Cleaning Iowa’s Waters with Saturated Buffers in Iowa Watersheds

Working with private land-owners in Iowa Water Quality Initiative watersheds, saturated buffers are being established and monitored as a nitrate management practice within tile-drained watersheds.

Tile-drained lands
Underground pipes divert water from cropland, reducing stress on plants. A box diverts water flow into the buffer, increasing the shallow groundwater level and nutrient removal. This is a saturated buffer.

CONVENTIONAL OUTLET
UNDERGROUND PIPE DIVERTS WATER FROM CROPLAND, REDUCING STRESS ON PLANTS.

OUTLET with SATURATED BUFFER
A BOX DIVERTS WATER FLOW INTO THE BUFFER, INCREASING THE SHALLOW GROUNDWATER LEVEL AND NUTRIENT REMOVAL. THIS IS A SATURATED BUFFER.

BENEFITS OF A SATURATED BUFFER
- Existing buffer removes sediment, phosphorus and pesticides and provides wildlife habitat
- Nitrate is removed through denitrification and plant uptake
- Flooding
  - 5% streamflow reduction
  - Reduces peak flow in streams

Saturated buffers
Allow natural removal of nitrogen from subsurface drainage.

Source: Frankenburger et al., unpublished
INITIAL RESEARCH

Initial research is being conducted within two saturated buffers on privately owned fields located in Hamilton and Story counties, north-central Iowa. Sites were established in 2010 and 2013. Additional monitoring is needed to demonstrate performance at other sites across the state.

DRAINAGE TILE FLOW

First 4 years

35% to 59% tile flow diverted into buffers

Study: Bear Creek Watershed

NITRATE REMOVAL WITHIN SATURATED BUFFERS

Most nitrate entering the buffer removed by plant uptake, microbial immobilization, and denitrification

IOWA WATER QUALITY INITIATIVE SITES

Additional saturated buffers are being established within Iowa Water Quality Initiative watersheds. Data is being used to develop criteria for installing saturated buffers as a conservation practice.

For more information go to

www.extension.iastate.edu/waterquality


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