



the Water Column

Vol. 4, No. 4

Provided free of charge to our monitors and affiliates

Winter 2000

To Bloom or Not to Bloom: That is the Question!

Scott Williams, Executive Director



Apologies to Shakespeare – but this common lake water quality question relates directly to the efforts of volunteer lake monitors: What is an algae bloom – or, more correctly – what is an algal bloom?

Volunteer monitors, shorefront property owners, and water quality professionals often speak of algal blooms, but each may have different thoughts about the meaning of this term. Confusion sometimes results from the fact that: 1) there are many types of algae in lakes, 2) the significance of a bloom to water quality may depend on the type of algae that is blooming, and 3) the point at which a bloom begins and ends is somewhat subjective: the perception that a bloom is occurring may be dependent on what one is used to seeing in an individual lake.

During the past summer algal blooms were reported on a number of Maine lakes. The VLMP and the Maine DEP received calls from volunteer lake monitors and others who were concerned about excess algae growth. But the descriptions of what callers observed in their lakes varied greatly!

The most common plants in lakes are *planktonic* algae (often referred to as phytoplankton). These tiny plants float freely in the water column, subject to the influence of wind and waves. They do not have leaves or roots. They are typically distributed throughout the entire lake.

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Thoughts from Your President

Joe Flanagan

In spite of fluctuating temperatures, most Maine lakes are now covered with at least a thin coating of ice.

With Secchi disks stored for the winter, we look forward to the next monitoring season – and wonder if the weather in future Maine summers will be as unusual as it was in 1999.

Many thanks to our Volunteer Monitors, Regional and Data Entry Coordinators, and VLMP and DEP staff for making this

Program such a success. Several thousand hours of volunteer service, with a value of hundreds of thousands of dollars, were contributed by our dedicated volunteers in 1999.

The VLMP is at the forefront of helping us understand and protect Maine's lakes - thanks to all of you!

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Planktonic algae generally look like green, yellow, or brown specks of dust in the water. Some species exist as individual cells that are not visible without magnification. Others form thread-like filaments or tiny spherical colonies that are clearly visible from a boat, or through a Secchi viewing scope. There are many shapes and sizes of planktonic algae.

Phytoplankton may be distributed throughout the first several meters of the water column, or they may be concentrated at a specific depth. That is why in some lakes the Secchi disk disappears slowly as it is lowered down into the water column, but in others it disappears abruptly a few to several meters below the surface. Wind, sunlight, the shape and depth of the lake basin, the species of algae in the water, and other factors determine how these plants are *distributed* in the water. The overall *abundance* of planktonic algae is linked to the availability of nutrients (primarily phosphorus). It is worth noting that yellow pine pollen, which blows into the lake in the early summer, is sometimes mistaken for planktonic algae.

In terms of biomass (the weight of organic matter), planktonic algae are generally the most abundant plants in lakes. That is because these plants are distributed throughout the entire surface water area. Many species of planktonic algae may exist in lake water together, but at any given point in time, one or two species are likely to dominate.

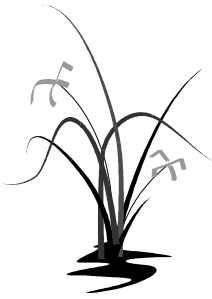


Photo 1
Planktonic algal
Bloom on Togus
Pond

The term “bloom” implies abundance or proliferation of a particular species. Planktonic algal blooms occur in most lakes every year without much fanfare because the intensity and duration of the bloom is low. But if phosphorus levels are high and other factors are favorable, a severe nuisance bloom may occur. These blooms may cause Secchi disk transparency readings to become very low. The Maine DEP has established a Secchi disk transparency standard of 2.0 meters, or less for an algal bloom (it is important to note the distinction between lakes that have very low Secchi disk readings because of blooming algae, and those that have poor clarity due to high levels of natural water color). Blooms may last from a few days to several weeks, depending primarily on the availability of phosphorus in the water, and the weather. The bloom may form a noxious scum on the lake surface, dying algae cells may accumulate along downwind shoreline areas, and when the cells decompose, dissolved oxygen in the water may decline to critically low levels for fish and other aquatic life. Shore-front property owners sometimes report “green paint” in the water under these conditions. Severe planktonic blooms generally get lots of attention because they are highly visible — the entire lake is affected. The public typically reacts to these blooms with questions and concerns about the safety of recreational use. According to the Maine DEP, each year between 30 and 50 Maine lakes experience an algal bloom.

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Invasive Aquatic Plant Update



This winter the VLMP staff will attend two conferences in order to enhance the Programs resources and development on invasive aquatic plant issues. Project Coordinator, Amy Shnur will attend the 1st Annual Northeast Aquatic Plant Management Society (NEAPMS) conference in New York on January 18 & 19, 2000. Typical topics will include: Controlling exotic aquatic plants through legislation and regulation; Ecological impacts of management techniques; and Aquatic plant surveys – mapping technology and data interpretation.

VLMP staff will also attend the 10th International Aquatic Nuisance Species and Zebra Mussel conference in Toronto.

Here in Maine, the VLMP will participate in a Summit, which will focus on developing strategies to aid in the prevention and management of invasives. The Summit will be held on February 29, 2000 in Augusta. The Lakes Environmental Association and the Maine Volunteer Lake Monitoring Program, along with many other agencies and organizations will collaborate resources and expertise to formulate and implement a plan to prevent the spread of invasive aquatic plants in Maine. The groups main objective is to finalize a feasible strategy by the summer of 2000.



VLMP WELCOMES NEW STAFF MEMBER



Our 1998 Strategic Plan articulated a very important goal: “To define, establish and maintain infrastructure to carry on the work of the VLMP, including funding for short-and long-range needs.”

The VLMP welcomes Becky Welsh as our new Development Coordinator. Becky joined the staff in November and is spending 20 hours a week developing and implementing a program that will

fulfill that goal by broadening our base of funding for both short-and long-range needs.

Becky comes to us with more than 16 years of experience in non-profit marketing and fund development. In addition to working with arts organizations such as PCA Great Performances and Maine Arts, Inc., producer of the Maine Festival and New Year's Portland, she spent three years at Maine Audubon Society as Volunteer Coordinator and as Assistant Director of Development for Restricted Funds (Grant Writer). Her professional expertise, familiarity with the field, and enthusiasm for Maine's natural environment make Becky a welcome addition to the VLMP staff.

Our project funding from the DEP and USEPA allows us to do what we do and do it well: monitor and protect the water quality of Maine's lakes. We are extraordi-

narily fortunate to enjoy such a significant level of support from federal and state agencies. We also recognize the fragility of government funding and the need to diversify our sources of funding in order to provide long-term security and stability for the VLMP.

Becky is researching foundations and charitable giving programs and writing grant proposals that will, hopefully, bring in new sources of funding to support our day-to-day operations and allow us to expand our work to cover acid rain monitoring, mercury assessment in lake waters, and to combat the invasion of exotic species. In addition, she is exploring a variety of opportunities that will increase awareness of the VLMP and expand our fund raising activities.



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Severe planktonic blooms are a serious water quality concern because they indicate that the lake ecosystem is out of balance.

However, planktonic blooms that do not cause an overall sustained decline in water clarity, or which occur as part of a natural annual or seasonal cycle, should not be viewed with concern. Following are three types of planktonic blooms that occur in Maine lakes, each with different implications:

1. Most of our lakes experience a *diatom* bloom in the Spring and Fall. Diatoms are a type of algae that are more dependent on the availability of silica (a naturally occurring, glassy mineral) than on phosphorus. When the lake turns over in the spring and fall, silica is swept-up from the lake bottom into the water column, where it is used by the diatoms. Diatom blooms may be quite intense, causing Secchi disk readings to drop substantially. But the blooms occur naturally in lakes with a wide range of water quality, and they are generally of short duration. Because they take place in the early spring and fall, most lake users are not aware of diatom blooms. Volunteer monitors who measure Secchi disk readings in April and early May often observe the effects of diatom growth.

2. During the late summer, a number of Maine Lakes experience a bloom of the colonial alga species *Gloeotrichia*. The globular colonies of this plant are very visible in the water, looking much like buff-colored tapioca grains. The colonies are generally widely-spaced in the water. As a result, water clarity and quality are not affected because the overall algal density is low. Because the algal colonies are highly visible, volunteer monitors and the public often have questions about water quality implications. *Gloeotrichia* often blooms in clear lakes that have good water quality, like Thompson and Christopher in Oxford County.

3. A number of Maine lakes experienced *severe* planktonic algal blooms in 1999. The blooms mostly occurred in July, August and September. Secchi disk readings on these lakes dropped to less than 2.0 meters for varying periods of time. Androscoggin Lake in Wayne dropped from 5.2 meters in May to 1.1 meter

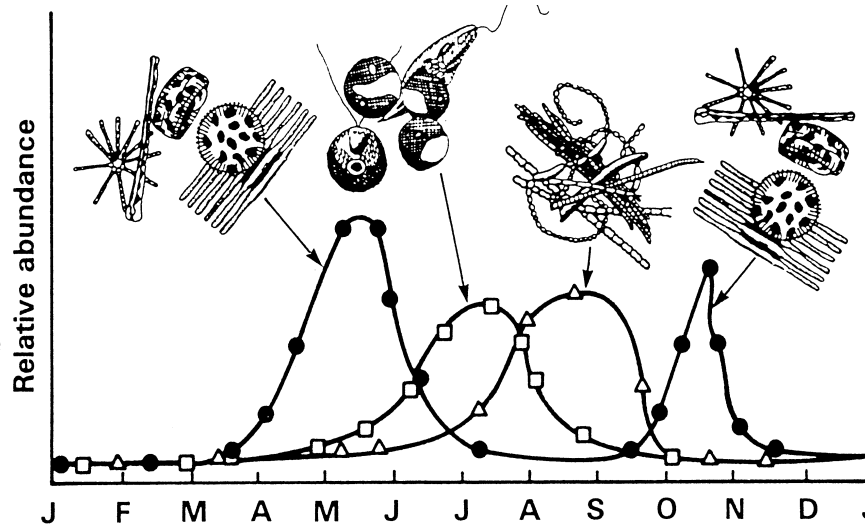


Figure 1 Courtesy of USEPA *Lake and Reservoir Restoration Guidance Manual—2nd Edition, 1990.*

in early August. Togus Pond experienced a similar severe bloom. The blooms were ultimately caused by high concentrations of phosphorus in the water column. **Photo 1 (on page 2)** shows the accumulation of planktonic algae on the water surface during a severe bloom in Togus Pond in Kennebec County last August.

Figure 1 shows a typical seasonal succession of lake phytoplankton communities. Blooms may or may not occur during the succession, depending on some of the factors discussed previously. In the spring and autumn most lakes are dominated by diatoms. Green algae are most abundant in early and mid-summer, and the blue-green Algae are more common in late summer. Blue-green algae are commonly associated with noxious blooms and poor water quality.

Metaphyton are a group of algae that grow near the lake shoreline in the shallow area that is known as the *littoral* zone. These plants often form bright green clouds that may be several meters, or more in length. *Metaphyton* also become attached to the stems and leaves of rooted water plants, appearing as long, wispy threads. Unless the shoreline has extended shallow areas, *metaphyton* occupy a smaller percentage of most lakes than planktonic species. Because their

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habitat is more limited, metaphyton blooms are generally less of a threat to overall lake water quality. Sunlight, warm water, and nutrients from the shallow lake bottom are the primary factors governing the growth of metaphyton.

Blooms are more often associated with warm, sunny weather than with the overall phosphorus enrichment of the lake. However, a substantial increase in the amount of metaphyton growing in the lake over time may indicate that negative changes are occurring to the lake ecosystem. There is no specific standard to define a metaphyton bloom. Many reports of excess littoral algae growth were received in 1999, very probably due to the unusually warm and bright weather during the summer months. **Photo 2** shows a metaphyton bloom taken at Barrows Lake in Washington County last summer.

Photo 2 Metaphyton Bloom in Barrows Lake, Courtesy of DEP

Another class of algae that are not commonly associated with blooms is the periphyton. These plants grow on the surfaces of rocks, sand, rooted plants, and even some animals. Periphyton are the algae that cause rock surfaces and docks in and near the water to be slippery.



Macrophytes are rooted plants that also grow in the shallow littoral areas. The abundance of macrophytes (water lilies, pickerelweed, pipewort, and many others) along the lakeshore is linked to water depth, sunlight, the composition of the lake bottom, exposure to wind and waves, shoreline stability, and other factors. The macrophyte population in a lake typically changes very slowly over time. One factor that can cause a significant increase in the number of rooted aquatic plants in a lake is soil erosion from the watershed. The accumulation of sediment on the lake bottom from eroded soil provides an ideal growth medium for these plants. The term bloom is not often associated with macrophytes, although people who are concerned with nuisance levels of aquatic plants sometimes use bloom to describe excess growth. Most exotic invasive aquatic plants (like Milfoil) are macrophytes. An infestation of *invasive* plants could reasonably be described as a bloom.

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What 's Going on in Your Neck of the Woods ?

We are interested in your tales, action photographs, questions concerning current water quality issues in your area, and illustrations or cartoons with a VLMP or water quality theme.



Please submit materials to:
Amy Shnur - Project Coordinator





Lakeside Notes

Scott Williams, Executive Director

Last summer the VLMP collaborated with the New England Chapter of the North American Lake Management Society (NEC-NALMS) and the Congress of Lake Associations (COLA) to produce a joint Annual Meeting. The two-day event was well-attended, and feedback was positive.

Decisions concerning the 2000 VLMP Annual Meeting must be made within the next several weeks. The primary question for this year's meeting is whether to hold an independent event, or to once again combine forces with other organizations. Both ways offer benefits to consider.

An independent meeting of the VLMP staff and volunteers, such as those held at Bryant Pond and Damariscotta Lake in 1997-98, allows us to create an atmosphere that is focused and friendly. We are able to meet as a single group and discuss concepts and ideas that are relevant to the VLMP. This format provides an easy way for volunteer monitors, coordinators, and Board members to meet and socialize.

Collaborating with other groups, like COLA, allows us to take advantage of a broader diversity of issues and topics that are offered at the meeting. This format also provides an opportunity for volunteers to meet with lake association members and others who have an interest in volunteer monitoring water quality data.

***Please help us make a decision
about the 2000 Annual Meeting!***

***We would like to hear from you.
Contact the VLMP office by
February 15, and share your
thoughts with VLMP staff.***

Fear of Fundraising

Rebecca Welsh, Development Coordinator

We all know how hard it is to ask someone for help. It's a very difficult thing to do. You ask yourself over and over again, do I really need this help? Am I worthy? Whom do I know well enough to ask for help, or better yet, who cares enough about me to help me? And, when we finally get up the courage to ask for assistance, we feel very vulnerable putting our fate in someone else's hands.

It's the same situation for a non-profit organization, which, by definition, exists to serve the community and, in return, is dependent upon the generosity of that community for its growth and well-being. It's a tough spot to be in, having to ask people for their financial support. Especially for grass-roots organizations like the VLMP.



Like everyone else, non-profit organizations have regular costs of living. Grants for new projects and ideas are relatively easy to obtain. However, the day-to-day costs of basic operation--salaries, office supplies, utilities, postage, printing, and the like—are relatively unglamorous and much more difficult to fund. They are, however, the guts of the operation that allow everything else to happen.

The Maine Volunteer Lake Monitoring Program is very fortunate to have a large, loyal group of volunteers and supporters. Without their enormous contributions of time and effort, the VLMP literally would not exist. This in-kind support is what has allowed the VLMP to become a credible, highly respected water quality monitoring program.

The movie "Field of Dreams" had the classic line, "If you build it, they will come." Fund raising is a lot like that. If you tell them, they will support you.

The first step in any fund raising effort is, "friend raising"

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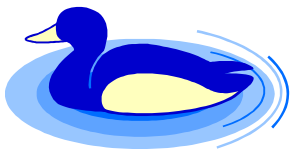


Fear of Fundraising... continued from page 6

As more and more people learn about the organization--from our friends, volunteers, colleagues and others familiar with the VLMP--the better chance we have of developing a strong system of support throughout the state.

The VLMP is a great organization. We have a compelling mission, and we fulfill it well. We do important work throughout the State of Maine. We have a strong Board, good management, and we have proven ourselves over time to be fiscally responsible.

We provide a valuable service in a cost-effective manner, and the VLMP deserves to thrive. People throughout the state deserve to know about this organization. **We** know how important this organization is. We have to make sure **everyone** knows about it!



Quality Counts!

Linda Bacon, MDEP Advisor

Details, Details, Details...

The science of monitoring is full of details. What time? What day? What depth? What lake? Who did it? You probably know all these details when you are out on your lake collecting data. In fact, we are very dependant on your recording of every last one of these details on the field sheets. The integrity of the lake's dataset depends on it!

Most of you know that Maine has almost 6000 lakes and ponds. What you may not realize is that there are many waters with the same name. For example, there are 49 Long Ponds and 101 Mud Ponds. Without the proper lake ID number (MIDAS number), it is most difficult to match data with the right lake. And you'd be surprised that often between 25-75 lakes might be monitored on a pleasant summer day. Keeping track of the who, what and where is a constant challenge.

After much thought, we will be starting the new century with a slight

modification to data tracking. Each monitor will be given a unique ID number that will need to be recorded along with the Secchi Disk reading. The program has been putting the results from quality assurance workshops into an electronic database for the past 6 years. Because the field sheets have a spot for the surveyor's name, it is possible to *almost* match a surveyor with their quality assurance information electronically. We can visually compare data with the monitoring list and match up names but to do so electronically is a nightmare. For example, the hypothetical volunteer, William Thomas is listed as such in the monitor database. William sometimes writes, Will Thomas, Bill Thomas, Bill & Jan Thos., or WT in the Surveyor blocks. This makes a 'perfect' electronic match impossible. Now if Bill is assigned the code Tho331, whenever he enters that code along side his Secchi reading, we'll know exactly who did what, where!



Lake Data on the Web

Maine Lake Water Quality data are available through PEARL (Public Educational Access to Resources on Lakes) website thanks to the University of Maine Water Research Institute.

More information is becoming available (as the site is updated).

Please visit PEARL at:

www.pearl.spatial.maine.edu

Use the "comments" option to send your suggestions on how to improve this service.

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How To Report An Algal Bloom

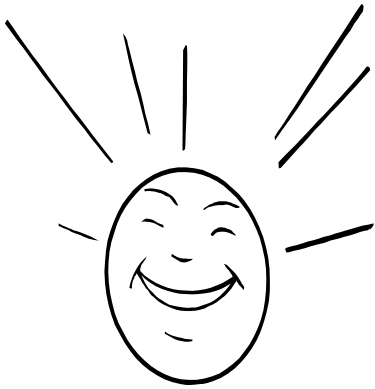
If you think an algal bloom has occurred in your lake, please call the Maine DEP (287-7798), or the VLMP (225-2070). Be prepared to provide the following information:

1. Make observations from several locations, including deep and shallow areas of the lake and different areas of the shoreline.
2. What was the date and depth of the most recent Secchi disk reading?
3. What color is the water, and how intense is the color?
4. Is the bloom concentrated in certain areas, or is it dispersed throughout the lake?
5. Is the water cloudy, or is it full of particles that can be seen with the eye?
6. Is the bloom mixed in the water, or is it attached to plants, rocks, or other structures?
7. If it is attached, describe the size and color of the growth. Is the growth stringy or like jelly?
8. Does the algae have the appearance of a suspended cloud (like green cotton candy)? If so, how large are the clouds – or what percentage of the shoreline is affected?
9. How long has the condition persisted?
10. Have similar conditions existed in the lake in previous years?

Photographs can be helpful in determining the type of bloom that has occurred. Samples may be sent to the Maine DEP or the VLMP (only to identify the type of algae) under the following conditions:



1. Call the DEP or VLMP office to discuss and describe the situation with staff before sending or delivering a sample. Samples must be mailed so that they will arrive during weekdays.
2. The sample must be fresh because algal cells deteriorate quickly. Mail or deliver the sample within 24 hours of collection. Keep the sample refrigerated until it is mailed.
3. Label the sample with the lake name, your name and phone number, the date the sample was taken, and the sample location and depth in the lake.



SPECIAL THANKS !!

To Our New Kennebec County
Data Entry Coordinator

Pat Bell , 15 year volunteer monitor on
Manhanock Pond in Piscataquis County.

Volunteer Opportunities

The VLMP is seeking Regional Coordinators for **Aroostook**, **Kennebec** and **Washington** Counties. Regional Coordinator responsibilities include:

- Communicating with the VLMP staff to coordinate certification workshops, equipment needs and replacement requests from volunteer monitors.
- Making sure that all contact information for each volunteer is accurate. Tracking data and communicating with Data Entry Coordinator in the summer and fall to insure that data is received and entered.
- Mailing all data sheets and entry disks to the VLMP office in the fall for annual lake reports.

Please contact the VLMP office for additional information.

REMINDERS

💧 Please notify the VLMP if you have changed your address, phone number or email so that we may continue to send you the *Water Column* and other information.

💧 If you're no longer able to monitor your lake, please contact the office as soon as possible. Your equipment and materials may be made available to someone in your lake association or other interested individuals who would be willing to continue your monitoring efforts.

💧 New volunteers must contact the VLMP office to schedule an orientation and training workshop before they begin to collect data. If you are unable to find a replacement, please return the equipment to the VLMP office so that the scopes and Secchi disks can be "recycled".

Thanks!

The **Water Column** is the newsletter of the Maine Volunteer Lake Monitoring Program, and is published quarterly. Please address questions or comments to: Scott Williams, editor, P.O. Box 445, Turner, ME 04282. We also welcome phone calls: (207) 225-2070.

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Inside this Issue: ALGAE BLOOMS!

Funding for this newsletter is made possible through Clean Water Act, Section 319 grant, courtesy of the US Environmental Protection Agency, Boston Regional Office, and the Maine Department of Environmental Protection.

Printed on recycled paper



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