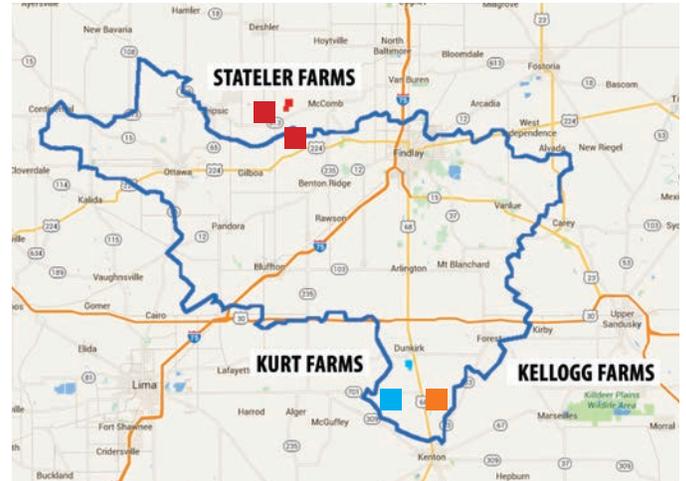


# ON-FARM PRACTICES TO EFFECTIVELY AND EFFICIENTLY IMPROVE NUTRIENT AND WATER CONSERVATION

The Blanchard River Demonstration Farms is a five-year, \$1 million project between United States Department of Agriculture Natural Resources Conservation Service and the Ohio Farm Bureau Federation to demonstrate on-farm conservation practices to help improve water and nutrient conservation. The Demonstration Farms aim to help producers find the right combination of practices that reduces nutrient and sediment loss while minimally impacting their financial bottom line.



■ Stater Farms    ■ Kellogg Farms  
■ Kurt Farms     Blanchard River Watershed

## STATELER FARMS

**Stateler Family Farms** is located in McComb, Ohio and owned and operated by Duane and Anthony Stateler. The Stateres farm corn, soybeans and wheat on approximately 600 acres in Hancock County and also operate a 7,200 head wean-to-finish swine operation. The Stateres have committed 243 acres to the Demonstration Farms project.

### Practices:

- Variable Rate Manure Application
- Cover Crops
- Drainage Water Management
- Animal Mortality Composting Facility
- Edge of Field Monitoring
- Wetland with Pollinator Habitat



## KURT FARMS

**Chris Kurt** owns and operates Kurt Farms, a 470 acre corn and soybean operation in Dunkirk, Ohio in Hardin County. Chris has committed 168 acres to the Demonstration Farms. Previously, Chris worked with The Nature Conservancy and Hardin Soil and Water Conservation District to construct a two-stage ditch on the Demonstration Farm project.

### Practices

- Two-stage ditch
- Phosphorus removal beds
- Filter strips
- Blind inlets
- Drainage water management
- Cover crops
- Edge of field monitoring



## KELLOGG FARMS

**Bill and Shane Kellogg** own and operate Kellogg Farms in Forest, Ohio in Hardin County. The farms consists of 5,000 acres of corn and soybeans. The Kelloggs have committed 305 acres to the Demonstration Farms project.

### Practices:

- Subsurface nutrient placement
- Cover crops
- Reduced tillage
- Abandoned water well removal
- Grassed waterway
- Pollinator habitat



Researchers are narrowing their focus on **four practices** that will help address nutrient and sediment loss. These include adhering to Tri-State Fertility Guide

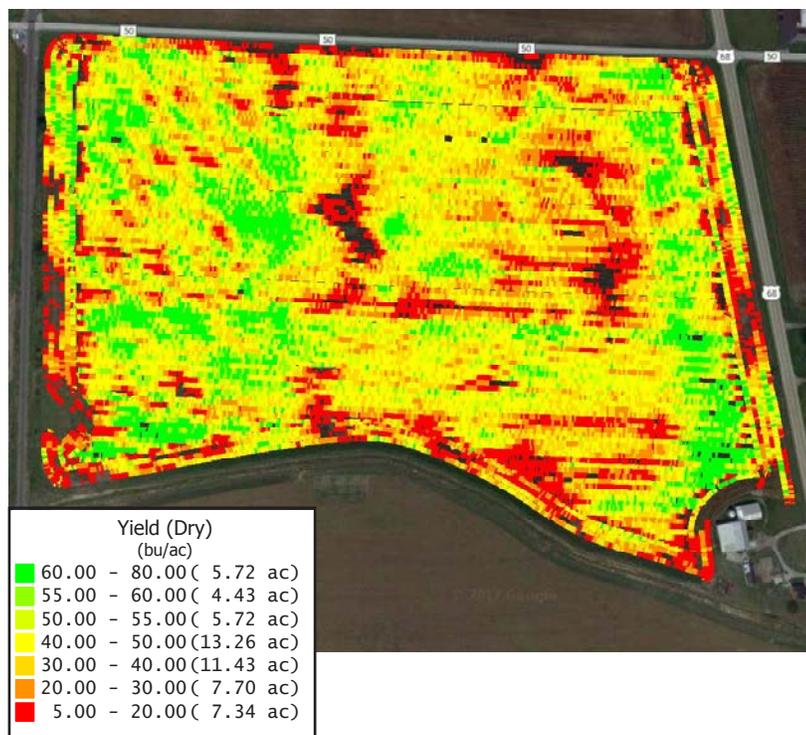
recommendations, improving soil health, subsurface placement of nutrients and disconnecting hydrologic pathways.

## ADHERING TO TRI-STATE FERTILIZER RECOMMENDATIONS

**1** Soil testing and mapping are investments that help avoid costly over-application of fertilizer and help prevent nutrient runoff<sup>1</sup>. Also, maintaining soil test phosphorus levels within the recommended ranges of the Tri-State Fertility Guide reduces the likelihood of nutrient loss. There are different degrees of management a farmer can implement to achieve this goal. A higher management level, based on more intense soil testing combined with multiple years of yield mapping, can lead to more cost savings by better placement of nutrients.

### Blanchard Demonstration Farms Network On-Farm Practices Explored

- Nutrient management plans
- Zone or grid soil sampling
- Yield mapping



## IMPROVING SOIL HEALTH

**2** Soil health, or soil quality, is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans. A healthy soil performs many vital tasks including regulating water and filtering out nutrients and pollutants. Improving soil structure through no-till and cover crop usage allows water to better infiltrate the soil profile. For every acre of cropland, an increase of 1% organic matter will allow an additional 27,000 gallons of water to be absorbed.

### Blanchard Demonstration Farms Network On-Farm Practices Explored

- No-till
- Cover crops

<sup>1</sup> OSU Extension, 2016

<sup>2</sup> King et al., 2015b

<sup>3</sup> Baker, et. al, 2017

<sup>4</sup> King et al., 2015b, Smith et al., 2016, Williams et al., 2016

<sup>5</sup> Dayton, 2016

<sup>6</sup> King et al., 2015a and Christianson et al., 2016

<sup>7</sup> Williams et al. 2015



## SUBSURFACE PLACEMENT OF NUTRIENTS

**3** Researchers have found that, in some circumstances, no-till and mulch-till practices may actually enhance the risk of nutrient loss when phosphorus is applied on the surface with no incorporation technique<sup>2</sup>. Stratified soil tests show phosphorus levels in the uppermost inch of soil can exceed levels in the total eight-inch soil core by 55%<sup>3</sup>. As a result, excess phosphorus not only runs off the surface more readily, but it may also bypass the

bulk soil and enter the tile system through preferential flow paths<sup>4</sup>. Research shows an average phosphorus runoff concentration reduction up to 92% when phosphorus is incorporated<sup>4</sup>.

### Blanchard Demonstration Farms Network On-Farm Practices Explored

- Subsurface nutrient placement
- Limited tillage techniques
- Fertilizer placement timing



## DISCONNECTING HYDROLOGIC PATHWAYS

**4** The highest concentrations of phosphorus runoff occur through surface runoff. The pathway that water travels across and through a farm field (surface runoff versus drain tile) influences the form and amount of phosphorus it carries. Current research demonstrates that over **70% of the phosphorus** in surface runoff and **53% of the tile discharge** is attached to the soil particles<sup>5</sup>. Results from an eight year watershed scale study in central Ohio demonstrated that phosphorus transported via drain tile discharge represented less than **2% of the phosphorus** that farmers typically apply on fields<sup>6</sup>. However, more than **90% of these samples** contained phosphorus at levels that exceed the 0.03 mg/l recommended limit for curtailing algal blooms. Studies have shown drainage water management structures can decrease annual tile discharge amounts between **8% to 34%**, annual nitrate-nitrogen loads by **-8% to 44%** and annual dissolved P loads by **40% to 68%**<sup>7</sup>.

### Blanchard Demonstration Farms Network On-Farm Practices Explored

- Nutrient removal beds
- Two-stage ditch
- Drainage water management structures
- Filter strips
- Wetland with pollinator habitat



## DATA COLLECTION

Edge-of-field water quality monitoring enables agricultural producers and scientists to quantify the impacts of conservation work on water quality. Through edge-of-field monitoring, producers and conservation partners, such as universities, agencies and non-governmental organizations, measure the amount of nutrients and sediment in water runoff from a field and compare the improvements under different conservation systems.

### Taking a Comprehensive Approach

Many other factors can impact water quality. Numerous projects at the Demonstration Farms seek to show the importance of taking a comprehensive approach to water quality.

### Blanchard Demonstration Farms Network On-Farm

#### Practices Explored

- Home septic system replacement
- Abandoned oil well removal
- Abandoned water well removal
- Animal mortality composting



## SUPPORTING PARTNERS:

- Ag Credit
- Farm Credit Mid-America
- Hardin and Hancock County Farm Bureaus
- Hardin and Hancock Soil and Water Conservation Districts
- Blanchard River Watershed Partnership
- Legacy Farmers Cooperative
- Ohio AgriBusiness Association
- Ohio Corn and Wheat Growers
- Ohio Dairy Producers Association
- Ohio Department of Natural Resources
- Ohio Federation of Soil and Water Conservation Districts
- Ohio Pork Council
- Ohio Soybean Council
- The Ohio State University
- USDA Agricultural Research Service
- USDA Natural Resources Conservation Service
- U.S. Geological Survey
- Ohio State University Extension
- Ohio Environmental Protection Agency
- Ohio Department of Agriculture
- Sunrise Cooperative
- The Nature Conservancy in Ohio

### For more information

Aaron Heilers, Project Manager  
937-726-7506  
blancharddemofarms@gmail.com  
www.ofbf.org