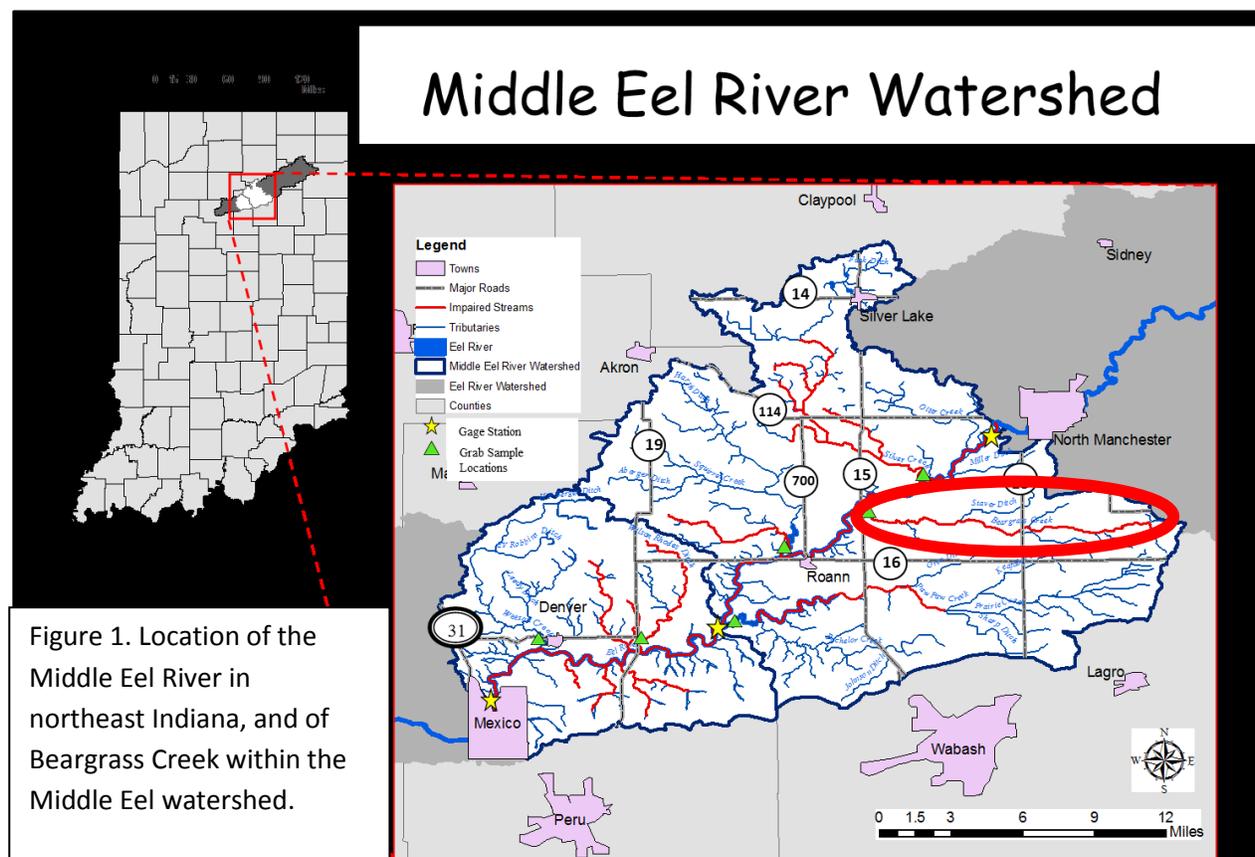


## CASE STUDY 9: BEARGRASS CREEK, INDIANA (OHIO RIVER BASIN)

### Location and Brief History of the Case Study

Beargrass Creek is in the Middle Eel River watershed in Wabash County, Indiana (Figure 1). The Middle Eel River Watershed Initiative, a community-wide effort to improve water resources led by Manchester College, began in 2009. In 2010 the Initiative received a Mississippi River Basin Healthy Watersheds Initiative (MRBI) grant from NRCS. Project partners have focused efforts on a set of paired watersheds in the eastern portion of the watershed, with Beargrass Creek serving as an experimental (practice implementation) watershed and PawPaw Creek as the control watershed. In 2014, project partners agreed to work with Environmental Defense Fund as part of a Conservation Innovation Grant from NRCS to demonstrate *the watershed approach*, a systemic and strategic approach to reducing nutrient losses from agricultural landscapes.



### Team Leaders and Key Team Members

The case study will be co-led by Dr. Eileen McLellan of Environmental Defense Fund and Dr. Joe Magner of Watershed Recovery, LLC. Key team members include: Dr. Jerry Sweeten, Manchester College; Terri Michaelis, Watershed Coordinator; Susi Stephan, Wabash County Soil and Water Conservation District; Joe Updike, NRCS; Linda Prokopy, Purdue University; Mark Tomer, USDA-ARS; Sarah Porter, USDA-ARS; Doug Smith, USDA-ARS.

## Focus

Extensive monitoring by Manchester College has shown that nitrogen and phosphorus loads in the Creek are high, and the U.S. Geological Survey's SPARROW model indicates that Beargrass delivers over 275,000 pounds of agriculturally-derived nitrogen per year to the Gulf of Mexico. The Conservation Innovation Grant seeks to demonstrate the value of *the watershed approach* to reducing nitrogen and phosphorus export from Beargrass Creek by 45%. *The watershed approach* is a community-led, expert-supported, science-based approach to selecting, siting and implementing agricultural conservation practices in a watershed-scale context. Our case study will describe the importance roles that both physical science and social science play in developing and implementing an ambitious watershed plan to achieve these target reductions.

## Typical Farming Practices

Beargrass Creek is a typical Ohio River Basin watershed of just under 23,000 acres in size, dominated by rowcrop production and with a significant number of small animal feeding operations (swine) (Figure 2). It is very flat, and so extensively tile-drained, with a number of agricultural drainage ditches in the headwaters (Figure 3). Significant efforts have been made to promote nutrient management, conservation tillage and cover crops are used.

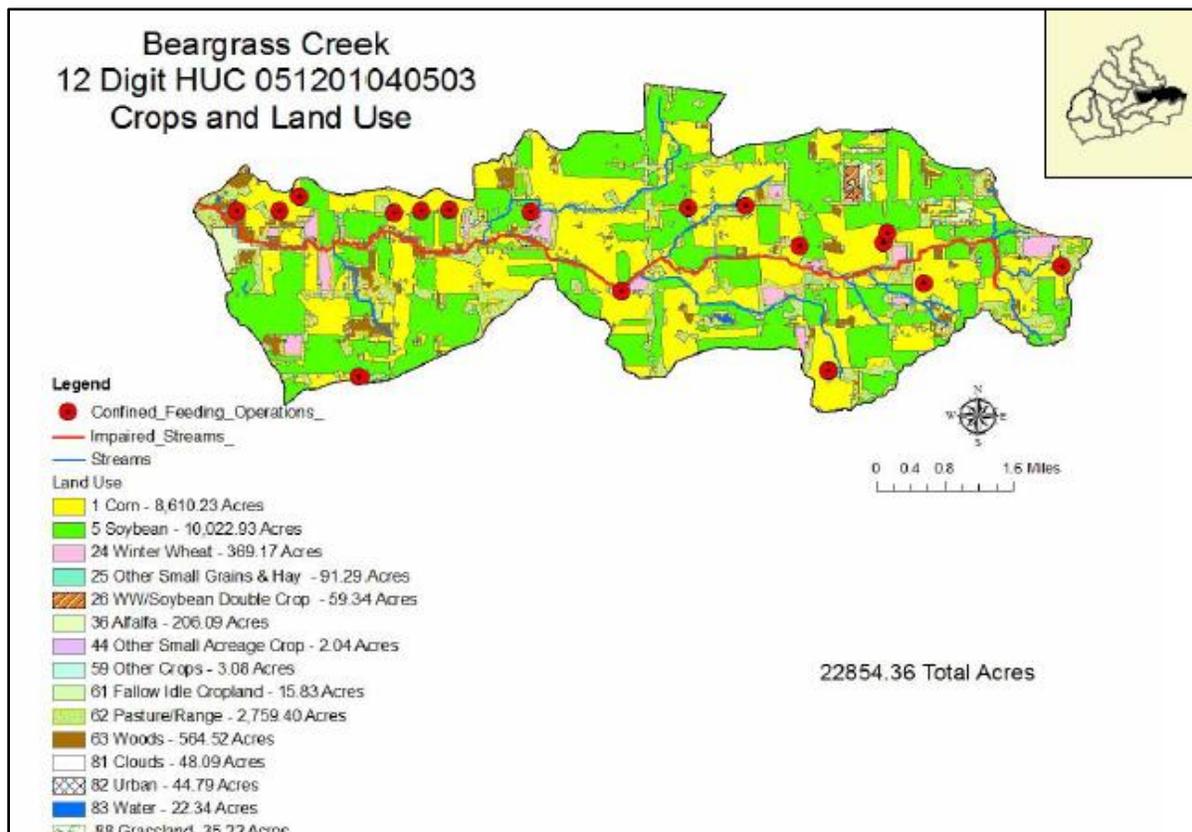


Figure 2. Land use in Beargrass Creek

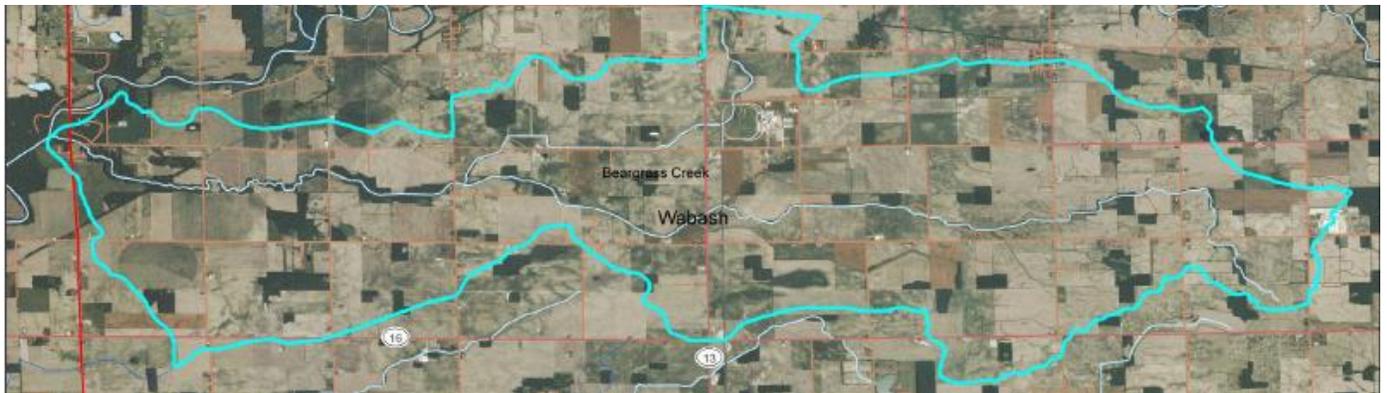


Figure 3. An aerial view of Beargrass Creek.

### **Agricultural BMPs**

The essence of the watershed approach is combining a suite of in-field, edge-of-field, edge-of-stream and instream practices in a treatment train from the ridgetops to the mainstem. The specific BMPs to be implemented in each of these categories will be determined by local stakeholders with advice from a team of physical science experts. Based on preliminary field visits and conversations, practices under consideration include nutrient management, conservation tillage, cover crops, controlled drainage, bioreactors, saturated buffers, two-stage ditches and floodplain reconnection. A series of watershed meetings to select preferred practices and practice locations is planned for late 2014 and early 2015.

### **Watershed Scale Approaches**

Beargrass Creek is intended to serve as a demonstration watershed for *the watershed approach*, an innovative approach to meeting water quality goals at the 12-digit HUC scale by combining biophysical analysis of watershed characteristics with social science insights into opportunities and challenges for agricultural conservation. Over the three-year period of the CIG project, from 2014 to 2016, we will: develop a greater understanding of the physical and socio-economic setting of the watershed; identify nutrient sources and flowpaths; suggest priority practices and map potential practice locations; work with local stakeholders and organizational partners to develop and implement a systemic and strategic watershed plan capable of achieving a 45% reduction in nitrogen and phosphorus at the outlet of Beargrass Creek; put in place monitoring to evaluate both the performance of individual innovative practices and watershed-scale outcomes; track any changes in stakeholder attitudes to conservation practices and the project; and model anticipated outcomes for comparison with monitoring data.

### **Federal and State Grants**

Past work in Beargrass Creek and the Middle Eel has been supported through an MRBI grant from NRCS; a 319 water quality improvement grant from the U.S. Environmental Protection Agency; a grant from the U.S. Fish and Wildlife Service; several grants from Indiana NRCS and funding from Indiana Department of Environmental Management.

### **Outreach and Education**

The Middle Eel River Watershed Initiative has been very active in engaging residents through a variety of activities: chemical and biological monitoring, annual canoe trips, annual stream clean-ups; and publication of a biannual newsletter. As part of our case study we will be working with local conservation staff to educate local farmers about the project and innovative conservation practices.

### **Socio-economic Factors**

Social science analysis is an integral part of *the watershed approach*. We have begun a first round of interviews with local conservation staff and key local farmers to understand their views on past conservation efforts, current conservation needs, and perceptions of innovative conservation practices. This will enable us to identify potential obstacles both to overall project success and to the adoption of specific conservation practices, and to develop ways to overcome these obstacles, as well as provide guidance on an effective outreach strategy. In addition, we will conduct pre- and post-project surveys of social indicators to detect any changes in attitudes towards water quality problems, conservation efforts and specific conservation practices.