### **North Cannon River WMO** 2017 Water Monitoring Presentation



#### **Lindsey Albright**

Water Resources Specialist Dakota County Soil and Water Conservation District



## **NCRWMO** Monitoring

- Annual monitoring at Chub Creek site since 2011
  - Additional monitoring in 1999, 2000, 2004, 2005, 2008
- Historical sites on Pine Creek, Trout Brook, Mud Creek



### Water Quality Impairments

#### Chub Creek

- Aquatic Macroinvertebrates Bioassessments (2014)
- Fishes Bioassessments (2014)
- Fecal Coliform (1994, 2006)

#### Mud Creek

• Fecal Coliform (2006)

#### Pine Creek

• Nitrates (2010)

#### **Trout Brook**

- Turbidity (2006)
- Nitrates (2010)
- Aquatic Macroinvertebrate Bioassessments (2014)
- Nitrates (2018)

#### **Dutch Creek**

- Aquatic Macroinvertebrates Bioassessments (2016)
- Fishes Bioassessments (2016)

# Trout Brook – Nitrate Impaired

2018

HAF

Common Railing Bridge

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## **2017 Monitoring Activities**

- Monthly water quality monitoring April until October
- Three flow measurements collected April, July, October
- Water level and temp logger deployed at site
- Groundwater and surface water monitoring in Trout Brook
- Vegetation surveys of Chub Lake and Lake Byllesby



### Water Quality Overview

- pH and conductivity levels are typical
- Dissolved oxygen levels exceed standard
- Water temperature is good
- Transparency varies due to runoff events
- Phosphorus is low
  - Elevated levels following runoff events
- Total suspended solids increase during runoff events
- *E. coli* levels continue to be high
- Nitrate meets drinking water standard

## **Sampling Equipment**



### **Chub Creek Hydrograph**



## **Field Monitoring**

- Water temperature
- Dissolved Oxygen
- pH
- Transparency
- Conductivity









## Field Monitoring Results

Parameter	Desired range	2017 Range	2017 Average
<i>Temperature (°C)</i>	Less than 30	9.54 - 18.46	15.54 °C
Dissolved Oxygen (mg/L)	Greater than 5.0	8.3 - 10.31	8.96 mg/L
рН (S.U.)	6.5 to 9.0	8.13 - 8.24	8.17 S.U.
Transparency (cm)	Greater than 25	32 - >100	82 cm
Conductivity (µS/cm)	Less than 698	582 - 654	634.75 µS/cm

### Lab Analyses

- Total Phosphorus
- Total Suspended Solids
- E. coli Bacteria
- Nitrogen
  - Nitrate



### **Total Phosphorus**



- Required by all living things
- Natural occurring
  - Other sources include: fertilizers, stormwater runoff, soil erosion, septic systems
- Elevated levels can lead to harmful algal blooms
  - Reduce dissolved oxygen
  - Cause fish kills

**Standard:**  $\leq 0.15 \text{ mg/L}$ 

### **Total Suspended Solids**



Total Suspended Solids ——State TSS Standard

- Measure the suspended particles in the water
- Potential sources include: eroded soils from fields and stream banks, decaying vegetation, and algae
- **Standard:** For warm water (2B) streams the standard is ≤ 65 mg/L

### E. coli Bacteria



- Indicator of diseasecausing pathogens in the water
- Potential sources include: manure spread on land, animal waste, and failing septic tanks
- Chub Creek has been listed as impaired for fecal coliform bacteria by the MPCA since 2006

## Nitrate (NO<sub>3</sub>)



- Nitrate levels exceed natural levels
  - Orange box 0.5-2 mg/L
- Chub creek is <u>not</u> currently listed for a nitrate impairment
- Nitrate levels in the Trout Brook subwatershed continue to be high

#### **Trout Brook Nitrate Monitoring**





\*\*Highest stream baseflow nitrate concentrations found in southeastern Minnesota

#### Monitoring Sites

- Three stream
- TB1
  - East branch
- TB2
  - West branch
- TB3
  - Watershed outlet
- ~ 15 year data record





#### Monitoring Sites

#### Four springs

- Fox
- LeDuc
- Beaver
- Swede

~30 year data record





## Beaver Spring







## Swede Spring









## **Trout Brook Monitoring Program**

#### **Current Strategy**

Surface water

• None

#### Groundwater

- Triennial assessments
  Feb 2017
- Late winter/early spring
- Baseflow conditions
  - Three stream
  - Four springs
- Analyzed for nitrate

#### **Proposed Strategy**

#### Surface water

- Snowmelt through October
- Monthly samples at three sites
- Baseflow and event sampling
- Chemistry and nutrients Groundwater
- Quarterly samples at stream and spring sites
  - **Baseflow conditions**
  - Analyzed for nitrate
- Water chemistry

### **NCRWMO Conclusions from 2017**

#### Met the standard:

- Total Phosphorus
- Total suspended solids
- Nitrates
- Exceedances:
  - E. coli bacteria

#### Continued monitoring to:

- Assess long term water quality trends
- Track the progress towards meeting water quality goals



### **Aquatic Invasive Species Monitoring**





#### Lake Byllesby







## **Local AIS Prevention Aid**

- In 2014, \$10 million was allocated on an annual basis to Minnesota counties to help prevent AIS
- Goals of Dakota County's AIS program:
  - Prevent the introduction of new AIS
  - Prevent further spread of existing AIS
  - Reduce the potential for environmental and economic impact brought on by AIS infestations
- Monitoring activities around the County







### **AIS monitoring in NCRWMO**

- Aquatic vegetation survey and suitability assessment of <u>Chub Lake</u>
- Aquatic vegetation survey and suitability assessment of <u>Lake Byllesby</u>

## **Vegetation Surveys**

#### Byllesby

- Current AIS:
  - Common carp
  - Flowering rush

#### Chub

- Current AIS:
  - Common carp
  - Curlyleaf pondweed
- \*\*High potential for other AIS to be found in future years

Action Plan:

- Continue monitoring on a 3-5 year cycle
- AIS inspector at Byllesby launch
  - Weekends and holidays
  - Goodhue funding inspector at their launch in 2018



### **AIS monitoring in NCRWMO**

- Aquatic vegetation survey and suitability assessment of <u>Chub Lake</u>
- Aquatic vegetation survey and suitability assessment of <u>Lake Byllesby</u>
- Biological monitoring (bugs and habitat)
  - Chub Creek, Trout Brook, and Pine Creek subwatersheds
- New AIS infestations will be reported using the EDDMapS online reporting tool
- UofM Extension AIS Detectors program

## Planning for 2018

- Monthly water quality monitoring
  - April through October
- Flow measurements collected during the field season – variety of water levels (3x)
- Water level and temperature logger deployed at Chub Creek permanent monitoring site
- Monitoring in Trout Brook and Pine Creek subwatersheds
- Aquatic Invasive Species (AIS) Monitoring
- Promote citizen water monitoring in NCRW



#### **QUESTIONS?**



#### North Cannon River Watershed Management Organization

Serving the Townships of: Castle Rock | Douglas | Eureka | Greenvale | Hampton | Randolph | Sciota | Waterford And the Cities of: Miesville | New Trier | Randolph