

OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **Hunkins Pond, Sanbornton**, the program coordinators have made the following observations and recommendations.

We congratulate your group on sampling twice this year! However, we encourage your group to conduct more sampling events in the future. Typically, we recommend that monitoring groups sample three times per summer (once in **June, July, and August**). We understand that the number of sampling events you decide to conduct per summer will depend upon volunteer availability, and your group's goals and funding availability. However, with a limited amount of data it is difficult to determine accurate and representative water quality trends. Since weather patterns and activity in the watershed can change throughout the summer, from year to year, and even from hour to hour during a rain event, it is a good idea to sample the pond at least once per month during the summer.

If you are having difficulty finding volunteers to help sample or to travel to one of the laboratories, please call the VLAP Coordinator and DES will help you work out an arrangement.

We encourage your monitoring group to continue utilizing the Plymouth State University's Center for the Environment Satellite Laboratory. This laboratory was established to serve the large number of lakes and ponds in the greater North region of the state. This laboratory is inspected by DES and operates under a DES approved quality assurance plan. We encourage your monitoring group to utilize this laboratory next summer for all sampling events, except for the annual DES biologist visit. To find out more about the Center for the Environment Satellite Laboratory, and/or to schedule dates to pick up bottles and equipment, please call Janet Towse or Adam Baumann, laboratory managers, at (603) 535-3269.

The New Hampshire Department of Environmental Services (DES), in conjunction with the U.S. Environmental Protection Agency (EPA) and the environmental consulting firm ENSR, conducted a Total Maximum Daily Load (TMDL) for total phosphorus for your pond. The TMDL refers to the pollutant reductions a waterbody needs to meet New Hampshire's

water quality standards. Hunkins Pond was listed on the 2008 impaired waters [303(d)] list because elevated algal growth impaired the primary contact recreation (swimming) use. Phosphorus is the nutrient responsible for algal growth and is the pollutant to be reduced to control algal growth. DES is required by the Federal Clean Water Act (CWA), Section 303(d), to report every two years to the EPA on all waters not meeting state water quality standards.

The TMDL conducted at your pond identified an in-lake target phosphorus value that, when met, should result in no additional primary contact recreation impairments due to algal growth. A phosphorus budget was constructed, phosphorus sources identified and phosphorus reductions allocated to each of the sources to meet the target value. An implementation plan provides recommendations on watershed remediation activities to reduce phosphorus inputs to the pond.

The draft TMDL will be provided to your pond association, town, and watershed stakeholders for review and will also be available on the DES website at

www.des.nh.gov/organization/divisions/water/wmb/tmdl/index.htm.

There will be a period for public review and comment, anticipated for Summer 2009, where DES and/or ENSR will present it's findings to interested stakeholders. We anticipate a TMDL informational session in conjunction with the annual VLAP Workshop scheduled for May 16, 2009. We encourage your pond association and/or residents to attend the workshop to learn more about TMDLs in general and the TMDL for your pond. Phosphorus load reductions can only occur with the knowledge, participation and action of watershed residents, businesses and stakeholders. If you are interested in participating in an informational session at the VLAP Workshop please contact the VLAP Coordinator at sara.steiner@des.nh.gov or 603-271-2658. If you are interested in learning more about the TMDL Program, or attending additional informational sessions, please contact Peg Foss, TMDL Coordinator, at Margaret.foss@des.nh.gov or 603-271-5448.

We encourage your monitoring group to formally participate in the DES Weed Watchers program, a volunteer program dedicated to monitoring lakes and ponds for the presence of exotic aquatic plants. This program only involves a small amount of time during the summer months.

Volunteers survey their waterbody once a month from **May** through **September**. To survey, volunteers slowly boat, or even snorkel, around the perimeter of the waterbody and any islands it may contain. Using the materials provided in the Weed Watcher kit, volunteers look for any species that are suspicious. After a trip or two around the waterbody, volunteers will have a good knowledge of its plant community and will immediately notice even the most subtle changes. If a suspicious plant is found, the volunteers immediately send a specimen to DES for

identification. If the plant specimen is an exotic species, a biologist will visit the site to determine the extent of the problem and to formulate a management plan to control the nuisance infestation. Remember that early detection is the key to controlling the spread of exotic plants.

If you would like to help protect your lake or pond from exotic plant infestations, contact Amy Smagula, Exotic Species Program Coordinator, at 271-2248 or visit the Weed Watchers website at www.des.nh.gov/organization/divisions/water/wmb/exoticspecies/weed_watcher.htm.

FIGURE INTERPRETATION

CHLOROPHYLL-A

- **Figure 1 and Table 1:** Figure 1 in Appendix A shows the historical and current year chlorophyll-a concentration in the water column. Table 1 in Appendix B lists the maximum, minimum, and mean concentration for each sampling year that the pond has been monitored through VLAP.

Chlorophyll-a, a pigment found in plants, is an indicator of the algal abundance. Algae (also known as phytoplankton) are typically microscopic, chlorophyll producing plants that naturally occur in lake ecosystems. The chlorophyll-a concentration measured in the water gives biologists an estimation of the algal concentration or lake productivity. **The median summer chlorophyll-a concentration for New Hampshire's lakes and ponds is 4.58 mg/m³.**

The current year data (the top graph) show that the chlorophyll-a concentration **increased drastically** from **June to August**. The August chlorophyll-a concentration was the highest measured since monitoring began. A significant cyanobacteria bloom was occurring during this time.

The historical data (the bottom graph) show that the **2008** chlorophyll-a mean is ***much greater than*** state and similar lake medians. For more information on the similar lake median, refer to Appendix F.

Overall, visual inspection of the historical data trend line (the bottom graph) shows an **increasing** in-lake chlorophyll-a trend since monitoring began. Specifically the mean chlorophyll concentration has **worsened** since **2006**.

Please keep in mind that this observation is based on limited data. As your group expands its sampling program to include additional

events each year, we will be able to determine trends with more accuracy and confidence.

After 10 consecutive years of sample collection, we will be able to conduct a statistical analysis of the historical data to objectively determine if there has been a significant change in the annual mean chlorophyll-a concentration since monitoring began.

While algae are naturally present in all lakes and ponds, an excessive or increasing amount of any type is not welcomed. In freshwater lakes and ponds, phosphorus is the nutrient that algae typically depend upon for growth in New Hampshire lakes. Algal concentrations may increase as nonpoint sources of phosphorus from the watershed increase, or as in-lake phosphorus sources increase. Therefore, it is extremely important for volunteer monitors to continually educate all watershed residents about management practices that can be implemented to minimize phosphorus loading to surface waters.

TRANSPARENCY

- **Figure 2 and Tables 3a and 3b:** Figure 2 in Appendix A shows the historical and current year data for transparency with and without the use of a viewscope. Table 3a in Appendix B lists the maximum, minimum and mean transparency data without the use of a viewscope and Table 3b lists the maximum, minimum and mean transparency data with the use of a viewscope for each year that the pond has been monitored through VLAP.

Volunteer monitors use the Secchi disk, a 20 cm disk with alternating black and white quadrants, to measure how far a person can see into the water. Transparency, a measure of water clarity, can be affected by the amount of algae and sediment in the water, as well as the natural color of the water. **The median summer transparency for New Hampshire's lakes and ponds is 3.2 meters.**

The current year data (the top graph) show that the non-viewscope in-lake transparency was **1.5 meters** in **June**. The transparency was not measured in August.

The historical data (the bottom graph) show that the **2008** mean non-viewscope transparency is **less than** the state and similar lake medians. Please refer to Appendix F for more information about the similar lake median.

Overall, visual inspection of the historical data trend line (the bottom graph) shows a **decreasing** trend for in-lake non-viewscope transparency, meaning that the transparency has **worsened** since monitoring began in **2006**.

Please keep in mind that this observation is based on limited data. As your group expands its sampling program to include additional events each year, we will be able to determine trends with more accuracy and confidence.

Again, please keep in mind that this trend is based on only **three** years of data. As previously discussed, after 10 consecutive years of sample collection, we will be able to conduct a statistical analysis of the historical data to objectively determine if there has been a significant change in the annual mean transparency since monitoring began.

Typically, high intensity rainfall causes sediment-laden stormwater runoff to flow into surface waters, thus increasing turbidity and decreasing clarity. Efforts should continually be made to stabilize stream banks, lake and pond shorelines, disturbed soils within the watershed, and especially dirt roads located immediately adjacent to the edge of tributaries and the lake and pond. Guides to best management practices that can be implemented to reduce, and possibly even eliminate, nonpoint source pollutants, are available from DES upon request.

TOTAL PHOSPHORUS

- **Figure 3 and Table 8:** The graphs in Figure 3 in Appendix A show the amount of epilimnetic (upper layer) phosphorus and hypolimnetic (lower layer) phosphorus; the inset graphs show current year data. Table 8 in Appendix B lists the annual maximum, minimum, and median concentration for each deep spot layer and each tributary since the pond has been sampled through VLAP.

Phosphorus is typically the limiting nutrient for vascular plant and algae growth in New Hampshire's lakes and ponds. Excessive phosphorus in a lake or pond can lead to increased plant and algal growth over time. **The median summer total phosphorus concentration in the epilimnion (upper layer) of New Hampshire's lakes and ponds is 12 ug/L. The median summer phosphorus concentration in the hypolimnion (lower layer) is 14 ug/L.**

The current year data for the epilimnion (the top inset graph) show that the phosphorus concentration **increased drastically** from **June** to **August**.

The historical data show that the **2008** mean epilimnetic phosphorus concentration is ***much greater than*** the state and similar lake medians. Refer to Appendix F for more information about the similar lake median.

The current year data for the hypolimnion (the bottom inset graph) show that the phosphorus concentration ***increased*** from **June** to **August**.

The hypolimnetic (lower layer) turbidity sample was ***elevated*** on the **June** and **August** sampling events (**11.5 and 23.5 NTUs**). This suggests that the pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the pond bottom is covered by an easily disturbed thick organic layer of sediment. When the pond bottom is disturbed, phosphorus rich sediment is released into the water column.

The historical data show that the **2008** mean hypolimnetic phosphorus concentration is ***much greater than*** the state and similar lake medians. Please refer to Appendix F for more information about the similar lake median.

Overall, visual inspection of the historical data trend line for the epilimnion and hypolimnion shows an ***increasing*** phosphorus trend since monitoring began. Specifically the mean annual epilimnetic and hypolimnetic phosphorus concentration has ***worsened*** since monitoring began in **2006**.

Please keep in mind that these observations are based on limited data. As your group expands its sampling program to include additional events each year, we will be able to determine trends with more accuracy and confidence.

As discussed previously, after 10 consecutive years of sample collection, we will be able to conduct a statistical analysis of the historical data to objectively determine if there has been a significant change in the annual mean phosphorus concentration since monitoring began.

One of the most important approaches to reducing phosphorus loading to a waterbody is to continually educate watershed residents about the watershed sources of phosphorus and how excessive phosphorus loading can negatively affect the ecology and the recreational, economical, and ecological value of lakes and ponds.

TABLE INTERPRETATION

➤ **Table 2: Phytoplankton**

Table 2 in Appendix B lists the current and historical phytoplankton and/or cyanobacteria observed in the pond. Specifically, this table lists the three most dominant phytoplankton and/or cyanobacteria observed in the sample and their relative abundance in the sample.

The dominant phytoplankton and/or cyanobacteria observed in the **June** sample were ***Anabaena* (Cyanobacteria)**, and ***Ceratium* (Dinoflagellate)**.

Phytoplankton populations undergo a natural succession during the growing season. Please refer to the “Biological Monitoring Parameters” section of this report for a more detailed explanation regarding seasonal plankton succession. Diatoms and golden-brown algae populations are typical in New Hampshire’s less productive lakes and ponds.

➤ **Table 2: Cyanobacteria**

A **large amount** of the cyanobacterium ***Anabaena*** was observed in the **June** plankton sample. ***This cyanobacteria, if present in large amounts, can be toxic to livestock, wildlife, pets, and humans.*** Please refer to the “Biological Monitoring Parameters” section of this report for a more detailed explanation regarding cyanobacteria.

A cyanobacteria surface scum was noted on the pond on **8/21/2008**. A sample was collected and returned to the DES Limnology Center for analysis. A **lake warning** was issued on **8/21/2008** notifying the public of the presence of potentially toxic cyanobacteria. The cyanobacterium was identified as ***Anabaena***, a potentially toxic cyanobacteria. Samples were collected regularly during the advisory period. Cyanobacteria concentrations dissipated rather quickly resulting in the removal of the beach advisory and lake warning on **8/29/2008**. To learn more about cyanobacteria and associated toxin production, please refer to the Data Interpretation section of your report.

Cyanobacteria can reach nuisance levels when phosphorus loading from the watershed to surface waters is increased and favorable environmental conditions occur, such as a period of sunny, warm weather.

The presence of cyanobacteria serves as a reminder of the pond’s delicate balance. Watershed residents should continue to act proactively to reduce nutrient loading to the pond by eliminating lawn fertilizer use, keeping the pond shoreline natural, re-vegetating

cleared areas within the watershed, and properly maintaining septic systems and roads.

In addition, residents should also observe the pond in September and October during the time of fall turnover (lake mixing) to document any algal blooms that may occur. Cyanobacteria have the ability to regulate their depth in the water column by producing or releasing gas from vesicles. However, occasionally lake mixing can affect their buoyancy and cause them to rise to the surface in high concentrations. Wind and currents tend to “pile” cyanobacteria into scums that accumulate in one section of the pond. If a fall bloom occurs, please collect a sample in any clean jar or bottle and contact the VLAP Coordinator.

➤ **Table 4: pH**

Table 4 in Appendix B presents the in-lake and tributary current year and historical pH data.

pH is measured on a logarithmic scale of 0 (acidic) to 14 (basic). pH is important to the survival and reproduction of fish and other aquatic life. A pH below 6.0 typically limits the growth and reproduction of fish. A pH between 6.0 and 7.0 is ideal for fish. The median pH value for the epilimnion (upper layer) in New Hampshire’s lakes and ponds is **6.6**, which indicates that the state surface waters are slightly acidic. For a more detailed explanation regarding pH, please refer to the “Chemical Monitoring Parameters” section of this report.

The mean pH at the deep spot this year ranged from **6.61** in the hypolimnion to **9.49** in the epilimnion, which means that the hypolimnion is **slightly acidic** and the epilimnion is **basic**.

It is important to note that the epilimnetic pH was **higher (more basic)** than the hypolimnetic pH. This increase in pH near the surface was due to the cyanobacteria bloom. Cyanobacteria and algae can increase pH levels by releasing of photosynthetic by-products into the water column.

It is important to point out that the hypolimnetic (lower layer) pH was **lower (more acidic)** than in the epilimnion (upper layer). This increase in acidity near the **pond** bottom is likely due to the decomposition of organic matter and the release of acidic by-products into the water column.

➤ **Table 5: Acid Neutralizing Capacity**

Table 5 in Appendix B presents the current year and historical epilimnetic ANC for each year the pond has been monitored through VLAP.

Buffering capacity (ANC) describes the ability of a solution to resist changes in pH by neutralizing the acidic input. The median ANC value for New Hampshire's lakes and ponds is **4.8 mg/L**, which indicates that many lakes and ponds in the state are at least "moderately vulnerable" to acidic inputs. For a more detailed explanation about ANC, please refer to the "Chemical Monitoring Parameters" section of this report.

The mean acid neutralizing capacity (ANC) of the epilimnion (upper layer) was **17.6 mg/L**, which is ***much greater than*** the state median. In addition, this indicates that the pond has a ***low vulnerability*** to acidic inputs.

➤ **Table 6: Conductivity**

Table 6 in Appendix B presents the current and historical conductivity values for tributaries and in-lake data. Conductivity is the numerical expression of the ability of water to carry an electric current, which is determined by the number of negatively charged ions from metals, salts, and minerals in the water column. The median conductivity value for New Hampshire's lakes and ponds is **38.4 uMhos/cm**. For a more detailed explanation, please refer to the "Chemical Monitoring Parameters" section of this report.

The mean annual epilimnetic conductivity at the deep spot this year was **148.4 uMhos/cm**, which is ***much greater than*** the state median.

The conductivity continued to remain ***much greater than*** the state median in the pond this year. Typically, elevated conductivity indicates the influence of pollutant sources associated with human activities. These sources include failed or marginally functioning septic systems, agricultural runoff, and road runoff, which contains road salt during the spring snow-melt. New development in the watershed can alter runoff patterns and expose new soil and bedrock areas, which could also contribute to increasing conductivity. In addition, natural sources, such as iron and manganese deposits in bedrock, can influence conductivity.

It is possible that de-icing materials applied to nearby roadways during the winter months may be influencing the conductivity in the pond. The most commonly used de-icing material in New Hampshire is salt (sodium chloride).

Therefore, we recommend that the **epilimnion** and the **tributaries** be sampled for chloride next year. This additional sampling may help us identify what areas of the watershed are contributing to the increasing in-lake conductivity.

Please note that the DES Limnology Center in Concord is able to conduct chloride analyses free of charge, and the Plymouth State University Center for the Environment is able to conduct chloride analyses at a minimal cost. As a reminder, it is best to conduct chloride sampling in the spring as the snow is melting and during rain events.

➤ **Table 7a and Table 7b: Total Kjeldahl Nitrogen and Nitrite+Nitrate Nitrogen**

Table 7a in Appendix B presents the current year and historical Total Kjeldahl Nitrogen and Table 7b presents the current year and historical nitrite and nitrate nitrogen. Nitrogen is another nutrient that is essential for the growth of plants and algae. Nitrogen is typically the limiting nutrient in estuaries and coastal ecosystems. However, in freshwater, nitrogen is not typically the limiting nutrient. Therefore, nitrogen is not typically sampled through VLAP. However, if phosphorus concentrations in freshwater are elevated, then nitrogen loading may stimulate additional plant and algal growth. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

During the most recent DES Lake Assessment Program survey, conducted during the Summer of **2006**, the ratio of the total nitrogen concentration to total phosphorus (TN:TP) concentration in the epilimnion sample was **25 (greater than 15)** indicating that the pond is **phosphorus-limited**. This means that any additional **phosphorus** loading to the pond will stimulate additional plant and algal growth. Therefore, it is not critical to conduct nitrogen sampling.

➤ **Table 8: Total Phosphorus**

Table 8 in Appendix B presents the current year and historical total phosphorus data for in-lake and tributary stations. Phosphorus is the nutrient that limits the algae’s ability to grow and reproduce. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

Since **Hunkins Pond** is primarily groundwater-fed, inlet sampling is not part of the routine sampling program. It would be a good idea to sample surface runoff areas early in the spring soon after snowmelt

or after a rain event to determine the quality of water that flows into the pond in this manner.

➤ **Table 9 and Table 10: Dissolved Oxygen and Temperature Data**

Table 9 in Appendix B shows the dissolved oxygen/temperature profile(s) collected during **2008**. Table 10 in Appendix B shows the historical and current year dissolved oxygen concentration in the hypolimnion (lower layer). The presence of sufficient amounts of dissolved oxygen in the water column is vital to fish and amphibians and bottom-dwelling organisms. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

The dissolved oxygen concentration was greater than **100 percent** saturation between the **surface** and **two** meters at the deep spot on the **June** sampling event. Wave action from wind can also dissolve atmospheric oxygen into the upper layers of the water column. Layers of algae can also increase the dissolved oxygen in the water column, since oxygen is a by-product of photosynthesis. Considering that the depth of sunlight penetration into the water column was approximately **1.5** meters on this sampling event, as shown by the Secchi disk transparency depth, we suspect that an abundance of algae in the epilimnion caused the oxygen super-saturation.

During this year, and past sampling years, the pond has experienced a lower dissolved oxygen concentration and a higher total phosphorus concentration in the hypolimnion (lower layer) than in the epilimnion (upper layer). These data suggest that the **process of internal phosphorus loading is occurring in the** pond. When the hypolimnetic dissolved oxygen concentration is depleted to less than 1 mg/L, **as it was on the annual biologist visit this year and on previous annual visits**, the phosphorus that is normally bound up with iron and aluminum in the sediment may be re-released into the water column. Since an internal source of phosphorus in the pond may be present, it is even more important that watershed residents act proactively to minimize phosphorus loading from the watershed.

Low hypolimnetic oxygen levels are a sign of the pond’s **aging** and **declining** health. This year the DES biologist conducted the dissolved oxygen profile in **June**. We recommend that the annual biologist visit for the **2009** sampling year be scheduled during **July** so that we can determine if oxygen is depleted in the hypolimnion **later** in the sampling year.

➤ **Table 11: Turbidity**

Table 11 in Appendix B lists the current year and historical data for

in-lake and tributary turbidity. Turbidity in the water is caused by suspended matter, such as clay, silt, and algae. Water clarity is strongly influenced by turbidity. Please refer to the “Other Monitoring Parameters” section of this report for a more detailed explanation.

As discussed previously, the hypolimnetic (lower layer) turbidity was **elevated (11.5 and 23.5 NTUs)** on the **June** and **August** sampling events. In addition, the hypolimnetic turbidity has been elevated on many sampling events during previous sampling years. This suggests that the pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling and/or that the lake bottom is covered by an easily disturbed, thick organic layer of sediment. When the pond bottom is disturbed, phosphorus rich sediment is released into the water column. When collecting the hypolimnion sample, make sure that there is no sediment in the Kemmerer Bottle before filling the sample bottles.

The turbidity of the epilimnion (upper layer) samples was **elevated (9.19 and 36.2 NTUs)** on the **June and August** sampling events. The cyanobacteria bloom and surface scum likely caused the turbid conditions.

➤ **Table 12: Bacteria (*E.coli*)**

Table 12 in Appendix B lists the current year and historical data for bacteria (*E.coli*) testing. *E. coli* is a normal bacterium found in the large intestine of humans and other warm-blooded animals. *E.coli* is used as an indicator organism because it is easily cultured and its presence in the water, in defined amounts, indicates that sewage **may** be present. If sewage is present in the water, potentially harmful disease-causing organisms **may** also be present.

The **North End** *E. coli* was **slightly elevated** on the **June** sampling event. However, the concentration of **100** counts per 100 mL **was not greater than** the state standard of 406 counts per 100 mL for recreational waters that are not designated public beaches.

If you are concerned about *E. coli* levels at this station, your monitoring group should conduct rain event sampling and bracket sampling in this area to help us determine the bacteria source.

For a detailed explanation on how to conduct rain event sampling and stream surveys, please refer to the 2002 VLAP Annual Report special topic article, which is posted on the VLAP website at <http://www.des.nh.gov/organization/divisions/water/wmb/vlap/categories/publications.htm>, or contact the VLAP Coordinator.

➤ **Table 13: Chloride**

Table 13 in Appendix B lists the current year and the historical data for chloride sampling. 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. The median epilimnetic chloride value for New Hampshire lakes and ponds is **5 mg/L**. Higher values are generally associated with salted highways and, to a lesser extent, with septic inputs. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

Chloride sampling was **not** conducted during **2008**.

➤ **Table 14: Current Year Biological and Chemical Raw Data**

Table 14 in Appendix B lists the most current sampling year results. Since the maximum, minimum, and annual mean values for each parameter are not shown on this table, this table displays the current year “raw,” meaning unprocessed, data. The results are sorted by station, depth, and then parameter.

➤ **Table 15: Station Table**

As of the spring of 2004, all historical and current year VLAP data are included in the DES Environmental Monitoring Database (EMD). To facilitate the transfer of VLAP data into the EMD, a new station identification system had to be developed. While volunteer monitoring groups can still use the sampling station names that they have used in the past and are most familiar with, an EMD station name also exists for each VLAP sampling location. Table 15 in Appendix B identifies what EMD station name corresponds to the station names you have used in the past and will continue to use in the future.

DATA QUALITY ASSURANCE AND CONTROL

Annual Assessment Audit:

During the annual visit to your pond, the biologist conducted a sampling procedures assessment audit for your monitoring group. Specifically, the biologist observed the performance of your monitoring group and

completed an assessment audit sheet to document the volunteer monitors' ability to follow the proper field sampling procedures, as outlined in the VLAP Monitor's Field Manual. This assessment is used to identify any aspects of sample collection in which volunteer monitors failed to follow proper procedures, and also provides an opportunity for the biologist to retrain the volunteer monitors as necessary. This will ultimately ensure samples that the volunteer monitors collect are truly representative of actual lake and tributary conditions.

Overall, your monitoring group performed *very well* while collecting samples on the annual biologist visit this year! Specifically, the members of your monitoring group followed the majority of the proper field sampling procedures. However, the biologist did identify a few aspects regarding sample collection that the volunteer monitors could improve upon, as follows:

- **Anchoring at deep spot:** Please remember to use an anchor with sufficient weight and a sufficient amount of rope to prevent the boat from drifting while sampling at the deep spot. It is difficult for the biologist to collect an accurate and representative dissolved oxygen/temperature profile when the boat is drifting. In addition, it is difficult to view the Secchi disk and collect samples from the proper depths when the boat is drifting. Depending on the depth of the pond and the wind conditions, it may be necessary to use two anchors!
- We suggest using a larger boat to accommodate sampling equipment, bottles, anchor, life vests and volunteer monitors while sampling. A two person kayak is difficult to maneuver, un-steady and un-safe while collecting samples. If you need assistance with a boat, DES *may* be able to provide one for the biologist visit.

Sample Receipt Checklist:

Each time your monitoring group dropped off samples at the laboratory this summer, the laboratory staff completed a sample receipt checklist to assess and document if your group followed proper sampling techniques when collecting the samples. The purpose of the sample receipt checklist is to minimize, and hopefully eliminate, improper sampling techniques.

Overall, the sample receipt checklist showed that your monitoring group did a *very good* job when collecting samples this year! Specifically, the members of your monitoring group followed the majority of the proper field sampling procedures when collecting and submitting samples to the laboratory. However, the laboratory did identify a few aspects of sample collection that your group could improve upon, as follows:

- **Sample labels:** On the **August** sampling event, at least one sample bottle was not labeled. However, by process of elimination or by contacting the volunteer monitors, it was possible for the laboratory staff to determine which sample bottles corresponded to what sampling locations. Please label your samples with a waterproof pen preferably by using a black permanent marker before sampling. If your association has made its own sample bottle labels, please fold over one corner of each label before placing it on a sample bottle so that the label will not become permanently attached to the bottle. In addition, please make sure that the labels will stick to the bottles when they are wet.

USEFUL RESOURCES

Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials, DES Booklet WD-03-42, (603) 271-2975 or

www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-03-42.pdf.

Cyanobacteria in New Hampshire Waters Potential Dangers of Blue-Green Algae Blooms, DES fact sheet WMB-10, (603) 271-2975 or

www.des.nh.gov/organization/commissioner/pip/factsheets/wmb/documents/wmb-10.pdf.

Impacts of Development Upon Stormwater Runoff, DES fact sheet WD-WQE-7, (603) 271-2975 or

www.des.nh.gov/organization/commissioner/pip/factsheets/aot/documents/wqe-7.pdf.

Lake Protection Tips: Some Do's and Don'ts for Maintaining Healthy Lakes, DES fact sheet WD-BB-9, (603) 271-2975 or

www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-9.pdf.

Road Salt and Water Quality, DES fact sheet WD-WMB-4, (603) 271-2975 or

www.des.nh.gov/organization/commissioner/pip/factsheets/wmb/documents/wmb-4.pdf.

Weed Watchers: An Association to Halt the Spread of Exotic Aquatic Plants, DES fact sheet WD-BB-4, (603) 271-2975 or

www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-4.pdf.