VADNAIS-SNAIL LAKES REGIONAL PARK

HIGH WATER: BACKGROUND & SUMMARY OF FLOOD RISK MANAGEMENT

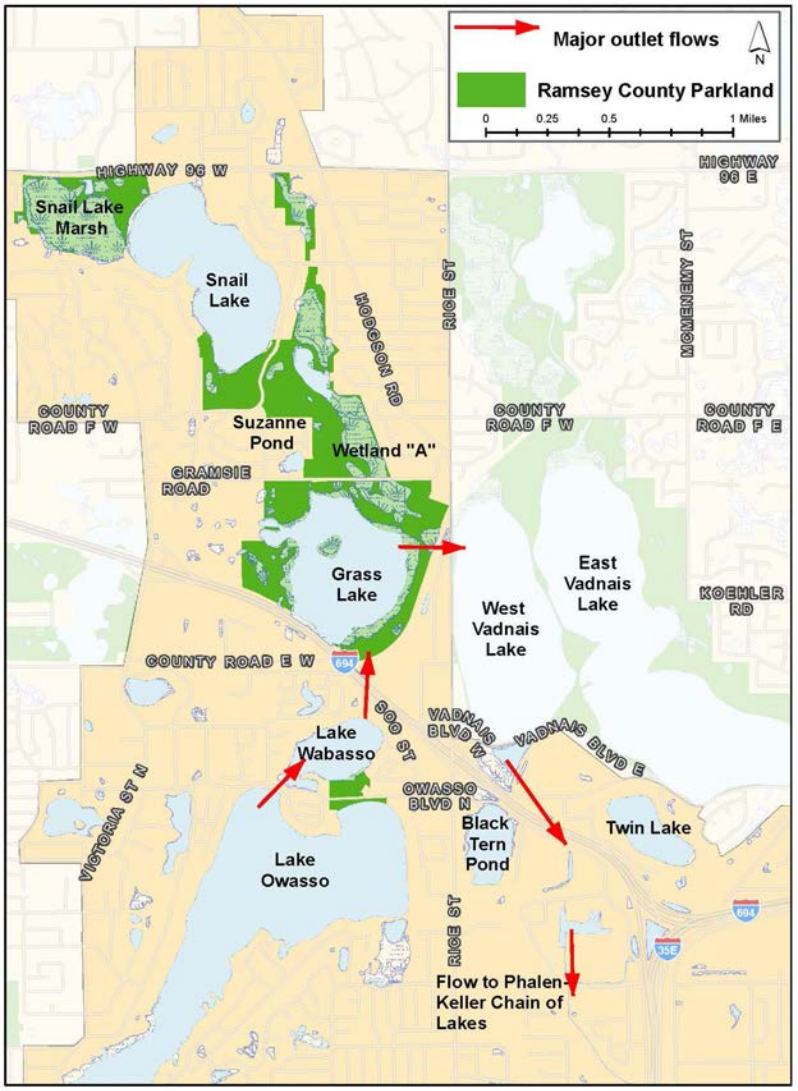
INTRODUCTION

The state of Minnesota and Ramsey County have experienced abnormally high precipitation over the past decade, causing high water in lakes, wetlands and rivers. This document is a summary of impacts and responses to high water in the Vadnais-Snail Lakes Regional Park and affected water bodies.

BACKGROUND

Vadnais-Snail Lakes Regional Park has been experiencing high surface and ground water causing flooding as a result of above average precipitation occurring in consecutive years from 2013 - 2019. This area is located within the Ramsey-Washington Metro Watershed District (RWMWD), while West Vadnais Lake is part of the Vadnais Lake Area Water Management Organization (VLAWMO).

The Grass Lake area encompasses the lowest portion of Shoreview and has become landlocked due to urbanization over time that includes construction of railroads, roadways and housing. Increased impervious surfaces throughout the area have raised the volume of stormwater that is collected in the water bodies. The area was able to manage its watershed until recent years due to increased precipitation. Restrictions downstream, due to other flood-prone areas throughout the watershed, limit how fast water can exit the Snail/Grass Lakes basin.



▲ *Location and flow of water around, through and out of the Grass Lake basin.*

IMPACTED LAKES & WETLANDS

- Grass Lake
- Snail Lake
- West Vadnais Lake
- Wetland A

PARTNER AGENCIES

RAMSEY-WASHINGTON METRO WATERSHED DISTRICT

CITY OF SHOREVIEW

RAMSEY COUNTY Parks & Recreation

FOR MORE INFORMATION:
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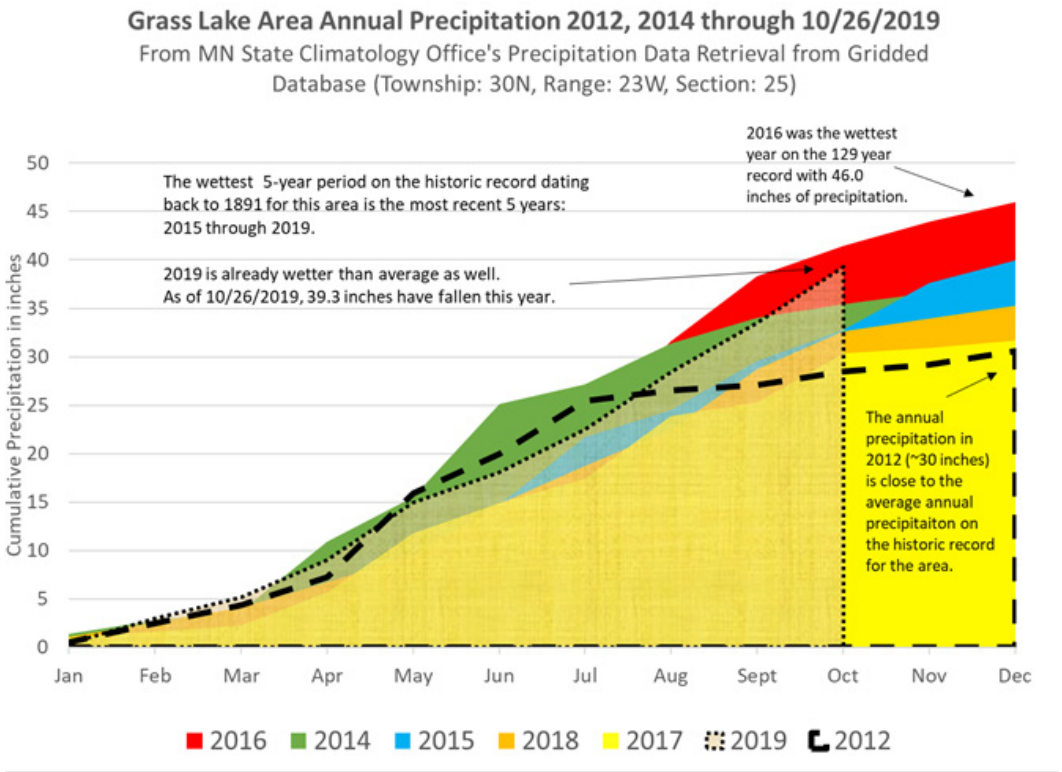
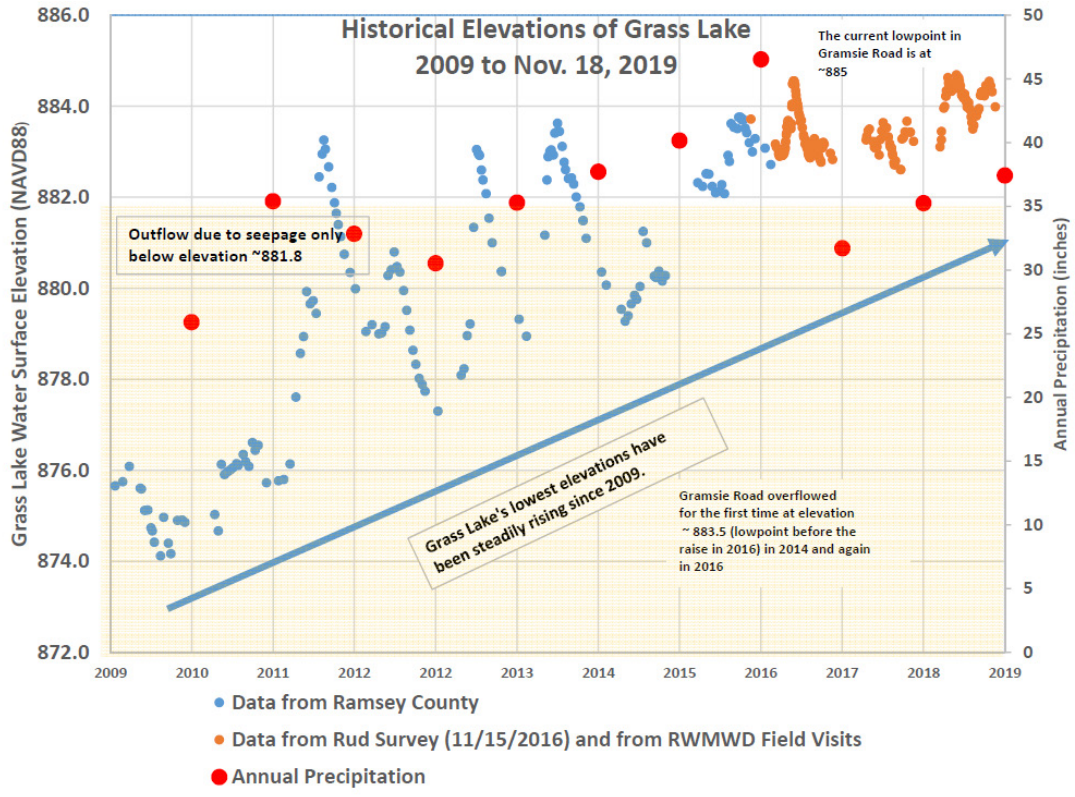


Shoreview has seen the wettest 5-year period on record, which dates back to 1891. The average annual precipitation, typically 30", has been exceeding 36" per year with one year exceeding 46" of annual precipitation.



Historical elevations of Snail and Grass Lakes indicate a trend and correlation of higher precipitation in consecutive years. This has resulted in higher groundwater, more surface runoff and little infiltration creating lake level elevation increase.

Graphs provided by Ramsey-Washington Metro Watershed District

HISTORY OF WORK

Ramsey County Parks & Recreation, the city of Shoreview and RWMWD have been working collaboratively to assess, analyze and develop working solutions to manage high water for affected properties and infrastructure in the area. The following is a summary of events and actions taken:

2013 Grass Lake Water Management Organization is dissolved. RWMWD annexes the Snail/Grass Lake watershed area into its jurisdiction.

2014 Heavy rain events cause public infrastructure to flood, including Gramsie Road and Snail Lake public beach.

2016 Record precipitation floods Gramsie Road, Wetland A, landscaping of properties along Snail Lake. Homeowners around Suzanne Pond in the Crestview Addition neighborhood have groundwater issues.

2017 At the request of the city and county, public infrastructure elevation data is collected and analyzed by RWMWD; RWMWD completes systems efficiency maintenance projects across the sub-watershed to improve water flow through West Vadnais Lake. Groundwater conditions are studied around Wetland A, including a short pumping study. Grass Lake optimization study is launched. Gramsie Road is raised by the city to protect it from high water impacts from adjacent water bodies.

2018 RWMWD begins work to adjust Grass Lake influence to the north and east that affects Gramsie Road, Wetland A and West Vadnais Lake. Many meetings involving multiple agencies and residents review considerations for large scale sub-watershed drainage relief strategies.

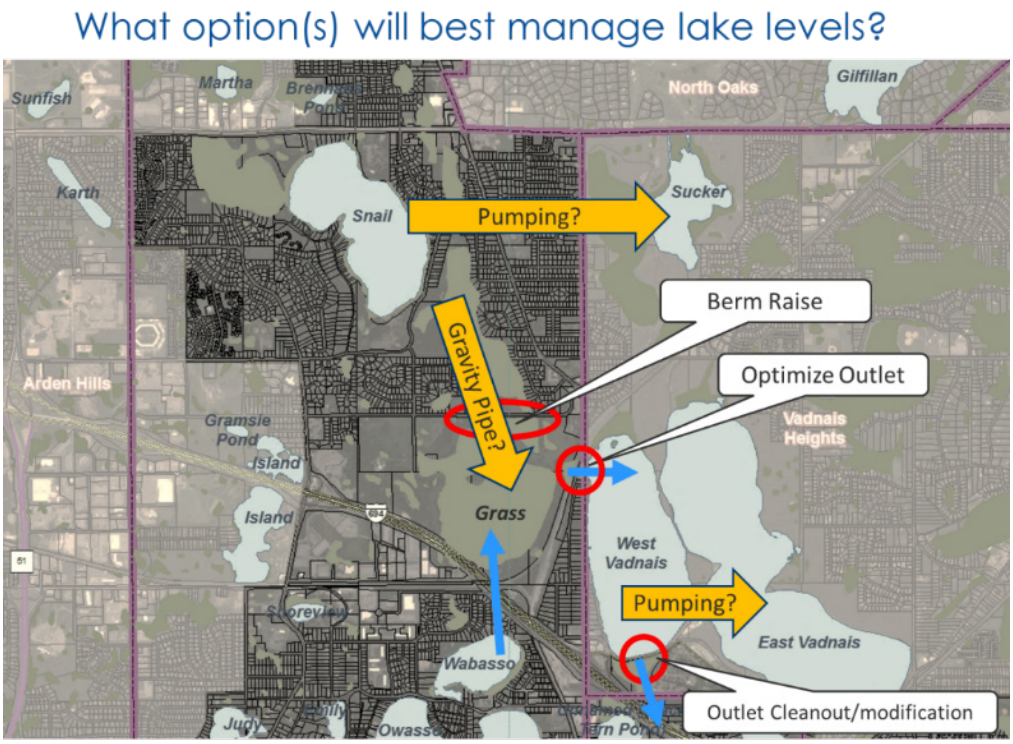
2019 With all other feasibility studies complete, RWMWD focuses on the lowering of the 15" outlet structure below I-694; Snail/Grass Lakes emergency response work continues. Beltline resiliency study begins looking at district-wide changes to the conveyance of flood waters to relieve flooding to homes. Record precipitation throughout 2019 make it one of the wettest years on record. County makes improvements to raise Rice Street.

STUDIES & TECHNICAL MEMORANDA

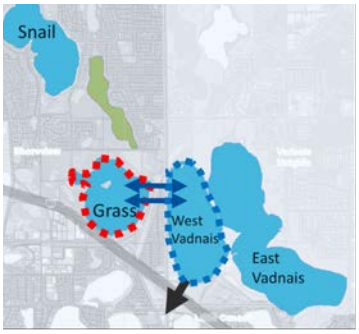
Studies are available by request from the Ramsey-Washington Metro Watershed District.

- 2014 Watershed updates models to include Atlas 14 precipitation.
- 2016 Snail/Grass area limited groundwater study.
- 2016/2017 Snail/Grass Lakes optimization study.
- 2017/2019 Surveying of pipes, overflows and critical elevations in influence areas.
- 2018 Water quality and geotechnical investigation of West/East Vadnais lakes.
- 2019 West Vadnais Lake outlet lowering environmental assessment worksheet.
- 2019 Beltline resiliency study.

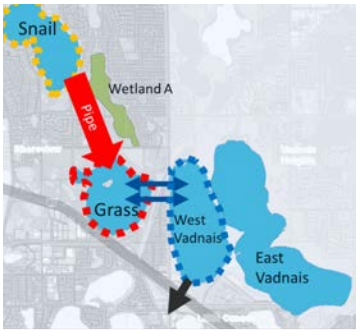
A SEARCH FOR SOLUTIONS



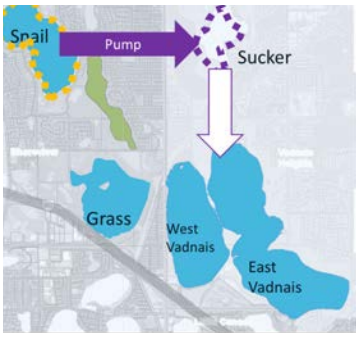
Data collection and modeling of past, existing and future climate conditions yielded information used to develop possible solutions to relieve the Grass Lake basin from high water. Six options have been explored by the RWMWD and considered by their board. Priority has been given to Option 1. Option 2 cannot proceed unless Option 1 is in place and regional levels are lower, at which time further discussions regarding implementation will take place.



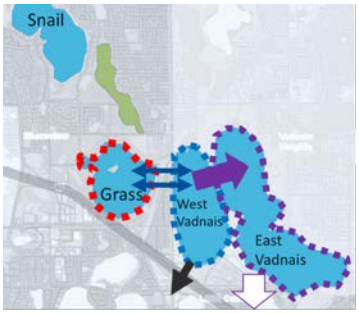
OPTION 1



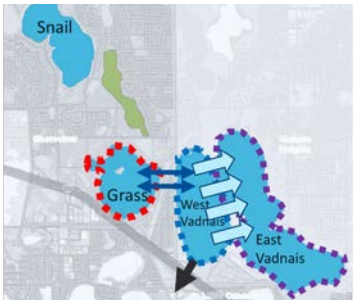
OPTION 2



OPTION 3

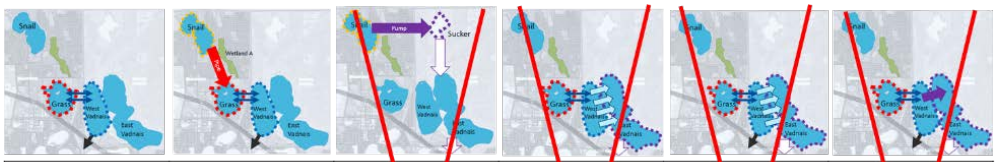


OPTION 4



OPTIONS 5 & 6

OPTIONS SUMMARY



1 of 6	2 of 6	3 of 6	4 of 6	5 of 6	6 of 6
Lower West Vadnais	Pipe Snail and Lower West Vadnais	Pump Snail	Lower East Vadnais	Lower East Vadnais & Lower West Vadnais	Pump West Vadnais
$40,000	$620,000	$2,500,000+	?	?	$2,500,000+
Ramsey Co. Parks	Ramsey Co. Parks		Ramsey Co. Parks	Ramsey Co. Parks	Ramsey Co. Parks
VLAWMO	VLAWMO	VLAWMO	VLAWMO	VLAWMO	VLAWMO
MNDNR	MNDNR	MNDNR	MNDNR	MNDNR	MNDNR
SPRWS		SPRWS	SPRWS	SPRWS	SPRWS
	Shoreview	Shoreview			

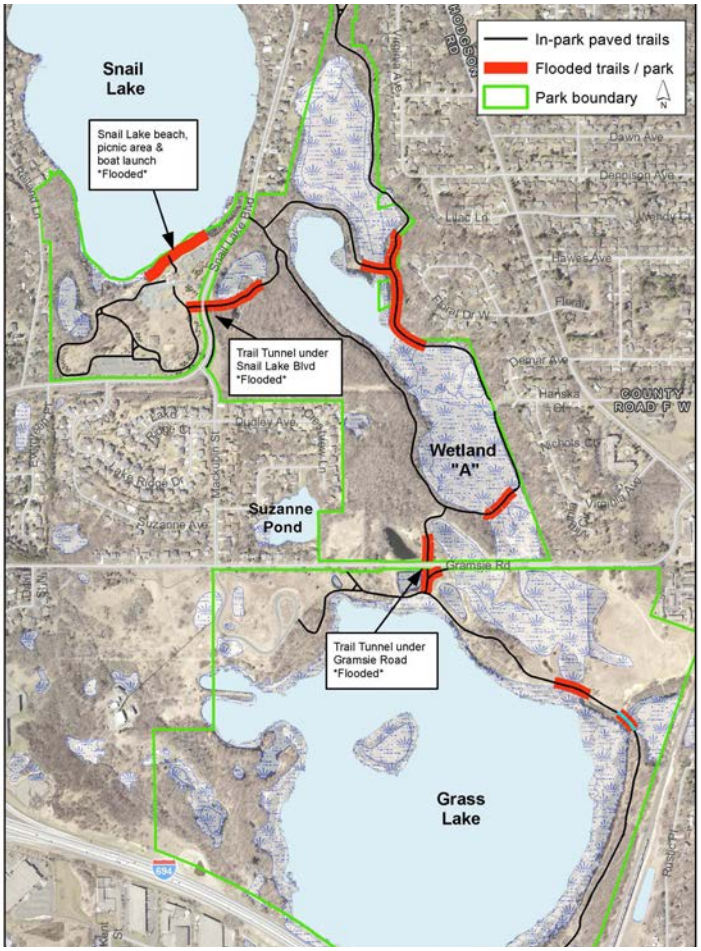
Graphics provided by Ramsey-Washington Metro Watershed District

IMPACTS TO RAMSEY COUNTY PARK

Ramsey County Parks & Recreation has managed impacts to the trails, beach and boat launch within the regional park. Department staff has been working with the RWMWD to make changes to drainage patterns which further protect homes from flooding. In addition, the department worked with the city of Shorview to place pumps and equipment in the park to keep roads from flooding.

Utilizing information and analysis collected over the past several years, Parks & Recreation is able to begin addressing the flooded beach and picnic areas at Snail Lake. The public beach will be redeveloped during the winter of 2019 - 2020 to accommodate the new high water levels.

Parks & Recreation worked with RWMWD to combine a trail and flood diversion berm at Grass Lake, along with other drainage optimization measures south of Snail Lake. A master plan update for the flood impacted areas of the park will begin in early 2020. This plan will seek to realign a trail system that will provide resiliency to future flooding while maintaining the usability of the trail system.



▲ *Current trail and park areas impacted due to flooding.*

CONCLUSIONS

RWMWD staff has met with staff from the city of Shoreview, Ramsey County Public Works, Parks & Recreation and other agencies on multiple occasions. The discussions have resulted in the following proposed conclusions about all aspects of the proposed Emergency Response Plan work in the Grass and Snail Lakes areas:

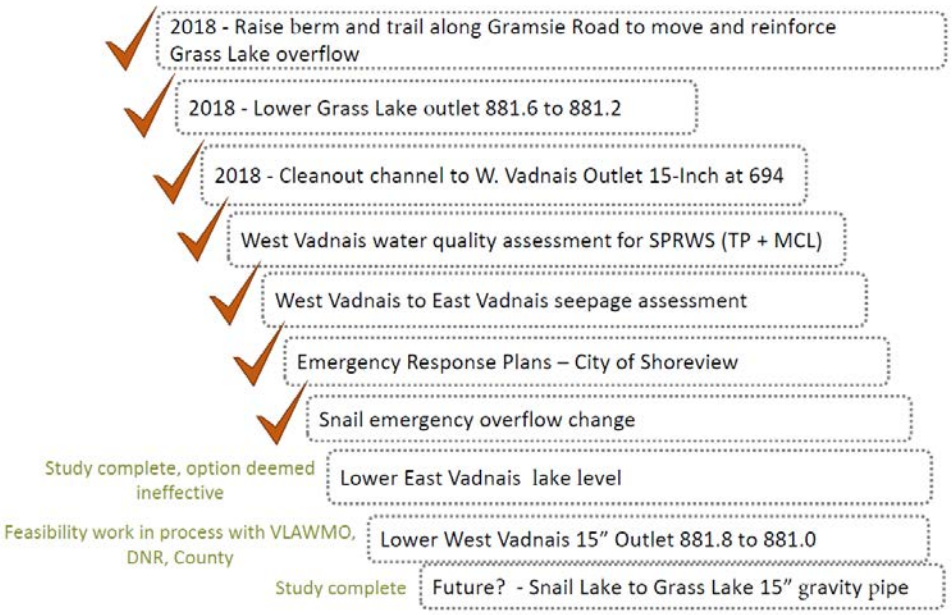
- Countywide surface and groundwater is high.
- Phosphorus concentration of West Vadnais Lake is too high to allow for excess water to be utilized by Saint Paul Regional Water Services (SPRWS) for drinking water.
- Lowering the West Vadnais outlet structure is currently the most feasible scenario to gain flood storage in the sub-watershed.
- Agency partnerships have successfully protected homes from impacts of high surface water conditions.
- Projects have been completed on Ramsey County Parks & Recreation property to help direct flood waters away from homes in low lying areas without increasing the rate of water going downstream to at-risk flood-prone areas (e.g. berm, stop logs, etc.).

SUMMARY OF KEY FACTS

- Area lakes' outlets and natural drainage patterns have been disrupted by urbanization over the last 100 years.
- Precipitation has increased over multiple years resulting in record high water levels in area lakes and wetlands.
- Low lying areas, lakes and wetlands are landlocked with limited availability for relief from high water.
- The number one priority of protecting habitable structures from flooding has been achieved.

NEXT STEPS

- Ramsey County Parks & Recreation will be redeveloping the Snail Lake beach area to open in 2020.
- The city of Shoreview will be completing a project in 2020 to increase pumping capacity and add a backup generator to the Suzanne Pond lift station, install infrastructure to connect the NW Gramsie Pond to the lift station, and complete Gramsie Road improvements to address flooding issues.
- In 2020, Ramsey County Parks & Recreation will complete a master plan update for the park trails that have been affected by high waters and develop a reconstruction strategy that will provide more resilience to high water in the future.
- RWMWD and partners will continue to gather data, implement projects and evaluate options to address high water in this and other flood-prone areas of the watershed district.



Graphic provided by Ramsey-Washington Metro Watershed District