Sochacki Park Monitoring Data Summary
2020

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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
  - 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
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
  - $0.003 \times 10^6 \text{ m}^3$

- 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
  - $0.15 \times 10^6 \text{ m}^3$
- 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

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

Double culvert that is dry until rain events
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
  - $0.13 \times 10^6 \text{ m}^3$

- 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
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