

LONG POND NORTH STUDY

Executive Summary and Recommendations

The Colby Environmental Assessment Team (CEAT) investigated the water quality of Long Pond North, located in the Belgrade Lakes region of Maine, from June through December 2006. CEAT analyzed several physical, chemical, and biological water quality parameters to determine the current health of the lake. Attributes of the watershed such as land-use patterns and residential and commercial development were also studied to determine their impact on water quality. Data collected were used to produce models of the watershed that enabled CEAT to identify possible sources of degradation to the current and future water quality of Long Pond North. To examine historic water quality trends, all data collected this summer were compared to data collected in previous years by CEAT, as well as the Maine Department of Environmental Protection.

The trends observed show a decrease in mean Secchi depth, a measurement of transparency that is an important indicator of water quality. CEAT also observed an increasing trend in mean phosphorus levels. Phosphorus is a limiting nutrient for aquatic plant species, and higher phosphorus levels in the lake can result in algal blooms that decrease the aesthetic and recreational value of the lake. Although the phosphorus levels of Long Pond North are not at the level to produce algal blooms, the increasing phosphorus level is a cause for concern.

Following is a brief summary of findings from CEAT's study of Long Pond North and its watershed:

- Using a water budget, CEAT calculated the flushing rate at 3.79 flushes per year. The relatively large water input from Great Pond (77 percent) contributes to the high flushing rate.
- The dissolved oxygen level in Long Pond North has decreased substantially in the past 30 years. Anoxic waters were measured at depths below 10 meters by mid August. As a result, bottom total phosphorus increased over the summer at this site. Low oxygen levels also limit the available habitat for cold-water fish species.
- There is an historic trend in decreasing mean Secchi depth, indicating that water clarity is decreasing. The trophic state index, which is based on Secchi depth, was calculated to be 38, classifying Long Pond North as oligotrophic, although close to mesotrophic status.
- *Gloeotrichia*, a cyanobacteria, occurs in Long Pond North. There are no health risks associated with this species, but its presence in the water column may detract from recreational enjoyment of the lake. Further studies on the life history and phosphorus sequestration of this species are being conducted.
- Roads found within the watershed can contribute disproportionately high amounts of phosphorus to the lake. The best estimate for state and municipal roads indicates a contribution of 18.00 kg/yr and 82.50 kg/yr for camp roads. Camp roads not only contribute more phosphorus to the lake but are also of greater concern because of their proximity to the shoreline. Many camp roads are in need of specific improvements such as grading, crowning, ditching, and the placement of diversions to limit erosion and nutrient runoff.

- The residential survey found 479 residences in the watershed. Of these, 286 (59.7%) were year-round and 193 (40.3%) were seasonal. Conversion of seasonal homes to year-round residences is common and increases septic system use, which can increase the amount of phosphorus entering the lake.
- Two hundred and sixty seven (55.7%) of the residences are shoreline. Residential density along the shoreline is low (17.5 houses/shoreline mi), but this is because there remains some large sections of undeveloped shoreline. Density is much higher in the developed areas, and parts of the remaining forested areas may be developed in the future, placing more pressure on the lake.
- Seventy-four percent of shoreline homes have buffers in good or excellent condition. The greatest concerns for homes with poor buffers are lack of buffer depth and the absence of canopy species.
- There are 66 lots still undeveloped along the shoreline and hundreds of non-shoreline lots that are close to the lake. Development of these lots will bring increased pressure to the lake.

The water quality of Long Pond North and trends within its watershed should continue to be monitored, and steps should be taken to reduce external nutrient loading. Maintaining roads, improving buffer strips, and limiting development within the watershed will help reduce the quantity of nutrients entering the lake. Collaboration is necessary among watershed residents, as well as with the residents of the Great Pond watershed, to minimize current threats to water quality and protect the future of Long Pond North.

Recommendations

The results of our study indicate that Long Pond's north basin is still relatively healthy compared to many other lakes in the area, and no remediation is currently required. The negative trends for dissolved oxygen, chlorophyll, and phosphorus, however, are causes for concern. Some action is necessary to ensure that the current standard of water quality does not degrade further in the future. The following list of recommendations represents simple actions that should be taken in order to minimize current threats to water quality and protect the future of Long Pond.

Roads

- Camp roads should be maintained regularly and attention should be paid immediately to the problem areas recognized and described in this report.
- Problems should be addressed with attention first paid to those that have greatest effect on the lake.
- Private camp roads should be evaluated annually for crowns, ditches, diversions, turnouts, and culverts, and repair work should be performed accordingly.

Land Use and Development

- Install effective buffer strips where they are still needed to prevent nutrient runoff.
- Strictly enforce zoning ordinances in wetlands and forested lands.

- Remaining undeveloped regions are an asset to the lake and should be protected where possible.
- Continue to monitor residential and commercial development, especially shoreline lots. This area may be one of the greatest points of pressure over the next ten to twenty years.
- Houses and septic systems should be set back from the water, with a deep buffer strip composed of several layers, including trees, shrubs, ground cover, and duff.
- Steps should be taken to minimize erosion at construction sites. Barriers can be constructed to prevent soil from washing into the lake, and plantings should be established immediately on soil left bare after construction.
- The conversion of summer homes to year-round residences should be monitored, and home-owners should be informed of steps they can take to reduce their increased impact on the lake.
- The water quality of Great Pond should also be carefully monitored and maintained, because of the large influence that it has on the water quality of Long Pond.

Community Awareness and Education

The Belgrade Lakes Association (BLA) and their associated programs have performed many service projects and made a great effort to educate the community about issues that affect lake water quality. These programs should be continued and expanded.

- There needs to be an effort to involve the entire community. The BLA is based on membership and not all residents are members.
- There has been an effort to include high school students as summer employees on the lake. This program could be expanded.
- The BLA and other organizations should continue to hold demonstrations on good practices within the watershed.
- The Belgrade Regional Conservation Alliance (BRCA) should continue their work to unify the towns and lake alliances in the Belgrade region.
- Belgrade Regional Conservation Corps (BRCC) should continue their work to educate landowners in the art of creating a lake-friendly property.

Invasive Species Control

No invasive plants are currently found in Long Pond, but efforts should be continued to prevent their introduction. The Maine Volunteer Lake Monitoring Program (VLMP) and Maine Center for Invasive Aquatic Plants (MCIAP) have done a great job so far conducting surveys and inspecting boats in an effort to educate boaters about the hazards of invasive species, as well as to aid with identification of the 11 species considered to be threats to the area (**VLMP 2006**).

- Closely inspect boats and trailers for clinging vegetation.
- Frequently monitor aquatic vegetation adjacent to the boat ramp.
- Remove suspicious plants and report to proper officials.
- Increase public awareness of the issue, both at the boat ramp as well as around Belgrade and Rome.