

De-nitrifying Bioreactor : Sheboygan County, Wisconsin

In September, 2014, the first de-nitrifying bioreactor in Wisconsin was completed in the Sheboygan River Watershed. Sheboygan County Planning & Conservation Department staff designed and oversaw the construction.

Such bioreactors have been constructed in several Midwestern states but, not in Wisconsin. The reactors are designed to remove a large portion of nitrogen from tile lines prior to discharge to a stream. Sheboygan County staff also wanted to test the impact on phosphorus discharge.

The bioreactor is intended to supplement in-field practices that by themselves have been largely unable to sufficiently reduce nutrient pollution.

The project was funded by the Kohler Trust for Preservation in cooperation with The Nature Conservancy.



Sheboygan County Planning & Conservation Department



Protecting nature. Preserving life.



Wood chips being placed in the bioreactor chamber.



Completed bioreactor.

How it Works:

A portion of the discharge from a tile line is diverted into a sealed cell of wood-chips. The biological action taking place in the chamber converts the nitrogen to a gaseous state that is then released to the atmosphere.

Monitoring:

Monitoring was done by collecting samples directly above and below the structure during suspected periods of discharge. Approximately 20% of the flow from the tile line was diverted to the bioreactor. Nitrogen was reduced by approximately 50%. The bioreactor had no long term impact on phosphorus discharge.

Cost, Challenges, and Results:

The cost of the Sheboygan bioreactor was \$11,000. The greatest challenge was to attain proper elevations as the stream channel water level was close to the outlet elevation. Alterations to the design to incorporate materials that would retain phosphorus might be the best next step.

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