NH Department of Environmental Services Volunteer Lake Assessment Program

Current Year Chemical and Biological Data

BEECH POND, LOWER

TUFTONBORO

August-28-2013

Stationid	Station Name	Zone	Depth	Startdate	Activityid	Category	Cl	ANC	Chl-a	Cond	EC	PH	Secchi		TP	Turb
													NVS	VS		
BEELTUFB1	LOWER BEECH POND - FIRST BEACH			06/23/2013	2013-1500	SAMPLE				=21.4	4	6.72				=0.28
				07/28/2013	2013-3026	SAMPLE					4					
BEELTUFB2	LOWER BEECH POND - SECOND BEACH			06/23/2013	2013-1501	SAMPLE				=27.2	<2	6.76				=0.28
				07/28/2013	2013-3027	SAMPLE					6					
BEELTUFD	LOWER BEECH POND - DEEP SPOT	COMP	6M	06/23/2013	2013-1502	SAMPLE			1.95							
				07/28/2013	2013-3028	SAMPLE			1.88							
		EPI	2M	06/23/2013	2013-1495	SAMPLE	=4.3	3.3		=31.9		6.77	=4.2		0.00646	=0.33
				07/28/2013	2013-3021	SAMPLE	=4.8	3.1		=32.2		6.18	=4.17		ND	=0.6
		HYPO	11M	07/28/2013	2013-3023	SAMPLE				=33.3		5.51			0.00752	=0.56
				06/23/2013	2013-1497	SAMPLE				=19		5.91			0.00619	=0.25
		META	6M	06/23/2013	2013-1496	SAMPLE				=31.7		6.53			0.00826	=0.4
				07/28/2013	2013-3022	SAMPLE				=32.1		6.29			0.00676	=0.69
BEELTUFI	LOWER BEECH POND - INLET			06/23/2013	2013-1498	SAMPLE				=23	10	6.62				=0.28
				07/28/2013	2013-3024	SAMPLE				=32.2	<10	6.47				=0.4
BEELTUFO	LOWER BEECH POND - OUTLET			06/23/2013	2013-1499	SAMPLE				=31.4	<10	6.78				=0.24
				07/28/2013	2013-3025	SAMPLE				=31.7	<10	6.6				=0.48

Please Note: pH (units), TP (mg/L) (ND = < 0.005 mg/L), Cond (UMHOS/cm), Secchi (M), EC = E. coli (cts/100mL), Turbidity (NTU), ANC (mg/L), Chloride (mg/L), Chl-A (mg/M3)

VLAP CHEMICAL PARAMETER EXPLANATIONS

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

pH

Definition: pH is measured on a logarithmic scale of 0 to 14. Lake pH is important to the survival and reproduction of fish and other aquatic life. A pH below 5.5 severely limits the growth and reproduction of fish.

pH (units)	Category
<5	Acidified
5.0-5.4	Critical
5.5-6.0	Endangered
6.1-8.0	Satisfactory

Acid Neutralizing Capacity (ANC)

Definition: Buffering capacity or Acid Neutralizing Capacity (ANC) describes the ability of a solution to resist changes in pH by neutralizing the acidic input to the lake. Historically, the waters of NH have had low ANC because of the prevalence of granite bedrock. The relatively low ANC values means that NH surface waters are vulnerable to the effects of acid precipitation.

ANC (mg/l as $CaCO_3$)	Category
<0	Acidified
0-2	Extremely Vulnerable
2.1-10	Moderately Vulnerable
10.1-25	Low Vulnerability
>25	Not Vulnerable

Turbidity

Definition: Turbidity in the water is caused by suspended matter (such as clay, silt, and algae) that cause light to be scattered and absorbed, not transmitted in straight lines through water. High turbidity readings are often found in water adjacent to construction sites. Also, improper sampling techniques (such as hitting the bottom sediments or sampling streams with little flow) may also cause high turbidity readings. The Class B standard for a water quality violation is 10 NTUs over the lake background level.

Statistical Summary of Turbidity Values for NH Lakes and Ponds

Turbidity (NTUs)	Category
<0.1	Minimum
22.0	Maximum
1.0	Median

Total Phosphorus

Note: The phosphorus results during the summer are reported by the DES State Chemistry lab with the units **"mg/L"**. To convert to **"ug/L"**, move the decimal point over **three** places to the right.

Definition: Phosphorus is the most important water quality parameter measured in our lakes. It is the nutrient that limits the algae's ability to grow and reproduce. Phosphorus sources around a lake typically include septic systems, animal waste, lawn fertilizer, road and construction erosion, and natural wetlands.

Total Phosphorus (TP) Ranges for New Hampshire Lakes and Ponds

TP (ug/L)	Category
1-10	Low (good)
11-20	Average
21-40	High
>40	Excessive

Conductivity

Definition: Conductivity is the numerical expression of the ability of water to carry an electrical current. It is determined by the number of ionic particles present. The soft waters of New Hampshire have traditionally had low conductivity values. High conductivity may indicate pollution from such sources as road salting, septic systems, wastewater treatment plants, or urban/agriculture runoff.

Note: Specific categories of good and bad levels can not be constructed for conductivity, because variations in watershed geology can result in natural fluctuations in conductivity. However, values in NH lakes exceeding 100 uMhos/cm generally indicate human disturbance.

Chloride

The chloride ion (Cl^-) is found naturally in some surfacewaters and groundwaters and in high concentrations in seawater. Research has shown that elevated chloride levels can be toxic to freshwater aquatic life. In order to protect freshwater aquatic life in New Hampshire, the state has adopted acute and chronic chloride criteria of 860 and 230 mg/L respectively. The chloride content in New Hampshire lakes is naturally low, generally less than 2 mg/L in surface waters located in remote areas away from habitation. Higher values are generally associated with salted highways and, to a lesser extent, with septic inputs.

VLAP BIOLOGICAL PARAMETER EXPLANATIONS

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

CHLOROPHYLL-A

Definition: VLAP uses the measure of chlorophyll-a, a pigment found in plants, as an indicator of the alga abundance. Because algae is a plant and contains chlorophyll-a, the concentration of chlorophyll-a found in the water gives us an estimation of the concentration of algae.

Chlorophyll-a	Category
0-5 mg/m^3	Good
5.1 – 15 mg/m^3	More than desirable
>15 mg/m^3	Nuisance Amounts

WATER CLARITY (SECCHI-DISK TRANSPARENCY)

Definition: The Secchi-disk is a 20cm disk with alternating black and white quadrants used to measure water clarity (how far a person can see into the water). Transparency, a measure of water clarity, is affected by the amount of algae, color, and particulate matter within a lake.

Water Clarity	Category
<2 m	Poor
2-4.5 m	Good
>4.5 m	Exceptional

Note: Clarity values may vary depending on the maximum depth of the lake/pond. For example, if the maximum depth of the pond is 3 meters, a good clarity reading would be 2-3 meters.

DEFINITION OF UNITS

cts/100ml = Counts per 100 milliliters. Used to measure *E.coli*.

m = meters. Used to measure secchi-disk depth.

mg/L = milligrams per liter. Used to measure total phosphorus concentrations and acid neutralizing capacity. To convert to **ug/L** (micrograms per liter), move the decimal point over three places to the right.

NTUs = Nephelometric turbidity measurement. Used to measure turbidity.

mg/m^3 = milligrams per meter cubed. Used to measure chlorophyll-a concentration.

uMhos/cm = micromhos per centimeter. Used to measure conductivity.

BACTERIA (*E. COLI*)

Definition: *E. coli* is a natural component of the larg intestines in humans and other warm-blooded animal *E.coli* is used as an indicator organism fo bacteriological monitoring because it is easily culture and its presence in the water in defined amoun indicates that sewage MAY be present. If sewage present in the water, potentially harmful pathogens ma also be present.

The state standards for Class B waters specify that n more than 406 *E.coli counts* /100mL, or a geometr mean based on at least 3 samples obtained over a 60-da period be greater than 126 *E.coli counts*/100mL. Fo designated beach areas, more stringent standards appl 88 *E. coli counts*/100 mL in any one sample, or geometric mean of 3 samples over 60 days of 47 *E. co counts*/100 mL.

PHYTOPLANKTON

(Note: Phytoplankton results will be included in t annual VLAP Report)

Definition: Microscopic algae floating in the wat column. The type of phytoplankton present in a lake ca be used as an indicator of general lake quality. A abundance of cyanobacteria (such as *Anabaen Aphanizomenon, Oscillatoria*, or *Microcystis*) ma indicate excessive phosphorus concentrations or that t lake ecology is out of balance. Diatoms (such *Asterionella, Melosira*, and *Tabellaria*) and golde brown algae (such as *Dinobryon* or *Chrysosphaerell* are typical of NH's less productive lakes.

Greens

Actinastrum	*Micractinium*	*Spirogyra*
Arthrodesmus	*Mougeotia*	*Staurastrum*
Dictyosphaerium	*Pandorina*	*Stigeoclonium*
Elakotothrix	*Pediastrum*	*Ulothrix*
Eudorina	*Scenedesmus*	
Kirchneriella	*Sphaerocystis*	

Diatoms

Asterionella	*Pleurosigma*	*Surirella*
Cyclotella	*Melosira*	*Synedra*
Fragilaria	*Rhizosolenia*	*Tabellaria*

Dinoflagellates

Ceratium	*Peridinium*	*Gymnodinium*

Cyanobacteria (blue-greens)

Anabaena	*Chroococcus*	*Microcystis*
Aphanizomenon	*Coelosphaerium*	*Lyngbya*
Aphanocapsa	*Gloeotrichia*	*Oscillatoria*

Golden-Browns

Chrysosphaerella	*Mallomonas*	*Synura*
Dinobryon	*Uroglenopsis*	