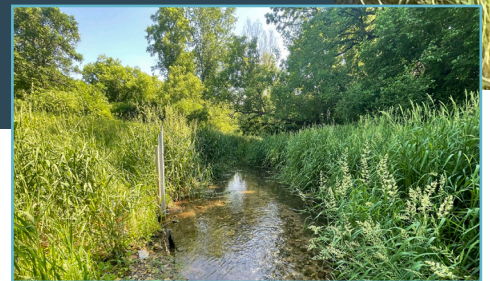




North Cannon River Watershed 2021 Water Monitoring Report

NORTH CANNON RIVER
WATERSHED MANAGEMENT ORGANIZATION

Dakota
COUNTY



Surface Water Monitoring Sites by Subwatershed

Chub Creek - 4
Pine Creek - 1
Trout Brook - 3

Monitoring Schedule

1x per month
April - October

Monitoring Parameters

Physical - Chlorophyll-a,
Conductivity, Dissolved Oxygen,
pH, Sediment, Temperature

Nutrients - Nitrates, Phosphorus

Bacteria - *E. coli*

Streamflow and stage

Trout Brook Groundwater Monitoring

Quarterly nitrate monitoring
at *four* sentinel springs -
Beaver, Fox,
Le Duc, Swede

and *three* surface water
monitoring sites -
TB1, TB2, TB3

Chub Creek Watershed

Chub Creek • Dutch Creek • Mud Creek • North Branch Chub Creek

Impairments

Chub Creek

Macroinvertebrates (2014)
Fishes (2014)
Fecal Coliform (2004)

Dutch Creek

Macroinvertebrates (2016)
Fishes (2016)

Mud Creek

Fecal Coliform (2006)

North Branch Chub Creek

Fecal Coliform (2006)



Four major rain events hit the watershed during the 2021 monitoring season – February, March, May, and August. Following each event, water levels increased quickly in response to the influx of water running off the land and entering the stream. Due to its size and several tributaries, Chub Creek is not a very flashy system, taking multiple days to flush the water out and return to baseflow conditions.

Dutch Creek

Downstream of a wetland complex. **Low dissolved oxygen. Warmest water temperature** of the four sites. **Very low chlorophyll-a, nitrate, total phosphorus, and total suspended solid** levels all season. **E. coli spike mid-summer**, but low overall.

North Branch Chub Creek
Lowest water temperatures and conductivity in the watershed. **Nitrate levels are just below the drinking water standard. High E. coli levels** starting mid-summer and continuing through fall. **Suspended solids increase** in the latter part of the season. **suspended solid levels** all season. **E. coli spike mid-summer**, but low overall.

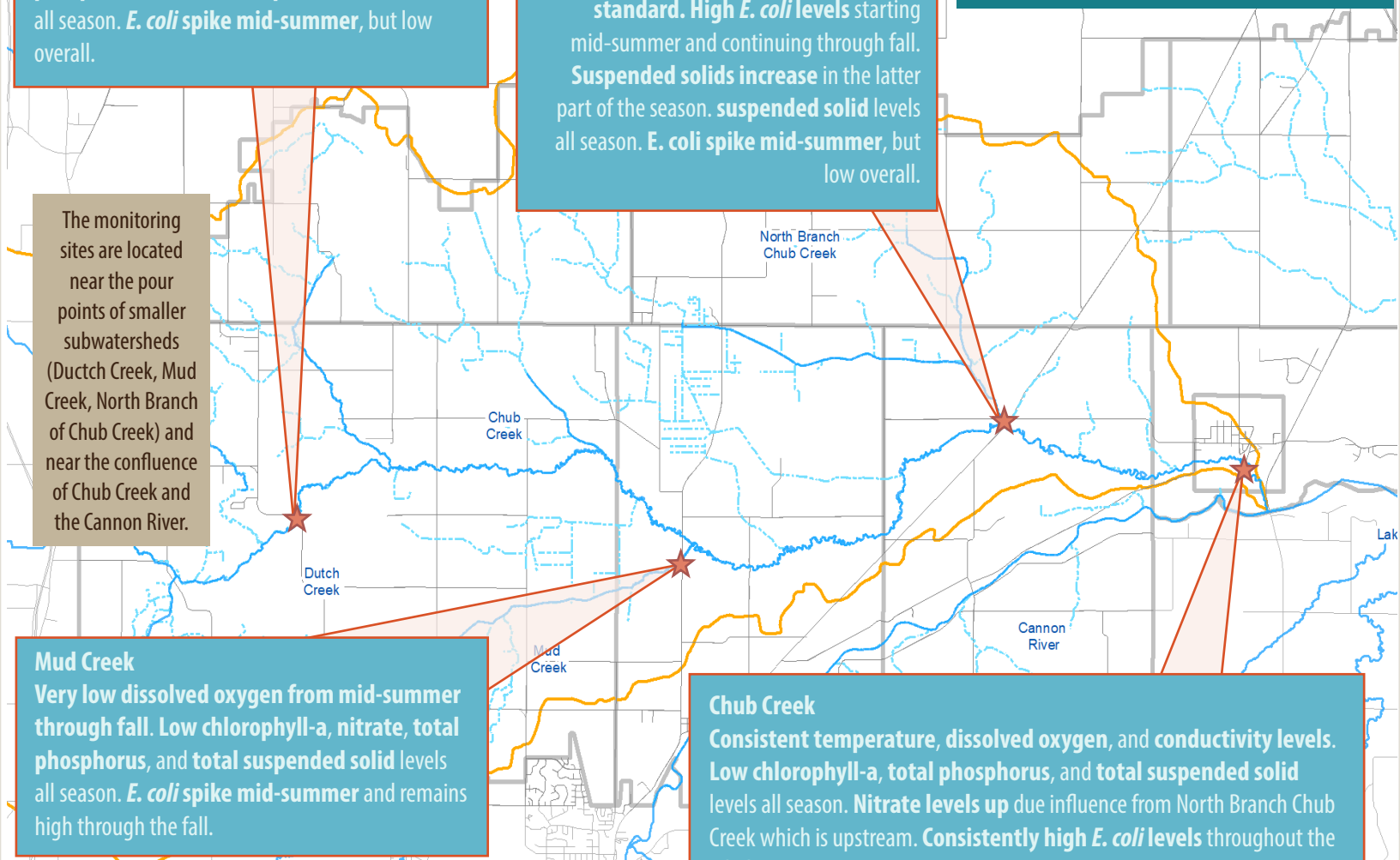
The monitoring sites are located near the pour points of smaller subwatersheds (Dutch Creek, Mud Creek, North Branch of Chub Creek) and near the confluence of Chub Creek and the Cannon River.

Mud Creek

Very low dissolved oxygen from mid-summer through fall. Low chlorophyll-a, nitrate, total phosphorus, and total suspended solid levels all season. **E. coli spike mid-summer** and remains high through the fall.

Chub Creek

Consistent temperature, dissolved oxygen, and conductivity levels. Low chlorophyll-a, total phosphorus, and total suspended solid levels all season. **Nitrate levels up** due influence from North Branch Chub Creek which is upstream. **Consistently high E. coli levels** throughout the whole season.



Pine Creek Watershed

• Pine Creek

Impairments
Nitrates (2010)



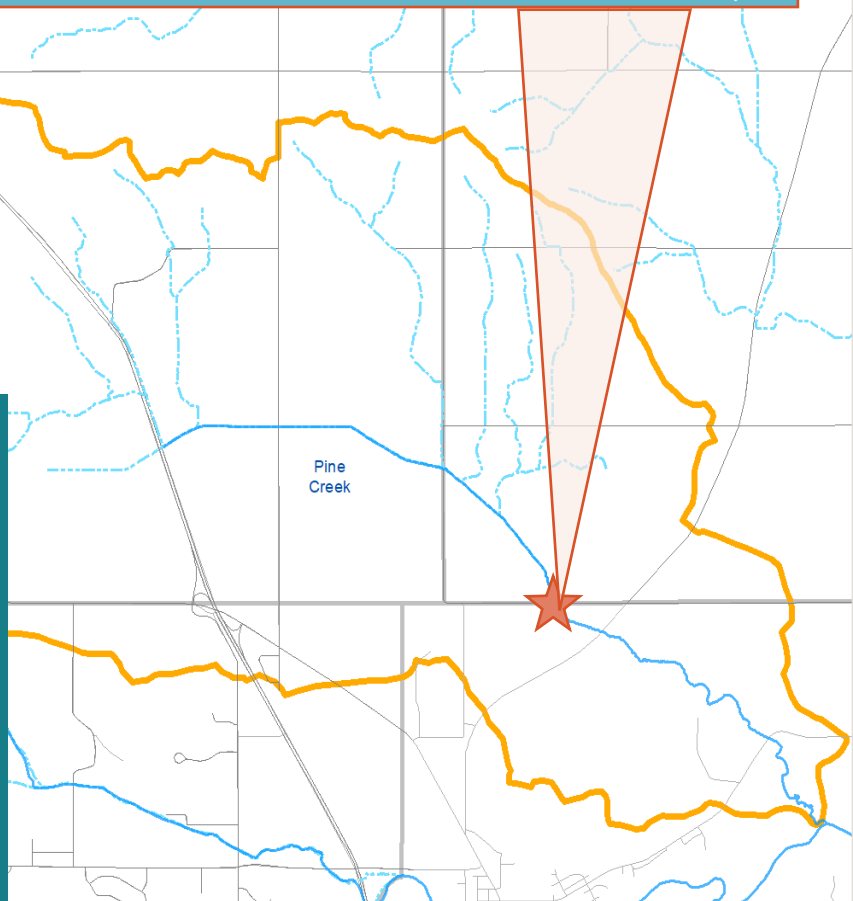
Pine Creek
Water temperature is low, remaining in the optimum range for brown trout (< 18 degC) for the entire monitoring season. Dissolved oxygen is above the standard for cold water streams. Conductivity is lower than what is found in both the Chub Creek and Trout Brook watersheds.

E. coli and nitrate levels are a big concern in the watershed. **E. coli was above the standard** for five of the seven monitoring events (below in April and October). **Nitrate was at or exceeded the drinking water standard** for six of the seven samples.

Four major rain events hit the watershed during the 2021 monitoring season – February, March, May, and August. Following each event, water levels increased quickly in response to the influx of water running off the land and entering the stream. Due to its size, Pine Creek is a very flashy stream, returning to baseflow conditions very quickly after each event.

Water quality sampling in the Pine Creek watershed first occurred in 2006 and continued until 2010, before restarting again in 2018. These activities occurred at three sites in the watershed - the current site at the bottom of the watershed, as well as two sites further upstream that are not currently monitored. Monitoring provides natural resource managers with a longterm dataset to use when evaluating watershed health and determining management activities.

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.



Trout Brook Watershed

Trout Brook • Unnamed Tributary

Impairments

Turbidity (2006)

Nitrates (2010, 2018*)

Macroinvertebrate (2014, 2014*)

*different branches



TB1 - Unnamed Trib



TB2 - Mainstem



TB3 - Mainstem: outlet of watershed

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.

These sites part of the MNDNR's stream monitoring program. Water temperature and level are continuously monitored and flow measurements are collected intermittently by MNDNR staff.

Four major rain events hit the watershed during the 2021 monitoring season – February, March, May, and August. Following each event, water levels increased quickly in response to the influx of water running off the land and entering the stream. Trout Brook responded to the first few rain events and returned to baseflow very quickly. Rain events later on in the season had little impact on stream discharge.

TB1

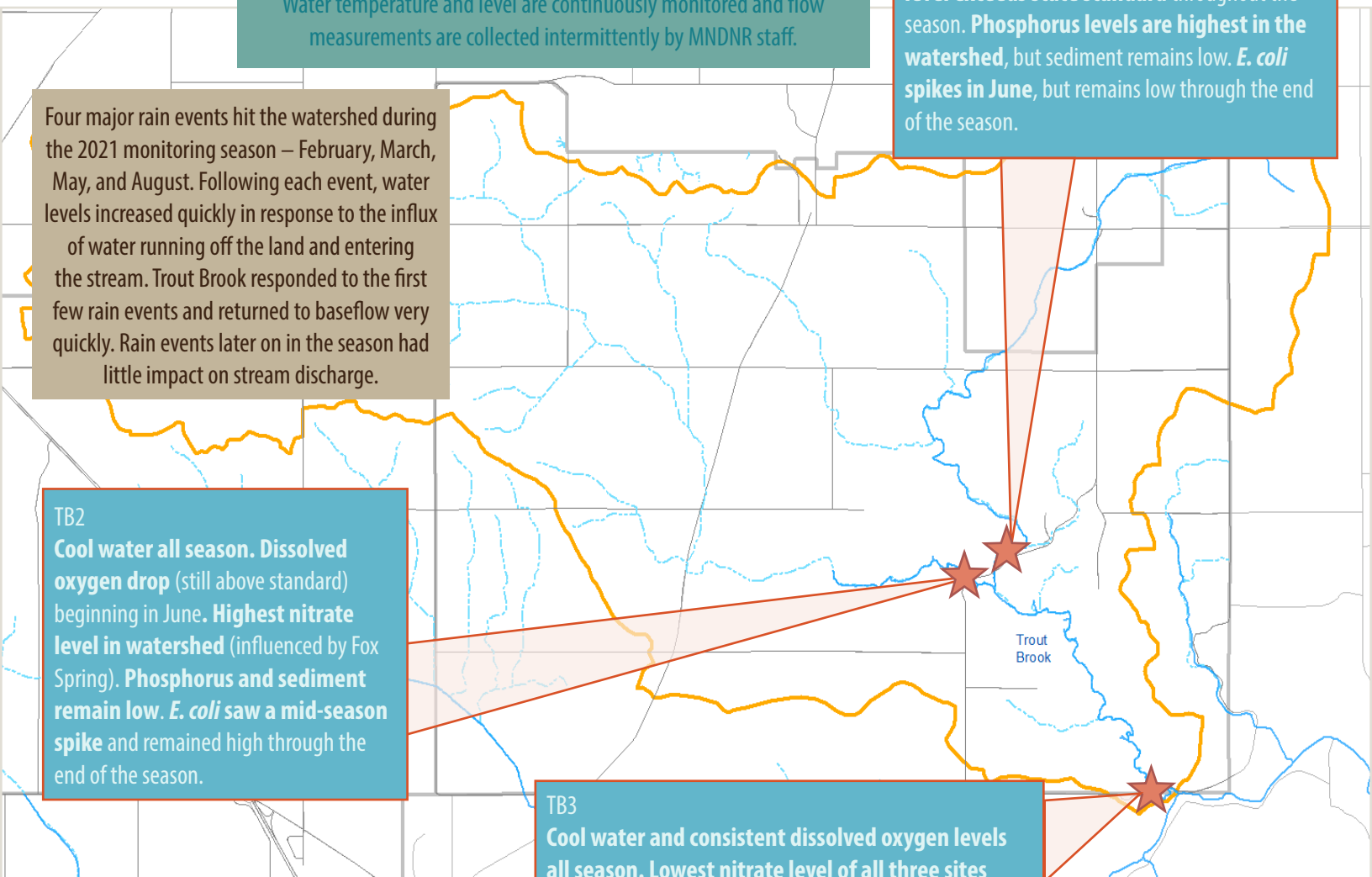
Cool water all season. Dissolved oxygen drop (still above standard) beginning in June. Nitrate level exceeds state standard throughout the season. Phosphorus levels are highest in the watershed, but sediment remains low. *E. coli* spikes in June, but remains low through the end of the season.

TB2

Cool water all season. Dissolved oxygen drop (still above standard) beginning in June. Highest nitrate level in watershed (influenced by Fox Spring). Phosphorus and sediment remain low. *E. coli* saw a mid-season spike and remained high through the end of the season.

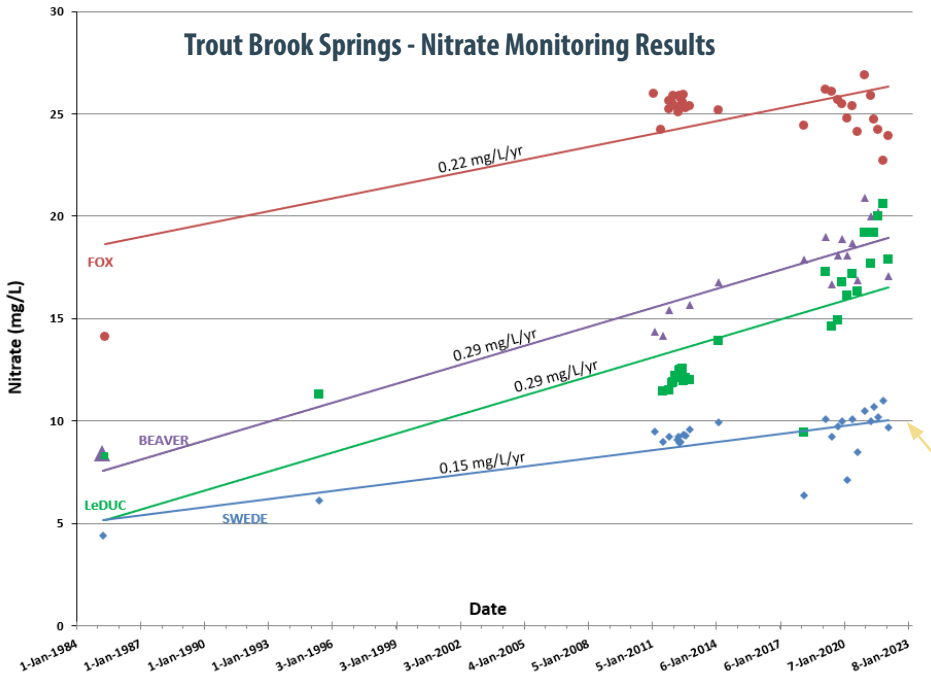
TB3

Cool water and consistent dissolved oxygen levels all season. Lowest nitrate level of all three sites (possibly influenced by groundwater influx). Phosphorus and sediment remained low all season. *E. coli* spike in the summer months, back down in the early fall.



Trout Brook Watershed

Beaver Spring • Fox Spring • LeDuc Spring • Swede Spring



Nitrate levels at all four sentinel springs continue to rise. Fox Spring (red; top of the watershed) has the highest levels and Swede Spring (blue; bottom of the watershed) has the lowest nitrate levels in the watershed. All sites have nitrate levels above the state drinking water standard (10 mg/L).

Sentinel Springs - Beaver, Fox, Le Duc, Swede

Spring monitoring in the Trout Brook watershed began as a one-off effort in 1985. A monitoring strategy was developed as part of the NCRWMO's watershed management plan, resulting in regular monitoring at the same four springs beginning in 2011.

Sampling frequency increased to quarterly in order to get a higher resolution dataset to better understand nitrate levels in the watershed over time.

Monitoring is supported by Dakota County Parks.

