## pH Levels and the Loons

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There has been concern recently that pH levels are affecting the reproductive success of Lake Temagami’s loons. While this is difficult to verify, loons generally return to a similar area to nest each year, and this is a valid concern. The TLA summer staff were asked to take up pH sampling while conducting the water sampling programs. For that purpose, a digital pH probe using an optical sensor was purchased from Hanna Instruments. The pH meter gives an accurate reading almost immediately after being placed in water, and gently swirled. However, as spring was over, this was incorporated into the summer sampling only. When this round of sampling was being completed, we took the probe out and used it. Before use of the probe, it was calibrated each day and was perfectly accurate for the standard buffer solutions (pH of 4, 7, and 10). The lake itself yielded pH readings with an average of 7.8.

While this may seem to be somewhat high, especially given concerns in the last couple decades over acid rain, Temagami is not the only lake in the Sudbury region to report pH levels that have risen in recent years (Alvo 2009). Measures were taken to limit the effects of Sudbury smelters on the nearby regions, such as scrubbers and taller stacks. The current pH levels in Lake Temagami should not be considered cause for concern, as we only have summer data. Despite a common expectation that the lake would have a neutral pH, the optimal range of pH for freshwater ecosystems is anywhere between 6.0 and 8.0 (Adirondack Watershed Institute 2010). A possible explanation for an alkaline pH in the summer is the action of phytoplankton (like algae and diatoms), found in the thermocline region of the lake. The thermocline is the layer of the lake where the temperature drops most rapidly, from an average of 22.5°C to 8.8°C in Temagami’s case. This is also a region high in oxygen due to the phytoplankton. Since Temagami’s water is highly oxygenated in the thermocline, it is reasonable to expect a great level of phytoplankton to be acting in the water. Phytoplankton act like tiny plants, performing photosynthesis. One key point to note is that photosynthesis involves the transformation of hydrogen atoms (more properly, hydronium atoms in solution [H­3O+]) into water atoms. The more hydronium atoms (which are acidic in solution) that are converted into water, the less acidic and, conversely, more basic the lake becomes.

Thus, the lake seems to be healthy at the present, and loon chicks should not be endangered by the water pH in Lake Temagami. A lack of reproduction in a year or two is not cause for concern, as a generally accepted reproductive success rate for stable loon populations is 0.50 fledged young per territorial pair (McIntyre 1994). However, a lack of immediate danger is not an excuse for complacency. It is important to keep in mind that other factors may play a role in the success of loons. These factors include weather, water-level fluctuations, predation, and human activities (Timmermans *et al.* 2005). Even lake area is correlated with breeding success (Weeber 1999), perhaps because larger lakes offer more abundant food sources. It is advisable while enjoying time on the lake each year that you boat carefully, slow down near loons, and avoid nearing loon nests if you happen to discover their location. You may also want to get involved by exploring volunteer options with the Canadian Lakes Loon Survey program, which attempts to compile data for a clear picture of loon successfulness on Canadian lakes. Their website is <http://www.birdscanada.org/volunteer/clls/>, or you can email [volunteer@bsc-eoc.org](mailto:volunteer@bsc-eoc.org) for more information. The TLA also supplies CLLS brochures for interested parties. Thank you for helping to protect Temagami’s loons!

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Sources:

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