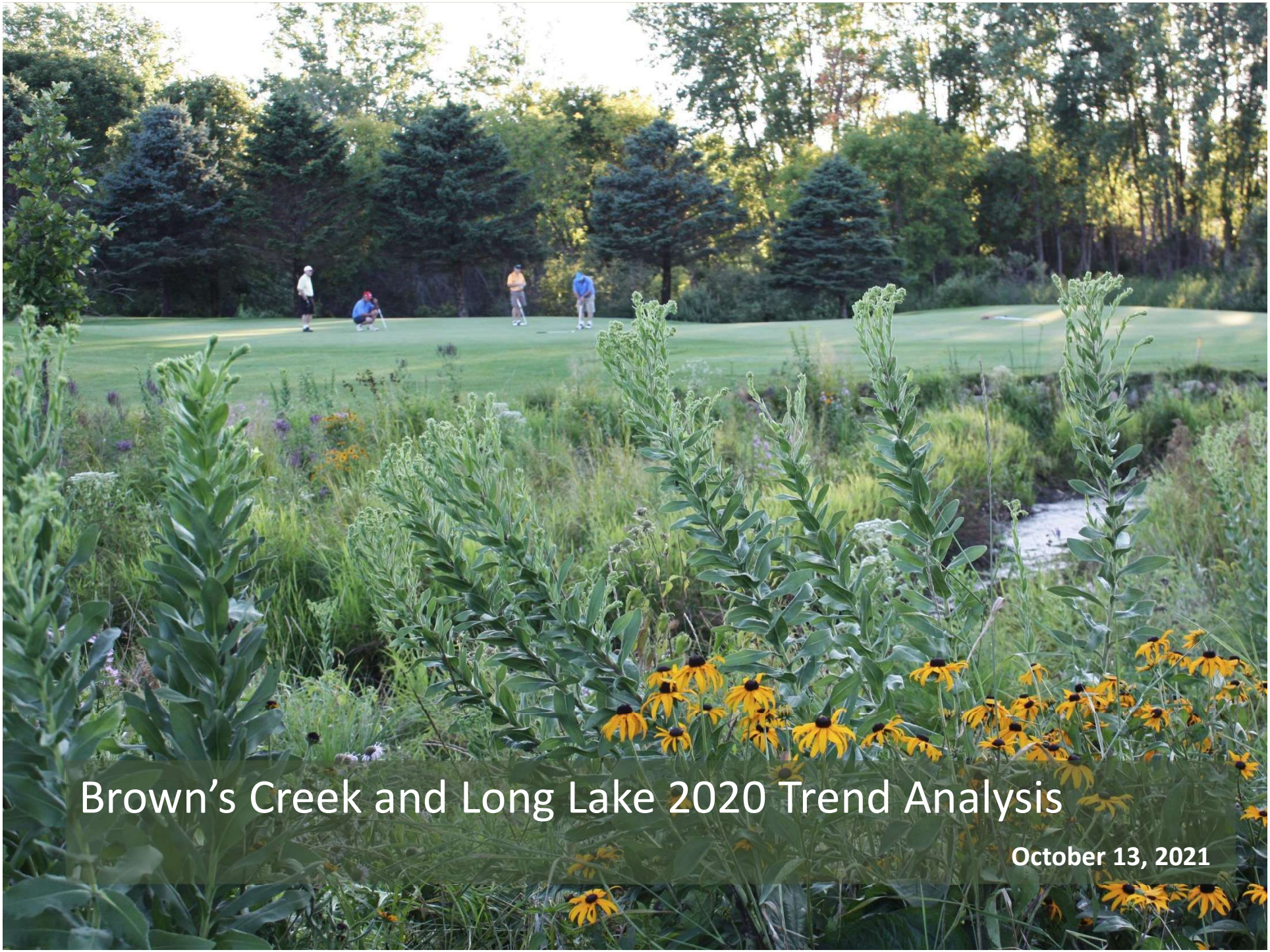
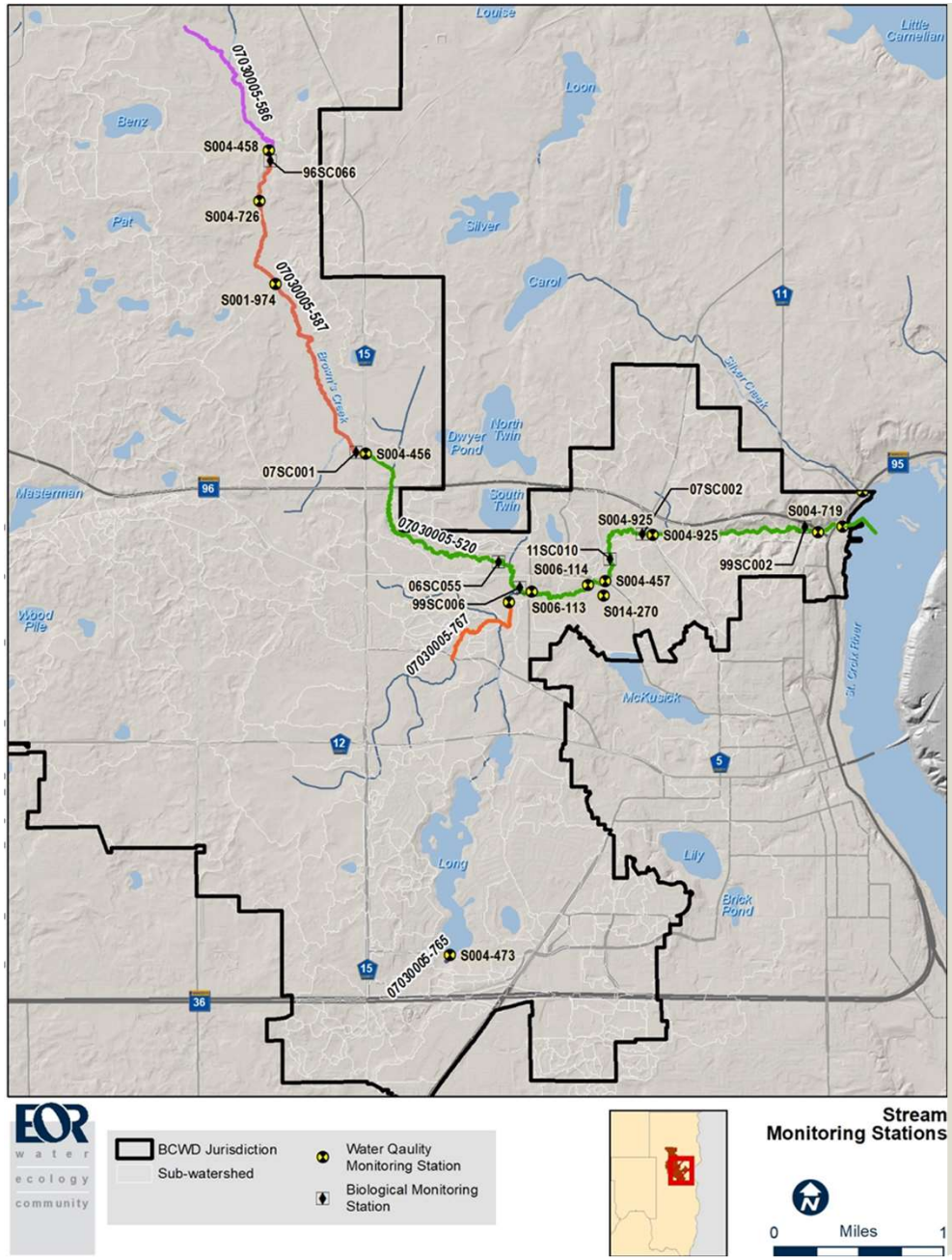


Brown's Creek and Long Lake 2020 Trend Analysis

October 13, 2021

Introduction

- From Watershed Management Plan:
  - Update the watershed conditions report every 5 years to assess the impact of district programs on water quality, evaluate trends in watershed conditions and evaluate the need to make course corrections in strategy
- 1st Progress to Goals Report (2015) summarized monitoring Data through 2012
- 2nd Progress to Goals Report (2021) summarizes the data through 2020



Where are we monitoring?

Brown's Creek Monitoring

- ***Highway 15 (S004-456)***
- ***McKusick Rd. (S004-457)***
- ***Stonebridge (S004-925)***
- ***WOMP (S006-528)***
- ***Diversion (S004-475)***

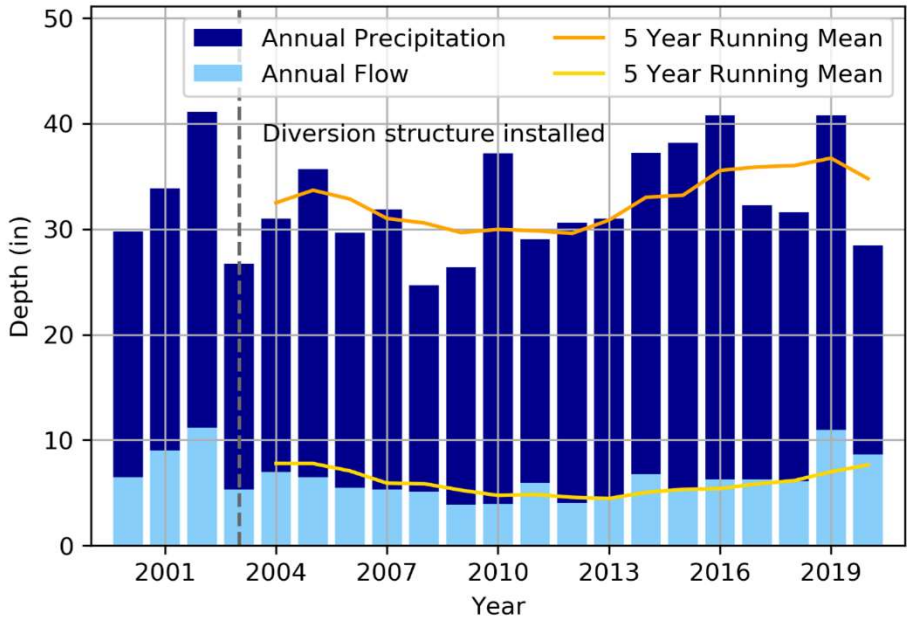
Long Lake Monitoring

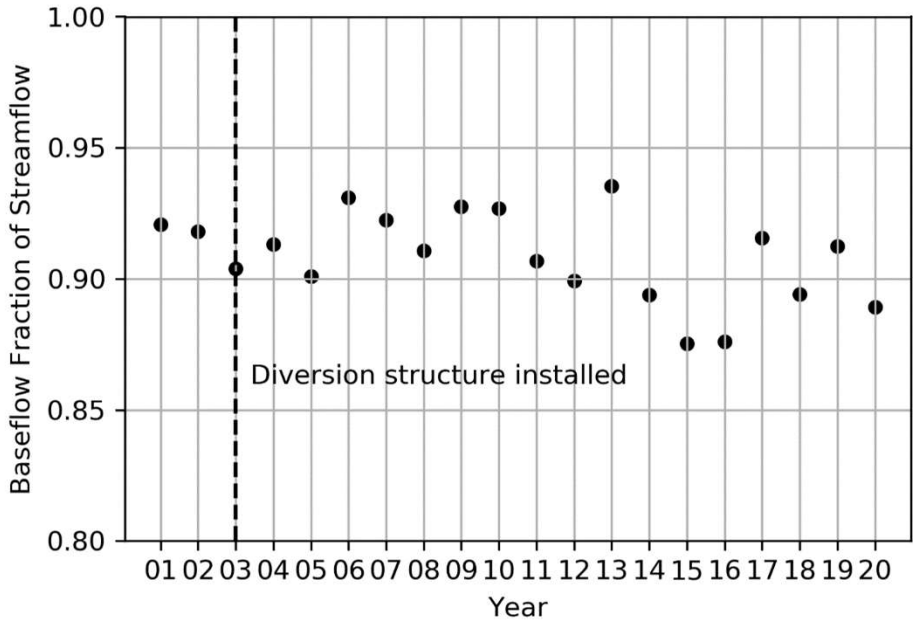
- ***Lake (82002100-01)***
- ***Long Lake Tributary at 62nd St. (S004-473)***

Brown's Creek Highlights

Parameters

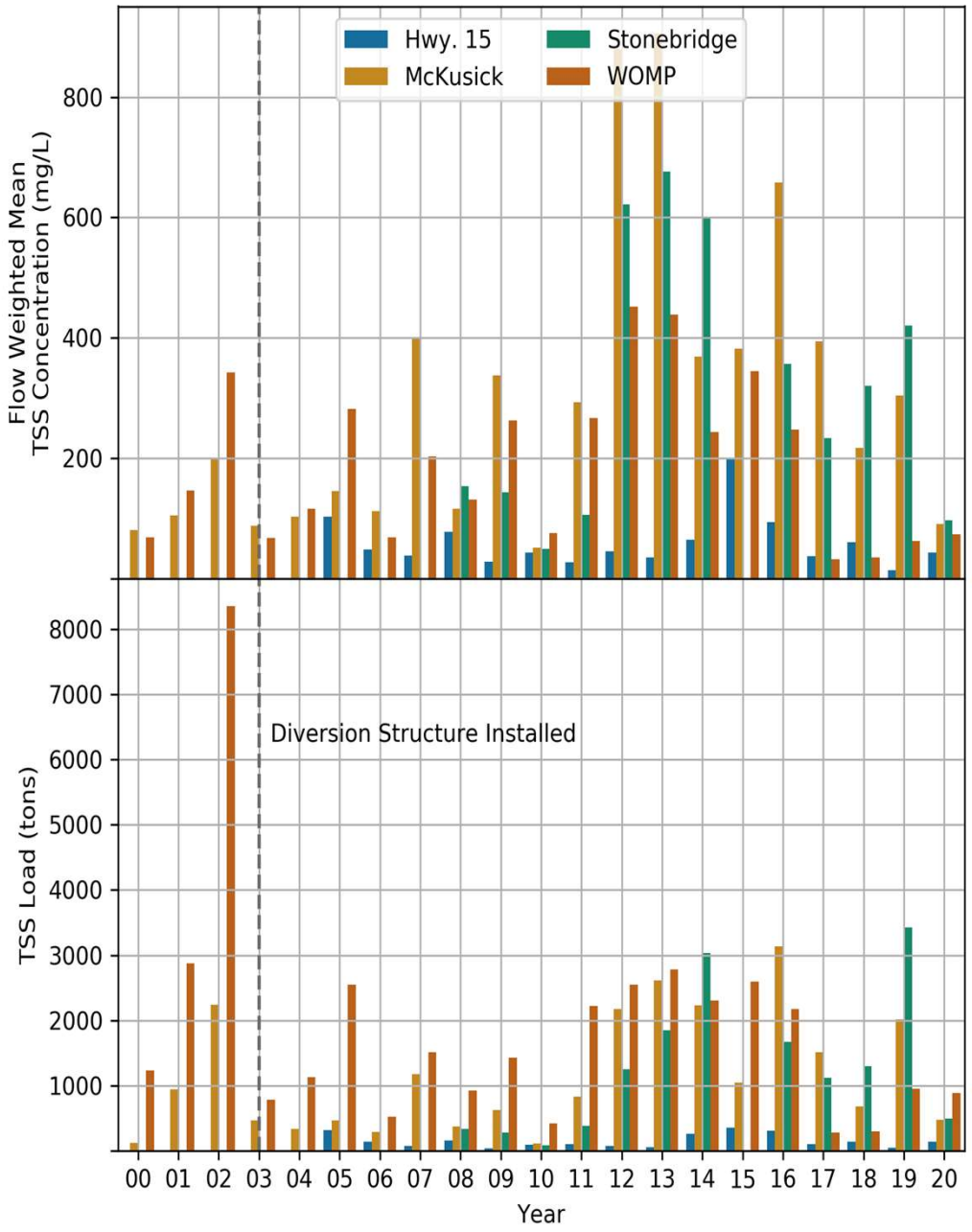
- ***Flow***
- ***Water Quality***
  - **Stream Temperature**
  - **Dissolved Oxygen**
  - **Chloride**
  - **Total Suspended Solids**
  - **Total Phosphorus**
  - **Nitrate**
  - ***E. coli***





Brown's Creek Flow Highlights

- ***Flow is increasing in Brown's Creek because of increased precipitation***
- ***Baseflow watershed wide fluctuates between 80% to 90% of the total flow***
- ***Groundwater can contribute to and remove flow from Brown's Creek***



Brown's Creek Water Quality

Evaluated:

- ***Progress towards Watershed District Goals***
  - **MN Water Quality Standards**
  - **Brown's Creek Impaired Biota TMDL**
  - **Lake St. Croix Excess Nutrient TMDL**
- ***Trends***
  - **Pollutant Flow Weighted Mean Concentration (FWMC)**
    - **What are the conditions in the stream at this point?**
  - **Pollutant Load**
    - **Volume x FWMC = Load**
    - **What is the impact of the stream to the water quality of downstream waterbodies e.g. Lake St. Croix or within Brown's Creek**

Brown's Creek Water Quality Highlights

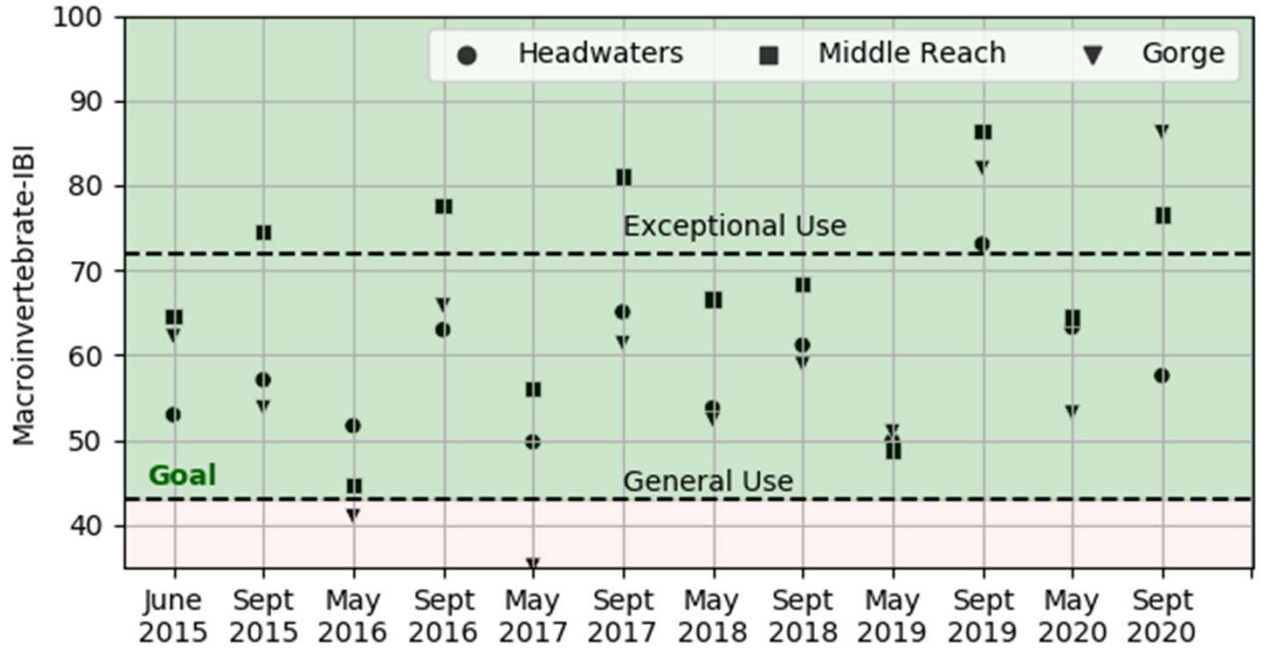
Long Term Significant Trends in Water Quality Concentrations

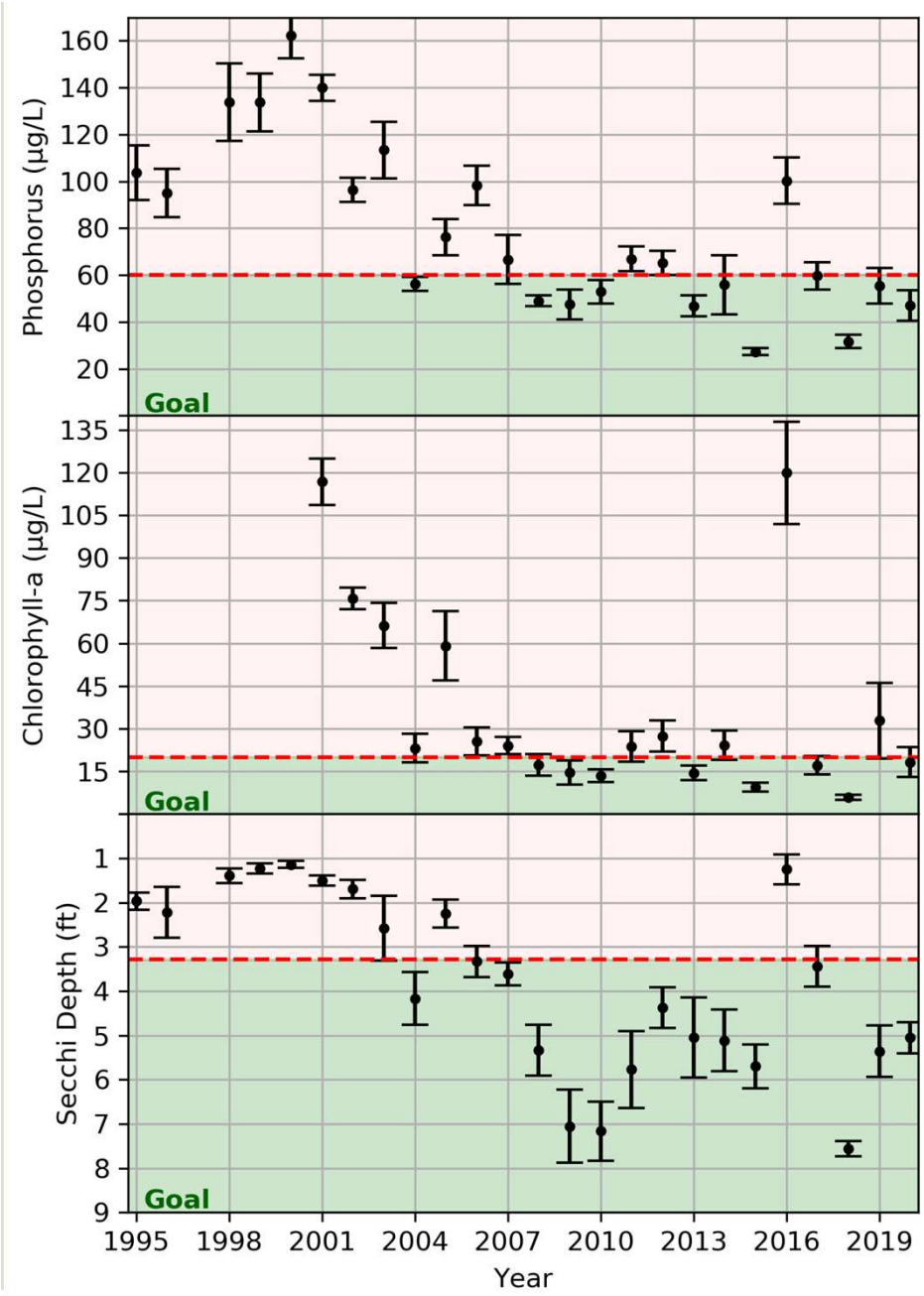
Stream Reach	Flow	Temperature	DO	Chloride	TSS	TP	Nitrate	*E. coli*
Highway 15	(+53%)	✓ (-8%)	X	✓ (+23%)	X	X		X
McKusick Rd	(+91%)	X (+80%)	!	✓ (+47%)	X	X		X (-57%)
Stonebridge	(+426%)	✓	✓	✓ (+32%)	X	X	(+86%)	X (-55%)
WOMP		✓ (-37%)	✓ (+17%)	✓ (+45%)	X	X		X
Diversion	NA	X	✓	✓	X	X (-171%)		X (-52%)

- Goal is met: ✓; Goal is close to being impaired: **!**; Goal is not met **X**; No significant trends or goals (blank);
- Statistically significant trends are shown in parentheses. (**Improving Water Quality; Worsening Water Quality**)

Brown's Creek Macroinvertebrate Community Highlights

- ***Improving at all three monitoring locations***
- ***Last score below the General Use threshold was in May 2017***





Long Lake Highlights

- **Meets Nutrient Goal for Total Phosphorus and Secchi Depth**
- **Statistically Significant Improving Trends in Nutrients**
- **Elevated Chloride Concentrations identified in 2019**

Recommendations

- Plan and manage for climate resiliency to mitigate the impacts of climate change,
- Working within the watershed to limit the use of chloride in the watershed.
- Continuing work on improving the cold-water conditions near McKusick Road,
- Continuing work on *E. coli* source identification and reductions,
- Continuing work on identifying sources of sediment near the stream, and potentially using sediment finger printing with the Lake St. Croix Research station to confirm the relative sources of sediment in Brown's Creek, and
- Conducting a TP source assessment for the watershed that includes a sequential diagnostic monitoring approach for TP sources in the watershed where grab samples are collected during or directly after rain events. Sampling locations should be placed along tributaries and in areas where the potential for legacy TP sources is identified.

Questions?