

## **Establishment and Monitoring of Saturated Buffers in High-Priority Watersheds**

**Issue:** Riparian buffers are a proven conservation technology for reducing the movement of nutrients from surface and shallow subsurface flows into receiving waters. However, in artificially drained land in the Midwest, much of the nitrate-laden water leaching from row crop fields is routed through the buffers in drainage pipe and discharged directly into surface waters. A future research need identified in the Iowa Nutrient Reduction Strategy science assessment was finding ways to direct tile drainage water through riparian buffers.

**Objective:** One promising approach is to intercept the field tile outlet where it crosses a riparian buffer and divert a fraction of the flow as shallow groundwater within the buffer — termed a saturated buffer. The infiltrated water potentially would raise the water table within the buffer into organic-rich soil layers and provide an opportunity for the nitrate contained in the field tile drainage water to be removed by denitrification before entering the adjacent stream.

**Approach:** This project will establish saturated buffers within a subset of the high-priority HUC-12 watersheds targeted for practice implementation by the Iowa Water Resources Coordinating Council. Newly developed software will be used to screen for suitable sites within the watersheds. This information will be shared with local natural resource professionals, who will help identify suitable sites based on contacts with potential cooperating farmers.

Project personnel will install the saturated buffers by intercepting a field tile outlet before it enters the buffer. A control box will be connected to the field outlet and to a 4-inch perforated pipe installed 2-feet below the ground surface along the top of the buffer. The control box will divert water from the tile outlet into the buffer. Pressure transducers in the box will allow for continuous monitoring of the flow diverted into the buffer and any flow that still may enter the stream. A series of shallow, fully penetrating wells installed in the buffer will be used to monitor nitrate concentrations as the drainage water leaves the field in the tile outlet, enters the buffer and percolates through the buffer to the stream.

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