

Noncompetitive Assistance Agreements to Hypoxia Task Force (HTF) States under Clean Water Act (CWA) 104(b)(3):

Work Plan on Development of an Indiana Science Assessment to Support the Indiana State Nutrient Reduction Strategy

1. Project Description and Project Design

Indiana's State Nutrient Reduction Strategy¹ was developed to capture statewide, present and future endeavors in Indiana that positively impact the State's waters, as well as gauge the progress of conservation, water quality improvement and soil health practice adoption in Indiana. The Strategy has provided a foundation for nutrient reduction efforts across Indiana Conservation Partnership agencies and others, and has enhanced collaboration in conservation implementation. This collaboration is demonstrated by Indiana's leadership in sharing conservation practice information among agencies within the Indiana Conservation Partnership² (ICP), which has allowed results of the Strategy and efforts across agencies to showcase the impacts of conservation practices.

However, quantifying the nutrient load reductions and water quality improvement from individual conservation practices is scientifically challenging, and the current Indiana method for determining nitrogen and phosphorus nutrient load reductions would benefit from using the most recent research and by including more parameters such as dissolved nutrients.

The state proposes to use EPA funds in the development of a **Science Assessment** that will support the State Nutrient Reduction Strategy. A Science Assessment Core Team, led by the Indiana State Department of Agriculture with representatives from the Indiana Department of Environmental Management, USDA-NRCS, The Nature Conservancy, Indiana Agriculture Nutrient Alliance³, and Purdue University, has developed an overall strategy to guide the Science Assessment. The Strategy includes two components. The first will be funded and conducted internally and is presented here for context but not as a funding request. An organizational chart is included in Appendix A.

Component 1: Determine historic and ongoing nutrient loads leaving the state, and also by watershed basins used in the State Nutrient Reduction Strategy. (*no funding requested.*)

Component 2: Improve method to quantify nitrogen and phosphorus nutrient reductions from conservation practices, including dissolved nutrients, and determine efficiency of practices in reducing loads. (*funding requested here.*)

This work plan requests funding only for Component 2.

¹ <https://www.in.gov/isda/2991.htm>

² The Indiana Conservation Partnership is comprised of eight agencies including the State Soil Conservation Board (SSCB), USDA Farm Service Agency (FSA), USDA Natural Resources Conservation Service (NRCS), Indiana Association of Soil and Water Conservation Districts (IASWCD), Indiana State Department of Agriculture's Division of Soil Conservation (ISDA-DSC), Indiana Department of Natural Resources (IDNR), Indiana Department of Environmental Management (IDEM), and the Purdue Cooperative Extension Service (CES).

³ Partners of the Indiana Agriculture Nutrient Alliance include Agribusiness Council of Indiana, Indiana Farm Bureau, Indiana Soybean Alliance, Indiana Corn Marketing Council, Indiana Dairy Producers, American Dairy Association of Indiana, Indiana Pork, Indiana Poultry Association, Indiana Beef Cattle Association, USDA-NRCS, Indiana Association of SWCDs, Indiana State Department of Agriculture, Purdue University College of Agriculture, and The Nature Conservancy of Indiana.

Roles and responsibilities: This work will be conducted by Purdue University, led by Project Director Jane Frankenberger with direction provided by the Science Assessment Core Team. Dr. Frankenberger will convene a group of scientists at Purdue and other Indiana universities with experience and insight on nutrient processes and the effects of conservation practices (referred to as the Science Committee), who will advise a research associate who will conduct the analyses as described below. They will hold regular meetings with a larger team of advisors including the Science Assessment Core Team.

Method overview

This project, representing Component 2 of the Indiana Science Assessment strategy, focuses on identifying or developing a standard tool and procedures for estimating nutrient load reductions from conservation practices, as well as determining the percent efficiency of conservation practices on reducing nitrogen and phosphorus loads. Monitoring conducted around the Midwest and in Indiana will be compiled, reviewed and be used to develop a standardized tool. This component will also include having a collective list and consistent definitions of conservation practices while considering their estimated nitrogen and phosphorus loss reductions, as well as the economic and agronomic feasibility of the practices.

- Phase 1 (FFY2019 funds): Funds will be used to agree on type and number of practices, gather and synthesize data, compare existing tools, develop the new tool for ten practices, and communicate the results. These are described in Intended Outputs 1 through 5.
- Phase 2 (FFY2020 funds): Funds will allow the tool to be completed for at least 25 practices that the team feels is critical, the development of a table showing percent efficiency of practices, and begin an ongoing process of review. These are described in Intended Outputs 6 through 10.

Specific steps

1. Determine and agree on a list of conservation practices to include in the Science Assessment, and on their definition to be used. The selection will be based on past implementation data, and on the practices that tend to give the highest in load reductions. Definitions will use the NRCS Practice Standards as a starting point while further describing practices such as nutrient management.
2. Describe and compare existing models and calculators, including those used in nutrient reduction strategies in other states such as Iowa and Illinois. Develop a white paper comparing options and their calculated nutrient loss reductions for key practices, to help identify strengths of existing tools and needs for Indiana.
3. Synthesize in-field and edge-of-field monitoring and research data on conservation practices to determine efficiencies of practices. These will be used in development of the “estimator” and also to ground truth the reductions calculated.
4. Compare analyses done on items 2 and 3 to determine the most appropriate method to estimate reductions of conservation practices in tons or lbs. and determine percent efficiencies of conservation practices.
5. Develop an “estimator” for determining reductions for each practice on the list determined in #1. This will be implemented in a spreadsheet or similar computer software so that it is scalable to apply in assessing thousands of practice implementations each year. The method must also use good science, giving values that are “as real as possible”. The output from the tool will be usable at many

scales including county, watershed, legislative district, significant waterbody, etc. – to share load reductions of conservation practices.

6. Develop a table of percent reduction (or range, or other format) for each practice using the estimator tool. This process will allow for prioritization of conservation practices on future conservation efforts.
7. Communicate to conservation agencies and organizations, researchers, scientists are other important stakeholders on the information that has been found and compiled to enhance collaboration, and transparency and accuracy of the Indiana Science Assessment.

Partnerships

Partnerships will be a key aspect of this entire project, from its creation by the multi-agency Core Team, to the regular meetings for carrying it out, to its use in the state plan. The value of this project will be useful to the Indiana Conservation Partnership as the new tool will better estimate nutrient load reductions and showcase the effectiveness of conservation practices on the land. The commitment to share conservation practice information among agencies will continue to benefit conservation in the State. This project will be valuable to partners of the Indiana Agriculture Nutrient Alliance to understand practices' nutrient reduction potential and help to understand where the gaps exist in nutrient reduction knowledge.

Other key partners that will be involved in the development of the Science Assessment will be the United States Geological Survey (USGS), and researchers from Indiana universities, including Purdue University-College of Agriculture, Indiana University, Notre Dame University, and IUPUI.

Appendix A includes an organization chart showing the components of the Indiana Science Assessment and the partners that will be involved in its development.

Through the development of the Indiana Science Assessment, public-private partnerships will benefit by working together to improve water quality from non-point source pollution.

2. Connectivity to EPA's Strategic Plan

Funding provided supports the EPA's FY 2018-2022 Strategic Plan. This award will support Goal 1- Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety, Objective 1.2 - Provide for Clean and Safe Water: Ensure waters are clean through improved water infrastructure and, in partnership with states and tribes, sustainably manage programs to support drinking water, aquatic ecosystems, and recreational, economic, and subsistence activities of the EPA Strategic Plan (available at <https://www.epa.gov/planandbudget/strategicplan.html>). Specifically, it supports the following goals under "Protect and Restore Water Quality" (Page 14)

- Work with partners to protect and restore wetlands and coastal and ocean water resources;
- Update analytical methods that enable precise analysis

The Non-Point Source Measures Workgroup of the Hypoxia Task Force (HTF) has been working on the creation of a plan that will enable the HTF states to collect and report conservation practice implementation data within their states. This work is taking place through the Conservation Tracking Framework project that was funded by the Walton Family Foundation through the HTF.

Indiana was one of the two pilot states under the Conservation Tracking Framework project because of the process of data collection that we have in Indiana. Through that project, Indiana was given a sub-award opportunity to be used to strengthen efforts in the state related to the State's Nutrient Reduction Strategy. This led to a workshop held in November of 2018 to discuss how to improve our tracking method for determining nitrogen and phosphorus nutrient load reductions where a decision was made to develop an Indiana Science Assessment.

The work of the Indiana Science Assessment to improve the method of determining nutrient load reductions could in-turn provide assistance/information to the other Hypoxia Task Force states who are working on how to gather conservation practice implementation data, and moving toward determining nutrient load reductions.

3. Intended Outputs and Outcomes

Outputs

The following outputs or deliverables are planned:

FFY2019 Funds

1. List of practices with definitions, with the top 10 to complete in the first year prioritized.
2. Synthesis of research and field monitoring data results for top 10 practices, relevant and applicable to Indiana cropland.
3. White paper comparing existing methods and tools specific to the work of the IN Science Assessment.
4. Comparison of results using different methods, and determination of final method to best meet criteria.
5. Most importantly, a tool developed using the method determined, populated and ready to use for 10 prioritized conservation practices

FFY2020 Funds

6. Synthesis of research and field monitoring data results for remaining practices
7. Tool populated for remaining practices
8. Table of percent reduction for all practices, to allow for prioritization of implementation by conservation agencies and landowners in the State.
9. Communication of the results, including a highly readable publication about the process.
10. Plan for regular review of the method and processes, agreed on by state partners.

Outcomes

The Science Assessment will lead to:

- Improved documentation showcasing statewide progress towards nutrient reduction goals
- Prioritization of the most effective conservation practices based on Indiana conditions, to improve program implementation
- More accurate assessment of Indiana's contributions to downstream water quality issues
- Alignment of communication by researchers, agencies, and others throughout Indiana about conservation practices effectiveness
- Enhanced transparency and accuracy for Indiana's water quality improvement quantifications
- A bolstered set of reportable goal-tracking parameters that includes dissolved nutrients
- A scientifically sound understanding of the nature of nutrient loading in Indiana waterways

4. Reporting

Interim Reports - Performance reports and financial reports will be submitted every 6 months, and are due July 1 and January 1 each year for the duration of the agreement. Interim reports should include direct and indirect environmental results from that interim reporting period (i.e., the previous 6 months). Interim reports will include any problems, issues or difficulties encountered that may affect the quality requirements of the project and what, if any, corrective actions were taken to mitigate those issues and/or challenges.

Final Report - The final report will be submitted within the 90 days after the performance period end, per EPA Grants Workplans and Progress Reports guidance. The final report will be submitted electronically and in hard copy and will include a 1-2 page project summary.

ISDA plans to update its Annual Reporting documents with a brief explanation of this project effort and any relevant milestones achieved under this proposal. Additionally, ISDA will update its Indiana State Nutrient Reduction Strategy webpage (<https://www.in.gov/isda/2991.htm>) with information related to this project effort and will post the Final Report on this webpage at the conclusion of this project.

5. Work Plan Time Frame

It is ISDA's understanding that the allowable timeframe for this grant is FY2019-FY2022.

Dark blue shading represents tasks planned to be completed with FY2019 funds. Items in green shading represent tasks planned to be completed with FY2020 funds.

Task	Year 1 (CY2020)	Year 2 (CY2021)	Year 3 (CY2022)
Hire staff, form working teams, develop QAPP	X		
Determine list and definitions of conservation practices	X	X	
Describe and compare existing models and calculators	X	X	
Synthesize research/field monitoring data	X	X	X
Determine the most appropriate method		X	X
Develop estimator in a spreadsheet or similar software		X	X
Develop table of percent reduction for prioritization			X
Communicate to enhance collaboration	X	X	X
Submit all reports (every 6 months, and the final report)	X	X	X

6. Data Quality and Management

Prior to the initiation of any data collection or data compilation, we will develop a Quality Assurance Project Plan (QAPP) in accordance with EPA OQ/R-5: EPA Requirements for Quality Assurance Project Plans. We will submit it to the EPA Project Officer at least 60 days in advance of data compilation, and we will not collect or compile any data until the QAPP is approved by the EPA Project Officer.

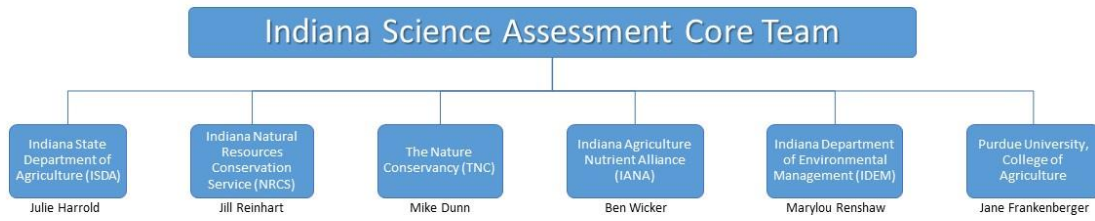
7. Budget Narrative

The funding from this grant will be used to hire a research associate who will work at Purdue University under the direction of Dr. Jane Frankenberger, and advised by a team of cooperating researchers and the Indiana Science Assessment Core Team.

FFY2019 funds will be used for the first year of salary and benefits, for the purchase of a computer and supplies for use by the research associate, and travel and meeting costs for the team to gather and oversee the project.

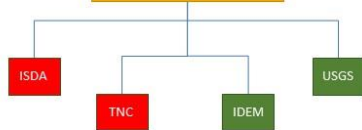
FFY2020 funds will be used to fund the continued salary for a second year for the research associate, for travel and meeting costs for the team to gather and oversee the project, and to communicate results of the project.

Appendix A: Organizational chart showing how the Indiana Science Assessment will be carried out.



Loading Piece

1) Determine historic and ongoing nutrient loads leaving the state, and also by basins in the state.



Tracking Method and Efficiencies

2) Improve method to quantify nutrient reductions from conservation practices, including dissolved nutrients, and determine efficiency of practices in reducing loads.

