

## NUTRIENT RETENTION AND ECOSYSTEM SERVICES OF MANAGED AGRICULTURAL LANDSCAPES OF THE UPPER MIDWEST, USA

### Background

The state of Iowa has set an ambitious goal to reduce nitrogen and phosphorus loading by 45% and maintain agricultural production while providing critical ecosystem services across these landscapes. Nutrient loads from agricultural lands in the upper Midwest continue to contribute to Gulf Coast hypoxia due to insufficient retention of nutrients associated with agricultural fertilizer and soils. Though multiple mitigation strategies exist, they have not had sufficient implementation to reduce nutrient loadings from agriculture, particularly in areas with extensive tile drainage.

As our understanding of the close relationship between agricultural practices and benefits from restored systems improve, interest in the potential ecosystem services derived from landscape depressions, farmed wetlands, and wetlands restored through USDA's Farmable Wetlands Program have developed. A variety of landscape management practices exist (e.g. no till, winter cover crops, and conservation buffer nutrient retention technologies), that have the potential to enhance ecosystem services at the watershed scale. To move forward, a new effort has started in collaboration with the state of Iowa, EPA Region 7, and EPA's Office of Research and Development (ORD) to examine beneficial management strategies for agriculture and wetland restoration.

The aim of this effort is to identify ecosystem goods and services that are important to Iowa's landowners and develop experimental approaches that would measure ecosystem service benefits and tradeoffs. Furthermore, ORD and Region 7 are developing these partnerships to work collaboratively and design



*Des Moines, IA, stakeholders discussing wetlands*  
Source: EPA

experiments meaningful to Iowa's stakeholders. The product of these initial steps will be a joint workshop to be held in 2019 and a commitment to share the insight from the workshop.

### State Partners in Cooperative Federalism

Iowa Department of Agriculture and the Iowa Farm Bureau along with stakeholders from Agribusiness Association of Iowa, Iowa State University, Iowa Department of Agriculture and Land Stewardship, and Iowa Department of Natural Resources met with ORD, EPA's Office of Water, and Region 7 for a field visit. The collaborative team visited several locations around Des Moines, IA where restoration had potential or had been completed. Afterward, the team discussed the opportunities and next steps for potential research. A workshop planning group volunteered to work toward scoping and problem formulation by identifying critical ecosystem services, their relevant scale, and the people that benefit.



*Des Moines, IA, Conservation Reserve Enhancement Program (CREP) wetland. Source: EPA*

## Next Steps

ORD and Region 7 will continue to engage with stakeholders. Future work includes; (1) continuing to work with stakeholders to establish ecosystem service and information needs; (2) exploring the application of existing ecosystem service tools for agricultural landscapes; (3) reviewing existing literature on wetlands, farmed wetlands, and CREP wetlands; and (4) developing an experimental design for potential demonstration sites that evaluate ecosystem goods and services from wetlands, farmed wetlands, and other conservation buffer nutrient retention technologies.

## Contact

Ken Forshay,  
Project Lead  
580-436-8912

[Forshay.Ken@epa.gov](mailto:Forshay.Ken@epa.gov)

Tammy Newcomer-Johnson,  
Research Ecologist  
513-569-7150  
[Newcomer-Johnson.Tammy@epa.gov](mailto:Newcomer-Johnson.Tammy@epa.gov)

Shawn Shifflett,  
ORISE Post doctoral  
Fellow

513-569-7444

[Shifflett.Shawn@epa.gov](mailto:Shifflett.Shawn@epa.gov)

Steve Schaff,  
Region 7 Technical  
Liaison

913-551-7447

[Schaff.Steve@epa.gov](mailto:Schaff.Steve@epa.gov)



*Des Moines, IA, Conservation Reserve Program (CREP) wetland. Source: EPA*