Sochacki Park Monitoring Data Summary 2020

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Sochacki Park
Sub-watershed Assessment

- Sub-watershed Assessment conducted to understand and improve the water quality of the wetlands in Sochacki Park.
  - Identify sources of pollutant loading
    - Watershed
    - Wetlands
  - Implement Best Management Practices (BMP) to Improve Water Quality

- Partnership Agencies
  - Golden Valley
  - Robbinsdale
  - Three Rivers Park District

  } Joint Powers Agreement

  - Bassett Creek Watershed Management Commission

- Objective
  - Understand the ecological health of the wetlands
  - Identify BMP's to improve ecological health of the wetlands, improve aesthetics, and provide recreation and education opportunities
  - Engage Stakeholders throughout the process

Sochacki Park Sub-watershed Assessment Process

- Monitoring – 2020 & 2021
  - Watershed – Pollutant Loading Estimates
    - Automated Sampling Equipment
    - Flow & Velocity Measurements
    - Water Quality – Nutrient Concentrations (TP, SRP, TSS, & TN)
  - Wetlands
    - Water Quality – (TP, SRP, Chl-a, and Secchi Depth)
    - Aquatic Vegetation
    - Dissolve Oxygen
    - Sediment Core Analysis
    - MnRAM – Assessing wetland function & value
    - Water Levels
- Watershed & Wetland Modeling (2021-2022)
  - Calibrate Watershed and Wetland Model to monitoring Data
  - Identify Sources of Pollutant Loading
  - Develop recommended BMP's that would result in pollutant load reductions to improve water quality
- Implement BMP Practices to Improve Water Quality
  - Identify those BMP practices that have a pollutant load reduction cost-benefit
  - Develop BMP implementation plan
  - Implementation of Project in the watershed and wetlands

Bassett Creek Watershed Management Commission
Barr Engineering Report
2013

- Assessment was completed on North and South Rice in 2013
  - Barr. (2013). Lake Water Quality Study Northwood Lake, North Rice Pond and South Rice Pond. Minneapolis, MN

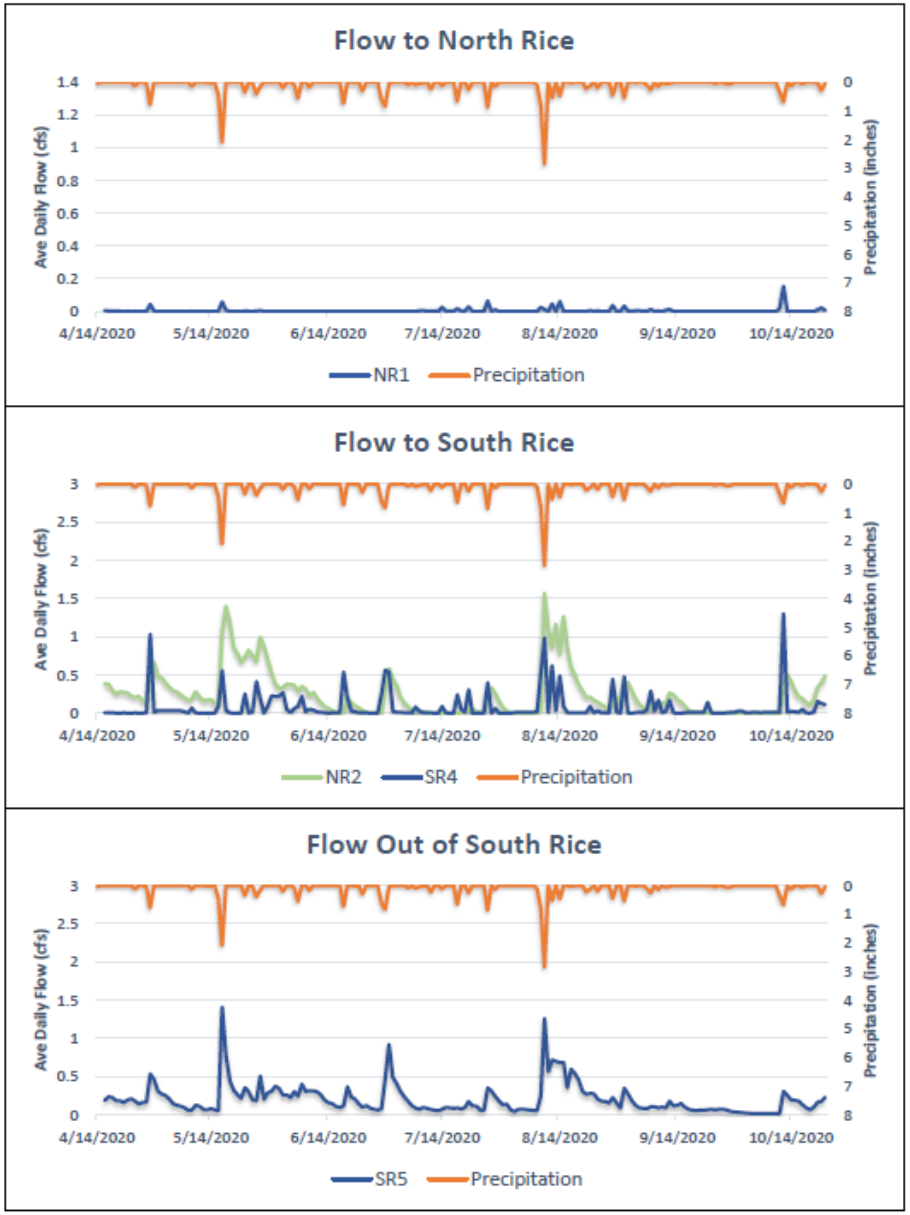
- Water quality goals for the wetlands in the report
  - Goals were set by the BCWMC
    - Total phosphorus = 75 µg/L
    - Chlorophyll-a = 40 µg/L
    - Secchi = 1 m

  - Since these are wetlands and not lakes, there are no state water quality standards

Monitoring

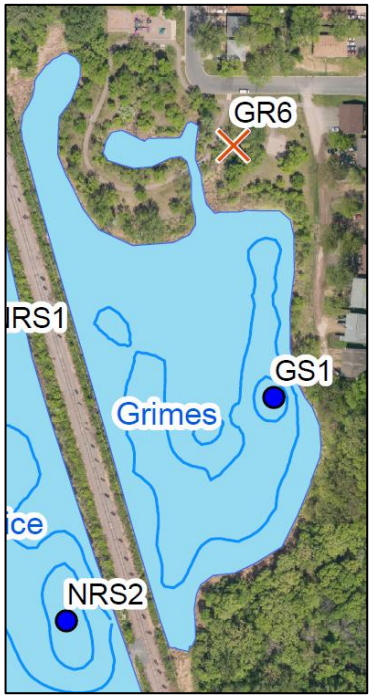
- 3 wetlands–water quality
  - Grimes
  - North Rice
  - South Rice
- 4 stormwater monitoring sites
- 2 sites where grab water samples were collected during storm events
- 5 sediment core locations
- Preliminary Data 2021
  - Data presented on the following slides

Sochacki Park
Precipitation and Flow 2020

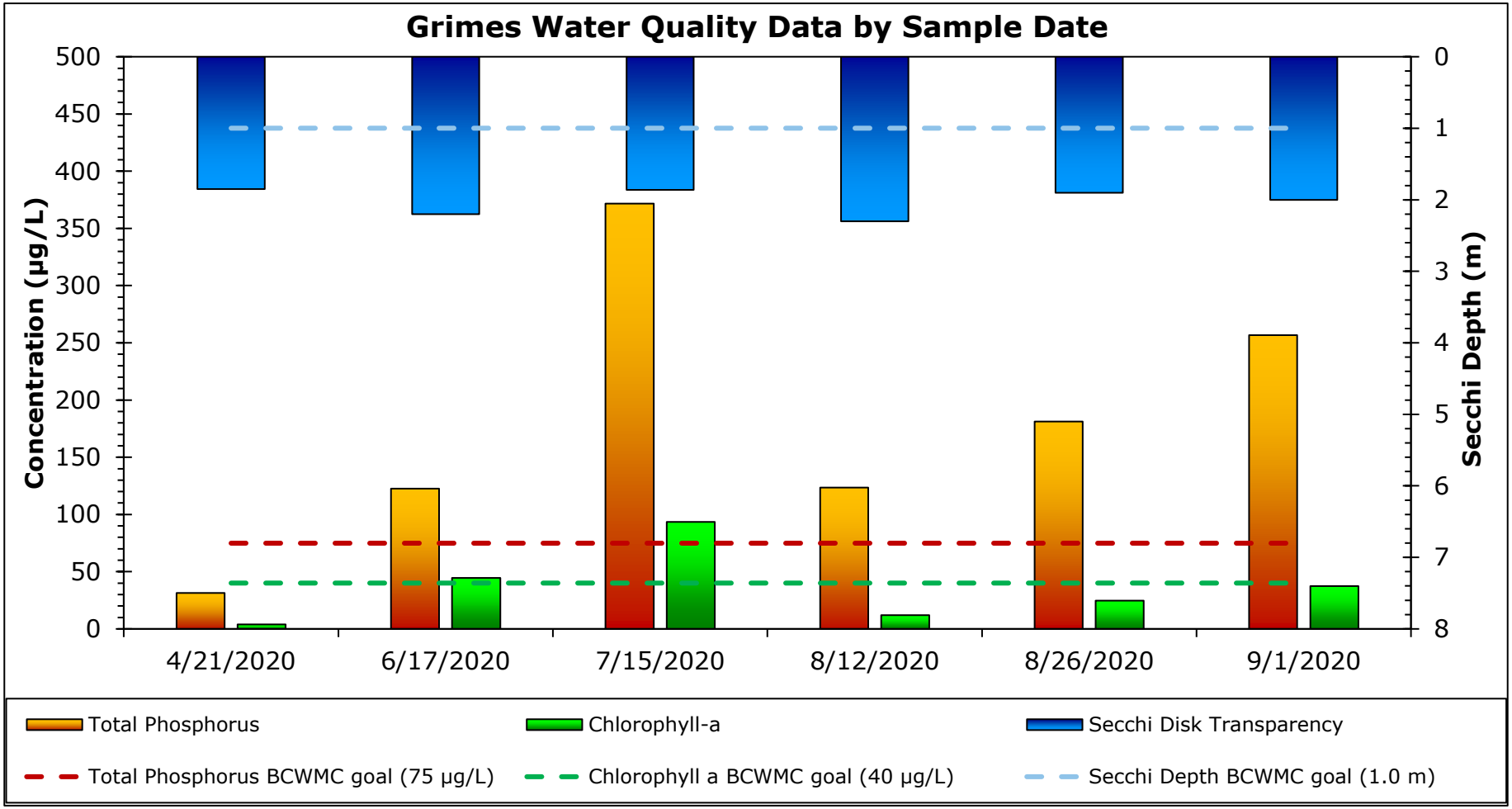


- 2020 Calendar Year
  - Precipitation below average
  - 2020: 26 inches
  - 20-year average: 30 inches
- Notable Rain Events
  - May 16-17th – 2.53 inches
  - August 9-10th – 3.65 inches
  - The rain events account for 11% to 15% of the sampling site total flow volumes.
- Advantage of monitoring two years allows for variations in precipitation conditions.

Grimes Pond



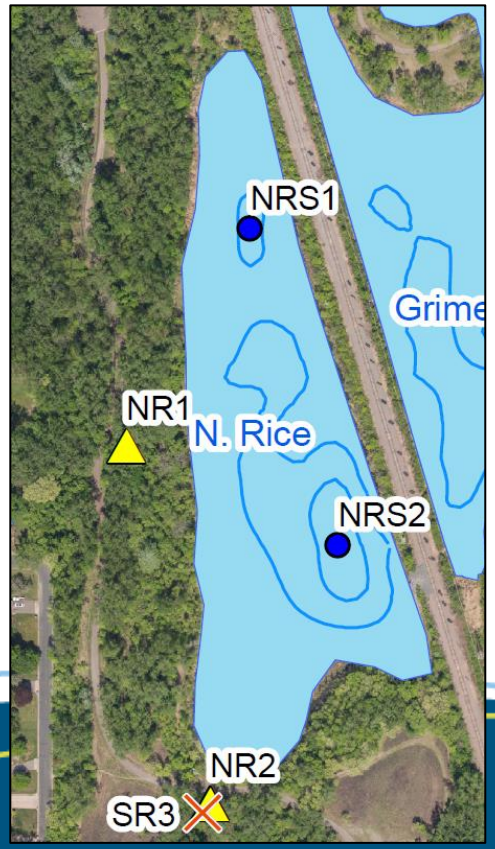
- A culvert that flows into Grimes, GR6, seems to be main source of stormwater
  - Very little flow - only 2 grab samples collected

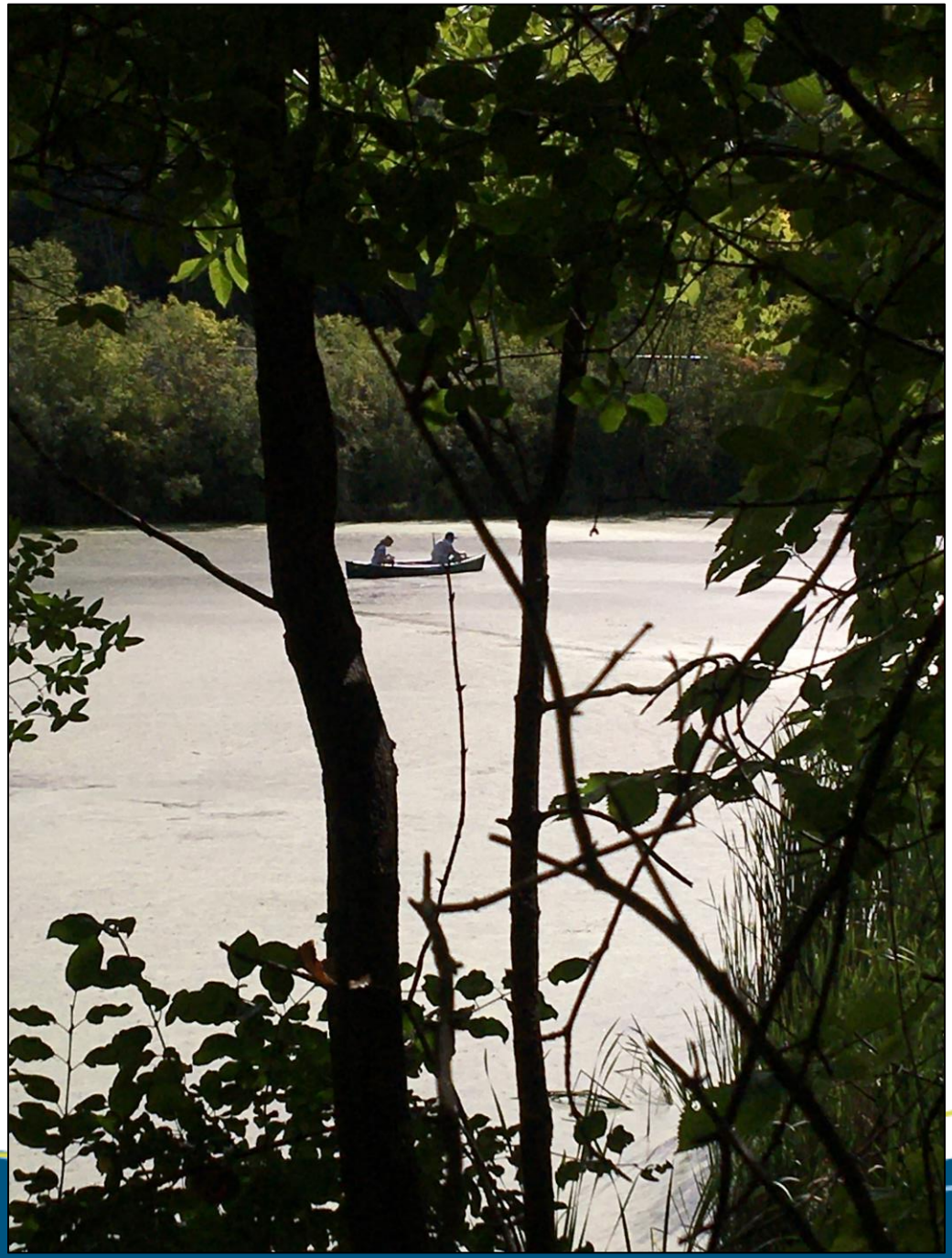


- Not meeting TP goals most of season
- Meeting Chlorophyll-a goals most of season
- Meeting secchi depth goals (max depth = 2.19 m)

North Rice Pond

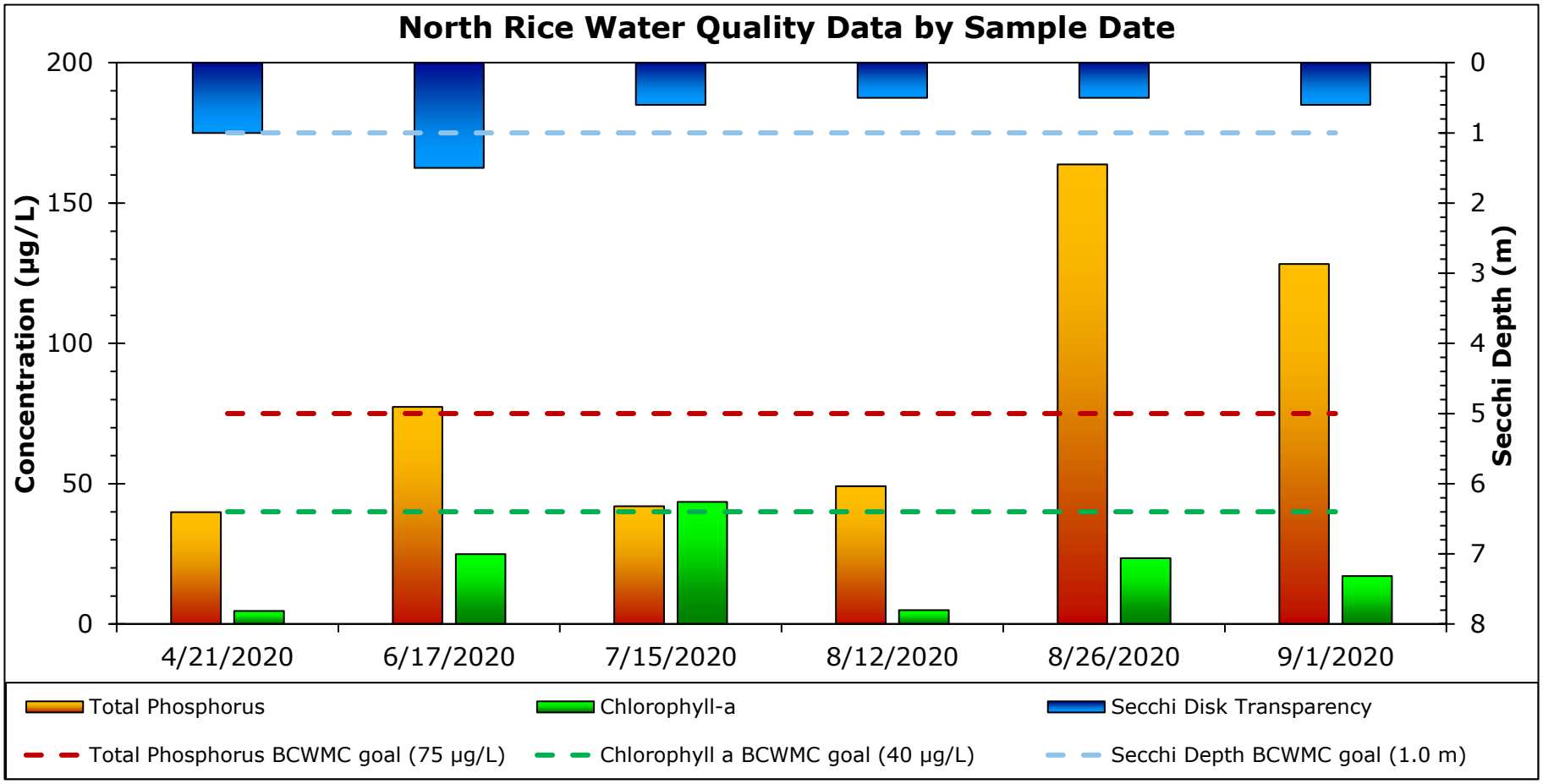
- Receives water from Grimes and NR1
  - There may be other smaller channels – but NR1 is the primary input





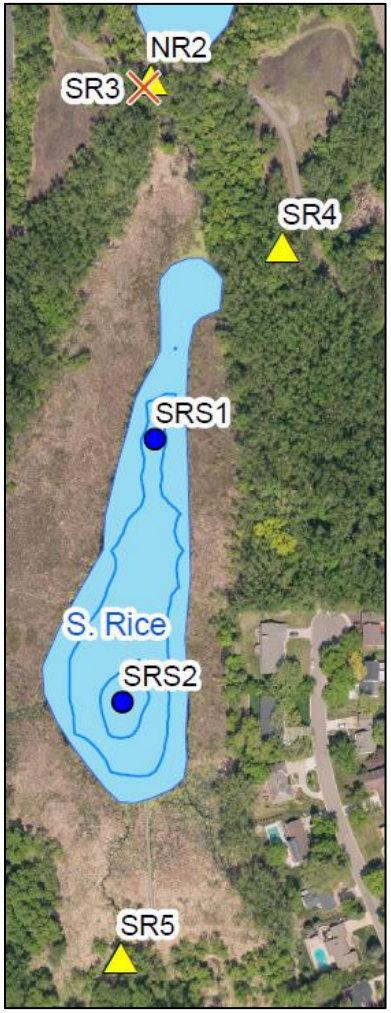
NR1 – North Rice Site 1

- Only has flow during rain events
  - Sandy soils, so water infiltrates
- Very little flow into North Rice pond
  - 0.003 x 10^6 m^3
- Low loading due to low flow even though has high concentrations
  - TP: 2 lbs/yr
  - TN: 12 lbs/yr
  - TSS: 283 lbs/yr
  - Chlorides: 0 lbs/yr



- Meeting TP goals until August
- Meeting Chlorophyll-a goals most of season
- Not meeting secchi depth goals (max depth = 1.58 m)
  - Pond is shallow and staff could see bottom of pond at every visit.

South Rice Pond



Receives water from

- North Rice via NR2
- SR3 –
  - a small culvert that only runs during storm events
  - Has very little flow and lower concentrations
  - 4 grab samples collected
- SR4

NR2 – North Rice outlet

- Flows out of North Rice and into South Rice
- Lowest nutrient and TSS concentrations of the sites
  - Has highest chloride concentrations
- Highest flow of sites
  - $0.15 \times 10^6\ m^3$
- Has average nutrient loading and high chloride loading
  - TP: 50 lbs/yr
  - TN: 459 lbs/yr
  - TSS: 1,900 lbs/yr
  - Chlorides: 45,700 lbs/yr

SR4 – South Rice site 4

Double culvert that is dry until rain events

- Flows into South Rice
- Highest average TP and SRP concentrations of the sites
- Low flow since only during storm events
  - $0.05 \times 10^6\ m^3$
- Average nutrient loading
  - TP: 30 lbs/yr
  - TN: 213 lbs/yr
  - TSS: 3,900 lbs/yr
  - Chlorides: 577 lbs/yr

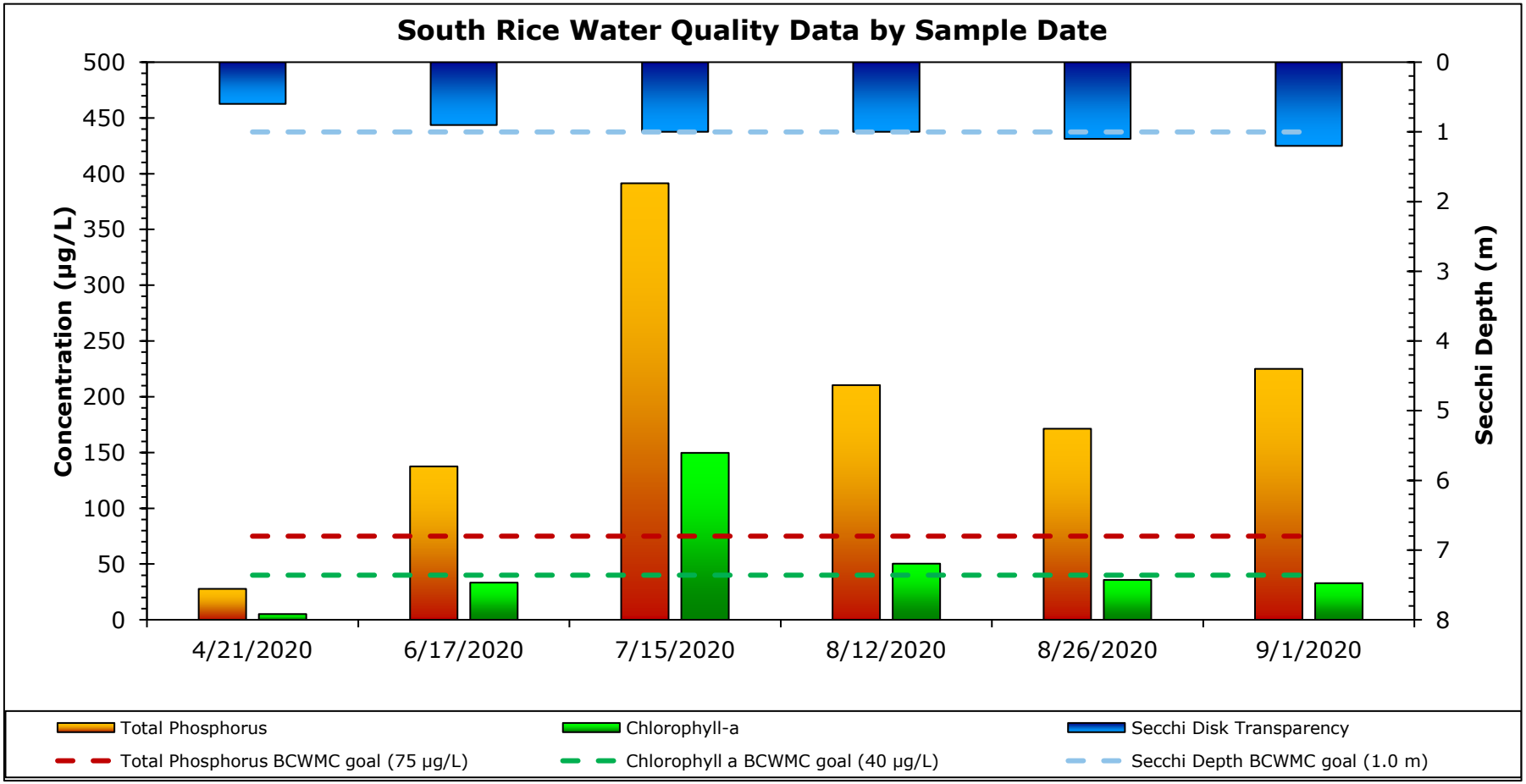
SR4 – South Rice site 4 – other details

Downstream of site

- Quite a bit of concrete and building materials
- Channel is eroded due to heavy flow through this area

Upstream side of culvert

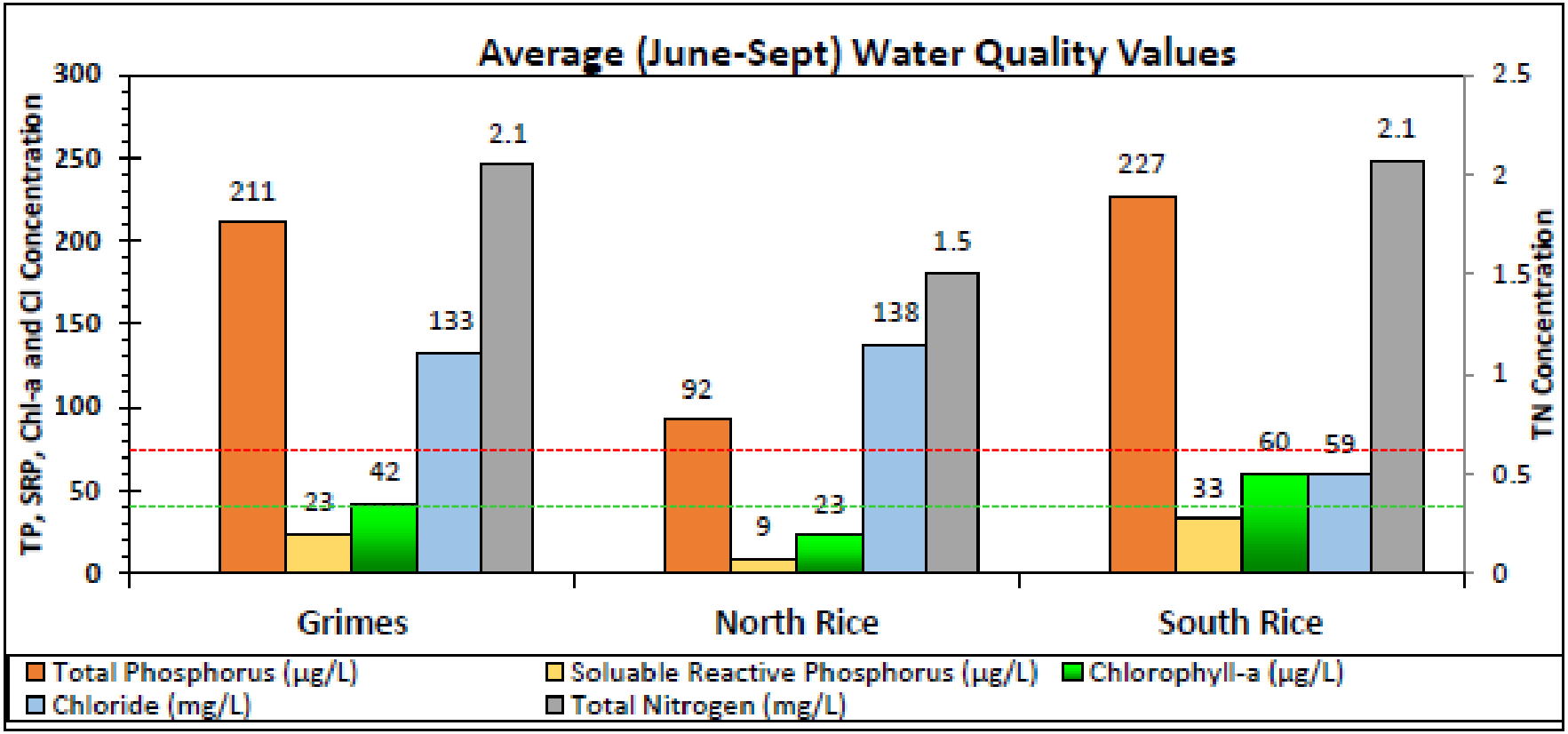
- Grates collect a lot of detritus/debris that is high in nutrients



- Not meeting TP goals most of season
- Meeting Chlorophyll-a goals most of season
- Meeting secchi depth goals for half of season (max depth = 1.34 m)
  - Pond is shallow and staff could see bottom of pond at every visit

SR5 – South Rice outlet

- Flows out of South Rice
  - There is a 2nd outlet channel with similar flows
- Average concentrations
- Measured flow is comparable to flow into South Rice
  - 0.13 x 10^6 m^3
- Has highest loading of the sites except for chlorides
  - TP: 74 lbs/yr
  - TN: 526 lbs/yr
  - TSS: 9,300 lbs/yr
  - Chlorides: 28,700 lbs/yr


Average (June-Sept) Water Quality Values
TP, SRP, Chl-a and Cl Concentration
TN Concentration
300
250
200
150
100
50
0
2.5
2
1.5
1
0.5
0
211
23
42
133
2.1
92
9
23
138
1.5
227
33
60
59
2.1
Grimes
North Rice
South Rice
Total Phosphorus (µg/L)
Soluable Reactive Phosphorus (µg/L)
Chlorophyll-a (µg/L)
Chloride (mg/L)
Total Nitrogen (mg/L)

Other monitoring

- Dissolved oxygen
  - April and June had higher levels, but rest of season was anoxic at all ponds
  - Due to low oxygen levels, bacteria do not efficiently break down decaying material
- Vegetation
  - Thick Coontail
  - Lots of duckweeds
  - 2013 study noted that Curly-leaf pondweed (CLP) was only found in South Rice
    - CLP was found in all 3 ponds in the spring but not in fall due to normal die off
- Sediment Cores
  - Collected in January 2021
  - Awaiting results to see influence of sediment phosphorus on water quality

Sochacki Park
Sub-watershed Assessment
Next Steps

- Stakeholder Engagement – Ongoing 2021/2022
- Continue Monitoring Efforts - Summer 2021
- Process and Summarize Monitoring Data – Fall/Winter 2021
- MnRAM Wetland Function & Value Analysis – Fall/Winter 2021
- Modeling of Watershed – January/February 2022
- Modeling of Wetlands – March/April 2022
- Modeling Simulations to evaluate potential watershed BMPs and wetland management options – May 2022
- Sochacki Park Sub-watershed Assessment Report – June 2022
  - Phosphorus Load reductions necessary to achieve water quality goals
  - Cost-benefit analysis
  - Implementation Plan