BIOREACTORS

Practice Description:

A bioreactor is a buried trench on the edge of a farm field that is traditionally filled with woodchips. Agricultural drainage tiles outlet into the woodchips where bacteria convert tile water nitrate-nitrogen into nitrogen gas.

Bioreactors are an edge of field practice, meaning that they do not impact in-field management. Tile lines connect to a control structure, which allows water to flow into the woodchips. A second control structure assures that bacteria have enough time to remove nitrate-nitrogen, before water flows out of the bioreactor into a water body.

According to the Iowa Nutrient Reduction Strategy, a bioreactor, on average, removes 43% of nitrate-nitrogen from water diverted through it.

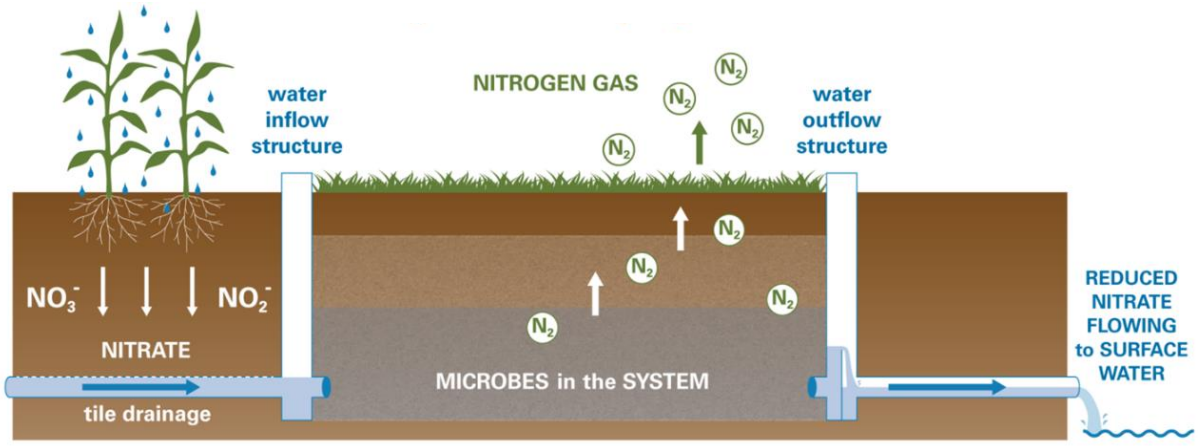

Illustration credit: Iowa State University Extension and Outreach

Practice Benefits:

- Decreases nitrate-nitrogen being deposited in waterways
- Does not impact in-field management, require little-to-no maintenance
- Vegetation on top of the bioreactor can have habitat benefits
- Have a lifespan of 10 – 15 before woodchips need to be replace

The Conservation Media Library was supported by a grant from the Iowa Department of Agriculture and Land Stewardship to the Soil and Water Conservation Society. To learn more about the Library and access other resources, go to www.swcs.org

Practice Economics:

- The average cost of installation, equipment, woodchips and labor for a bioreactor is $15,000. However, it can vary greatly depending on the size of the bioreactor.
- Compatible with existing federal and state cost-share programs so farmers who implement saturated buffers can recoup some of their costs

Bioreactor installation in Polk County, Iowa. SWCS/IDALS photo by Lynn Betts.

Other Resources:

- https://www.flickr.com/photos/151012306@N08/albums/with/72157716968785063: A step by step visual guide to bioreactor implementation. These photos were taken on real farms across Iowa and are part of the Conservation Media Library.
- https://www.cleanwateriowa.org/bioreactor: Several resources, including videos, from the Iowa Department of Agriculture and Land Stewardship's Water Quality Initiative.
- https://engineering.purdue.edu/watersheds/conservationdrainage/bioreactors.html: A storing house of resources from Purdue University
- https://store.extension.iastate.edu/product/14530: Two-page factsheet on bioreactors from Iowa State University Extension and Outreach.
- https://www.iowaagwateralliance.com/resourcelibrary/practices/bioreactors: Various technical and communication resources from the Iowa Ag Water Alliance.
- https://store.extension.iastate.edu/product/15823: A whole farm conservation best management practices manual from Iowa State University Extension and Outreach. It includes a decision tree to help decide which edge of field practice is right for you.

This project is part of the: CONSERVATION MEDIA LIBRARY

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