



North Cannon River Watershed

2019 Monitoring Report

Background The Cannon River Watershed within Dakota County is divided into three major subwatersheds - Chub Creek, Pine Creek, and Trout Brook. The watershed is predominantly rural, with agriculture as its primary land use. Rolling hills spread across the northern and southwest portions of the watershed; steep hills, bluffs, and rocky outcroppings are found in the east. Karst features are prevalent, highlighted by shallow depth of soils and glacial material covering limestone. Water quality is a major concern as these features can have a profound impact on the rate of infiltration and the flow path of water.

Since 1999, the North Cannon River Watershed Management Organization (NCRWMO) has monitored water quality and quantity of at multiple sites on all major creeks in the watershed. In 2018, the NCRWMO partnered with Dakota County Parks to monitor historical surface water sites in Chub Creek and Pine Creek and expanded groundwater monitoring activities in the Trout Brook subwatershed.



2019 Summary of Monitoring Activities

Surface Water Monitoring Sites	Surface Water Quality Monitoring	Monitoring Parameters	Surface Water Quantity Monitoring	Streamflow Monitoring	Trout Brook Groundwater
Chub Creek - 4 Pine Creek - 1 Trout Brook - 3	1x per month April - October	Physical - Conductivity, Dissolved Oxygen, pH, Sediment, Temperature Nutrients - Nitrates, Phosphorus Bacteria - <i>E. coli</i>	Equipment installed at Chub Creek on Dixie Avenue and at all sites in Pine Creek and Trout Brook subwatersheds	3x at Chub Creek on Dixie Ave and on a routine basis at all sites in Pine Creek and Trout Brook subwatersheds	Quarterly nitrate monitoring at four sentinel springs and three surface water monitoring sites



Chub Creek Watershed

2019 Monitoring Locations

Dutch Creek (DUTCH300)

Dutch Creek at 300th Street W

Mud Creek (MUD3)

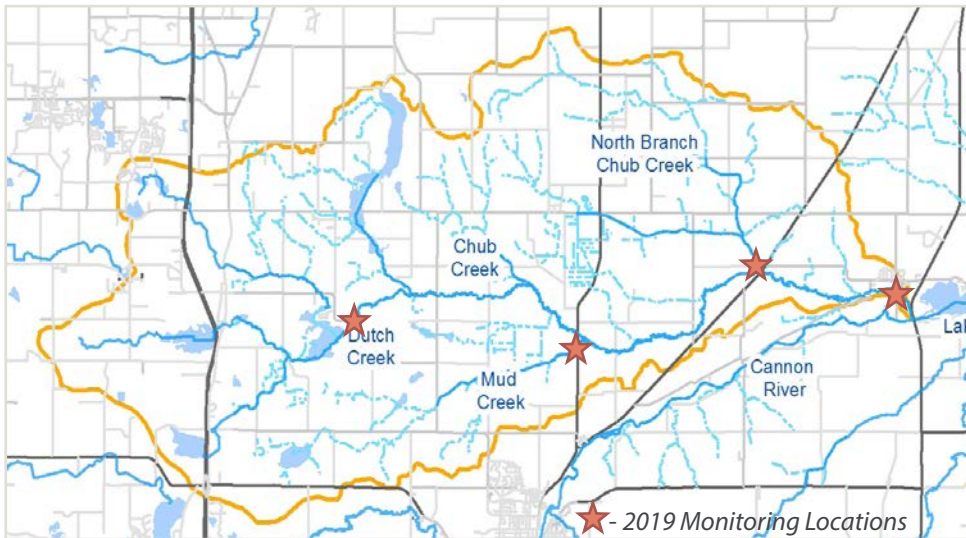
Mud Creek at Highway 3

North Branch Chub Creek (NB47)

North Branch Chub Creek at Highway 47

Chub Creek (Chub PMS)

Chub Creek on Dixie Ave



The monitoring sites are located at each of the pour points of the three smaller subwatersheds (Dutch Creek, Mud Creek, North Branch of Chub Creek) and near the confluence of Chub Creek and the Cannon River.

Water Quality Impairments

Chub: Aquatic

Macroinvertebrates and Fishes Bioassessments (2014); Fecal Coliform (1994, 2006)

Dutch: Aquatic

Macroinvertebrates and Fishes Bioassessments (2016)

Mud: Fecal Coliform (2006)

Dutch Creek



Dutch Creek is the most upstream site monitored in the watershed. At the tailend of a wetland complex, water quality data from this site show low dissolved oxygen levels, as well as *E. coli* and nitrates. Total phosphorus is highest of all monitoring sites.

The North Branch Chub Creek has the highest nitrate levels

North Branch Chub Creek



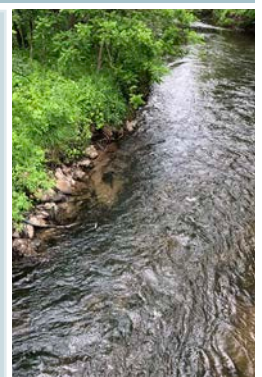
in the watershed. Levels continued to be high throughout the season and exceed the drinking water standard during all monitoring events.

Mud Creek



Total suspended solids are low for the majority of the monitoring season, peaking in July. *E. coli* and total phosphorus levels are lowest in the spring and fall with a similar peak during the summer months. Nitrate levels fluctuated throughout the monitoring season.

Chub Creek



The monitoring site on Chub Creek is influenced by the three tributaries that empty into the creek further upstream. Total suspended solid levels and transparency readings are highest at this site, as sediment moves off the land and travels downstream.





Pine Creek Watershed

2019 Monitoring Locations

Pine Creek (PC3)

Pine Creek at 280th Street

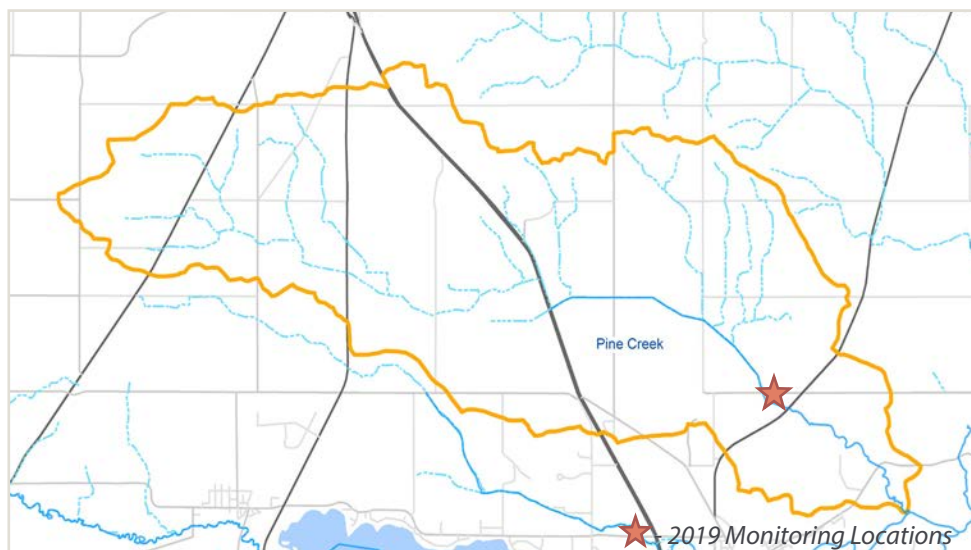
Water Quality Impairments

Nitrates (2010)

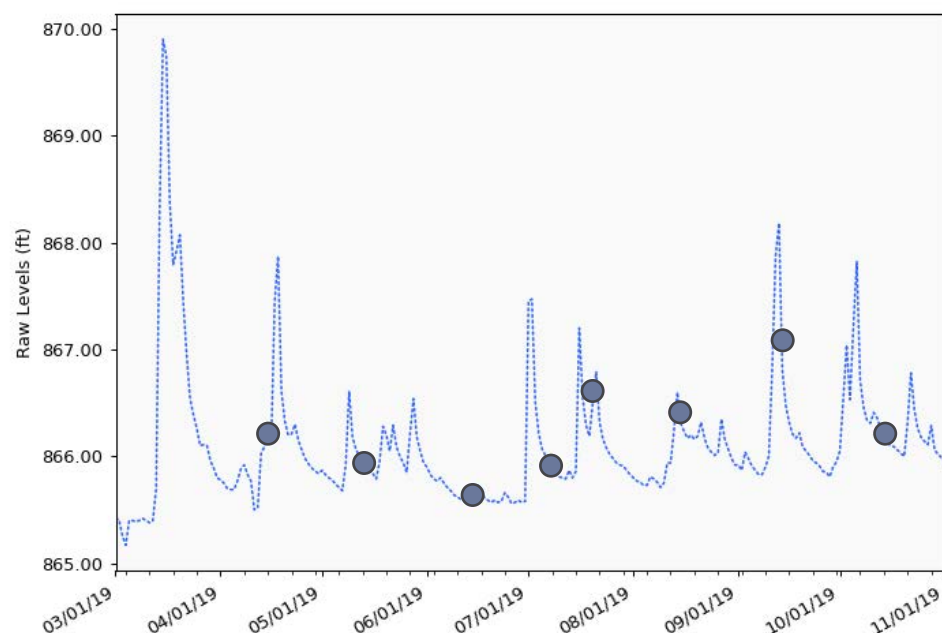
Monitoring Partner

Minnesota Department of Natural Resources (MNDNR)

PC3 is part of the MNDNR's stream monitoring program. Water temperature and level are continuously monitored and flow measurements are collected intermittently.



MNDNR hydrologists visit this site and another site upstream intermittently to monitor streamflow from March to November each year. Continuous temperature and water level monitoring equipment are deployed at both monitoring sites year round and data is collected on 15 minute intervals. Data is available on the MNDNR's website.



Water levels at PC2, NCRWMO historical monitoring site on Hogan Avenue

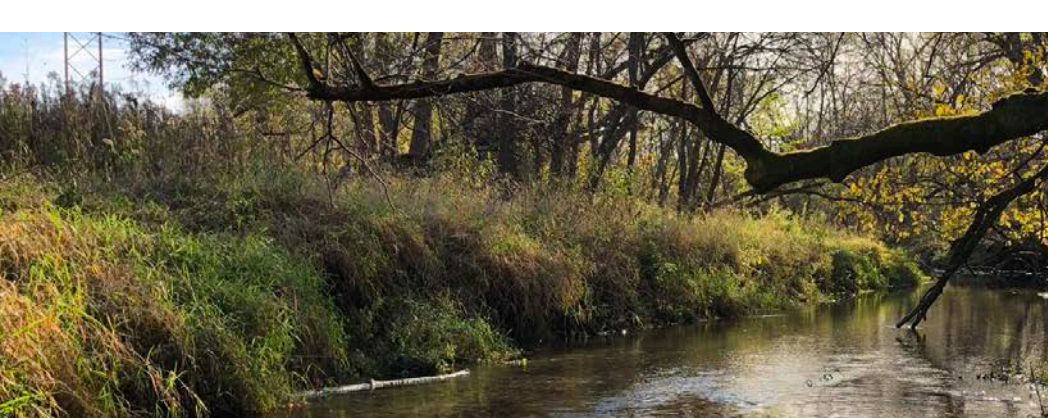
● - monitoring events by DCSWCD at PC3

Water quality sampling in the Pine Creek watershed began back in 2006, providing natural resource managers with a longterm dataset to use when evaluating watershed health and determining management activities.

Data collected in 2019 show:

- Phosphorus and sediment levels below the state standard throughout the season
- *E. coli* levels were low in the spring and fall months, but increased during the summer months.
- Nitrate levels exceeded the drinking water standard all year





Trout Brook Watershed

2019 Monitoring Locations

Trout Brook (TB1)

Unnamed Tributary to Trout Brook at Miesville Trail

Trout Brook (TB2)

Trout Brook at Miesville Trail

Trout Brook (TB3)

Trout Brook at Orlando Trail

Sentinel Springs

Beaver, Fox, Le Duc, Swede

Water Quality Impairments

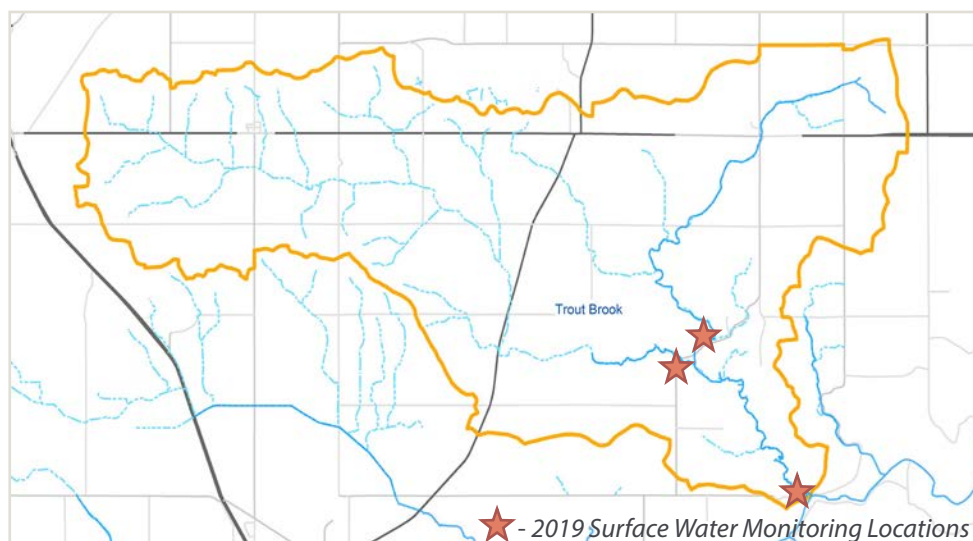
Turbidity (2006)

Nitrates (2010; mainstem)

Aquatic Macroinvertebrate

Bioassessments (2014)

Nitrates (2018; west branch)



Surface and groundwater monitoring activities occur in and around Trout Brook. Three surface water sites are monitored during the field season, testing water from the tributary and mainstem upstream of their confluence, as well as at the bottom of the watershed. Four sentinel springs are monitored under baseflow conditions throughout the year, studying nitrate levels as part of the groundwater monitoring program.



TB1 is located on the eastern tributary to Trout Brook. Dissolved oxygen levels were lower here than at other sites, but remained well above the standard all season. *E. coli* levels were higher than at other sites, with highest readings collected in late summer.



TB2 has the highest nitrate levels in the watershed. Nitrate levels are 2x higher than the state drinking water standard for the majority of the monitoring season. Fox Spring is upstream from this site and its high nitrate levels influence readings at TB2.



TB3 is located at the bottom of the watershed, upstream of the confluence with the Cannon River. Nitrate levels are much lower than samples from TB2, due to dilution from the eastern branch. Phosphorus and suspended solid levels are very low all season.

Trout Brook Groundwater Monitoring

Sentinel Springs

Beaver, Fox, Le Duc, Swede

Fox Spring is the most upstream of the sentinel springs, located just east of the Miesville Ravine Park boundary. Nitrate levels are highest at this spring of all of the monitoring sites and are increasing at the fastest rate.



LeDuc Spring is a short walk upstream of where the stream passes underneath Miesville Trail. The spring is located on the right bank, tucked in along the bluff running alongside the stream.

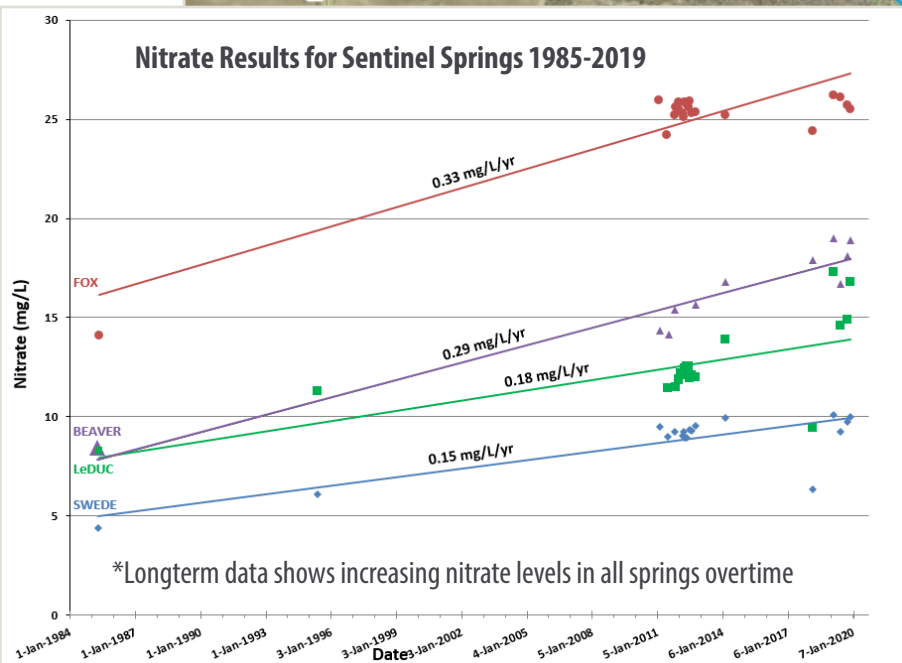
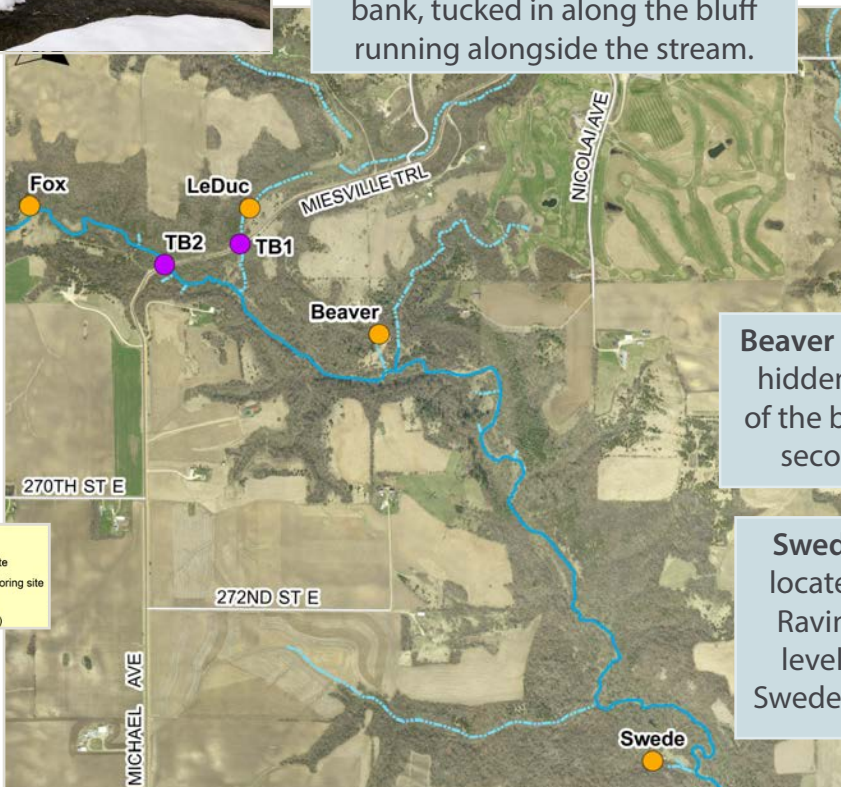


Beaver Spring is located deep within the park, hidden along a rock outcropping in the side of the bluff. Nitrate levels are increasing at the second fastest rate following Fox Spring.

Swede Spring is the southern most spring, located in the southern portion of Miesville Ravine Park near the walking trails. Nitrate levels are increasing at the slowest rate at Swede Spring.

Legend

- Spring monitoring site
- Surface water monitoring site
- Stream (Perennial)
- Stream (Intermittent)



The sentinel springs were first monitored in March 1985 with a single sampling event. Increased monitoring activities were outlined in the NCRWMO's watershed management plan leading to monitoring in 2011, 2014, and 2017. Beginning in 2019, Dakota County Parks provided funding for quarterly sampling in order to get a higher resolution dataset to better understand nitrate levels in the watershed over time.