

Applying Woodchip Bioreactors for Improved Water Quality

What is a woodchip bioreactor?

Drainage water is diverted through a buried trench filled with woodchips. Microorganisms convert the nitrate in the drainage water to harmless nitrogen gas (denitrification).

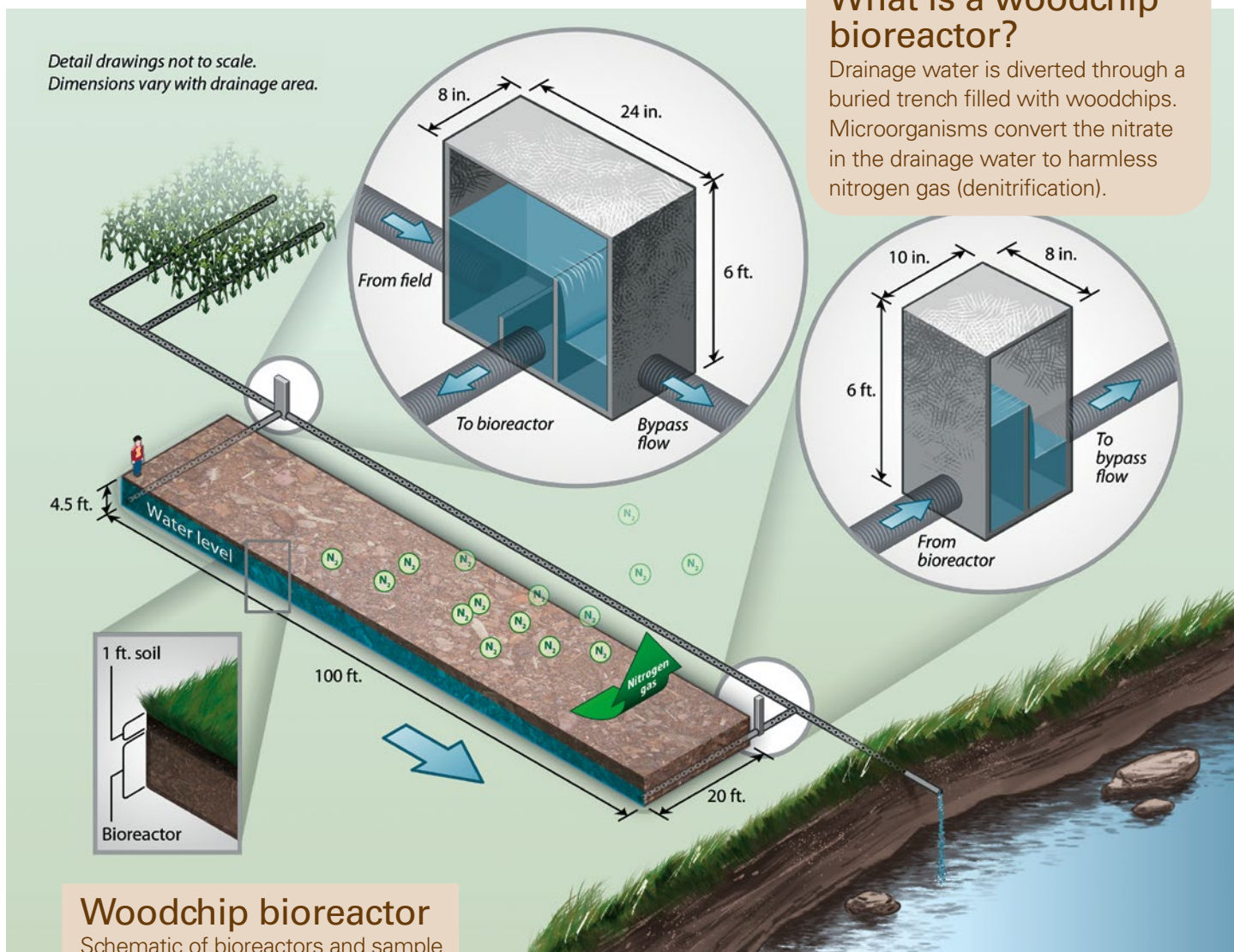


Image by John Petersen, www.petersenart.com

Woodchip bioreactor

Schematic of bioreactors and sample collection systems

Flooding

- 5% streamflow reduction
- Retains water for 4-8 hours within the bioreactor

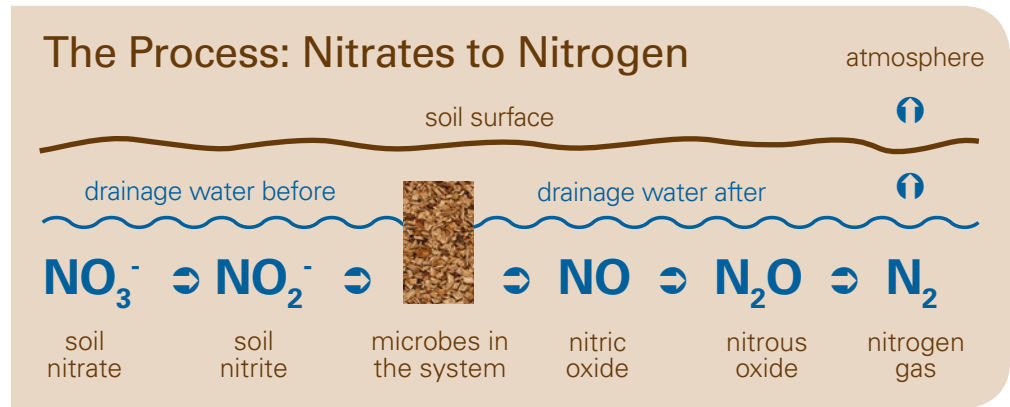
BENEFITS OF A WOODCHIP REACTOR

- Nitrate removed through denitrification
- Bioreactors placed at edge-of-field

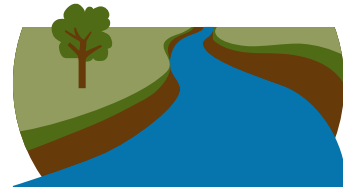
Does not impact current land management practices

DENITRIFICATION

Denitrification occurs when microbes living in the system use the woodchips as a carbon source to convert nitrate to nitrogen gas.



The end result is **CLEANER WATER**



RESEARCH

Current research is underway to evaluate the potential for woodchip bioreactors to treat multiple contaminants. Data is being collected at several sites in Iowa to measure effectiveness of field bioreactors in removing nitrate, phosphate, E. coli, and greenhouse gas emissions.

Woodchip Bioreactor Video at <https://www.youtube.com/watch?v=pQKtbDFd4A0>

Project involves

- ◆ Installation of nine pilot scale woodchip bioreactors
- ◆ Bioreactors monitored for
 - Nitrate removal under various flows
 - Influent nitrate concentrations in tile-drained watersheds

For more information go to

www.extension.iastate.edu/waterquality

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This project is supported by the Iowa Nutrient Research Center. Additional support is provided by the Iowa Soybean Association.

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