Engineer's Report

November 13, 2019

Normandale Lake Water Quality Improvement Project:

A curly-leaf pondweed turion survey was conducted on Normandale Lake on November 2, 2019 following the summer growing season. The goals of the survey were to determine the level of curly-leaf pondweed turions within the lake's substrate following the lake drawdown in the winter of 2018-2019 that resulted in the freezing of much of the lake's substrate. Although curly-leaf pondweed occasionally reproduces by seed, most curly-leaf pondweed plants resprout from overwintering buds called turions (see photo, bottom left). The turions are typically produced in number by the plants prior to their late-June or early-July die off. After the pinecone-like turions germinate in late-fall or early-winter, plants continue to grow slowly under the ice, giving them a competitive advantage over slower-growing native species after ice-out.

Results from the fall 2019 curly-leaf pondweed turion survey are positive. Curly-leaf pondweed turions were found at only 19 of 50 survey points (38% coverage), and, collectively, there were just 36 live turions present in the samples. Interestingly, every viable turion found was the small "stick" variety that are usually found on small parent plants (see photo, bottom right). The only large turions (dime-sized or greater) were rotten and disintegrating. This suggests that the viable turions found originated from the smaller-than-normal plants during the 2019 growing season (the curly-leaf pondweed plants had a late growth start in 2019 due to the drawdown) and that most larger turions were killed by the drawdown or used up (germinated) during the 2019 growing season. A copy of the report is included with the Engineer's Report.

Despite the good news, the survey documents the presence of turions which are expected to produce curly-leaf pondweed in the 2020 growing season. Barr has begun preparing the Lake Vegetation Management Plan (LVMP) in preparation for the spring 2020 herbicide treatment, a requirement of MnDNR permitting. District and Barr staff plan to meet with the MnDNR in the upcoming month to discuss the planned herbicide treatment.

Photo of a typical germinating curly-leaf pondweed turion (Matt Berg, Endangered Resource Services, LLC).

Photo of a small "stick" variety curly-leaf pondweed turion that typically comes from small (young) parent plants (Matt Berg, Endangered Resource Services, LLC).

Edina Stream Stabilization Project: Phase II of the project reached substantial completion at the end of October 2018. The substantial completion deadline was December 31, 2018 so the project was completed ahead of schedule.

Barr worked on a maintenance plan to establish clear roles for the District and the City of Edina for addressing future maintenance needs. A revised maintenance plan was completed to address Administrator Anhorn's comments, and the revised plan was provided to Administrator Anhorn to share with the City.

The contractor provided documentation about the required vegetation maintenance completed during the growing season of 2019; however, no new construction activities occurred this month.

Stabilized and vegetated shoreline on winding stretch of creek at Reach 11 (June 25, 2019).

Vegetated shoreline along the creek at Reach 1 (June 25, 2019).

District Office (Discovery Point): Barr staff coordinated with the restoration contractor regarding replacement of plants at the site, in accordance with the plant warranty. This work included a meeting onsite to coordinate tree layout.

Lake Cornelia and Lake Edina Water Quality Improvements:

Aluminum Treatment

HAB Aquatic Services Inc. has been selected to conduct the alum and sodium aluminate (aluminum) treatment of Lake Cornelia.

HAB originally scheduled the treatment for the last week in October (the contract with NMCWD indicated a required completion date of October 31, 2019). However, unseasonably cold temperatures in early- and mid-October caused lake water temperatures to drop earlier than normal. The contract documents require that water temperatures be above 45°F to conduct the aluminum treatment. At low temperatures aluminum is more soluble and floc does not form very well, potentially prohibiting even application of aluminum on bottom sediment and losses through the outlet. Because water temperatures were expected to be 45°F or below during the planned treatment dates of October 28-30, the treatment was not conducted and was rescheduled for May, 2020.

Barr, NMCWD staff and legal counsel are in the process of drafting a contract amendment to reflect the change in contract timing. The treatment timeframe specified in the contract amendment is May 10, 2020 through May 31, 2020. This tight timeframe was selected to allow time to conduct the herbicide treatment targeting curly-leaf pondweed before the alum treatment, but also to complete the aluminum treatment prior to significant growth of the native plant community. A key to the successful aluminum treatment will be the early treatment of the curly-leaf pondweed to make sure that by May 10th the pondweed has been treated and dead or decaying plant matter has settled to the lake bottom. This will require close coordination with the City of Edina and potentially some contracting assistance to ensure that the herbicide applicator completes the application in a timely fashion.

Lake Cornelia and Lake Edina Water Quality Improvements:

Feasibility Study

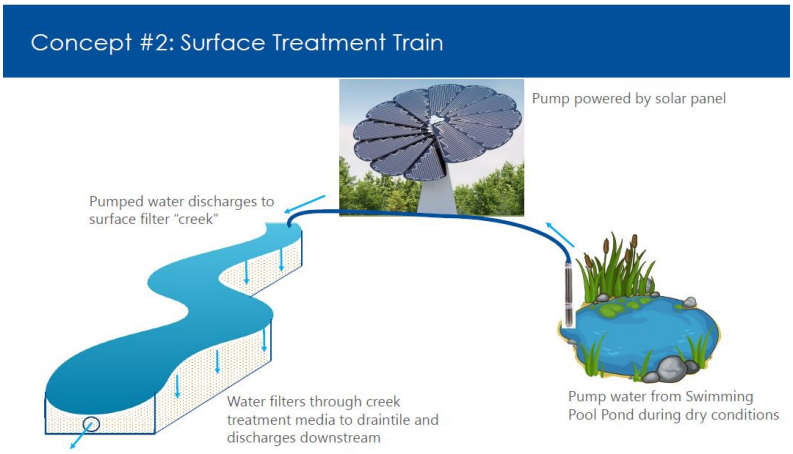
At the September 18, 2019 regular meeting, the Board approved a scope of work for Barr to complete a preliminary engineering/feasibility study to further evaluate the other water quality improvement practices recommended in the UAA study for Lake Cornelia and Lake Edina.

The Barr team developed two high-level stormwater management concepts for a BMP at Rosland Park and presented these concepts to District and City of Edina staff in mid-October. The two concepts presented at the meeting are shown and described below.

Concept #1: Subsurface Filtration Treatment Vault

Concept #1 is the concept developed as part of the UAA study. The BMP would be underground to minimize park impacts. Filtration media such as spent lime, CC-17, or other media would be used to remove phosphorus from the inflowing water.

Photos show construction of an underground spent lime filtration BMP in the Ramsey-Washington Metro Watershed District.



Concept #2 is an above-ground treatment BMP. Water would be pumped from Swimming Pool Pond to a "stream-like" stormwater feature using a solar pump. The stormwater BMP would use filtration media such as iron-enhanced sand, spent lime, or CC-17 to remove phosphorus from the inflowing water.

Rough sketch showing the conceptual BMP, a series of small shallow filtration basins connected by a flowing "stream". The BMP, located on a hilltop within the current disc golf course at Rosland Park, would serve as a park amenity, providing visual interest and educational opportunities.

Barr is currently revising these BMP conceptual designs based on feedback received at the meeting. The most significant changes will be to Concept #2, to reflect the City's desire to minimize the BMP footprint and associated impacts on current or future park use. Barr plans to solicit feedback on the revised BMP concepts with District and City staff by the end of November. Barr will also be initiating work on evaluating additional stormwater treatment/phosphorus reduction BMPs in the Lake Cornelia and/or Lake Edina watersheds, as well as strategies for managing curly-leaf pondweed and fisheries in Lake Cornelia.

BMP Retrofits on Nonprofit Sites- Final Design and Construction:

Barr staff are currently working on preparing bid-ready construction documents for five non-profit BMP sites. We met with NMCWD staff on November 8, 2019 to discuss progress and next steps. We anticipate that 90% design plans will be completed by the end of November, with final plans and contract documents to be completed for public bid following NMCWD's regular board meeting in January 2020.

Smetana Lake Use Attainability Analysis Update:

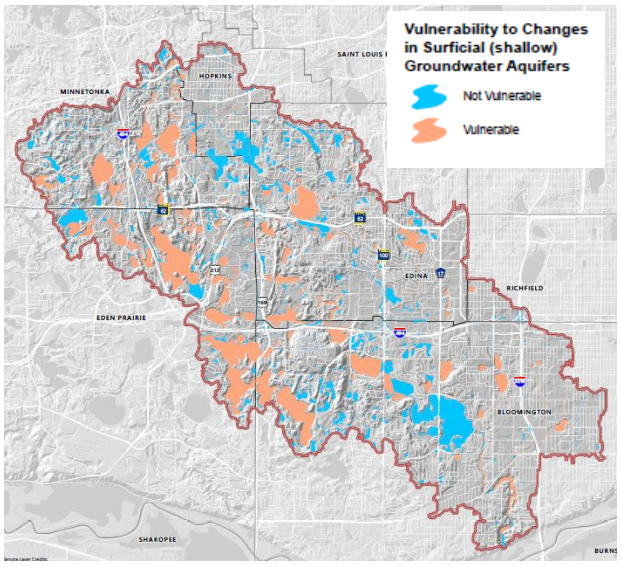
Barr has begun updating the Smetana Lake Use Attainability Analysis (UAA) to assess current water quality and re-evaluate implementation recommendations from the original UAA study completed in 2003. This past month output from the P8 model (flows and water quality) and monitoring data were used to develop and calibrate the in-lake model for the 2016 modeling year. One of the main goals of the in-lake modeling effort is to better understand how Smetana Lake functions and why the water quality of the lake has improved so significantly since the 2003 UAA.

A meeting to share preliminary study results with stakeholders is tentatively planned for December 2019.

Groundwater/Surface-Water Interaction Study and Assessment of Surface Water Vulnerability to Changes in the Groundwater System:

Understanding how changes in the groundwater system may affect surface water levels, stream flow, and water quality is an important component of long-term planning and protection of water resources in the Nine Mile Creek watershed. How connected, or disconnected, surface waters are to the groundwater system affects how they may respond to seasonal changes (drought), long-term climate change, or anthropogenic stresses (groundwater pumping).

Barr has completed the assessment for groundwater and surface water interaction and the vulnerability of surface waters to changes in the groundwater system. This analysis included approximately 2000 lakes, ponds, wetlands, and stream reaches across the District. Results of the study were presented to the NMCWD Board of Managers at the September 4, 2019 special meeting. The report has been provided to NMCWD staff and is included in the meeting materials for the November 20, 2019 regular board meeting.



This map shows the vulnerability of waterbodies throughout the watershed to the changes in surficial (shallow) groundwater aquifers.

Bush Lake Outlet Project: No new activities.

Pentagon Park Stormwater Management: No new activities.

Regional Stormwater Volume Reduction Opportunity Study: Barr has assisted NMCWD staff in evaluating two potential stormwater volume reduction opportunities in the past month, including:

- Reviewing a roadway project in Bloomington identified in Hennepin County's five-year Capital Improvement Program (CIP)
- Working with the City of Edina to evaluate the potential for expanding a stormwater management system at the City's cold storage site near the Braemar Arena in Edina.

Discovery Point Building Addition: No new activities.

Wetland Conservation Act (WCA) and NMCWD Wetland Rule Administration:

Work administering the WCA and NMCWD wetland rule in the past month included:

- Conducting wetland delineation site reviews, requesting and reviewing revisions, and submitting the WCA Notice of Decision for wetland boundary and type approval of the Liberty Plaza site located at 7075 Flying Cloud Drive in Eden Prairie.
- Conducting a wetland delineation site review, requesting and reviewing revisions, and submitting the WCA Notice of Decision for wetland boundary and type approval of Douglas Corporation's Valley View Road site in Eden Prairie.
- Reviewing a wetland delineation report, submitting the WCA Notice of Application, and reviewing MNRAM data for 6216 Baker Road in Eden Prairie.
- Conducting a site review and investigating a report of potential unpermitted wetland impact at 5127 Skyline Drive in Edina.
- Miscellaneous program administration.