the long-term average of 5.2 meters. Dissolved oxygen depletion was observed all season in the deeper waters of the pond. The depletion expanded up the water column and increased in severity as the season continued, impacting all but the top 4 meters of the water column. Phosphorus concentrations in the surface waters were moderate and averaged 7.8 ppb, which is just below the long-term average of 7.9 ppb. Phosphorus concentrations below the thermocline were moderate to very high, averaging 22 ppb. Alkalinity was 8 ppm, which is above the long term average of 7 ppm and pH was 6.7, which is above the long term average of 6.6. Chlorophyll concentrations were moderate and averaged 3.3 ppb, which is under the long-term average of 3.8 ppb. Conductivity was 16  $\mu$ s, which is under the long term average of 19  $\mu$ s and color was 23 SPU for the year, which is just under the long term average of 24 SPU. Although there is little development in the watershed, pronounced oxygen depletion and the potential for phosphorus recycling are real concerns for the pond. For this reason, Middle Pond remains in the HIGH degree of concern category.

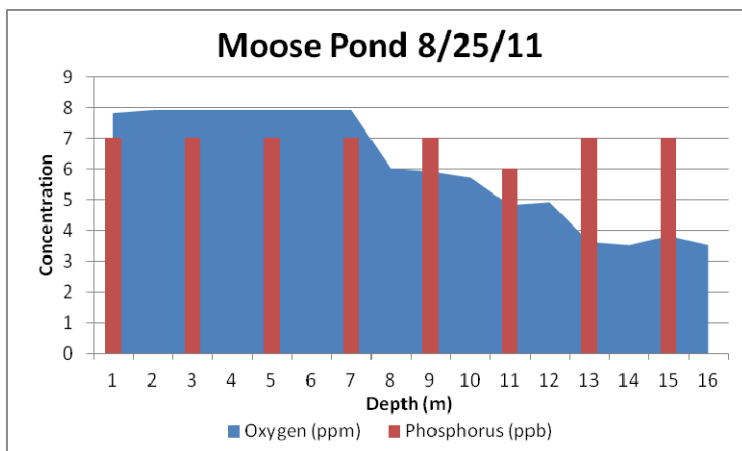


<b>Surface Area:</b>	72 acres
<b>Maximum Depth:</b>	50 feet
<b>Watershed Area:</b>	231 acres
<b>Elevation:</b>	572 feet

**Middle Pond Quick Statistics  
2011 Average Verses the Long Term Average:**

Secchi : Worse  
Chlorophyll: Better  
Phosphorus: Better

**Moose Pond (Main Basin)** - The 2011 Secchi disk average of 6.9 meters was less deep than long-term average of 7.3 meters for the main basin. Dissolved oxygen depletion first appeared in late July in the bottom waters of the pond. The depletion increased for the rest of the summer, impacting the bottom 12 meters by September. Phosphorus concentrations in the upper waters were 6.4 ppb, which is above the long-term average of 6.0 ppb. Phosphorus concentrations below the thermocline were moderate and averaged 6.7 ppb. Color was 12 SPU, which is below the long term average of 14 SPU. pH was 6.7, which is below the long term average of 6.8. Chlorophyll averaged 2.2 ppb, which is below the long-term average of 2.9 ppb. Conductivity averaged 30  $\mu$ s, which is below the long term average of 37  $\mu$ s and alkalinity was the same as the long term average of 8 ppm. Dissolved oxygen depletion was pronounced in September and August and continues to limit the amount of suitable habitat for cold-water fish in the pond. For this reason, the main basin of Moose Pond is in the **HIGH** degree of concern category.



<b>Surface Area:</b>	1,617 acres
<b>Maximum Depth:</b>	70 feet
<b>Mean Depth:</b>	20 feet
<b>Volume:</b>	30,722 acres/feet
<b>Watershed Area:</b>	11,170 acres
<b>Flushing Rate:</b>	3.69 flushes per year
<b>Elevation:</b>	418 feet

**Moose Pond (Main Basin) Quick Statistics  
2011 Average Verses the Long Term Average:**

Secchi : Worse  
Chlorophyll: Better  
Phosphorus: Worse

**Moose Pond (North Basin)**- The 2011 Secchi disk average of 5.0 meters was less deep than the long-term average of 5.1. Mild dissolved oxygen depletion was observed in the bottom two meters of the water column during August sampling. Phosphorus concentrations in the surface waters were 9 ppb, which is below the long term average of 9.5 ppb. Alkalinity was the same as the long term average of 8 ppm and color was 24 SPU, which is above the long term average of 20 SPU. Chlorophyll was moderate at 3.2 ppb, which is below the long term average of 3.8 ppb. Conductivity was 25  $\mu$ s, which is below the long term average of 34  $\mu$ s . pH was 6.3, which is below long term average of 6.7. Due to periodic dissolved oxygen depletion in the bottom waters, the north basin remains in the **MODERATE** degree of concern category.

**Mud Pond** - The 2011 Secchi disk average of 4.3 was deeper than the long-term average of 3.4 meters. Dissolved oxygen depletion was again very pronounced this year. Low oxygen conditions limited most aquatic life to within 2 to 3 meters of the surface during August sampling. Phosphorus was 12.0 ppb, which is just above the long-term average of 11.9 ppb on the pond. Alkalinity was the same as the long term average of 5 ppm and pH was 6.4, which is above the long term average of 6.3. Chlorophyll was moderate at 3.6 ppb, which is under the long-term average of 5.3 ppb. Conductivity was 15  $\mu$ s, which is below the long term average of 18  $\mu$ s and average color was 25 SPU which is below to the long term average of 44 SPU. Water quality conditions in Mud Pond are most likely a result of the pond's large surrounding wetland complex. For this reason, the pond is in the **MODERATE** degree of concern category.

**Mud Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Better  
 Chlorophyll: Better  
 Phosphorus: Worse

**Surface Area:** 45 acres  
**Maximum Depth:** 35 feet  
**Watershed Area:** 1,661 acres  
**Elevation:** 572 feet

**Otter Pond** - The 2011 Secchi disk reading of 4.8 meters was deeper than the long-term average of 3.6 meters. Oxygen depletion was observed in the bottom 2 meters of the water column during August sampling. The surface water phosphorus concentration was 22 ppb, which is above the long term average of 12.5 ppb. Alkalinity was the same as the long-term average of 9 ppm and pH was also the same as the long-term average of 6.6. Chlorophyll was moderate at 3.8 ppb, which is less than the long-term average of 5.1 ppb. Conductivity was 33  $\mu$ s, which is under the long term average of 40  $\mu$ s and color was 30 SPU, which is below the long term average of 52 SPU. Due to periodic elevated phosphorus levels and dissolved oxygen depletion, Otter Pond remains in the MODERATE degree of concern category.



**Surface Area:** 90 acres  
**Maximum Depth:** 21 feet  
**Mean Depth:** 10 feet  
**Volume:** 814 acres/feet  
**Watershed Area:** 790 acres  
**Flushing Rate:** 0.7 flushes per year  
**Elevation:** 392 feet

**Otter Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Better  
 Chlorophyll: Better  
 Phosphorus: Worse

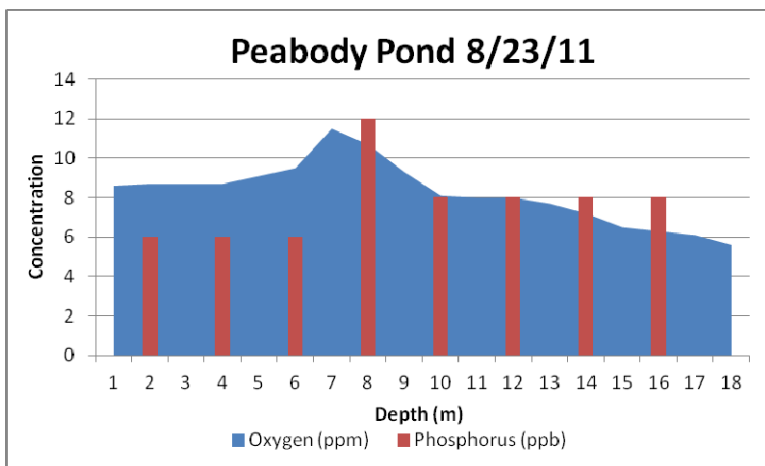
**Papoose Pond** - The 2011 Secchi disk average of 3.8 meters was deeper than the long-term average of 3.5 meters for the pond. Dissolved oxygen depletion was recorded in the bottom meter of the water column during August sampling. Phosphorus was 16 ppb, which is above the long-term average of 14.0 ppb. Alkalinity was 9 ppm, which is above the long term average of 7 ppm. pH was 6.7, which is above the long term average of 6.6. Chlorophyll was 5.3 ppb, which is below the long term average of 6.4 ppb. Conductivity was 32  $\mu$ s, which is below the long term average of 34  $\mu$ s and color was 25 SPU, which is below the long term average of 31 SPU. Due to high phosphorus concentrations and substantial shorefront development, Papoose Pond is in the MODERATE/HIGH degree of concern category.

**Papoose Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Better  
 Chlorophyll: Better  
 Phosphorus: Worse

**Surface Area:** 70 acres  
**Maximum Depth:** 15 feet  
**Watershed Area:** 192 acres  
**Elevation:** 490 feet

**Peabody Pond** - The 2011 Secchi disk average of 7.5 meters was deeper than the long-term average of 7.3 meters. Dissolved oxygen depletion was recorded in the bottom waters beginning in July and continuing for the rest of the season. During September, only 3 meters of the water column had suitable habitat for coldwater fish species such as salmon and trout. Phosphorus levels in the surface waters were moderate and averaged 6.8 ppb, which is above the long-term average of 6.0 ppb. Phosphorus concentrations below the thermocline were moderate, averaging 8.8 ppb. Alkalinity was 7 ppm, which is above the long term average of 6 ppm and pH was 6.8, which is above the long term average of 6.7. Chlorophyll levels were moderate at 2.5 ppb, which is below the long-term average of 2.7 ppb. Conductivity was 17  $\mu$ s, which is below the long term average of 23  $\mu$ s and color was 14 SPU, which is just above the long term average of 13 SPU. Although water quality conditions are fairly good in Peabody Pond, low oxygen conditions limit habitat for the pond's cold water fishery most years. For this reason, Peabody Pond is in the MODERATE/HIGH degree of concern category.



<b>Surface Area:</b>	740 acres
<b>Maximum Depth:</b>	64 feet
<b>Mean Depth:</b>	45 feet
<b>Volume:</b>	24,510 acres/feet
<b>Watershed Area:</b>	2,522 acres
<b>Flushing Rate:</b>	0.3 flushes per year
<b>Elevation:</b>	460 feet

**Peabody Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Better  
 Chlorophyll: Better  
 Phosphorus: Worse

**Perley Pond** - The 2011 Secchi disk reading of 5.0 was above the long-term average of 4.7 meters. Dissolved oxygen depletion was observed in the bottom half of the water column during August sampling. Phosphorus concentrations in the surface waters were 7.0 ppb, which is below the long-term average of 9.6 ppb. Alkalinity was the same as the long term average of 5 ppm and pH was 6.5, which is above the long term average of 6.4. Chlorophyll was 2.3 ppb for the year, which is below the long-term average of 4.9 ppb. Conductivity was 22  $\mu$ s, which is under the long term average of 30  $\mu$ s and color was 18 SPU, which is under the long term average of 30 SPU. Due to oxygen depletion in the bottom waters, Perley Pond remains in the MODERATE degree of concern category.

**Perley Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**  
 Secchi : Better  
 Chlorophyll: Better  
 Phosphorus: Better

<b>Surface Area:</b>	68 acres
<b>Maximum Depth:</b>	27 feet
<b>Watershed Area:</b>	293 acres
<b>Elevation:</b>	521 feet

**Pickerel Pond** - The 2011 Secchi disk reading of 5.3 was slightly deeper the long-term average of 5.2 meters. Dissolved oxygen depletion was observed in the bottom meter of the water column during late August sampling. Phosphorus in the surface waters was 9.0 ppb, which is above the long-term average of 5.7 ppb. Alkalinity was 8 ppm, which is above the long term average of 6 ppm and pH was the same as the long term average of 6.4. Chlorophyll concentrations were the same as the long-term average of 2.6 ppb. Conductivity was 20  $\mu$ s, which is under the long term average of 26  $\mu$ s and color was 17 SPU, which is under the long term average of 23 SPU. Water quality conditions appear fairly stable in Pickerel Pond. For this reason it remains in the **AVERAGE** degree of concern category.



**Surface Area:** 17 acres  
**Maximum Depth:** 18 feet  
**Watershed Area:** 290 acres  
**Elevation:** 515 feet

**Pickerel Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Better  
 Chlorophyll: Similar  
 Phosphorus: Worse

**Pleasant Pond** - The 2011 Secchi disk reading of 0.9 meters was significantly less deep than the long-term average of 2.7 meters. This unusually low clarity reading was due to an extremely high sediment load in the water column due to post hurricane Irene flooding. Dissolved oxygen depletion was observed in every meter except the surface. Phosphorus concentrations in the surface waters were extremely high at 57.0 ppb, which is well above the long term average of 21.5 ppb. This was again a result of the high sediment load in the water column from hurricane Irene. Conductivity was 21, which is below the long term average of 30  $\mu$ s. pH was 6.3, which is below the long term average of 6.5. Chlorophyll levels were high at 9.7, which is above the long-term average of 4.8 ppb. Alkalinity was 6 ppm, which is below the long term average of 7 ppm and color was 100 SPU, which is above the long term average of 60 SPU. High phosphorus levels in Pleasant Pond are due largely to riverine input from the Saco. Because of the naturally high color in the pond, there is less light penetration into the water column. This characteristic helps limits the amount of algae present during periods of elevated phosphorus. Pleasant Pond is in the **MODERATE** degree of concern category.

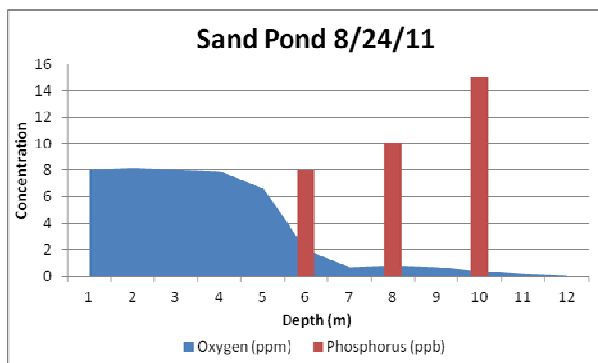


**Surface Area:** 604 acres  
**Maximum Depth:** 11 feet  
**Watershed Area:** 4,624 acres  
**Elevation:** 362 feet

**Pleasant Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Sand Pond** - The 2011 Secchi disk average of 5.6 meters was less deep than the long-term average of 6.4 meters. Dissolved oxygen depletion first appeared in early June and continued throughout the rest of the testing season. Through August and September, the bottom 7-8 meters of the water column had extremely low dissolved oxygen levels. Phosphorus concentrations in the surface waters averaged 9.7 ppb, which is above the long-term average of 8.3 ppb. Phosphorus levels below the thermocline averaged 11 ppb. Alkalinity was 7 ppm, which is above the long term average of 6 and pH was 6.6, which is below the long term average of 6.7. Chlorophyll readings were moderate at 3.9 ppb, which is above the long-term average of 3.4 ppb. Conductivity was 21  $\mu$ s, which is below the long term average of 28  $\mu$ s and color was 14 SPU, which is below the long term average of 16 SPU. Low oxygen conditions are reducing cold water fish habitat and periodic elevated phosphorus concentrations at depth are indicative of phosphorus recycling. For this reason, Sand Pond is in the **HIGH** degree of concern category.

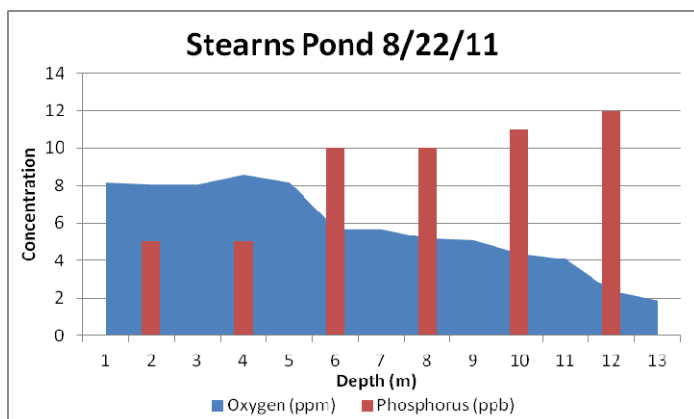


**Surface Area:** 256 acres  
**Maximum Depth:** 49 feet  
**Watershed Area:** 1394 acres  
**Elevation:** 502 feet

**Sand Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Worse

**Stearns Pond** - The 2011 Secchi disk average was the same as the long-term average of 5.2 meters. Dissolved oxygen depletion first appeared in the bottom of the water column in early July. The extent and severity of the depletion increased as the summer continued. Phosphorus concentrations in the surface waters averaged 7.6 ppb, which is below the long term average of 8.5 ppb. In the deeper waters below the thermocline, phosphorus concentrations averaged 10.8 ppb. Alkalinity was 8 ppm, which is above the long term average of 7 ppm and pH was the same as the long term average of 6.7. Chlorophyll was 3.2 ppb, which is just above the long-term average of 3.1 ppb. Color was 20 SPU, which is below the long term average of 24 SPU and conductivity was 24  $\mu$ s, which is below the long term average of 30  $\mu$ s. Due to oxygen depletion and elevated phosphorus concentrations at depth, Stearns Pond remains in the **MODERATE/HIGH** degree of concern category.

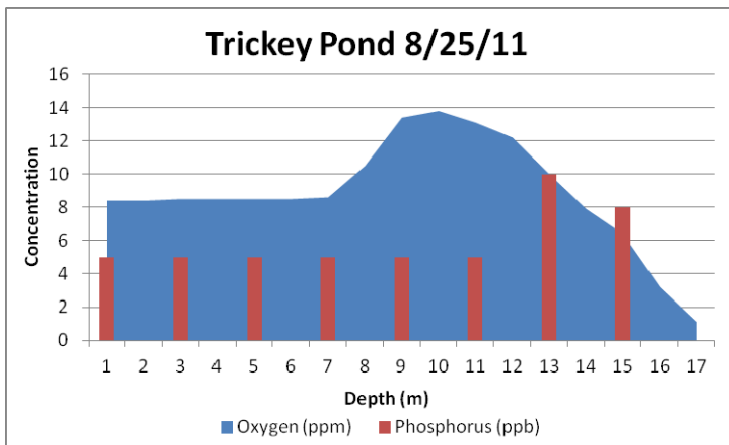


**Surface Area:** 248 acres  
**Maximum Depth:** 48 feet  
**Mean Depth:** 27 feet  
**Volume:** 6,585 acres/feet  
**Watershed Area:** 4,116 acres  
**Flushing Rate:** 1.6 flushes per year  
**Elevation:** 444 feet

**Stearns Pond Quick Statistics**  
**2011 Average Verses the Long Term Average:**

Secchi : Similar  
 Chlorophyll: Worse  
 Phosphorus: Better

**Trickey Pond** – The 2011 Secchi disk average was 9.7 meters, which is less deep than the long-term average of 10.1 meters. Dissolved oxygen depletion was recorded in the bottom 1 to 3 meters of the pond from July through September. In August and September, there was still at least 5 meters of cold and well-oxygenated water available for cold-water fish habitat. Phosphorus concentrations in the surface waters were the same as the long-term average of 5.3 ppb. Phosphorus concentrations in the waters below the thermocline averaged 7.7 ppb. Alkalinity was 9 ppm, which is above the long term average of 7 ppm and pH was 6.7, which is under the long term average of 6.8. Chlorophyll levels were low at 1.7 ppb, which is just above the long term average of 1.6 ppb. Conductivity was 34  $\mu$ s, which is under the long term average of 38  $\mu$ s and color was 10 SPU, which is over the long term average of 8 SPU. To help maintain Trickey Pond’s water quality and cold water fishery, the pond remains in the MODERATE degree of concern category.



**Surface Area:** 315 acres  
**Maximum Depth:** 57 feet  
**Mean Depth:** 34 feet  
**Volume:** 10,108 acres/feet  
**Watershed Area:** 555 acres  
**Flushing Rate:** 0.1 flushes per year  
**Elevation:** 360 feet

**Trickey Pond Quick Statistics  
 2011 Average Verses the Long Term Average:**

Secchi : Worse  
 Chlorophyll: Worse  
 Phosphorus: Similar

**Woods Pond** – The 2011 Secchi disk average of 4.8 meters was less deep than the long-term average of 5.0 meters. Dissolved oxygen depletion appeared in the bottom waters of the pond from June through September and reached its peak in late July. Phosphorus concentrations in the surface waters averaged 8.3 ppb, which is above the long-term average of 7.8 ppb. Alkalinity was 7 ppm, which is above the long term average of 6 ppm and pH was the same as the long term average of 6.6. Chlorophyll readings averaged 2.2 ppb, which is under the long-term average of 3.1 ppb. Conductivity was again 19  $\mu$ s, which is below the long term average of 25  $\mu$ s and color was the same as the long term average of 31 SPU. Trend analysis of over 20 years of data revealed lower clarity and increased nutrient and algae populations during the last decade. For this reason, Woods has been elevated to the MODERATE/HIGH degree of concern category.



Barry DeNofrio

**Surface Area:** 462 acres  
**Maximum Depth:** 29 feet  
**Mean Depth:** 17.5 feet  
**Volume:** 17,890 acres/feet  
**Watershed Area:** 3,329 acres  
**Flushing Rate:** 0.77 flushes per year  
**Elevation:** 456 feet

**Woods Pond Quick Statistics  
 2011 Average Verses the Long Term Average:**

Secchi : Worse  
 Chlorophyll: Better  
 Phosphorus: Worse