Engineer's Report

May 15, 2019

Normandale Lake Water Quality Improvement Project:

An alum treatment of Normandale Lake was completed by HAB Aquatic Solutions on May 7th and 8th to reduce the release of phosphorus from lake bottom sediments (i.e., internal loading). See photos below for more information.

Aerial view of boat landing at Normandale Lake, where large tanks stored the aluminum sulfate and sodium aluminate for refill of the tanks on the alum treatment barge (May 7, 2019).

Alum treatment barge coming in for refill of the aluminum sulfate and sodium aluminate tanks.

Alum treatment barge with tanks that store aluminum sulfate and sodium aluminate. The two chemicals are combined to buffer the application and prevent drastic swings in lake pH.

Photo of turtle sunning itself near the shoreline of Normandale Lake (May 7, 2019).

Photo of alum treatment barge on Normandale Lake, with Barr staff monitoring pH in boat behind the barge (May 7, 2019).

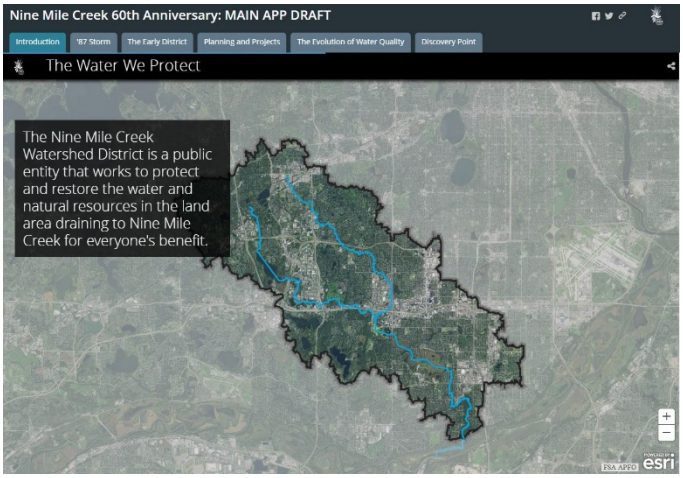
Late-afternoon photo of Normandale Lake alum treatment. A trail of alum floc can be seen behind the barge, which disperses and settles to the lake bottom within hours of treatment (May 7, 2019).

Normandale Lake Water Quality Improvement Project (continued): Rachel Contracting removed the turtle fencing in early-May. They have completed the re-grading around the new bypass pipe manhole structure and plan to re-stabilize and restore the area in the upcoming week, depending on weather conditions. The temporary weir located in the inlet channel to the lake remains in place; Rachel will remove it in late-June, after the MnDNR's exclusion period for fish spawning and migration has expired.

During the alum treatment monitoring, Barr staff noted very little plant growth throughout Normandale Lake. While this is positive news with regard to control of curly-leaf pondweed, it also indicates that the overall aquatic plant community may be less dense in 2019 than in typical years. With less aquatic plants, there will be less phosphorus uptake from the water column, which could lead to higher in-lake phosphorus concentrations and more frequent and/or severe algal blooms. The recent alum treatment will help minimize algal blooms due to internal phosphorus loading from the sediment. The water quality of Normandale Lake will be monitored this summer as part of the District's lake monitoring program.

Comprehensive aquatic plant monitoring will be conducted in summer and fall of 2019 to measure the success of the lake drawdown in controlling curly-leaf pondweed (CLP). Monitoring will include aquatic plant surveys and plant biomass assessments of the lake in June and August. CLP sediment turion (a type of overwintering bud that can produce new plants) sampling will be conducted in October to assess the potential for curly-leaf pondweed regrowth. An aquatic plant survey will also be completed for the portion of Nine Mile Creek directly upstream of Normandale Lake, between I-494 and West 84th Street, in June and August to identify and document the extent of CLP in this portion of the creek and plan for a potential 2020 herbicide treatment.

Nine Mile Creek Watershed District 60th Anniversary Story Map: Design team members (District and Barr staff) have begun creating the Story Map. Utilizing the content outline that has been created, GIS specialists at Barr have begun to build the web based map while additional content is being gathered and arranged within the map. The map will be made public prior to the 60th anniversary events being scheduled for this summer.



The Story Map will be a 20 minute web-based experience where users will learn broadly about the history and roles of the District. There will also be an emphasis on how folks can do their part to protect water resources.

Edina Stream Stabilization Project: Phase II of the project reached substantial completion at the end of October. The substantial completion deadline was December 31, 2019 so the project was completed ahead of schedule.

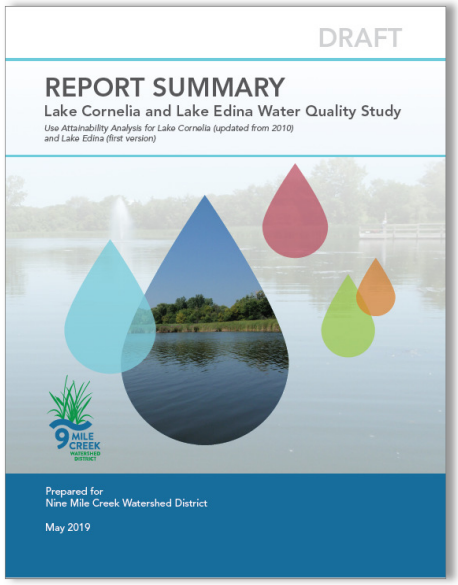
Barr worked on a maintenance plan to establish clear roles for the District and the city of Edina for addressing future maintenance needs.

Barr has also discussed a few isolated erosion areas and maintenance items with landowners, the contractor, and Administrator Anhorn.

Bush Lake Outlet Project: No new activities.

Lake Cornelia and Lake Edina Use Attainability Analysis (UAA): Barr has completed the draft Use Attainability Analyses (UAAs) for North and South Lake Cornelia and Lake Edina. The full report (draft) and a report summary (draft) are available for review. A summary of the findings of the study will be presented at the May 15, 2019 NMCWD Regular Board Meeting.

The study is an in-depth assessment of the water quality of Lake Cornelia (North and South) and Lake Edina, as well as a review of the overall lake ecosystems. Through watershed and in-lake modeling, sources of phosphorus were identified and quantified. The models were then used to predict the potential improvements in lake water quality resulting from various in-lake and watershed management practices. Costs for the evaluated management practices were estimated and used in conjunction with the lake modeling results to conduct a cost-benefit analysis and identify the most cost-effective lake management practices for further consideration by the NMCWD and City of Edina.



A summary of the *Lake Cornelia and Lake Edina Water Quality Study* report has been prepared to provide an easy-to-read overview of the conclusions and recommendations from the study.

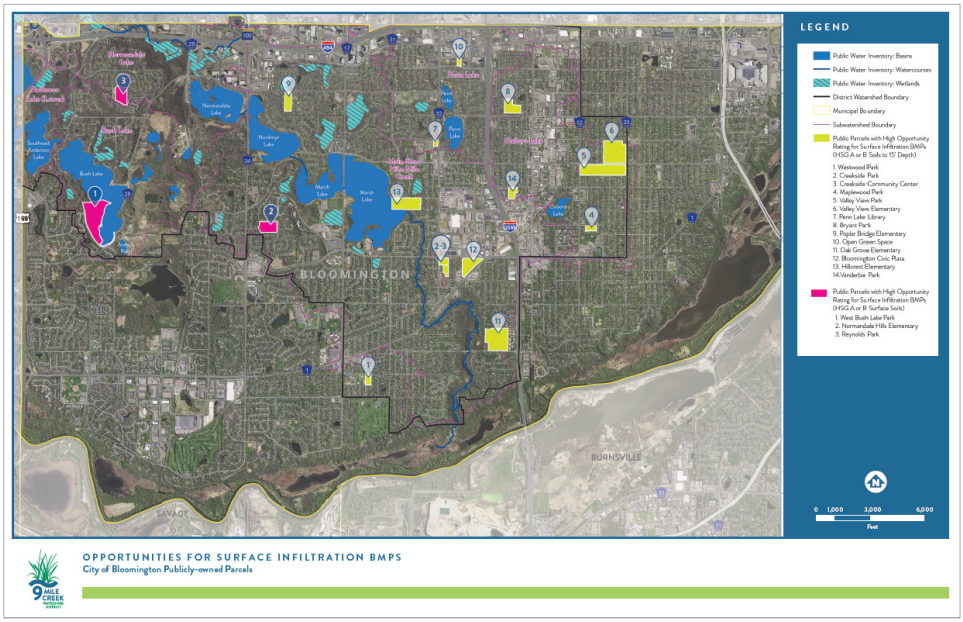
Pentagon Park Stormwater Management (in partnership with the cities of Edina and Bloomington): No new activities.

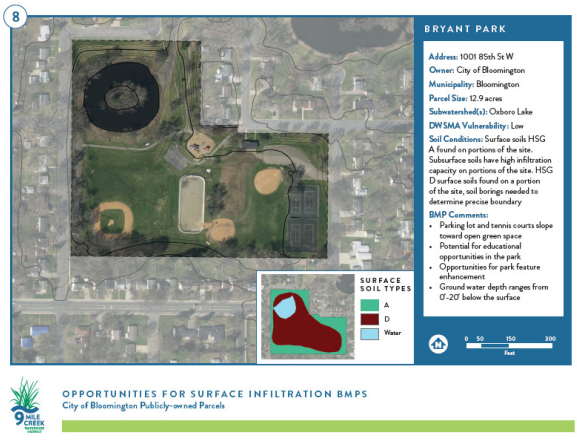
District Office (Discovery Point): Discovery Point has undergone dramatic changes since site restoration efforts began in 2016. The Discovery Point Restoration areas have been stable through winter as the cover crop and last round of native seeding begins to germinate. After initial inspection the screening plants appear to be establishing with some deer browse and rub damage on a few plants. Additional plant installations will take place in the spring of 2019; another volunteer event, including the installation of 750 native forbs, is scheduled for May 30th.

BMP Retrofits on Nonprofit Sites- Final Design and Construction: Final design has begun on three of the Non-Profit BMP sites identified by the 2017 BWSR Clean Water Fund grant the District received. Rain garden designs are being finalized at St. Edwards Catholic Church and Oak Grove Presbyterian Church in Bloomington and Good Samaritan Church in Edina. If directed by the Board, the project would go to bid after the June meeting with construction set to take place over the summer and fall. A final cost estimate will be included with plans and specifications for Board review at the June meeting.

Regional Stormwater Volume Reduction Opportunity Study: Barr presented the results of the regional stormwater volume reduction opportunity study to NMCWD's technical advisory committee (TAC) on April 23, 2019. As part of the study, the top opportunities for infiltration of stormwater on publicly-owned parcels were identified. These "top opportunities" were summarized by city and provided to TAC members at the meeting.

City-based summaries of publicly-owned parcels with good potential for stormwater infiltration were developed and distributed to city staff at the April 23, 2019 Technical Advisory Committee (TAC) meeting. The summaries include a map showing locations of the potential sites (see map to right), a list of potential infiltration sites, and site-specific maps showing topography and other site information (see examples below).

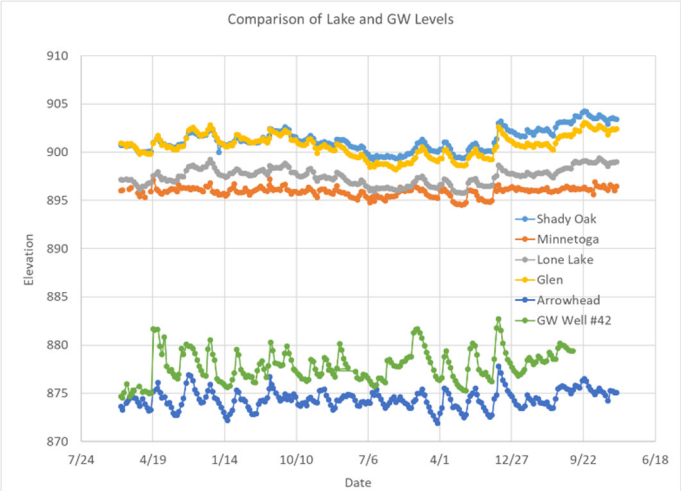




Groundwater/Surface-Water Interaction Study and Assessment of Surface Water Vulnerability to Changes in the Groundwater System: Barr is evaluating how groundwater and surface water interact across the Nine Mile Creek watershed and then will use that data to identify surface waters and wetlands that may be particularly sensitive 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 is nearly complete with identifying and compiling pertinent information from a variety of sources, including groundwater and lake level data that NMCWD has collected for decades. Some of the older data that was identified is being converted to electronic format. Preliminary study results will be available by early-July.



Historic lake and groundwater level data collected by NMCWD will be used, along with groundwater modeling and other data, to evaluate groundwater/surface water interaction throughout the Nine Mile Creek watershed.

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

- Work related to revisions to Friendship Village site design and associated impacts to wetlands and wetland buffer, including review of existing and proposed wetland assessments and buffer information, review of information regarding wetland functional assessment changes under existing and proposed conditions, and review, discussion, and documentation pertaining to variance request.