

# *Big Pine Creek Watershed Project*

## *Best Management Practices Fact Sheet*

### *Bioreactor and Saturated Buffer*

A **bioreactor** is a structure containing a carbon source, which is typically woodchips, installed to reduce the concentration of nitrate-nitrogen in surface or subsurface agricultural drainage flow via the conversion of nitrate to nitrogen gas or denitrification. Subsurface agricultural drainage can allow large gains in agricultural productivity in the midwestern United States. The water quality of our local streams, rivers, and lakes can be negatively impacted by nitrate in tile drainage. Many streams and rivers in this region lead to the Mississippi River, and nitrate in agricultural drainages contributes to the hypoxic zone (or Dead Zone) in the Gulf of Mexico. Woodchip bioreactors are a new option to reduce the concentration of nitrates in tile drainage before it reaches local surface waters.

Purposes and function of a bioreactor includes, but are not limited to:

- Use proven technology to reduce nitrate-nitrogen levels in exporting tiles.
- Route drainage water through a trench filled with woodchips.
- Suppress aquatic weeds.
- Constant flow of water to ensure viability of bacteria to remove nitrates.
- Require no modification of current practices.
- Do not decrease in drainage effectiveness.

Most installations to date measure approximately 100 to 120 feet long and 10 to 25 feet wide. Minimal land is taken out of production for a bioreactor as bioreactors tend to have an orientation that is long and narrow and fit well in edge of field buffer strips and grassed areas. Typically each bioreactor practice can treat up to a maximum of 80 acres of agricultural lands depending on its size and is used in many cases with a water control device through drainage water management. The lifespan of the practice is typically between 10 and 15 years or until the woodchips need to be replaced. A bioreactor's annual nitrate load reduction can range from 10% to 90% depending on the bioreactor, the drainage system, and the weather patterns for a given year. Based on research from several Midwest states, most bioreactors show performance of about 15% to 60% nitrate load removed per year.



Available cost share at 75%, 1 per producer at NRCS rates of \$44.19.  
unit is per cubic yard of wood chips in-place volume.)

(Payment

## Contact Info for the Soil & Water Conservation Districts in the Big Pine Creek Watershed

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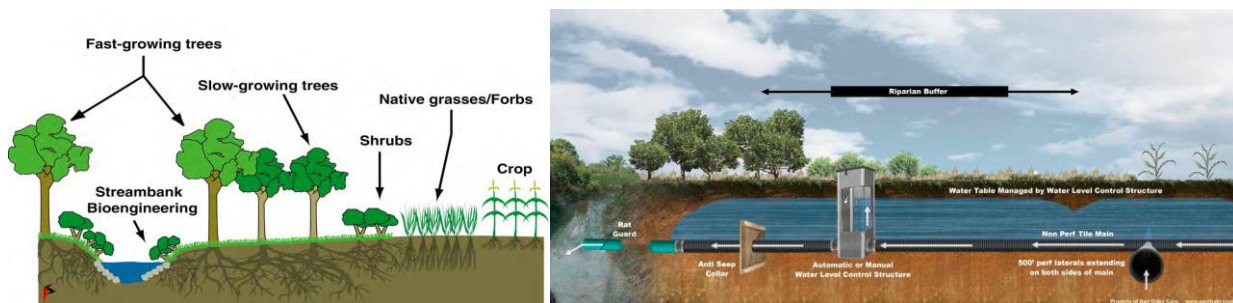
Warren County: Deb Lane 765-762-2443 x3 [debra.lane@in.nacdnet.net](mailto:debra.lane@in.nacdnet.net)

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A **saturated buffer** is a vegetated strip of land with a shallow water table. Saturated buffers are a cost effective tool for improving water quality. They are simple to design, install, and maintain with tremendous potential for broad implementation in the landscape for conservation. Saturated buffers should be minimum 30 feet wide and 300 feet long, and have well established vegetation (grass, trees, or shrubs). The most important site requirement is a vegetated area to retain water so that it doesn't impact productive agricultural lands. Additionally, the saturated buffer must intercept a tile main and the area should be graded into the land so that it promotes tile water flow into the vegetated area. It is also important to consider soil type, buffer dimensions, and overall landscape topography in the initial discussion on identifying proper sites for saturated buffer installation.

Purposes and function of a saturated buffer includes, but are not limited to:

- Removes all the nitrate that is diverted through the tile
- Does not take land out of production
- Low installation and maintenance cost - simply retrofit existing tile for management
- Potential to increase yields if coupled with a drainage water management (control structure)



### Available financial assistance:

The Big Pine Creek Watershed group is offering cost-share incentives to help producers adopt best management practices (BMPs) aimed at reducing the amount of nutrients, sediment and bacteria entering our surface waters. **Bioreactors** and **saturated buffers** are two of the BMPs we want to encourage. The financial incentive for these will come in the form of reimbursement of up to 75% of the total cost of one bioreactor or saturated buffer per producer at current NRCS rates for the practice.

- Applications for cost share assistance are available from the Soil & Water Conservation District offices in Benton, Warren and White counties. Closing dates for ranking periods are still to be determined. Please check the watershed group's webpage which can be accessed via the Benton County SWCD website [bentoncountyswcd.org](http://bentoncountyswcd.org).
- Applications will be ranked based on merit. Pairing the practice you select with other conservation practices such as no-till/strip till and/or filter strips will increase the ranking score of the application.
- Successful applicants will sign a contract spelling out the terms of the cost-share agreement.
- Assuming the designed and constructed practice meets NRCS standards and the field passes visual inspection by the appropriate individuals representing the Big Pine Creek, the applicant will be mailed a reimbursement check.