Implementing projects

Over the past fifty years, the District has worked with its partners to implement many projects. Explore these panels to learn about a few through history, and discover something new. None of these projects would have been possible with out the many partners that are a part of the watershed district community.

Chain of Lakes

One of the largest projects in the District's history, the Chain of Lakes Basic Water Management Project sought to stabilize water levels and prevent erosion in Round, Red Rock and Mitchell Lake, and McCoy pond. These water bodies did not have natural outlets, and rapid development during the late 1970s and early 1980s had caused the lake levels to rise significantly. Severe flooding in the mid- 1980s made it clear that something needed to be done.

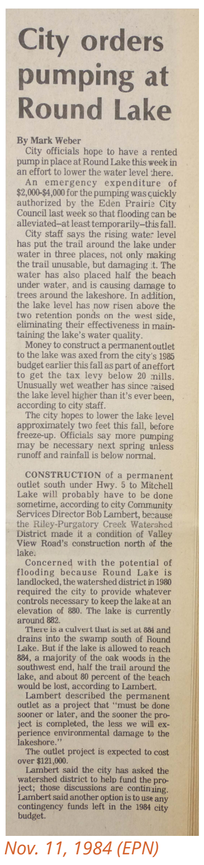
In 1984 alone, the city of Eden Prairie had to pump over 120 million gallons of water from Round Lake into Mitchell Lake. Subsequently in 1985, the city petitioned the District to pursue the "Chain of Lake Basic Water Management Project" - the installation of surface water outlets connecting the water bodies. Excess water would flow from one water body to the next, finally entering Purgatory Creek via Staring Lake[9]. This project was first proposed in the District's 1973 Overall Management plan, and after three years of active planning, broke ground in 1987[10].

BOB DALSIN and his daughter, Mary, sat atop the retaining wall that used to be 25 feet away from the water. All that remains of their former beach is at their feet. Trees that are underwater have died because of damage to their root systems, Dalsin said. (Photo by Joyce Krisko)

Local residents show property flooding (EPN)

BOB STARK of the Street Department helped connect irrigation pipe on Monday at Round Lake. The pipe will help carry Round Lake water to a pond near Hwy. 5 and County Road 1. (Photos by Mark Weber)

Setting up an emergency water pump (EPN)



City orders pumping at Round Lake

By Mark Weber

City officials hope to have a rented pump in place at Round Lake this week in an effort to lower the water level there.

An emergency expenditure of $2,000-$4,000 for the pumping was quickly authorized by the Eden Prairie City Council last week so that flooding can be alleviated–at least temporarily–this fall.

City staff says the rising water level has put the trail around the lake under water in three places, not only making the trail unusable, but damaging it. The water has also placed half the beach under water, and is causing damage to trees around the lakeshore. In addition, the lake level has now risen above the two retention ponds on the west side, eliminating their effectiveness in maintaining the lake's water quality.

Money to construct a permanent outlet to the lake was axed from the city's 1985 budget earlier this fall as part of an effort to get the tax levy below 20 mills. Unusually wet weather has since raised the lake level higher than it's ever been, according to city staff.

The city hopes to lower the lake level approximately two feet this fall, before freeze-up. Officials say more pumping may be necessary next spring unless runoff and rainfall is below normal.

CONSTRUCTION of a permanent outlet south under Hwy. 5 to Mitchell Lake will probably have to be done sometime, according to city Community Services Director Bob Lambert, because the Riley-Purgatory Creek Watershed District made it a condition of Valley View Road's construction north of the lake.

Concerned with the potential of flooding because Round Lake is landlocked, the watershed district in 1980 required the city to provide whatever controls necessary to keep the lake at an elevation of 880. The lake is currently around 882.

There is a culvert that is set at 884 and drains into the swamp south of Round Lake. But if the lake is allowed to reach 884, a majority of the oak woods in the southwest end, half the trail around the lake, and about 80 percent of the beach would be lost, according to Lambert.

Lambert described the permanent outlet as a project that "must be done sooner or later, and the sooner the project is completed, the less we will experience environmental damage to the lakeshore."

The outlet project is expected to cost over $121,000.

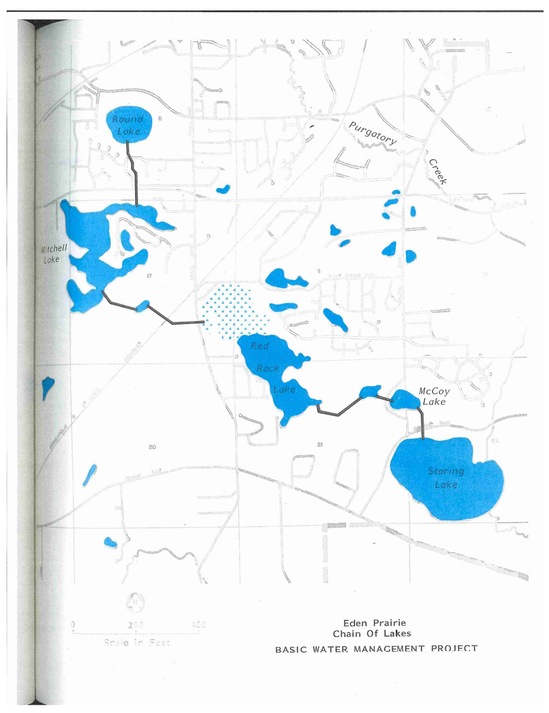
Lambert said the city has asked the watershed district to help fund the project; those discussions are continuing. Lambert said another option is to use any contingency funds left in the 1984 city budget.

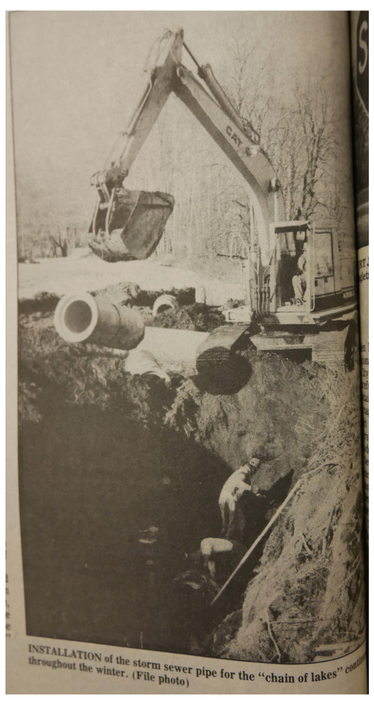
Nov. 11, 1984 (EPN)

Although the project had strong community support, there were two hotly debated points. First, the citizens of Eden Prairie wanted the lake levels to remain elevated from their natural state. There was some concern that the high water would harm vegetation, but after surveying the area it was determined that the effect would be minimal[10].

Second, there were 3 options for the Mitchell-to-Round Lake outlet. At the time there was not much developed land, but urbanization was expected to increase rapidly in the coming years. The options were different based on whether the outlet project would combine with storm sewer systems to deal with future runoff. In the end, the third option was used, and involved integrating the outlet from Lake Mitchell into a trunk storm sewer system along with stormwater ponds to provide storage for runoff[10].

The District paid for the construction work, and the city agreed to pay for maintenance after it was completed. The project was constructed all at once to prevent the risk of flooding one area due to backups from an incomplete system. The construction proceeded on schedule and was finished in under a year[5]. The Chain of Lakes project was successful, helping to maintain a steady water level in all of the lakes and manage major flooding.





INSTALLATION of the storm sewer pipe for the "chain of lakes" continued throughout the winter. (File photo)

Far left: map from the Chain of Lakes project, showing pipe sections to be installed (MNHS)

Near left: photo of construction of the storm water pipes for the project (EPN)

Lotus Lake Low Impact Development

This project, first proposed in 2008 and completed in 2012, involved constructing a series of landscape features focused on reducing erosion and pollution runoff[6]. Low Impact Development, or LID, refers to a set of practices way of development that tries to treat stormwater onsite, mimicking natural systems.

These methods included several re-grading projects, and the creation of boulder swales - a cascade of rocks used to slow down runoff water, increase infiltration, filter pollutants and reduce erosion. At the end of these re-grading efforts were several rain gardens, or bioretention cells, where excess water, sediment and other debris can be captured to support native vegetation and biodiversity[7]. Taken as a whole, these projects restore damaged ecosystems, improve soil health, reduce risk to infrastructure, and protect Lotus Lake from flooding and urban pollution.

The Lotus Lake LID project could not have been completed without the support and hard work of community members[7] and the City of Chanhassen[8]. The project was conducted mostly on private residential property, and the homeowners not only worked with the District to plan the project, many donated time and lent a hand during the construction. The City of Chanhassen provided curb and gutter materials to direct the runoff properly, and continue to invest in maintenance with biannual cleaning of pretreatment components.

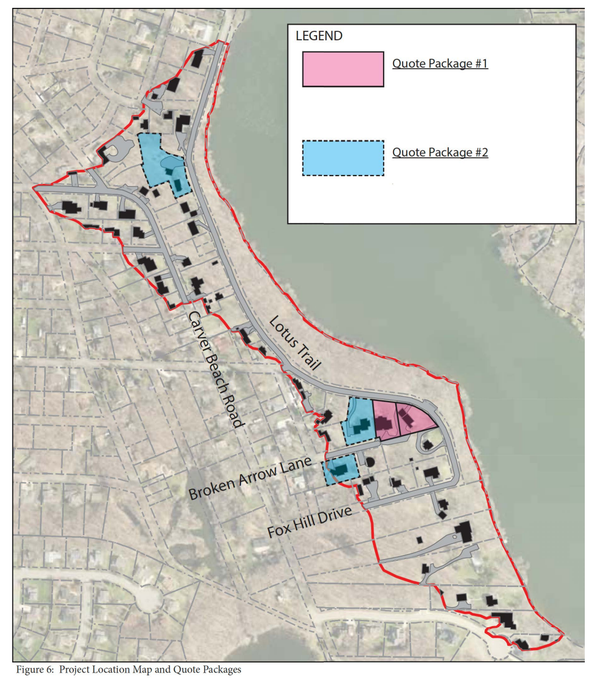


Figure 6: Project Location Map and Quote Packages

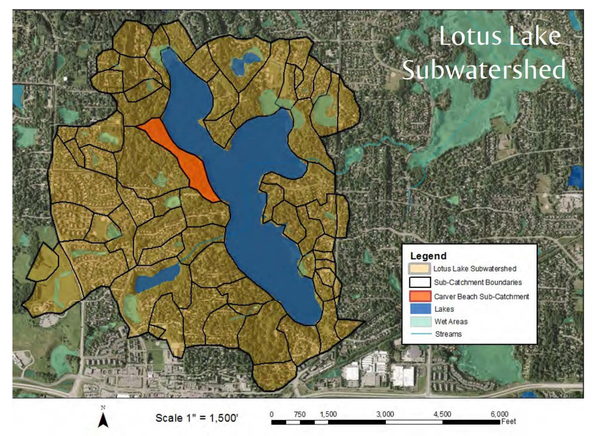


Figure 9: The Regraded Slope and Rock Cascade

Above and right: examples of practices that were installed as a part of the Lotus Lake LID project.

Figure 13: The Built Raingarden (Bioretention) Cells

Alum: setting the conditions for sucess

A 2003 study by the District identified alum treatments in Rice Marsh Lake and Lake Riley as measures that could help improve water quality in both lakes. Both lakes had high levels of phosphorus, which feeds algae growth. Some of that phosphorus stays in the water column, and some builds up in the sediment.

Alum is short for Aluminum Sulphate ($Al_2[SO_4]_3$ n H_2O), a non-toxic compound "commonly used in water treatment plants to help clarify drinking water"[4]. When it comes in contact with the water, it becomes Aluminum Hydroxide ($Al_2[OH]_3$), which is able to bind to phosphorus in the sediment so that it cannot be released into the water and used by algae. One treatment can reduce phosphorus loading by 80% and last up to 8 years[4]. The high levels of phosphorus in Rice Marsh Lake are likely due in part to the operation of a wastewater treatment plant on Rice Marsh Lake's southern shore from 1959 to 1972[4].

Alum treatments only work well in lakes where most of the phosphorus is internal, or coming from the sediments, and without heavy currents or carp that would stir up the bottom. Because of the problem with carp in these lakes, the alum treatments were postponed until carp were successfully managed. The first dose of the Lake Riley treatment was conducted in 2016, and Rice Marsh Lake in 2018.

Bottom left: a light blue streak shows the path of the alum treatment barge on Lake Riley

Bottom middle: the bright blue-green water reflects the addition of the alum to Rice Marsh Lake

Bottom right: an alum barge

Top right: an electrofishing boat for monitoring carp

Top far right: interns net carp

District's first creek restoration

In 2011, the City of Minnetonka petitioned the District to investigate and stabilize eroded areas of Purgatory Creek by the intersection of County Roads 101 and 62[13]. In 2014, Barr Engineering reported on 25 individual erosion sites along a 2,000 ft stretch of the creek[14]. This stream stabilization was the first project undertaken by the District to focus on creek restoration, and was completed in 2016[13].

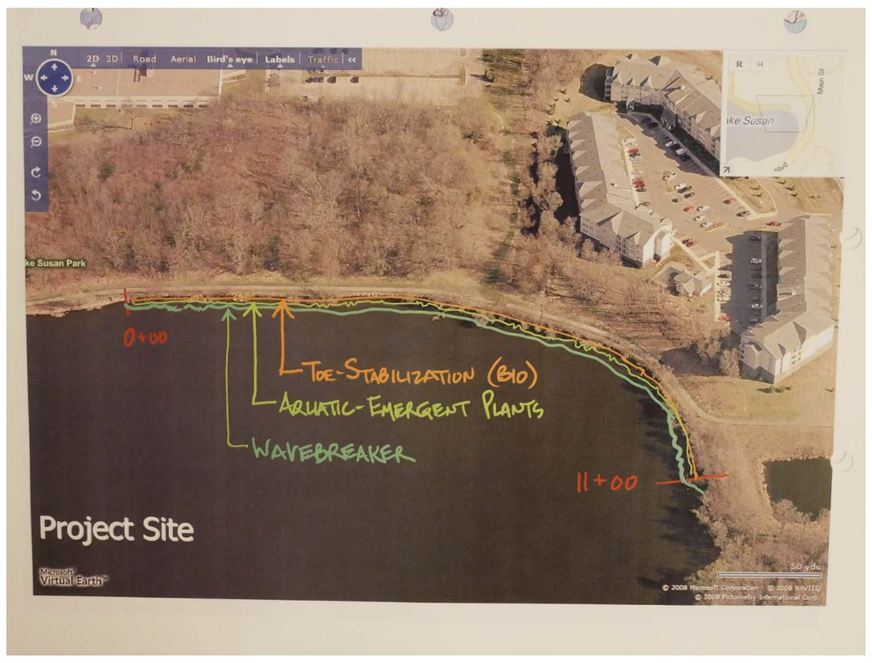
The project involved using a variety of methods to help slow and prevent erosion of the creek. The project used a variety of common and effective practices to prevent further erosion and restabilize the bank, including re-grading the bank slopes, installing rip rap, slowing stream velocity, and using vegetation to protect and anchor the topsoil. It was also necessary to remove an old, partially collapsed culvert, remove and replace riprap at a storm sewer outlet, and to reroute the stream around a stormwater pond to prevent increased erosion downstream[14].

Photos: the restoration site on Purgatory Creek at County Roads 101 and 62. This was the District's first creek restoration project

Partnering for a healthy shoreline

In 2008, a local eagle scout, and later the Minnesota Civilian Conservation Corps partnered with the City of Chanhassen, with support from the District, to restore and beautify 1,030 feet of shoreline on the northeast edge of Lake Susan, with great results. Up to this point, the northern shore lacked any major vegetation and eroding banks were threatening a nearby walking trail[15].

The project restored 1,030 ft of shoreline. Most of this area only required "soft measures" - planting native vegetation, placing cedar trees along the shore as wave-breaks, and using coconut-fiber "biologs" to help keep the soil in place. However, a 30ft stretch of shoreline was already so eroded that more intensive restoration was needed[15]. This included caged riprap and vegetated geotextiles - specialized layers of soil replacements with native plants[16].



Design plans for the Lake Susan Restoration initiative from the project contractor (MNHS)

Understanding hydrology

In 2005, the City of Eden Prairie Petitioned the District to do a hydrologic analysis of Riley Creek, showing how the creek would respond to different flood events. The model would be used to evaluate two key concerns: bank stabilization (erosion) of Riley Creek, and the possibility of improving the Lake Riley Outlet. A lack of vegetation in that area led to erosion, which threatened water quality and created the potential to damage nearby homes[1].

Both projects were also considered important for public safety. The outlet often plugged, and residents and city workers who went to unplug it were at risk of getting caught in the rapid current[2]. Additionally, Eden Prairie was at that time expanding its trail system, and needed to know if the banks were stable enough to safely walk on[1].

The outlet was replaced in 2008, widening the stream channel to allow improved water flow from the lake, and replacing and enlarging the outlet pipe. For the bank stabilization, a 3,000-foot stretch of creek from Dell Road to Eden Prairie Road was highlighted as requiring removal of invasive plants and some trees, and increased native vegetation on the stream bank to prevent rapid erosion[2].

By 2010, data indicated the project was successful. Lake levels were 2.5 times more stable, the high water elevation decreased by a foot, and after storms the water only took 1 week to return to normal levels, as opposed to 3 weeks[3].

A local resident explains his connection to the outlet project. (EPN)

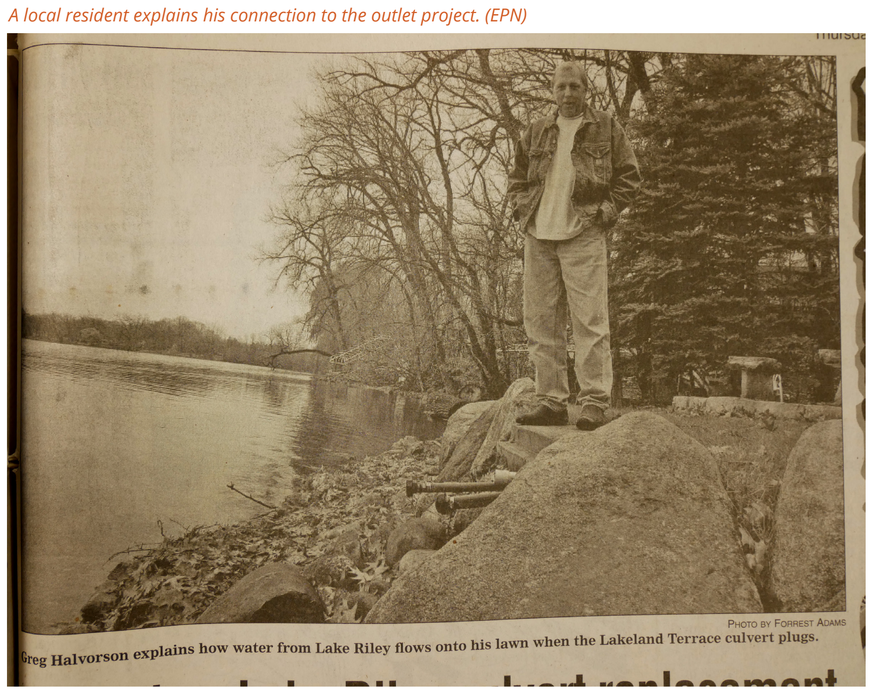


Photo by Forrest Adams

Greg Halvorson explains how water from Lake Riley flows onto his lawn when the Lakeland Terrace culvert plugs.

Stabilizing steep slopes

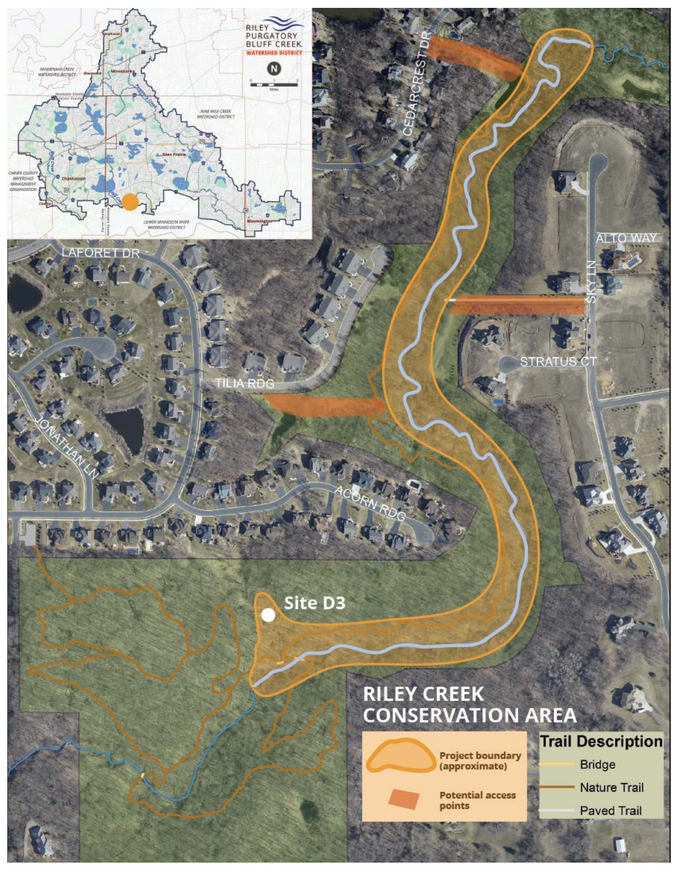
The District began planning for the Lower Riley Creek Stabilization Project in 2016, in partnership with the City of Eden Prairie, and is scheduled to begin construction in fall 2019. The area was first evaluated during the 2007 Lake Riley Outlet Improvement project, and flagged due to significant erosion[11]. This was then followed up by the 2015 Creek Restoration Action Strategy (CRAS) Report, which listed Lower Riley Creek as the highest priority project.

The project area includes 4,600 ft of Lower Riley Creek (Reach E) between Eden Prairie Road and Dell Road, as well as 375 ft of ravine (Site D3) that carries urban runoff to the creek. The project plans include reducing erosion, improving water quality, and improving natural stream habitat for aquatic organisms[11]. To accomplish this goal, the plan includes a variety of improvement strategies, listed below. Each of them will provide either greater stream depth variability, more channel bed substructure types, or varied channel velocities.

The proposed Project will require modification or replacement of 5 storm sewer outfalls within the extents of Reach E: two 24 inch lines, two 12 inch lines and one 18 inch line. There is also one stormwater pond on the west side of the Creek, and several small infiltration basins on the east side. All other stormwater either infiltrates or flows by gravity to Riley Creek[12]. The District is lucky to have both the City of Eden Prairie and the Lower Minnesota River Watershed District as project partners.

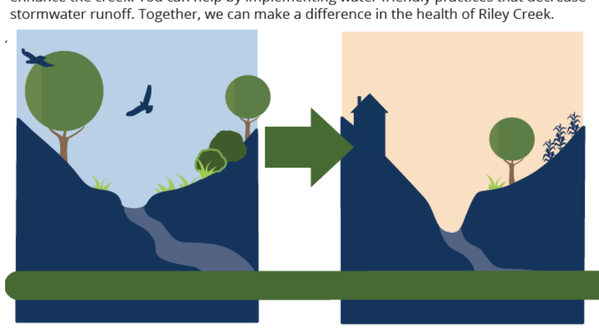
Below: an example of one of the slope failures in this reach

Right: map of the project site location



WHY RESTORE
Lower Riley Creek?

Riley Creek is unhealthy due to high levels of sediment in the water. There is active erosion occurring along the creek because of increased stormwater discharge. If nothing is done, the creek will continue to erode the streambanks and surrounding slopes, picking up more sediment. The Riley Purgatory Bluff Creek Watershed District with the City of Eden Prairie and the Lower Minnesota River Watershed District are working together to stabilize and enhance the creek. You can help by implementing water friendly practices that decrease stormwater runoff. Together, we can make a difference in the health of Riley Creek.



200 Years ago

more water soaked into the ground when it rained, and less flowed into the creek. The creek channel was connected to its floodplain, and water spilled out during heavy rains, slowing the flow of the creek. Native plants with deep roots held the soil in place and created habitat for fish and animals.

Now

less water can soak into the ground because of houses, roads, and other impervious structures that have been built. More water rushes more quickly to the creek, increasing erosion. The creek bed has eroded deeper, and is cut off from the floodplain, further increasing the power of the stream to erode its banks. Invasive plant species like buckthorn are common.