


Through **hypolimnetic aeration**, oxygen could be pumped into the lowest level in the lake and could provide more dissolved oxygen to animal life. **Artificial circulation** (fountains, paddlewheels, air diffusers) such as used in the bathhouse area could provide aeration to expose the lake water to more oxygen and could be added to the various Coves. Through **hypolimnetic withdrawal**, siphons could be used to remove nutrient rich water, which then would be replaced by neutral water.

Dilution methods could flush the lake to reduce algae but would require lots of water. **Nutrient diversion techniques** could utilize expensive engineering to divert drains. **Dredging** could use heavy hydraulic

equipment to increase the depth of the lake and could remove sediment; it was used for Bullough's Pond.

Nutrient inactivation could also be performed utilizing aluminum, iron, or calcium salts to inactivate phosphorus. Alum treatment (aluminum sulfate) can last eight or more years but also can have deleterious effects on the living creatures in the lake.

It is incumbent upon all of us to slow the accelerated eutrophication of Crystal Lake in order to keep it healthy for years to come. For more information on Crystal Lake and the work of the Conservancy, visit www.crystallakeconservancy.org. 

Editor's Note



For a second issue of the newsletter, the focus of our first two articles is on storm water: the problems it is creating in our watersheds and the ways that residents and city government can help to alleviate those

problems, which are expected to worsen as global warming increases.

Crystal Lake Conservancy co-president Janice Bourque presents evidence that the water quality in Crystal Lake is likely to be of greater concern in the future. She also presents suggestions that residents can follow to prevent pollution from their property from entering the storm drains. As you sit in your armchairs over the winter, scheming about what to do in your garden next spring, consider a rain garden. In our next issue, Ed Himlan, Executive Director of the Massachusetts Watershed Coalition, will present surprising statistics about the large amount of pollution that can be removed from stormwater runoff by the installation of simple rain gardens.

Marcie Scudder's beautiful photograph taken at Crystal Lake reminds us of the wildlife that is dependent on healthy water at Crystal Lake and all the city's bodies of water.

Alderman Deborah Crossley and Alderman Ruthanne Fuller give us a basic understanding of Newton's complicated sewer and stormwater system. We'll be waiting to hear more as the plan to update the stormwater system develops.

— Beth Wilkinson

City Storm Water Management

— Alderman Deb Crossley with Alderman Ruthanne Fuller

What's in a (storm) drain?

Which by any other name ("catch basin") should smell as sweet—as clean rain water. Ideally, it should contain nothing more.

The storm drains in our roads, however, also collect whatever the rains wash off the roads: dirt, leaves, trash, chemicals from car exhaust, pet waste, fertilizers and other garden chemicals. In places where there still are old connections to the sewer system and/or if the pipes are damaged and leaking, the storm drains also may be picking up sewage.

The previous article by Janice Bourque contains suggestions about what you as property owners can do to keep contaminants out of the city storm system. The city's responsibility is to provide and to maintain the public infrastructure in good working order, well functioning and reliable.

It is important to consider the city's stormwater system within the context of the vast underground plumbing system that Newton maintains to serve its citizens. We must provide residents with **clean** water, remove **waste** water (sewage), and drain rain water from properties and streets. These systems are the extensions of the plumbing systems that our homes and businesses require to sustain our lives and work. Beneath Newton's approximately 300 miles of streets, we have an almost equal length each of water, sewer and storm water pipes, as well as associated pump stations, manholes, catch basins, culverts, outflows, etc., that complete the public infrastructure that the city must steward. Much of these systems are now very old, leaking and in need of repair, which usually means cleaning and relining but in some cases requires replacement.

So, how are we doing with our stormwater system?

Keep in mind that it is a huge system. We have 320 miles of stormwater drain pipes, 12,750 catch basins, two pump stations, 155 major outfalls (the places where the drain

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pipes end), 200+ interior outfalls, and seven miles of streams that are part of the system.

There are several things to consider, including the condition and capacity of this infrastructure, the ongoing maintenance efforts needed to keep the system clean and in repair (such as cleaning storm drains), and the way that other city infrastructure (sewers) and operations (street cleaning) impact the system.

Beginning in the winter of 2011, Alderman Fuller and I began working closely with the City's executive office and the water, sewer, and stormwater divisions to arrive at a comprehensive understanding of the condition of these systems, and in the spring of 2011 we resolved to prepare a strategic plan, including a financing mechanism, to bring these systems up to a point of "predictable maintenance." We found that the Department of Public Works has maintained excellent data on the condition of the water and sewer systems but that needed repairs and maintenance have been underfunded for many decades. With its data and numerous financial analyses, the City completed a ten-project-area, eleven-year plan for the sewer system, targeting the oldest and leakiest parts of the system first, and a longer-term plan for the water system, the first three years of which will correct for water pressure needed to serve fire-fighting requirements. There is an excellent PowerPoint presentation detailing the plan on the city website: www.newtonma.gov/civicax/filebank/documents/40846. This plan is approved, funded, and on schedule.

Although our storm drainage system is as old as our streets, the city does not have the same quality of information on this system as yet. We must complete the comprehensive evaluation. More on that in a moment.

Work on the sewer system is relevant and important to a well functioning storm water system. The network of pipes and culverts that carry theoretically clean storm water from our streets eventually drains into the Charles and a few other isolated bodies of water, such as our treasured Crystal Lake. We do not want contaminants entering this system. However, one of the largest contributors of contaminants is due to some of the oldest sewer systems in the city, where "underdrains" were used in areas of high ground water to lower the water table and to allow for sewer lines to be installed above them in dry ground.

In those days it was thought that the underdrains should also be used to flush out the sewers periodically, so they were deliberately connected back up to the sewers.

This both puts clean rain water into our sewer system (which we pay to send to Deer Island for treatment) and also delivers sewage to the underdrain, which really is part of the storm water system.



Newton has about 70 miles of underdrains beneath sewer mains. They exist in generally older areas of the city. Underdrains will be disconnected from the sewer mains as we update the sewer system.

That's a lot of information before we even get to a storm water plan!

As mentioned earlier, we need first to fund and then to undertake a comprehensive assessment of the storm water system and its component parts before we can develop a plan to prioritize repairs to the system.

By several recent estimates, this assessment, which involves underground camera work—sort of like arthroscopic surgery, will cost approximately \$350,000. The City is discussing ways to fund this need. There is a storm water reserve fund that accrues from the small fee property owners pay into that fund. Newton was one of the first Massachusetts communities to recognize the need for, and to establish, such a fund, but to date it has proven insufficient to cover even the yearly maintenance of the system. Currently, homeowners pay \$6.25 quarterly into that fund, and businesses pay \$150 per year, regardless of the size of the property and its amount of impervious surface. In other words, a large shopping mall with a huge parking lot that creates a lot rainwater runoff pays the same \$150 fee as a small retail store with no parking lot.

A little more work is needed, but the Aldermen should be able to vote next spring on a plan to restructure these fees to make them fairer. We expect to keep residential fees constant but to assess larger commercial property owners according to their impervious area. Taking this step to adjust commercial fees would add to the reserve sufficiently to fund the assessment. However we fund the assessment, we need to do it as soon as possible in order to avoid costly repairs on emergency basis only so that we are managing risk, rather than being subject to it.

One last point to keep in mind: there are new EPA stormwater regulations that require more stringent pollution prevention requirements. The City will need to make additional investments in coming years for this as well.

Newton's underground infrastructure working group continues to meet regularly to review progress on all elements of the strategic plan. Members of the working group include Fred Russell, Director of Water/Sewer; COO Bob Rooney; Commissioner of Public Works Dave Turocy; City Engineer Lou Taverna; Utilities Superintendent Ted Jerdee; and consulting engineers Weston & Sampson. As needed, the group has been joined by CFO Maureen Lemieux, Comptroller Dave Wilkinson, and former Water & Sewer Accounts Manager Ryan Ferraro.

We should have more interesting information to share in the coming months and would love to keep you posted. 