



Capital Improvement Project Castle Rock Township: South Branch Vermillion River Nitrate Treatment Constructed Wetland



Improved Surface and Drinking Water

Nitrate is generally associated with non-point source runoff, and can cause health issues for humans and animals. The South Branch Vermillion River subwatershed has the highest nitrate load in the watershed and is a contributor to contaminated drinking water in the eastern portion of the watershed due to the geology of the area allowing for river water to leak into the underlying drinking water aquifers.

Dakota County reconstructed County Road 78, which allowed for the VRWJPO to design and construct a nitrate treatment practice adjacent to the road and concurrent with the road project to save on construction costs.

A constructed wetland was created and enhanced with woodchips. The woodchips provide for an additional carbon source in the wetland soil. This allows for nitrate reducing bacteria to better thrive within the wetland, leading to additional nitrate reduction than a wetland alone. A pre-treatment pond will settle the bulk of sediment prior to discharging into the wetland.

The South Branch Vermillion River has averaged 200,000 pounds of nitrate/year as measured at the VRWJPO's subwatershed outlet monitoring station. The proposed project would reduce total nitrate by 13,600 lbs./year.

A constructed wetland enhanced with woodchips will reduce nitrate loads, helping to improve water quality in surface and drinking water.

Vermillion River Watershed Joint Powers Organization

4100 220th Street, Suite 103
Farmington, MN 55024
952-891-7000

vrwjpo@co.dakota.mn.us
www.vermillionriverwatershed.org

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Problem:

- High nitrate loads in the South Branch Vermillion River subwatershed are leading to surface water and drinking water contamination
- Concentrations of nitrate in this subwatershed show a statistically significant increasing trend

Actions:

- A wet pond pre-treatment basin was installed for sediment removal
- A constructed wetland was enhanced with woodchips to provide an additional carbon source for nitrate reducing bacteria
- Design and construction was coordinated with Dakota County's road reconstruction project at County Road 78.

Benefits:

- Reduced nitrate by 13,600 lbs./year and sediment by 7.6 tons/year in the South Branch Vermillion River
- Reduced nitrate in drinking water supplies in the eastern watershed
- Coordinated effort with Dakota County allowed for cost savings on design and construction
- Habitat improvements within the South Branch Vermillion River and Vermillion River where sediment is responsible for covering or filling critical refuge and spawning areas
- Demonstration of a new type of nitrate treatment project
- Downstream benefits of nitrate and sediment reduction for the Mississippi River and Lake Pepin
- Protection of a designated trout stream, trophy brown trout population, and young-of-year trout

Costs and contributions:

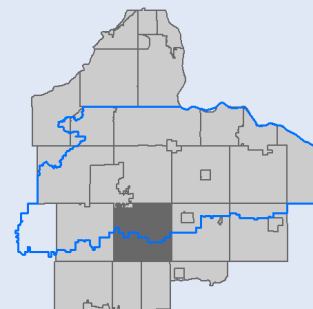
- Vermillion River Watershed Joint Powers Organization: Design assistance and construction oversight
- Dakota County: \$53,050 cash match, design assistance, and construction oversight
- Clean Water Fund: \$140,961 grant

Woodchips were tilled into the soil to provide an additional carbon source, or "food," for denitrifying bacteria to reduce the amount of nitrate in the water.



A project completed cooperatively by:

- Vermillion River Watershed Joint Powers Organization
- Dakota County
- Clean Water Fund Grant



Castle Rock Township, MN
near the intersection of Denmark Ave.
and Co. Rd. 78

A grant from the Clean Water Fund, one of four funds established by the Clean Water, Land & Legacy Amendment, supported this project. [Clean Water Stories](#) can be found on the Minnesota Board of Water and Soil Resources website.

