GRAY'S BAY DAM PARTNERSHIP

PROACTIVE MANAGEMENT OF WATER LEVELS

ABOUT THE PARTNERSHIP

After significant flooding along Minnehaha Creek and around Lake Minnetonka in 2014, the Minnehaha Creek Watershed District (MCWD) formed a partnership with the National Weather Service (NWS), Hennepin County, and the U.S. Geological Survey (USGS) to anticipate rain events and understand their effects on water levels to more proactively manage Gray's Bay Dam, which connects Lake Minnetonka to its only outlet at Minnehaha Creek.

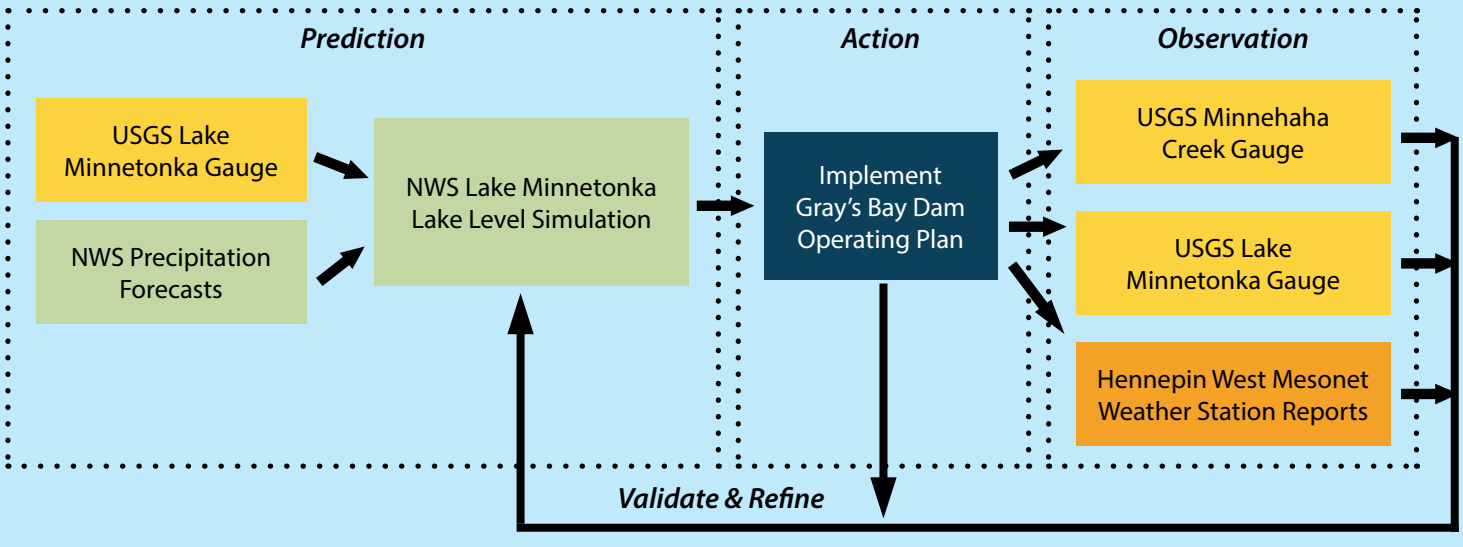
As part of the multi-agency partnership, the USGS, NWS, and Hennepin County provide MCWD with:

- Real-time water level readings on Minnehaha Creek and Lake Minnetonka
- Seven-day precipitation forecasts, in six-hour increments, for the 125-square mile area that drains to Lake MInnetonka
- Hydrologic inflow model which predicts how the forecasted precipitation will flow into Lake Minnetonka from the upper watershed streams
- Lake level simulation model which forecasts how the predicted inflow will affect the Lake Minnetonka water elevation
- Real-time precipitation and weather attributes

This information allows MCWD to plan and moderate dam discharge before large rain events to create space in the lake for forecasted precipitation. The success of this partnership was highlighted in 2016, which was the wettest year on record in the Minnehaha Creek watershed. With the information provided by the USGS, NWS, and Hennepin County, MCWD was able to operate the dam in such a way as to not experience any flooding on Lake Minnetonka or Minnehaha Creek, despite the record breaking rainy weather.

HOW IT ALL WORKS TOGETHER

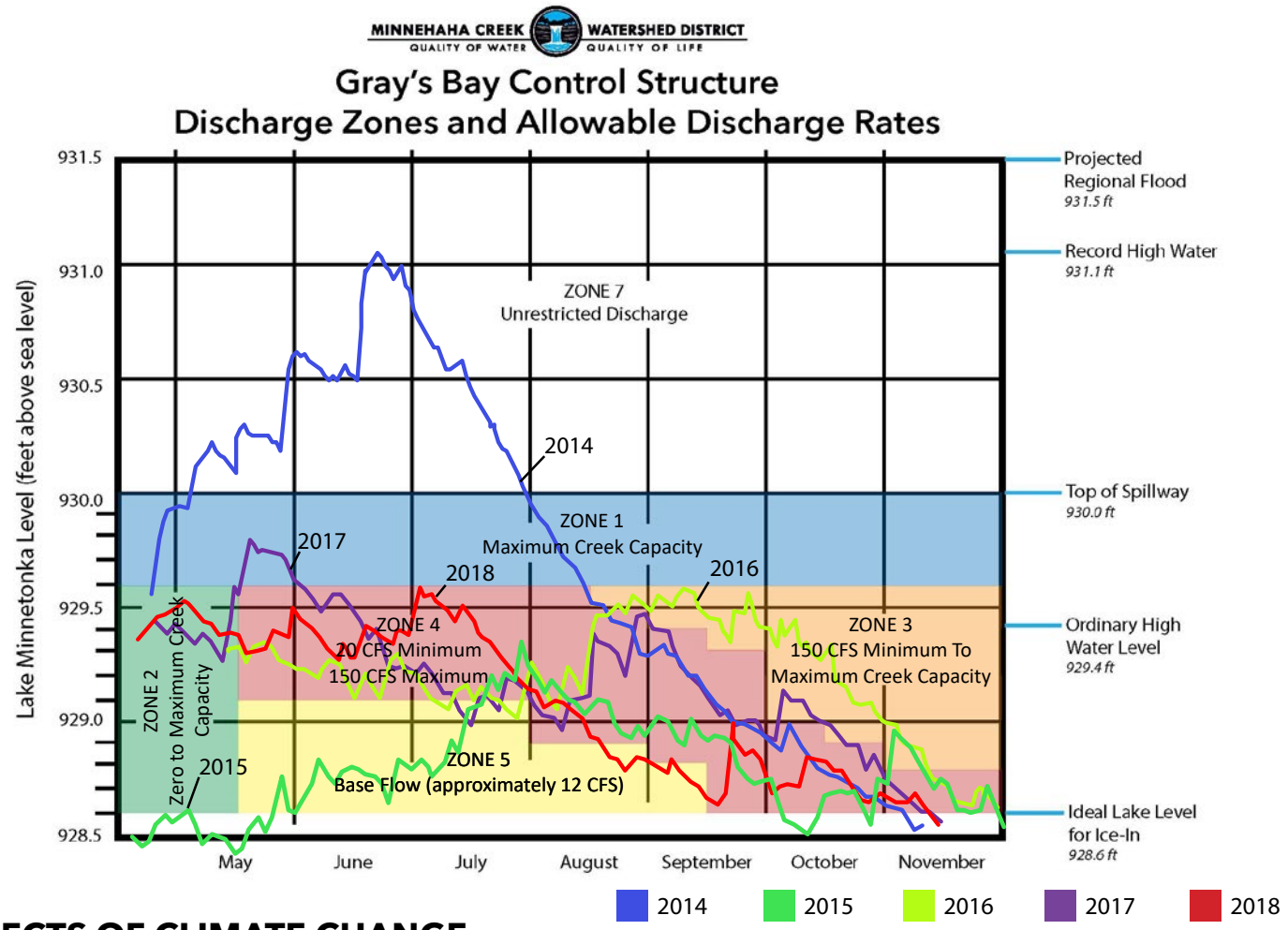
The USGS gauges provide real-time water level data that is used in conjunction with precipitation forecasts from NWS to populate the NWS Lake Minnetonka water level simulation model. Based on that data and the results of the simulation, we moderate dam discharge into Minnehaha Creek ahead of precipitation within the limits of the dam operating plan. After the rain, the USGS gauges help us track actual water level responses. Additionally, we receive actual rainfall reports from seven Hennepin West Mesonet weather stations from across the watershed which we use to calibrate the lake level simulation model to inform future rain events.



OPERATING GRAY'S BAY DAM

MCWD operates the dam by following the DNR-approved operating plan. The plan requires the lake to be drawn down every fall to an elevation of 928.60 feet above sea level to create storage for spring snowmelt, which allows the lake to be used as a storage basin. This allows MCWD to control discharge into Minnehaha Creek at a moderated pace and to adjust discharge rates based on precipitation forecasts to prevent flooding on Minnehaha Creek.

The graph below visually represents the operating plan for the Gray's Bay Dam. MCWD aims to keep dam operations within Zone 4 as this considered to be the desirable operation zone of the structure to achieve all six management goals of the dam. The operating plan prescribes discharge zones which are dependent on the time of year, the existing lake level, downstream capacity in Minnehaha Creek, and forecasted precipitation. Between lake level elevations 928.6 and 930.0, discharge to Minnehaha Creek will vary. With the help of NWS, Hennepin County, and USGS, operating consistently in Zone 4 was achievable in 2016, 2017, and 2018 despite record setting precipitation events.



EFFECTS OF CLIMATE CHANGE

Climate change is changing the way the Gray's Bay Dam is operated. In the past, rainfall was fairly predictable - the spring would be wet and late summer and fall would be dry. In the recent past however, there has been a trend toward heavier rainfalls and wetter fall seasons. While the management goals of the Gray's Bay Dam haven't changed, the way the MCWD approaches dam operation has. The partnership between MCWD, USGS, NWS, and Hennepin County is one way MCWD is adapting to the changing climate, working to increase the resiliency of our natural resources while maintaining the safety of the communities around Lake Minnetonka and along Minnehaha Creek.

QUESTIONS?

Tiffany Schaufler, 952-641-4513
tschaufler@minnehahacreek.org

www.minnehahacreek.org/headwaters

MINNEHAHA CREEK WATERSHED DISTRICT

Hennepin County Emergency Operations Center

USGS science for a changing world

NOAA