

# Family works to improve water quality



Orlan Love/The Gazette

Blake Hollis, co-owner of Lanehaven Farms in Black Hawk County, uses a skid loader to distribute wood chips in a denitrification bioreactor on farm south of Waterloo. The wood chips serve as a medium for bacteria that will convert nitrates entering the bioreactor from drainage tile into nitrogen gas, which will escape harmlessly into the atmosphere.

## Bioreactors help reduce fertilizer runoff

By Orlan Love, The Gazette

**WATERLOO** — A new woodchip bioreactor will reduce nitrates in tile water draining off an 80-acre Lanehaven Farms field about four miles south of here.

The bioreactor — one of several components of the state's Nutrient Reduction Strategy — has the potential to substantially reduce the volume of nitrogen fertilizer polluting Iowa's surface water.

"It is one of many solutions we will implement to improve water quality," said Blake Hollis, a partner with his dad, Curtis Hollis, and other family members in Lanehaven Farms.

The Hollises consider themselves early adopters of technological advances that foster productivity and sustainability. They employ many of the practices recommended in the state's Nutrient Reduction Strategy, including conservation tillage, cover crops and spoon-feeding fertilizer to reduce costs and limit non-point pollution.



**Blake Hollis**  
Co-owner  
Lanehaven  
Farms

"I like that (the bioreactor) is an edge-of-field practice that won't take land out of production and that we can measure the results," Blake Hollis said.

Its effectiveness can be determined

► **BIOREACTORS, PAGE 10A**

# Bioreactors/Benefits carry to those downstream

## ► FROM PAGE 1A

simply by monitoring the nitrate content of water entering and leaving the bioreactor — a trench filled with wood chips, which host bacteria that convert nitrates into harmless nitrogen gas.

“On average, we’ve reduced nitrates from 50 percent to 70 percent in water actually going through the bioreactor,” said Chad Ingels, a watershed specialist with Iowa State University Extension who helped the Hollises install theirs in mid-November.

“We have gotten a 40 percent reduction



**Chad Ingels**  
Watershed  
specialist  
Iowa State  
University  
Extension

in normal years,” said Keegan Kult, who has been involved in installing about 20 bioreactors in his role as environmental projects manager for the Iowa Soybean Association.

Effectiveness decreases in abnormal weather, such as last year’s drought, when tile lines quit running and this year’s record spring rainfalls, during which untreated water had to be diverted around bioreactors, he said.

“This year, with a lot of tile flow, nitrate reductions were in the 15 percent range,” said Bruce Atherton, an agricultural engineer with the Natural Resources Conservation Service in Ankeny.

Kult and Atherton said the bioreactor’s benefits carry to those living downstream — as far downstream as the

Gulf of Mexico, where nutrients running off farm fields have created an anorexic dead zone incapable of supporting aquatic life.

Unlike cover crops, which improve the health of soil and protect it from erosion, bioreactors do nothing to improve farmers’ bottom lines, they said.

“They have great societal benefits, and there certainly should be more cost-share funding available to support their implementation,” said Bill Northey, secretary of the Iowa Department of Agriculture and Land Stewardship.

The state’s Water Quality Initiative, developed to support the Nutrient Reduction Strategy, included no bioreactor funding this year, but that likely will change next year, Northey said.

## IN THEIR INFANCY

To build the Hollises’ bioreactor, an excavator dug a trench 100 feet long, 30 feet wide and 4 feet deep at the lowest edge of an 80-acre field that had just been pattern tiled. The trench was lined with plastic, filled with four semi loads of wood chips and covered with soil.

The wood chips serve as a medium for bacteria that convert nitrates in the tile drainage water to nitrogen gas, which escapes harmlessly into the atmosphere.

Ingels said the structure will cost between \$10,000 and \$15,000 and will have a life expectancy of 10 years to 15 years.

Half the cost of the demonstration bioreactor will be borne by the Heartland Water Quality Project,

a collaboration by Iowa, Nebraska, Missouri and Kansas.

Though bioreactors are in their infancy — the number of operating bioreactors in Iowa is estimated to be no more than 30 — they can be especially beneficial in fields fertilized with high volumes of manure, Ingels said.

“We have one site in Dubuque County that has been reducing nitrates by more than 90 percent under normal flows,” he said.

Bioreactors are one option among several practices recommended for reducing non-point pollution under the state’s Nutrient Reduction Strategy.

“It will take a lot of farmers adjusting their management to make it work,” he said.